



COTERRA
ENVIRONMENT

**Native Vegetation Clearing Permit
Application**

**Kargotich Road Upgrades – Shire of
Serpentine Jarrahdale**

Draft A

November 2023



CALIBRE | COMMITMENT | COLLABORATION

This report was prepared by: Coterra Pty Ltd trading as COTERRA ENVIRONMENT

ABN: ABN: 92 143 411 456

Our Ref: SSJKRC01

Author(s): C. Norman, W. Oversby

Reviewer: K. Watts

Report Version: Draft A

Date: November 2023

This report was prepared for:

Shire of Serpentine Jarrahdale

6 Paterson Street

Mundijong, WA 6123

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1 Introduction

1.1 Background

The Shire of Serpentine Jarrahdale (the proponent) is proposing to undertake road upgrade works along a 6.6 km section of Kargotich Road extending from south of Thomas Road in the north to Bishop Road in the south (the project area; Figure 1).

Kargotich Road is currently a single carriageway (dual lane) local road (Main Roads, undated), with a posted speed limit of between 80 to 90 kilometres per hour. Increased traffic and safety concerns have prompted the requirement for Kargotich Road to be upgraded to support current and future traffic load.

The project area is exclusively located within Public Road lots which are managed by the Shire, covering Land ID 3787754, 3641466, 3994272, 3786899, and 4031614. The project area covers a total area of 11.76 hectares (ha) and includes predominately bitumised areas, with fringing native and introduced vegetation.

1.2 Planning and Environmental Approvals

Proposed upgrades to Kargotich Road require the clearing of roadside vegetation, including native vegetation within the project area (Figure 1). Design of the proposed upgrades has been undertaken to minimise the extent of clearing required, such that clearing will only be undertaken within three metres of the travel line.

Based on an assessment of Matters of National Environmental Significance (MNES) from the proposed works, impacts to MNES do not appear to be significant. However, a referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) has been submitted to provide certainty to the proponent.

1.3 Shire of Serpentine Jarrahdale

The management of native vegetation within the Shire of Serpentine Jarrahdale is underpinned by the Shire's Local Biodiversity Strategy (2019). The strategy focuses on 6,333 ha of local natural areas and local reserves, and is structured around five 'focus areas' with targets to retain, protect and enhance the values of the specific focus area. These being:

- Natural Areas
- Locally Characteristic Species
- Vegetation Complexes
- Specific Features
- Consultation and Education

With specific regard to native vegetation, the Shire has committed to protecting, retaining and enhancing a minimum area of each vegetation type found in the Shire, equating to a total area of approximately 1,690 ha. It is noted that via its Local Biodiversity Strategy (2019), the Shire has committed to the protection of 20 ha of the Beermullah Vegetation Complex within its local parks and reserves.

The Shire's Local Biodiversity Strategy is also supported by several other strategies and policies which intersect with the strategy in terms of common goals and management actions. These include:

- Biodiversity Incentives Strategy
- Climate Change Strategy and Local Action Plan
- Natural Assets Management Plan

- Weed and Pest Management Plan
- Urban and Rural Forest Strategy
- State of the Environment Report.

At a statutory level, the Shire's *Local Planning Policy 4.16: Landscape and Vegetation Policy* guides the development of land within the Shire in accordance with the Shire's Local Planning Scheme No. 3. With specific regard to native vegetation, LPP 4.16:

- Ensures the effective integration of landscape and vegetation into land use planning processes
- Facilitates the effective integration of both state government and Shire planning and environmental documents
- Contributes towards achievement of vegetation and landscape outcomes that meet expectations of stakeholders and contribute towards the achievement of biodiversity targets and the creation of vibrant places for the Shire's communities.

The clearing of native vegetation along Kargotich Road to facilitate the proposed road upgrades has been minimised to the fullest extent possible, in accordance with the Shire's own biodiversity commitments.

1.4 Purpose of this report

This report has been prepared in support of a Native Vegetation Clearing Permit (NVCP) application to clear vegetation within the project area to progress upgrades to Kargotich Road, under Part V of the *Environmental Protection Act 1986* (EP Act).

2 Proposed Clearing

2.1 Schedule

Works are proposed to be undertaken in the warmer and drier months between 2024 and 2025, with clearing occurring over a two week period in October, and broader construction works being undertaken from October to February. This approach will minimise the risk of unnecessary topsoil disturbances and water runoff into adjacent retained vegetation.

2.2 Proposed works

Road upgrade works will involve the clearing of existing vegetation, installation of subbase, road base (limestone and crushed rock) and asphalt within a defined corridor of approximately 6.6 km in length. Design of the proposed upgrades have been undertaken to minimise the extent of clearing required, such that this will be undertaken within 3 metres of the edge of the travel line.

Where possible, significant trees within the project area will also be retained, however determination on where construction works will enable this retention will need to be made as works progress.

2.3 Clearing methodology

2.3.1 Pre-clearing

Prior to clearing, the works area will be clearly demarcated to ensure over-clearing does not occur. Project area contractors will be provided with an Environment Induction Note to:

- Ensure knowledge of the environmental values within and adjacent to the project area, and the importance of minimising construction related impacts
- Adequately implement measures to protect the environment, including the use of dust minimisation strategies
- Comply with local, state and federal environmental legislation

2.3.2 Clearing

Clearing will be undertaken by mechanical removal. Dust emissions from the proposed works will be mitigated through the use of a water-cart where necessary, thereby ensuring that indirect impacts to adjacent retained vegetation will be minimised to the fullest extent possible. Protocols for environmental incidents which occur during the course of clearing (such as contingency actions in the event of fauna strike) will be implemented and communicated to project area contractors.

2.4 Alternatives Considered / Actions to Avoid and Minimise Clearing Actions

The Shire of Serpentine Jarrahdale has experienced significant urban residential development in the Byford area in recent years, including estates such as:

- Byford West Private Estate
- The Glades at Byford Estate
- Byford Meadows Estate
- The Brook at Byford.

Kargotich Road is an important access route that links newly developed residential areas and existing infrastructure within the Perth Metropolitan Region. The north-south link of Kargotich Road provides access to Rowley Road in the north, Thomas Road mid-way and Mundijong Road in the south, all of which are ultimately access point to the Kwinana Freeway, which in turn provides access to the Perth CBD and significant industrial areas such as Kwinana.

No upgrades to this road have been made to account for its increased use in recent years, prompting significant road safety concerns. Further, it is reasonable to expect that additional urban residential development in the Byford and Mundijong areas will occur in the medium to long term, noting the significant area of land with conducive zoning in these areas (as identified in the Shire of Serpentine Jarrahdale Local Planning Scheme No. 3). Upgrades to Kargotich Road, as well as ultimately other linkages in the area, are required to account for significant historic and future growth in the Byford and Mundijong areas.

3 Project area Characteristics

3.1 Topography, Geology and Soils

Topography within the project area along Kargotich Road ranges from 16 metres Australian Height Datum (mAHD) in the south to 20 mAHD in the north (Figure 2).

The project area contains the following soils, as described by Jordan (1986).

- Sandy Clay (Cs) – white-grey to brown, fine to coarse-grained, subangular to rounded sand, clay of moderate plasticity gravel and silt layers near scarp
- Sand (S10) – As S8 over sandy clay to clayey sand of the Guilford Formation, of eolian origin.

All soils within the proposed clearing area are mapped as having a Moderate to Low Acid Sulfate Soil risk (Landgate 2023).

3.2 Hydrology

3.2.1 Groundwater

The project area falls within the Serpentine groundwater area and is underlain by the Superficial Swan, Leederville and Yarragadee North aquifers (DWER 2023).

While groundwater depths have not been assessed within the proposed clearing area, regional mapping adjacent to the northern project area boundary indicates that the minimum depth to groundwater is approximately 4 m (DWER 2021). Based on the known topography, this equates to approximately 18 m AHD, in this area.

There are no Public Drinking Water Source Areas within or in proximity to the project area.

3.2.2 Surface Water

One surface water feature has been mapped as intersecting the project area, being the Cardup Brook (Landgate 2023) (Figure 3). Passing under Kargotich Road between Gossage Road and Bishop Road, Cardup Brook appears to be a modified watercourse, which functions similarly to other drains present in the area which were constructed to remove water from agricultural land in the Upper Serpentine River Catchment (DWER and the Department of Primary Industries and Regional Development 2018). Historic aerial imagery of Cardup Brook shows significant earthworks along its length in private agricultural land adjacent to Kargotich Road in the past 12 months (Landgate 2023), suggesting that its function as a drain requires regular maintenance.

It is understood that implementation of the proposal will necessitate the widening the Kargotich Road bridge, which crosses the Cardup Brook.

At various intervals along the length of Kargotich Road run a series of additional minor drains of various sizes, widths and depths. These drains are predominately associated with surrounding agricultural land uses (namely grazing) and are largely devoid of remnant native vegetation (Treeswest 2022).

3.2.3 Wetlands

The entirety of the project area lies within two Multiple Use Wetlands (MUWs), as mapped by the Department of Biodiversity, Conservation and Attractions (DBCA) (Landgate 2023). These wetlands are identified in Table 1 and displayed in Figure 3.

On the Swan Coastal Plain, wetlands are afforded protection based on their management category as detailed in Table 2.

