



CLEARING PERMIT SUPPORTING DOCUMENTATION

LOT 1 (1326) RIVERDALE ROAD, COOKERNUP

February 2022

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1 INTRODUCTION

1.1 Applicant

The applicant for this Clearing Permit is Richard Lovegrove. Contact details for the applicant are provided below.

41 Brentwood Road
Wattle Grove, WA, 6107
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1.2 Background

Dick Lovegrove (the proponent) is seeking to clear approximately 8.2 hectares (ha) of native vegetation within a 28 ha clearing footprint in Lot 1 Riverdale Road, Cookernup (herein referred to as the subject site). The subject site will be utilised for pasture following clearing. The subject site is located within the municipality of the Shire of Harvey, approximately 25 kilometres (km) south-east of Preston Beach and 100 km south of Perth (refer to **Figure 1** and **Figure 2**).

1.3 Scope and Purpose

This document has been prepared to support an application for a Clearing Permit (Area Permit) pursuant to Section 51E of the *Environmental Protection Act 1986* (EP Act). This document provides information regarding the current environmental condition of the subject site, including the predicted impacts of clearing and proposed management actions to mitigate predicted impacts. It also provides an assessment against the ten clearing principles and other relevant legislation and policy.

1.4 Relevant Legislation and Policy

Western Australian legislation relevant to this Clearing Permit application includes:

- *Bush Fires Act 1954*;
- *Biodiversity Conservation Act 2016*;
- *Environmental Protection Act 1986*;
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*; and
- *Rights in Water and Irrigation Act 1914*.

2 BIOPHYSICAL ENVIRONMENT

During the compilation of this clearing permit application, a range of specific environmental and heritage issues were explored in relation to the subject site. This involved a detailed desktop assessment supported by a site visit conducted by Accendo Australia on the 25th November 2021.

2.1 Topography, Landform and Soils

The current topography of the subject site can be described as gently sloping from south to north with minimal variation within the subject site. Online mapping from the Department of Primary Industries and Regional Development's (DPIRD's) *Natural Resource Information* (NRInfo) database indicated an elevation ranging between approximately 16 metres (m) Australian Height Datum (AHD) to 18 m AHD within the subject site.

The DPIRD's *Natural Resource Information* (NRInfo) maps the subject site as being located within the Bassendean landscape system, part of the Swan Coastal Plain which extends from Perth to Capel and consists of a poorly drained coastal plain with variable alluvial and aeolian soils. The Bassendean zone originates from the mid Pleistocene era, consisting of fixed dunes inland from coastal dune zone, non-calcareous, Bassendean sands, podsolised soils with low-lying wet areas.

Specifically, the subject site has been mapped as containing soils of the Sw - Swamp (Bassendean) Phase, Bassendean B6 Phase and the Bassendean B4 Phase (refer to **Figure 3**). These Phases are described as:

- Sw - Swamp (Bassendean): Wet soils comprised of pale deep sands and peaty sands;
- Bassendean B6 Phase: Sandplain and broad extremely low rises with imperfectly drained deep or very deep grey siliceous sands; and
- Bassendean B4 Phase: Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron – organic hardpan.

2.2 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain when the naturally anaerobic conditions in which they are situated are disturbed and they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS produce sulfuric acid, which can result in a range of impacts to the surrounding environment. ASS that has oxidised and resulted in the creation of acidic conditions are termed "Actual ASS" (AASS), and those that have acid generating potential but remain in their naturally anaerobic conditions are termed "Potential ASS" (PASS).

Mapping prepared by the Department of Water and Environmental Regulation (DWER) indicates that the subject site is classified as having "*moderate to low risk of ASS, occurring within 3 m of the natural soil surface*".

2.3 Hydrology

2.3.1 Groundwater

The subject site is located within the Harvey subarea of the *Rights in Irrigation and Water Act* (1914) (RiWI Act) proclaimed South West Coastal Groundwater Management Area. The principal groundwater aquifers for the subject site include the superficial aquifer, the Upper and Lower Leederville aquifer and the Cattamarra aquifer. The superficial aquifer comprises the Quaternary Superficial formations including the

Gnangara Sand, Bassendean Sand and Ascot Formation. The Lower Leederville aquifer is present throughout the Waroona subarea and the top of this aquifer is expected to occur at around 0 m AHD. The Upper Leederville aquifer only occurs in the western half of the subarea. The Cattamarra aquifer consists of the Cattamarra Coal measures and occurs throughout the subarea underlying the superficial and Leederville aquifers (DoW 2012).

To protect the State’s drinking water resources the Department of Water and Environmental regulation (DWER) has defined certain Priority Classification Areas within Public Drinking Water Source Areas (PDWSA) providing three levels of groundwater quality protection. These are based on the principles of risk avoidance (Priority 1), risk minimisation (Priority 2) and pollution limiting (Priority 3). The subject site does not lie within any existing or potential PDWSAs.

2.3.2 Surface Water

The subject site is within the Harvey Main Drain sub catchment area of the Harvey River catchment area. No surface water features were identified directly within the subject site, however there are small dams present on adjacent properties. The Waroona drain is also approximately 1 km to the north of the subject site.

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system (refer to **Table 1**).

Table 1. Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands have been mapped previously by Semeniuk (1995) across the entire Swan Coastal Plain. This mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the ‘*Geomorphic Wetlands of the Swan Coastal Plain*’ dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 2**.

Table 2. DBCA Wetland Management Categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: <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. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity

Category	Description	Management Objectives
		that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified by still support substantial ecological attributes and functions.	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 functions, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions.	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

A portion of the subject site is classified as a Palusplain Multiple Use (MU) wetland (UFI 3823) in accordance with the *Swan Coastal Plain Geomorphic Wetlands* dataset. There are three Resource Enhancement (RE) sumpland wetlands mapped within the property (UFI 3785, 3841 and 14581) (refer to **Figure 4**). All vegetative clearing will be setback a minimum of 30 m to the mapped RE wetland boundaries.

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas within the property. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing through drainage lines into the wider drainage system. The clearing is not proposing to alter this process.

2.4 Vegetation and Flora

2.4.1 Vegetation Types

The subject site is within the Swan Coastal Plain Biogeographic Region of the South-west Botanical Province (Thackway and Cresswell 1995, and Paczkowska and Chapman 2000), an area that extends from Jurien Bay to the north to Dunsborough to the south, and west of the Darling Scarp. Historically this biogeographic region has been extensively cleared for both urban and agricultural purposes.

Regional vegetation has been mapped by Heddle *et al.* (1980) at a scale of 1:250,000 based on major geomorphic units on the Swan Coastal Plain and the site consists of vegetation of the Bassendean complex central and south; woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - Banksia species to low woodland of Melaleuca species, and sedgelands on the moister sites.

Beard (1979) vegetation mapping indicates the subject site would have contained vegetation of the Bassendean complex, consisting of a mosaic, medium forest of Jarrah-Marri, low woodland containing Banksia and low forest of teatree (*Melaleuca* spp.).

