ENVIRONMENTAL ASSESSMENT

Mayfield Site Port-Related Activities Concept Plan
Volume 1 - Main Report

July 2010

Prepared for Newcastle Ports Corporation
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NEWCASTLE PORT CORPORATION
Delivering Opportunity

Mayfield Site Port-Related Activities Concept Plan

Environmental Assessment

Prepared for

Newcastle Port Corporation

Prepared by

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19 July 2010

Job No60153568

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Certification

Submission of Environmental Assessment (EA) prepared under the Environmental Planning and Assessment Act 1979 Section 75F

EA prepared by		
Name	Andrew Cook	Sarah Townsend
Qualifications	Associate Director/Workgroup Leader	Principal Environmental Scientist
	AECOM	
Address	Level 8, 17 York Street	
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in respect of	Mayfield Site Port-Related Activities Concept Plan, Mayfield, Newcastle Port Project	
Project application	MP 09_0096	
Applicant name	Newcastle Port Corporation	
Applicant address	PO Box, 663, Newcastle, NSW, 2300	
Land to be developed lot no., DP/MPS, vol/fol etc Proposed project	The proposed project is to be carried out on Part of Lot 33 D.P. 1116571. The proposed project involves the development of land owned by NPC for port-related activities.	
Environmental Assessment	an Environmental Assessment (EA) is attached	
Certification	I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.	
		
	Signature	Signature
	Name: Andrew Cook	Name: Sarah Townsend
	Date: 19th July 2010	Date: 19th July 2010

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Abbreviations

µg/L	Micrograms per litre
AADT	Average Annual Daily Traffic
ABARE	Australian Bureau of Agriculture and Resource Economics
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ALARP	As Low As Reasonably Practicable
ALCAM	Australian Level Crossing Assessment Model
AMP	Archaeological Management Plan
AN	Ammonium nitrate
ANZECC	Australia and New Zealand Environment and Conservation Council
AQIA	Air Quality Impact Assessment
AQIS	Australian Quarantine Inspection Service
ARI	Average Recurrence Interval
ARTC	Australian Rail Track Corporation
AS	Australian Standards
ASS	Acid Sulfate Soils
BCC	Budget Committee of Cabinet
BoM	Bureau of Meteorology
BOS	Basic Oxygen Steelmaking
BTEX	Benzene, toluene, ethylbenzene, and xylene
BTRE	Bureau of Transport and Regional Economics
CAMBA	Agreement between Australia and the People's Republic of China for the Protection of Migratory Birds and their Environment
CBD	Central Business District
CCC	Community Consultative Committee
CEMP	Construction Environmental Management Plan
CFC	Chlorofluorocarbon
CIV	Capital Investment Value
CLM Act	Contaminated Land Management Act
CNG	Compressed Natural Gas
CORTN	Calculation of Road Traffic Noise
CSMP	Contaminated Site Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSMP	Contaminated Site Management Plan

dBA	Decibels
DEC	Department of Environment and Conservation, now DECCW
DECC	Department of Environment and Climate Change, now DECCW
DECCW	Department of Environment, Climate Change and Water
DEWHA	Department of the Environment, Water, Heritage and the Arts
DGRs	Director General's Requirements
DIPNR	Department of Infrastructure Planning and National Resources, now DoP
DoP	Department of Planning
DoS	Degree of Separation
DPI	Department of Primary Industries, now IINSW
DWE	Department of Water and Energy, now DECCW and IINSW
EA	Environmental Assessment
ECRTN	Environmental Criteria For Traffic Noise
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EMS	Environmental Management System
ENCM	Environmental Noise Control Manual
EP	Equivalent Population
EPA	Environment Protection Authority (NSW), now part of DECCW
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESD	Ecological Sustainable Development
ET	Equivalent Tenements
eVDV	Estimated Vibration Dose Value
HDC	Hunter Development Corporation
HDPE	high density polyethylene
Heritage Act	Heritage Act 1977
HIPAP	Hazardous Industry Planning Advisory Paper
HRRP	Hunter River Remediation Project
Hunter Water	Hunter Water Corporation
HVRF	Hunter Valley Research Foundation
IBC	Intermediate Bulk Containers
IGANRIP	Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects
IINSW	Industry and Investment NSW
IIP	Intertrade Industrial Park

Infrastructure SEPP	State Environmental Planning Policy (Infrastructure) 2007
INP	NSW Industrial Noise Policy
ITV	Intra Terminal Vehicle
JAMBA	Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment
KBF	Kooragang Bulk Facilities
Koppers	Koppers Carbon Materials and Chemicals Pty Ltd
kPa	Kilopascal
KTPs	Key Threatening Processes
kV	Kilovolts
kW/m^2	kilowatts per square metre
Leq	Equivalent Continuous Noise Level
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
Major Developments SEPP	State Environmental Planning Policy (Major Developments) 2005
MARPOL	International Convention for the Prevention of Pollution from Ships
Mayfield CCC	Mayfield Community Consultative Committee
MIEA	Mayfield Industrial Estate Association
ML	Mega litres
MPT	Multi Purpose Terminal
MOD	Modification
MTPA	Million tonnes per annum
MWh	Megawatt hour
NAMAP	Newcastle Airshed Management Plan
NEMP	Newcastle Environment Management Plan
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NES	National Environmental Significance
NPC	Newcastle Port Corporation
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NSW State Plan	NSW State Plan: A New Direction for NSW
NSW WARR	NSW Waste and Resource Recovery Strategy 2007
NTU	Nephelometric Turbidity Units
OEMP	Operational Environmental Management Plan
P6	Priority 6 of the NSW State Plan

PAHs	Polycyclic Aromatic Hydrocarbons
PEA	Preliminary Environmental Assessment
pH	pH is a measure of acidity or basicity
PHA	Preliminary Hazard Analysis
PFM	Planning Focus Meeting
PKPC	Port Kembla Port Corporation
PMA Act	Ports and Maritime Administration Act 1995
pmpy	Chances in a million per year
POEO Act	Protection Of The Environment Operations Act 1997
PSS	Preliminary Stormwater Strategy
RAP	Remediation Action Plan
RBL	Rating Background Level
RID	Regional Illegal Dumping
RL	Relative Level
RLMC	Regional Land Management Corporation
rmq	Root mean quartic
Ro/Ro	Roll on Roll off cargo
RTA	NSW Road and Traffic Authority
SEPP	State Environmental Planning Policy
SEPP 33	State Environmental Planning Policy 33 – Hazardous and Offensive Development
SEPP 55	State Environment Planning Policy 55 – Remediation of Land
SEPP 71	State Environmental Planning Policy 71 – Coastal Protection
SMS	Stormwater Management System
SoC	Statement of Commitments
SOHI	Statement of Heritage Impact
SOPEP	Ship Board Oil Pollution Emergency Plan
SPA	State Property Authority
SPC	Sydney Port Corporation
SSS	State Significant Site
SWMP	Soil and Water Management Plan
TEC	Threatened ecological community
TEU	Twenty Foot Equivalent Units
TIS	Traffic Impact Statement
TMP	Traffic Management Plan
TPH	Total Petroleum Hydrocarbons
TSC Act	Threatened Species Conservation Act 1995
TSP	Total Suspended Particulate

VDV	Vibration Dose Value
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
VRA	Voluntary Remediation Agreement
WMP	Waste Management Plan
WWTW	Waste Water Treatment Work

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Executive Summary

Introduction

Newcastle Port Corporation has developed a Concept Plan for the proposed development of port-related activities on a portion of the former BHP Steelworks site located along the South Arm of the Hunter River in Mayfield, Newcastle. AECOM has been engaged to assess the potential environmental impacts of the proposed Mayfield Site Port-Related Activities Concept Plan (proposed concept) and to prepare an Environmental Assessment documenting the potential environmental impacts. The Environmental Assessment has been prepared in accordance with the provisions of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) and Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), together with the Director-General's Requirements which were issued to NPC on 29 May 2009 by the New South Wales Department of Planning.

The BHP Steelworks site (known as the Closure Area) is made up of a 60-hectare area at the rear of the site which is to be developed as the Intertrade Industrial Park, and a 90-hectare portside portion being the site of the proposed concept, which is proposed to be developed by Newcastle Port Corporation for port-related activities. Newcastle Port Corporation is the Proponent of the proposed concept. The proposed concept identifies five key land-based operational precincts which would be developed and operated through 2034. The precincts are:

- NPC Operations Precinct including office, storage sheds, vehicle and marine equipment, Newcastle Port Corporation dredging vessel, pilot cutters and helipad.
- Bulk and General Precinct capable of handling non hazardous dry bulk products including grain, briquettes, and coke cargoes.
- General Purpose Precinct a flexible facility to handle and store cargo containers, heavy machinery, Roll On Roll Off and break bulk cargo. This includes the existing general cargo facility known as Mayfield No.4 Berth.
- Container Terminal Precinct with a trade volume of 1 million twenty foot equivalent units (TEU) per annum at final development.
- Bulk Liquid Precinct used for storage, blending and distribution of high quality fuels and biofuels.

There is also a Berth Precinct proposed along the portside edge of the South Arm of the Hunter River containing seven shipping berths, one berth each for the NPC Operations, Bulk and General Precinct, and the General Purpose Precinct, three berths for the Container Terminal Precinct and one berth for the Bulk Liquid Precinct. One of the container Terminal Precinct berths may be shared with the General Purpose Precinct. Road and rail freight infrastructure would also be required to service the site.

Newcastle Port Corporation has prepared a Concept Plan for the proposed development of port-related activities within the site and is seeking Concept Approval for the Concept Plan pursuant to Part 3A of the EP&A Act. The Minister for Planning provided authorisation of the lodgement of a Concept Plan for the proposed concept in accordance with Part 3A of the EP&A Act on 16 April 2009. The proposed concept would allow reasonable flexibility for future development of the five key land-based operational precincts and berth precinct, thereby allowing the detailed plans, which would require Project Approval and detailed assessment, to evolve over the period through 2034.

The Concept Plan establishes broad parameters and environmental performance criteria to guide future development, and would give future developers the confidence and level of certainty required to invest in Port development and the more detailed Project Approval process. The Concept Plan would also provide a level of certainty for regulators and the local community that the site would be developed in a coordinated and environmentally responsible manner. Project Approval would be sought at a later date for future development applications relating to the site or individual precincts within the site. Further detailed assessments would also be undertaken on the basis of a specific project.

Site and Surrounds

The site is located on the former BHP Steelworks site (known as the Closure Area), in Mayfield, approximately 7 kilometres north west of the Newcastle Central Business District. It is located in an existing industrial area of the Port of Newcastle and abuts the South Arm of the Hunter River to the north and east, the future Intertrade Industrial Park and the Carrington Coal Terminal, owned and operated by the Port Waratah Coal Service, to the south and south west, and OneSteel to the west. Surrounding land use comprises predominantly industrial development with residential development located further to the south across Industrial Drive.

The site has a long history of industrial use. From 1866 to 1893 the site was used for copper smelting. Between 1915 and 1999 the site was used by BHP for iron and steelmaking. In 1999, iron and steel making operations at the Closure Area ceased and preparation of an Environmental Impact Statement for demolition of the Steelworks, remediation of the Closure Area and development of a multi-purpose terminal commenced. The Environmental Impact Statement titled *Development of a Multi Purpose Terminal and Remediation of the Closure Area, BHP Newcastle Steelworks* was prepared by URS on behalf of BHP and was completed in 2000. Development consent was issued by the Minister for Planning in 2001. In accordance with the 2001 consent, soil and groundwater remediation activities commenced in 2006 and are due for completion in 2012. Redevelopment of the site for industrial port-related uses, such as a general cargo handling facility known as Mayfield No.4 Berth, began in 2009 in accordance with the 2001 consent. Mayfield No.4 Berth became operational in 2010.

The main road access to the site is from Selwyn Street and Ingall Street both via Industrial Drive, which joins to the Pacific Highway and New England Highway to the north west. The site is also accessible to cargo ships via the shipping channel in the South Arm of the Hunter River. Rail infrastructure is also available to service the site via a spur line which connects with the Port Waratah Loop and Main North Rail Line.

Newcastle Port Corporation has signed a contract of sale with the State Property Authority for ownership of the site and execution of the contract is subject to satisfying several conditions.

Newcastle Port Corporation is committed to ensuring the proposed concept does not compromise the requirements of the 2001 consent where relevant to the approximate 90-hectare footprint of the proposed concept. Once the proposed concept is approved, it is recommended that the 2001 consent be subsequently modified so that it relates only to the activities which are not specifically covered by this Concept Approval (e.g. remediation activities and construction of Mayfield No.4 Berth). In all other respects, the 2001 consent would effectively be superseded by this Concept Approval.

Newcastle Port Corporation is also committed to ensuring construction activities associated with this Concept Approval and subsequent Project Approvals either:

- Do not commence until the remediation activities within the footprint of the proposed concept are complete; or
- If any construction activities commence prior to completion of remediation activities, they will be done so synergistically and without impact on the remediation outcome.

