Our Ref: 6052_Access_EA:MSR

25 September 2007

Marsim (Rosedale) Pty Ltd
62 New South Head Road
EDGECLIFF NSW 2027

Attention: Lara Mulligan

Dear Lara

Re: Ecological Assessment of Main Access Road Options
Bevian Road Concept Application, Rosedale.

Conacher Travers has been engaged to provide an ecological comparison of two main southern access options into the Bevian Road Concept area as shown on Figure 1. This comparison identifies the vegetation communities that will be impacted, the area of impact and the potential environmental impacts of the options.

Access Road Options

The site has two (2) potential southern access options which include (Figure 1):-

- **Option 1** - Bevian Road South West Access – the current proposed road alignment on the western edge of Bevian Wetland.

  Option 1 is the proponents current preferred option as it runs along an existing formed single lane gravel road, an entry point onto George Bass Drive can be built with adequate sight distance for approaching drivers and generally impacts to a lesser extent on sensitive vegetation types and habitat.

- **Option 2** - The STP South East Access – the proposed alignment running between Bevian Wetland and the Rosedale STP.

  Option 2 is the proponents less preferred option as it requires significant importation of fill to build up the road pavement; it is within the smell zone of the STP and will impact to a greater extent on sensitive vegetation (endangered ecological communities) and habitats associated with Bevian Wetland.

  A third access, located in the northern portion of the site, provides a secondary access. This access enters George Bass Drive on a blind corner increasing the risk of vehicle accidents. As such, this road is not considered to be a viable option for a main access and is intended, under the Bevian Road Concept application, to be used for emergency

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purposes only in the event that the southern access is closed due to extreme fire or flooding.

Site Investigations and Surveys

Vegetation communities across the site were comprehensively surveyed in 2006, whilst those vegetation communities adjacent to the Bevian Wetland were surveyed further in June 2007. The results of the June 2007 survey are presented in the Flora and Fauna Assessment Report (*Conacher Travers* 2007).

Given the inaccuracies of the DoP SEPP 14 Wetland Mapping, the Bevian Wetland boundaries have also been ground truthed and mapped to verify the location of the SEPP 14 boundary. *Conacher Travers* has independently verified the surveyed boundary and undertaken detailed mapping of adjacent vegetation communities. These vegetation communities are shown on the attached Figure 1. The current proposed access road design (option 1) has been located by defining the outer edge of the wetland based on vegetation and site topography.

The road is a raised single level design that minimises impacts on the wetland. Cut and fill has been minimised to reduce the impact on surrounding terrestrial vegetation by providing a retaining wall on the western side of the proposed road. Raising the level of the existing road also provides an opportunity to install stormwater drainage structures that would otherwise be affected by the water tables surrounding the wetland. In addition, the proposed road has been aligned to retain identified habitat trees, with the highest habitat value. Habitat trees along the proposed southern access route have been mapped and the route modified accordingly.

Description of Existing Vegetation

Nine (9) vegetation communities and three (3) vegetation community variations were identified within the subject site using aerial photographic interpretation and extensive ground-truthing (Figure 1). Of the nine vegetation communities the following types occur within close proximity to Bevian Wetland and are potentially affected by road works subject to the selected option.

Vegetation Community 1 – Spotted Gum/Ironbark Open Forest/Woodland: This vegetation community within the subject site corresponds to Map Unit - 9 Coastal Lowlands Cycad Dry Shrub Forest – *Corymbia maculata / Macrozamia communis* as described and mapped by NPWS (2000). Variations from the NPWS (2000) description include *Eucalyptus fibrosa* occurred as the dominant ironbark along the eastern boundary of the subject site and *Eucalyptus muelleriana* occurred throughout the vegetation community.

This vegetation community occurs in the northern-eastern corner, along the eastern boundary, within the north-western and south-western sections of the subject site and covers approximately 10 % of the subject site.

Vegetation Community 5 – Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest – TSC Act EEC): This vegetation community was mapped as Map Unit – 25 South Coast Swamp Forest Complex however, it is most similar to Map Unit 27 – Ecotonal Coastal Swamp Forest as described by NPWS (2000). Variations of this community to the community described by NPWS (2000) include; only a small percentage (<5%) of *Eucalyptus botryoides* surrounding the wetland and the dominance of *Casuarina glauca.* Two areas of this vegetation community within the floodplain have a high level of disturbance due to cattle grazing hence the dominance of the coloniser species, *Casuarina glauca.* In

contrast, the area surrounding the Bevian Swamp has a moderate level of disturbance with a diverse composition of species in both the shrublayer and groundlayer, more representative of Map Unit 27 – Ecotonal Coastal Swamp Forest as described by NPWS (2000).

