Jacobs

Native Vegetation Clearance

Riddoch Highway – Central Overtaking Lane Data Report

Clearance under the *Native Vegetation Regulations 2017*

12 April 2021 (minor updates 20 July 2021)

Prepared by Accredited Consultants Katie Fels, Dr Zeta Bull, Dr Sonia Croft and Dr Lucy Clive (not accredited) on behalf of DIT

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1. Application information

Application Details

Applicant:	Department for Infrastructure and Transport (DIT)		
Key contact:	Catherine Gray (DIT, Senior Environmental Advisor)		
Landowner:	Road easement owned by the Commonwealth Government and managed by DIT, but may impact the frontage of several private properties adjacent the footprint to accommodate earth works.		
Site Address:	The Central Overtaking Lane (COTL) is a north bound overtaking lane located on the Naracoorte to Edenhope Road approximately 18 km south-east of Naracoorte (Figure 1). The COTL starts 200m south of Riddoch Highway-Tintagel Road intersection and finishes approximately 620 m north of the Riddoch Highway-Hoods Lane intersection (from MMP 128 to MMP 131).		
Local Government Area:	Naracoorte Lucindale Council Area	Hundred:	Joanna
Title ID:	CT5445/298 NA for road reserve CT6122/766 CT5585/656 CT5679/914 CT5274/174	Parcel ID	D13497 A60 NA for road reserve D38500 A100 F205720 A374 D49415 A99 D49415 A100

Summary of proposed clearance

Purpose of clearance	Clearance is required to accommodate the Riddoch Highway Central Overtaking Lane (COTL, approximately 1.5 km long) and associated road furniture, drainage and safety features as required by relevant standards.
Native Vegetation Regulation	The project falls under Part 6 – Other Activities, Regulation 12, Clause 32 (Works on Behalf of Commissioner of Highways) of the Native Vegetation Regulations 1997. This clause relates to *"clearance of vegetation incidental to work being undertaken by or on behalf of the Commissioner of Highways (other than repair or maintenance work of a kind referred to in Part 1, Clause 2)"*.
Description of the vegetation under application	This project will require the removal of mostly scattered native paddock trees and amenity plantings as follows: Vegetation under application: • **Scattered Paddock Trees** – **21 trees in total removed**, including 6 River Red Gum (*Eucalyptus camaldulensis*) (5 individual and 1 from clump I), and 15 Blackwood Wattle (*Acacia melanoxylon*) (5 adults, 10 juveniles, as a roadside clump surrounded by exotic pasture). • **Scattered Paddock Trees** – **up to 4 trees in total trimmed,** all River Red Gum (*Eucalyptus camaldulensis*) (1 individual minor prune, 3 major prune (25-50%)

	Amenity vegetation not under application (refer DIT data report and data sheet, DIT internal approval required):
	• Amenity Trees (not subject to NV Act) – 2 amenity trees both exotic *Poplus* sp.
	• Amenity Shrub (not subject to NV Act) – 1 amenity shrub in total, including 1 Trailing Hop-bush (*Dodonaea viscosa* ssp. *angustissima*)
	• Amenity Patches (not subject to NV Act), 0.222 ha in total:
	  • 0.022 ha of Amenity Patch 1 (C_AP1) comprised of exotic *Eucalyptus* sp., 2 River Red Gum (*Eucalyptus camaldulensis*), 3 exotic *Acacia* sp., 1 Drooping She-Oak (*Allocasuarina verticillata*), 1 *Melaleuca* sp., 1 *Pinus* sp., 1 *Callistemon* sp., and 1 Australian Blackwood (*Acacia melanoxylon*)
	  • 0.107 ha of Amenity Patch 3 (C_AP3) comprised of planted River Red Gum (19 *Eucalyptus camaldulensis*, 6 *Eucalyptus leucoxylon* ssp. and 1 *Dodonaea viscosa* ssp.)
	  • 0.028 ha of Amenity Patch 6 (C_AP6) comprised of 10 planted *Eucalyptus* sp.
	  • 0.065 ha of Amenity Patch 7 (C_AP7) comprised of 10 planted River Red gum (*Eucalyptus camaldulensis*).

Total proposed clearance - area (ha) and number of trees	Total proposed clearance subject to the NV Regulations: • 21 scattered paddock / roadside trees, includes clearance of 6 River Red Gums (1 from a clump of 2) and 15 Blackwood Wattle (includes clump of 5 adult and 10 juvenile Blackwood Wattle), • Up to 4 scattered paddock / roadside trees (*Eucalyptus camaldulensis*) subject to minor or major pruning (major prune of 3 RRG (2 in a clump, 1 individual, minor prune of 1 RRG)
Level of clearance	Level 4 (Level 3 (>20 trees, TBS is 66.59), with escalating factors, however moderating factors suggest remain Level 3)
Overlay (Planning and Design Code)	This project is not subject to a development application (refer Section 2.5 below).
Map of proposed clearance area (show as a minimum; property boundary and proposed clearance area)	

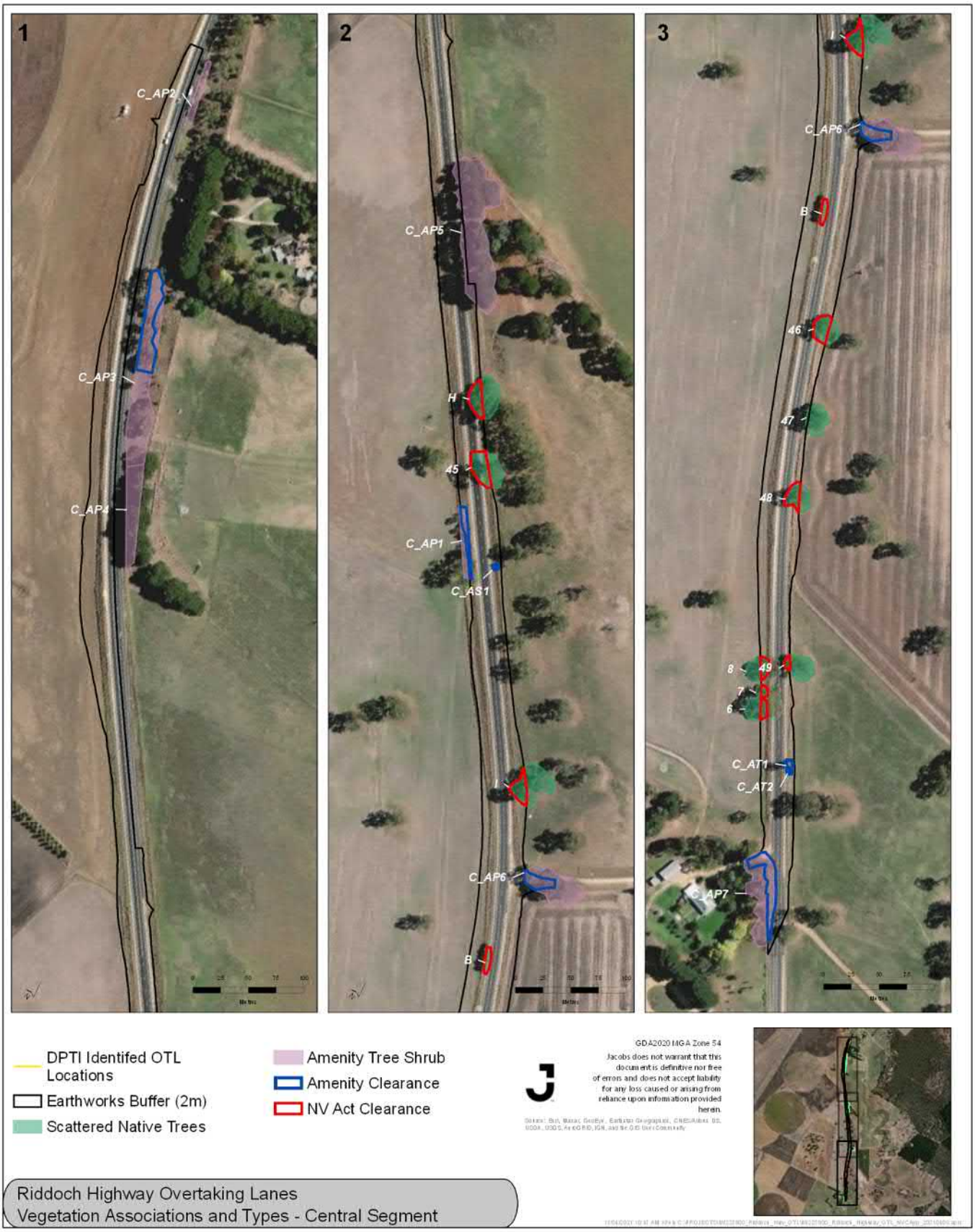

Figure 1: Proposed clearance based on 100% Final Design (2m buffer boundary) for the COTL

