Maintenance Zone Establishment – Williams Narrogin Highway and Pinjarra Williams Road

EPBC 2016/7689
Preliminary Documentation

May 2020

TRIM Document No: D19#821942

Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Ryan Hepworth Environment Officer	Draft A	18/05/2020
Reviewer:	Paul West Senior Environment Officer	Rev 0	19/05/2020

1 SUMMARY

1.1 Project Description

The Wheatbelt region in Western Australia (WA) has the unwanted reputation for having the most dangerous roads in Australia. A person involved in a crash in the Wheatbelt is 5.5 times more likely not to survive compared to the rest of the state. Many of these crashes are a result of narrow roads that have large trees immediately adjacent to them.

Main Roads Western Australia (Main Roads) recognises the significant environmental values that are present within its road reserves, especially in the Wheatbelt region where broad scale clearing has occurred in the past.

The ongoing challenge for Main Roads is balancing road user safety, while trying to protect and conserve important environmental values.

Main Roads is proposing to undertake nominal clearing along two major roads in the Wheatbelt region to make them safer. These roads are:

- Pinjarra Williams Road in the Shire of Williams; and
- Williams Narrogin Highway in the Shire of Narrogin.

Given the speed and traffic volumes for these roads, the Austroads Standard recommends that all hazardous objects be removed within 8 m of the edge of the road to provide drivers with an opportunity to correct an errant vehicle. Establishing such a wide corridor in Wheatbelt areas is difficult to achieve given most rural roads occur in narrow road reserves.

For the Pinjarra Williams Road and Williams Narrogin Highway, a compromised position has been taken such that a 4 m recovery zone will be established, requiring on average less than 60 cm of clearing on either side of the road. The trees within this 4 m recovery zone have been considered on an individual and group basis to identify trees or stands of trees that provide high environmental values and these will be avoided.

Approximately 4.7 hectares (ha) of native vegetation will be cleared to accommodate a wider 33 km maintenance zone for Pinjarra Williams Road and approximately 2.8 ha will be cleared to accommodate a wider 31 km maintenance zone for the Williams Narrogin Highway.

Although the proposed clearing extends more than 60 km, less than three ha of good or better quality vegetation will be impacted.

Clearing to widen the maintenance zone will impact upon the habitat of:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*);
- Forest Red-tailed Black Cockatoo (FRTBC) (*Calyptorhynchus banksii naso)*; and
- Red-tailed Phascogale (*Phascogale calura*).

Main Roads is proposing to clear up to 7.36 ha of Black Cockatoo foraging habitat that consists largely of degraded condition vegetation. The proposed action will impact 670 trees with a suitable diameter at breast height (DBH) for Black Cockatoos. No trees with a suitable hollow for breeding will be affected by the clearing.

The project will also result in the clearing of up to 7.36 ha of Red-tailed Phascogale habitat, including 45 trees with small or medium hollows.

Given the very narrow corridor of largely degraded vegetation to be cleared, the avoidance and minimisation measures Main Roads has implemented and that no trees with suitable hollows for Black Cockatoos will be impacted, the project is not considered to have a significant impact on any Matters of National Environmental Significance (MNES).

2 INTRODUCTION

The Wheatbelt region in WA has the unwanted reputation for having the most dangerous roads in the Australia. The rate of fatalities in WA (6.9 per 100,000 of population) is significantly higher than all other Australian States. Of particular concern is the high rate of fatalities in agricultural areas of WA (37.7 per 100,000 of population), which is significantly higher than most undeveloped countries. A person involved in a crash in the Wheatbelt is five and half times more likely not to survive. Of the fatal crashes recorded, roadside vegetation contributes to 37.5 % of the deaths.

Main Roads is proposing to make two roads within the Wheatbelt region safer. To do this, Main Roads is planning to establish a wider maintenance zone for approximately 31.4 km of the Williams Narrogin Highway, in the Shire of Narrogin and for approximately 33.6 km of the Pinjarra Williams Road in the Shire of Williams.

The objective of the project is to establish a 4 m recovery zone from the edge of the road seal. This 4 m recovery zone will provide drivers with a greater opportunity to correct an errant vehicle that leaves the road. The widening of the maintenance zone for these two sections of road is expected to reduce the number of fatalities on these roads. It is worth noting that much of this area is already cleared for the road shoulder and road drainage, therefore the proposed clearing is restricted to any remaining hazardous trees and shrubs.

2.1 Purpose and Scope

Main Roads referred the project to the former Department of the Environment (now the Department of Water, Agriculture and the Environment) and it was determined to be a Controlled Action on 29 June 2016, requiring assessment by preliminary documentation (EPBC 2016/7698).

The initial proposal to widen the maintenance zone included three roads. In addition to Williams Narrogin Highway and Pinjarra Williams Road, the referral also included the widening of the maintenance zone for Toodyay Goomalling Road.

The Department considered the proposed action likely to have a significant impact on MNES, specifically:

- Carnaby's cockatoo (*Calyptorhynchus latirostris*);
- FRTBC (*Calyptorhynchus banksii naso)*; and
- Red-tailed Phascogale (*Phascogale calura*).

On 31 August 2016, the Department requested additional information to inform the assessment of the relevant impacts of the proposed action (Appendix A).

Main Roads has sought two variations to the project since the initial referral. The first variation removed Toodyay Goomalling Road from the project area. Following further investigations into the potential impacts of clearing along the three roads, Main Roads identified that while the Williams Narrogin Highway and Pinjarra Williams Road provides habitat for Red-tailed Phascogale, the Toodyay Goomalling Road lies outside the known distribution of the species. Accordingly, it was considered the project activities associated with the Toodyay Goomalling Road were unlikely to have a significant impact on Matters of National Environmental Significance.

It was also considered that the Toodyay Goomalling Road project area was geographically distinct from the southern project areas and should be considered as a separate project. Main Roads sought a variation to the existing referral to exclude the Toodyay Goomalling Road project area, which was accepted on 6 June 2018.

The project was again varied in 2020. The purpose of this variation was to modify the project boundary to more accurately reflect the road alignment, amend the number of suitable Diameter Breast Height (DBH) trees (Suitable DBH Trees) to more accurately capture the number of trees to

be removed and decrease the overall clearing area for the project. This variation was accepted by DAWE on 8 May 2020.

The information presented in this report is generally limited to the southern project area comprising Williams Narrogin Highway and Pinjarra Williams Road, and incorporates a revised impact assessment based on the additional investigations undertaken by Main Roads. The additional information sought on aspects of the Toodyay Goomalling Road has also been addressed for the purposes of completeness.

3 PROJECT DESCRIPTION

3.1 Project Location

The project areas are located on the following roads:

- Pinjarra Williams Road SLK 91.9 to 125.5, in the Shire of Williams; and
- Williams Narrogin Highway SLK 0 to 31.4, in the Shire of Narrogin.

The project areas are shown on Figures 1 to 3.

3.2 Project Summary

To improve road user safety, Main Roads is proposing to remove hazardous trees and shrubs that exist within 4 m from the road edge of seal to establish a wider recovery zone for errant vehicles.

A total of 7.48 ha of vegetation will be cleared for the project, comprising the following:

- Pinjarra Williams Road
  - 4.15 ha of remnant native vegetation; and
  - 0.51 ha of planted native and exotic trees.

- Williams Narrogin Highway
  - 2.50 ha of remnant native vegetation; and
  - 0.32 ha of planted trees and revegetation.

The proposed project area has been determined by avoiding the key values identified in the biological assessment wherever possible. Main Roads has endeavoured to:

- Minimise direct and indirect impacts to Threatened fauna species and the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (TEC) by reducing the original clearing width from 6 m to 4 m. Although the Austroads Standard is 8 m, meeting this standard is difficult to achieve in the Wheatbelt due to the narrow road reserve available;
- Minimise the clearing footprint as much as possible by restricting clearing to hazardous trees and vegetation only. Main Roads has reviewed the vegetation spatial data against aerial and ground level imagery and undertaken ground-truthing to ensure that the clearing footprint is as small as possible. All trees have been considered on an individual and group basis to identify trees or stands of trees that present less of a safety hazard inside the 4 m clearing zone and will retain these trees where possible;
- Avoid removing any large suitable hollows for Black Cockatoos;
- Minimise impacts to major rivers and other creeks or drainage lines that cross the project area by limiting clearing at these locations;
- Minimise impacts to Red-tailed Phascogale known and potential habitat. In the locations adjacent to where Red-tailed Phascogale have been recorded, minimal clearing will be undertaken; and
- Habitat logs and tree limbs with hollows will be salvaged and placed in the road reserve to increase habitat availability.

Appendix D illustrates some of the trees to be removed.

A key strategy to avoid impacts to native vegetation, fauna and habitat during the construction phase of the project will be to strictly adhere to clearing and disturbance boundaries. The clearing area will marked and then checked by a member of the Main Roads' environment team before clearing commences.

