EXECUTIVE SUMMARY

On 12 May 2016, the NSW Office of Environment and Heritage (OEH) received a concurrence application from Queanbeyan-Palerang Regional Council (QPRC) pursuant to Section 112C of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Concurrence has been sought for a decision by QPRC to approve under Part 5 of the EP&A Act 1979 for the Ellerton Drive extension. The new road involves a 4.6 km extension to the existing Ellerton Drive at East Queanbeyan to Old Cooma Road and Edwin Land Parkway at Karabar. The road is to provide a flood free alternative route around the central business district and connects East and West Queanbeyan to the new southern population growth areas. The new section of road would form an important link in the regional transport corridor.

QPRC is the proponent and determining authority for this project.

OEH has considered the application from QPRC in accordance with Section 112D of the EP&A Act and I have decided to grant concurrence to this development for the reasons set out in Section 8 and subject to the conditions set in Section 9 of this report.

DEREK RUTHERFORD
Director South Branch
Regional Operations Group
Office of Environment and Heritage
as delegate to the OEH Chief Executive

10 June 2016
1 ROLE OF THE OFFICE OF ENVIRONMENT AND HERITAGE (OEH)

It is OEH's role to consider, as the concurrence authority for this project, matters outlined under Section 112D(1) of the Environmental Planning and Assessment Act 1979 (EP&A Act). These include:

a) any Species Impact Statement (SIS) prepared in relation to the activity,
b) any assessment report prepared by or on behalf of the proponent,
c) any representations made under section 113 concerning the species impact statement,
d) any relevant recovery plan or threat abatement plan,
e) whether the activity is likely to reduce the long-term viability of the species, population or ecological community in the region,
f) whether the activity is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction,
g) the principles of ecologically sustainable development,
h) the likely social and economic consequences of granting or of not granting concurrence.

This report demonstrates OEH’s consideration of these matters.

2 DESCRIPTION OF THE PROPOSAL AND THE ENVIRONMENT

The proposal is for Queanbeyan-Palerang Regional Council (QPRC) to construct a 4.6 km extension to link the existing Ellerton Drive at East Queanbeyan to Old Cooma Road and Edwin Land Parkway at Karabar. The stated objective is to provide a flood free alternative route around the central business district and to connect East and West Queanbeyan to the new southern population growth areas. The new section of road would form an important link in the regional transport corridor and has been supported by NSW Roads and Maritime Services. QPRC reports the Ellerton Drive Extension has been planned since the 1970s and indicated on the Local Environmental Plan mapping since 1991.

The proposal would involve the construction of a two lane road (i.e. one travel lane in each direction) with climbing lanes in areas with steep grades, a bridge over the Queanbeyan River and supporting infrastructure including shared paths, lighting, stormwater drains, fauna underpasses, stockpile areas and noise walls. The footprint has been increased to include connecting works and intersections of existing roads.
QPRC also engaged Aecom Australia to prepare a Determination Report to assist Council in its consideration of the proposal for transparency and probity reasons.

The proposal and assessment undertaken is also described in the following documents:

- Determination Report, Ellerton Drive Extension Part 5 Review of Environmental Factors (REF), May 2016 Aecom
- Copy of all submissions made during the REF/SIS notification period 12th December 2014 – 9 February 2015
- Copy of all submissions made during the SIS Addendum notification period 4 March 2016 to 3 April 2016
- Review of Environmental Factors, Ellerton Drive Extension, SMEC April 2016
- Species Impact Statement, Ellerton Drive Extension, ngh Environmental, 2014
- Species Impact Statement Addendum (2), Ellerton Drive Extension, ngh Environmental 2016
- The Australian Research Centre for Urban Ecology (ARCUE), 2016. Final report on targeted Squirrel Glider surveys for the Ellerton Drive Extension, Queanbeyan NSW.
- Ellerton Drive Extension Noise Impact Assessment Operation, SLR Consulting Australia Pty Ltd. 2014
- Ellerton Drive Extension Noise and Vibration Assessment Operation, SLR Consulting Australia Pty Ltd. 2016.

Under clause 60(1) of the *Environmental Planning and Assessment Regulation*, OEH can request QPRC provide additional information about the proposed activity if it considers it necessary to give proper consideration of the question as to whether concurrence should be granted. In this regard further information was sought on 26 May 2016 relating to the potential impacts of the proposal on Rosenberg’s Goanna. This is referred to as the ‘additional information request’ throughout this document (NGH2016b).

2.1 Subject Site

The subject site is located approximately 3 kilometres from the centre of Queanbeyan along the Eastern edge of what is known as the Queanbeyan escarpment. The alignment of the road runs along the eastern urban fringe, through bushland for much of its length. The total development
footprint is approximately 49 ha. Of the overall length, 3.86 km is new construction in native vegetation and the balance of the length consists of upgrades to existing Ellerton Drive.

From an ecological viewpoint, the development footprint comprises patches of shrubland, grassland, dry forest and woodland. The vegetation includes the Endangered Ecological Community (EEC) of White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland as listed under the NSW Threatened Species Conservation Act 1995 (TSC Act). A portion of this community is also critically endangered, listed under the Commonwealth Environment Protection Biodiversity Conservation Act (EPBC Act). The development footprint also comprises 0.2 ha riverine habitat where the road crosses the Queanbeyan River. The Queanbeyan River would be bridged in an area where some local riparian, aquatic and recreational values have been identified. The road alignment follows an area predominately set aside and zoned for this development. The land also falls within the fringe of the Local Environment Plan’s ‘biodiversity overlay’ as part of a regional bio-link and the local vegetation also contains threatened species habitats.

2.2 Study Area

Generally, the study area was limited to the west by residential development and extended, on average, approximately 300 metres to the south and east where less disturbed habitats are present. The study area equates to approximately 158.5 ha, excluding modified areas (i.e. private residential areas on the northern and western edges, existing roads and intersections and a small stretch of the Queanbeyan River).

2.3 The Proposal

In summary the key features of the Proposal described in the REF include:

- 2 lane single carriageway design with climbing lanes
- Bridge crossing over Queanbeyan River and Barracks Flat Drive
- Shared cyclist and pedestrian pathway
- Provision for on-road cyclists
- Additional access points for Fairlane Estate
- Emergency egress for Greenleigh Estate at Lonergan Drive and the East Queanbeyan reservoir
- Stormwater drainage system, including pavement surface drainage and culverts
- Two fauna under-passes
• Potential for pedestrian under-passes at Jumping Creek Estate
• Noise mitigation measures
• Edwin Land Parkway Intersection upgrade

Several changes that were made to the detail design since exhibition of the SIS and the original REF (Dec 2014) are detailed below:
• The centreline and vertical alignment of the approximately 4 km extension of Ellerton Drive has shifted marginally in some locations,
• The centreline has been adjusted in different directions and the vertical alignment improved to minimise earthworks and optimise the vertical profile. The subject site is therefore narrower in some locations and slightly wider at several points mostly due to changes in required cut and fill batters.
• Erosion and sediment control elements have been added to the design, some of which are slightly outside the originally SIS assessed areas.
• The proposed northern construction compound area has increased substantially in size, and now also includes a section of the existing Ellerton Drive.
• The proposed bridge compound area on the south bank of the Queanbeyan River has increased in size.
• Minor adjustments to the footprint have been made to accommodate the shared path connections to various neighbourhoods.
• One bridge would be constructed over Queanbeyan River, rather than two, as the roadway is no longer a dual carriageway. This reduces the project footprint over the river.
• Several new potential stockpile sites have been identified and included in the updated assessment.

The design is described in detail in the submitted documentation by Queanbeyan-Palerang Regional Council.

3 DETERMINATION REPORT

Section 112D(1) of the EP&A Act requires that the Chief Executive, in deciding whether or not to grant concurrence, must take into account any assessment report prepared by or on behalf of the proponent. QQC has provided to OEH the Ellerton Drive Extension - Determination Report May 2016 by AECOM to fulfil this requirement.
The Aecom report describes that the proposal has been assessed as required under Part 5 of the EP&A Act. This report outlines that the Determining Authority has examined the REF and submissions report and taken into account to the fullest extent possible all matters likely to affect the environment. The Aecom report does not outline any Conditions of Consent it recommends the activity be implemented in accordance with the REF, SIS and SIS Addendum. In particular Chapter 6 and Offsets in Chapter 7 of the SIS addendum and the environmental management framework described in chapter 7 of the REF.

The Determination Report outlines the public consultation process and indicates a strong interest in the project and generally an equal split between those submissions in favour of the proposal and those who do not support it. The determination report considers that the mitigation and management measures proposed in the REF, to address concerns raised in the submissions, are generally considered adequate.

4 CONSIDERATION OF THREATENED SPECIES & COMMUNITIES ISSUES

Section 112D(1) of the EP&A Act requires that the Chief Executive consider the predicted impacts of the proposal on threatened species and communities, in particular,

- any relevant recovery plan or threat abatement plan (s.112D(1)(d)).
- whether the development proposed is likely to reduce the long term viability of the species, population or ecological community in the region (s.112D(1)(e)); and
- whether the development is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction (s.112D(1)(f))

This section of the assessment report addresses these statutory considerations, using information from the Species Impact Statement (SIS), SIS Addendum, Review of Environmental Factors (REF), Determination Report and appendices and QPRC letter/provision for addition information for the Rosenberg's Goanna, to determine the impact of the proposal at the local and regional level.