Table 1: Wetlands within the project area

Wetland name	Wetland Type	UFI	Total Wetland Extent (ha)
Armadale Palusplain	Palusplain	15,797	7,266.41
Unknown	Palusplain	16,021	27,602.08

Table 2: Wetland Management Categories (EPA 2008)

Management Category	General Description	Management Objective
Conservation	Wetlands which support a high level of attributes and functions	<p>Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including:</p> <ul style="list-style-type: none"> • Reservation in national parks, crown reserves and State-owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. <p>No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.</p>
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	<p>Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity. Protection is recommended through a number of mechanisms.</p>
Multiple Use	Wetlands with few remaining important attributes and functions	<p>Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.</p>

3.3 Flora and Vegetation

3.3.1 Pre-European Vegetation

Pre-European vegetation within Western Australia has been mapped at a broad level by Beard (1990) as vegetation system associations, and of the south west by Heddle et al (1980) as vegetation complexes.

One vegetation system association has been mapped within the project area, being Pinjarrah 968. This vegetation system association is described as being a southwest woodland of *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), and *Eucalyptus wandoo* (Wandoo). There is approximately 6.69% of this system association with Western Australia, and 4.6% remaining within the Shire of Serpentine Jarrahdale (Government of Western Australia (GoWA) 2019a).

One vegetation complex is mapped across the project area, being the Beermullah complex. This is described as a mixture of low open forest of *Casuarina obesa* (Swamp Sheoak) and open woodland of Marri – Wandoo

– Jarrah. Minor components include closed scrub of *Melaleuca* species and occurrence of *Callitris pyramidalis* (Swamp Cypress). There is approximately 6.67% of this vegetation complex remaining on the Swan Coastal Plain, and within the Perth Metropolitan Region (GoWA 2019b).

The Environmental Protection Authority (EPA) uses vegetation complexes as the basis for regional representation of biodiversity and has an overall objective to seek retention of at least 30 % of the pre-clearing extent of each ecological community (EPA 2015). The EPA does have a modified objective to seek retention of at least 10 % of the pre-clearing extent of each ecological community within constrained areas such as the Perth Metropolitan Region. While the project area is located within the Perth Metropolitan Region and is therefore considered to be in a constrained area, the remaining extent of this vegetation does not meet the 10 % target.

It is noted that via its Local Biodiversity Strategy (2019), the Shire has committed to the protection of 20 ha of the Beermullah Complex within its local parks and reserves.

3.3.2 Site Assessment

As part of a black cockatoo habitat assessment undertaken by Bamford Consulting Ecologists (BCE; Appendix 1), Vegetation and Substrate Associations (VSAs) were identified and mapped across the project area and broader road corridor (collectively, the survey area (22.72 ha)) to provide a contextual understanding of environmental values within the area. While traditionally used to identify and map fauna habitat, VSAs provide a greater level of information than vegetation types alone, by also considering soils, other substrates and landforms.

Generally, VSAs across the survey area were considered to be typical of rural areas, including open grassy areas and patches of remnant and planted vegetation with weedy understories. A total of six VSAs were identified within the survey area. A description of these VSAs as well as the extent of each within the survey area and proposed clearing area are presented in Table 3 and Figure 5.

Table 3:Vegetation and Substrate Associations (VSAs) and extent

VSA	Description	Extent within survey area (ha)	Maximum extent proposed to be cleared (ha)
1	Sheoak stands. Closed dense stands of Sheoak (<i>Allocasuarina fraseriana</i>) with no midstorey and understorey consisting of invasive grasses and weeds.	12.5	2.88
2	Melaleuca Dampland. Closed dampland forest of <i>Melaleuca raphiophylla</i> with midstorey of scattered <i>Kunzea</i> and understorey of invasive weeds and grasses on dark grey sand. Appears to be seasonally inundated.	0.34	0.21
3	Flooded Gum stands. Closed dense stands of Flooded Gum (<i>Eucalyptus rudis</i>) with no midstorey and understorey consisting of invasive grasses and weeds.	0.43	0.17
4	Planted Eucalypts. Open woodland of scattered planted mature trees such as <i>Eucalyptus camaldulensis</i> over a grassy understorey on grey to white sand.	0.36	0.21
5	Xanthorrhoea Shrubland. Consisting of moderate density of Balga <i>Xanthorrhoea pressii</i> with introduced grasses scattered with disturbance species of plants and weeds with occasional <i>Acacia saligna</i> on grey to white sand.	0.07	0.05

VSA	Description	Extent within survey area (ha)	Maximum extent proposed to be cleared (ha)
6	Open areas. Disturbed open areas ranging from introduced grasses scattered with disturbance species of plants and weeds with occasional <i>Acacia saligna</i> on grey to white sand.	1.53	0.74
Total		15.22 ha	4.26 ha

It is important to note that of the VSAs listed in Table 3, some may not qualify as native vegetation as per its definition under the EP Act and *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (EP Regulations). These include VSA 4 (Planted Eucalypts) and VSA 6 (Open areas), which collectively comprise 0.95 ha of the area proposed to be cleared. Omitting these areas, it can be considered that the proposed road widening works will result in the clearing of at most, 3.31 ha of native vegetation.

3.3.3 Conservation significant flora and vegetation

Based on the results of the desktop assessment and subsequent black cockatoo habitat assessment (BCE, 2023; Appendix 1), two site inspections during Winter and Spring were undertaken by Coterra Environment on 20 June and 12 September 2023, to evaluate the likelihood of conservation significant flora and vegetation occurring with the project area.

Generally where remnant vegetation was identified to occur within the project area, this was considered to be in a degraded or completely degraded condition with an understory dominated by introduced grasses. VSA 1 for example which comprises approximately 87% of native vegetation within the project area was observed to contain only one native species, being Sheoak. Imagery of VSA 1 which illustrates this monoculture is presented below in Plate 1.



Plate 1: VSA 1 Sheoak stands. Only one native species was identified within this VSA

No other VSAs were considered to have the potential to be representative of conservation significant ecological communities, or to support conservation significant flora. All vegetation along the road length is geographically separated from larger patches of vegetation in the area.

3.4 Fauna and Habitat

A desktop assessment of conservation significant fauna that could potentially occur within the project area and within a 10 km buffer was undertaken utilizing the DBCA Naturemap Database and the DCCEEW Protected Matters Search Tool. A total of 14 Threatened, 14 Priority, 17 Migratory and two specially protected fauna were identified to potentially occur within the project area or associated buffer (Appendix 2).

Based on a review of known distributions and habitat requirements, the following conservation significant fauna were considered to potentially occur within the project area:

- Carnaby’s Black Cockatoo (CBC; *Zanda latirostris*): ranked as Endangered under the *Biodiversity Conservation Act 2016* (BC Act) and EPBC Act.
- Baudin’s Black Cockatoo (BBC; *Zanda baudinii*): ranked as Endangered under the BC Act and EPBC Act.
- Forest Red-tailed Black Cockatoo (FRTBC; *Calyptorhynchus banksia naso*): ranked as Vulnerable under the BC Act and EPBC Act.

3.4.1 Black Cockatoo Habitat Assessment

To assess the value of vegetation along Kargotich Road as habitat for black cockatoos, a dedicated assessment was undertaken by Bamford Consulting Ecologists (BCE 2023; Appendix 1). The assessment was undertaken of the areas proposed for clearing to facilitate road upgrades, as well as the remainder of the road corridor along the project areas length to provide a contextual understanding of black cockatoo habitat in the area. The assessment involved examining the availability of foraging, breeding and roosting habitat for all three species of black cockatoos which could be potentially occur within the project area.

3.4.1.1 Foraging Habitat

In terms of foraging habitat, VSAs within the survey area were assigned a foraging habitat score out of ten for each black cockatoo species based on the vegetation composition, project area context and foraging species density. A total of six VSAs were identified within the survey area (Table 4; Figure 5). These VSAs, their foraging habitat for each species, and the extent of each within the survey area are outlined in Table 4.

Table 4: Black Cockatoo foraging habitat score based on VSA

VSA	Foraging Score			Area (ha) within survey area	Maximum extent (ha) to be cleared
	Carnaby’s Black Cockatoo	Baudin’s Black Cockatoo	Forest Red-tailed Black Cockatoo		
1	2	2	6	12.5	2.88
2	2	2	2	0.34	0.21
3	2	2	2	0.43	0.17
4	2	2	2	0.36	0.21
5	2	2	2	0.07	0.05

VSA	Foraging Score			Area (ha) within survey area	Maximum extent (ha) to be cleared
	Carnaby's Black Cockatoo	Baudin's Black Cockatoo	Forest Red-tailed Black Cockatoo		
6	1	1	1	1.53	0.74

As per the foraging habitat methodology presented in Appendix 1, VSA's with a foraging habitat score of less than 3 are considered to have no to low foraging value for black cockatoos. Examples of habitat which may score as such include urban areas with scattered trees, open paddocks with known food source weeds, and areas with foliage cover of less than 5% (such as bare ground or surface water bodies). On this basis, VSA's scoring 2 or less out of 10 are not considered to represent suitable foraging habitat for the respective species.

Omitting these areas, the proposed road upgrade works are anticipated to result in the clearing of vegetation representing 2.88 ha of foraging habitat for Forest Red-tailed Black Cockatoos, only. It should be noted that this area represents the maximum foreseeable extent of clearing required to facilitate the proposed works. Opportunities for the retention of individual trees (including significant trees) which provide valuable foraging habitat will be investigated as works progress, and every effort will be made by the proponent to retain such trees where possible.

3.4.1.2 Potential Breeding Habitat

A total of 30 trees with a Diameter at Breast Height (DBH) greater than 500 mm were identified within the survey area. These included 19 planted Eucalypts and 11 Flooded Gums. All trees were identified as 'category 5' in that lacked any hollows which could be suitable for breeding by black cockatoos (Appendix 1).