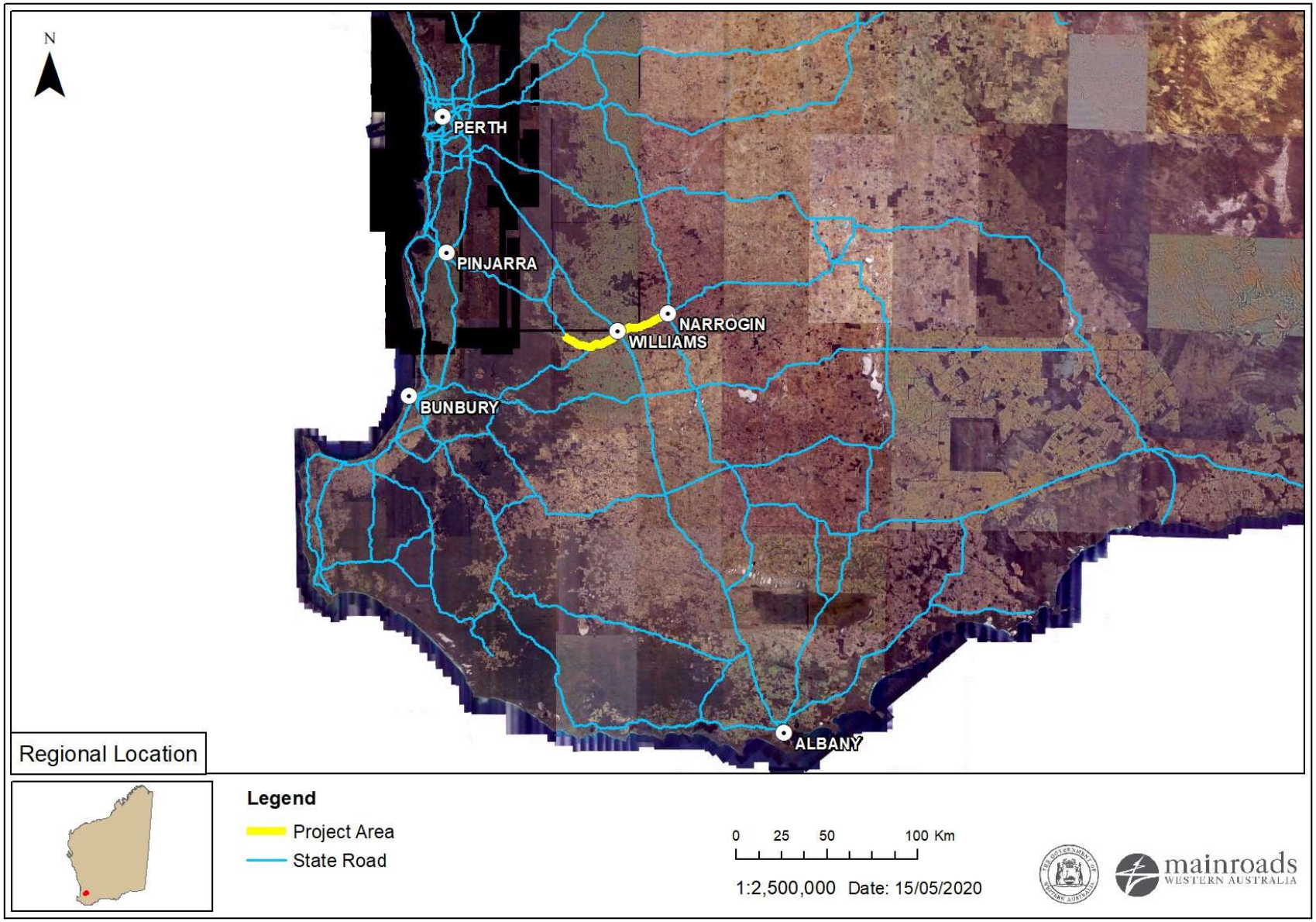


Figure 1 – Project Area regional location

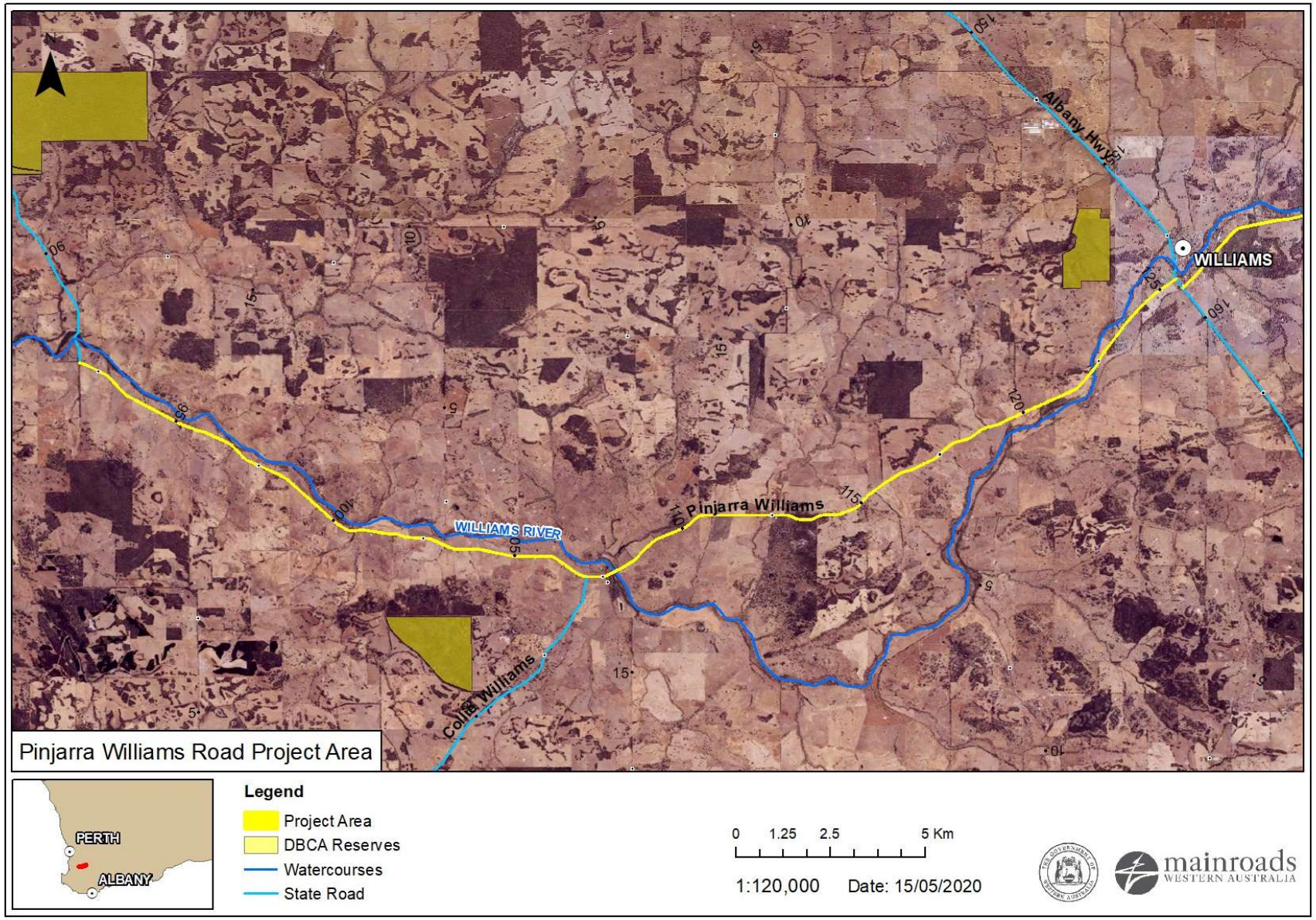


Figure 2 – Pinjarra Williams Road Project Area

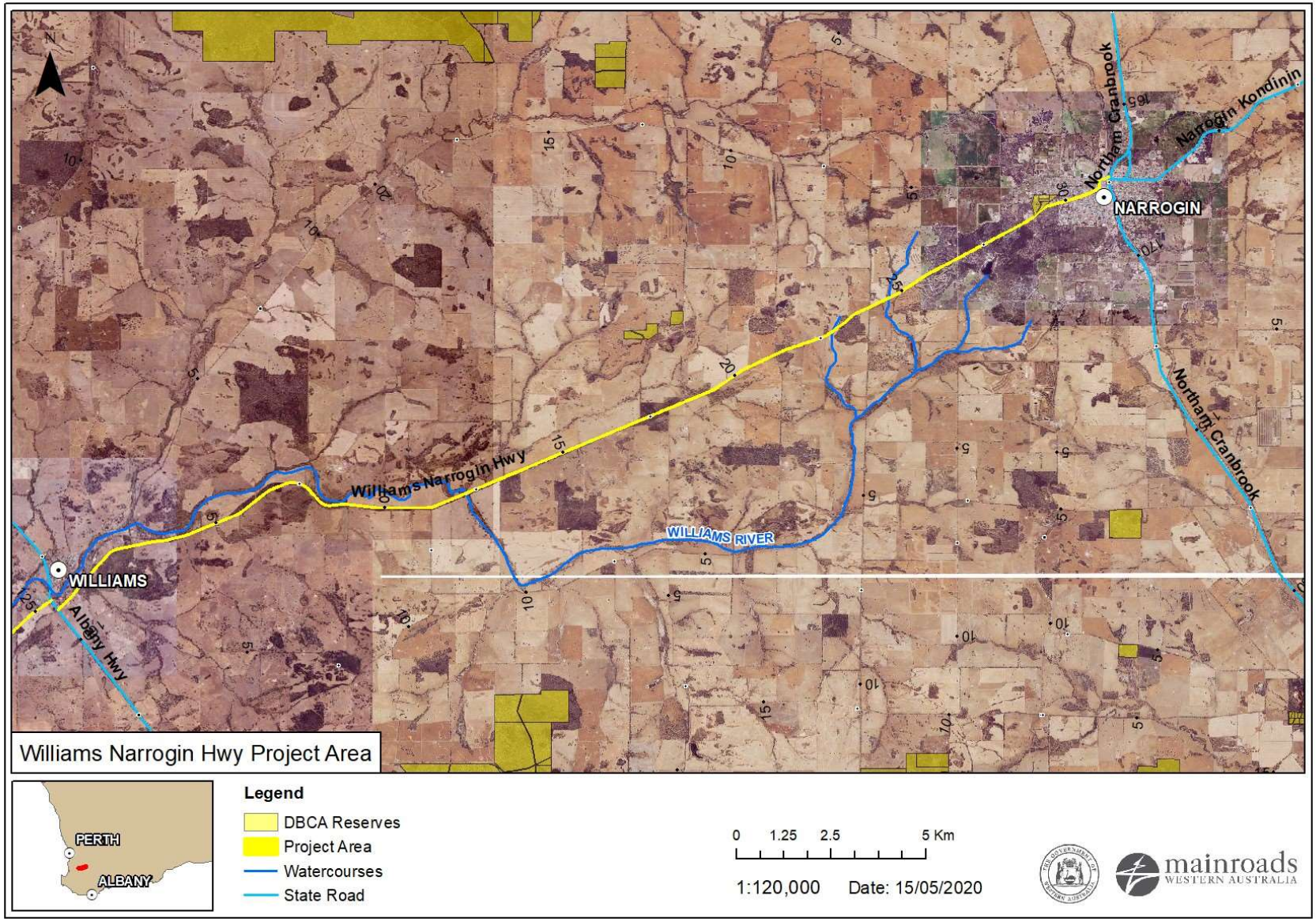


Figure 3 - Williams Narrogin Highway Project Area

4 SUMMARY OF PRELIMINARY DOCUMENTATION

A summary of the information requested as part of the Preliminary Document and the corresponding section in this report is provided in Table 1.

Table 1 – Information requested for preliminary documentation

Information Requested	Section
Listed Threatened Species and Ecological Communities	
1. For the hook-point poison (*Gastrolobium hamulosum*) a) The referral notes that this species is small and similar in appearance to other non-listed species and therefore may have been overlooked. Please undertake a targeted survey for the hook-point poison in the Toodyay-Goomalling survey area and provide information detailing the time/timing, location, conditions, method and results. The survey should be designed in the consultation with a relevant expert on the species as approved by the Department. b) If the species is located please provide specific information on the direct/indirect impacts to the populations as a result of the proposed action, including but not limited to: • Habitat loss; • Weed invasion; and • Dieback caused by *Phytophthora cinnamomi.* c) Please describe any proposed avoidance or mitigation measures and the effectiveness of these measures on limiting impacts to the hook-point poison.	5.1
2. For the Red-tailed Phascogale (*Phascogale calura*) a) The referral notes that camera traps were deployed at all three locations but the Red-tailed Phascogale was only recorded in the Pinjarra-Williams Roads survey area, although potential habitat was recorded within the other survey areas. In the Department's view the survey was not done in accordance with the methodology outlined in the Department's Survey guidelines for Australia's threatened mammals (the guidelines, http://www.environment.gov.au/resource/survey-guidelines-australias-threatened-mammals-guidelines-detecting-mammals-listed). For example the recommended number of camera traps per hectare does not appear to have been used. b) If surveys were not undertaken using the methods and effort recommended in the guidelines please re-survey all three areas in accordance with the methods detailed in the guidelines for the Red-tailed Phascogale and provide information detailing the survey methodology and results of these surveys. c) In the absence of additional surveys conducted in accordance with the guidelines, you must assume that all three areas provide critical habitat for an important breeding population of Red-tailed Phascogale. d) Based on the above surveys or assumption that all three areas provide critical habitat for an important breeding population of Red-tailed Phascogale, provide information about the available breeding habitat in the surrounding areas and describe what proportion of available breeding habitat will be cleared as a result of the proposed action.	5.2.2 5.2.3.1

e) Provide a discussion and assessment of the direct/indirect impacts to the Red-tailed Phascogale as a result of the proposed action, including but not limited to: • Loss of habitat; • Loss of tree hollows; and • Habitat fragmentation, including loss of roadside vegetation corridors. f) Provide a description of any proposed avoidance or mitigation measures and the effectiveness of these measures on limiting impacts to the Red-tailed Phascogale.	5.2.3 5.2.4
Environmental offsets	
3. In the event that impacts cannot be avoided or mitigated: a) provide further details on any offset/s to compensate for any residual impacts on EPBC Act listed species, including: • The type of offset/s proposed; • Extent to which the proposed offset actions correlate to, and adequately compensate for, EPBC Act listed species; • Suitability of the location of any proposed offset site for EPBC Act listed species; • Conservation gain to be achieved by the offset i.e. positive management strategies that improve the site or averting the future loss, degradation or damage of the protected matter; • Time it will take to achieve the proposed conservation gain; • Level of certainty that the proposed offset will be successful; and • Current land tenure of any proposed offset and the method of securing and managing the offset for the life of the impact. b) Demonstrate how any proposed offsets are consistent with the *Environmental Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (October 2012).	7
Threat Abatement Plans and Recovery Plans	
4. Demonstrate that the action is not inconsistent with any relevant recovery plan or threat abatement plan, including but not limited to: • Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan, Western Australia Department of Parks and Wildlife, 2013; • Threat abatement plan for predation by feral cats, Department of Environment, 2015; and • Threat abatement plan for predation by the European Red Fox, Department of the Environment, Water, Heritage and the Arts, 2008.	8
Economic and Social Matters	
5. Please provide further detail on the social and economic cost and/or benefits of undertaking the proposed action, including: • Basis for any estimations of costs and/or benefits; • Potential employment opportunities expected to be generated at each phase of the proposed action; • Benefits to the local and wider community as a result of the proposed action; and • Details of any public and stakeholder consultation activities, including the outcomes.	9

5 LISTED THREATENED SPECIES AND ECOLOGICAL COMMUNITIES

5.1 Hook Point Poison

Hook Point Poison *(Gastrolobium hamulosum)* is listed as Endangered under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Critically Endangered under the Western Australian *Biodiversity Conservation Act 2016* (BC Act). The species is a low shrub that is associated with sandy, often gravelly soils or clay (WA Herbarium, 1998 -).

GHD (2016a) did not record any individuals of this species but noted suitable habitat was present within the Toodyay Goomalling study area, and the plant is small and similar to a more common species. For these reasons, the species may have been overlooked during the field survey.

GHD (2016a) developed a survey methodology for *G. hamulosum*, which was endorsed by a relevant expert at Department of Parks and Wildlife (now Department of Biodiversity, Conservation and Attractions (DBCA)). The Toodyay Goomalling survey area was resurveyed in September 2016, and no *G. hamulosum* was recorded. A detailed description of the methodology for the survey is included in Appendix B. DBCA endorsement of the survey methodology is included in Appendix C.

As discussed previously, the Toodyay Goomalling Road project area has been removed from this action.

5.2 Red-tailed Phascogale

5.2.1 Description and Habitat Requirements

Red-tailed Phascogale is listed as Vulnerable under the EPBC Act and Specially Protected Fauna under the BC Act. The species is a small, arboreal marsupial found in the Wheatbelt region of WA. Once widespread, the distribution of this species has significantly contracted following extensive clearing for agriculture and subsequent predation from feral animals.

Current populations are restricted to remnant patches of native vegetation in the southern Wheatbelt region from Brookton to Katanning and from about Williams to Dumbleyung. Some outlying records have also been recorded to the west, east and south of this range. Regional studies into the habitat requirements of Red-tailed Phascogale have found that areas of remnant vegetation occupied by the species range from very small (<20 ha) to very large (>200 ha) (Short *et al*, 2011).

Red-tailed Phascogale is associated with Wandoo and dense *Allocasuarina huegeliana* (upland habitat) or *Casuarina obesa* (lowland/riverine habitat) woodland associations (DoEE, 2019; Short *et al*, 2011). The species is reliant on hollows for breeding or temporary shelter, and trees need to be of sufficient age to supply hollows for nesting in limbs or logs. The species can also be found in grasstrees with ample skirts to provide cover (GHD, 2016a). Preference appears to be given to vegetation that is long unburnt (>20yrs) that provides a continuous canopy to support the species' arboreal habits (GHD, 2016a). Although an arboreal species, studies into the diet of Red-tailed Phascogale suggest that they forage extensively at ground level (Kitchener, 1981).

Given the fragmented nature of native vegetation in the Wheatbelt, vegetation corridors linking remnant vegetation patches are beneficial to the ongoing persistence of this species. Linkages across the landscape allow for effective dispersal and colonisation of remnant patches, and to maintain viable populations (Short *et al,* 2011).

5.2.2 Habitat Assessment

5.2.2.1 GHD (2016a) – Biological Survey

GHD (2016a) conducted a biological survey for the project, which included a fauna habitat assessment and targeted survey for Red-tailed Phascogale using infrared camera traps. Thirteen cameras were deployed within or just outside of the survey area in suitable habitat for Red-tailed Phascogale in all three road alignments. Cameras were deployed for 21- 24 days between November and December 2015. The cameras were strapped in trees and shrubs off the ground, mostly pointing onto horizontal branches.

One population of Red-tailed Phascogale was recorded in the camera traps on Pinjarra Williams Road at SLK 113.21. This population was recorded in a small section of Wandoo/Sheoak woodland within the Pinjarra Williams Road survey area. The vegetation identified at this location was commensurate with the known preferences of the species, including Wandoo with hollows and thick Allocasuarina woodland.

5.2.2.2 Bamford (2017) – Red-tailed Phascogale Assessment

In early 2017, fauna specialists at Bamford Consulting Ecologists conducted additional surveys for Red-tailed Phascogale. This work was undertaken in accordance with DSEWPaC (2011) and developed to address the additional information requested in 2016 by DoEE (Appendix A). This survey was based on a more refined project footprint. Twenty-nine cameras were deployed within the study areas, for a period of 18-21 nights, resulting in a total of 465 trap nights. Cameras were placed in remnant and revegetated bushland areas adjacent to the three road alignments. Cameras were generally placed within a metre of ground level and deployed with a bait tube positioned within view to attract fauna and provide a scale to aid fauna identification.

Given the project area is not within its distribution range, not surprisingly, Red-tailed Phascogale was not recorded in the Toodyay-Goomalling survey area. The survey concluded that Red-tailed Phascogale are unlikely to be present further north than Beverley, the northern most point of the species' distribution. As previously discussed, the Toodyay Goomalling Road project area has been removed from this action.

Red-tailed Phascogale were recorded from five locations within the Williams Narrogin Highway study area and one location in the Pinjarra Williams Road study area. A total of 40 phascogale events were recorded across the two project areas. The highest level of activity was recorded at camera sites MC045 and MC046, which were located in a Wandoo/Allocasuarina woodland remnant approximately 6.5 km east of Williams at SLK 6.25.

Camera trapping locations and recorded populations are shown in Figures 4 and 5.

The findings of the targeted survey are consistent with the known habitat preferences of the species. Each population was recorded in a remnant patch of native vegetation predominantly comprising Wandoo/Allocasuarina woodland. Bamford (2017) found a higher level of activity towards Williams Narrogin Highway.

