



5 February 2019

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Review of previous ecological reports regarding the NSW portion of the Ginninderry project area.

Capital Ecology project no. 2829

Dear Mr Maxwell,

In 2014 the Ginninderry NSW rezoning proposal was originally lodged, and in August 2018 a renewed gateway decision was issued. It is expected that the rezoning proposal will go on public exhibition shortly after March 2019.

When initially lodged, the rezoning proposal was accompanied by a number of technical reports, including several ecological reports. Some of these ecological reports date back to 2009, and all are at least several years old.

In order to ensure that the rezoning decision making process is informed by the best available information, Riverview Projects (ACT) Pty Ltd ('Riverview') commissioned Capital Ecology Pty Ltd to review the ecological reports which pertain to the NSW portion of the Ginninderry project area.

Accordingly, this letter provides our review of nine ecological reports which focussed on the NSW portion of the Ginninderry project area. The aim of this review is to determine if the reports remain valid and 'fit-for-purpose' to inform the proposed rezoning, and is informed by site inspections, relevant literature reviews, and NSW and Commonwealth legislation.

The following table provides a detailed review of each ecological study and the final discussion outlines our conclusions. In brief, it is our view that the previous ecological reports remain valid, and in combination provide sufficient information to adequately inform the Ginninderry NSW rezoning proposal.

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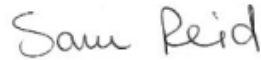
We trust that this letter provides the review and advice required. If, however, you should have any questions relating to this letter, please do not hesitate to contact us.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Robert Speirs".

Robert Speirs

Director / Principal Ecologist

A handwritten signature in black ink, appearing to read "Sam Reid".