Of the 30 potential breeding trees identified within the survey area, only 15 are located with the project area and have the potential to be cleared. The nearest confirmed black cockatoo breeding activity is located approximately 7 km north east of the survey area in Lambert Lane Nature Reserve.

The location of potential breeding trees within the survey area and project area are displayed in Figure 6.

3.4.1.3 Potential Roosting Habitat

There are 49 known roost sites within 15 km of the survey area, with the closest confirmed roost located approximately 4.5 km to the west. This roost (roost code DEC28) is listed as being a roost for CBC. No roosting sites were identified within the survey area (BCE 2023; Appendix 1).

3.5 Conservation Areas and Ecological Linkages

There are no zoned reserves or other conservation areas which intersect with or are adjacent to the project area. The nearest conservation area to the project area is Cardup Nature Reserve, which is a Class A nature reserve managed by the DBCA on behalf of the Conservation and Parks Commission of Western Australia. Cardup Nature Reserve is located approximately 3 km to the east of the project area.

Two regional ecological linkages intersect the project area boundary, as mapped by the Western Australian Local Government Association (WALGA), including link ID's 67 and 68. Each of these linkages run perpendicular to the orientation of Kargotich Road as opposed to parallel, suggesting that remnant vegetation along Kargotich Road serves as a stepping stone for avian fauna, as opposed to an intact linkage in its own right. Notwithstanding, the majority of native vegetation along Kargotich Road is proposed to be retained following the proposed upgrade works, resulting in the maintenance of what habitat connectivity Kargotich Road currently provides.

There are no Environmentally Sensitive Areas as defined under the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* mapped within the project area.

3.6 Heritage

3.6.1 Indigenous Heritage

Based on a search of the Department of Planning Lands and Heritage (DPLH) Aboriginal Heritage Enquiry System, there are no known Registered sites or other Aboriginal Heritage Places within or in proximity to the project area. The nearest registered Aboriginal Heritage site is located approximately 2 km to the east, and is identified as South East Corridor 1 (Place ID 448) which is recorded as artefacts/scatter.

3.6.2 Other Heritage

A review of the State Heritage Office's InHerit database identified no non-aboriginal heritage places within the project area. The nearest non-aboriginal heritage place was identified as Manjedal Brook, which is listed on the Shire of Serpentine Jarrahdale's Municipal Inventory. Manjedal Brook is located approximately 0.5 km south of the southern limit of the project area.

4 Assessment Against Native Vegetation Clearing Permit Clearing Principles

An assessment of the proposed vegetation clearing against the ten native vegetation clearing principles contained in Schedule 5 of the EP Act is provided in Table 5. Based on the outcomes of the assessment, it is considered that the development is not at variance with the seven of the ten clearing principles. The development is considered unlikely to be at variance with principles (b) and (e), and may technically be at variance with principle (f). However, it should be noted that the proposed clearing aligns with the intended management objective for a MUW.

Table 5: Assessment Against Clearing Principles

Clearing principle	Discussion	Assessment
a. Native vegetation should not be cleared if it comprises a high level of biological diversity	<p>87% of native vegetation within the project area contains one native species only, being dominated by Sheoaks. The remaining 13% of native vegetation is considered to be in a similarly degraded condition, with no conservation significant species present.</p> <p>Historical aerial imagery dating from 1950 indicates that significant sections of Kargotich Road have been historically cleared for agricultural purposes.</p> <p>On this basis, the proposed clearing is not considered to be at variance with this principle.</p>	The proposed clearing is not considered to be at variance with this principle.
b. Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	<p>Vegetation within the project area is considered to provide the following faunal habitat values, only:</p> <ul style="list-style-type: none"> • 2.88 ha of foraging habitat for Forest Red-tailed Black Cockatoo • 15 potential breeding trees, none of which contain hollows suitable for breeding by black cockatoos. <p>It is noted that extensive potential foraging and potential breeding habitat for black cockatoos is available in dedicated conservation areas in proximity to the site, which include:</p> <ul style="list-style-type: none"> • Cardup Nature Reserve – Located approximately 3 km east of the project area • Jandakot Regional Park – Located approximately 3 km north west of the project area • Bush Forever site 65 – Located less than 1 km east of the project area <p>Considering the degraded condition of vegetation within the project area, the absence of suitable breeding habitat for black cockatoos, the suitability of this vegetation as foraging habitat for only one species of cockatoo, and the prevalence of suitable habitat in proximity to Kargotich Road, vegetation within the project area is not considered to be significant.</p> <p>The retention of habitat within the survey area following clearing will mean that the limited habitat connectivity currently provided by Kargotich Road will be maintained.</p> <p>On this basis, the proposed clearing is considered unlikely to be at variance with this principle.</p>	The proposed clearing is considered unlikely to be at variance with this principle.
c. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora	<p>No rare (threatened or priority) native flora have been identified within the project area based on the Winter and Spring site inspections and black cockatoo habitat assessment.</p> <p>Vegetation within the project area appears to be in a completely degraded condition, with an understory in all areas decimated by introduced grasses and other weed species. Historical aerial imagery indicates that the majority of Kargotich Road was historically cleared for agricultural purposes, with regrowth and planted vegetation comprising predominately of native and non-native trees. Where native vegetation is present, diversity appears limited to monocultural stands of Sheoak, only.</p> <p>It is considered highly unlikely that rare flora have been able to persist in the project area following this significant historical disturbance. Remaining habitat is not considered to represent habitat suitable for any rare flora, as identified in the desktop assessment (Appendix 2).</p> <p>On this basis, the proposed clearing will not result in the clearing of rare flora.</p>	The proposed clearing is not considered to be at variance with this principle.
d. Native vegetation should not be cleared if it comprises the whole, or a part of, or is necessary for the maintenance of, a threatened ecological community	<p>Based on the results of the black cockatoo habitat assessment, two site visits were undertaken in Winter and Spring to evaluate the likelihood of conservation significant flora and vegetation occurring within the project area. All VSA's which were considered to represent native vegetation (VSA's 1, 2, 3, and 5) were observed to be in a degraded condition, with a ubiquitous understory of introduced grasses and other weed species. 87% of native vegetation within the project area (which corresponds to VSA 1) contained one native species only, being sheoak. There are no threatened or priority listed ecological communities which could potentially be represented by the remaining 13% of vegetation within the project area.</p> <p>On this basis, no conservation significant ecological communities are anticipated to be directly or indirectly impacted by the proposed action.</p>	The proposed clearing is not considered to be at variance with this principle.
e. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	<p>One vegetation complex has been mapped across the project area, being the Beermullah complex. There is approximately 6.67% of this vegetation complex remaining on the Swan Coastal Plain (GoWA 2019b). Native vegetation within the project area and which may be representative of this vegetation complex was observed to be in a degraded condition during two site inspections undertaken in Winter and Spring. The predominant native species within the project area (Sheoak) is not considered to be a conservation significant species.</p> <p>Historic aerial imagery of Kargotich Road indicates that almost the entire road length was completely cleared of native vegetation for agricultural purposes prior to at least 1953, suggesting that all native vegetation currently present represents planted or regrowth vegetation.</p> <p>It is noted that Bush Forever site 65 which is located less than 1 km east of the site contains relatively intact and protected vegetation representative of the Beermullah complex.</p> <p>On this basis, vegetation within the project area is not considered significant as a remnant of native vegetation.</p>	The proposed clearing is considered unlikely to be at variance with this principle.
f. Native vegetation should not be cleared if it is growing in, or in association with, an environment	<p>The project area intersects with two regionally mapped MUW's as defined by DBCA (Armadale palusplain UFI 15,797 and unknown palusplain UFI 16,021). The proposed road upgrade works will align with the management objectives for MUWs.</p> <p>One watercourse intersects the project area, being the Cardup Brook. Vegetation in proximity to this watercourse (which functions and is maintained as a drain) is limited to stands of Sheoak only (VSA1) which is not considered to be a conservation significant species.</p>	The proposed clearing may be at variance with this principle, however it should be noted that the proposed works align with the intended management objective for a MUW.

Clearing principle	Discussion	Assessment
associated with a watercourse or a wetland		
g. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	<p>Historical aerial imagery dating from 1953 shows an extensive record of clearing and land alteration for agricultural purposes along Kargotich Road. The resulting road verge is one dominated by introduced weeds and grasses, which is consistent with the open paddocks adjacent to the project area. The proposed clearing of native vegetation is not anticipated to result in any further appreciable land degradation, nor will it have a deleterious impact on the environment.</p> <p>Notwithstanding the above, the proponent has committed to undertaking the proposed works in the warmer months of October to February, thereby minimizing the risk of excessive topsoil disturbance and excessive water runoff</p>	The proposed clearing is not considered to be at variance with this principle.
h. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area	<p>Indirect impacts on proximal conservation areas resulting from the proposed road upgrade works are anticipated to be limited to dust emissions and water runoff, only. To minimise these impacts, the proponent has committed to the availability and use of a water cart as works progress, to minimise dust emissions to the fullest extent possible. Further, works are proposed to only occur in the warmer months of October to February, thereby minimising the risk of excessive topsoil disturbance and excessive water runoff.</p>	The proposed clearing is not considered to be at variance with this principle.
i. Native vegetation should not be cleared if the clearing of vegetation is likely to cause deterioration in the quality of the surface or underground water	<p>The proposed works are limited to the construction of road infrastructure, only. No changes to surface water flows, or emissions to the environment (including groundwater) of any kind are anticipated.</p>	The proposed clearing is not considered to be at variance with this principle.
j. Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding	<p>The proposed works are limited to the construction of road infrastructure, only. No changes to surface water flows or groundwater levels of any kind are anticipated.</p>	The proposed clearing is not considered to be at variance with this principle.