OEH issued QPRC with Director General's Requirements (DGRs) for the SIS on 22 June 2012, outlining a number of species that could occur in the study area. Out of these species, the SIS considered the following species as subject species:

- White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland (Box Gum Woodland)
- Pink-tailed Worm-lizard (*Aprasia parapulchella*)
- Rosenberg’s Goanna (*Varanus rosenbergi*)
- Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*)
- Scarlet Robin (*Petroica boodang*)
• Hooded Robin (south eastern form) (*Melanodryas cucullata cucullata*)
• Diamond Firetail (*Stagonopleura guttata*)
• Painted Honeyeater Painted Honeyeater (*Grantiella picta*)
• Gang-gang Cockatoo (*Callocephalon fimbriatum*)
• Speckled Warbler (*Pyrrholaemus sagittatus*)
• Koala (*Phascolarctos cinereus*)
• Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
• Eastern Bent-wing Bat (*Miniopterus schreibersii*)
• Golden Sun Moth (*Synemon plana*)

A public submission raised the possibility of squirrel gliders occurring close to the proposed road corridor. OEH issued supplementary survey requirements to determine if the animals identified during the public exhibition process were common Sugar Gliders or Squirrel Gliders which are listed under the *NSW Threatened Species Conservation Act 1995*.

Of this list, the SIS considers that two species and one endangered ecological community (EEC), will be significantly impacted by the proposal:

a) Rosenberg’s Goanna
b) Speckled Warbler
c) White Box Yellow Box Blakely’s Red Gum Woodland,

OEH agrees with this finding, and the information outlined in the SIS and SIS Addendum. Therefore this assessment report and the concurrence conditions largely focus on Rosenberg’s Goanna, Speckled Warbler’s and the Box Gum Woodland EEC. Other focal threatened species issues and matters that were raised during the public exhibition periods are discussed in Chapter 5 of this report.

4.1 Rosenberg’s Goanna (*Varanus rosenbergi*)

OEH assessed the information provided in the SIS and SIS Addendum for this species. OEH considered that the information provided in these reports was insufficient and prevented OEH from making a definitive conclusion about the potential impacts of the proposal on Rosenberg’s Goannas. OEH subsequently requested additional information from QPRC on 26 May 2016. QPRC commissioned further assessment and the additional information was provided by QPRC to OEH on 3 June 2016.

Rosenberg’s Goanna is listed as ‘vulnerable’ under the *NSW Threatened Species Conservation Act 1995* (TSC Act). Within NSW, this species occurs in the Wollemi National Park to the north-
west of Sydney, in the Goulburn and ACT regions and near Cooma in the South. Within the locality there are records near Cuumbeun Nature Reserve and throughout southern Queanbeyan, including along the Queanbeyan River corridor. Rosenberg’s Goanna is found in heath, open forest and woodland in the locality.

Individuals require large areas of habitat and shelter in hollow logs, rock crevices and in burrows. Termite mounds are considered to be a critical habitat component for the species, as eggs are laid in termite mounds (OEH 2016a). The eggs are incubated in the mound for approximately eight months until they hatch and the young then continue to use the mound and feed on the termites for up to five months after hatching (SA DEWNR 2013; Sass 2008), demonstrating the importance of this habitat feature.

This species has been recorded in the locality, and in vegetation that is contiguous to where Ellerton Drive extension is proposed. Previous environmental assessments have found that there are approximately 81 termite mounds in the area to the south of the subject site, near Wickerslack Lane, which has been assessed as likely habitat for this species by EcoLogical (2010) for the Old Cooma Road duplication development. Similarly, to the south west of the EDE subject site in the area surrounding the Edwin Land Parkway development (GHD 2009), approximately 250 termite mounds were recorded, and this area was considered to be likely habitat for this species.

This species is considered to be cryptic and difficult to survey for (Sass 2008). Consequently, OEH advised QPRC to survey and map termite mounds within the subject site, study area and locality in the Director General’s Requirements for the SIS.

NGH Environmental, on behalf of QPRC, mapped the termite mounds within the subject site and across the higher quality habitat areas of the study area. NGH also conducted 6 transects, searching for termite mounds, in the contiguous dry forest vegetation to the east of the study area, leading up to Cuumbeun Nature Reserve. The surveys undertaken for the SIS, SIS Addendum and the ‘additional information request’ did not locate any Rosenberg’s Goannas. However, during the additional surveys in June 2016, five mounds were recorded as having signs of damage and repair, which may have been from Rosenberg Goannas. None of these were recorded in the subject site.

It is anticipated that the removal of termitaria and vehicle collision are likely to cause the greatest risks to Rosenberg’s Goanna by the project.

A total of 226 termite mounds were recorded by NGH in the study area, which could be suitable for use as egg laying sites (NGH 2016). Fifty-seven of these termite mounds are within the
subject site, which equates to an impact of 25.22% on the potential breeding habitat for Rosenberg's Goanna for this development in the study area (NGH 2016b). The proposed development will remove 20.3ha of habitat for this species (including 8.3ha moderate quality and 12ha important habitat). The dry forest to be removed does not support many large hollow logs which are useful to this species (NGH 2014).

The study area, locality and region all contain suitable foraging and breeding habitat for this species (NGH 2016b). The 'additional information request' (NGH 2016b) quantifies the likely impacts to be:

- The study area is approximately 164ha with the 226 termite mounds, as stated above, this equates to an impact of about 25.22% of termitaria.
- The study area and “extrapolated area” have an estimated 1035 termite mounds in the 366 ha of vegetation (NGH 2016b). Equating to an approximate impact of 4.52% of termitaria.
- Approximately 5800ha of suitable vegetation types for the Rosenberg's Goanna have been recorded in the locality, most of which is connected to the study area (NGH 2016b). This has an impact on termitaria from between 0.57% and 3.58% depending on whether NGH's extrapolated or known results are used.

NGH's survey work and analysis demonstrated that the habitat resource is widely distributed at a similar density to what has been found in the subject site and study area (NGH 2016b). A home range for this species is expected to be large and extend between 80 and 1000ha (SA DEWNR 2013; NGH 2016b), although the home range of the individuals in the Queanbeyan area has not been confirmed. NGH estimate that the proposal would result in the removal of approximately 3.83% of the dry forest habitat and 4.52% of the termite mound resource in an approximate home range of 530ha.

In the SIS, NGH state that given the impact area, this species' large home range and the areas of similar habitat surrounding the subject site with relatively high densities of termite mounds, the habitat loss from this project is not likely to put the population of Rosenberg's Goanna at risk.

In regards to the impacts of collision on Rosenberg's Goanna, over the last 20 years few vehicle collision deaths for this species have been recorded in the area, however it is recognised that true mortality figures are unknown. Twelve individuals were found as road kill in a study in Garawarra State Conservation Area, most of which were killed in November and December (NGH 2016b). NGH predict that if one or two individual Goanna home ranges coincide with the development footprint, then the local population may be placed at risk of extinction.
The long term impacts of vehicle collision are proposed to be reduced through the inclusion of fencing and fauna underpasses as part of the road design. Fencing has been proposed along the eastern side of the better quality potential Rosenberg’s Goanna habitat. OEH considers that it may be counterproductive to only fence the eastern side of this area and that access to the road should be prevented for the Goanna (and all other species) from both sides, to minimise the impact of the road on wildlife. OEH considers that the design of the underpasses must be compatible with the species, for it to be of any use. OEH recommends that QPRC incorporate best practice design into the development of the underpasses, in line with Rodney van der Ree’s Handbook of Road Ecology (2015).

NGH also propose in the SIS Addendum that they aim to discourage the use of breeding resources in the subject site (and avoid undesirable mortalities during works) to clear areas with high density termite mounds prior to the majority of egg laying and guarding phase of the Goanna’s breeding cycle in March. OEH disagrees with this approach, given that depending on seasonal and geographic variations with this species, individuals are likely to be laying eggs in March. OEH have designed a condition which limits the clearing of termite mounds.

NGH have proposed the use of pre-clearance surveys to detect potential nesting sites – and measures to protect the sites if identified. The proposed methods for protection of nesting sites have not been detailed in the documentation, but OEH considers that any nesting sites must be avoided, given the importance of this part of the lifecycle. It will be highly important to make sure that no removal of termite mounds is undertaken when juvenile goannas could be inside prior to hatching and dispersal. OEH supports the proposal that an ‘unexpected threatened species find procedure’ also be developed, in conjunction with OEH.

Given the potential impact of vehicle collision on this species, OEH recommends an additional measure – to monitor road kill for this species (and other species) and the success of the underpasses for this species. The location of each road kill event and species should be recorded and areas with the highest record of mortality should then be the focus for additional mitigation measures. Monitoring should also evaluate whether the mitigation measures described above are effective. These results will be important to OEH and the conservation of this species across southern Australia.

Habitat loss for this species has been proposed to be offset through the provision of similar habitat in the same region as the impact, at a rate identified through the NSW Government BioBanking calculator. OEH has inspected one of the offset sites proposed for this species (site 7 in the SIS Addendum) and considers that it will be a worthy offset site for this species as it has
termite mounds and suitable habitat to the impact site, except with more fallen logs that this species could use. From the SIS Addendum, it appears that site 7 will not wholly fulfil the offset requirements for this species, in which case offset site 1 is OEH's preference to fulfil the difference in species credit requirements. If these sites cannot fulfil the offset requirements together then other sites will need to be added.

