Vegetation, Flora, Fauna and Environmental Considerations Report

Shire of Esperance 2023-24 Strategic Purpose Permit
Site D – Farmers Road Gravel Pit

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Acknowledgement of country

The Shire of Esperance acknowledges the Kepa Kurl Wudjari people of the Nyungar nation and Ngadju people who are the traditional custodians of this land and have a continuing connection to land, waters and community. The Shire of Esperance pays respect to Elders past, present and emerging, and extend that respect to other Aboriginal Australians present today.

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LIST OF ABBREVIATIONS

BAM Act: Biosecurity and Agriculture Management Act 2007 (WA)
BC Act: Biodiversity Conservation Act 2016 (WA)
BOM: Bureau of Meteorology
DBCA: Department of Biodiversity, Conservation and Attractions
EP Act: Environmental Protection Act 1986 (WA)
EPA: Environmental Protection Authority
EPBC Act: Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
IBRA: Interim Biogeographical Regionalisation for Australia
IUCN: International Union of Conservation Nature
LGA: Local Government Area
NVIS: National Vegetation Information System
PEC: Priority Ecological Community
PF: Priority Flora (Under BC Act)
SOE: Shire of Esperance
SLK: Straight Line Kilometres (Main Roads WA)
TEC: Threatened Ecological Community
TF: Threatened Flora (Under BC Act)
TPFL: Threatened and Priority Flora Database (DBCA)
TPRF: Threatened and Priority Flora Report Form
WAH: Western Australian Herbarium (PERTH)
WAOL: Western Australian Organism List

1 Executive Summary

The Shire of Esperance Environmental Team was commissioned by the Shire of Esperance Asset Management department to undertake a review of the flora, vegetation and fauna values on the proposed Farmers Road Gravel Pit project in 2022-23 as part of their Strategic Purpose Permit application.

A total of 129 vascular plant taxa, representative of 85 genera and 34 families, were recorded within Farmers Road Gravel Pit survey area. Of these 113 were native species and 16 were introduced. The plurality of taxa recorded were representative of the Myrtaceae (23 taxa), Proteaceae (21 taxa) and Fabaceae (12 taxa) families (see Appendix 1 for the complete incidental species list).

One threatened flora species pursuant to the Biodiversity Conservation Act (2016) and as listed by the Department of Biodiversity, Conservation and Attractions (DBCA) was recorded within the Farmers Road Gravel Pit survey area.

Two vegetation types were distinguished and described during the field survey, consisting of Vegetation Type A: Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa and Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland; Vegetation Type B: *Eucalyptus leptocalyx* and *Eucalyptus micranthera* woodland with open heathland; and Vegetation Type C: Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* over *Acacia myrtifolia* dominated shrubland. Overall, the vegetation communities mapped and species recorded in the Farmers Road Gravel Pit survey area were consistent with the historical mapping of Beard (1973) Esperance_47 was an appropriate match for vegetation type A, & C, Vegetation type B was deemed to be an appropriate watch for Esperance_4048. Esperance_47 is poorly represented within the Shire of Esperance and the Recherche IBRA sub-region with only 13% of its original extent remaining within the Shire of Esperance.

No plant taxa listed as Threatened pursuant to Schedule 1 of the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 were recorded during the survey within the proposed Farmers Road Gravel Pit survey area. The project area has been modified to exclude this taxon from the clearing area.

A total of 1.399 ha of the EBPC listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' Threatened Ecological Community (TEC) was present within Site D - Farmers Road Gravel Pit. No other TECs or PECs were located within Site D - Farmers Road Gravel Pit.

The site contains suitable foraging habitat for the EPBC listed Carnaby's cockatoo (*Calyptorhynchus latirostis*). 1.500 ha of high quality native foraging habitat. No other threatened fauna species under either the BC Act or EPBC Act are likely to be impacted upon by this proposal.

Should the development of Farmers Road Gravel Pit go ahead the following recommendations are made as a means of minimizing the impacts of infrastructure activities on the flora, vegetation and fauna values in the area:

- All vehicles and construction equipment to be cleaned prior to start of the project.
- Works to be carried out in the dry (summer) months to minimise spread of dieback.
- Follow up spraying of emergent weeds where gravel has been sourced from farmland to prevent weeds coming into the weed free areas.

- Remove and stockpile topsoil, log debris and leaf litter where possible for use in future rehabilitation programs. If possible, stockpiled topsoil should be directly replaced on disturbed areas;

These have been addressed in the attached Rehabilitation Plan, and provided these measures are implemented, there should be no impediments to approval of 'Site D Farmers Road Gravel Pit'.

1 Introduction

The Shire of Esperance endeavors to maintain a high level of road safety, being proactive in identifying high risk road designs and progressively upgrading them. The Shire of Esperance manages the largest road network of any local government in Western Australia, encompassing a total of 4,593 km of road. The Shire of Esperance is submitting 'Farmers Road Gravel Pit' project as Site D under the 2023/24 Strategic Purpose Permit (Figure 1), for the purpose of gravel extraction.

1.1 Location and Scope of Project

The proposed development involves the clearing native vegetation in order to extract gravel for use in road upgrades along Farmers Road. 3.332 ha of native vegetation will be cleared from within a 4.072 ha project area. The location of the gravel pit was selected due to the neighbouring landholder having completed drainage works within the road reserve, the drainage lines had revealed high quality gravel recourse within the project area (Figure 1).

The proposed works are located ~21 km southwest of Cascade, within the Shire of Esperance managed road reserve of Farmers Road. Specifically, it is located from 330 m to 1.56 km north of Clayhole Road, at straight line kilometre (SLK) 9.21 to 10.42 (Main Roads 2022). A point within the proposed clearing permit area is 308949m E, 6275931m N (UTM Zone 51 H, GDA94).

The Farmers Road Gravel Pit was initially planned to be part of a significantly larger clearing permit which included clearing along Farmers Road for road bituminisation, road upgrade designs have been altered to fit within the current maintenance zone of Farmers Road. The Shire of Esperance Road Construction Team had attempted to locate gravel sources from historically cleared farmland to completely avoid clearance of native vegetation associated with the road project, negotiation with private landholders have failed.

Figure 1. Photo of drainage line showing high quality gravel recourses.

Figure 2. Location of Site D – Farmers Road Gravel Pit.

1.2 Environmental Legislation and Guidelines

The Commonwealth (federal) legislation relevant to this survey:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The following Western Australian (state) legislation is relevant to this survey:

- Biodiversity Conservation Act 2016 (BC Act);
- Biodiversity Conservation Act 2016 Biodiversity Conservation (Listing of Native Species) (Flora) Order 2022;
- Biodiversity Conservation Act 2016 Biodiversity Conservation (Listing of Native Species) (Fauna) Order 2022;
- Biosecurity and Agriculture Management Act 2007 (BAM Act); and
- Environmental Protection Act 1986 (EP Act).