5 Conclusion

The proposed upgrades to Kargotich Road will ensure the safety of road users in the Shire of Serpentine Jarrahdale, and will aid in future-proofing the local road network as urban residential development in the Shire progresses.

Native vegetation which will be cleared to facilitate the proposed upgrades is generally degraded in nature and dominated by introduced grasses and other weed species. While this vegetation provides limited foraging habitat for Forest Red-tailed Black Cockatoos only, the lack of species diversity and prevalence of large, intact conservation areas in the vicinity of the project area mean that these values are not considered to be significant. Habitat connectivity value provided by this vegetation is anticipated to be maintained following the proposed upgrades.

The proposal has endeavoured to minimise the extent of clearing necessitated by the proposed upgrades, and has committed to the further retention of significant trees within the project area where construction activities permit. The implementation of mitigation measures which will prevent and/or minimise dust emissions, water runoff and topsoil disturbance will ensure that potential indirect impacts will be minimised to the fullest extent possible.

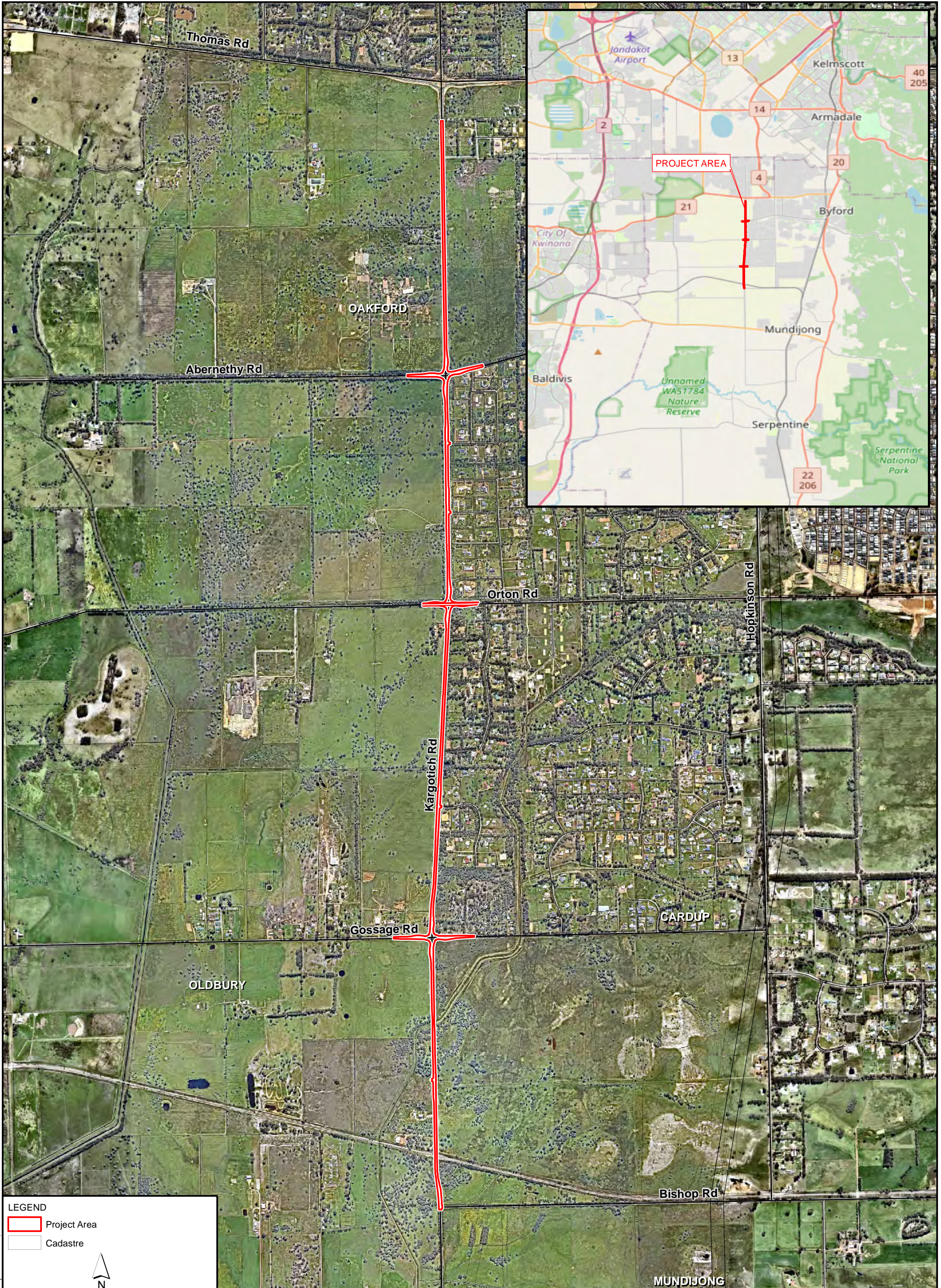
An assessment against the ten clearing principles demonstrates that the proposed clearing is considered to not be at variance with seven of the principles, is unlikely to be at variance with two principles ((b) and (e)), and may be at variance with principle (f). However it is noted that this potential variance relates to the presence of MUWs, and the proposed clearing is considered to align with the management objective for wetlands of this type.

Based on the above, the proposed clearing is not anticipated to be significant at a local or regional scale.

6 References


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Figures



LEGEND

- Project Area
- Cadastre

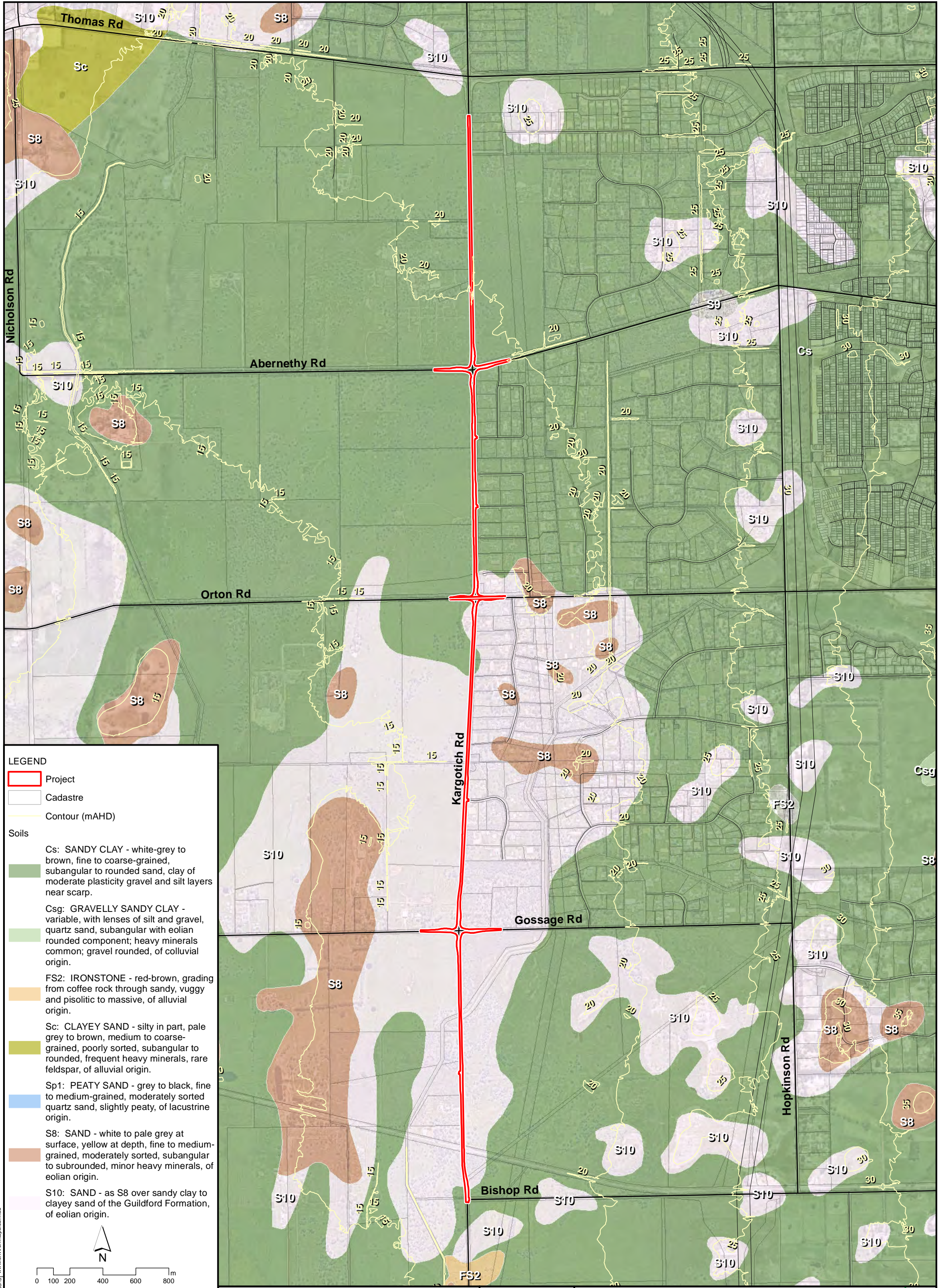


0 100 200 400 600 800 m

Scale: 1:20,000 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate
Orthophoto - NearMaps, 30.08.23

