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Port Kembla Outer Harbour Development

Preliminary Environmental Assessment

Port Kembla Port Corporation

5 December 2008

Port Kembla Outer Harbour Development

Prepared for

Port Kembla Port Corporation

Prepared by

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Executive Summary

Port Kembla Port Corporation (PKPC) proposes to develop the Outer Harbour of Port Kembla to attract new trades as well as increasing the volume of existing cargoes. Maunsell Australia Pty Ltd (Maunsell), in association with ENSR Australia (ENSR) and Bassett Acoustics, has been engaged to undertake an environmental impact assessment for a proposed port expansion on behalf of Port Kembla Port Corporation.

PKPC has received formal notification from Department of Planning that the Port Kembla Outer Harbour development is subject to Part 3A of the *Environmental Planning and Assessment Act 1979*. This Preliminary Environmental Assessment has been prepared in accordance with the provisions under Part 3A, to assist in the preparation of the Director Generals requirements for the project.

A Master Plan to guide future development in the Outer Harbour of the Port has recently been completed. A number of development options for the Outer Harbour were considered and compared during preparation of the Master Plan. The preferred option was selected due to its ability to accommodate potential future container trade and flexibility to accommodate other future trades. Physical features of the preferred development option include the following:

- At least 42 hectares of reclamation, carried out in stages
- 1770 metres total new berth length
- A total of seven berths, including:
  - Four container berths with a total berth length of 1150 metres
  - Two new multi purpose / bulk berths with a total berth length of 620 metres
  - A new multi purpose / bulk berth at the site of the existing Jetty 6
- Retention of the existing oil berth
- Berthing basins and approaches with up to 15m water depth below lowest astronomical tide (LAT) for new berths
- Road and rail infrastructure to support the expansion

The Port Kembla Outer Harbour development, as described in this report, comprises three discrete stages.

Stage 1 comprises reclamation and dredging for the concept plan, construction and operation of part of the multi purpose terminal and construction of part of the container terminal, berthing facilities, truck loading and unloading facilities, and road and rail infrastructure.

Stages 2 and 3 will comprise the construction and operation of the remaining portions of the multi purpose terminal and container terminal, additional berthing facilities, and further development of road and rail links and connections.

PKPC is seeking concurrent concept plan approval, for all stages of development, and major project approval for all components of stage 1.

This Preliminary Environmental Assessment report outlines the project description and discusses alternative options considered as part of the Master Planning process. The findings of a preliminary environmental assessment are outlined and key environmental issues identified. Methodologies for detailed environmental impact assessment are recommended within the report.

1.0 Introduction

1.1 Background

Port Kembla Port Corporation (PKPC) proposes to develop additional landside facilities in the Outer Harbour of Port Kembla (the Port) to attract new trades as well as increasing the volume of existing cargoes. Maunsell Australia Pty Ltd (Maunsell), in association with ENSR Australia (ENSR) and Bassett Acoustics, has been engaged to undertake an environmental impact assessment for a proposed port expansion on behalf of Port Kembla Port Corporation.

PKPC has received formal notification from the Director-General of the Department of Planning (DoP) that the Port Kembla Outer Harbour development is subject to Part 3A of the *Environmental Planning and Assessment Act* (EP&A Act). This Preliminary Environmental Assessment (PEA) has been prepared for submission to the DoP to satisfy provisions under Part 3A of the *EP&A Act*.

A Master Plan to guide future development in the Outer Harbour of the Port has recently been completed (Maunsell, 2008). Land within the inner harbour is almost fully occupied and growth in trade is constrained by lack of suitable port facilities. In order to develop the potential of the existing port PKPC needs to create new port facilities through dredging, reclamation and the construction of new berths. The Outer Harbour is the only remaining area where this can be accommodated.

A number of development options for the Outer Harbour were considered and compared during preparation of the Master Plan. The preferred option was selected due to its ability to accommodate potential future container trade and its flexibility to accommodate other trades in the future. Physical features of the preferred development option include the following:

- At least 42 hectares of reclamation, carried out in stages
- 1770 metres total new berth length
- A total of seven berths, including:
  - Four container berths with a total berth length of 1150 metres
  - Two new multi purpose / bulk berths with a total berth length of 620 metres
  - A new multi purpose / bulk berth at the site of the existing Jetty 6
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- Road and rail infrastructure to support the expansion

Two of the guiding principles behind the Master Plan for the Outer Harbour were to maximise available land area and provide the maximum number of berths suitable for container handling, bulk trades and general cargo. In satisfying these principles, PKPC proposes to develop the Outer Harbour in a series of discrete stages to cater for growing port needs and regional development, meet the needs of prospective customers and increase the potential to address the needs of new industry.

The Port Kembla Outer Harbour development concept, as described in this report, comprises three discrete stages to be constructed over the next few decades.

- Stage 1 comprises land reclamation and associated dredging for the footprint of the concept plan, construction and operation of part of the multi purpose terminal and part of the container terminal, berthing facilities, truck loading and unloading facilities, and road and rail infrastructure.
- Stages 2 and 3 would comprise the construction and operation of the remaining portions of the multi purpose terminal and container terminal, additional berthing facilities, and further development of road and rail links and connections.

In accordance with advice provided by DoP, PKPC is seeking concurrent concept plan approval, for all stages of development, and major project approval for all components of stage 1 (Figures 1 and 2).

Concept plan approval would provide PKPC with a greater level of certainty and confidence in securing trades and future customers for components of the development in later stages, while retaining flexibility for refinement of the design. Major project approval would allow PKPC to construct and operate a portion of the development following completion of stage 1.

1.2 Report purpose

This PEA has been prepared on behalf of PKPC in accordance with the provisions of the EP&A Act. The purpose of this PEA is to describe the key elements of the proposed Outer Harbour development, with the view to:

- Seeking formal Director General's Requirements from DoP, which includes requirements of other relevant government agencies, as the basis for the detailed Environmental Assessment (EA) and further design development
- Providing conceptual design information to the community and other stakeholders for feedback to inform the detailed design and environmental impact assessment process

This report provides a preliminary assessment of the key issues associated with the proposed Outer Harbour development and recommends methodologies for detailed environmental impact assessment. The proposed development described in this report will be refined as part of the detailed environmental assessment following issue of the Director General's Requirements (refer to Figure 18 which describes the Part 3A approval process).

This PEA is based on a concept design for the outer harbour development prepared by Maunsell and informed by a range of specialist reports.

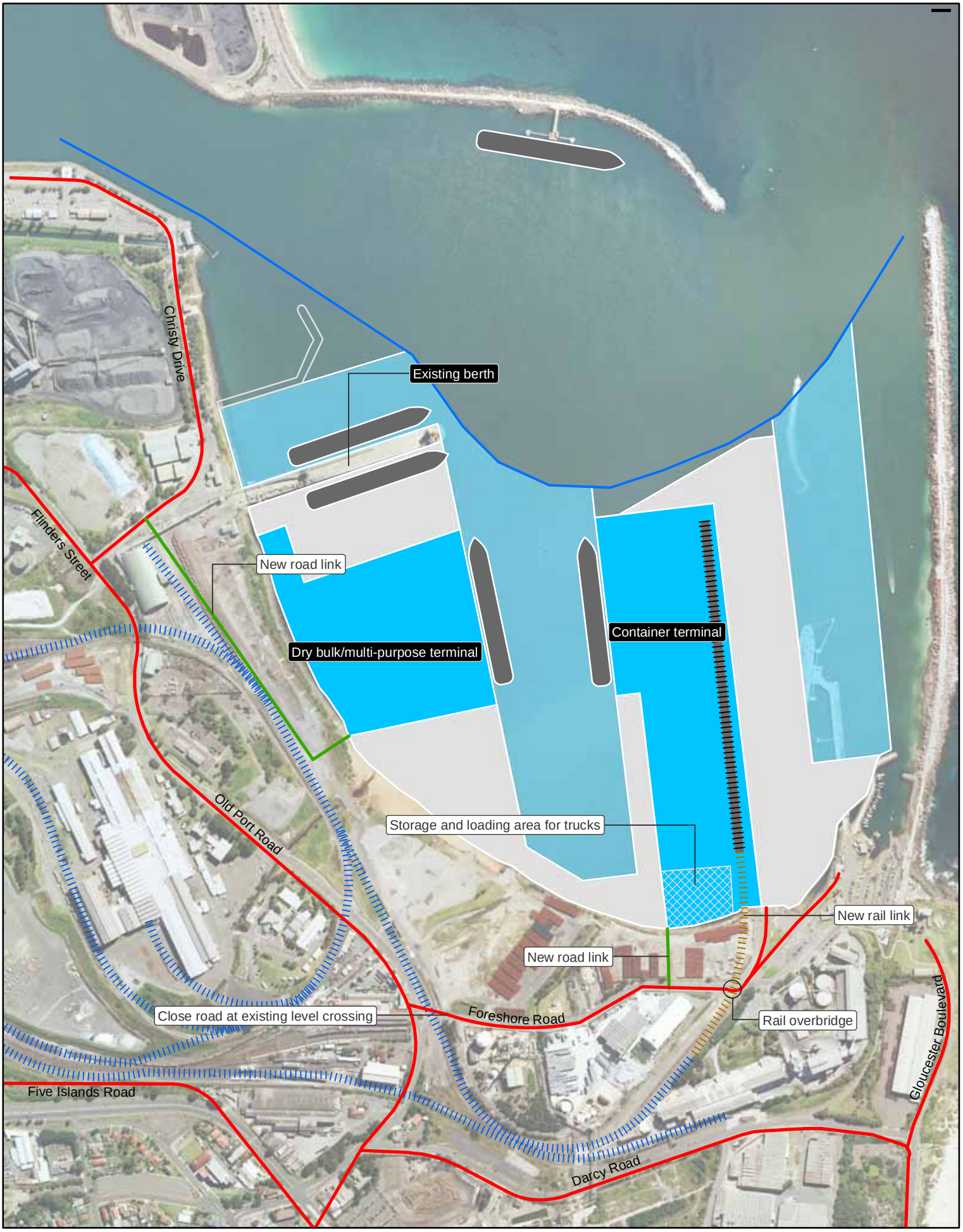
1.3 Port of Port Kembla

The Port of Port Kembla is one of three main international trade ports in NSW, alongside Port Botany in Sydney and the Port of Newcastle. Port Kembla will receive a portion of shipping, cargo and car stevedoring, currently handled through Port Jackson in Sydney Harbour, in 2008 as part of the State Government's NSW Ports Growth Plan. An additional 400 ship visits, 15-20,000 containers, 240,000 motor vehicles and 120,000 tonnes of break bulk cargo (timber, machinery, steel, paper, etc.) will be handled through Port Kembla each year. Car imports commenced in Port Kembla in October 2007, with the bulk of the car imports expected to be relocated to Port Kembla by November 2008. At present, the Port is primarily a bulk commodities port servicing the coal mining industry and the adjacent BlueScope steel works. The Port currently handles commodities, including coal, iron-ore and steel, and has the facilities to handle bulk liquids. In 2007/08, total trade through the Port reached 27 million tonnes. The major cargoes handled comprised 13 million tonnes of export coal and 11 million tonnes of steel related products (iron ore imports and steel product exports).

Future changes to the Port area are proposed, or currently underway, to accommodate the transfer of some cargo from Sydney as well as the general growth in freight. In the Sydney metropolitan area, general freight has been growing by approximately 7% pa between 1995 and 2002. Containerised freight at Port Botany has also displayed a similar growth pattern at 7% pa (although higher growth has been seen recently with 8% average growth in the past five years).

Existing activities at Port Kembla Inner Harbour include the BlueScope steel precinct, grain and coal exporting facilities. A soybean processing and biodiesel production facility is also proposed to be constructed (subject to Major Project approval under Part 3A). The increases in shipping, cargo and car stevedoring will be accommodated at the Port Kembla Inner Harbour within a general cargo handling facility (refer to Major Projects Approval No. 05_0073). The current and proposed facilities for the Inner harbour will take up all available port development land.

Consequently, if the Port is to continue to attract new trades as well as cater for increasing volumes of existing cargoes, additional landside facilities are needed. This is the primary driver for the proposed Outer Harbour development.



Existing road
New road link
Existing rail
New rail link

Terminal
Dredged area
Reclamation

PORT KEMBLA OUTER HARBOUR DEVELOPMENT
STAGE 1

0 100 200 400 m

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Fig. **1**

PORT KEMBLA OUTER HARBOUR DEVELOPMENT

CONCEPT PLAN

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Fig. **2**

1.4 The proponent

The Port of Port Kembla, is managed by PKPC, which is a State Owned Corporation under the *Ports and Maritime Administration Act 1995*.

The legislated objectives of PKPC are:

> *(a) to be a successful business and, to this end:*
> *(i) to operate at least as efficiently as any comparable businesses, and*
> *(ii) to maximise the net worth of the State's investment in the Port Corporation, and*
> *(iii) to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates and by endeavouring to accommodate these when able to do so, and*
> *(b) to promote and facilitate trade through its port facilities, and*
> *(c) to ensure that its port safety functions are carried out properly.*

PKPC aims to achieve these objectives through the following key functions:

- Facilitating business growth in the port by planning, marketing and promoting services and facilities
- A proactive approach to the provision of port infrastructure which is cost effective and relevant to the needs of current and prospective customers
- Providing port shipping management, security and safety services, including vessel movement scheduling, navigation services, port security and channels
- Providing pilotage services
- Providing unload and load facilities such as berths and equipment for private sector tenure or common use
- Providing onshore facilities such as land, sheds and access to enable the movement and storage of cargo or the development of port related industries
- Managing and maintaining assets, including land, berths and wetland areas
- Operating in a commercial and sustainable manner
- Leading the development of efficient, effective and reliable services in the Port
- Providing corporate services for the above activities and ensuring the business remains financially viable

The proposed Outer Harbour development is consistent with the legislated objectives of PKPC as a State Owned Corporation.

1.5 Location

The Outer Harbour of Port Kembla (Outer Harbour) is located in the south eastern extent of Port Kembla in the Wollongong Local Government Area (LGA). The Outer Harbour lies approximately 3km south of the Wollongong CBD and is in the order of 80km south of Sydney CBD and 60km from Sydney's south western suburbs. Port Kembla is the closest specialist industrial port to Sydney, Australia's largest market, and is well connected with Sydney and regional NSW by virtue of a well established road and rail network, making it an ideal base for import or export activities. The location of the Outer Harbour in the Metropolitan Sydney context is shown in Figure 3.

The Port Kembla eastern breakwater lies at the eastern extent of the Outer Harbour and the foreshore is bounded by Foreshore Road and Old Port Road to the south and west. The existing shipping channel and northern breakwater lie in the northern portion of the Outer Harbour.

Figure 4 shows the existing features of the Outer Harbour.

Blusescope Steel works is the dominant land use to the west of the Outer Harbour. Other prominent activities in the Outer Harbour and immediately adjacent include:

Water Based

- Bulk liquids berth (berth 206)
- Small boat harbour and recreational boat ramp
- Tug Berth facility.
- Port Kembla Gateway Pty Ltd (berths 202-205)

Land Based

- Cleared short term lease storage areas on the foreshore (current uses include pipe storage and mobile concrete crushing plant
- Port Kembla Port Corporation Training Facility
- Port Kembla Port Corporation Headquarters (currently under construction)
- Brick and Block Company Pty Ltd
- Morgan Cement
- Bluescope Steel and BHP Billiton
- Orica

The nearest residence to the Outer Harbour is approximately 400m to the south west located along Wentworth Road.

Further detail regarding the study area is provided in Section 2.1 of this PEA.

Figure 3: Regional Location of the Port of Port Kembla

Figure 4: Port of Port Kembla

PORT KEMBLA OUTER HARBOUR DEVELOPMENT
PORT KEMBLA
Source: Port Kembla Port Corporation

NOV 2008
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0 250 500 1000 m

1.5.1 Legal Description

At present the seabed of the outer harbour is owned by NSW Maritime. PKPC is currently negotiating with NSW Maritime to transfer ownership to PKPC. The parcel of land between the PKPC property boundary (shown on Figure 4) and the shoreline is identified as Lot 100 DP 1013971.

1.6 Justification and Need for the Project

1.6.1 Introduction

Port Kembla processes the greatest volume of steel exports and is the second largest exporter of grain from Australia, Newcastle is one of the largest coal export ports in the world and Port Botany is currently Australia's leading container port.

Port Kembla is primarily a bulk commodities port servicing the coal mining industry and the adjacent BlueScope steel works. Commodities handled at the port include coal, iron ore, steel and grain, car imports and the port has the facilities to handle bulk liquids.

In the 2007/08 period, Port Kembla had a record throughput of 27 million tonnes of exports and imports representing a slight increase over the previous record in 1993, due in part to increased coal exports and the introduction of car imports. Total trade was up by 1.6 million tonnes on the 2006/07 period. Coal exports increased by nearly 14% some of which was redirected from the Hunter Valley due to logistic difficulties at Newcastle Port, while there was a 61% increase in some steel products.

In the same period, the Port received no grain to export as a consequence of the drought, with grain exports down on the previous years export volume of 350,000 tonnes.

1.6.1.1 Inner Harbour

Future changes to the Port are proposed or currently underway to accommodate the transfer of some cargo from Sydney and the general growth in freight. Under the State Government's *NSW Ports Growth Plan* a proportion of shipping and cargo previously handled through Port Jackson is being transferred to Port Kembla. This will mean up to an additional 400 ship visits, 15-20,000 containers, 240,000 motor vehicles and 120,000 tonnes of break bulk cargo (timber, machinery, steel, paper, etc.) to Port Kembla each year. Port Kembla will become the State's major centre for the importation of cars once the Glebe Island operation ceases in November 2008. Many of these vehicles are currently transported to major holding yards in the Minto/Ingleburn area which has good linkages to Port Kembla using a number of routes (Maunsell 2008).

The increase in the trades listed above will be accommodated within the confines of the Inner Harbour. This growth combined with existing activities including the BlueScope steel precinct and the grain and coal exporting facilities means that there is very little available land in the Inner Harbour to accommodate future growth. Consequently, if the Port is to continue to attract new trades as well as increasing the volume of existing cargoes, additional landside facilities will need to be provided. This is the primary driver for the proposed Outer Harbour development (Maunsell 2008).

1.6.2 Building on its Competitive Strength

Over time Port Kembla has shown a degree of flexibility to be able to receive goods which otherwise would have been processed elsewhere. Investing in infrastructure will enable the Port to more effectively compete on the wider market but more importantly to service the needs of a wide range of businesses in the local and wider region. It will also enable PKPC to attract a range of investment that maximises the potential of the Port and reflects the trade needs of Port users.

1.6.2.1 Outer Harbour Growth

Outer Harbour growth is particularly critical to industries that rely on Port services to deliver to or receive goods from, the international market. This investment would enable the Port to service bulk

trades from the near hinterlands and compete for bulk trades of the more distant region. It would also provide a much needed investment in the regional economy, generating jobs in regional NSW and the Illawarra in particular.

According to the *Illawarra Regional Strategy*, manufacturing is the main economic driver of the region ($6 billion annual turnover). Consequently expansion of port operations provides a significant opportunity to support investment in this sector. Furthermore, expansion of port activities also provides the opportunity to develop corporate support services in Wollongong, which strengthens its role as a regional centre. This supports one of the key objectives in the region which is to increase employment self containment (Maunsell 2008).

Development of the Port would also enhance the potential for regional specialisation, enabling the South Coast region to become more specialised in a range of economic activities, where it has a comparative advantage over other areas.

1.6.2.2 Economic Effect

The 'trickle down or multiplier effect' of Port growth is expected to have a significant economic impact on output, employment and earnings in the Illawarra, South Coast region and the State. The development of the Outer Harbour would act as both a short term and long term stimulus to the local economy. In the short term it is expected that construction activities associated with land reclamation and the subsequent fit out of terminal facilities would generate a large number of jobs, as well as contributing a significant amount of value added to the economy.