Western Australian guidelines relevant to this survey are:

- Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority [EPA] 2016);
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016);
- A guide to the assessment of applications to clear native vegetation, Under Part V Division 2 of the Environmental Protection Act 1986 (DWER, 2014); and
- Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA, 2020).

International Agreements relevant to this survey are:

- Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment 1974 (Japan-Australia Migratory Bird Agreement – JAMBA);
- Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986 (China-Australia Migratory Bird Agreement – CAMBA);
- Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds 2007 (Republic of Korea-Australia Migratory Bird Agreement – ROKAMBA); and
- Convention on Wetlands of International Importance 1971 (Ramsar Convention).

2 OBJECTIVES

The objective of this survey was to undertake a flora, fauna and vegetation assessment of the Farmers Road Gravel Pit survey area. This is inclusive of the following:

- Undertake a desktop study of the flora, fauna and vegetation of the Farmers Road Gravel Pit survey area, with an emphasis on threatened and priority flora, threatened and priority ecological communities (TECs and PECs) and Threatened and Priority fauna;
- Review the historical literature of the Farmers Road Gravel Pit survey area;
- Undertake a detailed survey of the Farmers Road Gravel Pit survey area, and collect and identify the vascular plant species present;
- Review the conservation status of the vascular plant species recorded by reference to current literature and listings by the Department of Biodiversity, Conservation and Attractions (DBCA) and plant collections held at the Western Australian State Herbarium (WAH), and listed by the Department of Climate Change, Energy, the Environment and Water under the EPBC Act;
- Define and map the vegetation communities in the Farmers Road Gravel Pit survey area;
- Define and map the location of any threatened and priority flora located within the Farmers Road Gravel Pit survey area;
- Define any management issues related to flora, fauna and vegetation values;
- Provide recommendations on the local and regional significance of the vegetation communities; and
- Prepare a report summarising the findings.

3 METHODS

3.1 Desktop Assessment

Desktop information was collated for all areas within a 20 km buffer zone of the site using DBCA datasets sourced under agreement. These data sources are listed below:

- Western Australian Herbarium data (WAH);
- Threatened and Priority Flora Database (TPFL);
- DBCA's Esperance District Threatened Flora spatial dataset;
- Threatened and Priority Ecological Communities (TECs & PECs);
- Threatened, Specially Protected and Priority fauna; and
- Black cockatoo roost and breeding sites.

Additionally, the EPBC Act Protected Matters Search Tool (PMST), was also checked to identify the possible occurrence of Threatened and Priority flora, fauna and ecological communities within the Farmers Road Gravel Pit area. Search parameters were 'by polygon' and a 20 km buffer was applied to the search area; standard used in this IBRA subregion. Historical and State documentation and datasets consulted include:

- Vegetation mapping of the region, principally the coarse-scale vegetation associations of Beard (1973);
- Vegetation Extent by Statewide Pre-European mapping statistics (GoWA, 2020);
- Soil landscape mapping (DAFWA);
- Dieback Information Data Management System (DIDMS; Gaia Resources);
- Shire of Esperance Weed Mapping Data;
- Existing site digital orthophotos (Oldfield_3030; 2018)
- Atlas of Living Australia (ALA) database;
- Hydrographic Catchments (DWER); and
- Crown Reserves (Landgate).
-

3.2 Field Survey

The site was initially inspected on 20th of September by Julie Waters (SOE Environmental Coordinator) and Katherine Walkerden (SOE Environmental Officer). A general assessment of possible ecological impacts included historical clearing, impact of fire regimes, regeneration from disturbance, waterlogging, senescence, weeds, erosion, sedimentation, invasive fauna, *Phytophthora* Dieback, and illegal dumping of rubbish.

A detailed field assessment of the flora and vegetation of the Farmers Road Gravel Pit survey area was undertaken by Julie Waters and Katherine Walkerden from 20th of September to 21st of September 2023 in accordance with methods outlined in Technical Guidance – Flora and vegetation surveys for

environmental impact assessment (EPA 2016). All staff held valid collection licences to collect flora for scientific purposes, issued under the BC Act.

The methodology for assessing threatened and priority flora consisted of traversing by foot the entire Farmers Road Gravel Pit survey area. The road was used as a continuous transect. Botanists walked in a zig-zag fashion over survey site (at approximately at 10m intervals) recording all species, and collecting all but the very common, well known species.

For PF or TF species identified in the desktop survey as possible to occur, scans of pressed specimens from either the WAH or local Esperance District Herbarium were taken into the field. Suitable associated habitat for TF or PF identified in the desktop study were particularly focused on, and extensively searched. If suspected or known conservation significant flora species were encountered, a specimen was collected for subsequent identification with GPS coordinates and plant numbers recorded for the population. During the survey, a field herbarium for Farmers Road Gravel Pit was also constructed.

All species unknown in the field were collected, pressed and dressed in accordance with WAH instructions, and later identified by SOE's three Botanists, using keys, WA Herbarium's Florabase, literature and Esperance District Herbarium. Any species that were unable to be identified were submitted to the WAH for identification. Nomenclature of the species recorded is in accordance with the WAH.

The vegetation communities of 'Site D – Farmers Road Gravel Pit' was assessed for the presence a TEC or PEC (DBCA 2023f, 2023a) comparing that to descriptions in approved conservation advice for these communities.

Specifically, the site was assessed for the 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' TEC, which is listed as 'Endangered' under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999). The presence of Kwongkan was identified using diagnostic characteristics defined in the 'Approved Conservation Advice for Kwongkan (Commonwealth of Australia, 2014)' as;

> 2a) Characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (crowns measured as if they are opaque).
> And/or
> 2b) Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated.

Due to the lack of published Approved Conservation Advice for PECs recognised under State legislation; definitions elaborated in the Priority Ecological Communities for Western Australia, Version 35 (DBCA 2023e) were used to diagnostically qualify observed vegetation types.

Only a basic fauna survey was conducted as per EPA (2020) guidelines. Observations of fauna presence, such as call sounds, footprints and scats were noted, and the area assessed for suitability of habitat within 'Site D – Farmers Road Gravel Pit' for fauna species identified in the desktop survey. Carnaby's Black Cockatoo (*Calyptorhynchus latirostris)* feeding, roosting and nesting habitat was also assessed using EPBC Act referral guidelines (DAWE 2022).

3.3 Survey Timing

The peak flowering period, and therefore optimal survey timing, for the South-west and Interzone Botanical Province is spring (September to October; EPA 2016). Therefore, the survey period coincided

with the optimal flowering period for the botanical region. The surveys were timed, where possible, to align with peak flowering periods of conservation significant flora with the potential to occur in the 'Farmers Road Gravel Pit' survey area.

3.4 Vegetation Descriptions

Vegetation communities present within the survey area were assessed during the field survey. Broad vegetation types defined by structure and composition were recorded and described using the National Vegetation Information System (NVIS; ESCAVI 2003) classification system.

