NSW GOVERNMENT | Planning & Environment

MAJOR PROJECT ASSESSMENT:

Port Waratah Coal Services Terminal 4 Project, Kooragang Island

(10_0215)

Secretary's Preliminary
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

June 2014

Cover Photograph: The Terminal 4 Project
Preliminary Environmental Assessment Report (November, 2010)

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ABBREVIATIONS AND DEFINITIONS

ANSTO	Australian Nuclear Science and Technology Organisation
ANZECC Guidelines	*Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000)
Aquitard	A naturally occurring low permeability layer that separates aquifers and limits transfer of water between the aquifers.
Barrier Wall	limits the migration of contamination and allows for contaminated groundwater flows to be collected and treated
BoM	Bureau of Meteorology
CCT	Carrington Coal Terminal
CIV	Capital Investment Value
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
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*
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
Department	The Department of Planning & Environment, formerly known as the Department of Planning and Infrastructure
FDF	Fines Disposal Facility
HDC	Hunter Development Corporation
HVAS	High volume air samplers
KCT	Kooragang Coal Terminal
KIWEF	Kooragang Island Waste Emplacement Facility
Landfill Closure Plan	A plan to integrate the construction of the Proposal with the management of contamination and closure of landfill areas.
LoS	Level of Service
Low Permeability Liner	A layer that prevents water loss and minimises infiltration between layers.
MD SEPP	State Environmental Planning Policy (Major Development) 2005
Minister	Minister for Planning
Mm^3	Million cubic metres
Mtpa	Million tonnes per annum
NCIG	Newcastle Coal Infrastructure Group Pty Limited
NPC	Newcastle Port Corporation
NHTG	Newcastle Harbour Tide Gauge – Tidal heights listed refer to the Newcastle Harbour Tide Gauge zero which is 1.01m below Australia Height Datum
PAC	Planning Assessment Commission
Part 3A	Part 3A of the *Environmental Planning and Assessment Act 1979*
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PM_{XX}	Particulate matter of less than a nominated size eg. 0.1, 2.5, 10 microns in aerodynamic diameter
PPR	Preferred Project Report
PRB	Permeable Reactive Barrier. A barrier constructed as a "Funnel and Gate" type barrier. Groundwater flows through the sections of the barrier containing a reactive medium "gate" which immobilises contamination.
Proponent	Port Waratah Coal Services (PWCS)
RAP	Remediation Action Plan outlines how key areas of contamination will be managed or remediated.
RtS	Response to Submissions
Secretary	Secretary of the Department of Planning & Environment
SEARs	Secretary's Environmental Assessment Requirements, previously known as Director General's Environmental Assessment Requirements
TSC Act	*Threatened Species Conservation Act 1994*

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EXECUTIVE SUMMARY

Port Waratah Coal Services (the Proponent) proposes to construct and operate a coal export terminal with a capacity to export up to 70 Million tonnes of coal per annum (Mtpa) on Kooragang Island in the Port of Newcastle (the Proposal). The Proposal includes rail and coal receival infrastructure, coal stockpile pads and associated stacking and reclaiming machinery; wharf and berth infrastructure; coal conveyors, feeders and transfer stations and associated infrastructure. The Proposal also includes three biodiversity offset sites located at Ellalong Lagoon, Brundee Swamp Nature Reserve and habitat restoration and creation works at Tomago. The Proposal has a capital investment value of $4.8 billion and is expected to generate 1,500 construction and up to 80 operational positions.

The proposed development is a Major Project subject to the transitional provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Planning Assessment Commission (PAC) will determine the application under delegation from the Minister for Planning. The project is also a controlled action and requires approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Commonwealth Minister for the Environment will make a determination on the proposal with reference to the Department's assessment of matters of national significance.

The Proponent's Environmental Assessment was publicly exhibited for an extended two month period between March and May 2012. The Department received 488 submissions, 477 of which were public submissions. Of these 444 objected, 9 supported and a further 24 made comment on the Proposal. The remainder of submissions were from NSW public authorities. The Proponent responded to the submissions received in a Response to Submissions and Preferred Project Report submitted to the Department in September 2013.

The Response to Submissions and Preferred Project Report outlined changes to the Proposal most notable being a reduced throughput capacity from 120 Mtpa to 70 Mtpa. Other changes included a smaller footprint, a reduction in the number of coal stockpile pads and deletion of all infrastructure on the south arm of the Hunter River (on the former One Steel site), including removal of the proposed coal conveyor bridge over the Hunter River. The Response to Submissions and Preferred Project Report were publicly exhibited for an extended two month period between September and November 2013. The Department received a further 974 submissions, 960 were public submissions and 14 from NSW public authorities. Of the public submissions 349 objected, 605 supported and the remaining 9 made comments on the Proposal.

Based on the submissions, there were four key areas of concern regarding the project and its impacts. These were:

- a lack of justification for the proposal;
- upstream and downstream impacts including amenity and health impacts from coal trains and greenhouse gas emissions and consequential climate change implications;
- ecological impacts including impacts to the green and golden bell frog, Australasian bittern and migratory shorebirds habitat; and
- site specific amenity and health impacts particularly in relation to air quality and noise.

The former Minister for Planning and Infrastructure directed that the PAC carry out a full review of the Proposal, paying particular attention to noise, air quality and traffic impacts along with biodiversity and contamination impacts. This *Secretary's Preliminary Environmental Assessment Report* has been prepared for the purposes of submission to the PAC review and to put the Department's current position on the public record for that purpose. During its review the PAC will hold public hearings to give the community another opportunity to make representations on the Proposal.

Justification

The Proposed development seeks approval to construct and operate a 4th coal terminal in the Port of Newcastle to increase the efficiency of the Hunter Valley Coal Chain. The facility would also operate as an 'open access terminal', meaning access to terminal facilities would be available to any operator wanting to export coal.

The Port of Newcastle is recognised by the government as a major strategic asset for the NSW economy. Newcastle is the world's largest coal export port, exporting over 134 million tonnes of coal per annum in 2012, and handling over $20 billion in general trade annually. The ultimate driver for increased coal production is the world market. Notwithstanding the current softening of coal demand, the Reserve Bank of Australia expects demand for thermal coal to grow gradually and in line with the forecast pick-up in global

economic activity in the short to medium term. The Australian Government Bureau of Resources and Energy Economics (BREE) also expects world demand to continue to grow over the next four decades.

The Newcastle Port Corporation Annual Report 2011-12 forecasted that coal exports from the Port of Newcastle would exceed 250 million tonnes per annum by 2020. The current combined capacity of the Port of Newcastle (NCIG, KCT and CCT terminals) is 211 million tonnes per annum. In 2013 a peak of 150.5 million tonnes of coal was exported through the Port of Newcastle, an increase of 17 percent on the previous year's exports. It is acknowledged that since this time, demand for coal has softened eliminating the prospect of a capacity shortfall in the short term, and the immediate requirement for the Proposal. However, the Department considers that while the fluctuating coal market may delay the requirement for the Proposal, it is unlikely to remove its need altogether.

The ability to meet increased demand for coal exports will require commensurate investment and expansion in supporting infrastructure, including rail and port capacity. There is a strategic infrastructure framework in place to increase coal handling capacity of rail and port networks and to provide for long term growth in Newcastle. The infrastructure upgrades include the Kooragang and Carrington Coal Loaders operated by PWCS, the Newcastle Coal Infrastructure Group (NCIG) Terminal; the Maitland to Minimbah and Nundah Third Track projects and now, the proposed development of the 4th Coal Terminal (the Proposal).

The Government has also taken strategic planning steps to ensure the Port asset is preserved and can accommodate growth. This commitment is demonstrated through a planning framework which includes the NSW Freight and Ports Strategy and the identification of Newcastle Port as a 'State Significant Site'. The Framework provides for the expansion of port related activities and industry when necessary; protection for port and port related land and corridors; a strategic approach to development to prevent conflicts arising from incompatible land uses; and finally, certainty to encourage investment in the necessary infrastructure.

The Department is satisfied that the Proposal supports the State Government's objective and planning for the port and the coal chain in general. The proposal is justified on the grounds that it will enable the coal chain to meet forecast export demand of coal through Newcastle Port. Fluctuations in the coal market may delay the requirement for the Proposal, but are unlikely to remove its need. Given this, and the long lead times and significant financial investment required for the project, it is prudent to have the matter determined now.

Upstream and Downstream impacts

A large number of submissions raised concern regarding increased train movements along the Hunter Valley coal rail network and potential impacts upon receivers located close to the rail corridor. Whilst the Department notes that the Proposal itself would not directly trigger an increase in coal production levels, it is acknowledged that the construction of a new coal terminal at Kooragang provides additional capacity in the coal chain and would lead to an increase in train movements along the Hunter Valley rail network up to the Port of Newcastle if developed.

The Department notes that ARTC (not the Proponent), is responsible for managing the broader rail network including undertaking capacity upgrades to ensure efficient freight transport. The rail freight operators are responsible for maintaining their fleet to ensure consistency with operational standards. The Proponent has committed to working with the EPA, ARTC, rail freight operators and coal producers to reduce fugitive emissions from trains where possible.

Notwithstanding, the Proponent undertook a qualitative assessment of the potential air quality and noise impacts from these increased train movements. The Department has also considered the related impacts from the coal distribution network and has concluded that the project's contribution to air quality and noise levels would be relatively modest. These impacts are considered acceptable subject to appropriate regulation of the rail network through the environmental protection licence administered by the Environment Protection Authority (EPA).

Many submissions also considered that the Proposal would result in the significant expansion of mining upstream. However, the production of coal is not driven by export infrastructure, but by global demand. Furthermore, the extraction of coal across the State's coalfields only occurs following detailed merit assessment taking into consideration the Government's strategic land use frameworks.

In terms of downstream impacts, the Department has considered Scope 3 greenhouse gas emissions (GHG) but recognises that the activities of third parties are outside the Proponent's direct control. The coal loader would facilitate the transfer of coal as opposed to combusting it. Furthermore, regardless of whether the

proposal proceeds, coal will continue to be sought and combusted into the foreseeable future by third parties to satisfy global energy demands with no net reduction in greenhouse gas emissions.

Some submissions also raised utilisation of alternative energy. However, even with the increasing uptake of renewable energy technologies, coal will continue to play a key role in world energy requirements. Subsequently, the key response to the broader issue of global warming/climate change needs to be made at a policy or strategic level, outside and beyond the NSW planning assessment process.

Ecological Impacts

In relation to the natural environment, the Department is mindful that the Proposal has the potential to adversely impact biodiversity, in particular, habitat of the green and golden bell frog, Australasian bittern and migratory shorebirds. The Proposal would result in the clearance of 273.3 ha of vegetation including 174.6 ha of disturbed or modified land.

As part of its assessment, the Department required the Proponent to demonstrate whether or not complete avoidance of the impacts was reasonable or feasible. Investigations included an examination of the possibility of building the coal stockpiles in the southern portion of the project site rather than the northern portion, in order to avoid some significant green and gold bell frog breeding habitat. However, the southern option was determined to be cost prohibitive, would result in a longer construction period and provide no guarantee that it would contribute towards habitat that would enable a viable population. Further it is noted that other existing factors affecting the viability of the frogs would remain such as droughts, floods, disease and predation. The Department has accepted the outcome of these investigations.

The Proponent has developed a range of biodiversity mitigation measures in consultation with the Department, OEH and the Commonwealth. The key aspects of the package include:

- creation of an onsite Green and Golden Bell Frog (GGBF) habitat corridor;
- pre clearance surveys to facilitate GGBF relocation;
- direct offsets totalling 851 ha across three sites within the same bioregion;
- significant habitat restoration and creation works on the Tomago Offset Site; and
- significant monetary contributions to research, weed control and other ongoing management measures.

The Department considers these measures to be best practice and is confident that there would be a net environmental benefit once fully functional.

Site specific amenity and health impacts

In relation to the construction and operation of the coal loader, the Department and EPA are satisfied that the Proposal would meet relevant air quality criteria. The Department and EPA are also satisfied that dust and other emission levels are predicted to be acceptable. Nevertheless, the Department has recommended stringent conditions that would ensure best practice noise and dust mitigation measures are employed throughout the life of the project.

Conclusion

The Department's assessment has considered all relevant documentation including submissions received from public agencies and the community. In this respect the Department has also carefully considered the key areas of concern, including lack of justification, upstream and downstream impacts including greenhouse gas emissions and associated impacts to climate change, biodiversity impacts and project specific amenity impacts, particularly in relation to air quality and noise.

The Department's assessment concludes that the construction and operation of the Proposal would meet key environmental and amenity criteria. In addition the Department considers the Proposal to be relatively well located given its proximity to shipping channels, rail lines, separation from sensitive receivers and appropriate zoning. Further, there is a range of mitigation and management measures that would be imposed to ensure appropriate environmental performance in both the short and long term.

The Proposal is consistent with the Government's strategic objective to maintain the Port's competitiveness in the global export market by increasing capacity and efficiency. The Proposal would also have substantial economic benefits for Newcastle, the State and Australia with the direct investment of $4.8 billion; generate 1500 positions during construction and up to 80 positions during operation; provide for the upgrade of local road infrastructure; result in the remediation of contaminated land and its return to productive use; and provide for the payment of $528,140 in local developer contributions to Newcastle City Council.

In addition, the Proponent has committed significant funds to biodiversity matters including the purchase of three biodiversity offset sites totalling 851 hectares, along with contributions to research programs and ongoing management funds.

Given the above the Department is confident that the Proposal could proceed with minimal adverse environmental impacts whilst realising significant benefits to the local, regional State and National economies.

1. STRATEGIC CONTEXT

Port Waratah Coal Services (the Proponent) comprises a joint venture between a number of coal producers and other coal industry participants, including exporters and importers. Port Waratah Coal Services (PWCS) owns and operates the Carrington and Kooragang Coal Terminals in Mayfield and on Kooragang Island respectively, in the Port of Newcastle, New South Wales.

PWCS proposes to construct and operate a new coal export terminal on Kooragang Island, referred to as Terminal 4 (the Proposal). This will essentially be an extension of the Kooragang Coal Terminal although operated independently. The Proposal site (shown in **Figure 1**) is located within the Newcastle Local Government Area in the Lower Hunter Region.

Figure 1: Project Location *(Source: T4 Project Environmental Assessment, March 2012)*

1.1. Land Use

Kooragang Island was originally a series of low lying deltaic islands in the Hunter River estuary, which had been subject to land reclamation for industrial development since the late 1800's. The island currently comprises a reclaimed landmass of approximately 2,600 hectares, situated between the north and south arms of the Hunter River, in the Hunter River estuary.

Kooragang Island supports significant industrial development in its southern section (the location of the Proposal), including heavy and light industries, transport and distribution infrastructure, waste emplacement and port facilities. These facilities include the PWCS Kooragang Coal Terminal and Newcastle Coal Infrastructure Group (NCIG) coal terminals, Boral cement manufacturing and distribution facility, Cargill Bulk Liquids facility, Cargill oilseed processing facility, Cement Australia terminal, Hi Fert fertiliser distribution facilities, Incitec Pivot fertiliser manufacturing facility, Kooragang Bulk Facilities, OneSteel and Orica's ammonium nitrate facility.

Historically the proposed terminal site has been used for waste or contaminated material disposal associated with past activities of nearby industry and the port. The Proposal would be partly constructed on three licensed landfill areas (see **Section 5.4**, **Figure 17** and **12**):

- Areas A and B - part of the Kooragang Island Waste Emplacement Facility owned by Hunter Development Corporation;
- Area C – Delta Electrolytic Manganese Dioxide owned by PWCS; and
- Area D – Fines Disposal Facility owned by PWCS.

The northern section of Kooragang Island features estuarine and freshwater wetland communities comprising mangroves and saltmarsh, which have been almost entirely incorporated into conservation areas. The following conservation areas surround the Proposal:

- The Hunter Wetlands National Park (HWNP);
- The Hunter Estuary Wetlands Ramsar Site;
- The Kooragang Wetland Rehabilitation project; and
- Wetlands listed under *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP 14).

The Department considers the Proposal to be appropriately located given its proposed setting in an area that has a long history of industrial use and rail, road and shipping infrastructure/access to support the Proposal. The Department also notes the site is a rare, large and contiguous land parcel, important to the development of large scale operations such as the Proposal. In addition, the Department considers the site offers good separation distance to residential areas with the nearest residential areas being located at Fern Bay and Stockton, east of the Hunter River North Arm and Mayfield and Warabrook, south of the Hunter River South Arm. The Proposal, in the context of existing surrounding land use is shown in **Figure 2**.

1.2. The Hunter Valley Coal Chain

The Port of Newcastle services the Hunter Valley Coal Chain consisting of approximately 35 coal mines owned by 11 coal producers with 31 load points and coal haulage distances of up to 380km (refer **Figure 3**). The Port of Newcastle is the world's largest export port in terms of coal throughput, exporting over 134 million tonnes per annum in 2012. Coal is transported from the mines to the Port of Newcastle via rail. Coal is then received at one of three coal export terminals: PWCS Kooragang Island terminal (KCT); PWCS Carrington Coal Terminal or NCIG's Kooragang Island terminal. The Proposal, if approved, would be the Port's 4th coal terminal.

Management of coal transportation by rail is the responsibility of the ARTC and is regulated by an Environment Protection Licence (EPL) administered by the Environment Protection Authority (EPA). Rail freight operators are responsible for maintaining their fleets to ensure consistency with operational standards. The Proponent does not control the trains that transport coal to the Port. Similarly, the Proponent does not control the ships at berth that receive the coal exported through the Port.

The Port of Newcastle is a state and nationally significant trade gateway, with total imports and exports in 2011-12 contributing $20 billion to the NSW economy. Some 79 percent of this level of investment is largely underpinned by coal exports which totalled $15 billion in 2011-12. The Port and the associated coal terminals therefore play a critical role in the NSW coal industry, along with both the NSW and Australian economies.

Figure 2: Existing Site and Surrounding Land Use (Source: T4 Project Environmental Assessment (EMM, March 2012))

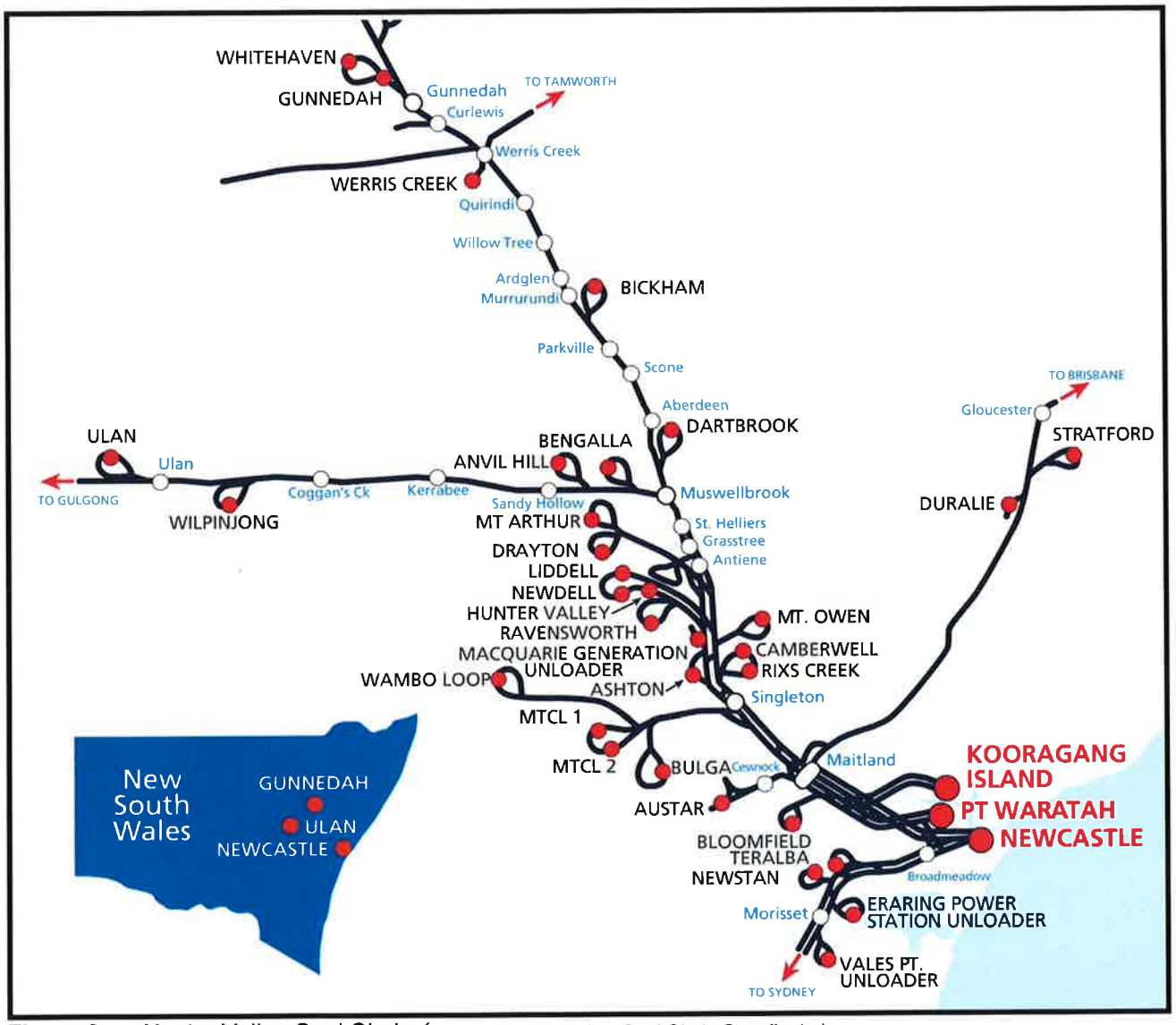

Figure 3: Hunter Valley Coal Chain *(Source: Hunter Valley Coal Chain Coordinator)*

2. PROPOSED PROJECT

2.1. Proposal Description

PWCS proposes to develop a new coal export terminal with capacity of up to 70 Million tonnes per annum (Mtpa) in the Port of Newcastle. This throughput amount is a reduction from the 120 million Mtpa as proposed within the original Environmental Assessment (EA). The revised Proposal is summarised in **Table 1** and key components shown in **Figure 4**, **Figure 5**, and **Figure 6**. A comparison of the changes made to the Proposal as presented in the EA and modified within the Response to Submissions/Preferred Project Report is provided in **Appendix A**.

Table 1: Major Components of the Proposal

Component	Preferred Project (RTS/PPR)
Proposal Summary	• Development of a new coal terminal with throughput capacity of up to 70 Mtpa. • Site establishment and remediation works. Development of terminal infrastructure including rail infrastructure, stockpile pads, conveyers and shiploaders, berthing facilities, access, services, water management and supporting infrastructure. • Biodiversity offsets including habitat restoration and creation works at Tomago.
Land reclamation and ground improvements	• Dredged material pumped to southern end of proposed stockyard by pipeline adjacent to Delta EMD Access Road and then trucked around the site. • Proposed stockyard bench levels lowered. Fill including an estimated 4.3 million cubic metres (Mm^3) of dredged bulk fill (sand) piped from the dredge area, 1.3 Mm^3 of imported bulk fill (sand) and 1.6 Mm^3 of imported rock and other engineered fill (trucked in), to be confirmed during detailed design. • Dredge return water route adjacent to rail tracks, west of Sandgate Bridge. • Design of containment cell(s) provided along with a Landfill Closure Plan to coordinate closure, subject to refinement during detailed design.
Rail infrastructure and coal receival	• Up to 4 arrival tracks converging into up to 3 dump stations and up to 4 departure tracks combining into a single track around Kooragang Coal Terminal. • Rail tracks realigned at Mosquito Creek to minimise disturbance to the creek. Rail tracks also realigned at arrival onto island to accommodate NCIG's tracks.
Coal stockyard and stockpiles	Up to 4 coal stockpile pads with total throughput capacity of 70 Mtpa, and up to 4 stackers and 4 reclaimers. Inbound and outbound conveyors would service up to 2 dump stations and 4 stockpiles.
Outloading conveyors and shiploaders	Two buffer bins immediately south of stockyard and either A-frame or bridge type shiploaders.
Wharves and berths	Three ship berths on the north side of the Hunter River South Arm and a barge landing area on north bank of swing basin to unload large equipment.
Roads and access	New traffic lights at the Cormorant Road and Pacific National Access Road intersection.
Water management	Three main settling ponds and one main transfer pond, south of stockyard.
Infrastructure and service locations	• Hunter Water pipeline to be relocated within the rail embankment, with some sections open trenched and/or horizontally directionally drilled. • Potential for ground improvements and/or concrete ground level structure over the ends of the relocated gas pipeline, near its connection to the existing pipeline, subject to detailed design and further geotechnical investigations.
Biodiversity offsets	• Three land based offset sites secured at Ellalong Lagoon Offset Site (409 hectares), Tomago Offset Site (238 hectares) and Brundee Swamp Offset Site (204 hectares) • Habitat restoration and creation works are proposed at the Tomago offset site.
Capital Investment Value	$4.8 billion
Timing and staging	Construction in stages up to a nominal capacity of 70 Mtpa, with timing and size of staging based on demand. For modelling purposes, it has been assumed that construction will start in 2015 with first coal shipped in 2017, however actual commencement will be determined by export demand.
Employment	Construction workforce of 1500 employees. PWCS's existing workforce would be supported by contractors as required and up to 80 additional employees for operation.
Hours of Construction	• Generally between 7:00 am and 6:00 pm. • Piling works shall only be conducted Monday to Saturday (within times specified), excluding public holidays.
Hours of Operation	Operations would take place 24 hours a day, seven days a week.

Figure 4: Proposal Components as modified by the Response to Submissions and Preferred Project Report – Western View
(*Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013)*)

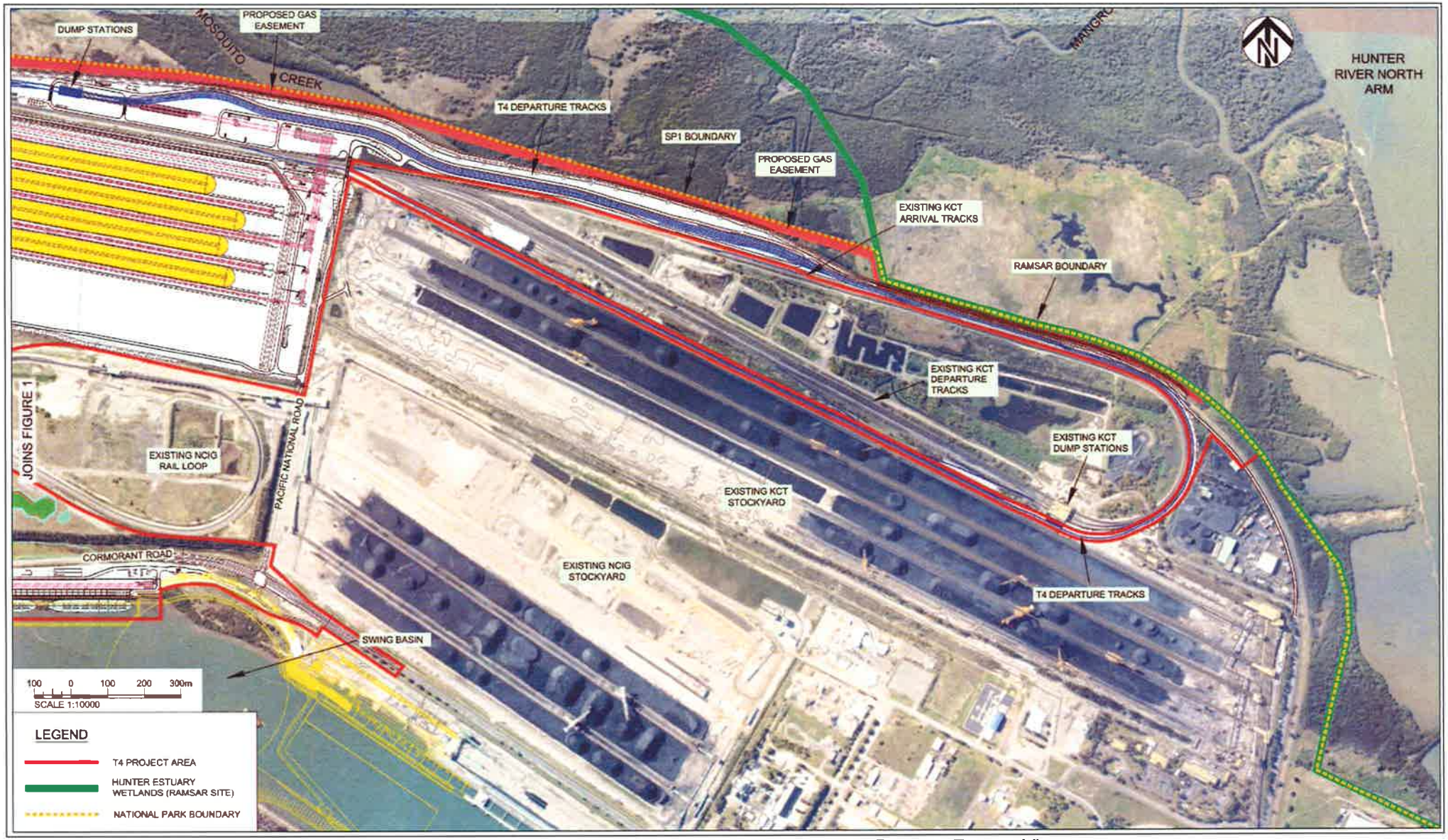

Figure 5: Proposal Components as modified by the Response to Submissions and Preferred Project Report – Eastern View
(*Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013)*)

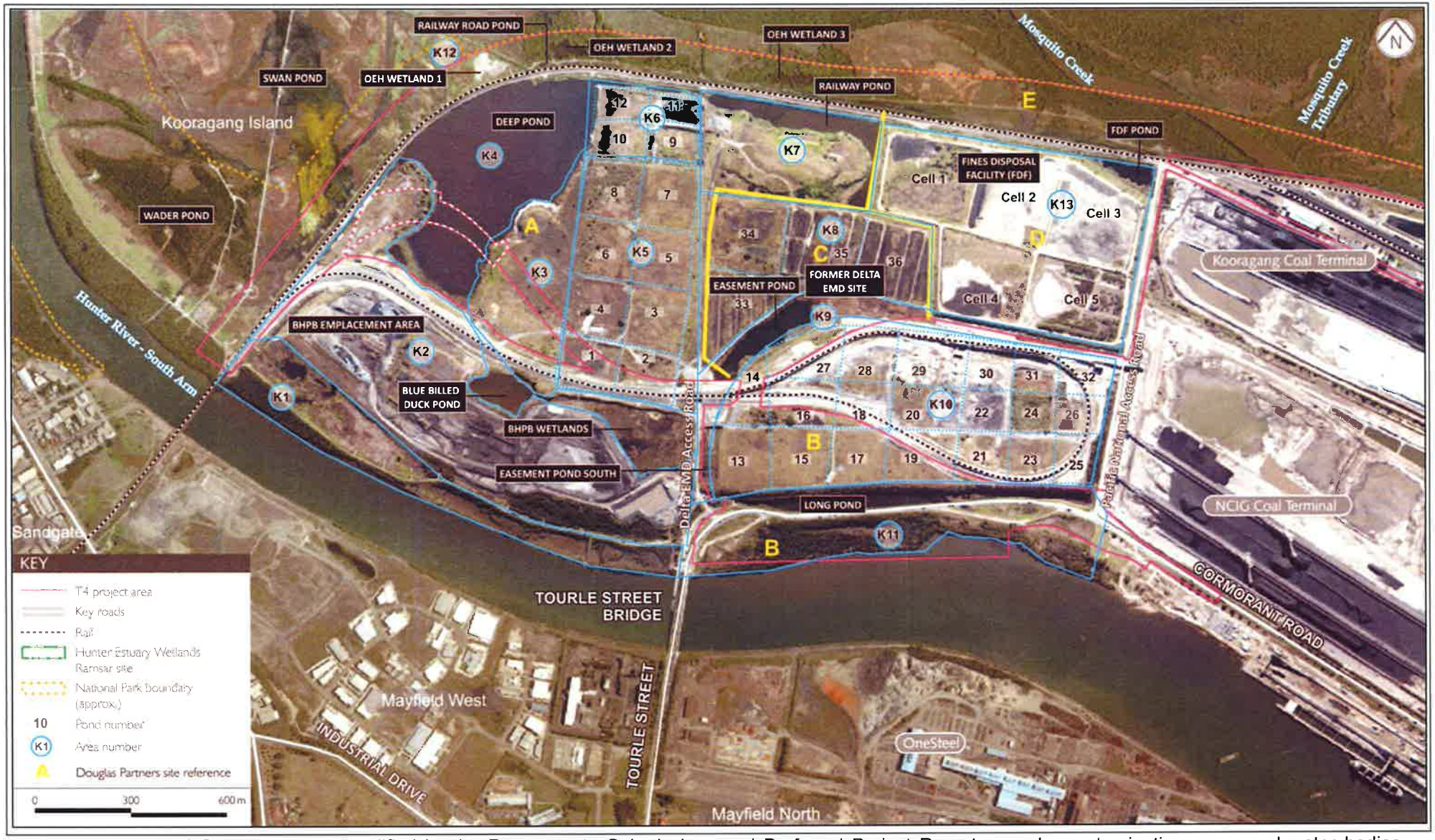

Figure 6: Proposal Components as modified by the Response to Submissions and Preferred Project Report – roads, contamination areas and water bodies (*Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013)*)

2.2. Proposal Need and Justification

World Coal Demand

Coal currently provides approximately 40 per cent of world electricity demand and is projected to increase to 45 percent in 2030. Export of thermal coal is Australia's third largest export commodity by value, accounting for approximately six per cent of total export income in 2011/2012. The top five export destinations are Japan, Republic of Korea, Taiwan, China and India.

