

REVEGETATION PLAN (REV 1)

SAND EXTRACTION ON LOT 230 ELGIN ROAD ELGIN

PREPARED FOR:

COWARA CONTRACTORS PTY LTD

MAY 2022

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LOT 230 ELGIN ROAD, ELGIN
REVEGETATION PLAN REV1

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1. INTRODUCTION

1.1 PLAN PURPOSE

Cowara Contractors Pty Ltd (Cowara Contractors or the Proponent) is proposing to undertake sand extraction on Lot 230 (on Plan 232802) Elgin Road, in Elgin within Shire of Capel (Figure 1, Figure 2). A Development Approval for extractive industry has been granted to the project by Shire of Capel and an Extractive Industry Licence will be issued once pre-development conditions have been met. The project involves clearing of up to 5.44 ha of remnant native vegetation and a Clearing Permit (CPS 8958) is being sought from the Department of Water and Environmental Regulation (DWER). DWER 'Agreement in Principle' letter dated 30 March 2022 indicates that permit is expected to be granted subject to conditions, assuming local government approvals are in place.

This Revegetation Plan has been prepared to describe the revegetation the Proponent will undertake for mitigation and offset purposes in relation to CPS 8958. This Revegetation Plan will also form part of the Development Approval and Extractive Industry Licence from Shire of Capel.

The document is consistent with the provisions of *A Guide to Preparing Revegetation Plans for Clearing Permits under Part V of the Environmental Protection Act 1986* (Department of Water and Environmental Regulation 2018).

1.2 CLEARING IMPACTS, MITIGATION AND OFFSET

Under CPS 8958, the project involves clearing of up to 5.44 ha of native vegetation in Completely Degraded condition, comprising Jarrah-Banksia woodland with a few outlier Marris and a Peppermint. Key impacts of the clearing are:

- Loss of up to 2.86 ha of habitat for Threatened Western Ringtail Possum (WRP) (*Pseudocheirus occidentalis*; Critically Endangered),
- Loss of habitat for the three Threatened Black Cockatoo species including Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*; Endangered), Baudin's Black Cockatoo (*Calyptorhynchus baudinii* - Endangered) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*; Vulnerable). The habitat loss is limited to 3.00 ha of foraging habitat and 37 trees with diameter at breast height (DBH) of >50 cm; no suitable nesting hollows or known roosting habitat will be removed.
- Loss of 5.44 ha of native vegetation in an area that has been extensively cleared.

DWER 'Agreement in Principle' letter dated 30 March 2022 states that DWER calculations indicate the revegetation of 6.69 ha on Lot 230 on Deposited Plan 232802, Elgin, would offset 100 per cent of the significant residual impacts of the proposed clearing.

The aim of revegetation will be to establish native vegetation comprising locally occurring native species and to create habitat suitable for the target fauna species (WRP and Black Cockatoos) to mitigate and offset the key impacts of the proposed clearing. It is noted that the proposed clearing is not expected to have a significant impact on any particular pre-European vegetation association or significant ecological community (i.e. Threatened or Priority Ecological Community) as the Completely Degraded vegetation proposed to be cleared is not representative of these. Therefore, the aim of revegetation will not be to recreate a particular natural vegetation community that existed in the area prior to clearing, but rather to establish suitable habitat for the target fauna species that comprises locally occurring native flora species to address the key impacts of clearing.

1.3 CLEARING AND REVEGETATION LOCATIONS

Both the clearing area and the revegetation area are located on Lot 230 (on Plan 232802) Elgin Road, in Elgin, approximately 20 km south of Bunbury, in the Shire of Capel (Figure 1, Figure 2).

1.4 CONTACT DETAILS

Any queries regarding this plan, should be directed to:

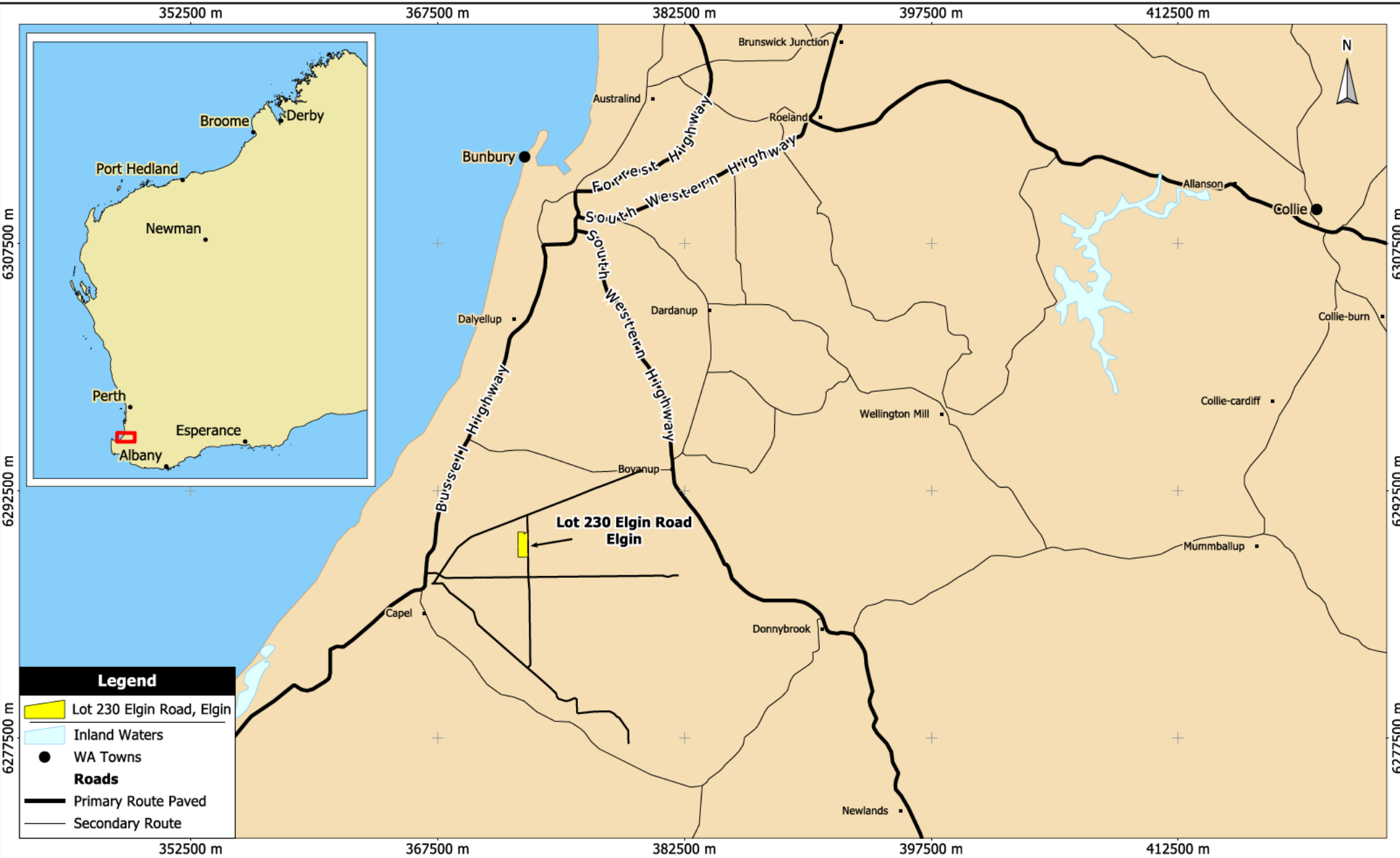
Landowners Stephen Thomas Duggan and Hilton Oscar Yelverton
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steve@cowara.com.au and chip@cowara.com.au

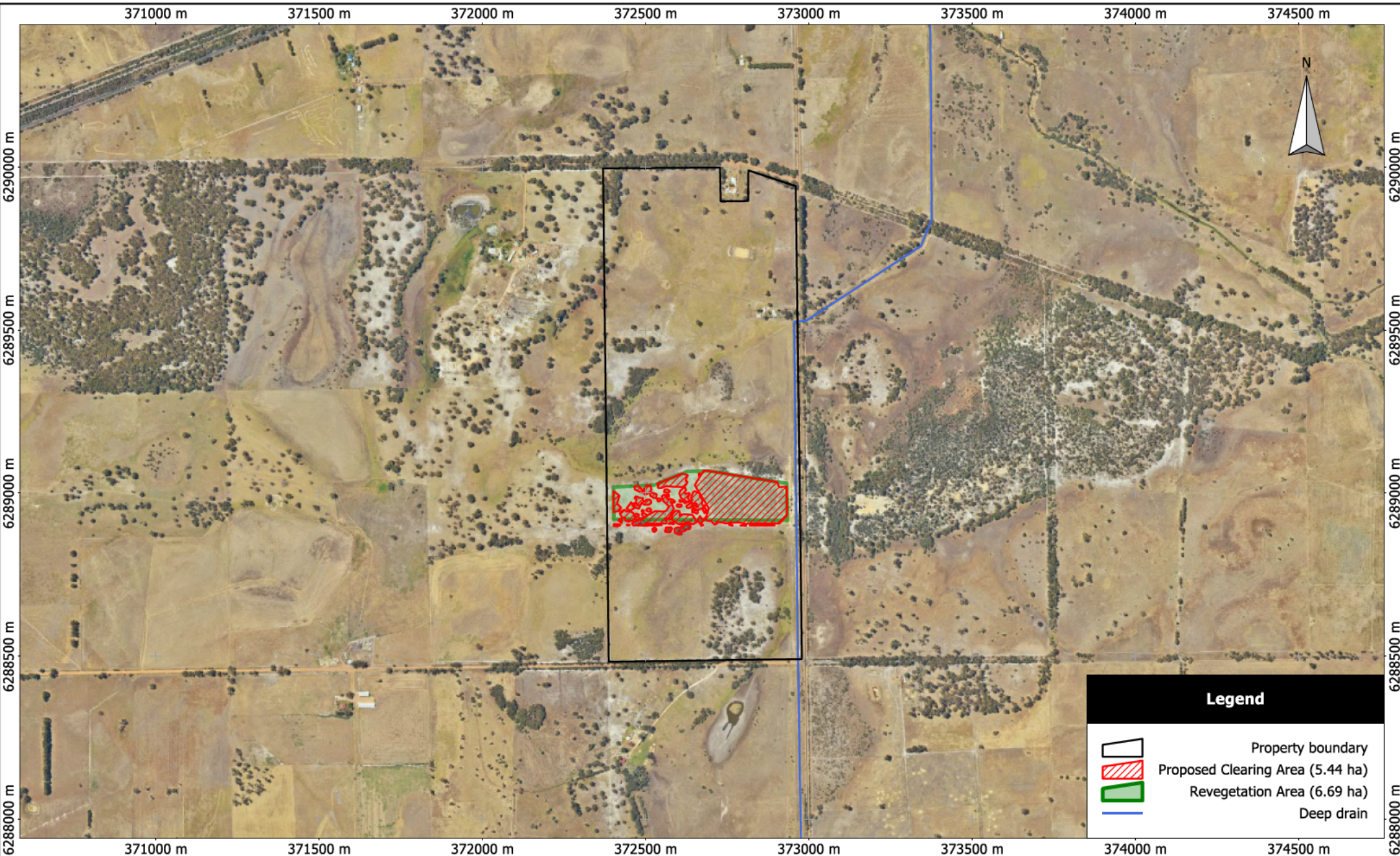
1.5 REVEGETATION PLAN PREPARATION

This revegetation plan was prepared by:





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Kirsi's qualifications include Doctor of Philosophy (Environmental Science) and Bachelor of Environmental Science (Hons). She has over 10 years professional experience relating to the preparation of revegetation plans for the southwest of WA, covering all aspects of plan development, including undertaking baseline surveys, determining appropriate revegetation species, defining revegetation methodology, and developing completion criteria, monitoring methods, management triggers and contingency measures. She also regularly undertakes revegetation monitoring and reporting.






Legend

-  Property boundary
-  Proposed Clearing Area (5.44 ha)
-  Revegetation Area (6.69 ha)
-  Deep drain

Scale: 1:15000
 Original Size: A4
 Air Photo Date: March 2018
 Grid: Australia MGA94 (50)



Cowara Contractors Pty Ltd
 Lot 230 Elgin Road, Elgin

Figure 2
Local Setting

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2. BACKGROUND INFORMATION

2.1 OWNERSHIP AND ZONING

The clearing and revegetation areas are located on Lot 230 (on Plan 232802) Elgin Road, in Elgin. Lot 230 is owned by Warwick Glen Grazing Pty Ltd (ACN 061 604 993, Director Stephen Thomas Duggan) and Molita Grove Grazing Pty Ltd (ACN 062 889 598, Director Hilton Oscar Yelverton). The landowners are the proponents of the sand extraction project and the applicants of the Clearing Permit. The landowners are also directors of Cowara Contractors. The property is zoned rural in the Shire of Capel Town Planning Scheme and in the Greater Bunbury Region Scheme.

2.2 SITE HISTORY

The total area of Lot 230 is 87.76 ha and the majority of it has been cleared in the past for grazing and is currently grazed by cattle. The property includes a residential dwelling approximately 480 m to the north of the clearing area. A deep agricultural drain (part of the man-made Elgin Main Drain) runs along the eastern property boundary.

2.3 CLIMATE

The climate of the project area is Mediterranean, with cool wet winters and hot dry summers. Long-term average climate data for the closest meteorological station (Bunbury, 20 km north of project, ID 9965) in Figure 3 show average annual rainfall of 718.4 mm, mean minimum temperatures between 7°C and 16°C and mean maximum temperatures between 17°C and 30°C (Bureau of Meteorology 2020).

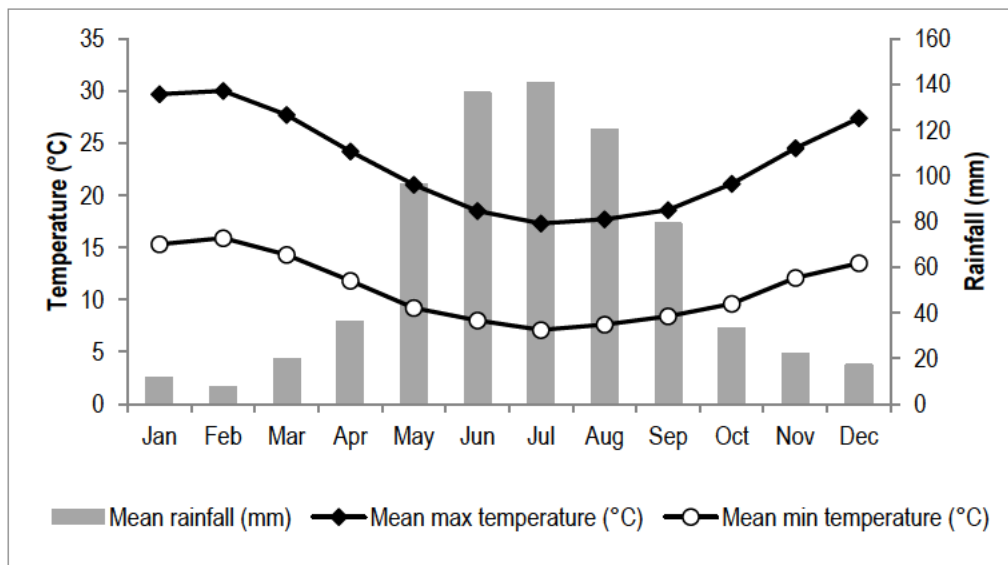


Figure 3: Long-term Rainfall and Temperature Data (1995-2020) for Bunbury Meteorological Station 9965 (Bureau of Meteorology 2020)

2.4 REGIONAL CONTEXT

The project area is located on the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) region and Perth (SWA2) sub-region. The sub-region comprises colluvial and aeolian sands, alluvial river flats and coastal limestone. Heath and/or Tuart woodlands occur on limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials. The sub-region also contains a complex series of seasonal wetlands (Mitchell *et al.* 2002).

2.5 LANDFORM AND SOIL

In soil landscape mapping, Lot 230 is located on the Pinjarra System (213Pj) (DPIRD-064). The clearing area is mapped as Pinjarra B1a Phase (DPIRD-027) that has been described as: "*extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands with an intensely coloured yellow B horizon occurring within 1 m of the surface; marri and jarrah dominant*" (Government of Western Australia 2020). The areas surrounding the extraction area are mostly mapped as Phase P7a (DPIRD-027) that has been described as: "*Seasonally inundated swamps and depressions with very poorly drained variable acidic mottled yellow and grey duplex soils becoming alkaline with depth*". However, it is noted that the deep agricultural drain along the eastern property boundary has changed the hydrology of the area and reduced the areas that may have historically been seasonally inundated. The soil landscape systems and phases and the agricultural drain are shown in Figure 4.

The project area within Lot 230 is located on a low, east-west aligned sand hill. Ground surface level peaks at approximately 28 mAHD (metres Australian Height Datum) at the top of the hill and slopes down to approximately 24-25 mAHD along the southern and northern boundaries of the extraction area (Figure 5). Along the agricultural drain, ground surface level drops down to 22 mAHD.

Post-extraction landform will vary from approximately 27 mAHD in the west, down to approximately 24 mAHD in the east, remaining at least 1 m above the maximum groundwater level (Figure 6). Based on onsite soil sampling, the soil profile post-extraction will remain sand.

2.6 HYDROLOGY

2.6.1 Surface Hydrology

The project area is located in the Capel River catchment of the Busselton Coast basin in the Southwest drainage division. Further, the project area is located within the proclaimed Capel River surface water area and the Gynudup Brook and Treen Creek surface water sub-area. The project area is not within a Public Drinking Water Supply Area (PDWSA).

According to available databases, Lot 230 intersects two wetlands (Figure 4):

- Multiple-use palusplain wetland (ID15809) that covers 42,000 ha between Boyanup and Vasse.
- Multiple-use sumpland wetland (ID1039) that covers 7.47 ha to the northwest of the clearing area.

Multiple-use wetlands are considered to be wetlands that have few remaining important attributes, functions or values (Water and Rivers Commission 2001). Both wetlands intersected by Lot 230 have been mostly cleared of native vegetation and are locally used for grazing, in line with the rural zoning.

There are no natural watercourses within or immediately adjacent to the proposed clearing area. However, there is a deep (2-4 m below natural ground surface), man-made drain running along the eastern property boundary. This drain flows north and connects to the Gynudup Brook approximately 1.7 km north-east from the project site.

The drain has significantly modified the hydrology of the area and will continue to maintain lower than natural surface and ground water levels in the area. As a result, areas that may have historically become seasonally inundated or damp, now remain drier and are more suitable for dryland rather than wetland type vegetation.