In the longer term, the operation of the Outer Harbour would generate direct employment at the Port as well as indirect employment in supporting and ancillary activities in the local economy. The *Port of Port Kembla Economic Impact Study* (Econsearch, 2007) found that each ship call contributes over half a million dollars to the Illawarra region and $602,000 to the NSW economy.

1.6.2.3 Infrastructure Needs

To deal with the predicted growth in imports and exports, the Port needs to be better integrated with road and rail infrastructure and freight terminal facilities, to ensure freight can be moved quickly and efficiently with minimal social and environmental impact.

Failure to meet the infrastructure needs to handle the trade forecasts of between 3% (low growth) and 7% (high growth) may result in a substantially lower than forecast growth. In addition the Port would not have the capacity to meet future trade volumes and would remain highly dependant on a limited range of cargos which are subject to fluctuations in international demand.

1.6.3 Policy Context

The need to expand Port operations in Port Kembla is driven by a number of regional, state and commonwealth policies. These are discussed below.

1.6.3.1 NSW Ports Growth Plan

The *NSW Ports Growth Plan* released in 2003, provides strategic direction for ports to ensure NSW continues to benefit from strong future trade levels by expanding port capacity to meet demand. The plan includes the relocation of containers, general cargo and car stevedoring from Port Jackson to Port Kembla. It also anticipates that as Port Botany reaches capacity, Newcastle will be the State's next major container facility. The growth plan recognises that the transfer of significant volumes of imports to Port Kembla and Newcastle will likely have a long term positive impact on the competitive environment in NSW ports, by fragmenting the dominance of imports in the Sydney ports.

1.6.3.2 Metropolitan Strategy

The Metropolitan Strategy *City of Cities: A Plan for Sydney's Future* was released in December 2005. It supports continuing economic growth within the Sydney Region for 25 years, while balancing social and environmental impacts.

The transport component of the Strategy includes a number of specific objectives relating to freight including:

- Maximise the efficiency of freight transport and increase the proportion transported by rail
- Develop transport plans to facilitate the relocation of vehicle importation from Glebe Island and White Bay to Port Kembla
- Facilitate the upgrading of the metropolitan rail freight network. Plan for the provision of sufficient freight transport capacity in key corridors. Protect corridors and land for freight related activities in the future
- Reduce noise and air quality impacts of freight operations

The proposed Outer Harbour expansion will better enable Port Kembla to accommodate vehicle importation to be transferred from Glebe Island and White Bay.

1.6.3.3 Competition and Infrastructure Agreement (CIRA)

In February 2006, the Council of Australian Governments (COAG) committed to the *National Reform Agenda (NRA)* which includes competition, regulation and human capital reforms aimed at increasing the nation's productivity and workforce participation. At that meeting, the NSW Government committed to the *Competition and Infrastructure Agreement (CIRA)* as part of the NRA.

The CIRA (Parts 4.1 and 4.2) establishes a national framework for the regulation of nationally significant infrastructure. Only those Ports defined as 'significant' were required to be reviewed under the CIRA. Port Kembla's Inner and Outer Harbour, including the handling and storage facility operations at the Port, were defined as 'significant'.

A review conducted by Price Waterhouse Coopers recommended amongst others, that the State government explore options to streamline the planning process for projects that are not assessed under Part 3A of the *EP&A Act,* and are greater than $5 million in value, and to consider whether port corporations should be the consent authority for investments over $5 million under specified circumstances.

The State Government supported these recommendations and enacted *State Environmental Planning Policy (Infrastructure) 2007* (see Section 3.4.3) and sought to declare Newcastle, Botany and Port Kembla as State Significant Sites. Significant developments at the ports, such as berths and terminals worth more than $30 million and hazardous goods facilities are to be assessed by the State Government. Public infrastructure such as roads, rail and utilities (internal to port land) and dredging by public authorities are also to be assessed by the State Government. Proposals for port facilities on port corporation owned lands are to be assessed by the relevant port corporation under Part 5 of the *EP&A Act*.

1.6.3.4 State Plan: A New Direction for NSW

The NSW Government draft State Significant Declaration for the three ports is currently being considered by DoP. The *State Plan* released in November 2006, sets out priorities for Government action over a ten year time span. The Plan with 34 priorities and 60 targets was designed to deliver better services and improve accountability across the public sector.

Consultation with the local community and stakeholders during preparation of the Plan identified the key challenges for the Illawarra as:

- Fostering business growth and ensuring a skilled workforce
- Planning for infrastructure to support the growing population
- Balancing development and the needs for business lands with protection of the environment

A *Regional Business Growth Plan* to determine key actions to promote economic growth and increase the level of employment is being finalised for the Illawarra. It identifies key opportunities and actions required to attract investment to the region and increase the number of local jobs.

The proposed Outer Harbour expansion has been defined as a high priority action that would foster employment generation in the region. The Plan refers to simplifying the planning process and improving access to industrial/employment lands, which when developed could increase demand for port facilities to satisfy increased import/ export requirements.

1.6.3.5 Illawarra Regional Strategy

The *Illawarra Regional Strategy 2031* developed as part of the State Plan was released by the DoP in January 2007 to guide new development to the region and ensure there is capacity for 30,000 new jobs and 38,000 new dwellings by 2031, in the local government areas of Kiama, Shellharbour and Wollongong.

The primary purpose of the Regional Strategy is '*to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the Region's population over the next 25 years*'.

The Regional Strategy identifies specific regional infrastructure requirements to inform future infrastructure investment priorities for the Illawarra.

The Strategy provides for growth around existing centres, with Wollongong as the Regional Centre. It identifies manufacturing as the main economic driver in the region with a turnover of $6 billion annually. The expansion of Port Kembla is seen as a '*significant opportunity to support infrastructure and employment in this sector*'.

The Strategy also states that '*in addition to identifying lands to support port – related activities, transport infrastructure and corridors necessary to support freight links to Sydney markets and export opportunities can be seized'.*

The Strategy clearly identifies the challenges ahead to strengthen the region's links to Sydney and other regional markets and to ensure the capacity and connectivity available within the transport network.

The Port and its contribution to the economy of the area is clearly seen as part of a '*prosperous, diverse and sustainable future for the Illawarra'*. Key employment lands include Port Kembla and these should be developed to increase job opportunities locally and to reduce the reliance of the workforce from areas outside the region. Currently 15.8% of the workforce commutes to work from outside the region.

Management of efficient freight networks is identified as a priority. In particular the Princes Highway and proposed alignments, Illawarra Highway, Northern Distributor/Bulli Pass, the Maldon to Dombarton rail corridor, Moss Vale to Unanderra rail line and the F6 transport corridor.

1.6.3.6 Other Initiatives

In August 2008, a public forum on transport for the Illawarra agreed on key project ideas to be submitted to the Commonwealth Infrastructure Fund including the completion of the Maldon and Dombarton rail link and upgrades to Picton Road and the Princes Highway. Stakeholders agreed on the need for the expansion of Port Kembla supported by efficient transport links.

Maldon and Dombarton Rail Link

Construction of the rail link commenced in the early 1980s to service the then burgeoning coal export from Port Kembla. Construction of the line ceased in the late 1980s due to the down turn at the time in the coal market. With the more recent growth in coal exports and general growth in trade through the Port, there is now a commitment to a feasibility study to review the engineering and economic requirements for the rail line, to assess the work completed to date and to determine the suitability of the rail link for the proposed rail freight task.

The Federal Government has committed $300,000 in 2008-09 to undertake a pre-feasibility study of the Maldon and Dombarton rail link. PKPC is managing the study in conjunction with the Federal Department of Infrastructure Transport Regional Development and Local Government.

1.6.4 Conclusion

The expansion of Port Kembla is part of a broad regional and state planning strategy context. Port Kembla provides an important economic and employment function for the region and the State. The current landside facilities are at maximum capacity and growth is constrained by lack of suitable Port facilities. The development of additional land in the Outer Harbour is crucial to ensure the current regional and State economic and employment function of the Port continues well into the future.

1.7 Report structure

This PEA report comprises the following sections.

- **Section 1 – Introduction:** This section describes the purpose of the report, the background demand for the proposal and justification from a social, environmental and economic viewpoint.
- **Section 2 – Project Description:** This section describes the study area, and introduces the proposed development, including a discussion on the alternatives considered. The staging of the development and key design and construction issues are addressed.
- **Section 3 – Statutory Controls and Approval Process :** This section provides an overview of the statutory and non statutory planning framework considered relevant to the proposal, including consideration of the strategic context of the project.
- **Section 4 – Consultation:** This section describes consultation undertaken for the proposal to date and outlines the consultation strategy that will be implemented throughout the detailed environmental impact assessment.
- **Section 5 – Physical and Pollution Effects/Preliminary environmental assessment:** This section contains a summary of the key issues relating to the main topics to be addressed in the EA report. Findings of studies undertaken as part of the preparation of the PEA are summarised.
- **Section 6 – Environmental Risk Appraisal:** This section provides a summary of the key issues identified as part of the PEA and an outline of the approach used for prioritising the key issues.
- **Section 7 – Conclusion:** This section summarises the report and describes the main findings of the PEA.

2.0 Project Description

2.1 Study Area

Port Kembla is recognised as the major industrial precinct within the Illawarra Region and is recognised as a key employment precinct.

The Outer Harbour is characterised by a mixture of both the built environment and natural features (Figure 4). Key features include:

- Three jetties and an inflammable liquids berth located on the northern breakwater
- A saltwater intake channel that supplies cooling water for BlueScope Steel operations located on the south eastern corner of The Cut
- A boat harbour and boat ramp located adjacent to the eastern breakwater
- A number of commercial and industrial operations on the foreshore including Brick and Block manufacturing structural masonry products, Morgan Cement, BlueScope Steel and BHP Billiton
- The rail network (including rail corridor and sidings) located between Darcy Road and Foreshore Road, Old Port Road and Five Islands Road, recently acquired by PKPC
- A concrete lined stormwater drain, identified as Darcy Road drain, located adjacent to lots currently occupied by Brick and Block and Sydney Water
- Salty Creek, which extends from an area adjacent to the Port Kembla railway station and flows via culvert under Old Port Road and discharges in the Outer Harbour
- Port Kembla Heritage Park located on the southern headland of the Outer Harbour, south of the eastern breakwater. Heritage Park has been developed to conserve military, cultural and historic heritage in the area

Land uses surrounding the Outer Harbour include:

- Commercial and residential properties located to the south and south west of the Outer Harbour
- The closest residential and commercial properties to the south west of the Outer Harbour are located along Wentworth Road, approximately 400m from the Outer Harbour foreshore. Housing is also located to the south along Electrolytic Street, approximately 600m south of Foreshore Road
- Five Islands Nature Reserve, a cluster of islands (Flinders Islet, Bass Islet, Martins Islet, Big Island and Rocky Islet) located between 1.5km and 2.5km to the south east and east of the Port. The islands are protected to provide breeding and feeding areas for seabirds including endangered and vulnerable species such as the southern giant petrel and sooty tern
- Wollongong sewage treatment and recycling plant located approximately 2km north of the northern breakwater. The 1km discharge pipe for the plant extends in a south eastern direction toward the breakwaters. The Port Kembla storm sewage treatment plant is located on Red Point, approximately 2km south of the Outer Harbour

2.2 Alternatives Considered

2.2.1 Key Project Requirements

PKPC is pursuing opportunities to expand and develop the Port. There are several future trades under consideration by PKPC, as well as opportunistic trades which PKPC will continue to pursue. To be able to cater for imminent and future growth, PKPC wants to develop new port facilities through reclamation and the construction of new berths, in order to have the ability to react at short notice to commercial requests for extra land and berths in the Port, in a coordinated, pre-planned manner.

As discussed in Section 2.3 any potential for future development at the Port will require dredging and reclamation in the Outer Harbour. PKPC recognises that development of the Port will involve a relatively long timeline and as a consequence is now seeking environmental approval for proposed works to enable reclamation and berth construction when appropriate fill sources become available or immediately upon agreement with future lease-holders to provide new land. PKPC also needs to have seed infrastructure in place wherever possible to attract new trades and clients. Above all, PKPC wants to minimise its capital outlay and maximise its return on investment both for the benefit of the Port's shareholders, but also so that operating costs for operators are kept at competitive levels and thus render the Port attractive for future operators.

The proposed Outer Harbour development is the preferred option selected after rigorous consideration of all options available to the Port as outlined in the *Port Kembla Outer Harbour Master Plan Report* (Maunsell 2008). Alternative options to meet PKPC'c needs are addressed in Section 2.2.4. below including the options considered as part of the Master Plan.

2.2.2 Development of Other Ports

Construction works are currently underway at Port Botany on what is expected to be the last major expansion of the Port. This expansion was approved by the Minister for Planning on 13 October 2005 and limits the capacity of the Port throughput to 3.2 million Total Equivalent Units (TEUs) of containers per annum. Botany is the largest container port in NSW and services the needs of the immediate Sydney market in particular. The current and recent trends in freight growth rates indicate that this capacity may be reached much sooner than first expected. As a result there is an onus on the State Government to look at the role of both Port Kembla and Newcastle Ports in meeting subsequent demand. It is becoming increasingly evident that there is a role for all three ports in meeting the growing freight demand.

2.2.3 Other Sites

The role of Sydney Harbour as an industrial and cargo handling port continues to diminish with increasing demand for foreshore land for residential and a variety of commercial uses, and land use conflicts with residual neighbours in particular. As a consequence Port Kembla, Newcastle and Port Botany have been nominated as the three key trading ports for NSW into the future as all have, to varying degrees, the capacity to accommodate increased trade and the potential to expand, or are currently in the process of expanding operations.

While the three ports provide opportunities to accommodate increased freight levels, there is little impetus to establish new ports, owing to the substantial investment required in port and ancillary infrastructure. In addition the shipping industry has shown that fewer points of call on international shipping routes are a preferred outcome (URS, 2003).

2.2.4 Alternatives within Port Kembla

2.2.4.1 Considerations

Virtually all land within the PKPC existing Inner Harbour is now tenanted and there are no large areas available to locate new trades and operators. The Outer Harbour is the only remaining area which provides the potential, following reclamation and establishment of new berths, to accommodate future business interests.

In recognition of the long lead times in port infrastructure planning and to take advantage of an offer of excess blast furnace slag, planning for Outer Harbour reclamation development commenced in the 1990's. The *Port Kembla Port Corporation Environmental Impact Statement – Outer Harbour Development Project Draft – For Discussion Purposes Only* (EIS) was prepared in 1999 by CH2MHill, and preliminary Master Plan drawings were prepared in 2001. Reclamation engineering was further investigated in 2004 and as part of the current Inner Harbour development, dredge material is being placed in the Outer Harbour. In mid 2008, the *Port Kembla Outer Harbour Master Plan Report* (Maunsell 2008) identified the best option available for the development of the Outer Harbour.

Selection of the preferred option was an iterative process involving consideration of a range of Port planning issues, opportunities and constraints. This process identified key areas within the Port that are open or subject to change, subject to some possible modification or cannot be modified. Other key considerations in this process included:

- Ship operation and navigation issues (including hydrodynamic considerations and the impact of seiching)
- Environmental issues (including site characteristics and surrounding land uses, contamination, hydrology and water quality, aquatic and terrestrial ecology, heritage and socio-economic)
- Geotechnical considerations
- Landside road and rail infrastructure
- Trade forecasting and terminal type feasibility
- Capital investment requirements and return forecasts
- Tug facilities (existing and future)

2.2.4.2 Options Considered

The options investigated in the Master Plan included:

- Options 1 and 1A, which maximise the reclamation area and number of berths attainable within the existing port layout, with a similar mix of trades to the existing Inner Harbour.
- Option 2, which expands the reclamation area of Option 1 by moving the breakwaters and shipping channel to the north east.
- Options 3, and 3A to 3E, which optimise the harbour layout for a container terminal operation.

The key components of the options considered are summarised in Table 1 and are illustrated in Figure 5 to Figure 13.

Table 1: Alternative Options Summary

Option	Summary Description	Berths	Reclamation Area
Option 1 (Figure 5)	Maximum creation of land is targeted, with berths provided where considered feasible and economical. The emphasis is on trade types and customer types similar to the Inner Harbour minor trades – that is, break-bulk/general cargo, niche bulk, cars – plus bulk liquids. 450m diameter swing basin.	2100m new berth length (excl Gateway Berths): 3 bulk solids / liquids 4 container 2 multi purpose (at Gateway Jetty) 1 bulk liquid / oil	51ha
Option 1A (Figure 6)	As for Option 1 except reclamation area is further increased by filling westward to the Gateway Berths. Additional land is created at the expense of the loss of 3 berths in the Outer Harbour compared to Option 1.	2180m new berth length (incl Gateway Berths): 3 bulk solids / liquids 2 container 1 multi purpose (at Gateway Jetty) 1 bulk liquid / oil	59ha

Option	Summary Description	Berths	Reclamation Area
Option 2 (Figure 7)	450m diameter swing basin moved north to allow new berths to have minimal rock dredging. Re-alignment / extension of breakwaters is required.	2020m new berth length: 2 bulk solids / liquids 2 container 1 multi purpose (at Gateway Jetty) existing oil berth	72ha
Option 3 (Figure 8)	450m diameter swing basin moved north to allow new container berths. Re-alignment / extension of breakwaters is required.	2400m new berth length: 2 bulk liquids / solids 4 container 3 multi purpose (1 at Gateway Jetty) existing oil berth	52ha
Option 3A (Figure 9)	450m diameter swing basin moved north to allow new container berths. Re-alignment / extension of breakwaters is required. Reclamation shifted eastward with loss of east side bulk berths.	1830m new berth length: 4 container 3 multi purpose (1 at Gateway Jetty) existing oil berth	62ha
Option 3B (Figure 10)	450m diameter swing basin shifted south to avoid modifications to breakwaters.	1770m new berth length: 4 container 3 multi purpose existing oil berth	52ha
Option 3C (Figure 11)	450m diameter swing basin shifted west to avoid modifications to breakwaters and to reduce rock dredging requirements.	1800m new berth length: 4 container 3 multi purpose existing oil berth	52ha
Option 3D (Figure 12)	As for 3C with berth alignments rotated anticlockwise to reduce wave penetration into docks.	1770m new berth length: 4 container 3 multi purpose existing oil berth	42ha
Option 3E (Figure 13)	As for 3D with 450m diameter swing basin moved slightly north to allow new container berths. Re-alignment / extension of breakwaters is required.	1770m new berth length: 4 container 3 multi purpose existing oil berth	42ha

Figure 5: Option 1

Figure 6: Option 1A

Figure 7: Option 2

Figure 8: Option 3

Figure 9: Option 3A

Figure 10: Option 3B

Figure 11: Option 3C

Figure 12: Option 3D

Figure 13: Option 3E

2.2.4.3 Do Nothing Option

The 'do nothing' option involves maintaining the status quo and continuing current port operations at existing levels. Maintaining the status quo would present considerable difficulties to PKPC when operating in an increasingly competitive environment by constraining opportunities for growth. Key reasons why the 'do nothing' option is not favourable include:

- Port Kembla would be unable to cater for future trade growth beyond the current Inner Harbour developments as the Inner Harbour is now occupied
- Future trades currently under consideration, require additional berths. Without the development of the Outer Harbour, additional berths would not be available to accommodate these trades
- Opportunistic trades PKPC would like to be in a position to attract would be lost. PKPC needs to have infrastructure in place where possible to attract new trades and clients
- Significant opportunity to support investment in manufacturing (key regional economic driver, *Illawarra Regional Strategy, 2006*) would be lost. In addition one of the key objectives in the Illawarra Regional Strategy relating to regional employment self containment could also be affected
- There would be lost opportunity of short (construction) and ongoing long term (operation) stimulus to the local and regional economy in particular.
- Port Kembla would become capacity constrained in the next decade and not be able to react to international shipping trade and cargoes.