Condition of vegetation was assessed using Table 2 of the Technical Guidance – Flora and vegetation surveys for Environmental Impact Assessment (EPA 2016) categories, as 'Excellent', 'Very Good', 'Good', 'Degraded' or 'Completely Degraded'. This illustrates how healthy vegetation is, determined by vegetation structure, weed cover, presence of dieback, historical clearing, grazing and other signs of disturbance.

Additionally, possible environmentally sensitive areas, such as wetlands or granite, were noted. Overall, an assessment of environmental impacts to Department of Water and Environmental Regulation's (DWER) biodiversity values were inspected and valued.

3.5 Survey Limitations

A general assessment was made of the survey against a range of factors that may have limited the outcomes and conclusions of this report (Table 2). Based on this assessment, the present survey has not been subject to constraints which would affect the thoroughness of the survey, and the conclusions which have been formed.

Table 1: Potential limitations affecting the conclusions made in this report.

Potential Survey Limitation	Impact on Current Survey
Availability of contextual information at a regional and local scale	**Not a limitation:** Reference resources such as Beard's mapping, together with online flora and vegetation information, have provided an appropriate level of information for the current survey. The vegetation of the Esperance shire has previously been mapped by Beard (1973).
Resources (i.e. were there adequate resources to complete the survey to the required standard).	**Not a constraint:** Adequate resources were made available by Shire of Esperance to complete the surveys.
Competency/experience of team carrying out survey; experience in the bioregion surveyed	**Not a limitation:** Staff had extensive experience working within the Shire of Esperance and wider areas. Two of the botanists have consistently worked within this bioregion for more than 15 years. Staff were familiar with flora in the area. Any unknown or potential threatened or priority flora species were collected and identified, utilising resources available at the Western Australian Herbarium and consultation with expert taxonomists.
Proportion of flora collected and identification issues	**Potential limitation:** While many plants were in flower during the survey, a proportion of plants encountered during the survey were sterile and may impact the chance of identification of some specimens to species level. Orchid species may not emerge each year if conditions are not favourable. Although these may affect the completeness of the species list, it is not expected to have a significant effect on mapping reliability, nor on the identification of threatened and priority species in the area as the majority were perennial species. Surveys were only undertaken in one year
Effort and extent of survey	**Potential limitation:** The survey area was thoroughly covered. The threatened and priority flora search undertaken by botanists by means of foot-traverse between vegetation quadrat sites ensured thorough coverage of the survey area. Flora that was unknown or resembled threatened or priority flora were collected, the location and habitat noted, and the number of plants estimated.
Mapping reliability	**Not a constraint.** Handheld GPS units were used for the survey, which for a majority of field conditions have an accuracy level of ± 5 m.
Survey timing, rainfall, season of survey	**Not a limitation:** The EPA (2016a) recommends that flora and vegetation surveys in the South – West Botanical Province be conducted in Spring (September-November). All surveys have been conducted in September which falls within this period.
Disturbances (fire/flood/clearing)	**Potential limitation:** Parts of the Farmers Road gravel pit was regenerating after fire, Vegetation type 'C' was the only vegetation type which had completely burned and the vegetation structure during the surveys may not be representative of vegetation structure once fully regenerated.

4 DESKTOP ASSESSMENT RESULTS

4.1 Climate

The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers (BoM 2022). The Munglinup area receives an average annual rainfall of 426 mm.

4.2 Catchment

The project is present within the 'Stokes Inlet: Lort Young' and the 'Oldfield River' catchment area. It is located approximately 24km from the coast.

4.3 Geology, Soils and Topography

A single geological unit was identified within 'Site D – Farmers Road Gravel Pit', by Schoknecht et al. (2004). It is described as: 'tertiary marine sediments of the Pallinup formation and small outcrops of Archean granite'.

Within the area, there has been one soil type recorded 'grey deep and shallow sandy duplex soils (gravelly) with minor pale deep sands and gravelly duplex soils and deep sandy gravels'.

Using Schnoknect et al. (2004), the project topography is mapped at a fine scale, traversing one topographic area: 'externally drained plains and rises with gently inclined slopes some small level plains on upper slopes and catchment divides'.

4.4 Regional Vegetation

The site is located within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) Esperance Plains region and Recherche sub-region (Esp2). The Esp2 region is described as "Proteaceae Scrub and Mallee heaths on sandplain overlying Eocene sediments, rich in endemics. Herbfields and heaths (rich in endemics) on abrupt granite and quartzite ranges that rise from the plan. Eucalyptus woodlands occur in gullies and alluvial foot-slopes".

Beard (1973) mapped one vegetation association (VA) within the 'Site D – Farmers Road Gravel Pit' area (Table 2). Esperance_47 is moderately cleared overall with 35% of its original extent remaining but is poorly represented within the Shire of Esperance and the Recherche IBRA sub-region with only 13% of its original extent remaining within the Shire of Esperance.

Table 2. Vegetation associations mapped by Beard (1973) within the 'Site D – Farmers Road Gravel Pit', and statistics on pre-European remaining areas.

Vegetation Association	
Name	Esperance _47
Description	Shrublands; tallerack mallee-heath
Pre-European extent remaining (%)	35.86
Pre-European extent in IBRA sub-region ESP2 (%)	15.06

Pre-European extent in LGA (%)	13.43
Current extent conserved in IUCN area (%)	49.30
Pre-European extent conserved in IUCN area (%)	17.80

4.5 Surrounding Land Use

Site D – Farmers Road Gravel Pit is within a vegetated 100-200m wide road reserve, managed by the Shire of Esperance. The surrounding land use is agricultural. The area is within rural zoning. DPIRD (2023) native vegetation extent datasets showed only 11.32% of native vegetation within 5km of the project area is remaining.

The site was 10.39km from Reserve 26410 the closest conservation reserve.

4.6 Potential Threatened and Priority Flora

Two threatened flora (TF) and 21 priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Appendix 3)). Of these, one TF species and seven PF species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site D – Farmers Road Gravel Pit' project.

4.7 Potential Threatened and Priority Ecological Communities

The desktop study identified the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' within 'Site D – Farmers Road Gravel Pit' project area. No other TEC's or priority ecological communities (PEC) were identified by the desktop study as being within 'Site D – Farmers Road Gravel Pit' or within a 20 km buffer of the site.

4.8 Potential Threatened and Priority Fauna

24 conservation listed fauna were recorded within a 20 km radius of the proposed impact site (Appendix 4)). An additional five species had habitat listed as 'likely to occur' or 'may occur' under the EPBC Protected Matters Search Tool.

4.9 *Phytophthora* Dieback

Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2022) data shows several positive *Phytophthora cinnamomi* and *Phytophthora pseudocryptogea* along Farmers Road. The closet positive result was of a *Phytophthora pseudocryptogea* sample 500m south of the project area. The closest *Phytophthora cinnamomi* result was 2 km south of the project area along Farmers road.