The mapped Heddle *et al.* (1980) and Beard (1979) complexes can be used to determine vegetation extent and status on the Swan Coastal Plain (refer to **Table 3**). The EPA has a target to retain all remaining areas of each complex where less than 30% remains on the Swan Coastal Plain (EPA 2003).

Table 3. Regional assessment of vegetation extent.

System	Pre-European (ha)	Current Extent (ha)	Remaining Extent (%)	Extent in Managed Lands (%)
IBRA Bioregion Swan Coastal Plain	1,501,222	579,813	39	38
Local Government Shire of Harvey	83,233	44,807	54	80
Beard Vegetation Association Bassendean (1000)	99,836	27,769	28	19
Hedde Vegetation Complex Bassendean complex central and south	87,476	23,533	26.9	1.86

In consideration of **Table 3**, the Bassendean (1000) vegetation association and the Bassendean complex central and south vegetation complex present within the subject site have less than 30% of the pre-European extent remaining.

Based on observations during a site visit undertaken by Accendo on the 25th November 2021, vegetation within the subject site is classified as being in a 'Degraded' to 'Completely Degraded' condition. This can be attributed to historical and ongoing disturbances such as livestock grazing and firewood collecting/logging, which has resulted in the absence of tree species.

During the site visit, only two flora species were evident within the subject site which included spearwood (*Kunzea ericifolia*) and *Juncus* spp. (refer to **Plate 1 - 4**). Species diversity is very limited and the spearwood (*Kunzea ericifolia*) appears to be regrowth from the 2016 Waroona fire. The absence of under and upper-storey species can be attributed to historical and recent grazing of the subject site.



Plate 1: *Juncus* spp. with occasional Spearwood (*Kunzea ericifolia*) in south-western corner of clearing footprint.



Plate 2: Spearwood (*Kunzea ericifolia*) monoculture in northern portion of the site.



Plate 3: Juvenile *Spearwood* (*Kunzea ericifolia*) monoculture in eastern portion of subject site.



Plate 4: Mature *Spearwood* (*Kunzea ericifolia*) monoculture in northern portion of subject site.

2.4.2 Ecological Communities

Threatened Ecological Communities (TECs) are defined by the Department of Biodiversity, Conservation and Attractions (DBCA) and are assigned to a category of Priority 1 to Priority 5.

Selected TECs are also afforded statutory protection at a Federal level pursuant to the *Environment Protection and Biodiversity Conservation Act 1998* (EPBC Act). The EPBC Act provides for the protection of TECs that are listed under section 181 of the Act, and are defined as “Critically Endangered”, “Endangered” or “Vulnerable”.

In addition to listing as a TEC, a community may be listed as a Priority Ecological Community (PEC). An ecological community that is under consideration for listing as a TEC, but does not yet meet the survey criteria or has not been adequately defined, is placed on the list of PECs in either Category 1, 2 or 3.

A search was undertaken of the DBCA’s TEC database and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters database indicated that two TECs are mapped as being likely to occur within 5 km of the subject site. This includes the Banksia Woodlands of the Swan Coastal Plain ecological community (Endangered) and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered).

To be considered as part of the Banksia Woodlands TEC, a patch of Banksia woodlands needs to meet a number of criteria as follows:

- Occurrence on the Swan Coastal Plain and immediately adjacent areas of the Whicher Scarp, Ridge Hill Shelf and Dandaragan Plateau in well-drained, low nutrient soils on sandplain landforms;
- The structure is that of a low woodland to forest;
- The canopy is commonly dominated by or co-dominated by *Banksia attenuata* and/or *Banksia menziesii*;
- The patch must include at least one of *Banksia attenuata*, *Banksia menziesii*, *Banksia ilicifolia* or *Banksia prionotes*; and
- The canopy may include emergent trees of *Eucalyptus marginata* or *Corymbia calophylla*.

The condition of the patch is also important in determining the presence of the Banksia Woodlands TEC. A patch must meet the criteria for ‘Good’ condition or better according to the Keighery (1994) Condition Scale. If a patch is rated as being in ‘Good’ condition, then it must be at least 2 ha in size.

Given the ‘Degraded’ to ‘Completely Degraded’ nature of the vegetation within the subject site and the complete absence of Banksia spp., it is very unlikely that the Banksia Woodlands TEC is present within the subject site.

To be considered as part of the Tuart Woodlands and Forest TEC, a patch of Tuart woodland needs to meet the following criteria:

- Occurrence on the Swan Coastal Plain;
- Primarily occurs on the Spearwood and Quindalup dune systems, but can also occur on the Bassendean Dunes and Pinjarra Plain. It can occur on the banks of rivers and wetlands. It occurs below the Darling and Whicher escarpments where they define a plateau to the east of the Swan Coastal Plain;
- Most often occurs as a woodland but can occur in a variety of structural forms, including closed forest, open forest, woodland, open woodland, closed mallee forest, open mallee forest, mallee woodland and open mallee woodland; and
- The dominant tree canopy species is Tuart (*Eucalyptus gomphocephala*). While other tree species may be present in the canopy, they are less abundant than Tuart.

The condition of the patch is also important in determining the present of the Tuart Woodlands and Forest TEC. A patch must meet the criteria for 'Good' condition or better according to the Keighery (1994) Condition Scale. If a patch is rated as being in 'Good' condition it must also be at least 2 ha in size.

Given the 'Degraded' to 'Completely Degraded' nature of vegetation within the subject site and the complete absence of Tuarts, it is very unlikely that the Tuart Woodlands and Forest TEC is present within the subject site.

2.4.3 Ecological Linkages

The DBCA recognises several Regional Ecological Linkages that have been identified from studies of regionally significant natural areas (Molloy *et al.* 1999). While there is no statutory basis for regional ecological linkages, they have been recognised as an environmental policy consideration in EPA and planning policy over the last decade (EPA, 2009 and references therein).

The *South West Regional Ecological Linkages (SWREL) Technical Report* (Molloy *et al.* 2009) identifies an ecological linkage located approximately 250 m to northwest of the subject site. This linkage runs in a north south direction and the vegetation within the subject site is not directly connected to vegetation within the linkage.

2.4.4 Environmentally Sensitive Areas

Section 51B of the EP Act allows the Minister to declare an Environmentally Sensitive Area (ESA). Once declared, the exemptions to clear native vegetation under the regulations do not apply in these areas. Current declared ESAs are listed in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005.

There are no ESAs located within or in proximity to the subject site.

2.4.5 Flora

A search for known rare and Priority flora within or in proximity to the subject site was undertaken through review of the following databases:

- DBCA's NatureMap database; and
- EPBC Act Protected Matters database.

A total of three Priority flora and one Declared Rare Flora species have been recorded within 5 km of the subject site. The EPBC Act Protected Matters database search returned two results for listed "Critically Endangered" species, six results for "Endangered" species and four results for "Vulnerable" flora species of which five have potential to occur within the subject site. A summary of these species and their likelihood of occurring within the subject site based on preferred soil types is provided within **Table 4**.