Dr Sam Reid

Consultant Ecologist

Attachments

Attachment A. Summary for the linked-reports on the Ginninderry website

Review of previous ecological studies

Reference	Summary of Study	Conclusion and Recommendations
Kevin Mills & Associates (2009a). <i>West Belconnen Project. ACT and NSW Land. Flora and Fauna Studies</i> . Prepared for CB Richard Ellis Pty Limited, January.	<p>The aim of this study was to identify the significant ecological values present within the Ginninderry project area. Particular attention was given to the presence/absence of threatened species and ecological communities as listed pursuant to the relevant Commonwealth and/or ACT or NSW legislation.</p> <p>The study included vegetation assessments, targeted threatened flora surveys, habitat assessments, general fauna surveys (including nocturnal surveys), targeted threatened fauna surveys, rock turning surveys, frog surveys, bird surveys, and ANABAT® surveys for insectivorous bats. The methods, survey effort and survey timing described in this study were appropriate for the ecological values being investigated.</p> <p>The study identified a variety of plant communities, including patches of Box-Gum Woodland in the ACT portion of the project area which met the criteria for the listed community. No areas were determined to be naturally occurring grassland, and so no Natural Temperate Grassland was identified. No threatened flora were recorded. The report identified the river corridor and plateau woodland as important areas of fauna habitat. A number of threatened fauna species were recorded, specifically the Pink-tailed Worm Lizard <i>Aprasia parapulchella</i>, Superb Parrot <i>Polytelis swainsonii</i> (non-breeding observations), Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>, and Speckled Warbler <i>Pyrholaemus sagittatus</i>. The report identifies the areas of Box-Gum Woodland and presence of threatened fauna as the key ecological values occurring in the Ginninderry project area.</p>	<p>Whilst this study was performed approximately 10 years ago, it provides a useful initial identification of the ecological values present within the Ginninderry project area. In particular, the recorded plant communities, flora species and fauna species provide useful records of the ecological values present.</p> <p>Notwithstanding the above, the study does not provide sufficient information or detailed enough mapping to be able to reliably determine the extent of threatened fauna habitat, particularly with respect to the Pink-tailed Worm Lizard. This issue has since been addressed in subsequent studies. In addition, no areas of NTG were identified. However, as noted by Sharp (2015, 2017), it is likely that the subsequent identification of the occurrence of the EPBC Act listed critically endangered ecological community Natural Temperate Grassland of the South East Highlands (NTG-SEH) is due to the revised classification criteria for the listed community. This issue has since been addressed in the Ginninderry development area by SMEC (2017a,b).</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Kevin Mills & Associates (2009b). <i>Further Flora and Fauna Studies, Land at West Molonglo and Ginninderra Creek, New South Wales, Australian Capital Territory</i>. Report prepared for The Riverview Group, July.</p>	<p>The aims of this study were to describe and map Pink-tailed Worm-lizard habitat, describe the ecological values along Ginninderra Creek, define the boundary of a conservation area running along the Murrumbidgee River corridor, and map the extent of the River Sheoak <i>Casuarina cunninghamiana</i> forest along the Murrumbidgee River.</p> <p>The methods, survey effort and survey timing described in this study were appropriate for the ecological values being investigated.</p> <p>The Pink-tailed Worm-lizard habitat mapping identified areas of varying habitat quality spread across the ridges and gullies of the Murrumbidgee River, with very little habitat found in farmland/paddocks. Not all areas were surveyed for presence/absence of the Pink-tailed Worm-lizard. The key values identified along Ginninderra creek were the riparian habitat, adjacent rock outcrops, and strands of River Sheoak. The boundary of a conservation corridor along the Murrumbidgee River was determined based on the distribution of mapped Pink-tailed Worm-lizard habitat and the inclusion of the areas of very steep topography, thereby capturing the majority of Pink-tailed Worm-lizard habitat, woodland, shrubland, riparian habitat and significant fauna habitat present in the project area. Finally, River Sheoak forest was found to extent almost continuously along both sides of the Murrumbidgee River, and along a small section of Ginninderra Creek.</p>	<p>Since this study was published, the extent of Pink-tailed Worm-lizard habitat has been more accurately mapped and surveyed and the boundary of the West Belconnen Conservation Corridor adjusted. However, as with their previous work (Kevin Mills & Associates 2009a), this study identifies a number of important ecological values within the Ginninderry project area. These findings remain relevant and do not need to be repeated as the methods employed during the study were appropriate and the identified ecological values are unlikely to have changed in extent or quality.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Osborne and Wong (2013). <i>The extent of habitat for the vulnerable Pink-tailed Worm Lizard (Aprasia parapulchella) in the West Belconnen – Ginninderra Creek investigation area – confirmatory distribution surveys and mapping</i>. Report commissioned by The Riverview Group Pty Ltd, 10 May 2013.</p>	<p>This study by Osborne and Wong combined fine-scale GIS-based mapping of potential Pink-tailed Worm-lizard habitat with an extensive field survey program to ground-truth the habitat mapping and determine the presence/absence of the species within each patch of mapped potential habitat. The Pink-tailed Worm-lizard habitat was categorised as either “Suitable Habitat (moderate and high quality habitat combined as a mapping unit) or “Low Quality Habitat (highly disturbed and degraded habitat that is likely to no longer support the species)”.</p> <p>A total of 162.8 ha of Pink-tailed Worm-lizard habitat was mapped comprising 152.1 ha of suitable habitat and 10.7 ha of low quality habitat. The vast majority of the habitat was found in the ACT and was ‘...confined to the far western sector of the investigation area where it is in good condition and occurs very extensively along the slopes of the Murrumbidgee River’. Only a small proportion of potential habit was located on the flatter farmland/paddock areas.</p> <p>Overall, the Pink-tailed Worm-lizard habitat present within the Ginninderry project area constitutes a large and important component of the regional population, the majority of which will be protected within the West Belconnen Conservation Corridor.</p>	<p>The results presented in this study were part of a wide-ranging investigation of the distribution and abundance of Pink-tailed Worm-lizard across the lower Molonglo region. The methods were appropriate, and the survey effort was significant.</p> <p>Capital Ecology (2018a) re-confirmed the accuracy of the survey and habitat mapping completed by Osborne and Wong in sections of the ACT portion of the Ginninderry project area. In contrast, Capital Ecology (2018b) found that the habitat classification and extent in the NSW portion of the project area were not as accurate. It is important to note that subsequent to their study Dr David Wong (co-author of the Osborne and Wong study) expressed doubts on the ‘low quality’ classification of some of the mapped patches of PTWL habitat in NSW. It is unclear why Dr Wong expressed these doubts, however it may explain why there is a discrepancy in mapped PTWL habitat in the NSW portion of the development area, but not in the ACT portion.</p> <p>It is important to note that the Capital Ecology (2018b) surveys did not extend into the areas set aside for the conservation corridor. It is therefore possible that previously identified areas of PTWL habitat within the NSW portion of conservation corridor may also be of a higher quality than that previously mapped, and/or that there are patches of PTWL habitat within the NSW portion</p>