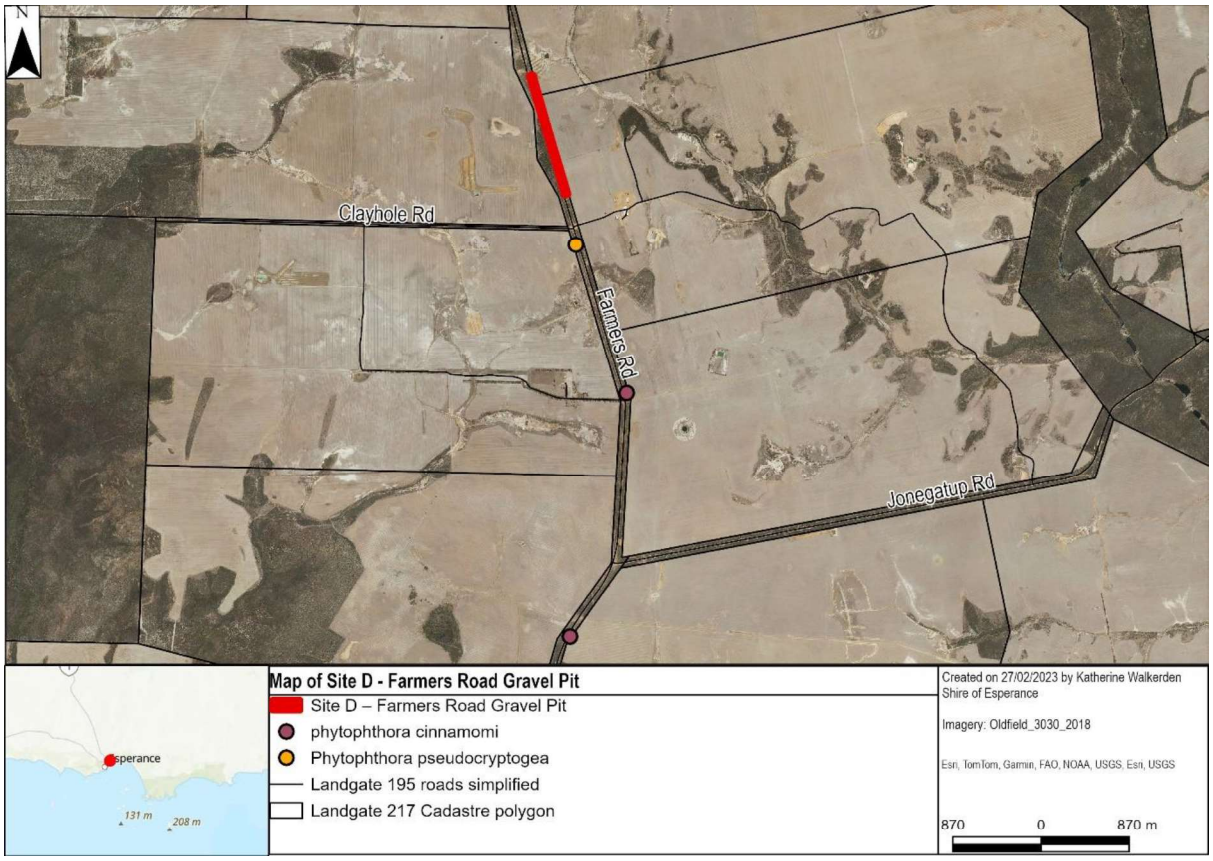

Figure 3. Map of positive Phytophthora samples near 'Site D – Farmers Road Gravel Pit'.

5 FIELD SURVEY RESULTS AND DISCUSSION

5.1 Flora

A total of 129 vascular plant taxa, representative of 85 genera and 34 families, were recorded within the Farmers Road Gravel Pit survey area. Of these 113 were native species and 16 were introduced. The plurality of taxa recorded were representative of the Myrtaceae (23 taxa), Proteaceae (21 taxa) and Fabaceae (12 taxa) families (see Appendix 1 for the complete incidental species list).

Numerous specimen's unknown to surveyors were collected and verified at the WAH as non-threatened species, such as *Crassula exserta* (Accession 10518; KSW07423, Specimen retained).

A number of plant specimens collected could not be identified accurately to species level due to the absence of sufficient taxonomic characters to enable accurate identification. The principal reasons for not being able to fully identify some of the collected specimens to species level were:

- Plant material was sterile or lacked sufficient taxonomic features to permit accurate identification to species level. In these cases, the species is identified as, for example, *Lollium* sp.; and
- The plant material collected could not be determined to a known taxon. For example, *Lepidosperma* (as species are currently undergoing taxonomic revision).

5.2 Threatened and Priority Flora

The targeted flora survey identified one TF species, *Conostylis lepidospermoides* (VU) from within the survey area. Two *Conostylis lepidospermoides* plants were found during the surveys, these plants were one metre apart. Due to the *Conostylis lepidospermoides* being listed as endangered and having a small area of occupancy the Shire of Esperance Environmental Team had recommended removing the area of occupancy of *Conostylis lepidospermoides* from the proposed clearing permit, with buffers put in place to prevent accidental damage (i.e trampling). The proposed alterations to the clearing permit area was accepted by Shire of Esperance management. The area surrounding the *Conostylis lepidospermoides* will be flagged off and works crews will be briefed on the presence of the plant before clearing begins.

A Threatened and Priority Flora Reporting Form (TPRF) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 05/03/2024 (Appendix 2). If proposed works occur, no plants will be impacted upon.

Figure 4. Location of endangered *Conostylis lepidospermoides* near the 'Site D – Farmers Road Gravel Pit' project.

5.3 Flora Range Extensions

One species was collected that resulted in a known range extension to the species. A specimen of *Persoonia striata* (PERTH 09616195) was sent to WAH. This species, had only one previous record from

the Cascade area (not yet databased), otherwise it was new to Shire of Esperance, Recherche IBRA subregion and a 30km Eastern range extension.

5.4 Weeds

During the site inspection, 16 introduced weed species were recorded (refer to comprehensive flora list in Appendix 1). There was significant invasion of agricultural weeds along the eastern border of the project area, adjacent to farmland and where historical clearing had occurred for fenceline and firebreak construction. There were scattered Poaceae weeds throughout most of the project area. *Eucalyptus gomphocephala* had been planted as a windbreak by the neighbouring landholder within the road reserve, *E. gomphocephala* has begun to naturalise within vegetation within the project area.

It is likely that proposed works will increase the distribution of weeds and degrade vegetation along the entire road reserve where works occur. Ideally, regular wash downs during the course of works to remove weed seeds and follow up herbicide control of invasive species needs to occur.

Weed specimen's that result in range extensions are sent to the WAH. One species were collected that resulted in range extensions, this was:

- *Moraea setifolia* (Accession #10471; KSW04223, Specimen retained). The plant was new to the Shire of Esperance & Esperance Plains IBRA region and a 110km eastern range extension.

Figure 5. Photo of *Eucalyptus gomphocephala* invasion within Site D – Farmers Road Gravel Pit.

Figure 6. Photo of agricultural weeds present along firebreak at eastern portion of site.

