

**Environment Protection and Biodiversity Conservation Act
1999**

Referral Form

1. Contacts and proponent

1.1 Person making the referral

Mr Robert Yeates
Project Director – Newcastle Coal Export Terminal
Newcastle Coal Infrastructure Group Pty Limited
Post Office Box H287
Australia Square
SYDNEY NSW 1215
Telephone: 02 4929 3479

1.2 Person(s) proposing to take the action

Newcastle Coal Infrastructure Group Pty Limited (NCIG) is a consortium of the following six companies: Hunter Valley Energy Coal Limited, Centennial Coal Company Limited, Donaldson Coal Pty Limited, Excel Coal Limited, Felix Resources Limited (formerly White Mining Limited) and Whitehaven Coal Mining Pty Ltd.

See contact details above.

1.3 Person(s) who will be the proponent for the action

As above in 1.2.

2. Description of the proposal

2.1 Provide a *summary description* of the action

The referral is for the proposed development of a 66 million tonnes per annum (Mtpa) Coal Export Terminal (CET) (the Project), including associated rail and coal handling infrastructure and wharf/shiplading facilities on the south arm of the Hunter River.

2.2 Details of the *location* of the project area

The Project is located on Kooragang Island within the Newcastle Local Government area (Newcastle LGA) in New South Wales (NSW). The Project is located approximately 6 kilometres (km) to the north-west of the Newcastle Central Business District (Figure 1).

The Project site is greater than 1 km² (i.e. the Project site is approximately 180 hectares [ha] in area) and is located within the following area coordinates:

Latitude (S)	Longitude (E)
-32 52 18	151 43 5
-32 53 12	151 43 5
-32 52 24	151 46 18
-32 51 54	151 43 25

Note: Conservative area co-ordinates have been provided to incorporate the CET and associated rail and coal handling infrastructure and wharf/ship loading facilities and surrounding areas.

2.3 Provide the *timeframe* in which the action is proposed to occur. Include start and finish dates where applicable.

Construction of the CET is scheduled to commence in the first quarter of 2007 (assuming that the CET is approved in 2006). An initial 33 month construction phase is expected for a Project capacity of 33 Mtpa. The timing of further development of the Project capacity up to 66 Mtpa would depend on coal market demand. The Project life is expected to exceed 30 years.

2.4 Provide a *description* of the action, including *all activities* proposed to be carried out as part of the proposed action.

The Project comprises the following key components (Figure 2):

- foundation preparation/capping of a rail corridor traversing the existing Kooragang Island Waste Emplacement Facility (KIWEF) for the development of the rail spurs, rail sidings and rail loops;
- construction of rail spurs, rail sidings and rail loops, rail overpass, train unloading stations and connecting conveyors;
- re-use of dredged materials from the south arm of the Hunter River as pre-load and engineering fill for construction of the coal storage area, rail corridor and wharf facilities;
- construction of a coal storage area including coal stockpiles, conveyors, transfer points and combined stacker/reclaimers;
- construction of wharf facilities, shiploaders, conveyors and buffer bins;
- development of water management infrastructure including site drainage works, stormwater settlement ponds, primary and secondary settling ponds, site water pond, water tanks and stockpile spray system;
- installation of electricity reticulation and control systems;
- development of access roads and internal roads;
- construction of administration and workshop buildings;
- other associated minor infrastructure, plant, equipment and activities; and
- operation of the CET up to a capacity of 66 Mtpa, including the unloading of coal trains the stockpiling of coal, and the loading of coal to ships via the wharf facilities and shiploaders.

The Project also includes measures to enhance/create habitat for the Green and Golden Bell Frog and potential habitat for shorebirds on lands adjacent to the Project site.

A detailed description of the proposed activities associated with the Project is provided in Section 2 of the Project Environmental Assessment (EA). A description of the proposed measures to enhance/create habitat for the Green and Golden Bell Frog and shorebirds is provided in Section 4 of the EA (Attachment A). The main proposed activities are also described below.

Train Unloading

Coal trains would enter the Project site from the Kooragang Island mainline, travel along the Project rail spurs and empty their coal wagons into one of the two train unloading stations (Figure 2 and Figure 2-2 of the Project EA) (Attachment A). Empty trains would then travel around the Project rail loops in a clockwise direction and rejoin the Kooragang Island mainline. Train signalling would manage the interaction of the Project rail traffic with other traffic on the Kooragang Island mainline.

A description of train unloading stations is provided in Section 2.4.2 of the Project EA (Attachment A). Each train unloading station would have a capacity of up to approximately 8,500 tonnes per hour (tph).

The Project would receive coal by rail transportation only. Based on a nominal 7,000 tonne (t) capacity train, an average of approximately 26 trains would be unloaded each day. Allowing for the time taken to manoeuvre trains and equipment, the Project infrastructure would have a capacity to receive up to a maximum of 40 trains on any one day.

Coal Handling/Stockpiling

Coal would be transferred from the train unloading stations to the coal storage area for stockpiling via stacking conveyors or conveyed directly to the wharf facilities and shiploaders. Up to four combined stacker/reclaimers would be used to stack coal onto the coal stockpiles and reclaim coal via bucket-wheel. The combined stacker/reclaimers would each have a stacking capacity of up to 8,500 tph and a reclaiming capacity of up to 10,500 tph. Coal would be reclaimed from the coal storage area and conveyed to the wharf facilities and shiploaders, as required.

Shiplading

At a maximum capacity of 66 Mtpa the Project infrastructure would include two shiploaders to service the three berths. Shiploaders would operate at approximately 10,500 tph nominal capacity, peaking at up to 12,500 tph when drawing coal from the buffer bins. Based on a 180,000 t capacity ship, and allowing for the time taken to manoeuvre ships and equipment, up to approximately 12 ships would be loaded per week.

Habitat Creation/Enhancement

Habitat creation for the Green and Golden Bell Frog and enhancement of habitat for shorebirds would be funded as part of the Project.

Green and Golden Bell Frog Habitat

A financial contribution would be made towards current or future projects which involve habitat creation for the Green and Golden Bell Frog on Regional Land Management Corporation (RLMC)-owned lands within the Kooragang Wetland Rehabilitation Project (KWRP) or alternate suitable lands in the Kooragang Nature Reserve. Habitat creation would be located on the perimeter of existing habitat areas to provide suitable habitat into which the existing Green and Golden Bell Frog population can expand. This habitat creation would also create an opportunity to research the performance of alternative types of habitat enhancement.

Habitat creation initiatives for the Green and Golden Bell Frog would include construction of two habitat ponds of similar scale and detail to existing ponds where the Green and Golden Bell Frogs have been recorded on the KIWEF site. This is consistent with the recovery strategies (i.e. *habitat rehabilitation/restoration and/or regeneration* and *monitoring*) identified by the Department of Environment and Conservation (DEC) to help recover the Green and Golden Bell Frog (DEC, 2005).

Shorebird Habitat

Mangroves in the Hunter Estuary have been expanding at the expense of saltmarsh and, in some areas (e.g. Ash Island), mangroves have been removed to enhance habitat for saltmarsh and shorebirds.

A financial contribution would be made to an organisation such as the KWRP for the removal of up to 6 ha of mangroves from saltmarsh habitat. A financial contribution would also be made towards the construction of a flow control structure to minimise the potential for mangrove propagules to enter areas reserved for saltmarsh. Alternatively, these initiatives may also be applied to lands within the Kooragang Nature Reserve. These works are expected to enhance habitat for shorebirds as well as provide habitat for saltmarsh.

In addition, habitat in the form of shallow areas for foraging shorebirds would be created during the construction of the northern rail spur embankment, if required to be installed when the Project is fully developed to 66 Mtpa, by modifying the design of the embankment batter slopes to have a gentle toe gradient (i.e. in the submerged zone of the batter slope). This would result in the creation of shallow areas suitable for shorebirds in Deep Pond (Figure 3).

2.5 Provide an *explanation of the context* in which the action is proposed to take place, including any relevant planning framework (for example, relevant management plans or State or Local Government approvals). Indicate whether, and in what way, the action is *related to other actions or proposals* that may have already occurred, are occurring, or are likely to occur, at a future date. You should also provide the name(s) of the Local Council and/or Local Government Area the action will take place in, if relevant.

In July 2005, NCIG submitted the Project EA (NCIG, 2006 provided as Attachment A) under the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Project is a major project under Part 3A of the EP&A Act and therefore the NSW Minister for Planning is the approval authority for the Project. The Project EA is expected to go on public exhibition in August 2006. The Project Application was submitted December 2005.

Consultation undertaken for the EA included consultation with members of the public, relevant non-government organisations and Government agencies. Government agencies consulted with included the Premiers Department, Department of Planning [DoP], DEC, NSW Maritime Authority, Department of Primary Industries [DPI], The Australian Rail and Track Corporation [ARTC] and Newcastle Port Corporation [NPC]).

As previously stated, the Project is located within the Newcastle LGA. Environmental planning instruments relevant to the Project include the *Hunter Regional Environmental Plan, 1989*; *Newcastle Local Environmental Plan, 2003* (Newcastle LEP); *State Environmental Planning Policy (SEPP) (Major Projects) 2005*; *SEPP No. 11 (Traffic Generating Developments)*; *SEPP No. 14 (Coastal Wetlands)*; *SEPP No. 33 (Hazardous and Offensive Development)*; *SEPP No. 55 (Remediation of Land)*; *SEPP No. 71 (Coastal Protection)*; *SEPP No. 74 (Newcastle Port and Employment Lands)*; *Newcastle Development Control Plan* and Section 94 Contribution Plans.

Other actions which will occur in the vicinity of the Project (but which are not part of the Project and therefore the potential impacts from these actions are not considered in this EPBC referral) are:

- Dredging the south arm of the Hunter River, within the area shown on Figure 1 as southern arm dredging DA-134-3-2003-i. This work has already been approved under the NSW planning regime. The NSW Maritime Authority holds a development consent for this work. The dredging would occur prior to the construction of the wharf/ship loading facilities. The proposed action to dredge the south arm of the Hunter River in Newcastle, NSW, including the construction of a swing basin, remediation of contaminated sediments on land and associated activities was referred to the Department of the Environment and Heritage (DEH) on the 5 February 2003 by the NPC. The Minister's decision on approval of the action is yet to be made.
- Sea dumping material from the dredging operation. The disposal of material offshore is subject to a separate Commonwealth approval process under the *Environment Protection (Sea Dumping) Act 1981* and therefore requires a separate application to the DEH. The application was submitted on 12 December 2003 by the NPC. The sea dumping application is currently under consideration by the DEH.

The Project would receive coal from coal mines in NSW for export to countries such as Japan, South Korea and Taiwan, with strong demand also forecast for Malaysia, where it is anticipated that it would be used for purposes such as power generation and steel manufacturing.

2.6 If you are considering making a referral of a stage or component of a larger action, you must provide information about the larger action and details of any interdependency between the stages/components and the larger action. If appropriate, you may also provide justification as to why you believe it is reasonable for the proposed action, that is the subject of this referral, to be considered separately from the larger proposal (see the Referral Guide).

The Project is not a component of a larger action. All components of the Project have been assessed in this referral.

3. Description of the project area and the affected area

3.1 Describe the affected area referring, as appropriate, to attached maps, plans and aerial photos. In particular, indicate on the map the location of any of the following features: World Heritage properties, National Heritage places, Ramsar wetlands, listed threatened species or communities and/or known habitat for these species or communities, listed migratory species and/or known habitat for these species, Commonwealth marine areas and Commonwealth land, listed Commonwealth Heritage places, conservation reserves/parks, and areas of remnant native vegetation.

World Heritage Properties

No World Heritage Properties are located in the vicinity of the Project. The Greater Blue Mountains World Heritage Area and the Central Eastern Rainforest Reserves (Australia) are the nearest World Heritage Properties and are located approximately 60 km to the west and north of the Project site, respectively.

National Heritage Places

No National Heritage Places are located in the vicinity of the Project. The nearest National Heritage Places are located approximately 160 km south-west of the Project site in Sydney (*viz.*, Kurnell Peninsula, Sydney Opera House, First Government House and North Head, Sydney).

Ramsar Wetlands

The Hunter Estuary Wetlands are listed as a Wetland of International Importance under the Ramsar Convention (DEH, 2002). For the purposes of the Ramsar listing, the Hunter Estuary Wetlands consists of Kooragang Nature Reserve and Shortland Wetlands (DEH, 2002) (Figure 1). The Project site is situated approximately 1 km to the south of the main area of Kooragang Nature Reserve, approximately 500 metres (m) to the east of a smaller area of Kooragang Nature Reserve adjacent to the south arm of the Hunter River and approximately 1.5 km to the east of Shortland Wetlands (Figure 1).

Threatened Species or Communities and/or Known Habitat for these Species or Communities

The Environment Protection and Biodiversity Conservation Act (EPBC Act) on-line database lists ten EPBC Act listed threatened flora species and 44 threatened fauna species and/or their habitats that may potentially occur in a search area of 400 km² surrounding the Project site (Attachment B). The EPBC Act on-line database lists no threatened ecological communities and/or their habitats that may potentially occur in the vicinity of the Project. Targeted surveys were conducted as part of the Project EA and included:

- targeted survey for the Green and Golden Bell Frog (*Litoria aurea*) (Connell Hatch, 2006a);
- Shorebird Study and Habitat Assessment (Avifauna Research and Services, 2006); and
- vegetation survey (Connell Hatch, 2006b).

A number of flora and fauna surveys and assessments have been undertaken within the Project site and surrounds in the past including those by Protech Steel (2001), RLMC (2003), Umwelt (2003a), Cargill (2005), and Department of Commerce (2005).

