NSW GOVERNMENT | Environment, Climate Change & Water

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Your reference:
Our reference: FIL07/3654-04 DOC11/9608
Contact: Julian Thompson, (02) 6229 7002

Mr Chris Wilson
Executive Director
Major Project Assessments
Department of Planning
GPO Box 39
SYDNEY NSW 2001

18 March 2011

Chris

Dear ~~Mr~~ Wilson

RE: Proposed North Nowra Link Road – Part 3A Major Project – Environmental Assessment

I refer to your letter of 16 February 2011 requesting comments from the Department of Environment, Climate Change & Water (DECCW) on the Environmental Assessment (EA) for Shoalhaven City Council's proposed North Nowra Link Road Concept Plan. This proposal is being assessed under Part 3A of the *Environmental Planning and Assessment Act* 1979.

DECCW has reviewed the EA report prepared by JBA Urban Planning Consultants, dated February 2011. The main environmental issues associated with the proposal relate to impacts on biodiversity, functionality of the Bomaderry Creek Regional Park, noise, and impacts on Aboriginal cultural heritage.

The three routes proposed by Shoalhaven City Council for the North Nowra Link Road Concept Plan all impact upon land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) and known as Bomaderry Creek Regional Park (the "Park").

DECCW appreciates that Council is wishing to improve vehicular access to the Nowra town centre. The construction of a major road in the Park, which is currently reserved under the NPW Act, will require revocation of land from the Park. Reservation of land under the NPW Act is envisaged to be in perpetuity and therefore it takes an Act of Parliament to revoke land from a national park or regional park. Of course, an Act to revoke part of the Park would require the approval of the Minister for Climate Change and the Environment, the NSW Government and the NSW Parliament. In relation to the proposed routes a planning approval would not have effect unless revocation is supported by the Minister, the Government and is assented to by Parliament.

Under the DECCW "Revocation of Land Policy", a revocation will only be considered if all other possible options for construction of public infrastructure have been considered on all other land tenures and assessed as not socially or economically viable. The Government would also require adequate offsets to ensure there is no net environmental or biodiversity loss.

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Please be aware that as a general principle, DECCW does not support the dissection of protected areas or reserved lands. However, where it is clear that there is not an alternative to the revocation of reserved land, DECCW strongly recommends this be done with the least possible impact to land management functions, visitor experiences and conservation values.

To help guide you in your deliberations DECCW has provided detailed comments in **Attachment A** to this letter. You will find DECCW's various recommendations and conclusions are highlighted in bold throughout Attachment A.

A summary of DECCW's submission is provided below.

Biodiversity Impacts

One of the reasons for the reservation of the Park is to protect certain threatened flora species and significant biodiversity values in the Park. The Park and the adjacent Bomaderry bushland area is an island of gorge and bushland within a relatively developed urban area. It is considered that all three proposed route options in this EA will fragment vegetation and habitat for fauna in the Park and bushland to some extent.

The proposed central route will have permanent impacts on an endangered population, *Eucalyptus langleyi* (Albatross Mallee), and also the listed threatened plant species *Zieria bauerlenii* (Bomaderry Zieria) which is only found in the Bomaderry bushland area.

Following a comprehensive assessment and comparison of all three proposed route options, DECCW concurs with the conclusion in the EA that Option 3 (the northern route) will have the least impact on biodiversity of all the options, as it will not impact on flora listed under the *Threatened Species Conservation Act 1995* (TSC Act) and its long term impact to fauna species through fragmentation and vehicle collision will be less significant than the other route options.

Option 1 (central route) is considered to be the least favourable of all options for the conservation of biodiversity and is not supported by the Department. It will result in a loss of two individuals (of a total of 20) of an Endangered Population of Albatross Mallee, the probable loss of two individual Bomaderry Zieria plants, which are listed as endangered under both NSW and the Commonwealth threatened species legislation, and the loss of three plants (of 27) of the largest population of *Genoplesium baueri* (a native orchid) in a conservation reserve within the region. It will also fragment habitat for several threatened fauna species.

Option 2 (southern route) is considered to have slightly less impact on biodiversity than the central route, but is still less favourable that the northern route from a biodiversity conservation perspective. It will have impacts on two threatened plant species *Genoplesium baueri* and *Hibbertia sp. Nov* "Menai" and potentially one Endangered Ecological Community (Lowland Rainforest) listed under the TSC Act. The EA predicts that nine individuals (of 27) of *Genoplesium baueri* will be lost.

Option 3 (northern route) is considered in the EA to have the least impact of the three on biodiversity. It would result in the clearing of Scribbly Gum forest and the potential loss of habitat for the Gang-gang cockatoo, a threatened bird species that has been recorded in the Bomaderry bushland area.

Biodiversity Offset

Shoalhaven City Council has proposed to offer land as a biodiversity offset to be added to the Park as part of each route proposal. Due to the high conservation values to be impacted by all three route options, DECCW supports a biodiversity offset for any approved route(s), to strive towards a "maintain or improve biodiversity" outcome. Such offsets are also required by DECCW's "Revocation of Land Policy" as all three proposed routes will require partial revocation of the Park.

After a review of the offset proposals, all three proposed routes had an impact on biodiversity that was greater than is able to be offset by the proposed addition of the offset lands to the Park. The northern route was best placed in terms of the conservation value of the offset relative to the predicted biodiversity impacts, and DECCW considers that a suitable offset package could be achieved with some further route refinement and assessment of the offset area.

Impacts on Bomaderry Creek Regional Park

All three proposed routes will impact on Bomaderry Creek Regional Park to differing extents.

The impacts on the park can be summarised as fragmentation; impacts on amenity and recreation for Park users; increased opportunities for vandalism, rubbish dumping, littering, arson and the introduction of pests and weeds. The central route would have the greatest impact on the Park and is not supported by the Department. It severs habitat connectivity for fauna and vegetation in the park, increases vectors for the introduction of weeds, and increases the potential for vandalism, arson and rubbish dumping in the central portion of the park. It would significantly decrease the quality of visitor experience as it is immediately adjacent to the picnic area, it would fragment walking tracks and introduce road noise into the relatively quiet central portion of the Park.

The northern and southern routes would have less impact on Park values as they are located on its fringes, but as noted above, the southern route has significant biodiversity impacts on the bushland generally.

Noise Impacts

The EA included a basic assessment, as previously agreed with DECCW, of predicted noise levels from the three proposed route options. The information in this EA and the specialist noise report is, in DECCW's view, sufficient to gain a broad understanding of the potential impacts from each route option.