5.5 Phytophthora Dieback

Unburned vegetation within the project area contained diverse and healthy proteaceous vegetation, which is unlikely to be currently impacted by Phytophthora dieback. The southern section of the road reserve (SLK 9.8 - 9.2) was uninterpretable due to being recently burned. It is known to take at least five years for visual markers of Dieback to become apparent due to the tolerance of juveniles to the adverse effects of *P. cinnamomi*.

Given the small distance from known positive samples of *Phytophthora spp.* along Farmers Road there is a high likelihood that Phytophthora will be present within parts of the project area. Proposed works will be conducted using appropriate hygiene measures to limit spreading of the disease, including clearing in dry conditions and clean down of vehicles and machinery before entering the site.

5.7 Vegetation Communities

Three vegetation communities were identified within the 'Site D – Farmers Road Gravel Pit', as defined by structure and composition (Table 3). It is believed that the Beard (1973) vegetation associations identified in Section 4.4 are an appropriate match for two vegetation types observed. Esperance_47 was an appropriate match for vegetation type A, & C, Vegetation type B was deemed to be an appropriate match for Esperance_4048.

Portions of the project area had burned recently (after February 2018), with portions (approximately 32%) of Vegetation type A being burned and the entirety (100%) of Vegetation type C being burned.

Table 3. Vegetation communities identified within proposed 'Site D – Farmers Road Gravel Pit' project area, burned areas were also quantified.

Type	Description	Figure	Closest Matching Beard Vegetation Association	Area (ha)	Burned area (ha)
A	Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa and Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland.	9	Esperance_47	1.500	0.478
B	*Eucalyptus leptocalyx* and *Eucalyptus micranthera* woodland with open heathland.	10	Esperance _4048	0.602	0
C	Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* over *Acacia myrtifolia* dominated shrubland.	11	Esperance_47	1.229	1.229

Figure 7. Vegetation types within the 'Site D – Farmers Road Gravel Pit' area.

Figure 8. Map of burned vegetation within the 'Site D – Farmers Road Gravel Pit' area.

Figure 9. Vegetation type A (burned) identified in 'Site D – Farmers Road Gravel Pit' project, described as Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* and *Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland.

Figure 10. Vegetation type A (unburned) identified in 'Site D – Farmers Road Gravel Pit' project, described as Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* and *Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland.

Figure 11. Vegetation type B (unburned) identified in 'Site D – Farmers Road Gravel Pit' project, described as mixed Mallee woodland with open heathland.

Figure 12. Vegetation type C (burned) identified in 'Site D – Farmers Road Gravel Pit' project, described as Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* over *Acacia myrtifolia* dominated shrubland.

5.8 Vegetation Condition

Vegetation condition varied between a completely degraded and an excellent condition, with vegetation in a degraded condition being along the eastern firebreak where historical clearing for fence lines, firebreak and more recently drainage lines had been dug, significant weed invasion was present within this area. *Eucalyptus gomphocephala* had been planted along the edge of the road reserve with *E. gomphocephala* invading section of the project area. A majority of the vegetation was in a very good condition. Scattered weeds were present throughout the site.

Table 4. Quantifying vegetation to be cleared by vegetation type and condition.
(Note completely degraded vegetation is not included due to these areas being bare of vegetation).

Vegetation Type	Excellent	Very Good	Good	Degraded	Total
A	0.438	0.961	-	0.101	1.500
B	-	0.559	-	0.044	0.602
C	<0.001	1.141	-	0.087	1.229
Total	0.438	2.661	-	0.232	**3.332**

Figure 13. Photo of degraded area along the edge of the road reserve, with recently dug drainage line present.

Figure 14. Vegetation condition across 'Site D – Farmers Road Gravel Pit' project, ranging from completely degraded to excellent condition.

5.9 Threatened Ecological Communities

Vegetation type A, described as 'Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* and *Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland.' met criteria to be considered as Kwongkan TEC. As it contained 30% or greater cover of Proteaceae species across all vegetation structural layers. However, due to historical clearing and weed invasion, only areas within these vegetation communities in good condition or better were considered as Kwongkan TEC (Table 5). In total, 1.399 ha of vegetation was considered as Kwongkan TEC present within 'Site D – Farmers Road Gravel Pit' area.

In addition, vegetation type C was regenerating after fire, using the 'Approved Conservation Advice for Kwongkan (Commonwealth of Australia 2014)' for assessing the presence of Kwongkan, assessment relied on determining if two or more Proteaceae species were diagnostic, and will form a significant vegetative component when mature. Vegetation type C contained several Kwongkan diagnostic species and was considered to be Kwongkan TEC under this definition. Including vegetation of a good or better condition within vegetation type A & C there was a total of 2.541ha of Kwongkan TEC proposed to be cleared.

Table 5. Vegetation communities of vegetation type 'A' and 'C' in good or better condition met threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' within 'Site D – Farmers Road Gravel Pit' project.

Vegetation Type	Excellent	Very Good	Total
A	0.438	0.961	1.399
C	<0.001	1.141	1.142
Total	0.438	2.103	**2.541**

5.10 Fauna

Of the species identified within the Desktop survey, only the Quenda and Carnaby's Black Cockatoo have suitable habitat within the proposed clearing permit area.

5.10.1 Quenda, *Isoodon fusciventer*, Priority 4

There was a confirmed record of the Quenda 7.92km from the project area. In addition, diggings and runnels were observed further south along Farmers Road.

The Quenda prefers dense shrubby vegetation up to 1 metre high vegetation often preferring areas of dense cover near pasture or crop areas. The unburned vegetation within vegetation type A provides suitably dense vegetation for the species, this includes a total of 1.022 ha of vegetation proposed to be cleared within the project.

5.10.2 Carnaby's Black Cockatoo, *Zanda latirostris*, Endangered

The Shire of Esperance Black Cockatoo assessment was conducted in accordance with the EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's Cockatoo *Zanda latirostris* (Endangered), Baudin's Cockatoo *Zanda baudinii* (Endangered) and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso* (Vulnerable) (Department of Agriculture, Water and the

Environment, 2022). The only black cockatoo species likely to occur within the Shire of Esperance is Carnaby's Cockatoo, with the Forest Red-tailed Black Cockatoo and Baudin's Cockatoo restricted to the forested areas of the south-west (CoA, 2012; DPAW, 2013). The Shire of Esperance forms part of the non-breeding range of the Carnaby's Cockatoo, with the closest breeding areas located approximately 100 km west in the Ravensthorpe-Hopetoun area in pockets of suitable mature eucalypt woodland (DPAW, 2013). Several roosting sites are known to occur within Esperance and the wider region, with tall trees such as *Eucalyptus occidentalis (*Swamp Yate), *E. gomphocephala (*Tuart), other eucalypts, and introduced pines favoured (DAWE 2022).

As vegetation type A contained a potential foraging habitat, the foraging quality scoring tool was undertaken within vegetation type A (Appendix 13). Vegetation type A held a foraging quality score of 7. Vegetation type A included a total of 1.500ha of vegetation, 0.478 ha which was regenerating after fire and did not currently provide suitable foraging habitat, but may provide foraging habitat in time once it matures.