	<p>Job: SSJKRC01 Doc: 001 Date: 18/10/2023 Ph: (08) 9381 5513 Fax: (08) 9381 5514 E: info@coterra.com.au</p>	<p>Shire of Serpentine Jarrahdale NATIVE VEGETATION CLEARING PERMIT KARGOTICH ROAD UPGRADES</p> <p style="text-align: center; font-weight: bold; font-size: 1.2em;">PROJECT AREA</p>
		Figure 1



LEGEND

- Project
- Cadastre
- Contour (mAHD)

Soils

- Cs: SANDY CLAY** - white-grey to brown, fine to coarse-grained, subangular to rounded sand, clay of moderate plasticity gravel and silt layers near scarp.
- Csg: GRAVELLY SANDY CLAY** - variable, with lenses of silt and gravel, quartz sand, subangular with eolian rounded component; heavy minerals common; gravel rounded, of colluvial origin.
- FS2: IRONSTONE** - red-brown, grading from coffee rock through sandy, vuggy and pisolitic to massive, of alluvial origin.
- Sc: CLAYEY SAND** - silty in part, pale grey to brown, medium to coarse-grained, poorly sorted, subangular to rounded, frequent heavy minerals, rare feldspar, of alluvial origin.
- Sp1: PEATY SAND** - grey to black, fine to medium-grained, moderately sorted quartz sand, slightly peaty, of lacustrine origin.
- S8: SAND** - white to pale grey at surface, yellow at depth, fine to medium-grained, moderately sorted, subangular to subrounded, minor heavy minerals, of eolian origin.
- S10: SAND** - as S8 over sandy clay to clayey sand of the Guildford Formation, of eolian origin.

Scale: 1:20,000 @ A3
GDA2020 MGA Zone 50

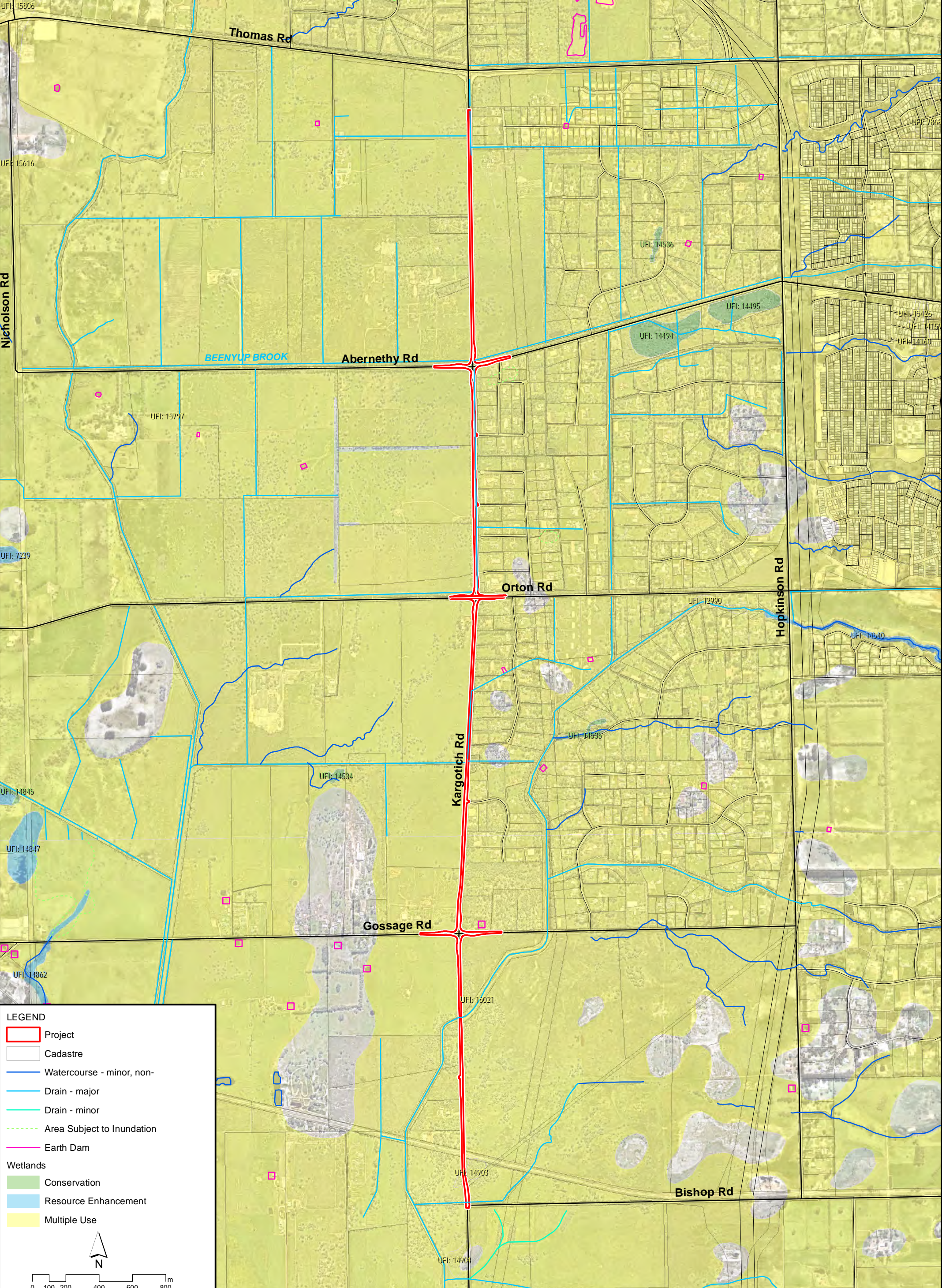
Source: Cadastre - Landgate
Orthophoto - NearMaps, 30.08.23
Hydrological / Contours - DWER
Geology - DoIR: Geological Survey of W.A., 1999

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Doc: 002
Date: 18/10/2023
Ph: (08) 9381 5513
Fax: (08) 9381 5514
E: info@coterra.com.au

Shire of Serpentine Jarrahdale
NATIVE VEGETATION CLEARING PERMIT
KARGOTICH ROAD UPGRADES
TOPOGRAPHY AND SOILS

Figure 2



LEGEND

- Project
- Cadastre
- Watercourse - minor, non-
- Drain - major
- Drain - minor
- Area Subject to Inundation
- Earth Dam

Wetlands

- Conservation
- Resource Enhancement
- Multiple Use

Scale: 1:20,000 @ A3
GDA2020 MGA Zone 50

0 100 200 400 600 800 m

Source: Cadastre - Landgate
 Orthophoto - NearMaps, 30.08.23
 Hydrological / Contours - DWER
 Hydrological - DWER Wetlands - DBCA

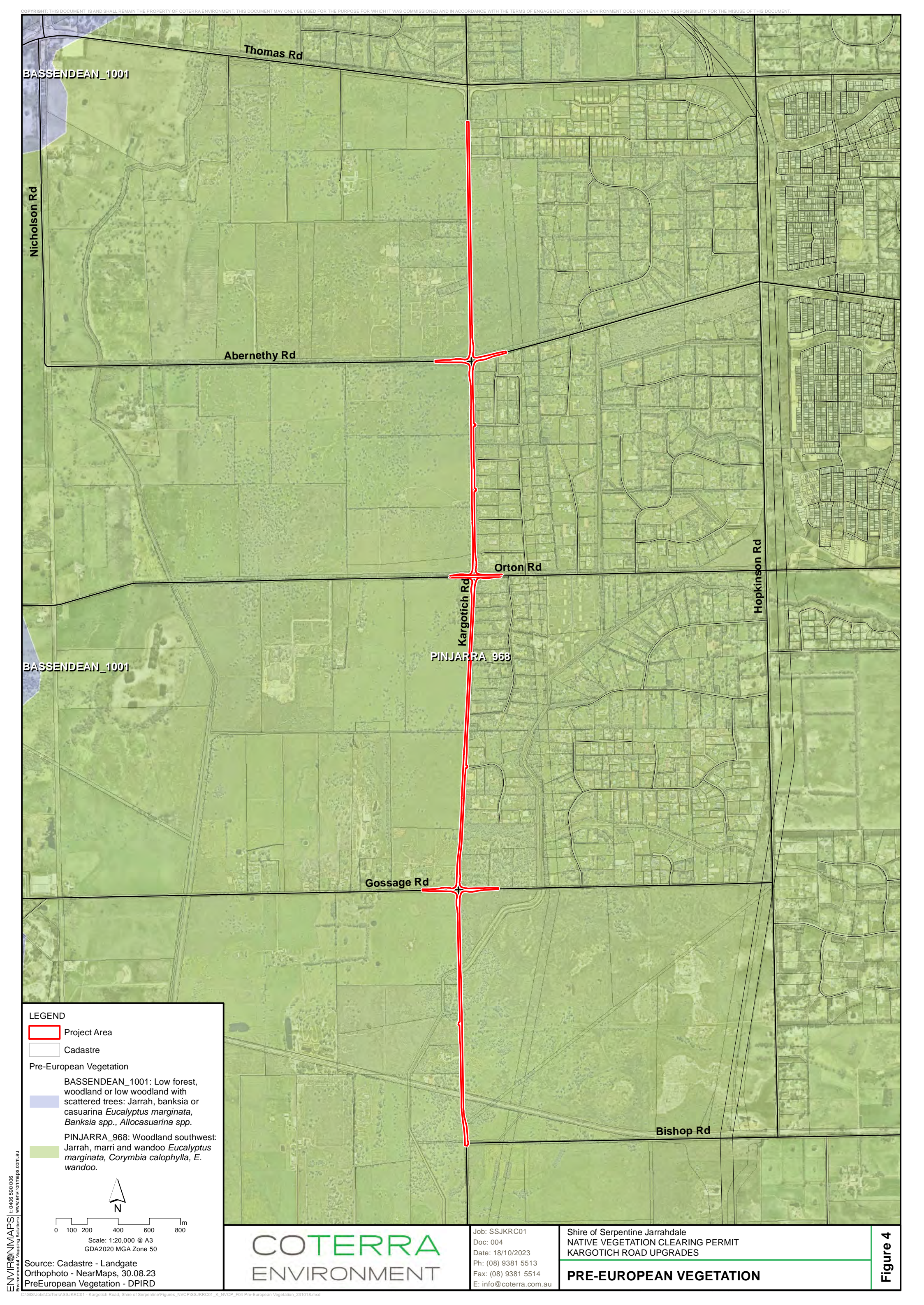


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 Doc: 003
 Date: 18/10/2023
 Ph: (08) 9381 5513
 Fax: (08) 9381 5514
 E: info@coterra.com.au