2.2.4.4 Preferred Option

Trade and return forecasting along with capital investment requirements have determined that only the highest value cargoes, the container trade, are likely to generate sufficient revenue to justify the required capital investment in the Outer Harbour and provide a positive return on investment in a reasonable time.

The flexibility to handle other trades must also be maintained in Port Kembla. Based on the overall assessment of the options, Option 3D has been selected as the preferred option for development of the Outer Harbour. This option has the demonstrated capability to best accommodate potential future container trade and the ability and flexibility to accommodate other future trades such as gypsum, iron ore, limestone, coke, clinker, woodchips, granulated slag and bulk cargo generally.

2.3 Staged Development

It is proposed for the development to be constructed in stages and to be driven by and consistent with market growth. Three stages of development have been considered, however it is noted that actual staging may vary, subject to the rate of trade growth and driven by market demand. It is envisaged that final completion of the Outer Harbour reclamation will occur over a 20 to 30 year time frame. The three stages of development allows for functional operation of the reclaimed area following completion of each stage. The new landside facilities that will be created at the completion of each of the three stages are illustrated in Figures 14, 15 and 16.

The *Port Kembla Outer Harbour Master Plan Report* (Maunsell 2008) describes the proposed staged development of the Outer Harbour. A summary of the proposed Outer Harbour stages are outlined below. It should be noted that PKPC is seeking concept plan approval for all three stages and concurrent major project approval for stage 1.

The capacity for Stage 1, Stage 2, and Stage 3 are shown in Table 2.

Table 2: Preferred option capacity for Stages 1, 2, and 3

Stage	Bulk / General Cargo		Containers	
	No. Berths	Capacity (mtpa) Bulk and General Cargo	No. Berths	Capacity ('000 TEU)
1	1	5.25 and 1.0	1	300
2	3	5.25 and 2.0	2	600
3	3	5.25 and 2.0	4	1,200

The capacity of the three stages of development has been calculated using the following throughputs:

- Dry bulk products assumed at 5.25 mtpa per berth
- General cargo assumed at 1 mtpa per berth
- Containers assumed at 300,000 TEU pa per berth

Specific components of each stage are detailed below.

2.3.1 Stage 1

Stage 1 development (refer Figure 14) involves construction of the following components:

- Dredging for the multi-purpose berth box
- Dredging for the container berth box
- Dredging for the basin

- Construction of part of the multi-purpose terminal, partly paved for common users (part of the reclaimed area would remain unpaved ready for future lessees to develop)
- One container berth
- One dry bulk berth
- Installation of utilities to service the multi-purpose terminal (i.e. water, power 240V and 415V, telecommunications, sewer)
- Construction of part of the container terminal, fully paved (ready for future development that would be subject to a separate approval)
- New road from Christy Drive to the multi-purpose terminal as identified in Figure 14
- New road from Foreshore Road to the container terminal
- New rail link connecting existing rail to container terminal as identified in Figure 14
- Truck loading and unloading facilities at the southern end of the container terminal

This stage provides a new bulk berth and a new container berth while minimising the amount of rock dredging required by locating the berths in areas where the rock levels are deeper. At the end of stage 1 part of the multi purpose terminal would be operational.

2.3.2 Stage 2

Stage 2 development (refer Figure 15) involves:

- Completion of the multi purpose terminal
- Completion of the second container berth
- Completion of the second dry bulk/multi purpose berth

Road and rail links completed under Stage 1 are expected to provide sufficient capacity for Stage 2.

2.3.3 Stage 3

The final stage, Stage 3, of the Outer Harbour development (refer Figure 16) involves:

- Two additional container berths and associated construction to complete the container terminal development
- Further development of the rail connection and development of a rail siding for the container terminal
- An extended new road link to link the new container terminal with Christy Drive
- A new rail overbridge to provide grade separation between the rail lines to the container terminal and road traffic also using the terminal
- A new road along the old rail corridor at the southern end of the eastern breakwater to serve the Port offices and public facilities area and to separate this traffic from the Port traffic
- A truck loading and unloading area facility located at the southern end of the reclamation, on the eastern side of the rail line.

Figure 14: Stage 1

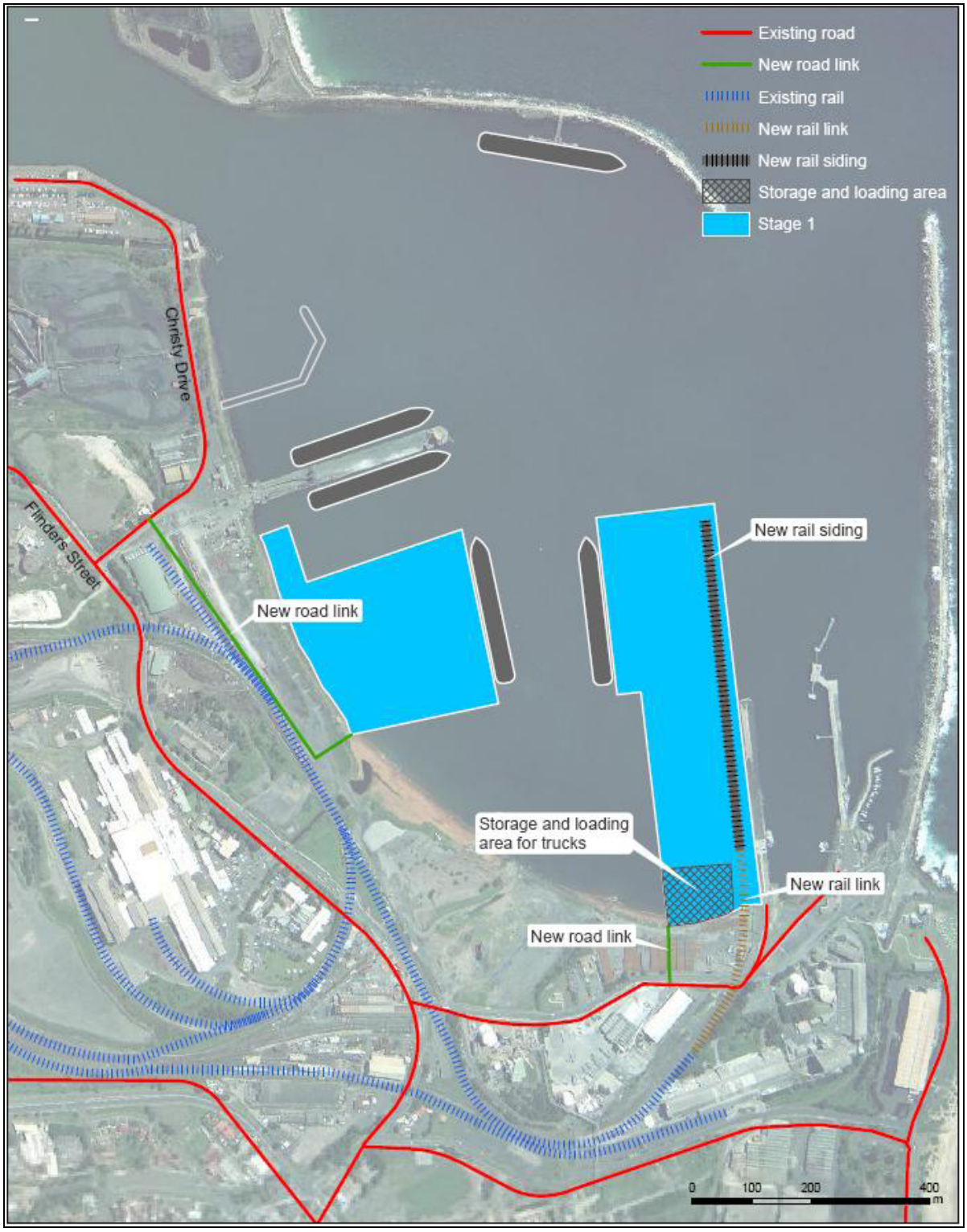


Figure 15: Stage 2

Figure 16: Stage 3

2.4 Project Cost Estimate

A preliminary cost estimate for the Outer Harbour development is in the order of $624 million (in 2008 Australian dollars). The cost estimate is indicative only at this stage and will be refined during the detailed design phase.

Quantities were calculated for the major cost items based on the investigations and drawings prepared for the concept design developed during preparation of the Master Plan. The cost estimate is indicative only at this stage and will be refined during the detailed design phase. The indicative estimate was developed by Maunsell and PKPC and includes reclamation and associated basin and berth box dredging, construction of the terminals, and rail extensions and new roads.

Indicative costing for each of the three stages is provided below:

Table 3: Indicative Project Cost

Stage 1	**Cost**
Multi-Purpose Terminal	$52,900,000
Container Terminal	$64,500,000
Dredging	$27,600,000
Reclamation	$42,900,000
Rail	$8,000,000
Road	$2,000,000
Services	$4,000,000
Total	**$201,900,000**
Stage 2	
Multi-Purpose Terminal	$76,500,000
Container Terminal	$50,800,000
Back up Land	$400,000
Dredging	$100,200,000
Reclamation	$18,800,000
Total	**$246,700,000**
Stage 3	
Container Terminal (North)	$101,600,000
Dredging - Container Berth Box (North)	$62,100,000
Reclamation	$25,700,000
Total	**$189,400,000**
Total Option 3D	**$638,000,000**

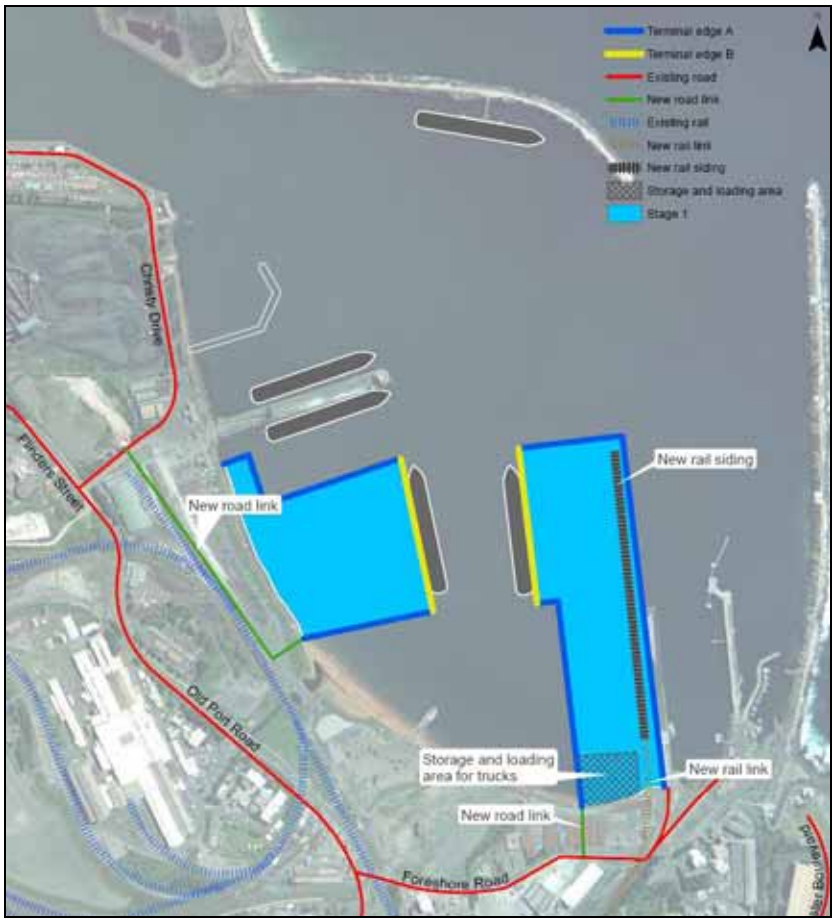
2.5 Key Design and Construction Issues

2.5.1 Stage 1 Berthing Arrangement and Construction Activities

Staged development of the Outer Harbour (see Section 2.3) sees the berthing arrangement at the completion of Stage 1 differ from the final port development. Edge structures for the reclamation undertaken in Stage 1 are either permanent edge structures (edge structures as yellow lines in Figure 17) suitable for vessel berthing or temporary edge structures (edge structures as blue lines in Figure 17) that will become redundant when Stages 2 and 3 of the Port development progresses.

The Stage 1 eastern shoreline reclamation is the multi purpose / bulk berth facility. The Stage 1 southern shoreline reclamation is the container berth facility.

Figure 17 Stage 1 Permanent and temporary edge structures.



2.5.2 Reclamation Fill

It is unlikely that suitable fill will be available from dredging within Port Kembla Inner Harbour in the required quantities for the reclamation works for all stages of the project. For Stage 1 it is likely that the reclamation fill will consist of a combination of iron/steel making slag, coal wash and dredged material from the channel and berthing regions. Fill may also be sourced from major civil and road work projects in the Illawarra and Sydney region, major dredging projects within the region, and continued negotiations with Australian Steel Mill Services (ASMS) to provide slag materials.

2.5.3 Construction Issues

A range of treatment options is available for consolidation of fill material. Selection of the preferred consideration of fill option will occur during the detailed design phase, and will need to be considered in light of environmental, economic and time constraints. Options for further investigation include:

- Leave the materials to consolidate with time under their own weight and the weight of additional overlying fill. This may sterilise the area for many years from commercial use, and will only be applicable to areas not required for commercial development until well into the future.
- Accelerate the consolidation settlement by application of surcharge and installation of drainage (e.g. vertical wick drains) if required.
- Strengthen the materials by inclusions such as piles, stone columns, cement deep mixing and other similar techniques. The reclamation may be able to sustain even higher loadings after such treatment.

- Excavate the soft materials and replace or modify them as appropriate. Excavation options need to be investigated for issues such as the most economical techniques, including the viability of mud-waving, and a suitable location to spoil the soft materials. Treatment could comprise mixing with materials such as cements, sands gravels or slag and replacement. These techniques, however, may be costly.
- In-situ treatment methods, such as vibro-compaction, dynamic consolidation, where granular fill materials are utilised to improve the reclamation.
- Select only materials that can compact quickly under their own weight (e.g. coarser, graded sands and gravels) or set up on placement (slags, self cementing materials).

Dredging of the in situ soft bed material and rock excavation will be required adjacent the berth facility during Stage 1. Survey data will be used to determine the extent of dredging and rock excavation required to accommodate vessels of 14 m draft. Estimated dredge quantities for this task are 350,000 m^3 of soft materials and 70,000 m^3 of rock. The hard rock will be drilled, blasted and excavated using a grab dredge. Silt skirts will be used during all soft dredging activities to contain plume dispersion. Assessment of dredging and rock excavation requirements for locations adjacent to portions of the terminals that will be constructed in stages 2 and 3 will occur during detailed project design.

2.6 Project Timing

Detailed design is expected to commence August 2009, and construction activities for Stage 1 programmed to commence September 2010 and finalised January 2012. Detailed design and construction activities associated with the Stage 1 container berth facility are anticipated to commence upon completion of the Stage 1 bulk berth facility. Detailed design is programmed to commence February 2013, with construction activities carried out between August 2013 and February 2016.

Subject to planning approval requirements, reclamation works not directly related to the construction for stage 1 are expected to commence upon finalisation of Stage 1 works, subject to staged business case reviews. Detailed reclamation design is expected to occur July to December 2013, with construction periods scheduled between June 2015 and February 2018. Stage 2 and Stage 3 project timing has been determined based on current market projections determined in the Outer Harbour Master Plan (Maunsell, 2008). It is anticipated that Stages 2 and 3 will be completed by 2030 and 2040 respectively.

3.0 Statutory Controls and Approval Process

This section describes the approval process for the proposed Outer Harbour development. A detailed flow diagram of the steps involved in the approval process under Part 3A of the EP&A Act is described in Figure 18.

3.1 Commonwealth Environmental Assessment Process

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) requires the approval of the Commonwealth Minister for the Environment and Water Resources for actions that may have a significant impact on matters of National Environmental Significance (NES). Approval from the Commonwealth is in addition to any approvals under NSW legislation. *The EPBC Act* is administered by the Commonwealth Department of Environment Water, Heritage and the Arts (DEWHA).

As of 1 January 2004, the *EPBC Act* also provides for the identification, conservation and protection of places of national heritage significance and provides for the management of Commonwealth heritage places and establishes the Australian Heritage Council.

The *EPBC Act* lists seven matters of NES which must be addressed when assessing the impacts of a proposal, including:

- Nationally threatened species and ecological communities.
- Australia's World Heritage properties.
- Ramsar wetlands of international importance.
- Migratory species listed under the *EPBC Act* (species protected under international agreements).
- Commonwealth marine areas.
- Nuclear actions, including uranium mining.
- National heritage.

Preliminary investigations undertaken to date indicate that the proposed project would not have an impact on the matters of NES. Referral of the project to the DEWHA in accordance with the *EPBC Act* is considered not to be required.

3.2 NSW Environmental Legislation and Assessment Process

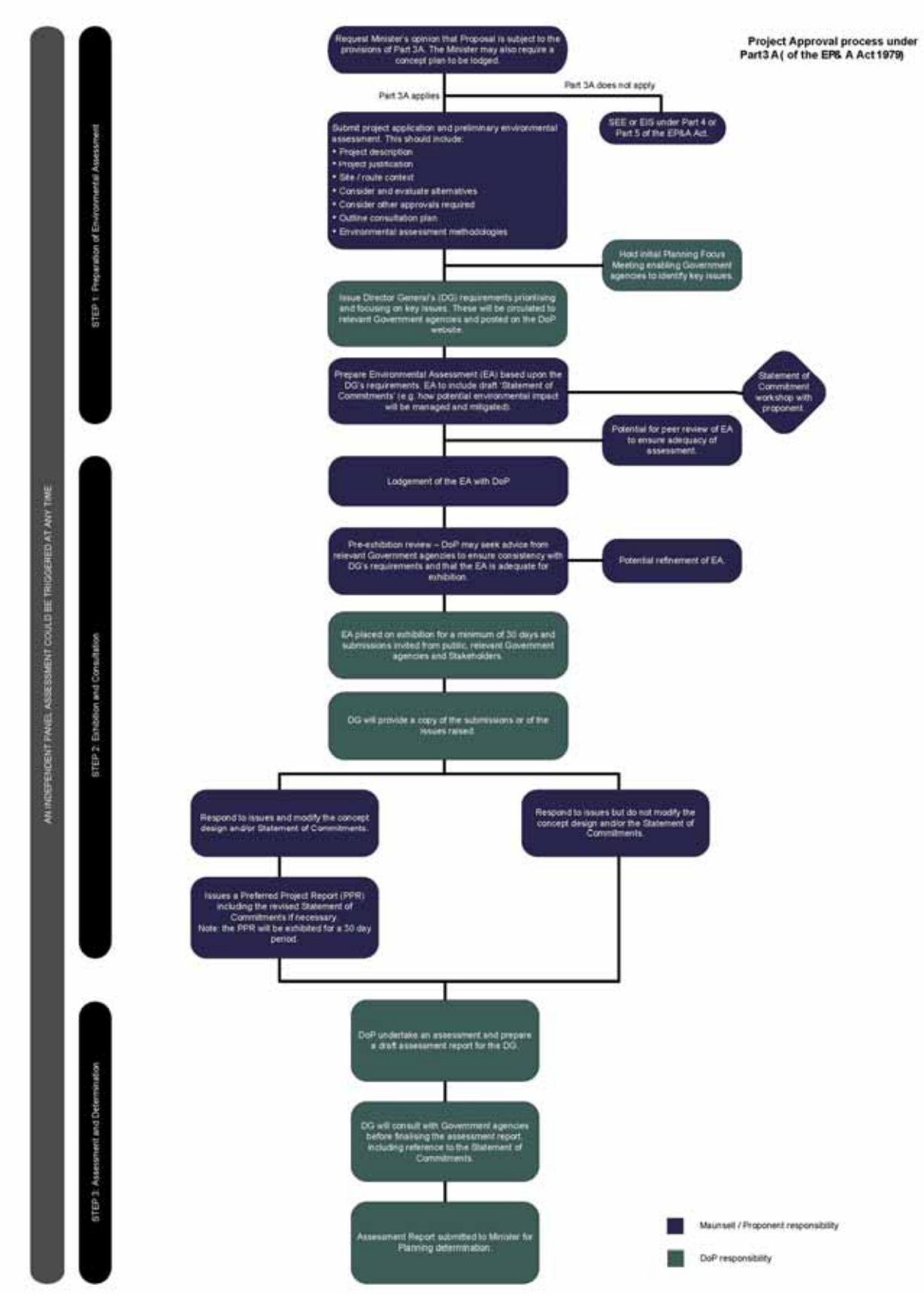
3.2.1 Environmental Planning and Assessment Act, 1979

The *EP&A Act* and the *Environmental Planning and Assessment Regulation, 2000 (EP&A Regulation)* provides the framework for environmental planning in NSW and includes provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement.

