

# REHABILITATION MANAGEMENT AND MONITORING PLAN

**LOT 265 QUEELUP ROAD (PREVIOUSLY DUCANE  
ROAD), NORTH BOYANUP**

PREPARED FOR:

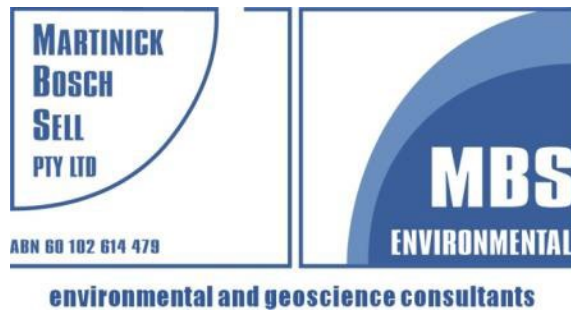
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MAY 2024

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## LOT 265 QUEELUP ROAD (PREVIOUSLY DUCANE ROAD), NORTH BOYANUP REHABILITATION MANAGEMENT AND MONITORING PLAN

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# 1. INTRODUCTION

This Rehabilitation Management and Monitoring Plan (RMMP) has been prepared for sand extraction operations on Lot 265 Queelup Road (Plan 232768) (the property) in North Boyanup. It is noted that a road name change occurred in 2024 and previously the road the property is located on was named Ducane Road; however, it is now renamed to Queelup Road and will be referred to as such throughout this document.

On 28 April 2023, the Regional Joint Development Assessment Panel (RJDAP) granted conditional a Development Approval (DA) to the proposed development expansion. Condition 6 of the approval states the following:

*Prior to the commencement of development, a Rehabilitation Management and Monitoring Plan shall be submitted for approval by the Shire. The Rehabilitation Management and Monitoring Plan shall include:*

- a) Revegetation and rehabilitation of the extraction area the subject of this approval;*
- b) The use of local endemic species within the native vegetation revegetation/rehabilitation areas;*
- c) Proposed revegetation/rehabilitation to a mixture of pasture and native vegetation, to ensure rural land uses and the ecological linkages are maintained;*
- d) Details of species types and maintenance and monitoring measures; and*
- e) The site is reinstated with topsoil to a finished rehabilitated level at least 2m above the highest groundwater table level.*

This RMMP has been developed in accordance with the above condition and should be read in conjunction with the DA and Extractive Industry Licence (EIL) report and approved development plans. This RMMP will replace any previous rehabilitation plans provided for DA and EIL purposes.

## 2. BACKGROUND

### 2.1 SITE LOCATION

Lot 265 is located in North Boyanup within the Shire of Capel in the South West region of Western Australia and is approximately 6 km southeast of Bunbury (Figure 1). The property totals 39.94 ha in size with unsealed Queelup Road (previously Ducane Road) running along the northern boundary and undeveloped road reserves along the western and southern boundaries and along the lower part of the eastern boundary.

### 2.2 EXTRACTION WORKS

The latest EIL area (as per plans submitted following granting of the conditional DA) covers 31.96 ha (Figure 2). The proponent has obtained a Clearing Permit (CPS 5319) from the Department of Water and Environmental Regulation (DWER) for clearing of native vegetation within the previously approved extraction area. This clearing permit will be amended, or a new permit obtained, to cover the minor changes in the extraction area.

To summarise, the extraction works will proceed in stages and comprise of the following:

- Removal of vegetation (where applicable).
- Removal and stockpiling of topsoil and litter.
- Sand extraction, in accordance with the Works and Excavations Plan (Figure 2).
- Transportation of sand off site.
- Formation of final landform in accordance with the Finished Development Plan (Figure 3).
- Topsoil respread and rehabilitation to a mixture of pasture and native vegetation (Figure 8).

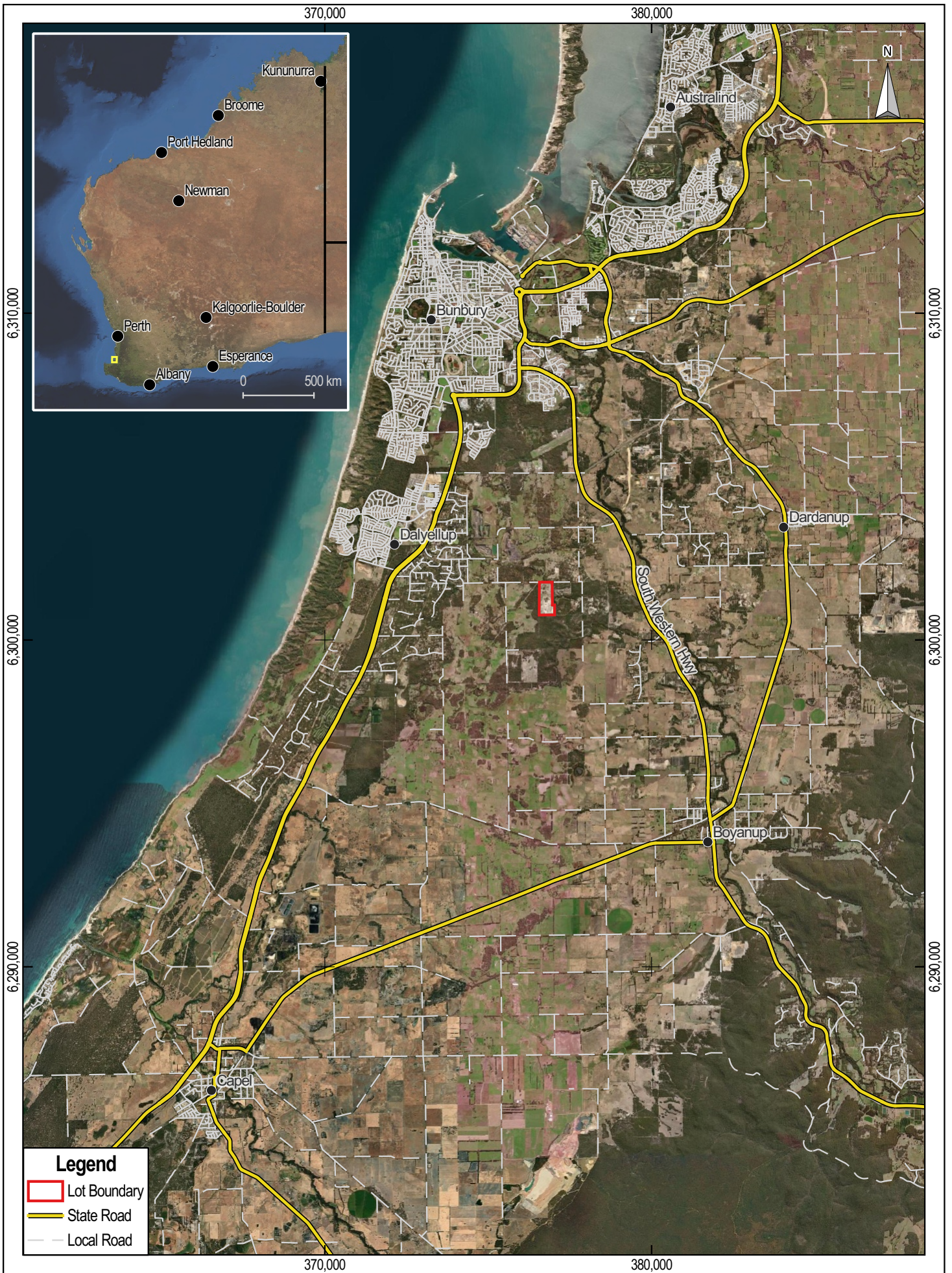
For further information regarding the extraction works, refer to the DA and EIL report and plans for Lot 265.

### 2.3 OBJECTIVES OF REHABILITATION

The objectives of rehabilitation on Lot 265 are as follows:

- Establish a stable and safe landform that is at least 2 m above the highest groundwater level.
- Remove any temporary infrastructure, rubbish, and debris.
- Establish pasture area to cater for future rural use.
- Establish locally sourced, self-sustaining, endemic vegetation corridors along the northern, southern, and eastern property boundaries.





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 Grid: GDA94 / MGA zone 50

0 2.5 5 km

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**Figure 1**

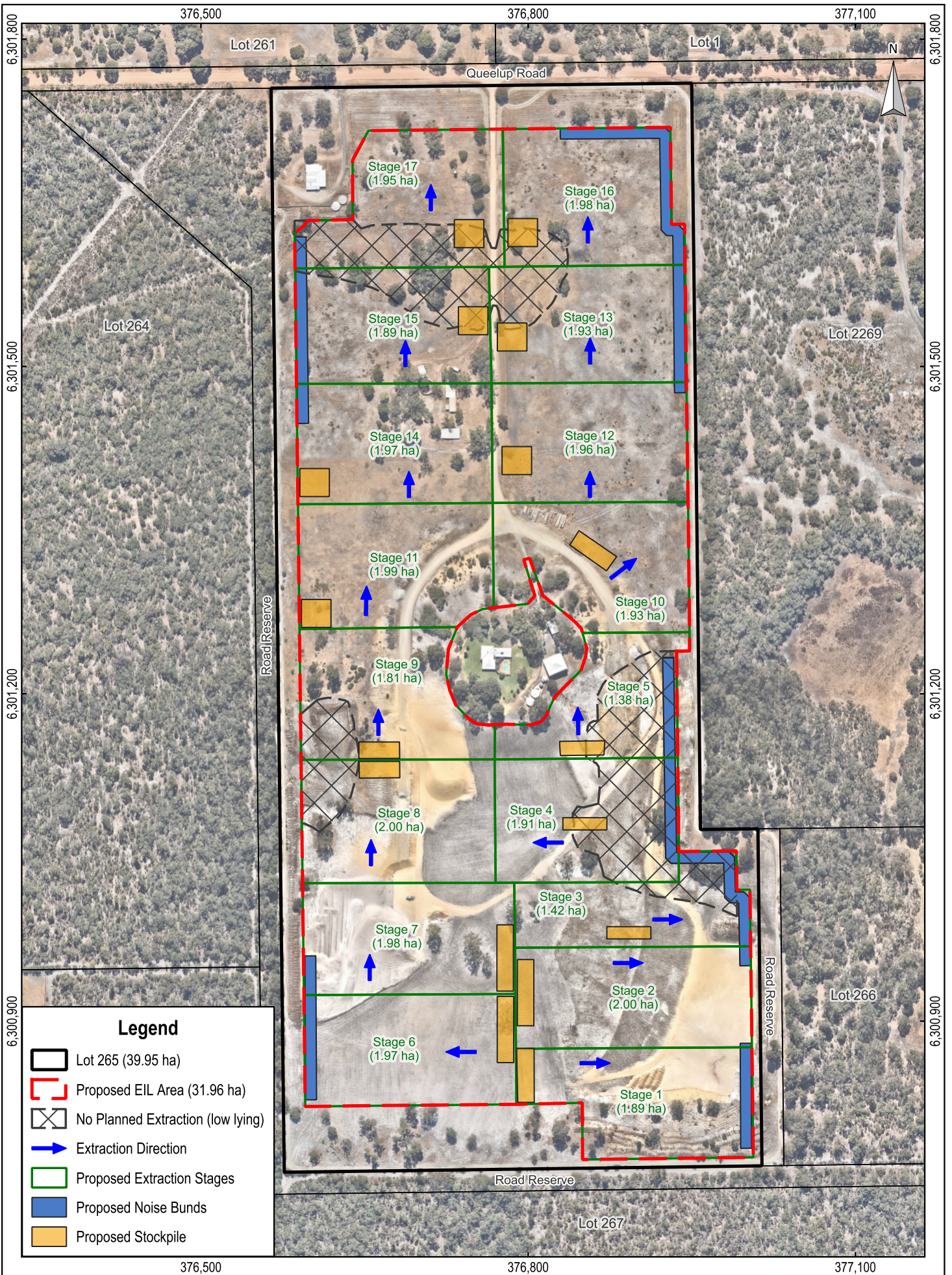
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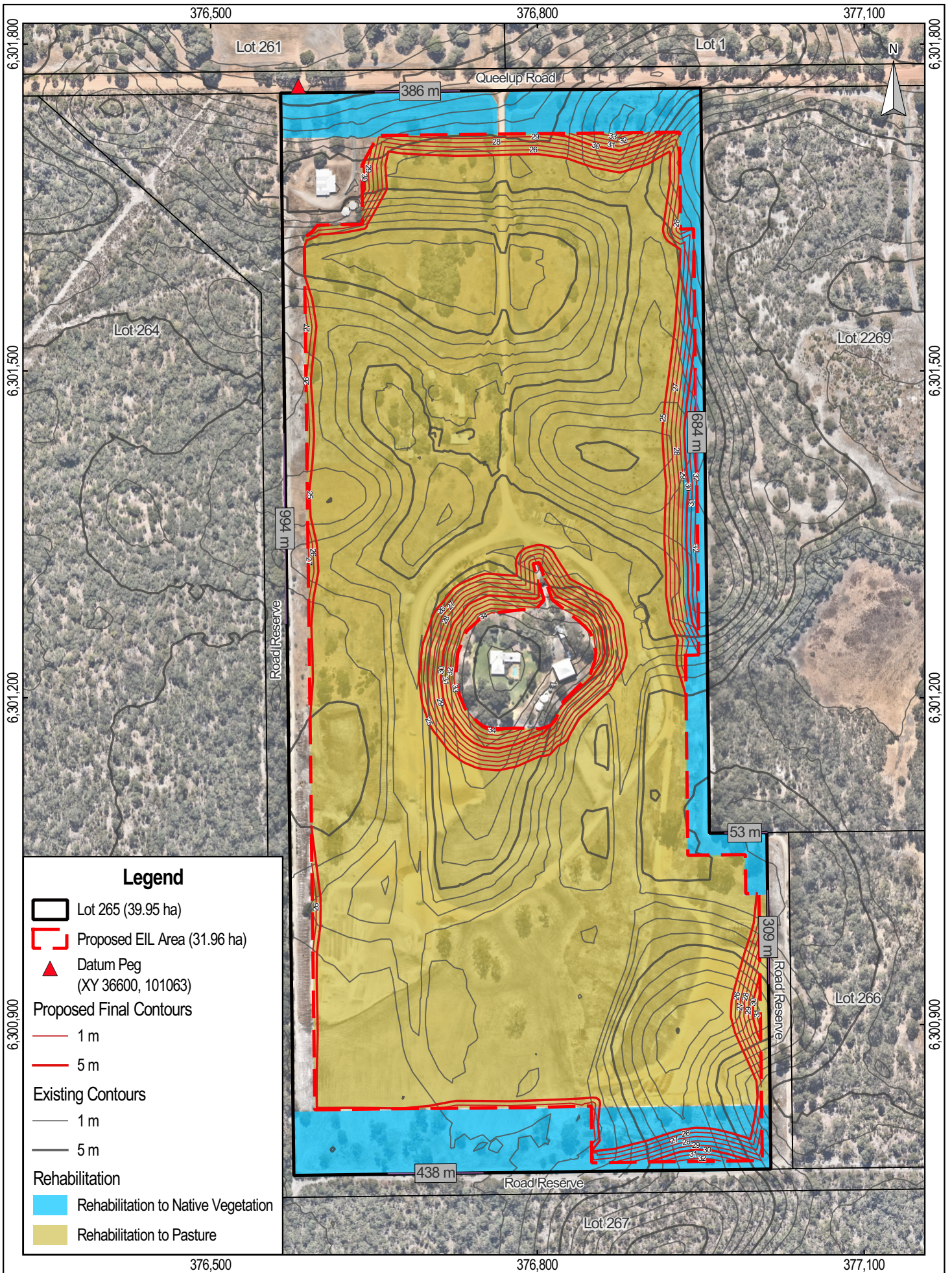
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**Figure 2**  
**Works and Excavation Plan**