Mitigation hierarchy	The project has considered avoidance and minimisation of impact to the environment at all stages of the project thus far, from pre-feasibility through to concept and detailed design, in conjunction with design safety requirements and minimised construction envelopes. An initial feasibility study was completed by DIT (then DPTI) in 2012. This study provided a cost v benefit analysis, considering avoidance (do nothing case) and minimisation (do something case(s)) of impact to a range of factors including ecological (and other) environments. From this, DIT determined that the project was of sufficient value to proceed and identified three preferred options that represented a compromise between the factors considered and specifically minimise impact to scattered native trees. The overtaking lane design has been developed to retain the existing horizontal road alignment as much as possible, thereby minimising the disturbance footprint and associated impacted to native vegetation. Minor adjustments have been made only, and include curve widening for all curves and increasing nearside shoulder widths to 2.0m, enabling the road to cater for the new PBS level 3 design vehicles and to accommodate a 1.4m wide centre line treatment. Both upgrades are in line with current road design standards implemented to enhance road safety and reduce the likelihood of head-on collisions. To further minimise impact to native vegetation within or near the road corridor, 1(vertical) to 3(horizontal) batter slopes with safety barrier protection have been implemented wherever possible (i.e. where sight visibility requirements are not impacted). Where not possible, batter slopes have been designed as 1(vertical) to 6 (horizontal) slopes to provide an acceptable balance between motorist safety, cost of construction and potential impact to native flora and fauna. This application is based on the final design provided in April 2021. Please note: The likely impact on existing vegetation (including the Structural Root Zone (SRZ)) has been determined based on the Issued for Approval (IFA) design and an estimated 1.5m construction area (i.e. construction activities including plant and vehicle movement are expected to be contained to within 1.5m of the edge of design). However, it is noted that the calculated impact is an estimate only. The real impact is dependent on the final Issued for Construction (IFC) design, the selected Construction Contractor and their proposed construction methodology. It is recommended that the vegetation impacts described in this document are reviewed and confirmed by the Construction Contractor and / or a qualified arborist and following the mitigation hierarchy where safety allows.
SEB Offset proposal	To offset clearance of 6 scattered paddock River Red Gum trees and 15 Blackwood Wattle trees (adults and juveniles) as a clump, and minor/major pruning of up to 4 paddock River Red Gums: • TBS of the application = 60.14 (as per scattered tree sheet, error in clearance summary formula) • 44.11 SEB Points required, $35,418.15ex-GST (SEB payment + Admin fee) ***Offset via payment into the NVC fund***

2. Purpose of clearance

2.1 Description

The Riddoch Highway (the Highway) is a 240-kilometre state-maintained highway between Keith and Port MacDonnell, near the South Australia's south eastern border with Victoria. The highway is vital for tourism, and primary production industries in the region, linking the high timber producing Limestone coast to the major road network in South Australia.

Clearance is required to permit the installation of a north bound overtaking lane (approximately 1.9 km long) with associated road furniture, drainage and safety features as required by relevant standards. The project will provide a safer method of travel, avoiding the need to enter the oncoming traffic lane when overtaking slower vehicles. The project will also improve stormwater drainage infrastructure within the road reserve, reducing the risk of the road being inundated during events of high rainfall.

2.2 Background

The land-uses within the project area (including a 1 km buffer) include:

- Agriculture & Livestock (west)
- Rural residential (east & north-east)
- Horticulture (east)
- Forestry (east)
- Commonwealth Road Reserve (within which the development is mostly located).

From review of the available aerial photography (earliest 1966, latest 2020). the Study Area and surrounding areas appear predominantly unchanged, with scattered horticultural (vineyards and cropping) land uses over historic cleared land within the 150 m buffer.

The COTL is one of three overtaking lanes being considered for the Riddoch Highway to significantly improve road safety for this major transport route. Potential project areas were initially identified by DIT, and have undergone refinement through consideration of engineering, safety and environmental constraints.

The three overtaking lanes are located:

- 20 km north of Naracoorte, accommodating south-bound traffic (Northern Overtaking Lane or NOTL)
- 18 km south of Naracoorte, accommodating north-bound traffic (COTL, this report)
- 5 km north of Coonawarra, accommodating south-bound traffic (Southern Overtaking Lane or SOTL).

This report is the native vegetation clearance approval for the COTL.

2.3 General location map

The COTL is a north bound overtaking lane located on the Naracoorte to Edenhope Road approximately 18 km south-east of Naracoorte. The COTL starts 200m south of Riddoch Highway-Tintagel Road intersection and finishes approximately 620 m north of the Riddoch Highway-Hoods Lane intersection (from MMP 128 to MMP 131).

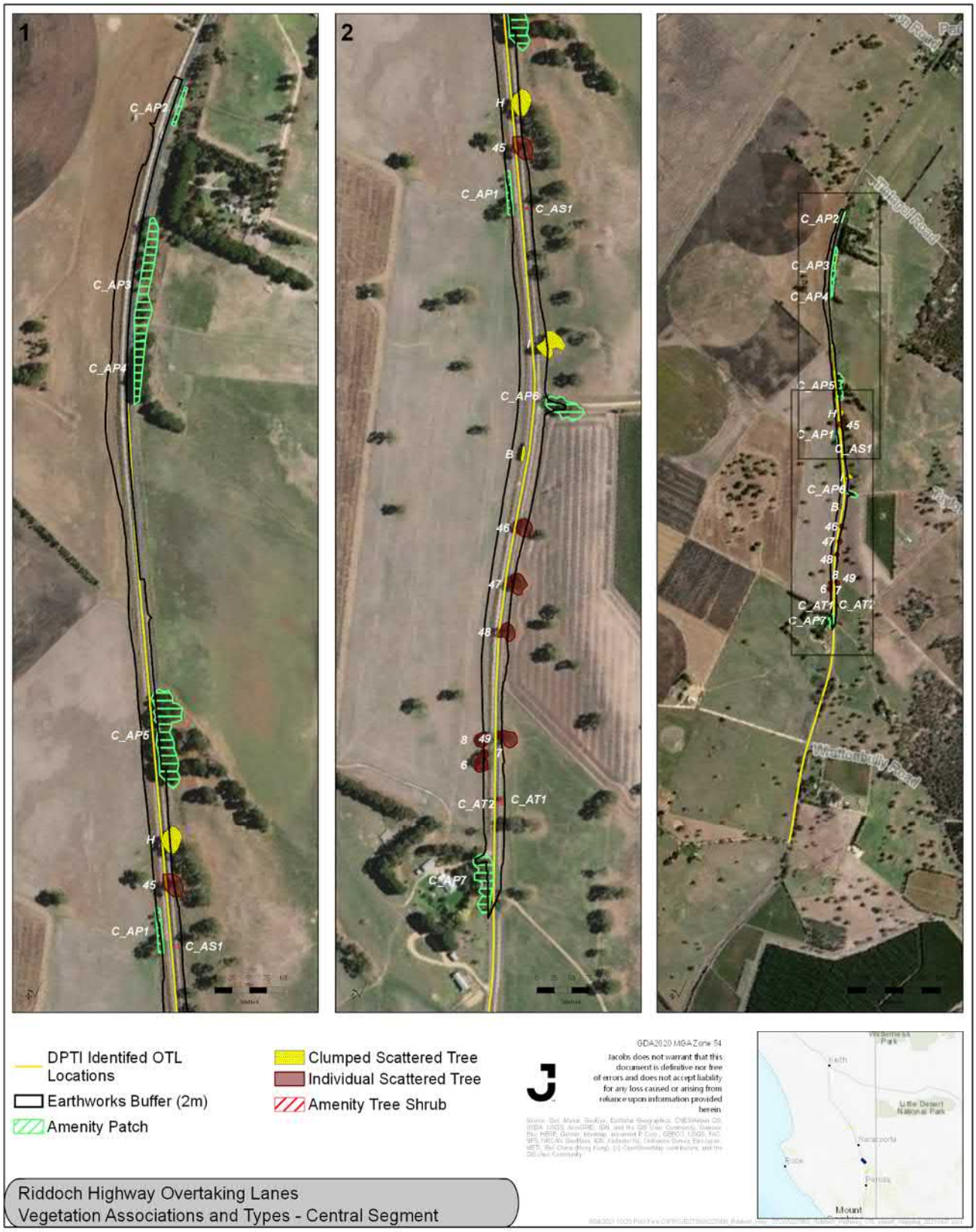

Figure 2: Riddoch Highway Central Overtaking Lane Project Area

2.4 Details of the proposal

Refer to Riddoch Highway EHIAR report and 100% design reports for the COTL. Refer to DIT Vegetation Survey Data sheet for information related to Structural Root Zone and proposed site specific construction impacts (e.g. SRZ impacts related to fencing, trenching, pavement or line of site).

2.5 Approvals required *or* obtained

The main approval required for this project relates to native vegetation removal and is the subject of this data report. Additional information is provided in regard to other relevant legislation and why it is / is not applicable each case.

Native Vegetation Act 1991* and *Regulations 1997

Removal of native vegetation is necessary. Clearance approval and offsetting will be required for the removal of any native vegetation (the subject of this data report). Risk Level is 4, as per DIT Vegetation Removal policy (2020) (i.e. approval via General Manager, Infrastructure Delivery (GMID) & Native Vegetation Assessment Panel (NVAP)), due to escalating factors (Seriously at Variance with Principle 1b), however moderating factors could reduce the clearance to Level 3. Twenty one trees are proposed for clearance with a TBS of 60.14 (including 6 River Red Gums and 15 Blackwood Wattle (as a roadside clump surrounded by pasture). An additional 2 River Red Gums likely require minor pruning, and 2 River Red Gum clumps (of 2 trees each) are likely to require major pruning. In total, 25 trees are likely to be impacted by the development.

All native vegetation clearance will be offset by DIT through payment into the NV fund.

Amenity Vegetation clearance (DIT internal) approval and offsetting will also be required for the removal of Amenity Vegetation. DIT will offset all amenity vegetation losses 1:1.

Planning, Development and Infrastructure* (PDI) *Act 2016

The proposed works do not require Development Approval, as works for the construction or alteration of a road by the Crown (DIT) is exempt pursuant to section 3 of the PDI Act.

The project also falls outside of the designated area in which the Regulated and Significant tree controls apply – which is limited to the whole of Metropolitan Adelaide (with exceptions), and parts of the Adelaide Hills Council and the District Council of Mount Barker (with exceptions).

Water Resources Act 1997

No additional water will need to be sourced or licensed for the construction of the overtaking lane.

Environment Protection and Biodiversity Conservation (EPBC) Act 1999

The project has been assessed as not having a significant impact upon any related Matter of National Environmental Significance, and therefore EPBC referral is not required and has not been undertaken.

National Parks and Wildlife (NPW) Act 1972

The project is not impacting directly on and state reserves. Flora (material or seed) will not be collected as part of this project. The project has been assessed as not having a significant impact upon any endangered, rare or vulnerable species as listed by the schedules of this Act. A desktop likelihood assessment has been undertaken and well as a

more detailed significant impact assessment for relevant EPBC listed species (Appendix 1.2 in the EHIAR package). Refer section 3 and 4 for further information.