Noise impacts on residences for all three routes were similar with around 600-700 residences predicted to experience an increase of 0.5 dB(A) and around 50-80 residences predicted to experience an increase of 2 dB(A) in noise levels. Around 50-100 residences would exceed sleep disturbance guidelines.

Impacts on the Bomaderry bushland area and the Park are also similar across the three routes with about 50-60 hectares of bushland impacted above guideline levels. However, the central route is also predicted to create noise impacts on a lookout, picnic area and walking tracks in the Park.

All three routes had feasible noise mitigation measures that could be applied to reduce the impacts to guideline levels on residents, though not on visitors to the Park. In terms of noise impact on residents only, all three options can be considered equal. The central route would have a greater noise impact on park visitors.

Factors associated with noise can be considered in further assessment of route options. Such factors could include the number of residences, or area of bushland, for which noise mitigation measures are required; the cost of noise mitigation for each option; and impacts associated with implementation of mitigation measures.

Impacts on Aboriginal Cultural Heritage

According to the Aboriginal Archaeological Assessment report and the current road design provided in the EA, all three proposed route options show evidence of potential impact on Aboriginal heritage values. DECCW supports a road design that limits and possibly avoids impacts on Aboriginal heritage values.

The current route corridor design information in the EA indicates that the central route and northern routes present a low overall impact on significant Aboriginal archaeological and cultural features whilst the southern route exhibits a moderate archaeological and cultural impact on Aboriginal heritage. However, the central and southern routes would also affect Aboriginal cultural heritage by intruding on a rich grouping of Aboriginal sites that are currently in a relatively natural setting.

DECCW is satisfied that Aboriginal stakeholders have been provided with an opportunity to comment on the proposed Concept Plan, however the actual level of discussion was minimal. Following any Concept Approval for route(s), Aboriginal stakeholders should continue to be provided with an opportunity to be consulted on any subsequent detailed road design and refinements, and any final mitigation and management recommendations for Aboriginal heritage sites and values.

Conclusion

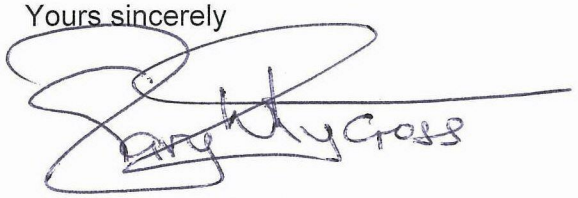
The final rankings for the three route options presented in Table 19-5 and then discussed in Part D of the EA use a numerical matrix to ascribe risks and benefits associated with the proposal across environmental, socio-economic, heritage, traffic and visual aspects. DECCW considers that this simple numerical ranking does not account for the complexities and scale of potential impacts on biodiversity for very rare endangered species such as Bomaderry Zieria relative to (for example) a time saving for traffic, or a noise impact on a local resident. Such numerical rankings across vastly different aspects and impacts of the proposal oversimplify the process of arriving at a preferred route option.

DECCW does appreciate that there may be wider social and economic benefits that could flow from the construction of the North Nowra Link Road. These benefits are explained in the EA and range from decreased travel times, a reduction in traffic congestion in the North Nowra area, and an expectation of a reduction in vehicle accidents. At the same time, we encourage the Department of Planning to also carefully consider the important biodiversity and Aboriginal cultural heritage issues in selecting an alternative, along with irreversible impacts on recreational and tourism opportunities in the area.

If the Department of Planning grants Concept approval to any of the proposed route options, further planning approvals will be required before construction approval can be granted. These further planning approvals must not be progressed until the new Minister for the Climate Change and the Environment has had an opportunity to consider whether revocation of the recommended route through the Park is appropriate, and, if so, until Parliament has given effect to this outcome. This is essential to avoid any real or perceived pre-empting of the decision by Government on the matter of revocation.

Should you wish to discuss this matter, meet with DECCW or require further assistance please do not hesitate to contact Nigel Sargent, Manager South-East Region at the Queanbeyan office of DECCW on 6229 7002.

Yours sincerely



GARY WHYTCROSS
Director - South
Environment Protection and Regulation Group

"ATTACHMENT A"

Shoalhaven City Council - North Nowra Link Road Concept Plan Environmental Assessment

Department of Environment, Climate Change & Water Comments – March 2011

PART A – IMPACTS ON BIODIVERSITY

1. Threatened Flora

Zieria baeuerlenii (Bomaderry Zieria)
This plant species is listed as Endangered under both the NSW *Threatened Species Conservation Act* 1995 (*TSC Act*) and Commonwealth *Environment Protection & Biodiversity Conservation Act* 1999 (*EPBC Act*). The species has also been preliminarily listed as Critical Habitat under the *TSC Act*. This species will only be impacted by the central route option (option 1).

Zieria baeuerlenii is one of the rarest plants in Australia, with an extent of occurrence of 26 hectares and an area of occupancy of approximately 1 hectare, all within the local Bomaderry Creek bushland area. Analysis of the plant's enzymes suggests there are only 20 genotypes spread over the 49-57 sub-populations. There are particular risks to the "A" sub-population from a major road development. DECCW regards the long term persistence of two plants which are located only 13 metres from the centreline of the proposed central route as doubtful. It may be that the plants could be protected during the construction phase, but longer term it is highly likely that habitat change, road maintenance, vehicle accidents, or weed invasion will kill the individual plants.

If the central option is constructed the two *z baeuerlennii* plants closest to the proposed central route will be subjected to many possible impacts which will be difficult to prevent, despite the proposed management plans. Management actions, similar to those proposed in the EA, are currently in place along roads throughout the Shoalhaven and throughout NSW. Generally speaking, road side impacts such as fire, weeds, vandalism and littering are not prevented in the long term. It is recognised that management plans can help alleviate these impacts, however they effectively only ease the indirect impacts. It is also well documented the greatest affect is to areas within the first few metres from the road and impacts generally decline with distance from the road's edge.

Where there are complex management measures that rely on the success of multiple mitigation actions, such as is proposed in the EA to protect the two plants near the central route, DECCW believes there is a significant chance of failure. The two *z. baeuerlennii* plants could be lost even if only one of the proposed mitigation measures (eg. Fencing, sediment controls, signage, construction management plans) fails. DECCW believes therefore, that indirect impacts to the two *z. baeuerlennii* closest to the central route alignment are likely.

The construction of the central route would likely exacerbate weeds. It provides a corridor for the movement weeds into the population of *Z. baeuerlennii*, to a much larger degree than the existing utility easement and service track. DECCW believes that construction of the

central route could compromise the long term viability of the northern sub-populations of the species.