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**Legend**

- Lot 265 (39.95 ha)
- Proposed EIL Area (31.96 ha)
- ▲ Datum Peg (XY 36600, 101063)
- Proposed Final Contours**
- 1 m
- 5 m
- Existing Contours**
- 1 m
- 5 m
- Rehabilitation**
- Rehabilitation to Native Vegetation
- Rehabilitation to Pasture

Scale: 1: 4,500  
 Original Size: A4  
 Air Photo Date: April 2024  
 Source: Extraction area existing contours from Thompson Surveying 2012.  
 Grid: GDA94 / MGA zone 50

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**Figure 3**  
**Finished Development Plan**

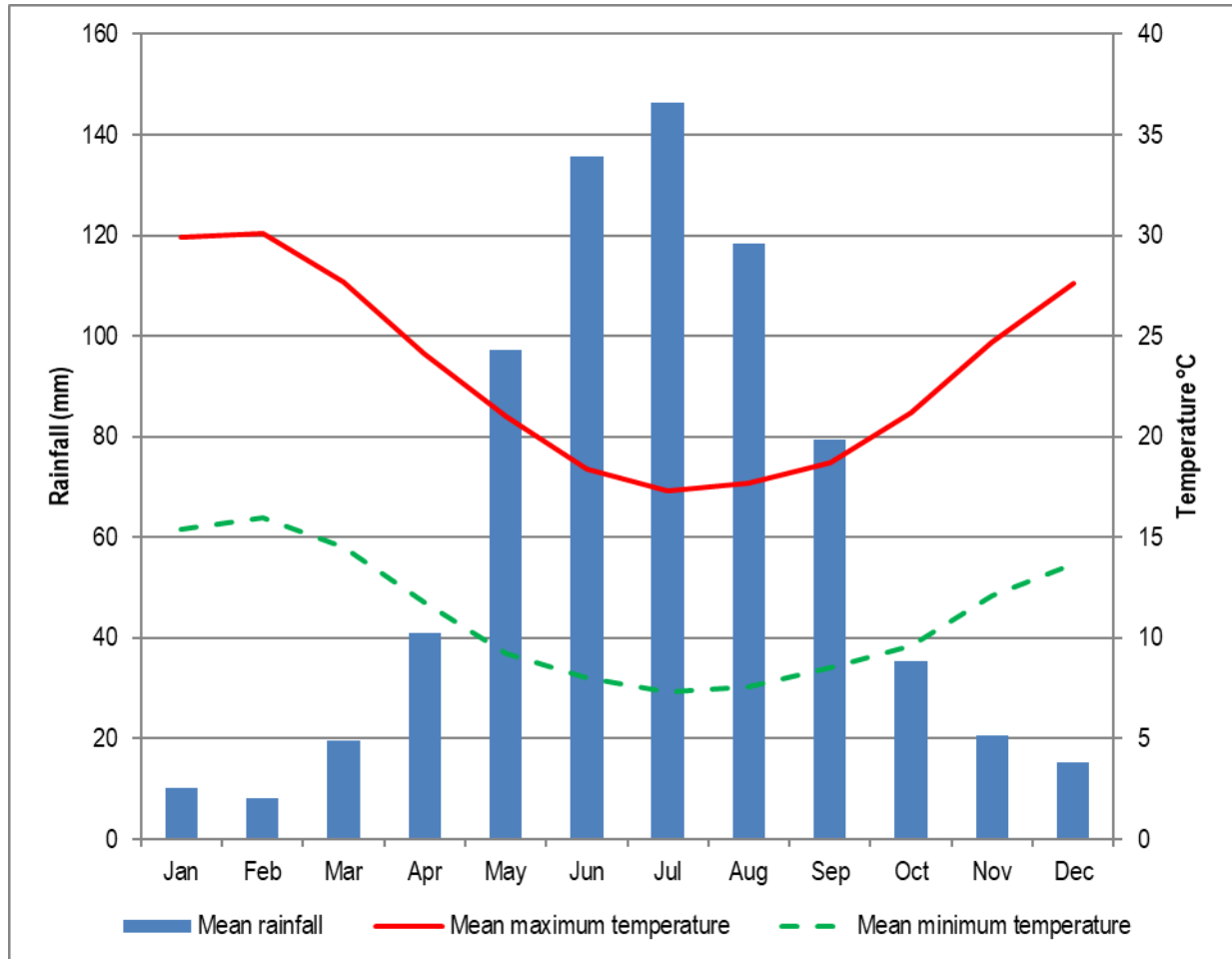
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### 3. ENVIRONMENTAL CONTEXT

#### 3.1 CLIMATE

The local climate for Lot 265 is Mediterranean, with cool wet winters and hot dry summers. Bureau of Meteorology (BOM) long-term average climate data for the closest meteorological station (Bunbury – 6 km northwest of the project) is shown in Figure 4. The average annual rainfall is 730.4 mm, mean minimum temperatures between 7°C and 16°C, and mean maximum temperatures between 17°C and 30°C (BOM 2024).



**Figure 4: Long-term Rainfall and Temperature Data (1995-2023) for Bunbury Meteorological Station 9965 (BOM 2024)**

The South West region, where Lot 265 is located, sits within the *Southern and South Western Flatlands West* (SSFW) subcluster where it is predicted with high confidence that (CSIRO and BOM 2023):

- Average temperatures will continue to increase across all seasons.
- There will be more occurrences of hot days and prolonged warm spells with a decrease in frosts.
- A trend of decreasing spring and winter rainfall will continue.
- There will be an increase in fire prone weather.

Within the SSFW it is also predicted, with medium confidence, that extreme rainfall events will increase. Between these storms, drought conditions are projected (with high confidence) to increase over the course of the century (CSIRO and BOM 2023).

## 3.2 LANDFORM AND SOILS

The entirety of Lot 265 is situated on the Swan Coastal Plain within the Bassendean System (212Bs) (DPIRD-064, DPIRD 2022b). The Bassendean System is characterised by sand dunes and sandplains with pale deep sand, semi-wet, and wet soil (DPIRD-064, DPIRD 2022b). There are three soil landscape units on the property, all of which are represented within the proposed extraction area and the rehabilitation areas (Table 1, Figure 5) (DPIRD-027, DPIRD 2022a). The Soil profile contains a thin grey sandy topsoil overlaying deep grey and yellow sands.

Landform on the property is gently undulating with low, scattered sand dunes between sandy flats. The dunes peak between 32 and 36 m Australian Height Datum (AHD). The flats are between 23 and 26 m AHD (Figure 2). The natural slopes vary from almost flat to approximately 1:8 (vertical:horizontal).