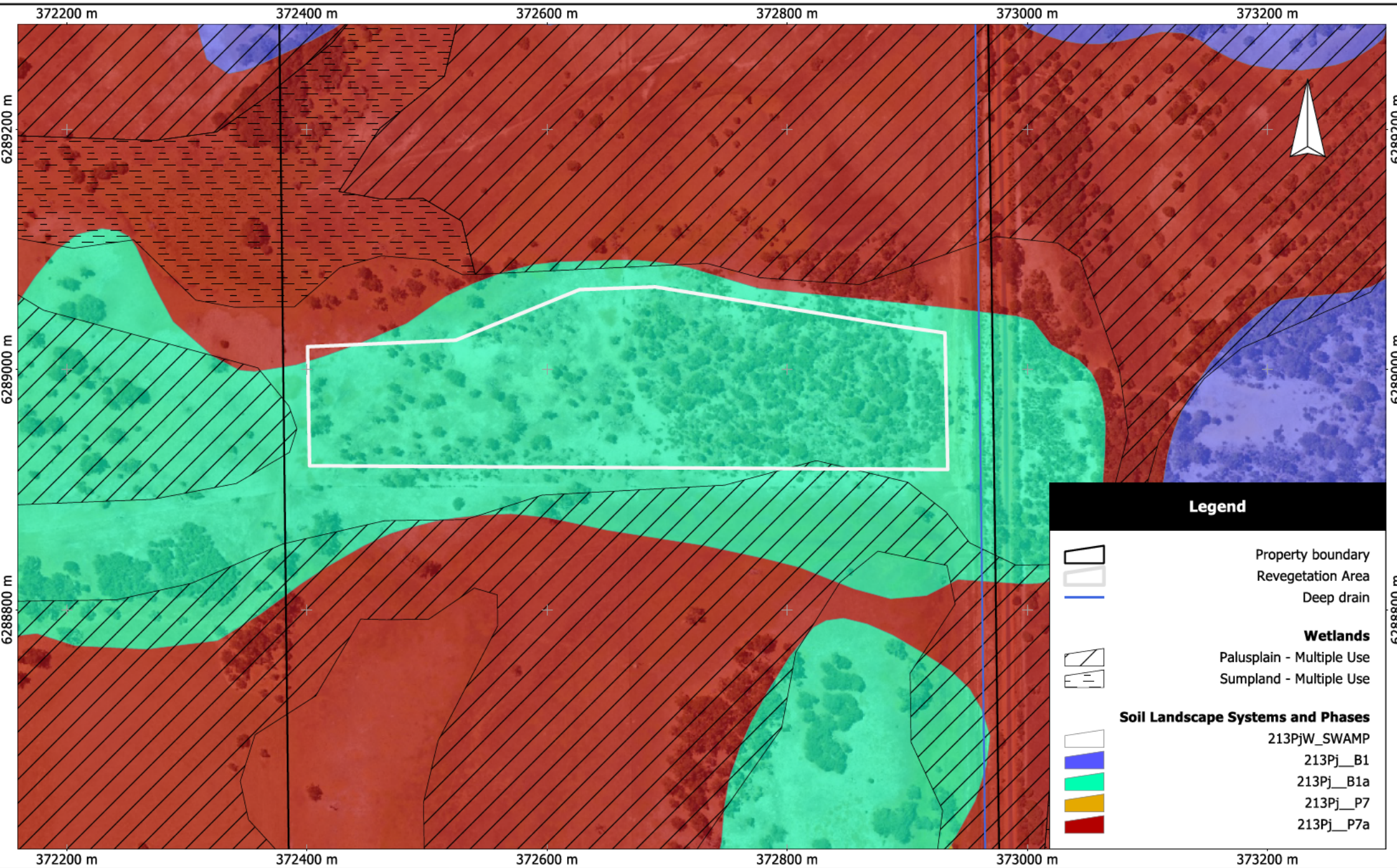
Due to the post-extraction soil profile remaining sandy, minimal stormwater runoff is anticipated, with rainfall expected to readily infiltrate into the soil. The post-extraction landform of the extraction area has been designed so that if there was any stormwater runoff, it would be captured within the extraction area until it infiltrates.

2.6.2 Groundwater











The project is within the Busselton-Capel groundwater area (Busselton-Capel sub-area) proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). There are three aquifers: Level 1 Perth - Superficial Swan, Level 2 Perth - Leederville and Level 3 Perth - Yarragadee South (DWER 2021).

Regional groundwater flow is east to west however local groundwater levels are influenced by the drain along the eastern property boundary, with local superficial groundwater flow west to east towards the drain (JDA 2020).


Maximum groundwater levels obtained through groundwater monitoring and modelling (JDA 2020) are shown in Figure 6. Post-extraction landform has been designed to remain at least 1 m above the maximum groundwater levels. As the pre-extraction landform is approximately 1 m - 6 m above the maximum groundwater levels, the post-extraction growing conditions in terms of depth to groundwater will be significantly different in some parts of the extraction area and potentially not suited to some of the flora species currently present. It is noted that the maximum groundwater levels modelled are only expected to be present for short periods of time during years of significant winter rainfall, with levels typically peaking in spring. For most of the time, the soil conditions will be drier.



Legend

-  Property boundary
-  Revegetation Area
-  Deep drain
- Wetlands**
-  Palusplain - Multiple Use
-  Sumpland - Multiple Use
- Soil Landscape Systems and Phases**
-  213PjW_SWAMP
-  213Pj_B1
-  213Pj_B1a
-  213Pj_P7
-  213Pj_P7a

Scale: 1:4000
 Original Size: A4
 Air Photo Date: March 2018
 Grid: Australia MGA94 (50)

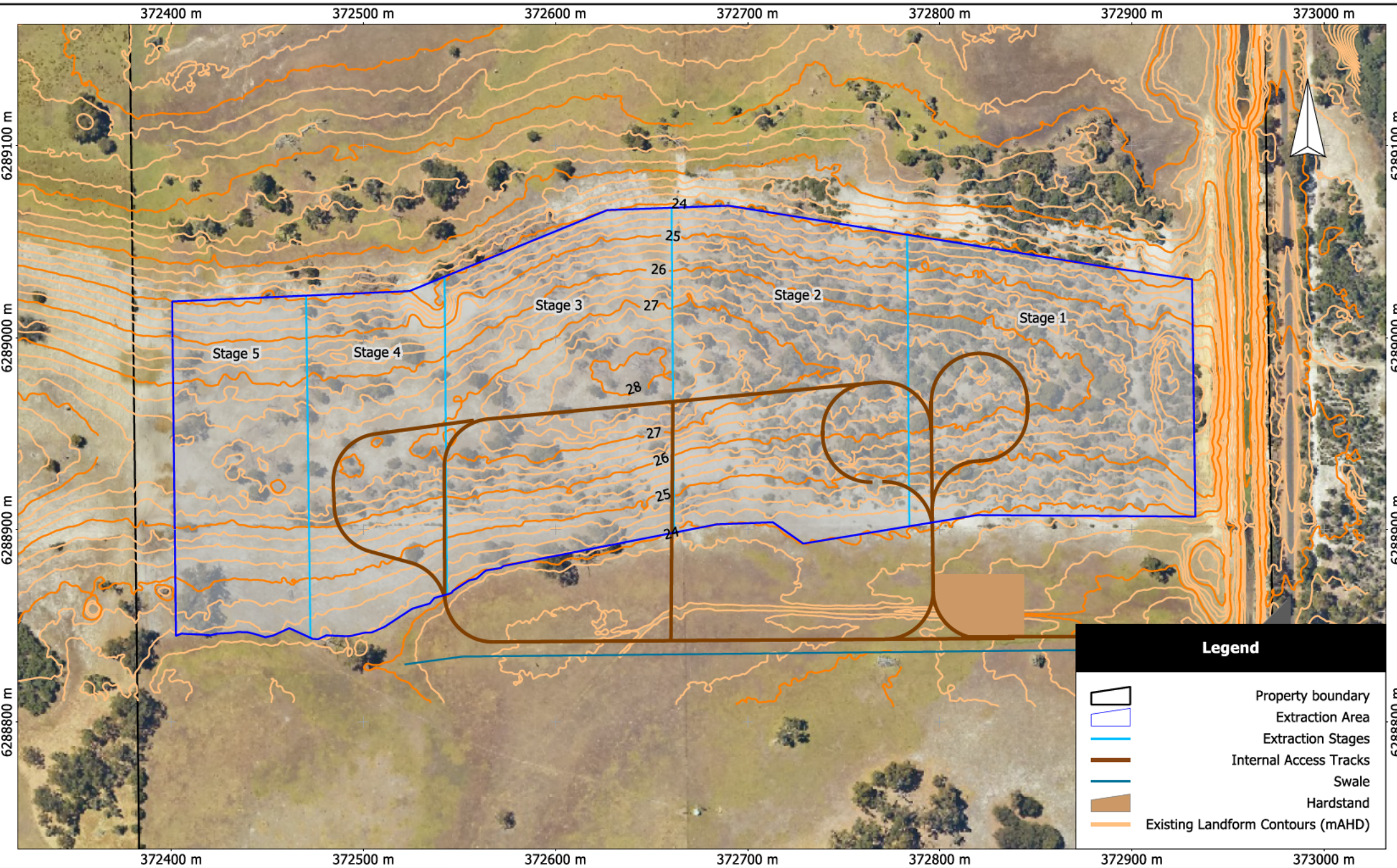


Cowara Contractors Pty Ltd
 Lot 230 Elgin Road, Elgin

Figure 5
Soil Landscape and Wetlands

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Legend

- Property boundary
- Extraction Area
- Extraction Stages
- Internal Access Tracks
- Swale
- Hardstand
- Existing Landform Contours (mMAD)

Scale: 1:2500
 Original Size: A4
 Air Photo Date: March 2018
 Grid: MGA94(50)

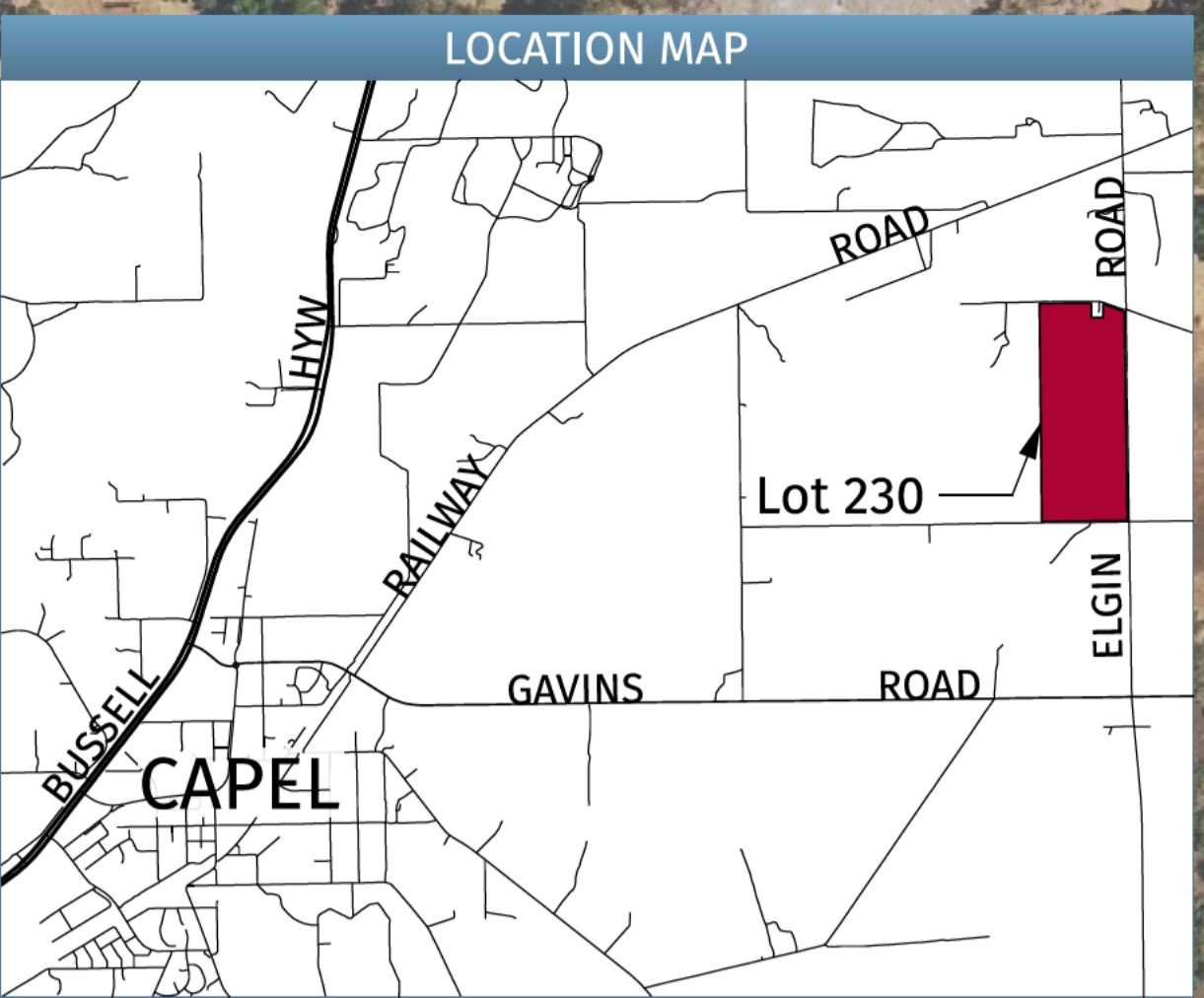
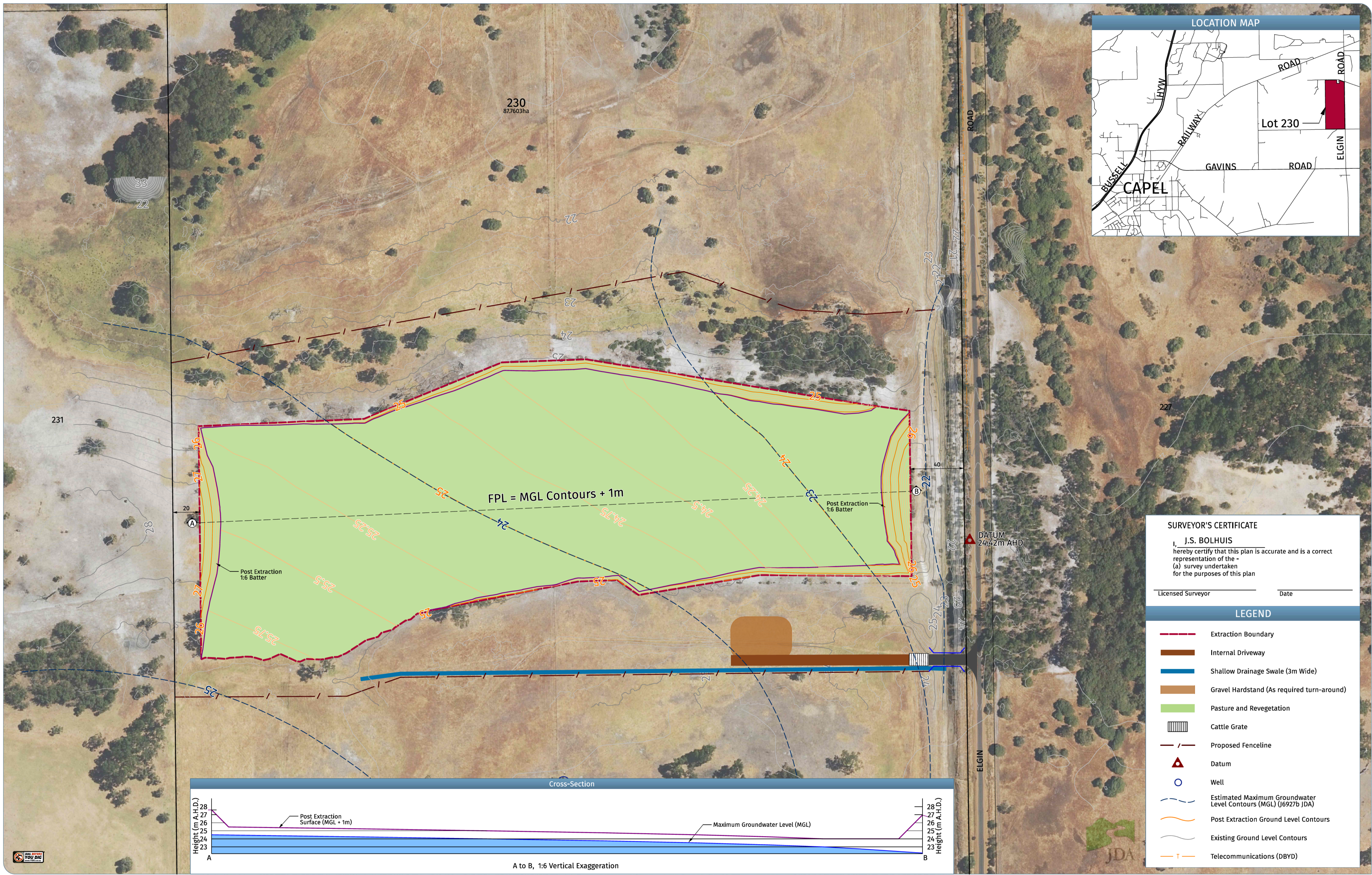
0 100 m

Cowara Contractors Pty Ltd
 Lot 230 Elgin Road, Elgin
 Revegetation Plan

Figure 5
Extraction Project Layout

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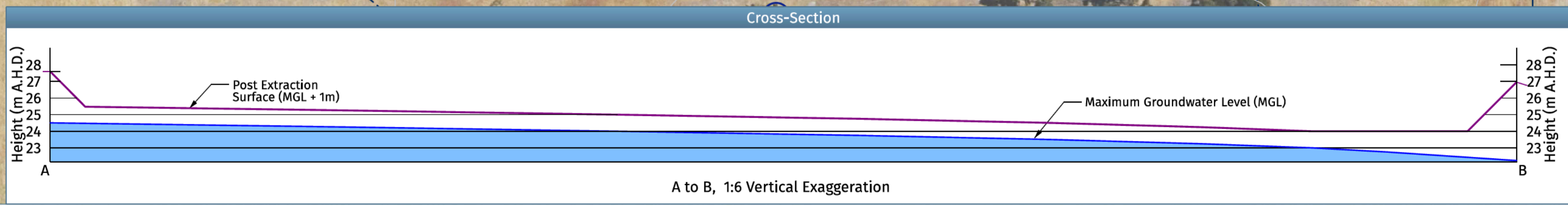
SURVEYOR'S CERTIFICATE

I, **J.S. BOLHUIS**
 hereby certify that this plan is accurate and is a correct
 representation of the -
 (a) survey undertaken
 for the purposes of this plan

Licensed Surveyor _____ Date _____

LEGEND

- Extraction Boundary
- Internal Driveway
- Shallow Drainage Swale (3m Wide)
- Gravel Hardstand (As required turn-around)
- Pasture and Revegetation
- Cattle Grate
- Proposed Fenceline
- Datum
- Well
- Estimated Maximum Groundwater Level Contours (MGL) (I6927b JDA)
- Post Extraction Ground Level Contours
- Existing Ground Level Contours
- Telecommunications (DBYD)



POST EXTRACTION CONTOUR PLAN

Lot 230 (No. 550) Elgin Road,
 ELGIN

Plan No. | 22061-03
 Date | 15/09/21
 Drawn | NP
 Checked | BdR
 Revision | E
 Scale | 1:1250 @ A1

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2.7 VEGETATION AND FLORA

2.7.1 Regional Data

The clearing application area is mapped as Bassendean vegetation system association (Bassendean_1000) (DPIRD-006), which is broadly described as a mosaic of Medium forest; jarrah-marri / Low woodland; banksia / Low forest; and Melaleuca species (DPIRD-006, Government of Western Australia 2020).

