

18 October 2023

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Re: Review and comment on koala impact assessment Addendum Appin Road Upgrade Review of Environmental Factors – Gilead to Ambarvale NSW, Response to Submissions amendments

Dear Mark,

As requested, this letter provides documentation of my review on the *Biodiversity Impact Assessment for Addendum Appin Road Upgrade Review of Environmental Factors – Gilead to Ambarvale NSW*, prepared by Robert Humphries, Eco Logical Australia, dated 13/9/2023. This review is limited to the assessment of impact on the koala.

The design of the proposed upgrade works remains substantially similar to those set out in the Addendum REF (AREF), with some changes in response to public submissions received during the exhibition period. Changes relevant to the koala include:

- Glen Lorne Underpass:
 - A change in the orientation of the underpass culvert to make it perpendicular to Appin Road. This has shortened the length of the underpass from 57 m to 54 m and means the culvert entrances will be square on to Appin Road. In general, shorter lengths are considered to be more likely to be utilised for successful crossings as the koalas will traverse a lesser length. Being square on to Appin Road will also improve the ability of the koala to find enter the crossing culverts.
 - Previously proposed round concrete pipe (2.4m in diameter) redesigned to incorporate a Reinforced Concrete Box Culvert (RCBC) 2.4m (h) x 3m (w)
 - An elevated timber rail (1.5m above floor level) will be installed and be directed towards refuge poles at RCBC openings.
- Interim Browns Bush Underpass:
 - Previously proposed twin round concrete pipes (each 1.2m in diameter) redesigned to incorporate one RCBC 1.5m (h) x 2.4m (w)
 - A ledge will be installed to help provide dry, safe passage under the road. The ledge will be placed on one side of the underpass and be approximately 400mm wide and 300mm above the ground.

- Additional koala exclusion fencing and grids:
 - Ensuring that the koala exclusion fencing “ties in” with property boundary fencing to the south of Rosemeadow, and that the boundary fencing for 600m west of Appin Road (to Gabun Gajaaja Reserve) and 300m east of Appin Road is adequate to prevent koala entry (to access urban areas). There is also to be allowance for current pedestrian access via access driveways with grids, to avoid the koala exclusion fence being “cut” or otherwise damaged to seek to force entry.
 - Installation of ‘to-specification’ koala grids beneath gates that provide vehicle access to Noorumba Reserve, Glen Lorne, and Beulah biobank site, and any other access sites.
 - Should the Mount Gilead to Ambarvale upgrade be constructed as a standalone project, or if the Appin Road Safety Improvement Project is delayed by more than 12 months from the date of koala exclusion fencing completion the additional koala exclusion fencing south would be extended (if needed) for 700m south of the Beulah Biobank site on both sides of Appin Road with additional escape poles. This would be to seek to avoid “end of fence” effects where koalas can potentially bypass the koala exclusion fencing and access Appin Road. This will only be required should the installation of Appin Road upgrade works to the south of Mount Gilead and Beulah Biobank site be delayed.
- Refuge and escape measures
 - Addition of timber refuge poles outside RCBC openings. The timber refuge poles will be installed to provide koalas with a means of escaping predators while moving between existing vegetation and the underpasses.
 - Timber escape poles have been included as an additional safeguard to address submissions and concerns about koalas being trapped and unable to escape from the road corridor. The escape poles will be installed on the roadside of the koala exclusion fencing to enable koalas to escape from the road corridor. Whilst there is no known reported monitoring of these structures to date, there is potential that these structures could facilitate koala escape if they are trapped.
- The preparation and implementation of a Koala Monitoring and Adaptive Management Plan (KMAMP) during the construction phase. This will include monitoring of the underpasses, koala exclusion fence and surrounding koala corridors as outlined in the AREF, and of koala access to Appin Road within the suburb of Rosemeadow, and in particular whether the koala may be utilising Mansfield Creek drainage reserve to access trees adjacent to Appin Road.
- Additional monitoring of Appin Road corridor for Koala presence or injuries. Additional exclusion measures to be agreed with Campbelltown Council at Mansfield Creek Reserve to seek to prevent koala access to the Appin Road corridor within the suburb of Rosemeadow, via the Mansfield Creek drainage line.

Overall, the above changes seek to improve the project design with regards to outcomes for the koala, based on feedback received from the community and subject matter experts. The above will both minimise impacts on native vegetation compared to the installation of an overpass crossing structure at Glen Lorne and avoid time delays associated with seeking to have part of the Noorumba Biobank site revoked to facilitate the installation of an overpass structure.

In preparing this advice I reviewed data provided by Lendlease of thermal drone monitoring of koala observations within the Noorumba Biobank site. This monitoring has identified koala detection ranging from 1 observed koala (on 10/5/2023 and 31/05/23), to 4 observed koalas (14/06/23) to 5 observed koalas (31/08/23). Research indicates that thermal drone survey has a detection rate of approximately 83% (Witt et al. 2020), and thus it is unlikely that this level of difference is due to individuals being present and not detected. Thus, the data suggests that 3 koala movements, and possibly more, occurred between 31/05/23 – 14/06/23, a timeframe of approximately 2 weeks. The movement pathway utilised by the koalas is unknown, but likely includes movement across Appin Road, and potentially to the northwest of Noorumba Reserve.

