November 2002

London Gateway

The (London Gateway Logistic and Commercial Centre) Transport and Works Act Order 2002

Non Technical Summary

P&O

1 CONTEXT FOR THE PROPOSED DEVELOPMENT

1.1 INTRODUCTION

EIA and the Non-Technical Summary

1.1.1 The Peninsular and Oriental Steam Navigation Company (POSN) - referred to as the Promoter - is proposing to redevelop part of the former oil refinery at Shell Haven, Stanford-le-Hope, Thurrock in Essex.

1.1.2 It is proposed to create and operate a new port to accommodate container traffic, freight, general cargo, aggregates and bulk liquids on that site and on land reclaimed from the River Thames Estuary.

1.1.3 An Environmental Impact Assessment (EIA) has been undertaken for the proposed London Gateway Port at Shell Haven. EIA is a procedure which allows the drawing together, in a systematic way, of a proposed development project's likely significant environmental effects. The EIA process and findings are reported in an Environmental Statement (ES), and this document is the Non-Technical Summary (NTS) of the ES in respect of the London Gateway Port proposals.

1.1.4 The ES and this NTS accompany the consent application for port development, the Harbour Empowerment Order (HEO). This application covers the proposed port development, amelioration works and its associated road and rail improvements.

1.1.5 The HEO ES was published in July 2002 and since then certain EIA refinement work has taken place, and an HEO ES Update has been published in November 2002 reporting this. In addition, the HEO ES has been republished in a reformatted version to further aid its reading and understanding. The content of the HEO ES has not changed in the reformatted version. This NTS summarises the July HEO ES and its November update.

1.1.6 The proposed port is a standing alone application.

1.1.7 Because Regulations require the in-combination environmental effects of applications to be considered with other likely developments, an overarching environmental statement ("OES") has been prepared which is the in-combination effects section of the HEO ES.

1.1.8 Consultations with statutory agencies have taken place during the EIA, and determination of the scope of the assessment has been assisted by a formal Scoping Opinion received from the Secretary of State for Transport, Local Government and the Regions, together with a Scoping Direction issued by the Secretary of State for Transport in June 2002.

Summary of the proposal

1.1.9 The location of the proposed port development is shown on Figures NTS1 and NTS2. The proposal is for redevelopment of part of the former Shell Haven oil refinery and reclamation of part of the foreshore of the River Thames Estuary, together with associated improved road and rail connections. Dredging of shallower parts of the navigation channel within the Estuary is proposed in order to allow the passage of very large container vessels. Two areas of Estuary frontage to the west and south of the site are also proposed for the creation of new areas of mudflat to ameliorate areas predicted to be lost or changed as a result of the port development.

1.1.10 The proposed port is being promoted by means of an HEO under the terms of the Harbours Act 1964. In addition to permitting the construction and operation of the port, the HEO would establish a new Harbour Authority for the London Gateway Port and would include compulsory purchase powers enabling the construction of the port and associated works. New rail works to serve the port are also proposed as part of the HEO applicction. The HEO includes powers to ameliorate effects of the proposed development.

1.1.11 Figure NTS 3 shows the HEO application boundary (and the other application site boundaries at Shell Haven). Figure NTS 4 shows the extent of the River Thames Estuary within which dredging is proposed. The land area encompassed by the HEO boundary is some 238ha (588 acres) in extent, including proposed new road and rail improvements. The port would be built on 80ha (198 acres) of this land, together with 92ha (227 acres) reclaimed from the River Thames Estuary, creating the operational port area (excluding its transport connections) of some 172ha (425 acres) in extent.

1.1.12 The HEO boundary also includes 5,443ha (13,450 acres) of the Thames Estuary and navigation channel, together with the areas of land which are proposed for amelioration purposes (Figure NTS 5). These areas include Site A and Site X, together with a third, the triangle of land to the north of The Manorway, referred to as the Northern Triangle, and together they have an area of some 388ha (959 acres). The total area encompassed by the HEO boundary is therefore 6,069ha (14,996 acres) in extent.

1.2 THE APPLICATION SITE

Site location

1.2.1 The site lies on the north bank of the River Thames Estuary in the Thurrock Council (unitary) administrative area. It lies about 1.5 km (0.9 mile) due east of the settlement of Stanford-le-Hope and a similar distance south east of Corringham. The BP Coryton oil refinery lies immediately to the east of the site.

1.2.2 The other settlements nearest to the site are: Basildon, some 6km (4 miles) to the north; Canvey Island, about 5km (3 miles) to the east; and Grays, 9km (6 miles) to the south west.

Site description

1.2.3 The northern and eastern port site boundaries are formed by the Thameshaven Branch Line which crosses the former refinery from east to west. The site is bounded to the west by the foreshore area of Mucking Flats, and the southern boundary extends into the Estuary. At present the frontage of the former refinery includes a concrete sea wall with a stretch of mudflat beyond at the western end of the frontage, and deeper water with jetties in the central and eastern part of the Estuary frontage.