The clearing application area is also mapped as Southern River Complex (DBCA-046) described as Open woodland of *Corymbia calophylla* (Marri) – *Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca raphiophylla* (Swamp Paperbark) along creek beds (Government of Western Australia 2020).

2.7.2 Site Surveys

Site inspections by MBS Environmental in May-June 2020 (Appendix 1) indicated that:

- The majority of the vegetation proposed to be cleared comprises open woodland of *Eucalyptus marginata*, *Banksia attenuata*, *Banksia ilicifolia*, *Xylomelum occidentale* and *Nuytsia floribunda* over patches of *Kunzea glabrescens* over bare ground and weeds.
- In the lower lying areas along the edge of the extraction area, there are isolated *Corymbia calophylla* and *Agonis flexuosa* over pasture.

Outside the proposed clearing and extraction areas, there are *Corymbia calophylla*, *Agonis flexuosa* and *Melaleuca preissiana* over pasture.

The condition of the vegetation within the clearing area is Completely Degraded (using condition scale by Keighery, 1994). The project envelope shows signs of multiple historical disturbances including selective logging, clearing for pasture, draining, grazing and fire. Native understorey has been lost and replaced by introduced weed species, and upper storey density is low. Much of the Jarrah-Banksia woodland that remains is either dead or in poor health, likely due to dieback but also potentially due to water stress as the deep drain would have resulted in reduction in groundwater levels.

Due to the Completely Degraded condition of the vegetation within the clearing area, it is no longer considered representative of the original vegetation association or complex of the area. Due to the condition, the vegetation is also not representative of any state or federally listed Threatened or Priority Ecological Community (TEC or PEC) with potential to occur in the local area (e.g. Banksia Woodlands of the Swan Coastal Plain TEC or PEC).

A targeted significant flora survey was undertaken by MBS Environmental with site inspections on 23 September and 21 October 2020. No Threatened or Priority flora species were recorded (MBS Environmental 2021).

2.7.3 Weeds

The understorey has been replaced by introduced species, being dominated by various pasture grasses with other common weeds including *Arctotheca calendula* and *Ursinia anthemoides*. None of the introduced species observed on site (MBS Environmental 2020, 2021) are listed as a declared pest under the *Biosecurity and Agricultural Management Act 2007* or as a weed of national significance (WoNS).

2.7.4 Disease

The occurrence of dieback (*Phytophthora cinnamomi*) is suspected in the clearing area due to gradual deaths of susceptible species (e.g. *Banksia* spp. and Jarrah). Much of the project envelope is completely cleared and the

occurrence of dieback in these cleared areas cannot be ruled out. Thus the entire project area is considered as potentially dieback infested. No evidence of other disease has been recorded.

The proposed sand operations are unlikely to substantially increase the risk of dieback spread as vehicles and machinery will be required to arrive to site clean and remain within the project area, and drainage will be contained within the extraction area. Any seedlings will be sourced from Nursery Industry Accreditation Scheme Australia (NIASA) accredited nurseries.

2.8 FAUNA

The main fauna habitat type present within the proposed clearing area consists of an open woodland containing jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*), candlestick banksia (*Banksia attenuata*), holly-leaved banksia (*Banksia ilicifolia*), woody pear (*Xylomelum occidentale*), Christmas tree (*Nuytsia floribunda*) and peppermint (*Agonis flexuosa*) in various densities over small areas of spearwood (*Kunzea glabrescens*) on a low sandy hill (Harewood 2020).

The overall fauna habitat quality of the proposed clearing area is low due to its Completely Degraded condition and in particular the lack of native ground cover (Harewood 2020). The fauna assemblage present would therefore be depauperate, in particular in relation to ground dwelling reptile and mammal species. The remnant is also relatively isolated given that the majority of surrounding areas have been cleared and fragmented with poor connectivity. Also, the deep drain running along the eastern property boundary, restricts connectivity.

The following significant fauna species were recorded within the proposed clearing area (Harewood 2020):

- Western Ringtail Possum (*Pseudocheirus occidentalis* - Critically Endangered under the BC Act and EPBC Act)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso* - Vulnerable under the BC Act and EPBC Act)

The survey (Harewood 2020) also indicated that the area provides potential habitat for Baudin's Black Cockatoo (*Calyptorhynchus baudinii* - Endangered under the BC Act and EPBC Act) and Carnaby's Black Cockatoo (*Calyptorhynchus latirostris* - Endangered under the BC Act and EPBC Act).

The fauna survey (Harewood 2020) identified 47 suitable DBH trees (DBH>50 cm), of which 37 are within the proposed clearing area. No tree appeared to contain hollows possibly large enough for Black Cockatoos to use for nesting. None of the hollows observed in the fauna survey showed conclusive signs of use by any fauna.

Evidence of Black Cockatoo foraging was observed in the form of chewed marri fruits (Harewood 2020). This evidence was attributed to the Forest Red-tailed Black Cockatoo based on the nature of the debris (i.e. bite marks). Much of the remnant native vegetation within the survey area can be regarded as foraging habitat for Black Cockatoos given the presence of jarrah, marri and banksia in various concentrations.

No existing roosting trees were positively identified during the survey (Harewood 2020).

Based on available vegetation mapping it is estimated that there is approximately 19,000 ha of native vegetation within 12 km the survey area, much of which is very likely to represent potential Black Cockatoo breeding, foraging and roosting habitat (Harewood 2020). The proposed clearing would remove only 0.03% of this vegetation and there are several patches in better condition than that proposed to be cleared.

WRP dreys and scats were located within the survey area during the daytime inspection (Harewood 2020). One of the dreys is proposed to be cleared. A total of three WRPs were observed during the nocturnal survey of the site. No evidence of the WRP was observed in the western part of the project envelope that has a lower density of trees.

Some of the WRP habitat surveyed by Harewood (2020), immediately to the northwest of the clearing area will be retained. This patch includes two of the three WRP dreys recorded on site. Outside the fauna survey area, Lot 230 will also retain remnant native vegetation with some potential value to WRP (e.g. Marri and Peppermint trees). A larger area of remnant native vegetation is located on the adjacent property on the eastern side and may provide further habitat for WRP.

It is noted that Lot 230 falls outside the important habitat areas of WRP (core habitat, primary corridors, supporting habitat) identified in the federal significant impact guideline for the species (Commonwealth of Australia 2009). The proposed clearing area has been mapped as having 'medium' habitat suitability for the western ringtail possum (DBCA-049; Government of Western Australia 2020).

2.9 POTENTIAL THREATS

As the proposed operations involve sand extraction prior to revegetation, the potential threats to revegetation include a combination of current disturbances and potential future threats as follows:

- **Change in depth to groundwater:** Most of the revegetation area will be closer to groundwater post-extraction than currently. To achieve successful revegetation, the revegetation species are required to be suited to the post-extraction conditions whilst also providing habitat for the target fauna species.
- **Erosion:** Clearing of vegetation, removal of topsoil and extraction of sand have potential to increase the risk of erosion. To achieve successful revegetation, measures to control, monitor and mitigate erosion are needed.
- **Weeds:** Uncontrolled weeds have potential to outcompete the native revegetation. To achieve successful revegetation, measures to control, monitor and mitigate weeds are needed.
- **Dieback:** The site is considered likely to be dieback infested and revegetation with dieback susceptible flora species would likely fail (due to increased mortality of susceptible species) and would not deliver the necessary habitat outcomes for the target fauna species in the long term. To achieve successful revegetation, preference should be given to dieback resistant species.
- **Grazing:** The property is currently used for cattle grazing and this is expected to continue. Further, the area is known to support kangaroos and is likely to support rabbits. Grazing on revegetation (young plants in particular) has potential to result in failure to meet completion criteria. To achieve successful revegetation, measures to control, monitor and mitigate grazing are needed.
- **Unauthorised access:** There are currently no signs of unauthorised access, damage or disturbance (e.g. motorbike tracks or rubbish dumping) within the revegetation area. However, to achieve successful revegetation, measures to control unauthorised access are necessary.
- **Fire:** Fire presents a threat to all native vegetation in the local landscape and measures to reduce fire risk are necessary.

The above threats have been taken into consideration in the revegetation planning as described later in this document.

3. SAND EXTRACTION OPERATIONS

3.1 SITE LAYOUT

Sand extraction will be carried out in five stages from east to west. The general layout of the site and the proposed staging is provided in Figure 5.

3.2 VEGETATION CLEARING

Vegetation clearing will be undertaken in stages (extraction stages) via mechanical removal using a bulldozer or similar. Some of the native vegetation will be mulched and stockpiled in maximum 2 m high windrows for later use in rehabilitation. Some logs and larger branches of native trees will also be stockpiled for later use in rehabilitation to provide microhabitat.

3.3 TOPSOIL REMOVAL

Topsoil will be removed to a depth of approximately 100 mm and stockpiled in maximum 2 m high windrows for later use in rehabilitation. Topsoil will be removed in stages following vegetation clearing once the stage is ready for extraction. The site is considered uniform in terms vegetation type and the risk of weed seed and dieback, and therefore it is not necessary to stockpile topsoil separately from any area.

3.4 EXTRACTION OF SAND

Sand will be extracted and stockpiled near the haul road for easy loading of trucks by the loader. All sand extraction machinery will be connected to the site survey and pit design specifications through a machine control system to ensure no extraction occurs below the +1.0m maximum groundwater level. The machine control model will eliminate chance of over extraction onsite.

Final batter slopes will have a maximum slope of 1:6 vertical : horizontal. Figure 6 shows an indicative final landform for the site.

3.5 PROJECT DURATION

For the purposes of this Revegetation Plan the sand extraction is expected to be completed within five years, with approximately one stage extracted per year. However, this is subject to market demand for the sand. There are several large construction projects in the region either underway or planned to occur in near future and therefore the extraction of sand from this site could occur relatively quickly. Quicker rates of extraction would result in earlier revegetation and quicker delivery of ecological benefit to the target fauna species.

4. REVEGETATION COMMITMENTS

4.1 VISION

The overall aim of revegetation is to:

- Establish 6.69 ha of self-sustaining native vegetation that will provide suitable habitat for Western Ringtail Possum and the three Black Cockatoo species.

4.2 OBJECTIVES

The key objectives of the revegetation are following:

- The landform and soils are safe and stable.
- The vegetation is self-sustaining and comprises locally occurring native species.
- The vegetation will provide habitat for the WRP and Black Cockatoos.

5. REVEGETATION REFERENCE SITES

Due to the Completely Degraded condition of the vegetation within the clearing area, the vegetation is no longer considered representative of the original vegetation association or complex of the area. Due to the condition, the vegetation is also not representative of any state or federally listed Threatened or Priority Ecological Community. Further, a targeted significant flora survey of the clearing area, found no Threatened or Priority flora species (MBS Environmental 2021).

DWER has advised that the proposed clearing (assuming no onsite revegetation) will result in a significant residual impact to native vegetation that provides habitat for the three Black Cockatoo species and WRP, within an area that has been extensively cleared. No significant residual impact was identified on any particular vegetation type and this reflects the degraded nature of the clearing area.

In order to mitigate and offset the significant residual impact of the proposed clearing, this revegetation plan aims to establish self-sustaining native vegetation of locally occurring flora species that will provide suitable habitat for the WRP and Black Cockatoos ('target fauna species').

Naturally occurring vegetation communities were initially considered as potential reference sites for the revegetation. However, as the revegetation area will be subject to sand extraction prior to revegetation, the post-extraction landform and soil profile to be revegetated do not occur naturally. As a result, no naturally occurring vegetation community is directly relevant as a reference site to the revegetation.

Based on the above, it was determined that rather than trying to recreate a particular reference site(s) that would not be directly relevant to the revegetation site, a better outcome for the target fauna species could be achieved through a site-specific approach, using on-site conditions and the understanding of the habitat preferences of the target fauna species to guide the revegetation design.

The site is also considered likely to be dieback infested and therefore it is not in the long-term interest of the target fauna species to try and re-establish a vegetation community dominated by dieback susceptible species.

Overall, as a result of the above, the species selection has not been based on a particular reference site but rather been guided by the following requirements:

- The species are suited to sandy soils.
- The species are suited to the post-extraction depth to groundwater (maximum groundwater level >1m from post extraction ground surface).
- The majority of the species are dieback resistant.
- The species provide habitat for the target fauna species or support the establishment of a self-sustaining vegetation community.
- The species are locally occurring native species with known records within 10 km of the site.

Planting/seeding rates and targets for stem density and vegetation structure have been guided by following:

- Density sufficient to provide canopy connectivity for WRP.
- Density sufficient to continue to outcompete weed species.
- Upper, middle and understorey vegetation layers are to be returned, however it is recognised that the upper storey vegetation is likely to provide the most significant habitat for the target fauna species and is therefore the most significant layer of vegetation to be returned.

Targets for weeds have been driven by following:

- The live cover of weeds is maintained low enough to not outcompete the establishment of native plants, while recognising that the site has a large weed seed store and the surrounding areas will remain covered in weeds.
- If any declared pest plants or weeds of national significance are found (so far none recorded), they are eradicated.

Targets for vegetation condition have been driven by following:

- In order for the vegetation to be self-sustaining, a Good or better condition rating (Keighery 1994) is likely necessary.

6. REVEGETATION PLAN

6.1 REVEGETATION AREA AND STAGES

The total revegetation area is 6.69 ha (Figure 7). The revegetation area has been divided into five stages in accordance with the similarly numbered extraction stages. Revegetation will progress from east to west as sand extraction is completed. The entire revegetation area will be placed under a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945*.

6.2 SITE PREPARATION

6.2.1 Landform Establishment

Following completion of extraction, the final landform contours will be established in accordance with the post-extraction plan for the site (Figure 6). Maximum final batter slopes will be 1:6 (vertical : horizontal) that will minimise the risk of erosion.

6.2.2 Ripping

Prior to topsoil return, the pit floor will be deep ripped to remove any compaction that may have occurred during the sand extraction operations. Other areas of potential compaction will also be ripped. Due to the sandy nature of the soils, the pit batter slopes are not expected to require deep ripping. The removal of compaction is necessary to maximise plant root and water penetration into the soil during revegetation.

Following return of topsoil and mulch, all areas will be shallow ripped along contour. This will create rip lines that will assist in stormwater retention and infiltration. Seedlings will be planted into these lines. The reason ripping is undertaken after spreading of topsoil and mulch is to avoid compacting and otherwise disturbing the rip lines while moving topsoil/mulch. Ripping will not occur in close vicinity to retained native trees to protect their root systems.

6.2.3 Returning Topsoil and Mulch

The stockpiled topsoil will be re-spread across the extraction area to 50-100 mm deep. A thin layer of the stockpiled mulch will also be added to assist in erosion control and moisture retention.

6.2.4 Returning Logs

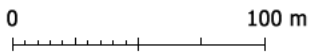
Logs and larger branches salvaged during clearing operations will be spread across the revegetation area.



Legend

- Property boundary
- Proposed Clearing Area (5.44 ha)
- Revegetation Area (6.69 ha)
- Revegetation Stage Labels
- Deep drain

Scale: 1:3000
 Original Size: A4
 Air Photo Date: March 2018
 Grid: Australia MGA94 (50)



Cowara Contractors Pty Ltd
 Lot 230 Elgin Road, Elgin

Figure 6
Revegetation Area and Stages

4 Cook St
 West Perth WA 6005
 Ph: (08) 9226 3166
 Fax: (08) 9226 3177
info@mbsenvironmental.com.au
www.mbsenvironmental.com.au



6.2.5 Fencing

Lot 230 is currently used for cattle grazing and also supports a population of kangaroos. Rabbits are also known to occur in the general area. The deep drain running along the eastern side of the property provides a source of water for wildlife for most of the year, increasing local grazing pressure. Grazing on revegetation, young plants in particular, would significantly increase plant mortality rates and typically result in a failure to meet nominated completion criteria within anticipated timeframes.

Therefore, fencing will be constructed around the revegetation area to serve two purposes:

- To permanently exclude domestic grazing animals (e.g. cattle, sheep, horses) from the revegetation areas.
- To temporarily exclude or greatly reduce access by wild grazing animals (kangaroos and rabbits) while the revegetation is young.

The fence is expected to be constructed from ring-lock material to a minimum height of 1.2 m and include a 600 mm high rabbit skirt, which also extends 300mm over the ground to prevent digging underneath. Depending on the observed grazing pressure, additional stringlines up to 1.8 m may be required to control kangaroos. To increase the visibility of the fence to kangaroos (and therefore to increase its effectiveness and minimise fence damage), white electric fence tape, white strand wire or something similar will be run along sections of the fence. The exact location of the fence will be determined as part of the sand extraction operations and it may cover an area larger than the revegetation area, at least during extraction operations. Fencing is considered to be a more cost-effective approach than tree guards against grazing by kangaroos and rabbits in this instance.

Should any rabbits be observed in the revegetation area once it has been fenced, an experienced and appropriately licenced pest control person will be engaged. Ultimately the revegetation area is designed to provide habitat and connectivity for native wildlife in the local landscape, including ground dwelling fauna and therefore rabbit skirt may be removed once revegetation is fully established.

6.2.6 Preliminary Weed Control

Broad-spectrum chemical weed control (e.g. glyphosate) will be undertaken in the revegetation area prior to planting of seedlings or seeding to reduce weed competition. Additional maintenance weed control will be undertaken as described later in Section 6.3.6.

