Main Roads Western Australia

Nowergup Depot Access

Native Vegetation Clearing Permit Supporting Documentation

February 2020

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Abbreviations

BAM Act	*Biosecurity and Agricultural Management Act 2007*
BoM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
DAWE	Department of Agriculture, Water and Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DoEE	Department of the Environment and Energy [now DAWE]
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MWSSD Act	*Metropolitan Water Supply, Sewerage and Drainage Act 1909*
MS	Ministerial Statement
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Community
RIWI Act	*Rights in Water and Irrigation Act 1914*
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance

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Appendices

1. Introduction

1.1 Proposal background

Main Roads Western Australia (Main Roads) proposes to undertake clearing of native vegetation to construct a roundabout and access road on Hester Avenue, immediately east of Mitchell Freeway where the freeway currently terminates (Figure 1, Appendix A). This Proposal is related to the Mitchell Freeway Extension Hester Avenue to Romeo Road project, however is being assessed separately to allow for flexibility in delivery timing, funding and approval requirements.

The Proposal will involve the construction of a new roundabout on Hester Avenue, construction of a new two lane northern access road to the Public Transport Authority (PTA) Nowergup Bus/Rail Depot. Construction of a new bridge is also required to facilitate the grade separation of the Mitchell Freeway southbound carriageway from the PTA access road. A native vegetation clearing permit (NVCP) (purpose) is required for clearing of native vegetation associated with the proposed works.

1.2 Scope and purpose of this document

This document has been prepared in support of an application for a NVCP under Section 51E of Part V of the *Environmental Protection Act 1986* (EP Act), to clear up to 1.91 hectares (ha) of native vegetation within an envelope of 2.3 ha (referred to as the NVCP area or the Proposal).

This document includes:

- An overview of works required and description of clearing activities to be undertaken (Section 2)
- An overview of existing environment (Section 3)
- Potential impacts identified (Section 4)
- Environmental management measures to be implemented to minimise clearing impacts (Section 5)
- An assessment against the Ten Clearing Principles, as defined in Schedule 5 of the EP Act (Section 6).

The environmental assessment for this NVCP was informed by a biological survey conducted north of Hester Avenue (GHD 2019) for Mitchell Freeway Extension Hester Avenue to Romeo Road, including upgrade of Wanneroo Road from Dunstan Road to Trian Road. The GHD (2019) survey covered the proposed road corridors for the Mitchell Freeway Extension and Wanneroo Road upgrade, and an additional 50 meter (m) buffer, covering a total area of 399.97 hectares (ha). The survey included a detailed vegetation and flora assessment, targeted flora survey, Level 1 fauna assessment and a Black Cockatoo habitat assessment. Relevant survey area boundaries are shown on Figure 1, Appendix A.

1.3 Location and land ownership

The NVCP area is located north of Hester Avenue, immediately east of Mitchell Freeway where the freeway currently terminates (Figure 1, Appendix A). Land ownership is a mixture of road reserve and National Park (Neerabup National Park). As Main Roads is the public authority responsible for road reserves, Main Roads partially owns the land on which the application occurs. To facilitate the construction and operation of the Proposal, Main Roads requires to excise various parcels of land from Neerabup National Park. Main Roads is consulting and

working with the Department of Biodiversity Conservation and Attractions (DBCA) Swan Coastal District to progress land excision from Neerabup National Park.

2. Description of clearing activities

Native vegetation will be cleared for the following activities:

- Construction of approximately 930 m of two lane access road to Nowergup Bus/Rail Depot, east of the existing road that currently accesses the Nowergup Depot. The existing access road requires relocating as it currently connects to Hester Avenue at Mitchell Freeway interchange (i.e. location of the proposed Mitchell Freeway southbound off ramp to Hester Avenue).
- Construction of a new bridge (Structure No. 1876) to facilitate the grade separation of the Mitchell Freeway southbound carriageway from the PTA access road.
- Construction of a new four-way roundabout on Hester Avenue with access to the north for the PTA Nowergup Bus/Rail Depot. The southern access road to Quinns Quarry will be assessed under a separate NVCP. The location of the roundabout is in approximately the same location as the existing unsignalised T-intersection of Hester Avenue and Quinns Quarry access road. The roundabout has been designed to accommodate for the maximum sized vehicle (design vehicle) of a 27.5 m B-Double.

Laydown areas and site offices will be located in already cleared areas designated for the larger adjacent Mitchell Freeway Extension Hester Avenue to Romeo Road project.

Clearing of native vegetation will be undertaken using traditional earth moving machinery such as bulldozers. Topsoil will be striped separately and stockpiled for later reuse.

3. Existing environment

For the purposes of the desktop searches and existing environment a study area was defined, which included a 5 km buffer of the NVCP area (Figure 2, Appendix A).

3.1 Climate

The Perth Metropolitan area experiences a Mediterranean climate with cool, wet winters and warm, dry summers. Rainfall is generally received in winter (June-August), however, the area also receives periodic summer rainfall as a result of thunderstorm activity or rain-bearing depressions from tropical cyclones (Bureau of Meteorology (BoM) 2020). The closest BoM weather station with sufficient historical data is Perth weather station (site no. 009225). Average temperatures range from 7.8 °C (July) to 31.6 °C (February), with an average rainfall of 733.2 mm per annum (BoM 2020).

3.2 Land use

The NVCP area is zoned as “Primary regional roads” and “Parks and recreation” under the City of Wanneroo Town Planning Scheme No. 2 (2020).

3.3 Landform, geology and soils

The NVCP area is situated on the Leederville Formation stratigraphic unit, which is comprised of interbedded sandstone and siltstone, minor conglomerate and scattered thin coal seams (GoWA 2020.

The area covers two geological units, Guilderton and Spearwood systems, comprising of coastal sand dunes, sands and calcarenite. Soils in the NVCP area are mapped as Karrakatta yellow sand and shallow soils (GoWA 2020).

3.4 Hydrology

3.4.1 Groundwater

The NVCP area is located in the Perth Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) and the Perth Coastal and Gwelup Underground Water Pollution Control Area (Priority 3) proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* (MWSSD Act) (GoWA 2020).

3.4.2 Surface water

The NVCP area is located within the Swan Coastal Plain Surface Water Management Area. There are no watercourses or drainage lines located within the NVCP area.

No wetlands of national or international importance (Ramsar) or geomorphic wetlands are present within the NVCP area (DAWE 2020, GoWA 2020). Seven geomorphic wetlands are located within the study area (Table 3-1) (Figure 3, Appendix A).

Table 3-1 Geomorphic wetlands mapped within the study area

Name	Unique feature identifier	Category	Location relative to NVCP area
Neerabup Lake	8019	Resource Enhancement	Approximately 0.9 km from the NVCP area east boundary
Nowergup Lake	8021	Conservation	Approximately 2.8 km from NVCP area northern boundary

Name	Unique feature identifier	Category	Location relative to NVCP area
Camel Swamp	7938	Resource Enhancement	Approximately 4.6 km north east of the NVCP area boundary
Carabooda Lake	8009	Resource Enhancement	Approximately 4.6 km north of the NVCP area boundary
Unknown	8018	Multiple Use	Approximately 1.7 km north east of the NVCP area boundary
Unknown	8017	Resource Enhancement	Approximately 2.1 km from NVCP area north eastern boundary
Unknown	8020	Resource Enhancement	Approximately 4.3 km from the NVCP area northern boundary

3.5 Flora and vegetation

A flora and vegetation survey was conducted by GHD (2019) for the proposed upgrade of the Nowergup Depot access road, which covers this proposed NVCP area. The purpose of this survey was to delineate key flora and vegetation values. The initial biological survey area covered 399 ha to the north of Hester.

3.5.1 Broad vegetation mapping and extents

Vegetation associations

Broad scale (1:250,000) pre-European vegetation mapping (Beard 1979) mapping indicates the NVCP area intersects two vegetation associations:

- Low woodland; Banksia (Association 949)
- Medium woodland; Tuart (Association 998).

The pre-European mapping has been adapted and digitised by Shepherd *et al.* (2002). The extent of the vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) (current as of March 2019 – GoWA 2019a).

As shown in Table 3-2, the current extents of all Vegetation Associations that intersect the NVCP area above 30 % of the pre-European extent at the State, IBRA bioregion, IBRA subregion and Local Government Authority (LGA) levels.

Vegetation complexes

Regional vegetation complex mapping has been completed by Heddle *at al.* (1980) with updates from Webb *et al*. (2016) based on major landform boundaries on the Swan Coastal Plain (SCP) and forested region of south-west Western Australia. The mapping indicates one vegetation complex is present within the NVCP area:

- Cottesloe Complex – Central and South: Consists of a mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *E. gomphocephala – E. marginata* (Jarrah) – *Corymbia calophylla* (Marri); closed heath on the limestone outcrops.

GoWA (2019b) has assessed the vegetation complexes mapped by Heddle *et al.* (1980) and Webb *et al*. (2016) against presumed pre-European extents within the SCP bioregion (Table 3-3) and LGA (Table 3-4). These tables show the current extent of the Cottesloe complex within the NVCP area is above 30% of pre-European extent remaining within the SCP bioregion and the City of Wanneroo.

Table 3-2 Extent of vegetation associations mapped within the NVCP area (GoWA 2019a)

Pre-European Vegetation Associations	Scale	Pre–European extent (ha)	Current extent (ha)	% Remaining	% of Remaining in DBCA managed lands
949	State: WA	218,193.94	123,104.02	56.42	55.86
	IBRA bioregion: Swan Coastal Plain	209,983.26	120,287.93	57.28	56.40
	Sub-region: Perth	184,475.82	104,128.96	56.45	58.99
	LGA: City of Wanneroo	37,138.40	17,196.34	46.30	70.10
998	State: WA	51,015.33	18,492.63	36.25	48.68
	IBRA bioregion: Swan Coastal Plain	50,867.50	18,492.32	36.35	48.68
	Sub-region: Perth	50,867.50	18,492.32	36.35	48.68
	LGA: City of Wanneroo	4,635.30	2,787.40	60.13	52.75

Table 3-3 Extent of vegetation complexes on the SCP mapped within the NVCP area (GoWA 2019b)

Vegetation complex	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Remaining within DBCA managed lands (%)
Cottesloe Complex – Central and South	45,299.61	14,567.87	32.16	14.58

Table 3-4 Extent of vegetation complexes within the City of Wanneroo mapped within the NVCP area (GoWA 2019b)

Vegetation complex	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Proportion of the vegetation complex within the LGA (%)
Cottesloe Complex – Central and South	13,313.58	5,545.39	41.65	29.39

3.5.2 Vegetation types and condition

The biological survey identified four vegetation types in the NVCP area, ranging in condition from Very Good – Good to Completely Degraded (GHD 2019). The vegetation types and condition mapped within the NVCP area are described in Table 3-5, and are shown in Figure 4 and Figure 5 (Appendix A). The NVCP area is predominantly located along existing transport corridors (Hester Avenue and Mitchell Freeway).