The major long term threat for the central route is weed invasion. The following is extracted from the 2011 Commonwealth Recovery Plan for *Zieria baeuerlenii*: "*Weeds are prevalent on the margins of the Bomaderry bushland. Lantana, Crofton weed, Mother of Millions, Kikuyu grass, Giant Parramatta grass, Black-eyed Susan, Morning Glory and Purpletop are common in places. Some sites are impacted by weeds, particularly Mother of Millions. It is unlikely that weeds can be eliminated in the Bomaderry bushland, as the surrounding area provides a constant source of weed propagules. Ongoing work will be required to manage weeds as they affect the population*".

Nearly all major roads within cities have weed issues on the road verges and in adjacent bushland, particularly if there are weed problems in the vicinity, as in this case. Many major road verges in the Shoalhaven LGA have been colonised by African Lovegrass (*Eragrostis curvula*) and Whiskey Grass (*Andropogon virginicus*) which threaten adjacent native flora. Weed populations often expand rapidly after a disturbance such as fire, which opens up further habitat for colonisation. Whilst the Bomaderry Creek Regional Park has weed infestations on its edges, the construction of the central route, which bisects the Park, would almost certainly introduce a weed vector through the centre of the Park, and in close proximity to colonies of *Z. baeuerlennii*.

There is likely to be foreseeable impacts to *Zieria baeuerlenii* if the central route is constructed. The EA has proposed mitigation measures to ease these impacts. Should the central route be approved, DECCW recommends that a demonstration of how these measures have, in a similarly environmentally sensitive area, been successfully implemented to avoid indirect impacts. This should be provided in any Preferred Project Report (PPR) or Submissions Report.

Conclusion:

- **The central option is likely to impact on 2 plants (of the approximately 50 plants known) of the endangered *Zieria baeuerlenii*.**
- **Both the southern and northern route options will not impact on *Zieria baeuerlenii*.**
- **If the central route is chosen, the proponent needs to demonstrate (in a PPR or Submissions Report) that the mitigation measures proposed in the EA have been previously used in similar situations elsewhere and were effective.**

<u>*Eucalyptus langleyi* (Albatross Mallee)</u>

This tree species is listed as an "Endangered Population" in the Bomaderry Creek area under the *TSC Act*. It is also listed as a vulnerable species under both the *TSC Act* and Commonwealth *EPBC Act*. The EA states that the central route option will result in the loss of two individuals, which is equivalent to a 10% loss of this endangered population.

The EA states that the *E. langleyi* population has declined in recent years from 32 plants to 20 plants (Eco Logical, 2011, p43). The EA also suggests that a loss of a further two plants, assuming the central route option is constructed, can be accommodated without increasing the risk of extinction. A 10% reduction in the adult population in addition to the recent 37% reduction in the population further reduces the viability of the population in the absence of any recruitment. DECCW's view is that such a loss would increase the risk of extinction of the local Endangered Population of this species. The southern and northern routes would not impact on *E. langleyi*.

The Albatross Mallee is also listed as an individual threatened species under both NSW and Commonwealth legislation. The central route option is not likely to impact on the long term viability of this species in a regional context, where thousands of plants are know across its range. It is recommended DoP consider both the local impact to the Endangered Population and the regional impact to the individual species.

Conclusion:

- **The EA predicts that 2 plants (of 20) in the Endangered Population of *Euclayptus langleyi* in the local Bomaderry Creek area will be lost if the central route is constructed.**
- **The risk of extinction of this Endangered Population would be increased if the central route option was constructed.**
- **Both the southern and northern route options will not impact on *Euclayptus langleyi*.**

Genoplesium baueri (Bauer's Midge Orchid)
This plant species is listed as Vulnerable under the *TSC Act*. The EA suggests the central route option will result in the loss of 1 individual, however there are 14 within the vicinity of the proposed alignment for the central route. The EA states that southern route option will result in the loss of 9 individuals (Eco Logical, 2011, p50). The northern route will not impact on *G. baueri*.

The Biodiversity Assessment in the EA relied on previous surveys and existing data for this species (Eco Logical, 2011, p25) in order to make a conclusion on the potential impact on the regional population (Eco Logical, 2011, p250). Field surveys were not undertaken to assess the number of plants this species to be impacted by this proposal. The Biodiversity Assessment in the EA used data collected for a separate purpose by Alan Stephenson, a conservation officer for the Australian Native Orchid Society. Due to mapping/coordinate errors, DECCW has reason to believe (pers coms Alan Stephenson & Geoff Robertson) the central route will directly impact on 3 individual *Genoplesium baueri*, not 1 as stated in the mapping in the Biodiversity Assessment (Eco Logical, 21011, p50). Due to lack of field survey, it is not known whether this species occurs in the proposed offset area.

This species is recognised as a difficult species to survey for, and DECCW expects the occurrence of this species, and therefore impact of the central and southern route options, are likely to be more extensive than reported in the EA. It is also possible that the species could be within the proposed offset area.

Most of the records that exist for this species are from the suburbs of Sydney prior to the 1960s. Currently this species is restricted to approximately 200 plants from 13 sites across its range (DECCW 2005b) from Ulladulla to Port Stephens. Regionally the occurrence of this species is restricted to the Bomaderry Creek, Vincentia, Callala Beach, and Flat Rock Creek areas and within the Jerrawangala National Park Creek (*pers coms Alan Stephenson*).

G. baueri has declined as a result of urban and infrastructure development, and is likely to be affected by inappropriate fire regimes (DECCW5c). This species is not well represented in conservation reserves regionally. The only other population in a conservation reserve is the Jerrawangala National Park population and is restricted to between 3 and 12 individual plants. The largest population in a conservation reserve is the Bomaderry Creek population, being 27 plants recorded in 2010 (*pers comm. Alan Stephenson*).

If either the southern or the central routes are approved, DECCW recommends a comprehensive survey for *Genoplesium baueri* is undertaken during the recognised

flowering period to better assess the impacts to this species, the development of mitigation measures and to develop an appropriate offset.

Conclusion

- **The central route option will result in the loss of 3 plants (of 27) of the local population of *G. Baueri.***
- **The southern route option will result in the loss of 9 plants of the local population of *G. Baueri.***
- **The northern route option will not impact on *G. baueri***
- **The central and southern routes will adversely impact on an important regional population of *G. Baueri.***
- **If the southern or central routes are chosen DECCW recommends a comprehensive survey for *G. Baueri* is undertaken during the recognised flowering period to better assess the impacts to this species, the development of mitigation measures and to develop an appropriate offset (and reported in a PPR or Submissions Report)**

Hibbertia sp. nov 'Menai'
This species is listed as Endangered under the *TSC Act*. The EA has identified 45 plants within the study area. The central route option will result the loss of 11 individuals, and the southern route option will result in the loss of 23 individuals, while the northern option will not impact on this species.