OEH considers if the proposed mitigation measures and conditions of concurrence in this report are implemented, the Ellerton Drive Extension development is not likely to reduce the long term viability of the species in the region (s112D(1)(e)); and the development is not likely to accelerate the extinction of the species, or place it at risk of extinction (s.112D(1)(f)).

4.2 Speckled Warbler (Chthonicola sagittata)

The Speckled Warbler is listed as 'vulnerable' under the TSC Act.

The Speckled Warbler has a distribution throughout south-eastern Queensland, through the central and eastern parts of NSW and Victoria, and in the cypress woodlands of the northern Riverina. It is most frequently reported from the hills and tablelands of the Great Dividing Ranges (OEH 2016b and Scientific Determination).

The species lives in a wide range of Eucalypt-dominated communities with a combination of open grassy patches, leaf litter and shrub cover (OEH 2016b). In the Queanbeyan Region, the species' distribution is widespread but patchy, occurring in woodlands with bare or stony ground and avoiding heavily forested or cleared areas (GHD 2009). There has been a decline in the population density of Speckled Warblers, with their habitat being particularly susceptible to degradation by stock and weed invasion (OEH 2016b: NSW Scientific committee).

The SIS reports one Speckled Warbler individual was recorded north of the Queanbeyan River in 2013 in low shrubs and grassland habitat. NGH considered this area to be highly modified. Speckled Warblers were also recorded in riparian habitat in the assessment of Jumping Creek estate by Ecological, near the same location in 2010, which has lead NGH to consider this it is likely to be individuals from the same population.

No breeding sites were observed during the surveys for this project but NGH identified 7ha of important habitat near the Queanbeyan River for this species. The broader amount of habitat that this species could use across the proposed impact area is 37.9ha, but this figure is predicted rather than confirmed. This figure also contains disturbed and predominantly exotic areas with
blackberry bushes that the Speckled Warbler may use. That is, both the 7ha of important habitat and the 37.9ha of broader habitat figures include non-native vegetation. This species was not recorded in the northern part of the site, despite extensive bird surveys in the area. (NGH 2014).

Speckled Warbler pairs are sedentary and occupy a breeding territory of about 6-12ha (Gardner et al. 2003), with a larger home-range of up to 30ha when not breeding (Gardner 2004). There are numerous records and sightings of this species in the locality (Bionet 2016) and large portions of suitable habitat exist (BES 2008). NGH predict the area of habitat available for this species in the locality to be approximately 3000ha of Box Gum Woodland habitat and 7000ha of Dry Forest habitat.

The SIS recognises this species utilises habitats close to the ground, which may render it more susceptible to vehicle impacts when moving across the road (NGH 2014). NGH consider this has the potential to adversely affect the life cycle of the resident population, along with habitat removal and fragmentation. This is why NGH considered this species may be significantly affected by the proposal.

Proposed mitigation measures for this species include offsets to contribute to habitat protection and enhancement that would be suitable for this species. The SIS also recommends short term measures to protect edge effects of the road, including barrier fencing, erosion controls and rehabilitation of disturbed edges. OEH has confirmed the presence of this species adjacent to offset site 6 and considers that suitable habitat exists for this species on offset site 7.

The population density around the locality is unknown, however the patch size of the remnant vegetation adjacent to the subject site is excess of 700ha. This patch size is likely to be of sufficient size for Speckled Warblers persisting over 100 years in the locality. Therefore, OEH does not concur with the conclusion that the development will have a significant impact on Speckled Warblers, based on their single record and the fact that there is a relatively large patch of potential habitat in the locality.

Given the home range for this species and the expected level of impact for this species (7ha of known habitat), this proposal is not likely to reduce the long term viability of the species, in the region (s.112D(1)(e)); and the development is not likely to accelerate the extinction of the species, or place it at risk of extinction (s.112D (1)(f)).
4.3 Squirrel gliders *Petaurus norfolcensis*

In NSW, the Squirrel Glider is listed as ‘vulnerable’ under the TSC Act. Two populations are listed as Endangered Populations under the TSC Act, one on Barrenjoey Peninsula and one in the Wagga Wagga Local Government Area.

The Squirrel Glider is a medium-sized gliding marsupial. The Squirrel Glider is distributed from north Queensland to western Victoria, with a few records in extreme south-east South Australia where it may still persist (NSW Scientific Committee 2008). Its core range is in north-east NSW and south-east Queensland (Quin et al. 1996), but it is generally rare and patchy in NSW (Kavanagh 2004). There are hotspots in the Clarence and lower Richmond Valleys in NSW, and the Central Coast (Kavanagh 2004), and some parts of the western slopes support good populations (e.g. the Nandewar Bioregion, which is considered an inland conservation stronghold for the species (NSW Scientific Committee 2008). The glider is rare on the coast south of Sydney; records for the south coast have been questioned as possibly misidentified Sugar Gliders (NSW Scientific Committee 2008).

This species generally occurs in areas with a floriferous Eucalypt, Angophora or Corymbia overstorey with a shrubby understorey of Acacia and/or Banksia species and required large trees with abundant hollows for shelter and breeding habitat. This species benefits from a reliable source of winter nectar (NSW Scientific Committee 2008).

Squirrel Gliders live in social groups comprised of one or two males and females and their young (van der Ree and Suckling 2008). Social groups use multiple hollows, with van der Ree and Suckling (2008) reporting that one group used 19 different trees over a 40 day period.

The main threats are loss and degradation of habitat, in particular the loss of large, hollow-bearing trees and nectar producing shrubs (NSW Scientific Committee 2008). Other threats include road mortality, inappropriate fire regimes, predation by foxes and cats, competition of roosts with the Large Earth Bumblebee, weed invasion, and collision with barbed wire fences (NSW Scientific Committee 2008).

The Squirrel Glider was not a species included OEH’s Director General Survey requirements as it was not known to occur in the locality. The closest confirmed record is approximately 35km to the east of the subject site, on the eastern side of Tallaganda State Conservation Area.

During a meeting with NGH, QPRC and OEH on 19 May 2015, QPRC and NGH introduced photos which residents adjacent to EDE believed to be a Sugar Glider, which NGH thought may
be a Squirrel Glider. The photos were taken within and around the household at 35 Lonergan Drive, Greenleigh by the residents. OEH sought internal advice on whether the individual(s) were likely to be a Squirrel Glider or a Sugar Glider. The advice was inconclusive. Consequently OEH requested that QPRC conduct trapping at the address where the individuals were photographed to confirm which species were present.

NGH conducted surveys between mid-June and early November in 2015. Survey methods included:

- arboreal cage and pipe trapping, where individuals were measured (including length, body weight and gender) and a DNA sample was taken to enable testing that could conclusively identify the species
- camera trapping, where motion sensitive infrared cameras were placed adjacent to cage traps to detect and record movement around the trap locations
- night time spotlighting by ecologists around the location where Gliders were recorded
- stag watching of hollow-bearing trees in the study area, within proximity of the area where the Gliders were recorded, and
- bio-acoustic recordings, set to record wildlife noises and calls between sunset and sunrise.

The results of this work is detailed in the SIS Addendum (NGH 2016). The total survey effort conducted by NGH for Squirrel Gliders was 336 trap nights, 11.8 hours of stag watching and 10.3 hours of spotlighting. No Squirrel Gliders were captured or observed during the survey program. Sugar Gliders were confirmed to be using the area, through trapping and DNA analysis. There were some temperature and weather limitations that may have affected the results of the survey, but there were also sufficient nights of suitable temperatures for this species. NGH surveyed throughout the subject site area, with a particular focus on the location where the individual gliders were previously recorded (i.e. just north of the Queanbeyan area) (see the survey locations in the SIS Addendum, maps titled “Glider surveys”, NGH 2016).

Access was denied to QPRC and their consultants to survey the specific household where the Gliders were recorded. As a result of this, OEH engaged Squirrel Glider ecologists at the Australian Research Centre for Urban Ecology (ARCUE), led by Dr Rodney van der Ree, to undertake a separate investigation to determine whether Squirrel Gliders were likely to exist in the study area. This involved trapping at the roof cavity of the household where the potential Squirrel Gliders were recorded. ARCUE were specifically tasked with determining:

1. The species of glider occupying the roof space at 35 Lonergan Drive Greenleigh;
2. The species of glider occupying the backyard at 35 Lonergan Drive Greenleigh;
3. The occurrence and distribution of gliders within and adjacent to the proposed alignment of the EDE.

In January 2016, ARCUE surveyed eight broader sites across the study area: four on privately owned properties where gliders were recently sighted and four across the EDE alignment. A combination of cage trapping, spotlighting and camera-trapping survey methods were used.

The number of cage traps set at each site varied from three to sixteen, and sites were trapped between five to seven consecutive nights, between the 4th and 11th January 2016. Traps were baited and sprayed with diluted honey to increase the animal capture rates. One trap was placed within the roof cavity of 35 Lonergan Drive and another on the window edge near the animal’s entry-point into the roof. All individuals caught in the traps were measured (head to snout length, maximum head width, tail length, tail width inc. fur). ARCUE ecologists gave each individual caught a unique identifier to determine if individuals were being recaptured. The location of the trapping locations is illustrated in ARCUE 2016.

Remote sensor cameras “camera-trapping”, were deployed between 4th and 7th January and remained active until 19th January. Twenty-one cameras were used (including one in the roof cavity) and each camera had a baited tea strainer within its field of view, or a baited cage trap. All recorded images were analysed to species level, where possible.