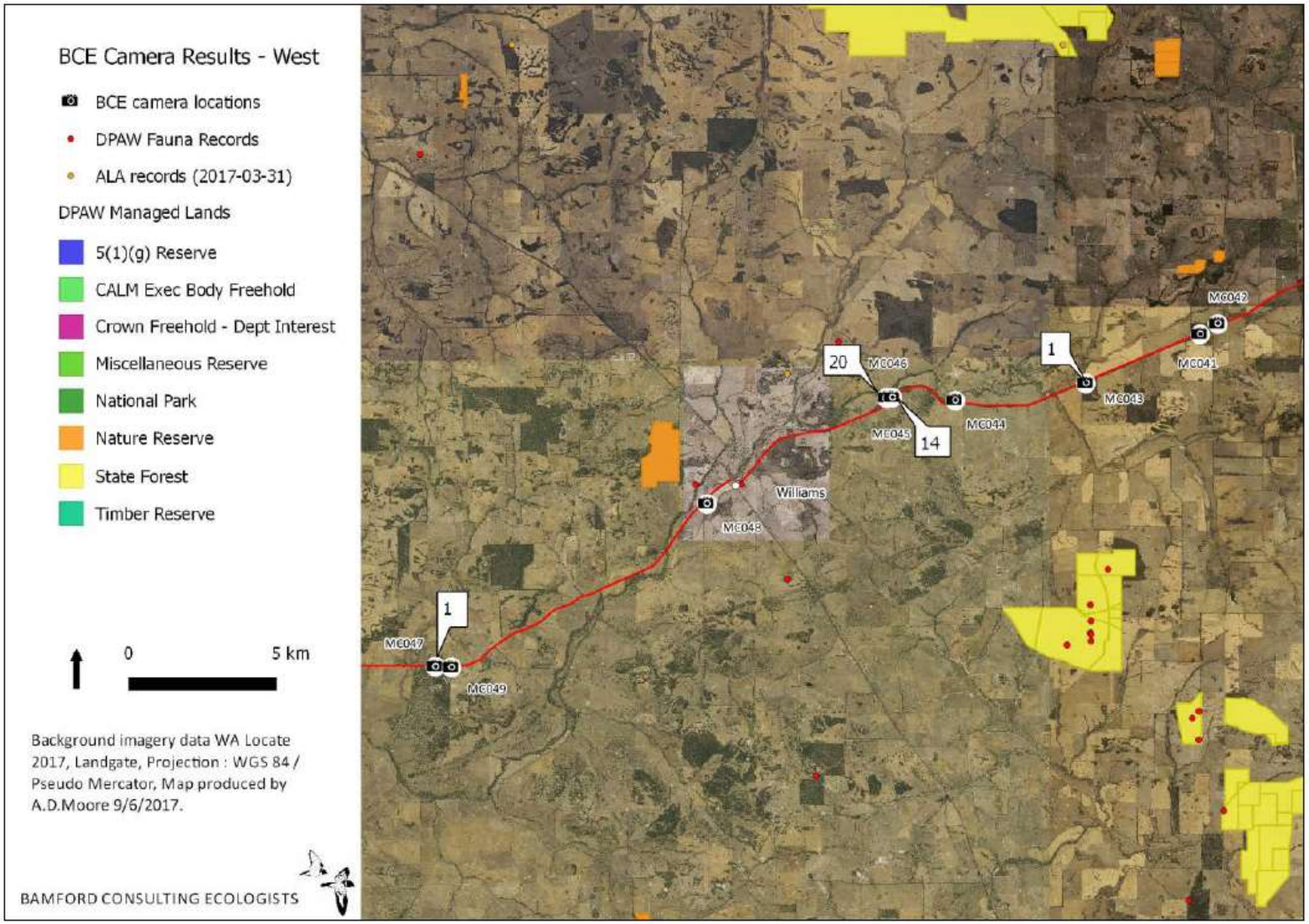


Figure 4 – Red-tailed Phascogale Results – Project area west (number of phascogale events shown in text boxes)

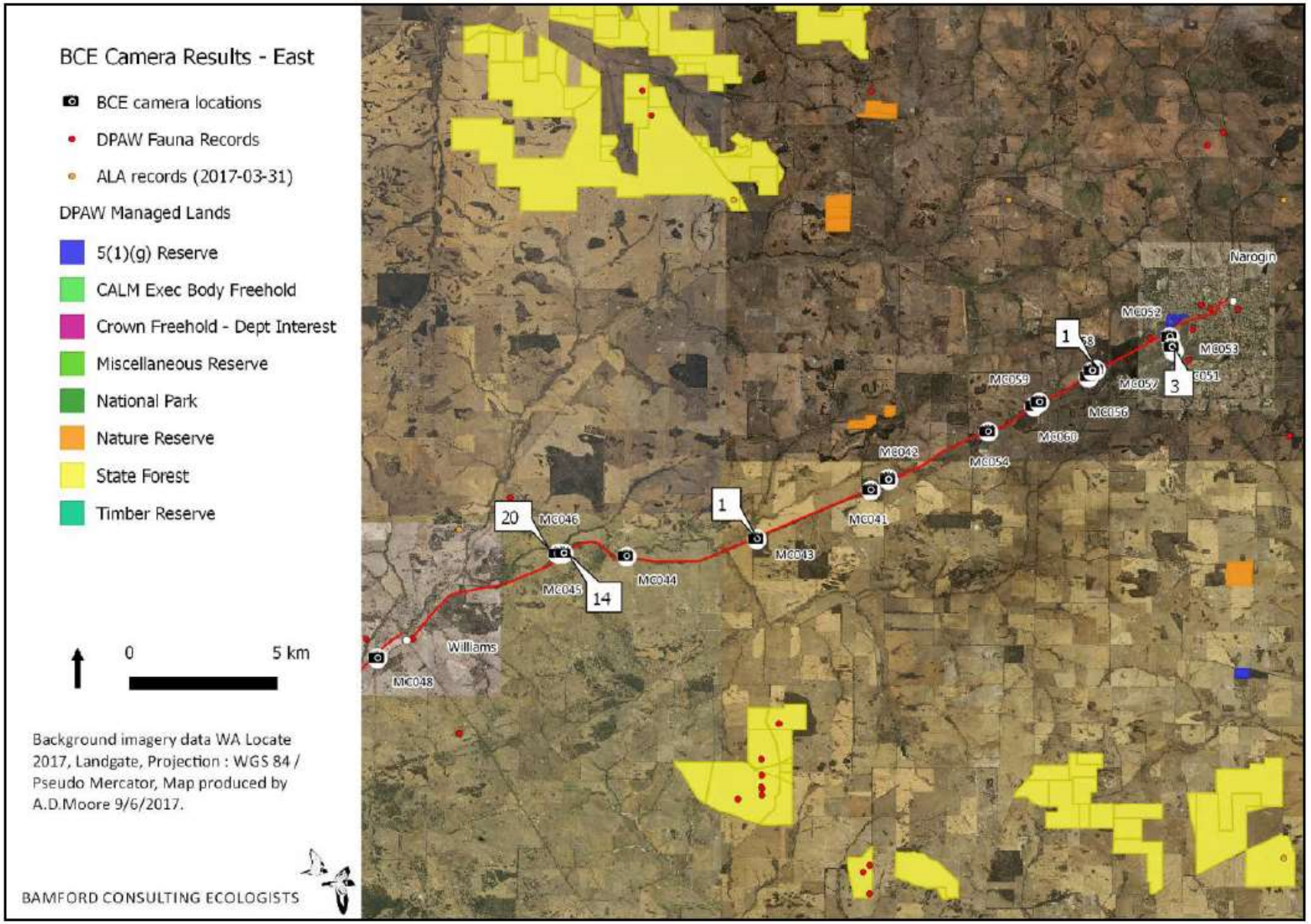


Figure 5 – Red-tailed Phascogale Results – Project area east (number of phascogale events shown in text boxes)

5.2.3 Assessment of Potential Direct/Indirect Impacts to Red-tailed Phascogale

5.2.3.1 Loss of habitat

Based on the findings from Bamford (2017), Red-tailed Phascogale occupy four remnant patches of native vegetation adjacent to the two project areas, which vary in size between 35 and 760 ha.

The estimated area of clearing adjacent to each remnant patch containing a known population of Red-tailed Phascogale is summarised in Table 2.

Table 2 – Clearing near recorded phascogale locations

Project Area	Camera Number	No. of Red-tailed Phascogale	Approximate Reserve/Remnant size [1]	Approximate area to be directly impacted	Percentage of remnant size
Williams – Narrogin Highway	MC043	1	41 ha	0 ha	0 %
	MC045	20	35 ha	0 ha	0 %
	MC046	14			
	MC051	3	760 ha	0.29 ha	0.03 %
	MC057	1			
Pinjarra – Williams Road	MC047[2]	1	450 ha	0.35 ha	0.08 %

The scope of the project is to remove hazardous trees and vegetation that occurs within 4 m from the edge of the road seal, noting the majority of this area is already cleared. This represents the removal of a very thin, linear strip of native vegetation, which in most cases comprises isolated trees or the first line of trees adjacent to the road, as demonstrated in Appendix D. The proposed clearing will result in approximately 0.64 ha of vegetation being removed from sections of road reserve that abut patches of native vegetation occupied by phascogales. This is considered to be a negligible impact to their habitat. Table 2 demonstrates that only marginal clearing will be undertaken near two populations of Red-tailed Phascogale, and no clearing will be undertaken near the largest population recorded at MC045 and MC046. Figures 6-11 illustrates the minimal clearing that will occur to Red-tailed Phascogale habitat.

[1] These measurements are very approximate and generally include areas of woodland/shrubland vegetation bordered by major roads, housing, open paddocks. Most remnants were linked to other areas via vegetation corridors and in some cases formed part of a larger bushland area dissected by major roads

[2] This was the same location where GHD (2016a) had recorded Red-tailed Phascogales previously.

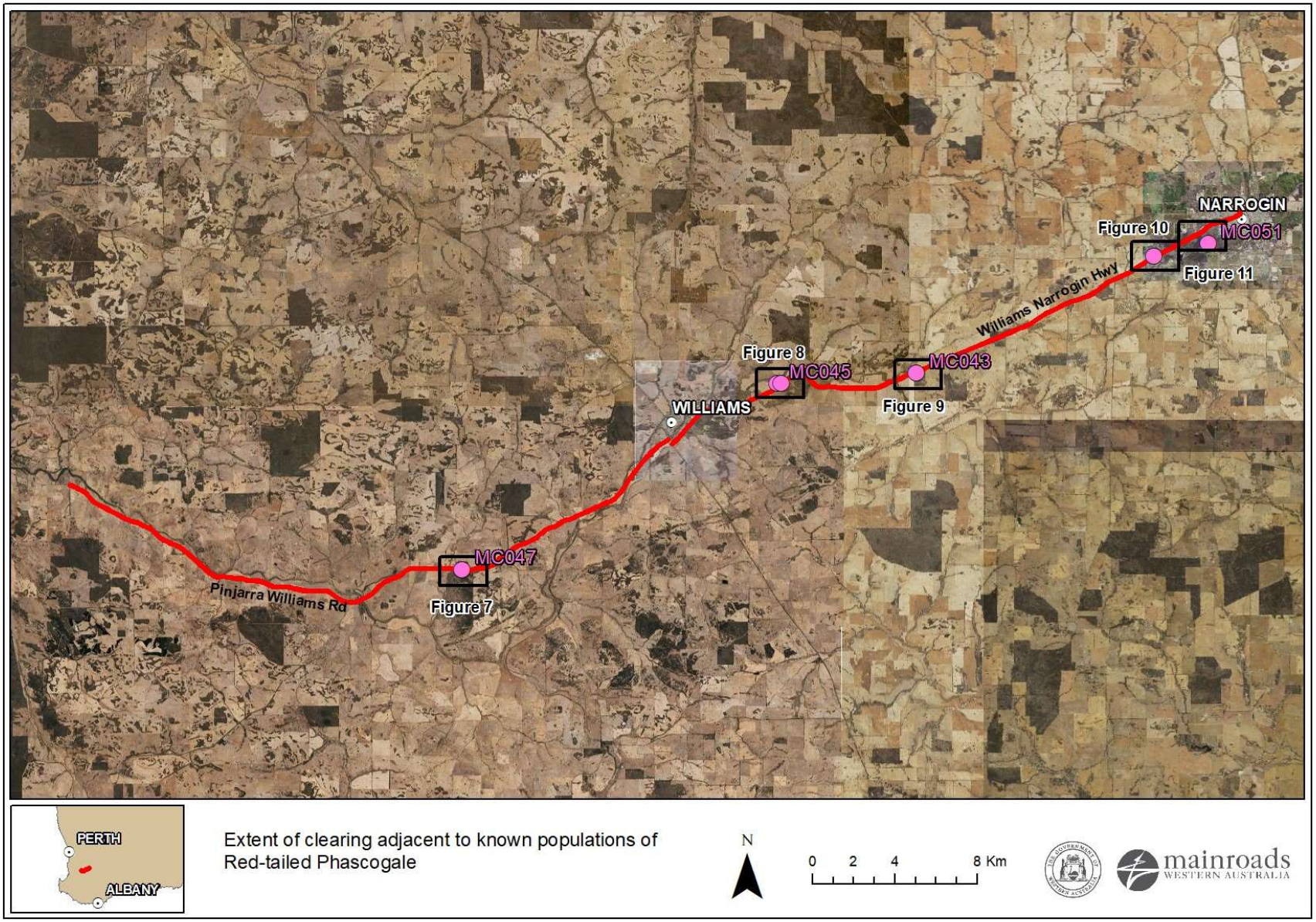


Figure 6 – Extent of clearing adjacent to Red-tailed Phascogale populations – Figure Index