1.2.4 The nearest landfall to the south of the site, across the Thames Estuary, comprises coastal pasture land in the Medway Council administrative area in north Kent, some 2km (1 mile) distant.

1.2.5 As part of the port proposals, an area of land 282ha (697 acres) on this Kent coast, at Halstow Marshes to the south east of the former refinery site, is proposed potentially as one of two sites where it is proposed to create replacement habitat. The second site, 37ha (91 acres) is proposed to the rear of Mucking Flats. These areas, referred to here and in the HEO ES Update as the Amelioration Lands, are proposed potentially to ameliorate the predicted loss of, or change in character of, existing mudflats as a result of the proposed port development. The land at Mucking Flats is known as Site A, and that on the Kent Coast as Site X; they are shown on Figure NTS3. Whilst both sites are considered in this assessment it may either be that a combination of all or parts of each site are required for amelioration, or only one single site, or part of that site would be adequate.

1.2.6 A third site, the Northern Triangle is also proposed ameliorate effects on nature conservation habitats as a result of the proposals. However, this site, to the north of The Manorway would be subject to enhanced nature conservation management, and no works requiring planning permission or other consents are anticipated. No significant effects are predicted as a result of this ecological management regime, and therefore the Northern Triangle is not reported on in detail in the updated HEO ES.

1.2.7 The proposed land areas of the site are: port development area, excluding reclaimed area – 80ha (198 acres), and a further 92ha (227 acres) would be reclaimed from the Thames Estuary, which would ultimately make the port development area 172ha (425 acres). The proposed road and rail corridor improvements and the Amelioration Lands are in addition to this.

Thames Estuary

1.2.8 The navigation approach to the London Gateway Port is some 54 nautical miles long (see Figure NTS 6). The deep-water navigation channel is from The Sunk in the southern North Sea via Black Deep, the Knock John Channel, Oaze Deep and the Yantlet Channel to the proposed port.

1.2.9 Some stretches of the main deep-water navigation channel are relatively shallow, and dredging is proposed of these 'high spots' to permit the safe passage of large container ships to the port.

Road, rail and footpath connections

1.2.10 The A1014 Manorway forms the northern frontage of the former refinery site and is dual carriageway from its junction in the west with the A13, through Corringham to provide access to the former refinery, BP Coryton oil refinery, the power station, and other facilities near the proposed port site. It has a roundabout (Sorrells roundabout) from which local housing areas on the east side of Stanford-le-Hope and south side of Corringham are accessed. Two pedestrian underpasses cross the road further to the west. From a point on the former refinery frontage to the road, east to the BP refinery, the Manorway narrows from dual carriageway to conventional two-lane highway.

1.2.11 The Thameshaven Branch Line railway passes east-west through the former refinery site, branching from the Tilbury to Southend Line about 2.5 km (1.6 miles) to the west of the site, due south of Stanford-le-Hope . Currently there are up to three freight trains a day in either direction along the line. There are no passenger services using the line.

1.2.12 The Thurrock Council Definitive Map of public rights of way shows three public rights of way either adjoining or in close proximity to the proposed port, to the west. The routes of one of these paths would be subject to amendments and alterations. The Medway Council Definitive Map shows footpaths and bridleways would also be affected where the road and rail connections are to be built, and during the proposed works at the Amelioration Land, Site A and Site X. These would need to be diverted permanently.

History of port and industrial usage on the site

1.2.13 The site has been associated with port uses for nearly 400 years. This use has continued to the present day with oil tanker movements.

1.2.14 The last 150 years or so has seen the importation of goods and distribution from the site: firstly cattle then petroleum products were imported. Since then, industrial activities have been carried out on the site, with the import and export of petroleum products being of prime importance. Shell and its predecessor companies operated site as an oil refinery since 1876 until it was closed in 1999.

1.2.15 Two aspects of the refinery remain in operation. These are the bitumen plant located toward the western end of the refinery site, and the aviation fuel tank farm, located at the eastern end of the site. The retention of these uses will involve the creation of a new jetty to serve them, as part of the London Gateway Port development. However, both of these are to the north of the railway line and are therefore outside the proposed port area.

1.2.16 Now that the main refinery activities have ceased and the site is decommissioned, it is considered by the Promoter to be appropriate for the development proposed.

1.3 SUMMARY OF THE PROPOSED DEVELOPMENT

The Conceptual Masterplan

1.3.1 A Conceptual Masterplan is reproduced at Figure NTS 7. It shows a possible form of development for the proposed port, which has been subject to EIA. This plan therefore acts as the upper limit for development within an assessed 'envelope'. What this means is that there may be aspects of the port proposals that vary from the Conceptual Masterplan, but these would not give rise to any adverse environmental effects over and above those predicted and assessed in the EIA.

Port proposals

1.3.2 It is proposed that the port would be constructed on part of the former refinery land to the south of the railway line, with additional land to be reclaimed from the River Thames using material dredged from the access channel. Figure NTS 8 shows the proposed layout of the port.