Two nights of spotlighting was undertaken targeting specific areas where anecdotal glider sightings were reported on the 7th and 8th January 2016. In addition to cage trapping, camera trapping and spotlighting, ARCUE analysed 26 photographs of potential Squirrel Gliders that were provided by the residents at 35 Lonergan Drive, Greenleigh, as part of their study.

No Squirrel Gliders were detected during the survey by any of the methods. Survey effort equated to 254 trap nights, 340 person minutes spotlighting, 270 camera-trap nights plus habitat assessments and photograph analysis. The professional review of the photographs provided by the residents at 35 Lonergan Drive, Greenleigh, did not confirm the presence of any Squirrel Gliders – some of which were undeterminable because of a lack of discriminatory features shown in the photographs.

During ARCUE’s survey, three Sugar Gliders were captured in or around 35 Lonergan Drive, Greenleigh. One Sugar Glider was observed during spotlighting and Sugar Gliders were also detected on 17 of the 21 remote-sensor cameras. Brushtail and Ringtail Possums were also recorded during the study.
Based on all of the evidence obtained during their project, ARCUE 2016 concluded, in relation to Squirrel Gliders, that:

1. They cannot confirm the existence of a Squirrel Glider population within the EDE alignment or adjacent surveyed habitat, including at 35 Lonergan Drive.
2. They believe the likelihood of Squirrel Gliders occurring within the EDE area is low, because of (i) their relatively high survey effort using three different survey techniques; (ii) the sub-optimal and low quality habitat for the species and (iii) the lack of historical Squirrel Glider records within the area.
3. They could not conclude that any of the photographs provided by the residents of 35 Lonergan Drive contained Squirrel Gliders. The majority of individuals were either Sugar Gliders or classified as ‘Glider spp.,’ as the photographs did not provide an adequate view of the animal to enable accurate species identification. While some images showed gliders with both Squirrel Glider and Sugar Glider features, there was insufficient evidence to be confident in concluding species identity.

ARCUE state that “While we cannot unequivocally rule out the possibility of Squirrel Gliders being present, we consider it highly unlikely that we would miss them during 354 cage-trap nights, 270 camera-trap nights and two nights of spotlighting”. In similar trapping projects in Southern NSW, ARCUE found that 72% of first captures occurred during the first four nights of trapping, indicating that ARCUE’s survey of the EDE provided ample time for a Squirrel Glider population to be detected. They qualify the reduced possibility of Squirrel Gliders occurring in the project area by stating that “the abundance of Sugar Gliders in the EDE study area was low, suggesting a lack of critical resources or processes necessary to support multiple species or larger population sizes”.

Regardless of the project not being likely to have a significant impact on Squirrel Gliders, ARCUE recommend a number of mitigation measures to lessen the project’s impact on local arboreal fauna. OEH considers the most important and relevant ones to be:

1. The avoidance of clearing woodland for temporary construction activities, for example, site offices, car parking, stock piles and access roads. This could also include minor modifications to the alignment to avoid high-quality areas or assets (e.g. tall trees for connectivity or hollow-bearing trees).
2. Strategic revegetation around the subject area to maintain connectivity or create linkages. This could include strategic revegetation along the Queanbeyan River, connections between the east and west of the subject site, and a connection across the Queanbeyan River.
3. The maintenance of natural tree canopy over the road and noise barriers (with distances <10-20m) – or, where this is not possible, a gliding poles and canopy rope bridges. ARCUE firmly recommend the preference of maintaining natural canopy, then the use of
rope bridges as a preferred method when compared to gliding poles. OEH notes that the retention of large trees would have a number of benefits for example, reducing the visual impacts of the road on neighbouring residents.

4. Lighting fixtures and light walls should be incorporated, now and into the future, into the EDE development plan to avoid light spill into adjacent habitats.

5. **No** barbed-wire use in the development, for example at crossings.

6. Monitoring of glider populations with the aim of determining whether the road and bridge had an impact on glider populations and the level of connectivity and glider movement across the alignment.

7. Intensive monitoring recommended before and after construction

Based on ARCUE's rigorous scientific work, and previous NGH work across the subject site, OEH considers the probability of Squirrel Gliders occurring in the subject site or study area to be very low. However, irrespective of the very low probability, to ensure the activity is not likely to reduce the long term viability of the species in the region or likely to accelerate the extinction of the species, or place it at risk of extinction (s.112D(1)(f)), the mitigation measures above should be included in the project design as they will benefit local arboreal mammal populations and lessen the impacts of the activity on biodiversity.

### 4.4 White Box Yellow Box Blakely's Red Gum Woodland

White Box Yellow Box Blakely's Red Gum Woodland (commonly referred to as Box Gum Woodland; BGW) is listed as an Endangered Ecological Community (EEC) under the TSC Act.

The scientific determination for this community describes it as a grassy woodland community in which the characteristic species are either one or more of *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) or *Eucalyptus blakelyi* (Blakely's Red Gum). Grass and herbaceous species generally characterise the ground layer. In some locations, the tree overstorey may be absent as a result of past clearing or thinning and at these locations only an understorey may be present. Shrubs are generally sparse or absent, though they may be locally common.

Box Gum Woodland predominantly occurs in the southern section of the study area and extends from old Cooma Road to north of the Queanbeyan River. The predominantly grassy groundcover of this community exhibits a high diversity of forbs, grasses and sedges in the area (NGH 2014). There are areas within the study where high quality Box Gum Woodland has been found, which also meets the definition of the Commonwealth listed community (NGH 2014). Across the study
area the community is generally disturbed by edge effects such as erosion and weed invasion, human access/trampling and over-grazing.

NGH have quantified in the SIS that 6.5ha of moderate-good quality Box-Gum Woodland and 1ha of derived grasslands from Box Gum Woodland will be cleared for this development. NGH have mapped 15.7ha of the community within the study area. Within the locality (the area within 10-km of the Subject Site), NGH have identified around 3121ha of this community, of which approximately 1546 ha of this is expected to be in moderate-good Biometric condition. This equates to an impact of 43% within the study area and 0.4% within the locality (of moderate-good quality Box Gum Woodland). Regionally, it is estimated that there is more than 106,000ha of Box Gum Woodland within the southern tablelands and ACT region (NGH 2014 quoting Fallding 2002).

During the public exhibition process, a number of concerns were raised by residents about the quality of the vegetation mapping of the Box Gum Woodland community at the end of Lonergan Drive in Greenleigh Estate. The mapping undertaken by EcoLogical mapping for the Jumping Creek rezoning proposal and the NGH EDE mapping was highlighted in these submissions.

OEH investigated this matter through desktop and in-field analysis. There is a net difference of 1 ha in total area of Box Gum woodland within the subject site between the two mapping products - EcoLogical mapped approximately 1ha more Box Gum Woodland compared to NGH. OEH staff visited the areas of difference within the subject site which are at risk from this development. OEH confirmed that there a few Yellow Box trees present within the canopy outside of where NGH had mapped as Box Gum Woodland, but they were not generally dominant. Red Box and Scribbly Gum were co-occurring and often dominant in these areas, with the presence of a shrub layer (varying in density). The soil was skeletal and poor and the ground layer was highly degraded where Lonergan Drive meets the subject site.

The Box Gum Woodland community tends to align with relatively fertile soils (Scientific Determination), which were absent in the area at the top of the escarpment on the northern side of the Queanbeyan River. A grassy understory with forbs was absent in most of these areas. Therefore, In OEH’s opinion, the areas that clearly aligned with Box Gum Woodland scientific determination matched the NGH mapping provided to OEH with the SIS Addendum. OEH also considers NGH’s description and justification of their vegetation mapping in section 4.1 of the SIS Addendum to be fitting.
The SIS contains a number of mitigation measures that will assist in reducing the impact of the proposal on the Box Gum Woodland EEC. The proposed mitigation measures are:

- The development footprint will be minimised to the greatest extent possible while still achieving the objectives of the proposal. The current impact area has a buffer built into the total impact area to account for a worst case scenario, however the whole footprint may not be used. Where works impact upon the EEC, the works will be confined within the road formation unless absolutely necessary. Regardless of this, QPRC have agreed to offset the ‘worst case scenario’ impact areas for this community.

- An offset strategy has been proposed as part of the proposal to compensate for the impacts to this community. The offset ratio is likely to be approximately 1:8 for the impact to offset areas of this community, and the areas will be secured and managed in perpetuity for conservation purposes.

- Following the works, the perimeter of the community adjoining the subject site would be monitored and managed to prevent the establishment and spread of weeds.

A draft National Recovery Plan exists for this endangered community and has been considered in relation to this development. The objectives of the recovery plan is to promote the recovery and minimise the risk of extinction of the ecological community through:

1. achieving no net loss in extent and condition of the ecological community throughout its geographic distribution;
2. increasing protection of sites in good condition;
3. increasing landscape function of the ecological community through management and restoration of degraded sites;
4. increasing transitional areas around remnants and linkages between remnants; and
5. bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland.