6.2.7 Fire Control

Firebreaks will be maintained along the property boundaries of Lot 230 and around the revegetation area. The firebreaks will need to comply with Shire of Capel specifications. Internal tracks on Lot 230 will also be maintained to provide long-term access for fire fighting purposes in addition to the farm uses.

6.2.8 Dieback Control

As the site is considered potentially dieback infested, the main control measure will be the requirement for all vehicles to arrive and leave the site clean (tyres and undercarriage free of soil and plant matter) both during sand extraction and revegetation works. It will also be required that tubestock are sourced from a Nursery Industry Accreditation Scheme Australia (NIASA) accredited nursery (Section 6.3.2). NIASA accredited nurseries adopt best practice management and environmentally sound work practices, including consideration of dieback in their operations and the potential for spread in tubestock.

6.3 REVEGETATION METHODOLOGY

6.3.1 Revegetation Species

Table 1 provides an indicative list of species that will be used in active revegetation efforts (planting and/or seeding). This list has been developed in line with information in Section 5. This list is subject to change depending on availability of seed/seedlings and other suitable, locally occurring species may be added if they become available. It is noted that other locally occurring native species may be recruited naturally from the topsoil seedbank or may be brought in by fauna. All native, locally occurring species (known records within 10 km of the site) will count towards the completion criteria.

Out of the 32 species in Table 1, 4 are trees or large shrubs (>5m), 19 are shrubs and 9 are herbs and climbers. At least six species on the list are known to provide Black Cockatoo habitat (foraging/breeding/roosting) while at least seven species are known foraging species of WRP.

The proposed key canopy species for revegetation, *Corymbia calophylla* (Marri) and *Agonis flexuosa* (Peppermint), both currently occur on Lot 230 and on the surrounding properties. They are not present along the top of the sand hill that will be extracted, where the vegetation is dominated by Jarrah-Banksia, but rather emerge a bit lower in the landscape and extend across the lower parts of the dryland areas to the margins of the wetlands that are dominated by Melaleucas. The occurrence of Marri and Peppermint in the lower parts of the dryland areas and even into wetland areas has been commonly described on the Swan Coastal Plain (e.g. Keighery *et al.* 2006, Webb *et al.* 2009). Therefore it is considered that the species will be well suited for the post-extraction depth to groundwater and the site conditions more broadly.

Marri is a key Black Cockatoo habitat species providing high value foraging habitat as well as breeding and roosting habitat (Department of Parks and Wildlife 2013, Department of Environment and Conservation 2008). Peppermint is a key habitat species for WRP that also utilises Marri (Department of Parks and Wildlife 2017).

Table 1: Indicative Species List for Planting and/or Seeding

Scientific Name	Common Name	Life Form ¹	Dieback Status ²	Preferred Habitat ¹	Known Records ³		Target Fauna Habitat ⁴	
					Lot 230	Within 10 km	WRP	Black Cockatoos
<i>Acacia extensa</i>	Wiry Wattle	Shrub to 2 m	R	Often on sandy & sandy lateritic soils. Damp areas, along watercourses, near swamps.		x	x	
<i>Acacia pulchella</i>	Prickly Moses	Shrub to 3 m	R	Sandy soils, clay loam over laterite. Low-lying areas, swamps, near watercourses.	x	x	x	
<i>Acacia saligna</i>	Orange Wattle	Shrub to 6m	R	Variety of habitats	x	x	x	x
<i>Acacia wilddenowiana</i>	Grass Wattle	Shrub to 0.6 m	?	Sand, loam & lateritic soils. Often in winter-wet depressions.		x		
<i>Adenanthos meisneri</i>		Shrub to 1.5 m	S	White/grey or brown sand, gravel.		x		
<i>Agonis flexuosa</i>	Peppermint	Tree to 10 m	R	White or grey sand, sandy soils, laterite, limestone. Coastal sand dunes, granite outcrops, limestone areas.	x	x	x	x
<i>Anigozanthos manglesii</i>	Mangles Kangaroo Paw	Perennial herb to 1.1 m	R	White, yellow or grey sand, sandy loam.		x		
<i>Austrostipa</i> sp. (e.g. <i>A. compressa</i> , <i>A. flavescens</i> or <i>A. semibarbata</i>)	Speargrass	Perennial grass	R	Includes sandy soil.		x		
<i>Bossiaea eriocarpa</i>	Common Brown Pea	Shrub to 1 m	S	Usually on sandy soils		x		
<i>Calytrix flavescens</i>	Summer Starflower	Shrub to 0.8 m	R	White, grey or yellow sand, often over laterite, granite or sandstone. Undulating sandplains, gentle slopes, sometimes in swampy areas.		x		
<i>Conostylis aculeata</i>	Prickly Conostylis	Perennial herb to 0.5 m	R	Sand, loam, clay, gravel, limestone, laterite. Winter-wet areas, swamp margins, drainage areas, ditches, sand dunes.		x		
<i>Conostylis setigera</i>	Bristly Cottonhead	Perennial herb to 0.36 m	R	Sand, loam, gravel, laterite.		x		
<i>Corymbia calophylla</i>	Marri	Tree to 40 m	R	Red-brown clay loam, orange-brown sandy clay, gravel, grey sand over limestone, granite, laterite. Flats, hills, slopes, breakaways, wetlands, fringing salt marches, beside drainage lines.	x	x	x	x
<i>Dampiera linearis</i>	Common Dampiera	Perennial herb to 0.6 m	R	Sandy or clayey soils, laterite. Plains, stony ridges, seasonally wet flats		x		
<i>Daviesia divaricata</i>	Marno	Shrub to 3 m	?	White, grey or yellow sand over limestone, laterite. Sandplains, rocky outcrops, slopes, roadsides.		x		

Scientific Name	Common Name	Life Form ¹	Dieback Status ²	Preferred Habitat ¹	Known Records ³		Target Fauna Habitat ⁴	
					Lot 230	Within 10 km	WRP	Black Cockatoos
<i>Gompholobium tomentosum</i>	Hairy Yellow Pea	Shrub to 1 m	R	White, grey or yellow sand, sandy clay, lateritic sand. Coastal limestone & sand dunes, undulating plains.		x		
<i>Hakea prostrata</i>	Harsh Hakea	Shrub to 3 m	S	Sandy soils, often over laterite, loam, gravel. Hillslopes, granite outcrops, coastal dunes.		x		x
<i>Hakea varia</i>	Variable-leaved Hakea	Shrub to 4 m	?	White, grey or red loamy sand, clay loam, laterite. Seasonally-wet flats.		x		x
<i>Hardenbergia comptoniana</i>	Native Wisteria	Climber	R	Sandy soils. Coastal limestone, sandplains, dunes.		x	x	
<i>Hemiandra pungens</i>	Snakebush	Shrub to 1 m	R	Sand, clay and loam, gravel, laterite, granite. Rock outcrops.		x		
<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Shrub to 3 m	?	White/grey sand, loamy soils. Coastal dunes, swampy plains		x		
<i>Hibbertia racemosa</i>	Stalked Guinea Flower	Shrub to 0.75 m	R	Grey, white or yellow sand. Coastal areas: dunes, plains & limestone.		x		
<i>Hovea trisperma</i>	Common Hovea	Shrub to 0.7 m	R	Sandy soils, laterite, gravel, clay loam.		x		
<i>Hypocalymma angustifolium</i>	White Myrtle	Shrub to 1.5 m	R	Grey to white sand, peaty soils, sandy clay, sandstone. Flats, swamps, along watercourses, near permanent fresh-water springs, outcrops, hillsides.		x		
<i>Jacksonia furcellata</i>	Grey Stinkwood	Shrub to 4 m	S	Sandy soils. Sandplains, rises, swampy depressions, river banks.		x		x
<i>Kennedia prostrata</i>	Scarlet Runner	Prostrate	R	Usually sandy gravelly soils				
<i>Kunzea glabrescens</i>	Spearwood	Shrub to 4 m	?	Clay, sandy soils. Edges of swamps, lakes, rivers, moist depressions.	x	x	x	
<i>Lomandra</i> sp (e.g. <i>Lomandra nigricans</i> , <i>Lomandra preissii</i> , <i>Lomandra suaveolens</i>)	Mat Rush	Perennial herb to 0.7 m	R	Includes sand.		x		
<i>Melaleuca thymoides</i>		Shrub to 2 m	S	Sandy soils, often over laterite or granite. Winter-wet depressions, granite hills, sand dunes.		x		
<i>Patersonia occidentalis</i>	Purple Flag	Perennial herb to 1.5 m	S	Grey-brown sand or sandy clay, red-brown clayey loam, gravel, laterite, ironstone, granite, limestone. Winter-wet areas, dunes, granite outcrops.		x		
<i>Phyllanthus calycinus</i>	False Boronia	Shrub to 1.2 m	R	Often on sandy soils.		x		

Scientific Name	Common Name	Life Form ¹	Dieback Status ²	Preferred Habitat ¹	Known Records ³		Target Fauna Habitat ⁴	
					Lot 230	Within 10 km	WRP	Black Cockatoos
<i>Taxandria linearifolia</i>		Tree or shrub to 5 m	?	Loam, clay or sand, gravel, quartzite, laterite. Bordering swamps & watercourses.		x		

1 Source: *Western Australian Herbarium (1998-)*

2 Source: *Centre for Phytophthora Science & Management (2021)*

3 Sources: *MBS Environmental (2020, 2021), DBCA (2021, NatureMap search report provided as Appendix 2)*

4 Sources: *Department of Environment and Conservation (2008), Department of the Environment, Water, Heritage and the Arts (2009), Department of Parks and Wildlife (2017), Department of Parks and Wildlife (2013), Department of Sustainability, Environment, Water, Population and Communities (2012), Environmental Protection Authority (2019), Groom et al (2011), Shedley and Williams (2014), Threatened Species Scientific Committee (2013), Valentine and Stock (2008)*

6.3.2 Seedlings versus Seed

Revegetation will be undertaken through planting seedlings and/or seeding. The exact numbers of seedlings to be planted and amount of seed to be broadcast will depend on the availability of suitable species as seedlings and/or seed. Indicative seedling numbers and seeding rates are provided in the next two sections. Infill planting/seeding rates will be determined on the basis of revegetation monitoring against the set completion criteria.

6.3.3 Seedlings

Assuming revegetation will be primarily undertaken through planting seedlings and allowing for 40% seedling death rate, it is estimated that in order to achieve the set completion criteria (see Section 7), 6,000 stems per hectare will be planted comprising approximately 1,000 trees per ha, 3,000 shrubs per ha and 2,000 herbs/grasses/climbers per ha. Species that provide habitat for the target fauna species will be planted at a rate of 2:1 to other species of the same form. The number of seedlings to be planted each year will depend on the area available for revegetation that year. In total across the 6.69 ha revegetation area, approximately 36,000 seedlings are expected to be planted. If seeding is undertaken as well, the necessary planting rates will be lower.

Seedlings should be planted out using appropriate techniques after the onset of major seasonal rains, typically around June, to allow plants to become established over winter. Plants should be installed into the rip lines with a native plant fertiliser tablet, such as Typhoon or similar.

The majority of the seedlings will be planted as tubestock or deep cell stock. The planting of some larger (more mature) Marris and Peppermints will be considered depending on the feasibility of deep watering over the first summer.

Seedlings will typically need to be ordered by November at the latest the year before planting is to commence, and meet the following requirements aimed at maximising revegetation success:

- Sourced from a NIASA accredited nursery (e.g. Boyanup Botanicals, Leschenault Community Nursery and Geographe Community Landcare Nursery).
- Suited to the offset site growing conditions (local provenance).
- Plants are vigorous, established and hardened off.
- Plants have a good form consistent with species and variety.
- Plants are free from disease and pests.
- Plants have large healthy root systems with no evidence of having been restricted or damaged (e.g.: root bound).
- Any pruning, budding or grafting scars are clean and well calloused.
- Plants are able to support their own weight, i.e. stand without staking.
- Containers are free of weeds.
- Pot size preferably a forestry tube (50 mm x 50 mm x 120 mm tall) or a deep cell.

6.3.4 Seed

Seeding is expected to be undertaken as a complimentary revegetation method and will depend on the availability of suitable local provenance seed. Indicative seeding rate is up to 2 kg/ha. Species selection for seeding would be consistent with Section 6.3.1. Any seed collection would be undertaken by DBCA licensed collectors from approved areas and seed storage, treatments and broadcasting would be undertaken by an experienced contractor. Costs of seed collection, processing, and storage have not been included in the revegetation estimates provided.

6.3.5 Natural Regeneration

In addition to the plantings and/or seeding, natural recruitment of native plants is likely to occur from the soil seed stock or seed brought in by fauna. The scale of this type of natural regeneration is difficult to estimate at this stage but it will contribute towards achieving the completion criteria.

6.3.6 Weed Control

Weed control will be undertaken prior to planting (or direct seeding) as per Section 6.2.6, and thereafter at least annually as indicated by monitoring results for five years or until completion criteria have been met. The main purpose of weed control during the revegetation project is to reduce weed competition on juvenile native seedlings and minimise associated seedling mortality. Weed control will also aim to eradicate any Declared pest plants, weeds of national significance or DBCA priority weeds (none recorded so far).

Maintenance weed control may involve chemical and/or manual control depending on the weed species to be controlled. Control of any Declared pest plants, if any, will occur in accordance with guidance from Department of Primary Industries and Regional Development (DPIRD 2021a) and other relevant sources e.g. FloraBase (2021).

6.3.7 Watering

Watering of all stock is to occur on the day of planting prior to installation. Watering of planted seedlings can reduce the rate of seedling mortality over hot summer months, however deep watering individual plants (typically at rates of at least 2 L per plant per visit) would be required to avoid erosion and develop deep root systems, and this is not considered feasible due to the number of plants to be installed and the location of the project area. Infill planting is expected to be a more cost-effective method to achieve completion criteria for plant survival.

7. COMPLETION CRITERIA

To determine when revegetation objectives (defined in Section 4.2) have been met, it is necessary to formulate quantitative completion criteria and monitor those over time. As discussed in Section 5, no directly relevant natural reference sites exist and rather than recreating a particular natural vegetation community, the aim of revegetation is to establish habitat suitable for WRP and Black Cockatoos.

The completion criteria in Table 2 have been developed taking into considering information in Section 5 and the various constraints of the site (e.g. change in depth to groundwater, likely presence of dieback, high weed cover of the site and surrounds).

The completion criteria are expected to be achieved within five years of planting in each stage and then maintained for a period of two years. If any criteria are not achieved within this time frame, infill planting and other maintenance works will continue until monitoring indicates that the completion criteria have been achieved.

Table 2: Completion Criteria

Aspect	Completion Criteria*
Species richness (a)	For each target revegetation type, the revegetation needs to support the following species: <ul style="list-style-type: none"> • <i>Acacia saligna</i> • <i>Agonis flexuosa</i> • <i>Corymbia calophylla</i> • <i>Taxandria linearifolia</i>.
Species richness (b)	For each target revegetation type, the revegetation needs to support a minimum of 25 locally occurring native species.
Cover and density (a)	For each target revegetation type, the revegetation needs to support a minimum of 600 stems/ha of the following overstorey species combined: <ul style="list-style-type: none"> • <i>Acacia saligna</i> • <i>Agonis flexuosa</i> • <i>Corymbia calophylla</i> • <i>Taxandria linearifolia</i>.
Cover and density (b)	For each target revegetation type, the revegetation needs to achieve a minimum density of: <ul style="list-style-type: none"> • 1,800 native shrubs /ha • 1,200 native herbs/grasses/climbers/ha.
Black cockatoos foraging species cover and density	For each target revegetation type, the revegetation needs to support a minimum of 1,500 stems/ha of the following species combined: <ul style="list-style-type: none"> • <i>Acacia saligna</i> • <i>Agonis flexuosa</i> • <i>Corymbia calophylla</i> • <i>Hakea prostrata</i> • <i>Hakea varia</i> • <i>Jacksonia furcellata</i>.
Weeds (a)	The offset site should have a maximum of 20 per cent weed cover.
Weeds (b)	The offset site does not contain any declared pest plants, weeds of national significance or DBCA priority alert weeds.
Bare ground	The offset site has no bare patches of ground more than 30 m ² in size.

Aspect	Completion Criteria*
Gates and boundary fence	Gates and boundary fence to be in good condition with no obvious damage that will enable the entry of pest animals into the revegetation area.

* These are in accordance with the completion criteria in the draft clearing permit conditions provided by DWER.

8. MONITORING

The purpose of monitoring is to track the progress of revegetation against the completion criteria and assist in determining what infill planting and/or other maintenance is needed.

Formal revegetation monitoring will occur at least once per year in spring until the completion criteria have been met and maintained for two years. This monitoring will be undertaken by an environmental specialist as defined in the clearing permit (CPS 8958/1). Additional informal monitoring will be undertaken by the sand extraction project operators and landowners to identify and respond to any maintenance needs as quickly as possible and maximise progress towards completion criteria. Informal monitoring may also be undertaken to check for post-summer survival rates of seedlings in autumn, ahead of the next planting season.

Each round of formal revegetation monitoring will include following:

- Photographs taken at 10 permanent photo monitoring points set up evenly across the revegetation area to enable visual tracking of progress over time.
- Data collected at 12 permanent and 12 random 10 m x 10 m quadrats set up across the revegetation areas (approximately 1 permanent and 1 random per ha). Data collection in each quadrat will include:
 - Number of native plants present (planted, seeded, or naturally recruited).
 - Species of native plants (planted, seeded, or naturally recruited).
 - Maximum height for each native species.
 - Native vegetation structure.
 - Native vegetation % foliage cover.
 - Black cockatoo foraging species % foliage cover.
 - Species of weeds.
 - Estimated live % foliage cover of weeds.
 - Vegetation condition (Keighery 1994).
 - Signs of grazing, disease, pests, lack of moisture, erosion or other landform instability, or other factor potentially adversely impacting on revegetation.
 - Location coordinates and photograph.
- Boundary fence inspected to determine need for maintenance.
- Opportunistic traverses undertaken across the revegetation area when moving between monitoring locations. During these traverses, notes will be made of following:
 - Species of native plants (to obtain a record of species potentially not present in quadrats).
 - Species of weeds (particularly any significant weed species to be eradicated).
 - Signs and location of any grazing, disease, pests, lack of moisture, erosion or other landform instability, or other factor potentially adversely impacting on revegetation.
 - Location of any bare patches larger than 30m².

As revegetation activities can be of varying success across the site, a review of aerial imagery showing change in vegetative coverage over time will be used to provide a broader measure of progress across the site.

9. CONTINGENCY MEASURES

Monitoring results will be assessed against the completion criteria and contingency measures will be implemented if any completion criteria are not met. These contingency measures include but are not limited to following:

- Infill planting/seeding.
- Weed and/or pest control.
- Fence maintenance.
- Erosion control.