Strategic and Project Justification

The Port of Newcastle is one of three main international trade ports in New South Wales , the others being Port Botany and the Port of Port Kembla. The Port of Newcastle is Australia's largest port in bulk terms with 14 percent of Australia's total exports passing through the Port. The Port primarily handles the export of commodities and currently has 16 berths for handling coal, project cargo, break bulk, grain and other bulk cargos. There is currently no container terminal at the Port of Newcastle. The total volume of commodities handled by the Port of Newcastle increased from 85.5 million tonnes in 2006/07 to 95.8 million tonnes in 2008/09, representing growth of approximately 12 percent over this two year period. This growth in trade is consistent with the trend of growth exhibited at other New South Wales ports.

The ability of the New South Wales port system to meet the forecast trade growth of the State is reliant on the planned and future expansion of all of the three major ports at Newcastle, Botany and Port Kembla, and cannot be achieved by the expansion of one or two ports alone. When looking solely at container trade, by 2035 it is expected that 6.5 million TEU of containers would be handled in New South Wales ports (Maunsell AECOM, 2005). Even with the current expansion of Port Botany it is anticipated that there would be a container facility capacity shortfall in New South Wales ports of up to 3 million TEU within a 30 year timeframe.

By developing the site for port-related industrial uses which would provide long-term capacity for handling containers, bulk goods and general cargo and enhancing the economic efficiency of the New South Wales port system, the proposed concept would satisfy the needs of the State and is consistent with the *NSW Ports Growth Plan*. The *NSW Ports Growth Plan* has identified that when Port Botany reaches capacity, the Port of Newcastle would be the State's next major container facility.

In the short and long-term the proposed concept would also stimulate the local and regional economy, by providing both direct and indirect employment during construction and operation.

Alternatives

Alternative approval mechanisms and sites were considered as alternatives to the proposed concept. Concept Approval and Project Approval were considered. The Concept Approval was selected as the appropriate approval mechanism because it establishes the strategic framework for development of the site through 2034 and would provide certainty for all stakeholders, including government agencies, the local community and potential developers, that the site is suitable for the intended port-related uses, and that potential environmental impacts can be minimised and managed to acceptable levels. In addition, insufficient detail is available at this point of time to support Project Approval applications.

The alternatives of developing other existing ports, developing a new port, developing alternative sites within the Port of Newcastle, development of the original multi-purpose terminal alternative, and the 'do nothing' alternative were considered.

The alternative of developing other existing ports was eliminated on the basis that the *NSW Ports Growth Plan* relies on a strategy of the three New South Wales ports (the Port of Newcastle, Port of Port Kembla, and Port Botany) combined to meet the port-related needs of New South Wales . Owing to the substantial investment required in port and ancillary infrastructure, the potentially significant environmental impacts of developing a new port, and the fact that fewer ports of call are preferred by the shipping industry, the alternative of developing a new port was eliminated.

Development of alternative sites within the Port of Newcastle was also eliminated as an option because there are no other Newcastle Port Corporation-owned and operated sites with sufficient vacant land and ready port access available for handling containers and bulk and general cargo. Development of the original multi-purpose terminal alternative was eliminated on the basis that the design is outdated and would not meet future port needs. The 'do nothing' alternative was also eliminated.

Development of the proposed concept, with five key land-based operational precincts and a Berth Precinct, was selected by Newcastle Port Corporation as the preferred alternative.

Concept Description

Newcastle Port Corporation is seeking to ensure the site is developed in accordance with the *NSW Ports Growth Plan*. One of the core directions of the *NSW Ports Growth Plan* is for the entire former BHP Steelworks site, including the proposed concept site, to be secured for port use. Newcastle Port Corporation is also seeking to develop the site in accordance with other relevant State and regional plans and policies, and in accordance with Newcastle Port Corporation's own strategic planning for the site. The proposed concept would enable Newcastle Port Corporation to retain appropriate flexibility in the long-term development of the site and to ensure that development of the site occurs in a coordinated and efficient manner that promotes highest and best use of the site for port uses, whilst minimising potential environmental impacts and cumulative impacts on surrounding land use, particularly neighbouring industrial and residential areas.

It is anticipated that the site would be dedicated predominately to handling containers and break bulk including Roll On Roll Off cargo. There would also need to be provisions for bulk storage and handling, including solid and liquids. Berths would be required along the waterfront, and covered and open hardstand storage areas would be required to support ship loading and unloading activities. Road and rail freight infrastructure would also be required to service the site.

The 90-hectare site would have five key land-based operational precincts which are described below:

- **NPC Operations Precinct**. The NPC Operations Precinct would have an area of approximately 3 hectares and would be used by NPC for managing all operations within the Port of Newcastle. The precinct would be located at the south eastern end of the site, fronting Berth 1. Various buildings and small-scale facilities, including vehicle and marine equipment maintenance areas, would be located in the precinct. The precinct would also likely be the berthing location for the Newcastle Port Corporation dredge vessel 'David Allan'.
- **Bulk and General Precinct**. The Bulk and General Precinct has an area of approximately 12 hectares would be used for handling and storing bulk goods such as grain and other dry bulk goods, including cement, fertilizer, and coke cargoes, and for other general purposes. The precinct would be located in the south eastern portion of the site, immediately to the north west of the NPC Operations Precinct and fronting Berth 2. Various buildings and infrastructure would be located in the precinct, including covered storage areas, storage silos, conveyor systems and office buildings.
- **General Purpose Precinct**. The General Purpose Precinct would have an area of approximately 25 hectares and would be used for handling and storing cargo containers, heavy machinery, break bulk and Roll On Roll Off cargo. The precinct would be located in the central and north eastern portion of the site, immediately to the north west of the Bulk and General Precinct and fronting Berths 3 and 4. Various buildings and infrastructure would be located in the precinct, including covered storage areas and areas of hardstand.
- **Container Terminal Precinct**. The Container Terminal Precinct would have an area of approximately 35 hectares and would be used for container storage and transfer. The precinct would be located in the central and north western portion of the site, immediately to the north west of the General Purpose Precinct and fronting Berths 5 and 6. Buildings and infrastructure including quayside and mobile cranes, rail mounted gantries, hardstand areas and an administration building would be provided.
- **Bulk Liquid Precinct**. The Bulk Liquid Precinct would have an area of approximately 15 hectares and would be used for receival, storage, blending and distribution of fuels. The precinct would be located in the far north western portion of the site, immediately to the north west of the Container Terminal Precinct and fronting Berth 7. Buildings and structures including tank farms with steel storage tanks, fuel distribution pipelines and administration buildings would be provided.

The proposed concept also includes a Berth Precinct which would contain up to seven berths to support operations within the five land-based operational precincts described above. Access corridors accommodating the necessary infrastructure (e.g. road infrastructure, potable water, electricity, communications, gas and sewerage) to service the facilities would also be provided.

It is anticipated that development at the site would commence in 2011 and that peak operations would be reached by approximately 2034.

Statutory Planning

The NSW Ports Growth Plan released in 2003 provides a framework within which the Government, industry and the community would work to ensure future growth and development of port capacity in New South Wales. The Port of Newcastle has been identified as part of the *NSW Ports Growth Plan* to become the State's next major container facility following the current expansion of Port Botany. The *NSW Ports Growth Plan* is expected to have a long-term positive impact on the competitive environment in New South Wales ports by redirecting activities (existing and planned) from Sydney ports to regional ports such as Newcastle and Port Kembla. A core direction of the *NSW Ports Growth Plan* is for the former BHP Steelworks site to be secured for port use, justifying the purpose and intent of this proposed concept.

On 16 April 2009, the Minister for Planning declared the proposed concept to be a Major Project under the provisions of the EP&A Act and the *State Environmental Planning Policy (Major Developments) 2005*. Therefore, it is subject to the provisions of Part 3A of the EP&A Act. Part 3A of the EP&A Act establishes the processes and matters for consideration by the approval authority when determining the impact of a proposal once developed and determining whether the proposal should be approved.

Under Section 75M of the EP&A Act, the Minister has authorised the lodgement of a Concept Plan. A Concept Plan allows the proposed concept to be assessed by focusing on the broader strategic issues and key environmental impacts. In accordance with the provisions of Part 3A of the EP&A Act, Newcastle Port Corporation is seeking Concept Plan approval for the proposed concept.

The three major New South Wales ports, including the Port of Newcastle, Port Botany and the Port of Port Kembla, have been nominated as State Significant Sites in the *Three Ports SSS Proposal* prepared by the Department of Planning in 2008. This designation recognises the State economic importance of the three Ports and the directions outlined in the *NSW Ports Growth Plan*. The Minister for Planning and Minister for Ports and Waterways have determined that the ports and related industrial land should be State Significant Sites, and have listed them as such in Schedule 3 of the *State Environmental Planning Policy (Major Developments) 2005*. The State Significant Sites status aims to protect the Ports and associated nearby transport corridors from encroachment by residential and commercial land uses and spot rezonings.

As part of the State Significant Sites status, the New South Wales government has developed a planning regime for the three New South Wales ports that would provide for their expansion and preserve these areas for port-related activities and industry. It is intended that the new planning regime would introduce greater certainty and consistency in planning provisions, which would equip industry and the community with the confidence to invest in the infrastructure required to maintain and expand port activities. Under the new planning regime the site is zoned SP1 Special Activities (Port Industry).

Consultation and Identification of Issues

In preparing this EA, the Director-General's Requirements issued on 29 May 2009 have been addressed as required by Clause 75F of the EP&A Act. Environmental assessment requirements from relevant statutory authorities were requested by the Department of Planning as part of the formal procedure of issuing Director-General's Requirements.

In addition to this process, consultation was undertaken with Government agencies, stakeholders and other relevant authorities during preparation of the Environmental Assessment to further discuss pertinent issues. Consultation was undertaken with agencies and authorities including the Department of Environment, Climate Change and Water, the Roads and Traffic Authority, Newcastle City Council, Maritime New South Wales, and Hunter Development Corporation. A Planning Focus Meeting was held on 17 April 2009, to provide information about the proposed concept to relevant authorities and to discuss initial issues of concern. These discussions were used to inform the subsequent environmental assessment requirements issued by the statutory authorities.

The Closure Area, which the site forms part of, has an established community consultation mechanism via the Mayfield Community Consultative Committee. The Mayfield Community Consultative Committee has been established as requirement of the 2001 consent. Newcastle Port Corporation presented the proposed concept at a meeting of the Community Consultative Committee in August 2009 and a range of issues were raised for consideration in the EA.

Issues Prioritisation

Preparation of a Preliminary Environmental Assessment, consultation with the Department of Planning and relevant agencies (including during the Planning Focus Meeting held on 17 April 2009) and receipt of subsequent Director-General's Requirements issued on 29 May 2009 assisted in the identification of issues relating to the proposed concept. The PEA involved a desktop analysis and preliminary investigations to provide an outline of existing information on the site and the proposed concept, sufficient to establish the key environmental issues. This information and the Director-General's Requirements were used to identify the level of assessment required for this EA. The prioritisation of environmental issues is as follows:

High priority: Traffic, transport and access (road);

Medium priority: Traffic, transport and access (rail and ship), noise and vibration, air quality, hazard and risk, water quality, heritage and cultural, infrastructure, and geology and soils.

Low Priority: Socioeconomic, visual, ecology, waste and energy.

Environmental Impact Assessment

Road Transport

The local road network in the vicinity of the site comprises local roads such as George/Selwyn Street, Ingall Street and Bull Street. There is also a major divided road, Industrial Drive, which in the vicinity of the site carries approximately 30,000 vehicles per day. The local road network primarily services the industrial and port areas of Mayfield.

The regional road network includes Tourle Street and Cormorant Road which connect with Kooragang Island and the New England Highway, Pacific Highway and the F3 Freeway which connect with Maitland to the west, Brisbane to the north and Sydney to the south, respectively.

The two main intersections in the area surrounding the site are the Industrial Drive/George Street intersection and the Industrial Drive/Ingall Street intersection. SIDRA analysis shows that in 2008, without the proposed concept, both intersections perform satisfactorily and with spare capacity at Level of Service (LOS) B in both the AM and PM peak hours. Allowing for future traffic growth through to 2024 (initial operations) and 2034 (final operations), and again without the proposed development, the Industrial Drive/George Street intersection continues to perform at LOS B in both the AM and PM peak hours for both scenarios while the Industrial Drive/Ingall Street intersection performs at LOS B in the AM peak and LOS C in the PM peak for both scenarios.

Based on trade forecasts for each precinct and a series of assumptions regarding modal split, truck loading capacity, port operations etc, truck and employee vehicle movements have been estimated for both the initial operations scenario in 2024 and the final operations scenario in 2034. The main difference between these two scenarios is that the container terminal is expected to operate at a capacity of 600,000 TEU per annum in 2024 and 1 million TEU per annum in 2034. It is estimated that the proposed development will generate approximately:

- Initial operations in 2024 - 148 truck movements and 60 employee vehicle movements in the daytime peak hour.
- Final operations in 2034 – 214 truck movements and 90 employee vehicle movements in the daytime peak hour.

The intersections were modelled again using SIDRA analysis and allowing for the additional traffic to be generated by the proposed development. This analysis showed that in 2024 the Industrial Drive / George Street intersection would operate at LOS B in both the AM and PM peak hours while in 2024 the Industrial Drive / Ingall Street intersection would operate at LOS B in both the AM and PM peak hours if an internal link road is included within the site to ensure a more strategic distribution of trucks between the two intersections. This recognises that the Industrial Drive / George Street intersection has some spare capacity by comparison with the Industrial Drive / Ingall Street intersection.