Table 4. Database search results for significant flora known to occur within a 5km radius of the subject site.

Species	DBCA Status ¹	EPBC Act Status	Likelihood of Occurrence
<i>Andersonia gracilis</i>		Endangered	Unlikely
<i>Boronia capitata subsp. gracilis</i>	P3		Unlikely
<i>Caladenia huegelii</i> (King Spider -orchid)	T	Endangered	Possible
<i>Caladenia speciosa</i>	P4		Possible
<i>Diuris drummondii</i> (Tall Donkey Orchid)	-	Vulnerable	Unlikely
<i>Diuris micrantha</i> (Dwarf Bee-orchid)	-	Vulnerable	Unlikely
<i>Diuris purdiei</i> (Purdie's Donkey-orchid)	-	Endangered	Unlikely

Species	DBCAs Status ¹	EPBC Act Status	Likelihood of Occurrence
<i>Drakaea elastica</i> (Glossy-leafed Hammer Orchid)	-	Endangered	Possible
<i>Drakaea micrantha</i> (Dwarf Hammer-orchid)	-	Vulnerable	Possible
<i>Eleocharis keigheryi</i> (Keighery's Eleocharis)	-	Vulnerable	Unlikely
<i>Synaphea</i> sp. Fairbridge Farm (Selena's Synaphea)	-	Critically Endangered	Unlikely
<i>Synaphea odocoileops</i>	P1	-	Unlikely
<i>Synaphea</i> sp. Pinjarra Plain	-	Endangered	Unlikely
<i>Synaphea</i> sp. Serpentine	-	Critically Endangered	Unlikely
<i>Synaphea stenoloba</i> (Dwellingup Synaphea)	-	Endangered	Unlikely

Four species of conservation significance have the possibility of occurring within the subject site based on preferential soil types. These species are all herbs. While the soil profile may be suitable for these species to occur, the subject site has been previously cleared and has been subjected to grazing historically and currently, as evidenced by the lack of understorey and midstorey species. Accordingly, it is very unlikely that any herb species of conservation significance will occur within the subject site.

2.5 Fauna

A search of the DBCA NatureMap database was undertaken to establish whether species declared as 'Rare or likely to become extinct' (Schedule 1), 'Birds protected under an international agreement' (Schedule 3) and 'Other specially protected fauna' (Schedule 4) as listed under the *Biodiversity Conservation Act 2016* (BC Act) have been recorded in proximity to the subject site. Five fauna species listed as Schedule 1 species and five Schedule 3 species have been recorded within a 5km radius of the subject site. Additionally, the DBCA Priority fauna database identified three Priority 3, three Priority 4 and two other specially protected fauna within this zone (refer to **Table 5**).

The EPBC Act Protected Matters Search Tool also identified several threatened and migratory species that could potentially occur within or in proximity to the subject site. This included five species classified as Vulnerable, four Endangered species and two Critically Endangered species. Of the listed species one is a migratory bird species (refer to **Table 5**). Marine species identified within the search were not assessed given that the subject site is not in proximity to a marine environment.

Table 5. Significant fauna potentially occurring within the subject site as identified by State and Commonwealth database searches.

Species	DBCAs Status ¹	EPBC Act Status	Likelihood of Occurrence
<i>Botaurus poiciloptilus</i> (Australasian Bittern)	-	Endangered	Unlikely, absence of suitable habitat
<i>Calidris canutus</i> (Red Knot)	-	Endangered	Unlikely, absence of suitable habitat
<i>Calidris ferruginea</i> (Curlew Sandpiper)	-	Critically Endangered	Unlikely, absence of suitable habitat
<i>Calyptorhynchus banksia naso</i> (Forest Red – tailed Black Cockatoo)	T	Vulnerable	Unlikely, absence of suitable habitat
<i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo)	T	Endangered	Unlikely, absence of suitable habitat

Species	DBCAs Status ¹	EPBC Act Status	Likelihood of Occurrence
<i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo)	T	Endangered	Unlikely, absence of suitable habitat
<i>Dasyurus geoffroii</i> (Chuditch)	S1	Vulnerable	Unlikely, absence of
<i>Falco hypoleucos</i> (Grey Falcon)	-	Vulnerable	Unlikely, outside of known range
<i>Falsistrellus mackenziei</i> (Western False Pipistrelle)	P4	-	Unlikely, absence of suitable habitat
<i>Leipoa ocellata</i> (Malleefowl)	-	Vulnerable	Unlikely, absence of suitable habitat.
<i>Numenius madagascariensis</i> (Eastern Curlew)	-	Critically Endangered	Unlikely, absence of suitable habitat.
<i>Notamacropus irma</i> (Western Brush Wallaby)	P4	-	Unlikely, absence of suitable habitat.
<i>Oxyura australis</i> (Blue-billed Duck)	P4	-	Unlikely, absence of suitable habitat.
<i>Pseudocheirus occidentalis</i> (Western Ringtail Possum)	S1	Critically Endangered	Unlikely, absence of suitable habitat.
<i>Tringa nebularia</i> (Common Greenshank)	IA	-	Unlikely, absence of suitable habitat.
<i>Westralunio carteri</i> (Carter's Freshwater Mussel)	-	Vulnerable	Unlikely, absence of waterbody.

Overall, the fauna habitats present are highly degraded with all areas appearing to have been subject to considerable disturbance. Given the degree of disturbance the original fauna assemblage within the subject site is likely to be depauperate, in particular with respect to ground dwelling and arboreal species which rely on dense native understory and upper storey vegetation, which is almost entirely absent. On this basis, it is very unlikely that the subject site provides habitat critical for the survival of conservation significant fauna species.

2.6 Aboriginal Heritage

All Aboriginal sites in Western Australia are provided protection under the *Aboriginal Heritage Act 1972* in which it is an offence for anyone to excavate, damage, destroy, conceal or in any way alter an Aboriginal site without the Minister's permission.

An online search for relevant Aboriginal heritage information was undertaken using the Department of Planning, Lands and Heritage (DPLH) *Aboriginal Heritage Inquiry System* (AHIS) that incorporates both the heritage site register and the heritage survey database (DPLH 2021). The Aboriginal Heritage Site Register is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* and contains information on over 22,000 listed Aboriginal sites throughout Western Australia.

Results of the AHIS database search revealed no Aboriginal heritage sites were recorded within 2 km of the subject site.

3 CLEARING ASSESSMENT

3.1 Avoidance and Mitigation Measures

The applicant undertook an assessment of the area prior to determining the clearing footprint. This included a visual and desktop assessment of vegetation within the proposed location. Upon completion of this assessment, it was determined that vegetation in proximity to the mapped RE wetlands could be avoided to preserve the ecological function of these wetlands. Given that the clearing footprint has been specifically selected to target areas of the most degraded vegetation within the property, it is considered that no other reasonable or practicable avoidance measures can be implemented.