Table 3-5 Vegetation types and condition mapped within the NVCP area

Vegetation Type	Description	Area (hectares)	Condition	Area (hectares)
Banksia low woodland	Low woodland of *Banksia attenuata* and *B. menziesii* with occasional *Allocasuarina fraseriana* and *Eucalyptus todtiana* over a mid to low shrubland of *Hibbertia hypericoides*, *Xanthorrhoea preissii* and *Acacia pulchella* var. *glaberrima* over open sedgeland and forbland of *Mesomelaena pseudostygia*, *Conostylis aculeata* and *Desmocladus flexuosus*.	1.30	Degraded	0.26
			Very Good – Good	1.03
Banksia sessilis tall closed shrubland	Tall closed shrubland of *Banksia sessilis*, *Melaleuca systena* and *Calothamnus quadrifidus* subsp. *quadrifidus* over shrubland of *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Hakea trifurcata* over forbland/sedgeland of *Desmocladus flexuosus*, *Conostylis aculeata* and *Mesomelaena pseudostygia*.	0.14	Degraded	0.02
			Good	0.12
Jarrah tall woodland	Tall woodland of *Eucalyptus marginata*, Banksia spp. and *Allocasuarina fraseriana* over shrubland of *Hibbertia hypericoides*, *Xanthorrhoea preissii* and *Acacia pulchella* var. *glaberrima* over a forbland/grassland of *Mesomelaena pseudostygia*, *Desmocladus flexuosus* and weedy grasses (**Ehrharta longiflora* and **Briza maxima*).	0.17	Degraded	0.17
Scattered natives over weeds	Areas that have been impacted by previous clearing or grazing and consist of scattered native trees and/or shrubs including *Eucalyptus marginata*, *E. gomphocephala*, *Corymbia calophylla*, *Banksia* spp., *Allocasuarina fraseriana* with a scattered mid and lower storey including *Acacia* spp., *Xanthorrhoea preissii* and *Hibbertia hypericoides* over a groundcover completely dominated by introduced grasses (**Avena barbata*, **Bromus diandrus* and **Ehrharta calycina*) and herbs (**Euphorbia terracina*, **Carpobrotus edulis* and **Pelargonium capitatum*).	0.30	Completely Degraded	0.03
			Degraded	0.28
Total		1.91		1.91

3.5.3 Conservation significant ecological communities

The flora and vegetation survey indicates that two Priority Ecological Communities (PECs) were recorded in the NVCP area. A breakdown of community type and area is provided in Table 3-6. Some areas of the Banksia woodland PEC also coincide with the Banksia Woodlands of the SCP Threatened Ecological Community (TEC), listed under the *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) 1999. Conservation significant ecological communities occurring within the NVCP area are mapped in Figure 6 and Figure 7, Appendix A.

Table 3-6 Threatened and Priority Ecological communities in the NVCP area

Community type	Status	Extent within the NVCP Area (ha)
Banksia dominated woodlands of the SCP IBRA region (PEC) (Banksia woodlands of the SCP (TEC))[1]	DBCA: P3 EPBC Act: Endangered TEC	1.30 (1.11[1])
Northern Spearwood shrublands and woodlands (SCP24) (PEC)	DBCA: P3	0.14
Total		1.44

[1] Banksia woodlands (TEC) extent is a subset of the PEC. To be representative of the Banksia Woodland TEC, vegetation must meet key diagnostic characteristics which include minimum patch size and condition thresholds. Only vegetation in good or better condition was considered representative of Banksia Woodlands TEC.

3.5.4 Flora diversity

The *NatureMap* database identified 286 flora taxa, representing 57 families and 165 genera previously recorded within the study area. This total comprised 233 native flora taxa and 53 naturalised (introduced) flora taxa. Dominant families recorded included Fabaceae (38 taxa), Asteraceae (22 taxa) and Proteaceae (20 taxa).

The *NatureMap* database search is provided in Appendix C.

3.5.5 Conservation significant flora

The EPBC Act Protected Matters Search Tool (PMST) and a search of the *NatureMap* database identified the presence/potential presence of 24 conservation significant flora taxa within the study area (Appendix C).

The biological survey identified no Threatened or Priority flora within the NVCP area. A likelihood of occurrence assessment was conducted as part of the biological survey. This assessment took into account previous records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of species. The likelihood assessment concluded that no conservation significant flora are likely to occur within the survey area based on habitat requirements.

3.5.6 Weeds

The biological survey recorded the presence of two introduced species within the NVCP area. Both species were listed as Declared Pests under the *Biosecurity and Management Act 2007.* Of these taxa, one was also identified as a Weed of National Significance (WoNS).

- *Echium plantagineum* (Paterson's Curse) – Declared Pest
- *Asparagus asparagoides* (Bridal Creeper) – Declared Pest and WoNS

3.6 Phytophthora dieback

Phytophthora cinnamomi (Dieback) is an introduced plant pathogen targeting the roots of susceptible plants, common in the south west of WA where the mean annual rainfall exceeds 400 mm (Department of the Environment and Energy (DoEE) 2018). It is considered that Dieback may pose a risk to the native vegetation within the NVCP area, which experiences a mean annual rainfall of 733.2 millimetres (mm). Dieback is likely to be present in the NVCP area and will be managed under a Dieback Management Plan as detailed in Section 4.2.

3.7 Fauna

A fauna assessment was conducted by GHD (2019) for the proposed upgrade of the Nowergup Depot access road, which covers this proposed NVCP area. The purpose of this survey was to delineate key fauna habitats and black cockatoo breeding, foraging and roosting habitat. The initial biological survey area covered 399 hectares (ha) to the north of Hester.

3.7.1 Fauna diversity

The *NatureMap* database identified 253 terrestrial fauna species previously recorded within the study area. This total comprised 142 birds, 54 reptiles, 22 mammals, 5 amphibians and 27 invertebrates. Of the 253 fauna species previously recorded, 243 are native species and 10 are naturalised (introduced) species.

The *NatureMap* fauna database search is provided in Appendix C.

3.7.2 Fauna habitats

The biological assessment identified four broad fauna habitat types, all of which occur within the NVCP area (Table 3-7). Habitat values ranged from high to low value, with the low value areas being degraded or highly modified. The 0.31 ha of scattered natives over weeds was highly disturbed and would not provide significant fauna habitat. Fauna habitat mapping is shown in Figure 8, Appendix A.

Table 3-7 Fauna habitat in NVCP area

Fauna habitat	Area (ha)
Banksia woodland	1.30
Jarrah woodland	0.17
Mixed heathland	0.14
Scattered natives over weeds	0.31
Total	1.91

3.7.3 Conservation significant fauna

Desktop searches (EPBC Act PMST, DBCA *NatureMap* database and previous GHD observations) identified the presence/ potential presence of 35 conservation significant fauna taxa within the study area (Appendix C). This total does not include species identified by the PMST as marine and/or migratory marine. These species have been excluded from this assessment as no marine habitat was present within or immediately adjacent to the survey area.

The biological assessment recorded no conservation significant fauna species within the NVCP area, however seven species were considered likely to occur based on the habitat present (Table 3-8).

3.7.4 Black cockatoo habitats

Two species of black cockatoo, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo were recorded during the biological survey, outside of the NVCP area, but in adjacent areas. The NVCP area contains suitable foraging habitat for both Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. Potential breeding habitat includes suitable Diameter at Breast Height (DBH) trees, with a DBH over 500 mm, as per the Black Cockatoo guidelines (DSEWPaC 2012). One potential breeding tree recorded in the Jarrah woodland habitat was recorded in NVCP area by GHD (2019) (Figure 8, Appendix A). This tree did not contain any hollows. No black cockatoo roosting habitat was identified within the NVCP area.

Further details on black cockatoo habitat present in the NVCP area is provided in Table 3-8.

Table 3-8 Fauna species potentially within NVCP area

Species	Status	Likelihood of occurrence and estimated extent of habitat within the NVCP area (ha)
Carnaby's Cockatoo (*Calyptorhynchus latirostris*)	Endangered under the EPBC Act and BC Act	Likely to occur, present in adjacent areas Carnaby's Cockatoo occurs in uncleared or remnant native eucalypt woodlands, especially those that contain Salmon gum, Wandoo, Marri, Jarrah and Karri, and in shrubland or kwongan heathland dominated by Hakea, Banksia and Grevillea species. Breeding activity is restricted to eucalypt woodlands mainly in the semiarid and subhumid interior. The species has expanded its breeding range westward and south into the Jarrah- Marri forests of the Darling Scarp and into the Tuart forests of the Swan Coastal Plain, including the Yanchep area. All native vegetation in the NVCP area (1.91 ha) would provide foraging habitat for this species, however the 0.31 ha of scattered natives over weeds would provide low value foraging habitat. One tree with a DBH over 500 mm (a *Eucalyptus marginata*) was recorded in the NVCP area. No hollows were identified in this tree. No roosting habitat was identified within the NVCP area.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*)	Vulnerable under the EPBC Act and BC Act	Likely to occur, present adjacent areas The Forest Red-tailed Black Cockatoo inhabits the dense Jarrah, Karri, and Marri forests receiving more than 600 mm annual average rainfall but also occurs in a range of other forest and woodland types, including Blackbutt (*E. patens*), Wandoo (*E. wandoo*), Tuart (*E. gomphocephala*), Albany Blackbutt (*E. staeri*), Yate (*E. cornuta*), and Flooded Gum (*E. rudis*) (DSEWPAC 2012). Habitats tend to have an understorey of Balga (*Xanthorrhoea* spp.), Kingia (*Kingia australis*), Snottygobble (*Persoonia* spp.), Parrot bush (*Banksia sessilis*), Holly-leaved mirbelia (*Mirbelia dilatata*), Bull banksia (*B. grandis*), Bullich (*Taxandria* spp.) and Sheoak (*Allocasuarina fraseriana*). They are most common in the Jarrah forest region of the northern Darling Range from Collie north to Mundaring and are very local throughout the lower south-west. They can be found on the Swan Coastal Plain in search of food. All native vegetation in the NVCP area (1.91 ha) would provide foraging habitat for this species, however the 0.31 ha of scattered natives over weeds would provide low value foraging habitat. One tree with a DBH over 500 mm (a *Eucalyptus marginata*) was recorded in the NVCP area. No hollows were identified in this tree. No roosting habitat was identified in the NVCP area.
Peregrine Falcon (*Falco peregrinus*)	Other specially protected fauna under the BC Act	The Peregrine Falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings, though less frequently in desert regions Morcombe 2004). They are not common but can be found almost anywhere throughout WA and in the southwest. All native vegetation within the NVCP area (1.91 ha) is suitable for this species.