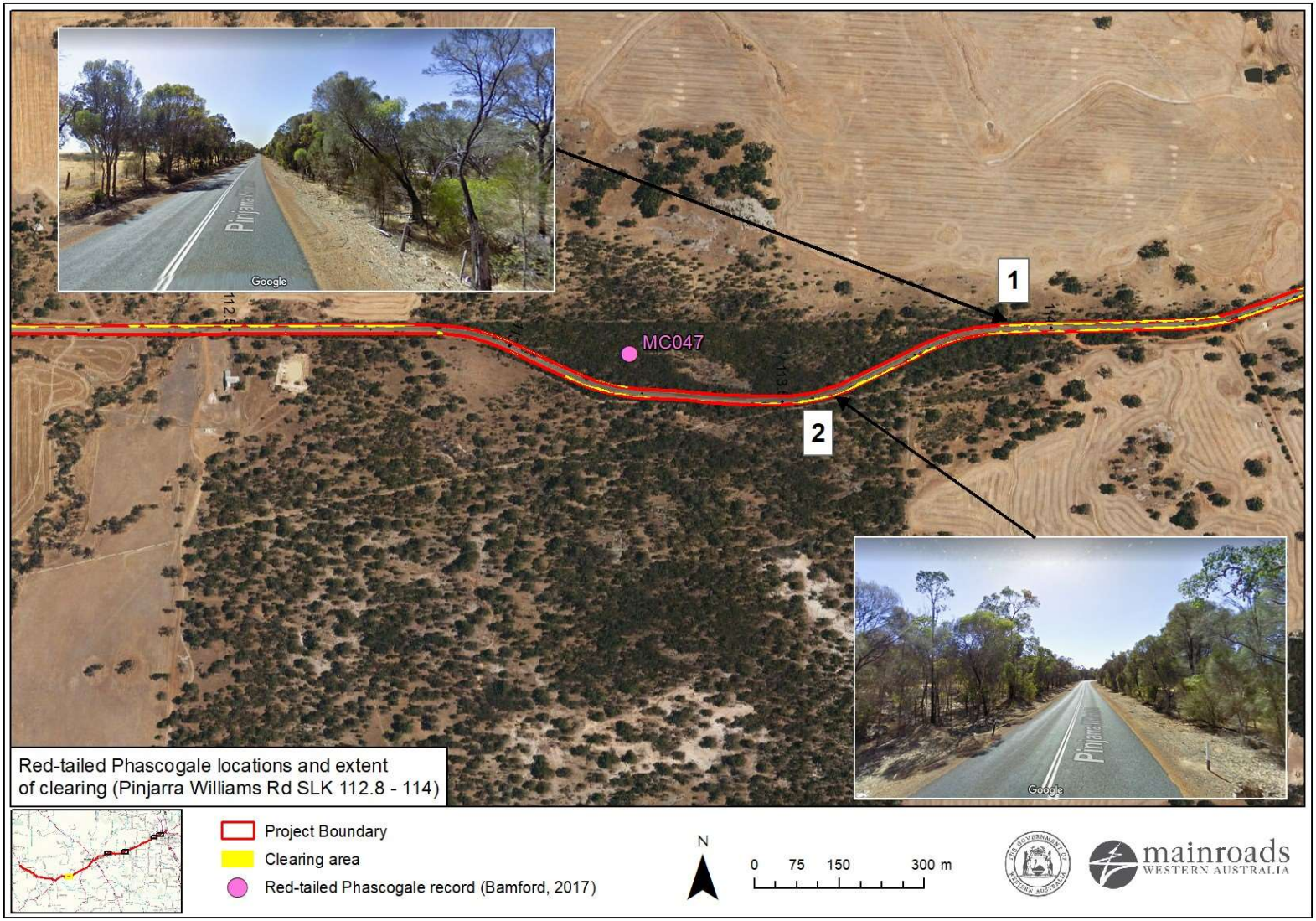


Figure 7 – Extent of clearing near Bamford (2017) Red-tailed Phascogale record MC047 – Pinjarra Williams Road SLK 112.8-114

Photo 1 – Street view looking east, vegetation control required on left hand and right hand sides

Photo 2 – Street view looking east, vegetation control required along right hand side only

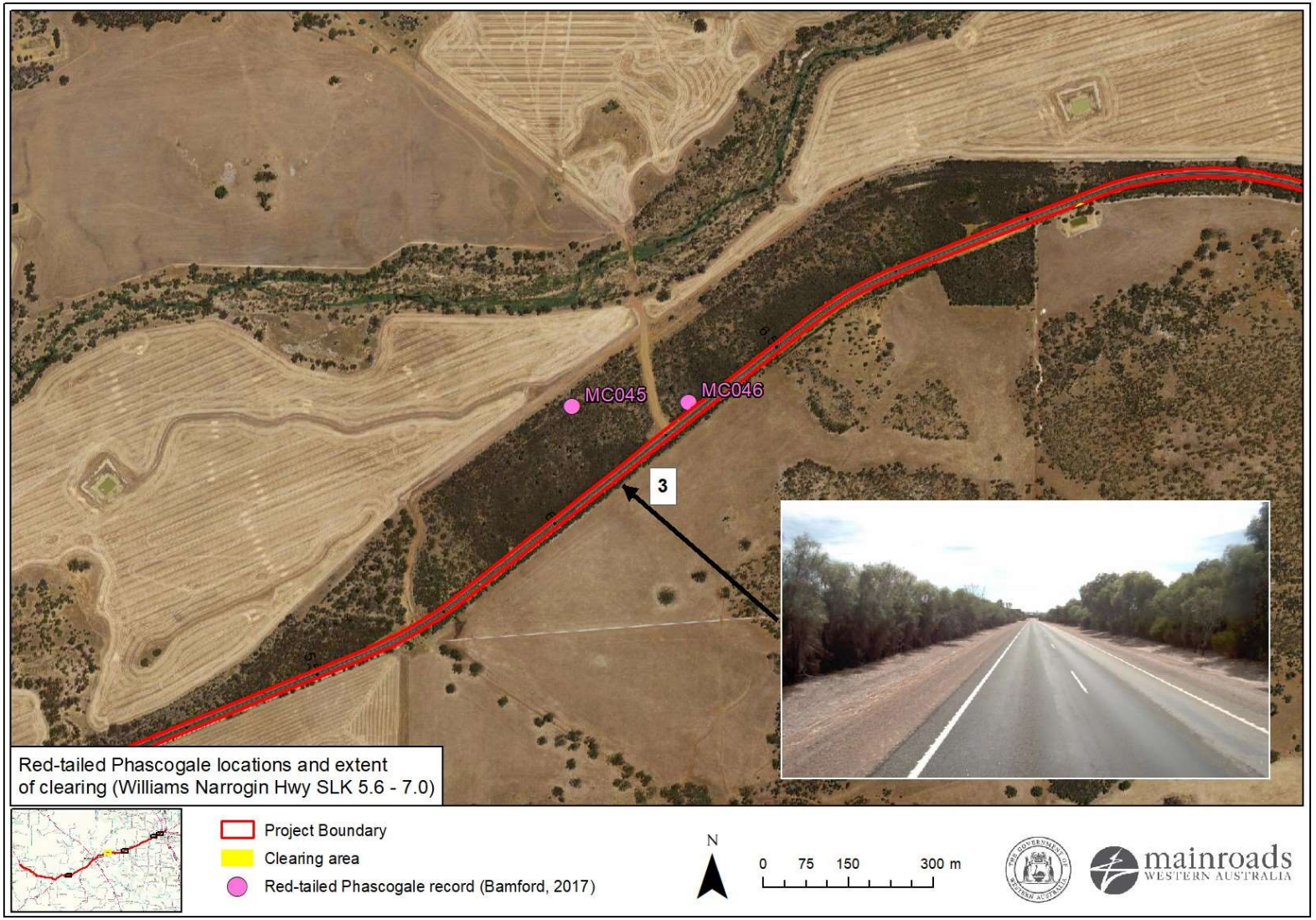


Figure 8 – Extent of clearing near Bamford (2017) Red-tailed Phascogale records MC045 and MC046 – Williams Narrogin Hwy SLK 5.6 – 7.0

Photo 3 – Street view looking east, no vegetation control required (note road shoulder continues well beyond white edge line, creating a significantly safer road compared to road shoulders in Figures 7, 9, 10 and 11)

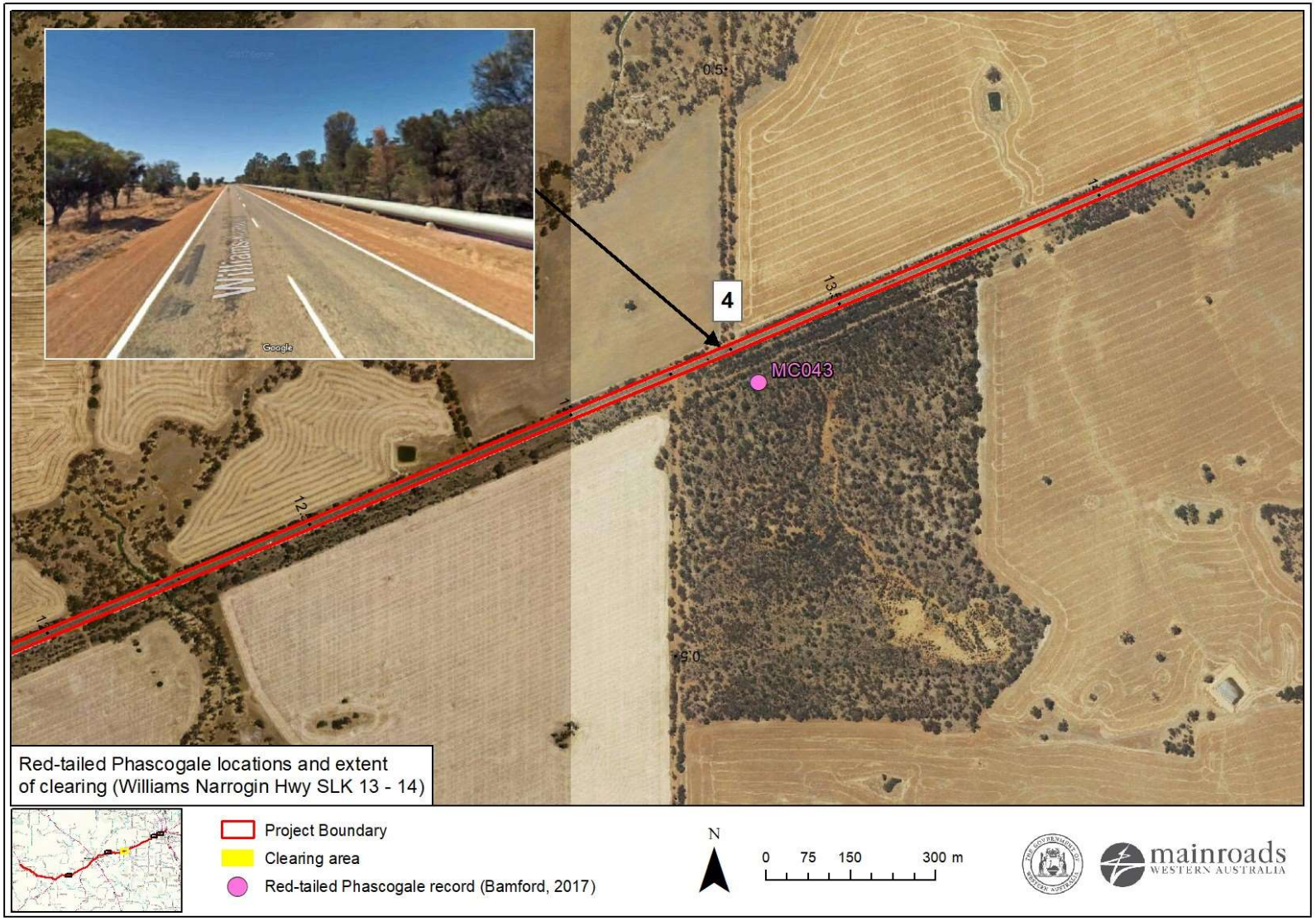


Figure 9 – Extent of clearing near Bamford (2017)
Red-tailed Phascogale records MC043 – Williams Narrogin Hwy SLK 13 – 14

Photo 4 – Street view looking east, no vegetation control required

Figure 10 – Extent of clearing near Bamford (2017) Red-tailed Phascogale record MC057 – Williams Narrogin Hwy SLK 25 – 28

Photo 5 – Street view looking east, minor vegetation control required on left hand side

Figure 11 – Extent of clearing near Bamford (2017) Red-tailed Phascogale record MC051 – Williams Narrogin Hwy SLK 27.5 - 30

Photo 6 – Street view looking east, minor vegetation control required on left hand side

While Red-tailed Phascogale shows a preference for Wandoo/*Allocasuarina* woodlands, Main Roads has considered the full extent of vegetation in the project area to assess potential impacts to Red-tailed Phascogale habitat. This is to account for the natural variation and interspersing of vegetation types across two long linear project areas.

A detailed review of vegetation mapping (GHD, 2016a), aerial imagery, ground level imagery and ground-truthing has determined that the clearing area coincides with approximately 7.36 ha of vegetation that is considered suitable for Red-tailed Phascogale. Sixty three percent of the vegetation within the project area recorded a vegetation condition of Degraded or worse.

The proposed removal of hazardous trees immediately adjacent to the carriageway will involve the clearing of less than eight hectares of clearing along 65 km of road reserve, which equates to an average of less than 60 cm of clearing on either side of the road. This clearing will not significantly reduce the extent of vegetation present within the road reserve.

At a broader scale, it is estimated from state-wide vegetation mapping that approximately 19,150 ha of native vegetation occurs within 5 km of the two project areas (GIS Database). Much of this vegetation occurs in large remnant patches that provide alternative corridor habitat for Red-tailed Phascogale, such as the following parcels of land (Figures 12 and 13):

- Lavender Nature Reserve (281 ha) – Approximately 2 km south of Pinjarra Williams Rd;
- Crown reserves R 18059 and R 33136 (37 ha) – Directly adjacent to Pinjarra Williams Rd along the Williams River;
- Crown reserve R 24791 (186 ha) – Approximately 1.3 km from Pinjarra Williams Rd;
- Crown reserves R 1791, R 14767 and 36575 (50 ha) – Directly adjacent to Pinjarra Williams Rd along the Williams River;
- Williams Nature Reserve (205 ha) – Approximately 2 km north-west of Pinjarra Williams Rd;
- Various Crown reserves (155 ha) – Directly adjacent to Williams Narrogin Hwy and the town of Williams;
- Crown reserves R 23684 and R 23685 (33 ha) – Directly adjacent to Williams Narrogin Hwy;
- Crown reserves R 18833 and R 24972 (63 ha) – Directly adjacent to Williams Narrogin Hwy; and
- Various Crown reserves (760 ha) – Directly adjacent to Williams Narrogin Hwy and the town of Narrogin.