A number of additional reference sources containing database records (e.g. DEC Atlas of NSW Wildlife [2006a], Birds Australia [2006], Australian Museum [2006] and Hunter Bird Observers Club [2006]) have been reviewed and, where appropriate, included in the assessment of matters protected under the EPBC Act.

Threatened Flora Species

No threatened flora species listed under the EPBC Act were recorded by the Project vegetation survey (Connell Hatch, 2006b).

Table 1 contains a list of EPBC Act listed threatened flora species considered possible occurrences in the Project site and/or surrounds.

Table 1
EPBC Act Listed Threatened Flora Species
Considered Possible Occurrences in the Project site or Surrounds

Common Scientific Name	Scientific Name	Conservation Status ¹	EPBC Act On-line Database Search ²
Leafless Tongue-orchid	<i>Cryptostylis hunteriana</i>	V	•
Newcastle Doubletail	<i>Diuris praecox</i>	V	•
Camfield's Stringybark	<i>Eucalyptus camfieldii</i>	V	•
Earp's Gum	<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>	V	•
-	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	•
Knotweed	<i>Persicaria elatior</i>	V	•
Dwarf Kerrawang	<i>Rulingia prostrata</i>	E	•
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	V	•
-	<i>Tetradlea juncea</i>	V	•
-	<i>Rutidosis heterogama</i>	V	-

¹ Status under the EPBC Act current as at July 2006.

E Endangered V Vulnerable

² Searched using a search area of approximately 400 km² surrounding the Project site (conducted June 2006).

Threatened Fauna Species

The targeted Project surveys recorded only one EPBC Act listed threatened fauna species, namely the Green and Golden Bell Frog (*Litoria aurea*) which is listed as vulnerable. The distribution of Green and Golden Bell Frog in proximity to the Project site determined from available records (e.g. the Project surveys [Connell Hatch, 2006a], DEC [2006], Hamer [1997], Hamer [2002], RLMC [2003] and Premier's Department [2003]) is provided in Figure 4 and indicates known habitat for this species.

Table 2 contains a list of EPBC Act listed threatened fauna species recorded in the wider region surrounding the Project site.

Table 2
EPBC Act Listed Threatened Fauna Species Recorded in the Wider Region

Common Name	Scientific Name	Status ¹	EPBC Act On-line Database Search ²	DEC Atlas of NSW Wildlife ³	Birds Australia ⁴	HBOC ⁵	Project Surveys ^{6,7}	Australian Museum ⁸
Green and Golden Bell Frog	<i>Litoria aurea</i>	V	•	•	-	-	•	-
Heath Frog	<i>Litoria littlejohni</i>	V	•	•	-	-	-	-
Stuttering Frog	<i>Mixophyes balbus</i>	V	•	-	-	-	-	-
Giant Barred Frog	<i>Mixophyes iteratus</i>	E	•	•	-	-	-	-
Green Turtle	<i>Chelonia mydas</i>	V	•	•	-	-	-	-
Leatherback Turtle	<i>Dermochelys coriacea</i>	V	•	-	-	-	-	-
Loggerhead Turtle	<i>Caretta caretta</i>	E	-	•	-	-	-	-
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	V	-	•	-	-	-	-
Flatback Turtle	<i>Natator depressus</i>	V	-	•	-	-	-	-
Broad-headed Snake	<i>Hoplocephalus bungaroides</i>	V	•	-	-	-	-	-
Amsterdam Albatross	<i>Diomedea amsterdamensis</i>	E	•	-	-	-	-	-
Antipodean Albatross	<i>Diomedea antipodensis</i>	V	•	-	-	-	-	-
Tristan Albatross	<i>Diomedea dabbenena</i>	E	•	-	-	-	-	-
Wandering Albatross	<i>Diomedea exulans</i>	V	•	•	-	-	-	•
Gibson's Albatross	<i>Diomedea gibsoni</i>	V	•	-	-	-	-	-
Swift Parrot	<i>Lathamus discolor</i>	E	•	•	•	-	-	-
Southern Giant-Petrel	<i>Macronectes giganteus</i>	E	•	•	-	-	-	-
Northern Giant-Petrel	<i>Macronectes halli</i>	V	•	•	-	-	-	-
Gould's Petrel	<i>Pterodroma leucoptera leucoptera</i>	E	•	•	-	-	-	-
Blue Petrel	<i>Halobaena caerulea</i>	V	-	-	-	-	-	•
Kermadec Petrel (western)	<i>Pterodroma neglecta neglecta</i>	V	•	-	-	-	-	-
Australian Painted Snipe	<i>Rostratula australis</i>	V	•	•	•	•	-	-
Buller's Albatross	<i>Thalassarche bulleri</i>	V	•	-	-	-	-	-
Shy Albatross	<i>Thalassarche cauta</i>	V	•	•	-	-	-	-
Campbell Albatross	<i>Thalassarche impavida</i>	V	•	-	-	-	-	-
Black-browed Albatross	<i>Thalassarche melanophris</i>	V	•	•	•	-	-	-
Salvin's Albatross	<i>Thalassarche salvini</i>	V	•	-	-	-	-	-
White-capped Albatross	<i>Thalassarche steadi</i>	V	•	-	-	-	-	-
Royal Albatross	<i>Diomedea epomophora</i>	V	-	•	-	-	-	-
Sooty Albatross	<i>Phoebastria fusca</i>	V	-	•	-	-	-	-
Regent Honeyeater	<i>Xanthomyza phrygia</i>	E	•	•	•	-	-	-
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	•	•	-	-	•
Blue Whale	<i>Balaenoptera musculus</i>	E	•	-	-	-	-	-
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	•	•	-	-	-	-
Spotted-tailed Quoll (south-eastern mainland population)	<i>Dasyurus maculatus maculatus</i>	E	•	•	-	-	-	-
Southern Right Whale	<i>Eubalaena australis</i>	E	•	•	-	-	-	-
Humpback Whale	<i>Megaptera novaeangliae</i>	V	•	•	-	-	-	-
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	V	•	-	-	-	-	-
Long-nosed Potoroo	<i>Potorous tridactylus tridactylus</i>	V	•	•	-	-	-	-
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	•	•	-	-	-	-
Grey Nurse Shark (east coast population)	<i>Carcharias taurus</i>	CE	•	-	-	-	-	-
Great White Shark	<i>Carcharodon carcharias</i>	V	•	-	-	-	-	-
Whale Shark	<i>Rhincodon typus</i>	V	•	-	-	-	-	-

¹ Status under the EPBC Act current as at July 2006.

E Endangered V Vulnerable CE Critically Endangered

² Searched using a search area of approximately 400 km² surrounding the Project site, search conducted July 2006.

- 3 Searched using DEC (2006) *Atlas of NSW Wildlife - records for the Newcastle [9232], Port Stephens [9332] and Lake Macquarie [9231] 1:100,000 map sheets*. Data received 15 February 2006.
- 4 Birds Australia (2006) *Database Records for the Search Area -- -32.77 to -32.96 and 151.63 to 151.85*. Data received 17 February 2006.
- 5 Hunter Bird Observers Club (HBOC) (2006) *Database Records for Ash Island, Big Pond, Deep Pond, Fullerton Cove, Kooragang NR, Long Pond and Stockton Sand Spit*. Data received 23 March 2006.
- 6 Connell Hatch (2006a) *NCIG Kooragang Island Coal Export Terminal – Seasonal Ecological Investigations – Green and Golden Bell Frog Survey*. Revision 2.
- 7 Avifauna Research and Services (2006) *Shorebird Study and Habitat Assessment NCIG Project, Kooragang Island*. Final Report.
- 8 Australian Museum (2006) *Database Records for the Search Area – 151°38' to 151°51'E by 32°46' to 32°57'S*. Data received February 2006.

Endangered Ecological Communities

No threatened ecological communities listed under the EPBC Act were recorded by the Project vegetation survey (Connell Hatch, 2006b). As previously mentioned, the EPBC Act on-line database lists no threatened ecological communities and/or their habitats that may potentially occur in the vicinity of the Project.

Migratory Species and/or Known Habitat for these Species

EPBC Act listed migratory species which have been recorded in the wider region surrounding the Project site are provided in Table 3.

Table 3
Migratory Species Recorded in the Wider Region

Common Name ¹	Scientific Name	DEC Atlas of NSW Wildlife ²	Project Surveys ³	Australian Museum ⁴	Birds Australia ⁴	HBOC ⁵
Loggerhead Turtle	<i>Caretta caretta</i>	•	-	-	-	-
Green Turtle	<i>Chelonia mydas</i>	•	-	-	-	-
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	•	-	-	-	-
Flatback Turtle	<i>Natator depressus</i>	•	-	-	-	-
Garganey	<i>Anas querquedula</i>	•	-	-	-	-
Royal Albatross	<i>Diomedea epomophora</i>	•	-	-	-	-
Wandering Albatross	<i>Diomedea exulans</i>	•	-	•	-	-
Sooty Albatross	<i>Phoebastria fusca</i>	•	-	-	-	-
Southern Giant-Petrel	<i>Macronectes giganteus</i>	•	-	-	-	-
Northern Giant-Petrel	<i>Macronectes halli</i>	•	-	-	-	-
Providence Petrel	<i>Pterodroma solandri</i>	•	-	•	-	-
Gould's Petrel	<i>Pterodroma leucoptera leucoptera</i>	•	-	-	-	-
Black Petrel	<i>Procellaria parkinsoni</i>	•	-	-	-	-
Westland Petrel	<i>Procellaria westlandica</i>	•	-	-	-	-
Streaked Shearwater	<i>Calonectris leucomelas</i>	•	-	-	-	-
Wedge-tailed Shearwater	<i>Puffinus pacificus</i>	•	-	-	•	-
Sooty Shearwater	<i>Puffinus griseus</i>	•	-	-	-	-
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>	•	-	-	•	-
Flesh-footed Shearwater	<i>Puffinus carneipes</i>	•	-	-	-	-
Wilson's Storm-Petrel	<i>Oceanites oceanicus</i>	•	-	-	-	-
Glossy Ibis	<i>Plegadis falcinellus</i>	•	-	-	•	-
Cattle Egret	<i>Bubulcus ibis</i>	•	•	•	•	•
Eastern Reef Egret	<i>Egretta sacra</i>	•	-	-	-	-
Great Egret	<i>Ardea alba</i>	•	•	-	•	•
Lesser Frigatebird	<i>Fregata ariel</i>	•	-	-	-	-
Brown Booby	<i>Sula leucogaster</i>	•	-	-	-	-

Table 3 (Continued)
Migratory Species Recorded in the Wider Region

Common Name ¹	Scientific Name	DEC Atlas of NSW Wildlife ²	Project Surveys ³	Australian Museum ⁴	Birds Australia ⁴	HBOC ⁶
Osprey	<i>Pandion haliaetus</i>	•	-	-	•	•
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	•	•	-	•	•
Pacific Golden Plover	<i>Pluvialis fulva</i>	•	-	•	•	•
Grey Plover	<i>Pluvialis squatarola</i>	•	-	-	•	•
Double-banded Plover	<i>Charadrius bicinctus</i>	•	•	•	•	•
Lesser Sand Plover	<i>Charadrius mongolus</i>	•	-	•	•	•
Greater Sand Plover	<i>Charadrius leschenaultii</i>	•	-	-	•	-
Oriental Plover	<i>Charadrius veredus</i>	•	-	-	•	-
Painted Snipe (Australian subspecies)	<i>Rostratula australis</i>	•	-	-	•	•
Latham's Snipe	<i>Gallinago hardwickii</i>	•	-	-	•	•
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	•	-	-	•	•
Black-tailed Godwit	<i>Limosa limosa</i>	•	•	•	•	•
Bar-tailed Godwit	<i>Limosa lapponica</i>	•	-	•	•	•
Little Curlew	<i>Numenius minutus</i>	•	-	-	•	•
Whimbrel	<i>Numenius phaeopus</i>	•	-	-	•	•
Eastern Curlew	<i>Numenius madagascariensis</i>	•	-	•	•	•
Marsh Sandpiper	<i>Tringa stagnatilis</i>	•	•	•	•	•
Common Greenshank	<i>Tringa nebularia</i>	•	•	•	•	•
Wood Sandpiper	<i>Tringa glareola</i>	•	-	-	•	•
Terek Sandpiper	<i>Xenus cinereus</i>	•	-	•	•	•
Common Sandpiper	<i>Actitis hypoleucos</i>	•	-	-	•	•
Ruddy Turnstone	<i>Arenaria interpres</i>	•	-	•	•	•
Great Knot	<i>Calidris tenuirostris</i>	•	-	•	•	•
Red Knot	<i>Calidris canutus</i>	•	-	•	•	•
Sanderling	<i>Calidris alba</i>	•	-	-	•	-
Red-necked Stint	<i>Calidris ruficollis</i>	•	-	•	•	•
Long-toed Stint	<i>Calidris subminuta</i>	•	-	-	-	•
Pectoral Sandpiper	<i>Calidris melanotos</i>	•	-	-	•	•
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	•	•	•	•	•
Curlew Sandpiper	<i>Calidris ferruginea</i>	•	•	•	•	•
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	•	-	•	•	•
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	•	-	-	•	•
Ruff	<i>Philomachus pugnax</i>	•	-	-	•	•
Common Tern	<i>Sterna hirundo</i>	•	-	•	•	•
Arctic Tern	<i>Sterna paradisaea</i>	•	-	-	-	-
Little Tern	<i>Sterna albifrons</i>	•	-	•	•	•
White-winged Black Tern	<i>Chlidonias leucopterus</i>	•	•	-	•	•
Caspian Tern	<i>Sterna caspia</i>	•	•	-	•	•
Common Noddy	<i>Anous stolidus</i>	•	-	-	-	-
Pomarine Skua	<i>Stercorarius pomarinus</i>	•	-	-	•	-
Arctic Skua	<i>Stercorarius parasiticus</i>	•	-	-	•	-
Long-tailed Skua	<i>Stercorarius longicaudus</i>	•	-	-	-	-
Oriental Cuckoo	<i>Cuculus saturatus</i>	•	-	-	•	-

Table 3 (Continued)
Migratory Species Recorded in the Wider Region

Common Name ¹	Scientific Name	DEC Atlas of NSW Wildlife ²	Project Surveys ³	Australian Museum ⁴	Birds Australia ⁴	HBOC ⁶
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	-	-	-	•
Fork-tailed Swift	<i>Apus pacificus</i>	•	-	-	•	-
Rainbow Bee-eater	<i>Merops ornatus</i>	•	-	•	•	-
Regent Honeyeater	<i>Xanthomyza phrygia</i>	•	-	-	•	-
Rufous Fantail	<i>Rhipidura rufifrons</i>	•	-	-	•	•
Spectacled Monarch	<i>Monarcha trivirgatus</i>	•	-	-	-	-
Black-faced Monarch	<i>Monarcha melanopsis</i>	•	-	-	•	-
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	•	-	-	•	-
Yellow Wagtail	<i>Motacilla flava</i>	•	-	-	•	•
Lesser Golden Plover	<i>Pluvialis dominica</i>	•	-	-	-	•
Clamorous Reed-Warbler	<i>Acrocephalus stentoreus</i>	•	-	-	-	•
Northern Shoveler	<i>Anas clypeata</i>	-	-	-	-	•

¹ Nomenclature for species in accordance with Clayton *et al.* (2006).