In 2034, the analysis shows that with the proposed development the Industrial Drive/George Street intersection would operate at LOS B in the AM peak hour and LOS C in the PM peak hour if an internal link road is included within the site while the Industrial Drive/Ingall Street intersection would operate at LOS B in the AM peak hour and LOS D in the PM peak hour if an internal link road is included. The performance of the Industrial Drive / Ingall Street intersection could be marginally improved by diverting all employee traffic away from this intersection.

Estimated traffic volumes from the proposed development in 2034 were then assessed for their impact on the broader road network. The assessment showed that the trucks and vehicle movements generated by the development would be a small proportion (less than ten percent) of the forecast daily traffic on the road network in 2034 and therefore the development was considered to have a minimal impact on the road network.

Estimated traffic volumes from the proposed development in 2034 are predicted to be within the mid-block capacity of the local road network (e.g. Selwyn Street) and capacity exists to accommodate additional traffic generated by development of adjoining sites such as the Intertrade Industrial Park that may occur in the future. As part of future Project applications, precinct operators should be required to assess the impact of heavy goods vehicles on the road pavement condition and geometry of the local road network.

There are two road crossings of the railway line proposed, one at Selwyn Street and one in the western portion of the site to service the Container Terminal and Bulk Liquid Precincts. These crossings would be closed for periods of the day/night to accommodate rail movements associated with the existing OneSteel facility and the proposed concept plan development.

An assessment of potential queuing impacts was undertaken and this determined that the maximum truck queuing length at the Selwyn Street and western crossings would be 75 metres and 150 metres respectively, although the queue length at Selwyn Street would increase to 225 metres if an internal link road was introduced. On this basis truck queuing was not expected to impact on the two nearby intersections although queuing would need to be managed so that it did not impact on access to surrounding sites such as the Intertrade Industrial Park.

Construction traffic has not been specifically assessed as part of the Environmental Assessment document as the exact nature of the infrastructure to be constructed within each precinct and therefore the construction methods and construction machinery to be used is not known at this stage. However, it is reasonable to expect that the construction traffic generated at any one time over the duration of development of the proposed concept would not exceed the operational traffic estimated for the initial operations scenario in 2024 being 148 truck movements and 60 employee vehicle movements in peak hour. This level of traffic is well within the capacity of the surrounding road network and intersections. The issue of construction traffic can be assessed in more detail when Project applications are lodged by the operators of each precinct in the future.

In conclusion, the proposed development would not unreasonably impact on the capacity of the local and regional road network. Truck queuing at the two rail crossings is expected to be acceptable although impacts on the local road network and access to adjoining properties in the surrounding area would need to be managed.

Satisfactory intersection performance can be maintained at both Industrial Drive / Ingall Street and Industrial Drive/George Street if an internal link road is provided to allow a more even distribution of development traffic between the two intersections. The performance of the Industrial Drive / Ingall Street intersection could be marginally improved by diverting all employee traffic away from this intersection. A Traffic Management Plan for the site should be prepared to ensure that this distribution is enforced.

Rail Transport

Port Waratah Loop is coal handling facility, but also has a grain export facility that can be very heavily utilised in certain periods of the year. Port Waratah Loop is connected to the Main North Rail Line via Islington Junction. There are a number of sidings and facilities connected to Port Waratah Loop, namely Port Waratah Coal handing facility, Brambles Sidings, Bullock Island Grain facility, Pasminco Siding, Grain Corp Grain loading facility, Morandoo Sidings and OneSteel Sidings.

All of the above are connected to the Main North via Islington Junction, and two roads (Arrival Road and Storage Road 1). The Arrival Road services all but the Morandoo sidings and OneSteel, which are accessed via Storage Road 1. The proposed concept site is connected to Port Waratah Loop via the OneSteel Arrival Road. This siding, which would be used for any rail freight movements from the new berths, is currently used by OneSteel. OneSteel currently operates up to three trains in and out of their site per day.

The proposed concept would require approximately three trains per day running into the site for the initial operations scenario in 2024. It is important to note, that this has been calculated assuming 315 operating days per year for rail (due to track closures, possessions etc). Based on the fact that there are three trains per day required for the initial operations scenario in 2024, and that time must be allowed for OneSteel trains to move in and out of their facility, there needs to be a minimum of two new rail sidings provided within the site. There is adequate space available within the site to accommodate two sidings of around 520 metres in length.

The envisaged operation is that a maximum length train of 766 metres would arrive via the number 6 road in the Morandoo Sidings and would cross over to the number 7 road via a new crossover and then onto the old BHP Billiton rail road, now called the OneSteel Arrival Road. Note that the number 7 road is currently disconnected in Morandoo Siding and therefore a new linking crossover would need to be constructed.

The train would enter the first of the sidings, such that the back of the train is clear of the Selwyn Street level crossing, but with the break point of the wagons still short of the siding points (i.e., still on the OneSteel access road). The back half of the train would then be broken off and temporarily parked, and the front half would be moved forward clear of the points and into the siding and parked. The locomotives would detach and leave the siding and run back around to pick up the back half of the rake, and that would be moved into the second siding and parked. This leaves the OneSteel Arrival Road clear for OneSteel trains to enter and leave while the Port train is being loaded and unloaded. Given that there would be two trains in this section at any one time (i.e., one train in the OneSteel facility and one train in the sidings at the site), it is possible that the OneSteel Arrival Road would need to be signalled. The train is then reformed after loading by the reverse move carried out on entry. The entire consist is then reversed back over the Selwyn Street level crossing into the number 6 road in Morandoo Sidings, before leaving via the Port Waratah Loop.

The above operation can be undertaken for the initial years of operation. However, once the freight task requires more than two trains per day an exit road would need to be installed connecting to the Bullock Island Loop in order to deal with the increase in train operations.

There are several constraints associated with the 2024 rail operations:

- OneSteel requires access to their facility, therefore the Morandoo Arrival Road (road number 13) and the OneSteel Arrival Road need to be kept clear. This means that trains cannot be parked in the number 6 road on arrival for any length of time, as they are too long for the siding and would block access and egress for OneSteel trains. If a Port train needs to be held in Morandoo Sidings for some hours while it waits for entry into the site, then it would be broken in two and parked in the number 4 and 5 roads in the Morandoo Sidings. If it is only a short term park, then the number 6 road can be used and potential conflict with OneSteel trains can be easily managed by scheduling these train movements.
- Within the Morandoo Sidings, the number 6 and 7 roads need to be connected via a new crossover, so as to provide access to the OneSteel Arrival Road.
- Selwyn Street level crossing sits between the Morandoo siding and the site. The level crossing would be closed for only relatively short periods of time (five to six minutes per train movement) while trains enter and exit the site. The impact on Selwyn Street is that the level crossing would close for five to six minutes at a time, up to ten times per day. This is three OneSteel trains entering and leaving, and two trains associated with the proposed concept, entering and leaving. This crossing would likely need to become a full barrier as a minimum and an Australian Level Crossing Assessment Model (ALCAM) assessment should be undertaken once vehicle numbers have been properly identified.
- The new western road crossing of the railway line that would be required to service the Container Terminal and Bulk Liquid Precincts may also require treatment to separate road and rail movements. If this crossing is kept more than 65 metres from the toes of points for the siding (on the western side), then the port train locomotives shunting back on the OneSteel Arrival Road would turn back prior to reaching the level crossing, meaning that the only rail traffic crossing the new level crossing would be OneSteel trains (three trains per day).
- The Main North Line operates under a freight train curfew during the peak hours. This means that running trains between Newcastle and Sydney needs to be carefully planned. It is quite possible that this curfew would cause path restrictions to Newcastle. This issue should be discussed with Australian Rail Track Corporation and RailCorp.
- This freight train curfew would be removed when the Main North Corridor Upgrade project is completed but this is likely to occur in a medium/longer term timeframe.
- Use of the Morandoo Arrival Road would require a discussion to take place with Pacific National to ensure that the siding is available for use.

The increase in container freight operations to 1 million TEU under the final operations condition (2034) requires the addition of 1.3 additional freight trains per day into the site. The total number of trains now entering the sidings would be 4.4 trains per day. This means that the sidings would be occupied for 21 hours of each day.

There is an increased risk that, due to the curfew on the Main North line, trains would stack up at the site. However, once the Northern Sydney Freight Corridor is in operation, this would no longer be an issue, as trains can be timetabled to arrive at the correct time of day for entry into the site without holding on the Morandoo Siding. It is worth noting that the Northern Sydney Freight Corridor is currently being implemented, therefore it is likely that this project will be in place before the port facility reaches 1 million TEU in 2034. It is assumed for the purposes of the 2034 case that the Northern Sydney Freight Corridor has been built. The number of trains able to access the site becomes (to all intents and purposes) unrestricted, and train lengths improve up to the limit of the siding space available in the site. This is because the gradients on the Cowan Bank will be improved and the trains can be lengthened. This equates to a 12 percent increase in handling capacity per train. Therefore, the base case of 4.4 trains has been improved to 3.9 trains in 2034 due to the above 12 percent increase in handling capacity per train.

The envisaged operation is that a maximum length train of 766 metres would be pulled into the site, and then broken into two and shunted into the two 520-metre sidings for loading and unloading. The train is then reformed after loading, in the same manner as described for the 2024 operations, before leaving via the new exit road to the Bullock Island Loop.

At Train Operations Plan would be prepared by NPC to manage train operations within the Morandoo Yard and the site.

Should there be changes to the modal splits for freight demand beyond the base cases that have been modelled then further assessment of the rail impacts would be required and further upgrades to rail infrastructure within the site and on the local rail network would in all likelihood be required.

Noise

Noise monitoring was conducted to determine existing noise levels. Existing noise levels at Mayfield residences to the south west of the site are subject to relatively constant noise levels throughout the day from Industrial Drive and nearby industrial land use. Residences in Mayfield, represented by a noise monitoring location on Arthur Street, have an existing industrial noise contribution of 45 dBA based on site observations and noise measurements. Noise levels at Mayfield residences further to the south are represented by a noise monitoring location at Crebert Street. These residences are subject to significant levels of traffic noise associated with intermittent traffic, including trucks on Industrial Drive. An industrial noise contribution to the area of 40 dBA has been estimated based on site observations and noise measurements. Traffic noise at this location is in the order of 66 dBA during the day and 62 dBA during the night.

Residences on the northern end of Carrington residential area to the south east of the site, represented by a noise monitoring location on Elizabeth Street, are subjected to industrial noise from nearby industry and noise from the Carrington Coal Loader to a lesser degree. A review of the noise data indicates that noise from industry is clearly noticeable during the day, whereby a noise contribution from industry of 57 dBA during the day and 54 dBA in the evening has been established.

The western side of Stockton is located to the east of the site and is adjacent to Kooragang Island which is a major industrial area. As such, industrial noise is present in the area. The noise contribution from existing industry in this area is in the order of 47 dBA.

Site related noise emissions were modeled using the CONCAWE algorithms implemented in the “Cadna A” acoustic noise prediction software. Predicted noise levels from operations at the site indicate that the potential for noise impact at surrounding residences would be greatest in the night period when adverse weather conditions (temperature inversions) occur. Noise criteria exceedances of up to 7 dBA during the night period in the worst case conditions are predicted at Crebert Street, Mayfield. An exceedance at night of up to 2 dBA is anticipated at residences in Arthur Street, Mayfield and up to 7 dBA is anticipated at residences in Stockton. Noise levels are predicted to comply with the sleep disturbance screening criterion at all locations.There would be no exceedances at Carrington. In the case of day time operations, noise levels at all surrounding residences are expected to be below established noise criteria.

Based on a review of the predicted results, noise mitigation measures have been recommended for minimising night time noise including the use of noise barriers at select locations and providing silencers on equipment. These measures should be included in future detailed assessments at the time Project applications are prepared.

The *Calculation of Road Traffic Noise* traffic noise prediction model was used to determine traffic noise levels at residences along Industrial Drive. Review of traffic noise based on projected traffic volumes with and without the proposed concept development indicates compliance with the Department of Environment, Climate Change and Water traffic noise criteria at residences along Industrial Drive during the daytime period. However, at night an exeedance is indicated at a number of residences along Industrial Drive due to an increase in heavy vehicle traffic. It is anticipated that the exceedance in night time traffic noise levels would occur at the later stages of the development, when approaching peak operations. It is considered that the most feasible measures to protect the acoustic amenity of these residences is to provide façade treatment and ventilation to affected rooms of these residences.

Estimates of train noise levels at residences along the rail access corridor, was conducted using the rail noise database developed by Wilkinson Murray for Railcorp. An increase of up to eight rail movements (four trains a day) has been assessed with respect to the Department of Environment, Climate Change and Water’s *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* criteria. Based on the results of the modelling, an $L_{Aeq(9hr)}$ noise level of 55.9 dBA and L_{Amax} noise level of 83 dBA at residences nearest the rail line is anticipated during the night time, which is below the applicable trigger levels specified in the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects*.