Landscapes South Australia Act 2019

The project seeks to remove, replace and install culverts to divert overland waters. As such, advice was sought from the Limestone Coast Landscape Board and the South East Water Conservation and Drainage Board regarding the need for a Water Affecting Activity Permit and/or Private Water Management Works Licence, respectively.

Representatives from both Boards have confirmed the nature of works do not trigger the need for a Water Affecting Activity Permit and/or Private Water Management Works Licence.

A permit will be sought (if required) from the relevant Limestone Coast Landscapes SA Board to remove, transport and seek appropriate disposal of any Declared or WoNS removed during the land clearance required for this project.

Aboriginal Heritage Act 1988

A desktop assessment of Aboriginal (and non-Aboriginal) heritage was undertaken but did not note result in any locations or items of note requiring protection or relocation (see DIT EHIAR). In relation to Native Title, on 10 November 2017, the Native Title claim of the First Nations of the South East #1 was accepted for registration by the National Native Title Tribunal and entered on the Register of Native Title Claims (NNTT No. SC2017/002). At the time of writing, a decision regarding the application of Native Title to land within the project area remains undetermined (i.e. no land has been determined yet to be subject to Native Title). A decision regarding the application of Native Title to land is anticipated in 2021.

Environment Protection Act 1993

With a shallow water table present across much of this region, construction activities may require an Earthworks Drainage License from the EPA to dispose of excess water.

2.6 Native Vegetation Regulation

The project falls under Part 6 – Other Activities, Regulation 12, Clause 32 (Works on Behalf of Commissioner of Highways) of the Native Vegetation Regulations 1997. This clause relates to *"clearance of vegetation incidental to work being undertaken by or on behalf of the Commissioner of Highways (other than repair or maintenance work of a kind referred to in Part 1, Clause 2)"*.

Vegetation clearance and offsetting will be processed in accordance with DIT's vegetation Removal Policy (Standard Operation Procedure endorsed by the Native Vegetation Council (NVC)). As the vegetation removal has been assessed as a Level 4 clearance, the project will require:

- Level 4 (Level 3 with escalating factors, however moderating factors may remain at Level 3) – if Level 4 endorsement required by DIT General Manager, Infrastructure Delivery (GMID) and approved by the Native Vegetation Assessment Panel (NVAP), if Level 3 approval by PEA and NVC Delegate (NVB).

2.7 Development Application information (if applicable)

Not applicable (see Section 2.5 above).

3. Method

3.1 Flora assessment

The flora data contained within the report has been compiled from desktop and in-field assessment.

DESKTOP

Searches of publicly available information about the Study Area (i.e. 5km sections of road, with 5 km buffers) included:

- The EPBC Act *1999* Protected Matters database via the online Protected Matters Search Tool (PMST) with a 5 km buffer (see Appendix 1).
- Department for Environment and Water (DEW) Biological Databases of South Australia (BDBSA) data output with a 5 km buffer.
- DEW NatureMaps (2020)
- General ecology flora reference materials, including Bushland Condition Monitoring (BCM) classifications for South East native vegetation communities (Milne and Croft 2012).
- Consideration of the DIT Vegetation Removal Policy (DIT 2020)
- Consideration of the Native Vegetation Regulations 2017 under the *Native Vegetation Act 1991*, Bushland Assessment Manual (NVC 2020a), Significant Environmental Benefit Offset Policy and Guidelines (NVC 2020b) and NVC Scattered Tree Guidelines (NVC 2020c).

The EPBC Act online Protected Matters Search Tool (PMST, Appendix 1) was used to identify any flora or ecological communities of national environmental significance potentially occurring within the wider Study Area and the Project Areas.

The BDBSA extract was obtained from DEW (February 2020) to identify flora species previously recorded within a 5 km buffer around the road alignment (the Study Area). The 5 km buffer provides a higher probability of records in an area with a general paucity of data. The BDBSA is comprised of an integrated collection of corporate databases which meet DEW standards for quality data, integrity and maintenance (Department for Environment and Water 2019). This data is included under agreement with the partner organisation for ease of distribution.

INFIELD ASSESSMENT

Field assessment was undertaken on 30th and 31st March 2020 by Jacobs ecologists (Dr Sonia Croft, Native Vegetation Accredited Consultant, and Dr Lucy Clive, graduate ecologist). Ecological information was collected according to the DIT Vegetation Removal Policy (2020), Native Vegetation Council Bushland Assessment Methodology (NVC 2020a) and the Native Vegetation Council Scattered Tree Assessment Manual (NVC 2020c), where applicable. It is noted that only publicly accessible areas were accessed during this survey. A photo appendix was prepared of all vegetation assessed (Appendix 2).

The assessment identified potential flora (and fauna, refer Section 3.2 below) constraints associated with the project.. Both sides of the approximate 1.5 km road corridor were surveyed, up to 10 m from the edge of the road, or until the perimeter fence of the adjacent property.

The following definitions were applied to the field assessment:

- **Amenity Tree:** A tree which, by virtue of its size and aesthetic qualities, provides amenity. Amenity trees do not include native vegetation as defined by the *Native Vegetation Act 1991* or declared plants or environmental weeds (with the exception of environmental weeds that are planted and have amenity value). Amenity trees are usually planted trees but may include self-sown plants if they have high amenity value (DIT 2020). Each amenity tree was given an individual code (e.g. AT 1).
- **Amenity Patch:** A patch that has amenity / planted vegetation dominant in the understorey. An amenity patch may also include amenity trees with or without understorey. General details about the species, size and

number of amenity trees are collected, but each tree is not given an individual tree number. Each amenity patch was given an individual code (e.g. AP 1).

- **Amenity Shrub**: Shrubs are not clearly defined in the DIT policy but is mainly related to larger shrub species that are tree-like, e.g. tall Acacias or spreading Melaleucas. For the purpose of offset, these types of shrubs would be treated like an amenity tree. Smaller shrubs / bushes would be classed as a patch or within a patch.
- **Environmental Weeds:** Native or exotic species that invade and degrade native vegetation (DIT 2020). For the purpose of this report, environmental weeds are those listed in the DPTI Weeds List, available from link at https://www.dpti.sa.gov.au/standards/environment
- **Major prune:** Removal of limbs or severing roots greater than 10% of the biomass of the tree (DIT 2020)
- **Native Vegetation:** A plant or plants of a species indigenous to South Australia including:
    - A plant or plants growing in or under waters of the sea.
    - Dead trees, with trunk circumference > 200 cm (> 100 cm on Kangaroo Island), measured at 300 mm above natural ground level, which provide habitat for threatened species listed under the EPBC Act.
    - Also includes vegetation that was sown or planted to comply with a condition of clearance approval under the Native Vegetation Act.
- **Tree / Scattered Tree:** For the purpose of the DIT Policy, the department defines a 'tree' as a plant with a butt diameter of 0.15 m or greater measured at 1 m above the natural ground level, or for multi-stemmed trees, with one or more stems with a butt diameter 0.1 m or greater measured at 1 m above natural ground level (see Table 3.1 of the policy for where this definition is applied).
  For Native Vegetation assessments, 'scattered trees' are defined by the Scattered Tree Assessment Manual (NVC 2019b) guidelines as naturally occurring indigenous trees, usually two or more meters in height that occur over little or no native understorey (DIT 2020). However, height can vary depending on the species and habit. In some instances, trees < 2 m may be considered scattered trees, and some >2 m in height may still be classed as saplings (DIT 2020). **Clumps** as per NVC scattered tree manual.
- **Overlapping areas:** As per discussion with DIT, where there is overlap of native vegetation understorey and/or overstorey and amenity trees, both vegetation types are delineated. Similarly, where scattered trees occur within highly degraded native vegetation patches, both areas will be delineated to assist with offsetting.
- **Regulated / Significant trees:** A tree is considered a Regulated tree if it is declared to be a significant tree, or a tree within a stand of trees declared to be significant trees, by a Development Plan (whether or not the tree is also declared to be a regulated tree, or also falls within a class of trees declared to be regulated trees, by the regulations). That declaration overrides the definition (and exclusions) in the Development Regulations.

This project falls outside the designated area in which the Regulated and Significant tree controls apply – which is limited to the whole of Metropolitan Adelaide (with exceptions) and parts of the Adelaide Hills Council and the District Council of Mount Barker (with exceptions), in accordance with Regulation 6A(3) of the Development Regulations, 2008

3.2 Fauna assessment

The fauna data contained within the report has been compiled from desktop and in-field high level habitat assessment. Desktop assessments indicated that detailed fauna trapping and targeted assessments was not required (refer Appendix 3 for further detail).

DESKTOP

Searches of publicly available information about the Study Area (i.e. 5km sections of road, with 5 km buffers) included:

- The EPBC Act *1999* Protected Matters database via the online Protected Matters Search Tool (PMST) with a 5 km buffer (see Appendix 8.1).
- Department for Environment and Water (DEW) Biological Databases of South Australia (BDBSA) data output with a 5 km buffer.
- DEW NatureMaps (2020)
- General ecology fauna reference materials

The EPBC Act online Protected Matters Search Tool (PMST) was used to identify fauna of national environmental significance, including listed threatened and migratory species potentially occurring within the wider study area and ultimately the project areas.

The BDBSA extract was obtained from DEW (February 2020) to identify fauna species previously recorded within a 5 km buffer around the road alignment (the study area). The 5 km buffer provides a higher probability of records in an area with a general paucity of data and allows for records of mobile fauna (mostly birds) that have been recorded more broadly in the region. The BDBSA is comprised of an integrated collection of corporate databases which meet DEW standards for quality data, integrity and maintenance (Department for Environment and Water 2019). In addition to DEW biological data, the BDBSA also includes data from partner organisations (Birds Australia, Birds SA, Australasian Wader Study Group, SA Museum, and other State Government Agencies).

The desktop assessment included a likelihood of occurrence assessment and following field survey a significant impact assessment for EPBC listed species considered possible or likely to occur (Refer to Section 1.2 of the EHIAR).