To avoid any direct or indirect environmental impacts, the applicant has also committed to various management measures as discussed in **Section 4**.

3.2 Assessment Against the Ten Clearing Principles

Any clearing of native vegetation requires a permit in accordance with Part V of the EP Act, except where an exception applies under Schedule 6 of the Act or is prescribed by regulation in the *Environmental Protection (Clearing Native Vegetation) Regulations 2004*.

The clearing of native vegetation will require an approved clearing permit. Clearing applications are assessed against the Ten Clearing Principles outlined in Schedule 5 of the EP Act. These principles aim to ensure that all potential impacts resulting from the removal of native vegetation can be assessed in an integrated manner.

An examination of the Ten Clearing Principles applied against a desktop investigation, and a site visit is provided below.

a) **Native vegetation should not be cleared if it comprises a high level of biological diversity.**

Based on observations during a site visit undertaken by Accendo on the 25th November 2021, vegetation within the subject site is classified as being in a 'Degraded' to 'Completely Degraded' condition. The area mapped as a MU wetland is comprised of only two species of vegetation including *Kunzea ericifolia* and *Juncus* spp. The very limited species diversity can be attributed to historical clearing activities, the 2016 Waroona fire and historical and ongoing cattle grazing.

Regional vegetation mapping by Heddle *et al.* (1980) indicates that the subject site consists of vegetation of the Bassendean complex central and south complex and the Beard vegetation association 1000. In consideration of the vegetation condition and the absence of all key characteristic species, the vegetation within the subject site is not representative of the vegetation complex or association.

The condition of the subject site and history of anthropogenic disturbances denotes that the subject site would not contain any Priority or Threatened Ecological communities (PEC or TECs), or flora of conservation significance (especially herb species which are susceptible to grazing).

As discussed within **Section 2.5**, habitat within the subject site is considered marginal in quality due to the vegetation condition and limited flora species diversity. Although fauna species may move through the subject site, they are unlikely to rely on it for their survival.

While it is noted that a SWREL axis line is located to the north of the subject site, the removal of the isolated vegetation from the subject site will not impact faunal movement in the general area or isolate existing remnant vegetation within this linkage. The proposed clearing is therefore unlikely to compromise any existing values of the nearby ecological linkage.

In consideration of the above information, the vegetation subject to clearing is very unlikely to provide habitat critical to the survival of conservation flora or fauna species. The clearing required is considered to have minimal regional or local significance in the context of the existing remnants of vegetation in the area. Therefore, the proposal is not considered to be at variance to 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.

In the *EPBC Act referral guidelines for three threatened black cockatoo species* (2012), the Commonwealth DAWE identify flora species as potential breeding and foraging habitat for the three threatened species of black cockatoo. No trees are contained within the development footprint, and native flora appears to be mostly limited to two species which do not provide foraging habitat. Accordingly, the clearing footprint is very unlikely to provide habitat critical to the survival of black cockatoos.

The clearing footprint has been excluded from the DBCA's *Western Ringtail Possum Habitat Suitability* mapping. Furthermore, the development footprint does not contain any *Agonis flexuosa* trees or habitat considered preferential for WRPs. Accordingly, the clearing is very unlikely to impact habitat critical to the survival of WRPs.

The highly disturbed environment of the subject site and absence of suitable habitat denotes that the removal of vegetation (predominately weeds) is unlikely to present a significant impact to any fauna species of conservation significance.

On this basis, the proposal is unlikely to impact habitat critical for the survival of conservation significant species. Therefore, the proposal is not considered to be at variance to this Principle.

c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

As discussed in **Section 2.4.5**, due to the history of disturbance in the subject site resulting in vegetation in a 'Degraded' to 'Completely Degraded' condition, it is unlikely that any flora species of conservation significance are present (especially herb species which are susceptible to grazing).

Therefore, the proposal is not considered to be at variance to 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.

A search was undertaken of the DBCA's TEC database and the EPBC Act Protected Matters database indicated that two TECs are mapped as being likely to occur within 5 km of the subject site. This includes the Banksia Woodlands of the Swan Coastal Plain ecological community (Endangered) and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered).

Given the 'Degraded' to 'Completely Degraded' nature of the vegetation within the subject site and the complete absence of key indicator species, it is very unlikely that the Banksia Woodlands TEC or the Tuart Woodlands and Forest TEC is present within the subject site.

On this basis, the proposal is not considered to be at variance to this Principle.

e) Native vegetation should not be cleared if it is a remnant of native vegetation in an area that has been extensively cleared.

The EPA has a target to retain all remaining areas of each complex where less than 30% remains on the Swan Coastal Plain (EPA 2003). The Bassendean (1000) vegetation association and the Bassendean central and south vegetation complex present within the subject site have less than 30% of the pre-European extent remaining.

In consideration of the vegetation condition and the absence of all key characteristic species, the vegetation within the subject site is not representative of the above-mentioned vegetation association or complex.

Therefore, this proposal is not considered to be at variance to this Principle.

f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

The property contains three RE wetlands. A minimum buffer of 30 m has been provided to all mapped RE wetlands to avoid any potential indirect impacts to the wetlands.

While a portion of the subject is classified as a 'Multiple Use' wetland, vegetation within this area is predominately restricted to *Kunzea ericifolia* and *Juncus* spp. This species does inhabit riparian/wetland zones, however it also acts as colonizer of previously disturbed areas.

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas within the property. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing through drainage lines into the wider drainage system. The clearing is not proposing to alter this process.

Based on the above, the proposal is at variance to this Principle given that *Kunzea ericifolia* and *Juncus* spp. will be cleared, however these species are widely abundant in the locality and are also a common colonizer species. Removal of this vegetation will not impact the existing hydrological values of the MU wetland.

g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

The subject site has been mapped as containing soils of the Sw - Swamp (Bassendean) Phase, Bassendean B6 Phase and the Bassendean B4 Phase. The key constraining factors associated with these Phases are (NRInfo 2021):

- 15 % (B6 Phase) -52 % (B1 Phase) of the map unit has a high to extreme wind erosion risk; and
- 100% of the Sw - Swamp (Bassendean) Phase as a low flood risk.

The subject site is mapped within an area having low risk of water erosion, flooding and salinity, and low to moderate risk of wind erosion.

Mapping prepared by the DWER indicates that the subject site is classified as having “*moderate to low risk of ASS, occurring within 3 m of the natural soil surface*”.

Clearing will be limited to the area required for pasture with seeding commencing immediately following the clearing event. Accordingly, potential impacts associated with wind erosion are considered insignificant.

The proposal is not likely to be at variance to 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.

The land adjoining the western boundary of Lot 1 is zoned Forest (Type 3 F) pursuant to the *Shire of Harvey Scheme No. 1*, which has conservation value. The clearing footprint will be setback a minimum of 180 m from the Reserve. Accordingly, there will be no direct or indirect impacts to the reserve as a result of the clearing. On this basis, the proposed clearing is not at variance to this Principle.

i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface of underground water.