Coal has been the fastest growing energy source since 2000, driven largely by Asian demand. Whilst coal demand growth is concentrated in non-OECD countries, it is expected to remain flat in the OECD but not decline. Exports are projected to continue to grow at 2.4 percent per annum at least until 2030.

The International Energy Agency estimates global electricity demand could double between 2009 and 2035. Unless there is a significant shift in global energy policy, coal will continue to play an important role in the global energy mix, although the share in energy supply may fluctuate. Further, it is expected to overtake oil as the primary energy source by 2020.

Coal Chain Infrastructure

The rail network and port facilities at Newcastle and Port Kembla are key infrastructure in the coal chain. The majority of coal production in New South Wales is in the Hunter Valley with a growing number of mines in the Gunnedah Basin, approximately 200 kilometres north-west of Newcastle (refer **Figure 7**). The Hunter Valley Coal Chain, the process of extracting coal from the mine to loading on vessels at the port, is the largest coal export operation in the world.

The ability to meet increased demand for coal exports will require commensurate expansion or investment of the supporting infrastructure, including rail and port capacity. In the Hunter Valley, there are frameworks and strategies in place to increase coal handling capacity of rail and port networks and to provide for the long term co-ordination of this growth. A number of projects resulting from these frameworks and strategies have been completed or are under construction including:

- expansion of Kooragang and Carrington Coal Terminals (operated by PWCS) to increase combined throughput capacity to 145 million tonnes per annum;
- Newcastle Coal Infrastructure Group expansion to the approved 66 million tonnes per annum throughput capacity; and
- rail upgrades including the Maitland to Minimbah and Nundah Third Track projects to relieve existing bottlenecks on the rail network and the Hexham Relief Roads (rail) currently under construction; and other future upgrades outlined in the 2013-2022 Hunter Valley Corridor Capacity Strategy.

Port Waratah Coal Services (PWCS)

The lease for the Kooragang Island terminal required PWCS to operate the terminal as a "common user facility" requiring provision of access to the terminal on a non-discriminatory basis to any producer wishing to ship coal. This is currently managed using allocation of port capacity to producers under long term contracts governed by the Capacity Framework Agreement. These allocations are generally projected ten years in advance on a "ship or pay" basis (i.e. penalties or the costs of coal handling are paid by the producer regardless of whether the allocation is used).

The allocations are the key identifier used to determine when additional capacity is required. Where a shortfall in capacity is identified that cannot be accommodated with expansion of existing terminal infrastructure, PWCS is obligated to build a new terminal that must be capable of meeting the capacity shortfall within four years of that shortfall arising.

The nature of long term contracts resulted in producers nominating allocations during the peak of the mining boom which triggered the requirement for PWCS to seek approval for a fourth terminal. The more recent slowing of coal demand has exposed the over-allocations sought by producers. In May 2013, PWCS voluntarily accepted a reduction in contracted tonnages from the majority of Hunter Valley producers. This meant that the immediate need for a new terminal no longer applied. Notwithstanding this immediate need dissipating, the long lead times required to construct and commence operations of such significant infrastructure was key in PWCS choosing to pursue approval for a 4th terminal so that it would be able to respond quickly to any significant upswing in world coal demand.

Despite the current uncertainty in the price of coal it can be more cost efficient for some producers to increase production than to close due to the nature of the contracts producers have entered into.

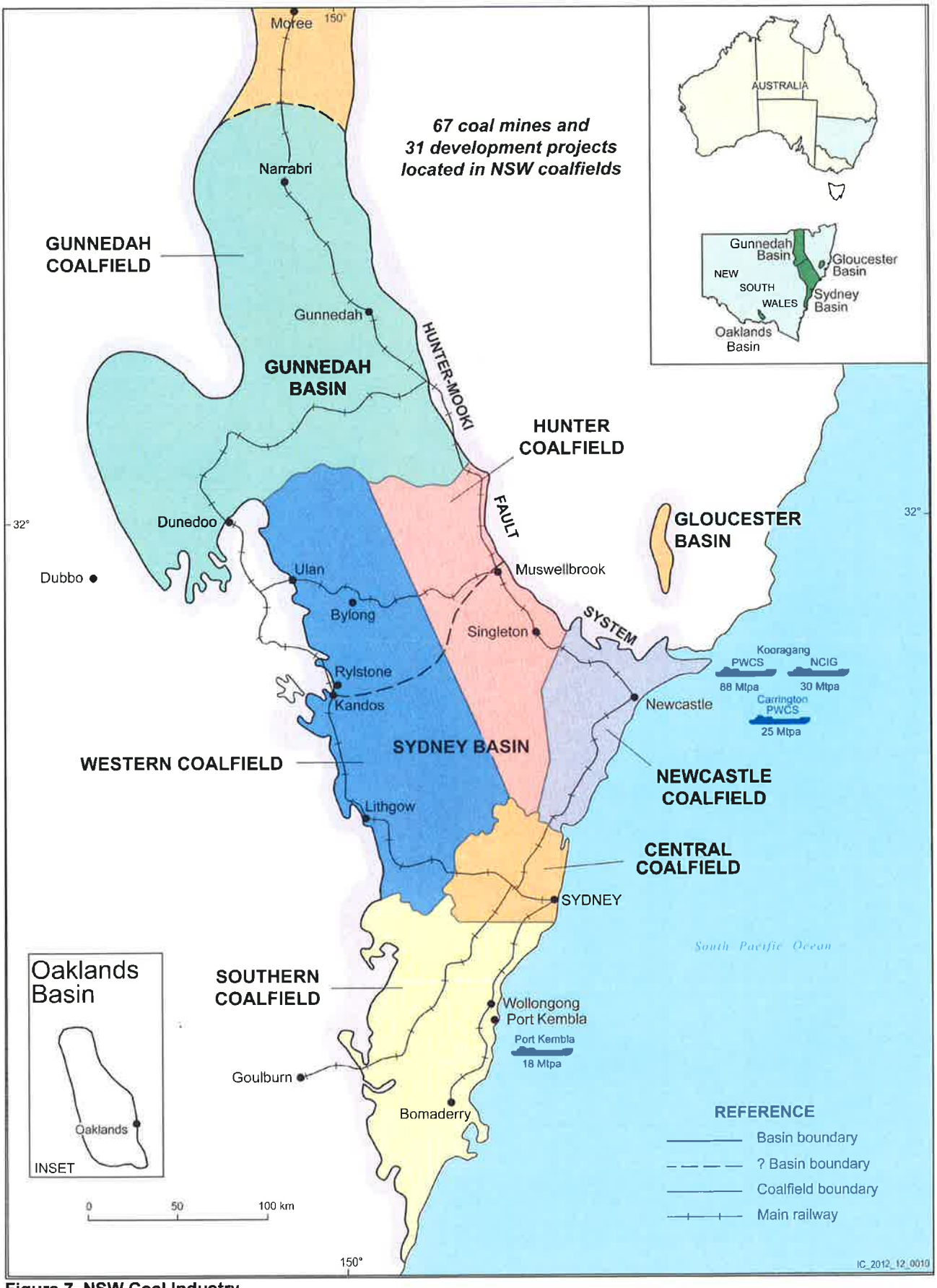

Figure 7. NSW Coal Industry
Source: 2013 New South Wales Coal Industry Profile (NSW Trade and Investment Resources and Energy, 2013)

Department's Position

The Department accepts that world energy demands will continue to increase and the reliance on coal as a fuel source for electricity generation will continue to increase, even if the proportion it provides fluctuates. The Department notes that significant opposition to the Proposal was raised in submissions on the basis that it would increase coal extraction and associated impacts. These issues largely relate to objections to coal extraction itself rather than the terminal infrastructure specifically. The Department accepts that the need for the new terminal is underpinned by a forecast increase in coal throughput based on world coal demand and existing contractual obligations. Increased terminal capacity would result in increased throughput of coal and consequential increases in NSW export revenue.

The Newcastle Port Corporation Annual Report 2011-12 forecasted that coal exports from the Port of Newcastle would exceed 250 million tonnes per annum by 2020. The current combined capacity of the Port of Newcastle (NCIG, KCT and CCT terminals) is 211 million tonnes per annum. In 2013 a peak of 150.5 million tonnes of coal was exported through the Port of Newcastle, an increase of 17 percent on the previous year's exports. It is acknowledged that since this time, demand for coal has softened eliminating the prospect of a capacity shortfall in the short term, and the immediate requirement for the Proposal. However, the Department considers that while the fluctuating coal market may delay the requirement for the Proposal, it is unlikely to remove its need altogether.

The Proposal would provide efficiencies for the coal chain by aligning infrastructure capacity with production capacity and contribute to the NSW and Australian economies by meeting increased demand for coal export from the Port of Newcastle.

The primary driver for coal production is the international resources market. The Department accepts that in the absence of the Proposal:

- world energy demands would continue to drive coal production at committed levels; and
- inefficiencies in the coal export chain would continue to grow, including large offshore ship queues.

The Department acknowledges that inefficiencies at the coal terminal would have flow-on negative effects on the entire coal chain, with consequent implications to the industry and the NSW economy. Coal production and export accounted for a third of the total NSW export revenue in 2011 (equating to $12.6 billion in export revenue). The Capacity Framework Agreement process was developed to avoid such circumstances, by providing an appropriate framework for forward planning and long-term operational management.

Several submissions raised the fluctuating coal markets and likely reduced demand for coal in the future as reasons why the proposal should not proceed. Whilst fluctuations in markets may delay the point at which a new terminal would be required, it is unlikely to remove the need for the Proposal outright. In this regard, it remains prudent for the Proponent to seek relevant approvals before capacity shortfalls are realised and to reduce the long lead times to construct and commence operation of the facility whilst meeting its obligations under the Capacity Framework Agreement. In addition, the Department accepts that the need for additional capacity to service the Hunter Valley Coal Chain remains, even with recent approvals increasing capacity at the Kooragang and Carrington Coal Terminals (to a combined 145 Mtpa throughput capacity) and the construction of the NCIG terminal (66 Mtpa throughput capacity).

Other submissions raised objections to predicted greenhouse gas generation from the end use of coal products (Scope 3 emissions) and climate change implications of these. The Department notes that impacts associated with coal production are assessed during the environmental approvals process for coal mine developments and are outside the scope of this Proposal. The Department also considers that downstream impacts associated with the end use of coal products following its export (including greenhouse gas emissions) are outside the control of the Proposal and are the responsibility of the end user. The Proposal in itself is not a driver for coal demand or use. Whether the Terminal 4 Proposal would operate at full capacity is ultimately linked to global coal export markets. With this in mind, the Department has considered these factors in its merit assessment of the environmental impacts associated with the Proposal itself (see **Section 5.1**).

A large number of submissions raised objection to the Proposal given it would result in more train movements on the rail network, which could increase noise and air quality impacts for receivers located close to the rail corridor. Whilst the Department notes that the Proposal itself would not trigger an increase in coal production, it is acknowledged that the construction of a new coal terminal at Kooragang (rather than an alternate location), would lead to an increase in train movements along the Hunter Valley rail network to the Port. The Department has considered the existing coal distribution network through the Hunter Valley and the related impacts of this Proposal in this assessment (see **Section 5.1**). In doing this, the Department

recognises that the Australian Rail Track Corporation (ARTC) is responsible for managing the rail network including undertaking capacity upgrades and rail freight operators for fleet maintenance to ensure consistency with noise and operational standards. Future upgrades to ensure the efficient movement of trains along the coal chain are outlined in the *2013-2035 Hunter Valley Corridor Capacity Strategy*. These would be subject to separate assessment and approval processes.

The Department considers that the proposed location of the new coal terminal, whilst presented with some environmental constraints, is likely to provide significant environmental advantages compared to locating a new terminal on a greenfield or alternative site. Further, the government has recognised the contribution of ports to the state economy. Significant planning has been undertaken in this area and Kooragang Island and its surrounds are recognised and zoned for industrial and port uses. The commitment to this is demonstrated by the identification of the Port Botany, Port Kembla and Newcastle Port as being State Significant Sites with a planning regime which:

- provides for expansion and preserves the nominated areas for port related activities and industry;
- provides certainty to encourage investment in infrastructure required to maintain and expand port activities;
- protects ports and nearby corridors from encroaching residential and commercial land use and spot rezonings that might limit operations; and
- provides a strategic approach to development to prevent conflicts arising from juxtaposition of incompatible land uses.

Not constructing the Proposal would have no effect in reducing already committed coal levels. It would, however, result in inefficiencies in the Hunter Valley Coal Chain as committed coal would still need to be transported for export, if not from this location, from another. In this regard, the proposed location adjacent to existing coal terminal and rail transport infrastructure within an already disturbed site, presents several benefits compared to an alternate site at the Port of Newcastle or a Port Kembla expansion, which is constrained by rail capacity to the Hunter Valley and land availability. Further, the construction of a new terminal in another location could have additional impacts associated with new infrastructure, exposure of new receivers, longer transport distances and associated impacts. The Department also recognises that the Proposal is consistent with the:

- *Draft Strategic Development Plan for the Port of Newcastle* which identifies Kooragang Island as primarily a coal precinct, noting that a new port strategy will be prepared by the lessee as a result of the Port of Newcastle transaction;
- the NSW Freight and Ports Strategy which notes that Newcastle Port will continue to be the primary coal export port for NSW; and
- the *National Land Freight Strategy*.

The site provides advantages of land availability, suitable land use (port related and industrial land use), ready access to road and rail infrastructure, proximity to shipping channels and relative isolation from sensitive receivers (with a large proportion of surrounding land being comprised of unoccupied wetland and industrial receivers). The proposed site also provides the opportunity to rehabilitate previously contaminated land and allow for its reuse for another compatible use, which has a broader environmental benefit. On balance the Department is satisfied that the site is suitable for the proposed development.

The Department accepts the need for the Proposal is driven by demand of the global coal export markets. The Department considers that even with the increasing uptake of renewable energy technologies, coal will continue to play an essential role in meeting the world energy requirements. As a significant coal exporter, and in order to remain competitive, Australia must have reliable and efficient coal export infrastructure. The need to expand and maintain competitive port infrastructure to support the coal industry in NSW has been recognised in strategic policies including the:

- *Hunter Strategic Infrastructure Plan 2013*;
- *Hunter Economic Infrastructure Plan;*
- Draft Strategic Development Plan for the Port of Newcastle;
- *NSW Freight and Ports Strategy;*
- *Three Ports State Significant Site Proposal for New South Wales: Major Ports of Newcastle, Botany and Port Kembla;* and
- the NSW Government *NSW Coal and Gas Strategy Scoping Paper* (February 2011).

The proposed development is consistent with these strategies and the Capacity Framework Agreement process. It would facilitate the ongoing social and economic benefits provided by the coal industry to NSW through employment and increased revenue.

Economic Modelling

The Department has considered submissions criticising the economic modelling and assumptions used, including the detailed submission by The Australia Institute. The Department is also aware of criticism of similar economic modelling completed for other projects by the Land and Environment Court and the Planning Assessment Commission recently.

The Department acknowledges that all models, including that prepared by Gillespie Economics for the Proposal, have limitations and can only ever provide estimations based on the assumptions used and cannot substitute for an ultimate analysis of the project. The Department further acknowledges that the longer the timeframes considered the greater the uncertainty of the assumptions used and the outputs of the model. Specifically for this Proposal, the Department is cognisant of the assumptions used including those to estimate growth in throughput, coal price, associated coal producer mining and transport costs, royalty and tax rate calculations and the use of input and output modelling to attempt to calculate the additional benefits of the project. The Department accepts the Proponent's modelling and recognises that it has limitations. For example, it is based on complex assumptions of activities of multiple third parties and of the global coal market. Further, given the continued softening of the coal price currently, a model completed today may have made different assumptions to one completed only a few years ago during the peak of the coal price.

However, the Department considers that while the magnitude of the economic costs and benefits may be argued, the Proposal would ultimately result in increased throughput of coal to global markets, increased cost efficiencies through economies of scale, and therefore increased revenue for NSW in general. In addition, other public benefits include increased employment opportunities, the upgrade of road infrastructure, the remediation of contaminated land and the payment of local developer contributions.

Further, the Department considers the long lead times and significant financial investment required for projects of this nature warrant prudent consideration and determination of the Proposal now to ensure the infrastructure is in place to meet demand when it arises. The Department is also mindful of the consequences resulting from coal chain inefficiencies and a subsequent reduction in the global competitiveness of the Port of Newcastle should demand not be met.

In summary, the Department considers the Proposal to be in the public interest as the Hunter Valley Coal Chain, which this Proposal would support, is a significant contributor to Australian and NSW export economy and a significant employer in the region. The Proposal would also support the efficient supply of committed coal volumes to the export market which would, in turn reduce the associated demurrage costs (costs associated with shipping delays) and environmental and safety risks of ships queuing offshore for extended periods and allow for the Hunter Valley coal industry to remain competitive in the international export market.

3. STATUTORY CONTEXT

3.1. Major Project

Transitional arrangements are in place as a result of the repeal of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Clause 2(1) of Schedule 6A states that Part 3A of the EP&A Act continues to apply to projects where EA requirements for approval to carry out the Proposal were last notified or adopted within two years before the repeal of Part 3A. The environmental assessment requirements for the Proposal were notified on the 14 March 2011 with supplementary requirements notified on the 21 September 2011. Part 3A was repealed on 1 October 2011. The Proposal is therefore a transitional Part 3A Project.

The Proposal is a Major Project subject to Part 3A of the EP&A Act in accordance with section 75B of that Act as it met the category of development identified in Schedule 3, Part 20 – State significant sites of the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP) that being development on land identified as the 'Newcastle Port Site'. The consent authority for development that requires development consent on land within the Newcastle Port Site, other than development that is a transitional Part 3A project, is the relevant council. The Tomago Offset Site also on land identified in Schedule 3, Part 10 – the Tomago Industrial Site. The consent authority for development on land within that part of the Tomago Industrial site that is within Port Stephens local government area is the Council of Port Stephens, however, by virtue of the application of Part 3A, the Minister for Planning is the approval authority. Both Newcastle and Port Stephens Councils have been consulted throughout the assessment process.

The application falls within the Minister's delegation to the Planning Assessment Commission (PAC) dated 14 September 2011 because more than 25 members of the public have made a submission on the application in the nature of an objection and a political donation disclosure statement has been lodged in relation to the project by a submitter.

3.2. Permissibility

The Proposal is located on land zoned SP1 (Special Activities) under Schedule 3 (Part 20) of Major Development SEPP. The Proposal meets the definition of "port facilities" in Schedule 3 (Part 20, Clause 2) of the Major Development SEPP and pursuant to Part 20, Clause 11 (3) of Schedule 3 of that SEPP "port facilities" are identified as a permissible land use with consent in the SP1 zoning. Consequently, the Proposal is permissible with consent under this zoning.

3.3. Planning and Assessment Commission (PAC) Review

On 13 September 2012, the Minister for Planning requested the PAC carry out a review of the Proposal, pursuant to section 23D(1)(b) of the EP&A Act. The terms of the reference to the PAC were to:

1) *as part of its review:*
   a) *consider the Environmental Assessment for the project, issues raised in public and agency submissions on the project , and any other information provided during the course of the review;*
   b) *assess the merits of the project as whole, paying particular attention to the potential:*
      i) *Noise and air quality impacts of the project;*
      ii) *Traffic impacts of the project;*
      iii) *Biodiversity and contamination impacts of the project; and*
      iv) *Any other potentially significant impacts of the project: and*
   c) *recommend appropriate measures to avoid, minimise and/ or offset these impacts.*
2) *Conduct Public hearings on the project during the review.*
3) *Submit a final report on the review to the Minister within three months of the receipt of the Proponent's response to submissions or preferred project report, unless the Director-General of the Department, agrees otherwise.*

As part of its review, the PAC will invite members of the public to register to present to the PAC at the hearing. Following this hearing the PAC will finalise its review of the project. The PAC's Review Report will be forwarded to the Department for consideration in finalisation of the Secretary's Environmental Assessment Report and recommendation for determination. The Secretary's Environmental Assessment Report will then be submitted to the PAC for determination.

3.4. Relationship to Other Approvals

Dredging associated with the proposal would be undertaken under an existing approval held by Roads and Maritime Services (DA 134-3-2003-i) under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act), which covers the "*extension of shipping channels within the Port of Newcastle, including dredging, excavation, treatment and disposal of sediments from the south arm of the Hunter River*". The Proponent would use sand extracted from dredging of the Hunter River South Arm for fill and site preparation works, including pre-loading. The dredging of the Hunter River South Arm is required for the construction and use of the proposed new shipping berth sites on the north bank of the Hunter River South Arm.

Dredging within the Hunter River South Arm, therefore, does not comprise part of this Proposal. Consequently, this report does not cover matters relating to dredging activities. It does, however, assess the impacts of the Proposal from the emplacement of dredged materials on the T4 site. Dredging is proposed to be undertaken under a separate approval although the use of that dredged material; the land-based emplacement of dredged material and its use for land reclamation; comprises part of the Proposal.

3.5. Environmental Planning Instruments

The following State Environmental Planning Policies were considered in the assessment of the Proposal:

- State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP);
- State Environmental Planning Policy No. 14 - Coastal Wetlands;
- State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;
- State Environmental Planning Policy No. 55 - Remediation of Land; and
- State Environmental Planning Policy No. 71 – Coastal Protection.

3.6. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The Department considers the application is consistent with relevant objects of the Act for the following reasons:

- proper management, development and conservation of natural and artificial resources including agricultural land and natural areas for the purpose of promoting the social and economic welfare of the community and a better environment;
- the promotion and co-ordination of the orderly and economic use and development of land;
- protection of the environment including threatened species and their habitat; and
- provision of increased opportunity for public involvement and participation in environmental planning and assessment.

3.7. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle,
(b) inter-generational equity,
(c) conservation of biological diversity and ecological integrity,
(d) improved valuation, pricing and incentive mechanisms.

It is important to recognise that while the EP&A Act requires that the principles of ESD be encouraged, it provides other objects that must be equally included in the decision-making process for any proposal. The Department has considered the need to encourage the principles of ESD, in addition to the need for the proper management and conservation of natural resources; the orderly development of land considering land use; the need for the project as a whole; and, the protection of the environment including threatened species in **Sections 2**, **4**, and **5** of this report.

The Department's assessment of key issues (refer **Section 5**) is based on a conservative and rigorous assessment of the likely impacts of the Proposal, with consideration of cumulative impacts from existing and approved industrial development in Kooragang Island. This approach is consistent with the precautionary principle.

Further, the Department's assessment of flora and fauna impacts (refer **Section 5.3**) has focused on the extent and quality of ecological offset measures required for the Proposal to adequately compensate for unavoidable impacts, consistent with the principle of conserving biological diversity and ecological integrity. With respect to the adequacy of offset measures the Department has specifically considered offset calculations based on the NSW Office of Environment and Heritage BioBanking tool (NSW BioBanking Scheme), a methodology specifically developed to determine rigorous offset requirements based on the ecological value of impacted flora and fauna. This approach is consistent with the principle of *improved valuation, pricing and incentive mechanisms.*

The Department has considered the need to encourage the principles of ESD, in addition to the need for the proper management and conservation of natural resources; the orderly development of land considering land use; the need for the Proposal as a whole (which comprises a utility provision); and the protection of the environment including threatened species are considered in **Section 5** of this report.

3.8. Statement of Compliance

In accordance with section 75I of the EP&A Act, the Department is satisfied that the Proponent has complied with the Secretary's environmental assessment requirements (SEARs previously known as Director-General's Environmental Assessment Requirements) and supplementary SEARs.

3.9. Environment Protection and Biodiversity Conservation Act

On 5 August 2011, the Proposal was determined to be a "controlled action" under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it was considered likely that the Proposal could have a significant impact on:

- Wetlands of international importance (Ramsar) under sections 16 and 17B;
- Listed threatened species and communities under sections 18 and 18A; and
- Listed migratory species under sections 20 and 20A.

On 21 August 2011, the Australian Government Department of Sustainability, Environment, Water, Population and Communities (now the Australian Government Department of the Environment) confirmed that the Proposal would be assessed through the accredited assessment process under the NSW EP&A Act. This means that the NSW assessment process has been accredited for the purpose of the assessment requirements of the EPBC Act. However, the Commonwealth Minister for the Environment maintains an independent approval role and the Commonwealth provides input into certain stages of the assessment process.

To enable the assessment of controlling actions under the EPBC Act, the SEARs issued for the Proposal on 14 March 2011 and supplemented on 17 May 2011, were additionally supplemented on 21 September 2011 with requirements in relation to EPBC matters. The activity deemed a controlled action by the Commonwealth includes the Proposal for which Part 3A approval has been sought, as well as additional

activities (*i.e.* dredging within the Hunter River South Arm) that do not form part of this assessment. The Department's assessment of EPBC matters in this report is limited to those relating to the Proposal only and not the additional activities. The Department has consulted extensively with the Department of the Environment throughout the assessment process, and the Department's assessment of Commonwealth matters is detailed in **Section 5** of this report.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Both the EA and the Response to Submissions and Preferred Project Report were publicly exhibited and submissions from the public and agencies invited.

Environmental Assessment

The EA was exhibited from 8 March 2012 until 7 May 2012 (61 days) in accordance with Section 75H(3) of the EP&A Act and was available on the Department's website and at the following locations:

- Planning and Environment, Information Centre, 23-33 Bridge Street, Sydney;
- Nature Conservation Council of NSW, Level 2, 5 Wilson Street, Newtown;
- Newcastle City Council, City Administration Centre, 282 King Street, Newcastle;
- Newcastle Library, Level 3, War Memorial Cultural Centre, Laman Street, Newcastle;
- Mayfield Library, Hanbury Street, Mayfield; and
- Stockton Library, King Street, Stockton.

The Department advertised the public exhibition in Newcastle Herald on Thursday 8 March 2012 and the Newcastle Herald, Sydney Morning Herald and The Daily Telegraph on Wednesday 25 April 2012. Adjacent landholders, State, and local government authorities were also advised of the exhibition in writing. The Department received 488 submissions during the exhibition of the EA including 11 submissions from public authorities and 477 submissions from the general public and special interest groups. A summary of the issues raised in submissions received on the EA is provided in **Sections 4.2** and **4.3**.

Response to Submissions and Preferred Project Report

The Response to Submissions and Preferred Project Report was exhibited from 16 September 2013 to 22 November 2013 (68 days) and submissions were invited. The Department advertised the public exhibition in the Sydney Morning Herald and The Daily Telegraph on 11 September 2013, and in the Newcastle Herald and South Coast Register on 16 September 2013. Adjacent landowners and relevant state and local authorities were also notified of the exhibition. In addition to the locations listed above, the Response to Submissions and Preferred Project Report was also exhibited at the following locations due to the inclusion of the proposed biodiversity offset sites:

- Raymond Terrace Library, 18A Sturgeon Street, Raymond Terrace;
- Cessnock Library, 65-67 Vincent Street, Cessnock; and
- Nowra Library, 10 Berry Street, Nowra.

The Department received 974 submissions during the exhibition including 14 submissions from public authorities and 960 submissions from the general public and special interest groups. A summary of the issues raised in submissions is provided in **Sections 4.2** and **4.3**.

4.2. Public Authority Submissions

Eleven submissions were received from public authorities on the EA and 14 on the Response to Submissions and Preferred Project Report. The public authorities raised numerous issues in submissions received on both the EA and Response to Submissions and Preferred Project Report key issues raised are generally summarised below. All issues raised in submissions received were considered by the Department in its assessment in **Section 5**.