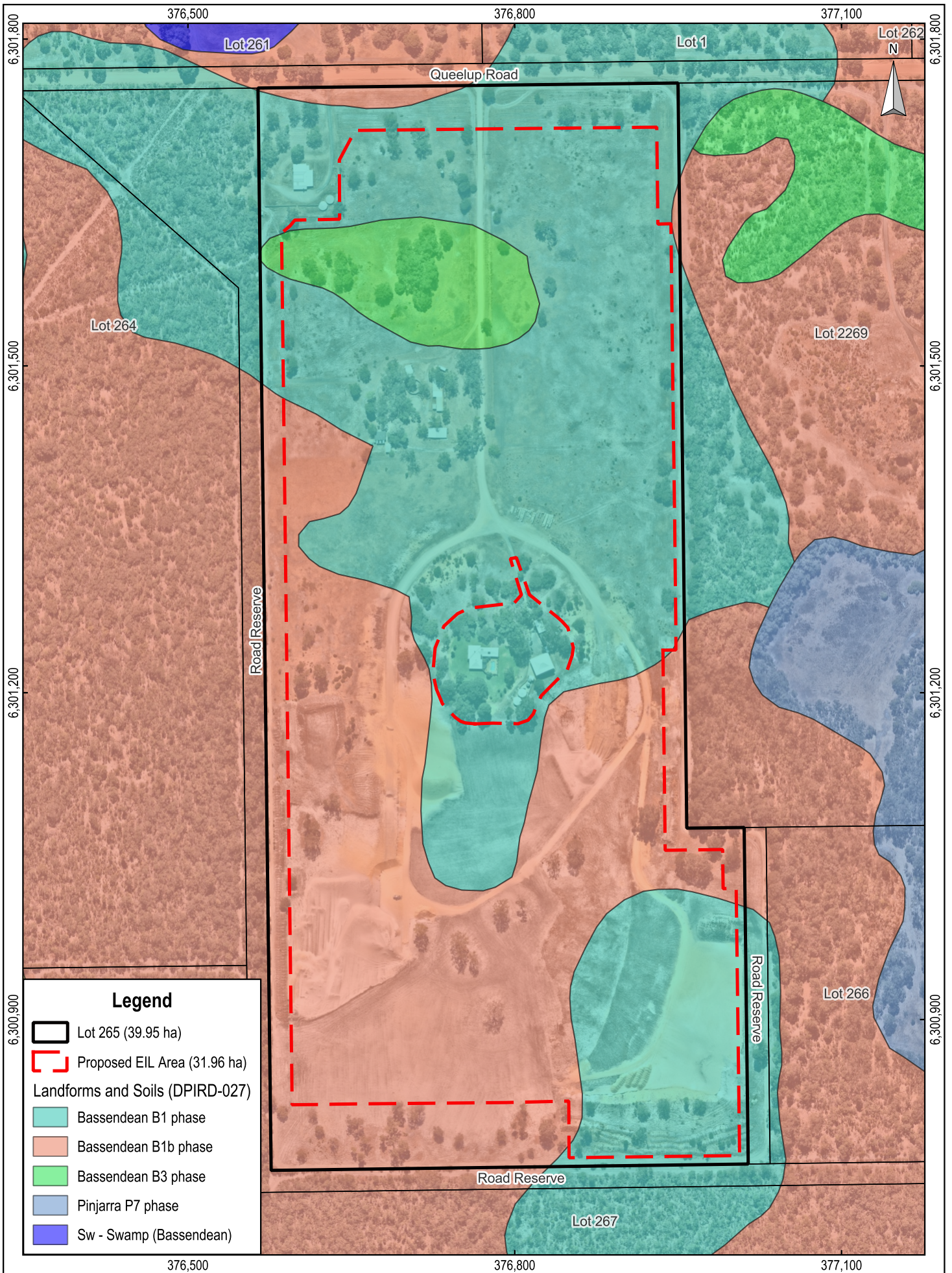
The site is well drained and there is no evidence of local runoff by way of erosion, scour, or defined water courses. Due to the nature of extraction works, wind erosion is a potential risk, particularly during the dry summer months when soil moisture is at its lowest. The risk of wind erosion for rehabilitation works has been addressed in this plan. A separate Dust Management Plan (MBS 2022) is also in place for the extractive operations.

As the proposed extraction area is located away from wetlands and waterways, the risk of acid sulfate soil (ASS) is low, and this is supported by DWER ASS mapping (DWER-055, DWER 2017). Outside of the proposed extraction area, in the northwest corner of the property, there is an area where the mapping indicates high to moderate risk of ASS (due to a wetland located to the northwest). The portion of Lot 265 mapped as high to moderate risk of ASS will be rehabilitated to native vegetation and will retain its natural landform, therefore, no ASS related monitoring or mitigation action is considered necessary.

**Table 1: Soil Units**

Soil Type	Description
Bassendean B1 Phase (212Bs_B1)	Extremely low to very low relief dunes, undulating sandplain, and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m; Banksia dominant.
Bassendean B1b Phase (212Bs_B1b)	Very low relief dunes of undulating sand plain with deep bleached grey sandy A2 horizons and pale yellow B horizons.
Bassendean B3 Phase (212Bs_B3)	Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands with an iron-organic pan or clay subsoil. Surfaces are dark grey sand or sandy loam.





Scale: 1: 4,500  
 Original Size: A4  
 Air Photo Date: April 2024  
 Grid: GDA94 / MGA zone 50

0 75 150 m

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**Figure 5**

**Landform and Soils**

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### 3.3 HYDROLOGY

#### 3.3.1 Surface Water

The property is within the South West catchment division and is intersected by the Preston River and Busselton Coast basins (DWER-027, DWER 2018a; DWER-029, DWER 2018c). Within the Preston River basin, the property falls in the Leschenault Estuary-Preston River catchment (DWER-028, DWER 2018b; DWER-029, DWER 2018c; DWER-030, DWER 2018d). Within the Busselton Coast basin, the property falls in the Five Mile Brook catchment (DWER-028, DWER 2018b; DWER-029, DWER 2018c; DWER-030, DWER 2018d).

There are no wetlands, watercourses, or drainage lines within Lot 265, inclusive of the proposed extraction area. The closest wetland to the property (and the rehabilitation areas) is a Multiple Use category sumpland (Unique Feature ID 1095) approximately 50 m to the northwest on Lot 261 (DP232768). The closest wetland to the extraction area is a Multiple Use category sumpland (Unique Feature ID 13236) approximately 100 m east across Lots 2269 and 266 (DP251514 and DP232768) (Figure 6).

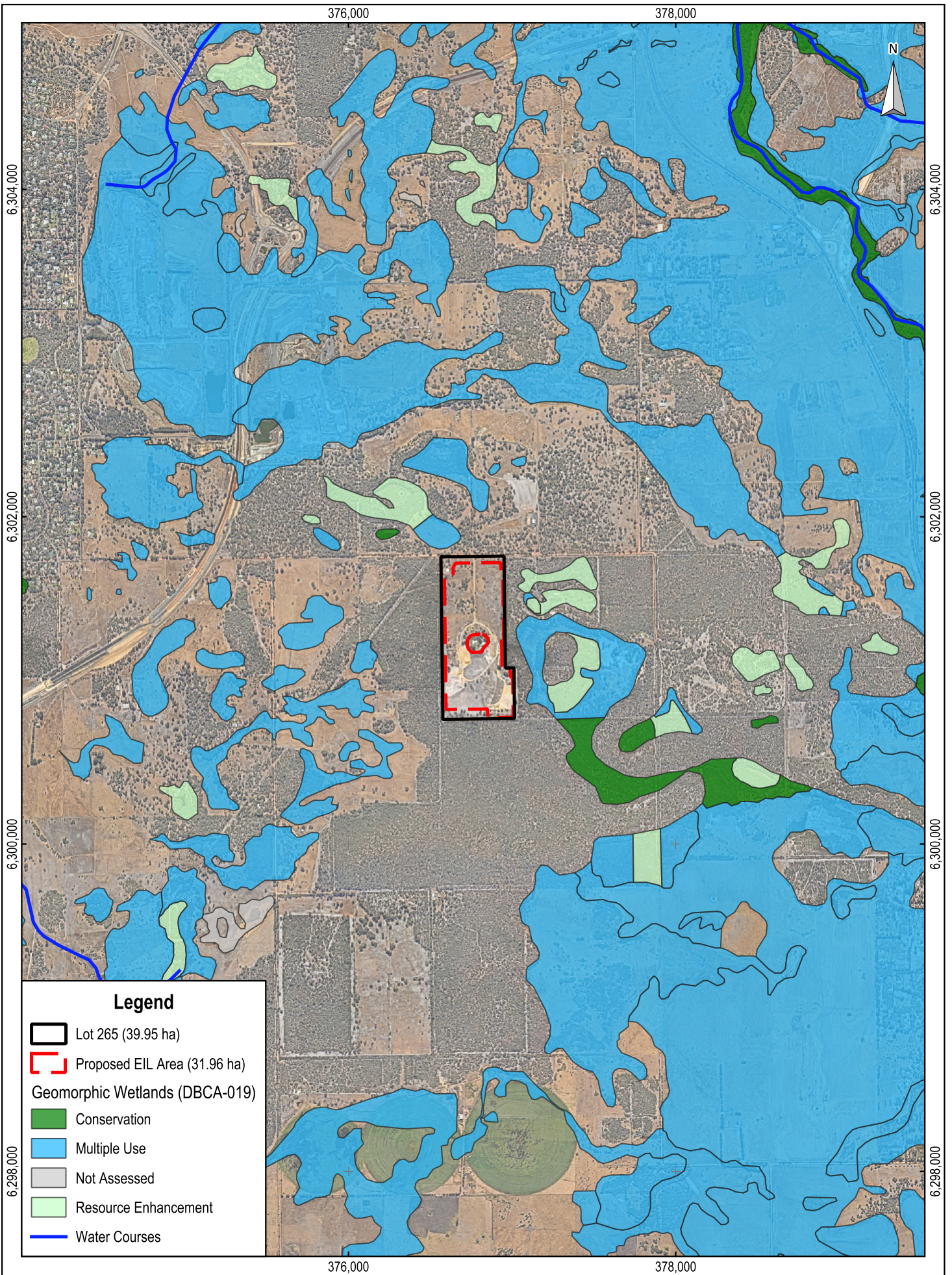
#### 3.3.2 Groundwater

Due to the highly permeable sandy soil of Lot 265, rainfall is expected to infiltrate quickly into the soil and recharge the local groundwater, except in high intensity rainfall events when some pooling might occur. The pit floor level is set at 25 mAHD, which is 2 m above the maximum seasonal groundwater level (Table 2) and in keeping with RJDAP Condition 6(e). To date, the operations on site have remained above 25 mAHD and have not intercepted groundwater. No significant change in the amount of groundwater recharge is expected between pre and post extraction.

**Table 2: Groundwater Levels on Lot 265 in September 2012**

Piezometer	Natural Ground Level (AHD)	Groundwater Level (AHD)
1	25.0 m	23.02 m
2	26.8 m	22.29 m





Scale: 1: 30,000  
 Original Size: A4  
 Air Photo Date: April 2024  
 Grid: GDA94 / MGA zone 50

0 0.5 1 km

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**Figure 6**  
**Wetlands and Waterways**

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## 3.4 VEGETATION

### 3.4.1 Regional Context

Lot 265 contains a mixture of native vegetation regrowth and cleared land around an array of existing infrastructure. There are two sets of broad scale (1:250,000) vegetation mapping available for this part of the southwest. The first set maps the entirety of Lot 265 as Vegetation Association 1000 (DPIRD-006, DPIRD 2019; Shepherd *et al.* 2002), which is described as Mosaic: medium forest; *Eucalyptus marginata* (Jarrah)–*Corymbia calophylla* (Marri) / low woodland; banksia / low forest; Tea tree (*Melaleuca* spp.).

The second set maps identifies two vegetation complexes, which are Southern River Complex and Bassendean Complex – Central and South (DBCA-046, DBCA 2018; Heddle *et al.* 1980, Webb *et al.* 2016) (Figure 7). Southern River Complex is described as: Open woodland of Marri – Jarrah – *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) – *Melaleuca raphiopylla* (Swamp Paperbark) along creek beds. Bassendean Complex – Central and South is described as: Vegetation ranges from woodland of Jarrah – *Allocasuarina fraseriana* (Sheoak) – *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgelands on the moister sites.

### 3.4.2 Vegetation Type

The site has been largely cleared since at least 1996, which is the year of the earliest aerial photo available on Landgate (2023) and is composed of unimproved pasture with patches of degraded native vegetation, scattered individual native trees and planted introduced species. The native vegetation consists predominately of Marri, Jarrah, *Agonis flexuosa* (Peppermint), and *Nuytsia floribunda* (WA Christmas tree) with a degraded understorey dominated by weed species. There are also scattered individuals of *Banksia attenuata*, *Banksia grandis*, *Banksia illicifolia*, *Kunzea glabrescens*, *Xanthorrhoea preissii*, *Macrozamia riedlei*, and *Hakea lissocarpha* (DER 2015). The planted trees include eastern states eucalyptus and other introduced plants that are mainly located around the residential houses, horse yards, and sheds.

## 3.5 FAUNA

As the property has been extensively cleared, there is limited habitat left for native fauna. However, the Threatened Western Ringtail Possum is known to occur in the local area and may utilise the remaining trees on the property at times. Black Cockatoos are also known to occur in the local area and there is some suitable foraging and potential breeding habitat within Lot 265. Native revegetation will include flora species that provide habitat for these (and other) local fauna species.

The property also has horses on site, which are intended to remain during and post operations. Kangaroos and rabbits are also frequently present. These grazing animals pose a risk to rehabilitation success and management measures will be included in this plan for grazing control (Section 6.3.6).

## 3.6 DIEBACK STATUS

Due to the degraded and sparse nature of native vegetation within the proposed extraction area, the presence or absence of *Phytophthora cinnamomi* (dieback) cannot be mapped. The Dieback Public Map by Project Dieback marks the central through northwest portion of the property as Low Confidence Infested and Lot 267 (P232768) immediately south as Moderate Confidence Infested. Consequently, the area should be considered as potentially dieback infested and managed accordingly.