The subject site does not contain any defined natural surface water channels and is not located within a ‘Public Drinking Water Source’ area. The current water cycle within the subject site consists of inputs from rainwater being largely infiltrated on site. The clearing of the vegetation within the subject site is unlikely to alter this.

Furthermore, no interactions with groundwater are expected. It is therefore unlikely that the proposed clearing will reduce the quality of surface or groundwater and therefore the proposal is not at variance to this Principle.

j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Given the topography, soil type and low flood risk documented within the subject site, it is considered unlikely that the proposed clearing will increase the incidence of flooding and therefore the proposal is not at variance to this Principle.

4 ENVIRONMENTAL MANAGEMENT MEASURES

In order to mitigate potential impacts associated with the proposed clearing activities, the following site specific management activities will be implemented.

4.1 Vegetation and Flora Management

4.1.1 Background

Vegetation clearing will be cleared with mechanical equipment such as an excavator. Seeding and establishment of pasture will commence immediately following the clearing events.

4.1.2 Management Plan

In order to ensure that the potential impacts associated with vegetation clearing is minimised as far as practicable, the following management measures are proposed.

Table 6. Vegetation clearing management plan.

Vegetation Clearing	
Responsibility	
<ul style="list-style-type: none"> Project Manager. Contractors. 	
Objectives	
<ul style="list-style-type: none"> Prevent clearing outside of the designated clearing boundaries. Minimise soil erosion and sedimentation. 	
Potential Impacts	
<ul style="list-style-type: none"> Clearing native vegetation. Inadvertent additional clearing of vegetation. Impacts on fauna species. Weed and disease invasion. 	
Management Strategies	Timing
<ul style="list-style-type: none"> All site personnel will be inducted on the clearing controls for this project. Vegetation required to be removed will be marked with white flagging tape to avoid any unnecessary disturbance to adjacent vegetation. The flagging tape which demarcates subject site will be checked on a daily basis to ensure that the clearing requirements remain clearly visible. No movement of vehicles or personnel within the vegetation retention areas will be allowed. No stockpiling of topsoil or other material is to occur outside of the clearing boundary. The location and area of vegetation cleared will be checked on a daily basis. 	<ul style="list-style-type: none"> Prior to clearing. Prior to clearing. During clearing. During clearing. During clearing. During clearing.
Performance Indicators	
<ul style="list-style-type: none"> No unauthorised clearing is undertaken. No fauna is directly impacted during clearing. 	
Monitoring	

- Daily checks to ensure that clearing is consistent with the approved clearing boundaries.
- Daily checks to ensure that no fauna have been impacted.

Reporting

- The DWER will be notified immediately if clearing beyond the approved clearing boundaries occurs, or if any fauna is directly impacted. Work may be stopped and the site inspected by DWER or LGA and a remedy determined before work restarts.
- A review of the performance indicators will be undertaken upon completion of clearing to determine the success of the vegetation clearing management measures. Where non-compliances are identified the DWER will be notified accordingly.

4.2 Weed and Pathogen Management

4.2.1 Background

Phytophthora dieback is a soil-borne pathogen recognised as a major threat to Australian vegetation, and in particular, the vegetation and dependent biota within the southwest botanical province. *Phytophthora dieback* is known to reduce the health and species diversity of native vegetation and the disease is listed as a key threatening process under the EPBC Act.

While there has been no formal mapping of the extent of weed incursion or dieback disease caused by the pathogen *Phytophthora cinnamomi* within the subject site, weed and pathogen management measures are recommended to minimise the spread and potential infestation. The key objective associated with weed and pathogen management is to prevent the introduction and/or spread of weeds or the disease throughout the subject site.

4.2.2 Management Plan

The following controls will be implemented within the subject site to assist in the control of weed and pathogen movement.

Table 7. Weed and pathogen management plan.

<i>Phytophthora dieback</i> and weed management	
Responsibility	
<ul style="list-style-type: none"> • Project Manager. • Contractors. 	
Objectives	
<ul style="list-style-type: none"> • To prevent the introduction and spread of <i>Phytophthora dieback</i> and weeds within the subject site. 	
Potential Impacts	
<ul style="list-style-type: none"> • Introduction and spread of disease (<i>Phytophthora spp.</i>) and weeds. 	
Management Strategies	Timing
<ul style="list-style-type: none"> • Training will be provided to all personnel during the safety and environment induction course. This will include an explanation of the specific requirements relating to <i>Phytophthora dieback</i> management. 	<ul style="list-style-type: none"> • Prior to clearing.
<ul style="list-style-type: none"> • All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation and soil prior to entry and exit of the subject site. 	<ul style="list-style-type: none"> • Prior to clearing.
<ul style="list-style-type: none"> • Access to the subject site during clearing will be restricted to the proposed roads and driveways. No other access points should be 	<ul style="list-style-type: none"> • Prior to and during clearing.

established. The access location and vehicle inspection point should be clearly sign posted.

- Reduce vehicle and plant movement into and within the site as much as possible, particularly during wet conditions.
- Prior to and during clearing.

Performance Indicators

- Hygiene procedures are adopted during clearing activities.

Monitoring

- Project Manager will ensure disease hygiene and control measures are implemented during clearing activities.

Reporting

- Contractors to confirm that *Phytophthora* dieback and weed management measures have been implemented.