Species	Status	Likelihood of occurrence and estimated extent of habitat within the NVCP area (ha)
Southern Brown Bandicoot (*Isoodon fusciventer*)	Priority 4 (DBCA)	The Southern Brown Bandicoot prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. On the Swan Coastal Plain, Quenda are often associated with wetlands. The species often feeds in adjacent Jarrah and Wandoo forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck and Strahan 2008). All native vegetation within the NVCP area (1.91 ha) is suitable for this species, however the 0.31 ha of scattered natives over weeds would provide low value habitat.
Western Brush Wallaby (*Notamacropus Irma*)	Priority 4 (DBCA)	The Western Brush Wallaby is found primarily in open forest or woodland, particularly favouring open, seasonally-wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest (Van Dyck and Strahan 2008). All native vegetation within the NVCP area (1.91 ha) is suitable for this species.
Black- striped Snake (*Neelaps calonotos*)	Priority 3 (DBCA)	The Black-striped Snake is a burrowing snake that is restricted to the southwest coastal regions of WA, on sand plains along the Swan Coastal Plain, from Dongara south to Mandurah (Wilson and Swan 2017). The habitat preferences of the Black-Striped Snake are not well known, however they are believed to prefer *banksia* woodlands and shrublands, and do not persist in small remnants of native vegetation (How and Shine 1999). There is 1.3 ha of suitable Banksia woodland habitat in the NVCP area for this species.
Jewelled southwest Ctenotus (Swan Coastal Plain population) (*Ctenotus gemmula)*	Priority 3 (DBCA)	Apparently disjunct populations occur on the lower west coastal plain, and south coast and adjacent interior of Western Australia. Known to occur on pale sands supporting heaths in association with banksia or mallee woodlands (Wilson and Swan 2017). There is 1.44 ha of suitable habitat in the NVCP area for this species, this habitat includes Banksia woodland and mixed heathland.

3.8 Conservation areas

Twenty conservation reserves are located within the study area. The NVCP area intersects the Neerabup National Park (Class A, R 27575). A total of 1.5 ha of native vegetation clearing will be required in the National Park.

There are 11 Bush Forever Sites located within the study area (GoWA 2000). Of these, Site No. 383 (Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland) intersects the NVCP area (Figure 9, Appendix A). A total of 1.5 ha of this Bush Forever site will be required to be cleared.

3.9 Regional ecological linkages

One Regional Ecological Linkage intersects the NVCP area. Greenways linkage I.D number 6 is part of a regionally significant contiguous bushland/wetland linkage (GoWA 2000). Greenways linkage I.D number 6 links Neerabup National Park (Bush Forever Site No. 383) to Lake Joondalup (Bush Forever Site No. 299) in the south and Yanchep and Neerabup National Parks (Bush Forever Site No. 130) in the north. The Proposal will not break or dissect this ecological linkage, rather clearing 0.42 ha within the linkage border (based on GIS boundary data) (WALGA 2008).

3.10 Environmentally Sensitive Areas

The majority of the NVCP area intersects an Environmentally Sensitive Area (ESA), which is likely associated with the Neerabup National Park. A total of 1.5 ha of clearing is required within this ESA.

4. Potential impacts

4.1 Impact avoidance through design

The Proposal design has commenced and impacts will be minimised where possible to prevent the clearing of native vegetation. Although the design has not been finalised, significant effort has been taken to avoid impacts on the environment. The following avoidance measures have been considered:

- The access has been located as close as possible to the existing PTA access to minimise the clearing footprint. Selection of preferred alignment and location of access was undertaken to minimise impacts to native vegetation.
- Design of access has minimised clearing or impacts to the National Park by:
  - Ensuring the access road alignment is located in or as close to the existing adjacent road reserve as possible.
  - Designing the access road to impact degraded vegetation and avoid better condition vegetation in the vicinity (e.g. follow existing cleared access tracks where possible).
  - Installing new or modifying existing drainage basins in the current roads reserve where possible including the use of Freehold Lot (Lot 809) for any future additional drainage needs.
  - Reducing the cross section width of the PTA access road to the minimum permissible to ensure safe and efficient movement.
  - Implementation of typical surface water control measures along the access road including swales to prevent impacts to adjacent vegetation from surface water runoff and control 1 in 50 flooding events.
  - Implementation of typical surface water control measures on the roundabout including pit and pipe drainage connecting to the existing drainage network on Hester Avenue preventing runoff into adjacent vegetation.
  - Fully sealing the road which eliminates potential impact of dust particles on adjacent vegetation (associated with unsealed roads).
  - Vertical design of the road closely matches the existing topography where possible to minimise earthworks.
  - Minimising roundabout size as far as permissible, to accommodate the design vehicles and minimise clearing.
- Installation of retaining walls is being considered during detailed design to further reduce the earthworks batters and associated clearing.
- Early consultation was undertaken with utility service providers to ensure design was optimised to minimise relocation of existing services (and associated ground disturbance/clearing).
- Early consultation with the DBCA was undertaken to ensure design acceptance and determine concerns in relation to minimising impacts to native vegetation and the National Park.

4.2 Potential impacts to vegetation and flora

The Proposal will involve the clearing of 1.91 ha of native vegetation, including 1.44 ha of native vegetation that is representative of two PECs and one TEC. The vegetation condition ranges from Completely Degraded to Very Good – Good, with the majority (54%) in Very Good – Good condition.

The Proposal is in a phytophthora dieback susceptible bioregion, with conservation significant protectable vegetation adjacent to the NVCP area. A Dieback Management Plan and proposal specific Construction Environmental Management Plan (CEMP) will be developed for the larger Mitchell Freeway Extension Hester Avenue to Romeo Road project and utilised during the clearing of the NVCP area.

The Proposal may also result in a range of indirect impacts on adjacent vegetation including smothering from dust and the introduction and spread of weeds. These risks will be managed as part of the CEMP.

4.3 Potential impacts to conservation areas

The Proposed clearing will result in the removal of 1.5 ha of native vegetation from within Neerabup National Park (Class A, R 27575) and Bush Forever Site No. 383 (Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland).

The Proposal may also result in indirect impacts on adjacent conservation areas including smothering from dust and the introduction and spread of weeds. These will be managed as part of the CEMP for the larger Mitchell Freeway Extension Hester Avenue to Romeo Road project. Weeds will be subject to a targeted weed spray program, as detailed in Section 5.

4.4 Potential impacts to fauna and fauna habitat

The NVCP area contains habitat suitable for seven conservation significant fauna species:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) – Endangered under the EPBC Act and BC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable under the EPBC Act and BC Act
- Peregrine Falcon (*Falco peregrinus*) – Other specially protected fauna under the BC Act
- Southern Brown Bandicoot (*Isoodon fusciventer)* – Priority 4
- Western Brush Wallaby (*Notamacropus Irma)* – Priority 4
- Black-striped Snake (*Neelaps calonotos*) – Priority 3
- Jewelled South West Ctenotus (*Ctenotus gemmula)* (Swan Coastal Plain population) – Priority 3.

Clearing of vegetation that provides suitable habitat for conservation significant species will occur. The entirety of the NVCP area provides habitat for black cockatoo species. A total of 1.91 ha of foraging habitat for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo will be cleared. One potential breeding tree with no hollows was identified and recorded in the NVCP area.

All native vegetation in the NVCP area (1.91 ha) is suitable habitat for Peregrine Falcon, however this species is migratory and the NVCP area does not contain core breeding habitat for the species. The Peregrine Falcon are not common but can be found almost anywhere throughout WA and in the southwest. Significant impacts to this species are not expected.

All native vegetation in the NVCP area (1.91 ha) is suitable habitat for the Southern Brown Bandicoot and Western Brush Wallaby. There is up to 1.3 ha of Black-striped Snake habitat and 1.44 ha of *Ctenotus gemmula* (Swan Coastal Plain population) habitat in the NVCP area that will be cleared.

One Regional Ecological Linkage intersects the NVCP area (greenways linkage I.D number 6). Greenways linkage I.D number 6 links Neerabup National Park (Bush Forever Site No. 383) to

Lake Joondalup (Bush Forever Site No. 299) in the south and Yanchep and Neerabup National Parks (Bush Forever Site No. 130) in the north. The Proposal will not break this ecological linkage, clearing 0.42 ha within the indicative border (based on GIS boundary data) (WALGA 2008).

The NVCP area is located adjacent to an existing road, therefore the impacts are expected to be less significant than bisecting contiguous vegetation.

Indirect impacts to fauna include injury and death through vehicle strikes during Proposal construction, as well as secondary impacts such as dust, noise and vibration. All potential impacts will be managed under the project CEMP (See Section 5).

4.5 Land degradation, water quality and flooding

The NVCP area is located in the Perth Groundwater Area proclaimed under the RIWI Act and the Perth Coastal and Gwelup Underground Water Pollution Control Area (Priority 3 Protection Zone) proclaimed under the MWSSD Act (GoWA 2020).

Priority 3 areas are declared over land where water supply sources need to coexist with other land uses such as residential, commercial and light industrial developments. Given the scale and nature of the clearing, the construction of the Proposal is unlikely to impact groundwater quality.

According to GoWA (2020) land degradation mapping, the NVCP area is mapped within an area having low risk of water erosion, flooding and salinity, and high risk of wind erosion and subsurface acidification. The Proposal is unlikely to cause subsurface acidification.

No records were returned for Acid Sulfate Soils (ASS) when searching state government databases (GoWA 2020). The Australian Soil Resources Information System (ASRIS) identified the Proposal as having extremely low risk of ASS.

