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NSW Department of
Planning and Infrastructure

3 May 2012

RE: Port Waratah Coal Services Terminal 4 Project Application - comment

Dear Assessment Officer,

I would like to offer the following comments on the ecological assessment component of the PWCS T4 project application. In particular, I would like to provide further information regarding the ecology of threatened microbat species resulting from my PhD research that was undertaken in close proximity to the proposal.

A total of five threatened hollow-roosting microbat species listed as vulnerable under NSW *Threatened Species Conservation Act 1995* have been recorded within the T4 project area, being *Mormopterus norfolkensis*, *Scoteanax rueppellii*, *Myotis macropus, Saccolaimus flaviventris* and *Falsistrellus tasmaniensis*. All of these species (except for *Myotis macropus*) are rarely captured and despite their threatened species status, very little is known of their ecology. Hollow-roosting bat species depend on day roosts to fulfil a number of aspects of their lifecycle such as shelter from weather and predators, thermoregulatory requirements and maternity sites for young. The protection of habitat features that are required to fulfil so many important lifecycle functions is essential to the conservation of threatened species,

particularly maternity roosts that can influence breeding success. It may be difficult to quantify or mitigate foraging habitat impacts for highly mobile bat species which may traverse large areas each night. However, this makes the protection of key habitat features such as day roosts so much more important. Of these roosts, maternity roosts are the most critical type of habitat to be conserved for most microbat species and warrant a cautious approach to impact assessment.

There have been very few ecological studies into the terrestrial fauna of mangrove forests in NSW and mangroves have been largely overlooked as bat habitat. However, I have recently found that the Hunter Estuary old growth mangroves are highly important maternity roost sites for *Mormopterus norfolkensis* with high patch fidelity. Another radio-tracking study (Department of Primary Industries, Dr Bradley Law) has found that *Scoteanax rueppellii* also uses these mangroves as maternity roosts. These two threatened species are rarely captured as they are adapted to flying in more open habitats and very little is known of their ecology. Yet we capture high numbers of these species in the mangroves during maternity season. Additionally, we also capture many *Myotis macropus* in the mangroves and it is likely that it also has maternity colonies resident in these old growth mangroves. The mangroves in the Hunter Estuary have had very little survey effort undertaken for bats and as such it is likely that other threatened species recorded nearby may also use the mangroves as roosts, such as *Saccolaimus flaviventris* and *Falsistrellus tasmaniensis*. The mangroves are also likely to represent highly important roosting habitat for many other non-threatened microbat species in the locality.

The Hunter Estuary old growth mangrove stands are considered to be so important to microbats and are unique in the region for the following reasons:

- Extremely high hollow-bearing tree density in the region. I have found an average of 804 hollow-bearing trees per hectare (n = 36 plots) in old growth mangroves nearby that visually look similar to those in the north of the project area. Estimates can depend on transect / quadrat placement, particularly if transects include disturbed edge habitats. I found that the average hollow-bearing tree density for non-mangrove habitats (n = 10 plots) was 79 per hectare with four plots having no hollow-bearing trees at all. This means that the Hunter Estuary old growth

mangrove stands have over 10 times the hollow-bearing trees per hectare than other remnant habitat patches within the locality (10km) which is quite remarkable;

- Lack of remnant habitat containing hollows in surrounding locality (10km) due to land clearing and urbanisation;
- Open structure of mature mangrove forests allow these open-adapted threatened species to navigate these forests compared to younger mangrove stands;
- Temperature / humidity benefits for bats roosting during the day and for raising young; and
- Highly mobile species such as microbats may gather in the mangroves to roost and then disperse across the landscape to forage at night as we observed to occur with *M. norfolkensis*. The congregation of so many individuals in the relatively small area that the old growth mangroves represent could result in impacts on local populations being of a much greater magnitude than just 29.8 hectares of habitat removal.

According to the ecological impact assessment documentation prepared for the project, the proposal is likely to have a significant impact on these threatened species. The old growth mangroves of the Hunter Estuary are known to be important breeding sites for two threatened species (*M. norfolkensis* and *S. rueppellii*) and are likely to be used by three other species. I have mapped the extent of old growth mangroves using aerial photography and I estimate that the project would remove 11.3% of the total old growth mangroves remaining in the Hunter Estuary (based on 29.8ha mangrove removal stated in the proposal). Very little survey effort was undertaken in the mangrove forest for the ecological assessment and no evidence has been presented to demonstrate that the mangroves within the project area are not used as maternity sites. Therefore, we must conclude that **the mangroves within the project site are highly likely to be important maternity sites** for up to five species of threatened microbat. Impacts on such important habitat for these rare species warrant further investigation and very careful consideration by the government.

The following actions are considered to be reasonable minimum recommendations for the project:

- **Determine if the mangroves to be removed / impacted are used as maternity roosts by threatened bat species and quantify the significance of this use in the locality;**
- Identify and accurately map the hollow-bearing trees to be removed by the proposal so not to rely on estimates which may have been biased by transect / plot placement;
- Develop a revised impact mitigation / offsets strategy that specifically addresses impacts on threatened microbat maternity habitat. The current offsets proposal is **highly unlikely** to offset or minimise the significant impacts on maternity colonies.

Please don't hesitate to contact me if you have any questions.

Yours Sincerely

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