1.3.3 The port would provide a container quay of approximately 2,300m frontage, two roll-on, roll-off vessel (Ro-Ro) berths and a new jetty for existing Shell shipping traffic serving the retained refinery facilities at the site. The port would occupy an overall water frontage of some 3,000m. The quay itself would be about 30m wide, with a further 30m width apron separating the quay from the container stacking yard. The quay would form part of the flood defence for the Estuary, and would tie into the flood defences to the east and west.

1.3.4 The port would be primarily used for the import, export and distribution of containerised freight. It would comprise berths, container storage yard and associated facilities capable of handling 3.5 million Twenty-foot Equivalent Units (TEU) containers per year when fully developed (Twenty foot equivalent units are the smaller container unit, which occupy half the length of standard forty feet long articulated lorry). It would also accommodate a facility for Ro-Ro operations. In addition, there would be, in common with all modern competitive ports, berthing and handling facilities for aggregates, general cargo and bulk fluids.

1.3.5 Container ships would be unloaded/loaded using quayside rail-mounted or rubber-tyred gantry cranes at the front and rear of the quay. These cranes would be designed to reach across 24 containers within each ship, about 70m, and when in operation the top of the crane would be about 85m above the quay. The maximum height of such cranes, when not in use and upright, could be up to approximately 130m. It is envisaged that when the port was fully developed, about 27 quayside gantry cranes would be installed.

1.3.6 The container stacking yard would extend to about 85ha A main stacking area would be used for temporary storage of containers and there would be separate areas for storage of refrigerated containers, empty containers, damaged containers and containers carrying dangerous goods.

1.3.7 Each main container stack would measure 201m by 24m in plan. Loaded containers could be stacked up to 5 high and 6 wide. Empty containers could be stacked up to 8 high in blocks up to 13 deep. A standard container is 2.9m high and therefore stack heights could be up to 23.2m high. With this arrangement there would be approximately 19,854 ground slots for normal containers, 576 ground slots for reefers and 2,059 ground slots for empty containers.

1.3.8 Access roads between the stacks would be provided for transfer vehicles and gantry cranes. It is anticipated that the main containers would be handled by rubber-tyred gantry cranes which can lift a container over the 5 high stacks and span the full six-stack. Vehicles known as reach-stackers would be used to handle empty containers.

1.3.9 As an alternative, rail-mounted gantry cranes or other types of overhead gantry cranes may be used to allow stacking of the main containers up to 9 high and 14 wide. In this case stacks could be up to 26.1m high.

1.3.10 Shell intends to continue its existing import/export of bitumen and aviation fuel. These are currently handled at two jetties. The existing bitumen and aviation fuel import jetties would be relocated to make space for the construction of the Container Terminal. The new replacement Shell Jetty would be located on the eastern end of the site. New pipelines would be routed from the existing bitumen plant and the aviation fuel depot to the new jetty.

1.3.11 In summary, the port would consist of the following:

a) a container terminal comprising quay with quayside cranes and a container stacking area and a Ro-Ro facility
b) berthing facilities to accommodate use by container, Ro-Ro, aggregates, car transporter and bulk vessels plus general cargo capability
c) a Rail Terminal for transfer of containers
d) an upgraded railway through the site and a train reception and maintenance area
e) port buildings and support facilities
f) an access road and internal roadways and parking areas
g) entrance gates and administration facilities for the Terminal
h) a new oil jetty to replace the existing Shell jetties

Dredging proposals

1.3.12 It is envisaged that navigational access to the port would need to be provided for design ships with draughts up to 15.0m. As a consequence, dredging of the shallower areas of the approach to Shell Haven would be required.

1.3.13 The nominal dredged level of the approach channel would generally be to –14.5m below Chart Datum (CD), with some sections of the outer channel dredged to –16.5m CD. A channel width of 300m would be maintained throughout; although in a number of areas the bed levels are naturally deep enough over a sufficient area to provide a wider channel.

Amelioration Lands

1.3.14 It is proposed that new areas of ecological habitat would be created at Site A at Mucking Flats and at Site X on the Kent coast near Halstow Marshes. The works at Site A would cover an area of about 37ha, from which about 20-27ha of mudflats would be created, together with areas of saltmarsh. At Site X, the works would cover a total area of about 282ha, and about 60-70ha of mudflats would be created, again with additional areas of saltmarsh. As stated in paragraph 1.2.5, it may be that only parts of each site are required or that both sites are not required. The NTS, as with the ES, presumes that all of both sites are required but refinement work may show that this is unnecessary. Where the need for any part of either or both sites is not fully justified, the Promoters will withdraw its proposals to that extent.

1.3.15 The works would involve the stripping of soils within the areas identified on the landward side of the sea defences at the sites. This would be in order to create appropriate levels in relation to sea level and existing mudflats in the vicinity, and to create an appropriate base for construction of the new flood defence embankments.