Based on the findings of this noise assessment it is considered that the night time operational and traffic noise impacts associated with the proposed concept are manageable and can be mitigated to acceptable levels. It is recommended that further detailed assessments be conducted at the Project application stage to confirm the need for, timing and extent of mitigation required. All other noise impacts are considered acceptable.

Air Quality

Regional air quality is influenced by major industry located around the Port and emissions from vehicles using major arterial roads feeding Newcastle. Primary industrial sources of air emissions likely to affect the Port include the OneSteel and Smorgon facility at Mayfield, the Orica and Incitec plants on Kooragang Island and the Tomago Aluminium smelter at Tomago (to the north). Additional pollutant sources include emissions from the coal and grain terminals and oil seed and fat manufacturing (Cargill), and three fuel storage facilities in Newcastle, Caltex (Wickham), BP (Carrington) and Shell (Hamilton).

Ambient pollutant concentrations derived from available monitoring data were used to provide a preliminary assessment of the existing air quality in the region. The New South Wales Department of Environment, Climate Change and Water operates an ambient air monitoring station at an athletic field in Smith Street, Newcastle. The station is approximately 5 kilometres to the south of the site. The following pollutants are currently measured at the station:

- Ozone (O_3)
- Nitric oxide (NO), nitrogen dioxide (NO_2) and nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Sulphur dioxide (SO_2)
- Particulate matter (PM_{10})

Key statistics for the monthly data monitored from 2006 to 2007 at the Smith Street station showed that the 24-hour PM_{10} guideline was the only *National Environment Protection Measure* level breached at the station (in November 2006 and May 2007). However, the *National Environment Protection Measure* goal of five days allowable exceedances per year was met.

Air quality monitoring data collected from May 2006 to August 2008 on behalf of the Hunter Development Corporation at sites in Mayfield, Steel River and Stockton also provides information relevant to the assessment of the existing air quality in the immediate vicinity of the Port. The Hunter Development Corporation monitoring data identified two days in the monitoring period that the 24-hour average PM_{10} concentration exceeded the relevant Department of Environment, Climate Change and Water criterion (55 micrograms per cubic metre on 3 October 2007 and 56 micrograms per cubic metre on 1 July 2008). It was noted that exceedances of 24-hour average PM_{10} concentrations are not uncommon and often attributed to natural sources such as bushfires or dust storms. The annual average Total Suspended Particulate (TSP) and PM_{10} concentrations were below the relevant Department of Environment, Climate Change and Water assessment criteria of 90 micrograms per cubic metre and 30 micrograms per cubic metre, respectively.

Sampling undertaken at Mayfield from June to August 2008 for BTEX (Benzene, Toluuene, Ethylbenzene and Xylenes) concentrations show all monitored concentrations were significantly lower than the *National Environment Protection Measure* Air Toxics monitoring investigation levels.

A qualitative assessment of the potential impacts associated with construction of the proposed concept was undertaken because details on construction vehicles and equipment were not available at the Concept Approval stage. Construction would result in emissions from fuel combustion from vehicles and equipment, dust emissions as a result of earthworks and other construction activities, and odour emissions from the disturbance of anoxic or contaminated material known to be present at the site. Mitigation measures such as watering exposed surfaces, covering loads of loose material during transportation, and switching off equipment when it is not in use would minimise these potential impacts. It is recommended that further assessment of construction impacts be undertaken as part of future Project applications when construction details are available.

A quantitative assessment was undertaken to assess the impacts of operation of the proposed concept. The assessment was undertaken using the CALPUFF dispersion model and the inputs were based on the known aspects of the proposed concept i.e., shipping numbers, train numbers, truck numbers, bulk material quantities, fuel storage quantities etc, along with other relevant factors such as meteorology, receptor locations and terrain surrounding the site.

The modelling results for operation of the proposed concept suggest that with the exception of short term (24-hour) PM_{10} concentrations, all pollutants comply with the relevant criteria. Background PM_{10} levels already exceed the Department of Environment, Climate Change and Water criteria of 50 micrograms per cubic metre for 24-hour PM_{10} due to existing industry and traffic in the Region. Operation of the Concept Plan combined with background PM_{10} would result in 24-hour PM_{10} levels exceeding the Department of Environment, Climate Change and Water criteria at all of the 14 discrete receptors surrounding the site. The modelling demonstrated that the criteria would be exceeded by up to 21 micrograms per cubic metre at Receptor 1 which is located at Selwyn Street. It should be noted that while the proposed concept would generate PM_{10} emissions and contribute to exceedance of the criteria, the contribution from the proposed concept alone is minor (less than 11 percent of the assessment criteria and around 8 percent of the predicted cumulative concentration).

Emissions of PM_{10} during the operation phase can be limited by implementing site specific 'best practice' dust mitigation measures which should be incorporated into Air Quality Management Plans to be developed by Project applicants. A variety of management measures have been recommended including covering loads of loose material during transportation, switching off equipment when it is not in use, and adjusting work practices as needed and based on wind observations. The recommended measures can be evaluated at any time during the project life and reviewed accordingly.

As PM_{10} is a dominant fraction of dust generated by construction and some operational activities, it is recommended that a PM_{10} measurement and monitoring program be implemented during the construction and operational activities. If new information or regulation supports monitoring of other particle size fractions (such as $PM_{2.5}$), this recommendation can be reviewed at a later date and incorporated into the monitoring program as appropriate. The monitoring program would be an integral part of the Air Quality Management Plans.

Hazard and Risk

The proposed concept would involve the temporary storage of Dangerous Goods that are listed in the Australian Dangerous Goods Code. These goods would be stored at the site, until they can be transported off-site. The Bulk Liquids Precinct would store fuels and the General Cargo Precinct and Container Terminal Precinct may include Dangerous Goods that enter the Port in containers or bulk products in portable tanks or Intermediate Bulk Containers. The existing Mayfield No.4 Berth, which handles the import and export of ammonium nitrate, is located in the General Cargo Precinct.

Based on the potential quantity of Dangerous Goods that would be stored at the Bulk Liquids Precinct alone, *State Environmental Planning Policy No.33* would apply to the proposed concept. The Department of Planning requested that a Preliminary Hazard Analysis be submitted with the Environmental Assessment, with an objective to demonstrate whether or not the proposed concept poses a risk to adjacent facilities and the site itself. The methodology selected for the Preliminary Hazard Analysis was that prescribed in the Department of Planning Multi-Level Risk Assessment approach, supported by *Hazardous Industry Planning Advisory Paper (HIPAP) No.6 – Guidelines for Hazard Analysis*. The basic approach for the study was to conduct a hazard analysis, consequence analysis, and risk analysis.

As a result of the hazard analysis the following incidents were examined and none were carried forward for consequence analysis:

- **NPC Operations Precinct.** Fuel release, ignition and fires as a result of storage and fuelling operations were identified hazards and carried forward into the consequence analysis. Port craft owned by Newcastle Port Corporation would be fuelled at Berth 1 adjacent to the NPC Operations Precinct, using an on-site underground diesel fuel storage tank (approximately 10,000 litres). Newcastle Port Corporation vehicles would also be refuelled at the precinct from an underground unleaded petrol tank (approximately 5,000 litres).
- **Bulk and General Precinct.** This precinct would not be used for the storage and handling of Dangerous Goods, however, fumigation operations for grain storage may be performed in this precinct using methyl bromide. Fumigant recapture equipment is available for fumigation operations and it is assumed that recapture equipment would be used to minimise the impacts from releases of fumigant gases at the Port. Therefore, release of fumigants was not carried forward into the consequence analysis.

- **General Purpose Precinct.** Handling shipping containers in this precinct may require fumigation operations using methyl bromide. However, it is assumed that recapture equipment would be used to minimise the impacts from releases of fumigant gases and therefore releases of fumigants was not carried forward into the consequence analysis. As mentioned previously, the general cargo handling facility Mayfield No. 4 Berth has been already approved within this precinct and commenced operation in 2010. This facility has approval for the handling of ammonium nitrate in a dedicated area located adjacent to the berth. Fire in the ammonium nitrate handling area leading to explosion with the potential to impact adjacent sites was carried forward into the consequence analysis.
- **Container Terminal Precinct.** Handling shipping containers in this precinct may require fumigation operations using methyl bromide. However, it is assumed that recapture equipment would be used to minimise the impacts from releases of fumigant gases and therefore releases of fumigants was not carried forward into the consequence analysis. There is a potential for Dangerous Goods to be transported using shipping containers and therefore hazards such as a flammable gas (including chlorine), liquid, or solids release and ignition/explosion was carried forward into the consequence analysis.
- **Bulk Liquids Precinct.** Receival, storage, blending and distribution of fuels and biofuels has the potential to result in a fuel release at the berth, resulting in ignition and pool fire. There is also potential for ignition of fuel in a storage tank, resulting in a tank roof fire. Release of fuel into a storage table bund could result in ignition and pool fire in the bund. These potential hazards were carried forward into the consequence analysis.

Each incident has been assessed in detail in the consequence analysis and all incidents were assessed for impacts at specific heat radiation levels (fire), overpressure (explosion) and toxic gas impact (toxic gas release). The distances to the specific levels of consequence impact were calculated to determine whether the impact at the site boundary exceeded the acceptable impact criteria. Only two incidents were identified to have the consequence potential to impact areas off-site and were carried forward into the risk analysis. These incidents were:

- A leak from a chlorine drum valve within the Container Terminal Precinct leading to the development of a toxic plume which is directed towards the adjacent sites and residential areas by wind. A conservative drum leak frequency analysis was conducted and combined with the wind direction, weather conditions and the probability of fatality at the adjacent industrial land uses and/or injury at the closest residential area. The risk of injury and fatality was estimated to be 30 chances in a million per year (pmpy). The acceptable fatality and injury risk criteria is 50 pmpy. Hence, the assessed risk does not exceed the acceptable risk criteria and therefore the storage of the toxic gases would only constitute a potential hazard. Nevertheless, the risk may be reduced even further by implementation of an Emergency Response Plan for evacuation of the downwind occupied areas.
- Ammonium nitrate incidents within the General Purpose Precinct which could include fire, explosion and toxic plume. The risks associated with handling of ammonium nitrate were assessed prior to construction of Mayfield No.4 Berth. This analysis indicated that a fatality risk of 0.5 pmpy extended a maximum of approximately 40 metres from transit of ammonium nitrate. This risk is well contained within the General Purpose Precinct and therefore the risk criteria of 50 pmpy was not exceeded at the adjacent precinct.

Based on the analysis conducted, it was determined that the potentially hazardous areas within the site can be located such that they do not impact adjacent surrounding residential and industrial land uses (i.e., OneSteel, the future lip, and Carrington Coal Terminal), and that potentially hazardous facilities can be located within specific precincts such that potential impacts do not overlap causing accumulation of risks. Therefore, the proposed concept can be classified as potentially hazardous and not actually hazardous, and would be permitted at the proposed location under the provisions of *State Environmental Planning Policy No.33*.

A number of mitigation measures are recommended to ensure the potential hazards and risks assessed are maintained in the As Low As Reasonably Practicable Range. Most importantly, it was recommended that a detailed Preliminary Hazard Analysis be conducted for each of the facilities proposed under subsequent Project applications to confirm the results of the Preliminary Hazard Analysis for the Concept Plan and to ensure that the detailed site layouts and Dangerous Goods storage quantities and operations do not result in the acceptable risk criteria being exceeded.

Water Management

The Port of Newcastle is located in the Hunter Estuary. The Hunter Estuary, at the mouth of the Hunter River, comprises over 100 kilometres of waterways, including the South Arm of the Hunter River. The estuary has been substantially modified by industrial activity and land use changes with resulting impacts on water quality and habitat integrity.

The site is located adjacent to the South Arm of the Hunter River. The stormwater drainage network in place at the site includes minor and main drains, stormwater pits and pipes, culverts and discharge structures into the South Arm of the Hunter River. The site is underlain by three distinct groundwater aquifers which generally flow in a north to north easterly direction and have low to very low permeability.

Surface water quality monitoring across the site has shown exceedances of Australian and New Zealand Environment Conservation Council guideline values for pollutants such as heavy metals and sediments. In general, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbon concentrations were generally below guideline values or detection limits.

Historically, groundwater quality at the site has been very poor as a result of contamination from industrial activity. Groundwater quality monitoring undertaken since installation of the subterranean barrier wall (conducted as part of the remediation activities) generally showed Total Petroleum Hydrocarbon concentrations above detection limits but mostly within site specific guideline values, with occasional exceedances in isolated boreholes. Isolated exceedances of heavy metal guideline values were recorded and exceedances of organic contaminants (such as Polycyclic Aromatic Hydrocarbon, phenols, benzene, toluene) predominantly occurred in the remediation Area 1, indicating that contamination at the site is largely maintained within the barrier wall.

Potential environmental impacts on the water environment during construction and operation were assessed. There is the potential for erosion and sedimentation resulting from land-based construction works such as earthworks and excavation for foundations, rail and road infrastructure and stormwater drainage networks. Mobilisation of sediment and contaminants (e.g. heavy metals, hydrocarbons) by stormwater runoff from roads, hardstand areas, stockpiles and buildings could occur during operation. Measures such as bunding to capture contaminated runoff, silt fencing, watering of stockpiles and first flush containment systems would be implemented to reduce the potential for contaminated runoff and minimise the impacts on the South Arm of the Hunter River.