Further south along Farmers Road outside of the project area Carnaby's Cockatoo was identified through evidence of foraging on *Banksia baueri, B. obovata*, and *B. violacea* seed cones and flowers. Given that each of these species were also present within the project area it is highly likely that Carnaby's Cockatoos have utilised the project area.

Eucalyptus gomphocephala had been planted along the eastern edge of the road reserve as a wind break, this provided potential exotic roosting habitat for the species immediately outside of the project area. *Eucalyptus gomphocephala* had been planted along the eastern edge of the entire length of Farmers Road, with *Eucalyptus camaldulensis* being planted instead of *Eucalyptus gomphocephala* in waterlogged in conditions. Several *Pinus pinaster* plantations a favoured feed and roost species were present within 20km from the project area with the closest being 8.4 km from the project.

Given that the site did / did not contain:

- nesting sites or large trees with hollows;
- night roosting areas;
- high-quality foraging habitat > 1 ha; or
- low quality (1-4) habitat > 10 ha

a referral for assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is unlikely to be required.

6 REVIEW OF 10 CLEARING PRINCIPLES FOR NATIVE VEGETATION

The 'Site D – Farmers Road Gravel Pit' project may be at variance to some of the clearing principles that the Department of Water and Environmental Regulations (DWER) assess applications, as listed under Schedule 5 of the Environmental Protection Act 1986 (DWER 2019).

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

Likely at Variance. Biodiversity at this site is high with 113 native species recorded over three vegetation communities.

6.2 Principle (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Likely at Variance. The vegetation contained habitat that was suitable for the Quenda (P4) and Quenda diggings and runnels were seen further south outside of the project area.

The vegetation contains foraging habitat for Carnaby's Black Cockatoo (EN) due to the presence of vegetation high in Proteaceous species. Vegetation type A provided suitable foraging habitat and included a total of 1.500ha of vegetation, 0.478ha which was regenerating after fire and did not currently provide suitable foraging habitat but is likely to in the future.

No other conservation listed fauna species are likely to be impacted upon.

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

Not at variance. *Conostylis lepidospermoides* (VU) was present within the initial survey area, the Shire of Esperance has removed the area of occupancy from the proposed clearing permit area with buffers in place in order to mitigate any potential impact to the endangered species.

6.4 Principle (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Likely at Variance. 2.541 ha of vegetation met the definition of Kwongkan TEC, other areas within the site failed to meet the definition of Kwongkan TEC, no other TEC's or PEC's within the Shire of Esperance were relevant to the study area.

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

Likely at Variance. The area immediately surrounding the project area is highly cleared, with only 11% of the areas Pre-European extent remaining. Farmers Road Reserve provides valuable ecological linkages, with Farmers Road Reserve providing connections to the other remaining ecological linkages in the area. However, the amount of vegetation being cleared and the fact that rehabilitation of the gravel pit will occur after gravel extraction there is unlikely to be any significant long-term impacts.

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

Not at Variance. Vegetation in this area was not growing in association with watercourses or wetlands.

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

May be at Variance. Vegetation within this area will be providing function as windbreaks and erosion control for the agricultural areas surrounding it.

6.8 Principle (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Not at Variance. The site was 10.39km from Reserve 26410, the closest the conservation reserve. Farmers Road reserve is providing important ecological linkages to nearby areas including Reserve 26410, though given the relatively small clearing area impact to the ecological connectivity will be minor.

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

Not at Variance. There may be a small increase of runoff into a nearby saline watercourse to the north of the site, though there is unlikely to be any impact to water quality.

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

Not at Variance. There may be a small increase of runoff into a nearby saline watercourse, though there is unlikely to be any increased risk of flooding.

7 RECOMMENDATIONS

As Shire Environmental Coordinator signs off on project work packs the following recommendation will be included within the internal SOE approval process for the road project

- All vehicles and construction equipment to be cleaned prior to start of the project
- Works to be carried out in the dry (summer) months to minimise spread of dieback
- Follow up spraying of emergent weeds to prevent weeds coming into the weed free areas
- Remove and stockpile topsoil, log debris and leaf litter for use in revegetation of the gravel pit as per revegetation plan

7.1 Revegetation plan

To meet the objectives of a successful scientific-based Revegetation Plan for 'Farmers Road Gravel Pit', numerous factors need to be considered and will be implemented, including the reference site, weed control, pest and disease hygiene practices, site preparation, species selection, completion criteria, monitoring and adaptive management practices in the need of contingency measures. These are outlined in Sections 7.1.1 to 7.1.7, with key points highlighted below:

- Revegetation works will consist of spreading the stockpiled cleared vegetation and topsoil containing the natural stored soil seed bank directly from the site accumulated during gravel extraction works.
- Revegetation works will be carried out over April-June prior to the onset of the main winter rains in the year post clearing.

Multispectral drone aerials will be conducted prior to clearing so that vegetation planned to be cleared can be used as a reference site.

7.1.1 Rehabilitation Methodology

A dozer will be used to remove vegetation, topsoil and the overburden (consisting of approximately 300 mm deep of soil). This valuable topsoil layer that contains large reservoirs of the soil seed bank and live clonal tissue will be stockpiled separately for rehabilitation after completion of the project.

Rehabilitation works will commence at the site between April – June. This will involve spreading the stockpiled topsoil containing the soil seed bank from prior to clearing evenly across the rehabilitation area. The site will be ripped to a depth of 200-350 mm deep and topsoil spread over the area. No direct tube stock planting or direct seeding will occur immediately, and only be used as a contingency measure if this method fails.

7.1.2 Weed Control

The site had significant weed issues on the astern edge of the road reserve where historical clearing had occurred for firebreaks and fenceline construction. Poaceae weeds were the biggest issue in this area and will require follow up control with grass selective herbicides application after rehabilitation.

There were areas of significant *Eucalyptus gomphocephala* infestation, presence of *Eucalyptus gomphocephala* seedlings in the rehabilitation area will require monitoring and may require control, appropriate control methods will depend on scope of Eucalyptus gomphocephala infestation.

Monitoring of broadleaf weed presence will also be required, additional control methods may be required, appropriate control methods will depend on scope of weed presence.

7.1.3 Disease Hygiene Management

There are a large number of plant pathogens that can be spread by moving infected soil and plant material. Specifically, of focus is *Phytophthora* dieback, such as *P. cinnamomi or P. pseudocryptogea*. Data shows the closest positive *P. pseudocryptogea sample* is 500m south of project area along Farmers Road. Hygiene measures to minimise the risk of diseases are a standard part of Shire of Esperance's practices when clearing vegetation, including:

- All machinery, plant and equipment shall be free of soil and vegetative matter prior to entering and leaving the site.
- Soil will only be moved during dry condition.