This vegetation community occurs within the floodplains and along the edge of the Bevian Swamp in the south eastern section of the subject site and covers approximately 15 % of the subject site. Two fragmented areas of this community exist within the floodplain of the Bevian Swamp.

Variation 5a Disturbed Swamp Oak Open Scrub (Low Quality Swamp Oak Floodplain Forest – TSC Act EEC) **–** A highly disturbed regrowth variation associated with previously cleared and heavily grazed areas of the floodplain. This community generally consists of no canopy, scattered samplings of *Casuarina glauca* <1m in height and an understorey generally dominated by a mixture of exotic herbs and pasture grasses with minor patches of native understorey.

Vegetation Community 6 – Aquatic Herbfield: This vegetation community has been mapped as cleared land by NPWS (2000) and consists of farm dams and does not correspond to any of the map units described by NPWS (2000). This vegetation community occurs in eight (8) farm dams located throughout the subject site and parts of Bevian Swamp and covers approximately 10% of the subject site.

Variation 6a Natural Freshwater Wetland (Core Quality Freshwater Wetlands on Coastal Floodplains TSC Act EEC) **–** A native Aquatic Herbfield variation to this community associated with the open water of Bevian Swamp is located in the south of the subject site. This largely natural community variation contains the floristic and geomorphological characteristics of the EEC, Freshwater Wetlands on Coastal Floodplains, and as such has been mapped separately (Figure 6).

Vegetation Community 7 – Grassland with Scattered Trees: This vegetation community occurs over the majority of the subject site and covering approximately 70%.

Vegetation Community 8 – Disturbed Redgum Open Woodland (Low Quality River Flat Eucalypt Forest on Coastal Floodplains TSC Act 1995): This vegetation community occurs as a number of isolated patches in the south-eastern portion of the subject site associated with the alluvial floodplain soils.

Vegetation Community 9 – Closed Swamp Paperbark Scrub (Core Quality Swamp Oak Floodplain Forest – TSC Act EEC): This vegetation community occurs as a small isolated patch in the southern most portion of the subject site associated with the alluvial floodplain soils.

Variation 9a Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest – TSC Act EEC) **–** A highly disturbed regrowth variation associated with previously cleared and heavily grazed areas of the floodplain. This community generally consists of no canopy, scattered regrowth samplings of *Melaleuca ericifolia* <1m in height and an understorey generally dominated by a mixture of exotic herbs and pasture grasses with minor patches of native species.

Condition of the Existing Vegetation

The western boundary of the wetland (Figure 1) is dominated by Swamp Oak Open Forest found on the steep western embankments of Bevian Wetland. With the exception of the currently formed Bevian Road the existing vegetation is in good condition and provides good bank stability.

The northern edge of the wetland is dominated by Swamp Oak Open Forest which at one stage would have extended northward into the southern catchment on site as indicated by remnant and regenerating Casuarina species (Vegetation Communities 5 & 5a). The vegetation on the northern boundary has been severely impacted by past clearing and the current access road crosses the drainage path of water courses feeding from the north of Bevian Wetland. The existing access road is inundated in high rainfall events and delivers sediment directly into the wetland with no filtration.

Vegetation to the west of Bevian Wetland consists of Swamp Oak Open Forest (Vegetation Community 5), Bangalow Sand Forest, Swamp Paperbark Forest (Vegetation Community 9a) and regenerating versions of these communities. The gap in Bangalow Sand Forest on the south eastern aspect of Bevian Wetland is due to vegetation clearance for services and is currently regenerating into a natural community representative of Swamp Oak Open Forest and Bangalow Sand Forest.

Potential Environmental Impacts of the Access Options

Option 1 – the Bevian Road South West Access

Option 1 – the Bevian Road South West Access (Figure 1) identifies the road alignment passing through Spotted Gum Forest part impacted by the existing Bevian Road. Hence it diverts away from Bevian Wetland as soon as practical. It then passes over one of the drainage lines feeding into Bevian Wetland up the central ridge into the southern catchment of the site.

This option impacts on the following existing Vegetation Communities

Vegetation Community	Impact Area (ha)
Swamp Oak Open Forest (EEC)	0.05
Spotted Gum Forest	0.25

The approximate clearance for the proposed access road is 20m in width impacting dominantly on Spotted Gum Forest. Due to the limited separation between the waters edge and the proposed road at the entrance, protection measures will need to be implemented to prevent damage to vegetation and avoid sediment deposition. However given that the road will be raised above the current road height the outcome will be a road that is separated vertically from the wetland. Stormwater filtration systems installed within the road pavement will provide long term protection to the wetland from potentially contaminated runoff from the road.