Conclusion:

- **The central route option will result the loss of 11 individuals, and the southern route option will result in the loss of 23 individuals, while the northern option will not impact on this species.**
- **The proposal is unlikely to impact on the Shoalhaven LGA regional population**

2. Endangered Ecological Communities

Lowland Rainforest – Endangered Ecological Community
"Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions" is an Endangered Ecological Community (EEC) listed under the *TSC Act*. The EA has identified that this community may be indirectly impacted by the southern route option (Appendix A – NNRL BA, p92). In the same section, it states these impacts will be mitigated by actions proposed in section 6, however, potential impacts to EEC are not addressed directly in section 6. There is no specific comment on how indirect impacts to the EEC will be mitigated during the bridge construction (eg. buffers/distance from EEC.)

The Bomaderry Creek sandstone gorge complex is mapped in the Biodiversity Assessment Figures 4, 5 & 6, (Eco Logical 2011) as the same community along the entire section of Bomaderry Creek within the study area. The entire Bomaderry Creek gorge complex could therefore be considered to be the Lowland Rainforest EEC. This would mean that both the central and southern routes may have a significant impact on the EEC as they traverse the gorge complex where it is relatively deep and wide, and the northern route would have less of an impact as it traverses the gorge upstream where it is narrow and shallower.

Further detailed mapping of the extent of the EEC (eg. the 1998 mapping by Kevin Mills & Associates - Figure 2 in the Revocation and Offset Assessment & Figure 16 in the Biodiversity Assessment) may more clearly show the extent of Lowland Rainforest EEC and its relationship with the proposed development footprints for each of the three route options. Such further detailed mapping should be provided in the PPR or Submissions Report.

Conclusion:

- **The EA predicts that the southern route will impact on Lowland Rainforest EEC located within the Bomaderry Creek gorge complex.**
- **The mapping in the biodiversity assessment indicates the northern and central routes will also impact on the EEC.**
- **The proponent could better clarify the precise extent of the Lowland Rainforest EEC along the Bomaderry Creek gorge to enable a better comparison of the three route options in a PPR or Submissions Report.**

3. Threatened Fauna

Threatened birds

DECCW's assessment of the EA indicates there is a possibility that certain threatened bird species which are recorded in the Bomaderry bushland area may use the area for breeding sites. These species are: Glossy Black-cockatoo, Gang-gang Cockatoo, Masked Owl, Sooty and Powerful Owls.

The EA assumes these species are only "visitors" to the study area because they have a permanent home range extending beyond the subject site/study area boundary. This is not necessarily the case, and only targeted breeding surveys conducted when the species is utilising the site can determine this question conclusively.

All three route corridors contain foraging and potential breeding habitat for the above species. Further detailed breeding surveys are recommended once a final route corridor is selected to ensure that breeding habitat for these species is detected, and (if detected) is able to be offset.

DECCW recommends:

- **If a route is approved in this Concept Plan, at the subsequent detailed design and environmental assessment phase the proponent should undertake stag watch surveys at suitable breeding sites within and near the selected route corridor for the Glossy Black-cockatoo, Gang-gang Cockatoo, Masked Owl, Sooty and Powerful Owls during their recognised breeding seasons.**

Spotted-tailed Quoll

This species is listed as Vulnerable under the *TSC Act* and Endangered under the Commonwealth *EPBC Act*. DECCW believes all three route options will impact on potential habitat for this species, however the southern and central options are considered to have the greatest impact on this species by vehicle collision due to fragmenting the available habitat in the form of a sub-arterial road.

This species is known to occur within the local area. The study area does provide suitable shelter/breeding and foraging habitat for the Spotted-tailed Quoll, therefore DECCW would expect the home range of this species to cover the subject site.

Vehicle collision is recognised as a contributor to individual deaths for this species, due to road kill scavenging and their large home range occupancy. Constant loss of top order species is likely to increase the presence of lower order species which can change to ecological function of an area.

DECCW notes and supports the commitment in the EA to conduct surveys of foraging and breeding habitat for this species within all three route options.

DECCW believes the northern route would place this species at least risk of all the three route options proposed. This is due to the large amounts of habitat that will remain either side of the central and southern roads and the fact that the northern route would only have edge effects on suitable habitat for this species.

The mitigation measures proposed in the EA such as lighting, wildlife signs and reduced speed zones may result in a reduction in vehicle collision rates. A further mitigation measure should be considered if any of the three routes is approved - underpasses constructed at regular intervals along the approved route.

DECCW recommends fixed camera survey is undertaken for the Spotted-tailed Quoll during its recognised breeding season and the results reported in a PPR or Submissions Report.

Eastern Pygmy Possum

This species is listed as Vulnerable under the *TSC Act*. DECCW recognises all three route options will impact on potential habitat for this species, however the southern and central options are considered to have the greatest impact on this species by vehicle collision due to fragmenting available habitat in the form of a sub-arterial road.

Although not identified in the study area the species is expected to occur there, as it has been recorded within the local area (Bangalee), and in habitat adjoining Illaroo Road located 600m of the North Nowra Link Road study area.

The mitigation measures proposed in the EA such as lighting, wildlife signs and reduced speed zones may result in a reduction in vehicle collision rates. A further mitigation measure should be considered if any of the three routes is approved - underpasses constructed at regular intervals along the approved route.

Despite the implementation of the above listed mitigation measures, impacts of a sub-arterial road through suitable habitat for this species cannot be completely neutralised. However a reduction of risk to this species may be achieved through further targeted surveys (which the proponent has committed to in the EA) and well designed mitigation/avoidance measures.

DECCW believes the northern option would place this species at least risk of all the three route options proposed. This is due to the large amounts of habitat that will remain either side of the central and southern roads and the fact that the northern route would only have edge effects on suitable habitat for this species.

Giant Burrowing Frog

This species is listed as Vulnerable under the *TSC Act* and the Commonwealth EPBC Act. DECCW believes the central route option may impact on habitat for the Giant Borrowing Frog. The northern and southern route options will not impact on habitat for the Giant Burrowing Frog.

The Biodiversity Assessment suggests the records for this species in the area are unconfirmed calls from studies by Garry Daly in 1992 (Eco Logical, 2011). This species is notoriously hard to identify during survey, however it also has a distinctive call, therefore these records must be given some consideration. A search of the NSW Wildlife Atlas (2011) by DECCW has identified three separate records in 1992 close to the proposed central route from three different observers, indicating the potential for this species to occur within the study area.