² Searched using DEC (2006) *Atlas of NSW Wildlife - records for the Newcastle [9232], Port Stephens [9332] and Lake Macquarie [9231] 1:100,000 map sheets*. Data received 15 February 2006.

³ Avifauna Research and Services (2006) *Shorebird Study and Habitat Assessment NCIG Project, Kooragang Island*. Final Report.

⁴ Australian Museum (2006) *Database Records for the Search Area – 151°38' to 151°51'E by 32°46' to 32°57'S*. Data received February 2006.

⁵ Birds Australia Database Records for the Search Area – -32.77 to -32.96 and 151.63 to 151.85. Data received 17 February 2006.

⁶ Hunter Bird Observers Club (HBOC) (2006) *Database Records for Ash Island, Big Pond, Deep Pond, Fullerton Cove, Kooragang NR, Long Pond and Stockton Sand Spit*. Data received 23 March 2006.

The EPBC Act on-line database in a search area of 400 km² lists an additional 20 migratory species and/or their habitats, namely, Amsterdam Albatross (*Diomedea amsterdamensis*), Antipodean Albatross (*Diomedea antipodensis*), Tristan Albatross (*Diomedea dabbenena*), Gibson's Albatross (*Diomedea gibsoni*), Buller's Albatross (*Thalassarche bulleri*), Shy Albatross (*Thalassarche cauta*), Campbell Albatross (*Thalassarche impavida*), Black-browed Albatross (*Thalassarche melanophris*), Salvin's Albatross (*Thalassarche salvini*), White-capped Albatross (*Thalassarche steadi*), Bryde's Whale (*Balaenoptera edeni*), Blue Whale (*Balaenoptera musculus*), Pygmy Right Whale (*Caperea marginata*), Southern Right Whale (*Eubalaena australis*), Dusky Dolphin (*Lagenorhynchus obscurus*), Humpback Whale (*Megaptera novaeangliae*), Killer Whale (*Orcinus orca*), Leatherback Turtle (*Dermochelys coriacea*), Great White Shark (*Carcharodon carcharias*) and Whale Shark (*Rhincodon typus*). The results of the database search are provided in Attachment B. All of these species are marine and are therefore unlikely to use the Project site due to lack of suitable habitat.

Commonwealth Marine Areas and Commonwealth Land

There are no Commonwealth Marine Areas located in the vicinity of the Project and the Project is not situated on Commonwealth land. The Commonwealth Marine Area generally stretches from three nautical miles to 200 nautical miles from the Australian coast (DEH, 2006a).

As discussed in Section 2.5, this EPBC referral does not consider the potential impacts associated with sea dumping of dredge spoil from dredging activities.

Commonwealth Heritage Places

There are five Commonwealth Heritage Places located in the vicinity of the Project (*viz.*, Fort Scratchley Group, Newcastle East; Fort Scratchley Above Ground Buildings, Newcastle East; Nobbys Lighthouse, Newcastle East; Fort Wallace, Stockton and Williamtown Royal Australian Air Force (RAAF) Base Group, Williamtown RAAF). The nearest Commonwealth Heritage Place is Fort Wallace, Stockton, approximately 3 km east of the Project site.

Conservation Reserves/Parks

The Project site is situated approximately 1 km to the south of the main area of Kooragang Nature Reserve, approximately 500 m to the east of a smaller area of Kooragang Nature Reserve adjacent to the south arm of the Hunter River, approximately 2.5 km to the east of Hexham Swamp Nature Reserve and approximately 1.5 km to the east of Shortland Wetlands (Figure 1). Kooragang and Hexham Swamp Nature Reserves, in addition to the Shortland Wetlands and the SEPP 14 listed wetlands associated with the lower Hunter River Estuary are listed on the Register of the National Estate (DEH, 2006a). Kooragang Nature Reserve and Shortland Wetlands are listed under the Ramsar Convention on Wetlands of International Importance (DEH, 2002) (Figure 1).

Areas of Remnant Native Vegetation

The results of the vegetation survey indicate that the Project site and surrounds is characterised by wetland habitat types varying from semi-natural to highly disturbed (Attachment A). Three main wetland types were identified in the Project site (*i.e.* ephemeral freshwater wetlands, ephemeral sedge swamps and estuarine wetlands [Connell Hatch, 2000b]). The predominant terrestrial habitat is grassland dominated by exotic pasture and landscaping species (Connell Hatch, 2006b).

As a result of the reclamation and land filling activities, the majority of the Project site has been covered with fill (Dames & Moore, 1999; NCIG, 2005). This landuse history has meant that much of the original vegetation has been covered by soil and industrial waste with consequent successional vegetation changes resulting in a series of vegetation communities dominated by weeds (Attachment A). Embankments, excavations and changed hydrological conditions have created the conditions for wetlands and marshes of varying conservation values.

Part of the Project site includes Big Pond which is highly modified, consisting of an artificially raised section, and is completely cleared of woody vegetation (Department of Commerce, 2005). The Project rail infrastructure would be constructed on land which is part of the KIWEF which is owned by the RLMC. The KIWEF is licensed as a Solid Waste Class 2 landfill under Environment Protection Licence (EPL) 6437, issued under the *Protection of the Environment Operations Act, 1997* (POEO Act).

3.2 Provide a *description of important features* of the project area and the affected area and show these on the attached map, including (if relevant to the project area or affected area) information about:

(a) Soil and vegetation characteristics

Dredge spoil and then other fill materials (e.g. coal washery rejects, steel manufacturing waste and other industrial wastes) were used to reclaim the land to form Kooragang Island. As a result of the reclamation and land filling activities, the majority of the Project site has been covered with fill (Dames & Moore, 1999; NCIG, 2005). The depth of the fill layer (depth above natural ground surface) varies from 0.5 to 3 m in the east and 0 to 10 m in the west of the Project site (Waterways Authority, 2003 and 2004; RCA Australia, 2005).

The natural soil profile underlying the reclamation fill layer across the Project site generally consists of an upper clay layer, sandy layer, lower clay layer and soft and hard rock layers. As a result of the various fill materials and the historical flow paths of the Hunter River and its tributaries the depth of each of the soil layers varies significantly across the Project site.

The Project coal storage area (Figure 2) was originally filled with dredged material from the mouth of the Hunter River approximately 45 years ago. Since then the area has been filled with miscellaneous waste materials (believed to be mainly demolition materials such as concrete, timber and rubble), additional dredge material (sourced from the Hunter River Mouth approximately 25 years ago and Throsby Creek in 1995) and a layer of blast furnace slag (Dames & Moore, 1999).

Waste disposal of by-products (eg. coal washery rejects and other wastes associated with steel production) from the BHP steel works at the KIWEF commenced in 1972 and ceased in late 1999. The composition and depth of the waste fill layer varies significantly across the site.

A description of the vegetation characteristics of the Project site is provided in Section 3.1.

(b) Water flows, including rivers, creeks and impoundments

The Project is situated on Kooragang Island which is in the Lower Hunter River system. The Hunter River catchment is one of the largest coastal basins in NSW and extends far inland (DEH, 2006a). The south arm of the Hunter River forms part of the southern boundary of the Project site (Figure 1). Surface water features on site comprise waterbodies created by the existing Kooragang Island mainline rail embankment, emplacement cells associated with the KIWEF and a number of depressions in the KIWEF landform that intermittently fill with water in response to rainfall runoff (eg. Deep Pond). Historical aerial photographs of Kooragang Island are provided in Figure 5 which show a number of ponds, including Deep Pond, did not occur in 1954 before the KIWEF was created in 1975.

(c) The presence of outstanding natural features, including caves

Outstanding natural features are natural features that are additional or different to those already described in parts (a), (b), (d) to (h) of Section 3.2, and which assist in characterising the Project site (eg. caves). No outstanding natural features occur within the Project disturbance area.

(d) Gradient

The topography of Kooragang Island (including the Project site) is generally flat and low lying. Elevations within the Project site vary from between 0.7 m to 12 m AHD across the site. There are a number of depressions that intermittently fill with surface runoff. The most notable of these depressions are Big Pond, which is located in the north-west of the Project coal storage area and Deep Pond the southern end of which would be traversed by the northern Project rail spur, should it be required when the Project is fully developed to 66 Mtpa.

(e) Any buildings or other infrastructure

No registered heritage buildings or infrastructure are located within or near the Project site.

(f) Any marine areas

As previously stated, there are no Commonwealth Marine Areas located in the vicinity of the Project.

(g) Kinds of fauna in the area

Previous fauna studies conducted in the industrial area of Kooragang Island have found few native mammals (e.g. Protech Steel, 2001; Cargill, 2005; Department of Commerce, 2005). For example, the only fauna observed in Big Pond during field surveys conducted for the Big Pond Habitat Offset Scheme (BPHOS) Report were common birds and feral mammals (Department of Commerce, 2005). Protech Steel Pty Ltd (2001) attributed the low diversity of vertebrates recorded in the area to the disturbed nature of the site, lack of refuge sites and poor vegetation structure.

A list of fauna species recorded in the Project site and immediate surrounds by previous studies (*viz.* Protech Steel [2001], Department of Commerce [2005], RLMC [2003] and Umwelt [2003a]) is provided in Appendix F of Attachment A.

(h) The current state of the environment in the area, including information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops

As a result of the reclamation and land filling activities, the majority of the Project site has been covered with fill (Dames & Moore, 1999; NCIG, 2005). This landuse history has meant that much of the original vegetation has been covered by soil and industrial waste with consequent successional vegetation changes resulting in a series of vegetation communities dominated by weeds (Attachment A). Embankments, excavations and changed hydrological conditions have created the conditions for wetlands and marshes of varying conservation values.

Part of the Project site includes Big Pond which is highly modified, consisting of an artificially raised section, and is completely cleared of woody vegetation (Department of Commerce, 2005).

The majority of the flora species recorded by the Project vegetation survey and previous studies were weeds (URS 2000 in Protech Steel, 2001; Protech Steel, 2001; Department of Commerce, 2005; Connell Hatch, 2006b). Thirteen noxious weeds listed for Newcastle City Council (NCC) were recorded within the Project site and surrounds by the Project vegetation survey (Connell Hatch, 2006b) and previous studies (URS, 2000; Protech Steel, 2001; Department of Commerce, 2005).

Noxious weeds such as Bitou Bush and Pampas Grass occur throughout the study site, the latter being particularly problematic (Connell Hatch, 2006b).

(i) Known Indigenous heritage values

No known indigenous heritage items are located within or near the Project site. A search of the NSW National Parks and Wildlife Service’s (NPWS) Aboriginal Heritage Information Management System (AHIMS) for recorded aboriginal sites in the vicinity of the Project was conducted in January 2006. The AHIMS search identified two sites (shell middens) registered for locations on Kooragang Island (Attachment A).

The closest shell midden site (NPWS No. 38-4-0041) was recorded outside the Project site, south-east of the intersection of Tourle and Cormorant Road (near the Tourle Street Bridge). The site was first recorded in March 1970 and was subsequently bulldozed approximately 30 years ago. An attempt to relocate the midden site by Umwelt and the Worimi Local Aboriginal Land Council (LALC) in 2003 was unsuccessful (Umwelt, 2003b).

The second midden site (NPWS No. 38-4-0050) is recorded in the north-east of Kooragang Island, near the mouth of the north arm of the Hunter River. The site location is well away from the Project site (approximately 1.5 km distant).

(j) Any other characteristics or important features of the receiving environment if the action is by a Commonwealth agency or may affect Commonwealth land

The action is not by a Commonwealth Agency nor is it on Commonwealth land.

3.3 What is the *tenure* of the project area (for example is it freehold, leasehold or some other tenure)? If practicable, show on the attached map.

The Project is located on lands administered by the RLMC, the Maritime Services Board of NSW and the Minister for Public Works and Services (Table 4).