INFIELD ASSESSMENT

The ecological assessment undertaken on 30th and 31st March 2020 included:

- An opportunistic fauna assessment undertaken concurrently with the vegetation survey, which included recording signs of fauna (scats, tracks, nests, holes and other traces) and any animals observed utilising the habitat (predominantly birds). No trapping or invasive methods were employed (fauna permitting not required), noting that these methods would be unlikely to yield reliable results due to the location immediately adjacent a busy road corridor (refer EHIAR for further details).
- An infield assessment was made as to the value of habitat for potential threatened fauna listed under the EPBC Act and NPW Act and identified as potentially present by the desktop assessment (e.g. Striped Legless Lizard, Red and Yellow-tailed Black Cockatoos) (refer Appendix 1.2 of the EHIAR for further details).

4. Assessment Outcomes

4.1 Vegetation Assessment

General description of the vegetation, the site and matters of significance

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information (Thackway and Cresswell 1995). The bioregions are further refined into subregions and then environmental associations. The COTL lies within the:

- Naracoorte Coastal Plain (NCP) bioregion
- Lucindale IBRA Subregion, or which there is an estimated 13 % remnant of native vegetation

Table 1 summarises key characteristics that describe the Lucindale IBRA Subregion (Nature Maps 2020).

Table 1: Vegetation, Landform, Geology and Soils of the Lucindale IBRA Subregion (NCP03)

Vegetation	The vegetation of this subregion is dominated by eucalypt woodlands with a shrubby understorey. Approximately 13% (93,770 ha) of the subregion is mapped as remnant vegetation, of which 30% (28,477 ha) is protected.
Landform	Swampy coastal plain with clayey lagoon deposits. Swampy plain overlain in large areas by gentle dunes and sheets of white arid sand. Adjacent to coast indurated dunes of calcareous sand and dunes of orange sand. The COTL is not intersected by any major watercourses or drainage lines, but is subject to general cross landform drainage.
Geology	Sequence of stranded beach ridges (Tertiary); silicified & ferruginised sands (Karoonda Surface); Ripon calcrete
Soil	Nomopodsols, sandy leptopodsols, solodic soils, swamp soils, rendzinas & terra rossas

The native vegetation in the region of the COTL project is in keeping with that described by the Glenroy IBRA Association; scattered remnant paddock trees mostly River Reg gum (*Eucalyptus camaldulensis*) with some smaller Blackwood (*Acacia melanoxylon*), together with sparse roadside, rural and residential amenity tree plantings (various locally indigenous, non-indigenous and exotic species), over very sparse (if any) remnant native understorey scattered amongst a mixture of common exotic pasture grasses. The native vegetation remaining is highly fragmented and of varying quality, surrounded by agricultural landscape of cropping and pasture. The footprint itself is not mapped as native vegetation in Nature Maps (NatureMaps, 2020).

The site is located in the Limestone Coast Region and falls within the area covered by the *Native Vegetation Act 1991*. Protected conservation assets within the broader region include:

- Hacks Lagoon Conservation Park is 6 km northwest from the northern end of the Central OTL footprint.
- Bool Lagoon Game Reserve is approximately 6.3 km west of the Central OTL footprint.
- Naracoorte Caves and the Naracoorte Caves National Park are 3 km north east of the northern end of the Central OTL footprint.
- Glen Roy Conservation Park is approximately 10 km south of the southern end of the Central OTL footprint.

The footprint avoids native vegetation patches (Heritage Agreement areas 344, 731 - 750 m and 3.5 km) and pine plantations to the east of the project area. These vegetation heritage agreement areas, as well as Bool and Hacks Lagoon and Naracoorte Caves are all mapped as greater than 50 ha vegetation patches and are considered important for habitats for local fauna.

Heritage Agreement Areas 344 and 731 are mapped as Eucalypt Forest and Woodland and include *Eucalyptus arenacea / baxteri*. These areas, along with the exotic pine forests to the east and south of the OTL footprint would provide suitable habitat for the SE Red-tailed Black Cockatoo (EPBC and NP listed as endangered) and the Yellow-tailed Black Cockatoo (NPW listed as rare), see 3.1.2 of the EHIAR.

The footprint itself is not mapped as native vegetation in Nature Maps (NatureMaps, 2020).

Details of the vegetation associates/scattered trees proposed to be impacted

Table 2 describes 26 scattered individual or scattered clump remnant trees likely to be impacted by the project. Most of the trees are moderate in size, and in moderate to good condition. The scattered native paddock trees are recognised as providing stepping-stone habitat to more mobile native fauna in the region, in a landscape where the native understorey habitat has been completely cleared. While the scattered trees may provide habitat for threatened birds and bats, it is likely to be temporary roosting habitat only given the landscape context, lack of diversity, and small size and number of hollows (Table 2). Refer Scattered trees summary for additional information, noting that an additional free (number 47) that is adjacent the footprint, will not be impacted, this tree has more hollows.

Twenty-six trees are proposed to be impacted in the project footprint. Of these, 21 will be removed, two will receive major pruning (clump of 2 River Red Gums) and two will receive minor pruning. It is noted that 15 of the trees are a clump of Blackwood Wattles (5 adults and 10 juveniles, adjacent a fence and surrounded by pasture. Every effort has been made to avoid and minimise removal of trees and thus impact to native vegetation, through implementation of minimalistic design and construction envelopes and the micro-siting of works within the broader landscape.

Table 2: Scattered trees (individual and clumps)

Tree (T) or Clump (C) #	Tree spp.	No. of trees	Height (m)	Hollows	Diam. (cm)	Canopy dieback (%)	Total Biodiversity Score (TBS)	General comments	Photo #[1]
T-6	*Eucalyptus camaldulensis* var. *camaldulensis*	1	18.0	0	150	5	6.49	TO BE REMOVED. U/S: Exotic. Dense Phalaris to 1.2 m, plus *Dactylis glomerata*, *Cenchrus clandestinus*. Sparse *Lactuca serriola* and Conyza on edge of road shoulder.	Plate 10-4
T-7	*Eucalyptus camaldulensis* var. *camaldulensis*	1	16.0	0	70	10	3.32	TO BE REMOVED. U/S: Dense Phalaris, *Dactylis glomerata* and *Cenchrus clandestinus*	Plate 10-5
T-8	*Eucalyptus camaldulensis* var. *camaldulensis*	1	15.0	0	80	0	.73	TO BE REMOVED. U/S: Dense Phalaris and *Dactylis glomerata*.	Plate 10-6
T-45	*Eucalyptus camaldulensis* var. *camaldulensis*	1	19.0	3	160	5	8.69	TO BE REMOVED.	Plate 10-7
T-46	*Eucalyptus camaldulensis* var. *camaldulensis*	1	15.0	4	90	10	4.70	TO BE REMOVED.	Plate 10-8
T-47	*Eucalyptus camaldulensis* var. *camaldulensis*	1	16	1	2	1	**6.46**	**To be avoided**	Plate 10-9
T-48	*Eucalyptus camaldulensis* var. *camaldulensis*	1	17.0	3	90	0	6.44	MINOR PRUNE.	Plate 10-10
T-49	*Eucalyptus camaldulensis* var. *camaldulensis*	1	16.0	3	80	5	4.83	MINOR PRUNE.	Plate 10-11
C-B	*Acacia melanoxylon*	15	5.0	0	12	0	4.68	TO BE REMOVED. Approx. 10 adults & 5 juveniles. U/S: Dense Phalaris +/- *Dactylis glomerata* fringed by sparse *Conyza bonariensis* (Fleabane)	Plate 10-1
C-H	*Eucalyptus camaldulensis* var. *camaldulensis*	2	14.0	0	70	10	7.97	MAJOR PRUNE	Plate 10-2
C-I	*Eucalyptus camaldulensis* var. *camaldulensis*	2	15.0	0	80	5	9.3	50% removal of clump, i.e. remove 1 tree	Plate 10-3

1 Refer Photo Log (Appendix 2), Scattered Tree Assessment Scoresheet (Appendix 4), Clearance Summary Report (Appendix 5) and DIT Scoresheet (Appendix 6).

In addition to the native vegetation discussed above, the survey recorded the following amenity vegetation which will be impacted, but is not subject to clearance approval; recorded here for completeness (Table 3). As per DIT's SOP, any amenity plantings lost will be offset at a ratio of 1:1 within the region or via payment into DIT's amenity planting fund.

Table 3: Amenity Plantings (Not Subject to NV Clearance Approval)

Amenity Tree / Patch #[1]	Description
C_AS1	Amenity Shrub 1: TO BE REMOVED. Trailing Hop-bush (*Dodonaea viscosa* ssp. *angustissima)*. U/S: Dense Phalaris plus about 10% cover of *Pteridium esculentum* plus Scabiosa, Dactylis, *Plantago lance*
C_AT1	Amenity Tree 1: TO BE REMOVED. U/S: Phalaris - Dactylis
C_AT2	Amenity Tree 2: TO BE REMOVED. U/S: Phalaris - Dactylis
C_AP1	Amenity Patch 1: TO BE REMOVED. Exotic Eucalypts (x 5), *Eucalyptus camaldulensis* (x 2), Exotic Acacias (x 3), All vert (x 1), Melaleuca sp (x 1), Pinus sp (x 1), Callistemon sp (x 1), *Acacia melanoxylon* (x7). U/S: Dense Phalaris +/- *Dactylis glomerata*, *Plantago lanceolata*, Conyza
C_AP5	Amenity Patch 5: Retain/avoid. Pinus sp. sparse grassy understorey
C_AP6	Amenity Patch 6: TO BE REMOVED. Eucalyptus spp.
C_AP7	Amenity Patch 7: TO BE TRIMMED (MAJOR PRUNE). River Red Gum (*Eucalyptus camaldulensis*). U/S: Some Dianella and Agapanthus
C_AP3	Amenity Patch 3; TO BE PARTIALLY REMOVED FOR LINE OF SITE SAFETY. 18 trees from patch of *Eucalyptus camaldulensis* (x 19); Eucalyptus leucoxylon ssp (x 6) *Dodonaea viscosa ssp* (x 1)
C_AP4	Amenity Patch 4: TO BE RETAINED, *Cupressus macrocarpa* (Monterey Cypress) patch

1 Refer Photo Log (Appendix 2), Scattered Tree Assessment Scoresheet (Appendix 4), Clearance Summary Report (Appendix 5) and DIT Scoresheet (Appendix 6).