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		<p>of the conservation corridor that have yet to be identified.</p> <p>In light of the above, the habitat quality and extent mapping produced by Capital Ecology (2018b) should supersede the Osborne and Wong mapping for the NSW portion of the Ginninderry development area. No further habitat mapping or surveys are recommended for Pink-tailed Worm-lizard in the Ginninderry project area.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Rowell (2013). <i>West Belconnen Golden Sun Moth surveys, October to December 2012.</i></p>	<p>The aim of this study was to identify potential habitat for, or populations of, Golden Sun Moth <i>Synemon plana</i> in the Ginninderry project area. Potential Golden Sun Moth habitat was identified as flat or gently sloping primary or secondary grassland or open woodland, dominated by native grasses. All areas of potential habitat were surveyed 2 to 4 times during appropriate conditions when Golden Sun Moth were confirmed to be flying at other nearby sites.</p> <p>No high-quality habitat was identified in the Ginninderry project area. Most potential habitat was classified as very low to low (quality), with some scattered moderate habitat. Despite sufficient survey effort, no Golden Sun Moths were recorded.</p> <p>The author notes that in 2010 Golden Sun Moths were recorded in Area 6 (along the ACT and NSW border) of the Ginninderry Project Area. At the time of survey in 2012 that area was overgrown and no Golden Sun Moth were observed. Rowell concludes that it is possible that the Golden Sun Moth may still occur <i>along Ginninderra Creek in Block 1621 and the adjacent paddocks in NSW.</i></p>	<p>This study was performed by a recognised Golden Sun Moth expert using appropriate methods and sufficient survey effort. As such, the finding that no Golden Sun Moths occur across the Ginninderry project area is a conclusion that remains valid.</p> <p>For the purposes of the rezoning proposal, no additional surveys are recommended. However, if the Biodiversity Offset Scheme (BOS) is applied to the NSW portion of the project area in the future, part of that process will require a reassessment of potential Golden Sun Moth habitat throughout the area. At that time particular attention should be given to the areas along Ginninderra Creek and the surrounding paddocks which Rowell identified as potential habitat.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Kevin Mills & Associates (2013). <i>West Belconnen Project. ACT and NSW Land. Targeted Bird Surveys</i>. Report prepared for The Riverview Group, September.</p>	<p>This study combines the results of surveys and assessments of the bird fauna in the Ginninderry project area from 2008 to 2013. It also addresses specific matters raised by the ACT Department of Environment and Sustainability, including consideration of Superb Parrot and birds of prey.</p> <p>At the time this report was prepared, the project area had been surveyed for birds on 31 occasions since 2008, resulting in a comprehensive species list for the area. In total, 75 native species and 9 exotic species were recorded. As shown in Figure 1 of the report, it is likely that most of the bird species which occur in the Ginninderry project area have been recorded.</p> <p>The Superb Parrot was observed five times in the ACT portion of the project area from late 2012 to late 2013. No evidence of breeding was found during bird surveys or tree hollow surveys. Targeted diurnal bird of prey surveys recorded 11 species, including the Peregrine Falcon <i>Falco peregrinus</i> and Spotted Harrier <i>Circus assimilis</i>. Only the Nankeen Kestrel <i>Falco cenchroides</i> was observed to nest in the project area.</p> <p>Overall, several bird species of conservation significance were recorded in the project area including Dusky Woodswallow <i>Artamus cyanopterus</i>, Flame Robin <i>Petroica phoenicea</i>, Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>, Peregrine Falcon, Scarlet Robin <i>Petroica boodang</i>, Speckled Warbler, Spotted Harrier, and White-winged Triller <i>Lalage tricolor</i>. All observations were associated with treed areas.</p> <p>A tree hollow survey of most trees occurring on the gentler topography in the project area was performed in October-November 2012. Thirteen species were observed utilising trees hollows, none of which are of conservation concern.</p>	<p>In combination, the bird and tree hollow surveys which have occurred across the Ginninderry project area since 2008 are sufficient to be able to determine the species which utilise the site, including those which are likely to breed there. It is important to note that while the Little Eagle <i>Hieraaetus morphnoides</i> was not recorded in this report, Kevin Mills & Associates (2014) observed the species nesting in the ACT portion of the project area.</p> <p>For the purposes of the rezoning proposal, no additional surveys are recommended. However, if the BOS is applied to the NSW portion of the project area in the future, part of that process should include an updated survey of tree hollow utilisation and raptor nesting in order to address breeding of threatened species, particularly the Superb Parrot, Little Eagle, and the other species of conservation significance.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Kevin Mills & Associates (2013). <i>West Belconnen Project. NSW Land. Flora and Fauna Studies</i>. Report prepared for The Riverview Group, September.</p>	<p>This report documents the findings of several surveys and assessments undertaken in the NSW portion of the Ginninderry Project Area, including Osborne and Wong (2013), Rowell (2013) and various Kevin Mills & Associates studies. As many of the studies have been summarised above, only the aspects which present additional information are described below.</p> <p>No Superb Parrots have been observed in the NSW portion of the project area, potentially due to the lack of substantial numbers of remnant trees in those areas. Other threatened species recorded in the NSW portion of the project area include Flame Robin, Scarlet Robin and Spotted Harrier. These species have mainly been observed in the gorges associated with the Murrumbidgee River.</p> <p>There is very little woodland vegetation remaining in the NSW portion of the project area and the area is largely treeless. Of the remaining trees, only 15 were found to contain potentially functional hollows.</p> <p>No threatened flora have been recorded in the flatter sections of the project area (i.e. the development area).</p> <p>The authors identify the following as matters of conservation importance in the NSW portion of the project area: the river and creek corridors and associated riparian vegetation; the woodland in the gorge and upper slopes (including threatened bird habitat); the rocky areas in the gorge and upper slopes (including threatened reptile habitat); three threatened bird species; and scattered hollow bearing trees.</p>	<p>This report succinctly summarises the important ecological values present within the NSW portion of the Ginninderry project area and remains valid.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Kevin Mills & Associates (2014). <i>Ecological Studies. West Belconnen. Australian Capital Territory</i>. Prepared for the Riverview Group, June.</p>	<p>This report documents the findings of several surveys and assessments undertaken in the ACT portion of the Ginninderry project area, but also includes additional studies which build upon this previous work. As this review focusses on the NSW portion of the project area, only the aspects which are of relevance to NSW are discussed below.</p> <p>One of the important outcomes of this report is the designation of the West Belconnen Conservation Corridor, which aims to protect a number of ecological values including the river corridor and associated flora and fauna, woodland areas including Box-Gum Woodland and threatened bird species habitat, and Pink-tailed Worm-lizard habitat.</p> <p>The Little Eagle was observed to be nesting in pine trees on the southern edge of the Strathnairn property in 2012/13. Recommendations included a temporary buffer around the nest tree, investigations into feeding/breeding/foraging requirements, and aims to determine home range, foraging range and diet.</p>	<p>This report succinctly summarises the important ecological values present within the ACT portion of the Ginninderry project area. The findings of relevance to the NSW portion of the project area are the designation of the West Belconnen Conservation Corridor and the presence of breeding Little Eagle nearby. Both these issues have been addressed in subsequent reports and studies.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Eco Logical Australia (2016). <i>Ginninderry Project, Rosenberg's Goanna habitat assessment</i>. Prepared for The Riverview Group.</p>	<p>As Rosenberg's Goanna <i>Varanus rosenbergi</i> had recently been recorded in the Ginninderra Creek catchment, the aim of this study was to document the extent and quality of potential Rosenberg's Goanna habitat in the Ginninderry project area as determined from historic records and field survey. In particular, the study aimed to determine if the area proposed for urban development contains habitat elements which may support a population of Rosenberg's Goanna.</p> <p>To achieve these aims the authors reviewed the available literature on the species' ecology, performed rapid assessment of habitat features in quadrates spread throughout the wooded areas along the Murrumbidgee River and Ginninderra Creek corridors and adjacent grassland areas, mapped potential habitat for the species, discussed the potential impacts of development, and provided habitat management and other recommendations.</p> <p>The authors reported that higher quality habitat was restricted to the northern portion of the study area, on the sloped and wooded areas bordering the Murrumbidgee River and Ginninderra Creek. Low quality habitat was recorded in the adjacent grassland areas. The authors concluded that the northern boundary of the proposed development area abuts high quality habitat. They therefore proposed substantial variations to the conservation corridor in the north of the study area to reduce the potential impacts of development. They also outlined a series of wide-ranging measures to manage habitat for the species and reduce the impact of urbanisation.</p>	<p>As discussed in the subsequent report by Green <i>et al.</i> (2017), this study's reliance on unpublished observations regarding the species ecology, in particular nesting requirements, go against the accepted and documented literature. As such, the authors have identified areas as potentially supporting an ongoing and viable population of the species despite the subject land lacking what are considered vital habitat features, such as termite mounds for egg laying and incubation. In addition, the suggested management actions, further studies, and alteration to the conservation corridor are excessive for the purposes of the proposed development. In some instances, these recommendations are not sufficiently justified.</p> <p>These above issues are addressed in detail in the following report (Green <i>et al.</i> 2017) and so are not discussed in detail here.</p>