The proposed development falls under the provisions of Part 3A of the *EP&A Act*. Part 3A applies to development that is declared by the Minister to be a 'major project'. Under Part 3A, a proponent can seek a project approval or a concept plan approval. In accordance with the provisions of Part 3A of the *EP&A Act*, PKPC is seeking concurrent concept plan and project approval for the proposed Outer Harbour Development. The Environmental Assessment (EA) would consider the impacts of all three stages broadly and provide specific details to enable commencement of all components of stage 1.

This PEA forms the first step in the planning process. It identifies the key issues to enable the Director General to issue the requirements to be addressed in the EA. In turn the EA must provide sufficient detail on the proposal and its potential impacts to inform the NSW DoP, NSW Department of Environment and Climate Change (DECC) and other relevant authorities when assessing the proposed development.

Figure 18: Part 3A approval process



3.2.1.1 Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) relates to pollution management and waste disposal in NSW. The POEO Act also establishes licensing of certain activities, which are listed in Schedule 1 of the Act. Schedule 1 identifies the following:

"Shipping facilities (bulk) for loading or unloading, in bulk, agricultural crop products, rock, ores, minerals or chemicals into or from vessels (but not where any material is wholly contained within a shipping container), being wharves or associated facilities with an intended capacity exceeding 500 tonnes per day or 50,000 tonnes per year.

"extractive activities (including dredging) water based extractive activity involves the extraction of more than 30,000 cubic metres per year of extractive materials."

Clause 47 of the Act specifies that an Environmental Protection Licence (EPL) is required for development of premises for the purpose of scheduled activities.

It is expected that the DECC would issue an EPL for the proposed project in accordance with the shipping facilities and extractive activities definitions of the POEO Act.

3.2.2 Fisheries Management Act 1994

The NSW *Fisheries Management Act 1994* (FM Act) aims to conserve, develop and share the fishery resources of the State for the benefit of present and future generations and applies in relation to all waters that are within the limits of the State.

The FM Act provides for the protection of certain aquatic habitats and species, the preparation of recovery plans and threat abatement plans and the regulation of certain activities that have the potential to impact aquatic habitats. Under the FM Act, approval is required from NSW Department of Primary Industries (DPI) - Fisheries for activities involving dredging and reclamation, blockage of fish passage and development of certain waterfront land.

These relevant approvals under sections 201, 205 and 219 of the FM Act are not required for projects assessed under Part 3A of the EP&A Act. However, the EA would ensure the potential impacts associated with dredging, reclamation and potential impacts on aquatic ecology are assessed in detail.

3.2.3 Contaminated Lands Management Act 1997

The Contaminated Lands Management Act 1997 (*CLM Act*) enables the DECC to respond to contamination issues which present a significant risk of harm to human health and/or the environment. 'Significant risk of harm' refers to the status of a site where the Contamination is considered to be serious and requires regulatory intervention. In some cases, the DECC may decide that the contamination risks can be addressed through the planning process, in which case regulation under the CLM Act may not be required.

The CLM Act sets out criteria for determining whether such a risk exists and gives the DECC the power to:

- Declare an investigation area and order an investigation.
- Declare a remediation site and order remediation to take place.
- Agree to a voluntary proposal to investigate or remediate a site.

The DECC may also direct an organization to investigate or remediate contaminated land. Those directed to investigate or remediate land may appeal against the direction. They can also recover costs from the polluter/s in some circumstances.

The CLM Act also allows the DECC to accredit suitably experienced and qualified individuals as site auditors to review work conducted by contaminated site consultants. The services of a site auditor can be used by anyone who needs an independent and authoritative review of information relating to possible or actual contamination of a site. The review may involve independent expert technical advice or 'sign-off' of contaminated site assessment, remediation or validation work conducted by a contaminated site consultant. Following a review of the work conducted by a consultant, the auditor must prepare and finalize a detailed site audit report. The report must be clearly expressed and presented and contain the information, discussion and rationale that support the conclusions in the site audit statement. The site audit statement will summarize essential findings of a site audit. It includes, where relevant, the auditor's conclusions regarding the suitability of the site for its proposed use.

The site is not currently the subject of any notices or other regulatory actions under the CLM Act. If DECC deems that land contamination may present a significant risk of harm then the proposed project would be subject to the CLM Act and sites would be investigated or remediated as necessary.

3.2.4 National Parks and Wildlife Act, 1974

The *National Parks and Wildlife Act 1974* (*NP&W Act*) governs the establishment, preservation and management of national parks, historic sites and certain other areas, and the protection of certain fauna, native plants and Aboriginal relics.

The *NP&W Act* is relevant to the protection of Aboriginal artefacts and the protection of native flora and fauna. Section 86 of the *NP&W Act* identifies offences relating to Aboriginal objects, including disturbing land to discover an artefact. Section 87(1) of the *NP&W Act* provides for the issue of a permit to remove any artefacts, while section 90 (2) of the *NP&W Act* requires consent from the Director-General of DECC to knowingly destroy, deface or damage an Aboriginal object or Aboriginal place.

The subject site is highly disturbed and therefore it is considered unlikely that the proposed project would have a significant impact on recorded Aboriginal sites. Once the proposal is approved under Part 3A of the *EP&A* Act, it would be exempt from the need for a section 87 permit or section 90 consent. However, potential impacts of the proposed project on cultural heritage is to be assessed in the EA.

3.2.5 Threatened Species Conservation Act, 1995

The *Threatened Species Conservation Act 1995* (*TSC Act*) provides for the conservation of threatened species, populations and ecological communities of animals and plants. This is achieved by the following:

- Conserving biological diversity and promoting ecologically sustainable development;
- Preventing extinction and promoting the recovery of threatened species, populations and ecological communities;
- Protecting critical habitat of threatened species, populations and ecological communities;
- Eliminating or managing certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities; and
- Encouraging the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

The *TSC Act* provides a framework to ensure that the impact of any action affecting threatened species is assessed. Schedule 1 of the *TSC Act* lists endangered species, populations and ecological communities, Schedule 2 lists vulnerable species and Schedule 3 lists key threatening processes. Part 3 of the *TSC Act* defines critical habitat.

The proposed project does not require the removal of native vegetation and the Site is not known to contain habitat for threatened species, populations or ecological communities of animals or plants. However, The Green and Golden Bell Frog *Litoria aurea* (GGBF) is known to occur near the project site. A detailed assessment of the potential impacts of the proposed project on the GGBF and it's habitat would be undertaken as part of the EA and construction and operation management measures recommended.

3.3 Regional Environmental Plans and Strategies

3.3.1 Illawarra Regional Environmental Plan

The aim of the *Illawarra Regional Environmental Plan (REP)* is to maximise the opportunities for the people of the region and the State to meet their individual and community economic and social needs. Part 10 of the REP has specific provision related to *Ports and Harbours*. Specifically part 10 has an objective:

> *to strengthen and expand the existing economic and functional roles of the port of Port Kembla.*

Part 10 of the REP also has specific principles of relevance to the Outer Harbour, including

> *A strategy plan for the utilization of the port of Port Kembla, including the Outer Harbour, should be developed as a matter of priority.*

Since the gazettal of the REP in the 1990's, strategic planning has continued with the ongoing inclusion of the Outer Harbour as an identified future development need. The *Illawarra Regional Strategy* released by the DoP in 2006 and the *2007 Port Kembla Landuse Review Strategy* are two key examples of this continued strategic support for the development of the Outer Harbour.
The proposed Outer Harbour development is consistent with the need identified by the REP and ongoing strategic planning. The proposed project would enable PKPC to continue to strengthen the economic and functional roles of the Port.

3.3.2 Illawarra Regional Strategy 2007

The *Illawarra Regional Strategy* released in January 2007 represents an agreed NSW Government position on the future of the Illawarra region in terms of infrastructure investment, settlement and environmental outcomes between 2006-2031.

The Regional Strategy identified the Port Kembla Precinct as regionally significant employment lands the growth of port activities as an important source of employment and economic activity in the region.

The proposed Outer Harbour development aims to contribute to the continued growth of the Port to provide a significant contribution to the economy of the region.

3.3.3 Port Kembla Land Use Review Strategy

The *Port Kembla Landuse Review Strategy* finalised in 2007 was a collaborative strategy prepared by PKPC, Wollongong City Council and the DoP and provides:

> *a planning and policy framework to capitalise on the opportunities presented by the Port of Port Kembla in terms of contributing to the economic sustainability of Wollongong and the Illawarra/South Coast Region.*

The strategy identifies aspects of the Port including the Outer Harbour as an area of high potential for future growth in trade through wharf and terminal infrastructure upgrades. A specific objective for the Outer Harbour is:

To develop the Outer Harbour as a major new wharf and terminal complex utilising existing assets and infrastructure, and through the reclamation project, to handle a diversity of cargo types.

3.4 State Environmental Planning Policies and State Strategies

3.4.1 State Environmental Planning Policy (Major Projects) 2005

State Environmental Planning Policy (Major Projects) 2005 (SEPP 2005) was gazetted on 25 May 2005 and together with Part 3A of the *EP&A Act* supersedes all previous provisions related to former 'State significant development' in planning instruments, directions and declarations.

The primary aim of SEPP 2005 is:

> '…*to identify development of economic, social or environmental significance to the State or regions of the State so as to provide a consistent and comprehensive assessment and decision making process for that development.'*

SEPP 2005 streamlines the assessment process for Major Projects and ensures that the assessment is carried out within the overall strategic context of the Region. Schedule 1 of SEPP 2005 identifies classes of development, such as the Port of Port Kembla, as major projects. Clause 6(1) of the Major Project SEPP requires the Minister for Planning to form the opinion that a development identified in Schedule 1, 2 or 3 of the Major Projects SEPP is a major project before that development is declared a Major Project in accordance with Part 3A of the EP&A Act. On 10th October 2008 the Director General of the Department of Planning, under delegation of the Minister for Planning, declared the Port Kembla Outer Harbour development to be a project to which Part 3A of the EP&A Act applies. The proposed project is therefore declared to be a Major Project.

Port and wharf facilities are listed in Schedule 1 of the Major Project SEPP as Group 8, Clause 22. The clause states that:

> *"Development for the purpose of shipping berths or terminals or wharf-side facilities (and related infrastructure) that has a capital investment value of more than $30 million".*

The proposed project constitutes development for the purpose of shipping berths and wharf-side facilities, and has a capital investment of approximately $630 million.

3.4.2 State Infrastructure Strategy (2006)

The *State Infrastructure Strategy* outlines planned financial outlays for infrastructure projects in NSW for the 10 years to 2015-16. The *State Infrastructure Strategy* confirms that funding is available for the future development of Port Kembla, allowing for:

- The purchase of Outer Harbour land ($1.5 million);
- Construction of a bridge to access 10 ha of land within the rail balloon loop ($4 million);
- Redevelopment of the Inner Harbour ($86 million); and
- Staged redevelopment of the Outer Harbour ($25 million).

3.4.3 State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP which commenced operation on 2 January 2008 aims to facilitate the effective delivery of infrastructure across the State by:

> (*a*) *improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and*
>
> *(b) providing greater flexibility in the location of infrastructure and service facilities, and*

(c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and

(d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and

(e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and

(f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

The SEPP in effect enables Port Corporations to develop appropriate facilities in port areas without consent. These may include facilities for commercial purposes provided the facilities are on land within the Port. Due to the capital investment associated with the Outer Harbour (Section 3.4.1) the SEPP does not apply.

3.4.4 Three Ports State Significant Sites Proposal, Exhibition Draft May 2008

A proposal for all three Ports of Newcastle, Botany and Port Kembla to be identified as State Significant Sites went on public exhibition from 28 May 2008 until 27 June 2008. The proposed listings details projects on the three ports sites that would automatically go to the Government for assessment under the State's major projects legislation.

In releasing the draft proposal on the 20 May 2008, the Minister for Planning acknowledged that the three ports "*are a crucial provider of jobs and income directly through port related activities, as well as indirectly through the flow on benefits created by the goods that are imported and exported*". The Minister also said that the proposal "*is in recognition of the importance of port employment and industrial lands more generally to the state*" and that the "*status would protect the ports, and industries reliant on access to port infrastructure, from incompatible land uses that may limit their operations*". The proposed Outer Harbour Development is consistent with the intent of the draft listing and would meet the draft trigger of "*Shipping berths or terminals on wharf-side facilities (and related infrastructure) with a capital investment value of more than $30 million."*

3.4.5 State Environmental Planning Policy No.71 – Coastal Protection

State Environmental Planning Policy No 71 – Coastal Protection (SEPP 71) has an aim of ensuring there is a consistent and strategic approach to coastal planning and management. The SEPP applies to the coastal zone. Relevant matters for consideration are listed in Clause 8 of SEPP 71. The applicability of SEPP 71 and matters of consideration will be addressed in the EA.

3.5 Local Environmental Plans

3.5.1 Wollongong Local Environmental Plan 1990

The proposed project would be carried out on land that is part zoned 5 (a) Special Uses - Port and 'unzoned' (area to be reclaimed) under *Wollongong LEP 1990* (LEP 1990). Development for the purpose of a port is permissible with development consent in zone 5 (a) Special Uses - Port. In relation to unzoned land, Part 3, Clause 10(1)(e) of LEP 1990 states that "*development of land not identified as being within a particular zone…may be carried out only with development consent".*

Accordingly, the proposed Outer Harbour project is permissible with development consent under *LEP 1990.*

3.6 Development Control Plans

There are no relevant development control plans that apply to the Outer Harbour area of Port Kembla.

4.0 Consultation

4.1 Overview

The proposed stakeholder and community engagement activities include:

- A planning focus meeting
- Community meetings
- Individual meetings with agencies and business stakeholders as required

A Communications Strategy has been developed to provide the local community and industry stakeholders with information about the Outer Harbour development and provide them with clearly defined opportunities to provide informed feedback.

The Communications Strategy has been designed to build effective and sustainable relationships between PKPC and project stakeholders.

The project team will engage the local community and key stakeholders in a process designed to inform the community of the staged development of the Port Kembla Outer Harbour and facilitate informed feedback from the general community and other stakeholders. The consultation process will address the following elements:

- Provide stakeholders with an overview of the project
- Explain the staged construction phases of the project
- Provide an overview of the environmental approvals process
- Advise stakeholders that the project team is currently seeking feedback on Stage 1 only
- Confirm with stakeholders when and how they will be able to provide feedback

Communication materials produced by the project team will provide accurate and timely information on the project's objectives and construction activities. Communication activities are tailored to each phase of the project, addressing key milestones and maintenance of ongoing relationships with community and stakeholders. The communication approach is aligned with other program management requirements, such as the environmental management approvals.

4.2 Planning Focus Meeting

It is expected that preliminary consultation will occur with key government agencies during a Planning Focus Meeting (PFM) to be held at Port Kembla Training and Conference Centre at the Outer Harbour on Thursday 27 November, 2008. As indicated by the DoP, it is anticipated that the key government agencies will include:

- DoP
- DECC
- Wollongong City Council
- Department of State and Regional Development
- NSW Maritime
- Roads and Traffic Authority (RTA)
- Railcorp
- The Department of Environment, Water, Heritage and the Arts.

Key aims of the PFM are to:

- Provide attendees with an overview of the Master Plan and layout of future development
- Reiterate what PKPC is seeking approval for
- Discuss and document agency concerns and requirements
- Establish stakeholder involvement requirements
- Identify requisite licences and permits not included within Part 3A

The key issues identified at the PFM will be addressed as part of the detailed EA.

5.0 Preliminary Environmental Assessment

5.1 Topography, Geology, Soils and Sediments

5.1.1 Existing Environment

Topography

The Illawarra Region is characterised by a pronounced coastal escarpment, rising 400 m to 700 m above sea level within 12 km of the coast. Port Kembla is located approximately 7 km east of the escarpment, on flat low lying topography of the narrow coastal plain. It is estimated that elevation within the study area is between 2 m and 4 m AHD.

Geology

The study area is underlain by Quaternary alluvium, described as being gravel, swamp deposits and sand dunes (1:50,000 Geological Sheet, 1974). Weathered geology of the area is conducive to sandy soil formation.

Quaternary materials are likely to be underlain by low to medium strength Permian siltstone, shale and sandstone of the Berry Formation, Shoalhaven Group to the centre, west and north of the site; and by melanocratic, coarse grained to porphyritic latite, Dapto Latite, of the Shoalhaven Group to the South (Wollongong 1:50 000 Geological Sheet, 1974). Basement bedrock varies between 11.5 m to 13.5 m across the site.

Soils

Soils onsite are categorised as 'Disturbed Terrain' on the Wollongong 1:100 000 soil landscape series sheet 9029-9129. Disturbed soils are those areas of varied topography, cleared of vegetation, with the top 100 cm of soil disturbed and/or removed. Previous subsurface investigations (cited in CH2MHill, 1999) indicate the site is underlain by imported fill of up to 3.6m depth.

Fill materials across the site include:

- Dark brown gravelly sand with minor clay
- Shallow sandy fill
- Coal wash fill
- Highly plastic clays
- Building material
- Shallow wash and road base

Elevated levels of heavy metals (arsenic, lead, copper, chromium and zinc), total petroleum hydrocarbons and polycyclic aromatic hydrocarbons have previously been detected in fill material. Previous subsurface investigations encountered natural sands, likely aeolian, marine or dune sands, and estuarine sediments below the fill layer. The relatively high permeability of naturally sandy soil is conducive to groundwater flows, which have been found to be moving into the harbour (north-eastward) at approximately 5 m below the surface. Previous groundwater investigations found groundwater to be contaminated with heavy metals (Section 5.2.2), likely sourced from contaminated fill materials and industrial runoff across the aquifer catchment.

Acid Sulfate Soils

Potential acid sulfate soils (PASS) are potentially acidic, waterlogged soil layers rich in iron sulphide; primarily pyrite. They generally occur in low lying areas. When excavation or drainage brings these soils into contact with oxygen, the pyrite is oxidised to form sulphuric acid. If the amount of acid exceeds the neutralising capacity of the soil, and the pH falls below 4, the soils are known as actual

acid sulphate soils (AASS). Acid can run off these soils during rainfall, scalding vegetation and killing aquatic fauna. AASS may also react with concrete and steel infrastructure.

The NSW Acid Sulfate Soil Risk Maps (Department of Natural Resources (DNR), 2002) for Wollongong show the following categories:

- High risk of occurrence of Acid Sulphate Soils in Estuarine Bottom Sediments of the Inner Harbour (extrapolated to be present in the Outer Harbour which is categorised as Ocean and therefore not tested)
- Disturbed terrain for all landward soil

The maps do not distinguish between PASS and AASS.