REFERENCES

- Department of Biodiversity, Conservation and Attractions (DBCA). (2017). *Fauna profiles – Chuditch *Dasyurus geoffroii**. Retrieved from <http://www.dbca.wa.gov.au> (Accessed November 2021).
- Department of Planning Lands and Heritage (DPLH), 2021, (Online) Available World Wide Web: URL: <https://maps.daa.wa.gov.au/AHIS/> (Accessed November 2021).
- Department of Parks and Wildlife (2013), *Definitions, Categories and Criteria for Threatened and Priority Ecological Communities*, Department of Parks and Wildlife, Perth.
- Department of Environment (DoE), 2004. *Stormwater Management Manual for Western Australia*, State Government of Western Australia.
- Department of Environment Regulation (DER), 2014. *A guide to the assessment of applications to clear native vegetation*, Department of Environment Regulation, Perth, WA.
- Department of Parks and Wildlife (DPaW), 2004. *Geomorphic Wetlands of the Swan Coastal Plain dataset*.
- Department of Parks and Wildlife (DPaW), 2007. *Protocol for Proposing Modifications of the Geomorphic Wetland Swan Coastal Plain dataset*. Western Australia.
- Department of Water (DoW), 2007, Perth Groundwater Atlas (Online) Available World Wide Web: URL: <http://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx> (Accessed August 2019)
- Department of Water (DoW), 2012. *Murray groundwater area: subarea reference sheets*. Department of Water, Perth, WA.
- Department of Water and Environment Regulation (DWER). 2012. *Contaminated sites database*, <https://dow.maps.arcgis.com/apps/webappviewer/index.html?id=c2ecb74291ae4da2ac32c441819c6d47> accessed August 2019.
- Environmental Protection Authority (EPA). (2003), *Greater Bunbury Region Scheme*. Bulletin 1108, Environmental Protection Authority, Perth, WA.
- Environmental Protection Authority (EPA) (2008a). *Review of the Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*. Environmental Protection Authority, Perth, WA. www.epa.wa.gov.au/Policies_guidelines/envprotecpol/Pages/1087_EnvironmentalProtectionSouthWestAgricultureZ.aspx
- Environmental Protection Authority (EPA). (2008b). *Advice on areas of conservation significance in the Preston Industrial Park*, Bulletin 1282, Environmental Protection Authority, Perth, WA.
- Environmental Protection Authority (EPA), (2009). *South West Regional Ecological Linkages*. Bulletin No. 8. Retrieved from http://epa.wa.gov.au/EPADocLib/3040_SWREL_EPB821009.pdf
- FloraBase (2013). *FloraBase the Western Australian Flora*. Department of Parks and Wildlife, Como, Western Australia. <http://Florabase.dpaw.wa.gov.au/>
- Department of the Environment and Energy (DotEE) (2013). EPBC Act Protected Matters Search Tool <https://www.environment.gov.au/epbc/protected-matters-search-tool> (accessed August 2019).
- Department of the Environment (DoE) (2009). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1*, EPBC Act 1999.

Geological Survey of Western Australia (1980). *Geology and mineral resources of Western Australia, memoir 3*. Geological Survey of Western Australia, Perth, WA.

Hedde, E.M., Loneragan, O.W. and Havel, J.J., 1980, *Darling Systems – Vegetation Complexes*, In: *Atlas of Natural Resources Darling System*, Western Australia, Department of Conservation and Environment, Perth.

Molloy, S., Wood, J., Hall, S., & Whisson, G. (2009). *South West Regional Ecological Linkages Technical Report*. Available from <http://walga.asn.au/AboutWALGA/Policy/SouthWestBiodiversityProject/SouthWestRegion/EcologicalLinkagesTechnicalReport.aspx>

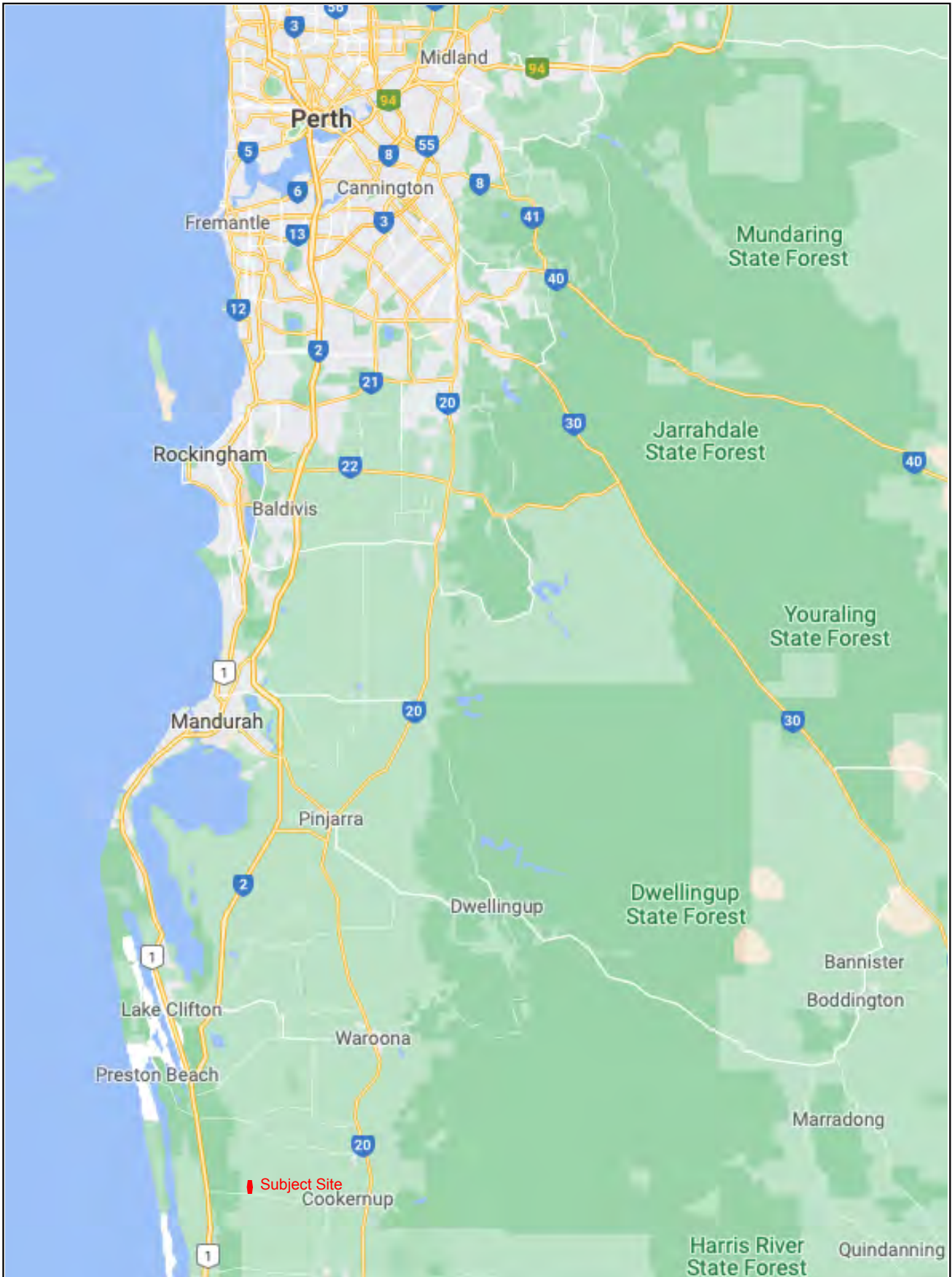
Paczkowska, G. and Chapman, A.R (2000). *The Western Australia Flora – A Descriptive Catalogue*. Wildflower Society of Western Australia (Inc.), the Western Australian Herbarium, CALM and the Botanic Gardens & Parks Authority, Perth, WA.