1.3.16 New flood embankments would then be created at the rear of the sites, linked into the defences extending along the coast either side of the sites. The existing flood defence embankments would then be broken through to allow tidal flows to enter the sites, depositing sediment so that new mudflats could form. The breaches in the embankments would be in the order of 300m long at Site A and 700m long at Site X.

1.3.17 The existing footpaths that follow the flood embankments would be re-routed to follow the new banks. At Site A it is anticipated that the embankment arms either side of the breach could remain accessible for birdwatching and other recreational use.

Utilities

1.3.18 New services and utilities would replace or supplement existing networks at the sitewhere necessary and appropriate.

Transport proposals

1.3.19 A range of highway works may be required as part of the port development, and these are provided for in the HEO application submitted. The reason it is not possible to be definitive about what works will be undertaken is that some will be the subject of discussion and negotiation with the relevant authorities, notably the Highways Agency in relation to other works already programmed, or emerging, across the local and wider road network.

1.3.20 Highway works to the A13/A1014 junction may comprise:

a) widening the carriageway of the roundabout to three lanes;
b) widening the entry from the A13 eastbound off-slip to a three-lane approach to the roundabout;
c) widening the entry from the northern arm to two lanes;
d) widening the on-slip to the A13 eastbound to two lanes;

e) improvement, reconfiguration and widening works to the A13 generally;
f) widening the off-slip from the A13 westbound to two lanes; and
g) widening the approach and departure lanes from the A1014 to three lanes.

1.3.21 The existing Sorrells roundabout on The Manorway would be redesigned and moved south eastwards away from existing houses. A new dual carriageway road would be provided from Sorrells roundabout to the development (referred to as the 'link road').

1.3.22 Future freight traffic generated by the port would be expected to exceed the capacity of the existing, partially-signalled single track of the Thameshaven Branch Line. Hence, it is proposed to provide a second track and partially realign and twin-track the route and provide it with modern signalling. Rail works would include a realignment of the curve of the Thameshaven Branch Line and other improvements at the junction with the Tilbury to Southend freight line. The existing embankment to the west of the site would be widened to accommodate a second track.

1.3.23 New rail sidings would be constructed within the port and this network within the site would allow for receiving and holding trains, prior to breaking up their loads or sending them onto these units; and also for standing and marshalling conventional wagon trains before forwarding them on to the network as complete trains.

1.4 CONSTRUCTION OF THE PROPOSED DEVELOPMENT

Port construction

1.4.1 Construction of the port would involve reclamation of part of the Estuary frontage, earthworks and ground improvement, demolition of existing structures, piling, reinforced concrete construction, laying of rail track and installation of associated signalling equipment. Utilities and port equipment installation, road and pavement construction, structural steelwork, and building construction would be required.

1.4.2 Advance works would involve demolition of existing jetties apart from the two Shell jetties for bitumen and aviation fuel use, and realignment of the existing railway line directly behind the port development site. The first phase of construction would include dredging of the navigation channel and berthing areas and use of dredged material for reclamation for the port. The subsequent seven phases would involve the construction of the Ro-Ro facility and New Shell Jetty, followed by the development of the container berths and the container storage yard and associated facilities.

1.4.3 It is anticipated that dredging and reclamation works would be undertaken continuously over about five years. The design of the reclamation and construction works would be managed in such a way to allow continuation of Shell's bitumen and aviation fuel loading operations from two existing jetties, until the new jetty was completed. The port outer quay wall and infrastructure would be developed in phases according to the demands of the port industry. Construction would commence with advance works followed by phased construction works. Although this period of time would be driven by market conditions, it has been assumed for assessment purposes that phased development of the port would be undertaken over a period of approximately 12 years.

Phased port construction

Phase 1 Dredging and reclamation

1.4.4 Dredging to deepen the main deep-water navigation channel to the port and the reclamation of land for the port would represent the first phase of port construction works. Dredging would be carried out principally in the Yantlet Channel, the Knock John Channel and parts of the Black Deep to The Sunk. An area in front of the port would also be dredged for manoeuvring of berthing ships along with a berth pocket in front of the quay.

1.4.5 Dredged material would be pumped into bunded areas on the port site, which would be advanced into the Estuary to form the reclaimed area as the phased reclamation progressed. Dredged water would be returned to the Estuary through drains which would control the amount of sediment released back into the Estuary. During early reclamation, dredged material would also be stockpiled for use in the construction of the Container Terminal and for other beneficial uses.

1.4.6 There could be a small increased maintenance dredging requirement in the main channel. Some deposition of suspended sediment would be expected at the upstream end of the berth pockets. It is anticipated that this sedimentation would be removed by agitation methods, as well as by ships' propellers and thrusters during berthing and manoeuvring.