**Table 4
Land Tenure Summary**

Lot/Deposited Plan (DP)	Land Administrator	Land Owner
Part of Lot 122 – DP 874949	RLMC	Crown (NSW Treasury Crown Property Portfolio)
Part of Lot 7 – DP 1015754	RLMC	Minister for Public Works and Services
Part of Lot 6 – DP 1015754	RLMC	Minister for Public Works and Services
Part of Lot 20 – DP 262325	Maritime Services Board of NSW	Maritime Services Board of NSW
Part of Lot 2 – DP 581473	Minister for Public Works and Services	Minister for Public Works and Services

NCIG executed an Agreement for Lease of the Project site on 26 August 2005. The Agreement entitles NCIG to be granted a 35 year lease subject to the satisfaction of various conditions precedent which include the procurement of the necessary approvals for the Project.

3.4 What are the current and/or proposed *land uses* for the project area?

Kooragang Island is characterised by a combination of port and industrial land uses in the south and the Kooragang Nature Reserve in the north (Figure 2). The Project site comprises part of the KIWEF and reclaimed land situated between the south arm of the Hunter River and existing industrial development on the island (Figure 2).

The Project is located on lands designated Zone 4(b) (Port and Industry), Zone 5(a) (Special Uses Zone – Arterial Road) and an unzoned area (Hunter River) under the Newcastle LEP.

4. Nature and extent of the likely impacts of the action

4.1 Describe, as relevant to your project, the nature and extent of *likely impacts* on the following matters of national environmental significance protected by the EPBC Act:

(a) *World Heritage Values of a Declared World Heritage Property*

No World Heritage properties are located in the vicinity of the Project site. The Greater Blue Mountains World Heritage Area and the Central Eastern Rainforest Reserves (Australia) are the nearest World Heritage Properties and are located approximately 60 km to the west and north of the Project site, respectively. The Project is not likely to have a significant impact on the World Heritage values of the Greater Blue Mountains World Heritage Area or the Central Eastern Rainforest Reserves (Australia) or any other World Heritage property as it is unlikely to result in:

- one or more of the World Heritage values being lost; or
- one or more of the World Heritage values being degraded or damaged.

(b) *Heritage Values of a Listed National Heritage Place*

No National Heritage Places are located in the vicinity of the Project. The nearest National Heritage Places are located approximately 160 km south-west of the Project site in Sydney (*viz.*, Kurnell Peninsula, Sydney Opera House, First Government House and North Head, Sydney). The Project is not likely to have a significant impact on the heritage values of a listed National Heritage Place.

(c) *Ecological Character of a Declared Ramsar Wetland*

The Hunter Estuary Wetlands are listed as a Wetland of International Importance under the Ramsar Convention (DEH, 2002) and are located near the Project site. For the purposes of the Ramsar listing, the Hunter Estuary Wetlands consists of Kooragang Nature Reserve and Shortland Wetlands (DEH, 2002) (Figure 1).

The Project is not likely to have a significant impact on the ecological character of this Ramsar Wetland, as it is unlikely to result in:

- areas of the wetland being destroyed or substantially modified;
- a substantial or measurable change in the hydrological regime of the wetland;
- the habitat or lifecycle of a native species dependant upon the wetland being seriously affected;
- a substantial and measurable change in the water quality of the wetland; or

- an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetlands.

This conclusion is based on the following:

- There is a buffer between the Project infrastructure and the Hunter Estuary Wetlands Ramsar Site. The Project site is situated approximately 1 km to the south of the main area of Kooragang Nature Reserve, approximately 500 m to the east of a smaller area of Kooragang Nature Reserve adjacent to the south arm of the Hunter River and approximately 1.5 km to the east of Shortland Wetlands (Figure 1).
- The site drainage network (including primary and secondary settling ponds and site water pond) would be established at the commencement of construction activities to capture site runoff and to manage sea water draining from dredged material during preloading of the coal storage area. Stormwater runoff from areas external to the Project site would be directed around the Project infrastructure areas by table drains and culverts to the existing stormwater drainage system on Kooragang Island.
- Although the Project would increase the existing level of noise, it is considered that the impact of noise generated by the Project on the fauna of the Hunter Estuary Wetlands would be minimal.
- The effect of dust caused by the Project on the health and viability of the surrounding vegetation is expected to be minimal. PWCS have conducted air quality monitoring around the Kooragang Coal Terminal since 1982 (PWCS, 1996). A dust deposition gauge and a directional dust gauge are located to the north of the Kooragang Coal Terminal in Kooragang Nature Reserve (PWCS, 1996). Results for the dust deposition gauge between 1990 and 1995 indicate that the deposition did not exceed the maximum criterion of 4 gm²month⁻¹ for residential areas (PWCS, 1996). Notwithstanding, dust controls would be employed, including watering of potential dust generating surfaces, to minimise dust emissions from the Project and associated potential impacts on surrounding vegetation.

(d) *Threatened Species (Except a Conservation-Dependant Species), Ecological Communities, and/or their Habitat*

The potential impacts of the Project on flora and fauna and their habitat are described in Section 4 of the Project EA (Attachment A).

The nature and extent of likely impacts¹ of the Project on endangered species and vulnerable species and their habitats are provided below.

A number of species listed in the tables below are aquatic species which have the potential to use habitat in the south arm of the Hunter River. As described in Section 2.4, the Project involves the construction of wharf/ship loading facilities. However, as described in Section 2.5, the south arm of the Hunter River will be dredged prior to the construction of the wharf/ship loading facilities. The dredging activities will change the potential habitat availability before carrying out the actions described in this referral. The construction of wharf facilities, shiploaders, conveyors and buffer bins is assessed as having negligible indirect sedimentation impacts on the south arm of the Hunter River.

¹ Likely Impact: An impact of the Project on the matters protected under the EPBC Act that has a real or not remote chance or possibility of occurring.

Critically Endangered and Endangered Species and/or their Habitat

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b) outlines the following criteria for determining whether an action is likely to have a significant impact on endangered species:

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of a population;*
- *reduce the area of occupancy of the species;*
- *fragment an existing population into two or more populations;*
- *adversely affect habitat critical to the survival of a species;*
- *disrupt the breeding cycle of a population;*
- *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*
- *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;*
- *introduce disease that may cause the species to decline; or*
- *interfere with the recovery of the species.*

Critically endangered and endangered species listed under the EPBC Act which have been considered possible occurrences within the wider region surrounding the Project site are listed in Tables 1 and 2. Only the Grey Nurse Shark (*Carcharias taurus*) is listed as critically endangered.

An assessment of the nature and extent of impacts of the Project on EPBC Act listed critically endangered and endangered species and their habitats is provided in Table 5. An assessment of the likelihood of the Project resulting in significant impacts on EPBC Act listed critically endangered and endangered species and their habitats is provided in Table 6. The Project is not likely to have a significant impact on any endangered or critically endangered species listed under the EPBC Act.

Table 5
Nature and Extent of Impacts on Critically Endangered and Endangered Species and their Habitats

Nature and Extent of Likely Impacts
Flora
Dwarf Kerraawang (<i>Rulingia prostrata</i>) Impacts on <i>R. prostrata</i> are unlikely, given the lack of records near the Project site and surrounds (despite a vegetation survey) and lack of potential habitat.
Fish
Grey Nurse Shark (east coast population) (<i>Carcharias taurus</i>) Impacts on the Grey Nurse Shark are unlikely given the lack of potential habitat within the Project site and surrounds.
Amphibians
Giant Barred Frog (<i>Mixophyes iteratus</i>) Impacts on <i>Mixophyes iterates</i> are unlikely given the lack of records near the Project site and surrounds (the closest record is 40 km south-west of the Project site) and lack of potential habitat.
Reptiles
Loggerhead Turtle (<i>Caretta caretta</i>) Impacts on the Loggerhead Turtle are unlikely given the lack of potential habitat within the Project site and surrounds. This species may utilise habitat within the Hunter River.
Birds
Amsterdam Albatross (<i>Diomedea amsterdamensis</i>) Impacts on the Amsterdam Albatross are unlikely given the lack of potential habitat within the Project site and surrounds. According to the <i>Recovery Plan for Albatrosses and Giant-petrels</i> , this species does not breed in Australia and at least until 2001 had not been positively identified within the Australian Fishing Zone.
Tristan Albatross (<i>Diomedea dabbenena</i>) Impacts on the Tristan Albatross are unlikely given the lack of potential habitat within the Project site and surrounds. According to the <i>Recovery Plan for Albatrosses and Giant-petrels</i> , there is no suitable breeding habitat for albatrosses and giant-petrels near the Project site and the Tristan Albatross is rarely observed in the Pacific Ocean.
Swift Parrot (<i>Lathamus discolor</i>) Impacts on the Swift Parrot are unlikely, given the lack of records and potential habitat in the Project site and surrounds.
Southern Giant-Petrel (<i>Macronectes giganteus</i>) Impacts on the Southern Giant-Petrel are unlikely given the lack of potential habitat within the Project site and surrounds. According to the <i>Recovery Plan for Albatrosses and Giant-petrels</i> , there is no suitable breeding habitat for albatrosses and giant-petrels near the Project site. The habitat for the Southern Giant-Petrel is considered to be oceans and bays (Simpson and Day, 1999).
Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>) Impacts on the Gould's Petrel are unlikely given the lack of potential habitat within the Project site and surrounds. According to the <i>Recovery Plan for Albatrosses and Giant-petrels</i> , there is no suitable breeding habitat for albatrosses and giant-petrels near the Project site. The habitat for the Gould's Petrel is considered to be oceanic (Simpson and Day, 1999).
Regent Honeyeater (<i>Xanthomyza phrygia</i>) Impacts on the Regent Honeyeater are unlikely, given the lack of records and potential habitat in the Project site and surrounds.
Mammals
Blue Whale (<i>Balaenoptera musculus</i>) Impacts on the Blue Whale are unlikely given the lack of potential habitat within the Project site and surrounds.
Spotted-tailed Quoll (south-eastern mainland population) (<i>Dasyurus maculatus maculatus</i>) Impacts on the Spotted-tailed Quoll are unlikely, given the lack of records proximal to the Project site and surrounds (the closest record is 13 km north-east of the Project site) and limited suitable habitat.
Southern Right Whale (<i>Eubalaena australis</i>) Impacts on the Southern Right Whale are unlikely given the lack of potential habitat within the Project site and surrounds.

Table 6
Likelihood of Significant Impacts on Critically Endangered and Endangered Species and their Habitats

Assessment Criteria ¹		Dwarf Kerrawang (<i>Rulingia prostrata</i>)	Grey Nurse Shark (east coast population) (<i>Carcharias taurus</i>)	Giant Barred Frog (<i>Mixophyes iteratus</i>)	Loggerhead Turtle (<i>Caretta caretta</i>)	Amsterdam Albatross (<i>Diomedea amsterdamensis</i>)	Tristan Albatross (<i>Diomedea dabbenena</i>)	Swift Parrot (<i>Lathamus discolor</i>)
Is the Project Likely to:	Lead to a long-term decrease in the size of a population?	No	No	No	No	No	No	No
	Reduce the area of occupancy of the species?	No	No	No	No	No	No	No
	Fragment an existing population into two or more populations?	No	No	No	No	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No	No	No	No
	Disrupt the breeding cycle of a population?	No	No	No	No	No	No	No
	Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	No	No	No	No
	Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	No	No	No	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	No	No	No	No
	Interfere with the recovery of the species?	No	No	No	No	No	No	No
Is the Project likely to have a significant impact on an endangered species?		No	No	No	No	No	No	No

Assessment: Yes/No/Unlikely

1 As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

Table 6 (Continued)
Likelihood of Significant Impacts on Critically Endangered and Endangered Species and their Habitats

Assessment Criteria ¹		Southern Giant-Petrel (<i>Macronectes giganteus</i>)	Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>)	Regent Honeyeater (<i>Xanthomyza phrygia</i>)	Blue Whale (<i>Balaenoptera musculus</i>)	Spotted-tailed Quoll (<i>Dasyurus maculatus maculatus</i>)	Southern Right Whale (<i>Eubalaena australis</i>)
Is the Project Likely to:	Lead to a long-term decrease in the size of a population?	No	No	No	No	No	No
	Reduce the area of occupancy of the species?	No	No	No	No	No	No
	Fragment an existing population into two or more populations?	No	No	No	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No	No	No
	Disrupt the breeding cycle of a population?	No	No	No	No	No	No
	Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	No	No	No
	Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	No	No	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	No	No	No
	Interfere with the recovery of the species?	No	No	No	No	No	No
Is the Project likely to have a significant impact on an endangered species?		No	No	No	No	No	No

Assessment: Yes/No/Unlikely

¹ As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

Vulnerable Species and/or their Habitat

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b) outlines the following criteria for significance for vulnerable species:

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population² of a species;*
- *reduce the area of occupancy of an important population;*
- *fragment an existing important population into two or more populations;*
- *adversely affect habitat critical to the survival of a species;*
- *disrupt the breeding cycle of an important population;*
- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*
- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;*
- *introduce disease that may cause the species to decline; or*
- *interfere substantially with the recovery of the species.*

Species listed as vulnerable under the EPBC Act which are considered possible occurrences within the wider region surrounding the Project site are listed in Tables 1 and 2.

An assessment of the nature and extent of impacts of the Project on EPBC Act listed vulnerable species and their habitat is provided in Table 7. An assessment of the likelihood of the Project resulting in significant impacts on EPBC Act listed vulnerable species and their habitat is provided in Table 8. The Project is not likely to have a significant impact on any vulnerable species listed under the EPBC Act.