Reference	Summary of Study	Conclusion and Recommendations
<p>Green, B., Guarino, F. and Higgisson, W. (2017). <i>Habitat evaluation of two proposed extension areas to the Ginninderry reserve to provide improved ecological outcomes for Varanus rosenbergi</i>. The Institute for Applied Ecology, University of Canberra.</p>	<p>This study assessed the suitability of expanding the conservation corridor to improve the conservation outcomes for Rosenberg's Goanna, as proposed by Eco Logical Australia (2016). The authors assessed the areas proposed to be included in the conservation corridor for the presence of habitat features deemed to be essential to the species, specifically termite mounds, refuge sites, and adequate foraging areas.</p> <p>A small number of termite mounds were recorded, but they were all found towards the edge of the conservation corridor and not in the proposed extensions. There was no evidence of Rosenberg's Goanna occupation of the proposed extensions.</p> <p>The report concluded that the identified extension areas should not be included in the conservation corridor as they do not contain critical habitat components essential for maintaining a viable Rosenberg's Goanna population. The areas lack active termite mounds, refuge habitat and vegetation cover, and only provide marginal foraging opportunities for the species.</p>	<p>This study was performed by recognised experts, including Dr Brian Green who is an expert Varanid ecologist with over 40 years of experience. Their determination regarding the absence of the critical habitat features required to maintain a viable population of Rosenberg's Goanna is supported by published literature. Their criticisms of Eco Logical Australia (2016), including the reliance on unpublished opinion, assertion that termite mounds are not essential for incubation and juvenile refugia, and determination of home ranges, are well justified.</p> <p>The author's field survey and conclusions regarding the suitability of the land proposed to be included in the conservation corridor are sound and based on the current understanding of the species' habitat requirements. The proposed extension areas do not contain the critical habitat components essential for maintaining a viable population of Rosenberg's Goanna.</p> <p>We agree with the conclusions of this study in that the inclusion of additional land as part of the conservation area is unwarranted and will not substantially improve the conservation outcomes for the Rosenberg's Goanna.</p>