Environment Protection Authority (EPA) – provided comments on air quality, noise, surface and groundwater and contamination including comments regarding the management of saline dredge water and differences in the modelled air quality results. EPA also suggested recommended conditions of approval should the project be approved.

NSW Health – states that health effects of exposure to $PM_{2.5}$ and PM_{10} are well established and commented that while the modelled air quality impacts comply with current EPA assessment criteria, should the project be approved, it recommends that all reasonable and feasible measures to control $PM_{2.5}$ and PM_{10} be

implemented. NSW Health also commented on coal trains and fugitive emissions and noise impacts from the project and cumulatively.

Office of Environment and Heritage (OEH) – raised issues concerning biodiversity impacts, including impacts to Green and Golden Bell Frogs, clearing of endangered ecological communities, cumulative impacts to wetland habitat and connectivity to Ramsar and State Significant Wetlands. OEH was also of the opinion that the proposed biodiversity offset strategy represents commensurate vegetation, species and habitat if not better than those found on the development area and suggested conditions of approval regarding ongoing consultation in relating to the design of the Tomago Offset Site.

Australian Government Department of the Environment (DotE) – commented on impacts to the Green and Golden Bell Frog, Australasian Bittern habitat, impacts to the adjacent Ramsar wetland and compensatory habitat.

Hunter Central Rivers Catchment Management Authority (Hunter-Central Rivers CMA) – objects to the Proposal as it considers the Tomago Offset site to be inappropriate to offset the loss of shorebird habitat as it would result in impacts to Swamp Oak, Eastern Grass Owl habitat, White Bellied Eagle nesting site and would cause acid sulfate issues. The CMA also does not believe that the proposed habitat restoration program would achieve the proposed ecological goals and recommended that additional offset land be purchased and that a less engineered restoration program be developed. The CMA also commented on cumulative impacts of multiple developments in the Hunter Estuary.

Department of Primary Industries - Fisheries NSW – recommended alterations to the design of the Tomago Offset Site.

NSW Office of Water (NOW) - raised no objections to the Proposal, however, advised that activities likely to intercept groundwater will require a water licence under Part 5 of the *Water Act 1912* and activities on waterfront land may be considered controlled activities and should be conducted in accordance with NSW Office of Water's Guidelines for controlled activities.

Hunter Development Corporation (HDC) – supports the Proposal and commented on potential timing conflicts of closure and capping works on parts of its site (i.e. the former Kooragang Waste Emplacement Facility) including potential conflicts with the timing and land requirements for its proposed Green and Golden Bell Frog habitat creation corridor and potential traffic and access conflicts during these works. HDC recommended that the Proponent be required to undertake capping and closure across the entire site to remove potential conflicts.

Newcastle City Council (NCC) – commented on lighting and visual impacts, contamination, ecology, air quality, noise, greenhouse gases, sewage management, traffic and flood and stormwater management.

Singleton Council – commented on consultation, health risks, cumulative impacts and financial and environmental costs to the Singleton and Upper Hunter Communities due to coal mining expansion.

Port Stephens Council – commented on noise and vibration impacts to residents of Fern Bay and the Council area and air quality. Council also requested ongoing consultation during the detailed design of the Tomago Offset site.

Roads and Maritime Services (RMS) – provided comments on traffic impacts; approvals under the *Roads Act 1993*; and the possibility that the duplication of Tourle Street and Cormorant Road may coincide with the construction of the Proposal.
Australian Rail Transport Corporation (ARTC)– clarified ARTC's responsibilities with respect to rail noise.

NSW Trade and Investment – advised that applications for a variation to a pipeline licence area and a variation to easements would be required.

Newcastle Port Corporation (NPC) – Supported the Proposal as it would help service the predicted growth in coal exports and provide long-term vessel loading capacity for the Hunter Region's coal industry. NPC also noted that the Proposal would fulfil the Proponent's obligations under the Hunter Coal Export Framework.

Transport for NSW - raised no additional comments and considered previous issues were adequately addressed in the RtS/PPR.

4.3. Public Submissions

A total of 477 public submissions were received on the EA and 960 public submissions on the Response to Submissions and Preferred Project Report. **Table 2** provides a summary of the breakdown of the submissions received from the public.

Table 2: Summary of Objection, Support and Comment Submissions

Reporting Stage	Objection (%)	Support (%)	Comment (%)	Total Public Submissions
EA	444 (93%)	9 (2%)	24 (5%)	477
Response to Submissions and Preferred Project Report	349 (36%)	605 (63%)	9 (1%)	960

Issues raised within the submissions received on the EA and the Response to Submissions and Preferred Project Report were generally similar, as presented in **Figure 8** which represents the percentage of submissions that objected to the EA (93%) and percentage of submissions within the Response to Submissions and Preferred Project Report (36%) that objected to the Proposal and each issue raised. Air quality, ecology, health, and greenhouse gas/climate change remained key issues in submissions received during the EA and RtS/PPR exhibition periods. The key issues raised in public submissions and where these have been considered by the Department are presented in **Table 3**.

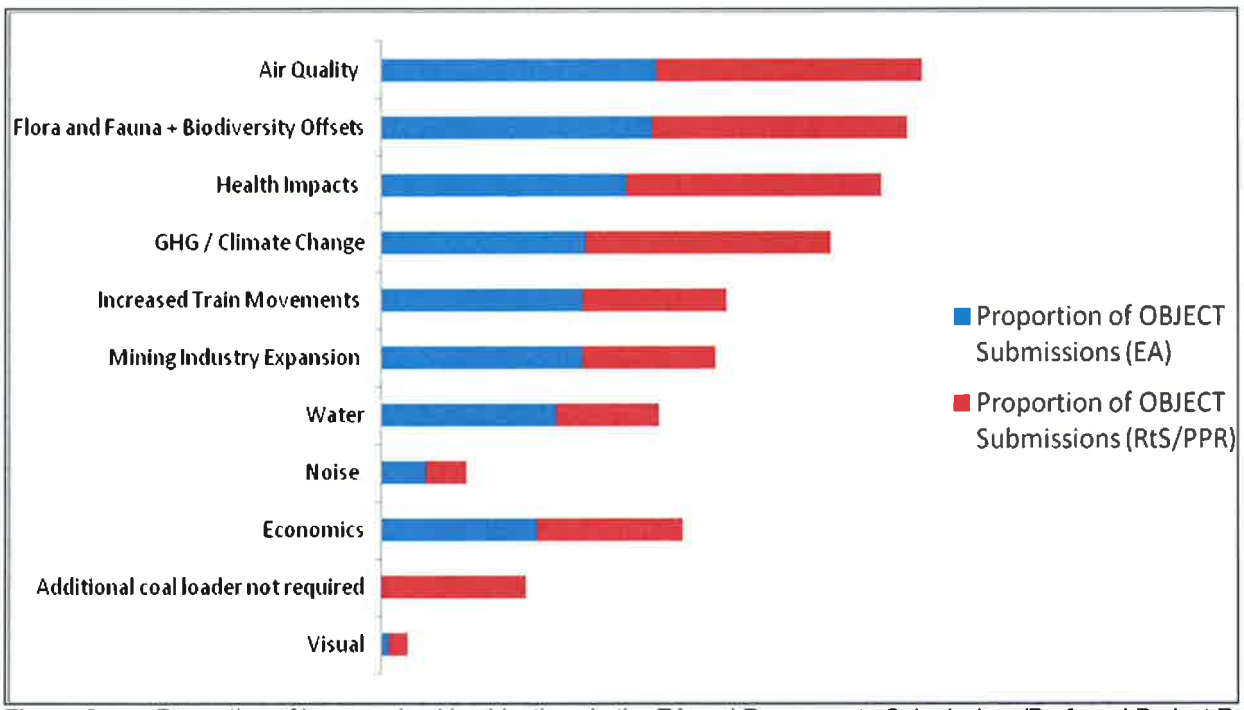

Figure 8: Proportion of issues raised in objections in the EA and Response to Submissions/Preferred Project Report
Note: coloured bars represent the percentage of objections raising a specific concern received during the EA or Response to Submissions and Preferred Project Report exhibition period, respectively.

Table 3: Summary of issues raised in public submissions

	PROPORTION OF SUBMISSIONS		
Issue	**Environmental Assessment**	**Response to Submissions Preferred Project Report ***	**Section addressed in this Report**
Air quality	69%	26% (72%)	**Section 5.1**
Flora and Fauna	68%	25% (69%)	**Section 5.3**
Health Impacts	61%	25% (69%)	Air Quality **Section 5.1** Noise **Section 5.7** Water Contamination **Section 5.4**
Greenhouse/ Climate Change	51%	24% (66%)	Climate change; need and justification of the Proposal **Section 2.2**. Greenhouse gas **Section 5.10**
Increased Train Movements	50%	14% (39%)	**Section 2.2, Section 5.1** and noise impacts **Section 5.7**
Opposition to expansion of mining industry	50%	13% (36%)	Need and Justification **Section 2.2** and Upstream and downstream impacts **Section 5.1**
Water Pollution (including dredging)	44%	10% (28%)	Contamination / groundwater issues **Section 5.4** Dredging **Section 5.5**
Noise	39%	4% (11%)	**Section 5.7**
Impacts to other economic activity	39%	14% (39%)	Socio-economic **Section 5.10**
Visual Impacts	2%	2% (5%)	**Section 5.9**
Additional coal loader not required	N/A	14% (39%)	**Section 2.2**

** Percentage includes all submissions. Proportion of objection only submissions raising this as an issue contained within the brackets*

5. ASSESSMENT

After consideration of the Proponent's EA, Response to Submissions and Preferred Project Report and final statement of commitments and the issues raised in community and public authority submissions, the Department considers the key issues associated with the Proposal to be:

- upstream and downstream impacts;
- air quality;
- flora and fauna;
- contamination;
- stormwater and drainage;
- flooding;
- noise;
- traffic and transport; and
- visual.

Other issues that are also considered in this report are greenhouse gases, socioeconomic and visual impacts traffic and transport.

5.1. Upstream and Downstream Impacts

Numerous submissions received raised concern about upstream and downstream impacts of the Proposal on air quality, noise amenity and greenhouse gas emissions. The Department has considered these issues in further detail below and recognises that other entities and not the Proponent have control over these impacts given they occur outside of the Proposal footprint. The Department also considers that the assessment, management and regulation of these impacts are appropriately covered by other mechanisms.

Specifically, the management and responsibility of impacts from the rail transport of coal which was a matter of key concern is:

- the responsibility of the ARTC and the rail freight (rolling stock) operators;
- regulated by an EPL administered by the EPA; and
- outside of the control of PWCS.

The Proponent similarly, does not have control or responsibility over the ships at port nor the combustion of the coal at its final destination.

Air Quality Impacts along the Rail Line

Concern about air quality impacts from the transportation of coal by rail was raised in numerous submissions. Any increase in rail transport would need to comply with ARTC's EPL for rail systems activities and any rail capacity upgrades would require further assessment and approval under the *Environmental Planning and Assessment Act 1979*. Notwithstanding, the Proponent's assessment did consider impacts of rail transport to the site. A qualitative assessment considered that the project contribution to the peak 24 hour PM_{10} concentration, from an increase of 26.6 trains per day, would be between 1.5 and 6.4 $\mu g/m^3$ at 20m from the rail corridor. The Department considers that the Proposal's contribution to this issue is relatively modest. Notwithstanding the impacts from increased rail transport on air quality may affect residences located close to the rail line and that management of air quality impacts from rail transport are appropriately managed by the EPA through the application of an EPL. Further, the Department has also recommended a condition of approval requiring the Proponent to participate in any cumulative dust study that may be commissioned by the EPA.

ARTC has Pollution Reduction Program requirements placed on its licence (EPL 3142) by the EPA. These pollution reduction measures included installing monitoring stations and assessing dust generated by train movements along the Hunter Valley rail corridor. The Department is aware of the limitations and criticisms around the conclusions of the ARTC report, however, it should be noted the conclusions were not relied upon in for the Department's assessment. The Department is also aware of further work being completed to address the requirements of the Pollution Reduction Program.

It is also noted that PWCS is a participant on the Newcastle Community Consultative Committee on the Environment established by the Minister for Environment and has committed to working with ARTC, EPA and coal producers to reduce fugitive emissions from trains. This Committee was established to enable the local community to identify important environmental and amenity issues associated with industrial activities and provide a forum for the local industry to understand the community's concerns. The Department understands

that this committee has also advised on the establishment of the Lower Hunter environmental monitoring network. The Department considers that the EPA's interagency approach to air quality in the Upper and Lower Hunter region, in consultation with industry and the community, is appropriate.

Submissions raising concern about the number of coal mines needed to achieve the maximum throughput of 70 Mtpa are also noted. The Department notes that any new coal mine or rail proposals are required to be assessed under the *Environmental Planning and Assessment Act 1979*. Further, the Department considers the Proposal in itself is not a driver for coal demand or the establishment of new mines. Whether the Proposal operates at full capacity is ultimately linked to global coal export markets, the capacity of the coal mines to extract coal and the capacity of the rail line to transport coal by train.

Diesel emissions

Concerns about diesel emissions from locomotives within the Proposal area, ships at berth and construction plant were also raised. Diesel emissions were considered as part of the air quality assessment including PM_{10}, $PM_{2.5}$ and Combustion emissions (SO_2, NO_2, CO and BTEX). The assessment predicted levels that comply with the relevant criteria and standards. It is noted that the Proponent does not control the locomotives, their emissions, or the ships at berth. Nevertheless, the Department has recommended a condition that requires that the Proponent only accept locomotives that meet the requirements of the ARTC EPL.

Rail Noise

The Issue of rail noise generally, and the potential increase in rail noise along the Hunter Valley Coal Chain from mine to port, was also raised by the community as an issue of concern. Whilst the Department acknowledges this broader concern about the impacts of rail noise along the rail corridor, it also accepts that the Proponent is not responsible for the management of the rail corridor or the rolling stock that uses it. As a common user facility (as is KCT) the project is one that must be able to respond to the demands of the Hunter Valley Coal Chain to export coal. In this way, the project does not drive demand and therefore cannot be held responsible for the volume of rail traffic that is generated by the export demand. Similarly, the rolling stock is dependent on mine contracts with freight providers and the rail infrastructure is leased by the ARTC which is responsible for managing use of the infrastructure and allocating train paths, again, not something which the Proponent is able to control.

Notwithstanding the above, the Proponent undertook an assessment of cumulative rail noise along the Main North Railway between Sandgate and Thornton. The assessment took into account existing train movements and future approved movements associated with the KCT upgrade and commencement of operations by Newcastle Coal Infrastructure Group (NCIG). It is recognised that increases could occur at any point along the Main North Rail Line as a result of increased mine production to supply export demand.

Noise increases of up to 0.7 dB, whilst relatively modest, are anticipated because of the additional rail movements accessing the T4 facility. It is however noted that this is slightly more than the increase nominated by the EPA (0.5 dB) as being a project related increase that would require all reasonable and feasible noise mitigation measures to be implemented.

The EPA in its submission indicated it is concerned about increases on the greater rail network as a result of increased coal haulage but acknowledges that a strategic approach is needed to the assessment and management of noise generated on the rail network. As the predicted increases are anticipated along the rail corridor, but not solely attributable to train movements to or from T4, it would be unreasonable to hold the project responsible for all rail noise impacts on the rail network.

The ARTC negotiated, through the rail industry body, that noise mitigation would be limited to project boundaries in the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* (IGANRIP) and committed to developing and funding a noise abatement program, similar to that operated by the Roads and Maritime Services. Such a program has yet to be implemented but would help meet the objectives of EPL 3142 to progressively reduce noise levels at affected residential properties.

Notwithstanding the lack of control the Proponent has on the rolling stock and infrastructure outside the Proposal boundaries, the Department acknowledges that there will be an impact due to increased train movements and recommends a condition which restricts the Proponent accepting rolling stock on site that does not meet the requirements of EPL 3142 or a Pollution Control Approval issued under the former *Pollution Control Act 1970*.

Greenhouse Gas

The Department acknowledges and does not question the potential greenhouse gas impacts caused by the burning of coal. Notwithstanding, it must also be acknowledged that the project in itself does not drive demand for the mining or burning of coal. Instead, the Proposal facilitates the link between the producer (the mine) and the consumer. Not proceeding with the development would not result in a decrease in demand for coal products (or CO2 emissions), which is driven by current and projected future global demand for energy.

The Proponent argues that Scope 3 emissions have been provided for completeness, however as it cannot control these emissions, these should not be counted towards the impacts of the project. The Department accepts that Scope 3 emissions are beyond the control of the Proponent and are accounted for by others/other developments (as either Scope 1 or 2 emissions). Further, the worldwide demand for coal, whilst subdued in recent years, is not likely to diminish to any great extent in the near future. Therefore, the Scope 3 emissions from the export of 70 Mtpa of coal would still be realised even if the proposal did not proceed as coal to satisfy global energy demand would be sought from alternative sources and consumed.

In addition even with the increasing uptake of renewable energy technologies, coal will continue to be sought and combusted by third parties to satisfy global energy demands. This point illustrates that the response to the issue of global warming/climate change needs to be made at a policy or strategic level, outside and beyond the NSW planning assessment process.

Overall, it is considered that the assessment has been undertaken in accordance with the relevant guidelines and is consistent with the approach adopted by other similar projects. The Greenhouse gas scope 1 and 2 emissions are considered further in **Section 5.10**.

5.2. Air Quality

The Proposal has the potential to have a direct impact on air quality during construction and operation. The Proponent intends to implement a range of mitigation measures it considers to be industry best practice including enclosing and partially enclosing dust sources, use of water sprays, earthen bunds, vegetative screens and real time monitoring to manage dust impacts. The Department is satisfied that the Proponent has undertaken an appropriate assessment of the residual impacts to air quality.

The assessment of the air quality impacts of the revised Proposal was undertaken by Environ and independently reviewed by atmospheric physicist, Dr Nigel Holmes. The assessment was undertaken in accordance with the DEC (now EPA) (2005) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.*

Baseline Data

The Proponent determined the baseline air quality data, for its assessment, by using monitoring data from the year 2010 as:

- this year was the latest complete data set with data from more monitoring sites available than in previous years;
- excluded data from 2009 due to dust storms which were considered to be atypical events; and
- did not include data with the now closed BHP Billiton operations.

The cumulative assessments of air quality were undertaken by combining predicted emissions from the T4 Proposal with baseline data for air quality at each location and the predicted future emissions from approved developments not operating at the time of the 2010 monitoring period. This included the addition of data from KCT Stage 4, Manildra Park, Knauf Insulation Plant and expansions of nearby NCIG and Orica.

In addressing the submissions and criticism of the data, that the Proponent selected a year with lower particulate emissions than other recent years, the Proponent undertook an additional sensitivity analysis. Using maximum annual average values for TSP, PM_{10} and $PM_{2.5}$ recorded between 2007 and 2011 did not result in any criteria exceedances.

The Department is satisfied that the Proponent has undertaken an adequate and comprehensive assessment of the construction and operation impacts of the Proposal on local air quality. The Department is also satisfied that use of baseline data from 2010 and the sensitivity analysis is appropriate to enable the Department to form a view on the magnitude and acceptability of the impact.

Air Quality Impacts

The Proposal has the potential to impact air quality during construction and operational stages, particularly during operations such as coal transfers and stacking and reclaiming of coal stockpiles. The Department's consideration of impacts to air quality is focused on the largest predicted impact that is expected to occur during the construction and operational stage where part of the Proposal is operational and the remainder under construction. Air quality impacts solely from the construction or operational stages, while different, would be generally less than this stage. The Department has also focused its assessment on particulate matter as the main source of air quality impacts associated with the Proposal and as it is an issue of high community concern as demonstrated by the submissions. Impacts from the transport of coal by rail are considered in Section 5.1.

It is considered that the management of air quality impacts during construction can be managed by using standard construction management techniques. Any health related impacts due to existing site contamination and proposed remediation works are addressed in **Section 5.4**.

The air quality assessment considered Proposal specific and cumulative impacts to air quality and predicted that the Proposal during construction; construction and part operation (up to 25 Mtpa); and full operation (up to 70 Mtpa) would comply with the EPA assessment criteria and NEPM advisory standards for:

- total suspended particles (TSP);
- annual average dust deposition;
- particulate matter less than 10 microns in aerodynamic diameter (PM_{10});
- particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$);
- sulphur dioxide (SO_2, combustion related);
- nitrogen dioxide (NO_2, combustion related);
- carbon monoxide (CO, combustion related);
- benzene (combustion related);
- ethylbenzene (combustion related);
- toluene (combustion related); and
- total xylene (combustion related).

Particulate Matter

The maximum 24 hour average PM_{10} is expected to exceed the criterion on one day per year with the Proposal and for a future scenario without the Proposal, therefore it can be said that the Proposal would not increase the number of days that exceedances occur in any year at the assessment locations considered.

Further, the exceedance of 50 $\mu g/m^3$ criterion for all cumulative scenarios and all assessment locations, for one day per year is consistent with the national criterion which allows up to five exceedances per year. Exceedances in NSW typically correspond with bush fire and dust storm events, resulting in high background concentrations of PM_{10}. The Department also notes that exceedances of the 24 hour average PM_{10} were also recorded during nearby bushfires in 2013.

Contributions to the maximum 24 hour PM_{10} from the Proposal are predicted to be greatest during the construction and partial operations scenario resulting in between 2 $\mu g/m^3$ at Stockton and 17.9 $\mu g/m^3$ at Sandgate, refer **Figure 9**. Maximum incremental concentrations occur in close proximity to the T4 Proposal area. The Sandgate monitoring location is approximately 500 m southwest of the rail line and is the closest assessment location considered. The Stockton site is approximately 4.5km south of the rail loop and the most distant location considered.

Although the Proposal's incremental contribution to the maximum 24 hour PM_{10} is 17.9 $\mu g/m^3$ at Sandgate (location R10) the cumulative maximum 24 hour PM_{10} is only expected to increase by 1.3 $\mu g/m^3$. This is because the maximum cumulative impact is not a sum of the maximum increment and the maximum baseline, as maximums may occur at different times. While the maximum cumulative concentration does exceed 50 $\mu g/m^3$ at times, this exceedance is attributable to regional events and not to T4.

To provide further context the cumulative annual average PM_{10} concentrations comply with the criterion at all locations and the cumulative concentration predicted at Sandgate (location R10) is comparable to the other locations (20.1 $\mu g/m^3$ at Sandgate compared with 17.9 $\mu g/m^3$ at Stockton) despite it being the closest location. The EPA criterion for the cumulative annual average PM_{10} is 30 $\mu g/m^3$.

To manage particulate matter or dust during operation, the Proponent has committed to implementing various site specific dust management measures for different components including:

- enclosing or partially enclosing infrastructure including the rail receival, belt conveyors and shiploaders;
- use of dust suppression sprays at the rail receival, transfers, coal stockpiles, yard machinery and shiploaders;
- use of screening, landscaping and earthen bund walls to provide windbreaks on site and stabilise open areas; and
- the implementation of management systems including a reactive/predictive air quality control system using real time data and meteorological forecast data, staff training and work practices.

The Department also considers that a robust and responsive air quality monitoring program is critical for effective management of air quality impacts resulting from the Proposal and notes that the Proponent has committed to the implementation of reactive and predictive air quality control systems that use real time data and meteorological forecasts to manage impacts. The Department supports this approach and has restated this commitment as a condition of approval.

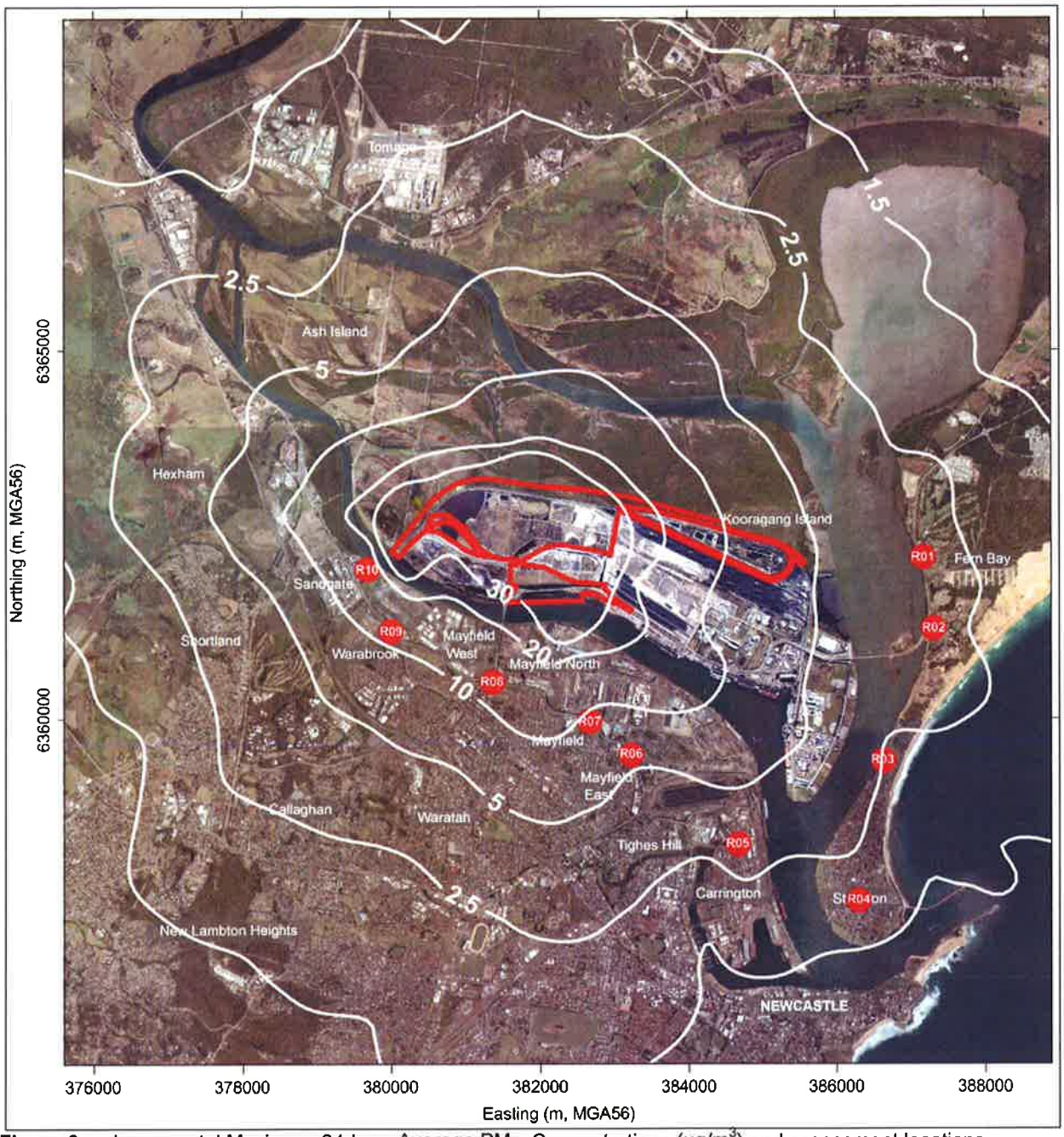

Figure 9: Incremental Maximum 24-hour Average PM_{10} Concentrations ($\mu g/m^3$) and assessment locations
(Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013)

Best Practice Dust Management During Operations

Notwithstanding that particulate matter levels will largely remain below the criterion submissions were received questioning whether the Proposal meets best practice for managing air quality impacts citing examples of covered and enclosed sheds housing coal stockpiles. The Department has considered this including reference to the Bunbury Coal Export Terminal in Western Australia which proposes to enclose coal stockpiles in a shed in order to manage dust.

It is noted that the Bunbury coal export facility proposes to export up to 15 Mtpa and that the enclosure would cover 7.5 ha. The T4 Proposal is larger (about 4.5 times at full development) with the stockpiles covering 31 ha. The Department recognises that the size of the T4 Proposal makes it difficult to enclose. Other methods, such as water and chemical suppression, use of screens and partial enclosures may achieve a similar result. The Department acknowledges that the Proponent proposes to:

- enclose or partially enclose dust sources such as dump stations, buffer bins, transfer houses, conveyors and shiploader discharge chutes (ie. processes that involve the movement of coal);
- use extendable shiploader spouts and water sprays; and
- construct earthen bund walls and/or vegetative screens or remove dust through impaction.

The Proponent has also committed to investigating the effectiveness of additional wind barriers to limit the movement of air across the stockpiles prior to operations commencing but prefers to use water over chemical suppression. This is based on review of dust management at KCT and CCT where water was found to be the most effective method for controlling dust lift-off. Water application rates could be increased and used as the main contingency measure during adverse meteorological conditions with dust control efficiencies greater than 80 per cent achieved through application rates of 3 L/m^2 to coal stockpiles compared with a typical water application rate at KCT of between 0.5 and 0.7 L/m^2. The Department is also aware that the Proponent is currently implementing an intelligent dust management system at both KCT and CCT to improve dust management and that this system had received industry recognition.

The Department is supportive of the proposed mitigation measures, including real time monitoring and implementation of appropriate management measures, and the involvement and ongoing commitment to minimising dust impacts in the region with the EPA, industry and the community. The Department has recommended conditions, should the Proposal be approved, that the Proponent be required to:

- participate in future activities or fora to manage dust in the region; and
- use real time monitoring and implement corrective actions should the monitoring indicate that the mitigation measures implemented are not resulting in effective dust control.

Regional Air Quality

The Proponent, in conjunction with the NCIG, operates a number of deposited dust gauges and high volume air samplers. These supplement other air quality and weather monitoring sites managed by BoM, EPA, NCC, HDC and other organisations to monitor ambient conditions or air quality associated with industrial activities (refer **Figure 10** for air monitoring locations). These include meteorological monitoring stations, high volume air samplers, dust depositional gauges and continuous air quality monitoring stations. ANSTO has also undertaken regular $PM_{2.5}$ particle characterisation for a site at Mayfield as part of its fine particle research.

The results from the monitoring show that the air quality in the Lower Hunter is generally 'as good' or 'better than' air quality in Sydney and the Illawarra. The Department understands that the EPA is working with industry, including the Proponent, and the community to characterise and monitor air quality in the Upper and Lower Hunter regions. Activities include:

- involvement in the Newcastle Community Consultative Committee on the Environment;
- particle characterisation studies (a Lower Hunter Particle Characterisation Study of $PM_{2.5}$ and PM_{10} particles is proposed to commence in Autumn 2014 and run for a year);
- assessment of impacts from rail transport of coal; and
- working towards establishing a Lower Hunter Air Quality Monitoring Network similar to the Upper Hunter Regional Network.