Shire of Serpentine Jarrahdale
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HYDROLOGY AND WETLANDS

Figure 3



ENVIRONMAPS t: 0406 590 006
Environmental Mapping Solutions www.environmentmaps.com.au

LEGEND

- Project Area
- Cadastre

Pre-European Vegetation

- BASSENDEAN_1001: Low forest, woodland or low woodland with scattered trees: Jarrah, banksia or casuarina *Eucalyptus marginata*, *Banksia spp.*, *Allocasuarina spp.*
- PINJARRA_968: Woodland southwest: Jarrah, marri and wandoo *Eucalyptus marginata*, *Corymbia calophylla*, *E. wandoo*.

Scale: 1:20,000 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate
Orthophoto - NearMaps, 30.08.23
PreEuropean Vegetation - DPIRD

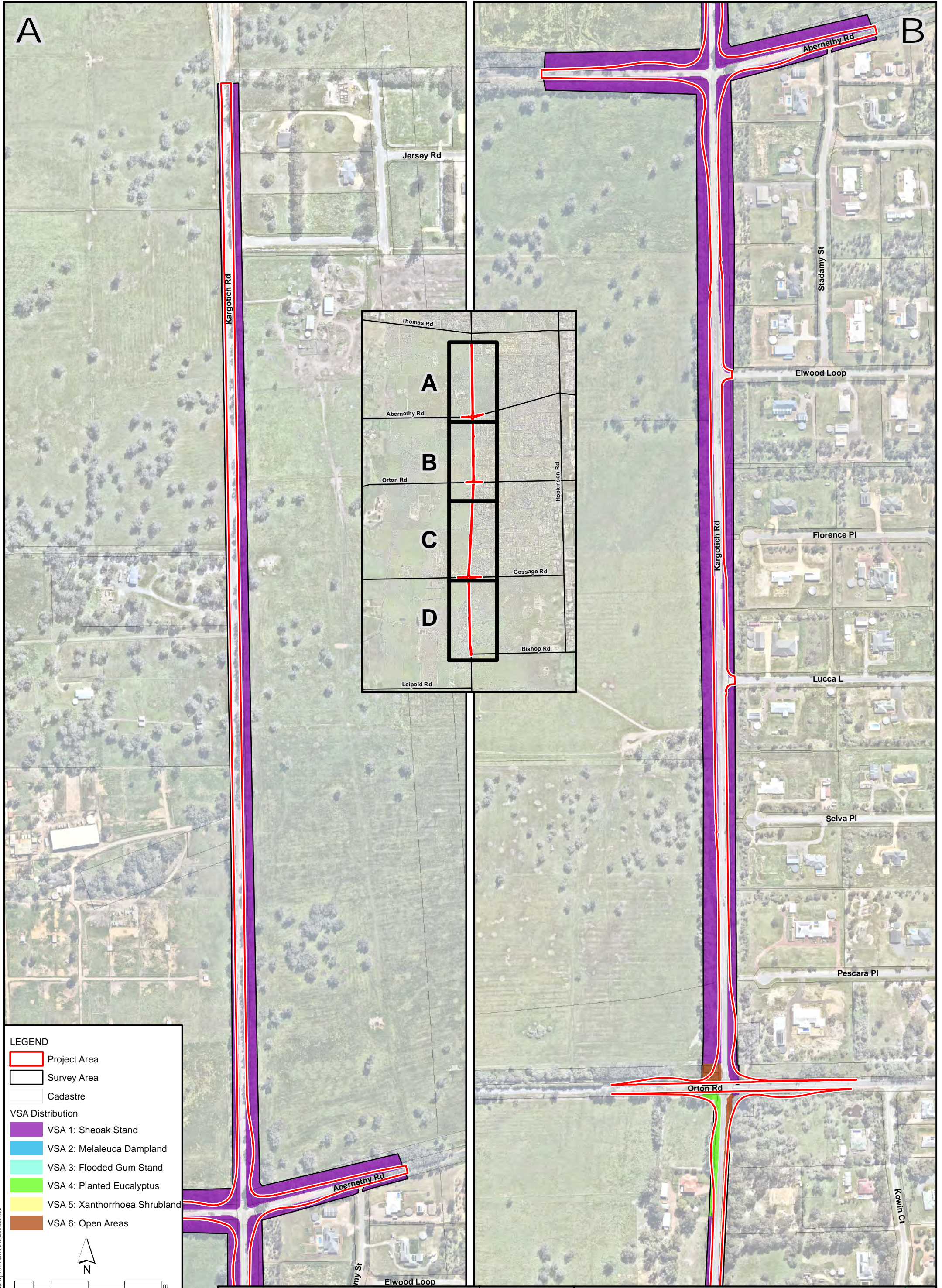
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Ph: (08) 9381 5513
Fax: (08) 9381 5514
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Shire of Serpentine Jarrahdale
NATIVE VEGETATION CLEARING PERMIT
KARGOTICH ROAD UPGRADES

PRE-EUROPEAN VEGETATION

Figure 4



LEGEND

- Project Area
- Survey Area
- Cadastre

VSA Distribution

- VSA 1: Sheoak Stand
- VSA 2: Melaleuca Dampland
- VSA 3: Flooded Gum Stand
- VSA 4: Planted Eucalyptus
- VSA 5: Xanthorrhoea Shrubland
- VSA 6: Open Areas

N

0 25 50 100 150 200
m

Scale: 1:4,500 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate, 2015
 Orthophoto - NearMaps, 27.06.15
 VSA Distribution - Bamford Consulting

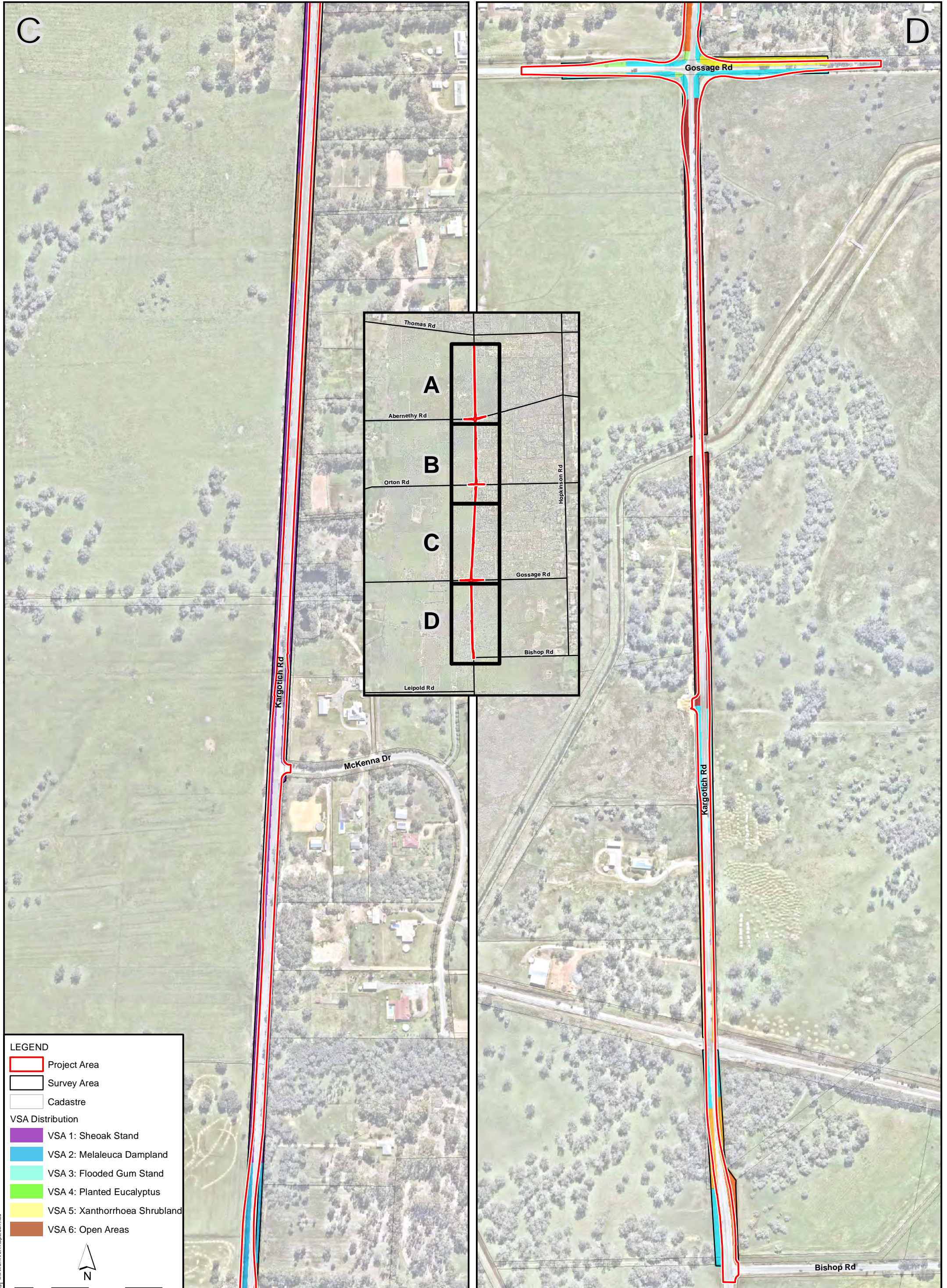
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 Doc: 005a
 Date: 21/10/2023
 Ph: (08) 9381 5513
 Fax: (08) 9381 5514
 E: info@coterra.com.au