Shedley E. and Williams K (2014) in *An assessment of habitat for western ringtail possum (Pseudocheirus occidentalis) on the southern Swan Coastal Plain*. Unpublished report for the Department of Parks and Wildlife Bunbury, WA

Thackway, R, and Cresswell, ID, (Eds) 1995, *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves*, Version 4.0. Australian Nature Conservation Agency, Canberra

Western Australian Planning Commission (WAPC), 2007. *Planning Bulletin No. 64: Acid Sulfate Soils*, Western Australian Planning Commission, Western Australia

FIGURES



PROJECT Lot 1 Riverdale Rd, Cookernup

Project Number 2218
 Drawing Number Figure 1
 Revision A

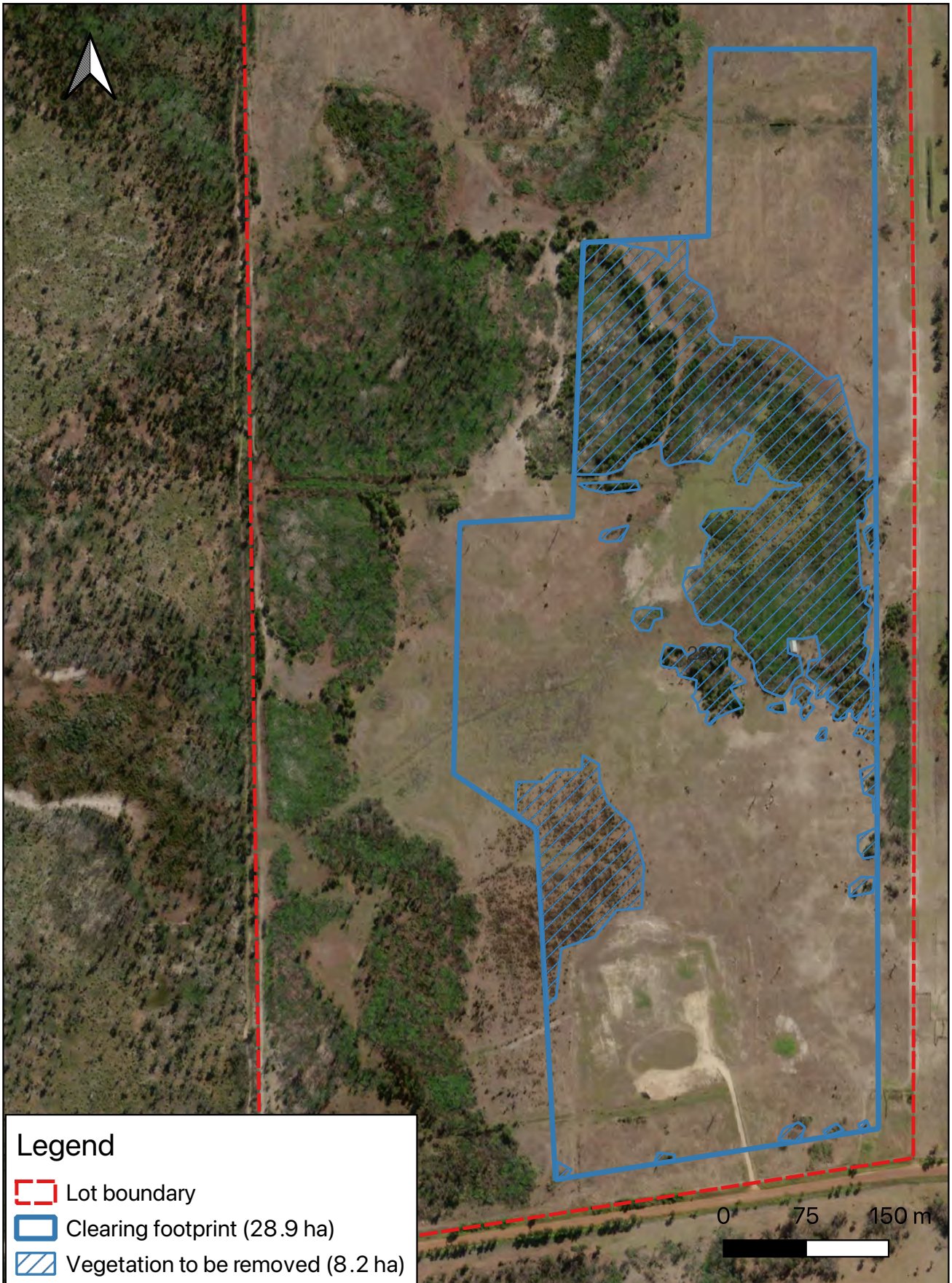
DRAWING TITLE Figure 1 – Site Locality

Designed PN
 Drawn PN
 Checked Approved




CLIENT Lovegrove Turf



Date 21/2/2022
 Local Authority Shire of Harvey
 Sheet 1 of 1



Legend

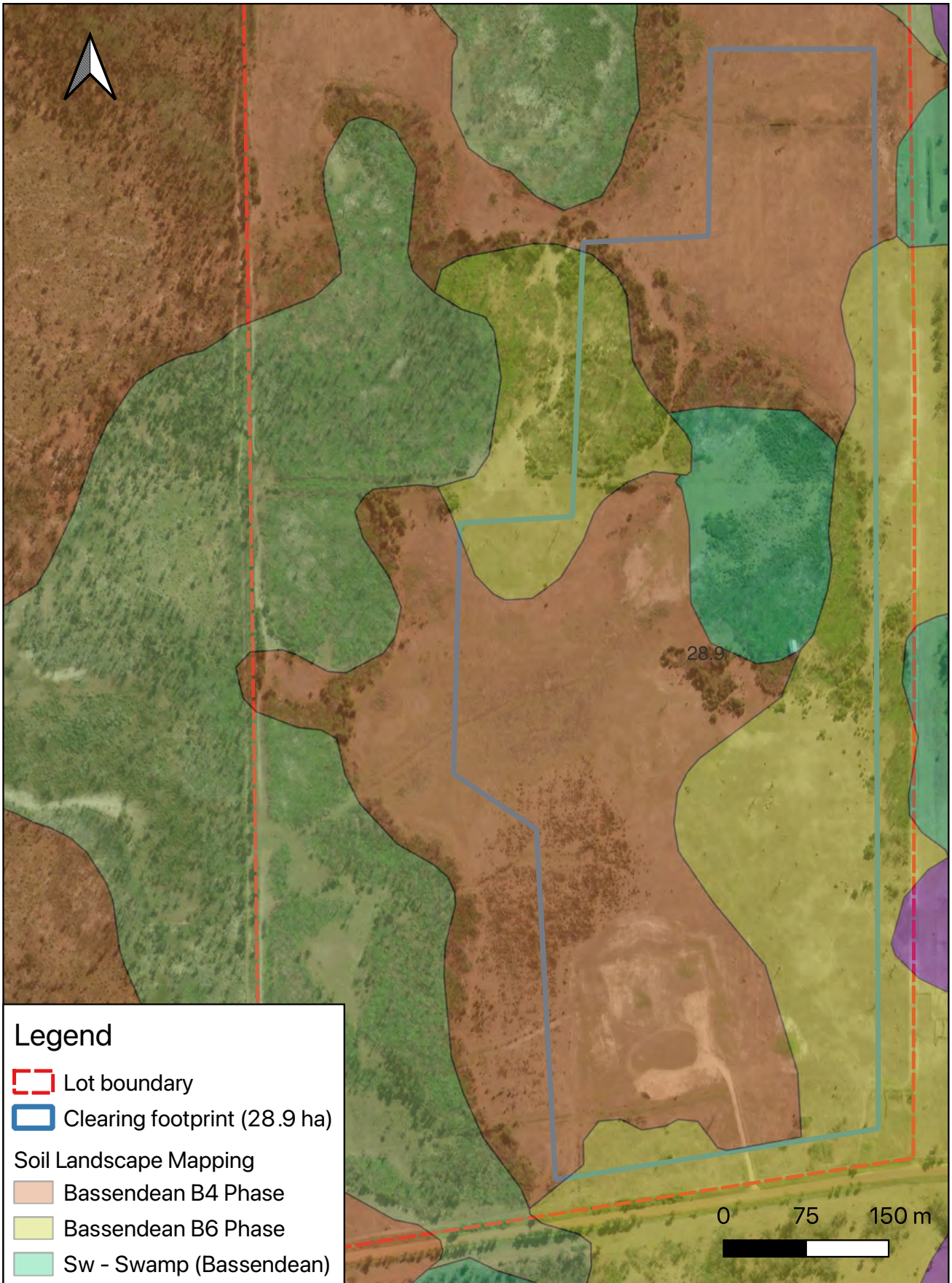
-  Lot boundary
-  Clearing footprint (28.9 ha)
-  Vegetation to be removed (8.2 ha)