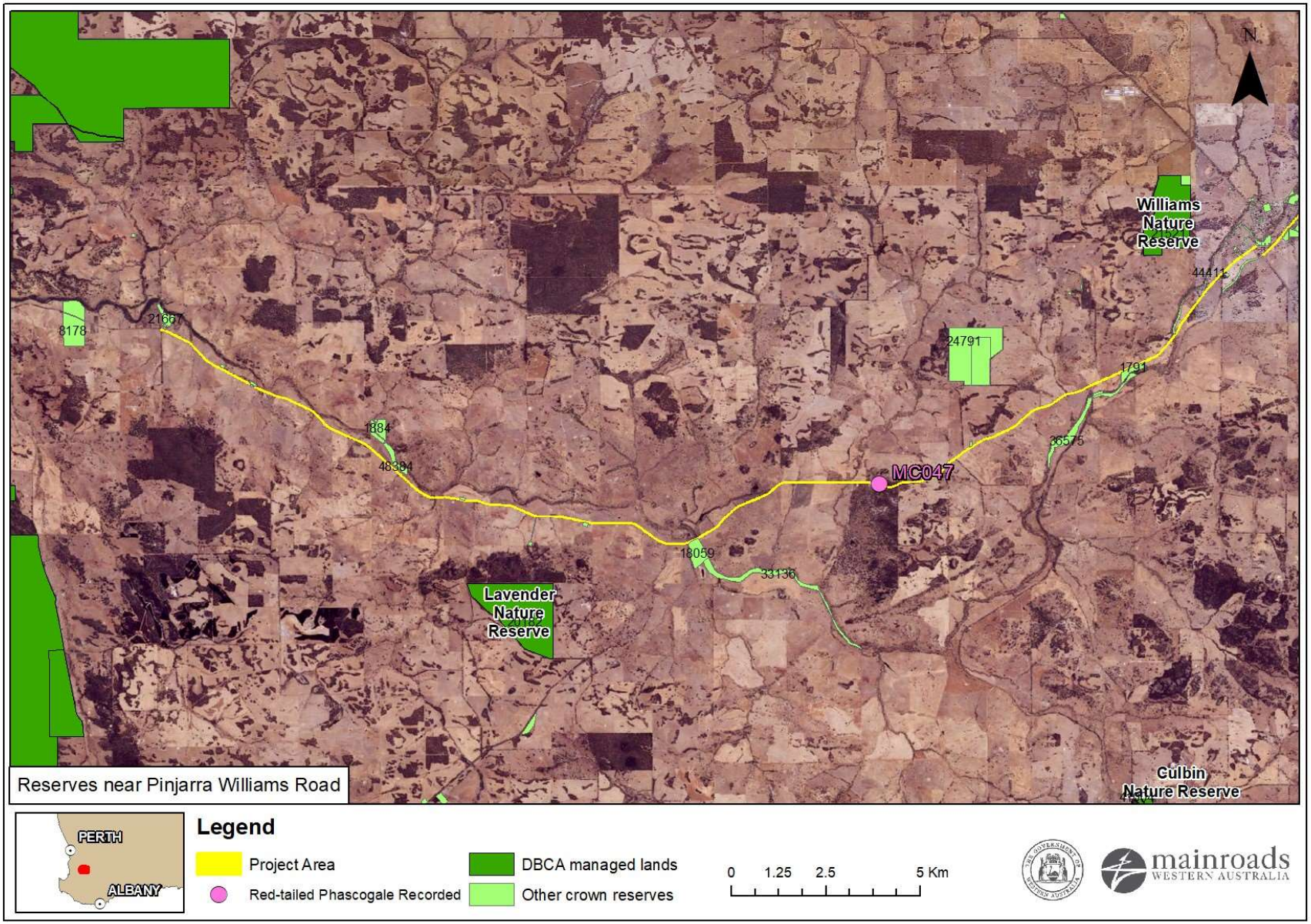


Figure 12 – DBCA-managed and other Crown Reserves near Pinjarra Williams Road

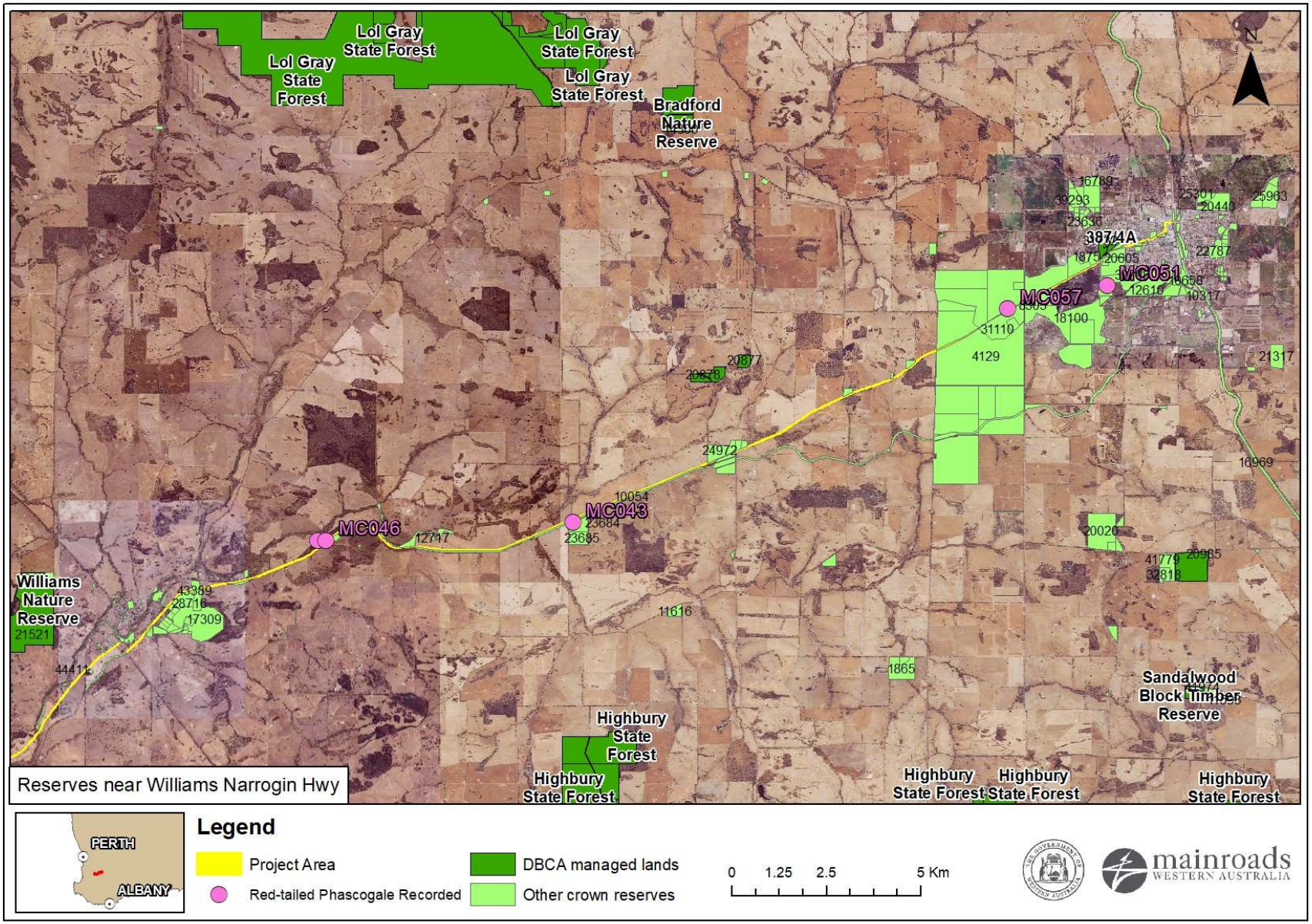


Figure 13 – DBCA-managed and other Crown Reserves near Williams Narrogin Hwy

While the proposed clearing of hazardous trees will result in a slight reduction in the extent of suitable habitat for Red-tailed Phascogale along Pinjarra Williams Road and Williams Narrogin Highway, impacts are not likely to be significant considering the extent of native vegetation that will remain in the local area, and the very narrow, linear nature of the clearing proposed.

5.2.3.2 Loss of Tree Hollows

A specific assessment of the number of suitable phascogale hollows present within the project area has not been undertaken. Bamford (2017) noted limited research has been conducted on the nest hollow requirements of Red-tailed Phascogale. The hollow requirements of the closely related Brush-tailed Phascogale could be used as a surrogate, however given the smaller size of Red-tailed Phascogale; smaller hollow dimensions may be acceptable.

Whitford (2002) suggests using DBH as a proxy for aging trees that are likely to provide hollows. Although Whitford (2002) was focussed on Jarrah and Marri forest, the same principle may apply to the Wandoo, York Gum and Flooded Gum dominated Eucalypt woodlands that occur within the project area.

GHD (2016a) conducted a Black Cockatoo habitat assessment for both road reserves, which can provide analogous information on the potential abundance of hollows available to Red-tailed Phascogale. The assessment quantified the number of suitable Black Cockatoo habitat trees (defined as ≥ 500 mm DBH for Flooded Gum, Marri, Jarrah and White Gum, and ≥ 300 mm DBH for *Eucalyptus astringens*, Wandoo and York Gum) within six metres of the road edge, including an examination for large, medium and small hollows. The findings of this survey are summarised in Table 3:

Table 3: Summary of Red-tailed Phascogale tree assessment for impacted and avoided trees located within 6 m of the road edge (GHD, 2016a – based on Black Cockatoo breeding habitat assessment).

Trees within 6 m of road edge that will be avoided			
	Pinjarra Williams Rd	Williams Narrogin Hwy	Total
Suitable DBH Trees	323	411	734
No. trees with hollows*	15	42	57
Small hollows	22	29	51
Medium hollows	0	25	25
Large hollows	16	20	36
Trees within 6 m of road edge that will be impacted			
	Pinjarra Williams Rd	Williams Narrogin Hwy	Total
Suitable DBH Trees	261	409	670
No. trees with hollows*	13	32	45
Small hollows	13	29	42
Medium hollows	8	23	31
Large hollows	0	0	0

*Some trees contain multiple hollows

The total number of large trees recorded in the two study areas is 1,404, of which 102 have hollows of varying sizes, with some trees containing multiple hollows. The proposed clearing for the project will result in the removal of 670 Suitable DBH Trees. A total of 45 trees containing 42 small and 31 medium hollows will be removed. All trees with large hollows will be avoided. This equates to the removal of less than half of the large trees in the study area, or one Suitable DBH

Tree every 100 metres. Although the assessment is not specific to Red-tail Phascogale, it demonstrates that a high number of large trees and hollows will be retained following clearing.

Main Roads has reviewed the trees to be removed to ascertain whether they provide significant habitat value. It was found that the majority of trees to be removed are not considered isolated, as there are numerous other trees, including trees with hollows, that will be retained in the road reserve that can provide the same habitat function.

5.2.3.3 Habitat Fragmentation

Bamford (2017) highlighted the importance of vegetation corridors that allow easy movement of Red-tailed Phascogale through the landscape. Short *et al* (2011) found that a lack of vegetation corridors negatively impacted the ability of Red-tailed Phascogale to colonise and/or maintain viable populations.

The level of impact to vegetation corridors because of the proposed clearing varies depending on the proximity to existing populations of Red-tailed Phascogale, presence of isolated trees that may act as stepping-stones for traversal, potential nest hollows, and area of vegetation that will remain following clearing.

Main Roads has undertaken an analysis of corridors that connect patches of remnant vegetation to determine whether the project will significantly increase habitat fragmentation. Particular focus has been given to sections of road reserve that connect known populations of Red-tailed Phascogale, and are therefore most likely to be used by local populations.

It was found that the majority of roadside vegetation and linkages between remnant vegetation patches will be retained. As discussed previously, the proposed clearing will be limited to hazardous trees within four metres of the road, and generally, the existing vegetation corridor will only be narrowed by the loss of the first line of trees. Analysis of aerial and ground-level imagery indicate that for the majority of the project area a corridor of vegetation will be retained on either one or both sides of the road.

In addition to the vegetation within these two road reserves, it should be noted that other existing vegetation corridors can also maintain suitable habitat connectivity.

On Williams Narrogin Highway, alternative vegetation is available in the form of vegetated creeklines through paddocks and large patches of remnant vegetation adjacent to the road, for example the Narrogin Golf Course and Water Corporation land located south of Narrogin town site. There is also a substantial amount of revegetation works undertaken by Main Roads approximately 20 years ago in the road reserve of Williams Narrogin Highway. This revegetation will not be cleared and is of sufficient density to provide habitat for phascogale movement through the landscape. Figure 14 identifies alternative habitat linkages available, Appendix D shows examples of alternative vegetation in the road reserve that can provide suitable habitat connectivity.

Similarly, alternative vegetation linkages are available in close proximity to Pinjarra Williams Road, such as the Williams River (see Figure 15). Fewer records along Pinjarra Williams Road also suggests less phascogale activity, likely attributed to the greater distance to established populations in larger remnants of native vegetation (Bamford, 2017). Therefore, any disruption of vegetation corridors along this road are not considered as significant.