7.1.4 Completion criteria

A high species richness was present at the site, due to a detailed flora survey being completed the 2023 survey can be used as a baseline for species richness. Multispectral drone aerials will be used to assess vegetation density, a drone aerial will be flown prior to the clearing to serve as a baseline for vegetation cover.

Table 6. Completion criteria following the SMART (specific, measurable, achievable, relevant, time-bound) principles for the rehabilitation of the West Point Road gravel pit.

Criterion	Baseline Floristic data	Completion Target	Completion Criteria
1	Diversity was high with 113 taxa present prior to clearing.	A majority of species richness has returned	60% of the native species diversity (68 taxa) are present during vegetation

			monitoring 2 years after rehabilitation completed
2	Vegetation A was classified as Kwongkan TEC prior to clearing with 21 proteaceous taxa present	Returns of 60% proteaceous taxa and Kwongkan TEC criteria met.	13 proteaceous taxa present during vegetation monitoring 2 years after rehabilitation completed
3	Vegetation cover in unburnt areas in pre-clearing drone aerials.	A majority of vegetation cover has returned	Drone aerial showing 60% of pre-clearing (unburnt areas) coverage

7.1.5 Monitoring

Monitoring of the rehabilitated area following gravel extraction will determine if completion criteria have been successful and if contingency measures are required (Section 7.1.6). The methodology for monitoring will involve onsite visual assessments to determine whether revegetation has been implemented as planned and that completion criteria have been met, as outlined in Table 4. Monitoring will occur annually by the Shire of Esperance's Environmental Officers. Monitoring will coincide with the inspection period of the calendar year Annual Compliance report for the Shire of Esperance 2023/24 strategic purpose permit. Baseline drone aerials will be taken prior to clearing and drone aerials will begin two years after revegetation has occurred. This will continue until rehabilitation has been deemed successful.

7.1.6 Contingency measures

Where the rehabilitation is deemed unsuccessful by comparison to the completion criteria (Section 7.1.4), contingency measures will be undertaken, until the completion criteria are met sufficiently. This is an adaptive process and dependent on what completion criteria has failed. A few standard techniques are outlined below:

- If the composition of species does not meet criteria, then specific species will be infill planted and/or seeded during the next revegetation season from April to June.
- If the density of cover does not meet criteria, then the area will be infill planted and/or seeded with species from the preclearing species list (Appendix 1) during the next revegetation season from April to August.
- If listed environmental weeds exist in the site then herbicide and or manual control will be applied to affected areas.

7.1.7 Species selection

Keystone and dominant species will be selected as a contingency measure if respreading topsoil and stockpiled vegetation has unsuccessful germination and does not meet the completion criteria. The incidental species list from the 2023 survey (Appendix 1) will be the basis for determining species selection for seed and tubestock seedlings, based on availability. Seed can also be collected from the surrounding road reserve.

8 LIST OF PERSONNEL

The following Shire of Esperance Staff were involved in this project.

Name	Julie Waters
Position	Environmental Coordinator
Project Involvement	Desktop and Field Survey, Specimen Identification, GIS Mapping Data Interpretation and Report writing
Qualifications	BEnvSc (Hons)
Experience	20 years working in environmental field including Flora Conservation Officer for previous DBCA, and 15 years' experience as a botanist in the region
Scientific Licence	FT61000787

Name	Katherine Walkerden
Position	Environmental Officer
Project Involvement	Desktop and Field Survey, Specimen Identification, GIS Mapping, Data Interpretation and Report writing
Qualifications	BSc, MEnvSc
Experience	3 years' experience as a Botanist in the region
Scientific Licence	FT61000788

Name	Rosamund Mary Hoggart
Position	Environmental Assistant
Project Involvement	Specimen Identification
Qualifications and Experience	BSc (Hons)Ag
	15 years' experience as a botanist in the region and is highly regarded by Esperance Wildflower Society and her peers in Esperance as one of the best botanists in Esperance.
Scientific Licence	N/A

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10 APPENDICES

Appendix 1: Incidental flora species list

Family	Genus	Species	Weed	WA Cons Status	Herbarium Reference
Aizoaceae	*Carpobrotus*	*virescens*			
Apiaceae	*Xanthosia*	*huegelii*			
Araliaceae	*Trachymene*	*pilosa*			
Asparagaceae	*Dianella*	*revoluta*			
Asparagaceae	*Laxmannia*	*paleacea*			
Asparagaceae	*Lomandra*	*collina*			
Asparagaceae	*Lomandra*	*mucronata*			
Asparagaceae	*Thysanotus*	*triandrus*			
Asteraceae	*Arctotheca*	*calendula*	X		
Asteraceae	*Euchiton*	*sphaericus*			
Asteraceae	*Hypochaeris*	*radicata*	X		
Asteraceae	*Senecio*	*quadridentatus*			
Asteraceae	*Sonchus*	*oleraceus*	X		
Asteraceae	*Ursinia*	*anthemoides*	X		
Asteraceae	*Vittadinia*	*gracilis*			
Brassicaceae	*Raphanus*	*raphanistrum*	X		
Casuarinaceae	*Allocasuarina*	*huegeliana*			KSW07623 ACC 10518
Casuarinaceae	*Allocasuarina*	*humilis*			
Casuarinaceae	*Allocasuarina*	*lehmanniana subsp. ecarinata*			
Crassulaceae	*Crassula*	*exserta*			KSW07423 ACC 10518
Cyperaceae	*Caustis*	*dioica*			
Cyperaceae	*Gahnia*	*ancistrophylla*			
Cyperaceae	*Lepidosperma*	*caespititius*			
Cyperaceae	*Lepidosperma*	*carphoides*			
Cyperaceae	*Lepidosperma*	*leptostachyum*			
Cyperaceae	*Lepidosperma*	*sp.*			KSW07323 ACC 10518
Cyperaceae	*Lepidosperma*	*tuberculatum*			
Cyperaceae	*Mesomelaena*	*stygia*			
Cyperaceae	*Mesomelaena*	*tetragona*			
Cyperaceae	*Schoenus*	*breviculmis*			
Cyperaceae	*Schoenus*	*caespititius*			
Cyperaceae	*Schoenus*	*submicrostachyus*			
Cyperaceae	*Tricostularia*	*compressa*			