Further, in case of higher than expected seedling mortality rates or lower than expected seed germination rates, an assessment will be undertaken to determine potential causes and solutions. The indicative species list for planting and seeding purposes may also be amended if this is considered likely to improve outcomes for the target fauna species.

10. REVEGETATION SCHEDULE

Revegetation activities will be gradual and will commence at the conclusion of sand extraction within each stage. For the purposes of this Revegetation Plan (and the Development Approval), it is assumed that sand extraction will proceed one stage at a time from east to west, approximately one stage per year (Table 3), however this timeline will be subject to market demand for sand. In the current market, the extraction could proceed considerably faster. The site preparation works and the initial round of planting/seeding are typically expected to be completed within 12 months of extraction being completed for that stage.

The initial works that involve preparing the final landform ahead of planting activities can be completed at any time of year, however plantings can only occur in late autumn - early winter (following onset of substantial seasonal rainfall). There will be one main round of plantings for each stage, followed by infill plantings (and other maintenance works) during subsequent years, if necessary, in order to meet the completion criteria. Formal monitoring will occur at least once per year in spring until the completion criteria have been met and maintained for two years. Completion criteria for each stage are expected to be achieved within five years of the initial plantings, however if this is not the case, infill plantings and/or other maintenance works will continue until the completion criteria are met. An indicative schedule of revegetation activities each year is provided in Table 4.

Table 3: Works Schedule (Subject to Market Demand)

Stage	Sand Extraction	Initial Planting	Monitor and Maintain				
			2024	2025	2026	2027	2028*
Stage 1	2022	2023	2024	2025	2026	2027	2028*
Stage 2	2023	2024	2025	2026	2027	2028	2029*
Stage 3	2024	2025	2026	2027	2028	2029	2030*
Stage 4	2025	2026	2027	2028	2029	2030	2031*
Stage 5	2026	2027	2028	2029	2030	2031	2032*

* If necessary, continue with monitoring and maintenance until completion criteria met.

Table 4: Indicative Annual Revegetation Schedule

Activity	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Order seedlings										x	x	x
Establish final landform and undertake deep ripping of pit floor.	x	x	x	x	x	x	x	x	x	x	x	x
Return topsoil and mulch and undertake shallow ripping. Return logs and branches.		x	x	x								
Undertake pre-planting weed control (if required)	x				x	x						
Install seedlings					x	x	x					
Formal spring monitoring (until completion criteria met and maintained for two years)										x	x	
Informal autumn monitoring to check for survival rates (on a needs basis)			x	x								
Maintenance weed control (if required)	x					x	x					x
Revegetation reporting	As per clearing permit conditions											

11. INDICATIVE COSTS

The revegetation costs will be funded by the sand extraction project (paid for by the landowner / proponent). An indicative cost schedule for the revegetation works described in this plan is provided in Table 5. It is noted that:

- Prices are indicative only and based on available information as at October 2021. No consideration has been given to any cost increases over time.
- Plant numbers and installation costs do not include any additional requirements associated with infill planting.
- Seeding costs have not been included but these would effectively come out of the seedling costs as less seedlings would be required if seeding is undertaken.
- Costings will be dependent on the contractor engaged to carry out the works along with timing.
- Costs assume completion criteria are achieved within five years.
- Annual costs will reduce once the project progresses into the post-planting monitoring phase.

Table 5: Indicative Revegetation Costings

Activity	Cost (excl. GST)	Unit	Notes
Fencing and gates	\$40,000-\$80,000	Total	To exclude stock, kangaroos and rabbits
Site preparation (landform, ripping, topsoil and mulch)	N/A	N/A	To be undertaken internally
Weed control	\$2,000-\$10,000	Per year	Depends on area to be treated and scale of weed infestation
Supply and installation of seedlings with a fertiliser tablet	\$126,000	Total	For total of 36,000 seedlings over 2-5 years, at an average cost of \$3.50 each
Monitoring	\$1,500-\$5,000	Year	Depends on size of monitoring area and number of monitoring runs (up to two)
Reporting	\$3,000-\$5,000	Year	One report per year

12. ANNUAL REPORTING

An annual report will be prepared providing details of following:

- Revegetation activities carried out.
- Monitoring results, including progress towards completion criteria.
- Any contingency measures to be undertaken (e.g. infill planting).
- Any other reporting requirements specified in the issued clearing permit.

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APPENDICES

APPENDIX 1: SITE INSPECTION REPORT

MEMORANDUM

Attention:	H.O. Yelverton	From:	Kirsi Kauhanen
Company:	Cowara Contractors Pty Ltd	Date:	23 June 2020
Subject:	Environmental Site Inspections	Project:	Lot 230 Elgin Road, Elgin

1. INTRODUCTION

Cowara Contractors Pty Ltd (Cowara) is proposing to extract sand on Lot 230 (on Plan 232802) Elgin Road in Elgin, approximately 20 km south of Bunbury (Figure 1). The project envelope contains remnant native vegetation. MBS Environmental was engaged to undertake a site inspection to describe the existing vegetation and other key environmental features and identify the need for further surveys. The findings of the site inspections will be used to inform project approval applications.

2. METHODS

Senior Environmental Scientist Kirsi Kauhanen visited the project envelope on 11 May 2020 and 17 June 2020. As the site was too degraded a Reconnaissance Flora Survey was not undertaken, but the vegetation was described by traversing the area on foot.

3. RESULTS

The project envelope is located on a low, east-west aligned, sandy hill that is surrounded by lower lying cleared pasture (Figure 2). Lot 230 and the surrounding properties are currently used for cattle grazing. Along the eastern property boundary the sand hill is cut by a deep (2-4 m from ground surface), north-south aligned open drain that connects to Gynudup Brook approximately 1.7 km north-east from the project site.

The majority of the vegetation within the project envelope comprised open woodland of *Eucalyptus marginata*, *Banksia attenuata*, *Banksia illicifolia*, *Xylomelum occidentale* and *Nuytsia floribunda* over patches of *Kunzea glabrescens* over bare ground and weeds (Figure 2, Plate 1, Plate 2). In the lower lying areas in the southern part, there were isolated *Corymbia calophylla* and *Agonis flexuosa* over pasture (Plate 3). The proposed drain crossing area contained regrowth *Kunzea* spp., *Acacia saligna*, *Melaleuca* spp. and *Astartea* sp. over weeds (Plate 4). Vegetation in the road reserve was outside the scope of the inspection. There was a small area of *Melaleuca preissiana* with emergent *Corymbia calophylla* over *Kunzea glabrescens* immediately to the north-northeast of the project envelope, outside the currently proposed project area.

The condition of the vegetation within the project envelope was Completely Degraded; no longer intact, completely/almost completely without native species (following scale by Keighery, 1994). The project envelope showed signs of multiple historical disturbances including selective logging, clearing for pasture, draining, grazing and fire. Native understorey had been lost and replaced by introduced weed species, and upper storey density was low. Much of the native vegetation that remained was either dead or in poor health, likely due to dieback but also potentially due to water stress as the deep drain would have resulted in reduction in groundwater levels. The occurrence of dieback (*Phytophthora cinnamomi*) was suspected due to gradual deaths of susceptible species (e.g. *Banksia* spp. and Jarrah).

Due to the Completely Degraded condition of the vegetation within the project envelope, it was not considered representative of the original vegetation community of the area. As such, the vegetation would not be representative of any state or federally listed Threatened or Priority Ecological Communities (TEC or PEC) with the potential to occur in the area (e.g. Banksia Woodlands of the Swan Coastal Plain TEC and PEC).

A list of flora species recorded in the project envelope during the site inspections is provided in Table 1. No significant flora species listed under the *Biodiversity Conservation Act 2016*, *Environment Protection and Biodiversity Conservation Act 1999* or Department of Biodiversity, Conservation and Attractions Priority list were recorded. Considering the degraded nature of the site and the lack of native understorey, the occurrence of any significant flora was considered low. None of the introduced species recorded are listed as declared pests under the *Biosecurity and Agricultural Management Act 2007* or as a weed of national significance.

The remnant native vegetation was considered to have potential to provide suitable habitat for threatened black cockatoo species (Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*) and western ringtail possum (*Pseudocheirus occidentalis*) that are protected under both state and federal legislation. A separate targeted survey for these species has subsequently been undertaken. Due to the lack of native understorey and poor canopy connectivity, the fauna habitat values of the site were generally considered poor and fauna diversity was expected to be low. Due to the mostly cleared nature of the surrounds and the deep drain on the eastern side, the habitat within project envelope has limited connectivity.

The areas surrounding the sandhill have been mapped as a multiple-use palusplain wetland (ID 15809; totalling over 42,000 ha in size) and a smaller multiple-use sumpland (ID 1309; 7.47 ha). Both wetlands have been mostly cleared of native vegetation in the vicinity of the proposed clearing area and are used for grazing, in line with their rural zoning. No wetland-type vegetation was recorded within the proposed clearing area. The hydrology of the area has been significantly modified by the deep drain along the eastern side of the property that continues to maintain lower than natural surface and ground water levels in the area and the natural functioning of any wetlands has long ceased.

There were no signs of substantial erosion or other land degradation within the project envelope. The banks of the drain showed signs of gradual erosion in some parts as would be expected from a historically cleared agricultural area currently used for grazing cattle.


4. DISCUSSION AND CONCLUSIONS

Overall, the site inspections found that the project envelope supports low biodiversity and has been significantly degraded over time by a range of disturbances. The remaining native vegetation is Completely Degraded and as such is no longer representative of the original vegetation community. The main remaining environmental value of the site is as potential fauna habitat for threatened black cockatoos and western ringtail possum which will be investigated further.

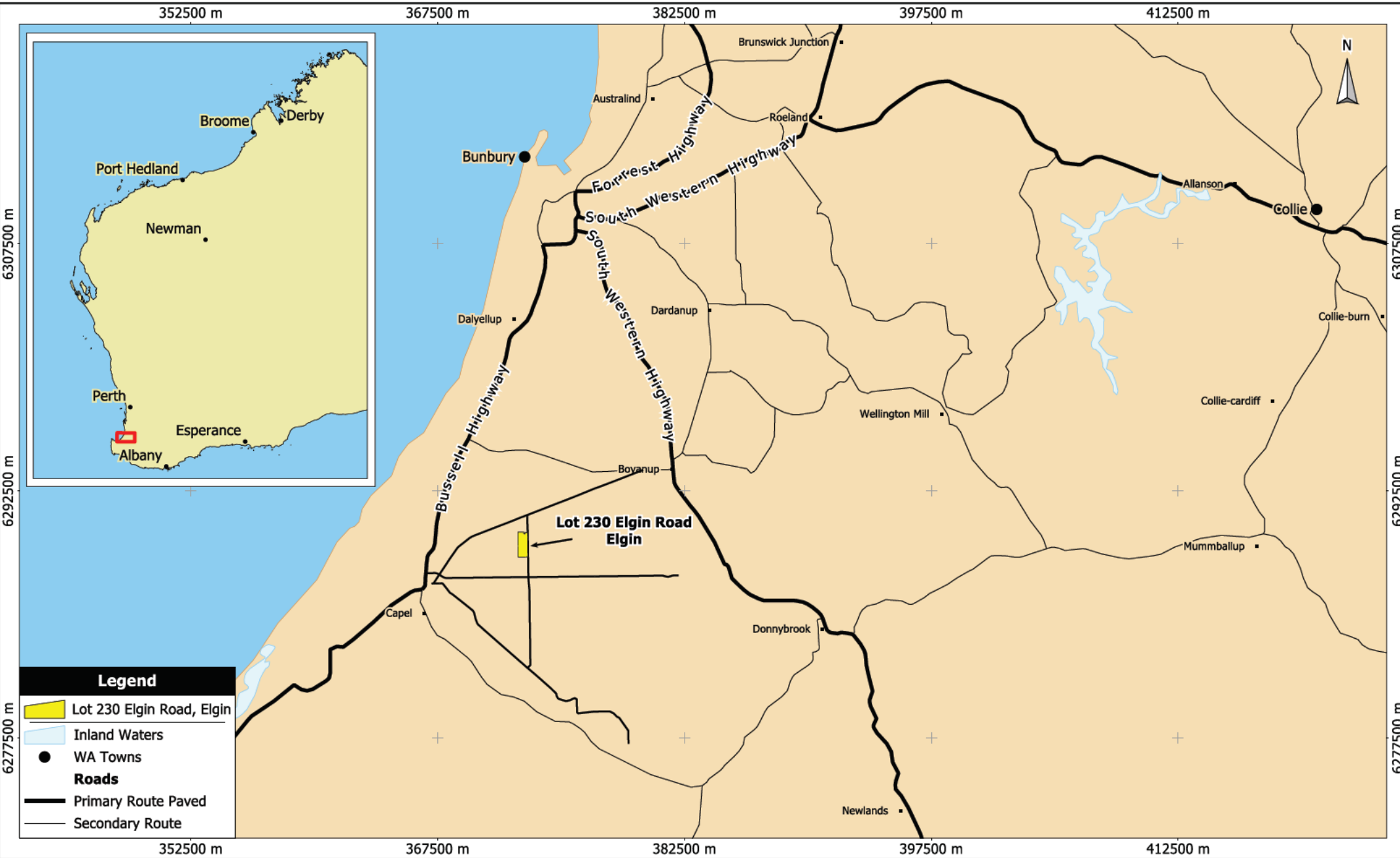
The site inspections were undertaken in late autumn – early winter that is not an optimal period for observing flora in the southwest. However, considering the vegetation condition was found to be Completely Degraded and there was a lack of native understorey, formal flora survey work during spring is not warranted.

As the remnant vegetation appears dieback infected and the occurrence of dieback cannot be ruled out in the cleared areas, the entire project area should be managed as potentially dieback infected.

Yours sincerely
MBS Environmental



Kirsi Kauhanen
Senior Environmental Scientist



Scale: 1:300000
 Original Size: A4
 Grid: MGA94(50)

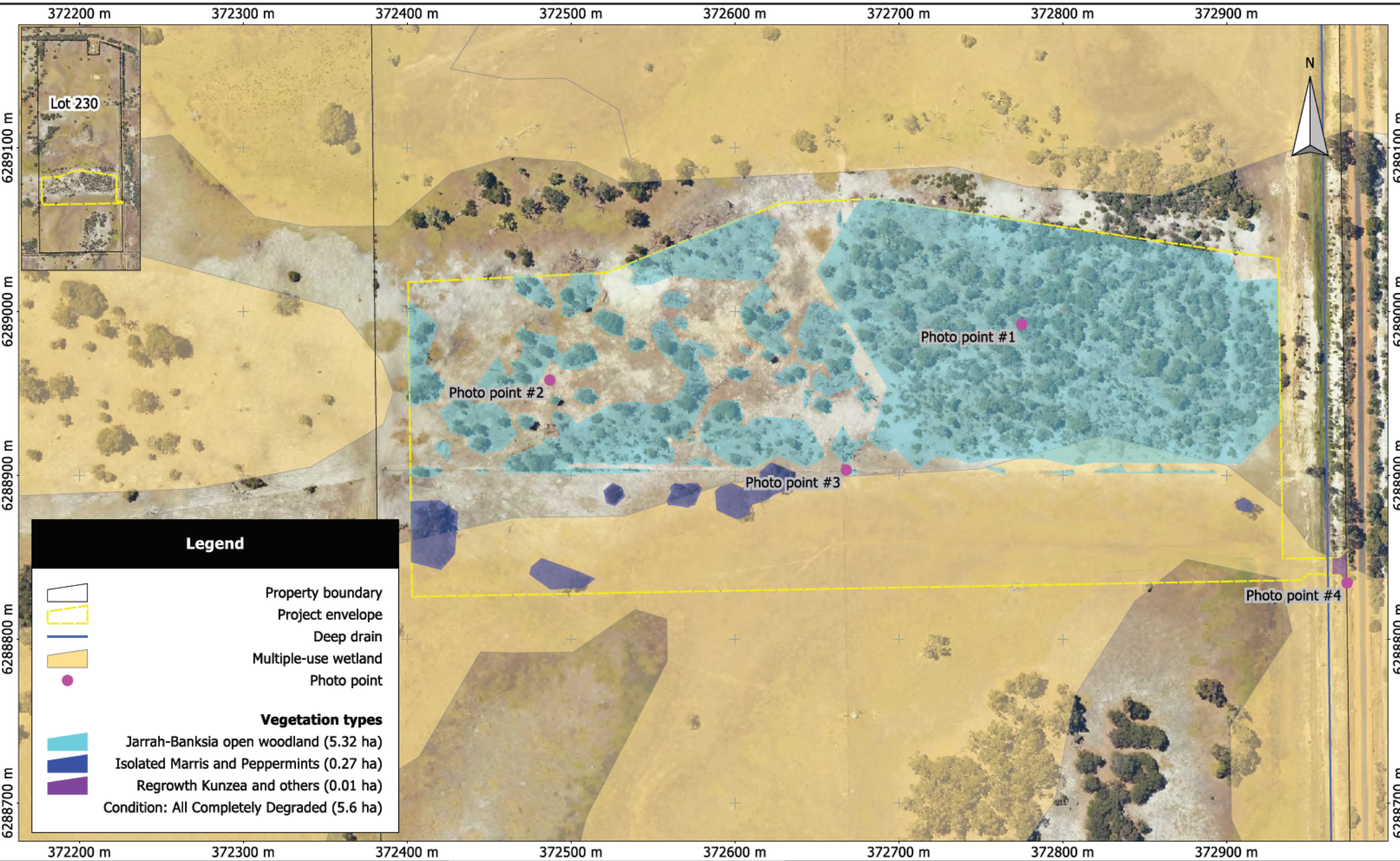
0 10 km

Cowara Contractors Pty Ltd
Lot 230 Elgin Road, Elgin

Figure 1
Project Location

4 Cook St
 West Perth WA 6005
 Ph: (08) 9226 3166
 Fax: (08) 9226 3177
 info@mbsenvironmental.com.au
 www.mbsenvironmental.com.au

MBS
 ENVIRONMENTAL



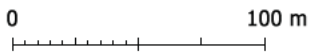
Legend

- Property boundary
- Project envelope
- Deep drain
- Multiple-use wetland
- Photo point

Vegetation types

- Jarrah-Banksia open woodland (5.32 ha)
- Isolated Marris and Peppermints (0.27 ha)
- Regrowth Kunzea and others (0.01 ha)
- Condition: All Completely Degraded (5.6 ha)

Scale: 1:3000
 Original Size: A4
 Air Photo Date: March 2018
 Grid: Australia MGA94 (50)



Cowara Contractors
 Lot 230 Elgin Road, Elgin
 Environmental Site Inspection

Figure 2
Site Inspection Records

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Table 1: Flora Taxa Recorded within Proposed Project Envelope During Site Inspections

Family	Taxa
Asteraceae	* <i>Arctotheca calendula</i>
	* <i>Cotula turbinata</i>
	* <i>Hypochaeris glabra</i>
	* <i>Ursinia anthemoides</i>
Loranthaceae	<i>Nuytsia floribunda</i>
Myrtaceae	<i>Corymbia calophylla</i>
	<i>Eucalyptus marginata</i>
	<i>Kunzea glabrescens</i>
Phytolaccaceae	* <i>Phytolacca octandra</i>
Poaceae	* Several annual introduced grass species (too young to identify)
Proteaceae	<i>Banksia attenuata</i>
	<i>Banksia ilicifolia</i>
	<i>Xylomelum occidentale</i>

Additionally, the proposed drain crossing included regrowth *Kunzea* spp., *Acacia saligna*, *Melaleuca* spp. and *Astartea* sp. over weeds.