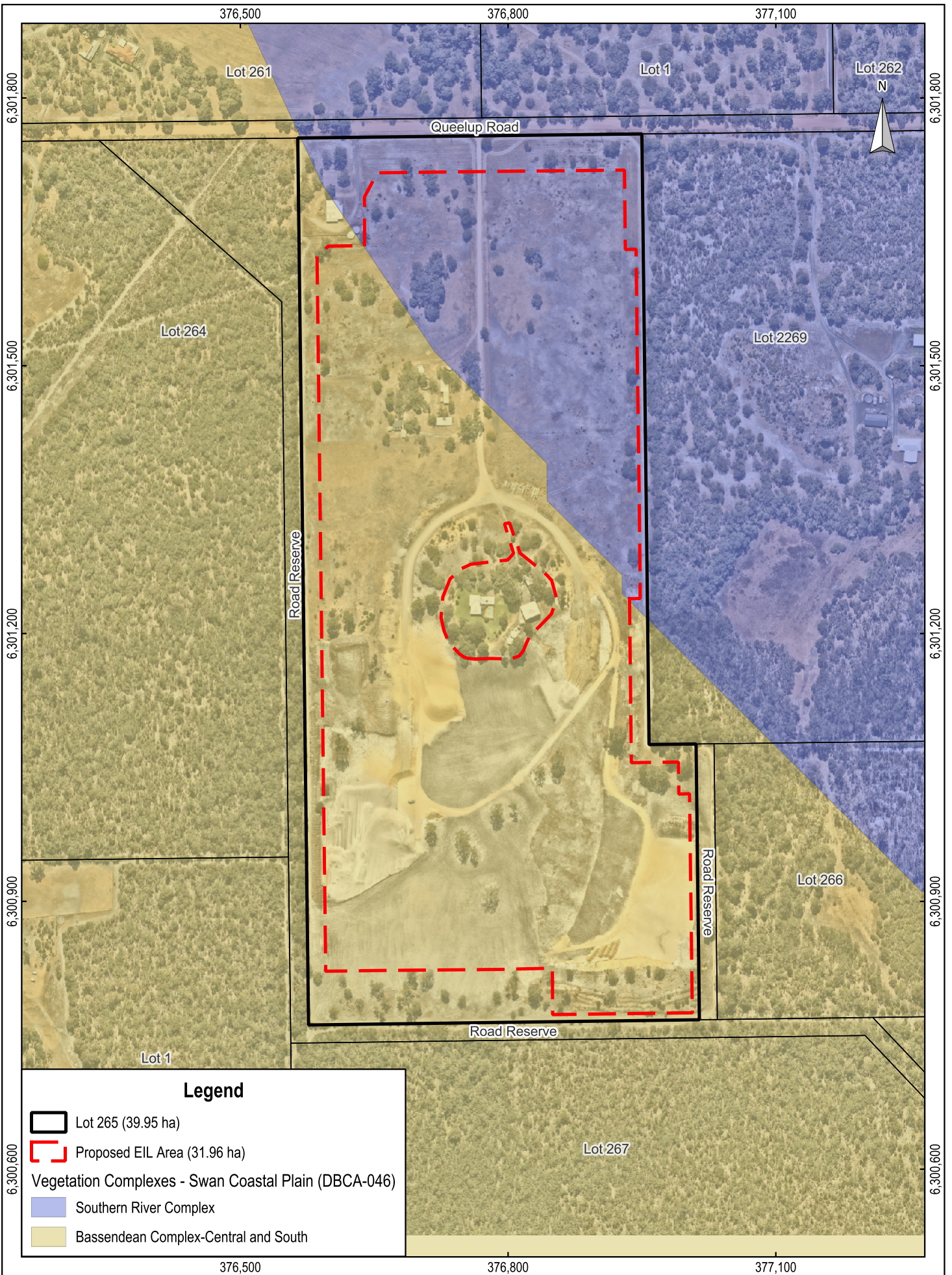
### 3.7 LANDUSE

Lot 265 is zoned “Rural” in the Shire of Capel Local Planning Scheme (LPS) No. 8 and is located in Special Control Area (SCA) 6 – Strategic Minerals and Basic Raw Materials, and SCA 8 – Regional Ecological Linkages. Lot 265 is mainly covered in unimproved pasture with patches of native and introduced vegetation (Figure 2). Sand extraction on the property commenced in 2019.

Currently, Lot 265 has multiple uses as a residence, horse property, and sand mining operation. There are two residences on the property, one central and the other in the northwest corner. Horse stables, associated sheds, and a sand training track are located in the central area of the property. Sand mining is occurring around the central residence, which has been excluded from the extraction area (Figure 2). There are overhead power connections to the houses, as well as underground telecommunications cables.

The surrounding properties support a range of rural land uses, including sand extraction operations, recreation (paintballing facility), agriculture, paddocks for grazing, residential dwellings and associated gardens, and bushland. Lot 1 (Diagram 43277) is a current sand extraction site. Lots 261 (Plan 232768) and Lot 264 (Plan 232768) were subject to extraction in the past (Landgate 2023).





**Legend**

- Lot 265 (39.95 ha)
- Proposed EIL Area (31.96 ha)
- Vegetation Complexes - Swan Coastal Plain (DBCA-046)
  - Southern River Complex
  - Bassendean Complex-Central and South

Scale: 1: 5,500  
 Original Size: A4  
 Air Photo Date: April 2024  
 Grid: GDA94 / MGA zone 50

0 75 150 m

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**Figure 7**  
**Vegetation Complex**

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## 4. REHABILITATION RISKS

A risk assessment has been undertaken for factors that may adversely impact upon rehabilitation success, particularly native rehabilitation. The risk assessment can be found in Appendix 2. The determination of risks is based on the risk rating system outlined in the *Environmental Management Plan Guidelines* developed by the Department of the Environment in 2014.

Key rehabilitation risks identified and their overall risk rating (assuming implementation of specified management and mitigation measures) are:

- Weeds — low risk.
- Dieback — low risk.
- Erosion — low risk.
- Fire — medium risk.
- Grazing — medium risk.
- Poor soil moisture — low risk.
- Climate change — low risk.
- Insufficient mulch — low risk.
- Availability of local seeds/cuttings — low risk.
- Depth to groundwater — low risk.
- Seed/Seedling quality — low risk.
- Unauthorised access — low risk.

Out of the 12 factors considered, two are ranked higher than 'Low' risk once management and mitigation measures are implemented. The fire risk rating is considered 'Medium' because, despite implementing management and mitigation measures, the likelihood remains possible and the impacts may be moderate, requiring substantial management effort. Grazing is considered a medium risk because of the presence of livestock, kangaroos, and rabbits in the local area; however, the listed management and mitigation methods will be effective in minimising impacts as far as practicable.

The identified rehabilitation risks have been considered in developing the rehabilitation measures in Section 6 and monitoring, maintenance, and mitigation measures in Section 8.

Regarding the risk of climate change, Southwest flora is unique and incredibly diverse, but little is known about its ability to cope with and adapt to a changing climate. Given climate projections (Section 3.1), it is reasonable to assume that the overall rainfall amount will decrease and that when rainfall does come it will be in the form of storm systems that rapidly released a high volume of water. Additionally, there are also the predicted increasing periods of drought to take into consideration. However, revegetation species are to only be local endemics in accordance with Condition 6(b) of the RJDAP approval requirements.

Additionally, CPS5319/1 Condition 9(a)(iii) requires that rehabilitation results in over storey, middle storey, and understorey species representative of the local area with a 10-km radius (WA Gov 2015). As such, the rehabilitation species selection is locally endemic within a 10-km radius and has been made with a mix of species that will add to local biodiversity values and habitat. For further information, refer to Section 6.3.2.

## 5. REHABILITATION ZONES

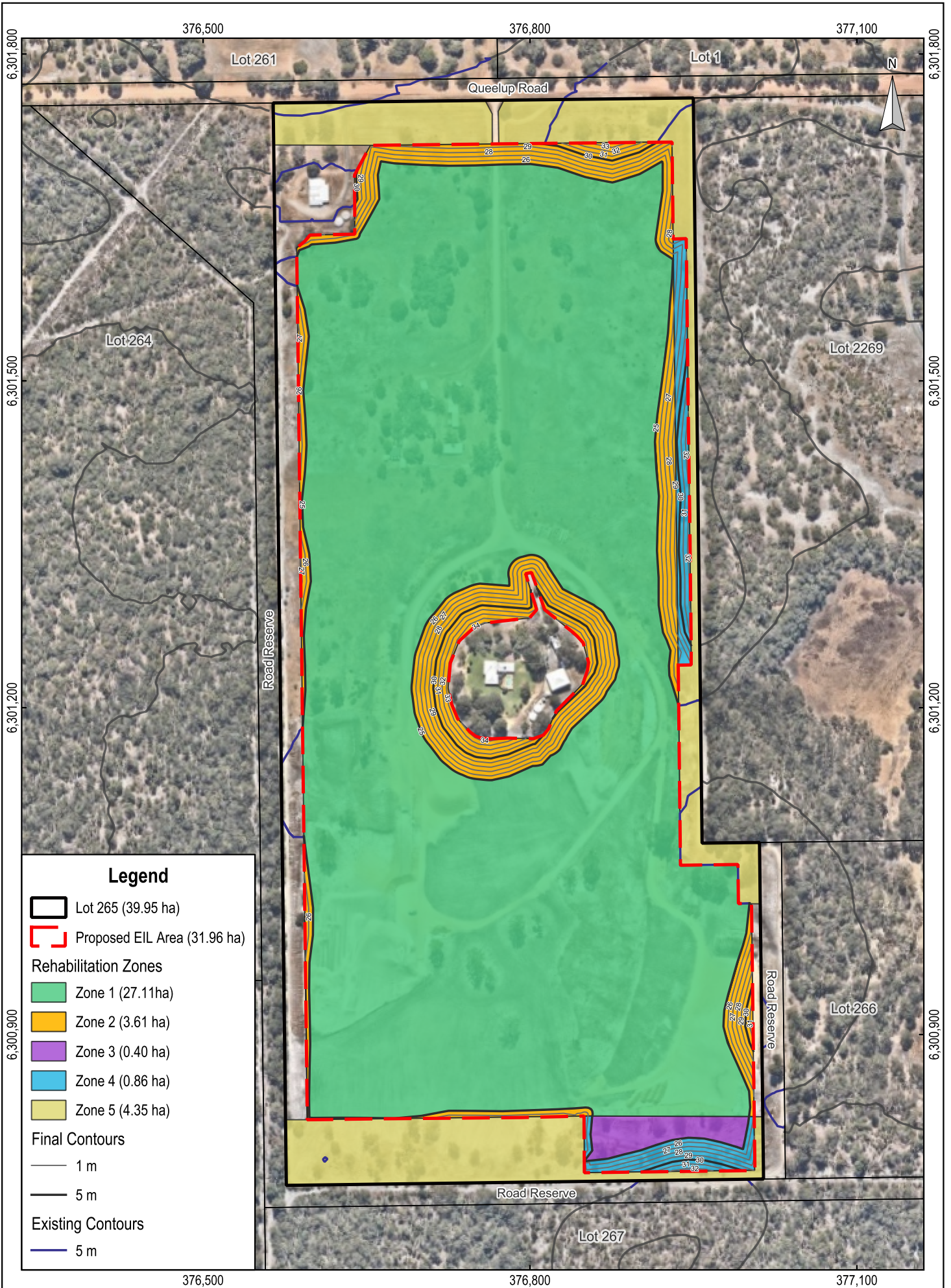
Rehabilitation activities differ across the proposed extraction area and reflect the intended final, long-term purpose of the property. Some of the rehabilitation will occur outside the extraction area. Five rehabilitation zones are proposed and shown in Figure 8. The zones are differentiated by extraction activity, post-use purpose, rehabilitation vegetation type, and final landform. The rehabilitation zones are as follows:

- Rehabilitation Zone 1 (Zone 1) — 27.11 ha at a final landform of flat to natural landform within extraction area, which will be rehabilitated to pasture.
- Rehabilitation Zone 2 (Zone 2) — 3.61 ha at a final landform of 1:4 batters within extraction area, which will be rehabilitated to pasture.
- Rehabilitation Zone 3 (Zone 3) — 0.40 ha at a final landform of flat within extraction area, which will be rehabilitated to native vegetation.
- Rehabilitation Zone 4 (Zone 4) — 0.86 ha at a final landform of 1:4 batters within extraction area, which will be rehabilitated to native revegetation.
- Rehabilitation Zone 5 (Zone 5) — situated outside of the proposed extraction area. An are (4.35 ha) of natural contours ranging between 1:6 and flat, which will be rehabilitated to native vegetation.