In regard to the central route, DECCW recommends, as a precautionary measure, inclusion of an underpass in the areas where the route intersects identified potential Giant Burrowing Frog habitat. This is to allow movement of the species between habitat and reduce the risk of vehicle collision.

4. Vehicle Collision

Animal-vehicle collisions occur daily on roads around the world, putting drivers and passengers at risk of trauma and death (Ramp, 2008). Collisions between animals and vehicles have become a concern for health agencies, environmentalists, animal welfare groups and road safety agencies (Ramp 2008). Where crashes involved animals, 22 human fatalities were recorded in the Traffic Accident Database System between 1996 and 2005 in NSW (Ramp 2008). The best estimates of wildlife killed on roads suggest that animal fatalities, in Australia alone, are likely to be in the millions annually, not including reptiles, amphibians or livestock (Ramp *et al.* 2005).

All three route options for the proposed North Nowra Link Road will traverse through a conservation reserve which has obvious risks of animal-vehicle collision.

If constructed the road will have long term impacts to fauna, such as wallabies, kangaroos, echidnas, Brush-tailed Possums, Ring-tailed Possums, monitors, snakes, lizards, amphibians, Owls, wrens, honeyeater etc. It is also recognised the list of species which has potential to be impacted by the proposal is expected to quite larger than those directly involved in a collision. This scale of impact has the potential to alter the ecological functions which maintain the current species composition of the Bomaderry Creek Regional Park.

Research by *Rodger at al, 2011 has* recognised that Roadway fatalities can deplete patch networks of common species over time.

DECCW recommends:

- **For any approved route option, the proponent engage a specialist to undertake predictive modelling to identify and quantify the potential impacts of animal vehicle collisions and report this in the PPR or Submissions Report.**
- **Upgrading of the suggested mitigation measures in the EA against animal-vehicle collision to reduce animal and human trauma should be undertaken based on the above modelling. Solutions might include reduced speed limits, adjustment of road width, lighting, engineering alternatives, under/overpasses combined with fencing.**

5. Proposed Mitigation Measures

In addition to the comments above, DECCW provides the following comments in relation to the proposed mitigation measures in the EA.

- The proposed mitigation measure to retain overhanging trees for the central route option to reduce the effects of habitat fragmentation is not likely to be practicable to implement as overhanging branches would be likely be considered to be a safety risk by Council, Fire Authorities and the Roads & Traffic Authority.

- The practicality of retaining overstory trees and building fauna bridges on the roadside to help mitigate habitat fragmentation (S6.1.3 – p78 Appendix F) has not

been assessed. The EA suggests this assessment will be undertaken after consent in an Environmental Management Plan.

DECCW recommends that the practicality of any proposed mitigation measure should be demonstrated in the PPR or Submissions Report.

- The proposed mitigation measures are potentially effective for arboreal species. No terrestrial underpass is proposed other than the road bridge crossing.

  DECCW recommends that underpasses for terrestrial species be given consideration by the proponent in a PPR or Submissions Report.

- DECCW notes the proposed road width has been reduced for some of its length to 20m for Option 1 (central route) to avoid a direct impact to *Z. baeuerlenii.* Considering the sensitivity of the subject land and the need to limit biodiversity impacts.

  Given the proponent is able to reduce the road corridor width in option 1, DECCW recommends consideration be given to reducing the entire road corridor width for all route options.

6. General Biodiversity related comments

In addition to those comments made above, DECCW provides the following general comments in relation to the biodiversity aspects of the proposal and the EA:

- Table 13-1 in the EA uses a scoring system that does not effectively attribute weightings to the range of biodiversity impacts identified in the EA. It is a ranking system which ranks the three route options in order of preference (1,2,3). It is not a numerical or value based system, yet the table presents the totals of ranks not relative scores. By using this system, it ascribes equal weighting to all factors in the table. DECCW believes that all predicted biodiversity impacts are not equal, for example, the risk of extinction of *Z. Bauerlenii* or the Endangered Population of *E. Langleyi* significantly outweighs the risk of some potential impacts on fauna habitat.

- Similarly, the final rankings for the three route options presented in Table 19-5 and then discussed in Part D of the EA use a simple matrix to ascribe risks and benefits associated with the proposal across environmental, socio-economic, heritage, traffic and visual aspects. DECCW believes that this simple numerical ranking does not account for the complexities and scale of potential impacts on biodiversity for very rare endangered species such as Bomaderry Zieria relative to (for example) a time saving for local traffic.

7. Assessment of Biodiversity Offsets

DECCW has assessed the adequacy of the biodiversity offsets proposed for each route option by Shoalhaven City Council and detailed in Appendix E of the Biodoversity Assessment.

Different biodiversity offsets have been proposed in the EA for the central, northern and southern routes. 50 ha of offset lands have offered by Council in respect of the central route, and subsets of this land, 17 ha in respect of the southern route and 12 ha in respect of the northern route were offered by Council. Although a biodiversity assessment was

provided for the 50 ha offset parcel, no biodiversity assessment was specifically undertaken on the 17 and 12 hectare subset parcels.

The offset assessment for each route option has been conducted using the data for the 50 ha offset parcel. This allows assessment of the best available offset outcome for each route.

The results of this assessment are summarised in the table below and generally accord with the EA's conclusion that the northern route is likely to have the least impact on biodiversity. The northern route option is most likely to be able to be offset (for biodiversity impacts) using the total offset lands proposed by Council.

Table – Biodiversity Impacts and Offsets for each route option

Route	Species / Vegetation Community	Able to be offset? (with proposed 50 ha offset)
Central	Gang-gang Cockatoo	Yes
	Bomaderry Zieria	Yes
	Albatross Mallee	No
	Hibbertia	No
	Genoplesium Baueri	No
	Kunzea Shrub land	Yes
	Coachwood Warm Temperate Rainforest	Yes
	Grey Gum	Yes
	Scribbly Gum	No
Southern	Gang-gang Cockatoo	Yes
	Hibbertia	No
	Genoplesium Baueri	No
	Kunzea Shrub land	Yes
	Coachwood Warm Temperate Rainforest	Yes
	Grey Gum	No
	Scribbly Gum	No
Northern	Gang-gang Cockatoo	Yes
	Coachwood Warm Temperate Rainforest	Yes
	Grey Gum	No
	Scribbly Gum	No

General Comments on Biodiversity Offset proposal

- The entire proposed 50 ha biodiversity offset area will not ameliorate the effects of habitat fragmentation and isolation of the central route option, which potentially impacts a number of flora and fauna species.