5. Environmental management framework

A CEMP has been prepared for the larger Mitchell Freeway Extension Hester Avenue to Romeo Road project and will be utilised for these works. The CEMP includes:

- Vegetation clearing management:
  - Vegetation to be retained will be clearly marked with flagging on site
  - Additional areas required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works.
- Fauna management:
  - Pre-clearance surveys will be undertaken for all areas of black cockatoo habitat proposed to be cleared within the breeding period of black cockatoos
  - Speed limits between 40-80 km p/hr will be applied throughout the construction site which will consequently reduce the risk of fauna strikes during construction
  - Transfer of any injured fauna found on site to an appropriate fauna rescue organisation or individual. A list of local fauna rescue organisations and individuals will be maintained on site
  - Soft starts will be implemented and clearing will be undertaken in one direction so as to allow mobile animals to vacate the area.
- Other management measures:
  - Water carts and/or surface stabilization measures (e.g. hydro mulch) will be used to minimise dust generated from cleared areas
  - Topsoil will be harvested, stockpiled and reused in accordance with Main Roads Environmental Guideline Topsoil Management
  - Temporary drainage will be installed to capture and infiltrate surface runoff from construction areas and prevent runoff from entering adjacent native vegetation
  - All heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material
  - The Proposal is in a phytophthora dieback susceptible bioregion, with conservation significant protectable vegetation adjacent to the NVCP area. A Dieback Management Plan will be developed for the larger Mitchell Freeway Extension Hester Avenue to Romeo Road project and utilised during the clearing of the NVCP area
  - Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests. The NVCP area will also be subject to the yearly Main Roads weed spraying program.

6. Assessment against the 10 Clearing Principles

Schedule 5 of the EP Act defines Ten Clearing Principles for native vegetation. These principles aim to ensure that all potential impacts resulting from removal of native vegetation can be assessed in an integrated way. Clearing required for construction of Proposal has been assessed against the Ten Clearing Principles, with each principle being assessed in accordance with the DWER's *A Guide to the Assessment of Applications to Clear Native Vegetation (Department of Environment Regulation 2014)* to determine whether the application is at variance to the principles.

The assessment indicates that the Proposal is at variance with principles b and h, and likely to be at variance with principle a. An offset will be required to compensate for the residual impacts associated with the proposed clearing (see Section 7).

Table 6-1 Assessment against the Ten Clearing Principles

Principle		Assessment	Outcome
A	Native vegetation should not be cleared if it comprises a high level of biological diversity.	The NVCP area has a high level of biodiversity, commensurate with the surrounding region. Four vegetation types were recorded from the NVCP area including two woodland types, one shrubland type and one type characterised by scattered natives over weeds. Native vegetation was mainly in Very Good – Good condition (54%). Approximately 38% was in Degraded condition. This reflects the context of the site, between an existing road and conservation areas. No State or Commonwealth Threatened or Priority flora species were recorded in the NVCP area during the biological surveys (GHD 2019). One Bush Forever site occurs within the NVCP area, Bush Forever Site No. 383 Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland. Up to 1.5 ha of Bush Forever Site No. 383 is within the NVCP area. The majority of vegetation within the NVCP area (1.44 ha) is representative of two State listed PECs, these include: • 0.14 ha of Northern Spearwood shrublands and woodlands PEC • 1.30 ha of Banksia woodlands of the Swan Coastal Plain PEC. This includes 1.11 ha of the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC. Four fauna habitat types were recorded in the NVCP area: • Banksia woodland • Jarrah woodland • Mixed heathland • Scattered natives over weeds, highly disturbed. The *NatureMap* database identified 253 terrestrial fauna species previously recorded within the study area. This total comprised 142 birds, 54 reptiles, 22 mammals, 5 amphibians and 27 invertebrates. The biological assessment (GHD 2019) recorded no conservation significant fauna species within the NVCP area, however seven species were considered likely to occur based on the habitat present. One Regional Ecological Linkage intersects the NVCP area, and provides for movement of fauna through the landscape. The NVCP area intersects Regional Ecological Linkage ID 6, which links Neerabup National Park (Bush Forever Site No. 383) to Lake Joondalup (Bush Forever Site No. 299) in the south	Likely to be at variance to this principle

Principle		Assessment	Outcome
		and Yanchep and Neerabup National Parks (Bush Forever Site No. 130) in the north. The NVCP area is located on an existing road, therefore the impacts are expected to be less significant than bisecting contiguous vegetation. The proposal will not break this ecological linkage, clearing 0.42 ha within the indicative border (based on GIS boundary data) (WALGA 2008). The Proposal will involve clearing native vegetation in an area of high biological diversity. The Proposal is likely 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	The NVCP area contains habitat suitable for seven conservation significant fauna species including: • Carnaby's Cockatoo (*Calyptorhynchus latirostris*) – Endangered under the EPBC Act and BC Act • Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable under the EPBC Act and BC Act • Peregrine Falcon (*Falco peregrinus*) – Other specially protected fauna under the BC Act • Southern Brown Bandicoot (*Isoodon fusciventer*) – Priority 4 • Western Brush Wallaby (*Notamacropus Irma*) – Priority 4 • Black-striped Snake (*Neelaps calonotos*) – Priority 3 • *Ctenotus gemmula* (Swan Coastal Plain population) – Priority 3. The NVCP area contains suitable foraging habitat for both Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. Up to 1.91 ha of foraging habitat will be cleared. One black cockatoo potential breeding tree is within the NVCP area (with a DBH > 500 mm). This tree does not contain any hollows. No roosting habitat was identified in the NVCP area. The Proposal represents approximately 0.04% of available Black Cockatoo foraging habitat within 5 km of the Proposal (approximately 4,800 ha), of which 35% (1,673 ha) is located in DBCA managed lands (GoWA 2020). The Proposal lies within the modelled distribution of Carnaby's Cockatoo. Red Forest Black Cockatoo are also known to occur in the area in search of food. There are extensive, well reserved areas in the vicinity of the Proposal that are expected to provide suitable foraging, roosting and potential breeding resources for Black Cockatoos. Clearing of the NVCP area will also result in the loss of: • 1.91 ha of habitat for the Peregrine Falcon • 1.91 ha of habitat for the Southern Brown Bandicoot	At variance to this principle

Principle		Assessment	Outcome
		• 1.91 ha of habitat for the Western Brush Wallaby • 1.3 ha of habitat for the Black-striped Snake • 1.44 ha of habitat for Ctenotus gemmula (Swan Coastal Plain population). Given the clearing of habitat for conservation significant fauna, the Proposal is 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.	No EPBC Act or BC Act listed flora were recorded within the NVCP area or are considered likely to occur based on habitat preferences. The Proposal is considered not at variance to this principle.	Not 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.	No State listed TECs were recorded in the NVCP area nor will be cleared for the Proposal. The Proposal is at not variance to this principle.	Not at variance to 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.	Broad scale (1:250,000) pre-European vegetation mapping (Beard 1979) mapping indicates the NVCP area intersects two vegetation associations: • Low woodland; Banksia (Association 949) • Medium woodland; Tuart (Association 998) The current extents of all vegetation associations that intersect the NVCP area are above 30 % of their pre-European extents at the State, IBRA bioregion, IBRA subregion and LGA levels. Regional vegetation complex mapping has been completed by Heddle *at al.* (1980) with updates from Webb *et al*. (2016) based on major landform boundaries within the IBRA subregion SCP and forested region of south-west Western Australia. The mapping indicates one vegetation complex is present within the NVCP area, Cottesloe Complex – Central and South: Consists of a mosaic of woodland of *Eucalyptus*	Not at variance to this principle

Principle		Assessment	Outcome
		gomphocephala (Tuart) and open forest of *E. gomphocephala* – *E. marginata* (Jarrah) – *Corymbia calophylla* (Marri); closed heath on the limestone outcrops. The current extent of the Cottesloe Complex – Central and South within the NVCP area is above 30 % of pre-European extent remaining within the SCP IBRA bioregion and the City of Wanneroo. The Proposal is not 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.	There are no wetlands, watercourses or drainage lines located within the NVCP area. The nearest waterbody is Neerabup Lake, approximately 0.9 km from the NVCP area. Four vegetation types were recorded from the NVCP area including two woodland types, one shrubland type and one type characterised by scattered natives over weeds. None of the vegetation types grow in, or in association with watercourses or wetlands. The Proposal is not at variance to this principle.	Not at variance to this principle.
G	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	According to the GoWA (2020) mapping, the NVCP area is mapped within an area having low risk of water erosion, flooding and salinity, and high risk of wind erosion and subsurface acidification. A review of ASRIS identified the Proposal as having extremely low risk of ASS. Given the small clearing area, the Proposal is unlikely to cause appreciable subsurface acidification. Clearing will be limited to the area required for construction and therefore surfaces will be sealed road or road infrastructure. Large unsealed areas prone to wind erosion will not be cleared, and therefore the impacts of wind erosion are considered insignificant. The Proposal is not likely to be at variance to this principle.	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	The NVCP area intersects Class A reserve, Neerabup National Park. Up to 1.5 ha of vegetation in Neerabup National Park will be cleared for the Proposal. The Proposal is at variance to this principle.	At variance to this principle.

Principle		Assessment	Outcome
	nearby conservation area.		
I	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	There are no wetlands, watercourses or drainage lines located within the NVCP area. The nearest waterbody is Neerabup Lake, approximately 0.9 km from the NVCP area. Surface water runoff will be managed as part of Proposal design including installation of culverts and drainage as required. Further, the Proposal is located in an area that is not at high risk of flooding or water erosion, therefore offsite impacts are considered minor. The NVCP area is located within the Perth Groundwater Area and the Perth Coastal and Gwelup Underground Pollution Control Area public drinking water source area (Priority 3 Protection Zone). Priority 3 areas are declared over land where water supply sources need to coexist with other land uses such as residential, commercial and light industrial developments. The construction of the Proposal is unlikely to impact groundwater quality. The Proposal is not at variance to this principle.	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 or intensity of flooding.	According to the GoWA (2020) mapping, the NVCP area is mapped as having low risk of water erosion and flooding. Surface water management measures will be implemented as part of Proposal design, including installation of culverts and swales as needed. The Proposal is not at variance to this principle.	Not at variance to this principle.

7. Offsets

A total offset of 8 ha will be required for this Proposal, taking the largest result from the offset calculations (black cockatoo). It is assumed that land purchased for offset purposes will include land suitable for the other environmental factors impacted.