Shire of Serpentine Jarrahdale
 NATIVE VEGETATION CLEARING PERMIT
 KARGOTICH ROAD UPGRADES

VSA DISTRIBUTION

Figure 5a



LEGEND

- Project Area
- Survey Area
- Cadastre

VSA Distribution

- VSA 1: Sheoak Stand
- VSA 2: Melaleuca Dampland
- VSA 3: Flooded Gum Stand
- VSA 4: Planted Eucalyptus
- VSA 5: Xanthorrhoea Shrubland
- VSA 6: Open Areas

Scale: 1:4,500 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate, 2015
Orthophoto - NearMaps, 27.06.15
VSA Distribution - Bamford Consulting

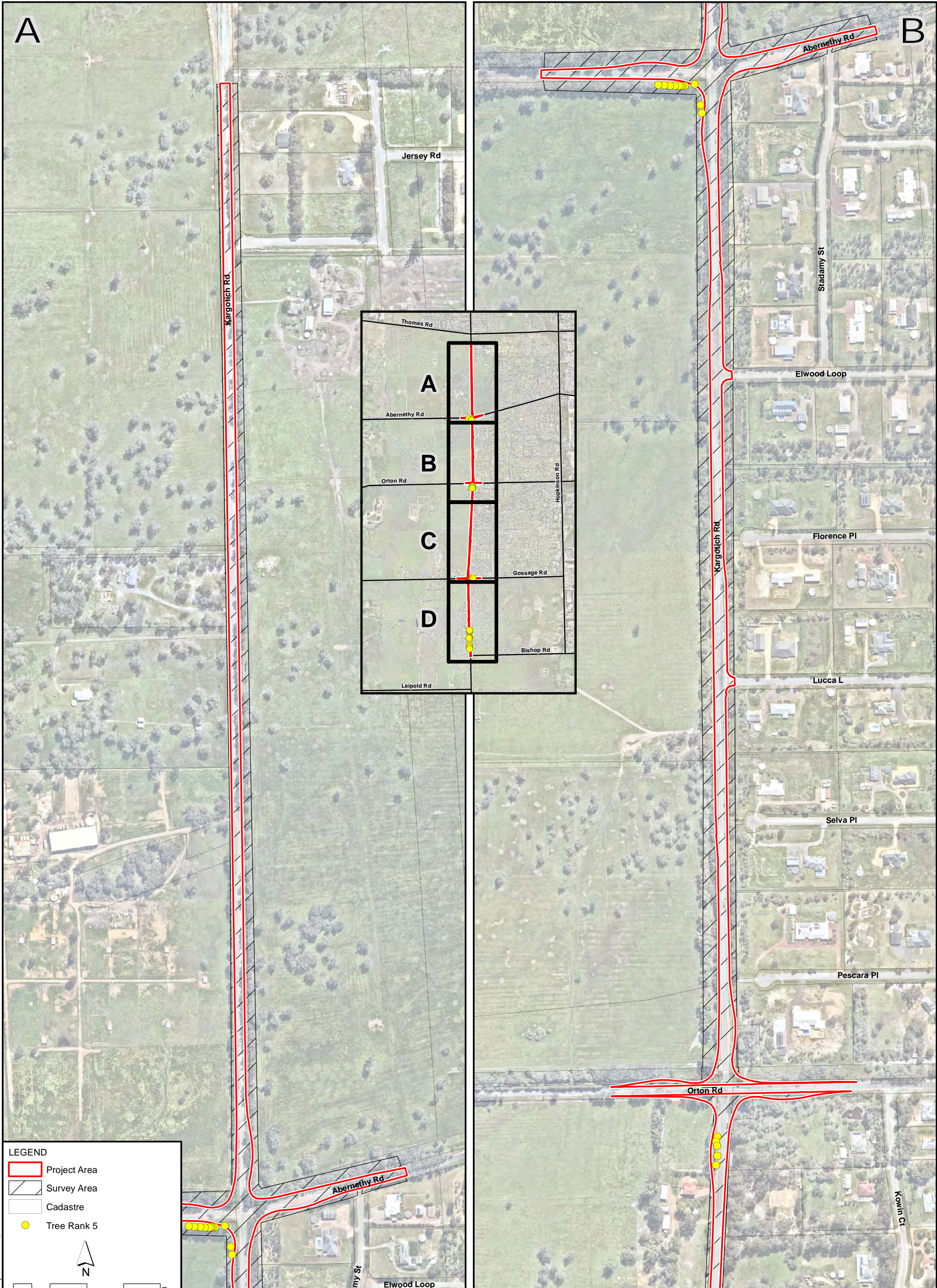
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Doc: 005b
Date: 21/10/2023
Ph: (08) 9381 5513
Fax: (08) 9381 5514
E: info@coterra.com.au

Shire of Serpentine Jarrahdale
NATIVE VEGETATION CLEARING PERMIT
KARGOTICH ROAD UPGRADES

VSA DISTRIBUTION

Figure 5b



LEGEND

- Project Area
- Survey Area
- Cadastre
- Tree Rank 5

N

0 25 50 100 150 200
m

Scale: 1:4,500 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate, 2015
Orthophoto - NearMaps, 27.06.15
BC Breeding Trees - Bamford Consulting

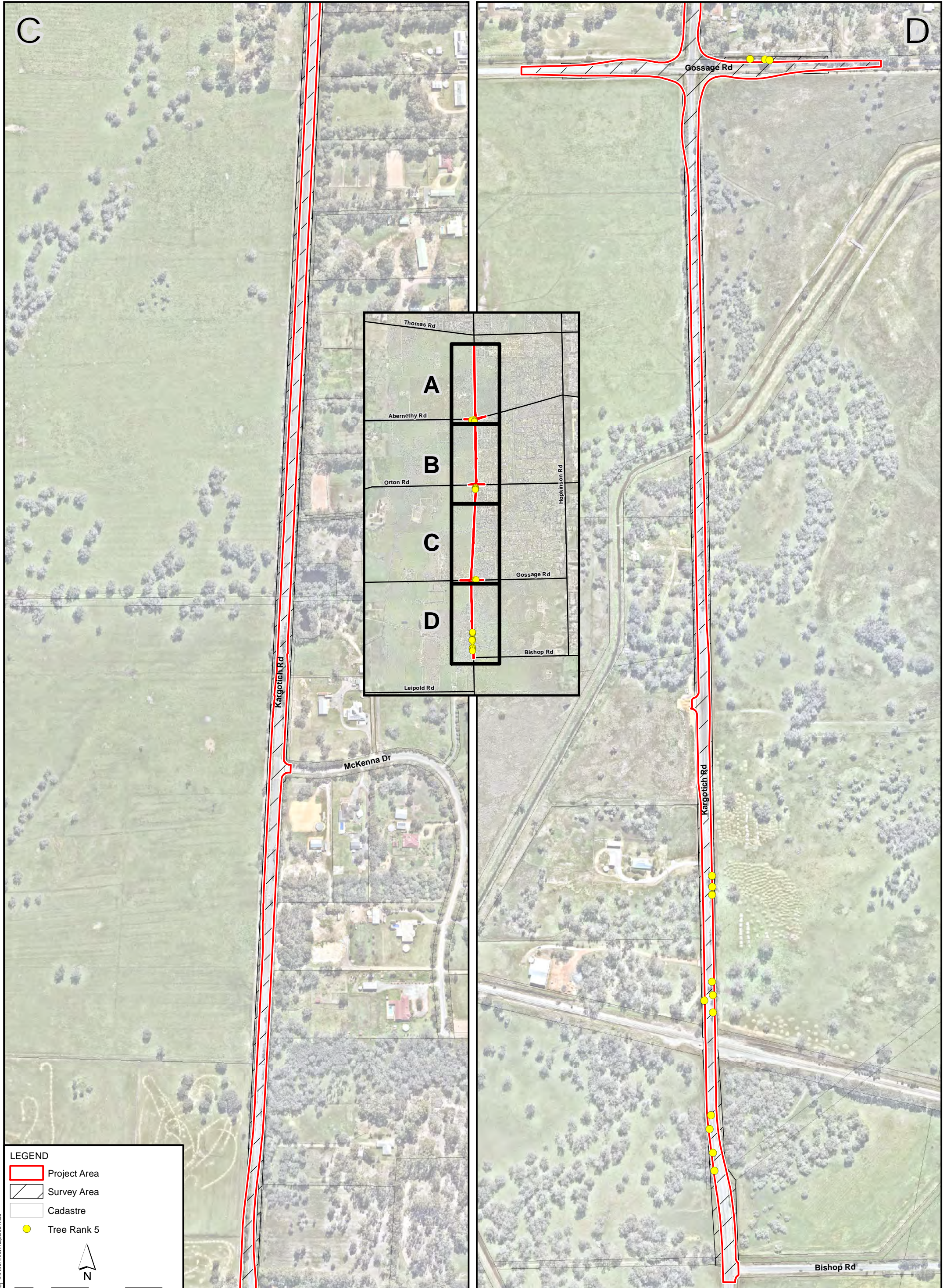
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Ph: (08) 9381 5513
Fax: (08) 9381 5514
E: info@coterra.com.au