The presence of AASS is generally limited to coastal/estuarine areas, where ground levels are below + 5 m AHD. Elevations of the site are considered to be less than 5 m AHD. Due to the occurrence of PASS within the Inner Harbour and tributaries, it is considered highly likely that the soils beneath the fill on site would typify AASS. However, due to land activities being limited to Stage 1 and Stage 3 road and rail construction, it is highly unlikely that excavation will expose soils below the variable 3.6 m deep fill layer.

Dredged material from the Inner Harbour has, on occasion, been deposited in the Outer Harbour. The presence of the relocated PASS in the Outer Harbour is not identified on the NSW ASS Risk Maps. PASS dredged and relocated from the Inner Harbour will need to be considered during any mobilisation of Outer Harbour sediments.

Sediments

Sediments of the Outer Harbour are affected by both natural processes, such as tidal flushing and longshore drift, and, to a lesser extent, mechanical mixing from deep draft vessels and wake produced by tug boats.

In the 1990's a reclamation program commenced in the Outer Harbour involving the placement of dredged material from the Inner Harbour in an area along and out from the south eastern foreshore. Materials were derived from the casting basin (Inner Harbour) and No. 4 Bulk Liquids Berth (Outer Harbour) in the 1990's, the multi-purpose berth extension (Inner Harbour) in early 2000's and development of Berths 107 and 103 in 2007-2008. Results of sampling within the disposal area indicate that sediments are comprised of very soft dark grey to black silty clay.

It is anticipated that a grain size gradient exists from the coarse sand and fine gravel sediments around the break wall and mid reaches of the Outer Harbour to the fine silty-clays towards the Cut and Inner Harbour. Following disturbance, coarser grains of sands and gravels tend to settle out of suspension considerably faster than fine sediments of silty-clay. A review of previous studies undertaken for the Outer Harbour revealed that hydrometer test results found the fine sediments, from dredged material of the Inner Harbour, settled out of suspension in sea water within two hours. The dispersion of sediments during dumping/reclamation activities is considered to be limited, assuming tidal and current conditions are adequately assessed.

5.1.2 Potential Impacts

Actions associated with the Outer Harbour development that may result in impacts related to soils include:

- Exposure and/or mobilisation of soils (exposed soil may be mobilised by Aeolian processes, that is, wind blown processes)
- Movement of machinery

- Site management procedures (including unsecured stockpiles of reclamation material)
- Potential exposure of dredged PASS to oxygen during movement and/or disposal of sediments
- Importation of potentially contaminated soils

The greatest potential for soil exposure and mobilisation will occur during excavation and construction activities associated with construction of the rail link from the existing rail line to the new container berth, and road link from and to Christy Drive to the new bulk terminal, during Stage 1 and Stage 3; or from stockpiles of spoil and fill material to be used for reclamation.

As a result of dredging and reclamation activities, potential impacts on harbour sediments include sedimentation and turbidity of the water column.

5.1.3 Methodology for Environmental Assessment

Soils

During the preparation of the EA, consideration will be given to developing effective and practical erosion and sediment control measures for construction and operation of the development. The objectives of the control measures will be to:

- provide a practical and logical staging program for the erosion and sediment control measures
- control the erosion of soil from disturbed areas on the site
- limit the area of disturbance to those locations necessary to construct the new roads, rail link, and reclamation area
- protect downstream water quality
- prevent any sediment laden water from entering Salty Creek, Darcy Road Drain, and the Outer Harbour
- establish an ecologically sustainable system of pollution control works during construction (including dredging and reclamation activities)

A comprehensive Soil and Water Management Plan will be developed for the site as well as a methodology for validation of fill material suitable for use in reclamation.

The control measures will address all the potential environmental impacts of erosion in consideration of the above objectives. The measures will form the basis of the draft Statement of Commitments to be included within the EA report.

Acid Sulfate Soils

During the detailed environmental assessment, consideration will be given to exposed soils, characterised as disturbed, to be tested for AASS potential. ASS investigation will need to incorporate variable soil characteristics, local environment sensitivity, and the nature of disturbance.

Where applicable, any removal of PASS dredged material to land, in addition to mobilisation of disturbed soils potentially confirmed to be AASS, will need to be handled carefully and in accordance with an Acid Sulfate Soil Management Plan. Preference will be given to disposal/placement of PASS in locations beneath the water to avoid exposure to oxygen. The addition of neutralising substances, such as lime, to the dredged sediments is unlikely to be required if soils are placed into seawater because of its buffering capacity.

Sediments

Sediment sampling and hydrometer testing will be carried out within the Outer Harbour to assess dispersion and re-suspension potential associated with dredging activities. Results will be used to identify appropriate mitigation measures to be implemented during periods of sediment disturbance, for example, silt curtains, to be used during dredging and reclamation activities.

5.2 Contamination

5.2.1 History

Port Kembla was first developed in the late 1800's to support the coal industry in the Illawarra region. The first Jetty was constructed on Five Islands Point in 1883 to service coal loading from the Mount Kembla Coal and Coke Company. In the 1920s the Hoskins Steelworks was developed which contributed significantly to the growth of the Port. By the 1960s, six jetties had been constructed in the Outer Harbour and coal export operations were transferred to the inner harbour.

The jetties that support berths 202-205 and berth 206 were originally constructed to service the needs of BHP and the growing demand for larger vessels. During the1970's further construction resulted in the addition of bulk cargo berths and deepening of the Inner Harbour.

The Outer Harbour foreshore is considered to be the land between the jetty that currently houses the tug boats, the jetty utilised by Port Kembla Gateway and Foreshore Road and Old Port Road. The land along the foreshore has been used for over 60 years for industrial uses which include a power station, a coke works, ship building yards, material stockpiling, electrical equipment storage, rubbish dumping and metals fabrication.

Activities at the PKPC storage facilities and berth 206 in the Outer Harbour include a quarantine zone. The jetty closest to the eastern breakwater has also been used for the import and export of sulphuric acid since the early 1970s. Fertiliser and cars have previously been unloaded from the jetty where the tug boats are currently located.

Current facilities and berths include a Coal Terminal, Grain Terminal, Bulk Liquids Berth, Oil Berth, Eastern Basin No.4, and various products berths, multi-purpose Berth.

5.2.2 Existing Environment

Site condition

A range of heavy industries, both on adjacent lands and onsite, have been supported by the Outer Harbour foreshore including fertiliser production (Incitec), copper smelting (PK copper), coke works, steel production, steel coating scrap metal and a power station. Current industrial operations on adjacent lands to the Outer Harbour foreshore include Brick and Block Masonry products manufacture, Morgan Cement, BlueScope Steel and BHP Billiton.

Heavy industry and land reclamation have left behind a legacy of contamination issues both on shore and off shore. The soil and water column in the Outer Harbour area are known to contain a range of contaminants at varying levels of concentration and significance. The proposed areas for development are typically constructed of fill placed over estuarine sediments. Sources of contamination include the use of slag for seawall construction, fill materials, spilled and dumped contaminants associated with industrial activity and filling with contaminated dredged sediments.

Geology and Soils

The 1:50,000 Geological sheet of Wollongong (1974) indicates that the Port Kembla area is underlain by Quarterly Alluvium which includes estuarine muds, alluvial gravel, beach and dune sand. This is underlain by melanocratic coarse grained porphyritic latite (Dapto Latite of the Shoalhaven Group).

The Wollongong 1:100,000 soil landscape series sheet 9029-9129, published by the Soil Conservation Service of NSW indicates that the Outer Harbour area is located on disturbed soils. Much of the land within the Outer Harbour area is reported to have had the top 100cm disturbed or removed.

Extensive filling of sites along the Outer Harbour foreshore has taken place which has resulted in the presence of various types of fill which including silts, sands, topsoil, silty gravelly clays, gravels, boulders, rock fragments, ash, asphalt, slag, black coal wash and building rubble. Fill materials contain variable elevated concentrations of heavy metals which include arsenic, lead, copper,

chromium and zinc. Elevated concentrations of total petroleum hydrocarbons (TPH) and poly aromatic hydrocarbons (PAH) are also present in the fill materials. One area of the foreshore where PAH contamination has occurred has been capped with lime.

Copper and asbestos contamination has previously been identified in surface soils within the eastern portion of the former power station site. Some of the copper concentrate/sweepings and asbestos fragments have been removed, however complete removal was not considered practical at the time. Some areas impacted with PAH and/or heavy metals have been capped with 0.2 to 0.5 m of blast furnace slag and some areas have been fenced off to restrict access. Blast furnace slag has been used as fill, as aggregate in concrete and as ballast extensively in the Port Kembla area. According to Patterson Britton (December 2005), no proven incidents or damage to the environment from use of blast furnace slag have been identified.

PASS are likely to be present beneath the water table. Concrete and/or steel structures in contact with PASS may be susceptible to sulfate attack due to high sulfate concentrations.

Potential impacts to soils and geology on the site may result from the following activities:

- Earthworks may result in the excavation of contaminated fill materials and accidental spillage of contaminants or stormwater during development, which will need to be appropriately managed in order to protect the health of construction workers and the environment during the works
- Earthworks may disturb areas within the Outer Harbour where contaminated materials have been capped as part of a remediation strategy. Capped areas will need to be identified and materials excavated from these areas will need to be managed according the concentrations of contaminants within the material
- Earthworks including installation of stormwater drainage channels and services may contribute to sedimentation, erosion and disturbance of ASS and the subsequent generation of contaminated sediment laden run-off which will be managed in accordance with the Soil and Water Management Plan for the site

Water Quality

Groundwater within the Outer Harbour area varies between 1.7- 4.9m below grade. The variance in groundwater levels is most likely attributable to the difference in porosity of the fill materials and as a result of the past reclamation activities in the Outer Harbour. Groundwater flow in the Outer Harbour is generally towards the north east.

The industrial nature of Port Kembla hinterland and industrial activities, such as copper smelting and coke making, has resulted in regional impacts to groundwater quality, and in turn, a metals plume for the general Port Kembla industrial area.

The regional impacts have also affected the quality of groundwater at the Outer Harbour. Historical data indicates that for existing groundwater monitoring wells in the eastern half of the Outer Harbour area around Foreshore Road, a consistent pulse of metalloid/metallic contaminants has been present since 1996. Variable elevated concentrations of heavy metals (arsenic, cadmium, copper, lead, nickel and zinc) and PAHs are present in the groundwater. The PAH concentrations in groundwater are generally considered to be localised and associated with PAH impacted soils.

A shallow groundwater gradient, combined with the variability of fill materials used along the foreshore suggests that groundwater flow rates may not be greater than 5m/year with little tidal influence or fluctuation. Although the data suggests that flow is towards the Outer Harbour from the foreshore, groundwater monitoring data to date suggests that in general contaminant concentrations decrease adjacent to the shoreline, which suggests this may be due to dilution and dispersion.

Potential impacts to water quality may result from:

- The creation of preferential pathways between the contaminated fill materials and the deeper aquifer beneath the Port Kembla Harbour
- Migration of contaminated groundwater to the Outer Harbour receiving waters as a result of construction and or reclamation activities
- The release of sulphuric acid from disturbed ASS, which may drain into the harbour/stormwater system
- Generation of sediment plumes and the subsequent transfer of contaminants from dredging and reclamation activities within the harbour area. The use of turbidity (silt) curtains and/or eco dredging techniques will need to be employed during the proposed development
- Accidental spillage of potential contaminants, and the release of contaminated stormwater runoff from the site

Design measures and appropriate management controls during construction will be incorporated into the proposed development in order to minimise potential impacts to water quality. Measures will include bunding to contain potentially contaminated stormwater runoff, and capture, monitoring and treatment of stormwater.

Sediment Quality

Historically, Port Kembla has accumulated annually some 16,000-20,000 cubic meters of sediment. Sediments within the harbour have accumulated due to the ongoing deposition from stormwater events.

Several phases of sediment sampling and physio-chemical characterisation have been undertaken in the past which have revealed contamination mainly due to run off from the surrounding urban and industrial catchment. Sampling of sediments within the harbour has indicated the presence of elevated concentrations of heavy metals, PAH and other contaminants.

Results of sediment sampling undertaken within the harbour in 2005 indicated that the 95% Upper Confidence Levels (UCLs) for the majority of the contaminants of concern were above the *Interim Sediment Quality Guidelines* (ISQG) Low values. The 95% UCLs of the mean for copper, lead, mercury, silver, zinc and naphthalene were also above the ISQG high. With respect to the proposed re-use of dredged materials within the reclamation area, comparison of the analytical results to land use criteria indicated that the sediments were suitable for placement within the reclamation area for commercial land use.

The estuarine materials within the harbour are PASS. Exposure to air should be minimised and material must be placed/disposed in locations beneath the water. Dredging and reclamation activities will need to be undertaken in a manner which ensures that sediments are not exposed to oxidising conditions (exposed to air) and if sediments are to be placed in areas where they may be exposed to air then, treatment with lime before placement may be necessary.

Summary of Contamination Issues

Contamination issues to be considered in the study area during the detailed environmental impact assessment of the proposed Outer Harbour development include:

- Nature and extent of existing land contamination in land areas subject to excavation during construction of the project
- Contamination associated with recently placed dredged sediments
- Groundwater contamination associated with existing soil and sediment contamination
- Suitability of existing contamination for the proposed Outer Harbour development and any remediation or site management requirements
- Potential for ASS soils to be disturbed

- Potential for new or on-going contamination of groundwater and potential discharge from filled areas into the harbour waters
- Occupational health and safety and environmental protection requirements for development activities in contaminated areas
- Soil handling, treatment and disposal during development
- Acceptable concentrations of contaminants in development areas and potential remediation requirements to enable development to proceed or to protect groundwater and the environment from further or potential damage
- Potential for Significant Risk of Harm as defined by the CLM Act and potential involvement of the NSW DECC in approving investigation, remediation and development of potentially contaminated areas

5.2.3 Methodology for Environmental Assessment

The potential contamination impacts and required mitigation measures will be investigated further as part of the detailed environmental impact assessment. The methodology proposed is discussed below.

Data and Legislative Review

A number of land based contamination studies and sediment dredging studies exist for a range of industrial sites which border Port Kembla harbour. These studies will be reviewed in detail as part of the EA and include the following:

- Coffey Geotechnics Pty Ltd (2006). "*Draft Report - Groundwater Assessment Port Kembla Port Corporation, Corner Old Port Road and Christy Drive, Port Kembla, NSW*", October
- URS Australia Pty Ltd (2006). "*Port Kembla Corporation – Outer Harbour Groundwater Monitoring Event, Port Kembla, NSW*", February
- Patterson Britton & Partners (2005). "*MPB3 and EB4 Dredging and Disposal of Material to the Outer Harbour*", December
- Patterson Britton & Partners (2005). "*Port Kembla Outer Harbour Reclamation Area Sediment Sampling and Testing*", November
- URS Australia Pty Ltd (2004). "*Phase II Environmental Site Assessment, Port Kembla Port Corporation, Inner and Outer Harbour Soil and Groundwater Assessment, Port Kembla NSW*", June
- Absolute Environmental (2004). "*Groundwater Monitoring Well Installation and Groundwater Monitoring Program – Proposed Hyrock Site, Eastern Corner Old Port Road and Christy Drive, Port Kembla, New South Wales*", May
- Egis Consulting NSW Pty Limited (2002). "*Preliminary Site Investigation – Old Port Road, Port Kembla, NSW*", November
- IT Environmental (Australia) Pty Ltd (2002). "*Environmental Site Assessment – Vacant Land Near Jetty No. 3, Foreshore Road, Port Kembla*", August
- CH2M HILL Australia Pty Ltd (1999). "*Port Kembla Port Corporation – Proposed Outer Harbour Development Hydrogeological Study*", October
- Fluor Daniel GTI (1998). "*Environmental Management Plan – Port Kembla Outer Harbour Land, Port Kembla NSW*", June
- Fluor Daniel GTI (1998). "*Summary Environmental Report – Port Kembla Outer Harbour Land, Port Kembla NSW 2505*", March
- CMPS&F Environmental (1995). "*Groundwater Study of the Former Electricity Commission Site (no. 6 Jetty)*", October
- CMPS&F Environmental (1995). "*MSB - Illawarra Ports Authority, Qualitative Human Health Risk Assessment for Port Kembla Outer Harbour Land*", February
- CMPS&F Environmental (1994). "*MSB – Illawarra Ports Authority, Contamination Assessment of Port Kembla Outer Harbour Vacant Land Parcels*", October

- CMPS&F Environmental (1993). "*Site Assessment Investigation of Former Electricity Commission Site for the Illawarra Ports Authority*", October

A review of potentially applicable contamination management legislation and guidelines will be performed to ensure that subsequent stages of work address statutory requirements. NSW legislation including the *CLM Act,* the *POEO Act* and NSW planning regulations pertaining to contaminated sites, and NSW and *NEPM guidelines* on the assessment of contaminated land, groundwater and sediments will form part of the review.

The information from the environmental review will be incorporated with the information from the legislative review and a conceptual site model will be developed for the Outer Harbour.

Conceptual Model

Available data and site observations will be consolidated to complete a Conceptual Site Model which describes the site history, geology, hydrogeology, nature and extent of contamination and potential migration and transformations of contaminants. If significant data gaps are identified, the scope of additional investigations will be designed at this stage.

Impact Assessment of Proposed Development

The proposed Outer Harbour development will be evaluated with reference to the Conceptual Site Model to identify those areas where contaminated materials may affect the development.

5.2.4 Mitigation Measures

Mitigation measures will be outlined to address the management of contamination as part of the development and operation of the new development. Measures to be considered will include:

- Environmental management plans for construction and operational phases
- Relocation of development components to avoid disturbing contaminated materials
- Remediation (active and passive) or containment of contamination
- Monitoring and maintenance requirements
- Implementing a Soil and Water Management Plan
- Sealing/capping impacted areas and locating building structures and storage areas in appropriate locations
- Groundwater interception trenches, vertical reactive barriers and/or permeable treatment walls, if required
- Sediment and erosion controls
- Long-term groundwater monitoring
- Use of turbidity (silt curtains) during dredging and land reclamation
- Treatment of ASS where the potential exists for exposure to air and preparation of an Acid Sulfate Soil Management Plan if required

5.3 Hydrology and Water Quality

5.3.1 Existing Environment

Water Quality

The proposed Outer Harbour development has the potential to affect water quality during both construction and operation. During construction, there will be impacts due to land and water-based activities including reclamation and dredging. On land, potentially contaminated soils will be disturbed

and runoff from these soils as well as spills and leaks from fuels, construction operations and equipment have the potential to affect surface water quality.

In the Outer Harbour, surrounding industrial development and operation of the Port have led to pollution of sediments and the water column with heavy metals, cyanide, ammonia and phenol. There have been concerted efforts to clean up Port Kembla Harbour since the 1970s. This has led to substantial reductions in the concentrations of cyanide, phenol, iron and zinc and small reductions in ammonia while copper, lead and cadmium levels are still high. Construction activities will involve disturbance of bottom sediments which has the potential to release contaminants into the water column in addition to causing high levels of turbidity.

Once the new terminals are operational, there is potential for spillage of oils, and other impacts to water quality resulting from throughput of cargo and bulk materials, and release of ballast water into Port waters.

Hydrology

Port Kembla is located on flat low lying topography of the narrow coastal plain. Surface water flow from the proposed development will drain into Port Kembla Outer Harbour.

Hydrodynamics and coastal processes

A study focusing on hydrodynamics and coastal processes has been recently completed by Maunsell, in association with Cardno Lawson Treloar, to consider the feasibility of the Outer Harbour development and, in turn, inform the Master Plan and Part 3A environmental assessment. The focus of the study was to provide context on the wave dynamics within the Outer Harbour and the effect this has on the proposed development.

The approach for the wave dynamics study comprised a comprehensive review of previous work done on wave dynamics in the Outer Harbour, including field measurements and basin scale modelling, additional original field data capture and analysis, a comprehensive literature review, and numerical modelling of swell and long waves relevant to the Outer Harbour.