Zones 1 and 2 have an intended future use for the grazing of horses or other livestock while Zones 3, 4, and 5 will contribute to local biodiversity values and will provide habitat for native flora and fauna.

The residential dwelling in the centre of the property will be retained as a hill with maximum final batter slope of 1:6 around it (Figure 3). All final landform heights will be, at minimum, 2 m above the highest groundwater level as required by Condition 6(e) (RJDAP 2023).





Scale: 1: 4,500  
 Original Size: A4  
 Air Photo Date: April 2024  
 Grid: GDA94 / MGA zone 50

0 75 150 m

Mario Michele Giacci  
 Lot 265 Queelup Road  
 (Previously Ducane Road),  
 North Boyanup

**Figure 8**  
**Rehabilitation Zones**

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 ENVIRONMENTAL



## 6. REHABILITATION MEASURES

This section outlines the site works that will be undertaken to achieve the rehabilitation objectives. The works have been divided into general measures (Section 6.1), pasture specific measure (Section 6.2), and native vegetation specific measures (Section 6.3). An indicative schedule of works is provided in Section 6.4.

### 6.1 GENERAL MEASURES — ALL ZONES

#### 6.1.1 Removal of Structures

Any existing infrastructure within the extraction area will be removed prior to that stage being excavated. The materials removed will be transported off site for appropriate disposal or reuse. As part of decommissioning, any temporary site infrastructure (e.g. portable toilets) and waste/debris will also be removed ahead of rehabilitation.

#### 6.1.2 Vegetative Material

Clearing of native vegetation will be undertaken gradually. Cleared vegetation will be mulched and stockpiled for later use in rehabilitation. Some larger branches and tree trunks removed from the clearing areas will be transferred to the native vegetation rehabilitation areas to create microhabitats.

#### 6.1.3 Soil Management and Earthworks

Key measures relating to soil management and earthworks include the following:

- Removal of topsoil (approximately 100 mm thick) and remaining litter will proceed in stages ahead of extraction. When possible, stripped topsoil will be directly transferred into rehabilitation areas and spread across finalised land surfaces to avoid stockpiling, thus maximising seed and microbial benefits. When necessary, topsoil will be stockpiled for later use.
  - It is noted that because most of the extraction area is currently cleared, the topsoil is likely to have relatively high weed seed stock and may not be suitable for use in the native revegetation zones. In this case, the topsoil will be spread across Zones 1 and 2 for pasture use and mulch will be used in Zones 3 and 4 (as Zone 5 is outside the extraction area, it will maintain the existing natural topsoil).
  - If there is any topsoil that appears to have low weed risk and high potential for native seed (e.g. small patches where vegetation condition is rated Good), that topsoil will be stockpiled separately from the weed-infested topsoil for use in Zones 3 and 4.
- Sand extraction will proceed in stages (Figure 2). As each stage of sand extraction is completed, the landform will be finalised in accordance with the latest approved development plan (maximum approved batter slopes of 1:4). The final contours shall be achieved and confirmed by digital survey.
- The reduction of soil compaction is necessary to maximise plant root and water penetration into the soil during revegetation. Prior to topsoil return, the pit floor will be deep ripped along contours to remove any compaction from extraction operations. Other areas of potential compaction will also be deep ripped. Due to the sandy nature of the soils on Lot 265, the pit batter slopes are not expected to require deep ripping.
- Where appropriate, the stockpiled topsoil will be re-spread across the extraction area at 50 to 100 mm deep. A thin layer of mulch (approximately 50 mm) will also be added in Zones 3 and 4 to assist in erosion control and moisture retention.
- Following the return of topsoil (and mulch if relevant), all zones will be shallow ripped along the contours to a depth of 300 to 500 mm. This will create lines to assist in stormwater retention and infiltration. In native revegetation areas, seedlings will be planted into these lines. Shallow ripping is undertaken after the re-spread of topsoil/mulch to avoid compaction issues that could occur during spreading activity and set effective and useable rip lines. Scarification may be undertaken immediately prior to any planned seeding.

- In Zone 5, ripping will not be undertaken in areas where it may adversely impact on existing native vegetation.

#### 6.1.4 Soil Testing and Amendments

Post-ripping, but prior to seeding or planting, the following soil management will be undertaken:

- Soil compaction testing to ensure sufficient ripping has been undertaken for plant establishment. Compaction testing is only necessary in pit floor areas and other areas where deep ripping was undertaken.
- Soil sampling (0 to 100 mm, 100 to 200 mm, and 200 to 300 mm) and testing for:
  - Top 0 to 100 mm: pH, EC, organic carbon, plant available nutrients, and water repellence.
  - Subsoil 100 to 300 mm: pH and EC.

Based on the test results, additional ripping and/or soil amendments may be required to support revegetation.

#### 6.1.5 Weed Management

Weed control will be conducted during the extraction works as detailed in the Weed and Dieback Management Plan (MBS 2023). The aim of the Weed and Dieback Management Plan is to prevent the spread of weeds and the introduction of new weeds to Lot 265 as a result of extraction works. It is noted that, considering past and current land use on the property and the degree of disturbance, the property is already relatively weed infested and, therefore, eradication of weeds is not feasible.

Rehabilitation will return both pasture areas and native vegetation. The pasture areas are in line with the post-extraction land use and zoning of the property, and will include introduced pasture species (weeds). The aim of weed management during the rehabilitation works is to prevent weeds from compromising rehabilitation outcomes and to eradicate any declared pest species on Lot 265.

Prior to vegetation clearing and topsoil removal, any known infestations of declared pest species or other weeds considered to be of significance will be treated to minimise their spread.

Pre-planting/seeding weed control will be undertaken to prepare the rehabilitation areas for planting/seeding and will occur once topsoil has been respread and weeds have germinated. In addition to broad spectrum herbicides, weed specific herbicides will be used where appropriate to target broadleaf, grass, geophyte, and woody weeds. Pre-emergent weed control may also be considered in heavily weed infested areas. Maintenance spot spraying with selective herbicides will also be undertaken as necessary after native vegetation and pasture rehabilitation is established.

#### 6.1.6 Erosion Control

The majority of the final landform is flat, which significantly reduces the risk of erosion. Areas where batters will be finalised to a maximum 1:4 slope, within Zones 2 and 4, have a higher risk of erosion than the rest of the extraction area. Within Zone 4, mulch will be spread across the batter slopes as part of rehabilitation to minimise erosion and stabilise the soils in the short term. The establishment of pasture within Zone 2 and native vegetation in Zone 4 will then stabilise the soils for the long term. A soil binding agent may be considered as an alternative or additional erosion control measure, particularly for pasture establishment in Zone 2.

A water truck will be used as necessary to control wind generated dust and erosion across the site during the operations, for further details see the Dust Management Plan (MBS 2022).

### 6.1.7 Dieback Management

Dieback management for operations – extraction and rehabilitation – on Lot 265 is detailed in a separate Weed and Dieback Management Plan (MBS 2023) and in accordance with the *Biosecurity and Agriculture Management Act 2007* (BAM Act; WA Gov 2023), the *Australian Weeds Strategy 2017 to 2027* developed by the Invasive Plants and Animals Committee (2016), and the Dieback Working Group's (DWG 2021) *Best Practice Guidelines for Management of Phytophthora Dieback in the Basic Raw Material Industries* (the Guidelines) with further consideration given to other dieback guidance documentation.

Because the site is considered as potentially dieback infested, the main control measure will be the requirement for all vehicles to arrive and leave the site clean (including the tyres and undercarriage being cleaned of all soil and plant matter) both during sand extraction and rehabilitation works. It will also be required that tubestock for rehabilitation is sourced from a Nursery Industry Accreditation Scheme Australia (NIASA) accredited nursery. 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.

### 6.1.8 Access and Fire Management

Existing main access from Queelup Road (previously Ducane Road) into Lot 265 and down the centre of the property will be maintained to service post-extraction landuses on the property. Internal tracks will be left within the extraction area to service the rehabilitation works. Minimum 3 m wide fire breaks will be maintained along all property boundaries, these will not be extracted and will provide additional access to the native vegetation rehabilitation areas.

## 6.2 PASTURE REHABILITATION — ZONES 1 AND 2

Revegetation to pasture will follow the extraction stages (Figure 2). When extraction for a stage is finished, that area will be prepared for revegetation as described in Section 6.1 and the following pasture specific Sections 6.2.1 and 6.2.2.

### 6.2.1 Weed Management

In Zones 1 and 2, weed management will aim to control weeds that could outcompete the desired pasture species. Where necessary, weeds will be controlled prior to the seeding of pasture with a glyphosate based herbicide or target specific herbicide as required. Fluazifop may be used as a grass specific herbicide and Metsulfuron-methyl for geophytes. Buffer spraying for weeds will extend for 2 m out from the edge of pasture establishment to minimise new weed encroachment; however, care will be taken to avoid any impacts to surrounding native vegetation.

### 6.2.2 Pasture Establishment

Once all the preparation works have been undertaken, as discussed in Section 6.1, pasture will be established as follows:

- The site will be allowed to wet up with autumn rains before fertiliser is applied at 200 kg/ha of NPK and trace elements.
- A pasture species mix will then be direct seeded into the topsoil by appropriate machinery. This will include a mix of annual grasses, clovers, and other species suitable to Bassendean sands. Seeding will only take place once sufficient rains have fallen to allow for successful germination.
- Pasture seed will be sown at a rate of at least 30 kg of seed/ha.

## 6.3 NATIVE VEGETATION REHABILITATION — ZONES 3,4, AND 5

CPS 5319/1 specifies areas for native vegetation rehabilitation on Lot 265. These areas are mostly located in the buffer zones between the extraction area and the property boundaries as shown in Figure 3 and total 5.16 ha. The areas include a 40 m wide corridor along the northern property boundary, a 60 m wide corridor along the southern boundary and a 20 m wide corridor along the majority of the eastern boundary.

Rehabilitation to native vegetation will follow the extraction stages. When extraction for a stage is finished, the area will be prepared for revegetation as described in Section 6.1 and the following native revegetation specific Sections 6.3.1 to 6.3.6.

### 6.3.1 Weed Management

Weed control will be undertaken in the year ahead of planting/seeding, targeting both winter and summer weeds as appropriate. This will include, but will not be limited to, a pre-planting/seeding weed control program approximately 3 weeks prior to planting/seeding. Weed control will include a combination of broad spectrum and selective herbicides. Care will be taken to ensure that weed control does not adversely impact on native vegetation. Maintenance weed control may involve chemical and/or manual control depending on the weed species to be controlled.

### 6.3.2 Species Selection

CPS5319/1 states that the permit holder should establish native vegetation that will result in over storey, middle storey, and understorey species representative of the remnant endemic vegetation in the area (10 km radius). A selection of common flora species known to occur within 10 km of the site (Atlas of Living Australia 2022) and found on sandy Bassendean soils is presented in Appendix 1. The list includes flora species that are known to provide habitat for significant fauna species, particularly black cockatoos and the western ringtail possum. These species are expected to be available through local nurseries; however, availability may vary. Native regrowth from topsoil and mulch may also return these or other species. Any native species emerging on the site and known to occur locally will be counted towards the rehabilitation completion criteria.

While both dieback susceptible and dieback resistant species (see Appendix 1) will be planted/seeded initially, it is noted that the occurrence of dieback on Lot 265 cannot be ruled out and it may become necessary to focus rehabilitation efforts on dieback resistant species in order to achieve the completion criteria. Other native species not currently listed in Appendix 1 may also be planted/seeded provided these are known to occur in the local area and are appropriate for the soil type and conditions. Seedlings and seed used as part of the rehabilitation works will be of local provenance and sourced from native nurseries and seed collectors, where possible.