Table 7
Nature and Extent of Impacts on Vulnerable Species and their Habitats

Nature and Extent of Likely Impacts
Flora
Leafless Tongue-orchid (<i>Cryptostylis hunteriana</i>) Impacts on <i>C. hunteriana</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey). The closest record of <i>C. hunteriana</i> is 28 km SW of the Project site.
Newcastle Doubletail (<i>Diuris praecox</i>) Impacts on <i>D. praecox</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).
Camfield's Stringybark (<i>Eucalyptus camfieldii</i>) Impacts on <i>E. camfieldii</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).
Earp's Gum (<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>) Impacts on <i>E. parramattensis</i> subsp. <i>decadens</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> Impacts on <i>G. parviflora</i> subsp. <i>parviflora</i> are unlikely given the lack of potential habitat resources and absence of records near the Project site. The closest record of <i>G. parviflora</i> subsp. <i>parviflora</i> is 21 km NW of the Project site.
Knotweed (<i>Persicaria elatior</i>) Impacts on <i>P. elatior</i> are unlikely given the absence of records near the Project site and close surrounds. The Project site provides only marginal potential habitat for this species.

² An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

Table 7 (Continued)
Nature and Extent of Impacts on Vulnerable Species and their Habitats

Nature and Extent of Likely Impacts
Flora (Continued)
<p>Magenta Lilly Pilly (<i>Syzygium paniculatum</i>)</p> <p>Impacts on <i>S. paniculatum</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).</p>
<p><i>Tetratheca juncea</i></p> <p>Impacts on <i>T. juncea</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).</p>
<p><i>Rutidosia heterogama</i></p> <p>Impacts on <i>R. heterogama</i> are unlikely given the lack of potential habitat resources and absence of records in the Project site and close surrounds (despite a vegetation survey).</p>
Fish
<p>Great White Shark (<i>Carcharodon carcharias</i>)</p> <p>Impacts on the Great White Shark are unlikely given the lack of potential habitat within the Project site and close surrounds.</p>
<p>Whale Shark (<i>Rhincodon typus</i>)</p> <p>Impacts on the Whale Shark are unlikely given the lack of potential habitat within the Project site and close surrounds.</p>
Amphibians
<p>Green and Golden Bell Frog (<i>Litoria aurea</i>)</p> <p>A low-localised impact on the Green and Golden Bell Frog is possible, as a population of Green and Golden Bell Frog utilises habitat within the Project site and surrounds.</p>
<p>Heath Frog (<i>Litoria littlejohni</i>)</p> <p>Impacts on the Heath Frog are unlikely given the absence of records (the closest record of Heath Frog is 25 km north-west of the Project site) and occurrence of only marginal potential habitat resources.</p>
<p>Stuttering Frog (<i>Mixophyes balbus</i>)</p> <p>Impacts on the Stuttering Frog are unlikely given the absence of records and lack of potential habitat resources within the Project site and close surrounds.</p>
Reptiles
<p>Green Turtle (<i>Chelonia mydas</i>), Leatherback Turtle (<i>Dermochelys coriacea</i>), Hawksbill Turtle (<i>Eretmochelys imbricata</i>), Flatback Turtle (<i>Natator depressus</i>)</p> <p>Impact on these species is unlikely given the lack of potential habitat within the Project site, but some of these species may occasionally utilise habitat within the the Hunter River.</p>
<p>Broad-headed Snake (<i>Hoplocephalus bungaroides</i>)</p> <p>Impacts on the Broad-headed Snake are unlikely given the absence of records near the Project site and lack of potential habitat resources.</p>
Birds
<p>Antipodean Albatross (<i>Diomedea antipodensis</i>), Wandering Albatross (<i>Diomedea exulans</i>), Gibson's Albatross (<i>Diomedea gibsoni</i>), Northern Giant-Petrel (<i>Macronectes halli</i>), Blue Petrel (<i>Halobaena caerulea</i>), Kermadec Petrel (western) (<i>Pterodroma neglecta neglecta</i>), Buller's Albatross (<i>Thalassarche bulleri</i>), Shy Albatross (<i>Thalassarche cauta</i>), Campbell Albatross (<i>Thalassarche impavida</i>), Black-browed Albatross (<i>Thalassarche melanophris</i>), Salvin's Albatross (<i>Thalassarche salvini</i>), White-capped Albatross (<i>Thalassarche steadi</i>), Royal Albatross (<i>Diomedea epomophora</i>), Sooty Albatross (<i>Phoebastria fusca</i>)</p> <p>Impacts on albatross and giant-petrels are unlikely, given that most albatrosses and giant-petrels spend more than 95% of their time foraging in the southern oceans of the world, usually only returning to land to breed (Environment Australia, 2001). According to the <i>Recovery Plan for Albatrosses and Giant-petrels</i>, there is no suitable breeding habitat for albatrosses and giant-petrels near the Project site.</p>
<p>Australian Painted Snipe (<i>Rostratula australis</i>)</p> <p>Impacts on the Australian Painted Snipe are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of the Australian Painted Snipe uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Australian Painted Snipe is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).</p>
<p>Masked Owl (<i>Tyto novaehollandiae</i>)</p> <p>Impacts on the Masked Owl are unlikely given the absence of records and lack of potential habitat resources in the Project site and close surrounds. The closest record of the Masked Owl is 5 km north-west of the Project site.</p>

Table 7 (Continued)
Nature and Extent of Impacts on Vulnerable Species and their Habitats

Nature and Extent of Likely Impacts
Mammals
<p>Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)</p> <p>Impacts on the Large-eared Pied Bat are unlikely given the absence of records in the Project site and close surrounds (the closest record is 12 km south-west of the Project site) and lack of potential habitat.</p>
<p>Humpback Whale (<i>Megaptera novaeangliae</i>)</p> <p>Impacts on the Humpback Whale are unlikely given the lack of potential habitat within the Project site and close surrounds.</p>
<p>Brush-tailed Rock-wallaby (<i>Petrogale penicillata</i>)</p> <p>Impacts on the Brush-tailed Rock-wallaby are unlikely, given the lack of records proximal to the Project site (the closest record is 63 km west of the Project site) and absence of suitable habitat within the Project site and close surrounds.</p>
<p>Long-nosed Potoroo (<i>Potorous tridactylus tridactylus</i>)</p> <p>Impacts on the Long-nosed Potoroo are unlikely, given the lack of records proximal to the Project site (the closest record of the Long-nosed Potoroo is 35 km north-east of the Project site) and absence of suitable habitat within the Project site and close surrounds.</p>
<p>Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)</p> <p>Impacts on the Grey-headed Flying-fox are unlikely given that there are no Grey-headed Flying Fox camps located in the Project site and potential habitat is limited. However, the Grey-headed Flying-fox has been previously recorded in the Project site flying overhead therefore low localised indirect impacts are possible.</p>

Green and Golden Bell Frog (*Litoria aurea*)

As previously stated, the Green and Golden Bell Frog has been recorded within the Project site.

The Green and Golden Bell Frog was historically widespread across much of the Hunter Valley, commonly associated with floodplain wetlands of the Hunter River and its tributaries (DEC, 2005). There are about 50 known populations of Green and Golden Bell Frog within NSW (NPWS, 1999), and of these, approximately 14 are situated within conservation reserves (NPWS, undated in DEC, 2005).

The Green and Golden Bell Frog was found in large numbers in 1970 on Kooragang Island (Gosper, 1975). It has since been recorded by numerous studies of Kooragang Island. The Green and Golden Bell Frog was recorded at approximately 21 out of the 33 ponds in the study area by Connell Hatch (2006a) and Hamer (1998, 2002). The majority of these ponds (i.e. 15) would not be directly disturbed by the Project (*ibid.*).

The Green and Golden Bell Frog can be regarded as a 'colonising'/'pioneering' species as it is a habitat generalist, disperses widely and matures early (Hamer, 1998, 2002). The Green and Golden Bell Frog exhibits strong migration tendencies, including the ability to move several kilometres (NPWS, undated in DEC, 2005).

The disturbance of a portion of the Green and Golden Bell Frog habitat by the Project is unlikely to significantly impact the Green and Golden Bell Frog, given the following:

- the localised nature of the Project site disturbance (i.e. the majority of the Green and Golden Bell Frog records are located outside of the Project disturbance areas) (Figure 4);
- part of the local Green and Golden Bell Frog population already exists in close proximity to the existing Kooragang Island main line and KIWEF activities. This demonstrates its ability to exist in close proximity to industrial development;

- known breeding habitat for the Green and Golden Bell Frog nearby (including *Schoenoplectus/Bolboschoenus* sedgeland) in the KWRP at Ash Island. Green and Golden Bell Frog adults and juveniles have been recorded here at a number of sites which suggests that these sites may represent potential core breeding habitat (Hamer, 1997); and
- the occurrence of proximal known and potential habitat to the Project site which would not be directly disturbed by the Project. Other nearby occurrences of Green and Golden Bell Frog habitat include areas in the KWRP on Ash Island, a *Typha* wetland in Kooragang NR, a site north of the eastern end of the Kooragang Island mainline railway embankment and an artificial pond within the PWCS Kooragang Coal Terminal (Hamer, 1997, 1998, 2002; PWCS, 1996).

Notwithstanding the above, the Project mitigation and compensatory measures would aid the creation, enhancement and ongoing management of Green and Golden Bell Frog habitat which is expected to benefit existing populations.

Threatened Ecological Communities and/or their Habitat

No threatened ecological communities listed under the EPBC Act were recorded by the Project vegetation survey (Connell Hatch, 2006b).

(e) *Migratory Species and/or their Habitat*

A number of migratory species have been recorded in the wider region surrounding the Project site including those listed in Table 3. Table 9 describes the nature and extent of impacts of the Project on migratory species and their habitats. Big Pond and Deep Pond offers known and potential habitat for a number of migratory species (eg. Black-tailed Godwit and Curlew Sandpiper). The construction of the Project northern rail spur embankment, if required to be installed when the Project is fully developed to 66 Mtpa, has the potential to impact on shorebirds which use the southern end of Deep Pond as known habitat would be disturbed during construction.

However, any local population is unlikely to be dependent upon the area of potential habitat to be disturbed (i.e. modified/removed) given the occurrence of proximal protected habitat resources in Kooragang Nature Reserve and Hexham Swamp Nature Reserve, the mobility of the species and/or the ability of many of the species to utilise a variety of habitat types.

In addition, Big Pond and Deep Pond are not listed on the Directory of Important Wetlands in Australia (DEH, 2006a).

**Table 8
Likelihood of Significant Impacts on Vulnerable Species and their Habitats**

Assessment Criteria ¹		Leafless Tongue-orchid (<i>Cryptostylis hunteriana</i>)	Newcastle Doubletail (<i>Diuris praecox</i>)	Camfield's Stringybark (<i>Eucalyptus camfieldii</i>)	Earp's Gum (<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>)	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Knotweed (<i>Persicaria elatior</i>)	Magenta Lilly Pilly (<i>Syzygium paniculatum</i>)	<i>Tetratheca juncea</i>
Is the Project likely to:	Lead to a long-term decrease in the size of an important population of a species?	No	No	No	No	No	No	No	No
	Reduce the area of occupancy of an important population?	No	No	No	No	No	No	No	No
	Fragment an existing important population into two or more populations?	No	No	No	No	No	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No	No	No	No	No
	Disrupt the breeding cycle of an important population?	No	No	No	No	No	No	No	No
	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	No	No	No	No	No
	Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No	No	No	No	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	No	No	No	No	No
	Interfere substantially with the recovery of the species?	No	No	No	No	No	No	No	No
Is the Project likely to have a significant impact on a vulnerable species?		No	No	No	No	No	No	No	No

Assessment: Yes/No/Unlikely

¹ As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

Table 8 (Continued)
Likelihood of Significant Impacts on Vulnerable Species and their Habitats

Assessment Criteria ¹		<i>Rutidosia heterogama</i>	Great White Shark (<i>Carcharodon carcharias</i>)	Whale Shark (<i>Rhincodon typus</i>)	Green and Golden Bell Frog (<i>Litoria aurea</i>)	Heath Frog (<i>Litoria littlejohni</i>)	Stuttering Frog (<i>Mixophyes balbus</i>)	Green Turtle (<i>Chelonia mydas</i>), Leatherback Turtle (<i>Dermochelys coriacea</i>), Hawksbill Turtle (<i>Eretmochelys imbricata</i>), Flatback Turtle (<i>Natator depressus</i>)
Is the Project likely to:	Lead to a long-term decrease in the size of an important population of a species?	No	No	No	Unlikely	No	No	No
	Reduce the area of occupancy of an important population?	No	No	No	Yes	No	No	No
	Fragment an existing important population into two or more populations?	No	No	No	Unlikely	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No	No	No	No
	Disrupt the breeding cycle of an important population?	No	No	No	Unlikely	No	No	No
	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	Unlikely	No	No	No
	Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No	No	No	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	Unlikely	No	No	No
	Interfere substantially with the recovery of the species?	No	No	No	Unlikely	No	No	No
Is the Project likely to have a significant impact on a vulnerable species?		No	No	No	Unlikely	No	No	No

Assessment: Yes/No/Unlikely

¹ As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

Table 8 (Continued)
Likelihood of Significant Impacts on Vulnerable Species and their Habitats