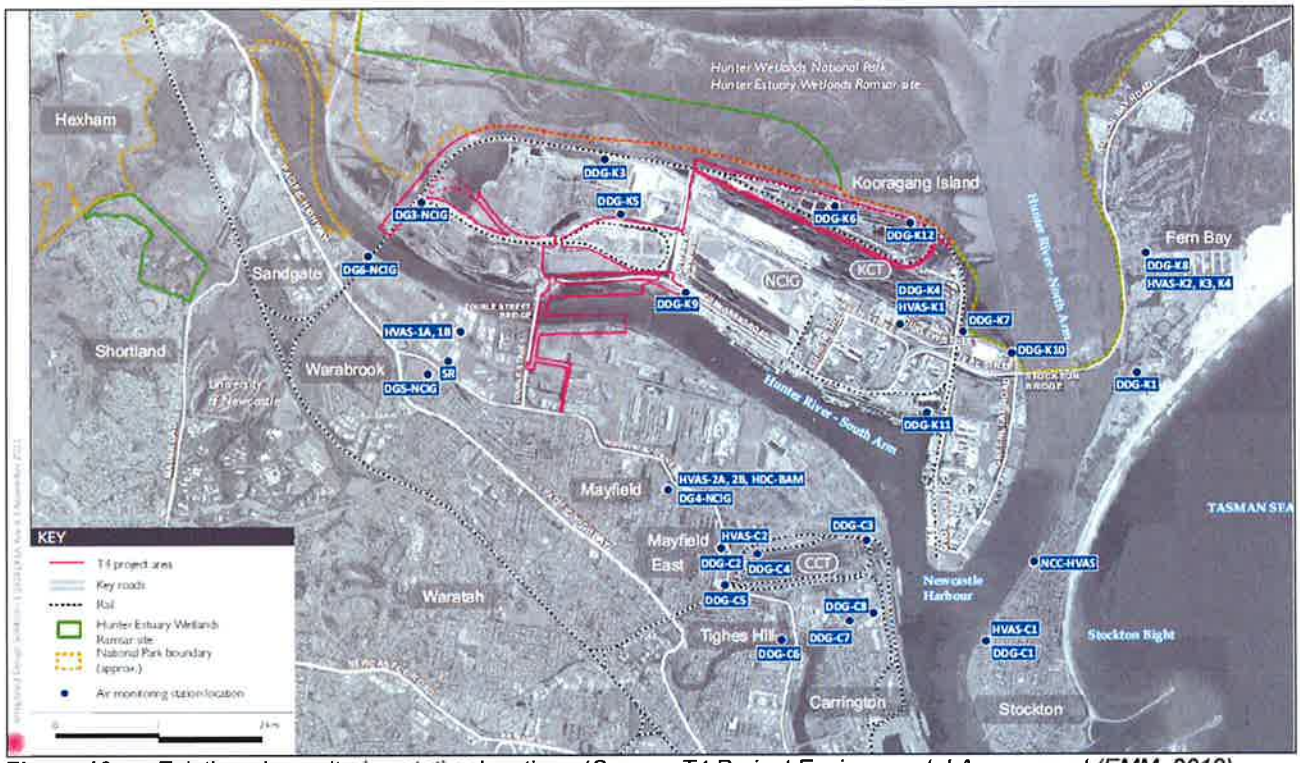

Figure 10: Existing air monitoring station locations (*Source: T4 Project Environmental Assessment (EMM, 2012)*

The results of the particle characterisation study would help identify the source of particulates and priorities for managing particle emission sources across the region and not just the Port. The Department also understands that the Proposal would not be the only source, and is unlikely to be the main source, of particulates in the region. This view is supported by studies completed by the Proponent, CSIRO and ANSTO. Microscopic examinations of dust samples collected in Stockton and Fern Bay between 2006 and 2010 completed by the Proponent, found that the coal dust component of those samples ranged between 5 and 16 percent of the annual dust deposition. Australian Nuclear Science and Technology Organisation (ANSTO) has collected particle characterisation data for $PM_{2.5}$ at Mayfield for a number of years. This fine particle research shows that the composition of $PM_{2.5}$, sampled over time, includes ammonium sulfate, organic matter, soil, elemental carbon (black carbon which can include combustion generated soot and coal dust) and sea salt. **Figure 11** shows that the percentage contribution to $PM_{2.5}$ from black carbon has generally decreased over time from approximately 35 percent to 15-20 percent for the site at Mayfield. It is also noted that over this same time period the percentage contribution from sea salt has ranged from eight percent to 18-28 percent.

The annual average concentrations of $PM_{2.5}$ recorded at Mayfield have also generally decreased over this same time and since 2003 have generally complied with the NEPM Advisory Reporting Standard of 8 $\mu g/m^3$ (refer **Figure 12**). The decrease coincides with the decommissioning of iron and steel operations in the late 1990s. Concentrations exceeding the NEPM Advisory Reporting Standard in 2001-2002 and 2009 were affected by regional bushfires and dust storms.

The EPA's Lower Hunter Particle Characterisation Study, planned to commence in August 2014, will consider both PM_{10} and $PM_{2.5}$ particles. A similar study completed for Singleton and Muswellbrook, *The Upper Hunter Valley Particle Characterization Study Final Report* (CSIRO, 2013), found that suspended particles other than soil (which includes coal dust) made up a larger proportion of the sampled $PM_{2.5}$ and that, during winter, wood smoke was the dominate source of fine particles. The study also noted that in order to determine the full contribution of coal dust that PM_{10} samples would need to be analysed, as coal dust is typically in the range of $PM_{2.5}$ to PM_{10}. The Department expects that the results of the Lower Hunter Particle Characterisation study will be used to identify key sources of particulate emissions and could help set or revise particle limits.

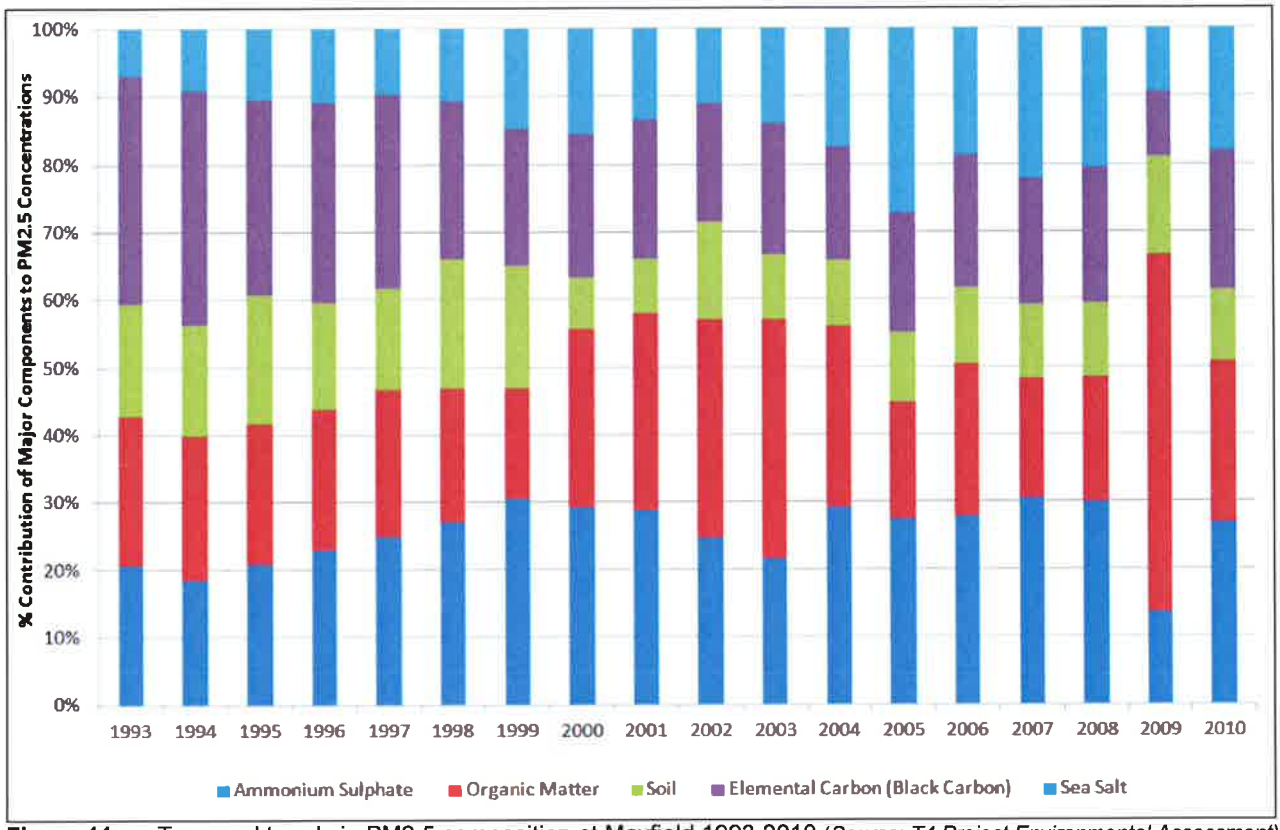

Figure 11: Temporal trends in PM2.5 composition at Mayfield 1993-2010 (*Source: T4 Project Environmental Assessment)*

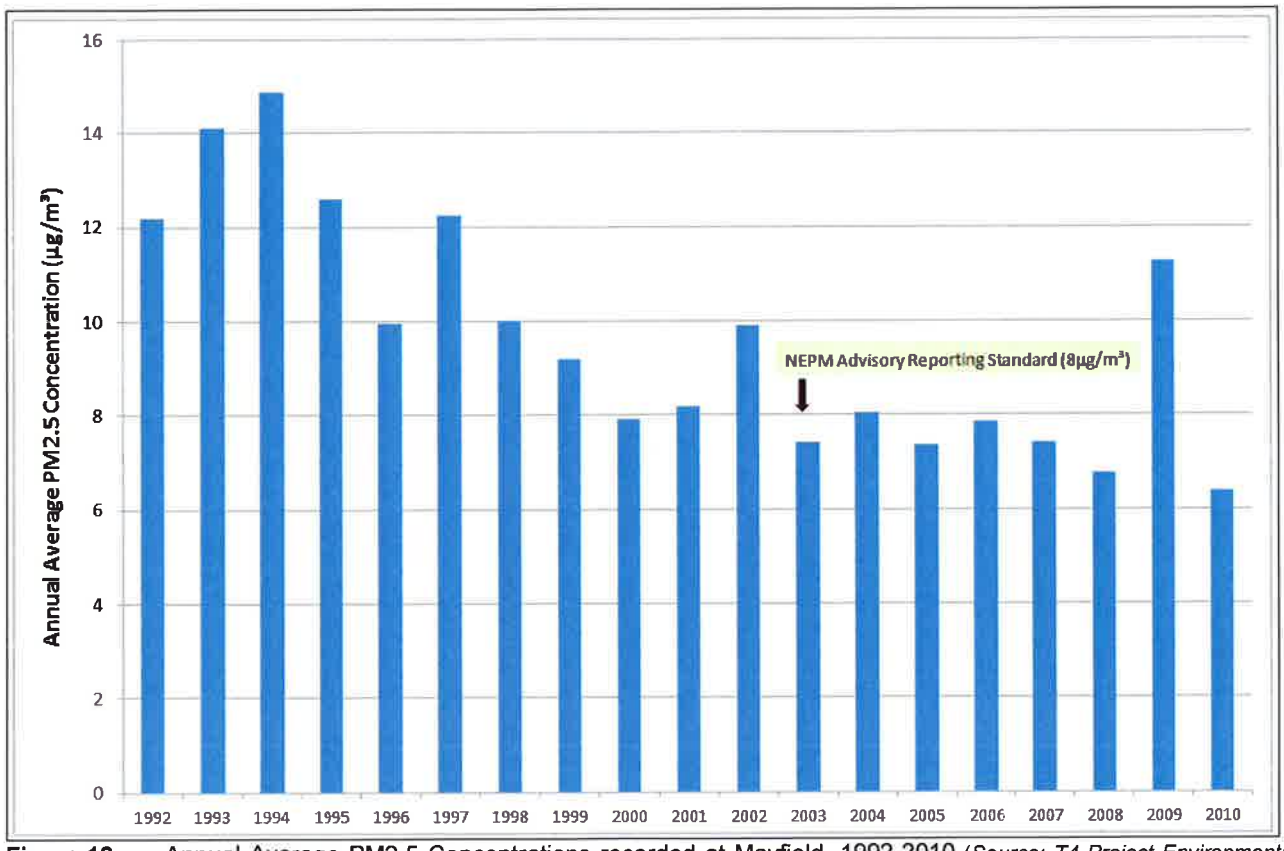

Figure 12: Annual Average PM2.5 Concentrations recorded at Mayfield, 1992-2010 (*Source: T4 Project Environmental Assessment (EMM, 2012)*)

Air Particles and Health

The Department acknowledges that health effects from air particles are known and, as also documented by submissions from the Department of Health and others, health effects from the exposure to $PM_{2.5}$ and PM_{10} are well established for susceptible individuals including the elderly, infants, asthmatics and those with cardiopulmonary disease. Particularly susceptible individuals may develop symptoms at exposure levels below the relevant criteria.

The Department of Health's submission, while noting that the contribution from the Proposal is expected to comply with the EPA assessment criteria states that, should the Proposal be approved, all reasonable and feasible mitigation measures to control emissions of $PM_{2.5}$ and PM_{10} should be implemented to ensure any health impact is minimised. The Department agrees with this view and has recommended conditions of approval to mitigate impacts.

The Department also acknowledges that the *National Plan for Clean Air*, currently being developed, aims to revise the air quality standards, include an exposure reduction framework along with proposals for laws, regulations and other incentives and guides for the Council of Australian Governments (COAG) endorsement by the end of 2014. The Department, however, considers it appropriate to assess the Proposal under the current air quality framework until such time that a new air quality framework is developed and endorsed.

Numerous submissions raised particulate matter in the smaller ranges of PM_1 and $PM_{0.1}$, as an area of interest and concern. The EA and Preferred Project Report state that there are no state, national or international standards for particles in this size range. The Preferred Project Report also notes that the modelling undertaken for $PM_{2.5}$ comprises all particulate matter less than 2.5 microns in aerodynamic diameter, including PM_1 and $PM_{0.1}$. In any case, it is accepted that coal dust is typically in the range of $PM_{2.5}$ to PM_{10}.

The Ambient Air Quality advisory reporting standards and goals for all assessed locations were considered. The results predict that the cumulative annual average and maximum 24 hour average $PM_{2.5}$ concentrations will be below the National Environment Protection (Ambient Air Quality) Measure reporting standards and goals.

The Department notes that the Proposal is predicted to meet relevant criteria in relation to air quality, The Department is satisfied that dust levels and other emissions would be at acceptable levels in terms of health risk to nearby sensitive receivers. The Department has recommended conditions that would ensure best practice dust mitigation measures are employed throughout the life of the project through monitoring, managing and reporting of impacts to air quality.

Standards and Guidelines

The use of standards and guidelines that may be out of date by the time the proposal would commence construction or are different to those used by the World Health Organisation were raised in submissions. Some expressed a concern that any increase in dust and particulate matter should be limited regardless of whether it is shown to comply with the current standards or guidelines. Submissions also raised concern that the Proposal may start construction after any revision of the standards is completed resulting in the proposal having less stringent goals or criteria than a future standard may allow.

The Department's assessment cannot predict what future standards might be implemented and can only assess the proposal against the current framework until any revision of the standards and goals is undertaken. The current standards and goals were developed to establish a nationally consistent framework for assessment, monitoring, reporting and management of air quality. The 'national environment protection standard' is a standard that consists of quantifiable characteristics against which environmental quality can be assessed, while the 'advisory reporting standards' (such as for $PM_{2.5}$) assess the results of monitoring for particles such as PM2.5. These standards do not have a timeframe for compliance associated with them.

The Department also notes and supports the Proponent's commitment to continuously improving dust management from its operations and to working with the EPA, industry and the community regarding regional dust issues. Further, the Proposal is a scheduled activity that will require either a new EPL or revision to an existing EPL and there are mechanisms in this process which allow EPA to impose a Pollution Reduction Program or change the pollution limits over time if justified.

Despite the above, should the Proposal be approved, the Department also considers that all reasonable and feasible mitigation measures should be implemented to minimise any increase in particulate matter. The Proponent's commitment to implementing a range of dust management measures during construction and

operation to manage dust impacts and continuously improving dust management in consultation with the EPA, industry and the community is also supported. The Department also recommends the imposition of a condition of approval to reflect this view.

5.3. Flora and Fauna

The Proposal will result in clearing of 273.3 ha of vegetation and associated impacts to threatened flora and fauna. To limit impacts the Proposal has been designed to avoid important breeding and habitat ponds, establish a green and golden bell frog corridor across the site Proposal, fund green and golden bell frog captive breeding, research and monitoring programs. To offset residual impacts the Proponent has proposed three offset locations at; Tomago (238 ha), Ellalong Lagoon (409 ha) and Brundee Swamp (204 ha).

Umwelt assessed the impacts of the revised Proposal upon biodiversity values, with specialist input provided by amphibian expert Gary Daly, Professor Michael Mahony, Associate Professor Ross Goldingay, Dr David Robertston, Dr Pia Laegdsgaard and Mr Phil Straw who independently reviewed parts of the assessment relevant to their fields of expertise. Ecological impacts will result from clearing and the subsequent habitat loss at the coal terminal site on Kooragang Island (the Proposal site), and the Tomago Offset Site where compensatory habitat for migratory shorebirds will be constructed. The Department has assessed the impacts at both sites. The impacts at the Proposal site are as a direct result of the construction and operation of the proposed coal terminal and would be on:

- habitat of threatened species including the green and golden bell frog and Australasian bittern;
- migratory shorebirds; and
- potential impacts upon the adjacent Hunter Wetlands National Park and Hunter Estuary Ramsar Site.

Impacts at the Tomago Offset Site result from works required to construct a series of shallow tidal lagoons designed to provide a range of conditions suitable for shorebird habitat and propagation of saltmarsh to offset the impacts of the Proposal. The Tomago Offset Site would be developed upon highly modified land and would require:

- removal of EECs, including 74 hectares of Swamp Oak Forest EEC; and
- alteration of already disturbed lands.

Proposal Site – Existing Environment

Extensive field surveys were conducted of the site and its surrounds at Kooragang Island. Surveys recorded:

- five vegetation communities;
- one endangered flora species - pondweed (*Zannichellia plustris*);
- two endangered ecological communities (EECs) (Coastal Saltmarsh EEC and Freshwater Wetlands EEC); and
- 20 threatened fauna species as listed under the TSC Act were identified within or flying over the proposal area including three threatened species co-listed under the EPBC Act (Australasian bittern (*Botaurus poiciloptilus*), green and golden bell frog (*Litoria aurea*), and the grey-headed flying fox (*Pteropus poliocephalus*)).

An additional 60 threatened species are likely to occur within 10 kilometres of the Proposal site. Sixty-one migratory species have been recorded within or flying over the Proposal site; 27 are listed in international treaties for migratory birds.

Proposal Site – Impacts

Habitat

Approximately 75 hectares of natural vegetation and habitat across the Proposal site would be cleared, 21.3 hectares of open water disturbed and a further 183.1 hectares of presently disturbed/modified land cleared or further modified. These are summarised in **Table 4.**

The Proposal is not expected to have an impact upon the floristic diversity of the region, however a population of the endangered flora species, pondweed (*Zannichellia palustris*) would be affected.

Table 4: Summary of vegetation and habitat areas to be cleared

Vegetation/Habitat type	Potential Suitable Habitat to be cleared	Total Area to be cleared (ha)
Natural vegetation/habitat	Green and golden bell frog	74.2
Coastal Saltmarsh (EEC under TSC Act)	18.1 ha Migratory Shorebirds	18.9
Mangrove forest		28.3
Freshwater Wetland (3.8 hectares EEC under TSC Act)	Green and golden bell frog Australasian Bittern	27.0
Open Water		**21.3**
Deep Pond	7.5 ha Migratory shorebirds	20.3
Other Disturbed/Modified land		**174.6**
Planted Areas		**3.2**
TOTAL		**273.3**

Threatened Species
The EA states that there would likely be an impact upon both the green and golden bell frog and the Australasian bittern if unmitigated. Furthermore, assessments of significance indicated potentially significant impacts on:

- Pondweed;
- Coastal Saltmarsh EEC;
- Curlew sandpiper;
- Red-backed button quail;
- White-fronted chat;
- Black-tailed godwit;
- Australian pied oystercatcher; and
- Eastern free-tailed bat.

Migratory Shorebirds
Collectively, 19 migratory species would likely be impacted by the Proposal. Loss or substantial modification to habitat for migratory shorebirds is likely to result from the removal of 7.5 hectares of mudflat at the northern area of Deep Pond as well as 18.8 hectares of saltmarsh habitat, including 2.3 hectares of Swan Pond. This would likely significantly impact 5 species that regularly use the habitats of Swan Pond and Deep Pond, being; Common greenshank; Curlew sandpiper; Marsh sandpiper; Red-necked stint; and Sharp-tailed sandpiper. Moderate impacts are anticipated on a further four species and low impacts on the remaining ten.

Hunter Wetlands National Park and Hunter Estuary Ramsar Site
The ecological values of the nearby Hunter Wetlands National Park and the Hunter Estuary Ramsar site are unlikely to be directly impacted by the Proposal. However, the close proximity of these to the Proposal area may result in some indirect edge effects. The rail embankment will block some tidal flow paths which may influence the tidal regime of wetlands to the north of the site within the national park. This is discussed further in **Section 5.5**.

Proposal Site - Department Consideration

The Department considers that the EA provides an adequate assessment of the construction and operational impacts of the Proposal on ecological values. The Proposal would directly affect ecological values through habitat clearing to construct the coal export terminal. The Proponent sought to avoid and minimise the impacts where possible, as summarised in **Table 5.** Where these actions were not practicable, prohibitive or insufficient, the Proponent secured three land based offsets to offset the residual impacts (refer **Table 6**).

The Proponent assessed alternative construction designs to avoid and minimise ecological impacts by avoiding OEH Wetland 1, Railway Road Pond and part of OEH Wetland 2. Whilst several rail designs were presented, no feasible options were found to avoid the southern portion of Swan Pond, an area located within the 'SP1 Special Activities' zone for industrial and port facilities. The Department is satisfied that the Proponent has explored feasible options to avoid impacts where possible. The Department endorses the actions proposed (**Table 5**) and has included conditions on the requirements of pre-clearance surveys and seasonal works particularly in relation to Deep Pond and Swan Pond, areas known to provide habitat to threatened species.

Table 5: Summary of biodiversity offset principles and Proponent actions

Principle	Action of the Proponent
Avoid	• Modification to the rail alignment to avoid OEH Wetland 1 – an important breeding pond and a key dispersal point for migratory birds between Kooragang and Ash Islands. • Modification to proposed Cormorant Road and Pacific National Access Road intersection to avoid impacts to Long Pond, which provides known green and golden bell frog habitat. • Alternative construction design reviewed to explore retention of green and golden bell frog habitat ponds at the northern extent of the proposed stockyard area. The option was determined to be cost prohibitive with a materially longer construction period.
Mitigate	• Minimising the impacts on the green and golden bell frog on Kooragang Island through the creation of an onsite green and golden bell frog habitat corridor to link known habitat across Kooragang Island and Ash Island. • Pre-clearance surveys and implementation of relocation procedures in all known green and golden bell frog habitat across the Proposal area. • Training in relation to the green and golden bell frog incorporated into the site induction process for all construction and operational staff. • Assessment (with relevant involvement by the University of Newcastle) of the need for a hygiene protocol similar to the DECC (2008) Hygiene Protocol for the Control of Disease in Frogs. If required, it will be incorporated into the ecological management plan and site induction procedure. • Feral animal and noxious weed control, including for the plague minnow (*Gambusia holbrookii*). • Funding a green and golden bell frog captive breeding program at the University of Newcastle. • Funding green and golden bell frog research/monitoring programs on Kooragang Island.
Offset	• Ellalong Lagoon – 409 hectares • Brundee Swamp - 204 hectares • Tomago Offset Site - 238 hectares Further details of the offsets are provided in **Table 6.**

Table 6: Biodiversity Offset Strategy

Site	Area (ha)	Location	LGA	Current Zoning	Conservation Target/Species
Ellalong Lagoon (See **Figure 13**)	409	40 kilometres west of Proposal site	Cessnock	RU2 - Rural landscape and E2 – Environmental Protection under the *Cessnock Local Environment Plan (LEP) 2011*	• Freshwater Wetland EEC (~34.5 hectares) • Drought refuge for water bird species • Conservation of threatened and migratory species recorded in the T4 project area
Brundee Swamp (See **Figure 14**)	204	250 kilometres south of the Proposal site; same bioregion.	Shoalhaven	Current: 'rural' under the *Shoalhaven Local Environment Plan (LEP) 1985* Draft: 'RU2 – Rural Landscape' and 'E3 – Environmental Management' under the *Draft Shoalhaven Local Environment Plan 2013*	• Green and golden bell frog within the Sydney Basin bioregion • Habitat for the Australasian bittern • Freshwater Wetland EEC (~160 hectares)
Tomago Offset Site (See **Figure 15**)	238	10 kilometres north of Newcastle CBD and immediately north of the Proposal site	Port Stephens	E2 Environmental Conservation under the *State Environmental Planning Policy (Major Development) 2005*	• Estuarine and freshwater vegetation • Habitat for the Australasian bittern • Freshwater Wetland Endangered Ecological Community (EEC) (~11 hectares) • Creation of migratory shorebird habitat • Coastal Saltmarsh EEC (target of ~100 hectares) • Estuarine habitat restoration program.

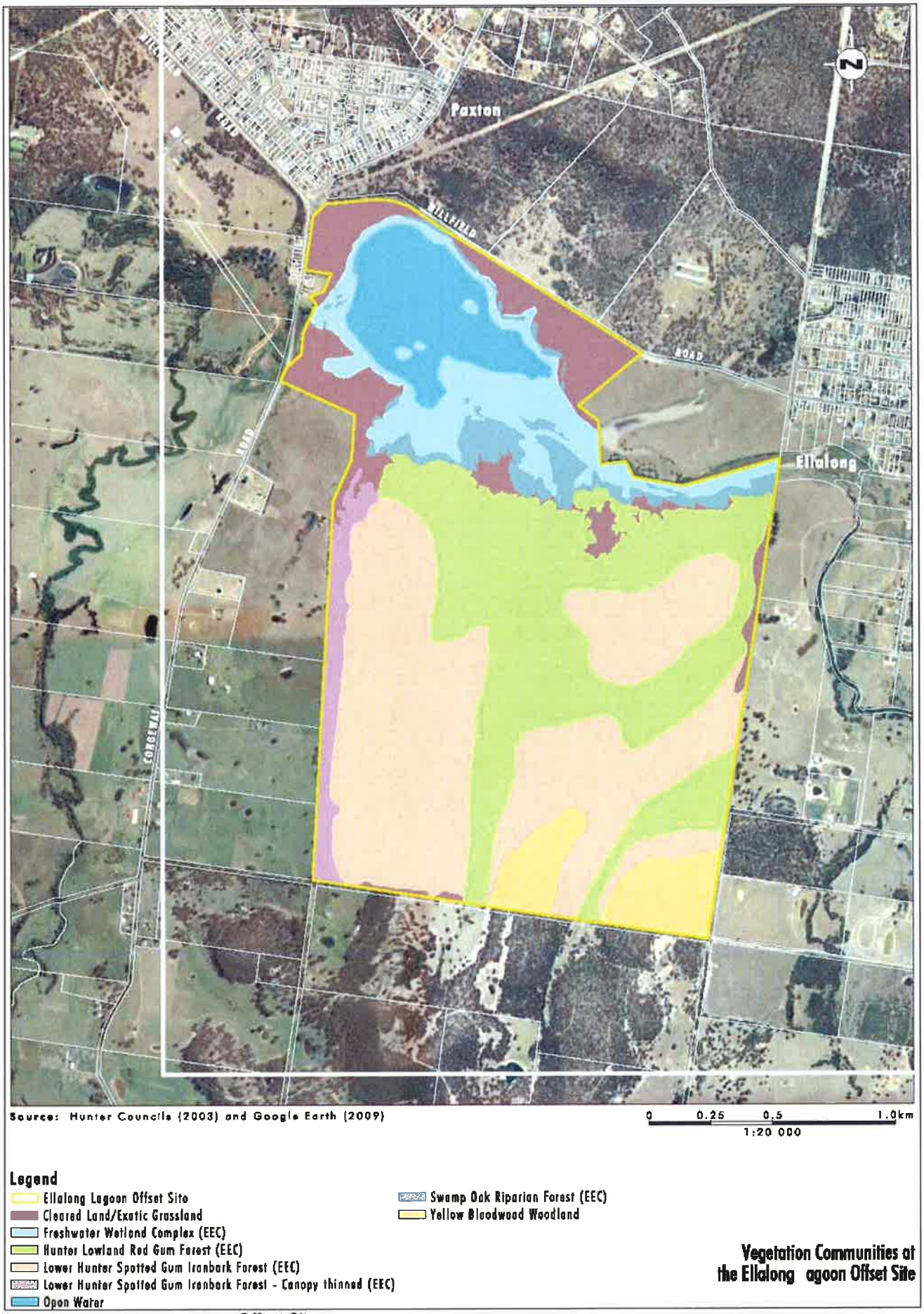

Figure 13: Ellalong Lagoon Offset Site

Figure 14: Brundee Swamp Offset Site

Figure 15: Tomago Offset Site – Concept Plan

Biodiversity Offset Strategy

The Biodiversity Offset Strategy aims to result in no net loss of ecological values as a result of the Proposal in the medium term, and a probable net gain in habitat area in the longer term. The Biodiversity Offset Strategy includes three land-based areas; Ellalong Lagoon, Brundee Swamp and the Tomago Offset Site. A summary of the areas, approximate locations and targeted species is provided within the following section and a summary in **Table 6.**

Despite the distances from the Proposal site, all three of the proposed offsets are located within the Sydney Basin Bioregion which extends from Batemans Bay in the south to Nelson Bay in the north and almost as far west as Mudgee. Bioregions are relatively large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems. These are linked to fauna and flora assemblages and processes at the ecosystem scale.

PWCS has purchased the offset site known as Ellalong Lagoon. Ellalong Lagoon is predominantly freshwater wetland and is known to provide habitat for water birds and the Green and Golden Bell Frog. It is recognised as a Wetland of National Significance in the Directory of Important Wetlands in Australia (Environment Australia, 2001). The area provides habitat for fauna during vulnerable stages of the life cycle and is considered an important drought refuge. Conservation of the Ellalong Lagoon would protect a number of EECs and species impacted by the Proposal, by protecting the site from development. Whilst the Ellalong Lagoon site does not contribute significantly to offsetting credits generated for the Proposal, the Department considers the addition of the site to the offset package for the Proposal to provide a substantial, regional conservation gain. Its location ensures available habitat within close to the direct impacts of the Proposal.