### 6.3.3 Planting

Local provenance seedlings, including a mixture of upper, middle, and under storey species (Appendix 1), will be planted to support native re-growth, so that the completion criteria (Section 7) are achieved. A minimum of 2,500 stems per hectare is required to survive to achieve the completion criteria; however, at least 5,000 seedlings per hectare will be planted to account for estimated loss of seedlings (between 40 – 60% over first three years after planting) and mitigate the possibility of a mass death event caused by extreme weather.

Seedlings will be ordered in advance, typically latest by November of the year preceding planting. Seedlings will be sourced from a NIASA nursery specialising in native seedlings. Planting of seedlings will be undertaken between late autumn and mid-winter (May to July), depending on the onset of significant winter rains. Seedlings will be set up with corflute plant guards for protection against grazers and to maximise chances of establishment. Additional treatments, such as slow release fertiliser, water crystals, and mulching, will be considered on a needs basis to achieve the completion criteria.

Native vegetation planting will be undertaken in stages. Planting works commenced in 2018 in the northern section of the property with infill plantings undertaken in these areas in 2022. The other native rehabilitation areas will be planted as soon as possible, prioritising the areas outside the extraction area as shown in Table 3. The need for infill plantings (or seeding) will be determined by comparing monitoring results against the completion criteria.

**Table 3: Native Rehabilitation Planting Stages**

Stage	Location	Timing for Initial Plantings
1	<ul style="list-style-type: none"> <li>Northern boundary.</li> </ul>	Completed
2	<ul style="list-style-type: none"> <li>All other native rehabilitation areas not within EIL:</li> <li>Northeast corner.</li> <li>Central east boundary.</li> <li>South boundary from central to west.</li> </ul>	Winter 2024
3	<ul style="list-style-type: none"> <li>South boundary from central to east</li> </ul>	Winter 2025
4	<ul style="list-style-type: none"> <li>East boundary — connecting central east to north east corner.</li> </ul>	Once extraction of this section completed.

### 6.3.4 Seeding

Planting of seedlings will be the primary method of native rehabilitation. Seeding will be considered as a supplementary measure in areas where weed cover is low. If seeding is considered necessary, an experienced seed contractor will be engaged to undertake collection, storage, treatment, and application of native seed. Seed treatments will be tailored to the species and seed will also be coated with a mycorrhizal fungi mixture to enhance germination, survival, and growth. Seeding will occur at a minimum rate of 3 kg of native seed/ha and will be undertaken by hand.

A cover crop of native everlastings (approximately 5 kg/ha) will also be applied to assist with soil stability, minimise potential for wind erosion and to provide protection for the native revegetation being established. This cover crop will be gradually lost over the years as the native revegetation grows and will not contribute towards the stem density completion criteria.

### 6.3.5 Natural Regrowth

Natural regrowth of native vegetation may occur from existing soil seed stock. Over time, seed will also be imported by wind and wildlife. Natural regrowth will be supported by appropriate weed control that avoids adverse impacts on native species. Natural regrowth will be difficult to differentiate if seeding is undertaken in addition to planting, unless the species from natural regrowth are not on the indicative species list (Appendix 1) and not included in the seeding. Natural regrowth will contribute towards meeting the final completion criteria.

### 6.3.6 Grazing Control

If needed, the risk of grazing by livestock, kangaroos, and rabbits on native revegetation will be minimised through the use of corflute plant guards until the vegetation has reached sufficient maturity to survive grazing impacts.

If excessive grazing occurs to the extent that the objectives of this RMMP cannot be accomplished, then fencing in strategic areas will be considered. Should fencing become necessary, it will be constructed from ring-lock material to a minimum height of 1.5 m and include a 600 mm high rabbit skirt, which also extends 300 mm 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 similar will be run along sections of the fence.

As the property boundary is already fenced to prevent livestock access from neighbouring properties, the pasture rehabilitation area may not need to be fenced separately for rehabilitation purposes. This will depend on the presence of livestock on the property and the degree of grazing pressure from kangaroos on pasture.

## 6.4 SCHEDULE OF WORKS

An indicative annual schedule of works has been developed for rehabilitation as shown in Table 4. Extraction will occur in approximately 2 ha stages (Figure 2) commencing in the southeast corner of Lot 265 and proceeding in a northerly direction. The pace of extraction will be dependent on demand for sand and this will also drive the pace of rehabilitation works.

**Table 4: Indicative Annual Rehabilitation Schedule**

No	Tasks	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Sand extraction.												
2	Seedling orders due												
3	Primary rehabilitation earthworks: reinstating embankments, ripping*												
4	Topsoil respreading in rehabilitation areas*												
5	Pre-planting/seeding weed control												
6	Seeding pasture												
7	Seeding of native species seeding — if any												
8	Planting native seedlings												
9	Maintenance weed control — as required												

\*Subject to suitable wind conditions due to potential to generate dust.



## 7. COMPLETION CRITERIA

To determine when revegetation objectives (defined in Section 2.3) have been met, it is necessary to formulate quantitative completion criteria and monitor those over time. Project specific progressive rehabilitation completion criteria have been developed for Lot 265 using local data and experience from similar projects in the region. Completion criteria for the rehabilitation works are presented in Table 5.

**Table 5: Completion Criteria**

Criteria	Zones	Interim Targets	Final Objectives	Assessment Method
Landform	1 to 4	Final landform is in accordance with the final contour plan for areas under or already rehabilitated.	Final landform is in accordance with the Post Extraction Plan (that may change over time subject to Shire of Capel approval).	Assessment undertaken by a licenced surveyor.
Soil Profile	1 to 4	Topsoil has been respread before rehabilitation in stages following extraction operation. This is provided that the topsoil is not considered unusable for Zones 3 and 4 due to high volume weed seed bank.	Topsoil has been replaced in rehabilitation areas where appropriate. Topsoil with high weed seed load should not be spread across Zones 3 and 4.	Monitoring undertaken by environmental specialist.
Pasture – Condition and Extent	1 and 2	Gradual establishment of pasture species. Seeding undertaken to infill any gaps.	Self-sustaining pasture cover across Zones 1 and 2.	Monitoring undertaken by the operator.
Native Vegetation – Species Composition	3, 4, 5	Gradual establishment of key species Appendix 1). Planting undertaken to infill any gaps.	Mixture of local upper, middle, and under storey species present that provide habitat for significant fauna (see Section 3.5).	Monitoring undertaken by an environmental specialist.
Native Vegetation – Density	3, 4, 5	Gradual establishment of key species (Appendix 1). Infill planting undertaken to address any gaps.	On average, across the revegetation area, the stem densities of native flora are: Upper storey (trees): >600/ha. Middle storey: >2,000/ha. Lower storey: >2,400/ha.	Monitoring undertaken by an environmental specialist.
Native Vegetation – Extent	3, 4, 5	Gradual rehabilitation being undertaken. In the extraction area, progressive rehabilitation follows the staged clearing and extraction.	Revegetation covers the areas specified in Figure 3 and Figure 8.	Monitoring undertaken by an environmental specialist.



<b>Criteria</b>	<b>Zones</b>	<b>Interim Targets</b>	<b>Final Objectives</b>	<b>Assessment Method</b>
Weeds	1 to 5	Weed control undertaken and weeds not outcompeting the revegetation.	Average weed cover <20%.	Monitoring undertaken by an environmental specialist.
Bare Ground	1 to 5	Bare patches are identified and infill planting or seeding undertaken.	No bare patches of ground more than 30 m <sup>2</sup> in size.	Monitoring undertaken by an environmental specialist.

## 8. MONITORING, MAINTENANCE, AND MITIGATION

Monitoring, maintenance, and mitigation measures for rehabilitation (Table 6) will commence following extraction operations for each individual stage (when final landform is completed and rehabilitation commences) and will continue until the completion criteria has been met and maintained for two years.

**Table 6: Monitoring and Maintenance Measures for Lot 265**

Item	Zone	Monitoring Frequency	Responsible	Maintenance/Mitigation
Final Landform	1 to 4	Once per completion of extraction stage.	Surveyor	Corrective works as necessary to meet final completion criteria.
Soil Profile	1 to 4	Once per completion of extraction stage.	Environmental specialist	Corrective works as necessary to meet final completion criteria.
Erosion	1 to 4	Quarterly.	Operator	Spreading of mulch or surface soil stabiliser if required. Recontouring if required.
Pasture establishment	1 and 2	Quarterly (See Section 8.1)	Operator	Re-seed areas of poor success. Trial alternative pasture species if required. Short term watering of dry areas until established. Mitigation of poor soils as required (e.g: fertiliser). (See Section 8.1)
Native species establishment	3, 4, 5	Biannually: first 3 years (autumn and spring).	Environmental specialist	Infill seeding/plantings if necessary. (See Section 8.2)
		After three years: Annually: as required until completion criteria met (spring). (See Section 8.2)		
Grazing	3, 4, 5	Biannually: first 3 years (autumn and spring).	Environmental specialist	Corflute plant guards. Fencing if necessary.
		After three years: Annually: as required until completion criteria met (spring).		
Weeds	1 to 5	Biannually: first 3 years (autumn and spring).	Environmental specialist	Weed control as necessary to meet final completion criteria.
		After three years: Annually: as required until completion criteria met (spring).		
Bare ground	1 to 5	Biannually: first 3 years (autumn and spring).	Environmental specialist	Infill seeding/plantings if necessary.
		After three years: Annually: as required until completion criteria met (spring). (See Section 8.2)		

## 8.1 ZONES 1 AND 2 MONITORING AND MITIGATION

Zones 1 and 2 will be restored to pasture and the rehabilitation monitoring of this zone will involve the following:

- Random walking transects across the pasture rehabilitation areas.
- Notes will be taken of following:
  - Areas where infill seeding is required.
  - Areas where weed control is required.
  - Areas where erosion control is required.
  - Signs of significant grazing or other factor(s) potentially impacting adversely on pasture establishment.
- Representative photographs will be taken.

Where required, mitigation measures will include, but are not limited to, the following:

- Supplementary seeding.
- Weed and/or pest control.
- Erosion control.
- Grazing control.
- Watering.

## 8.2 ZONES 3, 4, AND 5 MONITORING AND MITIGATION

Zones 3, 4, and 5 comprises of native vegetation and the rehabilitation monitoring of this zone will involve the following:

- Mixture of permanent and random quadrats: 10 m x 10 m each, with a minimum of 2/ha. Within each quadrat a 1 m x 1 m subplot will be setup to capture seed germination.
- During each monitoring survey, the following will be recorded for each quadrat:
  - 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.
  - Species of weeds.
  - Estimated live % foliage cover of weeds.
  - Vegetation condition (in accordance with Keighery 1994).
  - Signs of grazing, disease, pests, lack of moisture, erosion or other landform instability, or other factor(s) potentially impacting adversely on revegetation.
  - Location coordinates.
  - Photographs.
- Opportunistic traverses undertaken across the revegetation area when moving between monitoring quadrats. During these traverses, opportunistic notes of the following will be made:
  - Species of native plants not recorded in the monitoring quadrats.

- Species of weeds (particularly any declared pest species requiring eradication).
- Signs and location of 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 30 m<sup>2</sup>.

Where required, mitigation measures will include, but are not limited to, the following:

- Supplementary planting/seeding.
- Weed and/or pest control.
- Corflute plant guards.
- Fencing.
- Erosion control.

## **9. RECORD KEEPING, REPORTING, AND AUDITING**

### **9.1 RECORD KEEPING**

The applicant is responsible for collecting and maintaining records on the implementation of this RMMP at Lot 265. This will include, but is not limited to, the following data:

- Date and location of landform finalisation.
- Date and location of preparatory earthworks (e.g. spreading of topsoil and/or mulch, ripping).
- Date and location of revegetation actions (e.g. planting and seeding).
- Date and location of weed control actions.
- Date and location of monitoring, maintenance, and mitigation actions.
- Monitoring reports issued by consultants (e.g. environmental specialist).
- Invoices relating to the implementation of the RMMP.