OEH considers this project will not achieve objectives 1 or 4 but it has the potential to achieve the other objectives in the Recovery Plan. The project should achieve objectives 2 and 3, through securing 437 or more BioBanking Credits of Box Gum Woodland, in the region and ensuring it is protected and managed for conservation purposes in perpetuity. To achieve the intent of these offset sites, the land managers involved in the offset in perpetuity agreements will have to exhibit behaviours of sustainable land management and environmental protection, fulfilling objective 5 of the Recovery Plan. This in turn, will also demonstrate to the wider community that environmentally minded stewardship of land can be a feasible approach and provide income to the landholder.
The removal of up to 7.5ha of Box-Gum Woodland is not likely to reduce the long term viability of the EEC, in the region (s.112D(1)(e)); and the development is not likely to accelerate the extinction of the community, or place it at risk of extinction (s.112D(1)(f)) given the extent of Box Gum Woodland in the locality.

4.5 Other mitigation measures

QPRC have proposed a number of commitments to ameliorate the impacts of the development on biodiversity in chapter 6 of the SIS, Chapter 6 of the SIS Addendum and Chapter 7 of the REF. These mitigation measures have also been referred to in the AECOM Determination Report, as recommended conditions of approval.

The mitigation measures include clearly demarcating the allowable development footprint with temporary fencing, staff induction, fauna underpasses, advisory road signs, rope bridges, the timing of vegetation clearance, pre-clearance surveys, relocation of habitat features, erosion controls, weed management and site rehabilitation. The development of a monitoring program has also been proposed, which will include monitoring road kill and the success of the fauna underpasses. An offset strategy has also been proposed to secure and manage lands for conservation purposes, as a way of compensating the impacts of project on biodiversity.

OEH supports the uptake of all these mitigation measures, in particular the temporary fencing, fauna underpasses, fauna overpasses, the monitoring program and the offset proposal as they will likely have the largest environmental outcomes for this development.

OEH considers pre-clearance surveys are required for this project, but would prefer that QPRC adopt the method outlined in van der Ree’s report “whereby non-hollow-bearing trees are knocked over on day 1, and hollow-bearing trees on day 2, allowing for animals to leave the site on the first night. Alternative denning opportunities (i.e. nest boxes) should be installed in close proximity to the alignment but outside the clearing zone a few months prior to clearing commencing, allowing animals time to locate and use the alternative hollows” (ARCUE 2016). Furthermore trained and licenced ecologist with experience in fauna handling should be onsite during clearing to check hollows of felled trees and rescue any wildlife. This also applies to other habitat structures such as termite mounds, large hollow logs and burrows.

The loss of hollow-bearing trees and logs will impact on arboreal mammals, birds, bats and some reptiles, as these structures provide vital shelter for these animals. ARCUE 2016 identify that
gliders and other arboreal mammals will use artificial hollows (i.e. nest boxes) if appropriately designed and installed. Although a short-term solution, OEH acknowledges that they will help in mitigating the impacts of this proposal. ARCUE recommend that "nest boxes with a range of sizes and entrance-hole diameters should be installed to cater for a wide range of species, with at least one glider specific nest box for every hollow bearing tree removed". OEH endorses this approach.

Two fauna culvert underpasses, one under-bridge pass and two rope crossings have been proposed for this project in the 'additional information request provided by QPRC. These fauna crossings are expected to include natural habitat features and lead-ins such as logs, ground timber and rocks, harvested from clearing and grubbing (NGH 2014). Two rope bridges have been proposed for arboreal mammals. OEH considers that additional rope crossings should be utilised to ensure the crossing will be able to benefit the small local arboreal mammal populations in the study area. OEH supports ARCUE's (2016) recommend frequency of rope crossings, being at least every 500m along the length of the project, set in areas close to higher densities of hollow-bearing trees.

OEH considers that it's vitally important that the fauna crossings are designed effectively, so that they are able to enable connections between the habitat to the east and west of the development and therefore reduce the impacts of the proposal. The fauna crossing must be made suitable for a variety of species to use. OEH recommends that QPRC and their consultants design the underpasses and overpasses with the best available scientific knowledge, for example, with reference to chapter 12 in the Handbook of Road Ecology (van der Ree, Smith and Grilo 2005). The importance of this factor has led OEH to introducing the concurrence condition that the fauna underpass and overpass designs and location must be worked out in collaboration with OEH.

4.6 Biodiversity Offset

Compensatory measures in the form of Biodiversity Offsetting is required for the activity. The SIS and SIS Addendum describe the offset strategy and the environmental offset requirements for this project respectively. The areas nominated for offsets were to be assessed in accordance with the 'OEH principles for the use of biodiversity offsets in NSW'. The proponent has utilised the NSW Government endorsed BioBanking methodology to calculate the level of impact and therefore the amount of offset required for the activity.

The activity will result in the loss of 30.27ha of native vegetation, including the loss of two vegetation communities and habitat for the Rosenberg’s Goanna. The Rosenberg’s Goanna is the only species assessed in the SIS and Addendum that requires its own offsetting requirements as
it was a significant impact and also a "species credit" species under the BioBanking method. The Speckled Warbler, the other threatened species with potentially significant impacts, is classified as an "ecosystem species" under the BioBanking method. As such it does not require distinct offsets as the vegetation in the offsets should provide suitable habitat for this species.

QPRC have indicated there are seven sites available to meet the offset requirements for this activity. The exact amount of credits created at each offset site will need to be checked by OEH and "additionality" rules may apply, thereby reducing the amount of credits produced at each site.

Depending on which offset sites are secured, the proposed offsets equate to an offset ratio of approximately 1:5 for 'Red Stringybark – Red Box – Long leaved Box – Scribbly Gum Shrub-tussock grass open forest' and an offset ratio of approximately 1:8 for the 'Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland'.

If sites 1, 6 and 7 are secured in combination, this would equate to an offset ratio of 1:6 for 'Red Stringybark – Red Box – Long leaved Box – Scribbly Gum Shrub-tussock grass open forest' and an offset ratio of approximately 1:8 for the 'Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland'. These sites would also then be protected and managed for conservation purposes, to increase their ecological value.

OEH staff visited offset sites 1 and 7 during the concurrence period and OEH staff have also visited land directly adjacent to offset site 6 recently. OEH’s evaluation of these sites are:

**Offset site 1**
Offset site one is wholly Dry forest which would provide 48.47 ha for the loss of 'Red Stringybark – Red Box – Long leaved Box – Scribbly Gum Shrub-tussock grass open forest'. This site offers value as it would protect and secure land within the regional biolink, which maintains the connectivity of the between the site and Cuumbeun Nature Reserve. The eastern side of the site shares a border with the reserve, which in OEH’s opinion, increases the site’s value as an offset candidate. It also contains the same habitat as it is adjacent to the proposed activity, which would be of benefit for Rosenberg’s Goanna habitat.

**Offset site 6**
OEH staff visited land directly neighbouring offset site 6. OEH has verified this site would be of sufficient quality of Box Gum Woodland for part of the offset requirements for this development. In addition to the Box Gum Woodland, Speckled Warblers were recorded on this site and although they are not required to be offset individually, it is beneficial to know the offset would be providing compensatory habitat for this species.
Offset site 7

OEH considers that offset site 7 would provide a suitable offset to fulfil some of the compensatory requirements for the ‘Red Stringybark – Red Box – Long leaved Box – Scribbly Gum Shrub-tussock grass open forest’ and has confirmed that there is suitable habitat on site, including termite mounds, for the Rosenberg’s Goanna. However it is not likely to be able to fulfil the whole credit requirements for this vegetation community or for the Rosenberg’s Goanna.

Part of Offset site 7 site has been mapped as Box Gum Woodland (29ha). During an inspection of this site, OEH visited two areas which were mapped as Box Gum Woodland by NGH (locations are shown in Figure 1 below). However, OEH considers that these areas are not suitable for offsetting of Box Gum Woodland for this development. Area One around the dam may have been Box Gum Woodland in the past, but the dominant species is Apple Box (probably as a result of previous firewood collection), not one of the required dominant species (White Box, Yellow Box or Blakely’s Red Gum). It is also lacking a grassy understory. In Area Two, the vegetation has some Yellow Box in the canopy but it has a very dense shrubby understory, which does not align to the grassy woodland nature of the Box Gum Woodland community. There may be Box Gum Woodland in the areas further away from where OEH inspected, but this would need to be confirmed and verified by OEH prior to finalising the offsets strategy and securing the offsets.

Offset site 7 is part of the regional biolink, identified in the *Queanbeyan LGA Biodiversity Study* (BES 2008). This proposed offset is adjacent to Crown Land, leased by the current landowner, which shares a boarder with the southern block of Cuumbeun Nature Reserve. Securing this land will therefore increase protection of vegetation within this important habitat corridor. OEH considers that securing this site as part of the offset strategy would be a good conservation outcome for this development.
Figure 1: The two areas of offset site 7 that were inspected by OEH. These were indicatively mapped as Box Gum Woodland by NGH.

All candidate offset sites
OEH would require additional data from QPRC prior to any of the candidate offset sites being finalised and secured. This information is not required prior to concurrence. Required information includes:

- GPS locations of the termite mounds on the sites that will be used to generate species credits for Rosenberg’s Goanna (numbers and GPS locations)
- Confirmation of where the vegetation zone boundaries are (which would include OEH inspecting each site)
- Discussion about suitable management actions and the predicted increase in site values at each site, under each management action
- “Additionality” calculations to reduce offset site credit contributions where management actions, zoning or security/covenants already exist for a candidate offset site. For example, if a site is already being managed for conservation purposes, this will reduce the credit contribution of the site.