PROJECT	Lot 1 Riverdale Road, Cookernup	Project Number	2218	Drawing Number	Figure 2	Revision	A
DRAWING TITLE	Figure 2 – Site Extent	Designed	PN	Checked	PN		
CLIENT	Lovegrove Turf	Drawn	PN	Approved			
		Date	18/02/2022				
		Local Authority	Shire of Harvey				
		Sheet 1 of 1					



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Legend

- Lot boundary
- Clearing footprint (28.9 ha)

Soil Landscape Mapping

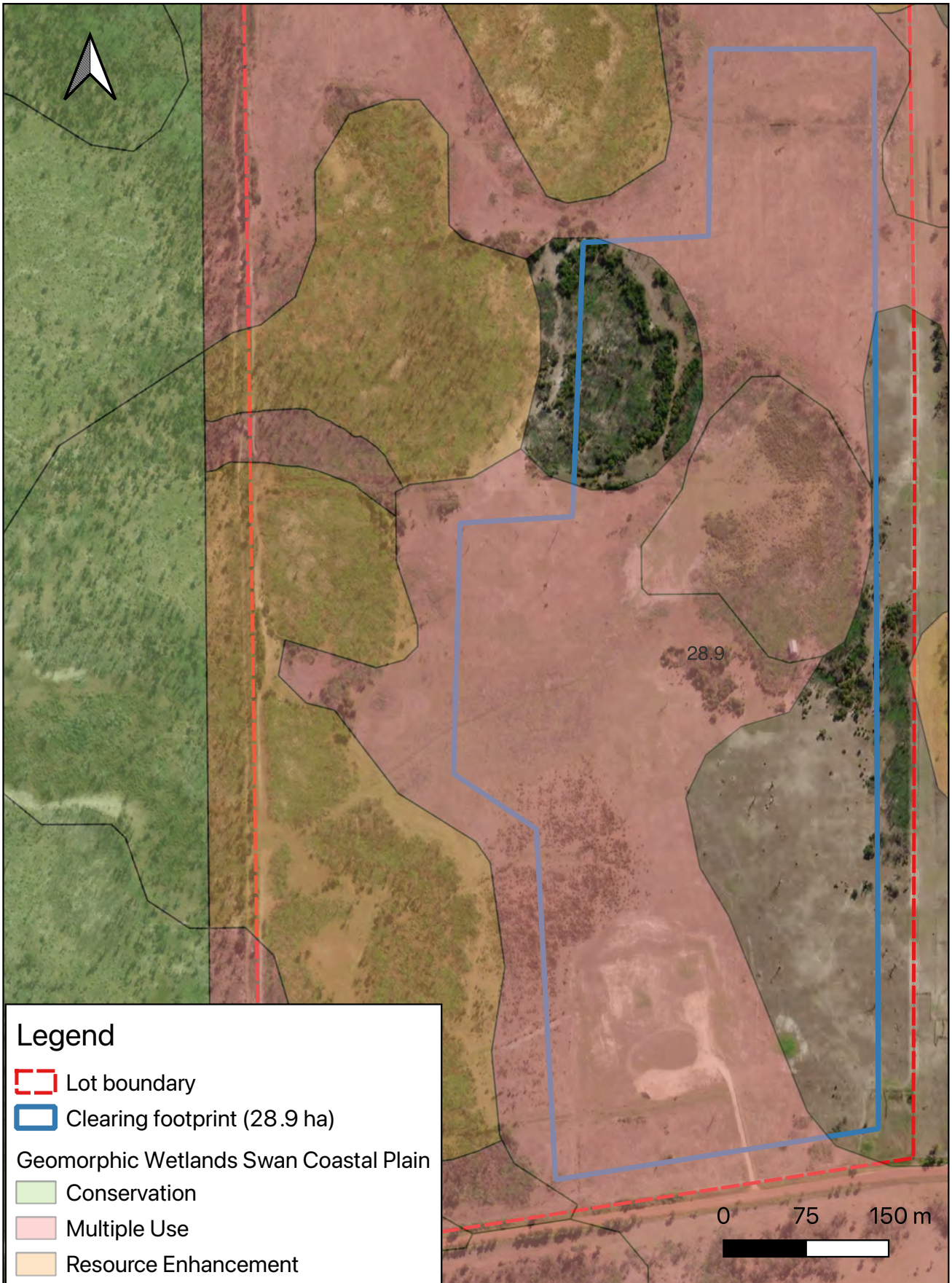
- Bassendean B4 Phase
- Bassendean B6 Phase
- Sw - Swamp (Bassendean)

PROJECT	Lot 1 Riverdale Road, Cookernup	Project Number	2218	Drawing Number	Figure 3	Revision	A
DRAWING TITLE	Figure 3 – Soil landscape mapping	Designed	PN	Checked	PN		
CLIENT	Lovegrove Turf	Drawn	PN	Approved			
		Date	18/02/2022				
		Local Authority	Shire of Harvey				
		Sheet 1 of 1					



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Legend

- Lot boundary
- Clearing footprint (28.9 ha)

Geomorphic Wetlands Swan Coastal Plain

- Conservation
- Multiple Use
- Resource Enhancement

PROJECT	Lot 1 Riverdale Road, Cookernup	Project Number	2218	Drawing Number	Revision
DRAWING TITLE	Figure 4 – Wetland mapping	Designed	PN	Checked	A
CLIENT	Lovegrove Turf	Drawn	PN	Approved	
		Date	18/02/2022		
		Local Authority	Shire of Harvey		
		Sheet 1 of 1			



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