Option 2 –STP South East Access

Option 2 –STP South East Access is shown on (Figure 1). This road option exits George Bass drive to the south west of the Rosedale STP and passes through Endangered Ecological Communities and hence into the low lying slopes of regenerating Redgum Open Woodland, Swamp Paperbark Heath and regenerating Swamp Oak Forest.

This option impacts on the following existing Vegetation Communities

Vegetation Community	Impact Area (ha)
Bangalow Sand Forest (EEC)	0.2
Swamp Oak Open Forest (EEC)	0.1
Swamp Paperbark Forest (EEC	0.05
Disturbed Swamp Oak Forest (low condition EEC)	0.48
Disturbed Red Gum Open Woodland (low condition EEC)	0.22

Disturbed Swamp Paperbark Heath (low condition EEC)	0.11

To construct the road in this case the effective vegetation clearance will be approximately 20 m to allow for the road construction (excluding any service easement). A total of 1.16 ha of endangered ecological communities in good and low condition will be destroyed. The road will require the importation of appropriate road base which will provide increased opportunities for weeds to establish along the road side. The proposed road will then be built above the current ground surface due to the highly waterlogged soils in the lower slopes.

The road will pass through extensive areas of regenerating endangered ecological communities that are currently planned for restoration under the current Bevian Road Concept Plan. The lands impacted by this option are critical regeneration areas for the proposed development and the imposition of a road corridor would result in a failed maintain & improve test.

The DoP has also identified the north western lands to Bevian Wetland as potentially forming a habitat corridor to vegetated lands to the east. This option would present another barrier to fauna movement which would be accessing the wetland for water, foraging and breeding opportunities.

Conclusion & Recommendations

In accordance with the Bevian Road Concept Application, the proponent supports the current proposed access provided by the existing Bevian Road which is on the western edge of Bevian Swamp. The existing access forms an unsealed single lane trail that borders the Bevian Wetland and currently impacts on drainage lines feeding into the wetland. Being unsealed, sediments from the trail are delivered into the wetland with no filtration during rainfall events.

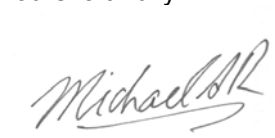
Conacher Travers considers that Option 1 provides the most ecologically sustainable access option due to the demonstrably reduced impact on endangered ecological communities (both good condition and regenerating disturbed habitats). The new proposed access road improves protection for the wetland by the installation of a stormwater treatment bio-swale that delivers runoff after filtration into the wetland and relocates the road as soon as practical away from the foreshore of Bevian Wetland.

Conacher Travers recommends the adoption of option 1 with the implementation of mitigation measures to reduce impacts of the proposed road upgrading on Bevian Wetland. These measures include:

- Provision of protective fencing and sediment control works on the wetland edge during construction.
- Diversion of surface runoff during construction to a containment area to strip sediments.
- Installation of stormwater filtration devices within the road to treat road runoff prior to disposal into the wetland.
- Rehabilitation of any disturbed areas to a natural standard.
- Implementation of a long term weed control program to prevent the introduction of weeds.
- Implementation of a litter collection program.

The ecological impact of option 1 is offset with the proposed restoration works in the north western portion which will form a significantly improved habitat outcome over the current land use. The future use of lands to the north west of Bevian Wetland as an ecological corridor remain as a viable future solution in the long term which will be enhanced by ensuring the current road access is adopted.

Yours faithfully



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Option 1

Option 2

Legend

- Property Boundary
- 1 Spotted Gum/Ironbark Open Forest
- 2 Blackbutt Woodland
- 4 Banksia Scrub
- 3 Dry Gully Rainforest (Preliminary EEC - EPBC Act)
- 5 Swamp Oak Open Forest (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 5a Disturbed Swamp Oak Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 6 Aquatic Herbfield
- 5a Freshwater Wetland Vegetation (Core Quality Freshwater Wetlands on Coastal Floodplains - EEC - TSC Act)
- 8 Disturbed Redgum Open Woodland (Low Quality Riverflat Eucalypt Forest on Coastal Floodplains - EEC - TSC Act)
- 9 Disturbed Swamp Paperbark Open Heath (Low Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- 9a Swamp Paperbark Closed Scrub (Core Quality Swamp Oak Floodplain Forest - EEC - TSC Act)
- Bangalay Sand Forest

0 100 200 300 400 500 m

1:8,000

Original plan produced in A3 colour

N

All mapped features are approximate and require land survey to confirm the location of Asset Protection Zones relative to developement footprint

*Subject Site boundary subject to final survey

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Figure 1 - Ecological Assessment of Access Options

Bevian Road, Rosedale

Ver.F1 By.TM 26/09/07 Ref.No.6052

Source: Dept. of Lands 1:25,000 Aerial Photograph,