<u>Site map</u> showing areas of proposed impact

Please refer Figure 2.

Photo log

Refer Photo Appendix 2.

Assessment and summary scoresheets

Refer also Appendix 4 (Scattered Tree Assessment Scoresheet), Appendix 5 (Clearance Summary Report) and Appendix 6 (DIT scoresheet).

4.2 Threatened Species assessment

A 5km buffer was applied to the project area, herein referred to as the "study area".

Given the lack of native remnancy, broadscale clearance and disturbance in the region where the project is situated, and location adjacent a major highway, this environment does not provide core / critical habitat for NPW Act or EPBC Act threatened flora or threatened communities, but does provide occasional roosting and foraging habitat for some threatened species if locally present

The limited habitat for fauna includes scattered native trees and amenity trees that could be used for roosting and foraging by common and threatened fauna (if present). This vegetation is not considered core vegetation for the fauna of the region but could provide temporary, stepping-stone habitat for more mobile species. Better quality habitat occurs in the vegetation Heritage Agreement Areas, Roadside Significant Sites, Hack's lagoon, Bool's Lagoon, Pine Plantations and Conservation Parks northeast and east of the footprint and the nearby Glen Roy Conservation Park, which will not be impacted by this project in any way.

EPBC Listed Species

The 5 km PMST output for the footprint identified 15 EPBC listed as threatened fauna and 12 EPBC listed as Migratory species with potential to occur in the area, of which 2 species (or species habitat) are known to occur; South-eastern Red-tailed Black-Cockatoo (*Calyptorhynchus banksii graptogyne*) and Growling Grass Frog (*Litoria raniformis*) (Appendix 1). There were BDBSA records for three EPBC species; South-eastern Red-tailed Black-Cockatoo, White-throated Needletail (*Hirundapus caudacutus*), Growling Grass Frog. There are no BDBSA records for the other threatened EPBC listed species or any of the migratory species within 5km of the project area. An EPBC listed Significant Impact Assessment was undertaken for the Striped Legless Lizard and the Red-tailed Black-cockatoo (See complete memo as Appendix 1.2 of the EHIAR). Scattered Trees were not considered suitable habitat for the Legless Lizard, hence only 1 EPBC listed threatened fauna (Red-tailed Black Cockatoo) was added to the appropriate column in the scattered tree scoresheet, noting that preferred roosting trees are generally taller than 23 m, much larger than the trees proposed for clearance.

The EPBC PMST report listed one aqautic species (Eastern Dwarf Galaxias, *Galaxiella pusilla*) as known to occur in the study area but has been excluded from further discussion in Table 4 due to the terrestrial nature of the proposed works.

One EPBC listed flora was identified in the PMST as being known (or with suitable habitat that is known) to occur within the study area: Bell Flower Hyacinth Orchid (*Dipodium campanulatum*).

NPW listed Species

Limited habitat for NPW Act listed species occurs within the footprint. There are records within 5 km of the project area for the Red-tailed Black Cockatoo (as mentioned above) as well as records for several threatened mammals and birds including the Yellow-tailed Black-cockatoo (also observed flying over the region during field survey). Core habitats for these species are not present within the footprint and will not be impacted by the project, however roosting habitat is present for some species (refer Table 4 below).

A range of other threatened species with the potential to occur within the 5 km study area have also been include below records as per the Scattered Tree Assessment Guidelines and Scoresheet requirements. The list of numbers of species to be included in the Scattered Tree Scoresheet was emailed to Adam Schutz 7/4/2021 for approval and updated assessment is attached, given some errors in the initial extract (Appendix 3).

Table 4: Species observed on site, or recorded within 5km (50km in the arid zone) of the application area since 1995, or the vegetation is considered to provide suitable habitat

Species (common name)	EPBC Act	NP&W Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments	Included in Scattered Tree Scoresheet Numbers
Birds							
Calyptorhynchus banksia graptogyne (South-eastern Red-tailed Black-cockatoo)	EN	E	1	1999	Endemic to the South-east of South Australia, this species occurs in a single population in a small area of south-eastern Australia delimited by Keith to Lucindale to Mt Gambier in South Australia (west of the project area) and also in Victoria. Restricted to Desert Stringybark *Eucalyptus arenacea* and Brown Stringybark *E. baxteri* woodlands occurring on deep aeolian sands in the Glenelg, Wimmera and Naracoorte Plains, and adjacent woodlands of River Red Gum *Eucalyptus camaldulensis*, Blue Gum *E. leucoxylon* and Buloke *Allocasuarina luehmannii* (Hill and Burnard 2001, Koch 2003) woodlands. The species requires very old, large hollow eucalypts for nesting (Joseph et al. 1991) with nests being recorded in *Eucalyptus camaldulensis, E. baxteri, E. arenacea, E. viminalis, E. leucoxylon* and *E. fasciculosa*. Species has also been recorded roosting in clumps of tall eucalypts. Whilst, River Red Gums may provide suitable perching habitat, core nesting and feeding habitat is not within the project footprint. Species not observed during survey	PMST suggests known to occur. **Possible**. No core feeding or nesting habitat in the project footprint. Trees present are approx. 75 years old with small to medium hollows that do not provide suitable nesting habitat. Trees may provide occasional roosting habitat, although preferred trees are generally >23m tall.	Yes (excluding clump of Blackwood Wattle)
Hirundapus caudacutus (White-throated Needletail)	VU	V	1	2004	An aerial insectivore that is sparsely present but widespread in eastern and south-eastern Australia. They occur over many habitats including forests, hills and coastal cliffs with updrafts, and whilst predominantly aerial, will sometimes roost in the outer foliage of tall trees as night approaches (Menkhorst et al, 2017). May be present as occasional visitor. Unlikely to be impacted given aerial nature and lack of habitat specialisation. Species not observed during survey.	PMST suggests may occur **Unlikely**. Species is aerial in nature and will likely pass over above the project footprint. However, trees within the project footprint may provide occasional roosting habitat.	No
Entomyzon cyanotis cyanotis (Blue-faced Honeyeater)	-	R	2	no	Scattered River Red Gums within the study could provide occasional, suitable habitat for this species. However species prefer riverine forest, gardens and rainforest.	**Possible -** core habitat not present	No

					Closest records for this species are known from the Naracoorte Caves region, with no verified recent records from the study or project area.		
Falcunculus frontatus frontatus (Crested Shrike-tit)	-	R	1, 2	2004	1 record. Occurs in Eucalypt forest and woodland, riparian eucalypts, rainforest.	Possible - core habitat not present	No
Falco peregrinus macropus (Peregrine Falcon)	-	R	1, 6	no	Widespread across Australia but generally uncommon to rare, this species builds no nests but uses ledges of cliff faces or sometimes large, very open tree hollows. Suitable nesting habitat is not present within the study area, which may provide general (not core) feeding habitat. No recent verified records exist for this species within the study or project area.	**Possible -** wide ranging and known to use River Red Gums	Yes
Ninox connivens connivens (Barking Owl)	-	R	2, 6	no	Less common in the SW and SE of Australia, this species is typically found in open country with stands of trees, along tree-line watercourses and in paperbark swamps. Closest record is from Big Heath CP west of the study and project area. Whilst, River Red Gums may provide suitable perching habitat, core nesting and feeding habitat is not within the project area. Species not observed or heard during survey (noting nocturnal surveys were not undertaken).	**Possible** – core habitat not present, but will use River Red Gums	Yes
Tyto novaehollandiae novaehollandiae (Australian Masked Owl)	-	E	6	no	Roosts and nests in heavy forest, hunts over open woodland and farmland (Menkhorst et al, 2017). Whilst, River Red Gums may provide suitable perching habitat, core nesting and feeding habitat is not within the project area. Species not observed or heard during survey (noting nocturnal surveys were not undertaken).	**Possible** – core habitat not present, but can use River Red Gums	Yes
Zanda funerea whiteae (Yellow-tailed Black Cockatoo)	-	V	1, 2	2001	10 records. Feeds on seeds of native (and pine) trees and shrubs including *Eucalypts, Banksias, Hakeas and Xanthorrhea* (Menkhorst et al, 2017). Whilst, River Red Gums may provide suitable perching habitat, core nesting and feeding habitat is not within the project area. Species was observed flying over the project area during the survey.	**Known** – fly over during survey	Yes
Neophema chrysostoma (Blue-winged Parrot)		V	1	2003	11 records. Feeds in grasslands, weed areas, saltmarsh, nests in tree hollows, coastal and subcoastal eucalypt forest and woodland.	Possible, some suitable habitat, but not core habitat	Yes
Melanodryas cucullata cucullata (Hooded Robin (YP, MN, AP, MLR, MM, SE))		R	1	2001	1 record. Prefers lightly timbered habitats, woodlands and shrublands with wattles.	Possible, but scattered tree not core habitat	No