The Brundee Swamp Offset Site was targeted as an offset primarily for the Green and Golden Bell Frog. The Brundee site also conserves known, high quality habitat of the Australasian bittern. It has high conservation value given its location in the Sydney Basin Bioregion and adjoins the Brundee Swamp Nature Reserve, which is managed by NSW National Parks and Wildlife Service for conservation purposes. The Brundee Swamp offset site is located approximately 250 kilometres south of the Proposal but within the Sydney Basin Bioregion. Location in the same bioregion as the impact site is rated highly by both the Office of the Environment and Heritage and Department of the Environment frameworks for establishing biodiversity offsets. The Department considers that conserving the Brundee Swamp Offset Site would result in the protection of an environmentally valuable area and result in an increase in available habitat for two threatened species, the Australasian bittern and Green and Golden Bell Frog, both protected under NSW and Commonwealth legislation.

The Department of the Environment had initial concerns that the proposed offset package would not be commensurate with the impact upon Green and Golden Bell Frog and the Australasian Bittern as calculated using the EPBC Act Environmental Offsets Policy. Additional information from the Proponent demonstrated to the Commonwealth that the offsets proposed would provide the minimum 90 percent in direct offsets.

The NSW Office of the Environment and Heritage (OEH) indicated that the proposed Biodiversity Offset Strategy represents commensurate vegetation, species and habitat, if not better than those found across both the Proposal site and the Tomago Offset Site when using the NSW BioBanking Assessment Methodology and Credit Calculator Operational Manual (OEH, 2011). The Department accepts that the Proponent has amended the Proposal to avoid and minimise impacts upon biodiversity (refer **Table 5**) and considers that the offset package for all residual impacts meets the requirements of NSW biodiversity offset guidelines.

Green and golden bell frog on site measures

The green and golden bell frog (*Litoria aurea*) is listed as endangered on the *Threatened Species Conservation Act 1995* and vulnerable on the EPBC Act. The green and golden bell frog was one of the most common frogs in Australia, present in vast numbers along the east coast, but has become one of the most threatened as a result of habitat loss, predation and the chytrid fungus. The green and golden bell frog has been repeatedly and extensively recorded within the Proposal area noting that the area is reclaimed land.

The Department considers that the proposed Biodiversity Offset Strategy is generally consistent with the objectives of the *Draft Recovery Plan for Green and Golden Bell Frog Litoria aurea* (DEC, 2005). The objectives of the recovery plan and the actions that address these are presented within **Table 7.**

The Commonwealth Department of the Environment initially raised concerns regarding the magnitude of impact on the local green and golden bell frog population and the potential isolation of any individuals in the wetland to the north of the Kooragang coal terminal rail loop. The Department and OEH note that the

Proponent has undertaken works to avoid impacts upon the species where possible and provided an offset package considered adequate to address residual impacts.

The green and golden bell frog population on Kooragang Island is the largest known population in the Hunter region and one of the largest remaining known populations across its distribution. Investigations indicate that the green and golden bell frog uses the Proposal site for breeding, dispersal, foraging and shelter. The Proponent has committed to designing a green and golden bell frog corridor across Kooragang Island to provide commensurate habitat features to those that will be lost and has redesigned aspects of the original Proposal in the PPR to avoid and minimise impacts, particularly around the proposed rail infrastructure. These include realigning the rail tracks to avoid OEH Wetland 1 (refer **Table 5**).

The Department acknowledges the importance of conserving the green and golden bell frog *in situ* and supports the approach to establish a green and golden bell frog corridor across the site. The Proponent has committed to designing the corridor using the best available information drawn from its own research and knowledge from other local projects. These include rehabilitation programs in the Hunter Wetlands National Park and the success of the habitat creation at Sydney Olympic Park where the original population has been conserved and two new self-sustaining sub-populations established. Furthermore, the Proposal will build upon knowledge obtained from the current trial ponds installed on site in 2012 where ongoing occupation and evidence of breeding has been recorded (data collected in January 2014).

Table 7: Objectives of the green and golden bell frog recovery plan and actions of the Proponent

Overall Objective	Action
Increase the security of key Green and Golden Bell Frog (GGBF) populations by preventing further loss of habitat at key populations across the species range and where possible secure opportunities for increasing protection of habitat areas.	Consolidation of 5 separately owned land parcels in Brundee and conserving these known areas of habitat in perpetuity with the intent to transfer the consolidated site to an appropriate land manager (i.e. NPWS).
Ensure extant GGBF populations are managed to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species.	The Proponent has committed to the provision of habitat at the Proposal site at all times during construction and would commence works on the habitat corridor linking known habitat as soon as practicable to provide the existing population suitable habitat. The Proponent is currently funding research.
Implement habitat management initiatives informed by data obtained through investigations into biology and ecology of the GGBF.	Trials are currently ongoing across the Proposal site to assess the success of constructed habitat.
Establish, within more than one institution, self sustaining and representative captive populations (particularly 'at risk' populations) for the purpose of maintaining 'insurance' colonies for re-establishment and supplementation of populations of the species.	The Proponent has committed to funding a captive breeding program in association with NCIG, undertaken by the University of Newcastle to supplement the wild population. The Proponent is funding research into the population for the Kooragang Island population.
Increase the level of regional and local awareness of the conservation status of the frog and provide greater opportunity for community involvement in the implementation of this recovery plan.	The Department is recommending a condition that the Proponent develops signage at the entry to the Hunter Wetlands National Park and at any onsite office building that details the work into the conservation of the frog to raise awareness amongst the community.

The Commonwealth and OEH support development of the habitat corridor subject to further refinements. Both agencies require some areas presently inhabited by the green and golden bell frog to be maintained during the construction of the corridor to provide refuge for any frogs that become displaced during construction. The Department concurs with this position and recommends a condition requiring works to be developed in consultation with both agencies and staged to maintain some known functioning habitat until the full establishment of the corridor. This may include the installation of temporary habitat (i.e. similar to the current trial ponds), however the success of these areas should be demonstrated before removing all known inhabited areas across the Proposal site. The management of this process would be outlined in an Onsite Green and Golden Bell Frog Management Plan which would include success criteria, how the corridor would be managed during operations and strategies for its improvement, where required. The Commonwealth has recommended that the Proponent extend this connection to the water treatment ponds within the KCT rail loop and any individuals that may use them. As such, the Department has recommended a condition that requires the extension of the corridor between the KCT rail loop and the proposed onsite habitat corridor.

Figure 16: Onsite Trial Pond

Green and golden bell frog off site offset

To further conserve the green and golden bell frog, the Proponent secured an agreement to purchase land adjoining the Brundee Swamp Nature Reserve (Brundee Swamp Biodiversity Site) as an offset site. The Brundee Swamp Biodiversity Site has high conservation value due to the presence of a large green and golden bell frog population and its location adjoining the Brundee Swamp Nature Reserve. The OEH has indicated that the bulk of species credits for the green and golden bell frog would be generated from this offset site using the *NSW BioBanking Assessment Methodology and Credit Calculator Operational Manual* (OEH, 2011). Conversely, this offset site would not generate sufficient credits to adequately offset the impacts when assessed using the EPBC Act Environmental Offsets Policy (October 2012) as:

- the green and golden bell frog habitat at Brundee Swamp is already high quality; and
- the Commonwealth considers there is a low risk of habitat loss due to current/future zoning of the land.

The Department notes that the current zoning of the Brundee Swamp Biodiversity Site is 'rural' under the Shoalhaven Local Environment Plan 1985 which would be changed to 'RU2 – Rural Landscape' and 'E3 – Environmental Management' if the Draft Shoalhaven Local Environment Plan 2013 is adopted. Five separate landholders currently own the Brundee Swamp Biodiversity Site. The Department considers that the existing division of the land increases the risk of fragmentation of the green and golden bell frog population. The Proponent has obtained in-principle agreement with these landowners to purchase and consolidate the parcels with the intent of long-term conservation, to be ultimately managed by the National Parks and Wildlife Service. This provides for conservation of a known population of the green and golden bell frog, as well as conserving known habitat for the Australasian bittern and Freshwater Wetland EEC.

Given the range of uses that would be permissible under the RU2 and E3 draft zoning (such as airstrips, depots, freight facilities, extensive agriculture and water supply systems), the Department is of the opinion that the zoning alone would not provide a level of protection that would ensure protection of the species at this locality beyond the foreseeable future. Securing and consolidating the land parcels as an offset provides significant benefits to the existing known green and golden bell frog population. This includes reducing the

risk of habitat loss through other development and maintaining connectivity to an existing area of conservation - the Brundee Swamp Nature Reserve.

The OEH considers the measures outlined to offset the impacts on the green and golden bell frog and the offset areas proposed would likely provide commensurate compensatory habitat to that being impacted as a result of the Proposal. That is, the measures proposed would essentially provide a 'like for like' biodiversity conservation offset based on the provision of similar (i.e. vegetation types and species) and appropriate numbers of 'ecosystem' and 'species' credits'. To ensure the continued conservation of the area, the Department recommends a condition that requires ongoing consultation with the Commonwealth Department of the Environment, OEH and Council for continued monitoring of the population and ensure the area is appropriately zoned, managed and conserved in perpetuity

Green and golden bell frog research and captive breeding

A further measure to manage impacts on the green and golden bell frog is to fund a captive breeding program in association with NCIG. The objective of the breeding program would be to supplement the wild population and monitor and assess the effectiveness of created habitat. The Department supports the Proponent's approach to providing an integrated approach to the management of green and golden bell frog across Kooragang Island. The Department recommends a condition that requires the Proponent to develop an Integrated Kooragang Island Green and Golden Bell Frog Management Plan, in consultation with adjoining stakeholders, the OEH and Commonwealth Department of the Environment to consolidate resources and implement collective management measures and strategies to maintain the viability of the green and golden bell frog on Kooragang Island.

Australasian bittern

The Australasian bittern is endangered under both the *Threatened Species Conservation Act 1995* and the EPBC Act. The species has been in decline across its range, predominantly because of modification and degradation of its habitat. It is able to adapt by also using ephemeral freshwater wetlands, however drought further reduces available habitat and can also affect this population. The species is known to use similar habitat to the green and golden bell frog for some life stages (i.e. freshwater/brackish waterbodies, ephemeral, with aquatic plants). The impacts upon known Australasian bittern habitat across the Proposal area would be significant (if unmitigated or not offset) with complete removal of suitable habitat at the Proposal site consisting of foraging, roosting and potential breeding habitat as shown in **Table 4**. Components of the proposed offset strategy aim to manage these impacts, being:

- development of the Tomago Offset Site;
- creation of the green and golden bell frog habitat corridor across Kooragang Island; and
- the Ellalong Lagoon offset site.

The conceptual design of the Tomago Offset Site would include conservation of 11 hectares of Freshwater Wetland EEC and the construction of a series of shallow tidal lagoons designed to provide a range of conditions suitable for shorebird habitat and propagation of saltmarsh. The Commonwealth Department of the Environment has recommended that offsets for the Australasian Bittern be located within an area occupied by the population. The Tomago Offset Site will support known habitat for the Australasian bittern within close proximity (2 kilometres north) to the habitat that will be lost at the Proposal site. The Preferred Project Report (Appendix J) states that the species has been recorded in freshwater wetland habitat of the Tomago Offset Site on three occasions (2 sightings and 1 heard calling). The concept proposal for the construction of the shallow tidal lagoons at the Tomago Offset Site would provide additional areas that would provide habitat suitable for the Australasian bittern.

To further support the suitability of the Tomago Offset Site for the development of the proposed concept design the Department accepts that before the infiltration of the Swamp Oak, the Tomago Offset Site would have likely been an area of saltmarsh habitat – a preferred habitat type for the Australasian bittern. The restoration of this area aims to restore saltwater inflows and a mosaic of lagoons and vegetative structures, including saltmarsh, which would be beneficial to this species.

Whilst the proposed Tomago Offset Site is not known to support a viable population of the Australasian bittern at this time, it would be designed to support comparable habitat features to those within the adjoining Hunter Wetlands National Park and Hunter Estuary Ramsar site, from where the species has been recorded. The Department supports detailed design of the Tomago Offset Site in consultation with government agencies and has included a condition to this effect requiring consultation with, the Commonwealth Department of the Environment, OEH, NSW Fisheries, CMA (Hunter-Central Rivers), Port Stephens Council and peer review by a qualified ornithologist. To ensure that the Tomago Offset Site does provide appropriate habitat that is utilised by the species, the Department has recommended a condition requiring the Proponent

to undertake (or obtain results of) on-going ecological studies and migratory bird monitoring in and around Deep Pond and Swan Pond, to investigate bird behaviour and to document any changes to the population.

The similar habitat requirements of the Australasian bittern and the green and golden bell frog indicate that parts of the proposed onsite green and golden bell frog habitat corridor (~4.7 hectares) would likely also provide habitat suitable for the Australasian bittern. Additionally, the Ellalong Lagoon offset site, 40 kilometres west of the Proposal, provides a further 35 hectares of Freshwater Wetland EEC and a potential drought refuge for the Australasian bittern and other waterbirds. Whilst further removed, the Brundee Swamp site would conserve 135 hectares of known Australasian bittern habitat.

The Department is satisfied that the Tomago Offset Site and the onsite green and golden bell frog corridor would minimise and offset the impacts of the Proposal upon the Australasian bittern and that Ellalong Lagoon and the Brundee Swamp Biodiversity Site would conserve areas of suitable habitat for this species. Conditions have been recommended for the Tomago Offset Site and onsite green and golden bell frog corridor be designed in consultation with the Commonwealth Department of the Environment, OEH and Councils.

Migratory shorebirds

The proposed coal terminal would directly impact upon both Deep Pond (23 hectares) and adjacent Swan Pond – areas utilised by migratory shorebirds, some threatened and protected by international conventions. Measures were incorporated into the design considered in the EA to avoid impacts and approximately three hectares of open water habitat at the southern end of Deep Pond will be retained. Furthermore, the proposed green and golden bell frog corridor would mitigate the impacts across the site as the installation of freshwater wetland habitats has the potential to provide refuge for shorebirds in the area. Where impacts upon migratory shorebirds could not be avoided or mitigated, the Tomago Offset Site is intended to address these impacts. The Tomago Offset Site would include the construction of a series of lagoons to provide alternative habitat for migratory shorebirds impacted by works at the Proposal site on Kooragang Island.

The Department is satisfied that where impacts upon migratory shorebirds could not be avoided or minimised, they have been mitigated and offset through the installation of the habitat corridor across Kooragang Island and the development of the Tomago Offset Site. The Commonwealth acknowledged that the Tomago Offset Site may provide an acceptable offset for impacts to migratory shorebirds and indicated that this offset would need to be functioning prior to construction commencing at the Proposal site which would affect shorebird habitat. The Department has included a condition requiring the Proponent to have documented evidence of the successful operation of the Tomago Offset Site prior to commencement of construction of the facility at Kooragang.

Hunter Wetlands National Park and the Hunter Estuary Ramsar Site

The Commonwealth Department of the Environment also indicated that any alteration to the migratory shorebird population in the area of the Proposal could result in the Limits of Acceptable Change for the adjacent Ramsar site being exceeded. This has the potential to impact upon the values for which it was initially nominated as a significant wetland site.

The Ecological Character Description of the Hunter Estuary Ramsar describes the site at the time of its listing (listed as part of the Hunter Wetlands Centre Australia in 2002). The site was reassessed in 2010 and identified that the wetland would meet criteria 2, 4 and 6:

- Criterion 2 – on wetland bird species (Australasian bittern; *Botaurus poiciloptilus*), listed as Endangered under both the EPBC Act and on the IUCN Red List (Version 2009.1), a fish species (Estuary Stingray; *Dasyatis fluviorum*) listed as vulnerable on the IUCN Red List (Version 2009.1) and a frog (green and golden bell frog; *Litoria aurea*) listed as Vulnerable on the EPBC Act have been recorded within the Kooragang component;
- Criterion 4 – the Kooragang component is an important foraging and roosting site for migratory shorebirds, and supports waterbirds at critical stages in their life cycles, including breeding, migration stop-over, roosting and drought refuge; and
- Criterion 6 – The Kooragang Island component regularly supports more than 1% of the East Asian-Australasian Flyway population of the eastern curlew (*Numenius madagascariensis*) and more than 1% of the Australian population of red-necked avocets (*Recurvirostra novaehollandiae*).

The 2010 reassessment highlights threats to the site and that the Limits of Acceptable Change for migratory shorebird numbers and saltmarsh habitat have been exceeded, the latter as a result of mangrove forest intrusion. The reassessment did not determine if the limits of acceptable change for the green and golden bell frog were exceeded, as no information was available at the time.

One of the objectives of the Tomago Offset Site is to reintroduce additional saltmarsh habitat close to the Ramsar site to ensure a continued refuge for migratory shorebirds and prevent swamp oak incursion. The Tomago Offset Site would be designed to provide habitat for migratory shorebirds. The reassessment of the Ramsar site indicates that this criterion has already been exceeded. The Department considers that the establishment of the nearby Tomago Offset Site would provide adjacent habitat for migratory shorebirds, whist potentially halting further decline in population numbers in the Ramsar site.

The green and golden bell frog has been recorded in the southern portion of the Hunter Wetlands National Park, however it was not recorded during surveys for the EA in 2010/2011 and the habitat present is considered limited; isolated from the north by unsuitable estuarine habitat and to the south by development on Kooragang Island. If individuals remain in the southern area of the National Park adjoining the Proposal, they would need to traverse a distance likely greater than the 500 m across KCT and various infrastructure to reach the Proposal site. The Proposal would not result in any additional physical barriers that would inhibit this movement. The Department, in conjunction with the Commonwealth Department of the Environment has included a condition to provide habitat connectivity between the National Park and Ash Island through the onsite green and golden bell frog corridor and also requires that additional artificial habitat be installed between the KCT rail loop and Trench Pond (parallel to Pacific National Access Road). This additional habitat would provide habitat connection for green and golden bell frogs utilising habitat, if available, within the National Park.

The Proposal does not include direct activities in the National Park or Ramsar site with the exception of reinstating an estuarine channel through the levee at the Eastern Watercourse (as flows would likely be impacted as a result of the rail embankment). These works would assist in maintaining the existing tidal regime to the wetlands to the southern end of the Eastern Watercourse. Potential edge effects to the Hunter Wetlands National Park would be managed by implementing measures to control lighting, noise, dust, surface water flows and groundwater contamination.

Whilst the Commonwealth's concern regarding the Limits of Acceptable Change is acknowledged, the Department does not believe that the works in the area of the Hunter Estuary Ramsar would directly impact the size, extent, connectivity or dispersal capacity of migratory birds or the green and golden bell frog such that the Limits of Acceptable Change would be compromised. Furthermore, the Tomago Offset Site has the potential to limit further decline in population numbers within the Ramsar site.

Conclusion

The Department has considered all submissions received concerning ecological values including those from the Commonwealth Department of the Environment, OEH, NSW Fisheries, CMA (Hunter-Central Rivers), Port Stephens Council, community organisations and the public. The Department understands that a robust monitoring program is critical to assess the effectiveness of the Biodiversity Offset Strategy. The Proponent has committed to managing and monitoring the three offset sites to maintain or improve the biodiversity values in the medium to long term and the viability of threatened and migratory species and communities affected by the Proposal. The Department supports this approach and recommends a condition that a Compensatory Habitat and Ecological Management Plan be developed in consultation with the Commonwealth Department of the Environment, OEH, CMA (Hunter-Central Rivers), NSW Fisheries and Port Stephens Council. To ensure that impacts of the Proposal would be appropriately offset, the Department requires the Proponent to finalise the design, construct and have documented evidence of the successful operation of the Tomago Offset Site before the commencement of construction at the Proposal site.

Tomago Offset Site – Existing Environment

The Tomago Offset Site currently supports:

- seven vegetation communities (including three EECs);
  - Swamp Oak Floodplain Forest;
  - Coastal Saltmarsh;
  - Freshwater Wetlands on Coastal Floodplains; and
- nine threatened fauna species.

The NSW Wildlife Atlas database and Department of the Environment Protected Matters Search Tool show that 79 threatened species are likely to occur within 10 kilometres of the Tomago Offset Site. Further, five migratory and marine species listed on international conventions have been recorded on the databases. There is also known to be an active white-bellied sea eagle nest.

Tomago Offset Site – Impacts

Works at the Tomago Offset Site are proposed to develop an estuarine wetland to provide alternative habitat for migratory shorebirds and other estuary dependant species. Approximately 140 hectares of shorebird habitat including mudflats, saltmarsh and island roosts would be created after clearing the following existing vegetation types:

- 74 hectares of Swamp Oak Forest EEC;
- 15 hectares of Freshwater Wetland EEC;
- 0.025 hectares of Coastal Saltmarsh EEC; and
- 68 hectares of disturbed land.

The Tomago Offset Site is highly modified. The Swamp Oak Forest EEC present would not naturally occur on site, is result of human-induced influences including land reclamation, levee construction and drainage which have altered the natural landscape. The proportion of Swamp Oak Forest EEC to be cleared to develop the Tomago Offset Site, approximately 74 hectares, is approximately 2.3 per cent of the broader local extant area of the community (Scientific Committee Determination, 2004 within EMGAMM, 2013). The Proponent considered the local significance of the area to be cleared to be relatively low as it:

- is considered heavily degraded and in poor condition;
- does not provide a winter feed tree source for arboreal mammals and birds;
- does not provide connectivity for fauna in an otherwise cleared landscape; and
- is not considered important for maintaining a healthy native seed bank.

The key objective of the proposed works is to restore the area to a pre-European condition, reflecting what would have been without any anthropogenic influence present:

- including up to 100 hectares of saltmarsh habitat;
- approximately 11 hectares of Freshwater Wetlands EEC;
- approximately 21 hectares of extant, high quality Coastal Saltmarsh EEC; and
- 47 hectares of mangrove habitat.

Tomago Offset Site – Department Consideration

The ecological context of the Tomago Offset Site, in conjunction with its location and existing condition, indicates its suitability for restoration. The concept design was developed by the Proponent in consultation with shorebird, saltmarsh and wetland rehabilitation specialists. The Department's and OEH's assessment of the design indicates that the Tomago Offset Site can achieve appropriate environmental outcomes, potentially providing a net conservation gain and function as intended. This is because a restored habitat would provide improved habitat for a greater range of threatened species.

The Department notes that the design would be refined following further consultation and detailed site investigations. This approach is supported. It is recommended that the further consultation and review include, but not be limited to, the Commonwealth Department of the Environment, OEH, NSW Fisheries, CMA (Hunter-Central Rivers) and Port Stephens Council and input from a qualified ornithologist.

Both OEH and the Department consider that the improved ecological value in both a local and regional context would outweigh the potential impacts upon the area. The impacts on the Tomago Offset Site are not considered significant in the context of the local area. Further, there are not expected to be significant impacts upon EECs, threatened or migratory fauna, flora or other Matters of National Environmental Significance, and the Department supports this outcome. The Department is confident that restoration of tidal influences to the area would provide a measurable conservation gain in an area that has been altered significantly over time.

The Department received a submission from Hardie Holdings concerning the Tomago Offset Site raising issues in relation to the ownership of the land and suggesting that the land may have already been taken into account for other projects for offset purposes, including the Redlake Enterprises Industrial Estate (MP07_0086) project. The submission effectively suggests that utilising the site as part of an offset package for the Proposal would amount to 'double-dipping'. The Department does not accept that position.

By way of background, the Tomago Offset Site has been historically used for agricultural purposes and was owned by Tomago Aluminium, forming part of the environmental buffer for its aluminium smelter on the northern side of Tomago Road.

The site was acquired by the NSW Government in 2003 and rezoned via State Environmental Planning Policy No 74 – Newcastle Port and Employment Lands (SEPP 74) to enable development of a steel mill and

associated infrastructure. However, the construction of the steel mill did not proceed and the Regional Land Management Corporation Pty Ltd (RLMC) later acquired the site.
In 2006, the then Minister for Planning entered into a Memorandum of Understanding (MOU) with the then Minister for the Environment and the RLMC regarding the Tomago Offset Site and other land., The MOU was formally abandoned by the Minister for Planning in 2011. As such, the MOU and representations regarding the MOU are not considered relevant to this determination.

Following the repeal of SEPP 74 in June 2007, the land was declared a State Significant Site, known as the Tomago Industrial Site under State Environmental Planning Policy (Major Development) 2005 (MD SEPP). The MD SEPP formalised the industrial zoning identified in SEPP 74 and broadened the permissible uses to allow other types of industry. The MD SEPP also formalised the environmental conservation zone of the adjacent 241 hectare land parcel, known as the Tomago Offset Site. The Proponent now owns the Tomago Offset Site.

The Redlake Enterprises Industrial Estate Project is located to the north of the Tomago Offset Site. At the time the Redlake project was being considered, it proposed removal of 5.35 hectares of Swamp Oak EEC and 15.5 ha of Coastal Saltmarsh. The Director General's assessment report for that project noted that, amongst other things, the Swamp Oak EEC was considered to have low conservation value due to its isolation and lack of connectivity, whereas the Coastal Saltmarsh EEC was considered to have high conservation value. Further, the Department notes that specific conditions of approval were ultimately imposed in relation to Coastal Saltmarsh, essentially requiring saltmarsh to be avoided. However, no specific conditions were imposed in relation to offsetting the Swamp Oak EEC at the Tomago Offset Site. In any case, dedication of some 241 hectares would significantly exceed of the offset required for the impact of removing 5.35 hectares of Swamp Oak EEC.

Furthermore, no works were proposed to improve the conservation value of the Tomago Offset Site in response to the Redlake project. In contrast, the Department notes that PWCS' Proposal involves significant restoration and rehabilitation works at the Tomago Offset site. In considering the suitability of the Tomago Offset Site proposal, there would be a greater conservation gain than any previous use of the site as no previous proposal intended to further improve its conservation value. Furthermore, to increase assurance that the development of the Tomago Offset Site would result in a conservation gain, the Department has imposed a number of conditions of approval to ensure appropriate values are conserved.

The Department considers that continuing development pressure and ongoing impacts on habitat across Kooragang Island and at Tomago is likely to result in continued impact on ecological values, including migratory shorebirds. In response, PWCS' proposal is to create habitat in an area that is currently in decline. The works proposed within the Tomago Offset Site aim to restore Coastal Saltmarsh EEC, lagoons and mudflat habitat to a state from which they would have naturally occurred prior to European disturbance. The Department considers the benefits anticipated from restoring this area would outweigh the impacts anticipated, as the impacts would be on an already highly altered area.

In summary, the Department considers the site to be unencumbered and suitable for use for the development of an offset. In the circumstances, the Department is satisfied that the benefits of the Biodiversity Offset Strategy proposed by PWCS would result in an appropriate and measurable conservation gain at the Tomago Offset site.

5.4. Contamination

Contamination - Soil and Groundwater

The Proposal would be located on land with history as an industrial waste disposal area for contaminated waste by numerous port and heavy industry projects. Groundwater and contamination impacts were assessed by Douglas Partners and independently reviewed by Dr Noel Merrick (groundwater) and Dr Bill Ryal (contamination). The Proponent proposes to implement a range of remediation and rehabilitation measures to limit offsite migration of contaminants. These would be confirmed by a Site Auditor engaged to confirm the applicability of the proposed measures to prevent or minimise impacts to human health and the environment.

Site Status

Historical use of the site has been as a waste or disposal area for contaminated material, substances and general refuse associated with past activities of nearby industry and the port. The Proposal would be partly constructed on three licensed landfill areas (refer **Figure 17**):

- Areas A and B - part of the Kooragang Island Waste Emplacement Facility (KIWEF) owned by Hunter Development Corporation;
- Area C – Delta Electrolytic Manganese Dioxide (Delta EMD) owned by PWCS; and
- Area D – Fines Disposal Facility (FDF) owned by PWCS.

Key contaminants of concern within the Proposal area include:

- polycyclic aromatic hydrocarbons in ponds 5 and 7;
- lead and asbestos dust in area K7; and
- aluminium and hydrocarbons in the Site D (FDF).

Elsewhere on site there are localised contamination 'hot spots' and the potential for acid sulfate soils above 10 m Newcastle Harbour Tide Gauge. The proposed rail and utility corridor in Site E and the southernmost portion of Site B have not been used for waste emplacement activities and are unlikely to be contaminated, however, one groundwater monitoring well (K12/1W near Site E) has recorded occasional polycyclic aromatic hydrocarbon spikes in the past, the last in 2005.

Contamination management on site is currently regulated by an Environment Protection Licence Surrender Notice held by Hunter Development Corporation for the Kooragang Island Waste Emplacement Facility (Surrender Notice #1111840) and two Environment Protection Licences held by Port Waratah Coal Services for the Fines Disposal Facility and Delta EMD Sites (Licence Numbers 5022 and 7675).

Landfill Closure Plans have been developed for the Kooragang Island Waste Emplacement Facility and the Delta EMD landfills (see **Table 8** for status). A Landfill Closure Plan is required as part of the process of surrendering the Environment Protection Licence for that landfill and is to be prepared and lodged with the EPA for approval in accordance Section 76 of the *Protection of the Environment Operations Act 1997* and Section 59 of the *Waste Minimisation and Management Act 1995*. A Landfill Closure Plan generally provides for the stabilisation of the landfill, suitably manages any remnant human health or environmental risks and provides for future beneficial use of the site.

The Proponent has prepared and included in the *Response to Submissions and Preferred Project Report* a Remediation Action Plan (RAP) based on pre-detailed design and an integrated Landfill Closure Plan that integrates the plans required for the three landfill sites. Key areas of contamination within the Proposal area will be managed or remediated through the implementation of the Remediation Action Plan (to be updated following detailed design) and a Landfill Closure Plan to integrate construction of the Proposal with the management of contamination and closure of the landfill areas.

The Remediation Action Plan documents propose measures to manage the risks associated with the site specific contamination issues and the additional loads and constraints due to construction that could render ineffective the proposed capping strategies completed as part of the individual Landfill Closure Plans.