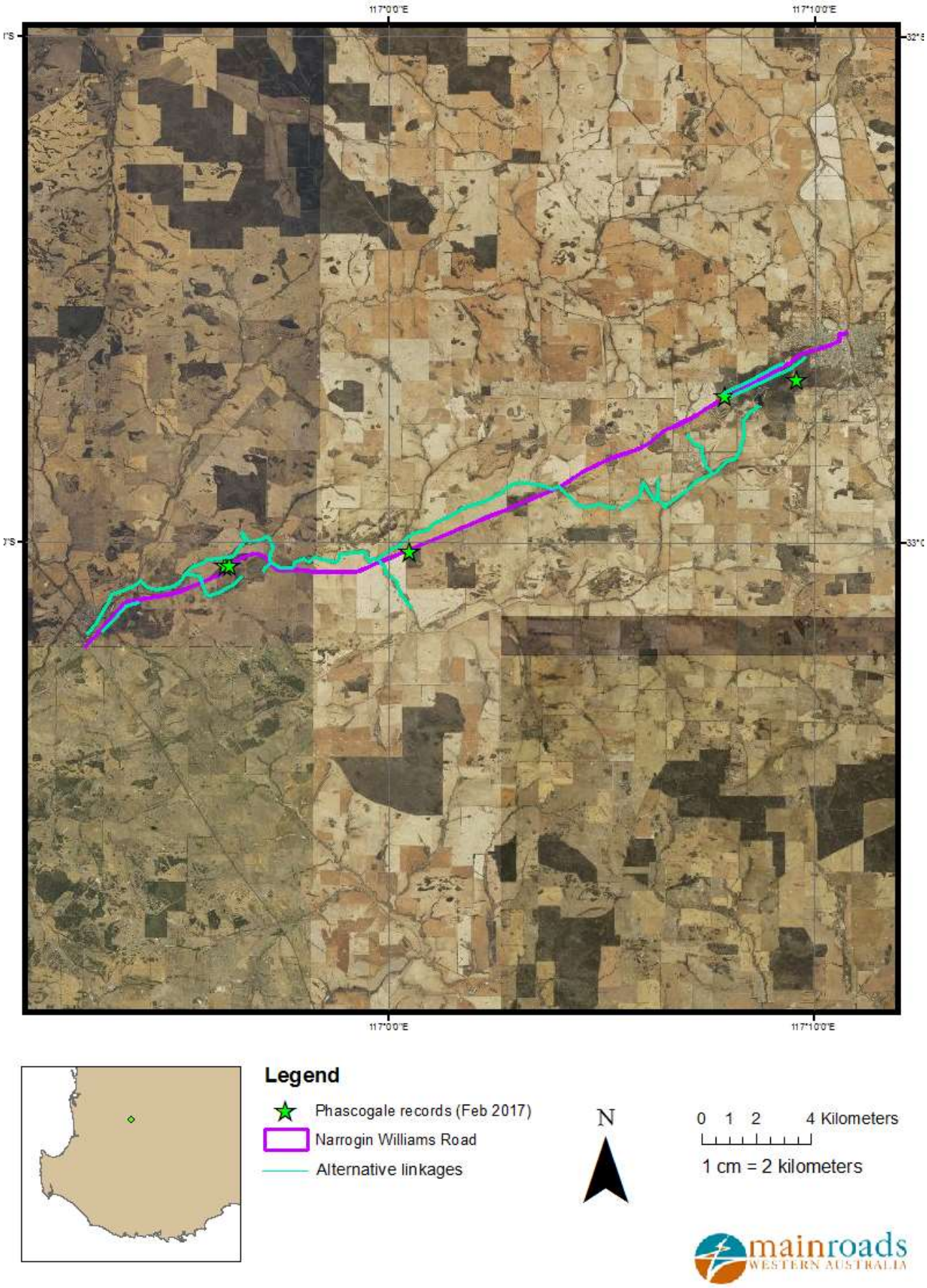


Figure 14: Alternative vegetation linkages adjacent to Williams Narrogin Highway

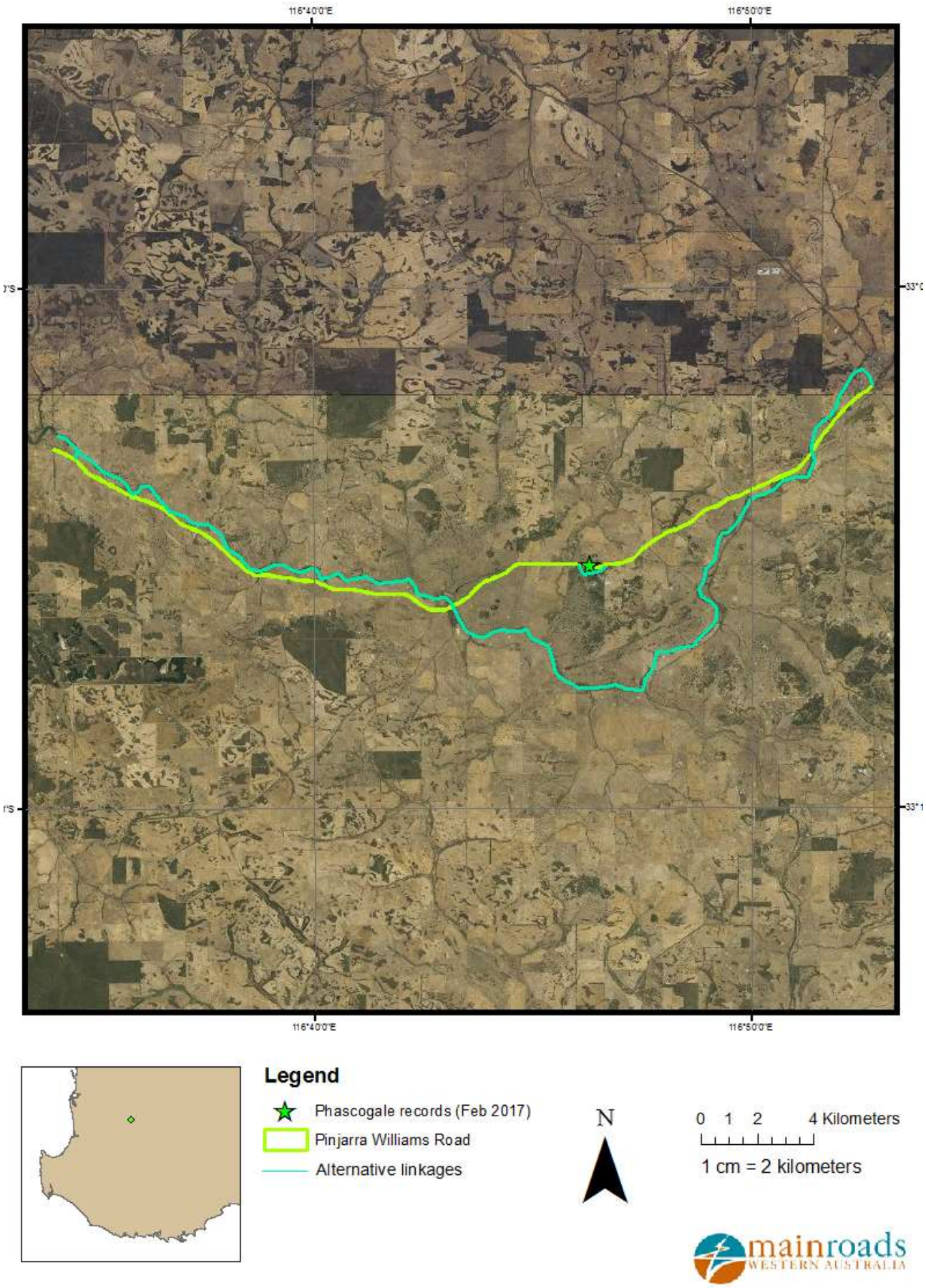


Figure 15: Alternative vegetation linkages adjacent to Pinjarra Williams Road

5.2.4 Proposed Avoidance or Mitigation Measures

The following strategies have been implemented to reduce the impacts of the project on Red-tailed Phascogale:

- The Austroads Standard for width of clearing is 8 m, which is difficult to achieve in the Wheatbelt due to the narrow road reserve width available. An alternative footprint of 6 m was considered, however this has been further reduced to 4 m to minimise the clearing footprint;
- Clearing will be restricted to hazardous trees and vegetation only. Main Roads has reviewed the vegetation spatial data against aerial and ground level imagery and undertaken ground-truthing to ensure that the clearing footprint is as small as possible. All trees have been considered on an individual and group basis to identify trees or stands of trees that present less of a safety hazard inside the 4 m clearing zone and will retain these trees where possible;
- Minimal clearing will be undertaken at locations of known phascogale breeding habitat. At these locations, only a thin, linear strip of native vegetation will be removed, leaving larger remnants intact; and
- Impacts to major rivers and other creeks or drainage lines that cross the project area will be minimised by limiting clearing at these locations.

The project will be undertaken in accordance with a Maintenance Environmental Management Plan (MEMP). The MEMP will include specific management actions to further reduce potential impacts to phascogales. Key management actions include:

- The 4 m clearing line will be pegged or otherwise demarcated by a surveyor, and strictly adhered to during clearing;
- Following pegging of the clearing area, Main Roads Environment Officers will undertake an inspection to ensure trees agreed for removal are clearly demarcated. Any trees that present less of a safety risk within the 4 m clearing area will be clearly marked for retention;
- A suitably qualified fauna specialist will inspect clearing areas that are immediately adjacent to where Bamford (2017) recorded phascogale populations prior to clearing, and any individuals found will be shepherded into adjacent native vegetation;
- Vehicle hygiene measures will be implemented during clearing activities to minimise the introduction and spread of weeds and plant disease to minimise impacts on adjacent phascogale habitat; and
- Habitat logs and tree limbs with hollows will be salvaged where practicable to increase habitat value within and adjacent to the road reserve.

Further management actions that will be incorporated in to the MEMP are listed in Appendix E.

The measures proposed above are standard management measures applied by Main Roads to all projects of similar scale and nature. Based on this experience, it is considered that the measures proposed will effectively manage risks associated with project activities.

5.3 Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo

The initial referral prior to the variation in April 2020 involved the clearing of an estimated 12.98 ha of foraging habitat and 114 Suitable DBH Trees for Carnaby's Cockatoo and FRTBC (GHD, 2016b). Main Roads has subsequently revised the clearing area so that only 7.36 ha of foraging habitat will be removed, comprising 2.82 ha on Williams Narrogin Highway and 4.54 ha on Pinjarra Williams Road. To achieve the required safety outcomes from removing large hazardous trees from adjacent to the road, the number of Suitable DBH Trees has been increased to 670, comprising 409 trees on Williams Narrogin Highway and 261 trees on Pinjarra Williams Road.

Due to the increase in clearing of potential breeding habitat for Black Cockatoo species, the impacts on Carnaby's Cockatoo and FRTBC has been reassessed.

The majority of vegetation within the project area has been mapped as potentially suitable for foraging habitat for Carnaby's Cockatoo and FRTBC (GHD, 2016a). The highest quality foraging resources are vegetation types comprising Eucalypt woodlands or *Allocasuarina* shrublands (GHD, 2016a). As outlined by GHD (2016a), evidence of Black Cockatoo foraging on *Banksia sessilis* and *Corymbia calophylla* nuts were observed on both roads during the survey. The project area will require the clearing of up to 7.36 ha of suitable foraging habitat.

GHD (2016a) recorded 1404 Suitable DBH Trees within six metres either side of the two roads, including 22 trees with one or more large hollows suitable for breeding. The project area coincides with 676 Suitable DBH Trees, which included six trees with one or more large hollows. The design has subsequently been amended to avoid these six trees, with the project now expected to impact 670 Suitable DBH Trees.

No active roosting was observed at the time of the survey (GHD, 2016a). Trees within the project area considered suitable for roosting.

Noting the above, the impacts to Black Cockatoos are not likely to be significant. The total area of foraging habitat (7.36ha) in the project area occurs over 65 km of road. This equates to approx. 0.1 ha of foraging habitat being removed per kilometre. Furthermore, as illustrated in Section 5.2.3.1 above, approximately 1000 ha of native vegetation occurs directly adjacent or in close proximity to the project area in the form of conservation reserves or other crown reserves.

The clearing of 7.36 ha of vegetation, which is predominantly in degraded or worse condition (4.77 ha or 60 %), along the edge of two existing roads is not likely to significantly reduce the availability of foraging habitat in the local area. Both Black Cockatoo species are highly mobile and can access areas of higher quality foraging resources adjacent to the project area.

In relation to impacts on breeding habitat, the project will not result in the loss of any large hollows suitable for breeding. The project will result in the loss of up to 670 Suitable DBH Treesthat may produce hollows in the future. This represents less than half of the trees surveyed in the two road reserves. It should be noted that this number is conservative, as only trees within six metres of the road edge were recorded. The road reserve does extend beyond six metres at multiple places along the project area. When taking into consideration the extent of similar native vegetation close to the project area, the loss of 670 Suitable DBH Trees, none with suitable hollows, along 65 km of road is not likely to significantly affect breeding hollow supply in the local area.

5.4 Summary of residual impacts

The proposed clearing will have the following residual impacts:

- Clearing up to 7.48 ha of vegetation, comprising 6.65 ha of native vegetation and 0.83 ha of planted trees and revegetation; Approximately 40 % of vegetation is in a good or better condition;
- Clearing up to 7.36 ha of potential Red-tailed Phascogale habitat;
- Clearing up to 0.64 ha of vegetation directly adjacent to known Red-tailed Phascogale breeding habitat;
- Removal of 670 Suitable DBH Trees for Threatened Black Cockatoo species and Red-tailed Phascogale, including 45 trees with potentially suitable hollows for Red-tailed Phascogale. No trees with suitable hollows for Black Cockatoos will be impacted; and
- Clearing up to 7.36 ha of Black Cockatoo foraging habitat.

6 ENVIRONMENTAL OFFSETS

The initial referral identified a total of 12.98 ha of native vegetation clearing, comprising 7.46 ha of clearing within the Pinjarra Williams project area and 5.52 ha of clearing within the Williams Narrogin project area. Following a review of the vegetation mapping and clearing requirements of the project, Main Roads is now proposing to clear up to 7.48 ha of vegetation total. This represents a sizable reduction in the clearing impacts of the project on MNES. As discussed above, there are large areas of suitable habitat for Red-tailed Phascogale, Carnaby's Cockatoo and FRTBC directly adjacent to the project area and in the local area; therefore neither species is likely to be reliant on vegetation within the road reserve for habitat. Furthermore, the project has been adjusted so that no suitable breeding hollows for Black Cockatoo species will be removed. Accordingly, the residual impacts of the project are not considered significant thereby warranting an offset.

It should be noted that in accordance with the clearing approval under the *Environmental Protection Act 1976* (WA), Main Roads will be making a financial contribution to the WA State Offset Fund. The financial contribution will be for the purchase of vegetated land that contains suitable habitat for Red-tailed Phascogale and Black Cockatoos, which will be put into the conservation estate and managed by DBCA.

A total of 84.65 ha is required to offset the clearing for the two roads (Appendix F). In order to satisfy this offset requirement, $215,145.20 will be paid into the State Offset Fund for the purposes of purchasing land to go into the conservation estate. The proposed contributions relevant to this action are a detailed below in Table 4.

Table 4: Calculation of Financial Contribution

Road	Total Offset Hectares	Total Offset Value
Pinjarra-Williams Road	50.25 ha	$ 126,630.00
Williams-Narrogin Road	34.4 ha	$ 88,515.20
Total	**84.65 ha**	**$ 215,145.20**

7 THREAT ABATEMENT PLANS AND RECOVERY PLANS

The action is not inconsistent with any relevant recovery plan including:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan, Western Australia (Department of Parks and Wildlife (DPaW), 2013);
- Threat abatement plan for predation by feral cats (Department of the Environment, 2015); and
- Threat Abatement Plan for Predation by the European Red Fox (Department of the Environment, Water, Heritage and the Arts, 2008).

The project area is not habitat critical to the survival of Black Cockatoos, as detailed in the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan (DPaW, 2013). Habitat critical to survival for Carnaby's Cockatoos is summarised as (DPaW, 2013):

- Eucalypt woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding;
- Woodland sites known to have supported breeding in the past and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established; and
- In the non-breeding season the vegetation that provides food resources as well as the sites for nearby watering and night roosting that enable the cockatoos to effectively utilise the available food resources.

The long-term survival of a robust population of Carnaby's Cockatoos depends on the availability of suitable woodland breeding habitat and tree hollows, and foraging habitat capable of providing enough food to sustain the population. The project will involve the removal of foraging habitat and potential habitat trees in a linear project area, over two roads in the Wheatbelt. No trees with a suitable breeding hollow will be impacted by the project. No signs of roosting were observed. The removal of the vegetation within 4 m of the project may actually reduce the number of Black Cockatoo motor vehicle collisions, which is listed as a contributing factor to species decline in the Recovery Plan (DPaW, 2013).

The Wheatbelt region is extensively disturbed by cropping and other land uses. The widening of the maintenance zone on the two roads will have no relevant impact to the number of feral cats or foxes.

8 ECONOMIC AND SOCIAL MATTERS

The project will cost approximately $1,000,000 ($500,000 per road) based on previous similar projects and will employ approximately 24 people, many from the local area, depending on whether it is undertaken over several years or all at once. The clearing within the 4 m zone will create a safer environment for road users. There will be temporary disruption for local road users during construction.

The two roads that are the subject of this assessment will be safer as infrangible obstructions (mainly trees) are removed from the road edge potentially reducing the frequency of serious and fatal crashes. Establishing an improved clear zone along these roads will provide drivers with a greater opportunity to regain control of an errant vehicle that leaves the road surface. Heavy and oversized haulage vehicles will also benefit from the project by being able to remain on the road surface when passing heading in the other direction.

Other intangible economic benefits from this project include reducing the longer-term maintenance costs for the road and improving travelling time by providing safer overtaking opportunities.

The social benefits of this project include:

- Safer roads, due to the reduced risks of fatal accidents and hospitalisation from crash impact;
- Better sight visibility at intersections, property access (local farmers) and pull-over areas (e.g. for school buses and local farmers); and
- Improved driving experience for all road users and local communities; and
- Reduced native fauna mortality.