Discussion

The existing ecological reports regarding the NSW portion of the Ginninderry project area provide an in-depth analysis of the ecological values of the area. While all of the reports are several years old, they remain valid as the studies were performed by suitably qualified individuals, the methods employed were appropriate, and the ecological values are unlikely to have substantially changed in extent or quality over the ensuing years. In combination, the ecological reports summarised above provide sufficient information to adequately inform and assess the Ginninderry NSW rezoning proposal.

At the time the ecological reports were produced, the NSW *Threatened Species Conservation Act 1995* (TSC Act) was in force. In August 2017, the TSC Act was repealed and replaced by the NSW *Biodiversity Conservation Act 2016* (BC Act). The threatened species and ecological communities listed under the TSC Act were correspondingly listed under the BC Act. As the ecological reports summarised above were performed a number of years ago, the species and ecological communities identified in the ecological reports have been checked for currency against the relevant schedules of the EPBC Act and the BC Act. No additional Commonwealth or NSW listed species were identified as being of potential relevance to the subject land.

Under the BC Act, the Biodiversity Offset Scheme (BOS) is triggered, and a Biodiversity Development Assessment Report (BDAR) must be prepared applying the NSW Biodiversity Assessment Method (BAM) by an accredited BAM Assessor, for a proposed development which:

1. is identified on the Biodiversity Values Map; and/or
2. will exceed the native vegetation clearance threshold for the minimum lot size associated with the zoning of the subject land; and/or
3. may significantly impact one or more BC Act listed entities (i.e. threatened species or ecological communities).

With regard to the above, it is very likely that the BOS will be triggered for any future development application associated with the NSW portion of the Ginninderry project area. Given that the existing studies are sufficient to inform the rezoning application, and that development in NSW portion of the Ginninderry project area is not proposed to occur for several years, it is our view that a BAM assessment will be best undertaken in future, post rezoning but sufficiently prior to development commencement (i.e. structure planning).

In this regard, instead of pursuing a BDAR we recommend that Ginninderry engage a BAM Assessor to develop a Biodiversity Certification Assessment Report (BCAR) and pursue Biodiversity Certification for the subject land. This approach has been discussed with Tobi Edmonds (Senior Conservation Planning Officer, Office of Environment and Heritage), who agrees that Biodiversity Certification is likely to be the most effective and streamlined mechanism to apply in this situation. As prescribed under Part 6, Division 3, Section 6.13 of the recently enacted BC Act, a BCAR is –

a report prepared by an accredited person in relation to the proposed biodiversity certification of land under Part 8 that:

(a) assesses in accordance with the biodiversity assessment method the biodiversity values of the land proposed for biodiversity certification, and

(b) assesses in accordance with that method the impacts on biodiversity values of the actions to which the biodiversity offsets scheme applies on the land proposed for biodiversity certification, and

specifies the number and class of biodiversity credits to be retired to offset those impacts as determined in accordance with that method, and

(c) specifies other proposed conservation measures on or in respect of other land to offset those impacts on biodiversity values and their value (in terms of biodiversity credits) determined in accordance with that method.

Biodiversity certification is a mechanism which acts to integrate planning for biodiversity conservation with planning for proposed intensification of land use. The key reasons for pursuing biodiversity certification are as follows.