1.4.7 Approximately 31.8 million cubic m would be dredged from the navigation channel, manoeuvring area, anchorage area and berth pocket. A proportion of this dredged volume would be lost during the dredging process as a result of a range of reasons including the type of materials involved and the plant used. These losses are estimated to be between 3.98 and 8.44 million cubic m, and a figure of about 6.58 million cubic m has been assumed. The total volume of dredged material available for use within the port and landward parts of the proposed development is therefore estimated to be between 20.4 and 30.8 million cubic m, with an average figure of 26.2 million cubic m.

1.4.8 Approximately 13.5 million cubic m of suitable fill material would be required in the reclamation of the port. This quantity includes an estimated allowance of 0.55 million cubic m to cover settlement of the underlying clay layers at the site. An estimated additional 1 million cubic m of material would also be required to place across the site (surcharge) as part of ground treatment, but this quantity would be available as surplus at the end of the construction period since it would not be needed in the longer term. The total volume of material required for the reclamation, settlement and the surcharge is therefore 14.5 million cubic m.

1.4.9 Possible phasing of port construction works is outlined below. Although alternative phasing may be adopted, as the port would be developed in response to market demands, the phasing described below has been used for assessment purposes.

Phase 2: Ro-Ro facility construction

1.4.10 Construction of the ferry terminal would require both piled marine structures and landward surface paving works. Berthing and mooring facilities would include fixed freestanding supports known as dolphins, and guides allowing the Ro-Ro pontoon and linkspan bridge to rise and fall with the tide. These would be installed using marine piling equipment.

1.4.11 On completion of piling, rock wave protection would be constructed along the riverside bund, capped with a new concrete flood protection wall that would be connected into the flood defences to the east and west. A bridge would be constructed over the floodwall to connect the Ro-Ro pontoon and linkspan to the terminal area. Following completion the old floodwall to the rear would be demolished.

1.4.12 Construction of the Ro-Ro yard at the western end of the Terminal, and a Border Inspection Post, could not commence before decommissioning and removal of the existing aviation fuel pipeline crossing this area, and before any filling of the area. This part of the Ro-Ro terminal would therefore be expected to be completed about 18 months after opening of the Ro-Ro facility.

Phase 3: New Shell Jetty

1.4.13 The existing Shell Jetties A and B are currently used for the import of bitumen and aviation fuel and would be relocated. The Phase 3 works would comprise the construction and commissioning of a proposed New Shell Jetty and necessary pipework, and the decommissioning and demolition of Jetties A and B.

1.4.14 A new pipeline approximately 2,800m long would be installed at ground level from the new jetty to the bitumen plant for the transfer of imported bitumen. Another new pipeline approximately 825m long would be installed at ground level from the new jetty to the aviation fuel storage tanks for the transfer of imported aviation fuel.

Phase 4: Container Terminal

1.4.15 Works for the construction of the Container Terminal during Phase 4 would include preparation for the construction of the berths and associated container storage yard, access bridge over the railway line and port buildings, infrastructure and services.

1.4.16 Preparation would involve the establishment of access for materials deliveries and equipment (whether road, rail or marine) and movement about the site (haul roads), establishment of compounds for temporary storage of materials and construction operations and contractors' site offices, utilities, lighting and security and mobilisation/ procurement of plant and equipment for the respective works

1.4.17 During this phase, 720m of the quay structure, including bollards, fenders, and facilities for rail-mounted quayside cranes, would be constructed. The quay would comprise either an open-piled quay structure or a steel tubular/sheet pile bulkhead wall.

1.4.18 Surfacing and pavements would be installed on completion of ground improvement, drainage runs, water supply and fire-fighting mains and electrical power and communications installations.

1.4.19 Typically, the container yard would be paved with concrete paving blocks. Alternatively, the container stacking areas might consist of gravel beds with reinforced concrete beams for the container supports and for the rubber tyred gantry crane runways. Concrete slab or asphalt pavement construction could also be used.

1.4.20 Other areas and roads within the Container Terminal could have asphalt or concrete surfacing. The precise design of these aspects would be determined at the detailed design stage, and the alternatives available have been considered within the parameters assessed for the EIA.

1.4.21 Flood protection would be maintained throughout construction. Existing floodwalls would not be demolished until new flood protection was in place. This would be provided by the temporary riverside bund until the quay was built. During construction, intermediate bunds would link the riverside bund back to the existing flood protection wall to maintain the integrity of the flood defences at all times.

1.4.22 The port access road would be constructed during this phase of the development. This would involve dual carriageway construction between the incoming landward area road and the port entrance area, crossing the railway on an elevated skewed bridge structure. Bridge construction would require piled foundations and embankments on both sides of the railway.

1.4.23 Other works for the completion of the Terminal would comprise construction of the entrance area, infrastructure (including roadways, signage, road markings and security fencing), refrigerated container areas including access gantries, services (including power and lighting, water, fire-fighting and gas supply and telecommunications), and port buildings (including entrance gate and administration complex, workshop, fuelling station, substations and the Border Inspection Post).