Consultation with key stakeholders has been undertaken for this project in accordance with Main Roads internal processes. Formal written correspondence has been issued to the following stakeholders regarding this proposal:

- WA Conservation Council;
- Department of Biodiversity, Conservation and Attractions (Northam);
- Department of Water and Environment Regulation (DWER);
- Department of Planning, Lands and Heritage (DPLH)
- Shires of Williams, Narrogin, and Toodyay and Goomalling;
- Roadside Conservation Committee;
- Soil and Land Conservation Commission; and
- WA Wildflower Society.

Approvals have been sought from the DWER (Native Vegetation and Water Resources branches) and DPLH, including consultation with these departments. The Shire of Williams, the Soil and Land Conservation Commission and DWER all responded to Main Roads' correspondence (Appendix H).

The Shire of Williams had no specific comments and no objections to the project proceeding due to the safety issues posed by the Pinjarra to Williams Road and Williams to Narrogin Highway sections within its Shire.

The Commissioner of Soil and Land Conservation raised concerns regarding increased soil erosion, which relates to both this project and another Main Roads project being undertaken in the area. A large portion of this submission relates directly to construction impacts, and refers to the other project. The points made for this project are that current drainage design is conducive to high levels of erosion. No changes to the construction of the road or the proposed drainage is expected as part of the maintenance zone establishment works, only clearing and culvert upgrades are required. Culvert upgrades will assist with water control on the roads.

9 CONCLUSION

The Wheatbelt region in WA has the unwanted reputation for having the most dangerous roads in Australia. To improve road user safety for Pinjarra Williams Road and Williams Narrogin Highway, Main Roads is proposing to undertake nominal clearing.

Although the Austroads Standard recommends that all hazardous objects be removed within 8 m of the edge of the road, Main Roads modified the extent of clearer to 4 m from the road given the environmental values present. This reduction will result in, on average, less than 60 cm of clearing on either side of the road.

Approximately 4.7 hectares (ha) of native vegetation will be cleared to accommodate a wider 33 km maintenance zone for Pinjarra Williams Road and approximately 2.8 ha will be cleared to accommodate a wider 31 km maintenance zone for the Williams Narrogin Highway.

Main Roads is proposing to clear up to 7.36 ha of Black Cockatoo foraging habitat that consists largely of degraded condition vegetation. The proposed action will impact 670 Suitable DBH Trees, none of which contain hollows that may be suitable for Black Cockatoos.

The project will also result in the clearing of up to 7.36 ha of Red-tailed Phascogale habitat, including 45 trees with small or medium hollows that may be suitable for Red-tailed Phascogale.

Given the very narrow corridor of largely degraded vegetation to be cleared, the avoidance and minimisation measures Main Roads has implemented, the extent of suitable habitat for Red-tailed Phascogale immediately adjacent to the project area and that no trees with suitable Black Cockatoos will be impacted, the project is not considered to have a significant impact on any Matters of National Environmental Significance (MNES).

10 REFERENCES

Bamford (2017) Red-tailed Phascogale Assessment – Maintenance Zone Establishment – Toodyay-Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053). Report prepared for Main Roads WA, by Bamford Consulting Ecologists, June 2017.

Department of Parks and Wildlife (2013) Carnaby's cockatoo (*Calyptorhynchus latirostris*) Recovery Plan. Department of Parks and Wildlife, Perth, Western Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011) Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the EPBC Act. Accessed February 2017 https://www.environment.gov.au/resource/survey-guidelines-australias-threatened-mammals-guidelines-detecting-mammals-listed

Department of the Environment (2015) Threat Abatement Plan for Predation by Feral Cats. Commonwealth of Australia, Canberra.

Department of the Environment (2019) *Phascogale calura* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 08/07/2019

Department of the Environment, Water, Heritage and the Arts (2008) Threat Abatement Plan for predation by the European Red Fox. Commonwealth of Australia, Canberra.

GHD (2016a) Maintenance Zone Establishment - Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053) - Biological Survey. Report prepared for Main Roads Western Australia, by GHD Pty Ltd, April 2016.

GHD (2016b) Maintenance Zone Establishment - Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053) – EIA and EMP. Report prepared for Main Roads Western Australia, by GHD Pty Ltd, April 2016.

Kitchener, D. (1981) Breeding, diet and habitat preference of *Phascogale calura* (Gould 1844) (Marsupalia: Dasyuridae) in the southern wheatbelt, Western Australia. Records of the Western Australian Museum 9(2), 173-186.

Short, J., Hide, A. and Stone, M. (2011) Habitat requirements of the endangered Red-tailed Phascogale,(*Phascogale calura*). Wildlife Research, 38 (5). pp. 359-369.

Western Australian Herbarium (1998-) Florabase – The Western Australia Flora. Department of Biodiversity, Conservation and Attractions. Http://florabase.dpaw.wa.gov.au/

Whitford K. (2002) Hollows in Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) trees. I. Hollow sizes, tree attributes and ages. *Forest Ecology and Management* 160: 201-214.

11 APPENDICES

Appendix	Title
Appendix A	DoEE Request for additional information
Appendix B	*Gastrolobium hamulosum* survey memo
Appendix C	DPaW Endorsement of *Gastrolobium hamulosum* survey method
Appendix D	Photos from site inspection
Appendix E	Environmental Management Plan
Appendix F	DER correspondance regarding offset proposal

Appendix A: DoEE Request for additional information

Australian Government
Department of the Environment and Energy

EPBC Ref: 2016/7698

Mr Roy Engelbrecht
Development Project Manager
Main Roads Western Australia
PO Box 6202
East Perth WA 6892

Dear Mr Engelbrecht

Additional information required for preliminary documentation.
Maintenance Zone Establishment – Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053), Wheatbelt Region, Western Australia

I am writing to you in relation to your proposal to establish wider maintenance zones for three roads (Toodyay Gomalling Road (M060) SLK 1.2 to SLK 48.0, Williams Narrogin Highway (H053) SLK 0 to SLK 31.4, and Pinjarra Williams Road (M053) SLK 91.9 to SLK 125.5) in the Wheatbelt Region of Western Australia, over the next three years.

On 29 June 2016, a delegate of the Minister decided that the the proposed action is a controlled action and that it will be assessed by preliminary documentation. Further information will be required to be able to assess the relevant impacts of the proposed action. The further information required to progress the assessment is detailed in Attachment A.

Details on the assessment process and the responsibilities of the proponent are set out in the enclosed fact sheet. Further information is available from the Department's website at http://www.environment.gov.au/epbc.

In any correspondence with the Department please quote title of the action and EPBC reference, as show at the beginning of this letter. You can send information to:

By letter
Project Assessments West Section
Assessments (WA, SA, NT) and Air Branch
Department of the Environment and Energy
GPO Box 787
CANBERRA ACT 2601

By email pablo.shopen@environment.gov.au

Once you have provided the Department with the information requested in this letter you will then be issued with a direction to publish, including detailed directions on what you are required to publish and for how long.

GPO Box 787 Canberra ACT 2601 • Telephone 02 6274 1111 • www.environment.gov.au

If you have any questions about the assessment process or the further information required, please contact Pablo Shopen, by email to the above address, or telephone (02) 6274 2110 and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

Denis Snowdon
A/g Director
Project Assessments West Section

31 August 2016

Attachment A: Further information required.

Listed threatened species and ecological communities	
Given the location of the proposed action, several EPBC Act listed flora and fauna species, or suitable habitat for them, are likely or have the potential to exist within the proposed action areas. These include the forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) and Carnaby's black cockatoo (*Calyptorhynchus latirostris*); the red-tailed phascogale (*Phascogale calura*); and the hook-point poison (*Gastrolobium hamulosum*).	
1.	For the hook-point poison (*Gastrolobium hamulosum*): a) the referral notes that this species is small and similar in appearance to other non-listed species and therefore may have been overlooked. Please undertake a targeted survey for the hook-point poison in the Toodyay-Goomalling survey area and provide information detailing the time/timing, location, conditions, method and results. The survey should be designed in consultation with a relevant expert on the species as approved by the Department. b) if the species is located please provide specific information on the direct/indirect impacts to the populations as a result of the proposed action, including but not limited to: ▪ habitat loss ▪ weed invasion ▪ dieback caused by *Phytophthora cinnamomi*. c) please describe any proposed avoidance or mitigation measures and the effectiveness of these measures on limiting impacts to the hook-point poison.
2.	For the red-tailed phascogale (*Phascogale calura*): a) the referral notes that camera traps were deployed at all three locations but the red-tailed phascogale was only recorded in the Pinjarra-Williams Road survey area, although potential habitat was recorded within the other survey areas. In the Department's view the survey was not done in accordance with the methodology outlined in the Department's *Survey guidelines for Australia's threatened mammals* (the guidelines, https://www.environment.gov.au/resource/survey-guidelines-australias-threatened-mammals-guidelines-detecting-mammals-listed). For example the recommended number of camera traps per hectare does not appear to have been used. If surveys were not undertaken using the methods and effort recommended in the guidelines please re-survey all three areas in accordance with the methods detailed in the guidelines for the red-tailed phascogale and provide information detailing the survey methodology and results of these surveys. In the absence of additional surveys conducted in accordance with the guidelines, you must assume that all three areas provide critical habitat for an important breeding population of red-tailed phascogale. b) Based on the above surveys or assumption that all three areas provide

	critical habitat for an important breeding population of red-tailed phascogale, provide information about available breeding habitat in the surrounding areas and describe what proportion of available breeding habitat will be cleared as a result of the proposed action. c) Provide a discussion and assessment of the direct/indirect impacts to the red-tailed phascogale as a result of the proposed action, including but not limited to: d) loss of habitat e) loss of tree hollows f) habitat fragmentation, including loss of roadside vegetation corridors. d) Provide a description of any proposed avoidance or mitigation measures and the effectiveness of these measures on limiting impacts to the red-tailed phascogale.
Environmental offsets	
3.	a) In the event that impacts cannot be avoided or mitigated, please provide further details on any offset/s to compensate for any residual impacts on EPBC Act listed species, including: ▪ the type of offset/s proposed ▪ extent to which the proposed offset actions correlate to, and adequately compensate for, EPBC Act listed species ▪ suitability of the location of any proposed offset site for EPBC Act listed species ▪ conservation gain to be achieved by the offset i.e. positive management strategies that improve the site or averting the future loss, degradation or damage of the protected matter ▪ time it will take to achieve the proposed conservation gain ▪ level of certainty that the proposed offset will be successful ▪ current land tenure of any proposed offset and the method of securing and managing the offset for the life of the impact. b) Demonstrate how any proposed offsets are consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (October 2012).
Threat Abatement Plans and Recovery Plans	
4.	Demonstrate that the action is not inconsistent with any relevant recovery plan or threat abatement plan, including but not limited to: ▪ Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan, Western Australia Department of Parks and Wildlife, 2013 ▪ Threat abatement plan for predation by feral cats, Department of the Environment, 2015

	▪ Threat Abatement Plan fro Predation by the european Red Fox, Department of the Environment, Water, Heritage and the Arts, 2008
Economic and Social matters	
5.	Please provide further detail on the social and economic costs and/or benefits of undertaking the proposed action, including: ▪ basis for any estimations of costs and/or benefits ▪ potential employment opportunities expected to be generated at each phase of the proposed action ▪ benefits to the local and wider community as a result of the proposed action ▪ details of any public and stakeholder consultation activities, including the outcomes.

Appendix B: *Gastrolobium hamulosum* survey memo

Memorandum

02 September 2016

To	Rochelle Lupton (Environment Officer, Main Roads Western Australia)		
Copy to	Ben Hollyock (Principal Environment Officer, Main Roads Western Australia)		
Via	Drew Farrar (Manager Environmental Assessment and Approvals, GHD)		
From	Gaynor Owen (Ecologist, GHD)	Tel	62228512
Subject	Hookpoint Poison Targeted Assessment	Job no.	61/34966

1 Project background and location

Main Roads Western Australia (Main Roads) is planning to establish a wider maintenance zone for three roads in the Wheatbelt Region–Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053) in the Shires of Toodyay, Williams and Narrogin. These roads have been identified as three of the most unsafe roads in the Wheatbelt, due to the significant safety hazard associated with the number of trees within 4 metres (m) of the road seal. Trees within this distance do not allow for driver recovery and increase fatality risk in an accident.

The proposed Project will consist of clearing vegetation within the 4 m zone for the three sections of road and will include upgrades to the existing watercourse infrastructure within the defined sections of road.

Main Roads commissioned GHD Pty Ltd (GHD) to undertake a targeted survey for the Hookpoint Poison pea (*Gastrolobium hamulosum*) which was identified from the biological assessment as possibly occurring along the Toodyay Goomalling Road (M060). The pea is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* and Threatened (Declared Rare) under the *Wildlife Conservation Act 1950*. The purpose of the survey was to determine if Hookpoint Poison pea occurs within the Project area, which is defined as 4 m from the edge of the road seal on each side of Toodyay Goomalling Road (MO60) for Straight Line Kilometre (SLK) 1.2 to SLK 48.0.

2 Memorandum scope and limitations

This memorandum provides the key findings of the targeted survey regarding Hookpoint Poison within the Project area.

GHD has prepared this memorandum on the basis of information provided by Main Roads and the Department of Parks and Wildlife (DPaW) and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

61/34966/158419

GHD Pty Ltd ABN 39 008 488 373
999 Hay Street Perth PO Box 3106 Perth WA 6832 Australia
T 61 8 6222 8222 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com

3 Methodology

A targeted survey of the Project area was conducted by botanist Gaynor Owen (SL011312) on 31 August 2016. The Hookpoint Poision pea flowering period is from August to October, as reported on *FloraBase* (WA Herbarium 2016), which coincides with the field assessment. The methodology employed for the survey was undertaken with reference to the Environmental Protection Authority (EPA) and DPaW *Technical Guide – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA and DPaW 2015) and *Terrestrial Biological Surveys as an Element of Biodiversity Protection, Position Statement No. 3* (EPA 2002).

Field survey

Prior to the field survey, information obtained from the Environmental Impact Assessment (GHD 2016a) and Biological Survey (GHD 2016b) was reviewed to determine the Hookpoint Poison peas possible occurrence within the Project area. Additionally, ecological information (e.g. habitat, associated flora taxa and phenology) was sourced from *FloraBase* (WA Herbarium 2016) and Department of the Environment and Energy (DotEE) Species Profile and Threats Database (DotEE 2016).

Hookpoint Poison habitats include: sandy, often gravelly soils or clay; flats; slopes; and ridges (WA Herbarium 2016). Sections of the Project area that support these habitats were targeted during the field assessment. This included vegetation units *Acacia acuminata/Allocasuarina huegeliana* tall shrubland, as well as other habitats with sandy, often gravelly soils including: *Eucalyptus wandoo* open woodland over tall shrubland, *Eucalyptus wandoo* woodland over open low shrubs, *Eucalyptus salmonophloia* woodland, and tall shrubland (GHD 2016b).

The entire Project area was traversed slowly by car and vegetation identified as Good to Excellent in condition (as per EPA and DPaW 2015) within the Project area was searched on foot. A GPS track log of areas traversed was recorded. The following data was collected in the field for *Gastrolobium* potentially aligning with the Hookpoint Poison pea: GPS location, height (centimetres (cm)), number of plants and corresponding area of population, reproductive state and plant condition.