I also reviewed Bionet Koala mortality records from 1 January 2014 to September 2023, a period of approximately 10 years. A total of 33 koala mortalities, or approximately 3.3 mortalities per year, were identified along Appin Road including within 700m south of the Beulah Biobank site. It is noted this is likely to be an underestimate as wildlife carer group data has not been added to Bionet since approximately mid-2019 (Roe 2023). This level of mortality will be detrimental to the local koala population, and thus measures to control this mortality are considered highly desirable.

The impact of the proposed upgrade works on the koala is identified as being the removal of 10.05 ha of koala habitat (Eco Logical Australia 2023). Of this, a total of 2.91 ha has been 'biodiversity certified' as part of the Mt Gilead Stage 1 residential development (Eco Logical Australia 2023). This means that the impacts have already been considered and approved, in this case under the Mt Gilead Stage 1 NSW *Threatened Species Conservation Act 1995* biodiversity certification, and in accordance with clause 37 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017, the biodiversity certification on the land is taken to be biodiversity certification conferred on the land under Part 8 of the NSW *Biodiversity Conservation Act 2016*. As such, no further impact assessment is required for the biodiversity certified land, and processes have already been put in place to provide biodiversity offsets for these impacts. Thus, the residual impact from the REF (as revised) upon the koala is accordingly an impact on 7.14 ha on koala habitat.

The density of koalas in the Campbelltown area has previously been estimated to be 0.035 koalas per ha from volunteer searches, and 0.049 koalas per ha excluding dependent young, based on the average female koala minimum convex polygon home range size (Ward 2002). However, there are indications from the number of koalas being reported, as well as increases in koala roadkill, that the Campbelltown koala population has continued to increase, and thus the average koala density may thus now be ~0.1 koalas per ha. Assuming that the higher density estimate applies, the loss of 7.14 ha of habitat would translate to a loss of habitat capable of supporting approximately 0.71 koalas.

Importantly, the proposed works will also include the installation of the fauna underpasses across Appin Road (one permanent RCBC 2.4 m (h) x 3 m (w), 54 m in length at Glen Lorne / Noorumba), and one RCBC 1.5 m (h) x 2.4 m (w), 30 m in length at Browns Bush / Beulah Reserve). These underpasses will be combined with temporary and permanent exclusion fencing and grids over driveways to direct koalas (and other fauna) to the crossing structures. Evidence of koalas using a 1050 mm diameter pipe as well as multiple other culvert structures (TfNSW 2023) and 1200 mm diameter pipe (Taylor and Goldingay 2003) supports the proposed type and sizes of the underpasses.

I have reviewed both the assessment of impact under the NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* in relation to the koala. I concur with the conclusions reached, that the proposal is unlikely to result in a 'significant impact' on the local koala population. A key reason for this conclusion is that removal of 7.14 ha of koala habitat translates to a loss of habitat capable of supporting approximately 0.71 koalas, but this is counterbalanced by excluding the koala from Appin Road which it is estimated will result in a reduction of approximately 3.3 koala mortalities per year.

References

- Eco Logical Australia 2023, *Biodiversity Impact Assessment for Addendum Appin Road Upgrade Review of Environmental Factors – Gilead to Ambarvale NSW*, letter report by Robert Humphries dated 11 October 2023.
- Roe I 2023, Missing rescue data casts doubt on effectiveness of policies to protect wildlife in NSW, ABC News, article published 4 Sep 2023, <https://www.abc.net.au/news/2023-09-04/nsw-bionet-missing-four-years-wildlife-recue-data-/102805330>
- Taylor BD and Goldingay RL 2003. Cutting the carnage: wildlife use of road culverts in north-eastern NSW. *Wildlife Research*, **30**: 529-537.
- TfNSW 2023, TfNSW_Koala-connectivity-report_7-July-2023. <https://www.transport.nsw.gov.au/operations/roads-and-waterways/environment-and-heritage/biodiversity>

Ward SJ 2002. *Koalas and the Community: A study of low density populations in Southern Sydney*, PhD thesis, University of Western Sydney. <https://researchdirect.westernsydney.edu.au/islandora/object/uws:265>

Witt RR, Beranek CT, Howell LG, Ryan SA, Clulow J, Jordan NR, Denholm B, Roff A 2020. Real-time drone derived thermal imagery outperforms traditional survey methods for an arboreal forest mammal. *PLoS One*. 16;15(11). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7668579/#:~:text=In%203%20of%2010%20comparative,4.2%20%C2%B1%204.17%25%20for%20SAT>

Yours sincerely

A handwritten signature in black ink that reads "Steven Ward". The signature is written in a cursive style and is underlined with a horizontal line.

Dr Steven Ward
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