For the purposes of providing a financial offset for this Proposal, it is assumed that an 8 ha rural freehold property will be acquired on the northern Swan Coastal Plain as part of a larger land parcel being purchased to satisfy EPBC offset requirements for the larger Mitchell Freeway Extension Hester Avenue to Romeo Road project (EPBC 2018/8367). The value of unimproved (vegetated) rural land in the Shire of Gingin is estimated by the Valuer-General at $16,910/hectare, which for 8 ha equates to the sum of $135,280.

The offset strategy proposed will provide adequate and commensurate offsetting of the impacted environmental values. A conservative approach has been adopted in calculating the offset requirements by using the total amount of clearing required, rather than the residual impact following landscaping and revegetation activities. This is likely to provide a slight net gain in the overall conservation outcome for environmental values being offset.

The Offset Proposal is attached as Appendix D.

8. References

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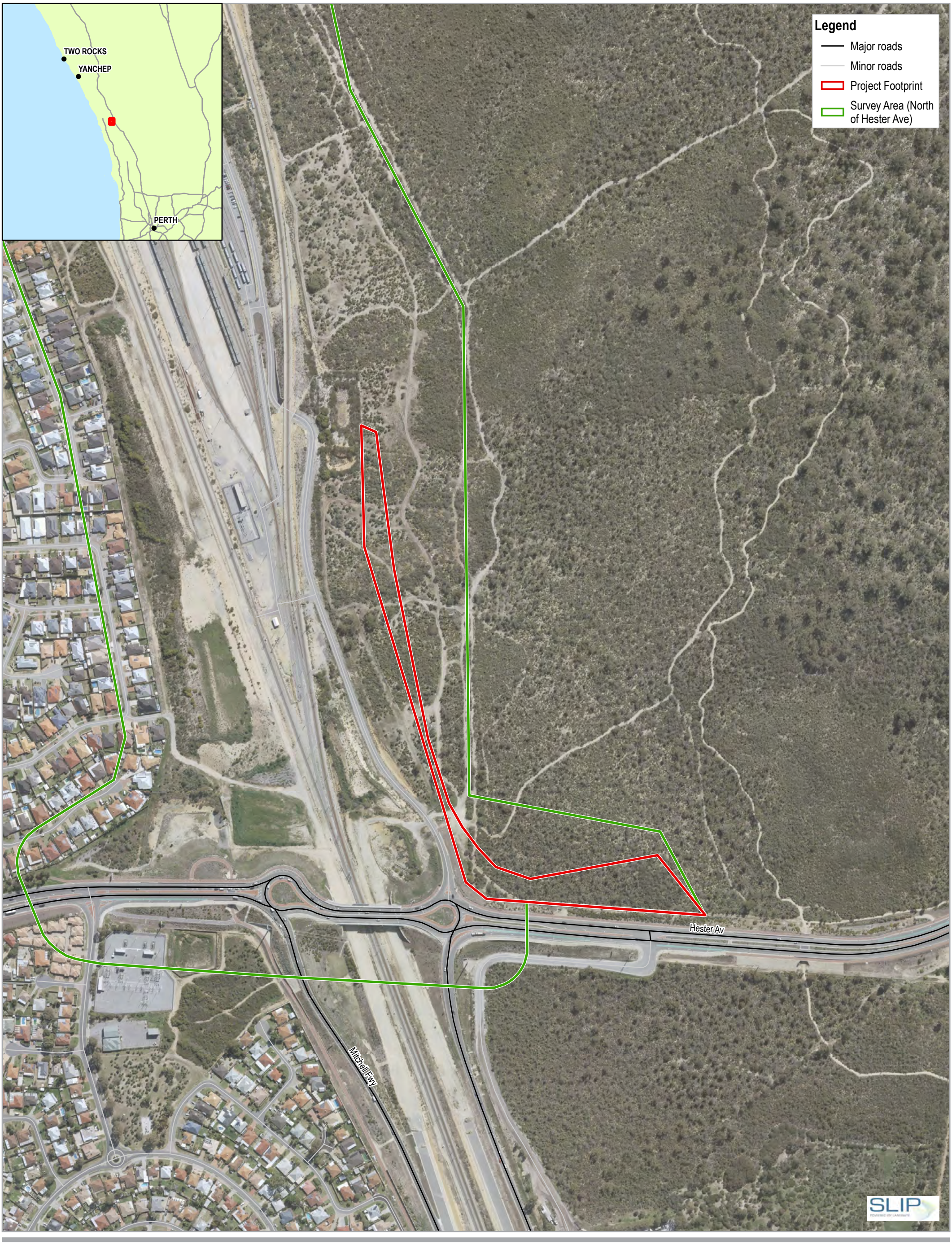
Appendices

Appendix A – Figures



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Meters

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Map Projection: Transverse Mercator
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Main Roads WA
Nowergup Depot Access

NVCP and survey area boundaries

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 1

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Kilometres

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Map Projection: Transverse Mercator
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GHD

Main Roads WA
Nowergup Depot Access

5 km Study Area

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 2

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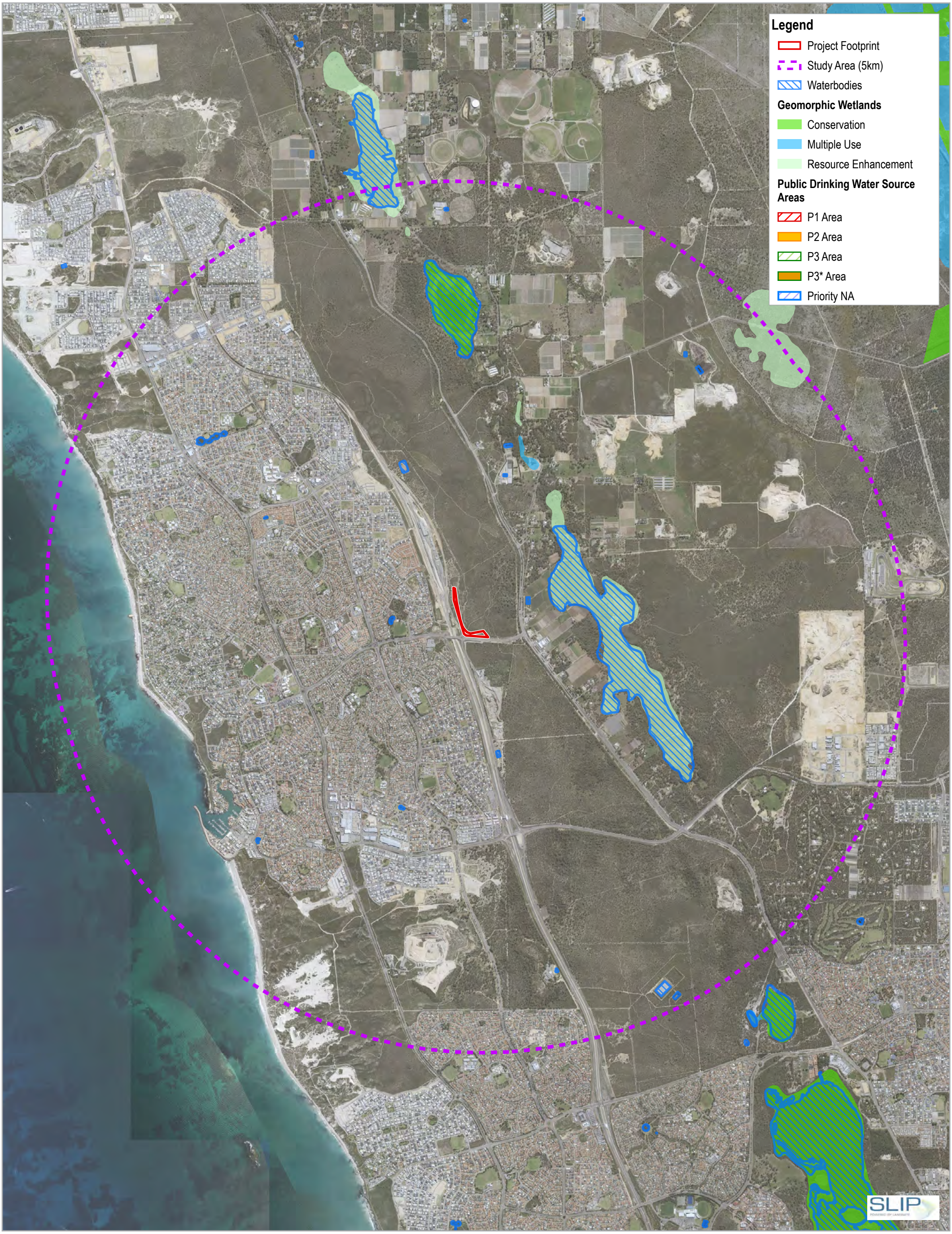

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Main Roads WA
Nowergup Depot Access