Microeca fascinans fascinans (Jacky Winter (SE))		R	1	2001	3 records. Prefers lightly timbered woodlands with open shrublayer, remnants near farmlands, roadside	Possible, use of scattered trees, but limited shrubs	Yes
Myiagra inquieta (Restless Flycatcher)		R	1	2001	1 record. Prefers Eucalypt woodland, treed farmland, mallee but has declined in the south.	Yes, habitat present, but very open and sparse	Yes
Petroica boodang boodang (Scarlet Robin)		R	1	2003	5 records, Eucalypt forest and woodlands, but will disperse into farmlands and grasslands, perches from low foliage of trees	Possible, but scattered River Red Gum not core habitat	No
Stipiturus malachurus polionotum (Southern Emu-wren)		R	1	2004	1 record. Prefers low heath near wetlands, sand dunes, dense shrub.	No	No
Amphibians							
Litoria raniformis (Growling Grass Frog)	VU	V	1	2011	4 records. Inhabits areas within or on the edges of permanent water, such as slow-flowing streams, swamps, lagoons and lakes (Clemann & Gillespie, 2012), but also farm dams, irrigation channels, irrigated rice crops and disused quarries. Waterbodies nearby (Hacks Lagoon, Bool's Lagoon) would provide core habitat for this species. There is no suitable habitat present within the project footprint. Species not observed (or heard) during survey.	PMST suggests known **Unlikely**. No habitat present in the project footprint.	No
Mammals							
Miniopterus orianae bassanii (Southern Bent-wing Bat)	CE	E	1	No records within 5 km of COTL	Species roosts in limestone caves. Forages above the tree line for flying insects, mainly moths. Species unlikely to use roadside trees as roosting habitat. Core habitat is located in Naracoorte Caves National Park (2km north-east of the northern edge of the COTL).	**Unlikely**. No suitable habitat in the project footprint.	No
Trichosurus vulpecula (Brushtail Possum)	-	R	1	1997 (6 records)	Species rests in tree hollows, which were not found in the project area. Very limited, suitable, but isolated habitat present in the project area for this species. The habitat is unlikely to present core breeding and feeding habitat required to support this species. Species not observed during survey (noting nocturnal surveys were not undertaken).	**Possible -** some hollows present, will use River Red Gums if present in the locality	Yes
Vombatus ursinus (Common Wombat)	-	R	1	1997 (2 records)	Known to use roadsides as corridors, but less frequently observed along major highways. More commonly recorded from established warrens in the softer dirt batters along constructed drainage channels in the Upper South East of SA. Wombat warrens were not observed in the project area during the survey.	**Possible –** will use pasture with scattered trees present, if food resources nearby, but scattered tree not core habitat	No

Petaurus breviceps (Sugar Glider)		R	1	1997	4 records. Prefers wet and dry sclerophyll forest.	No	No
Reptiles							
Delma impar (Striped Legless Lizard)	VU	E	1	2005	Mainly found in native grassland dominated by Kangaroo Grass (*Themeda triandra*) or Spear Grass (*Austrostipa* spp) but also recorded in grasslands with a high exotic component (Hadden, 1995). Species has also been noted to use, but is not restricted to, areas of cracking clay soil which were found in the southern section. The known larger populations in the Naracoorte vicinity are at Lake Ormerod and Hack's Lagoon and are protected habitat, which serve to sustain the genetic integrity of this lineage of the species.	PMST suggests likely **Unlikely**. Roadside verges provide small, isolated patches of poor quality potential habitat unlikely to sustain individuals, scattered trees not suitable habitat for the species.	No
Plants							
Dipodium campanulatum (Bell Flower Hyacinth Orchid)	EN	V	1	2012	The species is found only in the south-east of South Australia along the Naracoorte Range, emerging in October or November, growing in stringybark, blue gum or heathy woodland on deep grey sands or limestone (Seedbank SA). Species known to occur in an RSSD site near Naracoorte that is avoided by the project footprint. There are 23 records that occur in the wider study area but none in the project footprint.	**Unlikely**. No habitat in the study area. EPBC PMST states species or species habitat known to occur within area at an RSSD sites that is avoided by the project.	N/A
Source; 1- BDBSA, 2 - AoLA, 3 – NatureMaps 4 – Observed/recorded in the field, 5 - Protected matters search tool, 6 – others (e.g. Scattered Tree Assessment Manual) NP&W Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable							

For additional species considered and included in numbers for the scattered tree sheet refer Appendix 3 Fauna assessment for scattered trees.

4.3 Cumulative impact

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

The project footprint presented in Figure 2 provides the direct impact of this development on the local environment, which is inclusive of the construction envelope and the project elements (batters, culverts, railing, road surface). The direct, worst-case impact will result in:

- Removal of 21 scattered trees (5 scattered individual River Red Gum, 1 River Red Gum from a clump of two and one clump of 15 trees, including 5 adult and 10 juvenile Blackwood Wattle), major pruning of three trees (two River Red Gum in a clump, one individual), and minor pruning of 1 scattered individuals
- Loss of 2 amenity trees (exotic *Poplus* sp.), 1 amenity shrub (*Dodonaea viscosa* ssp. *angustissima*) and partial removal of 4 amenity patches (not subject to approval) including species such as exotic *Eucalyptus* sp., exotic *Acacia* sp., Drooping She-Oak (*Allocasuarina verticillata*), *Melaleuca* sp., *Pinus* sp., *Callistemon* sp., Australian Blackwood (*Acacia* melanoxylon) and River Red Gum.

A construction laydown area will be restricted to an existing laydown area located approximately 50m down Struan House Road at MMP 125.1 and is approximately 70 m x 14 m. There are no Roadside Significant Sites nearby (refer to the EHIAR).

The hydrology of the area will not be significantly altered from its current state, with culverts installed / replaced to enable movement of water across the landscape. There are no watercourses or swamps within the project area. Other general construction risks will be appropriately managed and mitigated with a Construction Environmental Management Plan (CEMP) to be developed for the project; sedimentation, dust, potential off target damage to tree root zones of trees not being removed, the use of clean, locally sourced fill, control of weeds and pests, fauna clearances prior to removal of habitat etc.

This project is the central of three overtaking lanes being considered for the Riddoch Highway in this region (noting all three have been determined as necessary to improve safety in their own right, and not that this is one of three alternative options). Each project is separated by more than 10 km, and as such, they have been treated as separate, independent project clearances, as advised by DIT.

Refer EHIAR (Jacobs 2021a) and Engineering Design Reports (Jacobs 2021b) for further detail.

4.4 Address the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NP&W Act.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

The Riddoch Highway is one of South Australia's major freight and commuter corridors and the main access through to Mt Gambier and Melbourne. Historically the road has been the location of many major accidents and fatalities (RAA reported nearly 200 vehicle crash-related injuries and 8 deaths in the period 2013-2017, (2019)). This project is one of three separate overtaking lanes being considered for the Riddoch Highway, which aims to improve safety and reduce accidents and fatalities.

A pre-feasibility study conducted by DIT in 2012 notes that a do-nothing scenario is not acceptable in this circumstance. This study provided a cost v benefit analysis, considering avoidance (do nothing case) and minimisation (do something case(s)) of impact to a range of factors including ecological (and other) environments. DIT determined that the project should proceed based on the outcomes of this assessment, and then identified three preferred areas that represented a compromise between all factors considered, including minimising impact to scattered native trees.

An initial engineering survey and aerial imagery survey identified trees and other constraints in the region. This information was used to identify broad study areas. Desktop and field assessment was undertaken to inform engineering design, including recommendations to avoid any potential Striped Legless Lizard Habitat and large River Red Gums with hollows.

The final footprint has been refined to conform to updated road standards and avoid vegetation impacts (specifically scattered remnant trees), where possible, (e.g. tree 47 has a higher TBS and will be avoided).

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).

DIT provided an initial preferred development envelope for the COTL, which represented a compromise between all factors considered, including minimising impact to scattered native trees. The COTL design has been developed to retain the existing horizontal road alignment as much as possible, thereby minimising the disturbance footprint and associated impacted to native vegetation. Minor adjustments have been made only, and include curve widening for all curves and increasing nearside shoulder widths to 2.0m, enabling the road to cater for the new PBS level 3 design vehicles and to accommodate a 1.4m wide centre line treatment. Both upgrades are in line with current road design standards implemented to enhance road safety and reduce the likelihood of head-on collisions.

To further minimise impact to native vegetation within or near the road corridor, 1(vertical) to 3(horizontal) batter slopes with safety barrier protection have been implemented wherever possible (i.e. where sight visibility requirements are also not impacted), reducing the overall disturbance footprint. Where not possible, batter slopes have been designed as 1 (vertical) to 6 (horizontal) slopes to provide an acceptable balance between motorist safety, cost of construction and potential impact to native flora and fauna.

Construction envelopes will be minimised in and around scattered trees to the extent where construction can still occur safely. The tree root zones of scattered native trees not being removed by the development will be protected to prevent any potential off-target damage.

Additional significant reductions in the number of trees to be removed and or pruned have been made between 70% and 100% design, with a determined effort to minimise overall project footprint. Refer EHIAR (Jacobs 2021a) and Engineering Design Reports (Jacobs 2021b) for further detail.

c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

The disturbance proposed by this project is largely permanent including a new overtaking lane, batters, culverts and standard road furniture.

Non-permanent features (e.g. a laydown yard) will be located in an existing disturbed DIT laydown area to minimise any further disturbance to vegetation. Construction envelopes have been minimised as discussed above, will be managed for weeds, and rehabilitated with low cover in immediate proximity to the road as per road safety requirements. Further detail will be provided in the project CEMP.

All vegetation (native remnant and amenity plantings) will be offset as per DIT's Vegetation Removal Policy (2020) and Standard Operating Procedure as endorsed by the NVC (DPTI, 2020).

Refer EHIAR (Jacobs 2021a) and Engineering Design Reports (Jacobs 2021b) for further detail.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The SEB Policy explains the biodiversity offsetting principles that must be met.

The losses described within will be offset by payment into the Native Vegetation Fund.

Amenity plantings (not considered by this application) will also be offset at a ratio of 1:1 by payment into the DIT amenity fund (e.g. $150 per amenity tree / shrub or $5,000 / hectare).

Refer EHIAR (Jacobs 2021a) and Engineering Design Reports (Jacobs 2021b) for further detail.