1.4.24 Quayside container cranes and container handling equipment would be procured and installed during this phase of the development. The large ship-to-shore quayside gantry cranes would either be delivered as completed units by sea, or in parts and assembled and erected on the quay.

Phase 5: 360m quay extension

1.4.25 Phase 5 would comprise the construction of an additional 360m of quay, additional container storage and associated yard area together with services including water supply to the quay, fire-fighting mains and hydrants, power supply for the quayside container cranes, high-mast lighting in the container yard, and communications. These works would be constructed on the existing land area and on the reclaimed area which would have been constructed in previous phases.

Phases 6 and 7: second and third 360m quay extensions

1.4.26 Phases 6 and 7 would comprise the construction of additional 360m lengths of quay and additional container storage and associated yard areas together with services. The rail container station would be completed in Phase 6 by the addition of a further 6 sidings together with roads and an access bridge at each end.

Phase 8: 500m quay extension

1.4.27 Phase 8 would comprise the construction of the final 500 metres of quay and the remaining container storage and associated yard area together with services.

Road and rail construction

1.4.28 The new link road would be constructed at existing ground levels with the material excavated for construction being used to landscape the adjoining verges. New adjoining pavements for pedestrians and cycleways would also be constructed at this time. Landscape works to the access road would be completed as part of the road works with planting being carried out in the appropriate seasons.

1.4.29 The rail connection to the main Tilbury Line would require the construction of an embankment and a bridge over Mucking Creek. An improved Wharf Road bridge would also be installed to allow for the twin tracks. The new railway track would diverge from the existing alignment onto a new embankment through the site to a point at its eastern end where it would rejoin the existing alignment.

1.4.30 The level crossings over the rail line would be constructed as the rail line was moved to the new alignment. All crossings would have either gates or lifting barriers. The crossings would also have lights and audible warning as required.

Amelioration Lands

1.4.31 The construction processes proposed for the Amelioration Lands sites at Mucking Flats (Site A) and Halstow Marshes (Site X) would be broadly similar. Both would involve the creation of a new flood defence embankment landward of the existing flood defence, followed by a breaching of the existing embankment to allow the tidal flooding of an area of land leading to mudflat creation. The construction activities at each site are programmed for 6 months duration and would mostly involve earth moving.

1.4.32 At Site A there would be the removal of topsoil within the site in order to create the necessary level for tidal inundation. In order to minimise construction road traffic, this material would be exported from the site by a conveyor system along the corridor of the Thameshaven Branch Line to the former Shell Haven refinery site. Similarly, a haul route along the same corridor would be used to bring materials into Site A, and in particular the rock armour needed for the seaward face of the new embankment.

1.4.33 Once the necessary levels were prepared, a new flood embankment would be constructed using materials extracted at the site, and when this was complete the existing embankment would be breached in a controlled way, through the removal of about 300m length near Mucking Creek. The footpath and non-definitive bridleway that currently follows the line of the flood defence would be realigned to follow the new flood bank, although it is proposed that public access would be retained to the arms of the breached bank for bird watching and other recreational uses.

1.4.34 At Site X, there would be a similar range of activities, although topsoil would only be stripped for the footprint of the new flood defence embankment. The main materials import/export is anticipated to comprise the export of steel sheet piles removed from the proposed 700m breach in the sea defence, for recycling, and import of rock for use on the seaward face of the new sea defence. Other material, notably for the construction of the new flood defence, would be extracted on-site, and it is anticipated that materials from the existing flood defence would be used on-site.

1.4.35 A construction compound would be created immediately to the north of Cliffe, and from there a haul road would be created to the construction site itself. Heavy plant would be brought to the site at the outset of the works and stored on-site. This would minimise the amount of daily traffic to and from the site. The low-loader heavy plant delivery vehicles would require the temporary realignment of some traffic calming facilities in Cliffe, although these would be reinstated on completion. It is also proposed that there would be the temporary suspension of some on-street parking in the village, with replacement facilities created in a purpose temporary car park at the northern edge of Cliffe, at the entrance to the construction site. Normal arrangements would be fully reinstated on completion of the works.

1.4.36 The construction traffic effects of the proposed Amelioration Lands works are considered later in this NTS, at the section dealing with road transport.

1.5 EMPLOYMENT GENERATION

1.5.1 The development of the site would generate employment in three broad categories, namely:

a) construction jobs associated with the development
b) direct employment created on-site
c) the employment generated off-site

Construction employment

1.5.2 The average annual level of direct construction employment associated with the port would be 201 jobs, across a 12-year construction period. The corresponding average annual level of managerial jobs would be 65.

1.5.3 In addition, construction activity would also contribute to the generation of jobs in the local and wider economies; although specific contribution of construction activity to employment cannot be quantified.

Operational employment

1.5.4 When fully operational, it is estimated that there would be over 1,900 jobs created at the port.

1.5.5 The types of job created would be expected to be similar to other ports in the UK. The largest sector would be 'operatives' at about 44% of the total. The next largest group would be 'craft/skilled' at around 15%. On average, around 10% of jobs on ports involve managers, and another 9% involve supervisors.