Plate 1: Photo Point #1 – View East



Plate 2: Photo Point #2 – View West



Plate 3: Photo Point #3 – View Southwest



Plate 4: Photo Point #4 – View Northwest into Proposed Drain Crossing

APPENDIX 2: NATUREMAP SEARCH RESULTS

NatureMap Species Report

Created By Guest user on 20/10/2021

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 37' 44" E, 33° 31' 51" S
Buffer 10km

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
1.	3262 <i>Acacia cochlearis</i> (Rigid Wattle)			
2.	3331 <i>Acacia extensa</i> (Wiry Wattle)			
3.	3339 <i>Acacia flagelliformis</i>		P4	
4.	3374 <i>Acacia huegelii</i>			
5.	3448 <i>Acacia mooreana</i>			
6.	3454 <i>Acacia nervosa</i> (Rib Wattle)			
7.	3464 <i>Acacia obovata</i>			
8.	3496 <i>Acacia preissiana</i>			
9.	3502 <i>Acacia pulchella</i> (Prickly Moses)			
10.	15483 <i>Acacia pulchella</i> var. <i>pulchella</i>			
11.	3504 <i>Acacia pycnantha</i> (Golden Wattle)	Y		
12.	3527 <i>Acacia saligna</i> (Orange Wattle, Kudjong)			
13.	3537 <i>Acacia semitrullata</i>		P4	
14.	3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle)			
15.	3576 <i>Acacia tetragonocarpa</i>			
16.	3602 <i>Acacia willdenowiana</i> (Grass Wattle)			
17.	3184 <i>Acaena echinata</i> (Sheep s Burr)			
18.	5315 <i>Actinodium cunninghamii</i> (Albany Daisy)			
19.	6203 <i>Actinotus glomeratus</i>			
20.	43201 <i>Adelphacme minima</i>		P3	
21.	14970 <i>Adenanthos barbiger</i>			
22.	1790 <i>Adenanthos meisneri</i>			
23.	1791 <i>Adenanthos obovatus</i> (Basket Flower)			
24.	5316 <i>Agonis flexuosa</i> (Peppermint, Wonil)			
25.	17202 <i>Agonis flexuosa</i> var. <i>flexuosa</i>			
26.	23474 <i>Agrostocrinum hirsutum</i>			
27.	1261 <i>Agrostocrinum scabrum</i> (Blue Grass Lily)			
28.	184 <i>Aira caryophylla</i> (Silvery Hairgrass)	Y		
29.	1728 <i>Allocasuarina fraseriana</i> (Sheoak, Kondil)			
30.	1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak)			
31.	6565 <i>Alyxia buxifolia</i> (Dysentery Bush)			
32.	2668 <i>Amaranthus powellii</i> (Powell s Amaranth)	Y		
33.	1489 <i>Amaryllis belladonna</i> (Belladonna Lily)	Y		
34.	4584 <i>Amperea conferta</i>			
35.	4586 <i>Amperea micrantha</i>		P2	
36.	13380 <i>Amphibromus nervosus</i>			
37.	194 <i>Amphipogon amphipogonoides</i>			
38.	197 <i>Amphipogon debilis</i>			
39.	200 <i>Amphipogon turbinatus</i>			
40.	1062 <i>Anarthria prolifera</i>			
41.	6306 <i>Andersonia caerulea</i> (Foxtails)			
42.	25844 <i>Andersonia caerulea</i> subsp. <i>caerulea</i>			
43.	18102 <i>Andersonia ferricola</i>		P1	
44.	6312 <i>Andersonia involucrata</i>			
45.	6317 <i>Andersonia micrantha</i>			
46.	1411 <i>Anigozanthos manglesii</i> (Mangles Kangaroo Paw, Kurulbrang)			
47.	1416 <i>Anigozanthos viridis</i> (Green Kangaroo Paw, Kurulbardang)			
48.	12724 <i>Anthotium junciforme</i>			
49.	202 <i>Anthoxanthum odoratum</i> (Sweet Vernal Grass)	Y		
50.	19987 <i>Anthriscus caucalis</i>	Y		Y
51.	3686 <i>Aotus cordifolia</i>			
52.	3688 <i>Aotus gracillima</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
53.	1117 <i>Aphelia cyperoides</i>			
54.	1118 <i>Aphelia drummondii</i>			
55.	141 <i>Aponogeton hexatepalus</i> (Stalked Water Ribbons)		P4	
56.	7838 <i>Arctotheca calendula</i> (Cape Weed, African Marigold)	Y		
57.	46393 <i>Arctotheca calendula</i> x <i>populifolia</i>	Y		
58.	8779 <i>Asparagus asparagoides</i> (Bridal Creeper)	Y		
59.	7851 <i>Asteridea pulverulenta</i> (Common Bristle Daisy)			
60.	6323 <i>Astroloma ciliatum</i> (Candle Cranberry)			
61.	6325 <i>Astroloma drummondii</i>			
62.	17233 <i>Austrostipa campylachne</i>			
63.	17240 <i>Austrostipa flavescens</i>			
64.	17253 <i>Austrostipa semibarbata</i>			
65.	37421 <i>Austrostipa</i> sp. <i>Marchagee</i> (B.R. Maslin 1407)			
66.	233 <i>Avena barbata</i> (Bearded Oat)	Y		
67.	36441 <i>Babingtonia camphorosmae</i> (Camphor Myrtle)			
68.	1800 <i>Banksia attenuata</i> (Slender Banksia, Piara)			
69.	1819 <i>Banksia grandis</i> (Bull Banksia, Pulgarla)			
70.	1822 <i>Banksia ilicifolia</i> (Holly-leaved Banksia)			
71.	32315 <i>Barbula calycina</i>			
72.	740 <i>Baumea arthropophylla</i>			
73.	741 <i>Baumea articulata</i> (Jointed Rush)			
74.	747 <i>Baumea rubiginosa</i>			
75.	748 <i>Baumea vaginalis</i> (Sheath Twigrush)			
76.	5392 <i>Beaufortia sparsa</i> (Swamp Bottlebrush)			
77.	7046 <i>Bellardia trixago</i> (Bellardia)	Y		
78.	48868 <i>Bellardia viscosa</i>	Y		
79.	25798 <i>Billardiera fusiformis</i> (Australian Bluebell)			
80.	3165 <i>Billardiera varifolia</i>			
81.	749 <i>Bolboschoenus caldwellii</i> (Marsh Club-rush)			
82.	14535 <i>Bolboschoenus medianus</i>		P1	Y
83.	16313 <i>Boronia anceps</i>		P3	
84.	11612 <i>Boronia capitata</i> subsp. <i>gracilis</i>		P3	
85.	4413 <i>Boronia crenulata</i> (Aniseed Boronia)			
86.	17653 <i>Boronia crenulata</i> subsp. <i>pubescens</i>			
87.	4415 <i>Boronia defoliata</i>			
88.	4417 <i>Boronia dichotoma</i>			
89.	4420 <i>Boronia fastigiata</i> (Bushy Boronia)			
90.	16618 <i>Boronia humifusa</i>		P1	
91.	4428 <i>Boronia megastigma</i> (Scented Boronia)			
92.	4441 <i>Boronia spathulata</i> (Boronia)			
93.	17804 <i>Boronia tetragona</i>		P3	
94.	1272 <i>Borya scirpoidea</i>			
95.	48782 <i>Bossiaea angustifolia</i>			
96.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
97.	3714 <i>Bossiaea ornata</i> (Broad Leaved Brown Pea)			
98.	3718 <i>Bossiaea rufa</i>			
99.	10915 <i>Brachychiton populneus</i> (Kurrajong)	Y		
100.	6341 <i>Brachyloma preissii</i> (Globe Heath)			
101.	7878 <i>Brachyscome iberidifolia</i>			
102.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
103.	245 <i>Briza minor</i> (Shivery Grass)	Y		
104.	247 <i>Bromus arenarius</i> (Sand Brome)			
105.	249 <i>Bromus diandrus</i> (Great Brome)	Y		
106.	<i>Bryum</i> sp.			
107.	1366 <i>Bulbine semibarbata</i> (Leek Lily)			
108.	12770 <i>Burchardia congesta</i>			
109.	1384 <i>Burchardia monantha</i>			
110.	1276 <i>Caesia micrantha</i> (Pale Grass Lily)			
111.	1277 <i>Caesia occidentalis</i>			
112.	15335 <i>Caladenia brownii</i>			
113.	15579 <i>Caladenia chapmanii</i>			
114.	1592 <i>Caladenia flava</i> (Cowslip Orchid)			
115.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
116.	15352 <i>Caladenia georgei</i>			
117.	1596 <i>Caladenia huegelii</i> (Grand Spider Orchid)		T	
118.	1599 <i>Caladenia latifolia</i> (Pink Fairy Orchid)			
119.	1602 <i>Caladenia longicauda</i> (Common White Spider Orchid)			
120.	1603 <i>Caladenia longiclavata</i> (Clubbed Spider Orchid)			
121.	15369 <i>Caladenia lorea</i>			
122.	15372 <i>Caladenia nana</i> subsp. <i>unita</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
123.	15503 <i>Caladenia paludosa</i>			
124.	13862 <i>Caladenia speciosa</i>		P4	
125.	1213 <i>Calectasia cyanea</i> (Blue Tinsel Lily)		T	
126.	19309 <i>Calectasia narragara</i>			
127.	34942 <i>Callitriche brutia</i> subsp. <i>brutia</i>	Y		
128.	4717 <i>Callitriche stagnalis</i> (Common Starwort)	Y		
129.	36520 <i>Callitriche acuminata</i> (Dwarf Cypress)			
130.	26534 <i>Callophycus dorsifer</i>			
131.	5415 <i>Calothamnus lateralis</i>			
132.	5458 <i>Calytrix flavescens</i> (Summer Starflower)			
133.	5460 <i>Calytrix fraseri</i> (Pink Summer Calytrix)			
134.	5465 <i>Calytrix leschenaultii</i>			
135.	48449 <i>Calytrix retrorsifolia</i>		P2	
136.	32338 <i>Campylopus introflexus</i>	Y		
137.	756 <i>Carex inversa</i> (Knob Sedge)			
138.	43241 <i>Carex thecata</i>			
139.	1162 <i>Cartonema philydroides</i>			
140.	2952 <i>Cassytha glabella</i> (Tangled Dodder Laurel)			
141.	2957 <i>Cassytha racemosa</i> (Dodder Laurel)			
142.	26574 <i>Caulerpa scalpelliformis</i>			
143.	13766 <i>Caustis</i> sp. <i>Boyanup</i> (G.S. McCutcheon 1706)		P3	
144.	7916 <i>Centaurea melitensis</i> (Maltese Cockspur, Malta Thistle)	Y		
145.	6542 <i>Centaureum tenuiflorum</i>	Y		
146.	7366 <i>Centranthus macrosiphon</i>	Y		
147.	1121 <i>Centrolepis aristata</i> (Pointed Centrolepis)			
148.	1125 <i>Centrolepis drummondiana</i>			
149.	1129 <i>Centrolepis glabra</i> (Smooth Centrolepis)			
150.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
151.	2889 <i>Cerastium glomeratum</i> (Mouse Ear Chickweed)	Y		
152.	17685 <i>Chaetanthus aristatus</i>			
153.	1065 <i>Chaetanthus leptocarpoides</i>			
154.	1280 <i>Chamaescilla corymbosa</i> (Blue Squill)			
155.	19338 <i>Chamaescilla gibsonii</i>		P3	
156.	26616 <i>Champia affinis</i>			
157.	7925 <i>Chondrilla juncea</i> (Skeleton Weed)	Y		
158.	17686 <i>Chordifex gracilior</i>		P3	
159.	763 <i>Chorizandra enodis</i> (Black Bristlerush)			
160.	3757 <i>Chorizema glycinifolium</i>			
161.	3761 <i>Chorizema rhombeum</i>			
162.	6543 <i>Cicendia filiformis</i> (Slender Cicendia)	Y		
163.	48391 <i>Cladophora dalmatica</i>			
164.	4550 <i>Comesperma calymega</i> (Blue-spike Milkwort)			
165.	4564 <i>Comesperma virgatum</i> (Milkwort)			
166.	4566 <i>Comesperma volubile</i> (Love Creeper)			
167.	1863 <i>Conospermum capitatum</i>			
168.	16850 <i>Conospermum flexuosum</i> subsp. <i>laevigatum</i>			
169.	1883 <i>Conospermum teretifolium</i> (Spider Smokebush)			
170.	6348 <i>Conostephium pendulum</i> (Pearl Flower)			
171.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
172.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
173.	1438 <i>Conostylis laxiflora</i>			
174.	1453 <i>Conostylis serrulata</i>			
175.	11597 <i>Conostylis setigera</i> subsp. <i>setigera</i>			
176.	20074 <i>Conyza sumatrensis</i>	Y		
177.	2891 <i>Corrigiola litoralis</i> (Strapwort)	Y		
178.	17105 <i>Corymbia haematoxylon</i> (Mountain Marri)			
179.	11883 <i>Corynotheca micrantha</i> var. <i>elongata</i>			
180.	7944 <i>Cotula bipinnata</i> (Ferny Cotula)	Y		
181.	7945 <i>Cotula coronopifolia</i> (Waterbuttons)	Y		
182.	13354 <i>Craspedia variabilis</i>			
183.	48979 <i>Crassa secundata</i>			
184.	17701 <i>Crassula closiana</i>			
185.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
186.	11349 <i>Crassula decumbens</i> var. <i>decumbens</i>			
187.	3142 <i>Crassula natans</i>	Y		
188.	26712 <i>Curdiea obesa</i>			
189.	768 <i>Cyathochaeta avenacea</i>			
190.	769 <i>Cyathochaeta clandestina</i>			
191.	16245 <i>Cyathochaeta teretifolia</i>		P3	
192.	40661 <i>Cycnogeton lineare</i>			

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193.	285 <i>Cynosurus echinatus</i> (Rough Dogstail)	Y		
194.	815 <i>Cyperus tenellus</i> (Tiny Flatsedge)	Y		
195.	10916 <i>Cyrtostylis huegelii</i>			
196.	17692 <i>Cytogonidium leptocarpoides</i>			
197.	7428 <i>Dampiera coronata</i> (Wedge-leaved Dampiera)			
198.	7454 <i>Dampiera linearis</i> (Common Dampiera)			
199.	7462 <i>Dampiera pedunculata</i>			
200.	5519 <i>Darwinia oederoides</i>			
201.	34765 <i>Darwinia whicherensis</i>		T	
202.	1218 <i>Dasyogon bromeliifolius</i> (Pineapple Bush)			
203.	1219 <i>Dasyogon hookeri</i> (Pineapple Bush)			
204.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
205.	3793 <i>Daviesia angulata</i>			
206.	18560 <i>Daviesia divaricata</i> subsp. <i>divaricata</i>			
207.	3808 <i>Daviesia elongata</i>		T	
208.	11879 <i>Daviesia hakeoides</i> subsp. <i>hakeoides</i>			
209.	16585 <i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>			
210.	3832 <i>Daviesia physodes</i>			
211.	3835 <i>Daviesia preissii</i>			
212.	17691 <i>Desmocladius fasciculatus</i>			
213.	16595 <i>Desmocladius flexuosus</i>			
214.	299 <i>Deyeuxia quadriseta</i> (Reed Bentgrass)			
215.	7487 <i>Diaspasis filifolia</i> (Thread-leaved Diaspasis)			
216.	306 <i>Dichelachne crinita</i> (Longhair Plumegrass)			
217.	6616 <i>Dichondra repens</i> (Kidney Weed)			
218.	1287 <i>Dichopogon capillipes</i>			
219.	1289 <i>Dichopogon preissii</i>			
220.	320 <i>Digitaria sanguinalis</i> (Crab Grass)	Y		
221.	3866 <i>Dillwynia uncinata</i> (Silky Parrot Pea)			
222.	4454 <i>Diplolaena dampieri</i> (Southern Diplolaena)			
223.	19649 <i>Disa bracteata</i>	Y		
224.	7054 <i>Dischisma arenarium</i>	Y		
225.	10796 <i>Diuris drummondii</i> (Tall Donkey Orchid)		T	
226.	10938 <i>Diuris filifolia</i> (Cat s Face Orchid)			
227.	1634 <i>Diuris laxiflora</i> (Bee Orchid)			
228.	46858 <i>Diuris tinctoria</i>			
229.	1639 <i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)		T	
230.	3091 <i>Drosera bulbigena</i> (Midget Sundew)			
231.	48751 <i>Drosera drummondii</i>			
232.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
233.	48747 <i>Drosera geniculata</i>			
234.	3097 <i>Drosera gigantea</i> (Giant Sundew)			
235.	48769 <i>Drosera indumenta</i>			
236.	3108 <i>Drosera marchantii</i>			
237.	3112 <i>Drosera myriantha</i> (Star Rainbow)			
238.	13189 <i>Drosera oreopodium</i>			
239.	8911 <i>Drosera rosulata</i>			
240.	49090 <i>Drosera</i> sp. Branched styles (S.C. Coffey 193)			
241.	33517 <i>Dysphania multifida</i> (Scented Goosefoot)	Y		
242.	349 <i>Ehrharta longiflora</i> (Annual Veldt Grass)	Y		
243.	822 <i>Eleocharis acuta</i> (Common Spikerush)			
244.	17605 <i>Eleocharis keigheryi</i>		T	
245.	1643 <i>Elythranthera brunonis</i> (Purple Enamel Orchid)			
246.	6131 <i>Epilobium billardioreanum</i> (Glabrous Willow Herb)			
247.	11756 <i>Epilobium billardioreanum</i> subsp. <i>cinereum</i> (Variable Willow Herb)			
248.	11992 <i>Epilobium billardioreanum</i> subsp. <i>intermedium</i>			
249.	13950 <i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>			
250.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
251.	15411 <i>Eriochilus dilatatus</i> subsp. <i>magnus</i>			
252.	15412 <i>Eriochilus dilatatus</i> subsp. <i>multiflorus</i>			
253.	6219 <i>Eryngium pinnatifidum</i> (Blue Devils)			
254.	15446 <i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>			
255.	5659 <i>Eucalyptus gomphocephala</i> (Tuart, Duart)			
256.	5688 <i>Eucalyptus laeliae</i> (Darling Range Ghost Gum)			
257.	5708 <i>Eucalyptus marginata</i> (Jarrah, Djara)			
258.	13547 <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
259.	44858 <i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>	Y		Y
260.	13511 <i>Eucalyptus rudis</i> subsp. <i>rudis</i>			
261.	3872 <i>Euchilopsis linearis</i> (Swamp Pea)			
262.	15137 <i>Euchiton sphaericus</i>			