4.5 Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Principle of clearance	Considerations
Principle 1a - it comprises a high level of diversity of plant species	Relevant information The scattered trees to be removed comprise 6 *Eucalyptus camaldulensis* var. *camaldulensis* & 15 *Acacia melanoxylon*. The amenity vegetation to be removed includes: *Dodonaea viscosa* ssp. *angustissima*; exotic *Poplus* sp., *Pinus* sp., *E. camaldulensis*, exotic *Eucalyptus* sp., exotic *Acacia* sp., *Allocasuarina verticillata*, *Melaleuca* sp., *Callistemon* sp. and *Acacia melanoxylon*.
	Assessment against the principles It does not contain a high level of diversity of native plant species. The scattered tree vegetation community present is highly modified and dominated by *Eucalyptus camaldulensis* var. *camaldulensis*, with a general absence of shrub cover and lack of native groundcover amongst and understorey dominated by exotic species.
	Moderating factors that may be considered by the NVC n/a

Principle 1b - significance as a habitat for wildlife	<u>Relevant information</u> List of potential threatened species that were recorded as using or may use the vegetation: • *Tyto novaehollandiae* (Australian Masked Owl) – not core habitat, potential foraging habitat. • *Vombatus ursinus* (Common Wombat) – not core habitat, would provide some foraging habitat, but is exposed, no recent records. Would not use scattered tree. • *Calptorhynchynchus banksia graptogyne* (South-eastern Red-tailed Black cockatoo) – not core habitat. Would provide potential perching habitat. • *Falco peregrinus macropus* (Peregrine falcon) – vegetation may provide general (not core) feeding habitat, but will use River Red Gum habitat • *Hirundapus caudacutus* (White-throated Needletail) – vegetation may provide occasional roosting habitat • *Ninox connivens connivens* (Barking Owl) – vegetation may provide perching habitat. • *Tyto novaehollandiae novaehollandiae* (Australian Masked Owl) – vegetation may provide suitable perching habitat • *Zanda funerea whiteae* (Yellow-tailed Black Cockatoo) – vegetation may provide suitable perching habitat. Species observed flying over during field survey. • *Trichosaurus vulpecular* (Brush-tailed Possum) – scattered trees may provide habitat if locally present. • *Neophema chrysostoma* (Blue-winged Parrot), potential but not core habitat • *Myiagra inquieta* (Restless Flycatcher), potential but not core habitat • *Microeca fascinans fascinans* (Jacky Winter (SE)), potential but not core habitat The vegetation does not support a high diversity of animal species, and is exposed, highly disturbed roadside vegetation (adjacent major highway with frequent traffic movements), but could provide a corridor for fauna movement between other areas of native vegetation. The vegetation is not a habitat refuge, and is in a heavily cleared area with an understorey dominated by exotic species. Fauna assessments indicated that 1 EPBC listed species (known in PMST) has the potential to utilise the scattered trees for occasional roosting, noting that the species recovery plan suggests preference is roosting trees > 23m (trees subject to potential removal are shorter). Core foraging and nesting trees do not occur within the proposed clearance area. Refer Significant Impact Assessment / Appendix 1.2 of EHIAR. Refer Appendix 3 (fauna assessment) for the threatened species included in scattered tree sheets, that contribute to the Biodiversity Score per tree and the Total Biodiversity Score for the proposed clearance. Trees: Fauna Habitat Score – 11 *E. camaldulensis* had a fauna score of 1.8 each, the 15 *A. melanoxylon* had a fauna score of 1. Total Biodiversity Score for all of these trees is 66.59 (total from the scattered trees sheet which includes clumps). Individual Total Biodiversity Scores for all scattered trees are <7, with the exception of tree 45 (Biodiversity Score = 8.69). Clump H has a TBS of 7.97, this clump of 2 trees will just require a major prune, Clump I has a TBS of 9.3 for 2 trees, where one tree is likely to be cleared (Biodiversity Score per tree is 4.65). Clump B has a TBS of 4.68 and will be completely removed (15 Blackwood Wattles, including 5 Adult and 10 juveniles).

	Assessment against the principles Seriously at Variance - 11 *Eucalyptus camaldulensis* trees have a fauna score of 1.8; 6 of these will be cleared, 2 will have a major prune and 2 will have a minor prune. - Only one individual tree with a TBS > 7 (Tree 45, TBS = 8.69) with the rest having a TBS <7), 2 clumps have scores above 7 – see above.
	Moderating factors that may be considered by the NVC As per the Significant Impact Assessment undertaken for the key EPBC listed species (refer Jacobs 2021a EHIAR Appendix 1.2), it is considered that the clearance will not lead to a long-term decrease in the size of a population, reduce the area of occupancy, fragment existing populations, adversely affect critical habitat, modify habitat that will result in species decline, result in invasive species, or interfere with the recovery of species. Therefore, it is considered that the clearance of the 6 Scattered River Red Gums, and pruning of 4 River Red Gum could be reduced to 'At Variance'.
Principle 1c - plants of a rare, vulnerable or endangered species	Relevant information The scattered trees recorded (*Eucalyptus camaldulensis* var. *camaldulensis* and *Acacia melanoxylon*) are not rare, vulnerable or endangered species under state or federal legislation.
	Assessment against the principles Not at variance.
	Moderating factors that may be considered by the NVC n/a
***Principle 1d - the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered*:**	Relevant information The scattered trees recorded (*Eucalyptus camaldulensis* var. *camaldulensis* and *Acacia melanoxylon*) are not part of a plant community that is Nationally Rare, Vulnerable or Endangered. They could be considered a very degraded representation of a community from the SA Provisional List of Threatened Ecosystems of South Australia; VULNERABLE *Eucalyptus camaldulensis var. camaldulensis Woodland on seasonally inundated flats.* This community is reduced in extent and threatened by drainage, extensive clearance and grazing. Inadequately conserved in Mary Seymour CP, Big Heath CP, Penola CP and Glen Roy CP. This ecosystem is not riparian. While subject to periodic flooding, the extent and frequency of flooding has historically been reduced in the region due to significant disruption and regulation (e.g. installation of road historic networks and culverts influencing the extent and duration of flooding events, and installation and operation of the Upper South East Drainage Scheme to facilitate agriculture). The COTL project area is not located within a riparian ecosystem. The River Red Gums present are also as scattered individuals, and not of sufficient density to be considered a 'woodland', with an absence of native understorey. In addition, some of the trees adjacent the road reserve show evidence of historical disturbance / coppice.
	Assessment against the principles As above the proposed clearance includes scattered River Red Gums in the south east which could be considered a poorer representative of the above SA Provisional Threatened Ecosystem, but no longer persists as a 'woodland' on seasonally inundated flats.
	Moderating factors that may be considered by the NVC Total Biodiversity Score for all of these trees is 60.14 (total from the scattered trees sheet which includes clumps). Individual Biodiversity TBS scores for all trees are <7 with the exception of one (T-45, TBS = 8.69), Clump H has a TBS of 7.97, this clump of 2 trees will just require a major prune, Clump I has a TBS of 9.3 for 2 trees, one tree would be cleared (Biodiversity Score per tree is 4.65). Clump B has a TBS of 4.68, a clump of 15 *Acacia melanoxylon* to be completely removed, this vegetation does not represent a threatened community. Hence clearance of higher value trees has been either avoided or minimised wherever possible.

	The trees to be removed may be representative of the community, but the location is in a heavily cleared area, used for agriculture and adjacent a major highway, with a modified drainage regime, and therefore is likely to be a poorer representative and provide limited opportunity to fauna. There is representative community conserved in nearby Glen Roy CP. It is considered that clearance of 6 River Red Gums and pruning of 5 River Red Gums would not result in a long-term decrease in the size of the SA provisional Vulnerable River Red Gum community, reduce the extent, fragment the existing extent, adversely affect critical habitat, modify habitat that will result in the community's decline, result in invasive species or interfere with the recovery of the community. Therefore, it is considered that the clearance of the 6 Scattered River Red Gums and the pruning of up to 4 scattered River Red Gums adjacent the Riddoch Highway could be reduced to 'At Variance'.
Principle 1e - it is significant as a remnant of vegetation in an area which has been extensively cleared.	<u>Relevant information</u> Refer Table 1 above for IBRA statistics. The COTL lies within the: • Naracoorte Coastal Plain (NCP) bioregion (18%) • Lucindale IBRA Subregion, or which there is an estimated 13 % remnant of native vegetation The native vegetation in the region of the COTL project is in keeping with that described by the Naracoorte IBRA Association; scattered remnant paddock trees mostly River Reg Gum (*Eucalyptus camaldulensis*) with some smaller Blackwood (*Acacia melanoxylon*), together with sparse roadside, rural and residential amenity tree plantings (various locally indigenous, non-indigenous and exotic species), over very sparse (if any) remnant native understorey scattered amongst a mixture of common exotic pasture grasses. The native vegetation remaining is highly fragmented and of varying quality, surrounded by agricultural landscape of cropping and pasture. The footprint itself is not mapped as native vegetation in Nature Maps (NatureMaps, 2020).
	<u>Assessment against the principles</u> <u>Seriously at Variance</u> N/A <u>At Variance</u> The Clearance is considered 'At Variance' (TBS 5-500, remnancy 10-30%) TBS (as per scattered tree sheet) is 66.59, in an area of IBRA association remanncy 18%, IBRA subregion remnancy 13%.
	<u>Moderating factors that may be considered by the NVC</u> <u>N/A</u>
Principle 1f - it is growing in, or in association with, a wetland environment.	<u>Relevant information</u> The scattered trees described within are not part of a wetland environment or growing in association with a wetland environment.
	<u>Assessment against the principles</u> Not at variance.
	<u>Moderating factors that may be considered by the NVC</u> <u>N/A</u>
Principle 1g - it contributes significantly to the amenity of the area in which it is	<u>Relevant information</u> The larger River Red Gum trees (*E. camaldulensis*) contribute to the amenity of the area in contrast to the largely cleared agricultural land either side of the road. The locality comprises large allotments used primarily for agricultural purposes. Dwellings sited on these allotments are sensitive to landscape change. Various trees and shrubs adjacent the Highway are present within the road reserve throughout the project alignment, contributing to a

growing or is situated.	softened, attractive rural environment. Vegetation removal has been limited where possible, to maintain the outlook available from residential buildings. (refer Section 3.3.2 in the EHIAR document for further assessment about cultural / historical value and landscape character) In addition, amenity plantings (not the subject of this application) will be replaced where possible within the region at a ratio of 1:1, and are replacements likely to comprise indigenous, native species.
	Assessment against the principles Not at variance.
	Moderating factors that may be considered by the NVC Vegetation removal has and will be limited where possible, to maintain the outlook available from residential buildings, and to align with safety requirements of the Riddoch Highway.