The study revealed that there are many possible seiching modes within the Outer Harbour. Harbour seiching is the formation of standing waves resonating within an enclosed or semi-enclosed water body that results from long wave formation within the harbour basin and subsequent reflections from the basin walls. Excessive ranging from seiching occurs, on average, around 12 days per year in the existing Outer Harbour, which is unacceptable for a major working port.

Further field studies and modeling work will be undertaken to develop the detail for the Outer Harbour reclamation in respect of wave dynamics, this will comprise:

- Undertaking long wave analysis for each stage of the proposed development
- Undertaking mooring modeling
- Using the PKPC existing wave gauge on an opportunity basis to obtain further field data on long waves and analyzing those data to add to the database.

The objectives of the study are to tune the harbour with the reclamation is such a way so as to eliminate as far as possible the occurrence of dangerous seiching.

Findings of the wave modeling and hydrodynamics will be utilised to assess the potential impacts associated with the development on hydrology and water quality within the Outer Harbour.

5.3.2 Methodology for Environmental Assessment

Water Quality

The methodology to assess impacts on water during stage 1 will include a review of existing water quality data construction, the potential for disturbance of contaminated soils on land will be identified by soil testing. A Soil and Water Management Plan will be developed to minimise the impact of surface water runoff on the receiving waters.

Hydrology

The amount of runoff from the proposed development will be modelled to calculate runoff volumes and allow the design of the stormwater system and treatment devices. Opportunities for stormwater capture and reuse will be recommended for incorporation into detailed design. The location of potential spills and leaks will be identified and appropriate management measures developed. Measures for dealing with chemical laden surface water runoff following a fire will also be identified.

The effect of the reclamation activities on the discharge location and flow regime of Salty Creek will be investigated.

5.3.3 Mitigation Measures

Measures that will be investigated to mitigate impacts are:

- Development of a Soil and Water Management Plan for land-based activities including
  - temporary measures such as sedimentation ponds and silt fences
  - diversion of clean water around the works site
  - resealing and revegetation of exposed areas as soon as possible
- Development of a detailed plan for controlling sediment during dredging and fill placement including the use of appropriate silt curtains to contain turbidity
- Implementation of best practice environmental controls during operation to minimise potential for oil and other spills from vessels, exchange of ballast water and antifouling agents
- Spill containment structures
- Collection and reuse of stormwater on site where possible
- Control and treatment of potentially contaminated stormwater runoff
- Stormwater treatment devices

5.4 Traffic and Transport

5.4.1 Existing Environment

Strategic Road Network

The Southern Freeway currently provides the primary road link between Sydney and Wollongong and is an authorised B-double route. The Southern Freeway is split into two sections, with the northern section running between Waterfall and Bulli Tops along the ridge of the Illawarra Escarpment, whilst the southern section runs between Gwynneville and Yallah, after which it rejoins the Princes Highway.

Mount Ousley Road is the major route up and down the Illawarra Escarpment and serves as the gateway to Wollongong. Developed to provide an alternative connection to the Bulli and Mount Keira Passes through the escarpment, Mount Ousley Road provides a connecting link between the two sections of the Southern Freeway, to form a continuous road link from the southern fringes of Sydney into the heart of the Illawarra. The southern end of Mount Ousley Road is characterised by a gradient (ranging from 6-9%) and the incline near Mount Keira reduces the speed of heavy vehicle traffic. These constraints combine to create a potential pinch-point in the corridor between Sydney and Wollongong.

After recommencing at the foothills of Mount Keira, the Southern Freeway is the primary freight route to Port Kembla. Although the Southern Freeway is a high quality road link, its ability to serve as an arterial connection between Wollongong, Sydney Airport, Port Botany and the Sydney motorway network is undermined by the lack of similar standard roads through Southern Sydney.

Picton Road provides a key connection between Western Sydney and Wollongong connecting Mount Ousley Road and the Hume Highway. As congestion on the Sydney road network increases and as significant population and employment centres become established in western Sydney, this route will increase in importance as an alternative inland corridor for freight traffic between Sydney and Wollongong. The importance of this road corridor has been enhanced by the recent opening of the M7 Motorway.

Appin Road connects the Southern Freeway just north of Bulli Pass with Campbelltown and the Hume Highway, running parallel and to the north of Picton Road. Significant volumes of trucks use this route (approximately 15% of total traffic) for hauling export coal from the West Cliff colliery through to Port Kembla or to coke works as feedstock. The route provides a good connection to serve the Minto industrial area whilst avoiding the Hume Highway (unlike Picton Road to the south).

External and Internal Road Network

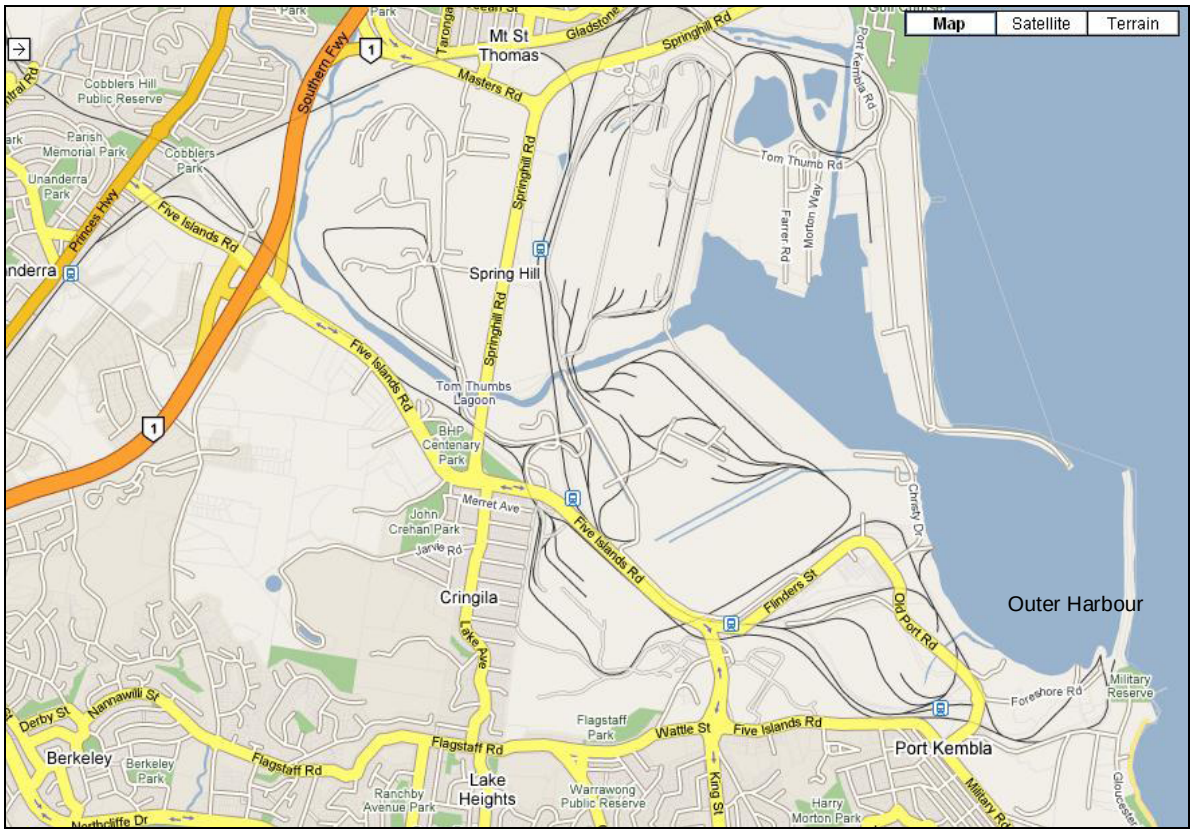
The external and internal road network is shown on Figure 19. Springhill Road provides a southern arterial link into the centre of Wollongong as well as passing through the Port Kembla industrial area. It currently forms the western boundary of the Inner Harbour and the majority of freight accessing the Inner Harbour must use or cross this road. It is a major connector to Five Islands Road which is the main access route to the Outer Harbour.

Masters Road connects Springhill Road to the Southern Freeway and is the main access route between Port Kembla and all destinations both north and south. Five Islands Road is also a major link to Port Kembla from the Southern Freeway and Princes Highway. The road links to Springhill Road and Flinders Street and provides access to both the Inner and Outer harbours.

The Outer Harbour is accessed from the arterial network by a ring road consisting of Flinders Street, Old Port Road and Five Islands Road. These roads primarily pass through an industrial area although they are also in close proximity to the residential areas of Port Kembla.

In contrast to the Inner Harbour, the Outer Harbour has a relatively poor road network. Foreshore Road provides access to the Outer Harbour and boat harbour (adjacent to the Eastern Breakwater) from Old Port Road, while Christy Drive leads to berth 206 and continues northwards to Jetty 6.

Figure 19: Existing Outer Harbour Internal and External Road Links

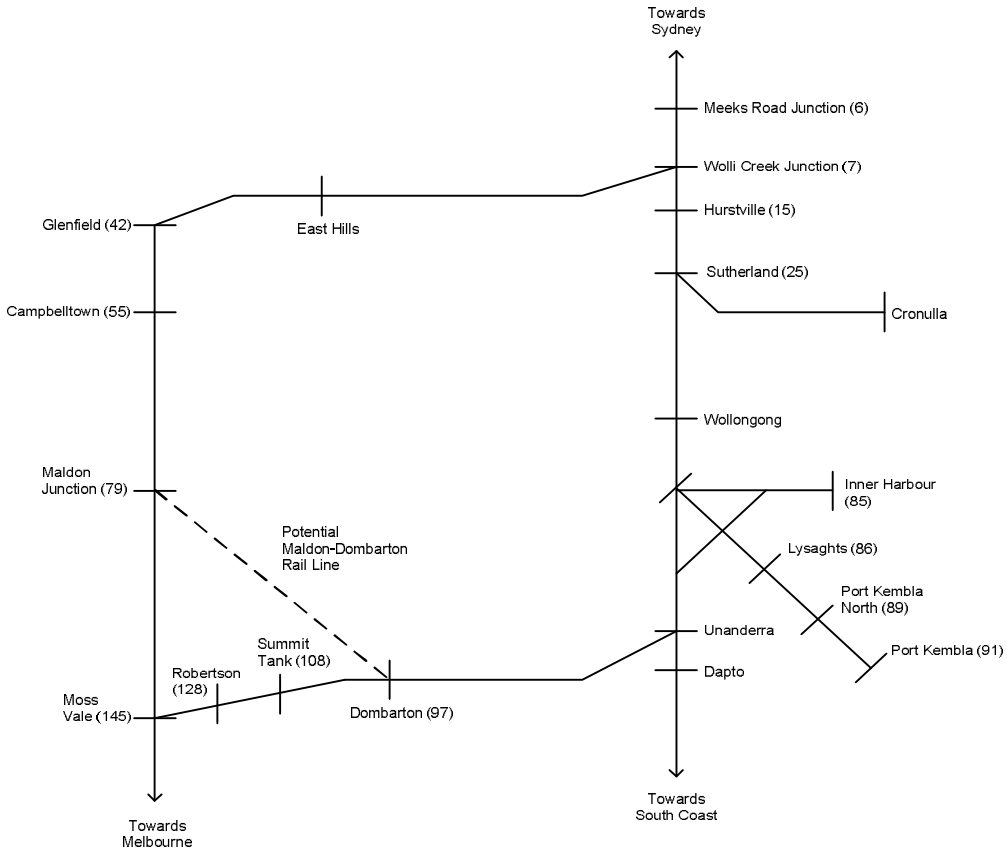


Source: Google Maps

Rail Network

The main railway lines serving Port Kembla are summarised in Figure 20. These include the Illawarra and South Coast Line and the Moss Vale to Unanderra Line. The former links Sydney with the NSW South Coast, whilst the latter provides an east-west connection from Port Kembla through the Illawarra escarpment to the Southern Highlands and the Main South Line. From the Main South Line it is possible to access either Sydney or Melbourne.

Figure 20: Rail Network in the Vicinity of Port Kembla



Source: Maunsell, 2008
Note: Figures in brackets are kilometre distances from Sydney

Rail freight movements on the Illawarra/South Coast Line focus upon Port Kembla as the ultimate destination, or in some cases, the origin. All rail traffic between Sydney and Wollongong utilises the Illawarra Line/South Coast Line and it primarily caters for coal traffic from the Western Coalfields and from colleries located along the line. A number of other commodities are also handled by rail including:

- Stone and ballast from Dunmore (Shellharbour) to Enfield in Sydney
- Steel products from Port Kembla to Sydney (for domestic and export via Port Botany) and interstate destinations
- Flour and grain services from regional NSW and Port Kembla for export, and Bomaderry for domestic production
- Containerised freight between Bomaderry and Cooks River Rail Yard

5.4.2 Potential Impacts

Whilst the mode split of cargo to and from the Outer Harbour will be determined to a large extent by the types of products hauled, and hence the detailed road and rail requirements, there are a number of general issues which need to be considered concerning transport access.

Strategic Road Network

The most direct link between the Outer Harbour and the Southern Freeway is Five Islands Road. As there is no southern access to Masters Road (the main entrance to the Inner Harbour) from the

Southern Freeway, the Five Islands Road and Springhill Road junction is used by all trucks, travelling from the south accessing the Inner Harbour. Although the number of truck movements to and from the south to the Inner Harbour is low, this will increase as a result of the relocation of the Port Jackson trade and further trade growth. The development of the Outer Harbour will put increased strain on this junction as a certain proportion of Outer Harbour trade will be by road. Consequently, one of the key areas for further study as part of the detailed environmental impact assessment of the proposed Outer Harbour development will be to assess the future of the Five Islands Road and Springhill Road interchange to ensure adequate capacity is provided.

Further away from the Port, the main access route north is either via the Southern Freeway and Princes Highway to southern Sydney or alternatively via Picton and Appin Roads to south west Sydney. In either case trucks are required to travel up the escarpment via Mount Ousley Road. Given the steep gradients, trucks travel slowly on this link and this causes congestion at peak times with general car traffic. The recent Sydney to Wollongong Corridor Study carried out as part of AusLink studies identified this route as a potential pinch point on the network as general car traffic increases in the next 20 years. Furthermore, it indicated that this increased congestion could impact on the efficiency of road freight transport. The potential impact of Outer Harbour traffic on this route will need to be assessed.

External and Internal Road Network

The impact on the local road network will also need to be considered. The main roads currently accessing the Outer Harbour, namely Flinders Street and Old Port Road, may need to be improved to cater for an increased level of traffic. Such improvements might include improvements to pavement strength, improved turning radii for long vehicles, as well as provision of potential grade separation to cross operational rail lines to remove potential conflicts and safety hazards. However, such improvements will need to be phased over time to match increase in trade volumes transported by both road and rail from the Outer Harbour.

The preliminary transport impact analysis indicates that for the trade forecast scenarios provided by PKPC, with an emphasis on container trade (which will be increasingly transported by rail), there is likely to be an increase in the number of trucks accessing the Outer Harbour. However, it is likely that some of the road junctions will need to be examined to determine whether there is adequate capacity to accommodate the remaining projected traffic volume. Should the trade throughput emphasis swing away from the container trade, then the increased truck traffic from transporting other bulk products could lead to road congestion, noise and air quality impacts during peak periods. Such an outcome will require capital investment in road infrastructure.

Rail Network

The Port is fortunate in that it has a number of purpose-built rail facilities within the Port boundary. However, the main constraint to rail usage is the capacity restriction with regard to access to the main line rail network at certain times of the day between Wollongong and Sydney. This is caused by a growing demand for passenger rail services which compete for track capacity, particularly during peak rail periods. CityRail passenger forecasts indicate that passenger rail trips on the Illawarra Line are expected to increase by 68 percent between 2001 and 2021. Given the interaction of passenger and freight operations in Sydney and the preference given to rail passenger services over freight operations during the morning and evening peak periods, this projected growth in passenger traffic has the potential to increase the already significant constraints on freight operations from the Port.

Based on information from RailCorp[1], an average of 12 freight train paths occur on the Illawarra/ South Coast Line in each direction on an average weekday. Given the unfavourable geography which will make any capacity enhancement very expensive, and the ongoing competition for passenger service usage, it is unlikely to be feasible to use the Illawarra/South Coast Line to South Sydney to transport significant freight volumes in the future. Most freight paths on this line are likely to be used for coal

[1] RailCorp, Sydney Metropolitan Rail Network: Accommodating Freight Beyond 2015, prepared for the Department of Transport and Regional Services North South Study Deficiency Workshop, September 2006

traffic from the Western Coalfields to Port Kembla as well as container services from the South Coast to Sydney.

The Moss Vale to Unanderra Line provides an east-west connection between the main South Line and the Illawarra Line. The line is currently dedicated to freight and provides an alternative between Sydney and Wollongong. Although the line allows Port Kembla to Melbourne freight to bypass Sydney, more often than not, due to operational constraints associated with grades, curves and rolling stock issues, trains utilise lines in the Sydney metropolitan area rather than traverse the Moss Vale line.

Based on preliminary studies undertaken during the Master Planning process, in terms of rail, there appears to be adequate rail capacity in the short term to handle the expected cargo volumes. However, there is likely to be a requirement for additional capacity post 2020. This will be investigated further as part of the detailed assessment.

Depending on market conditions at the time, it is possible that this capacity enhancement will be required in either of two possible locations. One option might be to upgrade the existing Port Kembla to Moss Vale railway line to provide additional capacity which might include infrastructure improvements to reduce track gradients, lengthening passing loops or double tracking. The other alternative might be to provide new dedicated rail freight access to the Port through the completion of a new line between Maldon and Dombarton, which requires approximately ten kilometres of track, including a four kilometre tunnel to complete the link. The development of the Outer Harbour could provide the support for the completion of the link (Section 1.6.3.6). If completed, this link would have the advantage that it would bypass much of the existing congested Sydney rail freight network and provide direct access to south west Sydney, which is expected to become the main industrial area in Sydney in the next two decades. Provision of this link would enable a much larger rail mode from the Port.

Whichever rail option is pursued, it is important to remember that it will need to be supported by the development of an intermodal facility at the other end of the line from the Port. It is understood that there are plans for the development of such infrastructure in a number of locations in South West Sydney. For example, Wingecarribee Shire Council already has plans to develop an intermodal terminal in the vicinity of Moss Vale, adjacent to the junction with the Main South Line. Likewise, there are a number of other sites currently proposed for intermodal facilities such as in the vicinity of Moorebank near Liverpool. It is important that these sites are planned carefully in order to take maximum advantage of any expansion at Port Kembla and supporting road and rail infrastructure.

5.4.3 Methodology for Environmental Assessment

The environmental assessment methodology for assessing the road and rail impacts will involve the following procedures:

- In terms of the conceptual plan for the complete Outer Harbour development, an assessment of the total road and rail traffic generated and the ability of the networks to accomodate the additional traffic will be reviewed

Construction Phase

- For the construction phase(s) of Stage 1 of the Outer Harbour development, an assessment of the amount of traffic generated – this would include the number of vehicle and truck movements associated with the various construction activities, the period and timing of construction activities and the routing of the vehicles/trucks for each construction activity
- Review of the impact of the additional traffic demand on the existing road network and expected impacts at the key intersections
- Recommend measures necessary to mitigate expected impacts during construction

Future Operation

- Assess the volume of traffic to be generated during the operation of the Stage 1 development – this would include both truck and rail movements associated with the dry bulk and multi-purpose terminal
- Review the internal operations to ensure its impact on the external road network is minimised
- Review the impact of the additional traffic demand on the existing road network and expected impacts at the key intersections
- Review the design of intersections and parking areas to ensure they meet with design and safety standards, including swept path analyses in the design of the truck parking areas
- Recommend measures necessary to mitigate expected impacts

5.5 Aquatic Ecology

5.5.1 Existing Environment

Port Kembla Harbour consists of the Outer Harbour formed by the construction of breakwaters and an Inner Harbour formed by the dredging of Tom Thumb Lagoon. The Outer Harbour has an area of 137.5 ha dredged to depths up to 16 m. The estuary has been heavily polluted from past industrial activities. The release of ballast water from visiting ships has resulted in two species of introduced toxic dinoflagellates and 47 other exotic marine species being found in the harbour.