A large part of the site would be covered in hard stand thereby avoiding potential interaction between surface water and groundwater.

Bulk liquid storage, transfer of liquids from ships to land (and vice versa) could result in leaks, spills and overflows of fuels and oils to the receiving environment. Appropriate spill response and containment measures, such as warning systems, alarms and bunding, would be implemented to minimise spills and overflows and Emergency Response Plans would be implemented to ensure the risk and impact of spills and overflows is minimised.

A site-wide Stormwater Management System would be implemented which would build on a preliminary stormwater strategy prepared for the site. The detailed design of stormwater systems for individual Project applications would be required to comply with the Stormwater Management System, which would be designed and implemented in accordance with Newcastle City Council design criteria, principles set out in the Contaminated Site Management Plan, and in consultation with Department of Environment, Climate Change and Water. The Contaminated Site Management Plan provides a common framework for the design, implementation, completion, use and maintenance of works across the whole Closure Area.

Drainage runoff generated from hardstand areas and buildings during operation could increase flood risk within the site or to adjacent land. In addition, barriers to flooding such as bunding, road and rail infrastructure and stockpiles could impede stormwater flows across the site. Flooding impacts would be addressed by ensuring that the Stormwater Management System is implemented across the site, appropriately designed culverts are installed and maintained, and that rainwater harvesting and reuse infrastructure is implemented across the site.

Water quality monitoring programs would be developed, in consultation with Newcastle City Council and Department of Environment, Climate Change and Water, and implemented during construction and operation, to ensure that water quality objectives in the South Arm of the Hunter River are not compromised.

Mitigation measures to minimise the impact of the proposed concept on water quality and flows would be outlined in Construction Environmental Management Plans and Operation Environmental Management Plans to be prepared for the site. These Plans would comprise a series of sub-plans that would outline specific measures to control impacts to the water environment. With the implementation of appropriate management measures across the site, it is concluded that the proposed concept is unlikely to have significant impacts on the water environment.

Heritage and Cultural

A search of the National Parks and Wildlife Service Register of Aboriginal Sites (now known as the Department of Environment, Climate Change and Water's Aboriginal Heritage Information Management System database) was carried out as part of the Environmental Impact Statement titled *Development of a Multi Purpose Terminal and Remediation of the Closure Area, BHP Newcastle Steelworks* (URS, 2000). No Indigenous heritage sites were identified through this search and therefore it was assumed that any Indigenous sites once present in the vicinity of the site would have been removed or destroyed during previous reclamation, construction and operational activities associated with the BHP Steelworks. Therefore, the impact to sites of Indigenous heritage significance is expected to be negligible given that no known sites have been recorded in the area and the extremely disturbed nature of the site.

A European heritage assessment was undertaken during the preparation of the Environmental Impact Statement, associated with the 2001 consent and approval was sought to demolish 15 heritage-listed items, being:

- Remnant of the No.1 Blast Furnace
- No. 1 Blower House
- Open Hearth Building
- No.1 Bloom and Rail Mill
- Soaking Pits Building
- Steel Foundry
- DC Substation
- Original Timber Wharves
- No. 3 Blast Furnace
- AC Pump House
- Power House
- Open Hearth Change House
- Mould conditioning Building
- Basic Oxygen Steelmaking Plant
- No. 4 Blast Furnace

Archival recording of the 15 heritage-listed items was undertaken and Statements of Heritage Impact were prepared. The Statements of Heritage Impact concluded that the heritage significance of items was invested in the iron and steel making processes, rather than the built fabric of the structures. It was concluded that as the site had been decommissioned, this had an impact on the interpretation of the significance of the item. Furthermore, retaining these structures, which could not be re-used or regenerated, would require significant expenditure to maintain and stabilise. These items were demolished in accordance with the 2001 consent.

The 2001 consent required the production of an Archaeological Management Plan for the Closure Area. Umwelt (Australia) Pty Ltd were commissioned to prepare the document. The site was divided into two areas, known as the Heritage and Non-Heritage Precincts or Areas (Umwelt, 2002a, 2005). The Heritage Area is located entirely within the Concept Area and portions of the Non-Heritage Area are also located in the site. The Archaeological Management Plan for the Non-Heritage Area (Umwelt, 2002b) required an archaeological assessment to be undertaken based on the concerns of the Heritage Office. The assessment was completed in 2002 and identified four potential archaeological resources within the Concept Area (Umwelt, 2002a). The Archaeological Management Plan for the Heritage Area also necessitated the completion of an archaeological assessment (Umwelt, 2004). This was completed by Umwelt in 2005 and titled *Assessment of the Historical Archaeology and Research Design: Newcastle Steel Works Closure Area*. Umwelt assessed and ascribed significance to the 15 items on the site as if they were still extant.

The archaeology assessment for the Heritage Area was submitted to the Heritage Council in support of an application for an Excavation Permit under Section 140 of the *Heritage Act 1977*. The research design advocated that the site be monitored for archaeological evidence. Should relics be uncovered they were to be archivally recorded prior to destruction. The documentation was lodged in June 2005 and issued as Excavation Permit No. 2005-S140-041 with Mr Paul Rheinberger as Excavation Director. The permit was amended in 2008 to change the applicant to HDC. The permit is valid for five years, being due to expire in September 2010.

The current situation is that the Excavation Permit expires in September 2010. Hunter Development Corporation indicated that the Excavation Permit would be enacted to the extent necessary to complete remediation works. As the proposed concept is seeking Concept Approval under Part 3A of the EP&A Act, an Excavation Permit would not be required. In addition, because Umwelt considered the archaeological values of the Mayfield site (in accordance with the 2001 consent) and ascribed local heritage significance to the 15 heritage items within the Heritage Area as though the structures were still standing rather than as extant archaeological remains, the existing significance assessments, on which the Archaeological Management Plan is based, are considered to be inaccurate. It was therefore necessary to re-assess the significance of the site and compile new recommendations regarding the archaeological management of the site.

The significance of the site was re-assessed and the following conclusions were made:

- The 15 items listed above, all of which are currently listed on the Heritage Schedule of the Newcastle Local Environmental Plan, have been substantially recorded prior to their demolition. Consequently, their significance as individual items has been significantly altered and their significance relates to their contribution to the site as a whole rather than as individual items;
- Two extant items, namely the Pattern Store and Master Mechanics Office, both currently listed on the Heritage Schedule of the Newcastle Local Environmental Plan, are over 100 metres outside the site. There is not considered to be any impacts under the current proposal; and
- Five items, namely the Hunter River Smelting Co, the No. 2 Blast Furnace, the original location of the No. 1 Pig Mill, the No. 1 and 2 Pig Mills and the Ferro-Manganese Blast Furnace, none of which are heritage listed, were demolished at various stages prior to the 1990s. These items were not archivally recorded prior to their demolition and are consequently considered to hold significant archaeological potential.

The proposed concept may impact on the remains of the former structures as listed above and has the potential to impact on the archaeological remains of the Hunter River Smelting Co, depending on the depth of excavations.

The works to be undertaken by Hunter Development Corporation would address the archaeological potential of the No. 2 Blast Furnace, the Original No. 1 Pig Mill and the Ferro-Manganese Blast Furnace. Archaeological remediation of the No. 1 and 2 Pig Mills may therefore be required should the area be impacted.

A Statement of Heritage Impact was prepared for the site as a whole, based on the significance assessment undertaken. The objective of a Statement of Heritage Impact is to evaluate and explain how a proposed development, rehabilitation or land use change would affect the value of the heritage item and/or place. A Statement of Heritage Impact should also address how the heritage value of the item/place can be conserved or maintained, or preferably enhanced by the proposed works. This assessment has been prepared in accordance with the Department of Planning's guidelines New South Wales Heritage Manual (NSW Heritage Office & DUAP, 1996a) and Statements of Heritage Impact (NSW Heritage Office, 2002).

The site was deemed to have State and local significance for its archaeological potential in relation to the former locations of the No. 2 Blast Furnace, the original location of the No. 1 Pig Mill, the No. 1 and No. 2 Pig Mills, the Ferro-Manganese Blast Furnace and the Hunter River Copper Smelter Works. The site also retains Local social significance for the place it holds in the memory of the local residents who worked in or grew up under the shadow of the Steelworks. The Statement of Heritage Impact concludes that the proposed concept is compatible with these heritage values. Construction activities could, however, impact on the archaeological values of the site. To ameliorate this impact Newcastle Port Corporation would undertake archaeological testing, monitoring and salvage should there be impacts such as from installation of footings and services in those areas of archaeological potential, as identified in this Environmental Assessment, that have not been investigated by Hunter Development Corporation.

Infrastructure

In September 1999 the BHP Steelworks closed and all utility services to the site became redundant. Demolition and remediation has been conducted at the site, and remediation is still ongoing. Most redundant utility services were removed during demolition and remediation. In recent years, limited new utility services have been provided to support operations currently on-site. As service and utility infrastructure currently servicing the site is minimal, it is anticipated that there would be minimal potential for impact on existing infrastructure during the construction stages of the proposed concept.

The proposed concept would require provision of water, sewer, natural gas, electrical, and telecommunications services, and installation of pipelines. Local service providers, namely Energy Australia, Hunter Water Corporation, and Jemena have advised that there is likely to be capacity available to service the proposed concept, particularly since there are a number of significant service upgrades planned for the area.

Three options exist for providing services as follows:

- **Connection to the IIP.** The Intertrade Industrial Park development would deliver trunk infrastructure in stages from which the site may connect. Indicative times for the delivery of infrastructure to the Intertrade Industrial Park, following the commencement of construction (anticipated to occur in 2010), are as follows:
  - Stage 1 – 27 months. Some trunk roads, water, telecommunications, sewer and gas and an electrical substation capable of upgrade for port-side users.
  - Stage 2 – 36 months. Additional trunk roads (including Steelworks Road), water, telecommunications, sewer and gas (NPC 2009).

  Whilst it is known that trunk infrastructure would be designed and installed within the Intertrade Industrial Park, these works do not fall under the proposed concept. As such, potential for connection and augmentation of trunk services through the Intertrade Industrial Park is likely but not certain.
- **Connection through OneSteel.** There are options to provide services to the site via connections to existing services provided to OneSteel.
- **Connection through existing service providers.** Infrastructure provision for all future Project applications falling under the proposed concept would need to consider the option of sourcing infrastructure from existing service providers where coordination cannot be achieved through the future Intertrade Industrial Park or OneSteel.

New service corridors would be delineated under each subsequent Project application to connect to the existing or planned services in the local area. It is anticipated that these service corridors would connect to a services corridor for the Container Terminal Precinct, General Purpose Precinct, and Bulk and General Precinct which Newcastle Port Corporation anticipates would be developed by a master developer. As the site develops, it is likely that the design and construction phases of individual projects would run in parallel. Therefore, subsequent Project applications would need to consider coordinating to provide services within the service corridors and construction accessibility to networks and service corridors.

The following measures would be implemented to ensure a coordinated approach to infrastructure provision across the site:

- Newcastle Port Corporation would prepare an Infrastructure Plan for the site that would ensure coordination in relation to the provision of services across the site;
- Newcastle Port Corporation would work with Project applicants regarding the provision of services to the site via a services corridor, and would negotiate with Project applicants on cost sharing mechanisms for provision of services; and
- Project applicants should consult with local service providers regarding demand for, and provision of, services when more detailed information is available.

Geology and Soils

Soils at the site are highly disturbed and are characterised by fill material of variable thickness underlain by marine and estuarine sediments. Fill material consists of coal washery rejects, slag, fly-ash and rubble and has been contaminated by past industrial use of the site. Extensive investigation of the site was undertaken prior to preparation of the *Development of a Multi Purpose Terminal and Remediation of the Closure Area, BHP Newcastle Steelworks*, *Environmental Impact Statement*. The findings of the site investigations as documented in the Environmental Impact Statement indicated that Polycyclic Aromatic Hydrocarbon, which are common to steel or gas works sites, were the only group of chemicals present in the surface fill layer at sufficiently high concentrations to warrant remediation prior to redevelopment of the site (URS, 2000). Elevated concentrations of volatile organic compounds such as benzene, toluene, ethylene, and xylene (BTEX) were also found to occur at depth at the site. The area of Polycyclic Aromatic Hydrocarbon and Volatile Organic Compounds contamination was largely confined to Area 1, a 30-hectare parcel of land abutting the South Arm of the Hunter River in the northern portion of the site. Site investigations also indicated the presence of tar or tar like materials at some locations (URS, 2000). Asbestos materials were also found at the site (HDC, 2009).

Remediation works have been conducted at the site since 2006 in accordance with the 2001 consent, and are scheduled for completion in 2012. A Remediation Action Plan was prepared in September 2004 to provide a basis for preparing a Voluntary Remediation Agreement and to comply with the conditions of the 2001 consent for the approved remediation works. A Voluntary Remediation Agreement with the Environment Protection Agency (now Department of Environment, Climate Change and Water) was prepared and Hunter Development Corporation is currently responsible for implementing the Voluntary Remediation Agreement.