### **9.2 REPORTING AND AUDITING**

The Shire of Capel requires that an annual audit of compliance is prepared by a suitably qualified independent expert. This audit is required to cover all the conditions of the DA and is also required to include a progress report on the approved RMMP, including the following:

- Details of completed, ongoing, and future rehabilitation areas.
- Photos of rehabilitation areas.
- Monitoring and reporting details, if available.
- Start and completion dates, and expected start dates, if applicable.
- A map depicting the rehabilitation areas and their completion progress.

The environmental specialist will prepare reports for each of the monitoring surveys detailing findings, progress towards completion criteria, and recommendations for management actions. These reports can be used as evidence for the annual compliance audit.

## 10. REVISIONS

This RMMP takes an adaptive approach to monitoring and management with the aim of being able to adjust and implement change where necessary to achieve the best end outcomes. As such, this RMMP may require updating throughout the life of the project subject to the outcomes of ongoing monitoring and revegetation success rates. The ability to revise the RMMP as needed will give greater flexibility in allowing for the implementation of improved actions.

## 11. REFERENCES

- Atlas of Living Australia. 2022. *Search for Records in Atlas of Living Australia*. Accessed October 2022, search within 10 km of Lot 265 Ducane Road North Boyanup.  
[https://biocache.ala.org.au/search#tab\\_spatialSearch](https://biocache.ala.org.au/search#tab_spatialSearch).
- Bureau of Meteorology (BOM). 2024. *Climate Statistics for Australian Locations*. Accessed March 2024.  
[http://www.bom.gov.au/climate/averages/tables/cw\\_009965.shtml](http://www.bom.gov.au/climate/averages/tables/cw_009965.shtml).
- Centre for Phytophthora Science and Management. 2022. *Western Australian Native Plants Susceptible and Resistant to Phytophthora cinnamomi*. Accessed March 2024.  
[http://www.cpsm-phytophthora.org/resources\\_supRes.php](http://www.cpsm-phytophthora.org/resources_supRes.php)
- Commonwealth Scientific and Industrial Research Organisation and the Bureau of Meteorology (CSIRO and BOM). 2023. *Climate Change in Australia - Southern and South-Western Flatlands West*. Accessed May 2023.  
<http://www.climatechangeinaustralia.gov.au>
- Department of Biodiversity, Conservation and Attractions (DBCA). 2007. *NatureMap: Mapping Western Australia's Biodiversity*. Department of Biodiversity, Conservation and Attractions. Accessed October 2022.  
<https://naturemap.dbca.wa.gov.au/>.
- Department of Biodiversity, Conservation and Attractions (DBCA). 2018. *Vegetation Complexes – Swan Coastal Plain (DBCA-046)*. Accessed June 2023.  
<https://catalogue.data.wa.gov.au/dataset/vegetation-complexes-swan-coastal-plain>
- Department of Environmental Regulation (DER). 2015. *CPS 5319/1 Permit, Plan and Decision Report*. Accessed May 2023.  
<https://ftp.dwer.wa.gov.au/permit/5319/Permit/>
- Department of the Environment. 2014. *Environmental Management Plan Guidelines*. Commonwealth of Australia 2014. Accessed March 2024.  
<https://www.agriculture.gov.au/sites/default/files/documents/environmental-management-plan-guidelines.pdf>
- Department of Primary Industries and Regional Development (DPIRD). 2019. *Pre-European Vegetation (DPIRD-006)*. Accessed May 2023.  
<https://catalogue.data.wa.gov.au/dataset/pre-european-dpird-006>
- Department of Primary Industries and Regional Development (DPIRD). 2022a. *Soil Landscape Mapping - Best Available (DPIRD-027)*. Accessed July 2023.  
<https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-best-available>
- Department of Primary Industries and Regional Development (DPIRD). 2022b. *Soil Landscape Mapping - Systems (DPIRD-064)*. Accessed July 2023.  
<https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-systems>
- Department of Water and Environmental Regulation (DWER). 2017. *Acid Sulfate Soil Risk Map, Swan Coastal Plain (DWER-055)*. Accessed July 2023.  
<https://catalogue.data.wa.gov.au/dataset/acid-sulphate-soil-risk-map-swan-coastal-plain-dwer-055>
- Department of Water and Environmental Regulation (DWER). 2018a. *Hydrographic Catchments - Basins (DWER-027)*. Accessed May 2023.  
<https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-basins>

Department of Water and Environmental Regulation (DWER). 2018b. *Hydrographic Catchments - Catchments (DWER-028)*. Accessed May 2023. <https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-catchments> (accessed May 2023).

Department of Water and Environmental Regulation (DWER). 2018c. *Hydrographic Catchments - Divisions (DWER-029)*. Accessed June 2023. <https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-divisions>

Department of Water and Environmental Regulation (DWER). 2018d. *Hydrographic Catchments - Subcatchments (DWER-030)*. Accessed May 2023. <https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-subcatchments>

Dieback Working Group Inc. (DWG). 2021. *Best Practice Guidelines for Management of Phytophthora Dieback in the Basic Raw Materials Industries*. Collaborative publication with Main Roads WA and Hanson Heidelberg Cement Group. Accessed May 2024. <https://www.dwg.org.au/publications-links/publications/download-info/basic-raw-materials-best-practice-guidelines/>

Heddle EM, Loneragan OW, and Havel JJ. 1980. *Vegetation of the Darling System*. IN: DCE 1980 *Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth, Western Australia.

Landgate. 2023. *Map Viewer Plus*. Historical aerial photographs. Accessed May 2023. <https://map-viewer-plus.app.landgate.wa.gov.au/index.html>

MBS Environmental (MBS). 2019. *Rehabilitation and Decommissioning Program*. Unpublished report for Mario Michele Giacci, Lot 265 Ducane Road, North Boyanup.

MBS Environmental (MBS). 2022. *Dust Management Plan*. Unpublished report for Mario Michele Giacci, Lot 265 Ducane Road, North Boyanup.

MBS Environmental (MBS). 2023. *Weed and Dieback Management Plan*. Unpublished report for Mario Michele Giacci, Lot 265 Ducane Road, North Boyanup.

Government of Western Australia (WA Gov). 2015. *Clearing Permit CPS5319/1*. Purpose permit granted 8 January 2015. Accessed May 2023. [https://ftp.dwer.wa.gov.au/permit/5319/Permit/CPS%205319\\_1%20-%20MM%20Giacci%20and%20Allmoon%20Nominees%20Pty%20Ltd%20-%20Lot%20265%20on%20Deposited%20Plan%20232768%20Boyanup%20Shire%20of%20Capel%20-%20permit%20plan%20and%20decision%20report.pdf](https://ftp.dwer.wa.gov.au/permit/5319/Permit/CPS%205319_1%20-%20MM%20Giacci%20and%20Allmoon%20Nominees%20Pty%20Ltd%20-%20Lot%20265%20on%20Deposited%20Plan%20232768%20Boyanup%20Shire%20of%20Capel%20-%20permit%20plan%20and%20decision%20report.pdf)

Government of Western Australia (WA Gov). 2023. *Biosecurity and Agriculture Management Act 2007*. Administered by the Department of Primary Industries and Regional Development. Accessed March 2024. [https://www.legislation.wa.gov.au/legislation/statutes.nsf/main\\_mrtitle\\_2736\\_homepage.html](https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_2736_homepage.html)

Government of Western Australia Development Assessments Panels - Regional Joint Development Assessment Panel (RJDAAP). 2023. *Regional Joint Development Assessment Panel Minutes, Friday, 28 April 2023; 12.00pm*. Meeting Number: RJDAAP/93. Meeting conducted by electronic means (Zoom) and open to public.

Invasive Plants and Animals Committee (IPAC). 2016. *Australian Weeds Strategy 2019 to 2027*. Australian Government Department of Agriculture, Fisheries and Forestry, Canberra. Accessed March 2024. <https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/pests-diseases-weeds/consultation/aws-final.pdf>

Shepherd, D P, Beeston, G R, and Hopkins, A J. 2002. *Native vegetation in Western Australia: extent, type and status*. Department of Primary Industries and Regional Development, Western Australia, Perth. Report 249.



Shire of Capel. 2023a. *Local Planning Policy LPP6.2 Extractive Industries*. Accessed March 2024.  
[https://www.capel.wa.gov.au/Profiles/capel/Assets/ClientData/Document-Centre/Policies/Planning/LPP6\\_2 -  
\\_Extractive Industries FINAL.pdf](https://www.capel.wa.gov.au/Profiles/capel/Assets/ClientData/Document-Centre/Policies/Planning/LPP6_2_-_Extractive_Industries_FINAL.pdf)

Shire of Capel. 2023b. *Shire of Capel Local Planning Scheme No. 8*. Gazetted 17 July 2023, Department of Planning, Lands and Heritage, Gordon Stephenson House, 140 William Street, Perth WA 6000. Accessed March 2024.  
<https://www.capel.wa.gov.au/local-planning-schemes.aspx>

South Coast Natural Resource Management (South Coast NRM). 2023. *Dieback Public Map*. Accessed March 2024.  
<https://dieback.net.au/dieback-public-map/>

Webb A, Kinloch J, Keighery G, Pitt G. 2016. *The extension of vegetation complex mapping to landform boundaries within the Swan Coastal Plain landform and forested region of south-west Western Australia*. Accessed March 2024.  
<https://library.dbca.wa.gov.au/static/FullTextFiles/072149/072149.pdf>

Western Australian Herbarium (2023). *FloraBase*. Accessed March 2024.  
<https://florabase.dpaw.wa.gov.au/>

## PLATES



**Plate 1: Example of Remnant Native Vegetation in Extraction Area**



**Plate 2: Example of Bare Area in Extraction Area**





**Plate 3: Part of Northern Native Vegetation Rehabilitation Area**



**Plate 4: Part of Eastern Native Vegetation Rehabilitation Area**



**Plate 5: Part of Southern Native Vegetation Rehabilitation Area**



## APPENDICES

## **APPENDIX 1: INDICATIVE REHABILITATION SPECIES LIST**

Species	Common Name	Strata	Dieback			Black Cockatoo	Western Ringtail Possum	Zone Selected		
			R	S	U			3	4	5
<i>Acacia applanata</i>	Golden Grass Wattle	Under			x			x	x	x
<i>Acacia pulchella</i>	Prickly Moses	Under	x					x	x	x
<i>Acacia saligna</i>	Coojong	Mid	x					x	x	x
<i>Adenanthos meisneri</i>	Woolly Bush	Mid		x				x	x	x
<i>Agonis flexuosa</i>	Peppermint	Upper	x			CBC	x	x	x	x
<i>Allocasuarina humilis</i>	Scrub Sheoak	Mid	x					x	x	x
<i>Anigozanthos manglesii</i>	Mangles Kangaroo Paw	Under	x					x	x	x
<i>Banksia attenuata</i>	Slender Banksia	Upper		x		CBC; BBC		x	x	x
<i>Banksia grandis</i>	Bull Banksia	Upper		x		CBC; FRTBC; BBC		x	x	x
<i>Banksia ilicifolia</i>	Holly-leaved Banksia	Upper		x		CBC; BBC		x	x	x
<i>Bossiaea eriocarpa</i>	Common Brown Pea	Under		x				x	x	x
<i>Conostylis acuelata</i>	Prickly Conostylis	Under	x					x	x	x
<i>Corymbia calophylla</i>	Marri	Upper	x			CBC; FRTBC; BBC	x	x	x	x
<i>Dampiera linearis</i>	Common Dampiera	Under	x					x	x	x
<i>Eucalyptus marginata</i>	Jarrah	Upper		x		CBC; FRTBC	x	x	x	x
<i>Hakea lissocarpha</i>	Honey Bush	Mid	x			CBC		x	x	x
<i>Hardenbergia comptoniana</i>	Native Wisteria	Other	x				x	x	x	x
<i>Hemiandra pungens</i>	Snake Bush	Under	x					x	x	x
<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Mid			x			x	x	x
<i>Hibbertia hypericoides</i>	Yellow Buttercups	Under		x				x	x	x
<i>Hovea trisperma</i>	Common Hovea	Under	x					x	x	x
<i>Hypocalymma angustifolium</i>	White Myrtle	Under	x					x	x	x
<i>Jacksonia furcellata</i>	Grey Stinkwood	Mid		x		CBC		x	x	x



Species	Common Name	Strata	Dieback			Black Cockatoo	Western Ringtail Possum	Zone Selected		
			R	S	U			3	4	5
<i>Kennedia prostrata</i>	Running Postman	Under	x					x	x	x
<i>Kunzea glabrescens</i>	Spearwood	Mid		x				x	x	x
<i>Melaleuca thymoides</i>	Sand Wattle-Myrtle	Mid		x			x	x	x	x
<i>Patersonia occidentalis</i>	Native Iris	Under		x				x	x	x
<i>Xylomelum occidentale</i>	Woody Pear	Upper		x		CBC		x	x	x

Dieback: R = Resistant. S = Susceptible. U = Unknown.