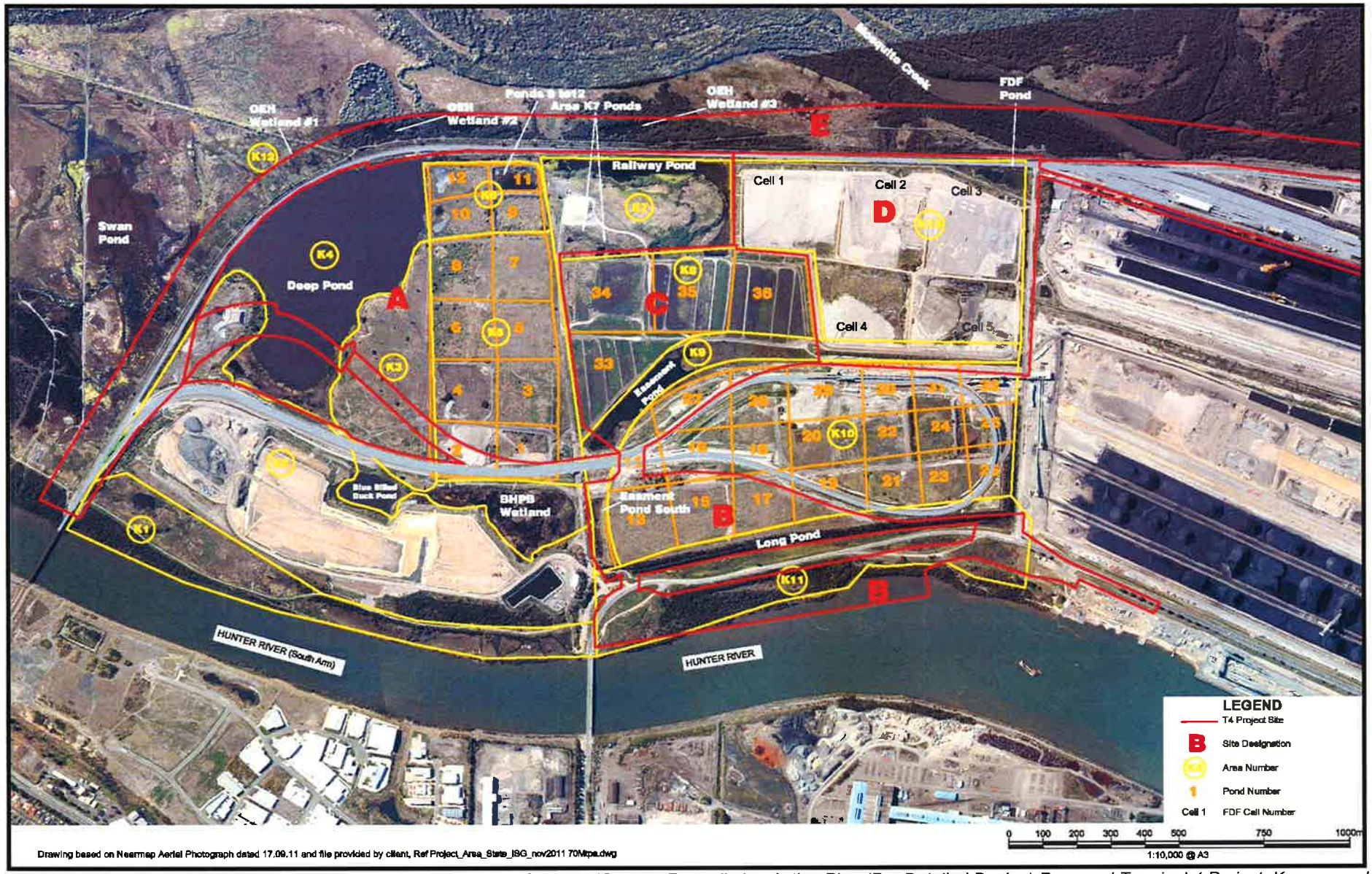

Figure 17: Locations of waste disposal cells and surface water features (*Source: Remediation Action Plan (Pre-Detailed Design) Proposed Terminal 4 Project, Kooragang Island (Douglas Partners, May 2013)*)

Table 8. Status Landfill sites

Site	Ownership	Status of landfill
Kooragang Island Waste Emplacement Facility (see **Figure 18**, includes Sites A and B and areas outside of T4 footprint)	Hunter Development Corporation	This site was in operation from 1972- 1999. Surrender of Environmental Protection licence Notice – 1111840 as varied has been issued. Surrender notice requires works to: • Area 1 (around K2 and K10 North) to be completed by 31 December 2014 • Areas 2 and 3 (includes areas K3 and K10 south and areas outside of the T4 Proposal) to be completed by 30 June 2017 The surrender notice also allows works to be completed in synergy with the construction of Terminal 4 if approved. This is discussed further below.
Delta Electrolytic Manganese Dioxide (Site C)	Port Waratah Coal Services	This site was in operation from 1989 – 2009. Environment Protection Licence 7675 applies to the site. The licence was varied in 2011 to include reference to the approved Landfill closure plan requiring the final cap to be constructed and installed in accordance with the *Technical Specification – Kooragang Island EMD Facility Capping Works* and the *Construction Quality Assurance Plan – Kooragang Island EMD Facility Capping Works.* The existing licence must be surrendered should T4 be approved and constructed.
Fines Disposal Facility (Site D)	Port Waratah Coal Services	This site has been in operation from 1993 and licenced from 2001 to receive and treat fines dredged from the Hunter River for coal terminal expansion works at Kooragang Coal Terminal. This site has been periodically filled with material dredged from the Hunter River. Environment Protection Licence 5022 applies to the site and a Landfill Closure Plan has not been completed for this site. Preparation of a Landfill Closure Plan and the existing licence surrendered should T4 be approved and constructed.

Table 9 summarises the key contamination issues considered in the RAP, the proposed mitigation measures and residual impacts. The proposed management measures have been analysed to evaluate their likely performance and the Remediation Action Plan reviewed by a site auditor accredited under the *Contaminated Land Management Act 1997.* The auditor's interim opinion considers the Remediation Action Plan practical and adequate. Following further trials, targeted investigations and monitoring, a final Site Audit Statement and Site Audit Report would be prepared to confirm the adequacy of the final Remediation Action Plan.

The integrated Landfill Closure Plan (based on pre-detailed design) was prepared to satisfy the intent of Benchmark 28 – Site Capping and Revegetation of the *Environmental Guidelines for Solid Waste Landfills* (EPA, 1996) and was included as part of the Preferred Project Report. Benchmark 28 states that site capping and revegetation should:

- ensure that the final surface provides a barrier to the migration of water into the waste;
- control emissions to water and the atmosphere;
- promote sound land management and conservation; and
- prevent hazards and protects amenity.

It details the proposed capping of the areas impacted by construction and / or operation of T4 with an equivalent or superior capping to that already approved for the Kooragang Island Waste Emplacement Facility and the Delta EMD Site. Hunter Development Corporation would cap the remaining areas of the Kooragang Island Waste Emplacement Facility that are outside of the T4 Proposal area footprint.

Should the Proposal not be approved the Proponent would prepare a Landfill Closure Plan for the FDF only and implement the Landfill Closure Plans for the Fines Disposal Facility and Delta EMD sites as both sites are currently owned by the Proponent.

Implementation of the Remediation Action Plan and the Landfill Closure Plan

During the initial works phase, excavated natural material or solid waste material with a low likelihood of contamination dredged from the Hunter River South Arm would be used to fill and cap the stockyard area, the general area and parts of the Newcastle Port Corporation/Hunter Development Corporation areas as

agreed and shown in **Figure 19**. An ultimate cap on top of the fill would effectively make any previously constructed or historical and now underlying caps redundant.

The dredged material would be pumped to the Delta EMD site and proposed stockyard area to provide preload and fill over the top of a low permeability cap. The dredge return water would flow along a temporary, engineered fill channel lined with a high density polyethylene liner and low permeability barriers or similar to Deep Pond for settling prior to discharge, under licence to the Hunter River at a point west of Sandgate Bridge. The low permeability barriers in Deep Pond would limit migration of saline water to groundwater and wetlands to the north-west and south.

Following capping, residual stockyard area (*i.e.* those areas previously proposed for stockpiles for a 120 Mtpa capacity operation) would be stabilised with a vegetative cover such as grass. Refer to **Figure 4**.

Excavation and disturbance of contaminated material would be minimised during construction, as most works would occur within the upper fill layers, avoiding the need to impact on the underlying contaminated layer. Any excavated contaminated material would be classified and managed in accordance with a Materials Management Plan proposed as part of the Construction Environment Management Plan. Any waste material not able to be re-used as general fill, would be placed in a purpose built containment cell within the Proposal area or treated (if required) and disposed of at an appropriately licenced facility offsite. An estimated 21,000 m^3 may need to be deposited within the containment cell.

Consideration

The Proponent plans to remediate or manage existing contamination on site before or at the same time as constructing the Proposal so as to prevent or minimise potential impacts to human health and the environment. This would be achieved using containment and capping measures, and by limiting disturbance to areas of known contamination. The Department supports this approach, which limits the need to excavate and treat or transport, and therefore potential human exposure.

The Department also agrees with EPA's submission that the Proposal does not result in "significant contamination", or conditions worse than currently experienced, as defined under the *Contaminated Land Management Act 1997*.

The Department is satisfied that the assessment of existing contamination, proposed remediation and management measures and impacts from the construction of the Proposal is thorough and sufficient for the Department to form a view on the likely impacts to the environment and human health and the effectiveness of the proposed management measures.

The measures outlined in the Remediation Action Plan would effectively remediate or manage contamination on the site and surrounding areas. It has been demonstrated that the capping and management measures proposed are generally consistent with best practice. Notwithstanding prior to its implementation the final Remediation Action Plan will be reviewed by an accredited Site Auditor and a final Site Audit Statement Report prepared to confirm the suitability of the Remediation Action Plan to meet its stated objectives. The implementation of an integrated Landfill Closure Plan and the measures outlined in the Remediation Action Plan are considered adequate and sufficient to manage the contamination identified and prevent any exacerbation of contamination on site. These plans would assist in applying a consistent level of capping that is equivalent to or better than that currently proposed across individual land parcels.

The Department expects that, overall; the proposed management of contamination would result in a positive contribution to the environment and human health compared to the current situation and reduces the risk of offsite contamination. Further, the proposed measures are suitable and acceptable in remediating and managing the land for its intended use.

Further detailed consideration of contamination with respect to groundwater, saline dredge water management issues and timing of the proposed implementation of mitigation and management measures, are considered below.

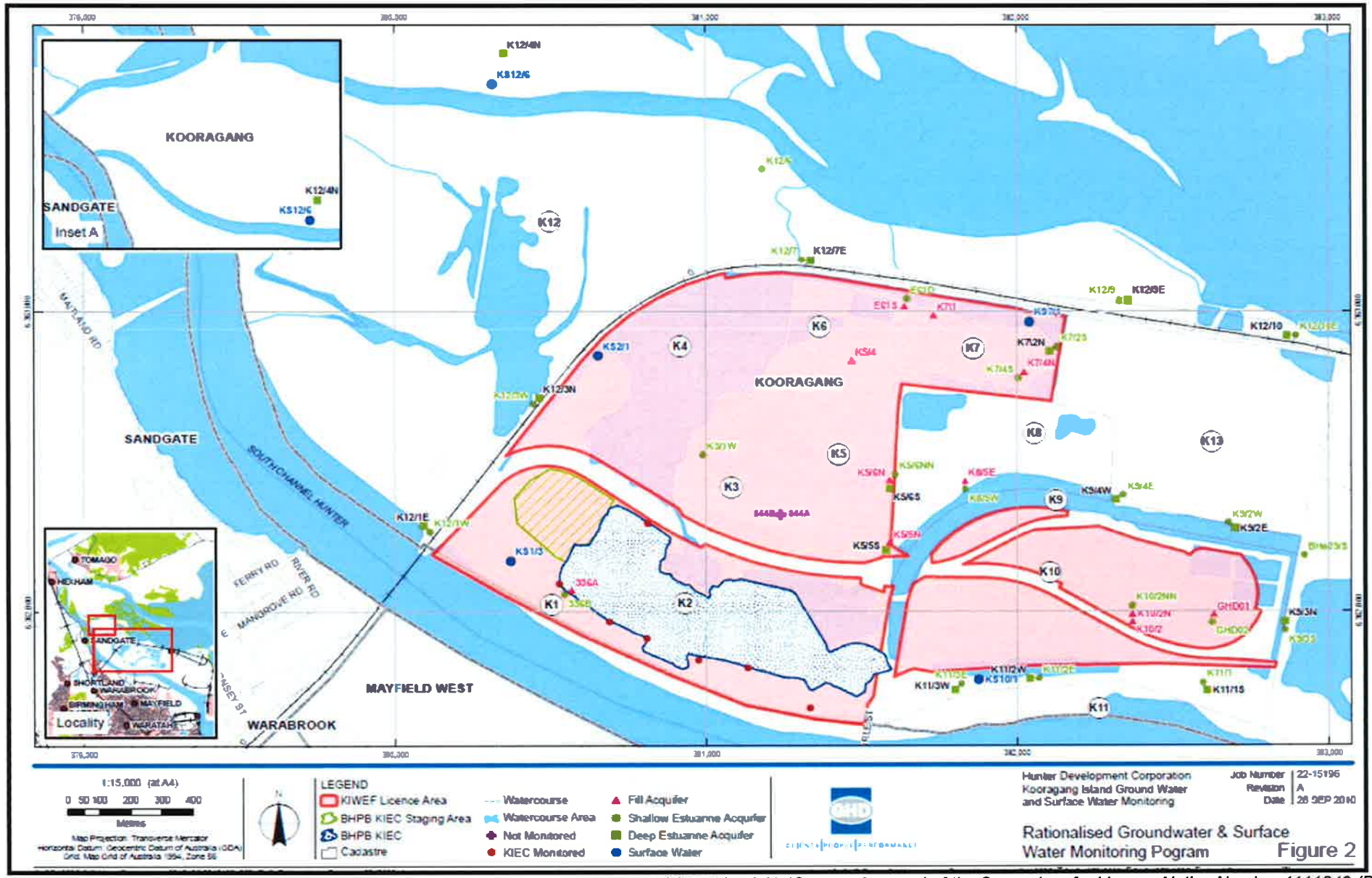

Figure 18: Kooragang Island Waste Emplacement Facility (KIWEF) Licence Area (shown in pink) (*Source: Approval of the Surrender of a Licence Notice Number 1111840 (DECC, 2010)*)

Table 9: Summary of areas of contamination and proposed management options to be implemented with construction of the T4 Proposal

Site (refer Figure 17)	Specific Contamination Issues	Proposed Management Option (See Figure 20)	Residual Impact
Site A Part of the Kooragang Island Waste Emplacement Facility (KIWEF) (North West) formerly used by BHP Billiton for disposal of wastes from steelmaking and subsidiaries. Owned by Hunter Development Corporation.	• Soil and groundwater contamination associated with tar waste in Ponds 5 and 7 as existing Geosynthetic Clay Liner cap is not large enough. • Polycyclic Aromatic Hydrocarbons, Total Petroleum Hydrocarbons, Manganese and lead.	• Installation of a barrier wall to contain and treat contaminants in groundwater and avoid disturbance across the Fill Aquifer. The Fill Aquifer is located above the Estuarine Aquifer and separated by an impermeable layer or aquitard. • Collection of groundwater from the Fill Aquifer via a drainage system within the barrier wall. • Stabilisation of the upper 2-3 m of the soil profile using deep soil mixing techniques for remediation activities and subsequent preloading. • Site capping to reduce the potential mobility of any background contamination that may be present outside the barrier wall in the Fill Aquifer.	• Flow rates in the estuarine aquifer would increase temporarily over about a 4 year period. • Potential for short term increase in mobilisation of existing background contamination but long term reduction in flow rates in the estuarine aquifer due to capping • Contaminants reaching the Hunter River within 100 years are unlikely to exceed the ANZECC (2000) criteria or background concentrations • The barrier wall around Ponds 5 and 7 can limit future migration of polycyclic aromatic hydrocarbon concentrations to the surrounding fill aquifer such that it is unlikely to extend to any identified environmental receptors in excess of ANZECC criteria
Site A Area K7 used as an asbestos and lead dust disposal area. This area was capped but has since had refuse materials stockpiled over the cap. Owned by Hunter Development Corporation.	• Lead dust co-disposed with asbestos could come into contact with groundwater due to pre-loading settlement. • The existing cap is considered adequate.	• Installation of a "Funnel and Gate" type Permeable Reactive Barrier along the northern boundary of Area K7. The Permeable Reactive Barrier allows groundwater to flow into the wetlands through a medium (gate) that immobilises lead contamination. • Permanent capping of asbestos and lead dust area.	• Pre-loading and settlement could saturate buried lead leading to leaching into groundwater. • Higher risk of lead reaching the northern boundary but expected to be immobilised by the Permeable Reactive Barrier. • Lead contamination unlikely to reach Deep Pond to the west of Area K7. • Long term, but low residual risk of lead transportation to the estuarine aquifer due to limited mobility through the clay aquitard.
Site B Part of the former Kooragang Island Waste Emplacement Facility (South East) and contains free-phase petroleum hydrocarbons. The southernmost portion of site B has a low potential for contamination and is covered in mangroves. Owned by Hunter Development Corporation.	• Potential for further migration of free-phase petroleum and hydrocarbon (hydraulic oil) contamination.	• Removal of contamination by extraction such as multi-phase extraction with the final method determined following trials. • Remediation of dissolved phase plumes to be by monitored natural attenuation, with contingencies for active remediation in the event that the plumes approach sensitive receptors.	• Groundwater level in the fill aquifer expected to increase during pre-loading phases but not as a direct result of these activities. Increased flows in the estuarine aquifer result from reduced leakage from the fill aquifer temporary backing up water in the overlying fill aquifer.

Site (refer Figure 17)	Specific Contamination Issues	Proposed Management Option (See Figure 20)	Residual Impact
Site C Former Delta Electrolytic Manganese Dioxide (EMD) waste disposal contains contaminants from alluvial sediments dredged from the Hunter River, BHP Steelworks wastes and EMD waste. Owned by Port Waratah Coal Services.	• Potential mobilisation of contaminants and groundwater interactions at the former Delta EMD site during the pre-loading phase.	• Installation of a low permeability cap before dredged material placement. • A low permeability barrier installed along the southern side of the Easement Pond to reduce migration of saline dredge water towards the wetlands. • A lined channel would allow saline decant water to flow along the surface to Deep Pond. • A low permeability barrier wall to be installed along the north and western perimeter of Deep Pond and the southern batter lined to limit the migration of saline water to wetlands to the north-west and the south.	• Risk of short term increase mobility of existing contamination but reduction in long term flow rates due to capping.
Site D Fines Disposal Facility (FDF) used to receive and treat fine sediments dredged from the Hunter River during Stage 2A works for Kooragang Coal Terminal. Owned by Port Waratah Coal Services.	• Potential mobilisation of contaminants (mainly hydrocarbons and metals) at the Fines Disposal Facility associated with settlement under the T4 Proposal load and a rise in the water table.	• Installation of a "Funnel and Gate" type permeable reactive barrier along the northern and eastern boundaries to allow groundwater flow into the wetlands but immobilisation of polycyclic aromatic hydrocarbons, total recoverable hydrocarbons and metal (aluminium, chromium, copper, lead, mercury and zinc) contamination. • Capping of the area	• Flows through the Permeable Reactive Barrier to the north and east are expected to comply with the ANZECC Guideline for aluminium • Flows to the south and west reaching Easement Pond are expected to have aluminium concentrations below the ANZECC criteria.
Overall Previous general and widespread industrial use.	• Contamination and localised 'hot spots' • Potential salinity impacts both on and off-site due to pre-loading during construction. • Acid Sulfate Soils above -10 m Newcastle Harbour Tide Gauge.	• Site capping • A barrier around the northern boundary of Deep Pond; • Liner (a low permeability layer that minimises infiltration between layers) at the southern boundary of the dredge decant pond; and • A barrier at the southern end of Easement Pond. • Acid Sulfate Soil Management Plan	• A temporary increase in surface water pond depth of 0.25 m during construction and approximately 0.1 m or less in the long term due to preloading.

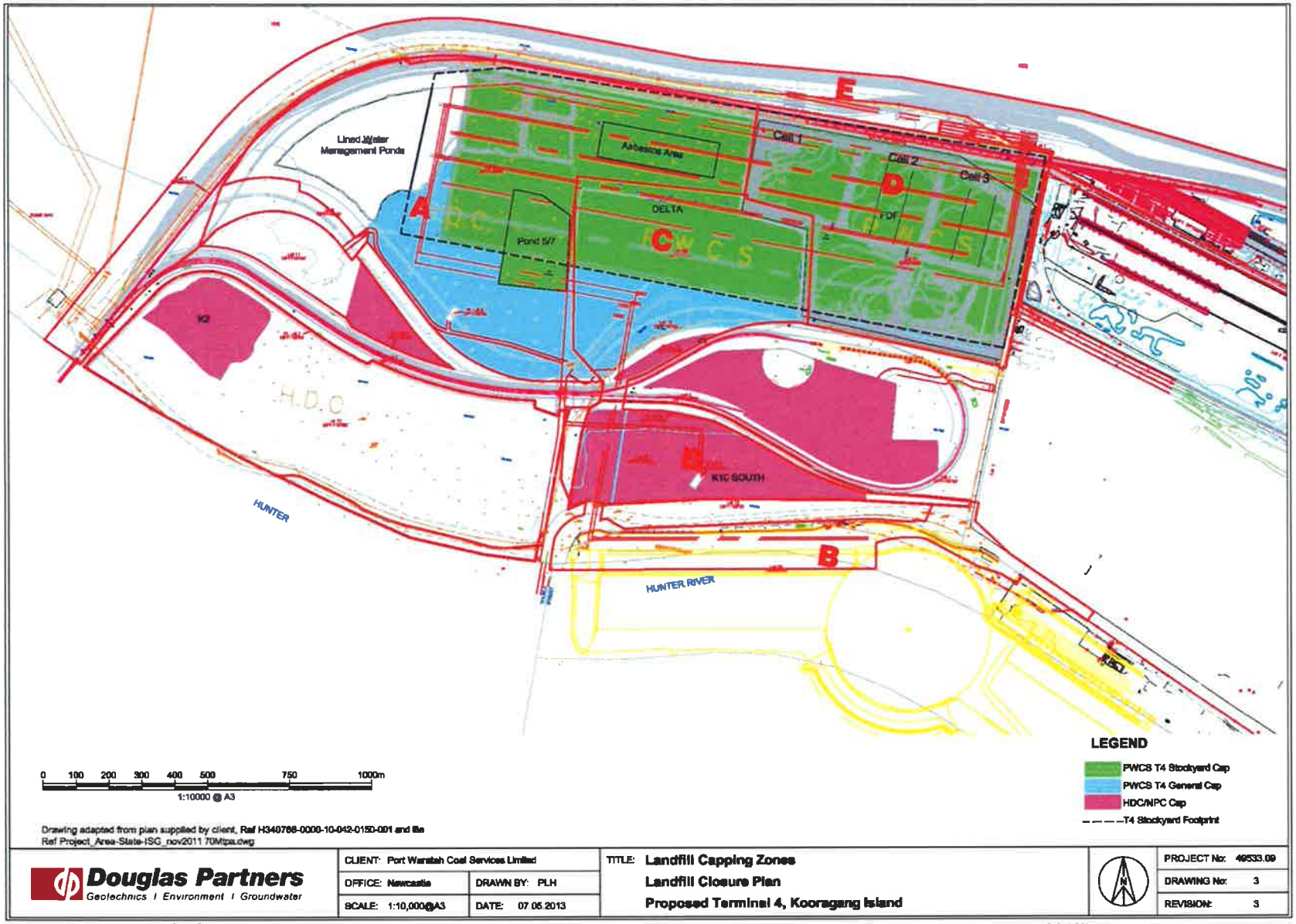

Figure 19: Landfill Capping Zones (*Source: Landfill Closure Plan, Proposed Terminal 4 Project, Kooragang Island (Douglas Partners, 2013)*)

Groundwater

Two aquifers are located under the T4 site; a fill aquifer and an estuarine aquifer. The fill aquifer is closer to the surface and is separated from the estuarine aquifer by a clay aquitard with bedrock varying between -5 m to -62 m below the Newcastle Harbour Tide Gauge zero (NHTG) (NHTG is 1.01m below Australia Height Datum). An aquitard is a naturally occurring low permeability layer that separates aquifers and limits vertical transfer of water between the water bodies.

Modelling of contaminant transport through each aquifer focused on polycyclic aromatic hydrocarbons in ponds 5 and 7 (Site A), lead dust in Area K7 (Site A) and aluminium in the Fines Disposal Facility (Site D). The proposed contaminant management measures (refer **Figure 20**) are predicted to lead to an overall decrease in long-term flow rates and mobility of contaminants compared to the current situation. In the short term, during pre-loading, temporary increases in groundwater flow rates and levels of surface water bodies are predicted of up to 0.25 m, varying by about 0.1 m or less in the longer term as groundwater is "squeezed" out during the pre-loading phase. Once settlement is complete, groundwater flows will decrease to below current levels.

The short term impacts are partly due to pre-loading and proposed mitigation measures (*e.g.* lower permeability barriers walls) limiting or slowing flows. The permeable reactive barriers, while allowing water to flow through the barrier, are less permeable than the existing situation, resulting in water within the fill aquifer backing up which can in turn result in an increase in vertical leakage between the fill and estuarine aquifers in the short term. However, preloading also leads to a decrease in the clay aquitard.

Once the site is capped, flow in the fill and estuarine aquifers would be reduced to below existing levels for the majority of the site, resulting in a long term reduction in contamination mobility. This includes contaminant concentrations in groundwater flows leaving the site which are expected to be below the ANZECC (2000) criteria or background concentrations in the Hunter River South Arm. This is for options with and without an impermeable sheet pile wall adjacent to the main berth and considered as part of the relocation of the swing basin approved under a separate approval.

The Department recognises that the project design, which aims to reduce the need for piles, is likely to minimise impacts to the clay aquitard. Only the conveyors and main structures will require piles in contaminated areas. Where piles are to be installed through the aquitard, this in itself would form a low-permeability zone limiting localised flows. Services and utilities would be located within the upper layers of fill or in areas that are not contaminated.

Dredge Material from the Hunter River South Arm

Material dredged from the Hunter River South Arm is likely to be classified as excavated natural material or general solid waste with a low likelihood of contamination and suitable for use on site. The upper layers of fine-grained sediments (silt and clay) have been found to contain low concentrations of contaminants. The underlying sand is not considered to be contaminated. Only the underlying sand would be used to fill the site.

The EPA queried the effectiveness of managing saline dredge water by limiting its ingress or seepage into groundwater or surface water wetlands by using low permeability barriers and liners. In particular, the EPA questioned whether the barrier wall in Deep Pond alone would ensure saline water does not seep into and potentially exacerbate existing groundwater contamination. Surface water impacts are considered in **Section 5.5**.

The Proponent clarified that vertical movement of saline water into the estuarine aquifer is unlikely, due to the thickness of the clay aquitard in this location (nominally between 4 – 14 m). Laboratory tests have indicated that the permeability of the aquitard is lower than the permeability of the proposed barrier wall. Therefore, water is likely to flow through the barrier wall as the point of least resistance in preference to the aquitard. The Department is satisfied that the use of a barrier wall is appropriate and unlikely to exacerbate contamination from intrusion of saline waters.

The Department accepts that material dredged from the river is unlikely to be highly contaminated and considers its reuse on the Terminal 4 site appropriate. A Materials Management Plan is also an appropriate way to manage any unexpected contaminated material. Should the Proposal be approved, the Department recommends the implementation of a condition requiring the preparation and implementation of such a plan to manage any potentially contaminated material not covered by the Landfill Closure Plan or the Remediation Action Plan.

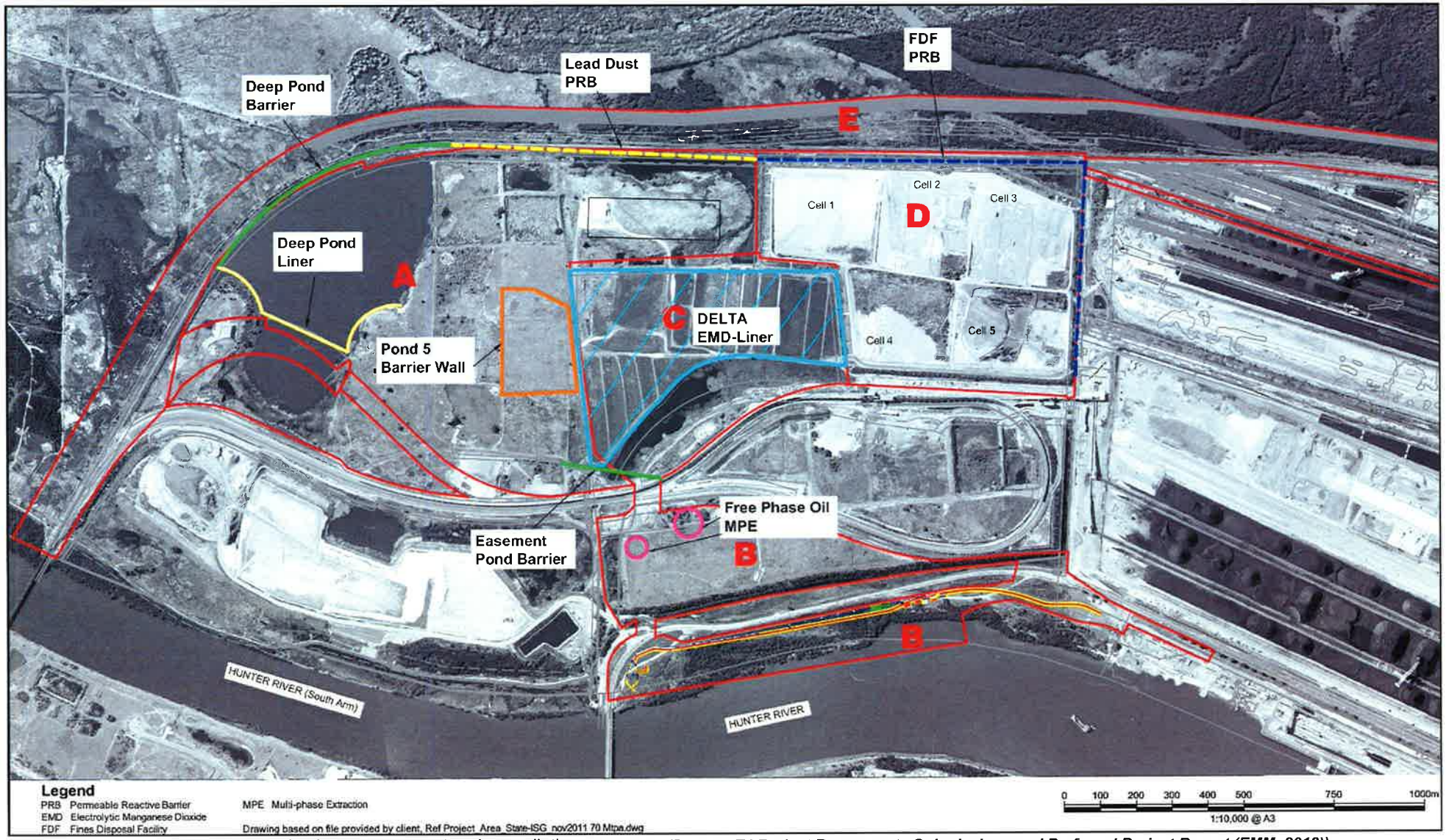

Figure 20: Proposed contamination management and remediation measures ***(Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013))***

Suitability of proposed measures

The Department accepts that, over the longer term, the construction of the Proposal would decrease groundwater flows and reduce contaminant concentrations to below the relevant ANZECC (2000) criteria or background concentrations in groundwater leaving the site within 100 years.