Hydrology constraints

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 3

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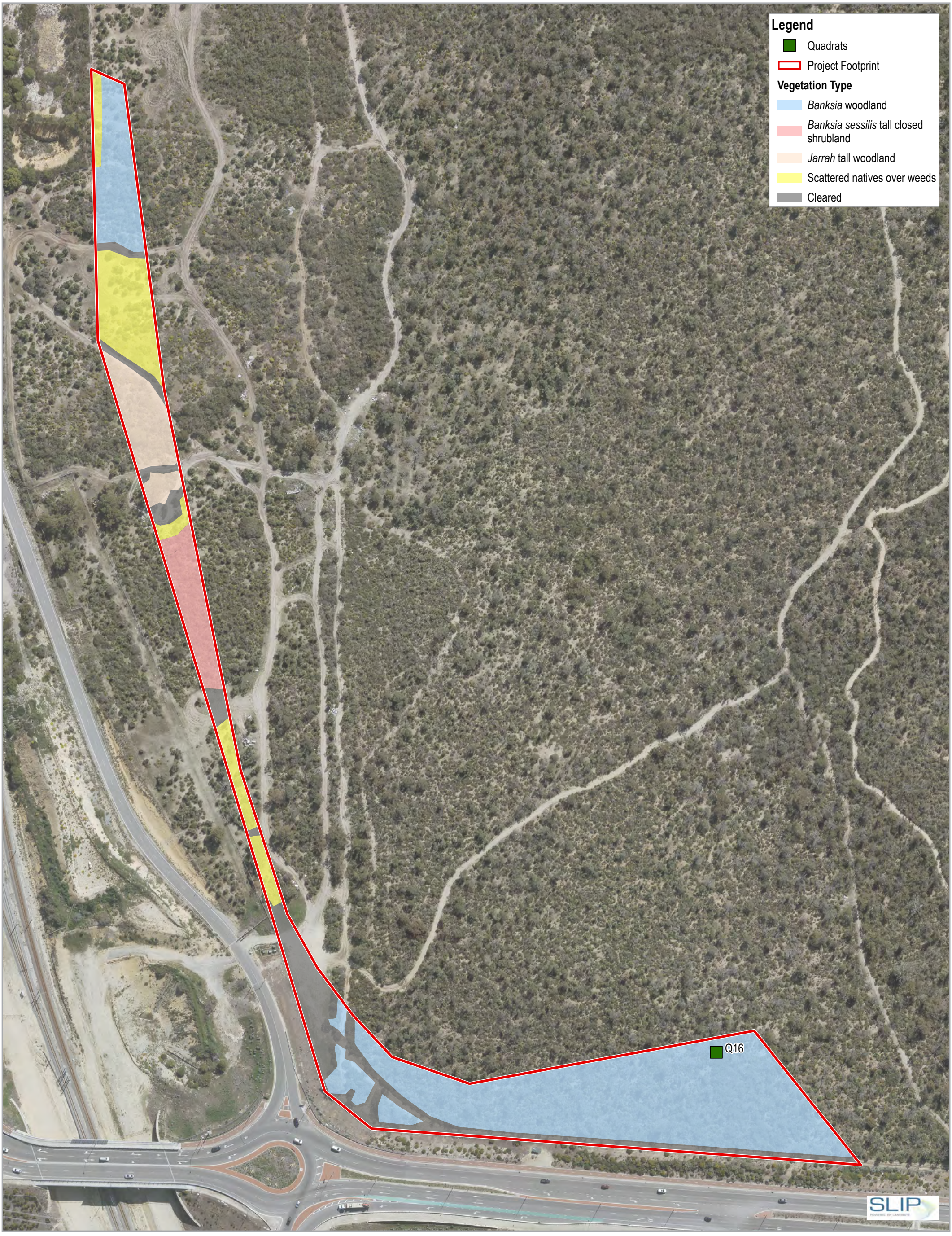
Created by: bmorgan



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Main Roads WA
Nowergup Depot Access

Vegetation types

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 4

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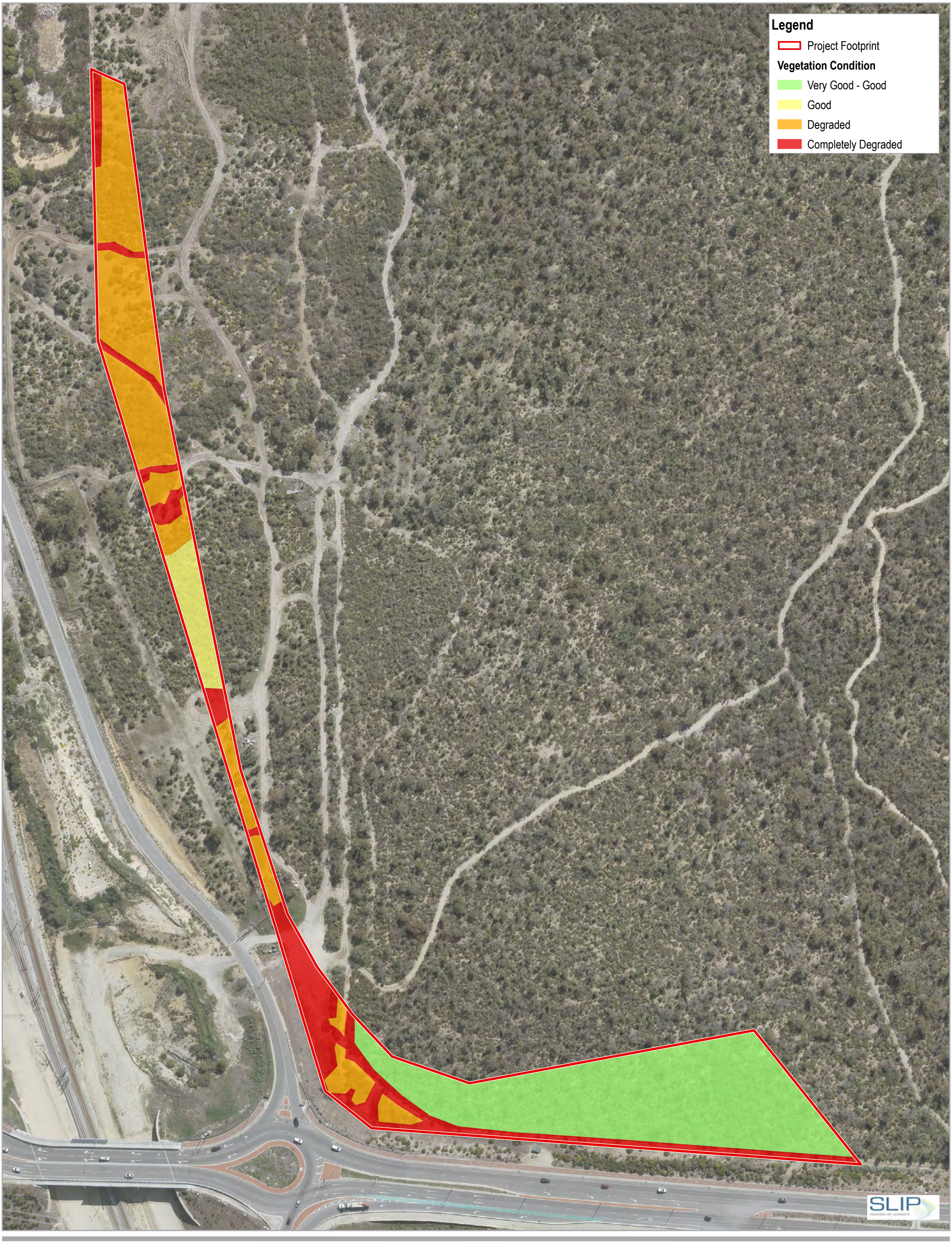

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GHD

Main Roads WA
Nowergup Depot Access

Vegetation condition

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 5

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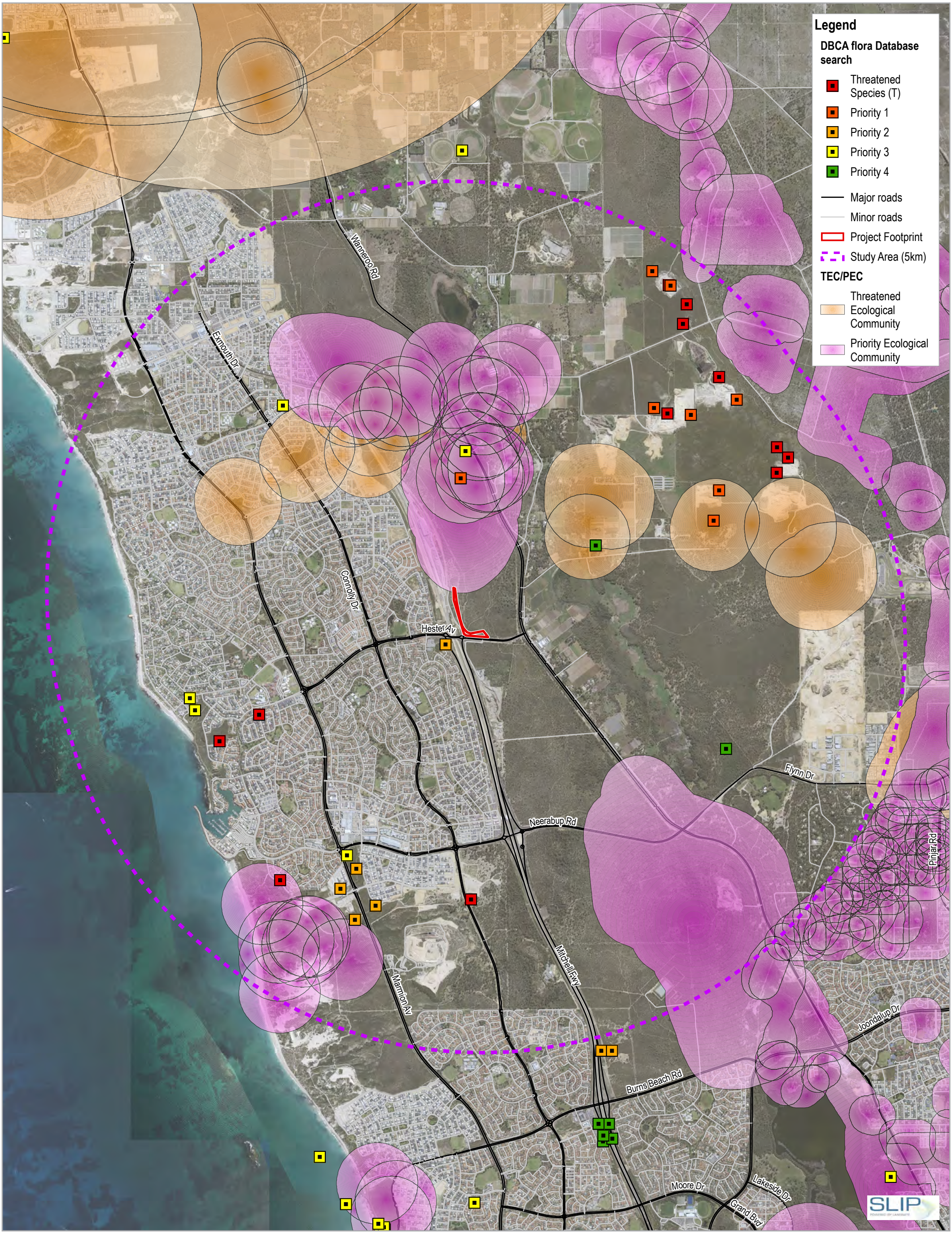

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Kilometres

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Main Roads WA
Nowergup Depot Access