The remediation strategy for the site is based on a strategy of containment (through capping and groundwater controls) rather than treatment. The remediation activities on the site are being undertaken in three stages, identified as Stage 1a, Stage 1b and Stage 2. The Stage 1a works, consisting of priority remediation activities, including capping and re-contouring the site, installation of major drains (known as the Eastern and Western Drains), and installation of a subterranean barrier wall in Area 1 have been completed. The Stage 1b works, which include installation of a low permeability cap in the northern portions of Area 1, adjacent to the foreshore of the South Arm of the Hunter River, have been deferred pending completion of the Hunter River Remediation Project by BHP (HDC, 2009). The Stage 2 works primarily involve re-contouring and installation of a low permeability cap in Area 2 which is located outside the subterranean barrier wall. The Stage 2 works commenced in 2010 and will be complete in 2012.

During construction, there is potential for the capping materials to be disturbed and contaminated soils to be exposed. However, the likelihood of contaminated soils being exposed would be minimised by conducting the construction activities in accordance with the existing Contaminated Site Management Plan. The Contaminated Site Management Plan provides a common framework for the design, implementation, completion, use and maintenance of works across the whole Closure Area. The Contaminated Site Management Plan is applicable to both remediation and redevelopment works, and includes restrictions relating to surface development in certain areas which would minimise the potential for contaminated soils to be exposed and for construction workers to come into contact with contaminated materials.

The Virgin Excavated Natural Material cap, which is located across the site, would not be suitable for a significant load bearing surface. Therefore, all or part of the Virgin Excavated Natural Material cap may need to be removed. Replacement or reinforcing of the existing capping system to support the required loads would need to be undertaken in a way that ensures the integrity of the capping system.

Construction activities carried out in the Bulk Liquid, Container Terminal and General Purpose Precincts in the vicinity of the subterranean barrier wall have the potential to compromise the integrity of the wall if the requirements of the Contaminated Site Management Plan are not adhered to. The barrier wall is constructed from a soil-bentonite mix, which has a lesser load bearing capacity than the surrounding ground. The barrier wall construction includes a surface completion beam to distribute surface loadings across the wall. An easement would be created in the vicinity of the barrier wall to protect its integrity.

Construction activities associated with the proposed concept may give rise to soil erosion, however, Soil and Water Management Plans would be prepared to manage erosion during construction. Once construction has been completed, the majority of the site would be covered with buildings and sealed surfaces such as hardstand areas, parking areas and roadways which would not give rise to erosion. Therefore, there would be little to no potential for erosion to occur during operation.

Social and Economic

The proposed concept would generate positive economic benefits for Newcastle, the Hunter Region and New South Wales through the significant capital investment and establishment of Port infrastructure. The estimated capital investment value of the proposed concept is $200 million. The proposed concept would support the development and growth of the Hunter Region by:

- Providing key infrastructure for the Region, indirectly strengthening employment opportunities;
- Stimulating business growth and development; and
- Creating port infrastructure that reinforces the Region as a strategic eastern seaboard gateway.

Construction would generate significant employment. It is estimated that construction would generally require a average full-time workforce of approximately 60 workers and a maximum workforce of approximately 160 workers during the peak period of construction. During operation, it is estimated that the proposed concept would employ a total workforce of approximately 300 full-time personnel over three shifts. It is anticipated that the majority of the positions would be filled by residents of the local Newcastle area.

The proposed concept would also result in indirect benefits to the Lower Hunter Region associated with expenditure on local goods and services, food, fuel, infrastructure and other supplies, which would be beneficial to a range of industries and businesses.

Visual

The site is located in the Port of Newcastle, approximately 7 kilometres north west of the Newcastle Central Business District. The Port of Newcastle is located within a landscape which has been highly modified and disturbed by industrial use over the last century, and is now dominated by port-related industrial and commercial activities. The visual envelope of the Port of Newcastle is typical of an active port, and includes commercial and industrial premises that range in size, building style and features. Many of the structures at existing industrial premises, especially the stacks, silos, elevated loaders, conveyors and ships, are highly visible and dominate the landscape, particularly given that the landform is generally low-lying and flat.

With the exception of its northern border, which is bordered by the South Arm of the Hunter River, the site is bordered entirely by industrial and port-related activities including a wire, rod and bar mill operated by OneSteel and Port Waratah Coal Service Carrington Coal Terminal. Mayfield and Mayfield East are the residential areas located closest to the site and are located approximately 900 metres to the south west. Mayfield and Mayfield East are separated from the site by Industrial Drive and the Intertrade Industrial Park lands. The site itself is relatively low-lying, flat and largely devoid of vegetation, infrastructure and structures with the exception of Mayfield No.4 Berth, Koppers pipeline and Ex-BHP No. 6 Berth.

The proposed concept would transform the site from a relatively vacant parcel of land into a modern, state-of-the-art facility with a visual appearance in keeping with the existing port-related industrial activities conducted in the Port and with the past industrial use of the site. Activity and infrastructure associated with the operation of the facilities, berths and rail and road infrastructure would have low to moderate visual impacts on the landscape. The main visual impacts would result from increased port infrastructure such as elevated conveyors, storage silos, forklifts and gantry cranes, increased shipping and rail movements into and out of the area, and impacts from lighting to facilitate night time operations. However, there are very few visual receivers with direct views of the site and most receivers would be transitory and would be affected by visual changes for limited and short times only. In addition, most view of the site would be from a distance.

In this regard, the proposed concept is not expected to have an adverse effect on the visual amenity of the area, particularly since mitigation measures would be adopted such as the use of building materials that minimise reflectivity and contrast, and directing lighting to minimise light spill into surrounding areas during the night time.

Project applicants would prepare Lighting and Material Finishes Management Plans that incorporate these mitigation measures.

Ecology

The site has been subject to extensive disturbance over the past century, through industrial development, past land use practices, and recent landside remediation activities. A flora and fauna survey and assessment was conducted at the site utilising the random meander method during preparation of the *Development of a Multi-Purpose Terminal and Remediation of the Closure Area, BHP Newcastle Steelworks* Environmental Impact Statement in 2000. The majority of vegetation recorded on the site consisted of exotic weeds, shrubs and tree species such as Bitou bush, Lantana and exotic figs. The flora survey found no threatened plant species or vegetation communities which are listed on schedules of the *Threatened Species Conservation Act 1995*. The fauna survey conducted at the site in 2000 did not identify threatened fauna species and it was concluded that the site does not provide suitable habitat for threatened species of fauna. Since then, the BHP Steelworks have been demolished and the site remediation is ongoing. As a result, the site still contains very little vegetation (consisting of exotic weeds and shrubs) and does not provide habitat for threatened species of fauna.

The site is located approximately 2 kilometres south west of the recently established Hunter Estuary National Park. The park incorporates the former Kooragang Nature Reserve, which covers an area in excess of 2,923 hectares, and sections of which are a RAMSAR site (pertaining to the conservation and sustainable utilisation of wetlands). The wetland area is important to migratory and Australasian waders, waterfowl and other wetland birds. The site itself does not provide habitat for migratory birds.

The estuarine environment of the South Arm of the Hunter River has been subject to intensive port-related activities over the past century including shipping movements, wharf development, and dredging campaigns. A small stand of mangroves, consisting of Grey Mangrove (*Avicennia marina*), is situated on the southern foreshore of the South Arm of the Hunter River, along the river bank in the northern portion of the site. However, the necessary permits have been obtained for this stand of mangroves to be cleared as part the BHP's Hunter River Remediation Project and extension of the Hunter River South Arm shipping channel (ENSR, 2008b). The benches of the Eastern Drain are vegetated with mangroves but they would not be impacted by the proposed concept.

A range of aquatic organisms occur in the Hunter River including oysters (*Saccostrea commercialis*), two species of crustaceans including school prawns (*Metapenaus macyleai*) and blue swimmer crabs (*Portunus pelagicus*), four species of estuarine fish including yellowfin bream (*Acanthopagrus*), flat-tail mullet (*Liza argentea*), dusky flathead (*Platycehalus fuscus*), and large-toothed flounder (*Pseudorhombus arsius*). None of these species are threatened or endangered but are commercially important.

Since the site does not contain any threatened species of flora or fauna, and the proposed concept would not require clearing or other activities which have the potential to impact native species and their habitats, it was determined that the proposed concept would not have a significant impact upon terrestrial flora and fauna.

The proposed concept has potential to impact the estuarine environment of the Hunter River as a result of leaks/spills and from stormwater discharge into the South Arm of the Hunter River during construction and operation, and also from the introduction of exotic marine species through the release of ballast water from ships. These potential impacts would be managed by implementing erosion controls and stormwater management measures. Ballasting would be undertaken in accordance with the *Australian Ballast Water Guidelines* produced by the Australian Quarantine Inspection Service.

Waste Management

The proposed concept would generate various different waste types during construction and operation including concrete, scrap metal, cardboard, paper, plastic, glass, used cartridges, food/organic waste, vegetation/green waste and small quantities of machinery parts, oils, used rags, spent solvents, empty paint cans, chemical containers, used lubricating oil and batteries.

Inappropriate waste management has the potential to pollute the surrounding environment, including soil and water. Waste avoidance and management measures would be required in order to prevent potential environmental harm. Where possible, non-putrescibles waste would be reused on-site. Non-putrescibles waste which cannot be reused and all general putrescibles wastes would be stored separately and collected by a licensed contractor and either disposed of, or recycled. Hazardous waste would be subject to strict storage procedures and would be disposed of by a licensed contractor to an approved site. Waste Management Plans would be prepared by Project applicants.

Climate Change and Sustainability

Newcastle Port Corporation is committed to sustainability. As documented in Newcastle Port Corporation's *Environmental Policy*, Newcastle Port Corporation's purpose is to provide safe, effective and sustainable port operations and to deliver port development that enhances the economic growth of the Hunter Region and New South Wales . Consistent with Newcastle Port Corporation's commitment to sustainability, Project applicants would be required to incorporate sustainability strategies into the design of individual facilities. At a minimum, sustainability strategies would be required to address:

- Use of renewable energy and energy conservation;
- Waste reduction, reuse, and recycling; and
- Water conservation.

In addition to the environmental benefits of incorporating sustainability strategies into the design of individual facilities, adopting sustainability strategies would also:

- Enhance public profile of individual operators and the site as a whole;
- Create a world-class port that showcases innovative technology;
- Attract investment and clients with similar commitments to the environment and sustainability; and
- Reduce operational expenditure on energy and water.

The greenhouse effect involves certain gases, known as greenhouse gases, capturing heat radiated from the earth and re-radiating heat back to the earth, resulting in climate change. The proposed concept would generate greenhouse gases during construction and operation. However, due to the detailed nature of the information required to conduct a thorough greenhouse gas emissions inventory, an inventory has not been prepared as part of this Environmental Assessment. Individual operators would be required to conduct greenhouse gas emission inventories as part of Project applications and to implement sustainability strategies which would conserve energy and reduce greenhouse gas emissions.

Commitments and Performance

In accordance with the Environmental Assessment requirements under Part 3A of the EP&A Act, Newcastle Port Corporation has compiled a Statement of Commitments for the proposed concept. The Statement of Commitments sets out Newcastle Port Corporation's environmental commitments and details on the environmental management and monitoring of the proposed concept during its construction and operation.

As discussed in detail in this Environmental Assessment, Concept Approval for the proposed concept would set the broad parameters and environmental management framework within which subsequent Project applications would be required to fit. An important component of this framework is the development of environmental performance objectives to guide development of the site and the development of environmental performance criteria from which to measure the environmental performance of the port-related developments which would occur at the site.

Environmental performance objectives and criteria have been developed for the following key environmental issues:

- Transport (road and rail)
- Noise
- Air quality
- Hazard and risk
- Water management
- Contamination

The environmental performance objectives and criteria are for operation of the port-related developments which would occur at the site.

General performance requirements have also been developed. Project applicants would be required to meet the general requirements, and would be required to achieve the environmental performance objectives and meet the environmental performance criteria set for the site. In doing so, Project applicants and Newcastle Port Corporation (who has the responsibility for managing the Port of Newcastle and the site) would have a degree of certainty that development of the site as a whole would not have adverse environmental impacts.

Newcastle Port Corporation would include the environmental performance objectives and criteria in agreements for lease and/or project development agreements or land leases with future operators. Performance management requirements applicable to future operators would also be included.

Residual Environmental Risk

A Residual Environmental Risk Analysis was conducted to compare the residual environmental risk to the prioritisation of environmental issues undertaken prior to conducting the detailed environmental assessment and developing mitigation measures for the proposed concept. The Residual Environmental Risk Analysis indicates that the proposed concept presents an overall low to moderate/minor risk, provided that the recommended mitigation, environmental performance management and monitoring measures are implemented.

Justification and Conclusion

The Port of Newcastle is one of three main international trade ports in New South Wales , the others being Port Botany and the Port of Port Kembla. The ability of the New South Wales port system to meet the forecast trade growth of the State is reliant on the planned and future expansion of all of the three major ports, and cannot be achieved by the expansion of one or two ports alone. When looking solely at container trade, by 2035 it is expected that 6.5 million TEU would be handled in New South Wales ports (Maunsell AECOM, 2005). Even with the current expansion of Port Botany it is anticipated that there would be a container facility capacity shortfall in New South Wales of up to 3 million TEU within a 30 year timeframe. Therefore, there is a need to expand the Port of Newcastle in order for the Port to meet its defined strategic role as the State's new major container terminal and to satisfy the needs of the State.