1. Under the BC Act, a Biodiversity Development Assessment Report (BDAR) would be required to accompany each separate development application (DA). However, if conferred by the Minister (i.e. approved), biodiversity certification will remove the requirement for any further NSW biodiversity assessment for development on the subject land. Neither Ginninderry nor Yass Valley Council ('Council') will need to consider likely impacts on biodiversity for future Part 4 DAs.
2. The BC Act would prevent Council from approving a Part 4 DA if Council determines that the development would result in a Serious and Irreversible Impact (SAII) on a BC Act listed SAI candidate entity. Unlike a Part 4 DA, the Minister is not prevented from conferring biodiversity certification due to SAI and may 'determine additional/alternative measures to minimise impacts'.

In light of the above, although biodiversity certification is a more involved process at the early planning stage, it is our recommended approach for the project given the likely benefits (i.e. streamlined single assessment, risk mitigation and certainty for planning etc.).

References

Capital Ecology (2018a). *Ginninderry – Pink-tailed Worm-lizard survey and habitat mapping*. Project 2772. 29 May 2018.

Capital Ecology (2018b). *Ginninderry – Pink-tailed Worm-lizard survey and habitat mapping*. Project 2842. 23 November 2018.

Sharp, S. (2015). *Procedures manual. Baseline condition assessment*. Report prepared for The Riverview Group. S. Sharp, Canberra, ACT.

Sharp, S. (2017). *Ginninderry conservation zone vegetation unit descriptions*. Report prepared for The Riverview Group. S. Sharp, Canberra, ACT.

SMEC (2017a). *West Belconnen vegetation survey. Summary. 2017 Update*. Report prepared for The Riverview Group, April 2017.

SMEC (2017b). *Assessment of mapped Pink-tailed Worm-lizard habitat within Ginninderry for potential to meet criteria for classification as natural temperate grassland*. Prepared for The Riverview Group, 27 September 2017.

Attachment A. Summary for the linked-reports on the Ginninderry website

Reference	Summary of Study
<p>Kevin Mills & Associates (2009a). <i>West Belconnen Project. ACT and NSW Land. Flora and Fauna Studies</i>. Prepared for CB Richard Ellis Pty Limited, January.</p>	<p>The aim of this study was to identify the significant ecological values present within the Ginninderry project area. Particular attention was given to the presence/absence of threatened species and ecological communities as listed pursuant to the relevant Commonwealth and/or ACT or NSW legislation.</p> <p>The study included vegetation assessments, targeted threatened flora surveys, habitat assessments, general fauna surveys (including nocturnal surveys), targeted threatened fauna surveys, rock turning surveys, frog surveys, bird surveys, and ANABAT® surveys for insectivorous bats. The methods, survey effort and survey timing described in this study were appropriate for the ecological values being investigated.</p> <p>The study identified a variety of plant communities, including patches of Box-Gum Woodland in the ACT portion of the project area which met the criteria for the listed community. No areas were determined to be naturally occurring grassland, and so no Natural Temperate Grassland was identified. No threatened flora were recorded. The report identified the river corridor and plateau woodland as important areas of fauna habitat. A number of threatened fauna species were recorded, specifically the Pink-tailed Worm Lizard <i>Aprasia parapulchella</i>, Superb Parrot <i>Polytelis swainsonii</i> (non-breeding observations), Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>, and Speckled Warbler <i>Pyrrholaemus sagittatus</i>. The report identifies the areas of Box-Gum Woodland and presence of threatened fauna as the key ecological values occurring in the Ginninderry project area.</p>

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<p>Kevin Mills & Associates (2009b). <i>Further Flora and Fauna Studies, Land at West Molonglo and Ginninderra Creek, New South Wales, Australian Capital Territory</i>. Report prepared for The Riverview Group, July.</p>	<p>The aims of this study were to describe and map Pink-tailed Worm-lizard habitat, describe the ecological values along Ginninderra Creek, define the boundary of a conservation area running along the Murrumbidgee River corridor, and map the extent of the River Sheoak <i>Casuarina cunninghamiana</i> forest along the Murrumbidgee River.</p> <p>The methods, survey effort and survey timing described in this study were appropriate for the ecological values being investigated.</p> <p>The Pink-tailed Worm-lizard habitat mapping identified areas of varying habitat quality spread across the ridges and gullies of the Murrumbidgee River, with very little habitat found in farmland/paddocks. Not all areas were surveyed for presence/absence of the Pink-tailed Worm-lizard. The key values identified along Ginninderra creek were the riparian habitat, adjacent rock outcrops, and strands of River Sheoak. The boundary of a conservation corridor along the Murrumbidgee River was determined based on the distribution of mapped Pink-tailed Worm-lizard habitat and the inclusion of the areas of very steep topography, thereby capturing the majority of Pink-tailed Worm-lizard habitat, woodland, shrubland, riparian habitat and significant fauna habitat present in the project area. Finally, River Sheoak forest was found to extent almost continuously along both sides of the Murrumbidgee River, and along a small section of Ginninderra Creek.</p>