Assessment Criteria ¹		Broad-headed Snake (<i>Hoplocephalus bungaroides</i>)	Antipodean Albatross (<i>Diomedea antipodensis</i>), Wandering Albatross (<i>Diomedea exulans</i>), Gibson's Albatross (<i>Diomedea gibsoni</i>), Northern Giant-Petrel (<i>Macronectes halli</i>), Blue Petrel (<i>Halobaena caerulea</i>), Kermadec Petrel (western) (<i>Pterodroma neglecta neglecta</i>), Buller's Albatross (<i>Thalassarche bulleri</i>), Shy Albatross (<i>Thalassarche cauta</i>), Campbell Albatross (<i>Thalassarche impavida</i>), Black-browed Albatross (<i>Thalassarche melanophris</i>), Salvin's Albatross (<i>Thalassarche salvini</i>), White-capped Albatross (<i>Thalassarche steadyi</i>), Royal Albatross (<i>Diomedea epomophora</i>), Sooty Albatross (<i>Phoebastria fusca</i>)	Australian Painted Snipe (<i>Rostratula australis</i>)	Masked Owl (<i>Tyto novaehollandiae</i>)
Is the Project likely to:	Lead to a long-term decrease in the size of an important population of a species?	No	No	Unlikely	No
	Reduce the area of occupancy of an important population?	No	No	Unlikely	No
	Fragment an existing important population into two or more populations?	No	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No
	Disrupt the breeding cycle of an important population?	No	No	No	No
	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	No
	Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	No
	Interfere substantially with the recovery of the species?	No	No	No	No
Is the Project likely to have a significant impact on a vulnerable species?		No	No	Unlikely	No

Assessment: Yes/No/Unlikely

¹ As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

Table 8 (Continued)
Likelihood of Significant Impacts on Vulnerable Species and their Habitats

Assessment Criteria ¹		Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	Humpback Whale (<i>Megaptera novaeangliae</i>)	Brush-tailed Rock-wallaby (<i>Petrogale penicillata</i>)	Long-nosed Potoroo (<i>Potorous tridactylus tridactylus</i>)	Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) ²
Is the Project likely to:	Lead to a long-term decrease in the size of an important population of a species?	No	No	No	No	Unlikely
	Reduce the area of occupancy of an important population?	No	No	No	No	Unlikely
	Fragment an existing important population into two or more populations?	No	No	No	No	No
	Adversely affect habitat critical to the survival of a species?	No	No	No	No	No
	Disrupt the breeding cycle of an important population?	No	No	No	No	No
	Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	No	No	No	No	No
	Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	No	No	No	No	No
	Introduce disease that may cause the species to decline?	No	No	No	No	No
	Interfere substantially with the recovery of the species?	No	No	No	No	No
Is the Project likely to have a significant impact on a vulnerable species?		No	No	No	No	No

Assessment: Yes/No/Unlikely

1 As defined by the EPBC Act Policy Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance (DEH, 2006b).

2 Also considering the EPBC Act Administrative Guidelines on Significance – Supplement for the Grey-headed Flying Fox 2003-2004 (Environment Australia, 2003).

**Table 9
Nature and Extent of Impacts on Migratory Species and their Habitats**

Species ¹	Nature and Extent of Likely Impacts
Loggerhead Turtle (<i>Caretta caretta</i>)	Impacts on turtles, including the Loggerhead Turtle, Green Turtle, Hawksbill Turtle and Flatback Turtle, are unlikely given the lack of potential habitat within the Project site.
Green Turtle (<i>Chelonia mydas</i>)	
Hawksbill Turtle (<i>Eretmochelys imbricata</i>)	
Flatback Turtle (<i>Natator depressus</i>)	
Garganey (<i>Anas querquedula</i>)	Impacts on the Garganey are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of the Garganey uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Garganey is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Royal Albatross (<i>Diomedea epomophora</i>)	Impacts on albatross, including the Royal Albatross, Wandering Albatross and Sooty Albatross, are unlikely given the lack of potential habitat within the Project site.
Wandering Albatross (<i>Diomedea exulans</i>)	
Sooty Albatross (<i>Phoebastria fusca</i>)	
Southern Giant-Petrel (<i>Macronectes giganteus</i>)	Impacts on petrels, including the Southern Giant-Petrel, Northern Giant-Petrel, Providence Petrel, Gould's Petrel, Black Petrel and Westland Petrel, are unlikely given the lack of potential habitat within the Project site.
Northern Giant-Petrel (<i>Macronectes halli</i>)	
Providence Petrel (<i>Pterodroma solandri</i>)	
Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>)	
Black Petrel (<i>Procellaria parkinsoni</i>)	
Westland Petrel (<i>Procellaria westlandica</i>)	
Streaked Shearwater (<i>Calonectris leucomelas</i>)	
Wedge-tailed Shearwater (<i>Puffinus pacificus</i>)	Impacts on these species are unlikely given the lack of potential habitat within the Project site.
Sooty Shearwater (<i>Puffinus griseus</i>)	
Short-tailed Shearwater (<i>Puffinus tenuirostris</i>)	
Flesh-footed Shearwater (<i>Puffinus carneipes</i>)	
Wilson's Storm-Petrel (<i>Oceanites oceanicus</i>)	
Glossy Ibis (<i>Plegadis falcinellus</i>)	
Cattle Egret (<i>Bubulcus ibis</i>)	A low-localised impact on the Cattle Egret is possible, as migratory Cattle Egret would be expected to periodically utilise habitat within the Project site.
Eastern Reef Egret (<i>Egretta sacra</i>)	Impacts on the Eastern Reef Egret are unlikely given the lack of potential habitat within the Project site.
Great Egret (<i>Ardea alba</i>)	A low-localised impact on the Great Egret is possible, as migratory Great Egret would be expected to periodically utilise habitat within the Project site.
Lesser Frigatebird (<i>Fregata ariel</i>)	Impacts on these species are unlikely given the lack of potential habitat within the Project site.
Brown Booby (<i>Sula leucogaster</i>)	
Osprey (<i>Pandion haliaetus</i>)	A low-localised impact on the Osprey is possible, as the Osprey would be expected to periodically utilise habitat within the Project site.
White-bellied Sea-eagle (<i>Haliaeetus leucogaster</i>)	A low-localised impact on the White-bellied Sea-eagle is possible, as the White-bellied Sea-eagle would be expected to periodically utilise habitat within the Project site.
Pacific Golden Plover (<i>Pluvialis fulva</i>)	A low-localised impact on the Pacific Golden Plover is possible, as the Pacific Golden Plover would be expected to periodically utilise habitat within the Project site.
Grey Plover (<i>Pluvialis squatarola</i>)	It is unlikely that local populations of the Grey Plover would use the Project site given the occurrence of only marginal potential habitat resources. Nil or negligible impacts on this species are likely given only marginal potential habitat resources for this species would be disturbed (ie. modified/removed).
Double-banded Plover (<i>Charadrius bicinctus</i>)	A low-localised impact on the Double-banded Plover is possible, as migratory Double-banded Plover would be expected to periodically utilise habitat within the Project site.

Table 9 (Continued)
Nature and Extent of Impacts on Migratory Species and their Habitats

Species ¹	Nature and Extent of Likely Impacts
Lesser Sand Plover (<i>Charadrius mongolus</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Greater Sand Plover (<i>Charadrius leschenaultii</i>)	
Oriental Plover (<i>Charadrius veredus</i>)	
Painted Snipe (Australian subspecies) (<i>Rostratula benghalensis</i>)	Impacts on the Painted Snipe are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Painted Snipe is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Latham's Snipe (<i>Gallinago hardwickii</i>)	A low-localised impact on the Latham's Snipe is possible, as migratory Latham's Snipe would be expected to periodically utilise habitat within the Project site.
Asian Dowitcher (<i>Limnodromus semipalmatus</i>)	Impacts on the Asian Dowitcher are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of the Asian Dowitcher uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Asian Dowitcher is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Black-tailed Godwit (<i>Limosa limosa</i>)	A low-localised impact on these species is possible, as these birds would be expected to periodically utilise habitat within the Project site.
Bar-tailed Godwit (<i>Limosa lapponica</i>)	
Little Curlew (<i>Numenius minutus</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Whimbrel (<i>Numenius phaeopus</i>)	
Eastern Curlew (<i>Numenius madagascariensis</i>)	
Marsh Sandpiper (<i>Tringa stagnatilis</i>)	A low-localised impact on these species is possible, as these birds would be expected to periodically utilise habitat within the Project site.
Common Greenshank (<i>Tringa nebularia</i>)	
Wood Sandpiper (<i>Tringa glareola</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Terek Sandpiper (<i>Xenus cinereus</i>)	
Common Sandpiper (<i>Actitis hypoleucos</i>)	
Ruddy Turnstone (<i>Arenaria interpres</i>)	Impacts on the Ruddy Turnstone are unlikely given the lack of potential habitat within the Project site.
Great Knot (<i>Calidris tenuirostris</i>)	It is unlikely that local populations of these species could use the Project site given the occurrence of only marginal potential habitat resources. Nil or negligible impacts on these species are likely given only marginal potential habitat resources for these species would be disturbed (ie. modified/removed).
Red Knot (<i>Calidris canutus</i>)	
Sanderling (<i>Calidris alba</i>)	Impacts on the Sanderling are unlikely given the lack of potential habitat within the Project site.
Red-necked Stint (<i>Calidris ruficollis</i>)	A low-localised impact on the Red-necked Stint is possible, as migratory Red-necked Stint would be expected to periodically utilise habitat within the Project site.
Long-toed Stint (<i>Calidris subminuta</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Pectoral Sandpiper (<i>Calidris melanotos</i>)	
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	A low-localised impact on these species is possible, as these birds would be expected to periodically utilise habitat within the Project site.
Curlew Sandpiper (<i>Calidris ferruginea</i>)	
Broad-billed Sandpiper (<i>Limicola falcinellus</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Buff-breasted Sandpiper (<i>Tryngites subruficollis</i>)	
Ruff (<i>Philomachus pugnax</i>)	

Table 9 (Continued)
Nature and Extent of Impacts on Migratory Species and their Habitats

Species ¹	Nature and Extent of Likely Impacts
Common Tern (<i>Sterna hirundo</i>)	Impacts on these terns, including the Common Tern, Arctic Tern and Little Tern, are unlikely given the lack of potential habitat within the Project site.
Arctic Tern (<i>Sterna paradisaea</i>)	
Little Tern (<i>Sterna albifrons</i>)	
White-winged Black Tern (<i>Chlidonias leucopterus</i>)	A low-localised impact on these species is possible, as these birds would be expected to periodically utilise habitat within the Project site.
Caspian Tern (<i>Sterna caspia</i>)	
Common Noddy (<i>Anous stolidus</i>)	Impacts on these birds, including the Common Noddy, Pomarine Skua, Arctic Skua, Long-tailed Skua and Oriental Cuckoo, are unlikely given the lack of potential habitat within the Project site.
Pomarine Skua (<i>Stercorarius pomarinus</i>)	
Arctic Skua (<i>Stercorarius parasiticus</i>)	
Long-tailed Skua (<i>Stercorarius longicaudus</i>)	
Oriental Cuckoo (<i>Cuculus saturatus</i>)	
White-throated Needletail (<i>Hirundapus caudacutus</i>)	A low-localised impact on the White-throated Needletail is possible, as migratory White-throated Needletail would be expected to periodically utilise habitat within the Project site.
Fork-tailed Swift (<i>Apus pacificus</i>)	Impacts on these species are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of these species uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on these species is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Rainbow Bee-eater (<i>Merops ornatus</i>)	
Regent Honeyeater (<i>Xanthomyza phrygia</i>)	Impacts on the Regent Honeyeater, are unlikely given the lack of potential habitat within the Project site.
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Impacts on the Rufous Fantail, are unlikely given the lack of potential habitat within the Project site.
Spectacled Monarch (<i>Monarcha trivirgatus</i>)	Impacts on the Spectacled Monarch and Black-faced Monarch, are unlikely given the lack of potential habitat within the Project site.
Black-faced Monarch (<i>Monarcha melanopsis</i>)	
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	Impacts on the Satin Flycatcher, are unlikely given the lack of potential habitat within the Project site.
Yellow Wagtail (<i>Motacilla flava</i>)	Impacts on the Yellow Wagtail are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of the Yellow Wagtail uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Yellow Wagtail is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Lesser Golden Plover (<i>Pluvialis dominica</i>)	Impacts on the Lesser Golden Plover are unlikely, given the absence of records in the Project site (despite avifauna surveys). However, it is possible that a local migratory population of the Lesser Golden Plover uses potential habitat resources which occur within the Project site. Therefore, a low-localised impact on the Lesser Golden Plover is possible given potential habitat resources for this species would be disturbed (ie. modified/removed).
Clamorous Reed-Warbler (<i>Acrocephalus stentoreus</i>)	A low-localised impact on the Clamorous Reed-Warbler is possible, as migratory Clamorous Reed-Warbler would be expected to periodically utilise habitat within the Project site.
Northern Shoveler (<i>Anas clypeata</i>)	Impacts on the Northern Shoveler are unlikely given the lack of potential habitat within the Project site.

¹ Nomenclature for species in accordance with Clayton *et al.* (2006).

Furthermore it is relevant to note the condition and context of the Project site:

- The Project site is situated on land zoned Zone 4(b) (Port and Industry), 5(a) (Special Uses Zone - Arterial Road) and an unzoned area (Hunter River) under the Newcastle LEP. The Kooragang Nature Reserve located approximately 1 km to the north of the Project site provides protected habitat for threatened fauna, as it is on land zoned 8(a) (National Parks) by the Newcastle LEP.
- The Project rail infrastructure would be constructed on land which is part of the KIWEF which is owned by the RLMC. The KIWEF is licensed as a Solid Waste Class 2 landfill under EPL 6437, issued under the POEO Act.

- The ecosystem in the Project site can be considered to be dynamic as the landuse history of the site is such that much of the original vegetation has been covered by fill. Embankments, excavations and changed hydrological conditions have created the conditions for wetlands and marshes of varying conservation values.