- **The proponent should indicate (in the PPR or Submissions Report) whether it proposes to fund or contribute to the future management of the offset site(s).**

- **In developing a final offset package for the chosen route, the proponent is expected to strive towards a "maintain or improve" biodiversity outcome.**

Such compensatory land is required in DECCW's "Revocation of Land Policy" and all three routes will require partial revocation of the Regional Park.

PART B – IMPACTS ON THE BOMADERRY CREEK REGIONAL PARK

Fragmentation

The northern and southern routes would fragment the Bomaderry bushland to some extent and have edge effects on the Regional Park. The proposed modified alignment of the northern route is now set back up to 80 metres from the existing West Cambewarra Road and would effectively isolate the strip of bushland between the proposed route and the existing road. This would be a more significant impact than previously proposed where corridor was only set back 10 metres into the bushland and Park. It is expected that micro-realignment of the northern route could be undertaken to reduce this setback into the bushland whilst still ensuring that residences on West Cambewarra Road were not subjected to excessive road traffic noise.

The central route has a significant fragmentation impact on the Regional Park. It effectively divides the bushland and Regional Park in two, creating a significant barrier between two areas of bushland. The current single unsealed utility service track cannot be compared with a two lane sealed public road carrying thousands of vehicles per day, with maintained road shoulders and verges. The impacts of fragmentation are not confined to the actual infrastructure corridor but extend into the bushland on both sides of the corridor for some distance (edge effects). This option has significant implications for ecological functioning of the bushland and also impedes recreational use and enjoyment (eg. walking tracks, picnic facilities). The current integrity of the Bomaderry bushland provides an opportunity for residents and tourists to escape the urban environment. The central option will significantly impact on the integrity of the bushland and enjoyment by locals and tourists.

DECCW understands that there a currently Aboriginal land claims over Crown land to the west of Falcon Crescent (and the west of the Regional Park). Reservation of this area under the NPW Act was proposed by the State Government under the Southern Forest Agreement process, and is still proposed should those land claims be unsuccessful. Therefore fragmentation and other impacts of the central route will be more extensive than just the current Park area.

Amenity and visual impacts for Park users

The northern route has a relatively low visual impact due to the reduced bridge height and its location on the fringes of the Regional Park is away from the primary visitors attractions an facilities.

Both the southern and central routes require large elevated bridges across the Bomaderry Creek gorge and would have a significant impact on visual amenity and the natural setting of visitor attractions and facilities (walking tracks, picnic area, lookouts, the Gorge itself) in the Regional Park or adjacent bushland. Road noise would also take away from the current quiet, peaceful experience and there would be a loss of social benefits such as a feeling of escape from the pressures of urban life. The central route adjacent to the Park picnic area would have particularly severe impacts on recreational and educational values and the tourism values of the bushland as a regional attraction would be effectively lost.

Pests

All routes would increase road use and therefore vectors for the introduction of pests into the Park and adjacent bushland. Impacts of the central route would be particularly significant as the central area of the Park is relatively pest free (compared to the edges) and would introduce a new vector for the introduction of pests into the park which will increase pest control resources required.

Vandalism, Litter, Rubbish Dumping, Arson

The central route would significantly increase opportunities for vandalism, arson, littering and rubbish dumping in the Park as it would introduce vehicle movements to the central portion, which is relatively protected at present. The northern and southern routes would create a lower level of opportunities for these activities in the Park as they are on its edges but the southern route would have significant impacts on the wider Bomaderry bushland. The location of a transport corridor through the bushland may lower community perceptions of the value of the area and result in increased antisocial behaviour.

Bushfire

The southern and central routes may provide a containment line for bushfire (which generally travels on north westerly and westerly winds) but would have the disadvantage of introducing a road through the bushland from which arsonists could operate. The northern route could be subject to less arson as it would be near private property.

Implications for Management of the Park

In addition to expected increased management costs related to pests, vandalism, littering and arson, the central route bisects the Regional Park and is close to visitor facilities including walking tracks, lookouts, picnic tables, barbecues, toilets, children's play feature and an Aboriginal mural. If this route was constructed it would render much of this infrastructure not able to be used. The infrastructure would need to be replaced elsewhere in the Park at significant cost, environmental impact and loss of amenity and function.

The northern and southern routes would have some impact on park management by increasing vectors for weeds, arson and littering. Impacts on existing Park infrastructure would be minor.

PART C – NOISE IMPACTS

The Environmental Assessment includes a basic assessment, as agreed with DECCW, of predicted noise levels from the three proposed route options. Whilst the NSW Roads & Traffic Authority's (RTA) Environmental Noise Management Manual provides guidance on conducting a more detailed assessment for the route options than is provided in this EA, the information in this EA is, in DECCW's view, sufficient to gain a broad understanding of the potential impacts from each route option.

The "North Nowra to Bomaderry Link Road Options Study" report included as Appendix E to the EA documents noise contours at **60 dB(A)** from the three route options as well as shading to indicate the **0.5 dB(A) increase** from the new road sections and **2 dB(A) increase** from the redevelopment road sections as required in DECCW's "Environmental Criteria for Road Traffic Noise" (ECRTN). The report also includes an indication of the number of individual residences potentially impacted from each route.

General Comments

- Table 7.4 in the report indicates existing noise levels (2006) at each logger location as well as other receiver locations. It is not clear to DECCW how the levels in Table

7.4 at logger locations 1-5 relate to the measured Day LAeq, (1 hour) road traffic noise levels presented in Table 7.1, as the levels differ. **DECCW recommends that this be clarified in the Preferred Project Report or Submissions Report.**

- DECCW notes that there is an "approved subdivision" through which the central route is proposed to pass however, no indication of the potential impact on this subdivision is mentioned in the report. This may increase the number of residential premises affected by the central route.

Noise impacts on residences

- The Options Study reports that the number of residences where noise levels increase by more than 0.5 dB(A) is 621 for the central route. This number is 655 for the central route with the Moss Vale Link Road; 706 for the southern route; 686 for the northern route; and 370 for the northern route with the Moss Vale Link Road. These numbers are fairly similar, other than for the northern route with the Moss Vale Link Road, which are substantially lower. See also the summary table below.

Noise impacts on bushland (including the Regional Park)

- The central route will impact up to 64Ha of bushland (including the Regional Park) that will be affected by noise levels over the ECRTN criteria, including walking tracks, a picnic area and a lookout. For the southern route, there is approximately 60Ha of bushland predicted to receive noise levels over the criteria, but no lookout, walking track or picnic area is included. For the northern route approximately 55Ha of bushland will receive noise levels above the criteria, but no lookout, walking track or picnic area is included. See also the summary table below.