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<p>Osborne and Wong (2013). <i>The extent of habitat for the vulnerable Pink-tailed Worm Lizard (Aprasia parapulchella) in the West Belconnen – Ginninderra Creek investigation area – confirmatory distribution surveys and mapping</i>. Report commissioned by The Riverview Group Pty Ltd, 10 May 2013.</p>	<p>This study by Osborne and Wong combined fine-scale GIS-based mapping of potential Pink-tailed Worm-lizard habitat with an extensive field survey program to ground-truth the habitat mapping and determine the presence/absence of the species within each patch of mapped potential habitat. The Pink-tailed Worm-lizard habitat was categorised as either “Suitable Habitat (moderate and high quality habitat combined as a mapping unit) or “Low Quality Habitat (highly disturbed and degraded habitat that is likely to no longer support the species)”.</p> <p>A total of 162.8 ha of Pink-tailed Worm-lizard habitat was mapped comprising 152.1 ha of suitable habitat and 10.7 ha of low quality habitat. The vast majority of the habitat was found in the ACT and was ‘...confined to the far western sector of the investigation area where it is in good condition and occurs very extensively along the slopes of the Murrumbidgee River’. Only a small proportion of potential habitat was located on the flatter farmland/paddock areas.</p> <p>Overall, the Pink-tailed Worm-lizard habitat present within the Ginninderry project area constitutes a large and important component of the regional population, the majority of which will be protected within the West Belconnen Conservation Corridor.</p>

Reference	Summary of Study
<p>Rowell (2013). <i>West Belconnen Golden Sun Moth surveys, October to December 2012.</i></p>	<p>The aim of this study was to identify potential habitat for, or populations of, Golden Sun Moth <i>Synemon plana</i> in the Ginninderry project area. Potential Golden Sun Moth habitat was identified as flat or gently sloping primary or secondary grassland or open woodland, dominated by native grasses. All areas of potential habitat were surveyed 2 to 4 times during appropriate conditions when Golden Sun Moth were confirmed to be flying at other nearby sites.</p> <p>No high-quality habitat was identified in the Ginninderry project area. Most potential habitat was classified as very low to low (quality), with some scattered moderate habitat. Despite sufficient survey effort, no Golden Sun Moths were recorded.</p> <p>The author notes that in 2010 Golden Sun Moths were recorded in Area 6 (along the ACT and NSW border) of the Ginninderry Project Area. At the time of survey in 2012 that area was overgrown and no Golden Sun Moth were observed. Rowell concludes that it is possible that the Golden Sun Moth may still occur <i>along Ginninderra Creek in Block 1621 and the adjacent paddocks in NSW.</i></p>

Reference	Summary of Study
<p>Kevin Mills & Associates (2013). <i>West Belconnen Project. ACT and NSW Land. Targeted Bird Surveys</i>. Report prepared for The Riverview Group, September.</p>	<p>This study combines the results of surveys and assessments of the bird fauna in the Ginninderry project area from 2008 to 2013. It also addresses specific matters raised by the ACT Department of Environment and Sustainability, including consideration of Superb Parrot and birds of prey.</p> <p>At the time this report was prepared, the project area had been surveyed for birds on 31 occasions since 2008, resulting in a comprehensive species list for the area. In total, 75 native species and 9 exotic species were recorded. As shown in Figure 1 of the report, it is likely that most of the bird species which occur in the Ginninderry project area have been recorded.</p> <p>The Superb Parrot was observed five times in the ACT portion of the project area from late 2012 to late 2013. No evidence of breeding was found during bird surveys or tree hollow surveys. Targeted diurnal bird of prey surveys recorded 11 species, including the Peregrine Falcon <i>Falco peregrinus</i> and Spotted Harrier <i>Circus assimilis</i>. Only the Nankeen Kestrel <i>Falco cenchroides</i> was observed to nest in the project area.</p> <p>Overall, several bird species of conservation significance were recorded in the project area including Dusky Woodswallow <i>Artamus cyanopterus</i>, Flame Robin <i>Petroica phoenicea</i>, Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>, Peregrine Falcon, Scarlet Robin <i>Petroica boodang</i>, Speckled Warbler, Spotted Harrier, and White-winged Triller <i>Lalage tricolor</i>. All observations were associated with treed areas.</p> <p>A tree hollow survey of most trees occurring on the gentler topography in the project area was performed in October-November 2012. Thirteen species were observed utilising trees hollows, none of which are of conservation concern.</p>