Principles of Clearance (h-m) will be considered by comments provided by the local NRM Board or relevant Minister. The Data Report should contain information on these principles where relevant and where sufficient information or expertise is available.

4.6 Risk Assessment

Determine the level of risk associated with the application

Total clearance	No. of trees	Removal of 21 trees (includes 6 River Red Gum. 15 Blackwood Wattle – 5 adults, 10 juveniles), plus major prune of 3 River Red Gum and minor prune of 1 River Red Gum.
	Area (ha)	N/A
	Total biodiversity Score	66.59 (scattered tree scoresheet) 51.8 (Clearance summary scoresheet, doesn't account for clumps)
Seriously at variance with principle 1(b), 1(c) or 1 (d)		1(b), but moderating factors could reduce to 'At Variance'
Risk assessment outcome		Level 4 (Level 3 with TBS <250, but escalating factors, however associated moderating factors suggest could remain at level 3)

4.7 NVC Guidelines

Provide any other information that demonstrates that the clearance complies with any relevant NVC guidelines related to the activity.

N/A

5. Clearance summary

Clearance Area(s) Summary table

N/A no native vegetation patches associated with clearance

Scattered trees Summary table

NVC July 2020 version

Tree or Cluster ID	# of trees present	Fauna Habitat score	Threatened flora score	Biodiversity score	Loss factor	SEB Points required	SEB Payment	Admin Fee
6	1	1.8	0	6.49	1	6.81	$5,121.65	$281.69
7	1	1.8	0	3.32	1	3.49	$2,620.01	$144.10
8	1	1.8	0	3.73	1	3.92	$2,943.57	$161.90
45	1	1.8	0	8.69	1	9.12	$6,857.80	$377.18
46	1	1.8	0	4.7	1	4.94	$3,709.05	$204.00
47	1	1.8	0	0	0	0	0	0
48	1	1.8	0	6.44	0.4	1.35	$1,016.44	$55.90
49	1	1.8	0	4.83	0	0	$0	$0
B	15	0.6	0	0.31	1	4.88	$3,669.59	$201.83
H	2	1.8	0	3.99	0.4	3.35	$2,519.00	$138.54
I	1	1.8	0	4.65	1	7.81	$5,817.35	$322.92
I	1	1.8	0	4.65	0	0	0	0
Total	**27**			**53.61**		**44.10**	**$33,143.13**	**$1,822.87**

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	51.8	44.10	$33,143.13	$1,822.87	$34,966.00

Economies of Scale Factor	0.5
Rainfall (mm)	578

It is noted that there are some discrepancies with formulae between the scattered tree sheet and the NVC clearance summary sheet, noted as an issue that NVC still need to resolve. It is also noted that the TBS above is actually the Biodiversity Score per tree and doesn't appear to allow for the native clumps. The Summary for the Scattered Tree sheet is also provided (below).

Scattered Tree Assessment Sheet (July 2020 Version) summary:

Total Biodiversity Score	66.59
Total SEB Points required	**44.11**
Total SEB $ required	**$35,480.09**

6. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

The Data Report must propose how the SEB will be achieved in accordance with the SEB Policy and Guide, by providing the following information.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☐ Establish a new SEB Area on land owned by the proponent. Provide information below.

☐ Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____

☐ Apply to have SEB Credit assigned from another person or body. The application form needs to be submitted with this Data Report.

☐ Apply to have an SEB to be delivered by a Third Party. The application form needs to be submitted with this Data Report.

☒ Pay into the Native Vegetation Fund. Provide details below

PAYMENT SEB

If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

- Payment amount required (including admin. fee)
- If the proponent wishes to make the payment in stages, details of those stages, including clear dates or milestones in which payments will be made. Noting, for staged payments, payments must be received prior to clearance occurring, therefore staged payments are only suitable for projects where the clearance will occur in a staged manner.

The losses described within will be offset by payment into the Native Vegetation Fund.

As per the scattered tree assessment scoresheet (Appendix 4), the complete or partial loss of 25 scattered individual or clumps of native remnant trees will require a payment of $35,480.09 (ex GST) (SEB payment + Admin fee) to offset 44.11 SEB points required.

Amenity plantings (not considered by this application) will also be offset at a ratio of 1:1 either by payment or direct on ground within the region as per DIT's Vegetation Removal Policy and Standard Operating Procedure (DPTI, 2020).

Payment will be made in full and upfront prior to commencement of works.

7. References

Biological Database of South Australia (BDBSA) (1999-2007) Targeted surveys for Delma impar (Striped Legless Lizard) and Pseudemoia rawlinsona (Rawlinson's window-eyed skink). South Australian Herpetology Group. Project metadata available at: http://apps.environment.sa.gov.au/emap/envmaps-query.do;jsessionid=d815a70ba8e0d51a863aabe5192b?key=201&cmd=su.SurveySummaryDetailList

Clemann N and Gillespie GR (2012) National Recovery Plan for the Southern Bell Frog *Litoria hrygia*. Department of Sustainability and Environment, Melbourne. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-southern-bell-frog-litoria-raniformis

Commonwealth of Australia (2006) Background and Implementation Information on for the South-eastern Red-tailed Black-Cockatoo, Calyptorhynchus banksii graptogyne Recovery Plan. Department of the Environment and Water Resources, Canberra.

Department for Environment and Water (DEW) (2019) Biological Databases of South Australia- Overview. Information Sheet – March 2019.

Department for Infrastructure and Transport (DIT) (2020) (2017) Environmental Weed Species List (August 2017). Accessed online at: https://DIT.sa.gov.au/standards/environment

Department for Infrastructure and Transport (DIT) (2020) Vegetation Removal Policy. https://www.DIT.sa.gov.au/__data/assets/pdf_file/0008/35657/DOCS_AND_FILES-1965602-v36B-Environment_-_Technical_Standards_-_Vegetation_-_Vegetation_Removal_Policy.pdf. Accessed 14/4/2020.

Department of Sustainability and Environment (DSE) (2006) Action Statement. Flora and Fauna Guarantee Act 1988. No. 27. https://www.environment.vic.gov.au/__data/assets/pdf_file/0024/32883/Red-tailed_Black-Cockatoo_Calyptorhynchus_banksii-graptogyne.pdf

Department of the Environment (DotE) (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999.

DEW (2020). Biological Database of South Australia. Database extract as of February 2020.

Hadden S (1995) Distribution, population habitat estimates and habitat requirements for the striped legless lizard Delma impar (Kluge). Report to the Australian Nature Conservation Agency. Melbourne: Department of Conservation and Natural Resources.

Hill R and Burnard T (2001) A Draft Habitat Management Plan for the South-eastern Red-tailed Black-Cockatoo. Unpublished report to the Red-tailed Black-Cockatoo Recovery Team. https://www.environment.sa.gov.au/topics/Science/Information_data/Biological_databases_of_South_Australia. Accessed 14/4/20

Jacobs (2020a) Technical Memo: Shortlist Options Identification and Assessment towards Preferred Options. Report written for DIT. 29 November 2019. Contract 19C762.

Jacobs (2021a) Riddoch Highway Central Overtaking Lane MM128-130 EHIAR (Environment and Heritage Impact Assessment Report)

Jacobs (2021a) Riddoch Highway Overtaking Lane Engineering Design Reports and Drawings; IW227800-0000-CR-0002.

Joseph L, Emison WB and Bren WM (1991) Critical assessment of the conservation status of the Red-tailed Black-Cockatoo in south-eastern Australia with special reference to nesting requirements. Emu 91: 46-50.

Koch P (2003) Factors influencing food availability for the endangered south-eastern Red-tailed Black-Cockatoo Calyptorhynchus banksii graptogyne in remnant stringybark woodland, and implications for management. PhD thesis, University of Adelaide, Adelaide.

Menkhorst P, Rogers D, Clarke R, Davis J, Marsack P, Franklin K (2017) The Australian Bird Guide. CSIRO Publishing, Clayton South.

Milne TI and Croft T (2012) Bushland Condition Monitoring Manual – Benchmark Communities of the South East. Nature Conservation Society of South Australia.

NatureMaps (2020) Environ Data SA. SA Government. Accessed online at: https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx.

NVC (2020a) Native Vegetation Council Bushland Assessment Manual

NVC (2020b). Guide for calculating a Significant Environmental Benefit. Native Vegetation Council, South Australia.

NVC (2020c) Native Vegetation Council Scattered Tree Assessment Manual

Pizzey G and Knight F (2012) The Field Guide to the Birds of Australia. Harper Collins Australia, Sydney.

Royal Automobile Association of SA (RAA), 2019, Trucking family highlights rural road risks; Riddoch Highway and Dukes Highway in the spotlight, RAA, Article available online from https://samotor.raa.com.au/trucking-family-highlights-rural-road-risks/#:~:text=The%20Riddoch%20Hwy%2C%20which%20has,deaths%20between%202013%20and%202017.&text=RAA%20wants%20to%20see%20the,and%20invest%20in%20critical%20upgrades

Thackway R and Cresswell I (1995) An Interim Biogeographic Regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program Version 4, Australian Nature Conservation Agency, Canberra.

8. Appendices

Appendix1. Protected Mattered Search Database Tool (PMST) Report

Appendix 2 Photo Log

Appendix 3 Fauna Assessment Summary

Appendix 4 Scattered Tree datasheet

Appendix 5 Clearance Summary Scoresheet

Appendix 6 DIT Scoresheet