Port Kembla Harbour's aquatic ecosystem has been modified by:

- Construction of breakwaters and Port facilities
- Dredging
- Sedimentation and pollution with heavy metals
- Removal of aquatic vegetation through industrial development of the foreshores
- Changes to wave action and increased turbidity

The main habitats for aquatic flora and fauna in the harbour are the soft, deposited bottom sediments, the extensive constructed rocky revetments and the water column.

Flora

Sediments

Neither mangroves nor seagrasses have been recorded in previous studies of the Outer Harbour. Wave action and high turbidity do not provide a suitable habitat for their occurance.

Low levels of cysts of the potentially toxic dinoflagellate *Alexandrium* have been found in all bottom sediments. When disturbed, these cysts can develop into algal blooms causing toxins to accumulate in shellfish and leading to Paralytic Shellfish Poisoning in humans.

Revetments

Many species of macroalgae (seaweed) have been found in PKH on hard substrata. The revetment walls provide potential habitat for macroalgae at shallower depths where light penetration is adequate. Macroalgae provide habitat for invertebrates and fishes.

No introduced macroalgae species have been found in PKH.

Water Column

There is no evidence of a toxic bloom having occurred in harbour waters although concern has been expressed that this may occur if cysts present in bottom sediments are disturbed during times when ambient conditions are suitable for germination.

Fauna

Sediments

The lack of seagrass and mangrove habitat results in limiting the assemblage of marine organisms to benthic invertebrates, such as worms and bivalves, in the soft sediments. These organisms provide food for fish and, despite contamination; these sediments would be regarded by NSW Fisheries as feeding habitat for fish.

Revetments

The rock revetments have been identified as potential habitat for juveniles of one threatened fish species, the black cod (*Epinephelus daemelii).* However the species has not been observed within PKH. The revetments support a range of attached and mobile (e.g. starfish) invertebrate species which provide food for other species. A variety of pest species also colonise hard substrata in PKH as a result of the discharge of ballast water. These include sponges, anemones, hydrozoans, bryozoans, polychaete worms, barnacles, crustaceans, ascidians and pest fish (goby) species.

Water Column

A large number of fish species have been recorded feeding in PKH. None of the recorded fish are listed under the NSW *Fisheries Management Act*.

5.5.2 Methodology for Environmental Assessment

Studies will be undertaken in the study area to assess:

- any impacts on macroalgae or other marine vegetation
- impacts on fish and of marine pest species
- potential smothering of benthic communities
- impacts on aquatic organisms in creeks and drainage lines
- the likely effect on water quality from disturbance of contaminated sediments
- potential for a 'toxic bloom' to be caused by disturbance of dinoflagellate cysts in sediment
- increased turbidity as a result of the dredging and excavation process

5.5.3 Mitigation Measures

The following mitigation measures will be investigated:

- Dredging controls to limit re-suspension of sediment
- Appropriate use of silt curtains
- Use of treatments to walls to provide habitat for marine organisms

5.6 Terrestrial Ecology

5.6.1 Existing Environment

The site generally provides little habitat for native flora and fauna and is considered to be of low habitat value. Potential reclamation works and subsequent Port facilities are likely to result in extensive excavation and clearance of the area.

To determine the potential impact of the proposed project on the terrestrial ecological environment, the following assessment will be undertaken as part of the EA:

- Assessment of the likelihood of impacts to Matters of NES under the EPBC Act
- Assessment of the likelihood of impacts to species listed under the *NSW TSC Act 1995*
- Assessment of the impact of the proposed project on particular known ecological features, specifically the *Litoria aurea* (Green and Golden Bell Frog) (GGBF) and birds that potentially inhabit the site
- Assessment of habitat significance;
- Identification of mitigation measures for the protection of flora and fauna.

Information obtained from DECC, Council staff and other relevant local experts will also be considered where relevant.

Findings of the preliminary assessment are summarized in the following sub sections.

Matters of National Environmental Significance

A search of the *EPBC Act* Protected Matters Tool found 38 threatened species and 44 migratory species that are of national significance potentially in the study area. Only terrestrial bird species, frogs, mammals and plants are considered in this review.

Fauna

The site does not provide shelter, breeding areas or habitat for most of the species, which are potentially found in the area (according to *EPBC Online Protected Matters Search Tool*). However, the GGBF is known to occur on or adjacent to the site (DECC 2007). This is further discussed in Section 5.6.

Flora

Flora species of national environmental significance which may potentially be in the study area (identified in the *EPBC Act* Online Database as being potentially on the site) have not been found on the site.

NSW Threatened Species Conservation Act 1995

A search of the *Wildlife Atlas* (National Parks and Wildlife Service) revealed 74 threatened fauna species and six threatened flora species previous recorded in the Wollongong and Port Kembla area.

Fauna

The study area does not provide shelter, breeding areas or habitat for most of the species which are potentially found in the area (according to *NSW Online Wildlife Atlas Database*). Those species where records are known within a kilometre of the study area have been considered as part of preliminary investigations. Further studies may be required to assess the likely impact on bird species that may inhabit the site. The Green and Golden Bell Frog (GGBF) is also known to occur adjacent the site.

Flora

The NSW Online Wildlife Atlas Database has also been searched for plant species which are potentially found in the area. However, none of these species are known to be present on the site.

Green and Golden Bell Frog

The GGBF inhabit unshaded permanent, open-water swamps or ponds that have a variable water level and dense vegetation (AMO, 2008), marshes dams and stream sides with a grassy area and rocks and/or vegetation nearby for sheltering (NPWS 1999). It is one of the few frogs known to be active by day and actually bask in the sunlight (FOA, 2008). Adults are usually found close to, or in

water or very wet areas in forests, woodlands, shrublands and open or disturbed areas. The eggs and tadpoles can be found in permanent lakes, swamps and dams with still water.

Threats identified to the GGBF include:

- natural predators such as wading birds, snakes and eels
- foxes and cats
- exotic fish, i.e. the Plague Minnow
- fungal pathogens
- changes to water quality and drainage patterns
- herbicides

There are only 43 remaining populations of the GGBF known to exist and only 12 of these are within conservation reserves (DECC, 2005). A sub-population of the species is found at North Port Kembla (adjacent to the Outer Harbour) (Maunsell 2008). This is the most well known and considered the most significant Illawarra population (DECC 2005).

It is thought that the artificial drainage lines along the Wollongong – Port Kembla railway line are functioning as refuge or dispersal areas for the GGBF (Gaia Research 2008). Gaia Research assessed potential and existing GGBF habitat in the vicinity of the proposed Outer Harbour development. Sites 15, 17 and 18 occur within a few hundred metres of the proposed development. Figure 21 shows the location of sites 15, 17 and 18 in proximity to the proposed project site.

Site 15: Also known as Brick and Block, this site is the prime breeding site for the Port Kembla sub-population. There are three fenced ponds, which are managed and the population is monitored regularly.

Site 17: GGBF have been observed to move from Site 15 to Site 17 at the end of the breeding season. Currently the area does not contain habitat. Construction of additional breeding habitat or a vegetated movement corridor is a high priority in this area (Gaia Research 2008).

Site 18: This site is very significant because it is a few hundred metres from Site 15 and a GGBF has been recorded here. The site is currently not used. Construction of ponds as habitat is a high priority in this area (Gaia Research 2008).

A number of initiatives in the Port Kembla Outer Harbour area aim to rehabilitate GGBF breeding habitat (Maunsell 2008). Businesses including Brick and Block, Bluescope Steel and PKPC have committed to constructing breeding ponds and viewing platforms to enhance and connect existing habitat.

PKPC has recently constructed a breeding pond at the Port Kembla Heritage Park site (Brown, 2008). The largest known breeding site in the Port Kembla breeding population, the plastic-lined pond (600 mm in depth) was constructed and revegetated with native terrestrial and aquatic plants.

5.6.2 Methodology for Environmental Assessment

It is proposed that a GGBF Management Plan would be prepared for both the construction and operation stages of the proposed project. The Management Plan would be prepared in consultation with PKPC and DECC and the requirements of the *Management Plan: The Green and Golden Bell Frog Key Population of Port Kembla* (DECC, 2007). The management plan would include information pertaining to movement corridors that will be preserved through construction and following completion of the Outer Harbour development.

Figure 21: Location of potential GGBF habitat sites 15, 17 and 18 in relation to the Outer Harbour development.

5.7 Socio-Economic

5.7.1 Existing Environment

The existing environment is characterised by a range of commercial and industrial operations including Brick and Block manufacturing structural masonry products, Morgan Cement and BHP Billiton. Bluescope Steel works is the dominant land use to the west of the Outer Harbour.

Commercial and residential properties are located to the south and south west of the Outer Harbour with the closest residential and commercial properties located along Wentworth Road, approximately 400m from the Outer Harbour foreshore. Housing is also located to the south along Electrolytic Street, approximately 600m south of Foreshore Road.

The existing boat ramp and harbour on the eastern side of the Outer Harbour is frequently used by the local community, and recreational fishing is popular from No. 3 Jetty.

5.7.2 Potential Impact

The proposed development has the potential to result in a beneficial social impact for the regional economy through local business investment and employment generation. In the short term, construction activities associated with the land reclamation and subsequent fit out of terminal facilities are expected to generate a large number of jobs and contribute to the local economy. There is also the potential for the proposed development to generate direct employment at the Port in the longer term, as well as supporting ancillary activities in the local economy.

Some facilities located within the Outer Harbour that are currently utilised by the community would be retained, such as the existing boat ramp and harbour, however others, such as public access to No. 3 Jetty for recreational fishing, would change as the Outer Harbour is developed.

5.7.3 Methodology for Environmental Assessment

The socio-economic assessment will provide the EA with a review of the project's social and economic costs and benefits – assessing consequences and opportunities and identifying mitigation strategies.

The socio-economic assessment will be completed using existing quantitative data (where available) to identify and compare actual social and economic impacts and qualitative data to identify community perceptions and priorities. Consideration of both quantitative and qualitative data provides greater insight into issues, potential mitigation strategies and communication and issues management requirements.

Key tasks to be undertaken in the socio-economic assessment include:

- Preparation of a socio-economic profile taking into account the history of the area, demographics, employment activity, industry base, land use, documentary analysis and media review.
- Identification of the key stakeholders that may have an interest in the proposal or may be impacted by the development.
- Review of applicable current economic and development policies and plans that describe the existing policy context of the area.
- Analysis and evaluation of the results from all specialist studies including quantitative social and existing economic data, qualitative social data and results of the cost and benefits analysis. This will be used to identify potential issues and mitigation strategies.

5.8 Noise and Vibration

5.8.1 Existing Environment

Background noise levels have been monitored in four locations that are deemed representative of surrounding sensitive receivers. Two loggers in residential areas monitored between Sept 18 and 24 and recorded background levels ranging between 37 dB(A) and 47 dB(A) during the day, 39 dB(A) and 46 dB(A) during the evening and 39 dB(A) to 45 dB(A) at night. One logger was located in a residential location and monitored from September 18 to 21. At this location background levels were recorded at 42 dB(A) during the day and evening periods and 43 dB(A) at night. One further logger was used to monitor background levels adjacent to Five Islands Road between September 18 and 24. Background levels at this location were recorded at 62 dB(A) during the day, 58 dB(A) during the evening and 53 dB(A) at night. This information will be used to determine appropriate criteria from which to assess the developments noise and vibration impact.

5.8.2 Potential Impact

Reclamation, dredging, construction and operational activities have the potential to alter existing environmental noise levels of nearby receivers. Potential noise impacts associated with residential and commercial receivers include:

- A temporary increase in noise and vibration associated with construction and operation of the new facilities and basin dredging;
- An increase in noise resulting from operations at the proposed terminals; and
- An increase in noise levels associated with increases in road and rail traffic resulting from operations at the proposed terminals.

5.8.3 Methodology for Environmental Assessment

Construction Noise and Vibration

The NSW Department of Environment and Climate Change's (DECC) draft guidance document *'New South Wales – Construction Noise Guidelines*' (August 2008), will be used to assess construction noise. Noise assessment will be based on the guidelines quantitative assessment method, involving prediction of noise levels based on the construction methodology and comparison with the levels outlined in the Construction Noise Guidelines.

The potential noise impact will be predicted for each stage of construction works. Criteria will be established based upon the measured background levels. The impact from construction noise will be assessed against the levels set out in the *Construction Noise Guidelines* with noise control recommendations detailed as required.

Operational Noise

The DECC provides guidelines for external noise emissions from industrial premises in the *New South Wales Industrial Noise Policy* (INP).

The assessment procedure for industrial noise sources has two components:

- Controlling intrusive noise impacts in the short term for residences; and
- Maintaining noise level amenity for residences and other land uses.

The lowest of the intrusive or amenity limits are set as the criteria for the receiver.

The potential noise impact resulting from operation of the proposed facility will be assessed by constructing a SoundPLAN model. Sources of operational noise, including vehicle movements within the site boundary, will be incorporated into the SoundPLAN model in order to assess the impact at

identified receivers. The impact will be assessed against the criteria established using the INP and noise control recommendations detailed as required.

Road and Rail Traffic Noise

The impact of noise from the increased road traffic movements will be assessed using the DECC document *'Environmental Criteria for Road Traffic Noise'* (ECRTN).

The impact of noise from increased rail movements will be assessed using the conditions for airborne rail noise emissions in RailCorp's Environmental Operating License. These criteria generally apply to airborne noise emissions from train operations in NSW.

The potential impact from both increased road traffic and rail traffic movements will be assessed using the SoundPLAN model and noise control recommendations detailed as required.

5.9 Air Quality

5.9.1 Existing Environment

Monitoring of air quality at a regional level is undertaken by the Department of Environment and Conservation (DEC) through a network that includes monitoring sites at Wollongong and Albion Park. The results are provided in the form of a Regional Pollution Index (RPI). The RPI is based on measured concentrations of fine particles, ozone and NO2 in the lower atmosphere. Each of these pollutants plays a major role in the development of visible air pollution.

The RPI for Wollongong and Albion Park as shown in the Wollongong City Council *State of the Environment (SoE) Report 06/07* show an increase in the number of high RPI values recorded in 2006-07 for both Wollongong and Albion Park compared with 2005-06. In 2006/07 two days recorded a high RPI compared with none in the 2005/06 period.

5.9.2 Potential Impacts

Potential air quality impacts associated with the proposed project would include:

Construction

- Dust emissions from construction activities including:
  - Dredging
  - Reclamation (emplacement of fill)
  - Infrastructure construction (road and rail)
  - Transport of fill material on site

Operation

- Emissions during operation from:
  - Ships
  - Truck
  - Trains
  - Berth loading and unloading equipment

5.9.3 Methodology for Environmental Assessment

The EA of the proposed Outer Harbour development would include an air quality impact assessment (AQIA) focusing on the development of an emissions envelope to determine the site requirements to comply with relevant environmental air quality goals. As the final nature of terminal operations are not known (particularly for stages 2 and 3), the AQIA will focus on the development of region specific limits for the site. The assessment will include the following:

- Ambient background pollutant concentrations will be investigated for the area surrounding the Outer Harbour. These levels will be analysed to determine the degree to which emissions from the proposed facility could contribute to pollution levels without exceeding regulatory limits
- Local topography, meteorology and location of sensitive receptors (both now and potentially in the future) will be examined to assess how these factors may affect the development pollution envelope
- The emissions envelop will be clearly defined to enable the maximum flexibility for port operators to locate anywhere within the envelop providing emissions are cumulatively maintained below ground level concentrations set at the site boundary
- It is expected that once more detailed information is available on the emissions from the Port facility that a more specific air quality study will be developed and compared with the findings of this study to ensure the development meets with air quality goals. This stage would be undertaken by subsequent terminal operators

5.9.4 Mitigation Measures

Air quality impacts would be minimised through the implementation of appropriate mitigation measures. The measures to be used would be determined through the EA process. However, likely measures would include:

- Spraying recycled water to active earthwork areas, stockpiles, site (internal) roads and transported fill material to reduce dust emissions
- Remove soil from wheels and undercarriage of vehicles prior to leaving the project site
- Ensure trucks leaving the project site and carrying fill material into the project site are covered
- Ensure surface material used on exposed reclaimed areas awaiting future construction is resistant to wind blown dust generation (where practical)

5.10 Landscape and Visual Amenity

5.10.1 Existing Environment

The visual envelope of the study area is typical of an active port. The Outer Harbour landscape is dominated by the existing jetties, eastern and northern breakwaters, and a stretch of sandy beach where Salty Creek discharges to the harbour. Heavy industry dominates the view north west and beyond the Port infrastructure in the inner harbour. The Illawarra Escarpment can be seen beyond the Port to the west and north west.

5.10.2 Methodology for Environmental Assessment

The landscape of the Port would be progressively altered both during construction and operation. A qualitative assessment will be carried out to establish the local landscape character and existing visual context in the vicinity of the proposed Outer Harbour development. A review of designated scenic areas and landscape zones will be conducted to establish the sensitivity of the visual resource and zone of visual influence.

The assessment will examine the potential impacts associated with future development activities on the local character and quality of the landscape unit, and on views to and from the Port during the land reclamation, dredging and construction activities.

Potential impacts are likely to include the cumulative impact from an expansion of cargo handling facilities and infrastructure, and changes to view corridors to and from the Port, particularly from view points near Harry Morton Park. Future land reclamation plans and final landform will be considered in the landscape and visual amenity assessment.

A series of photographs will be taken from representative view locations in the immediate and local area, including residential areas to the south, south west and west of the Outer Harbour, and publicly accessible locations (including Port Kembla Heritage Park, Gallipoli Park, and Hill 60) to document the visual impacts and assist in the preparation of visual simulations. The simulations will be used to assess the visual impact from views in the immediate vicinity, local and regional areas.

5.11 Land Use

5.11.1 Existing Environment

The subject site is situated in an industrial/port area, and is surrounded by generally compatible land uses. There is no residential land use within the immediate area of the subject site.

The area surrounding the study area is zoned for industrial and port purposes, which permit a range of industrial/port type activities.

The Outer Harbour is characterised by a mixture of both the built environment and natural features. Key features include:

- Three jetties and an inflammable liquids berth located on the northern breakwater
- Berths 202-206
- A saltwater intake channel that supplies cooling water for BlueScope Steel operations located on the south eastern corner of The Cut
- A boat harbour and boat ramp located adjacent to the eastern breakwater
- A number of commercial and industrial operations on the foreshore including Brick and Block manufacturing structural masonry products, Morgan Cement, BlueScope Steel and BHP Billiton
- The rail network (including rail corridor and sidings) located between Darcy Road and Foreshore Road, Old Port Road and Five Islands Road, recently acquired by PKPC
- A concrete lined stormwater drain, identified as Darcy Road drain, located adjacent to lots currently occupied by Brick and Block and Sydney Water
- Salty Creek, which extends from an area adjacent to the Port Kembla railway station and flows via culvert under Old Port Road and discharges in the Outer Harbour
- Port Kembla Heritage Park located on the southern headland of the Outer Harbour, south of the eastern breakwater. Heritage Park has been developed to conserve military, cultural and historic heritage in the area

Land uses surrounding the Outer Harbour include:

- Commercial and residential properties located to the south and south west of the Outer Harbour
- The closest residential and commercial properties to the south west of the Outer Harbour are located along Wentworth Road, approximately 400m from the Outer Harbour foreshore. Housing is also located to the south along Electrolytic Street, approximately 600m south of Foreshore Road
- Five Islands Nature Reserve, a cluster of islands (Flinders Islet, Bass Islet, Martins Islet, Big Island and Rocky Islet) located between 1.5km and 2.5km to the south east and east of the Port. The islands are protected to provide breeding and feeding areas for seabirds including endangered and vulnerable species such as the southern giant petrel and sooty tern
- Wollongong sewage treatment and recycling plant located approximately 2km north of the northern breakwater. The 1km discharge pipe for the plant extends in a south eastern direction toward the breakwaters. The Port Kembla storm sewage treatment plant is located on Red Point, approximately 2km south of the Outer Harbour

5.11.2 Methodology for Environmental Assessment

Expansion of port activities is compatible with the existing zoning and neighbouring port/industrial land uses of the Outer Harbour. However, the EA for the proposed project will assess the key issues identified through the environmental risk appraisal (see Section 6 of this PEA), Director General EA requirements and general consultations (see Section 4 of this PEA). The assessment of key issues will identify potential impacts on existing uses of the site and neighbouring landuses. Where required the EA will also identify appropriate safeguard measures required to ensure potential impacts are minimised.