There are currently four Newcastle Port Corporation-owned sites within the Port of Newcastle, including Mayfield (the site), and the three operational sites of Kooragang Island, Walsh Point and Carrington Basin. Alternative site analysis revealed that Kooragang Island, Walsh Point and Carrington Basin do not have sufficient vacant land, ready Port access, and supporting road and rail infrastructure available for accommodating what would become the State's next major container terminal. Only Walsh Point has sufficient area for accommodating small to medium-sized facilities for importing and exporting bulk goods, bulk liquids and general cargo. Current port operations at the Port of Newcastle do not have sufficient capacity to accommodate all growth indicated in trade forecasts and planned for under the State and Regional strategies, nor would the existing operations have capacity to facilitate expansion into strategic sectors such as container handling. The proposed concept is designed to align development of the site's precincts with the anticipated trade forecasts of the Port of Newcastle. In a strategic context, the proposed concept is consistent with all relevant Government policies and strategies and adequately addresses future trade forecasts for the Port of Newcastle.

In the short and long-term the proposed concept would also allow the Port of Newcastle to act as a stimulus to the local and regional economy, by providing both direct and indirect employment predominantly in the building and construction trades, transportation and manufacturing, and also in other sectors that rely on ports for cargo handling.

Key environmental issues associated with development and operation of the proposed concept have been subject to assessment and potential for impact has been identified. This Environmental Assessment and accompanying specialist studies, demonstrates that the proposed concept would not result in significant impact on the environment provided appropriate mitigation measures are implemented, and would generate significant social and economic benefits in the Lower Hunter Region and New South Wales.

The proposed concept has a strong justification for proceeding and is considered suitable for approval under Part 3A of the EP&A Act.

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1.0 Introduction

Newcastle Port Corporation (NPC) has developed a concept for the proposed development of port-related activities on a portion of the former BHP Steelworks site located along the South Arm of the Hunter River in Mayfield, Newcastle (refer to **Figure 1-1**). AECOM has been engaged to assess the potential environmental impacts of the proposed Mayfield Site Port-Related Activities Concept Plan (proposed concept) and to prepare an Environmental Assessment (EA) documenting the potential environmental impacts. The EA has been prepared in accordance with the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), together with the Director-General's Requirements (DGRs) which were issued to NPC on 29 May 2009 by the New South Wales (NSW) Department of Planning (DoP).

This section provides background information on the site, describes the role of the Port of Newcastle as one of the three main ports in NSW, describes the role of NPC in managing operation of the Port, provides an overview of the proposed concept, and information on the environmental impact assessment process and the structure of this EA.

1.1 Background

In 1999, iron and steel making operations at the BHP Steelworks site (known as the Closure Area) ceased and preparation of an Environmental Impact Statement (EIS) for demolition of the Steelworks, remediation of the Closure Area and development of a multi-purpose terminal (MPT) commenced. The EIS titled *Development of a Multi Purpose Terminal and Remediation of the Closure Area, BHP Newcastle Steelworks* was prepared by URS on behalf of BHP and was completed in 2000. Development consent (2001 consent) was issued by the Minister for Planning in 2001 (refer to **Appendix A**). In accordance with the 2001 consent, soil and groundwater remediation activities commenced in 2006 and are due for completion in 2012.

In 2002, ownership of the Closure Area was transferred from BHP to the NSW State Government and was later placed under the control of Hunter Development Corporation (HDC). In December 2007, the Budget Committee of Cabinet (BCC) endorsed the principle that to facilitate the growth of the Port of Newcastle, NPC should own and/or manage port-related land in Newcastle. In 2010, NPC signed a contract of sale with the State Property Authority (SPA) for ownership of a 90-hectare portside portion of the Closure Area, while HDC continues to manage the remainder of the Closure Area for redevelopment as an industrial estate known as the Intertrade Industrial Park or IIP (refer to **Figure 1-2**). In 2006, proposals were called for the lease/sale of all or part of the IIP site. Buildev Intertrade Consortium Pty Ltd has been selected as the preferred proponent to redevelop the rear 60-hectare portion of the Closure Area (now known as the IIP) for port-related activities, logistics and distribution services as well as general industrial and commercial development.

The 90-hectare portside portion of the Closure Area is the site of the proposed concept (the site) and is proposed to be developed by NPC for port-related activities (refer to **Figure 1-2**). Some port-related development has already been conducted at the site. In accordance with the 2001 consent, a general cargo handling facility known as Mayfield No.4 Berth was constructed. However, in many respects the 2001 consent for development of the MPT is dated and does not reflect NPC's current approach to development of the site. NPC's approach to development of the site and the Port of Newcastle as a whole is described in the following sections.

Additional information on the history of the site and development that has taken place in accordance with the 2001 consent is provided in **Section 2.0**.

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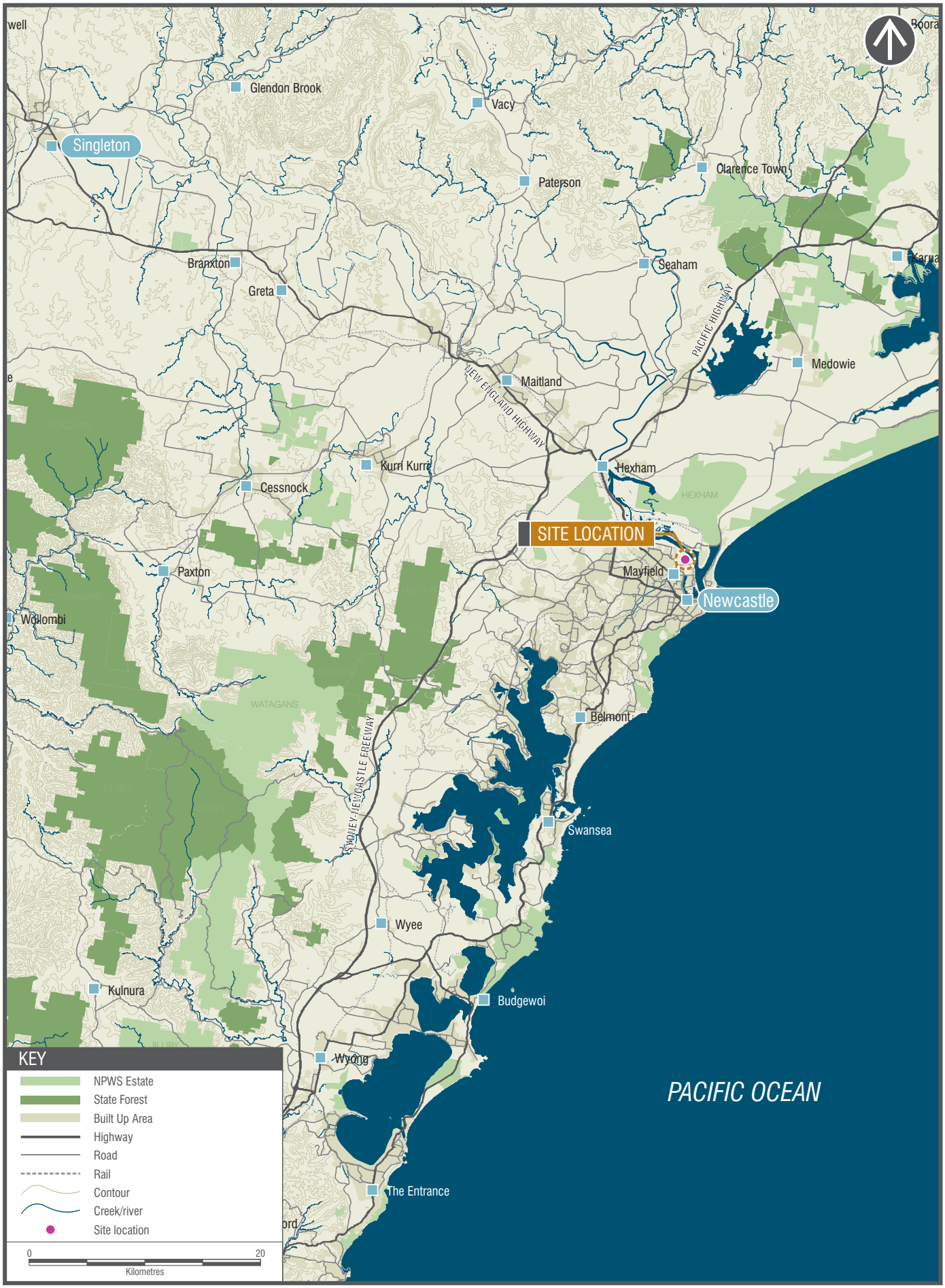

AECOM

REGIONAL LOCATION

Environmental Assessment

Mayfield Site Port-Related Activities Concept Plan

Figure 1-1

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AECOM

SITE LOCATION

Environmental Assessment

Mayfield Site Port-Related Activities Concept Plan

Figure 1-2

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1.2 Port of Newcastle

The Port of Newcastle is one of three main international trade ports in NSW, the others being Port Botany and the Port of Port Kembla. The Port of Newcastle is Australia's largest port in bulk terms and primarily handles the export of commodities, with 14 percent of Australia's total exports passing through the Port. Exports make up 96.5 percent of the total volume of trade through the Port and imports make up 3.5 percent (DoP, 2008). In 2006/07, 82.2 million tonnes of commodities were exported overseas and an additional 297,000 tonnes were exported to other ports in Australia, for a total of 82.5 million tonnes (DoP, 2008). In 2006/07, 2.97 million tonnes of commodities were imported through the Port. Imports of 1.82 million tonnes came from other Australian ports and imports of 1.14 million tonnes were imported from overseas. The total volume of commodities exported and imported through the Port in 2006/07 was 85.5 million tonnes, representing a trade value of $8.3 billion (DoP, 2008).

The Port is the world's largest single coal exporting port and activity at the Port is currently dominated by the export of coal, both in terms of volume of product and value of trade. In 2007, the export of steaming and coking coal made up 69 percent or $5.73 billion of the total value of trade (DoP, 2008). Other exports include grain, concentrates, woodchips, aluminium, grinding media, iron and steel, sands and pitch. Imports from other Australian ports are led by alumina (1.30 million tonnes), while overseas imports of iron and steel (259,408 tonnes), petroleum coke (238,061 tonnes) and fertiliser (147,768 tonnes) were the highest by volume in 2006/07 (DoP 2008). Other imports include cement, manganese ore, magnetite and soybean/meal.

The port also handles cruise ship and visiting naval vessels, and has marina facilities, ship repair businesses for naval vessels, ferries, small container ships and dredgers, recreational vessel manufacture and repair businesses, and the Newcastle Cruising Yacht Club.

There are currently three NPC-owned and operated sites within the Port of Newcastle, including Kooragang Island, Walsh Point and Carrington Basin. The Port currently has 16 berths for handling coal, project cargo, break bulk, grain and other bulk cargos. There is currently no container terminal at the Port.

The total volume of commodities handled by the Port increased from 85.5 million tonnes in 2006/07 to 95.8 million tonnes in 2008/09, representing growth of approximately 12 percent over this two year period. This growth in trade is consistent with the trend of growth exhibited at other NSW ports. For example, containerised freight at Port Botany has had a growth rate of 8 percent per annum for the past five years. With an estimated 1,200 hectares of vacant land remaining in the Port of Newcastle for port and airport development and other related development, the Port is in a good position to accommodate future growth in trade.

1.3 The Proponent

The Port is managed by NPC, which is a State-owned Corporation under the *Ports and Maritime Administration Act 1995* (PMA Act). The legislated objectives of NPC under Part 2, Division 2, Section 9 of the PMA Act 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, and

(d) to promote and facilitate a competitive commercial environment in port operations, and

(e) to improve productivity and efficiency in its ports and the port-related supply chain.

Through strategic planning, NPC aims to achieve these objectives. NPC's strategic planning seeks to ensure that:

- The Port has sufficient berths, back up land and transport connections to accommodate the future needs of the coal export industry. Future expansion of coal export facilities is currently occurring on Kooragang Island with loading berths on the northern bank of the South Arm of the Hunter River (DoP, 2008);
- The strategic Port land west of the coal area on Kooragang Island is available for future Port development (DoP, 2008);
- The Port has sufficient berths, back up land and transport connections to accommodate the next major container facility in NSW;
- That the former BHP Closure Area is effectively planned for optimal use of this strategic site;
- The Port has sufficient berths, back up land and transport connections to accommodate future and expanding bulk commodity needs including bulk liquids and cement;
- The Walsh Point precinct on the eastern side of Kooragang Island is effectively utilised for handling non-coal bulk commodities; and
- The existing Port activities at Carrington including the Carrington Coal loader, specialist bulk and general cargoes at Carrington Basin and on Dyke Point and the maritime activities around Throsby Basin will continue to be an important part of the working Port.

The proposed concept is consistent with the legislated objectives of NPC as a State-owned Corporation.