1.5.6 Given these proportions, it is anticipated that the port would provide a diversified range of jobs many of which would require a range of skills. Increasingly, container terminal operations involve the use of information technology and the operation of container handling equipment, such as gantries and cranes, that require a higher level of skills than has formerly been required. Therefore it is expected that there would be training required in a variety of employment aspects, with a corresponding increase in the type and range of skills available in the local workforce.

Additional off-site employment

1.5.7 Once fully operational, London Gateway Port would support an estimated 1,300 additional jobs in the surrounding area up to a 60-minute drive from the site, making over 3,200 jobs in total. These jobs would be generated both by companies on the site purchasing supplies from other companies in the area, and by the additional consumer spending in the area derived from the extra employment incomes.

1.6 DESIGN PRINCIPLES

Port design

1.6.1 The Container Terminal would be sized for an annual throughput of 3.5 million twenty-foot long (TEU) containers, handled by the largest new generation container ships with the following dimensions:

a) up to 350m long;
b) up to 15m draft; and
c) up to 57m beam (capable of carrying 22 containers across).

1.6.2 The berth length and area required at various stages of the development are based on the growth in container throughput forecast for London Gateway port over the period to 2016. This is combined with an estimation of berth length based provision of a sufficiently long quay to avoid queuing.

1.6.3 Based on these estimations, it has been calculated that a length of berth up to 3,000m would need to be provided.

1.6.4 It is intended that 60% of the throughput of the Container Terminal would be handled by road, 30% by rail and the remaining 10% by shipment on to other ports.

1.6.5 Containers would be stored on the site prior to onward transport. Allowing for peaks in the traffic during the year, the space required on site to allow for the port entrance gates, storage, buildings, parking, and an associated Rail Terminal would amount to 140ha.

1.6.6 Gates for the port would be capable of handling over 3,000 lorries in and out of the Terminal each day. An assumed average gate clearance time of 130 seconds per lorry means that five gates would be required.

1.6.7 A parking area of 14,000 square m would be required assuming that 80% of employees would travel to work by car, and 435 employees per shift.

1.6.8 To meet the required throughput for containers by rail, a dedicated Rail Terminal would be provided. The rail terminal would be sized to handle 775m long freight trains on two sets of six sidings. Separate sidings for reception, inspection and maintenance of trains would also be required.

1.6.9 The Rail Terminal has been sized on the basis of three cranes handling 15 containers per hour on each train.

1.6.10 The Ro-Ro facility would be sized for an annual throughput of 450,000 units handled by typical short sea Ro-Ro berths with a maximum ship length of 200m.

1.6.11 For the anticipated number of daily sailings of Ro-Ro ships, two berths would be required; and an area of 26ha would be required to accommodate the Terminal entrance gates, storage, buildings, parking and rail sidings.

Consultation and the design process

1.6.12 Consultation exercises have been widely undertaken to explain the emerging proposals to the general public, to Regulators and other interested bodies, and to receive feedback on, and suggestions for, improving them. These have comprised the following:

a) EIA pre-scoping, scoping and technical consultations;
b) meetings with and presentations to consultees;
c) distribution of Project Description brochures;
d) an Open Day on the site for consultees and subsequent guided tours around it;
e) widespread circulation of public consultation leaflets; and
f) creation of a London Gateway website (www.londongateway.com).

1.7 CONSIDERATION OF ALTERNATIVES

1.7.1 The relevant EIA Regulations and Harbours Act require, in the context of environmental assessment, an examination of alternatives to the proposals.

Port alternatives

1.7.2 After a screening process, five potential sites were selected for comparative assessment. These were:

a) Shell Haven (the London Gateway site)
b) Immingham
c) Grimsby
d) Canvey Island
e) Portland Harbour

1.7.3 These sites were then subjected to an evaluation which considered:

a) topography and ground conditions
b) wave exposure
c) availability of land for future expansion
d) proximity to market demand centres, infrastructure, and workforce
e) proximity to designated environmentally sensitive areas such as SSSIs, SPAs, SACs, Ramsar Sites and National Nature Reserves
f) proximity to hospitals, schools and residential areas
g) the amount of dredging required

1.7.4 It was concluded that, based on the parameters considered in this evaluation exercise, there would be no better alternative to Shell Haven for a port of the nature and size of London Gateway anywhere in the UK.

Ro-Ro alternatives

1.7.5 As part of the port, a Ro-Ro facility is proposed which would serve the Thames and Medway market for short sea Ro-Ro vessels and would provide daily services between Rotterdam and the London area. Accordingly the area considered in a study of Ro-Ro alternatives was limited to the Thames and Medway Rivers.