The Department is satisfied that the assessment of the final remediation action plan by an accredited site auditor is appropriate given that there may be changes to the plan as detailed design proceeds. The Department is satisfied that implementation of the mitigation measures and monitoring is appropriate to manage the contamination risks on site. With these measures in place, there would not be any increased risk to environmental values or human health that would render the site unsuitable for its intended use and the ongoing risk of harm to environmental values and human health from contaminants migrating offsite would be minimised.

In addition, the Department accepts that while there are risks associated with encountering acid sulfate soils at RL -10 m, works would involve minimal excavation and be mainly from the ground up. Any impacts would be manageable using standard management techniques that are long established and effective. Site specific management measures should be developed with reference to the *Acid Sulfate Soil Manual* (Acid Sulfate Soil Management Advisory Committee, 1998) and documented in an Acid Sulfate Soil Management Plan.

Timing of proposed remediation and containment measures

The Environment Protection Licence Notice to Surrender as varied (Surrender Notice #1111840) is for all areas of the KIWEF located within and outside of the Proposal footprint and requires the:

- capping and closure works around K2 and K10 North to be completed by December 2014; and
- capping and closure works around K3 and K10 south to be completed by June 2017.

The notice also acknowledges the Proposal and allows the capping and closure works to be completed as part of its construction where it coincides with the timing outlined. The Department notes that the construction of T4 is linked to global export demand for coal and therefore the timing for its commencement is uncertain at this time. Should the Proposal be approved and a decision to construct made, the Proponent would implement a Landfill Closure Plan that is superior to that required by the notice and the Remediation Action Plan.

The Surrender Notice only requires a cap consisting of a coal washery reject layer which could be implemented independent of the Hunter River South Arm dredge. This is considered a lesser standard than that proposed by the Proponent. Any capping implemented under the Surrender Notice before the construction of T4 would be redundant if the Proposal is implemented.

Despite the above, should the Proposal be approved and a decision made to defer construction which is likely in the short term, the Surrender Notice still requires the landowner (HDC) to complete capping and closure works by either December 2014 or June 2017 as appropriate. In this situation, contamination on site would be temporarily capped until construction of the Proposal commences and the integrated Landfill Closure Plan and the Remediation Action Plan are implemented.

Should the Proposal not be approved, a Landfill Closure Plan would be prepared for the Fines Disposal Facility only. The Proponent would implement closure and capping plans for the Fines Disposal Facility and Delta EMD sites, as the land holder. Closure and capping of all other areas would be the responsibility of the landholder, in this case, Hunter Development Corporation.

5.5. Stormwater and Drainage

The Proponent proposes to avoid or minimise potential operational impacts to adjoining surface water bodies by operating the site as a 'no discharge site' through the use of retention ponds and by managing and reusing onsite surface water to limit any discharge to adjoining waterways.

Drainage across the Proposal area is highly modified by culverts, drains, levees, artificially formed drainage depressions and ponds. The ponds were predominantly formed as a result of rail embankments and past landfill activities and are recharged by rainfall, surface water, groundwater and limited exchange between ponds. Flows across the site would be altered with the Proposal. Several ponds would be filled to enable site capping and to enable construction. Alteration to the depths of surface water bodies from initial pre-loading are discussed further in **Section 5.4**. Ponds that would be filled are artificial and do not have direct surface connections to water bodies outside of the Proposal area. The impacts on the surface-water flow regime outside of the Proposal area are anticipated to be negligible.

Deep Pond receives rainfall, inflows from Blue Billed Duck Pond (on the BHP-Emplacement area) in the south-east and localised runoff. Overflows from Deep Pond flow into the tidal wetlands located along the edge of the South Arm of the Hunter River via culverts under the existing rail line. During construction, runoff (saline dredge return water) would be diverted to the northern portion of Deep Pond for settling before discharge to the Hunter River via the path of the existing culvert to the Hunter River South Arm. A portion of the culvert would be realigned to avoid the wetland at the river's edge. The northern portion of Deep Pond would be converted to three settling ponds designed to improve water quality before discharge to the Hunter River (refer **Figure 21**).

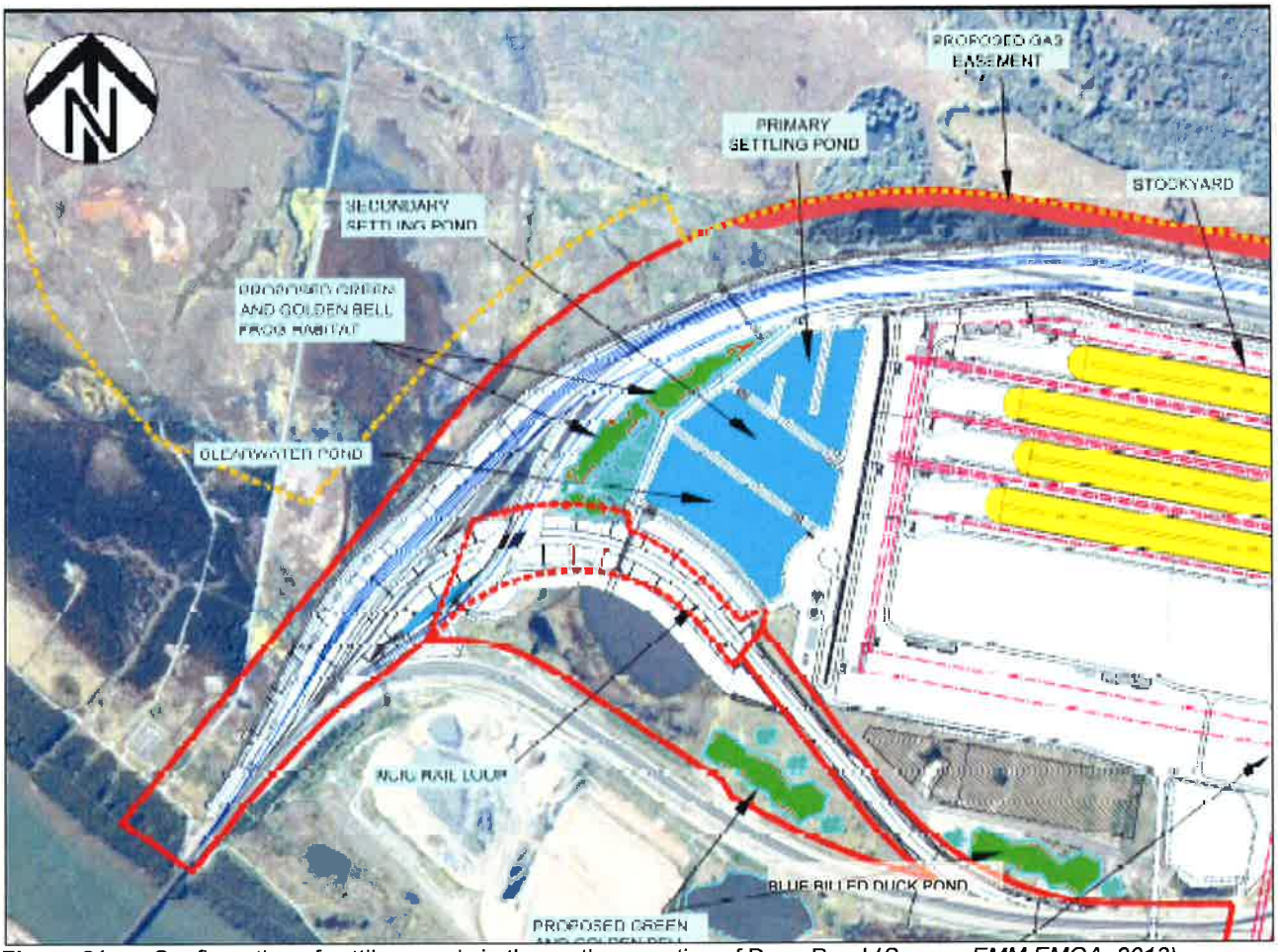

Figure 21: Configuration of settling ponds in the northern portion of Deep Pond (*Source: EMM EMGA, 2013)*

The Proposal site is in the tidal portion of the Hunter River, which conveys tidal flows to the Hunter Wetlands National Park. Immediately north of the Proposal site, Mosquito Creek conveys flows to wetlands in the eastern area of the Hunter Wetlands National Park. Mosquito Creek previously connected the north and south arms of the Hunter River and was modified in 1996 for the construction of the Kooragang Island main rail line. The lagoon of the Eastern Watercourse, at the southern extent of the water body, is a remnant of Mosquito Creek, isolated following filling of the area for industrial and agricultural use. A levee was constructed across the Eastern Watercourse to block tidal flows to and from the north and enable grazing activities.

Widening of the rail embankment in the northern portion of the Proposal area would require the crossing of Mosquito Creek and the Eastern Watercourse, (850 metres east of Mosquito Creek). The construction of the rail embankment may:

- obstruct/restrict tidal flows which may alter tidal regime in receiving wetlands;
- restrict tidal exchange to the mangrove area west of the Eastern Watercourse restricting tidal exchange with the wetlands to the east; and
- reduce/block surface flows to the Eastern Freshwater Wetland to the south (i.e. from the existing rail line).

The Proponent has committed to the following mitigation measures to manage the impacts:

- constructing a channel between the Mosquito Creek tributary and Mosquito Creek to maintain tidal flows into Hunter Wetlands National Park;
- modifying/removing the Eastern Watercourse levee to maintain tidal flows to the eastern wetlands; and
- designing drainage within the rail embankment to maintain surface (freshwater) flows into the Eastern Freshwater Wetland from the rail area.

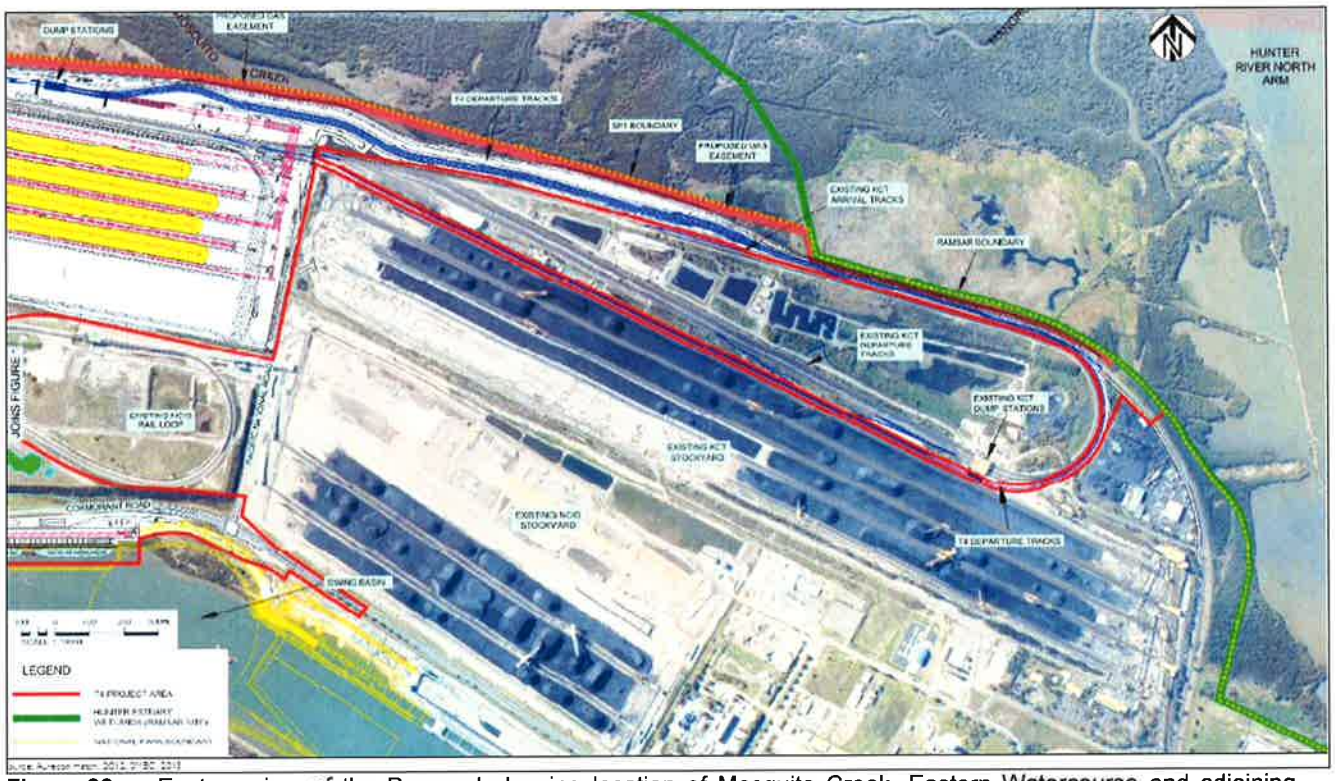

Figure 22: Eastern view of the Proposal showing location of Mosquito Creek, Eastern Watercourse and adjoining wetlands

Water Quality

Water quality monitoring was undertaken across the Proposal site and the Hunter River. Mean concentrations of several metals, ammonia, cyanide, total phosphorus and total suspended solids exceeded the ANZECC trigger values for slightly to moderately disturbed ecosystems across the Proposal Site. Some exceedances were also recorded in the Hunter River for a number of pollutants including total phosphorus, cadmium, chromium, mercury and zinc.

Surface disturbance could alter the quality of water collected on site and subsequent sediment mobilisation and spills from plant and equipment. Saline water (dredge water), hydrocarbons (from plant and machinery) and increased sediments (erosion and stockpiling) could also enter receiving waters.

The settling ponds established for construction (**Figure 21**) would be retained for operation, with the discharge channel lining removed as saline water (dredge water) would no longer flow from the site. Potential impacts upon water quality during operation could include:

- sediment laden runoff from operational areas entering waterways; and
- contaminated runoff from corrosion of structures and plant, particulates from vehicles, atmospheric deposition, and minor leaks and spills;

The following mitigation measures are proposed to manage water quality:

- separation of operational and non-operational areas and diversion of runoff from operational areas to sediment settling basins;
- storing construction plant and machinery away from drainage points and flow paths;
- installing silt curtains in the Hunter River South Arm at the dredge return point;
- stockpile watering during windy conditions;
- revegetating/sealing exposed areas as soon as possible to minimise sediment runoff.

The PWCS Kooragang Coal Terminal (KCT) has similar operations, catchment characteristics and surface water management to that anticipated for the Proposal. Discharge from KCT is of similar quality to that recorded in the Hunter River, the receiving water body. A closed system with no discharge during normal operations would be implemented. Discharges to the Hunter River would only occur following and/or during prolonged periods of wet weather, in compliance with any EPL, and after primary sedimentation treatment. Discharge from the site is anticipated to be similar to that from KCT and is therefore considered to be acceptable.

Department's Consideration

The Department is satisfied that the impacts on surface water and flooding have been adequately assessed. It is accepted that impacts to onsite surface water and flooding is unavoidable and that the Proponent has put appropriate management measures in place with the use of retention ponds and developing a 'no discharge site' where suitable water is re-used wherever possible. Where offsite impacts would otherwise be likely, measures have been proposed to maintain the existing flow regime.

The EPA noted that management of water in ponds to be realigned and/or filled has not been addressed and recommends this be addressed in a construction Water Quality Management Plan. The Department supports this and recommends a condition to this effect to be developed in consultation with the EPA.

The Department acknowledges that there would be changes to site drainage during both construction and operation and that offsite impacts would be minimal and the mitigation measures proposed adequate.

The OEH Parks and Wildlife Group has indicated that works associated with the modification/removal of the levee within the Eastern Watercourse are on National Park estate and that alteration of the existing levee height would mitigate changes to the tidal regime. Whilst the Department supports the approach of maintaining flows to the wetland complex south of the Eastern Watercourse, further investigation is recommended in consultation with NPWS and that appropriate approvals are obtained for these works before construction of the rail embankment commences.

NSW Fisheries supports the Proponent's intent to maintain flows from Mosquito Creek to the wetlands by connecting Mosquito Creek and Mosquito Creek Tributary. The Department acknowledges that further investigation would be undertaken before constructing the channel, which would include:

- establishing measures to maintain flows during construction;
- designing a channel with similar geometry to the existing channel;
- maintaining existing hydraulic characteristics of the area (during both construction and operation); and
- undertaking geotechnical investigations to determine channel support requirements.

The Department has recommended a condition that these investigations be undertaken in consultation with NSW Fisheries (DPI) and OEH.

Water Quality

The proposed sedimentation basins (Figure 21) were designed and assessed in accordance with relevant guidelines. The EPA raised a concern regarding the settlement efficiency in the lead up to an overflow event. Additional modelling indicated that the basins and settling pond system would meet the sediment removal efficiency target of 90 per cent for a 90th percentile peak daily flow event as established in the EA.

The EPA questioned the 20µm sediment particle size assumption used in assessing the runoff from the settlement basins. Typical particle size captured at KCT was measured and ranged from fine silts to coarser gravel smaller than 10 µm. Coarser materials dropped out into discharge sumps and within the inlet channel before entering the settling ponds. Sediments in the settling ponds were predominantly silt (80-90 per cent), with some sand particles down to 2 µm being retained. Runoff entering the settling system would be retained longer at the Proposal site than at KCT and is expected to result in greater retention of fine silt particles. Sensitivity analyses indicated that the ponds would effectively remove sediments down to 7 to 8 µm diameter indicating that the 20 µm sediment size assumption was likely conservative.

It is acknowledged that the Proponent is currently monitoring receiving waters for the Proposal. The EPA notes that the proposed trigger values for discharges from the site would be based on the results of current monitoring. Further, the EPA recommends water quality monitoring of discharges from the site be undertaken upstream, downstream and at the discharge point. The Department supports this but considers that it is more appropriate for inclusion in an EPL.

The EPA is also generally satisfied that the contingency measures should they be implemented (where the water quality trigger values are exceeded and discharge from the site is imminent) are appropriate. The

Department agrees with the EPA and recommends that this be detailed in a Water Quality Monitoring Program, for each of the construction and operation phases.

5.6. Flooding

The Proposal site lies above the 100 year Average Recurrence Interval and would not likely be significantly affected by flooding. Modelling showed that a 100 year ARI event would overtop the rail embankment by approximately 0.1m resulting in localised flooding around settling ponds in the present location of Deep Pond but not on infrastructure or other areas of the Proposal site.

The Tomago Offset Site is an area that historically included floodplain and tidal flats and is in the flood conveyance zone of the Hunter River. The site has been significantly altered by a drainage network constructed to mitigate flooding, and flood levees (along part of the eastern and western boundaries) to exclude tidal influences to enable grazing (refer **Figure 23**). There are currently tidal gates present both upstream and in the south-east of the Tomago Offset Site. These control tidal inundation of agricultural land to the north of the site and wetlands within the Hunter Wetlands National Park.

Works to construct the Tomago Offset Site require the re-introduction of tidal influences, changing surface levels and extending a bund around the restoration area to establish a lagoon system with a central channel from the Hunter River (Concept Design). Modelling indicated that there would be negligible changes to flood depths from the existing flood levels, and a minor increase in inundation area (noted to be an increase in flood area predominantly within the Tomago Offset Site). Flooding impacts in the surrounding area are anticipated to be negligible and the impacts on the Tomago Offset Site manageable. Where increased flows are generated, the existing floodgate system would be used to control water levels. The Proponent has committed to designing channels with appropriate scour protection to prevent erosion from increased flows and/or flow rates. Whilst the impacts of the development of the Tomago Offset Site in isolation are manageable, the cumulative impact of nearby developments in the flood conveyance zone upon the Tomago Offset Site may result in an altered flood regime to this site and altered flooding regionally.

Department's Consideration

Given the role of the NSW Office of Environment and Heritage (OEH) in reducing threats from flooding and coastal storms, input was sought on the Proposal and the works that form part of the Tomago Offset Site. OEH advised that it had reviewed the flooding assessment and had no concerns regarding the flooding impacts of the Proposal.

The City of Newcastle noted that the development was in an identified floodway and under the Newcastle Development Control Plan 2012 (Newcastle DCP) requires that the risk to life be considered in the event of flooding. The Department acknowledges this position and is satisfied that the modelling of current and future flooding shows that:

- there will be no increased risk to life as a result;
- impacts can be managed; and
- would generally satisfy the requirements of the Newcastle DCP.

Notwithstanding, the Department recommends that the impacts be confirmed following detailed design and any changes to flooding attributable to the project addressed.

The increase in impervious area at the Northbank Enterprise Hub (should it be approved and constructed) north of the Tomago Offset Site, could generate additional flows to the Tomago Offset Site. To avoid impacts of unanticipated additional flows to the Tomago Offset Site, the Department has recommended a condition that requires consultation with Northbank Enterprise Hub to co-operatively address any flooding impacts and manage the flows of the two sites in parallel should it be approved.

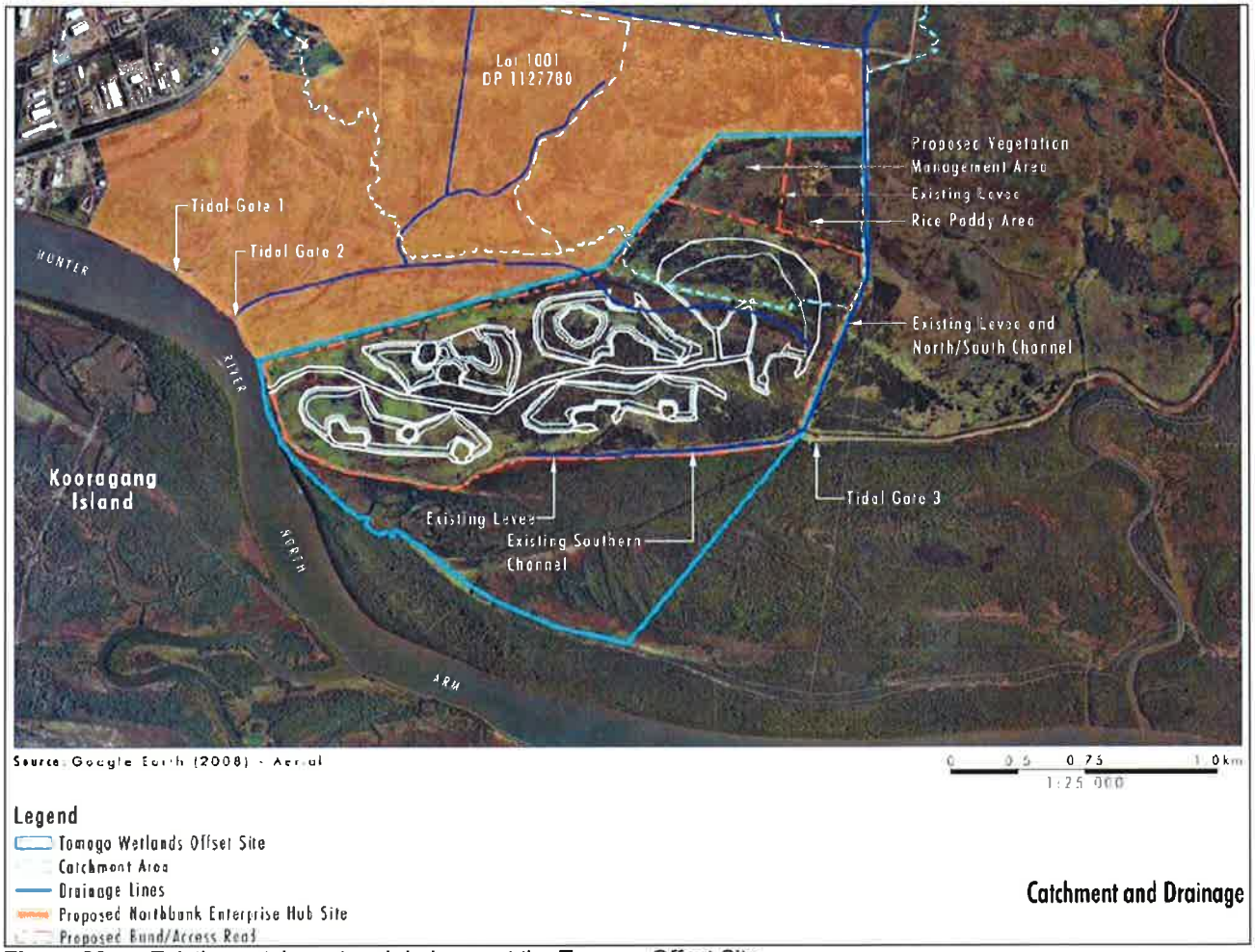

Figure 23: Existing catchment and drainage at the Tomago Offset Site

5.7. Noise

Construction and operation noise impacts were assessed in accordance with the *Interim Construction Noise Guideline* and the *NSW Industrial Noise Policy* by SLR Consulting and independently reviewed by Mr. Najah Ishac.

Construction noise is proposed to be managed through a range of standard mitigation measures including the use of less intrusive mobile equipment alarms, noise monitoring and restrictions on the use of vibratory machinery. Despite this it is likely that exceedances of the governing noise criterion will be experienced in some locations. Intrusive and amenity noise levels from operations are expected to be met at all locations except for some locations in Fern Bay, Stockton and Mayfield however this is due to the operation of KCT (as a noisier site) and not the Proposal. The Department also recognises that noise from the Proposal would be regulated through an EPL.

Construction Noise

The noise assessment considered a number of scenarios including various combinations of staged construction and operation both in isolation and in combination with Kooragang Coal Terminal (KCT) and other existing and future industrial development in the Newcastle Port area. Although it will be operated as a separate facility, it is recognised that the terminal is effectively an extension to KCT.

All construction activities, with the exception of piling, drilling and dozer operation, have been assessed as occurring at any time 24 hours per day, 7 days per week. Piling, drilling and dozer use have been assessed as operating from 7am to 5.30 pm Monday to Friday and 8am to 4pm Saturdays from April to September and 7am to 6pm (Monday to Friday) and 8am to 4pm (Saturdays) from October to March.

The Proponent has committed to a range of mitigation measures to address noise impacts including restrictions on operation of vibratory machinery; use of less intrusive mobile equipment alarms (*e.g.* quackers); noise monitoring and results analysis and response based on modelling undertaken to evaluate reasonable and feasible noise mitigation measures.

Construction noise is expected to be below the governing noise criterion for all assessment periods (day, evening and night) for both construction scenarios (site filling/earthworks to ultimate development and a nominal operational 25 Mtpa throughput; and construction to 70 Mtpa throughput with Stage 1 operation of 25 Mtpa) with the following exceptions:

- (Stage 1) - a site within 50 metres of the Hunter Wetlands National Park (HWNP) near the railway and at an access road (exceeds daytime Construction Noise Management Level (CNML) criterion by 5 dB); and
- (Stage 2) - as above and at some locations at Fern Bay and Stockton (during evening and night by up to 4dB of the CNML).

The Proponent argues that the exceedance at the HWNP is acceptable as although it is publicly accessible, there are no facilities and it is not a location likely to be frequented by park users, particularly during construction. The Department accepts this argument given that the area is already subject to rail movements to and from KCT, and construction related to the NCIG rail loop. The area is not known as or likely to be one frequented by the public and therefore the predicted noise exceedance during construction is acceptable in this circumstance.

The Department also notes that the ICNG acknowledges that it is often not possible to meet construction noise level objectives, and sets an upper daytime level of 75dB(A) if all reasonable and feasible mitigation options are being adopted.

The EPA noted that exceedances at Fern Bay and Stockton are governed by operation of KCT, and not the Proposal. The Department concurs with the EPA's position and also recognises the contribution to noise at these locations from other sources, such as from Orica, and notes that:

- it would be difficult to accurately attribute any potential cause of exceedance to either operation at the identified locations for compliance purposes; and
- construction of the proposal could be undertaken within the approved noise management levels set for operation of KCT at maximum capacity throughput (120 Mtpa).

Further, it is noted, though not referenced in the Proponent's assessment that the EPA's *Industrial Noise Policy* makes allowance for landuse at the urban/industrial interface which provides an additional 5 dB allowance for the amenity criterion. The INP defines an urban area as being (amongst other factors) dominated by an "urban hum" or industrial source noise; and/or is near commercial districts or industrial districts. The interface is one where an urban area is in close proximity to industrial premises and extends to a point where the existing industrial noise from the source has fallen by 5 dB. The Department is of the opinion that Fern Bay and Stockton meet these factors and therefore a 4 dB exceedance of the CNML is justifiable in this instance.

Notwithstanding the above, a number of recommended conditions are proposed which require the Proponent to manage construction noise to minimise impacts to the greatest extent practicable. These include:

- a management approach outlined in a Construction Noise and Vibration Management Plan to be implemented during construction. The Plan should outline construction management practices to minimise noise; a proactive approach to community consultation prior to and during construction; a noise monitoring program with particular reference to excessively noisy activities; and adaptive management processes to address any noise issues as they arise;
- a condition limiting construction hours and activities to those assessed in the EA;
- a condition limiting piling or other vibratory activities; and
- noise goals consistent with the KCT 120 Mtpa approval such that the operations occurring concurrently do not exceed these levels.

Operational Noise

As stated above, although the T4 project would operate independently of the Kooragang Coal Terminal, it is effectively an extension of that operation. Therefore, the noise emissions were assessed in isolation (*i.e.* the additional noise burden of the proposal); against project specific noise levels (PSNLs) as determined from the *Industrial Noise Policy* (INP); and against the KCT Stage 4 approved operating noise levels. Both the Department and the EPA consider this approach appropriate and consistent with the INP.