Biological constraints

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 6

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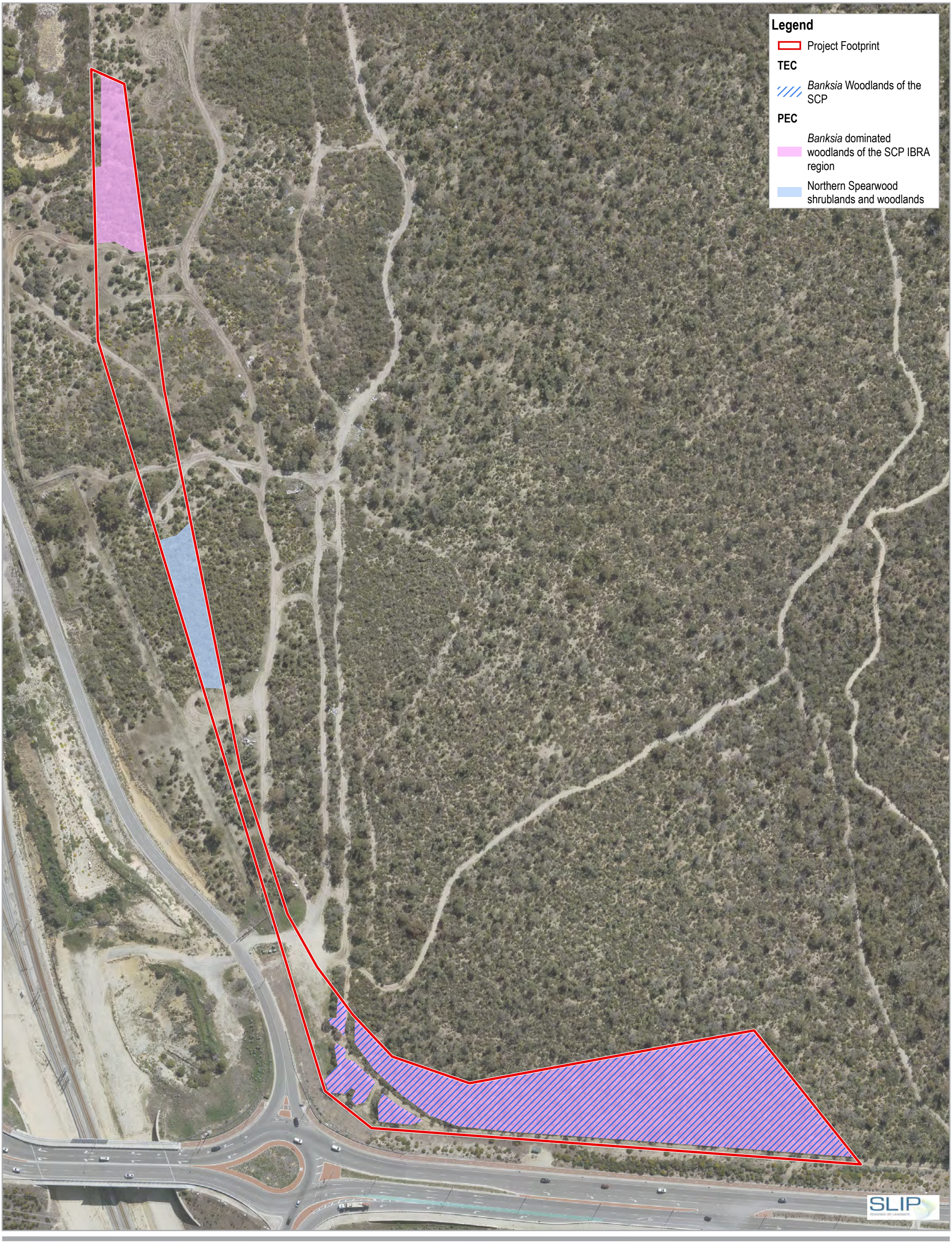

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Main Roads WA
Nowergup Depot Access Roundabout

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

Conservation significant vegetation

FIGURE 7

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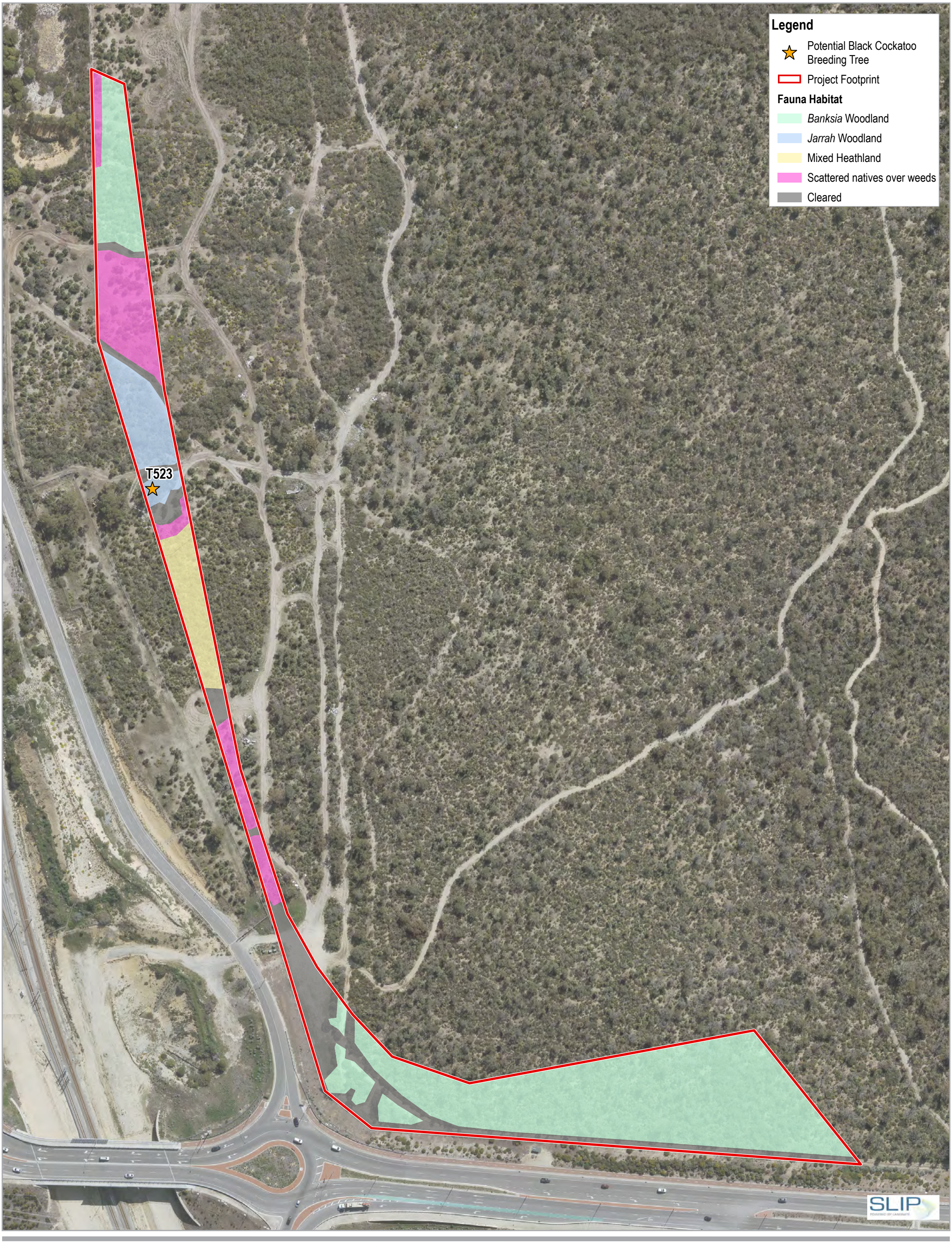

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Grid: GDA 1994 MGA Zone 50

Main Roads WA
Nowergup Depot Access

Fauna habitats

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 8

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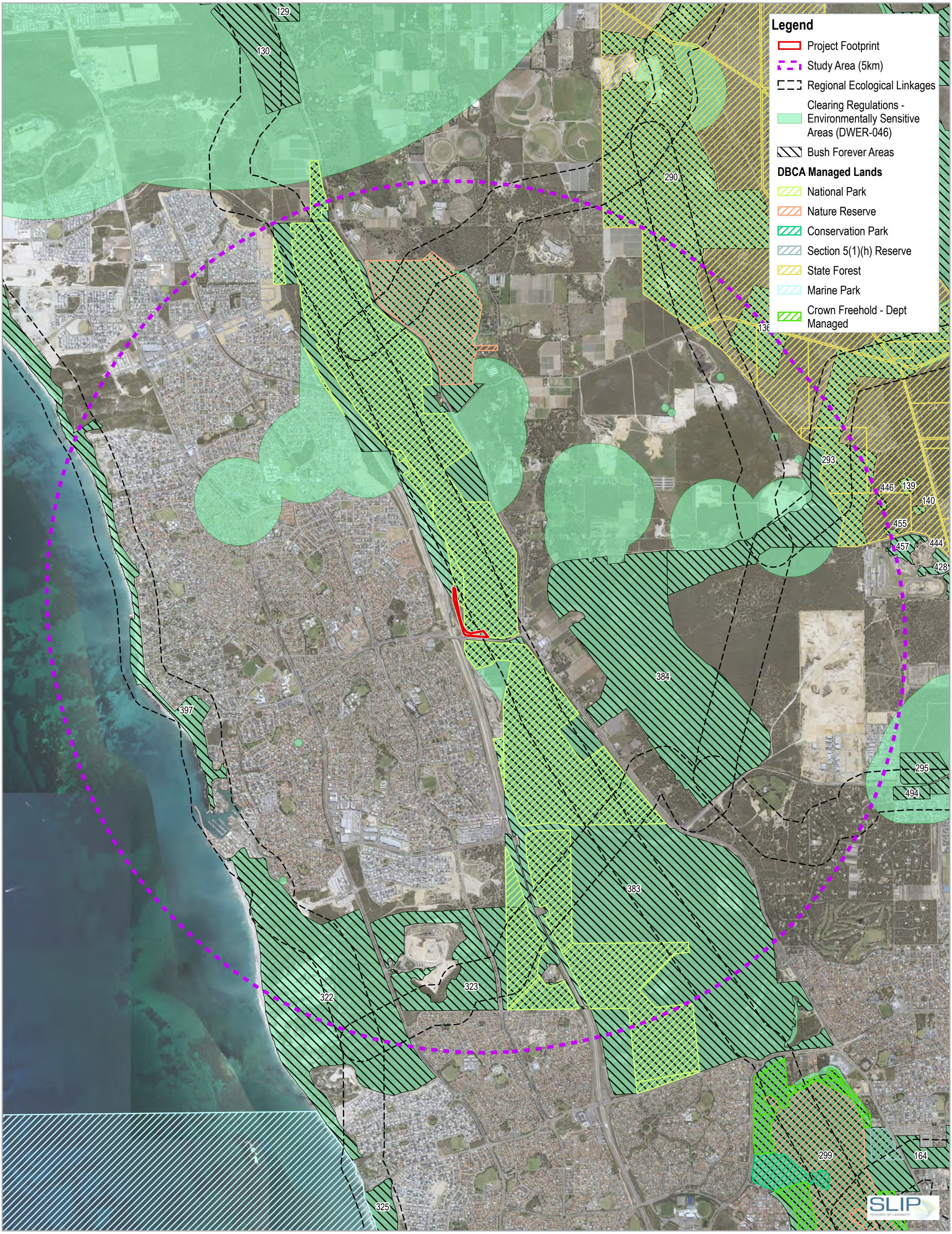