The proposed offset will be secured in consultation with OEH, which has adopted a strong offset policy to secure suitable land in perpetuity and which includes management actions to arrest
adverse impacts and obtain high quality habitat for biodiversity conservation. OEH has further strengthened the Council’s requirements through conditions of concurrence outlined in Section 9 of this report in relation to biodiversity offsets.

Overall, OEH believes that there is sufficient information to make an informed concurrence decision on threatened species matters. This includes the additional information, requested by OEH under clause 60 of the EP&A Regulation on the impacts to Rosenberg’s Goanna.

5 THE PUBLIC SUBMISSIONS

Section 112D of the EP&A Act requires that the Chief Executive in deciding whether or not to grant concurrence must take into account any representations concerning the SIS, made under s113 of the Act. Many of the issues raised specifically on threatened species matters, which relate to the quantum or nature of impacts, are addressed in Section 4.

In this regard Queanbeyan-Palerang Regional Council has provided the following:

- The *Ellerton Drive Extension Submissions Report Queanbeyan City Council April 2016* is a detailed report on the total consultation undertaken and submissions received on the activity. This also includes a summary of issues raised and Council response on how the issue has been addressed.

- All submissions made during the REF/SIS notification period 12th December 2014 – 9 February 2015; and submissions made during the Addendum SIS notification period 4 March 2016 to 3 April 2016;

The SIS was placed on public exhibition as part of the REF public consultation process. A total of 357 formal submissions were received in response to the public exhibition. Council describes the outcomes as 188 responses were in support for the Proposal, 140 against, and 29 other opinions.

The key issues raised were considered to be:

- The project is well overdue, and will improve traffic congestion in Queanbeyan
- Concerns regarding the cost of the project to the current community (Queanbeyan rate payers) and future generations
- Traffic noise generated in a rural setting, and the inadequacy of mitigation measures
- Lack of consideration of alternative routes
- Lack of benefits from the Proposal, and where funding could be better spent
- The adequacy of the consultation process
- General amenity impacts.

On specific biodiversity issues and the adequacy ecological assessment a total of 60 submissions were received. These raised:

- Concerns over the regionally significant wildlife corridor and the lack of connectivity resulting in detrimental impacts on species.
- Inadequate wildlife underpasses are proposed, the submission considered two animal crossings to be in adequate.
- Concerns over effects on Environmental Conservation zoned land
- Concerns over the adequacy of mitigation measures in place to offset wildlife corridor impacts
- Biodiversity offset is not 'like for like'.
- The inability of environmental offset land to benefit the study area.
- The SIS is insufficient for the Proposal
- The Proposal has not adequately considered impacts to flora and fauna.

A second Addendum to the SIS, addressing changes to the Proposal area, was prepared by ngh Environmental and placed on public exhibition from 4 March 2016 to 3 April 2016 to update the project footprint as per the amended design in March 2016. This addressed issues raised by OEH and the public submissions with respect to the original SIS and the revised EDE project design.

A total of 40 submissions were received of which 14 were considered to be specific to threatened species matters. These submissions considered the revised proposal would have a greater impact, upon Box-Gum Woodland, Hoary Sunray, Pink-tailed Worm-lizard, Rosenberg's Goanna, Brown Treecreeper, Scarlet Robin, Hooded Robin, Diamond Firetail, Painted Honeyeater, Gang-gang Cockatoo, Speckled Warbler, Koala, Squirrel Gliders, Eastern False Pipistrelle, Eastern Bent-wing Bat and Golden Sun Moth.

There were also specific concerns raised on the:

1. The adequacy and location of offsets.
2. Increased impact area of Box Gum Woodland.
3. Increased impact on Rosenberg's Goanna.
4. Squirrel Gliders haven't been considered or correctly identified.
5. Connectivity
6. Presence of other threatened species
7. Concerns expressed on the adequacy of assessment methodology, assessment of significance and mitigation measures.

The Council report *Ellerton Drive Extension Submissions 2016* is a very detailed response to the submissions raised in the notification process. The report is considered to provide a clear link to how the biodiversity related matters have been considered in the environment assessment undertaken for the activity. The approach by council taken is that the outcomes of the Submissions Report will be considered in the final determination, and any issues raised that are not adequately addressed in the REF/SIS will be subject to further assessments or conditions placed on the approval of the project by Council. OEH considers this to be a reasonable and valid approach to the submissions received.

OEH has provided additional information and comment on the on threatened species matters raised in Section 4 of this report.

Specific comments are made on the following issues raised:-

5.1 Connectivity

The road alignment runs predominantly in a north/south direction along the eastern urban fringe up against the Queanbeyan escarpment. QPRC reports that the detailed alignment was selected to run close to the western edge of the regional biolink thereby minimising impacts on wildlife connectivity. The proposed road corridor does not fragment large currently connected areas of habitat. Much of the habitat where the Ellerton Drive extension is proposed has been impacted by edge-effects of suburbia including weed infestation, over grazing and the creation of walking tracks. The area to the west of the subject site, along the Queanbeyan escarpment is a large lot residential area although these large lots have overstorey vegetation there is little if any connectivity in the ground cover as result of roads and gardens within these large lot areas. The proposed road alignment is therefore unlikely to impact on the connectivity of the area. The SIS considers that sufficient habitat remains to the east on the escarpment to ensure that the regional biolink remains functional and the proposal avoids dissecting the biolink whereas other route options such as Dunns Creek Road would fragment this north south link. OEH agrees that the regional wildlife connectivity would not be significantly impacted by the proposal.
To improve wildlife connectivity two fauna culvert underpasses and rope bridge for arboreal fauna are included in the design as well as enhanced crossing areas under the bridge. These would be supported by the inclusion of natural habitat features and lead-ins such as logs, ground timber and rocks harvested from the clearing and grubbing works. Vegetation enhancement and/or rehabilitation with appropriate plantings are proposed to improve the connectivity and promote movement of fauna through the underpasses and bridge areas. The underpasses will be located in areas with suitable topography and with high quality vegetation on either side to provide connectivity between existing corridor habitats. Additional crossing points will exist at storm drain culverts. Fauna exclusion fencing is proposed for 100 m either side of an underpass to direct the animals to the crossings. OEH has fortified these requirements through the concurrence conditions.

5.2 Woodland Birds

Seven species of threatened woodland birds are known or have potential habitat in the Study Area and other threatened woodland birds potentially occur or may utilise the area on occasion.

The SIS concludes that the EDE impacts will not be significant for a local or regional populations of woodland birds. Details provided for species are:

- The SIS assesses the potential impacts on Scarlet Robin and Hooded Robin. The Scarlet Robin and Hooded Robin species are assumed to occur in the study area although neither were found during the survey period. The SIS concludes that the removal of 28.9 hectares of habitat for these species is not significant OEH agrees with this decision. These birds are highly mobile. The Hooded Robin tends to inhabit home ranges around breeding habitat this breeding habitat was not located during the survey period. Scarlet robin is a migratory species so is unlikely to be impacted by this development.

- The brown tree creeper was also not identified during the survey period, this bird is also highly mobile. The activity will remove approximately six hectares of potential habitat, OEH agrees that the removal of six ha of habitat for this species will not be a significant impact for this species.

- No important habitat for the Diamond Firetail is likely to be impacted. It is not believed the impacts will not be significant for a local population of this species, based on the removal of approximately 9.6 ha of habitat,

- Both the SIS and the SIS Addendum assess the impact of the activity on the Painted Honeyleater and Gang Gang cockatoo OEH requested hollow bearing tree surveys and
assessment of Painted Honey Eater habitat. At the time of survey no hollow bearing trees were being utilised for breeding by the Gang Gang cockatoo, as this species is highly mobile and also migratory OEH agrees the activity is unlikely have a significant impact on the Gang Gang Cockatoo. No Painted Honey Eaters were identified during the survey and the activity occurs on the edge of the range for this species. The activity will remove 4ha of habitat in the form of mistletoe for this species, as a result it is unlikely to have a significant impact on this highly mobile species.

OEH concurs that these woodland birds are unlikely to be significantly impacted by the activity. Impacts to Speckled warbler is addressed separately in Section 4.

5.3 Platypus and the Queanbeyan River

The Australian Platypus Conservancy (APC) commented on the impact of the bridge foundation construction on the habitat and breeding of platypus. The river crossing area is known habitat for platypus. There is an estimated population of 60 individuals recorded along this stretch of the river from Googong dam to the Queanbeyan weir. Mitigation measures to protect the nesting of platypus within the Queanbeyan River are addressed in the REF.

The revised REF states that the bridge pylons would be located on the river banks and work in the river itself under normal flow conditions is not required. Also that construction would comply with recommendations made in the Platypus Awareness and Conservation Strategy (Australian Platypus Conservancy, 2012; EcoLogical Australia, 2012) and more recent advice from the APC.

OEH agrees with approach and recommend a condition of consent which states that no bridge pylons are to be constructed within the river.

5.4 Koala

Koala surveys were undertaken using the field aspects of Rapid Spot Assessment Technique (RapSAT) as described by Phillips and Callaghan (2011) This method involved searching at the base of 30 trees per. A total of seven RapSAT searches were completed within the subject site equating to a search of 30 trees every 3 ha. NGH also did nocturnal call playback and spotlighting for the Koalas on two nights. This approach fulfils the survey requirements that OEH set for the site.
Koalas were not detected during the survey, which is not-surprising given the history of very few sightings in the area. No Koala scats or scratching on trees attributed to the Koala were detected during RapSAT surveys.