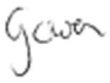
Flora identification and nomenclature

Where *Gastrolobium* samples were collected during the field assessment, they were compared against a representative specimen of Hookpoint Poison pea held in the reference collection at the WA herbarium.

4 Key findings

No Hookpoint Poison pea plants were recorded within the Project area during the targeted assessment. If this species was present within the Project area, it is reasonable to expect it would have been observed given the survey effort and survey timing within the optimal flowering period.

Regards



Gaynor Owen
Ecologist

References

DotE 2016, *Species Profile and Threats Database*, retrieved August 2016, from http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

EPA 2002, *Terrestrial Biological Surveys as an Element of Biodiversity Protection: Position Statement No. 3*, Perth, Environmental Protection Authority.

EPA and DPaW 2015, *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment*, (ed. K Freeman, G Stack, S Thomas and N Woolfrey), Perth, WA.

GHD 2016a, Maintenance Zone Establishment, Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053), EIA and EMP, unpublished report prepared for Main Roads, 2016.

GHD 2016b, Maintenance Zone Establishment, Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053), Biological Survey, unpublished report prepared for Main Roads, 2016.

WA Herbarium 2016, *FloraBase—the Western Australian Flora*, Department of Parks and Wildlife, retrieved August 2016, from http://florabase.dpaw.wa.gov.au/.

Appendix C: DPaW Endorsement of *Gastrolobium hamulosum* survey method

From: Donaldson, Jessica [mailto:Jessica.Donaldson@dpaw.wa.gov.au]
Sent: Tuesday, 13 September 2016 5:04 PM
To: Gaynor Owen <Gaynor.Owen@ghd.com>
Subject: RE: targeted assessment for Hookpoint Poison pea

Hi Gaynor,

The methodology used in the targeted search for *Gastrolobium hamulosum* was appropriate in timing as it is within the species flowering period, and this species has been observed flowering this year at known locations. Searching for this species on foot within suitable habitat is also adequate in intensity. The habitat for this species as described in your memo is consistent with the Departments records.

Overall the methodology used in the targeted search for *Gastrolobium hamulosum* would be considered appropriate.

Kind Regards

Jessica Donaldson| Botanist| Species & Communities Branch
Department of Parks and Wildlife | Kensington | Ph. 9219 8760| jessica.donaldson@dpaw.wa.gov.au
Part Time: Tuesdays, Wednesdays and Thursdays

PARKSAND WILDLIFE

Appendix D: Photos from site inspection

Photo 1: SLK 26.4 Williams Narrogin Highway. Red-tailed Phascogale was recorded deep in the existing bush at this location. Person in photo indicates clearing limit, only trees across the front row will be removed; the remaining vegetation will remain and provide usable vegetation linkages for phascogale.

Photo 2: SLK 20.0, between recorded phascogale populations. This photo demonstrates the removal of the front row of trees (where figures are standing) and the availability of alternative vegetation in the form of revegetation undertaken by Main Roads approximately 20 years ago (behind cars).

Photo 3 & 4: As above, figures demonstrate clearing distance from road and alternative vegetation behind cars.

Photo 5: No clearing required at this location adjacent to recorded population at SLK 13.33 Williams Narrogin Highway

Photo 6: No clearing at this location, adjacent to recorded population of Red-tailed Phascogale at SLK 6.25 Williams Narrogin Highway Highway

Appendix E: Environmental Management Plan

ENVIRONMENTAL MANAGEMENT PLAN

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
Standard Record Keeping Management				
Record Keeping	• Ensure standard record keeping requirements are completed within 3 months of completion of the project activities.	Post-project record maintenance	Project Manager and Environment Officer	3 months after completion of Project
Key Environmental Aspects - Flora and Fauna				
Flora and Vegetation Management	• Demarcate all native vegetation and fauna habitats to be retained or cleared (i.e. pegging), so that "No Go" zones are clearly delineated and noted by project workers, and any accidental loss of vegetation is avoided. • Induct all staff and contractors regarding biodiversity constraints, particularly the presence of conservation significant species, and required actions regarding biodiversity values. • No trees or ground vegetation outside of the approved disturbance footprint to be disturbed.	Construction maintenance	Contractor/Project Manager	Duration of project period
Fauna Management	• Examine the habitat in the vicinity of known records of the Red-tailed Phascogale for evidence of nesting or breeding • Induct all staff and contractors regarding biodiversity constraints, particularly the presence of conservation significant species, and required actions regarding biodiversity values. • Do not permit site personnel to bring firearms, other weapons or pets on site. • If possible schedule clearing operations to avoid peak breeding times of threatened species (July to January). • If any native fauna is disturbed during clearing it should be allowed to make its own way to adjacent vegetated areas. • Any injured wildlife should be taken to a designated veterinary clinic or a DPaW nominated wildlife carer.	Construction maintenance	Contractor/Project Manager	Duration of project period

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
Species specific management actions – Red-tailed Phascogale and Carnaby's Black Cockatoo **(Scenario 1 - Construction to be undertaken during the breeding season)**	• Survey of the habitat area on Pinjarra Williams Road by a qualified ecologist to relocate any phascogale in the clearing area. • Check two trees with hollows suitable for Black Cockatoos prior to clearing.			
Species specific management actions – Red-tailed Phascogale and Carnaby's Black Cockatoo **(Scenario 2 - Construction to be undertaken outside the breeding season)**	• Clearly delineate the extent of the disturbance footprint (clearing footprint) with coloured pegs. • Prior to clearing/ clearing operations the surveyor will mark out the clearing line and this will be checked by Main Roads Environment Officer to determine that it is clearly defined and compliant with permits. • The extent of this clearing will be clearly communicated in documentation and accurately demarcated on-ground. • All project clearing personnel will be inducted prior to the commencement of works. The induction program will include communication about the 'No Go Areas', importance and consequences of entering/disturbing these areas. • Regular review of the disturbance footprint boundary to ensure 'No Go Areas' are clearly delineated • Restrict clearing personnel to the disturbance footprint including designated access routes and parking areas. • Fauna encountered during the clearing process shall be given the chance to move on if there is no threat to the person's safety in doing so.			
Other Environmental Aspects				
Dieback and Weed Management	• Clean machinery of soil and vegetation prior to entry. • Restrict movement of machines and other vehicles to the limits of the areas cleared.	Machinery checked prior to entering and exiting Project site. Demarcate areas affected/not affected by dieback.	Project Manager	Duration of project period

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
Weed Control Pinjarra to Williams Highway **Asparagus asparagoides* (Bridal Creeper) Williams to Narrogin Highway **Asparagus asparagoides* (Bridal Creeper)	• Management actions will be implemented for *Asparagus asparagoides* (Bridal Creeper), which is a Declared Pest under Section 22 of the Biosecurity and Agriculture Management Act 2007 and a Weed of National Significance (Australian Weeds Committee 2010) • Machinery will be maintained and cleaned to reduce the spread of weeds throughout the Project area • Weeds growing in the Project area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition will be removed or killed.	One annual surveillance monitoring should be undertaken to manage spread of weeds.	Project Manager	Five years from commencement of clearing
Reserves and conservation areas Williams to Narrogin Project area Class C, No. 31732 and No. 27865	• No clearing is permitted within the Class C, No. 31732 and No. 27865 for the Williams to Narrogin Project area.	Pre-project/project surveillance	Project Manager	Duration of project period
Environmentally Sensitive Areas Williams to Narrogin Project area	• No clearing is permitted at the buffer zone of the ESA located within the Williams to Narrogin Project area.	Pre-project/project surveillance	Project Manager	Duration of project period
Aboriginal Heritage Sites Pinjarra to Williams Road Axle Grease Reserve No. 500 Williams to Narrogin Highway Geeralying No. 15139; Geeralying No. 5888; Manaring Road No. 5826. Toodyay to Goomalling Road Boolegin: Bolgart (Avon River crossing) No. 4045	• Ensure on-site project personnel are aware of the location of all Aboriginal heritage sites on site and the requirement to avoid impacting heritage values. • Disturbance outside the approved clearing area will not be permitted • Any disturbance to the heritage sites adjacent to the Project areas (Geeralying No. 15139; Geeralying No. 5888; Manaring Road No. 5826; Swan Avon River (and tributaries) No. 3536 and Axle Grease Reserve No. 500) will be undertaken through approvals from the Department of Aboriginal Affairs (DAA).	Pre-project/project surveillance	Project Manager	Duration of project period

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
All project areas in the event of unknown sites being unearthed during project process	• In the event that human skeletal material is discovered, work will cease immediately and the Police contacted. If the skeletal remains are determined to be of Aboriginal origin, the DAA will be contacted as soon as practicable. • In the event that artefacts or material of Aboriginal origin is discovered, work will cease within 25 metres of the material and a qualified archaeologist will investigate the item(s) and take appropriate actions (i.e. contact DAA). • Liquid spills, stormwater and runoff materials will be managed to ensure project activities and drainage do not adversely affect heritage sites or any wetland or water body including creeks, springs, swamps and soaks.			
Dust	• Clear vegetation only when necessary and treat areas requiring soil stabilisation as soon as practicable. • Ensure dust lift is controlled to limit exposure to nearby rural residential properties and road users through regular soil watering, road sweeping and treatment of cleared areas. • Surface watering, spreading of hydromulch or similar will be used to protect loose surfaces or cleared areas, as required. • Minimise or cease project activities when excessive dust is generated, when works are occurring near sensitive areas such as in the town of Narrogin, Toodyay and Williams.	Construction and post-project maintenance	Contractor	Duration of project period
Pollution and Litter	• All waste materials from the Project area will be removed from the site upon completion of the project and to the satisfaction of the Roadside Management Officer.	Construction and post-project maintenance	Contractor	Duration of project period

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
	• Construction waste and other rubbish will be contained in bins with lids (where practicable) and removed regularly.			
Noise and Vibration	• Ensure compliance with all applicable statutory requirements and any heritage protection requirements (for vibration) if required. • Adopt project techniques where possible that will minimise noise and vibration impacts to nearby sensitive receptors. • Inform nearby sensitive receptors including adjoining communities of activities that may cause excessive noise and respond quickly to complaints by community members. • Limit project activity to normal business hours and liaise with the Shires of Toodyay, Williams and Narrogin, if project activities are required outside of these hours.	Construction maintenance	Contractor/Project Manager	Duration of project period
Surface Drainage	• Vegetation removal and soil disturbance will be minimised, where practicable. • Disturbed areas will be stabilised soon after project activities are completed. • Existing natural drainage paths and channels along the road or the vicinity of the Project area will not be unnecessarily blocked or restricted during project. • Vehicle and equipment wash down areas will be located away from environmentally sensitive areas. • No on-site storage of fuel, oils and other contaminant materials will be permitted within 50 m of a watercourse.	Pre-project/project surveillance	Contractor	Duration of project period
Groundwater	• All spills will be contained immediately and removed within 24 hours to minimise the potential for contaminants to enter groundwater. • Spills to be reported as an incident to the Environment Officer for record keeping purposes.	Construction maintenance	Contractor/ Environment Officer	Duration of project period

Project Component	***Management Action***	Monitoring/ Maintenance Program	Responsible Party	Completion Timeframe
Hazardous Materials Proximity to Avon River, Mortlock River system, and Williams River and associated tributaries	• Bulk fuel and hazardous material storage areas will be bunded and managed in compliance with applicable Australian Standards. • Vehicle servicing will be undertaken at designated areas, at least 100 m away from watercourses. • Site personnel shall be trained in the use of emergency Fire suppressant equipment. • Spill trays and spill response equipment will be available near fuel storage or refuelling areas. • All hazardous material spills will be reported according to statutory requirements.	Construction maintenance	Contractor/Project Manager	Duration of project period
Fire	• No fires shall be lit within the Project area. • Machinery will be fitted with approved spark arresting exhaust systems. • All vehicles, plant and equipment to be fitted with fire extinguishers and restricted to designated cleared areas. • Construction personnel will extinguish and report fires occurring within the Project area.	Construction maintenance	Contractor/Project Manager	Duration of project period
Visual Amenity	• Cleared vegetation stockpiles and other materials will be stored in designated areas and kept in a neat and tidy condition at all times. • The duration of ground disturbing activities will be limited as far as practicable. • The Project area is to be kept free of litter and rubbish.	Construction maintenance	Contractor/Project Manager	Duration of project period

Appendix F: DWER Correspondence regarding offset requirements

Appendix 2: Assessment of suitability of proposed offset

After taking into account the applicant's avoidance and mitigation measures, the significant residual environmental impacts to native vegetation in 'Good' or better condition identified through this assessment are:

- 16.509 hectares of black cockatoo foraging and potential nesting habitat;
- 16.509 hectares of red-tailed phascogale habitat;
- 0.32 hectares of a critically endangered TEC; and
- 16.509 hectares of significant remnant vegetation in an extensively cleared landscape.

To counterbalance the significant residual environmental impacts, the applicant proposed an offsets package that consists of a financial contribution of $94,735 towards the purchase of 70 hectares of remnant vegetation in 'Very Good' condition to offset the significant residual impacts (GHD, 2016c).

Assessment of the suitability of the applicant's proposed offset was undertaken using the DotEE's Offset Assessment Guide. This calculation indicated that the minimum spatial offset to be achieved through land acquisition is approximately 131 hectares. The conversion of the minimum spatial offset into a monetary contribution was calculated to be $358,968, based on the 2015 vegetated land values for a 50 hectare parcel of land within the Shire of Toodyay ($5,160 per hectare), Shire of Goomalling ($2,140 per hectare), Shire of Narrogin ($2,600 per hectare) and Shire of Williams ($2,520 per hectare).

Table 1: Calculation of financial offset contribution

	Local government authority	Minimum spatial offset required (ha)	Cost per hectare ($)	Total ($)
Toodyay-Goomalling Road reserve (6.4 hectares, of which 5.841 hectares is in 'Good' or better condition)	Shire of Toodyay (31.7 per cent of this portion of the application area)	14.69	5,160	75,800.40
	Shire of Goomalling (68.3 per cent of this portion of the application area)	31.66	2,140	67,752.40
	Subtotal	***46.35***		***$143,552.80***
Pinjarra-Williams Road reserve (6.51 hectares, of which 6.333 hectares is in 'Good' or better condition)	Shire of Williams (100 per cent of this portion of the application area)	50.25	2,520	126,630.00
	Subtotal	***50.25***		***$126,630.00***
Williams-Kondinin (Narrogin) Road reserve (5.25 hectares, of which 4.33 hectares is in 'Good' or better condition)	Shire of Williams (33.6 per cent of this portion of the application area)	11.56	2,520	29,131.20
	Shire of Narrogin (66.4 per cent of this portion of the application area)	22.84	2,600	59,384.00
	Subtotal	***34.4***		***$88,515.20***
	TOTAL	131		$358,698.00

Disclaimer: This document is DER's preliminary assessment based on information available as at 21 February 2017. This document is not a final report and does not constitute a decision on the application to clear native vegetation

Page 14 of 14