1.4 Overview and Purpose of this Concept Plan

Consistent with the legislated objectives of NPC as a State-owned Corporation and with NPC's strategic planning for further development of the Port of Newcastle, NPC proposes to develop a 90-hectare portion of the former BHP Steelworks Closure Area for port-related activities (refer to **Figure 1-2**). The proposed concept identifies five key land-based operational precincts which would be developed progressively to reach peak operations by 2034. The precincts are:

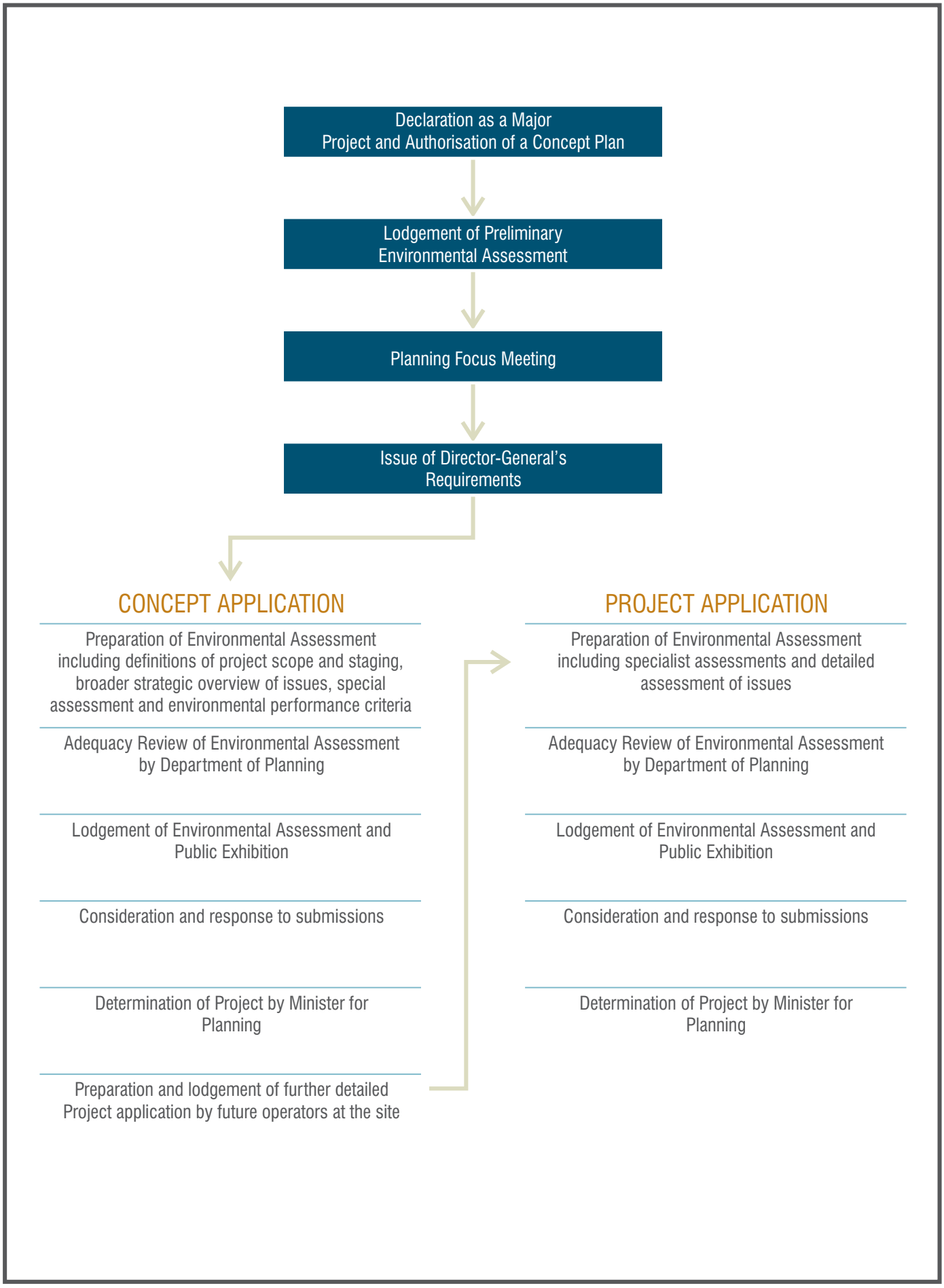
- NPC Operations Precinct (approximately 3 hectares) including office, storage sheds, vehicle and marine equipment, NPC dredging vessel, pilot cutters and helipad.
- Bulk and General Precinct (approximately 12 hectares) capable of handling non hazardous dry bulk products including grain, briquettes, and coke cargoes.
- General Purpose Precinct (approximately 25 hectares) a flexible facility to handle and store cargo containers, heavy machinery, Roll On Roll Off (Ro/Ro) and break bulk cargo. This includes the general cargo facility approved as part of the 2001 consent.
- Container Terminal Precinct (approximately 35 hectares) with a trade volume of 1 million twenty-foot equivalent units (TEU) per annum at final development.
- Bulk Liquid Precinct (approximately 15 hectares) used for storage, blending and distribution of high quality fuels and biofuels.

There is also a Berth Precinct proposed along the edge of the South Arm of the Hunter River containing seven shipping berths, one berth each for the NPC Operations, Bulk and General Precinct, and the General Purpose Precinct, three berths for the Container Terminal Precinct (of which one berth would be shared with the General Purpose Precinct) and one berth for the Bulk Liquid Precinct. Road and rail freight infrastructure would also be required to service the site.

The proposed concept is described in detail in **Section 5**.

1.5 Environmental Assessment Process and Approach

This EA has been prepared in accordance with the EP&A Act and the EP&A Regulation which provide a framework for environmental planning in NSW. The proposed concept has been declared by the Minister for Planning as a Major Project under the provisions of the EP&A Act and the *State Environmental Planning Policy (Major Developments) 2005* (Major Developments SEPP), and is therefore subject to the provisions of Part 3A of the EP&A Act. Part 3A of the EP&A Act establishes the processes and matters for consideration by the approval authority when determining the impact of a proposal once developed and determining whether the proposal should be approved. The sections below and **Figure 1-3** detail the approvals process for the proposed concept.



AECOM

ENVIRONMENTAL ASSESSMENT PART 3A CONCEPT AND PROJECT APPROVALS PROCESS

Environmental Assessment

Mayfield Site Port-Related Activities Concept Plan

Figure 1-3

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1.5.1 Major Project Declaration

The proposed concept falls under the definition of a 'Major Project' under Schedule 1 of the Major Development SEPP. Relevant classes of development which are defined as 'Major Projects' include:

- Group 3, clause 10 – Chemical, Manufacturing and Related Industries
  - Development with a Capital Investment Value (CIV) of more than $20 million for the purpose of:
    a) bulk liquid storage facilities, or
    b) chemical storage facilities;
- Group 4, clause 12 – Distribution and storage facilities
  - Development for the purpose of container storage facilities, or storage or distribution centres, with a capital investment value of more than $30 million;
- Group 8, clause 22 - Port and Wharf Facilities
  - Shipping berths or terminals or wharf-side facilities (and related infrastructure) that have a capital investment value of more than $30 million;
- Chemical/petroleum plants/storage that have a capital investment value of more than $20 million;
- Other industry that has a capital investment value of more than $30 million; and
- Freight terminals that have a capital investment value of more than $30 million.

Under Schedule 3 of the Major Developments SEPP, the site is declared as a State Significant Site (SSS) as it forms part of the land referred to as the Three Ports Site. The Three Ports Site is comprised of the Port of Newcastle, Port of Port Kembla, and Port Botany.

The proposed concept involves terminal facilities including container, bulk and general cargo, bulk liquids, berthing, and other port related activities with a CIV of approximately $200 million. Therefore, the proposal falls within the definition under Schedule 1 of the Major Development SEPP.

1.5.2 Concept Approval and Authorisation to Prepare a Concept Plan

NPC has prepared a Concept Plan for the proposed development of port-related activities within the site and is seeking Concept Approval for the Concept Plan pursuant to Part 3A of the EP&A Act. The Minister for Planning provided authorisation of the lodgement of a Concept Plan for the proposed concept in accordance with Part 3A of the EP&A Act on 16 April 2009 (refer to **Appendix B**). The proposed concept would allow reasonable flexibility for future development of five key land-based operational precincts and a Berth Precinct, thereby allowing the detailed plans, which would require Project Approval and detailed assessment, to evolve over the period through 2034.

The Concept Plan establishes broad parameters and environmental performance criteria to guide future development, and would give future developers the confidence and level of certainty required to invest in Port development and the more detailed Project application process. The proposed concept would also provide a level of certainty for regulators and the local community that the site would be developed in a coordinated and environmentally responsible manner.

Project Approval would be sought at a later date for subsequent Project applications relating to the site or individual precincts within the site. Further detailed assessments would also be undertaken on the basis of a specific project. The specific approval regime for subsequent projects on the site would be outlined in the Minister for Planning's Concept Approval.

NPC is committed to ensuring the proposed concept does not compromise the requirements of the 2001 consent where relevant to the 90-hectare footprint of the proposed concept. Once this EA is approved, it is recommended that the 2001 consent be subsequently modified so that it relates only to the activities which are not specifically covered by this EA (e.g. remediation activities and construction of the general cargo handling facility, known as Mayfield No.4 Berth). In all other respects, the 2001 consent would effectively be superseded by this EA. The 2001 consent is provided in **Appendix A.**

NPC is also committed to ensuring construction activities associated with the proposed concept and subsequent Project applications either:

- Do not commence until the remediation activities within the footprint of the site are complete (anticipated to be complete in 2012); or
- If any construction activities commence prior to completion of remediation activities, they would be done so synergistically and without impact on the remediation outcome.

1.5.3 Director-General's Requirements

A Preliminary Environmental Assessment (PEA) was prepared in February 2009. The PEA was provided to the DoP, relevant agencies and stakeholders, and outlined the key elements of the proposed concept so that project-specific DGRs could be formulated. The PEA identified the key issues for further assessment and included a risk assessment of each potential environmental impact as part of an overall process to identify whether an issue was potentially of high, medium or low environmental significance (refer to **Section 8.0**).

A Planning Focus Meeting (PFM) was held on the 17 April 2009 and was attended by relevant agencies and stakeholders. Attendees of the PFM discussed issues to be included in the DGRs. **Section 7.2.1** provides further detail on the PFM.

DGRs for the proposed concept were issued on 29 May 2009. The DGRs are the basis for preparation of this EA and are discussed in more detail in **Section 7.1** and included as **Appendix C**. The draft EA was submitted to DoP for Adequacy Review on 4 December 2009 and DoPs Adequacy Review comments were issued on 15 January 2010. This EA has been prepared to satisfy the DGRs and the Adequacy Review comments.

1.6 Environmental Assessment Report Structure

This EA has been structured to present the findings of the environmental assessment and consultation processes employed during this project. The structure of the EA is shown in **Table 1-1**.

Table 1-1: Environmental Assessment Report Structure

Section	Issues Addressed
Certification	
Executive Summary	Provides a summary of all sections of the EA.
Section 1 Introduction	Provides background information on the site, describes the role of the Port of Newcastle as one of the three main ports in NSW, describes the role of NPC in managing operation of the Port, provides an overview of the proposed concept, and information on the environmental impact assessment process and the structure of this EA.
Section 2 Site and Surrounds	Provides a detailed description of the site and its history, and describes the areas surrounding the site.
Section 3 Strategic and Project Justification	Describes the strategic justification and need for the proposed concept.
Section 4 Alternatives	Describes the alternatives to the proposed concept and consequences of not proceeding.
Section 5 Concept Description	Provides an overview of, and a detailed description of, the proposed activities and works linked to the proposed concept.
Section 6 Statutory Planning	Describes the legislative context of the proposed concept, including the approvals required.
Section 7 Consultation and Identification of Issues	Provides a discussion of formal procedures proposed and/or undertaken with other agencies, as well as the community, stakeholders, and relevant authorities as part of the approvals process. Presents the DGRs.
Section 8 Issues Prioritisation	Provides a summary of the prioritisation process undertaken to identify the key environmental issues.

Section	Issues Addressed
Section 9 Environmental Assessment - Road Transport - Rail Transport - Noise and Vibration - Air Quality - Hazard and Risk - Water Management - Heritage and cultural - Infrastructure - Geology and Soils - Socio-economic - Visual - Ecology - Waste - Cumulative Impacts	Reports and details environmental issues and assessment methods associated with the proposed concept. This section: - Includes environmental baseline information on existing conditions; - Discusses environmental implications; and - Outlines environmental safeguards and mitigation measures.
Section 10 Climate Change and Sustainability	Consistency of the proposed concept with the four principles of ecologically sustainable development (ESD) is addressed, as well as future requirements for preparation of greenhouse gas emission inventories and implementation of sustainability strategies
Section 11 Environmental Commitments and Performance	Provides a summary of environmental mitigation, management and monitoring responsibilities in relation to the construction and operation of the proposed concept. It also presents the environmental performance objectives and criteria for guiding future development of the site.
Section 12 Residual Environmental Risk Analysis	Provides an analysis of the residual environmental risk based on the likely impacts of the proposed concept and the ability to confidently manage those impacts to minimise harm to the environment.
Section 13 Justification and Conclusion	Provides justification for the proposed concept and summarises the findings of the EA.

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