Sleep disturbance

- In terms of sleep disturbance, the Options Study reports that the number of residences predicted to receive noise levels greater than LA, (Max) 65 dB(A) is 52 for the central route (with or without Moss Vale Link Road); 104 for the southern route; and 43 for the northern route (with or without Moss Vale Link Road). The number is not reported for the central route with River Crossing Relief. See also the table below.

- DECCW notes that the 65 dB(A) awakening level has been used as the criteria for sleep disturbance. The sleep disturbance criteria used for assessment of noise from road projects should be as specified in the RTA Environmental Noise Management Manual. This may alter the reported number of residences predicted to receive noise levels above the criteria.

Noise mitigation

- Noise mitigation measures in the form of barriers and low noise pavements appear at this stage to be feasible for the central and southern routes in order to meet acceptable noise limits. Specific noise mitigation measures for the central and southern routes will need to be determined (if either of these routes are approved) in a future detailed design and approval phase.

- For the northern route the road alignment may need to be altered to accommodate a noise wall. The EA states that a 10m encroachment into the bushland has historically been allowed for. Without noise mitigation measures (eg. noise wall or berm), a further encroachment of up to 70m (ie. total 80m) may be required to meet the acceptable noise limits without installing noise mitigation measures.

- **DECCW recommends that (if approved) the final alignment of the northern route be determined such that sufficient space for noise mitigation measures**

to be installed is available south of West Cambewarra Road to meet acceptable noise levels at residences, whilst minimising any encroachment into the bushland to minimise impacts on biodiversity. This is likely to be greater than the current 10m encroachment allowance, but less than the predicted 80m encroachment (without noise mitigation measures).

Table – Summary of Noise Impacts on residences and Bomaderry bushland (without noise mitigation measures)

Route Option	No. of residences impacted >0.5dB(A)	No. of residences impacted >2dB(A)	No. residences exceed LA_{max} >65 dB(A)	Hectares of bushland/Park impacted	Other bushland/Park impacts
Central	621	46	52	57	Noise impact on lookout, picnic area & walking tracks
Central + Moss Vale Rd Link	655	80	52	64	Noise impact on lookout, picnic area & walking tracks
Central + River Crossing Relief	621	46	Not reported	59	Noise impact on lookout, picnic area & walking tracks
Southern	706	202	104	60	None
Northern	686	74	43	53	None
Northern + Moss Vale Rd Link	370	124	43	49	None

Note: Feasible noise mitigation measures have been identified for all three route options which could be installed in order to meet guideline levels at all potentially impacted residences.

PART D – IMPACTS ON ABORIGINAL CULTURAL HERITAGE

DECCW conducted a review of the Aboriginal cultural heritage information contained within the Environmental Assessment (dated February 2011) and the Aboriginal Archaeological Assessment – Stage 2 report prepared by Kelleher Nightingale Consulting P/L (dated July 2010).

According to the Aboriginal Archaeological Assessment – Stage 2 report and the current road design provided in the Environmental Assessment (dated February 2011) all three proposed route options show some evidence of potential impact on Aboriginal heritage values.

Central Route - Option 1
Based on the information provided within the archaeological assessment three Aboriginal sites may be impacted by the proposed central route including; an artefact scatter (AHIMS # 52-5-0390), a rock shelter (AHIMS # 52-5-0542) and an isolated find (AHIMS # 52-5-0544). Both the artefact scatter and isolated find are located directly on the current transmission line service road and will be directly impacted by the route design, whilst the rockshelter is located within approximately 30 metres of the central route corridor.

No specific mitigation measures have been recommended for any of the Aboriginal sites associated with the central route, other than to avoid impact if possible through the detailed design phase and temporarily fence along the construction boundary any portions of a site not directly impacted so as to limit inadvertent impacts. All three sites are considered either disturbed or exhibit low potential to contain significant archaeological information.

Recommendation: DECCW supports avoiding impact to the Aboriginal sites as the preferred strategy. In the event that the central route is chosen, further detailed design should consider the conservation of the recorded Aboriginal sites and avoid or minimise impacts where possible, in particular avoiding direct impact to the rockshelter site AHIMS # 52-5-0542. Any necessary fencing, signage or other mitigation measures should be undertaken in conjunction with a qualified archaeologist and in consultation with the Aboriginal community.

Subject to further detailed design the potential of the central route to impact any other surrounding Aboriginal sites should also be considered, in particular the site recorded as AHIMS # 52-5-0262 as this site is currently located within 100 metres of the current route corridor. In particular, additional archaeological assessment or mitigation measures for other sites within the vicinity of the central route may be required depending on any final road design and the nature of the impacts.

Southern Route - Option 2
Based on the information provided in the Archaeological Assessment, three Aboriginal rockshelter sites (AHIMS # 52-5-0551, AHIMS # 52-5-0557 and AHIMS # 52-5-0558) may be impacted as all shelters are located within close proximity to the southern route corridor.

The rockshelter site AHIMS # 52-5-0558 has been assessed as having moderate archaeological significance and salvage excavation has been recommended in the event that the proposed southern route design cannot avoid the site. No specific mitigation measures have been recommended for the other two rockshelters other than to avoid impact if possible through the detailed design phase and temporary fencing along the construction boundary any portions of the sites which are not directly impacted so as to limit inadvertent impacts. Both these sites are considered disturbed and have a low potential to contain significant archaeological information.

Recommendation: Given the moderate archaeological significance of the rockshelter site AHIMS # 52-5-0558, and the cultural significance of the Bomaderry Creek Gorge area as a whole, DECCW supports avoiding impact to all three rockshelter sites as the preferred strategy. In the event that the southern route is chosen, further detailed design would need to consider the potential conservation of the rockshelter sites to

avoid or minimise impacts where possible, in particular avoiding direct impact to the rockshelter site AHIMS # 52-5-0558.

If impacts are ultimately proposed to the rockshelter site AHIMS # 52-5-0558, DECCW supports a program of salvage excavation and the proposed research methodology should be developed in consultation with the DECCW and Aboriginal stakeholders. The design and implementation of any necessary fencing, signage or other mitigation measures should be undertaken in conjunction with a qualified archaeologist and in consultation with the Aboriginal community.

Subject to further detailed design the potential of the southern route to impact any other surrounding Aboriginal sites would also need to be considered. As a comparison between the route design options provided in the Archaeological Assessment and the EA, the route option corridor appears slightly modified in the EA document and may now be closer to impacting the recorded Aboriginal sites AHIMS # 52-4-0261 and AHIMS # 52-5-0550. As such, additional assessment or mitigation measures of these sites, and any other sites within the vicinity of the final southern route corridor, may be required depending on any final road design and the nature of the impacts.