An assessment of the likelihood of the Project resulting in significant impacts on migratory species is provided in Table 10. The Project is not likely to have a significant impact on migratory species, as it is unlikely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species;
- result in invasive species that is harmful to the migratory species becoming established in an area of important habitat of the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.

Table 10
Likelihood of Significant Impacts on Migratory Species or their Habitats

Species ¹	Is the Project likely to:		
	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?
Loggerhead Turtle (<i>Caretta caretta</i>)	No	No	No
Green Turtle (<i>Chelonia mydas</i>)	No	No	No
Hawksbill Turtle (<i>Eretmochelys imbricata</i>)	No	No	No
Flatback Turtle (<i>Natator depressus</i>)	No	No	No
Garganey (<i>Anas querquedula</i>)	Unlikely	No	Unlikely
Royal Albatross (<i>Diomedea epomophora</i>)	No	No	No
Wandering Albatross (<i>Diomedea exulans</i>)	No	No	No
Sooty Albatross (<i>Phoebastria fusca</i>)	No	No	No
Southern Giant-Petrel (<i>Macronectes giganteus</i>)	No	No	No
Northern Giant-Petrel (<i>Macronectes halli</i>)	No	No	No
Providence Petrel (<i>Pterodroma solandri</i>)	No	No	No
Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>)	No	No	No
Black Petrel (<i>Procellaria parkinsoni</i>)	No	No	No
Westland Petrel (<i>Procellaria westlandica</i>)	No	No	No
Streaked Shearwater (<i>Calonectris leucomelas</i>)	No	No	No
Wedge-tailed Shearwater (<i>Puffinus pacificus</i>)	No	No	No
Sooty Shearwater (<i>Puffinus griseus</i>)	No	No	No
Short-tailed Shearwater (<i>Puffinus tenuirostris</i>)	No	No	No
Flesh-footed Shearwater (<i>Puffinus carneipes</i>)	No	No	No
Wilson's Storm-Petrel (<i>Oceanites oceanicus</i>)	No	No	No
Glossy Ibis (<i>Plegadis falcinellus</i>)	Unlikely	No	Unlikely
Cattle Egret (<i>Bubulcus ibis</i>)	Unlikely	No	Unlikely
Eastern Reef Egret (<i>Egretta sacra</i>)	No	No	No
Great Egret (<i>Ardea alba</i>)	Unlikely	No	Unlikely
Lesser Frigatebird (<i>Fregata ariel</i>)	No	No	No
Brown Booby (<i>Sula leucogaster</i>)	No	No	No
Osprey (<i>Pandion haliaetus</i>)	Unlikely	No	Unlikely

Table 10 (Continued)
Likelihood of Significant Impacts on Migratory Species or their Habitats

Species ¹	Is the Project likely to:		
	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?
White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>)	Unlikely	No	Unlikely
Pacific Golden Plover (<i>Pluvialis fulva</i>)	Unlikely	No	Unlikely
Grey Plover (<i>Pluvialis squatarola</i>)	No	No	No
Double-banded Plover (<i>Charadrius bicinctus</i>)	Unlikely	No	Unlikely
Lesser Sand Plover (<i>Charadrius mongolus</i>)	Unlikely	No	Unlikely
Greater Sand Plover (<i>Charadrius leschenaultii</i>)	Unlikely	No	Unlikely
Oriental Plover (<i>Charadrius veredus</i>)	Unlikely	No	Unlikely
Painted Snipe (Australian subspecies) (<i>Rostratula benghalensis</i>)	Unlikely	No	Unlikely
Latham's Snipe (<i>Gallinago hardwickii</i>)	Unlikely	No	Unlikely
Asian Dowitcher (<i>Limnodromus semipalmatus</i>)	Unlikely	No	Unlikely
Black-tailed Godwit (<i>Limosa limosa</i>)	Unlikely	No	Unlikely
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Unlikely	No	Unlikely
Little Curlew (<i>Numenius minutus</i>)	Unlikely	No	Unlikely
Whimbrel (<i>Numenius phaeopus</i>)	Unlikely	No	Unlikely
Eastern Curlew (<i>Numenius madagascariensis</i>)	Unlikely	No	Unlikely
Marsh Sandpiper (<i>Tringa stagnatilis</i>)	Unlikely	No	Unlikely
Common Greenshank (<i>Tringa nebularia</i>)	Unlikely	No	Unlikely
Wood Sandpiper (<i>Tringa glareola</i>)	Unlikely	No	Unlikely
Terek Sandpiper (<i>Xenus cinereus</i>)	Unlikely	No	Unlikely
Common Sandpiper (<i>Actitis hypoleucos</i>)	Unlikely	No	Unlikely
Ruddy Turnstone (<i>Arenaria interpres</i>)	No	No	No
Great Knot (<i>Calidris tenuirostris</i>)	No	No	No
Red Knot (<i>Calidris canutus</i>)	No	No	No
Sanderling (<i>Calidris alba</i>)	No	No	No
Red-necked Stint (<i>Calidris ruficollis</i>)	Unlikely	No	Unlikely
Long-toed Stint (<i>Calidris subminuta</i>)	Unlikely	No	Unlikely
Pectoral Sandpiper (<i>Calidris melanotos</i>)	Unlikely	No	Unlikely
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	Unlikely	No	Unlikely
Curlew Sandpiper (<i>Calidris ferruginea</i>)	Unlikely	No	Unlikely
Broad-billed Sandpiper (<i>Limicola falcinellus</i>)	Unlikely	No	Unlikely
Buff-breasted Sandpiper (<i>Tryngites subruficollis</i>)	Unlikely	No	Unlikely
Ruff (<i>Philomachus pugnax</i>)	Unlikely	No	Unlikely
Common Tern (<i>Sterna hirundo</i>)	No	No	No
Arctic Tern (<i>Sterna paradisaea</i>)	No	No	No
Little Tern (<i>Sterna albifrons</i>)	No	No	No
White-winged Black Tern (<i>Chlidonias leucopterus</i>)	Unlikely	No	Unlikely
Caspian Tern (<i>Sterna caspia</i>)	Unlikely	No	Unlikely
Common Noddy (<i>Anous stolidus</i>)	No	No	No
Pomarine Skua (<i>Stercorarius pomarinus</i>)	No	No	No
Arctic Skua (<i>Stercorarius parasiticus</i>)	No	No	No
Long-tailed Skua (<i>Stercorarius longicaudus</i>)	No	No	No
Oriental Cuckoo (<i>Cuculus saturatus</i>)	No	No	No

Table 10 (Continued)
Likelihood of Significant Impacts on Migratory Species or their Habitats

Species ¹	Is the Project likely to:		
	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?	Substantially modify, destroy or isolate an area of important habitat for migratory species?
White-throated Needletail (<i>Hirundapus caudacutus</i>)	Unlikely	No	Unlikely
Fork-tailed Swift (<i>Apus pacificus</i>)	Unlikely	No	Unlikely
Rainbow Bee-eater (<i>Merops ornatus</i>)	Unlikely	No	Unlikely
Regent Honeyeater (<i>Xanthomyza phrygia</i>)	No	No	No
Rufous Fantail (<i>Rhipidura rufifrons</i>)	No	No	No
Spectacled Monarch (<i>Monarcha trivirgatus</i>)	No	No	No
Black-faced Monarch (<i>Monarcha melanopsis</i>)	No	No	No
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	No	No	No
Yellow Wagtail (<i>Motacilla flava</i>)	Unlikely	No	Unlikely
Lesser Golden Plover (<i>Pluvialis dominica</i>)	Unlikely	No	Unlikely
Clamorous Reed-Warbler (<i>Acrocephalus stentoreus</i>)	Unlikely	No	Unlikely
Northern Shoveler (<i>Anas clypeata</i>)	No	No	No

¹ Nomenclature for species in accordance with Clayton *et al.* (2006).

(f) Commonwealth Marine Environment

No Commonwealth marine areas are located in the vicinity of the Project. The Project is not likely to have a significant impact on the environment in a Commonwealth marine area, as it is unlikely to:

- result in a known or potential pest species becoming established in a Commonwealth marine area;
- modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth Marine Area results;
- have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (eg. breeding, feeding, migration behaviour, and life expectancy) and spatial distribution;
- result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity, social amenity or human health;
- result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected; or
- have a substantial adverse impact on heritage values of a Commonwealth marine area, including damage or destruction of an historic shipwreck.

4.2 Describe, as relevant to your project, the nature and extent of likely impacts on the environment for the following category of proposed actions (in addition to the specific matters addressed above in 4.1):

- (a) a nuclear action; or**
- (b) an action by the Commonwealth or by a Commonwealth agency; or**
- (c) an action that will be taken on Commonwealth land or that may affect Commonwealth land; or**
- (d) an action taken by the Commonwealth or by a Commonwealth agency that may affect a listed Commonwealth Heritage place or a place listed on the Register of the National Estate.**

The action is not a nuclear action, nor an action by the Commonwealth or by a Commonwealth agency. The action will not be undertaken in a Commonwealth Marine Area or on Commonwealth land.

5. Measures aimed at avoiding or reducing significant impacts on matters protected under the EPBC Act

5.1 Describe any specific measures proposed as part of the action to avoid or lessen significant impacts on matters protected under the EPBC Act. Include a timeframe or workplan for implementation of any relevant measures.

Offsets have already been proposed by the NSW government for the development of Big Pond by the Department of Commerce as part of the BPHOS Report (Department of Commerce, 2005). The BPHOS Report proposes to enhance and create compensatory habitats in the Kooragang Nature Reserve to offset the proposed development of Big Pond (Department of Commerce, 2005).

The proposed compensatory areas are at Ash Island (located on Kooragang Island) and at the Tomago Wetlands (located north of the Hunter River [North Arm]). The aim of the BPHOS Report is to modify land of low habitat value to create land with high values particularly for resident and migratory shorebirds.

Other offsets funded by the NSW Government for potential impacts on Big Pond include the modifications of the Stockton Sand Spit, diurnal roost improvement at Smith Island and Sandy Island, the artificial roost at Fullerton Cove East, pond construction at Ash Island and reintroduction of tidal flows at Tomago (Straw, 1999; 2000).

In essence, Big Pond is a wetland area that was artificially created and has been manipulated as a foraging habitat for shorebirds (Straw, 1999). Originally, Big Pond was part of an intertidal mangrove area which was cut off from tidal influence when Moscheto Creek was blocked by a railway and then bunded to create land suitable for industrial use (Straw, 1999). Shorebirds ceased to use Big Pond when water flows to the wetland were blocked by an extension of PWCS in 1994 (*ibid.*). In order to make Big Pond attractive again to shorebirds, PWCS constructed a weir so that water levels could be manipulated but this was subsequently removed (*ibid.*).

No waterbirds or threatened avian species were observed during the survey at Big Pond during the Project surveys conducted during summer 2005-2006 (Avifauna Research and Services, 2006). This is most likely because Big Pond has since evolved from a brackish/saline open wetland with extensive mudflats and shallows to a largely freshwater wetland dominated by sedge and reeds as well as some open areas of mudflats or grass (Avifauna Research and Services, 2006).

Green and Golden Bell Frog Habitat

A financial contribution would be made towards current or future projects which involve habitat creation for the Green and Golden Bell Frog on RLMC-owned lands within the KWRP or alternate suitable lands in the Kooragang Nature Reserve. Habitat creation would be located on the perimeter of existing habitat areas to provide suitable habitat into which the existing Green and Golden Bell Frog population can expand. This habitat creation would also create an opportunity to research the performance of alternative types of habitat enhancement.

Habitat creation initiatives for the Green and Golden Bell Frog would include construction of two habitat ponds of similar scale and detail to existing ponds where the Green and Golden Bell Frogs have been recorded on the KIWEF site. This is consistent with the recovery strategies (i.e. *habitat rehabilitation/restoration and/or regeneration and monitoring*) identified by the DEC to help recover the Green and Golden Bell Frog (DEC, 2005).

Shorebird Habitat

Mangroves in the Hunter Estuary have been expanding at the expense of saltmarsh and, in some areas (e.g. Ash Island), mangroves have been removed to enhance habitat for saltmarsh and shorebirds.

A financial contribution would be made to an organisation such as the KWRP for the removal of up to 6 ha of mangroves from saltmarsh habitat. A financial contribution would also be made towards the construction of a flow control structure to prevent mangrove propagules from entering areas reserved for saltmarsh. Alternatively, these initiatives may also be applied to lands within the Kooragang Nature Reserve. These works are expected to enhance habitat for shorebirds.

In addition, habitat in the form of shallow areas for foraging shorebirds would be created during the construction of the northern rail spur embankment, if required to be installed when the Project is fully developed to 66 Mtpa, by modifying the design of the embankment batter slopes to have a gentle toe gradient (i.e. in the submerged zone of the batter slope). This would result in the creation of shallow areas suitable for shorebirds in Deep Pond.

Table 11 provides measures proposed as part of the Project to avoid or reduce significant impacts on the matters protected under the EPBC Act. A timeframe or workplan is also provided for each measure.