1.7.6 Following a screening process, the potential sites selected for comparative assessment were:

a) City Docks Gas Works
b) Dagenham
c) Hornchurch Marshes
d) Shell Haven
e) Canvey Island
f) Isle of Grain
g) Botany Marshes
h) Dartford Marshes
i) Belvedere Power Station

1.7.7 These sites were then subjected to an evaluation which allocated scores based on:

a) topography and ground conditions;
b) availability of land for future expansion;
c) proximity to Rotterdam Port, M25, road and rail links;
d) proximity to designated environmentally sensitive sites such as SSSIs, SPAs, SACs, Ramsar Sites and National Nature Reserves;
e) proximity to hospitals, schools and residential areas; and
f) the amount of dredging required.

1.7.8 The evaluation confirmed that for the Ro-Ro facility, the Shell Haven site would be better than the other alternatives based on all the parameters considered in this evaluation exercise.

Port layout alternatives

1.7.9 As the New Shell Jetty would replace existing jetties on the Shell Haven site and would serve existing processing and storage facilities at Shell Haven which cannot practically be moved elsewhere, no alternative locations for the facility were studied.

1.7.10 In the process of deriving an optimum design for the port at London Gateway, various layouts for the reclamation required for the port including the Ro-Ro facility were examined.

1.7.11 It was recognised that these works would be likely to have an effect on the hydrodynamic and sediment transport regime of the River Thames as well as the local ecology, in particular the possible loss of intertidal area which provides a habitat and feeding ground for birds.

1.7.12 The choice of layout also has an influence on:

a) port operations;
b) during construction, the disposal of the significant quantities of dredged material from the navigation channel; and
c) the construction cost.

1.7.13 Four different locations for the berth line of the port were tested by mathematical hydrodynamic modelling.

1.7.14 It was concluded from these studies that Scheme A1 (the submitted scheme) should form the basis for further development and optimisation studies in order to establish the layout of the proposed port and the configuration of the future berths.

1.7.15 Seven alternative berth configurations based on Scheme A1 were also subsequently identified and evaluated. The preferred configuration is the one that is contained within the HEO application.

Road access alternatives

1.7.16 10 alternative routes into the site from the highway network were considered by the Promoter. These were:

1) East Tilbury Riverside Route
2) routes via Mucking
3) Stanford-le-Hope bypass
4) The Manorway (Full Length)
5) The Manorway (Partial New Link)
6) Fobbing-Pitsea (Alternative 1)
7) Fobbing-Pitsea (Alternative 2)
8) Fobbing-Pitsea (Alternative 3)
9) Bowers Marsh Route
10) Canvey Island Link

1.7.17 These options were all considered in relation to the Government's Guidance on Methodology for Multi-Modal Studies (GOMMMS). This evaluated the alternative routes in respect of:

a) Environment (Noise, Air Quality, Environmental Designations, Landscape/Visual);
b) Safety (Accidents);
c) Economy (Transport Efficiency, Link Capacity, Existing/New Route, Capital Costs);
d) Accessibility (Highway Access, Public Transport); and
e) Integration (Land Use Policy).

1.7.18 Taking all these factors into account, the option of a new link road from the Sorrells roundabout into the site as currently proposed was considered by the Promoter to be the most appropriate and to have the least adverse environmental effects.

Amelioration Lands alternatives

1.7.19 Thirteen potential sites for the creation of mudflat habitat through managed retreat of sea defences were considered within the Thames Estuary, from which Site A and Site X were selected. The alternatives were not pursued for as did not perform as well as the selected sites for reasons including:

a) existing habitat was valuable and should not be lost;
b) the physical conditions in terms of levels and/or relationship to tides and wave activity were unsuitable;
c) existing designation as SPA/Ramsar site and therefore inappropriate for the proposed works, and the benefits would be commensurately less;
d) less good relationship with designated APA/Ramsar areas.

1.7.20 A number of locations were also examined in adjoining estuaries, but were not pursued further, primarily because Sites A and X were nearer to the areas predicted to be affected by the port development, and therefore offered more effective amelioration.

1.7.21 A number of alternative course of action were considered for the construction of the Amelioration Lands, which have been refined to give the approach now proposed. In particular, methods exclusively using road vehicles for the import and export of materials at Site A have been rejected in favour of a conveyor and haul road option which would minimise road traffic related effects on the local community.

1.7.22 The main alternatives at Site X have involved possible different routes for construction traffic, notably the low-loaders proposed to deliver and remove heavy plant equipment. Alternative routes to the west, avoiding Cliffe, have been examined in detail but have been rejected for reasons including:

a) there would be more points where works would be needed to allow low loader access, and some substantial road widening would be needed, to the detriment of the local environment;
b) routes from the west would require a site access across the SPA/Ramsar site;
c) routes from the west would require a site access across technically difficult terrain between the nearest point of the highway and the construction site itself.

1.7.23 Taking all these factors into account, the location of the proposed Amelioration Lands at Site A and Site X, together with the construction methodologies as currently proposed, are considered by the Promoter to be the most appropriate in providing the greatest environmental benefits on completion and to have the least adverse environmental effects during construction.