Northern Route - Option 3

Based on the information provided within the archaeological assessment, three Aboriginal sites; including an artefact scatter (AHIMS # 52-5-0546), an axe grinding groove site (AHIMS # 52-2-1797) and an isolated find (AHIMS # 52-5-0547) may be impacted by the route design proposed for the northern route as all three sites are recorded as being located within the proposed route corridor.

Both the artefact scatter and grinding groove site are assessed as having moderate archaeological significance whilst the isolated find is considered to be disturbed and has low archaeological significance. As such, salvage excavation has been recommended in the event that the proposed northern route design cannot avoid the artefact scatter (AHIMS # 52-5-0546). Due to the low archaeological significance assessment of the isolated find (AHIMS # 52-5-0547), no specific mitigation measures have been recommended other than to avoid impact if possible through the detailed design phase and temporary fencing along the construction boundary. Due to the nature of the grinding groove site (AHIMS # 52-2-1797) it is not possible to mitigate impacts to this site other than avoidance.

Recommendation: Information at the time of the archaeological assessment indicated that the northern route displayed the highest archaeological impacts. As displayed in Figure 7.1 of the Environmental Assessment the northern route corridor has been shifted to the south for amenity (noise) reasons. As a result, it appears that both the artefact scatter (AHIMS # 52-5-0546) and axe grinding groove site (AHIMS # 52-2-1797) may now be avoided by the re-aligned northern route, whilst another low archaeologically significant artefact scatter (AHIIMS # 52-5-0545) is potentially impacted instead, therefore the level of impact on Aboriginal heritage values may be lower than first assessed.

DECCW supports a road corridor that avoids both of these moderately significant Aboriginal sites (the artefact scatter and the axe grinding grooves) especially as it is difficult to mitigate the loss of a grinding groove site. There is no apparent updated discussion in the EA regarding the proposed realignment of the northern route (up to 80m southwards from West Cambewarra Road) and the apparent lessening of Aboriginal heritage impacts. As impacts on Aboriginal Heritage values along this route option may now be significantly reduced, DECCW recommends that the comparison of options in Section 16.4 of the Environmental Assessment should take this into account when considering the preferred route option as it

appears that the northern route no longer displays the highest archaeological impacts of the three routes. There is no apparent updated discussion in the EA regarding the proposed re-alignment of the northern route (up to 80m encroachment south from West Cambewarra Road) and the apparent lessening of Aboriginal heritage impacts.

If impacts are ultimately proposed to the artefact scatter AHIMS # 52-5-0546, DECCW supports a program of salvage excavation and the proposed research methodology should be developed in consultation with the DECCW and Aboriginal stakeholders. Design and implementation of any necessary fencing, signage or other mitigation measures should be undertaken in conjunction with a qualified archaeologist and in consultation with the Aboriginal community.

Consultation with Stakeholders
Aboriginal stakeholder consultation for the project has followed the "Interim Community Consultation Requirements for Aboriginal Community Consultation" (DEC 2004) as required by the "Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation "(DEC July 2005).

DECCW notes that although no Aboriginal stakeholders responded to the required advertisements for the project, consultation was still undertaken with representatives from the Nowra Local Aboriginal Land Council (LALC) due to previous expressions of interest in the project. Opportunities for a field inspection were provided and the potential impact (based on the concept plan at that time) and proposed mitigation measures were discussed with a representative from the Nowra LALC and it is recorded that comments were incorporated into the Aboriginal Archaeological Assessment report.

Comments on each Option during the field inspection included:

Central Route
Although all identified archaeological sites exhibit some cultural significance although none of the potential impacted sites display exceptional cultural value.

Southern Route
The southern portion of Bomaderry Gorge is more culturally significant (as a cultural landscape) than the more northern portion and displays moderate Aboriginal cultural significance.

Northern Route
Identified Aboriginal objects along this route (e.g. 52-5-0546 and 52-2-1797) are of at least moderate cultural value, displaying a moderate Aboriginal cultural significance

It is noted that a copy of the archaeological assessment report was forwarded to the Nowra LALC, but no comments had been received by the date of the final report in July 2010.

DECCW is satisfied that Aboriginal stakeholders have been provided with an opportunity to comment on the proposed Concept Plan. Following any Concept Approval for route(s) Aboriginal stakeholders should continue to be provided with an opportunity to be consulted on the project including subsequent detailed road design and refinements, and any final mitigation and management recommendations for Aboriginal heritage sites and values.

General Comments
DECCW supports a road design that limits and possibly avoids impacts on Aboriginal heritage values. Current route corridor design information supplied within the Environmental Assessment indicates that the central route and northern route now present a low overall

impact on significant Aboriginal archaeological and cultural features whilst the southern route still exhibits a moderate archaeological and cultural impact on Aboriginal heritage.

As well as impacts to individual Aboriginal sites, the Bomaderry Creek bushland contains a network of sites in relatively close proximity, in a natural setting. This is considered to be significant and needs to be considered in relation to the three route options. The central and southern routes, by bisecting the area, would have higher overall impacts on this network of sites than the northern route.

DECCW recommends that the comparison of route options in the Environmental Assessment should take into account the proposed changes to route options and the resulting implications to Aboriginal heritage impacts on all three route options be reported in the PPR or Submissions Report.

Subject to further detailed design of any of the proposed route options, the potential to impact any other surrounding Aboriginal sites also needs to be considered. DECCW recommends that if any additional construction activities or any ancillary works described within the Environmental Assessment; such as intersection upgrades and access roads, relocations of services (including transmission lines, gas, water, phone, sewerage etc), soil and erosion controls, proposed landscaping activities or any proposed modifications, for areas outside of those corridors previously surveyed then a supplementary Aboriginal heritage assessment of these additional areas and activities should be undertaken and management recommendations be prepared in consultation with DECCW and Aboriginal stakeholders.

It is understood that a further project based Environmental Assessment would be undertaken for any route option(s) approved in this Concept Plan and that would be an appropriate stage for such a supplementary and detailed archaeological assessment.

If any changes in route options occur, and construction works or associated ancillary works are proposed in close proximity to any of the recorded rock art sites in the Bomaderry bushland then supplementary Aboriginal heritage assessment of these impact areas and proposed activities should be undertaken. Management recommendations should be prepared in consultation with DECCW and Aboriginal stakeholders due to potential for rock art sites to be vulnerable to vibration (eg. from construction activities.)

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