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263.	3876 <i>Eutaxia epacridoides</i>			
264.	3880 <i>Eutaxia virgata</i>			
265.	835 <i>Evandra pauciflora</i>			
266.	10907 <i>Exocarpos odoratus</i> (Scented Ballart)			
267.	1945 <i>Franklandia triaristata</i> (Lanoline Bush)		P4	
268.	18392 <i>Freesia alba</i> x <i>leichtlinii</i>	Y		
269.	2969 <i>Fumaria capreolata</i> (Whiteflower Fumitory)	Y		
270.	32370 <i>Funaria hygrometrica</i>			
271.	902 <i>Gahnia decomposita</i>			
272.	7323 <i>Galium murale</i> (Small Goosegrass)	Y		
273.	19190 <i>Gastrolobium cuneatum</i>			
274.	20473 <i>Gastrolobium ebracteolatum</i>			
275.	20512 <i>Gastrolobium praemorsum</i>			
276.	4339 <i>Geranium molle</i> (Dove s Foot Cranesbill)	Y		
277.	4340 <i>Geranium retrorsum</i>			
278.	26854 <i>Gigartina disticha</i>			
279.	1523 <i>Gladiolus tristis</i> (Largeflower Gladiolus)	Y		
280.	7060 <i>Glossostigma diandrum</i>			
281.	3948 <i>Gompholobium capitatum</i>			
282.	10909 <i>Gompholobium confertum</i>			
283.	19216 <i>Gompholobium cyaninum</i>			
284.	3950 <i>Gompholobium knightianum</i>			
285.	3951 <i>Gompholobium marginatum</i>			
286.	3954 <i>Gompholobium polymorphum</i>			
287.	3955 <i>Gompholobium preissii</i>			
288.	11083 <i>Gompholobium scabrum</i>			
289.	3957 <i>Gompholobium tomentosum</i> (Hairy Yellow Pea)			
290.	6159 <i>Gonocarpus nodulosus</i>			
291.	6160 <i>Gonocarpus paniculatus</i>			
292.	29362 <i>Goodenia coerulea</i>			
293.	7505 <i>Goodenia eatoniana</i>			
294.	12551 <i>Goodenia micrantha</i>			
295.	7538 <i>Goodenia pulchella</i>			
296.	19628 <i>Grevillea bipinnatifida</i> subsp. <i>bipinnatifida</i>			
297.	12219 <i>Grevillea bronwenae</i>		P3	
298.	2078 <i>Grevillea pulchella</i> (Beautiful Grevillea)			
299.	15990 <i>Grevillea pulchella</i> subsp. <i>ascendens</i>			
300.	2112 <i>Grevillea trifida</i>			
301.	12824 <i>Grevillea vestita</i> subsp. <i>vestita</i>			
302.	26886 <i>Griffithsia tegea</i>			
303.	1468 <i>Haemodorum laxum</i>			
304.	1472 <i>Haemodorum simplex</i>			
305.	1474 <i>Haemodorum sparsiflorum</i>			
306.	1475 <i>Haemodorum spicatum</i> (Mardja)			
307.	2128 <i>Hakea amplexicaulis</i> (Prickly Hakea)			
308.	2152 <i>Hakea cyclocarpa</i> (Ramshorn)			
309.	2197 <i>Hakea prostrata</i> (Harsh Hakea)			
310.	2212 <i>Hakea sulcata</i> (Furrowed Hakea)			
311.	2216 <i>Hakea varia</i> (Variable-leaved Hakea)			
312.	47213 <i>Halimeda versatilis</i>			
313.	3961 <i>Hardenbergia comptoniana</i> (Native Wisteria)			
314.	12016 <i>Helianthus debilis</i> subsp. <i>cucumerifolius</i>	Y		
315.	6839 <i>Hemiandra pungens</i> (Snakebush)			
316.	6866 <i>Hemigenia pritzelii</i>			
317.	5108 <i>Hibbertia acerosa</i> (Needle Leaved Guinea Flower)			
318.	5109 <i>Hibbertia amplexicaulis</i>			
319.	5112 <i>Hibbertia aurea</i>			
320.	5114 <i>Hibbertia commutata</i>			
321.	5117 <i>Hibbertia cuneiformis</i> (Cutleaf Hibbertia)			
322.	20051 <i>Hibbertia diamesogenos</i>			
323.	5125 <i>Hibbertia ferruginea</i>			
324.	5129 <i>Hibbertia glomerata</i>			
325.	5134 <i>Hibbertia huegelii</i>			
326.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
327.	45534 <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>			
328.	20032 <i>Hibbertia pulchra</i> var. <i>pulchra</i>			
329.	5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
330.	5172 <i>Hibbertia stellaris</i> (Orange Stars)			
331.	5176 <i>Hibbertia vaginata</i>			
332.	1294 <i>Hodgsoniola junciformis</i>			

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333.	450 <i>Hordeum marinum</i>	Y		
334.	3964 <i>Hovea chorizemifolia</i> (Holly-leaved Hovea)			
335.	3966 <i>Hovea pungens</i> (Devil's Pins, Puyenak)			
336.	12907 <i>Hovea trisperma</i> var. <i>grandiflora</i>			
337.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
338.	12741 <i>Hyalosperma cotula</i>			
339.	16759 <i>Hyalosperma simplex</i> subsp. <i>simplex</i>			
340.	6226 <i>Hydrocotyle callicarpa</i> (Small Pennywort)			
341.	6229 <i>Hydrocotyle diantha</i>			
342.	5817 <i>Hypocalymma angustifolium</i> (White Myrtle, Kudjid)			
343.	35070 <i>Hypocalymma angustifolium</i> subsp. <i>Swan Coastal Plain</i> (G.J. Keighery 16777)			
344.	5819 <i>Hypocalymma ericifolium</i>			
345.	5825 <i>Hypocalymma robustum</i> (Swan River Myrtle)			
346.	8086 <i>Hypochoeris glabra</i> (Smooth Catsear)	Y		
347.	16835 <i>Hypolaena caespitosa</i>			
348.	1070 <i>Hypolaena exsulca</i>			
349.	17841 <i>Hypolaena pubescens</i>			
350.	11 <i>Isoetes drummondii</i> (Quillwort)			
351.	910 <i>Isolepis cernua</i> (Nodding Club-rush)			
352.	20199 <i>Isolepis cernua</i> var. <i>cernua</i>			
353.	20200 <i>Isolepis cernua</i> var. <i>setiformis</i>			
354.	912 <i>Isolepis cyperoides</i>			
355.	20198 <i>Isolepis fluitans</i> var. <i>fluitans</i>			
356.	917 <i>Isolepis marginata</i> (Coarse Club-rush)			
357.	921 <i>Isolepis producta</i>			
358.	924 <i>Isolepis stellata</i> (Star Club-rush)			
359.	16522 <i>Isopogon formosus</i> subsp. <i>dasylopis</i>		P3	
360.	2237 <i>Isopogon sphaerocephalus</i> (Drumstick Isopogon)			
361.	7398 <i>Isotoma pusilla</i> (Small Isotome)			
362.	7399 <i>Isotoma scapigera</i> (Long-scaped Isotome)			
363.	19700 <i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>			
364.	1532 <i>Ixia maculata</i> (Yellow Ixia)	Y		
365.	1534 <i>Ixia polystachya</i> (Variable Ixia)	Y		
366.	8092 <i>Ixiolaena viscosa</i> (Sticky Ixiolaena)			
367.	4012 <i>Jacksonia furcellata</i> (Grey Stinkwood)			
368.	20462 <i>Jacksonia gracillima</i>		P3	
369.	4017 <i>Jacksonia horrida</i>			
370.	1295 <i>Johnsonia acaulis</i>			
371.	1297 <i>Johnsonia lupulina</i> (Hooded Lily)			
372.	1178 <i>Juncus bufonius</i> (Toad Rush)	Y		
373.	1180 <i>Juncus capitatus</i> (Capitate Rush)	Y		
374.	1184 <i>Juncus holoschoenus</i> (Jointleaf Rush)			
375.	11922 <i>Juncus kraussii</i> subsp. <i>australiensis</i>			
376.	1186 <i>Juncus microcephalus</i>	Y		
377.	1188 <i>Juncus pallidus</i> (Pale Rush)			
378.	1195 <i>Juncus subsecundus</i> (Finger Rush)			
379.	4037 <i>Kennedia coccinea</i> (Coral Vine)			
380.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
381.	7068 <i>Kickxia spuria</i> (Roundleaf Toadflax)	Y		
382.	1221 <i>Kingia australis</i> (Kingia, Pulonok)			
383.	5832 <i>Kunzea ericifolia</i> (Spearwood, Pondil)			
384.	5835 <i>Kunzea micrantha</i>			
385.	17461 <i>Kunzea micrantha</i> subsp. <i>micrantha</i>			
386.	5841 <i>Kunzea recurva</i>			
387.	20019 <i>Lachnagrostis filiformis</i>			
388.	19955 <i>Lachnagrostis plebeia</i>			
389.	18585 <i>Lagenophora huegelii</i>			
390.	467 <i>Lagurus ovatus</i> (Hare's Tail Grass)	Y		
391.	14083 <i>Lambertia multiflora</i> var. <i>darlingensis</i>			
392.	5038 <i>Lasiopetalum membranaceum</i>		P3	
393.	27001 <i>Laurencia filiformis</i>			
394.	27009 <i>Laurencia tasmanica</i>			
395.	1304 <i>Laxmannia minor</i>			
396.	11464 <i>Laxmannia sessiliflora</i> subsp. <i>australis</i>			
397.	7568 <i>Lechenaultia biloba</i> (Blue Leschenaultia)			
398.	925 <i>Lepidosperma angustatum</i>			
399.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
400.	945 <i>Lepidosperma squamatum</i>			
401.	1653 <i>Leporella fimbriata</i> (Hare Orchid)			
402.	1077 <i>Leptocarpus canus</i> (Hoary Twine-rush)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
403.	1078 <i>Leptocarpus coangustus</i>			
404.	46382 <i>Leptocarpus roycei</i>			
405.	1080 <i>Leptocarpus scariosus</i>			
406.	46377 <i>Leptocarpus scoparius</i>			
407.	1082 <i>Leptocarpus tenax</i> (Slender Twine Rush)			
408.	17703 <i>Leptomeria ellytes</i>			
409.	5850 <i>Leptospermum laevigatum</i> (Coast Teatree)	Y		
410.	1085 <i>Lepyrodia glauca</i>			
411.	1088 <i>Lepyrodia macra</i> (Large Scale Rush)			
412.	1090 <i>Lepyrodia muirii</i>			
413.	6360 <i>Leucopogon australis</i> (Spiked Beard-heath)			
414.	6374 <i>Leucopogon conostephioides</i>			
415.	6375 <i>Leucopogon cordatus</i>			
416.	6396 <i>Leucopogon glabellus</i>			
417.	6417 <i>Leucopogon obovatus</i>			
418.	6425 <i>Leucopogon oxycedrus</i>			
419.	6427 <i>Leucopogon parviflorus</i> (Coast Beard-heath)			
420.	6428 <i>Leucopogon pendulus</i>			
421.	6434 <i>Leucopogon polymorphus</i>			
422.	6436 <i>Leucopogon propinquus</i>			
423.	6441 <i>Leucopogon reflexus</i> (Heart-leaf Beard-heath)			
424.	29492 <i>Leucopogon</i> sp. Busselton (D. Cooper 243)		P2	
425.	7676 <i>Levenhookia pusilla</i> (Midget Stylewort)			
426.	49103 <i>Levenhookia</i> sp. Whicher Range (J.A. Wege 2090)			
427.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
428.	59 <i>Lindsaea linearis</i> (Screw Fern)			
429.	36179 <i>Liparophyllum violifolium</i>			
430.	7406 <i>Lobelia rhombifolia</i> (Tufted Lobelia)			
431.	7407 <i>Lobelia rhytidosperra</i> (Wrinkled-seeded Lobelia)			
432.	7408 <i>Lobelia tenuior</i> (Slender Lobelia)			
433.	9356 <i>Logfia gallica</i>	Y		
434.	476 <i>Lolium perenne</i> (Perennial Ryegrass)	Y		
435.	478 <i>Lolium rigidum</i> (Wimmera Ryegrass)	Y		
436.	<i>Lolium</i> sp.			
437.	1223 <i>Lomandra caespitosa</i> (Tufted Mat Rush)			
438.	1228 <i>Lomandra hermaphrodita</i>			
439.	1232 <i>Lomandra micrantha</i> (Small-flower Mat-rush)			
440.	1234 <i>Lomandra nigricans</i>			
441.	1236 <i>Lomandra odora</i> (Tiered Matrush)			
442.	1239 <i>Lomandra preissii</i>			
443.	1240 <i>Lomandra purpurea</i> (Purple Mat Rush)			
444.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
445.	1244 <i>Lomandra sonderi</i>			
446.	1246 <i>Lomandra suaveolens</i>			
447.	33298 <i>Lomandra whicherensis</i>		P3	
448.	4059 <i>Lotus angustissimus</i> (Narrowleaf Trefoil)	Y		
449.	13779 <i>Loxocarya magna</i>		P3	
450.	1198 <i>Luzula meridionalis</i> (Field Woodrush)			
451.	1097 <i>Lyginia barbata</i>			
452.	18049 <i>Lyginia imberbis</i>			
453.	6456 <i>Lysinema ciliatum</i> (Curry Flower)			
454.	2838 <i>Macarthuria apetala</i>			
455.	85 <i>Macrozamia riedlei</i> (Zamia, Djiridji)			
456.	74 <i>Marsilea drummondii</i> (Common Nardoo)			
457.	4079 <i>Medicago polymorpha</i> (Burr Medic)	Y		
458.	37580 <i>Melaleuca acutifolia</i>			
459.	5921 <i>Melaleuca incana</i> (Grey Honeymyrtle)			
460.	5926 <i>Melaleuca lateritia</i> (Robin Redbreast Bush)			
461.	5946 <i>Melaleuca pauciflora</i>			
462.	5952 <i>Melaleuca preissiana</i> (Moonah)			
463.	5959 <i>Melaleuca raphiophylla</i> (Swamp Paperbark)			
464.	5978 <i>Melaleuca teretifolia</i> (Banbar)			
465.	5980 <i>Melaleuca thymoides</i>			
466.	5983 <i>Melaleuca trichophylla</i>			
467.	13280 <i>Melaleuca viminea</i> subsp. <i>viminea</i>			
468.	17682 <i>Melanostachya ustulata</i>			
469.	4085 <i>Melilotus indicus</i>	Y		
470.	19827 <i>Melilotus siculus</i>	Y		
471.	6883 <i>Mentha pulegium</i> (Pennyroyal)	Y		
472.	953 <i>Mesomelaena graciliceps</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
473.	957 <i>Mesomelaena tetragona</i> (Semaphore Sedge)			
474.	27070 <i>Metamastophora flabellata</i>			
475.	485 <i>Microlaena stipoides</i> (Weeping Grass)			
476.	10954 <i>Microtis media</i> (Tall Mignonette Orchid)			
477.	15419 <i>Microtis media</i> subsp. <i>media</i>			
478.	1660 <i>Microtis orbicularis</i> (Dark Mignonette Orchid)			
479.	2894 <i>Moenchia erecta</i> (Erect Chickweed)	Y		
480.	7410 <i>Monopsis debilis</i>	Y		
481.	37440 <i>Monopsis debilis</i> var. <i>depressa</i>	Y		
482.	4666 <i>Monotaxis occidentalis</i>			
483.	19178 <i>Moraea lewisiae</i>	Y		
484.	19180 <i>Moraea miniata</i> (Two-leaf Cape Tulip)	Y		
485.	19438 <i>Moraea ochroleuca</i>	Y		
486.	2412 <i>Muehlenbeckia adpressa</i> (Climbing Lignum)			
487.	6189 <i>Myriophyllum crispatum</i>			
488.	6199 <i>Myriophyllum tillaeoides</i>			
489.	6464 <i>Needhamiella pumilio</i>			
490.	2401 <i>Nuytsia floribunda</i> (Christmas Tree, Mudja)			
491.	6140 <i>Oenothera mollissima</i>	Y		
492.	8127 <i>Olearia axillaris</i> (Coastal Daisybush)			
493.	8133 <i>Olearia elaeophila</i>			
494.	18254 <i>Opercularia apiciflora</i>			
495.	7348 <i>Opercularia hispidula</i> (Hispid Stinkweed)			
496.	46256 <i>Orianthera wendyae</i>		P1	
497.	36177 <i>Ornduffia albiflora</i>			
498.	36181 <i>Ornduffia parnassifolia</i>			
499.	36200 <i>Ornduffia submersa</i>		P4	
500.	1372 <i>Ornithogalum arabicum</i> (Lesser Cape Lily)	Y		
501.	4113 <i>Ornithopus compressus</i> (Yellow Serradella)	Y		
502.	4114 <i>Ornithopus pinnatus</i> (Slender Serradella)	Y		
503.	7122 <i>Orobanche minor</i> (Lesser Broomrape)	Y		
504.	1537 <i>Orthrosanthus laxus</i> (Morning Iris)			
505.	27107 <i>Osmundaria prolifera</i>			
506.	168 <i>Ottelia ovalifolia</i> (Swamp Lily)			
507.	30375 <i>Oxalis exilis</i>			
508.	4352 <i>Oxalis glabra</i>	Y		
509.	4354 <i>Oxalis incarnata</i>	Y		
510.	4355 <i>Oxalis perennans</i>			
511.	4356 <i>Oxalis pes-caprae</i> (Soursob)	Y		
512.	23500 <i>Paracaleana hortorum</i>			
513.	20101 <i>Paragonis grandiflora</i>			
514.	3618 <i>Paraserianthes lophantha</i> (Albizia)			
515.	7089 <i>Parentucellia latifolia</i> (Common Bartsia)	Y		
516.	1762 <i>Parietaria debilis</i> (Pellitory)			
517.	527 <i>Paspalum dilatatum</i>	Y		
518.	1546 <i>Patersonia juncea</i> (Rush Leaved Patersonia)			
519.	1550 <i>Patersonia occidentalis</i> (Purple Flag, Koma)			
520.	30472 <i>Patersonia occidentalis</i> var. <i>occidentalis</i>			
521.	11550 <i>Patersonia umbrosa</i> var. <i>xanthina</i> (Yellow Flags)			
522.	43763 <i>Pauridia glabella</i>			
523.	43760 <i>Pauridia occidentalis</i>			
524.	43761 <i>Pauridia occidentalis</i> var. <i>occidentalis</i>			
525.	43762 <i>Pauridia occidentalis</i> var. <i>quadriloba</i>			
526.	43782 <i>Pauridia vaginata</i> var. <i>vaginata</i>			
527.	48991 <i>Pelargonium x hortorum</i>	Y		
528.	6006 <i>Pericalymma ellipticum</i> (Swamp Teatree)			
529.	16477 <i>Pericalymma ellipticum</i> var. <i>ellipticum</i>			
530.	15501 <i>Pericalymma spongiocaula</i>			
531.	13911 <i>Persicaria decipiens</i>			
532.	11052 <i>Persicaria prostrata</i>			
533.	2267 <i>Persoonia longifolia</i> (Snottygobble)			
534.	2273 <i>Persoonia saccata</i> (Snottygobble)			
535.	2299 <i>Petrophile linearis</i> (Pixie Mops)			
536.	547 <i>Phalaris angusta</i>	Y		
537.	1172 <i>Philydrella drummondii</i>			
538.	1478 <i>Phlebocarya ciliata</i>			
539.	1479 <i>Phlebocarya filifolia</i>			
540.	16177 <i>Phyllangium paradoxum</i>			
541.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
542.	6983 <i>Physalis peruviana</i> (Cape Gooseberry)	Y		