OEH Koala experts are of the opinion the area known as the Queanbeyan escarpment, which links to Carwoola where a recent sighting of a Koala was found, forms part of a movement corridor for Koalas. These are largely suspected to be mostly male Koalas moving through the landscape rather than being part of established territories. Based on this information, OEH considers that this species must be included in the ‘unexpected threatened species finds’ protocol that NGH recommend in the SIS Addendum. In addition, the fauna crossings should be designed to be compatible with this species’ requirements, as a precautionary approach.

6 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Section 112D(1)(g) of the EP&A Act requires that the Chief Executive to consider the principles of ecologically sustainable development as defined in the objects of the Protection of the Environment Administration Act 1991. The principles of ecologically sustainable development have been applied to this proposal as follows:

a) The precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

 Threats to the environment associated with the extension of Ellerton Drive have been acknowledged and mitigation measures have been proposed in the SIS. The mitigation measures identified in the Determination Report, REF, SIS, SIS Addendum and OEH’s conditions of concurrence are designed to prevent serious or irreversible damage to Box Gum Woodland, Rosenberg’s Goanna or Speckled Warblers. A full review of environmental factors and a species impact statement was completed for this project – as such, it is not considered that there is a lack of scientific certainty about the potential impacts of this development. The mitigation measures and offsets are designed to maintain or improve biodiversity.

b) Inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
Implementation of the mitigation measures outlined in Section 4 of this report and OEH's conditions of concurrence will increase the extent of habitat protected for a number of threatened species and the EEC. Securing a suitable offset site, that will be managed for conservation, in perpetuity, will provide greater conservation protection within the Queanbeyan area and is consistent with the NSW Government Offset Policy. The management actions within the offset site will maintain and improve the conservation values of the site which will be of benefit to future generations.

c) Conservation of biological diversity and ecological integrity.

Implementation of the mitigation measures proposed in the REF, SIS, SIS addendum, OEH's conditions of concurrence will, on balance, provide for the conservation of Box Gum Woodland and species of concern such as Rosenberg's Goanna and Speckled Warbler. In particular, managing the proposed offset sites for conservation in perpetuity will contribute to the conservation of biological diversity and ecological integrity in the Queanbeyan area.

d) Improved valuation and pricing on environmental resources

The principle of improved valuation and pricing of environmental resources seeks to overcome the inefficient allocation of resources by ensuring that the full value of these resources is recognised and considered in the decision-making process. Environmental resources have economic values and there is a trade-off between the economic benefits associated with the development and the economic benefits provided by the natural environment that will be foregone as a result of development. The economic benefits associated with the environment include use values and non-use (option, bequest and existence) values. The economic value of the environmental resources to be impacted by the development proposal is given explicit recognition through the costs involved in implementing the mitigation measures and the biodiversity offset outlined in OEH's concurrence conditions.

Threats to the environment associated with the activity have been addressed and mitigation measures have been proposed through the REF, SIS, SIS Addendum and the OEH conditions of concurrence.

Implementation of the mitigation measures outlined in this report and OEH's conditions of concurrence will maintain the extent of habitat protected for a number of threatened species in accordance with NSW Offset Policy.
7 SOCIAL AND ECONOMIC CONSEQUENCES

Section 112D(1)(h) of the EP&A Act requires the Chief Executive to consider the likely social and economic consequences of granting or not granting concurrence. Granting concurrence can include granting concurrence with or without conditions.

OEH has considered information in the Social Impact Assessment (RM Planning 2016), REF (SMEC 2016), SIS (NGH 2016), SIS Addendum (NGH 2016), the Submissions Report (QCC 2016) and the public submissions for the SIS for this component of the concurrence assessment.

7.1 Background of the proposal to build Ellerton Drive Extension

To understand the potential social and economic consequences of the project, the context and history of the Ellerton Drive Extension is necessary. EDE was first shown as potential route on the Queanbeyan Structure Plan in 1974. From 1991 it was included in the Queanbeyan LEP map and again marked on the Queanbeyan Structure Plan of 1994. QPRC commenced acquisition of properties in the road corridor in the 1990’s.

In 2008 QPRC released the Queanbeyan Residential and Economic Strategy 2031 The strategy identified the need to accommodate 10000 new dwellings and an additional 130ha of employment lands in Queanbeyan over the next 25 years. Following the strategy, the NSW State Government required QPRC to demonstrate the traffic needs of the development areas, which led to the Googong and Tralee Traffic Study which demonstrated the need for EDE.

In 2009 the EDE was endorsed by QPRC as a component of the transport infrastructure improvements to service forecasted growth in Queanbeyan Local Government Area.

In September 2011, the NSW Government announced the first instalment of $4 million package to allow design and environmental studies of the EDE and other local infrastructure projects. In 2014 a further $50 million was announced by the Australian Commonwealth and NSW Governments towards the construction of the EDE.

As stated in section 2 of this report, the stated objective is to provide a flood free alternative route around the central business district and to connect East and West Queanbeyan to the new southern population growth areas.

7.2 Economic
Economic consequences refer to the net effect of the development proposal on the local or regional economy.

"Queanbeyan is a major regional centre that provides employment education and health services to Southern NSW. Proximity to Canberra and on-going land release in the southern part of Queanbeyan will continue to influence travel patterns that radiate from and flow through Queanbeyan" (RM Planning 2016).

QPRC, in partnership with the Australian and NSW Governments, are proposing to fund the construction of the road. The new section of road would form an important link in the regional transport corridor and has been supported by NSW Roads and Maritime Services. It is stated in the documentation provided that the creation of the road will not result in an increase of rates of Queanbeyan residents.

Construction of the EDE is expected to have a net positive impact on the Queanbeyan economy and local businesses. It is anticipated this will be through the creation of jobs (45 direct and 140 indirect per year) and the use of local suppliers, shops and accommodation while the road is being built (RM Planning 2016).

QPRC are currently implementing actions under their Queanbeyan CBD master plan (2009) to improve the CBD. One of the aims of the EDE is to divert heavy traffic from Monaro Street to enhance the attraction of the CBD, improving the environment for existing businesses and to attract new businesses to the CBD. There was strong support from local business groups for the reduction of traffic from the main street, to make it more accessible and enjoyable for visitors and locals. Vacancy rates of business rentals along the main street are currently high and the EDE proposal is subsequently seen as a way to change the current predicament. These factors are expected to bring economic benefits to Queanbeyan during the operational phase of the project.

Queanbeyan has long benefited from its proximity to Canberra and vice-versa. Canberra’s industries and activities serve the wider area that encompasses Queanbeyan and south-eastern NSW. The interdependence between Canberra and Queanbeyan is facilitated by the Yass Roads/Pialligo connection to the airport and newly developing business parks in east Canberra. Additionally, the Monaro Highway and Canberra Avenues connect Queanbeyan to the established industrial areas of Fyshwick and central Canberra. According to RM Planning and SGS economics, two thirds of Queanbeyan residents travel to the ACT for work. Reducing travel times for workers, suppliers and customers, is expected to enhance business opportunities in the wider area.
OEH considers that granting or not granting concurrence for this proposal would not significantly affect the economics of the Queanbeyan or the broader region. However, on the balance of probabilities, OEH considers this project is more likely to positively effect the economics of the Queanbeyan region through enabling better transport connections between Queanbeyan and Canberra, making suburbs like Googong more appealing with reduced travel times, creating jobs during the construction phase of the project and reducing traffic in the CBD. Therefore, OEH’s decision is that the economic consequences support the granting of concurrence for this proposal.

7.3 Social

QPRC commissioned a Social Impact Assessment (SIA) to qualify and quantify the predicted social impacts that would stem from this project. The assessment (by RM Planning), in conjunction with the REF, the public submissions, and the QPRC Submissions report were incorporated into OEH’s consideration of the social impacts of this project.

In terms of social impacts, the main groups considered in this proposal have been:

- Residents close to the proposed EDE
- Residents in broader Queanbeyan LGA
- Local schools
- Local businesses including the Queanbeyan Business Chamber.

Queanbeyan Tomorrow Community Vision 2021 (QPRC 2012) recognises that there is a strong community support to divert heavy traffic out of the CBD, reclaiming the space for pedestrian and light vehicle access and providing an opportunity to reinvigorate the city centre. It also considers the need to provide more walking and cycling pathways for residents. The EDE is expected to provide benefits to CBD traffic issues, neighbourhood access for Greenleigh and Barracks Flat residents, and additional public transport, walking and cycling routes.

In April 2015, RMS commissioned a random and representative survey of 805 residents across Queanbeyan LGA to gather feedback about the proposal. Overall 82% of residents supported the EDE with 16% opposed and 21% neutral towards it. Respondents who lived less than 1km from the EDE were more likely to be opposed to the project than those who lived over 5km away, however the majority of people within 1km still supported the proposal. 52% of respondents believed that the EDE would create noise and reduce visual amenity for residents close to the road corridor. Thirty-seven percent felt that it would increase traffic noise and 29% agreed it would have negative impacts on the environment.
The core clients against the EDE are Jerrabomberra residents, Queanbeyan Conservation Alliance, Jerrabomberra Public School and Greenleigh Residents Group. The core concerns of these groups are increased traffic through their area of Queanbeyan LGA (i.e. Jerrabomberra and Greenleigh Estate), increases to Council rates, large increases in local noise, impacts to bushland and the Queanbeyan River, loss of access for residents of Greenleigh to bushwalk, visual amenity and scenic views to be impacted or reduced, heritage, increased bushfire risks, air pollution and doubt about how effective the road will be at achieving its aims of reducing traffic congestion. QPRC and their consultants have responded to all of these concerns with comments and/or mitigation measures in the SIA and Response to Public Submissions document. Additionally, OEH has addressed the impacts that relate to the Species Impact Statement (i.e. threatened species and communities) through this report.