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Kilometres

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Main Roads WA
Nowergup Depot Access

Land use constraints

Project No. **12522027**
Revision No. **0**
Date **24 Feb 2020**

FIGURE 9

G:\61\12522027\GIS\Maps\Working\12522027\12522027.aprx\12522027_004_LandUseConstraints_RevA
Print date: 24 Feb 2020 - 15:23

Data source: GHD: Survey Area - 20200122; DBCA: Managed Lands; WALGA: Regional Ecological Linkages - 20200122; DPLH - Bush Forever Areas - 20200122; DWER: Environmentally Sensitive Areas - 20200122; Landgate: Imagery - August 2019. Created by: bmorgan

Appendix B – Survey Report

Mitchell Freeway Extension Hester Avenue to Romeo Road Biological Survey (GHD 2019)

Appendix C – Desktop Searches

EPBC Act PMST (5 km)

NatureMap Flora Report (5 km)

NatureMap Fauna Report (5 km)

Australian Government
Department of the Environment and Energy

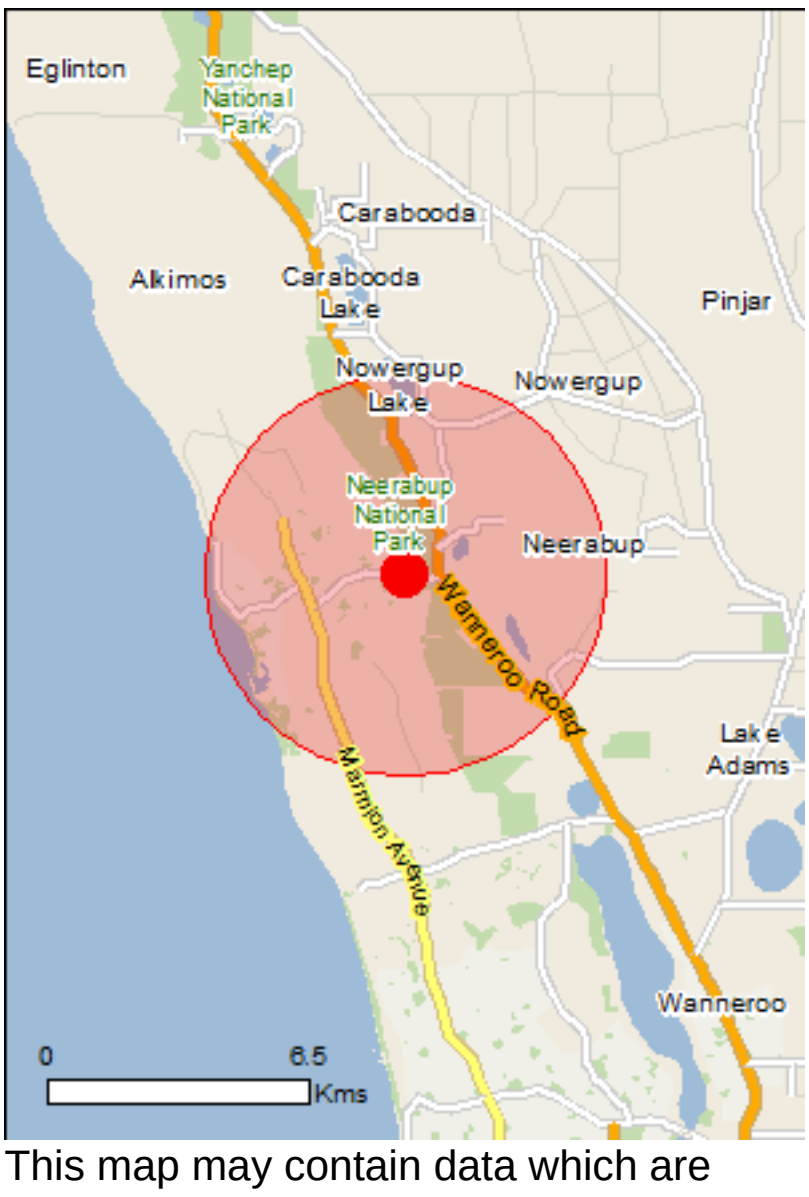
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

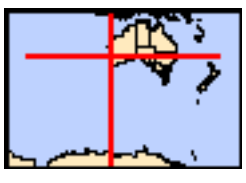
Report created: 03/02/20 16:47:11



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	47
Listed Migratory Species:	42

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	66
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Insects		
Hesperocolletes douglasi Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur within area
Plants		
[Andersonia gracilis](#) Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
[Anigozanthos viridis subsp. terraspectans](#) Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat may occur within area
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
[Diuris purdiei](#) Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
[Drakaea elastica](#) Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
[Drakaea micrantha](#) Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
[Eleocharis keigheryi](#) Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
[Eucalyptus argutifolia](#) Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area
[Lepidosperma rostratum](#) Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
[Marianthus paralius](#) [83925]	Endangered	Species or species habitat known to occur within area
[Melaleuca sp. Wanneroo (G.J. Keighery 16705)](#) [89456]	Endangered	Species or species habitat known to occur within area
Reptiles		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
[Balaena glacialis australis](#) Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
[Caperea marginata](#) Pygmy Right Whale [39]		Species or species habitat may occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
[Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
[Manta birostris](#) Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		

Name	Threatened	Type of Presence
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Anous tenuirostris melanops		
Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur

Name	Threatened	Type of Presence
		within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Reptiles		
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area

Name	Status	Type of Presence
Tursiops aduncus		
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str.		
Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Neerabup	WA
Neerabup	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		

Name	Status	Type of Presence
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-31.67011 115.73307

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Nowergup Flora Species Report

Created By Guest user on 03/02/2020

Kingdom	Plantae
Conservation Status	Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 43' 59" E,31° 40' 13" S
Buffer	5km
Group By	Family

Family	Species	Records
Aizoaceae	1	1
Cyperaceae	1	1
Dasypogonaceae	1	2
Dilleniaceae	1	2
Ericaceae	1	1
Fabaceae	3	5
Fabroniaceae	1	5
Haemodoraceae	1	1
Myrtaceae	3	28
Pittosporaceae	1	1
Stylidiaceae	1	2
Thymelaeaceae	1	2
TOTAL	**16**	**51**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Aizoaceae					
1.	17543	*Sarcozona bicarinata*		P3	
Cyperaceae					
2.	35581	*Tetraria sp. Chandala (G.J. Keighery 17055)*		P2	
Dasypogonaceae					
3.	1213	*Calectasia cyanea (Blue Tinsel Lily)*		T	
Dilleniaceae					
4.	11461	*Hibbertia spicata subsp. leptotheca*		P3	
Ericaceae					
5.	19460	*Leucopogon sp. Yanchep (M. Hislop 1986)*		P3	
Fabaceae					
6.	3237	*Acacia benthamii*		P2	
7.	20462	*Jacksonia gracillima*		P3	
8.	4027	*Jacksonia sericea (Waldjumi)*		P4	
Fabroniaceae					
9.	20162	*Fabronia hampeana*		P2	
Haemodoraceae					
10.	1425	*Conostylis bracteata*		P3	
Myrtaceae					
11.	34161	*Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)*		P1	
12.	13091	*Eucalyptus argutifolia (Wabling Hill Mallee)*		T	
13.	33022	*Melaleuca sp. Wanneroo (G.J. Keighery 16705)*		T	
Pittosporaceae					
14.	25819	*Marianthus paralius*		T	
Stylidiaceae					
15.	13127	*Stylidium maritimum*		P3	
Thymelaeaceae					
16.	5237	*Pimelea calcicola*		P3	

Conservation Codes

Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap Nowergup Fauna CS Report

Created By Guest user on 05/02/2020

Kingdom	Animalia
Conservation Status	Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 43' 59" E,31° 40' 13" S
Buffer	5km
Group By	Species Group

Species Group	Species	Records
Bird	8	147
Invertebrate	3	9
Mammal	8	35
Reptile	4	8
TOTAL	**23**	**199**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Bird					
1.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
2.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
3.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
4.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
5.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
6.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
7.	24716	*Puffinus pacificus (Wedge-tailed Shearwater)*		IA	
8.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Invertebrate					
9.	33973	*Austrosaga spinifer (spiny katydid (Swan Coastal Plain), bush cricket (Swan Coastal Plain))*		P2	
10.	48935	*Idiosoma sigillatum (Swan Coastal Plain shield-backed trapdoor spider)*		P3	
11.	33992	*Synemon gratiosa (Graceful Sunmoth)*		P4	
Mammal					
12.	24043	*Eubalaena australis (Southern Right Whale)*		T	
13.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
14.	24051	*Megaptera novaeangliae (Humpback Whale)*		S	
15.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
16.	24154	*Perameles bougainville subsp. bougainville (Western Barred Bandicoot, Marl)*		T	
17.	24155	*Perameles eremiana (Desert Bandicoot, walilya)*		X	
18.	24073	*Physeter macrocephalus (Sperm Whale)*		T	
19.	24157	*Trichosurus vulpecula subsp. arnhemensis (northern brushtail possum (Kimberley))*		T	
Reptile					
20.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
21.	25336	*Chelonia mydas (Green Turtle)*		T	
22.	25249	*Neelaps calonotos (Black-striped Snake, black-striped burrowing snake)*		P3	
23.	25258	*Pseudonaja affinis subsp. exilis (Rottnest Island Dugite)*		P4	

Conservation Codes
T - Rare or likely to become extinct
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S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix D – Offset proposal

GHD

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12522027-5155/https://projectsportal.ghd.com/sites/pp18_04/nowergupdepotaccessr/ProjectDocs/12522027_Nowergup Depot Access Native Vegetation Clearing Permit Supporting Documentation_Rev0.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	R Lupton	J Tindiglia		J Tindiglia		24/2/2020

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