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543.	14371 <i>Picris angustifolia</i>			
544.	8160 <i>Picris squarrosa</i>			
545.	78 <i>Pilularia novae-hollandiae</i> (Austral Pillwort)			
546.	5231 <i>Pimelea angustifolia</i> (Narrow-leaved Pimelea)			
547.	11928 <i>Pimelea ciliata</i> subsp. <i>ciliata</i>			
548.	11182 <i>Pimelea lehmanniana</i> subsp. <i>nervosa</i>			
549.	5261 <i>Pimelea rosea</i> (Rose Banjine)			
550.	18117 <i>Pimelea rosea</i> subsp. <i>rosea</i>			
551.	16322 <i>Pittosporum undulatum</i>	Y		
552.	7303 <i>Plantago lanceolata</i> (Ribwort Plantain)	Y		
553.	6249 <i>Platysace compressa</i> (Tapeworm Plant)			
554.	6259 <i>Platysace tenuissima</i>			
555.	33377 <i>Platytheca anasima</i>		P2	
556.	4524 <i>Platytheca galioides</i>			
557.	27155 <i>Plocamium cartilagineum</i>			
558.	86 <i>Podocarpus drouynianus</i> (Wild Plum, Kula)			
559.	8175 <i>Podolepis gracilis</i> (Slender Podolepis)			
560.	8182 <i>Podotheca angustifolia</i> (Sticky Longheads)			
561.	8183 <i>Podotheca chrysantha</i> (Yellow Podotheca)			
562.	2416 <i>Polygonum arenastrum</i> (Sand Wireweed)	Y		
563.	582 <i>Polypogon monspeliensis</i> (Annual Beardgrass)	Y		
564.	583 <i>Polypogon tenellus</i>			
565.	4690 <i>Poranthera huegelii</i>			
566.	27184 <i>Porphyra lucasii</i>			
567.	110 <i>Potamogeton drummondii</i>			
568.	15424 <i>Praecoxanthus aphyllus</i>			
569.	1671 <i>Prasophyllum elatum</i> (Tall Leek Orchid)			
570.	1674 <i>Prasophyllum giganteum</i> (Bronze Leek Orchid)			
571.	1680 <i>Prasophyllum parvifolium</i> (Autumn Leek Orchid)			
572.	10853 <i>Prasophyllum plumiforme</i>			
573.	8189 <i>Pseudognaphalium luteoalbum</i> (Jersey Cudweed)			
574.	<i>Pterostylis</i> aff. <i>nana</i>			
575.	1685 <i>Pterostylis angusta</i>			
576.	15426 <i>Pterostylis aspera</i>			
577.	17267 <i>Pterostylis brevisepala</i>			
578.	44527 <i>Pterostylis erubescens</i>			
579.	11118 <i>Pterostylis pyramidalis</i> (Snail Orchid)			
580.	1693 <i>Pterostylis recurva</i> (Jug Orchid)			
581.	1694 <i>Pterostylis rogersii</i> (Curled-tongue Shell Orchid)			
582.	48683 <i>Pterostylis serotina</i>			
583.	49034 <i>Pterostylis</i> sp. <i>Bloated snail orchid</i> (W. Jackson BJ 486)			
584.	18655 <i>Pterostylis</i> sp. <i>crinkled leaf</i> (G.J. Keighery 13426)			
585.	10998 <i>Pterostylis turfosa</i> (Bird Orchid)			
586.	1698 <i>Pterostylis vittata</i> (Banded Greenhood)			
587.	2742 <i>Ptilotus manglesii</i> (Pom Poms, Mulamula)			
588.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
589.	2759 <i>Ptilotus sericostachyus</i>			
590.	4172 <i>Pultenaea ericifolia</i>			
591.	4177 <i>Pultenaea ochreatea</i>			
592.	4179 <i>Pultenaea pinifolia</i>		P3	
593.	4181 <i>Pultenaea reticulata</i>			
594.	16367 <i>Pyrorchis nigricans</i> (Red beaks, Elephants ears)			
595.	8195 <i>Quinetia urvillei</i>			
596.	2932 <i>Ranunculus colonorum</i> (Common Buttercup)			
597.	2935 <i>Ranunculus pumilio</i> (Smallflower Buttercup)			
598.	11341 <i>Rhagodia baccata</i> subsp. <i>baccata</i>			
599.	13300 <i>Rhodanthe citrina</i>			
600.	13301 <i>Rhodanthe floribunda</i>			
601.	13312 <i>Rhodanthe pyrethrum</i>			
602.	27222 <i>Rhodophyllis volans</i>			
603.	13683 <i>Ricinocarpos cyanescens</i>			
604.	1556 <i>Romulea rosea</i> (Guildford Grass)	Y		
605.	14924 <i>Romulea rosea</i> var. <i>communis</i>	Y		
606.	2429 <i>Rumex acetosella</i> (Sorrel)	Y		
607.	11541 <i>Rumex dumosus</i> var. <i>dumosus</i>			
608.	20171 <i>Rumex pulcher</i> subsp. <i>woodsii</i>	Y		
609.	40425 <i>Rytidosperma caespitosum</i>			
610.	40426 <i>Rytidosperma occidentale</i>			
611.	40430 <i>Rytidosperma pilosum</i>			
612.	6483 <i>Samolus junceus</i>			

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613.	6484 <i>Samolus repens</i> (Creeping Brookweed)			
614.	7602 <i>Scaevola calliptera</i>			
615.	7634 <i>Scaevola phlebopetala</i> (Velvet Fanflower)			
616.	6263 <i>Schoenolaena juncea</i>			
617.	973 <i>Schoenus asperocarpus</i> (Poison Sedge)			
618.	975 <i>Schoenus bifidus</i>			
619.	978 <i>Schoenus brevisetis</i>			
620.	984 <i>Schoenus curvifolius</i>			
621.	985 <i>Schoenus discifer</i>			
622.	986 <i>Schoenus efoliatus</i>			
623.	17614 <i>Schoenus plumosus</i>			
624.	1017 <i>Schoenus subbulbosus</i>			
625.	1020 <i>Schoenus sublateralis</i>			
626.	1023 <i>Schoenus tenellus</i>			
627.	1026 <i>Schoenus unispiculatus</i>			
628.	17409 <i>Schoenus varicellae</i>			
629.	20663 <i>Senecio multicaulis</i> subsp. <i>multicaulis</i>			
630.	609 <i>Setaria palmifolia</i> (Palm Grass)	Y		
631.	19453 <i>Setaria parviflora</i>	Y		
632.	7362 <i>Sherardia arvensis</i> (Field Madder)	Y		
633.	2909 <i>Silene gallica</i> (French Catchfly)	Y		
634.	15972 <i>Silene gallica</i> var. <i>gallica</i>	Y		
635.	8225 <i>Siloxerus humifusus</i> (Procumbent Siloxerus)			
636.	48862 <i>Sisyrinchium rosulatum</i>	Y		
637.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
638.	1312 <i>Sowerbaea laxiflora</i> (Purple Tassels)			
639.	1558 <i>Sparaxis bulbifera</i>	Y		
640.	2912 <i>Spergula arvensis</i> (Corn Spurry)	Y		
641.	2915 <i>Spergularia rubra</i> (Sand Spurry)	Y		
642.	4205 <i>Sphaerolobium linophyllum</i>			
643.	4206 <i>Sphaerolobium macranthum</i>			
644.	4207 <i>Sphaerolobium medium</i>			
645.	4210 <i>Sphaerolobium scabriusculum</i>			
646.	4211 <i>Sphaerolobium vimineum</i> (Leafless Globe Pea)			
647.	31952 <i>Sphenotoma gracilis</i> (Swamp Paper-heath)			
648.	45118 <i>Sporobolus schoenoides</i>	Y		
649.	4828 <i>Spyridium globulosum</i> (Basket Bush)			
650.	20537 <i>Stachystemon virgatus</i>			
651.	4733 <i>Stackhousia monogyna</i>			
652.	19704 <i>Stenanthemum sublineare</i>		P2	
653.	2316 <i>Stirlingia latifolia</i> (Blueboy)			
654.	40480 <i>Stylidium acuminatum</i> subsp. <i>acuminatum</i>		P2	
655.	7684 <i>Stylidium amoenum</i> (Lovely Triggerplant)			
656.	30278 <i>Stylidium androsaceum</i>			
657.	39880 <i>Stylidium angustifolium</i> subsp. <i>glaucofolium</i>			
658.	7693 <i>Stylidium brunonianum</i> (Pink Fountain Triggerplant)			
659.	7694 <i>Stylidium bulbiferum</i> (Circus Triggerplant)			
660.	7696 <i>Stylidium calcaratum</i> (Book Triggerplant)			
661.	7699 <i>Stylidium carnosum</i> (Fleshy-leaved Triggerplant)			
662.	7708 <i>Stylidium crassifolium</i> (Thick-leaved Triggerplant)			
663.	7734 <i>Stylidium guttatum</i> (Dotted Triggerplant)			
664.	7745 <i>Stylidium junceum</i> (Reed Triggerplant)			
665.	13083 <i>Stylidium lateriticola</i>			
666.	19248 <i>Stylidium megacarpum</i>			
667.	25829 <i>Stylidium neurophyllum</i> (Coastal Plain Triggerplant)			
668.	48460 <i>Stylidium nitidum</i>		P1	
669.	25800 <i>Stylidium paludicola</i>		P3	
670.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
671.	7785 <i>Stylidium repens</i> (Matted Triggerplant)			
672.	7796 <i>Stylidium scandens</i> (Climbing Triggerplant)			
673.	7798 <i>Stylidium schoenoides</i> (Cow Kicks)			
674.	7803 <i>Stylidium striatum</i> (Fan-leaved Triggerplant)		P4	
675.	23511 <i>Stylidium thesioides</i> (Delicate Triggerplant)			
676.	7808 <i>Stylidium violaceum</i> (Violet Triggerplant)			
677.	1260 <i>Stypandra glauca</i> (Blind Grass)			
678.	6476 <i>Styphelia tenuiflora</i> (Common Pinheath)			
679.	15529 <i>Synaphea floribunda</i>			
680.	16769 <i>Synaphea hians</i>		P3	
681.	16865 <i>Synaphea odocoileops</i>		P1	
682.	2324 <i>Synaphea petiolaris</i> (Synaphea)			

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683.	16862 <i>Synaphea petiolaris</i> subsp. <i>simplex</i>		P3	
684.	16863 <i>Synaphea petiolaris</i> subsp. <i>triloba</i>			
685.	31767 <i>Synaphea polypodoides</i>		P3	
686.	34416 <i>Synaphea</i> sp. <i>Argyle</i> (R. Butcher RB 1323)		P1	Y
687.	18590 <i>Synaphea</i> sp. <i>Fairbridge Farm</i> (D. Papenfus 696)		T	
688.	30751 <i>Synaphea</i> sp. <i>Pinjarra Plain</i> (A.S. George 17182)		T	
689.	28354 <i>Synaphea</i> sp. <i>Serpentine</i> (G.R. Brand 103)		T	
690.	16749 <i>Synaphea stenoloba</i>		T	
691.	15535 <i>Synaphea whicherensis</i>			
692.	32439 <i>Syntrichia papillosa</i>			
693.	20135 <i>Taxandria linearifolia</i>			
694.	20133 <i>Taxandria parviceps</i>			
695.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
696.	1034 <i>Tetralia capillaris</i> (Hair Sedge)			
697.	1036 <i>Tetralia octandra</i>			
698.	4535 <i>Tetralia hirsuta</i> (Black Eyed Susan)			
699.	48341 <i>Tetralia hirsuta</i> subsp. <i>viminea</i>			
700.	4538 <i>Tetralia parvifolia</i>		P3	
701.	4544 <i>Tetralia setigera</i>			
702.	27327 <i>Thamnoclonium dichotomum</i>			
703.	1707 <i>Thelymitra flexuosa</i> (Twisted Sun Orchid)			
704.	1708 <i>Thelymitra fuscolutea</i> (Chestnut Sun Orchid)			
705.	11053 <i>Thelymitra macrophylla</i>			
706.	1710 <i>Thelymitra mucida</i> (Plum Orchid)			
707.	1717 <i>Thelymitra variegata</i> (Queen of Sheba)		P2	
708.	5084 <i>Thomasia grandiflora</i> (Large Flowered Thomasia)			
709.	32486 <i>Thuidium sparsum</i> var. <i>hastatum</i>			
710.	1334 <i>Thysanotus glaucus</i>		P4	
711.	1339 <i>Thysanotus multiflorus</i> (Many-flowered Fringe Lily)			
712.	1343 <i>Thysanotus patersonii</i>			
713.	1344 <i>Thysanotus pauciflorus</i> (Few Flowered Fringe Lily)			
714.	1351 <i>Thysanotus sparteus</i>			
715.	1357 <i>Thysanotus thyrsoides</i>			
716.	1368 <i>Trachyantha divaricata</i>	Y		
717.	19041 <i>Trachymene coerulea</i> subsp. <i>coerulea</i>			
718.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
719.	1481 <i>Tribonanthes australis</i> (Southern Tiurmdin)			
720.	1482 <i>Tribonanthes brachypetala</i> (Nodding Tiurmdin)			
721.	1483 <i>Tribonanthes longipetala</i> (Branching Tiurmdin)			
722.	1485 <i>Tribonanthes violacea</i> (Violet Tiurmdin)			
723.	8251 <i>Trichocline spathulata</i> (Native Gerbera)			
724.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
725.	1363 <i>Tricoryne tenella</i>			
726.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
727.	17763 <i>Trifolium campestre</i> var. <i>campestre</i> (Hop Clover)	Y		
728.	4293 <i>Trifolium cernuum</i> (Drooping Flower Clover)	Y		
729.	4297 <i>Trifolium glomeratum</i> (Cluster Clover)	Y		
730.	4302 <i>Trifolium ligusticum</i> (Ligurian Clover)	Y		
731.	4304 <i>Trifolium ornithopodioides</i> (Birdsfoot Fenugreek)	Y		
732.	14738 <i>Trifolium resupinatum</i> var. <i>resupinatum</i>	Y		
733.	4313 <i>Trifolium subterraneum</i> (Subterranean Clover)	Y		
734.	147 <i>Triglochin mucronata</i>			
735.	18587 <i>Triglochin nana</i>			
736.	151 <i>Triglochin striata</i>			
737.	4737 <i>Tripterococcus brunonis</i> (Winged Stackhousia)			
738.	33019 <i>Trithuria australis</i>		P4	
739.	1141 <i>Trithuria submersa</i>			
740.	1561 <i>Tritonia crocata</i>	Y		
741.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
742.	7157 <i>Utricularia violacea</i> (Violet Bladderwort)			
743.	7665 <i>Velleia trinervis</i>			
744.	8257 <i>Vellereophyton dealbatum</i> (White Cudweed)	Y		
745.	7108 <i>Veronica arvensis</i> (Wall Speedwell)	Y		
746.	12392 <i>Verticordia attenuata</i>		P3	
747.	12411 <i>Verticordia densiflora</i> var. <i>cespitosa</i>			
748.	15432 <i>Verticordia densiflora</i> var. <i>densiflora</i>			
749.	12412 <i>Verticordia densiflora</i> var. <i>pedunculata</i>		T	
750.	4322 <i>Vicia sativa</i> (Common Vetch)	Y		
751.	11474 <i>Vicia sativa</i> subsp. <i>nigra</i>	Y		
752.	6575 <i>Vinca major</i> (Blue Periwinkle)	Y		

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
753.	724 <i>Vulpia myuros</i> (Rat s Tail Fescue)	Y		
754.	7384 <i>Wahlenbergia capensis</i> (Cape Bluebell)	Y		
755.	7389 <i>Wahlenbergia preissii</i>			
756.	8282 <i>Waitzia suaveolens</i> (Fragrant Waitzia)			
757.	12072 <i>Wurmbea dioica</i> subsp. <i>alba</i>			
758.	1249 <i>Xanthorrhoea acanthostachya</i>			
759.	1253 <i>Xanthorrhoea gracilis</i> (Graceful Grass Tree, Mimidi)			
760.	1256 <i>Xanthorrhoea preissii</i> (Grass tree, Palga)			
761.	6285 <i>Xanthosia ciliata</i>			
762.	6289 <i>Xanthosia huegelii</i>			
763.	2331 <i>Xylomelum occidentale</i> (Woody Pear, Djandin)			
764.	1049 <i>Zantedeschia aethiopica</i> (Arum Lily)	Y		

Conservation Codes

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 wholly 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.