Table 11
Relevant Measures Aimed at Avoiding or Reducing
Significant Impacts on the Matters Protected under the EPBC Act

Measures aimed at Avoiding or Reducing Impacts on Listed Threatened Species, Migratory Species, or their Habitats	Timeframe/Workplan
<p>Vegetation Clearance</p> <ul style="list-style-type: none"> • As a component of the Vegetation Clearance Protocol to be developed for the Project, vegetation immediately adjoining Project disturbance areas would be delineated and clearly marked to minimise the potential for accidental damage during construction. • The FFMP would include a Vegetation Clearance Protocol to minimise the potential impacts of vegetation clearance on fauna. The Protocol would include the delineation of areas to be cleared of vegetation, a pre-clearance survey, identification of fauna management strategies and specific procedures for vegetation clearance. • A Threatened Species Management Protocol (TSMP) would be developed as a component of the FFMP to facilitate the implementation of threatened species management strategies to minimise potential impacts on threatened fauna species. 	<p>Details would be provided in the Flora and Fauna Management Plan (FFMP) which would be prepared prior to Project construction.</p>
<p>Landscape Plantings</p> <ul style="list-style-type: none"> • Landscape (amenity) plantings would be established on available areas of land between the coal storage area and Cormorant Road. These landscape plantings would comprise of locally indigenous species in order to provide some potential habitat for local fauna. 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>
<p>Weed and Pest Management</p> <ul style="list-style-type: none"> • A weed management programme would be implemented to limit the spread and colonisation of weeds in the Project site during construction and operations. • A clean, rubbish-free environment would be mandated to discourage scavenging and reduce the potential for further colonisation of the Project site by non-endemic fauna (e.g. introduced rodents and foxes). • Fox control strategies would be implemented because predation by foxes is a threat to the Green and Golden Bell Frog (NPWS, undated in DEC, 2005). 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>
<p>Amphibian Chytrid Fungus Management</p> <ul style="list-style-type: none"> • Management measures would be implemented to minimise the further spread of amphibian chytrid fungus, including potentially new strains of the fungus, into the Project site. • Project personnel would be trained in site hygiene management in accordance with the <i>Hygiene Protocol for the Control of Disease in Frogs</i> (NPWS, 2001) which recommends best-practice procedures for handling frogs and suggests strategies for minimising the potential of spreading amphibian chytrid fungus. This would include disinfecting tyres and wheels of vehicles brought into the Project site that have been exposed to mud and are to be used in areas in close proximity to potential frog habitat. • Mobile plant that is brought to the Project site during construction activities would be inspected prior to entering the site and would not be permitted to enter the site if it is not adequately clean (i.e. free of soil and/or organic matter). • Project personnel access to Green and Golden Bell Frog habitat located outside the Project disturbance area would be restricted to minimise any further spread of amphibian chytrid fungus. 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>
<p>Rail Culvert Design</p> <ul style="list-style-type: none"> • The design of rail culverts would include relevant specifications to facilitate the migration/dispersal of the Green and Golden Bell Frog to minimise the potential for frogs located to the south of the Project rail infrastructure to be isolated from the rest of the population to the north. An example of rail culverts which are suitable for use by the Green and Golden Bell Frog are culverts which are around 1 m wide and 1 m high (White pers. comm.). • Suitable habitat for Green and Golden Bell Frogs would be established at the 'frog underpasses' in order to encourage the frogs to use them. Habitat creation would include selective planting of plants preferred by the species (e.g. Cumbungi) and placing piles of rocks to provide protection from predators in strategic places such as either end of (or within) 'frog underpasses'. Pond areas would also be established at either end of the 'frog underpasses'. 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>

Table 11 (Continued)
Relevant Measures Aimed at Avoiding or Reducing
Significant Impacts on the Matters Protected under the EPBC Act

Measures aimed at Avoiding or Reducing Impacts on Listed Threatened Species, Migratory Species, or their Habitats	Timeframe/Workplan
<p>Construction of the Northern Rail Spur Embankment</p> <ul style="list-style-type: none"> Where practicable, construction of the northern rail spur embankment (should it be required when the Project is fully developed to 66 Mtpa) in the vicinity of Deep Pond would be timed to avoid migratory shorebird usage (i.e. May to August). 	<p>Details would be provided in the FFMP prior to Project construction.</p>
<p>Habitat Replacement at Deep Pond</p> <ul style="list-style-type: none"> Habitat in the form of shallow areas for foraging shorebirds would be created during the construction of the northern rail spur embankment, if required to be installed when the Project is fully developed to 66 Mtpa, by modifying the design of the embankment batter slopes to have a gentle toe gradient (i.e. in the submerged zone of the batter slope). This would result in the creation of shallow areas suitable for shorebirds in Deep Pond. 	<p>Details would be provided in the FFMP prior to Project construction.</p>
<p>Project Lights</p> <ul style="list-style-type: none"> The potential impact on fauna caused by the headlights of the trains using the Project rail infrastructure would be minimised by the selective placement of lighting screens in areas where there is an increased potential for interaction with fauna (e.g. where beams of light from the trains would sweep across the surface of Deep Pond). This would also screen the light emitted from the ground-level lighting which would be installed along the rail infrastructure corridor. 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>
<p>Fire</p> <ul style="list-style-type: none"> The potential for a change in the frequency of fires due to the Project would be reduced through the use of water sprays and prudent stockpile management. A 2 ML fire services tank would also be installed for emergency fire fighting situations. 	<p>Details would be provided in the Emergency Response Plan and Spontaneous Combustion Management Plan which would be prepared prior to Project operation.</p>
<p>Fauna Monitoring</p> <ul style="list-style-type: none"> Annual monitoring of the Green and Golden Bell Frog, Australasian Bittern and shorebirds would be undertaken in the area surrounding the Project for the Project duration. The objective of monitoring would be to collect up-to-date information on the use of the Project site and surrounds by fauna. Monitoring data for the Green and Golden Bell Frog would be provided to university institutions undertaking relevant research on the Green and Golden Bell Frog. 	<p>Details would be provided in the FFMP which would be prepared prior to Project construction.</p>
<p>Dust Controls</p> <ul style="list-style-type: none"> Dust controls would be employed, including watering of potential dust generating surfaces, to minimise dust emissions from the Project and associated potential impacts on surrounding vegetation. 	<p>Details would be provided in the Air Quality Monitoring Programme prior to Project construction.</p>
<p>Water Management</p> <ul style="list-style-type: none"> The Project would include several measures to minimise disturbance to the marine environment in the south arm of the Hunter River including the water management strategies. The primary design goal of the Project water management system is that of no discharge to the Hunter River during operation of the Project. Temporary erosion and sediment controls (e.g. silt fences and sediment control structures) would be installed prior to the commencement of construction activities. A silt curtain would be used during construction of the shipping berth batters, wharf structure and during piling operations. 	<p>Details would be provided in the Site Water Management Plan prior to Project construction.</p>

5.2 Describe any consultations undertaken with Indigenous stakeholders regarding the action, if relevant. Identify relevant stakeholders and the status of consultations at the time of referral.

The Project does not affect ‘the environment’ triggers (eg. nuclear actions, Commonwealth marine, Commonwealth land and Commonwealth action) and does not affect protected values that relate to Indigenous matters (eg. certain World Heritage properties and National Heritage places). Therefore in accordance with the *Referral Guideline* (DEH, 2005), this referral does not describe consultations undertaken with Indigenous stakeholders.

6. Information sources

6.1 List relevant references

Documents Referred to in this Referral

Australian Museum (2006) *Database Records for the Search Area – 151°38' to 151°51'E by 32°46' to 32°57'S*. Data received February 2006.

Avifauna Research and Services (2006) *Shorebird Study and Habitat Assessment NCIG Project, Kooragang Island*. Final Report.

Birds Australia (2006) *Database Records for the Search Area - -32.77 to -32.96 and 151.63 to 151.85*. Data received 17 February 2006.

Cargill (2005) *Expansion of the Cargill Oilseed Processing Facility Kooragang Island Environmental Assessment*. Report prepared by HLA-Envirosciences Pty Limited.

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6.2 For information given in sections 3 and 4 of this referral, please indicate:

(a) the source of the information

The information was sourced from the Project EA (Attachment A).

(b) how recent the information is

The Project EA (Attachment A) results and conclusions were based on a literature review, database searches as well as field surveys conducted for the Project during summer 2005-2006.

(c) how the reliability of the information was tested

Comprehensive flora and fauna assessments were prepared for the Project EA (Attachment A) by Resource Strategies and Professor David Goldney (BSc Dip Ed PhD DSc MEIA) (Principal Consulting Ecologist, Western Research Institute Ltd; Adjunct Professor, Charles Sturt University; and Visiting Professor, University of Sydney, Orange Campus).

In addition, the Fauna Assessment was peer reviewed by:

- Fauna Assessment (Frogs) – Associate Professor Michael Tyler (MSc DSc); Visiting Research Fellow, Department of Environmental Biology, University of Adelaide.
- Fauna Assessment (Frogs) – Doctor Arthur White (BSc PhD Dip Ed); Director Biosphere Consultants Pty Ltd.

In addition, comprehensive EA studies were conducted by recognised land contamination and groundwater, noise and air quality specialists in accordance with Project Environmental Assessment Requirements (EARs) issued by the Director-General of the DoP on 26 April 2006.

(d) any uncertainties in the information

Minimal uncertainty is expected given:

- the comprehensive nature of the studies undertaken;
- the extensive consultation process conducted with key stakeholders;
- the mitigation measures incorporated into the Project;
- the exhaustive nature of the assessment process conducted by the NSW Government;
- the preparation of detailed management plans prior to Project construction and operation;
- the intensive performance monitoring to be conducted and reporting to stakeholders; and
- the undertaking of regular independent monitoring and auditing.

7. Signatures and Declarations

7.1. Signature of person making the referral

I, Robert Yeates, declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature



Date 8 August 2006

7.2. Signature of person proposing to take the action

I, Robert Yeates, on behalf of Newcastle Coal Infrastructure Group, declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature



Date 8 August 2006

7.3. Declaration of person nominated as proponent in Section 1.3, if different from person proposing to take the action

Not applicable.

7.4. *If you think your proposed action is not likely to have a significant impact on any of the matters listed in the table below, then you should select and complete the following statement and you should not mark any of the boxes in the table below.*

I, Robert Yeates, being the person making this referral and agent acting on behalf of the person proposing to take the action, believe that the action described in this referral **is not a controlled action**.

The Project is not considered to be a controlled action as it is not likely to have a significant impact upon:

- the world heritage values of a declared World Heritage property;
 - the ecological character of a declared Ramsar wetland;
 - the members of a listed threatened species or any threatened ecological community, or their habitat;
 - the members of a listed migratory species or their habitat;
 - the environment in part of the Commonwealth marine area; or
 - the environment on Commonwealth land.
-

FIGURES

ATTACHMENT A

**NEWCASTLE COAL INFRASTRUCTURE GROUP PROJECT
ENVIRONMENTAL ASSESSMENT**

ATTACHMENT B

**EPBC ACT LISTED MIGRATORY SPECIES IDENTIFIED BY
EPBC ACT ON-LINE DATABASE SEARCH**

**EPBC Act Listed Migratory Species Identified by
EPBC Act On-line Database Search¹**

Scientific Name	Common Name
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>
White-throated Needletail	<i>Hirundapus caudacutus</i>
Black-faced Monarch	<i>Monarcha melanopsis</i>
Satin Flycatcher	<i>Myiagra cyanoleuca</i>
Rufous Fantail	<i>Rhipidura rufifrons</i>
Regent Honeyeater	<i>Xanthomyza phrygia</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Curlew Sandpiper	<i>Calidris ferruginea</i>
Lesser Sand Plover	<i>Charadrius mongolus</i>
Latham's Snipe	<i>Gallinago hardwickii</i>
Broad-billed Sandpiper	<i>Limicola falcinellus</i>
Bar-tailed Godwit	<i>Limosa lapponica</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Eastern Curlew	<i>Numenius madagascariensis</i>
Whimbrel	<i>Numenius phaeopus</i>
Pacific Golden Plover	<i>Pluvialis fulva</i>
Painted Snipe	<i>Rostratula benghalensis s. lat.</i>
Common Greenshank	<i>Tringa nebularia</i>
Marsh Sandpiper	<i>Tringa stagnatilis</i>
Terek Sandpiper	<i>Xenus cinereus</i>
Amsterdam Albatross	<i>Diomedea amsterdamensis</i>
Antipodean Albatross	<i>Diomedea antipodensis</i>
Tristan Albatross	<i>Diomedea dabbenena</i>
Wandering Albatross	<i>Diomedea exulans</i>
Gibson's Albatross	<i>Diomedea gibsoni</i>
Southern Giant-Petrel	<i>Macronectes giganteus</i>
Northern Giant-Petrel	<i>Macronectes halli</i>
Gould's Petrel	<i>Ptedrodroma leucoptera leucoptera</i>
Streaked Shearwater	<i>Puffins leucomelas</i>
Buller's Albatross	<i>Thalassarche bulleri</i>
Shy Albatross	<i>Thalassarche cauta</i>
Campbell Albatross	<i>Thalassarche impavida</i>
Black-browed Albatross	<i>Thalassarche melanophris</i>
Salvin's Albatross	<i>Thalassarche salvini</i>
White-capped Albatross	<i>Thalassarche steadi</i>
Bryde's Whale	<i>Balaenoptera edeni</i>
Blue Whale	<i>Balaenoptera musculus</i>
Pygmy Right Whale	<i>Caperea marginata</i>
Southern Right Whale	<i>Eubalaena australis</i>
Dusky Dolphin	<i>Lagenorhynchus obscurus</i>
Humpback Whale	<i>Megaptera novaeangliae</i>
Killer Whale, Orca	<i>Orcinus orca</i>
Green Turtle	<i>Chelonia mydas</i>
Leatherback Turtle	<i>Dermochelys coriacea</i>
Great White Shark	<i>Carcharodon carcharias</i>
Whale Shark	<i>Rhincodon typus</i>

¹ Searched using a search area of approximately 400 km² surrounding the Project site, search conducted June 2006.