Noise from operations was assessed at 11 locations in Stockton (2), Fern Bay (3), Carrington, Maryville, Mayfield, Mayfield West, Warabrook and Sandgate. Modelling of total operations (T4 and KCT) indicated that intrusive and amenity noise levels would be met at all locations during all assessment periods except for some locations in Fern Bay, Stockton and Mayfield as follows:

- intrusive noise levels up to 4 dB above the PSNLs during day and night assessment periods at Stockton and Fern Bay, however noise levels comply with KCT Stage 4 approved noise limits;
- amenity noise levels up to 4 dB above the PSNLs during the evening and night assessment periods at Stockton and Fern Bay but comply with the approved KCT stage 4 limits; and
- intrusive noise levels up to 2 dB above the KCT limits (but below the PSNLs) by 2dB at Mayfield West during evening assessment period.

In each case identified above, the exceedance is attributable to the operation of KCT and not the contributions of the project. The intrusiveness criterion is intended to control the direct noise impacts of any new source on a receiver so as not to exceed the background level for any given assessment period. The amenity criterion controls the cumulative noise impacts for particular land uses (*e.g.* rural, suburban, urban, urban/interface) of all existing and potential industrial noise sources affecting a location. It should be noted that the KCT limits were based on the predictions modelled and not the higher PSNLs to which the project was entitled.

As mentioned previously, the INP recognises urban/industrial interfaces and provides a 5 dB allowance. The Department is of the opinion that the Fern Bay, Stockton and Mayfield areas could appropriately be considered to fall within such an interface area, despite not being assessed as such by the Proponent (i.e. the assessment adopted a more conservative approach). In the case of each exceedance identified, the relevant goals are likely to have been met had this area classification been adopted. Further, given that the total operating noise (T4 and KCT) exceedance can be attributed to the operation of KCT and not the project, these exceedances are considered acceptable.

Notwithstanding the above, the Department recommends that a number of conditions be applied to the operation of the project. Whilst the EPA has indicated a preference to vary the existing Environmental Protection Licence for KCT to regulate the two operations as a single one, it is recognised that this is a matter for the EPA and the Proponent and it is understood that this decision is yet to be made. The recommended conditions include operational noise limits that take into account the two terminals operating concurrently. This approach effectively regulates the operations as a single entity; meaning that if one site emits noise to the nominated limits the other must alter its operations in order to avoid breaching the approval. It is understood that the two terminals would be directly managed/operated by PWCS (a single entity) and not by separate subsidiaries of that entity. Therefore both operations would effectively operate as a single terminal. Adoption of a limit, which the two terminals operating together would need to achieve, does not intend to have the effect of controlling the Kooragang terminal through any approval for the T4 proposal but requires the operation of the proposal (or both together) to be mindful of the cumulative noise output.

The Department is also aware that KCT is subject to a PRP for noise on its EPL, indicating that there would be more scope to operate the two sites in tandem without exceeding the nominated limits. Further, the Department is of the opinion that there is greater scope to identify and manage noise across recognised ports precincts in the future so as to not sterilise use of this strategically significant infrastructure. To this end, the Department has included a condition requiring the Proponent to participate in any efforts to establish a noise map across the ports precinct. The Department is of the opinion that the recommended conditions do not preclude either of these regulatory scenarios.

Cumulative Noise

The INP requires consideration of night time cumulative assessment of the sum of existing, approved/proposed development as well as the project. The likelihood of any one area being exposed to the predicted cumulative noise from the simultaneous operation of all existing, approved and proposed developments is remote given the influence of meteorological effects and the geographical extent of the port precinct.

The assessment indicates that increases in cumulative noise would be less than 1 dB in all areas except for Sandgate where a 1.1 dB increase is predicted, however this would be imperceptible. The Department considers that this is an acceptable increase and that the likelihood of it eventuating is low. The Department also notes that the highest cumulative noise levels at Stockton (50 dB) and Fern Bay (49 dB), despite no measureable contribution from the Proposal, comply with the night time Industrial Interface Amenity levels (50 dB).

The noise impacts associated with the construction and operation of the T4 project demonstrate that the project will result in only limited cumulative noise impacts and that these are not considered excessive when considered in the context of a heavily industrialised port area. Construction noise and road transport have been shown to be within acceptable levels. Operation of the facility can be undertaken within the approved noise levels developed for the KCT site which adjoins the Proposal site.

Ports Precinct

Newcastle Port is of significant economic importance to the state and as such it is important that future development and operation of the port precinct is not compromised. Currently noise impacts in the ports area are assessed and managed on a case by case basis. Regulation using this approach is difficult to achieve as it is almost impossible to identify the source of any noise exceedance. Options to more effectively manage noise from the ports precinct as a whole are currently being considered, including initiatives to assess and maximise development by adopting a "whole of port approach" similar to the noise mapping conditions which were developed and implemented on the Mayfield development site.

This approach, if the decision were made to expand it to include the greater Newcastle Port, would allow a strategic approach to port planning, as well as having an ability to test different scenarios to maximise port development without compromising the amenity of adjoining residential areas. Whilst the Department has developed recommended conditions to manage noise contributions from the Proposal with Kooragang Coal Terminal as though they were a single operation, it is recognised that there could be long term benefits for the port operator in adopting a more holistic approach. To this end, a recommended condition is included which would require the participation of the proponent in the development of any such noise map/model.

5.8. Traffic, Transport and Access

The Proposal would increase traffic impacts in the vicinity of the Project. To limit this impact the Proponent has committed to upgrading the Cormorant Road and Pacific National Road and the Cormorant Road and NCIG Wharf Access Road intersections, provide a shuttle bus when the construction workforce exceeds 1,200 persons and staggering traffic departures during the 4 to 5pm peak period. The Proponent also proposes to transport dredged material to the site via slurry pipes instead of by truck.

Traffic congestion in the morning and afternoon peak hour periods currently occurs in the vicinity of the Proposal site. Numerous intersections already experience congestion resulting in a Level of Service (LoS) F considered to be unsatisfactory (with an average delay of more than 71 seconds per vehicle). Of particular note are the following intersections:

- Industrial Drive and Woodstock Street (all peak periods);
- Cormorant Road and Delta EMD Road (afternoon peak 4pm - 6pm);
- Cormorant Road and Pacific National Access Road (early morning peak (6am – 7am) and early afternoon peak (4pm - 5pm));
- Cormorant Road and NCIG Wharf Access Road (later morning peak (7:30am - 8:30am); afternoon peak (4pm - 6pm));
- Cormorant Road and Egret Street (early afternoon peak 4pm – 5pm); and
- Teal Street and Raven Street (early afternoon peak 4pm – 5pm).

The Cormorant Road intersections with Pacific National Access Road and Egret Street are also operating at capacity (LoS E) in the early morning peak (6am -7am). **Figure 24** shows the location of these intersections. Congestion is predicted to increase and the level of service deteriorate at most intersections during construction and operation with the following deteriorating to LoS F during identified periods:

- Cormorant Road and Delta EMD Road (7:15 am – 8:15 am construction and operation);
- Cormorant Road and Egret Street (5 pm – 6 pm construction and operation); and
- Teal Street and Raven Street (4:30 pm to 5:30 pm construction and operation).

The change to intersection operation would be most significant at Cormorant Road and Delta EMD Access Road (from D to F during the 7:15-8:15 am peak period) due to background traffic growth on Cormorant Road reducing the LoS for the left turn onto Cormorant Road from the Delta EMD Access Road.
Dredging and reclamation could take place 24 hours a day, seven days a week with all other construction generally taking place during standard construction hours.

The Proponent plans to limit traffic impacts during construction by:

- upgrading the existing Cormorant Road and Pacific National Road T-intersection and the Cormorant and NCIG Wharf Access Road T-intersection to a four leg traffic signal controlled intersection;
- accessing the site via a left turn into the Delta EMD Access Road from the Tourle Street bridge direction but generally exit the work site via the new traffic signals at the Pacific National Access Road. Where possible, limit this access to light vehicles only.
- staggering traffic departures during the 4 to 5 pm peak period so fewer vehicles leave during that time;
- using a shuttle bus service should the construction workforce exceed 1,200 people; and
- adopting construction practices which minimise truck movements, such as the transport of dredged material onto the site via pipes.

Figure 24: Local Road Network and Intersections Considered in Traffic Assessment (*Source: Source: T4 Project Response to Submissions and Preferred Project Report (EMM, 2013)*)

The additional traffic associated with an extra 80 operation employees is not considered significant as employees would work shifts with approximately 20 people per shift working alternate 12 hour shifts (7am to 7pm) on a rotating basis. It should be noted that the additional 80 employees is attributable to the likelihood that standard operating technology would be adopted, however if the latest automation technology is used, no additional operational positions would be created.

Consideration

Construction Traffic Management

The Proponent has assessed a peak construction workforce (*i.e.* the most people working at the site at one time) of approximately 1,200 persons estimating that approximately 980 car parking spaces would be required and has committed to providing a shuttle bus if the workforce exceeds this. Notwithstanding that details of its operation are yet to be developed, the Department supports the use of a shuttle to manage traffic and recommends a condition of approval requiring development of a shuttle bus route as part of the Construction Traffic Management Sub Plan in consultation with RMS and Council.

The peak construction period is likely to commence at year two of construction and continue for four to five years. The Department considers that assessing an impact of 1,200 construction workers travelling to and from site is appropriate and notes that traffic surveys completed in 2011 identified a combined construction workforce for the KCT and NCIG projects. While natural traffic growth is expected over time (*i.e.* whether or not the proposal proceeds), it is noted that construction at KCT and NCIG are likely to be complete before peak construction of the proposal is reached.

Signalising the Cormorant and Pacific National Access Road and the NCIG Wharf Access Road intersections would improve their operation (LoS A to C instead of LoS E to F depending on the time of day). It is also noted that the detailed design of the Cormorant and Pacific National Access roads intersection would be finalised before construction commenced and timing of its implementation determined in consultation with the RMS. The Department is of the opinion that the signalised intersection should be operational before the peak construction workforce is required, however it is acknowledged that there are plans for duplication of Cormorant Road which may dictate the implementation of signalisation (refer below).

The commitment to stagger shift times so as to avoid the 4 to 5 pm peak where possible is supported. This may mitigate traffic congestion at the Industrial Drive and Tourle Street, Cormorant and Pacific National Access roads and the Teal and Raven streets (left turn) intersections. Notwithstanding, Newcastle City

Council and several public submissions suggested that this may be an unrealistic way to manage traffic congestion. The Department considers that it would be possible to stagger vehicle departures and should be implemented. To this end, a condition of approval requiring the Proponent, in consultation with RMS and Council, to develop a construction Traffic Management Plan to manage construction traffic impacts including proposed management of vehicles leaving the site.

The Department considers that while construction traffic would add to baseline traffic congestion in the area, impacts are expected to be temporary; similar to those experienced during the expansion of the KCT and NCIG projects; and reasonably accommodated by an improved road network with the implementation of the proposed mitigation measures and statements of commitment, in consultation with RMS.

Duplication of Tourle Street and Cormorant Road, Kooragang

The Roads and Maritime Services (RMS) proposes to duplicate Tourle Street and Cormorant Road to accommodate current and projected traffic volumes. The duplication is at concept design stage with the preferred option being a 3.8 km duplication between Industrial Drive and Egret Street providing two lanes in each direction and a new two lane bridge on the western side of the existing Tourle Street bridge.

The Department notes that the duplication would address the deterioration in level of service at intersections where this is driven by an increase in background traffic (irrespective of the Proposal), such as that experienced at the Cormorant and Delta EMD Access Roads. While the road upgrade is currently unfunded and the timing uncertain, there is potential that it could coincide with the construction of this Proposal.

The Department is supportive of, and recommends, the Proponent continue ongoing consultation with RMS and, should the construction of the Proposal coincide with the road duplication, actively seek to work collaboratively with RMS in order to manage cumulative construction impacts.

5.9. Visual

The Proponent proposes to minimise visual amenity impacts through the planting of vegetation screening, applying colour paint treatments to elevated infrastructure and implementing lighting controls to minimise light spill and glow.

The landscape of the Proposal area ranges from areas of high scenic value (estuaries and wetlands) to less scenic (industrial areas). There will be views of the Proposal (coal stockpiles and elevated infrastructure) from areas immediately adjacent, elevated locations up to three kilometres to the south and potentially from Ash Island and parts of the Hunter Wetlands National Park. Whilst there would be some visual impact upon views from the Hunter River mouth headlands, these would be reduced by the increased distance form the Proposal (~six kilometres) and intervening industrial development. The assessment of the Proposal's visual impact found that most viewers would experience low levels of visual change with four viewpoints being significantly affected (Braye Park, Waratah West (refer **Figure 25**); Bull Street, Mayfield West (refer **Figure 26**); Fort Scratchley, Newcastle (refer **Figure 27**) and Tourle Street Bridge (refer **Figure 28**).

The Proposal is located in an area already used predominantly for industrial purposes, so this would not change the immediate landscape. The Department understands that the configuration and requirements of the Proposal are such that avoidance of impacts to the visual landscape is not possible and that the impacts have been minimised where possible. The Proponent has committed to minimising impacts through the planting of vegetation screening, applying colour paint treatments to elevated infrastructure to better integrate with the existing environment and implementing lighting controls to minimise light spill and glow. The Department has recommended conditions to this effect, including a recommendation that the Proponent ensure all external lighting is mounted, screened, and directed so as not to create a nuisance to surrounding land uses in general accordance with *AS 4282 – 1997 Control of the Obtrusive Effects of Outdoor Lighting*.

Figure 25: Existing & predicted view from Braye Park, Waratah West (*Source: T4 Project EA*)

Figure 26: Existing & predicted view from Bull Street, Mayfield West (*Source: T4 Project EA*)

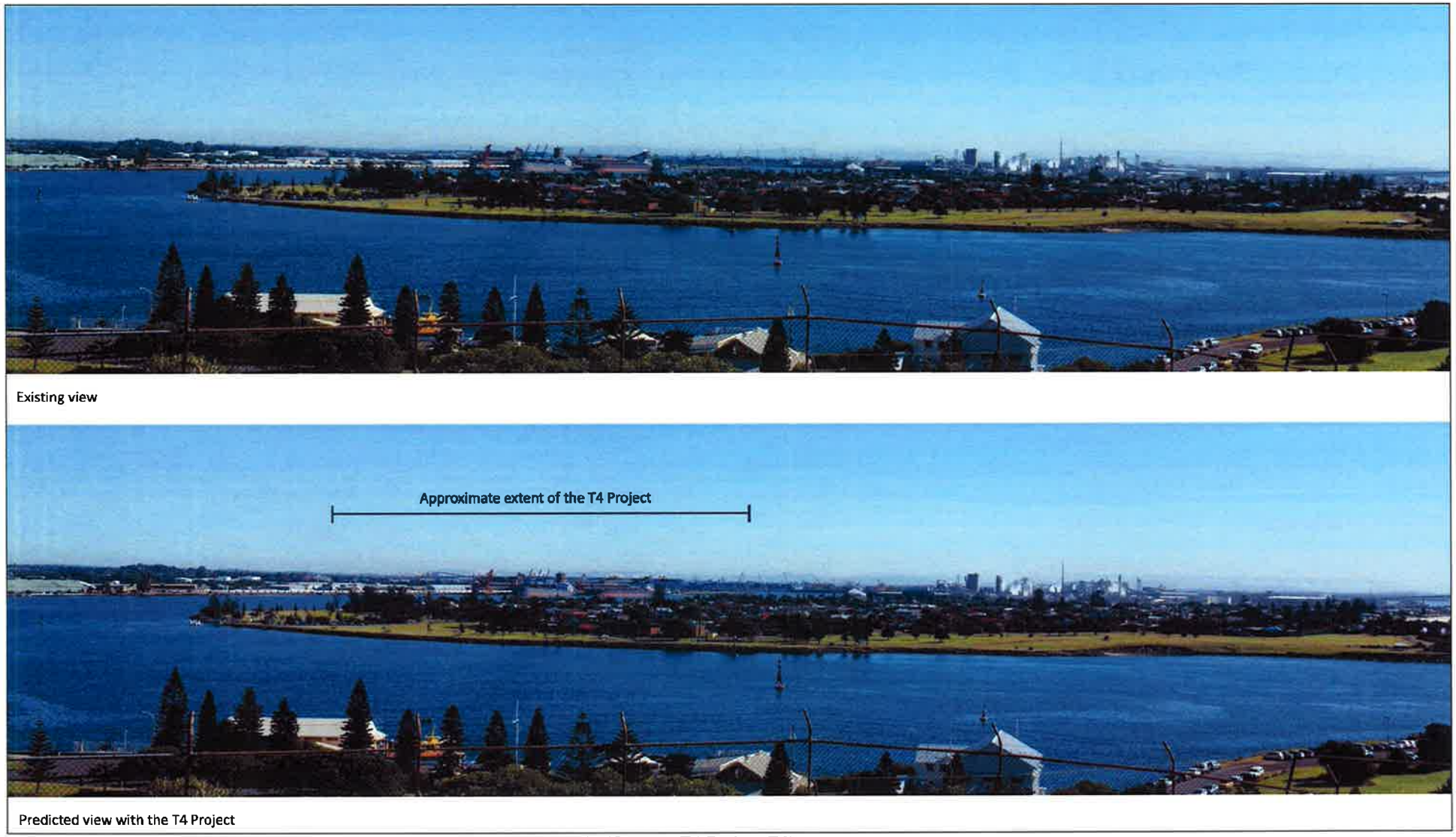

Figure 27: Existing and predicted view from Fort Scratchley, Newcastle (*Source: T4 Project EA*)

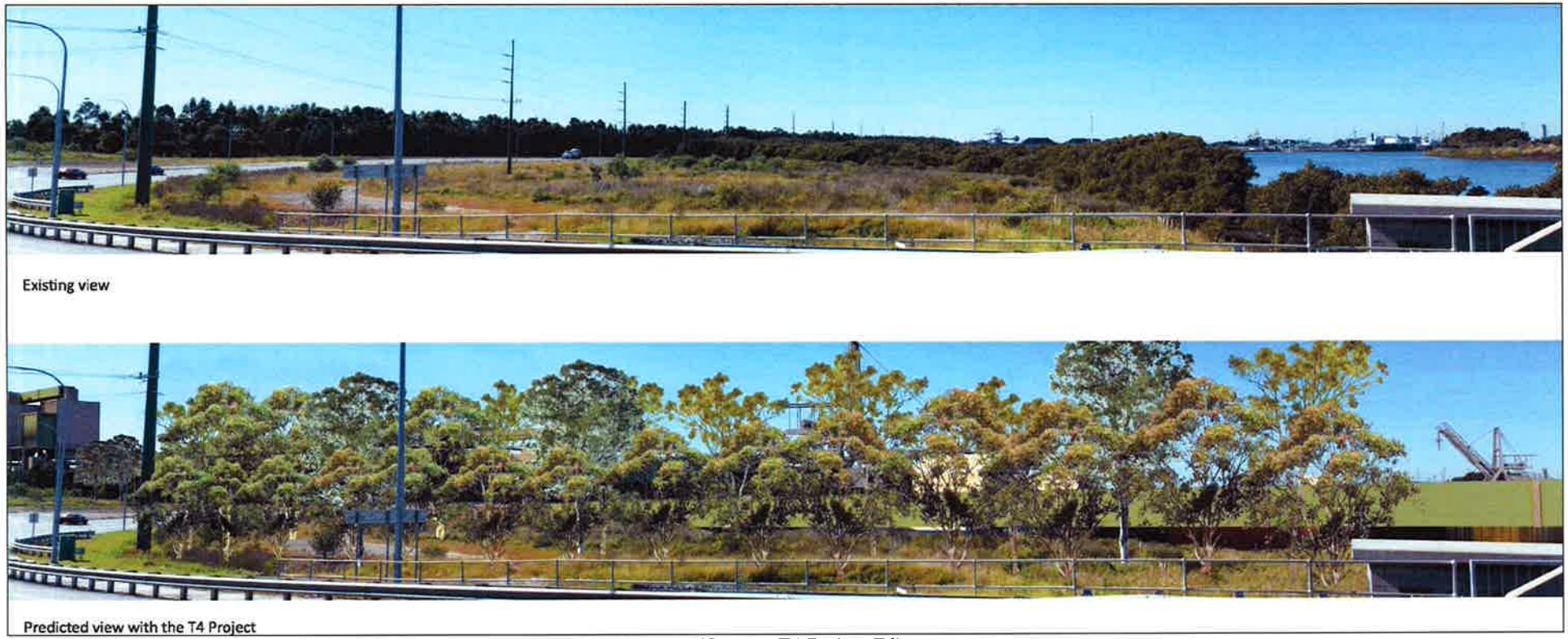

Figure 28: Existing and predicted view from Tourle Street Bridge, Newcastle (*Source: T4 Project EA*)

5.10. Other Matters

A number of other matters were raised in submissions to the EA and Preferred Project Report. The Department has considered those issues below.

Table 10: Other Matters

Issue	Potential Impact and Consideration	Conclusion and Recommendation
Greenhouse Gas	An energy and greenhouse gas assessment of the modified design was prepared by Environ. The Proponent's assessment calculates direct and indirect greenhouse gas emissions associated with the modified project (70Mtpa), including "scope 1' emissions (from sources owned and controlled by PWCS); 'Scope 2" (from consuming purchased electricity); and 'Scope 3' (indirect upstream and downstream activities) in accordance with relevant national and international standards. Annual Scope 1 and 2 emissions would contribute approximately 0.0002 per cent to current global, 0.01 per cent to national and 0.05 per cent to NSW CO2-e emissions or 0.0001 per cent, 0.01 per cent or 0.04 per cent respectively to 2030 mid-range projected emissions. Scope 3 emissions are considered further in **Section 5.1**.	The Proponent has committed to a range of strategies to minimise or optimise energy use during construction and operation such as selecting energy efficient equipment and lighting and optimising feed rates, investigating low GHG emission fuel for the project's fleet and establishing a reduction target and monitoring plan. To strengthen this commitment, a condition is recommended which requires preparation of an Energy Efficiency Plan confirming the measures to be implemented to minimise the energy use and greenhouse emissions attributable to the project and to explore the opportunities to use renewable energy sources.
Social	An assessment of social and economic impacts considered economic, human, physical, social and natural socio-economic aspects. Newcastle, the surrounding Hunter Region and NSW are expected to benefit economically from the Proposal through the export of coal, employment (up to 80 employees during operation and 1,511, based on figures in the EA, during the peak construction period) and other direct and indirect opportunities. The greatest potential impact to the region was considered to be the availability of housing and accommodation. Under all scenarios considered during peak construction, Newcastle LGA is expected to have capacity to provide sufficient long term rental properties (approximately 17 percent of available properties) and properties for sale (approximately five percent of available properties) to satisfy demand. Under a worst case scenario, for short-term accommodation, it was estimated that there would be a shortfall of 200 short-term accommodation options in the Newcastle LGA which could result in flow on effects to the rental market. The Department does accept that there is the potential for increased pressure on short term and rental accommodation should a large number of employees temporarily relocate to the Newcastle LGA. However, the Department also notes that the current PWCS workforce is distributed throughout the Hunter Region comprising of 42 percent living in the Newcastle LGA, 34 percent in Lake Macquarie, 11 percent Port Stephens and the remainder in other surrounding areas and expects that future employees would not all reside within the Newcastle LGA.	The Department acknowledges that the Proposal would generate an economic benefit during the construction and operation phases of the project, with the Hunter Region benefiting from increased employment, procurement and other more indirect business opportunities. There is a high likelihood that the workforce will consist of local residents already residing in the region with the required expertise and skills due to the presence of the coal industry. The Department does however, note the potential for impacts to housing and accommodation in the region should the majority of operation and construction employees relocate to the region on either a short term or longer term basis. The Proponent's commitment to prepare a Social Impact Management Plan including a Kooragang 2030 strategy, community investment strategies and to complete a housing and accommodation study closer to the start of construction is supported. The Department acknowledges that projects of this scale have positive and negative social impacts as also reflected by the submissions received. There is likely to be a range of social impacts the greatest of these being pressure on housing and accommodation as considered above. Other impacts to quality of life and the potential for the project to create conflicts between the community, industry and regional businesses are, on balance, likely to be minimal, considering that the Proposal is located on industrial port land and will utilise existing rail and road infrastructure. The Proposal is also expected to contribute positively to employment directly, particularly during construction, and indirectly along the Hunter Valley Coal Chain.

Issue	Potential Impact and Consideration	Conclusion and Recommendation
Development Contributions	In considering the submission and further correspondence from NCC regarding a Voluntary Planning Agreement and Council's request for a development contribution to be specified. The Department notes the Proponent's willingness to enter into a voluntary planning agreement.	In relation to development contributions, the Department has considered the Proponent's *Results of technical assessments to assist in determining a voluntary planning agreement* (EMM, 2014) that identifies the likely social impacts of the proposal on the region. Based on the impacts identified in that report, the Department is of the opinion that a modest contribution is appropriate and supports the Proponent's commitment to entering into a Voluntary Planning Agreement with Newcastle City Council. The Department also notes the difficulty in calculating a reasonable contribution based on a section 94A Contributions Plan when the Capital Investment Value is very large. In this instance, and given the limited impacts of the Proposal, the Department considers that the payment of a contribution equal to one percent of the total of Council's works schedule and new public facilities as listed in Appendices A and B of the *Section 94A Development Contributions Plan 2009* ($528,140) is reasonable. A condition of approval to that effect is recommended.
Heritage	An assessment of heritage found no specific Aboriginal or Non-Aboriginal cultural heritage values at the Proposal Site or the Tomago Offset Site. Given this, the significantly disturbed state of the Proposal site, and the low archaeological potential of the Tomago Offset Site, the Department considers that the impacts upon heritage values of the Proposal would be negligible. A submission received identified two palm trees that may be remnants of the former Towns farm. These trees are within the direct disturbance footprint of the Proposal and would require removal. Whilst these trees are not presently listed as heritage items, the Proponent has committed to an investigation of their heritage significance.	The Department recommends that a summary of the findings be provided to the OEH (Heritage Division) for consideration, following investigation and prior to removal. If these items are deemed significant, a Heritage Management Plan would be required to be developed in consultation with the NSW Heritage Branch and relevant Council. Subject to the implementation of these measures the Department is satisfied that impacts to Aboriginal and Non-Aboriginal cultural heritage would be minimised.
Hazard and Risk	Potentially hazardous materials likely required as part of the Proposal are diesel, petrol, hydrocarbons (oil) and gas cylinders. Potential hazards identified related to the following elements/activities: • diesel, petrol, hydrocarbon and gas use and storage facilities (e.g. fires and leaks/spills); • general operations, including construction activities (e.g. conveyor or stockpile fires, vehicle fires and leaks/spills); • failure of water management systems and spills; and • rail operations (e.g. leaks/spills). To minimise the potential for hazardous events, hazard treatment measures would be adopted for the Proposal.	The Department recognises the potential hazards associated with the Proposal and notes that the Proponent would undertake activities to manage risks associated with the potentially hazardous materials on the site. These would include: • Maintenance of mobile and fixed plant and equipment in accordance with the manufacturer's recommended maintenance schedule, and consistent with the maintenance schemes required by relevant standards. Only vehicles permitted to carry dangerous goods would be used for the transport of potentially hazardous materials. • Staff Training – Operators and drivers would be trained and (where appropriate) licensed for their job descriptions. Only those personnel licensed to undertake skilled and potentially hazardous work would be permitted to do so. • Engineering Structures – Civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards. • Contractor Management – All contractors employed would be required to operate in accordance with the relevant Australian Standards, NSW Legislation and relevant management plans of PWCS. • Storage Facilities – Storage and usage procedures for potentially hazardous materials (i.e. fuels and lubricants)

Issue	Potential Impact and Consideration	Conclusion and Recommendation
		would be developed in accordance with Australian Standards and relevant legislation. • Emergency response – emergency response procedures manuals and systems will be implemented. In addition to these measures the Department has also recommended conditions of approval to further ensure that hazards on site are appropriately managed. Subject to the implementation of the above measures and the recommended conditions the Department is satisfied that the hazards can be appropriately managed to avoid offsite impacts.

6. CONCLUSION

Port Waratah Coal Services proposes to construct and operate a 4th coal export terminal in the Port of Newcastle with a capacity to export up to 70 Million tonnes of coal per annum. The facility would operate as an 'open access terminal', meaning access to terminal facilities would be available to operators wanting to export coal, thereby enabling greater efficiencies in the Hunter Valley Coal Chain.

The Port of Newcastle is recognised by the government as a major strategic asset for the NSW economy. Newcastle is the world's largest coal export port, exporting over 134 million tonnes of coal per annum in 2012, and handling over $20 billion in general trade annually. The Government has taken strategic planning steps to ensure the Port asset is preserved and can accommodate growth. This commitment is demonstrated through a planning framework which includes the NSW Freight and Ports Strategy and the identification of Newcastle Port as a 'State Significant Site'.

The Department is satisfied that the Proposal supports the State Government's objective and planning for the port and the coal chain in general. The proposal is justified on the grounds that it will enable the coal chain to meet forecast export demand of coal through Newcastle Port. Fluctuations in the coal market may delay the requirement for the Proposal, but are unlikely to remove its need. Given this, and the long lead times and significant financial investment required for the project, it is prudent to have the matter determined now.

The Department's assessment has considered all relevant documentation including submissions received from public agencies and the community. In this respect the Department has also carefully considered the key areas of concern, including lack of justification, upstream and downstream impacts including greenhouse gas emissions and associated impacts to climate change, biodiversity impacts and project specific amenity impacts, particularly in relation to air quality and noise.

The Department's assessment concludes that the construction and operation of the Proposal would meet key environmental and amenity criteria. In addition, the Department considers the Proposal to be relatively well located given its proximity to shipping channels, rail lines, separation from sensitive receivers and appropriate zoning. Further, there is a range of mitigation and management measures that would be imposed to ensure appropriate environmental performance in both the short and long term.

The Proposal is consistent with the Government's strategic objective to maintain the Port's competitiveness in the global export market by increasing capacity and efficiency. The Proposal would also have substantial economic benefits for Newcastle, the State and Australia with the direct investment of $4.8 billion; generate 1500 positions during construction and up to 80 positions during operation; provide for the upgrade of local road infrastructure; result in the remediation of contaminated land and its return to productive use; and provide for the payment of $528,140 in local developer contributions to Newcastle City Council.

In addition, the Proponent has committed significant funds to biodiversity matters including the purchase of three biodiversity offset sites totalling 851 hectares, along with contributions to research programs and ongoing management funds.

Given the above the Department is confident that the Proposal could proceed with minimal adverse environmental impacts whilst realising significant benefits to the local, regional State and National economies.

7. RECOMMENDATION

With regard to the PWCS Coal Terminal 4 project application, it is recommended that the Planning Assessment Commission consider the preliminary findings and recommendations of this report in its Review of the Proposal.

26.6.14

Director
Infrastructure Projects

26.6.14

Executive Director
Development Assessment Systems
and Approvals