Another core social matter is the CBD precinct. Users of Cooma Street that need to access the Queanbeyan industrial area, Canberra airport precinct or Bungendore Road currently have to travel through the CBD. This has a number of implications, including increased travel time through the CBD, increased congestion and reduced amenity for business and residents around the CBD, increased safety risks particularly adjacent to schools and risks to the wider community from flooding (during a 1:20 flood event much of the CBD is underwater and access is restricted between north and south Queanbeyan). The EDE is expected to reduce the impacts of traffic on the CBD and thereby have positive outcomes for the CBD, and livelihood of the hub.

The positive social benefits from this project include:

- Improved movement of traffic around Queanbeyan’s CBD
- Increased road safety for the Queanbeyan community
- Potential increased capacity for public transport services
- Provision of specific infrastructure for cyclists and pedestrians along EDE
- Provision of additional routes for connecting the Queanbeyan community
- Increasing the capacity of the freight network.
- Reduced risks of flood impacts to Queanbeyan’s road network
- Increasing business attractiveness in CBD
- Increasing emergency access routes in Greenleigh Estate
- Another route for Googong and Tralee residents to get to east Queanbeyan and east Canberra business districts (near the airport) or to the coast (Bungendore Road)
- Reduced heavy vehicle traffic around St Gregory’s school
- Increased safety in the CBD in areas of high pedestrian access.
On a whole, OEH considers that although there will be some large impacts to residents close to the subject site, the social implications for the project are likely to be largely positive based on the assessments provided. Therefore, OEH’s decision is that the social consequences support the granting of concurrence for this proposal.

8 REASONS FOR THE DIRECTOR-GENERAL’S DECISION

Following consideration of the REF, SIS, SIS Addendum and Determination Report and the other matters provided for under Section 112D(1) of the EP&A Act, the Office of Environment & Heritage, has decided to grant concurrence to the development proposal, subject to the conditions outlined in section 9 of this report, for the following reasons:

1. The scale of impacts on biodiversity for this project are not likely to place any threatened species or community at risk of extinction
2. The conditions of concurrence will mitigate against any potential impact to Rosenberg’s Goanna
3. The provision of a biodiversity offset site will provide protection, enhancement and security for Box Gum Woodland and the Dry Forest community, that will be managed for conservation in perpetuity
4. The offset will also fulfil habitat requirements for the Rosenberg’s Goanna locally
5. The proposal, as conditioned, is unlikely to affect the long term viability of Box Gum Woodland, Rosenberg’s Goanna or Speckled Warbler in the region or increase their overall risk of extinction
6. There are social and economic benefits which will likely result from the development.

9 CONDITIONS OF CONCURRENCE

This concurrence is granted subject to the following conditions:

Condition 1: Offsets
   a) The proponent must offset all of the impacts to native vegetation for this proposal, in accordance with the offset proposal outlined in the SIS Addendum for Ellerton Drive Extension (NGH 2016)
   b) Offsets must be approved by OEH prior to the impact occurring.
   c) An offset management plan must be created, and approved by OEH, to appropriately manage and secure the offset sites for this development.
d) Offsets must be supplementary to other legal requirements, in line with the NSW BioBanking method. For example, if site are already being managed for conservation purposes or are protected, this may reduce the amount of suitable offset they contribute to the broader offset strategy.

e) Offsets must be legally secured, protected and funded to allow for in perpetuity conservation outcomes at the offset sites.

Reason: To offset the impact on the proposal on Yellow Box White Box Blakely’s Red Gum Endangered Ecological Community and Rosenberg’s Goanna by providing areas that will be managed for conservation in perpetuity.

Condition 2: Development footprint

a) Prior to development occurring on the site, all native vegetation adjacent to the construction site should be securely fenced to prevent access by construction equipment and personnel.

b) All stockpiles, machinery, plant and vehicles associated with construction must not be located within endangered ecological communities or watercourses.

c) Large trees which have the potential to overhang and provide movement pathways across the road must not be cleared.

d) All stockpiles, machinery, plant and vehicles associated with construction must be located within the approved road corridor.

e) Any areas that are impacted outside of the approved road corridor must be offset in accordance with the rest of the project’s impacts.

Reason: To minimise impacts associated with the project and ensure that the Box Gum Woodland EEC and other environmentally sensitive areas outside the approved road corridor are not adversely affected by construction works.

Condition 3: Rosenberg’s Goanna and pre-clearance surveys for termite mounds.

a) Termite mounds must only cleared during the months of December and January.

b) Pre-clearance survey of all termite mounds and hollow bearing trees must be undertaken and carried out by suitably qualified ecologist immediately prior to the clearance of termite mounds and hollow bearing trees.

a) If any termite mounds show signs of Rosenberg’s Goanna young, this mound is to be left in situ and connected to the existing vegetation until all young have dispersed.

b) The termite mounds identified outside of (but within 50m of) the subject area during NGH’s May 2016 survey must be protected during construction of EDE. These locations are
mapped in the 'additional information request' provided by QPRC and NGH to OEH on 3 June 2016.

b.1. This includes the five termite mounds which showed signs of use consistent with those of Rosenberg's Goanna

b.2. The location of these mounds must be included in the proposed induction material for construction workers, to increase the chance of their protection.

c) Boundary fencing must be suitably designed and constructed along both sides of the road, especially along the core habitat area for this species, to minimise vehicle collision risks for this species.

c.1. Fencing must be designed to enhance the success and usability of the fauna underpasses for this species

d) Prior to the opening of the road, the proponent must place at least two advisory signs in both directions along Ellerton Drive Extension, indicating the potential for the presence of Rosenberg's Goanna's

Reason: To minimise the impact of the road corridor on fauna that utilise the area and to minimise disturbance to termite mounds that could be used as nesting sites for Rosenberg’s Goannas.

Note: fencing was only proposed along the eastern side of the road in the core habitat area.

Condition 4 Other vegetation clearing and pre clearance survey

a) Hollow bearing trees must only be cleared during the months of December and January.

b) Pre-construction surveys for threatened fauna should be carried out by suitably qualified ecologist immediately prior to the clearance of forest and grassland areas of the site. If threatened fauna are detected, or signs of use, then recommendations included within Section 6.2 of the SIS Addendum (NGH 2016) should be implemented.

c) Clearing of vegetation for this proposal must follow the following method: non-hollow-bearing trees are knocked over on day 1, and hollow-bearing trees on day 2, allowing for animals to leave the site on the first night.

d) Alternative denning opportunities (i.e. nest boxes) should be installed in close proximity to the alignment but outside the clearing zone a few months prior to clearing commencing, allowing animals time to locate and use the alternative hollows.

Condition 5: Fauna crossings

a) Final design, number and location of the fauna underpasses, and other mitigations shall be approved by OEH.
b) The minimum number of fauna crossings will include two constructed fauna underpasses, an underpass under the bridge on the northern side of the Queanbeyan River, and at least 3 rope crossings for arboreal fauna.

c) Rope crossings should be incorporated into the final road design and constructed at least every 500m along the length of the project, where there is native vegetation on both sides of the corridor. Rope crossings should be set in areas close to higher densities of hollow-bearing trees.

d) Lighting fixtures and light walls should be incorporated, now and into the future, into the EDE development plan to avoid light spill into adjacent habitats.

e) No barbed-wire use in the development at crossings or in other areas of the development.

Reason: To minimise the impact of the road corridor on fauna species and in particular the Rosenberg's Goanna's and arboreal fauna.

Condition 6: Platypus

a) The bridge pylons must not be designed or constructed within the Queanbeyan River.

Reason: The revised REF states that the bridge pylons would be located on the river banks and work in the river itself under normal flow conditions is not required. Page 104 of the REF also states that construction would comply with recommendations made in the Platypus Awareness and Conservation Strategy (Australian Platypus Conservancy, 2012). OEH supports this approach.

Condition 7: Monitoring

a) The proponent must prepare and implement a biodiversity monitoring plan within 12 months of this concurrence, or prior to construction commencing for the road. The plan must;

i. Be developed in consultation with, and approved by, OEH

ii. Be capable of monitoring the success of the fauna crossings (underpasses and overpasses)

iii. Be capable of monitoring road kill along the road corridor, in particular any potential Rosenberg Goanna deaths

iv. Describe adaptive management techniques, in case mitigation measures are not successful and require adaptation

b) The results of the first 12 months of monitoring under this plan must be reported to OEH which will, at that time, review the results and the plan, and negotiate any necessary changes to the plan with Council.

c) Yearly monitoring results must be reported to OEH.
Note: monitoring prior to the clearing of native vegetation and construction impacts will likely be required for the monitoring program.
REFERENCES


Bushfire and Environmental Services, BES (2008). Queanbeyan Biodiversity Study, Biodiversity Study Findings Report, Queanbeyan Local Government Area, E1070065

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OEH (2016a) Rosenberg’s Goanna – threatened species profile on OEH’s website.

OEH (2016b) Speckled Warbler – threatened species profile on OEH’s website.

OEH (2016c) Box Gum Woodland – threatened species profile on OEH’s website.

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