Shire of Serpentine Jarrahdale
NATIVE VEGETATION CLEARING PERMIT
KARGOTICH ROAD UPGRADES

**BLACK COCKATOO
POTENTIAL BREEDING TREES**

Figure 6a



LEGEND

- Project Area
- Survey Area
- Cadastre
- Tree Rank 5

N

0 25 50 100 150 200m

Scale: 1:4,500 @ A3
GDA2020 MGA Zone 50

Source: Cadastre - Landgate, 2015
Orthophoto - NearMaps, 27.06.15
BC Breeding Trees - Bamford Consulting

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Figure 6b

Appendix 1 Black Cockatoo Habitat Assessment

Appendix 2 Desktop Assessment Results

Taxon	Common	Class	WA Status	EPBC Status
Fauna				
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	CR	MI
<i>Leioproctus douglasiellus</i>	a short-tongued bee	INVERTEBRATE	EN	CR
<i>Neopasiphae simplicior</i>	a short-tongued bee	INVERTEBRATE	EN	CR
<i>Botaurus poiciloptilus</i>	Australasian bittern	BIRD	EN	EN
<i>Calyptorhynchus baudinii</i>	Baudin's cockatoo	BIRD	EN	EN
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	EN	EN
<i>Myrmecobius fasciatus</i>	numbat, walpurti	MAMMAL	EN	EN
<i>Calyptorhynchus sp. 'white-tailed black cockatoo'</i>	white-tailed black cockatoo	BIRD	EN	EN
<i>Westralunio carteri</i>	Carter's freshwater mussel	INVERTEBRATE	VU	VU
<i>Dasyurus geoffroii</i>	chuditch, western quoll	MAMMAL	VU	VU
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	VU	VU
<i>Charadrius leschenaultii</i>	greater sand plover, large sand plover	BIRD	VU	MI
<i>Leipoa ocellata</i>	malleefowl	BIRD	VU	VU
<i>Phascogale tapoatafa wambenger</i>	south-western brush-tailed phascogale, wambenger	MAMMAL	CD	
<i>Limosa limosa</i>	black-tailed godwit	BIRD	MI	MI
<i>Hydroprogne caspia</i>	caspian tern	BIRD	MI	MI
<i>Tringa nebularia</i>	common greenshank	BIRD	MI	MI
<i>Actitis hypoleucos</i>	common sandpiper	BIRD	MI	MI
<i>Apus pacificus</i>	fork-tailed swift	BIRD	MI	MI
<i>Plegadis falcinellus</i>	glossy ibis	BIRD	MI	MI
<i>Pluvialis squatarola</i>	grey plover	BIRD	MI	MI
<i>Calidris subminuta</i>	long-toed stint	BIRD	MI	MI
<i>Tringa stagnatilis</i>	marsh sandpiper	BIRD	MI	MI
<i>Pandion haliaetus</i>	osprey	BIRD	MI	MI
<i>Pluvialis fulva</i>	Pacific golden plover	BIRD	MI	MI
<i>Calidris melanotos</i>	pectoral sandpiper	BIRD	MI	MI
<i>Calidris ruficollis</i>	red-necked stint	BIRD	MI	MI
<i>Arenaria interpres</i>	ruddy turnstone	BIRD	MI	MI
<i>Calidris acuminata</i>	sharp-tailed sandpiper	BIRD	MI	MI
<i>Tringa glareola</i>	wood sandpiper	BIRD	MI	MI
<i>Falco peregrinus</i>	peregrine falcon	BIRD	OS	

Taxon	Common	Class	WA Status	EPBC Status
<i>Austroconops mcmillani</i>	McMillan's biting midge (Swan Coastal Plain)	INVERTEBRATE	P2	
<i>Leioproctus contrarius</i>	a short-tongued bee	INVERTEBRATE	P3	
<i>Neelaps calonotos</i>	black-striped snake, black-striped burrowing snake	REPTILE	P3	
<i>Euoplos inornatus</i>	inornate trapdoor spider (northern Jarrah Forest)	INVERTEBRATE	P3	
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	P3	
<i>Acanthophis antarcticus</i>	southern death adder	REPTILE	P3	
<i>Idiosoma sigillatum</i>	Swan Coastal Plain shield-backed trapdoor spider	INVERTEBRATE	P3	
<i>Oxyura australis</i>	blue-billed duck	BIRD	P4	
<i>Synemon gratiosa</i>	graceful sunmoth	INVERTEBRATE	P4	
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	P4	
<i>Notamacropus eugenii derbianus</i>	tammar wallaby	MAMMAL	P4	
<i>Hydromys chrysogaster</i>	water-rat, rakali	MAMMAL	P4	
<i>Notamacropus irma</i>	western brush wallaby	MAMMAL	P4	
<i>Falsistrellus mackenziei</i>	western false pipistrelle, western falsistrelle	MAMMAL	P4	
Flora				
<i>Ptilotus sericostachyus subsp. roseus</i>		PLANT	EX	
<i>Caladenia huegelii</i>		PLANT	CR	
<i>Drakaea elastica</i>		PLANT	CR	
<i>Drosera oreopodion</i>		PLANT	CR	
<i>Eucalyptus x balanites</i>		PLANT	CR	
<i>Synaphea sp. Serpentine (G.R. Brand 103)</i>		PLANT	CR	
<i>Thelymitra magnifica</i>		PLANT	CR	
<i>Thelymitra variegata</i>		PLANT	CR	
<i>Diuris purdiei</i>		PLANT	EN	
<i>Drakaea micrantha</i>		PLANT	EN	
<i>Lepidosperma rostratum</i>		PLANT	EN	
<i>Synaphea sp. Pinjarra Plain (A.S. George 17182)</i>		PLANT	EN	
<i>Grevillea curviloba</i>		PLANT	EN	
<i>Thelymitra stellata</i>		PLANT	EN	
<i>Diuris micrantha</i>		PLANT	VU	

Taxon	Common	Class	WA Status	EPBC Status
<i>Morelotia australiensis</i>		PLANT	VU	
<i>Aponogeton hexatepalus</i>		PLANT	4	
<i>Drosera occidentalis</i>		PLANT	4	
<i>Jacksonia sericea</i>		PLANT	4	
<i>Ornduffia submersa</i>		PLANT	4	
<i>Stylidium longitubum</i>		PLANT	4	
<i>Tripterococcus sp. Brachylobus (A.S. George 14234)</i>		PLANT	4	
<i>Verticordia lindleyi subsp. lindleyi</i>		PLANT	4	
<i>Acacia oncinophylla subsp. patulifolia</i>		PLANT	4	
<i>Eucalyptus rudis subsp. cratyantha</i>		PLANT	4	
<i>Kennedia becxiana</i>		PLANT	4	
<i>Parsonsia diaphanophleba</i>		PLANT	4	
<i>Thysanotus glaucus</i>		PLANT	4	
<i>Babingtonia urbana</i>		PLANT	3	
<i>Cyathochaeta teretifolia</i>		PLANT	3	
<i>Dillwynia dillwynioides</i>		PLANT	3	
<i>Pithocarpa corymbulosa</i>		PLANT	3	
<i>Schoenus pennisetis</i>		PLANT	3	
<i>Acacia horridula</i>		PLANT	3	
<i>Amanita carneiphylla</i>		PLANT	3	
<i>Amanita fibrillopes</i>		PLANT	3	
<i>Amanita preissii</i>		PLANT	3	
<i>Amanita wadjukiorum</i>		PLANT	3	
<i>Angianthus drummondii</i>		PLANT	3	
<i>Banksia kippistiana var. paenepeccata</i>		PLANT	3	
<i>Byblis gigantea</i>		PLANT	3	
<i>Carex tereticaulis</i>		PLANT	3	
<i>Dampiera triloba</i>		PLANT	3	
<i>Jacksonia gracillima</i>		PLANT	3	
<i>Meionectes tenuifolia</i>		PLANT	3	
<i>Schoenus capillifolius</i>		PLANT	3	
<i>Schoenus sp. Waroona (G.J. Keighery 12235)</i>		PLANT	3	
<i>Stylidium aceratum</i>		PLANT	3	
<i>Stylidium paludicola</i>		PLANT	3	

Taxon	Common	Class	WA Status	EPBC Status
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>		PLANT	2	
<i>Millotia tenuifolia</i> var. <i>laevis</i>		PLANT	2	
<i>Amanita wadulawitu</i>		PLANT	2	
<i>Calectasia grandiflora</i>		PLANT	2	
<i>Netrostylis</i> sp. <i>Chandala</i> (G.J. Keighery 17055)		PLANT	2	
<i>Poranthera moorokatta</i>		PLANT	2	
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)		PLANT	1	
<i>Boronia juncea</i> subsp. <i>juncea</i>		PLANT	1	
<i>Calytrix simplex</i> subsp. <i>simplex</i>		PLANT	1	