Black Cockatoo: CBC = Carnaby Black Cockatoo. FRTBC = Forest Red Tailed Black Cockatoo. BBC = Baudin's Black Cockatoo.

Sources: Centre for Phytophthora Science and Management (2022), Western Australian Herbarium (2022).

## **APPENDIX 2: RISK ASSESSMENT AND MANAGEMENT**

The risk of potential impacts to native rehabilitation success has been assessed using a qualitative risk assessment methodology to measure the likelihood of the risk occurring and the resulting level of consequence to designate a rating of Low, Medium, High, or Severe (DCCEEW 2014). The designated risk rating assumes that the specified management measures are being implemented.

**Table A2-1: Qualitative Measure of Likelihood**

Rating	Description
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the project.
Possible	Might occur during the life of the project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstance.

**Table A2-2: Qualitative Measure of Consequences**

Rating	Description
Minor	Minor incident of environmental damage that can be reversed.
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts.
High	Substantial instances of environmental damage that could be reversed with intensive efforts.
Major	Major loss of environmental amenity and real danger of continuing.
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage.

**Table A2-3: Risk Rating**

	Consequence				
	Minor	Moderate	High	Major	Critical
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Risk Factors to Rehabilitation	Risk Rating	Reasoning	Management/Mitigation
Weed	Low	<p>Likelihood: likely Consequence: minor</p> <p>Weeds can be spread or introduced via wind, vehicle movement, rain runoff, fauna activity (such as horses or kangaroos), movement of soil (including rabbit movement and diggings), dust, and introduction of soil/plant matter from external sources. The surrounding properties support a range of rural land uses, including paddocks for grazing and hay production, timber plantations, a sand extraction site, residential dwellings and associated gardens, and bushland. Many of these activities either involve weed species or they pose a risk for introducing and spreading weed species in the local area. Past and current rural activities on Lot 265 also pose a risk of introducing and spreading weed. Considering the local setting, the site history, the post-extraction land use, and establishment of pasture through rehabilitation then the occurrence, introduction, and spread of weeds is expected to continue. Weeds have potential to outcompete rehabilitation.</p>	<ul style="list-style-type: none"> <li>• Access to Zone 5 will be restricted to authorised personnel only.</li> <li>• Access to Zones 3 and 4 will be restricted to authorised personnel after extraction activities have ceased in accordance with the stages.</li> <li>• Clean on entry and exit requirements will be established.</li> <li>• Weed control will be undertaken (Sections 6.1.5, 6.2.1, and 6.3.1).</li> <li>• Monitoring will be carried out as specified in Table 6 and Section 8.2.</li> <li>• Any mulch externally sourced will be weed free.</li> <li>• If required, native revegetation will be protected from grazers (such as kangaroos, horses, and rabbits) with corflute tree guards. Fencing will be considered if needed (see Section 6.3.6).</li> <li>• All management requirements outlined in the Weed and Dieback Management Plan (MBS 2023) will be met.</li> </ul>
Dieback	Low	<p>Likelihood: unlikely Consequences: medium</p> <p>Dieback is spread through infected soil by fauna movement, surface water runoff, soil movement on sloping surfaces, spores, and human activity. Infected soil can contaminate vehicles, footwear, and equipment. Additionally, the transport of infected soil as import or export material from a site can contribute to dieback spread. Dieback may occur on site already. Historical and current land uses on the property and the surrounding area have potential to introduce and spread dieback and it may also spread via natural means (e.g. kangaroos). Dieback poses a risk to rehabilitation, particularly native revegetation. The rehabilitation</p>	<ul style="list-style-type: none"> <li>• Access to Zone 5 will be restricted to authorised personnel only.</li> <li>• Access to Zones 3 and 4 will be restricted to authorised personnel after extraction activities have ceased in accordance with the stages.</li> <li>• Clean on entry and exit requirements will be established.</li> <li>• Seedlings will be sourced from a NIASA nursery only.</li> <li>• Any externally sourced mulch will be certified dieback free.</li> </ul>

Risk Factors to Rehabilitation	Risk Rating	Reasoning	Management/Mitigation
	Low	works themselves, have potential to spread dieback e.g. through movement of soil, mulch, and seedlings.	<ul style="list-style-type: none"> <li>• All management requirements outlined in the Weed and Dieback Management Plan (MBS 2023) will be met.</li> <li>• If need be, the species mixture can be adjusted to focus on dieback resilient species.</li> </ul>
Erosion	Low	<p>Likelihood: unlikely Consequence: minor</p> <p>Wind erosion impacts are unlikely and will be managed through staged clearing and dust management measures. Water erosion is highly unlikely due to well-draining soils and staged rehabilitation. Any impacts from erosion are expected to be minor. Erosion will be managed through many of the requirements outlined in the Dust Management Plan (MBS 2022).</p>	<ul style="list-style-type: none"> <li>• Revegetation undertaken in stages and closely following the completion of sand extraction to ensure soil is stabilised in a timely manner.</li> <li>• Mulch and/or other soil stabilisers will be used as described in Section 6.1.6.</li> <li>• During operations, a water truck will be available to water dust producing areas as described in Section 6.1.6.</li> <li>• Ripping will be undertaken along contour lines to capture any localised runoff and increase retention of moisture, thus reducing the potential for wind erosion.</li> <li>• Monitoring and mitigation will be undertaken for erosion as described in Section 8.</li> <li>• A Dust Management Plan will be implemented for the extraction operations.</li> </ul>
Fire	Medium	<p>Likelihood: possible Consequence: moderate</p> <p>Fire presents a threat to all native vegetation in the local landscape, including revegetation. It is unlikely a fire will be started as a result of operations; however, it is considered possible for a fire to occur in the local area over the course of the project and, therefore, fire could impact the site.</p>	<ul style="list-style-type: none"> <li>• Weed control will be undertaken as described in Sections 6.1.6, 6.2.1, and 6.3.1 to reduce weed load contribution to fire risk.</li> <li>• Firebreaks will be maintained as required by local government.</li> <li>• Access tracks will be maintained across the property to facilitate fire-fighting access.</li> </ul>
Grazing	Medium	<p>Likelihood: possible Consequence: moderate</p>	<ul style="list-style-type: none"> <li>• The property is fenced to prevent access by livestock from surrounding properties (Section 6.3.6).</li> </ul>

Risk Factors to Rehabilitation	Risk Rating	Reasoning	Management/Mitigation
		<p>Grazing poses a medium risk due to the presence of horses, kangaroos, and rabbits. However, the management measures that will be put in place, particularly around the rehabilitation areas in Zones 3, 4, and 5, should be sufficient to achieve the desired outcomes. Without these management measures, the risk grazing poses would be much higher.</p>	<ul style="list-style-type: none"> <li>• If needed, corflute plant guards will be used to protect native revegetation.</li> <li>• Should it become necessary, strategic fencing will be considered to protect native revegetation.</li> <li>• Monitoring and mitigation measures for grazing will be undertaken as described in Section 8.</li> </ul>
Depth to Groundwater	Low	<p>Likelihood: unlikely Consequence: minor</p> <p>The sand extraction will reduce depth from ground surface to groundwater level. Uncontrolled excavation could go below groundwater table and result in seasonal ground surface inundation and potential rehabilitation failure if the species were not suited to these conditions.</p>	<ul style="list-style-type: none"> <li>• Pit floor is required to remain at least 2 m above the maximum groundwater level that was determined by groundwater monitoring and modelling (Section 3.3.2).</li> <li>• Final pit landform contours will be verified by a surveyor (Section 8).</li> <li>• Species selection for native revegetation is focused on species occurring locally under conditions that are similar to the post-extraction conditions in the rehabilitation area. Species selection differentiates between the flat pit floor and the batter slopes, as the latter has greater depth to groundwater (6.3.2 and Appendix 1).</li> <li>• Seed/cuttings will be collected from local provenance to maximise survivability.</li> </ul>
Poor Soil Moisture (e.g. due to low rainfall, prolonged heatwave)	Low	<p>Likelihood: possible Consequence: minor</p> <p>The South West region experiences reasonably predictable seasons, including seasonal rainfall that allows for seeding/planting planning at opportune times of year. However, sometimes unexpected periods of low rainfall and high temperatures result in poor soil moisture that will reduce germination and seedling survival.</p>	<ul style="list-style-type: none"> <li>• Ripping of soil pre-seeding/planting.</li> <li>• Mulch as needed to help retain soil moisture.</li> <li>• Selection of drought tolerant, local native species suited to the conditions.</li> <li>• Using significantly larger than required volume of initial seedling numbers (and/or seed where necessary) to offset unexpected losses.</li> <li>• Infill planting as required to meet rehabilitation targets.</li> </ul>

Risk Factors to Rehabilitation	Risk Rating	Reasoning	Management/Mitigation
Climate Change	Low	Likelihood: unlikely Consequence: minor Whilst climate change is expected to have long-term impacts on all native vegetation, it is not expected to have a significant impact on the proposed rehabilitation over the duration of the works, beyond what is already factored in due to variability in existing climate records.	<ul style="list-style-type: none"> <li>Seeding/planting will be undertaken during the winter when temperatures are low and expected rainfall maximised.</li> <li>Only local endemic species will be selected for rehabilitation.</li> <li>Selection of drought tolerant, local species suited to the conditions.</li> <li>Local provenance stock will be used for rehabilitation to maximise adaptation to local environment.</li> </ul>
Insufficient Mulch	Low	Likelihood: possible Consequence: minor As the extraction area is already mostly cleared, there will be limited onsite mulch available and possibly not enough to cover the native rehabilitation zones. Lack of mulch has potential to result in poorer rehabilitation outcomes (e.g. through poor soil moisture). Mulch can be sourced externally to the property from suppliers that are dieback and weed free.	<ul style="list-style-type: none"> <li>Where possible, mulch will be sourced from onsite vegetation proposed for clearing (Sections 6.1.2).</li> <li>If additional mulch must be sourced externally, it will be from a supplier that confirms dieback and weed free status of the material.</li> </ul>
Availability of local provenance seedlings/cuttings/seed	Low	Likelihood: possible Consequence: minor The availability of local provenance seedlings, cuttings and seeds is a concern in the South West as major revegetation projects are underway and stripping supply. However, with sufficient planning in advance this risk can be effectively mitigated.	<ul style="list-style-type: none"> <li>Forward planning for seed/cuttings to be sourced from accredited collectors or nursery using local provenance stock.</li> <li>Seed/cuttings collected from sources available from other properties owned by the applicant within the local area and in accordance with RIAWA guidelines.</li> </ul>
Seed/Seedling Quality	Low	Likelihood: unlikely Consequence: minor Poor quality seedlings have higher mortality rates and poor quality seed will have lower germination rates.	<ul style="list-style-type: none"> <li>Seedlings will be propagated or provided by a NIASA nursery (Section 6.3.3).</li> <li>Seedlings will be propagated from local endemic sources.</li> <li>Seed will be collected, stored, treated and broadcast by experienced operators (Section 6.3.4).</li> </ul>

Risk Factors to Rehabilitation	Risk Rating	Reasoning	Management/Mitigation
Unauthorised Access	Low	Likelihood: unlikely Consequence: minor Unauthorised access has potential to damage the revegetation and introduce weeds and disease. Lot 265 has a residential dwelling on it, which decreases the likelihood of unauthorised access. The property is fenced and Zone 2 will be further fenced to address grazing impacts, which will also act as a barrier for unauthorised access.	<ul style="list-style-type: none"> <li>• The property is fenced to prevent access.</li> <li>• Signage is erected at access points to advise of restrictions on and conditions of entry.</li> <li>• Fences and gates will be maintained as part of general property maintenance.</li> </ul>