Reference	Summary of Study
<p>Kevin Mills & Associates (2013). <i>West Belconnen Project. NSW Land. Flora and Fauna Studies</i>. Report prepared for The Riverview Group, September.</p>	<p>This report documents the findings of several surveys and assessments undertaken in the NSW portion of the Ginninderry Project Area, including Osborne and Wong (2013), Rowell (2013) and various Kevin Mills & Associates studies. As many of the studies have been summarised above, only the aspects which present additional information are described below.</p> <p>No Superb Parrots have been observed in the NSW portion of the project area, potentially due to the lack of substantial numbers of remnant trees in those areas. Other threatened species recorded in the NSW portion of the project area include Flame Robin, Scarlet Robin and Spotted Harrier. These species have mainly been observed in the gorges associated with the Murrumbidgee River.</p> <p>There is very little woodland vegetation remaining in the NSW portion of the project area and the area is largely treeless. Of the remaining trees, only 15 were found to contain potentially functional hollows.</p> <p>No threatened flora have been recorded in the flatter sections of the project area (i.e. the development area).</p> <p>The authors identify the following as matters of conservation importance in the NSW portion of the project area: the river and creek corridors and associated riparian vegetation; the woodland in the gorge and upper slopes (including threatened bird habitat); the rocky areas in the gorge and upper slopes (including threatened reptile habitat); three threatened bird species; and scattered hollow bearing trees.</p>

Reference	Summary of Study
<p>Kevin Mills & Associates (2014). <i>Ecological Studies. West Belconnen. Australian Capital Territory</i>. Prepared for the Riverview Group, June.</p>	<p>This report documents the findings of several surveys and assessments undertaken in the ACT portion of the Ginninderry project area, but also includes additional studies which build upon this previous work. As this review focusses on the NSW portion of the project area, only the aspects which are of relevance to NSW are discussed below.</p> <p>One of the important outcomes of this report is the designation of the West Belconnen Conservation Corridor, which aims to protect a number of ecological values including the river corridor and associated flora and fauna, woodland areas including Box-Gum Woodland and threatened bird species habitat, and Pink-tailed Worm-lizard habitat.</p> <p>The Little Eagle was observed to be nesting in pine trees on the southern edge of the Strathnairn property in 2012/13. Recommendations included a temporary buffer around the nest tree, investigations into feeding/breeding/foraging requirements, and aims to determine home range, foraging range and diet.</p>

Reference	Summary of Study
<p>Eco Logical Australia (2016). <i>Ginninderry Project, Rosenberg's Goanna habitat assessment</i>. Prepared for The Riverview Group.</p>	<p>As Rosenberg's Goanna <i>Varanus rosenbergi</i> had recently been recorded in the Ginninderra Creek catchment, the aim of this study was to document the extent and quality of potential Rosenberg's Goanna habitat in the Ginninderry project area as determined from historic records and field survey. In particular, the study aimed to determine if the area proposed for urban development contains habitat elements which may support a population of Rosenberg's Goanna.</p> <p>To achieve these aims the authors reviewed the available literature on the species' ecology, performed rapid assessment of habitat features in quadrates spread throughout the wooded areas along the Murrumbidgee River and Ginninderra Creek corridors and adjacent grassland areas, mapped potential habitat for the species, discussed the potential impacts of development, and provided habitat management and other recommendations.</p> <p>The authors reported that higher quality habitat was restricted to the northern portion of the study area, on the sloped and wooded areas bordering the Murrumbidgee River and Ginninderra Creek. Low quality habitat was recorded in the adjacent grassland areas. The authors concluded that the northern boundary of the proposed development area abuts high quality habitat. They therefore proposed substantial variations to the conservation corridor in the north of the study area to reduce the potential impacts of development. They also outlined a series of wide-ranging measures to manage habitat for the species and reduce the impact of urbanisation.</p>

Reference	Summary of Study
<p>Green, B., Guarino, F. and Higgisson, W. (2017). <i>Habitat evaluation of two proposed extension areas to the Ginninderry reserve to provide improved ecological outcomes for Varanus rosenbergi</i>. The Institute for Applied Ecology, University of Canberra.</p>	<p>This study assessed the suitability of expanding the conservation corridor to improve the conservation outcomes for Rosenberg's Goanna, as proposed by Eco Logical Australia (2016). The authors assessed the areas proposed to be included in the conservation corridor for the presence of habitat features deemed to be essential to the species, specifically termite mounds, refuge sites, and adequate foraging areas.</p> <p>A small number of termite mounds were recorded, but they were all found towards the edge of the conservation corridor and not in the proposed extensions. There was no evidence of Rosenberg's Goanna occupation of the proposed extensions.</p> <p>The report concluded that the identified extension areas should not be included in the conservation corridor as they do not contain critical habitat components essential for maintaining a viable Rosenberg's Goanna population. The areas lack active termite mounds, refuge habitat and vegetation cover, and only provide marginal foraging opportunities for the species.</p>