5.12 Heritage

5.12.1 Existing Environment

Port Kembla as a harbour was first formally identified for construction through the Port *Kembla Harbour Act* in 1898. The Port was well placed to expand on existing jetty services provided to the Mt Kembla coal mines which were connected to the Port by rail. A preliminary review of background information and the knowledge that the subject area has previously been highly disturbed and extensively reclaimed indicate that heritage issues for the project will be minimal.

Wollongong LEP 1990 lists a number of heritage items within the suburb of Port Kembla of local, regional and State heritage significance. Two sites are listed as State significant in Port Kembla. These sites include Hill 60 and a mobile block setting steam crane (steam crane). The steam crane is located just south of the eastern breakwater at Port Kembla. The proposed project will not impact on either of these sites. Other local and regional significant sites include a number of military related sites around Hill 60 and the beaches of Port Kembla (located south of the proposed project site) and a number of shops and houses in the Military and Wentworth Street Port Kembla areas. All these sites are removed from the project site and will not be impacted by the proposed development.

5.12.2 Methodology for Environmental Assessment

The Heritage Assessment to be undertaken as part of the EA will consist of broadly a risk assessment with site familiarisation and may include consultation with the relevant local Aboriginal groups. The assessment will include a search of the DECC Aboriginal Heritage Information Management System, the NSW Heritage database and the Australian Heritage database. If the risk assessment identifies any heritage issues or constraints, a detailed Aboriginal and historical heritage assessment will be undertaken and will consist of background research, field investigation, impact assessment and mitigation options.

The detailed assessment will be undertaken in accordance with the appropriate State legislation, namely the NSW *National Parks and Wildlife Act, 1974,* and *Heritage Act, 1977,* and necessary guidelines, specifically the DECC (1997) *Aboriginal Cultural Heritage Standards and Guidelines Kit* and (2004) *Interim Community Consultation Requirements for Applicants*, and the NSW Heritage Office's (1996) *Heritage Manual.*

5.13 Sustainability and Climate Change

5.13.1 Climate change impacts on ports

The Infrastructure and Climate Change Risk Assessment for Victoria (CSIRO, Maunsell, and Phillips Fox 2007) (the Report) investigated climate change impacts to ports in Victoria. The impacts identified for Victorian ports will be similar to those experienced in NSW due to similarity in ocean currents and climatic conditions. The Report found that ports are sensitive to the following risks from the following climate change events:

- Increase in extreme daily rainfall
- Increase in frequency and intensity of storms

- Increase in intensity of extreme wind
- Sea level rise

Table 4 is a compilation of extracts from the Infrastructure and Climate Change Risk Assessment for Victoria showing the level of risk that ports can expect to be exposed to under 2030 and 2070 scenarios. As we are currently tracking at the higher end of emissions projections, the "high emissions scenario" column for 2030 and 2070 show the most accurate risk ratings. High risks to ports will be associated with storms by 2030, increasing to extreme risks by 2070. Risks from sea level rise will be moderate by 2030, increasing to high by 2070.

Table 4 Impacts to infrastructure associated with Ports and their operations (extracted from Infrastructure and Climate Change Risk Assessment for Victoria)

Infrastructure	Risk Scenario	Climate Variable	Rating			
			2030 emissions scenario		2070 emissions scenario	
			Low emissions	High emissions	Low emissions	High emissions
Ports	Storm impacts on ports and coastal infrastructure	Increase in Intensity of Extreme Wind Sea Level Rise Increase in Frequency and Intensity of Storms Increase in Extreme Daily Rainfall	Low	High	High	Extreme
	Sea level rise impacts on port infrastructure materials	Sea level rise	Low	Moderate	Low	High

Source: CSIRO, 2007

Impacts on other infrastructure

Ports are not isolated developments. Internally, roads and buildings are essential to operations. These are directly under the management of PKPC. Externally, ports rely on local and regional transport infrastructure (roads and rail), telecommunications, power and other infrastructure to ensure sustainable operations and economic viability. These items are managed by other agencies and PKPC has a reliance on these to sustain its operations.

5.13.2 Methodology for Environmental Assessment

Sustainability will be addressed in the EA through consideration of the sustainability principles as outlined in the *Environment Protection and Biodiversity Conservation Act* (precautionary principle; intergenerational equity; biological diversity and ecological integrity; and incentives, valuation and pricing). These will be reported on by each specialty field, facilitated by the sustainability specialist. Assessment of how the project responds to each of these principles will be provided in concept for the whole project, and in detail for Stage 1. Subsequent stages will address sustainability through the individual project approval requirements.

In the EA, consideration of climate change impacts will be achieved through a desktop study including:

- An outline of climate change science and scenarios

- Climate change risks to Port infrastructure (based on findings from the Infrastructure and Climate Change Risk Assessment for Victoria and identification of adaptation actions undertaken by other Ports)
- Identification of impacts specific to Port Kembla Outer Harbour

These will be addressed by considering high-level opportunities, and providing preliminary recommendations for the incorporation of:

- Energy savings, including alternative energy options
- Emissions reduction
- Incorporation of innovative technologies in the project to reduce carbon emission and reduce the Net Present Value.

5.14 Waste Management

5.14.1 Existing Environment

Strategic Background

The NSW *Waste and Resource Recovery Strategy 2007* (NSW WARR) aims to maximise conservation of natural resources and to minimise environmental harm from waste management and disposal of solid waste against a growing population in NSW and an economy that is producing more goods and services. The broad targets for the NSW WARR are highlighted in Table 5.

Table 5: NSW WARR Strategy 2007

Key Result Area	Target
Preventing and avoiding waste	To hold level the total waste generated for 5 years from the release of *Waste Strategy 2003*
Increased recovery and use of secondary resources	By 2014, to: Increase recovery and use of materials from the municipal waste stream, from 26% (in 2000) to 66% Increase recovery and use of materials from the commercial and industrial waste stream, from 28% (in 2000) to 63% Increase recovery and use of materials from the construction and demolition sector, from 65% (in 2000) to 76%
Reducing toxic substances in products and materials	By 2014 or earlier: To phase out priority substances in identified products as a first choice or, if not possible, to achieve maximum recovery for re-use
Reduce litter and illegal dumping	Reduce total amount of litter reported annually Reduction in total tonnages of illegally dumped material reported by regulatory agencies and RID squads annually

Source: DECC, NSW Waste Avoidance and Resource Recovery Strategy 2007

5.14.2 Methodology for Environmental Assessment

Various waste streams generated during reclamation, dredging and construction and operation phases of the proposed Outer Harbour development will be reviewed for the environmental assessment to identify and assess possible waste disposal and management options. These will follow best practice waste handling, containment, storage, transportation and disposal methods. This will include a review of hazardous waste handling and disposal as well as the potential for re-use and recycling of inert wastes. The waste generated will be managed in accordance with the NSW DECC *Waste Classification Guidelines (April 2008).*

The majority of the waste is expected to be generated during the reclamation and dredging components of the project. Construction of the development will involve both displacement and disposal of spoil, and capping of material contained within blast furnace slag containment bunds previously dredged from the Inner Harbour. An estimate of the quantities of dredging material recovered and reused during Stage 1 of the project is presented in Table 6. The advantages and disadvantages of fill materials, including slag, coalwash, dredge spoil and fill from other construction projects would be assessed.

The estuarine materials within the harbour are PASS. Where there is potential for acid sulphate soil disturbance, exposure to air should be minimised and material preferentially placed/disposed in locations beneath the water.

Table 6: Estimated Stage 1 Construction Soil/Rock Quantities

Stage 1	Dredging Rock Quantities (re-used in reclamation) (m3)	Soft Mud Dredging Quantities (Disposed) (m^3)
Container terminal Development	313,000	623,000
Multi Purpose Terminal Development	217,000	295,000

During operation of Stage 1 the waste that is produced by activities in the Port will be managed as per the applicable Australian regulations. This may include waste generated by employees and maintenance waste. Any waste transported by ship to the Port will be subject to Quarantine regulations. Environmental management procedures will be developed.

Stage 2 and Stage 3 methodology for impact assessment will be reassessed during project approval for each subsequent stage. Waste streams for construction and operation of subsequent stages will be identified, with disposal and management options tailored to individual stage requirements.

6.0 Environmental Risk Appraisal

6.1 Issues Identification

The environmental issues associated with the proposed project have been identified based on existing data and knowledge of the site held by PKPC, preliminary investigations undertaken by the project team (summarised in Section 5 of this PEA) and understanding of the statutory framework and general approvals requirements. The issues identified include (in no particular order):

- Contamination;
- Hydrology and Water Quality (including hydrodynamics and coastal processes);
- Traffic and Transport;
- Aquatic and Terrestrial Ecology;
- Socio-Economic ;
- Noise and Vibration;
- Air Quality;
- Landscape and Visual Amenity;
- Land use;
- Heritage;
- Sustainability;
- Waste Management.

6.2 Prioritisation of Issues

6.2.1 Approach

The prioritisation of issues for the project was based on the need to recognise that a higher degree of assessment is required for the issues with the highest severity and also greatest consequence. Table 7 presents the issues prioritisation matrix used to identify priorities for assessment. Each issue was given a ranking between one and three for the severity of effects and a number between one and three for the perceived consequence of those effects if left unmanaged. These two numbers were added together to provide a numerical ranking for the issue that was used to categorise each issue into high, medium and low priorities.

Table 7: Issues Priority Matrix

Severity of Effects	Consequence of Unmanaged Effects		
	3 High	2 Medium	1 Low
1 Low	4 (Medium)	3 (Low)	2 (Low)
2 Medium	5 (High)	4 (Medium)	3 (Low
3 High	6 (High)	5 (High)	4 (Medium)

6.2.2 Assessment

The prioritisation of environmental issues related to the Outer Harbour development is shown in Table 8. This assessment aims to allow the prioritisation of issues for assessment and does not consider the application of mitigation measures to manage the issue. In all cases, appropriate and proven mitigation measures, chosen based upon the experience of regulators and other similar projects, will be used to minimise potential impacts. These measures will be described in detail in the EA.

The allocation of risk is based upon the following considerations:

Severity of Effects

Low: localised implications; imperceptible or short term cumulative impacts.
Medium: regional implications; modest or medium term cumulative impacts.
High: inter-regional implications; serious or long term cumulative impacts.

Consequence of Unmanaged Effects

Low: minor environmental change; offsets readily available.
Medium: moderate adverse environmental change; offsets available.
High: adverse environmental change; offsets not readily available.

Table 8: Prioritisation of Environmental Issues

Issue	Severity	Consequence	Priority
Contamination (including Geology and Soils)			
Excavation of contaminated fill and accidental spillage of contaminants or stormwater	2	3	**5 (High)**
Disturbance of areas within the Outer Harbour where contaminated materials have been capped as part of a remediation strategy	2	3	**5 (High)**
Erosion and sedimentation and spread of contaminants off-site and/or into the harbour	2	2	**4 (Medium)**
Creation of preferential pathways between contaminated fill materials and aquifer beneath Port Kembla Harbour	2	2	**4 (Medium**
Migration of contaminated groundwater to the Outer Harbour	2	3	**5 (High)**
The release of sulphuric acid from disturbed ASS, which may drain into the harbour/stormwater system	2	2	**4 (Medium)**
Importation of potentially contaminated soils	2	3	**5 (High)**
Erosion and sedimentation and release of sediment laden surface water off-site and/or into the harbour	2	3	**5 (High)**
Hydrology and Water Quality (including Hydrodynamics and Coastal Processes			
Alteration to flow regime and discharge of Salty Creek	2	2	**4 (Medium)**
Disturbance to bed of Salty Creek	2	2	**4 (Medium)**

Issue	Severity	Consequence	Priority
Change to harbour hydrodynamics	2	3	**5 (High)**
Degradation of water quality during construction through re-suspension of contaminated sediments and increased turbidity	2	2	**4 (Medium)**
Degradation of groundwater quality during construction	2	3	**5 (High)**
Impacts on natural drainage processes	2	2	**4 (Medium)**
Consumption of potable water resources during construction	1	1	**2 (Low)**
Consumption of potable water resources during operation	1	1	**2 (Low)**
Traffic and Transport			
Increase in traffic on local road network during construction	2	2	**4 (Medium)**
Increase in traffic on local and regional road network during operation	2	3	**5 (High)**
Impact on local and regional rail network during construction	1	1	**2 (Low)**
Impact on local and regional rail network during operation	2	2	**4 (Medium)**
Impact on local and State transport infrastructure provision	2	2	**4 (Medium)**
Aquatic and Terrestrial Ecology			
Loss of habitat due to clearing, dredging and reclamation	2	2	**4 (Medium)**
Impacts on macroalgae and other marine vegetation	2	2	**4 (Medium)**
Impact on fish and marine species	2	2	**4 (Medium)**
Potential for a toxic bloom from disturbance of dinoflagellate cysts in sediment	2	3	**5 (High)**
Loss of GGBF* habitat due to clearing, dredging and reclamation	3	3	**6 (High)**
Impacts on threatened species other than the GGBF	1	1	**1 (Low)**
Socio-economic			
Impacts on amenity such as visual, traffic, noise, odour etc	1	2	**3 (Low)**
Impacts upon demand for community resources	1	1	**2 (Low)**
Job creation during construction	2	1	**2 (Low)**
Job creation during operation	2	2	**4 (Medium)**

Issue	Severity	Consequence	Priority
Community concern regarding degradation of air quality, increased noise and traffic movements associated with both the construction and operation phases	2	2	**4 (Medium)**
Investment in local and regional economy	2	2	**4 (Medium)**
Noise and Vibration			
Noise and vibration disturbance to surrounding area during construction, including reclamation and dredging activities	2	2	**4 (Medium)**
Noise disturbance to surrounding area during operation	2	2	**4 (Medium)**
Noise disturbance along transport routes during operation	2	2	**4 (Medium)**
Air Quality			
Construction related impacts on air quality	1	2	**3 (Low)**
Emissions to the atmosphere once the terminals are operational with the potential to result in degradation of air quality (including odour)	2	2	**4 (Medium)**
Landscape and Visual amenity			
Impacts on visual landscape	2	1	**3 (Low)**
Visual amenity impact on residents with a view of the Port	2	1	**3 (Low)**
Land use			
Inappropriate use of land	1	1	**2 (Low)**
Incompatibility of land use with surrounding environment	1	1	**2 (Low)**
Community perception of land use implications	2	1	**3 (Low)**
Heritage			
Damage or removal of Aboriginal artefacts or places	1	2	**3 (Low)**
Detrimental impact upon items of non-indigenous heritage significance	1	1	**2 (Low)**
Sustainability			
Inefficient use of resources	2	2	**4 (Medium)**
Lack of controls regarding GHG emissions	2	2	**4 (Medium)**
Impact of climatic changes on infrastructure of Port i.e. extreme and more frequent storm events, sea level rise	3	3	**6 (High)**
Waste Management			
Potential contamination of land and water as a result of inappropriate handling of waste	2	2	**4 (Medium)**
Hazard and Risk			
Exposure of employees to risks and hazards	2	2	**4 (Medium)**

Issue	Severity	Consequence	Priority
Exposure of surrounding land uses/population to risks and hazards	2	2	**4 (Medium)**

* The Green and Golden Bell Frog is known to occur immediately adjacent the proposed project site.

A summary of the prioritisation of environmental issues, and therefore the focus of the EA for the Outer Harbour development is outlined within Table 9.

Table 9: Summary of Prioritisation of Issues

Low	Medium	High
Hydrology and Water Quality (water consumption)	**Contamination, geology and soils** (erosion, sedimentation off-site, ASS, creation of preferential pathways)	**Contamination, geology and soils** (excavation/disturbance of contaminated fill, migration of groundwater, importation of contaminated material, sedimentation and potential spillage)
Traffic and Transport (rail network during construction)	**Hydrology and Water Quality** (discharge/disturbance to Salty Creek, degradation in water quality and impacts on natural drainage)	**Hydrology and water quality** (change to harbour hydrodynamics and degradation of groundwater quality during construction)
Aquatic and Terrestrial Ecology (impact on threatened species other than GGBF)	**Traffic and Transport** (impacts on local road network during construction, impacts on local and regional rail network, impacts on local and State transport infrastructure provision)	**Traffic and Transport** (increase in traffic on local and regional road network)
Social and Economic (impacts on amenity and demand on community resources)	**Aquatic and Terrestrial Ecology** (loss of habitat during construction, impacts on macroalgae and other marine vegetation, impact on fish and marine species)	**Aquatic and Terrestrial Ecology** (potential for toxic bloom, loss of GGBF habitat)
Climate and Air Quality (construction impacts on air quality)	**Social and economic** (job creation and investment in the local, regional and State economy, community concern regarding degradation of air quality, increase noise and traffic movements)	**Sustainability** (climatic change/ impacts on port infrastructure)
Landscape and Visual Amenity (impacts on visual landscape and on closest residents with views of the Port)	**Noise and Vibration** (noise and vibration during construction and noise during operation and along transport routes)	
Land use (incompatibility of landuse with surrounding environment)	**Climate and Air Quality** (emissions to the atmosphere during construction and operation)	
Heritage (impacts on Aboriginal artefacts and on items of non-indigenous heritage significance	**Sustainability** (inefficient use of resources, lack of controls regarding GHG emissions)	
	Waste Management (potential contamination of land and water)	

Low	Medium	High
	Hazards and Risk (exposure of employees and the surrounding populace to risks and hazards)	

7.0 Conclusion

This PEA has been prepared to satisfy the provisions under Part 3A of the EP&A Act. The PEA presents the findings of a preliminary environmental assessment that has been undertaken for key environmental issues associated with the development of the Port Kembla Outer Harbour.

Consideration has been given to the following environmental issues:

- Contamination (including geology and soils) and groundwater;
- Hydrology and Water Quality (including hydrodynamics and coastal processes);
- Traffic and Transport;
- Aquatic and Terrestrial Ecology;
- Social;
- Noise and Vibration;
- Climate and Air Quality;
- Landscape and Visual Amenity;
- Land use;
- Heritage;
- Sustainability; and
- Waste Management.

As part of an environmental risk appraisal an issues priority matrix has been prepared to rank the environmental issues. The aim of this ranking was to establish the prioritisation of issues for the detailed environmental impact assessment and as such the focus of the Environmental Assessment report. Issues that were assigned a high priority include

- Contamination (dredging and reclamation, migration of groundwater, importation of contaminated material)
- Hydrology and water quality (change to harbour hydrodynamics and degradation of surface and groundwater quality)
- Traffic and transport (increase in traffic on local and regional road network)
- Aquatic and terrestrial ecology (potential for toxic bloom, impact to ggbf habitat)
- Sustainability (climatic changes on port infrastructure)

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