Dasypogonaceae	*Calectasia*	*valida*			KSW07523 ACC10518
Droseraceae	*Drosera*	*sp. Branched Styles*			
Droseraceae	*Drosera*	*zonaria*			
Ericaceae	*Leucopogon*	*sp. Coujinup*			
Ericaceae	*Styphelia*	*sp. South Coast*			
Ericaceae	*Styphelia*	*woodsii*			
Euphorbiaceae	*Monotaxis*	*paxii*			
Fabaceae	*Acacia*	*aemula*			
Fabaceae	*Acacia*	*cochlearis*			
Fabaceae	*Acacia*	*crispula*			
Fabaceae	*Acacia*	*cyclops*			
Fabaceae	*Acacia*	*myrtifolia*			
Fabaceae	*Daviesia*	*teretifolia*			
Fabaceae	*Gompholobium*	*knightianum*			
Fabaceae	*Hovea*	*pungens*			
Fabaceae	*Jacksonia*	*condensata*			
Fabaceae	*Jacksonia*	*venosa*			
Fabaceae	*Kennedia*	*coccinea*			
Fabaceae	*Trifolium*	*subterraneum*	X		
Geraniaceae	*Erodium*	*botrys*	X		
Goodeniaceae	*Coopernookia*	*strophiolata*			
Goodeniaceae	*Goodenia*	*incana*			
Haemodoraceae	*Conostylis*	*lepidospermoides*		T	
Haemodoraceae	*Conostylis*	*seorsifolia subsp. seorsifolia*			
Haemodoraceae	*Haemodorum*	*discolor*			
Iridaceae	*Morea*	*setifolia*	X		Acc 10471 KSW04223
Iridaceae	*Patersonia*	*lanata*			
Iridaceae	*Patersonia*	*limbata*			
Lamiaceae	*Microcorys*	*subcanescens*			
Loranthaceae	*Nuytsia*	*floribunda*			
Malvaceae	*Lasiopetalum*	*rosmarinifolium*			
Myrtaceae	*Apectospermum*	*spinescens*			
Myrtaceae	*Beaufortia*	*micrantha*			
Myrtaceae	*Calothamnus*	*gracilis*			
Myrtaceae	*Calothamnus*	*quadrifidus*			
Myrtaceae	*Chamelaucium*	*ciliatum*			
Myrtaceae	*Conothamnus*	*aureus*			
Myrtaceae	*Eucalyptus*	*gomphocephala*	X		
Myrtaceae	*Eucalyptus*	*leptocalyx*			
Myrtaceae	*Eucalyptus*	*micranthera*			

Myrtaceae	*Eucalyptus*	*pleurocarpa*			
Myrtaceae	*Eucalyptus*	*tetraptera*			
Myrtaceae	*Kunzea*	*affinis*			
Myrtaceae	*Leptospermopsis*	*maxwellii*			
Myrtaceae	*Melaleuca*	*acuminata subsp. acuminata*			
Myrtaceae	*Melaleuca*	*scabra*			
Myrtaceae	*Melaleuca*	*tuberculata var tuberculata*			
Myrtaceae	*Melaleuca*	*undulata*			
Myrtaceae	*Micromyrtus*	*elobata subsp. elobata*			
Myrtaceae	*Micromyrtus*	*imbricata*			
Myrtaceae	*Phymatocarpus*	*maxwellii*			
Myrtaceae	*Taxandria*	*spathulata*			
Myrtaceae	*Verticordia*	*chrysanthella*			
Myrtaceae	*Verticordia*	*inclusa*			
Myrtaceae	*Verticordia*	*sieberi*			
Olacaceae	*Olax*	*benthamiana*			
Orchidaceae	*Caladenia*	*attingens subsp. gracillima*			
Orchidaceae	*Caladenia*	*flava*			
Orchidaceae	*Caladenia*	*pachychila*			
Orchidaceae	*Cyanicula*	*gemmata*			Acc 10518 KSW08523
Orchidaceae	*Disa*	*bracteata*	X		
Orchidaceae	*Erythraea*	*brunonis*			
Pittosporaceae	*Billardiera*	*fusiformis*			
Poaceae	*Amphipogon*	*turbinatus*			
Poaceae	*Avena*	*fatua*	X		
Poaceae	*Eragrostis*	*curvula*	X		
Poaceae	*Lagurus*	*ovatus*	X		
Poaceae	*Lolium*	*sp.*	X		
Poaceae	*Vulpia*	*myuros*	X		
Primulaceae	*Lysimachia*	*arvensis*	X		
Proteaceae	*Adenanthos*	*cuneatus*			
Proteaceae	*Banksia*	*armata*			
Proteaceae	*Banksia*	*baueri*			
Proteaceae	*Banksia*	*blechnifolia*			
Proteaceae	*Banksia*	*nivea*			
Proteaceae	*Banksia*	*obovata*			
Proteaceae	*Banksia*	*pteridifolia*			
Proteaceae	*Banksia*	*repens*			
Proteaceae	*Banksia*	*violacea*			

Proteaceae	*Grevillea*	*concinna subsp. concinna*			
Proteaceae	*Hakea*	*nitida*			
Proteaceae	*Hakea*	*pandanicarpa*			
Proteaceae	*Hakea*	*trifurcata*			
Proteaceae	*Isopogon*	*polycephalus*			
Proteaceae	*Isopogon*	*trilobus*			
Proteaceae	*Lambertia*	*inermis var. drummondii*			
Proteaceae	*Lambertia*	*inermis var. inermis*			
Proteaceae	*Persoonia*	*striata*			PERTH 09616195
Proteaceae	*Petrophile*	*fastigiata*			
Proteaceae	*Petrophile*	*squamata subsp. Ravensthorpe*			
Proteaceae	*Synaphea*	*media*			
Restionaceae	*Chordifex*	*sphacelatus*			
Rhamnaceae	*Cryptandra*	*myriantha*			
Rutaceae	*Cyanothamnus*	*inconspicuus*			
Rutaceae	*Cyanothamnus*	*ramosus subsp. anethifolia*			
Sapindaceae	*Dodonaea*	*caespitosa*			
Xanthorrhoeaceae	*xanthorrhoea*	*platyphylla*			

Appendix 2: Threatened and Priority Flora Report Form – *Conostylis lepidospermoides*

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.4 March 2021

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants

TAXON: Conostylis lepidospermoides **TPFL Pop. No:**

OBSERVATION DATE: 21/09/2023 **CONSERVATION STATUS:** EN **New population** ☒

OBSERVER/S: Katherine Walkerden, Emma Adams **PHONE** 90831518

ROLE: Environemntal Officer/ Conservation Officer **ORGANISATION:** Shire of Esperance/ Esperance DBCA

EMAIL: Katherine.Walkerden@esperance.wa.gov.au

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):

Farmers Road at SLK 9.96.

Reserve No:

DBCA DISTRICT: Esperance **LGA:** Esperance Land manager present: ☐

DATUM:
GDA84 / MGA94 ☐
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)
DecDegrees ☐ DegMinSec ☐ UTMs ☒
Lat / Northing: 308908
Long / Easting: 6276117
ZONE: 51

METHOD USED:
GPS ☐ Differential GPS ☐ Map ☐
No. satellites: Map used:
Boundary polygon captured: ☐ Map scale:

LAND TENURE:
Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒
National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐
Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole to Specify other:

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²):
EFFORT: Time spent surveying (minutes): No. of minutes spent / 100 m²:
POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☐ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	2			
Dead				

Area of pop (m²):
Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☐
Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: 100%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme. Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Low population size			
•			
•			

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.4 March 2021

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK: (on soil surface: eg gravel, quartz fields)	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	0-10% ☐	Sand ☐	Red ☐	Well drained ☐
Hill ☐	Dolerite ☐	10-30% ☐	Sandy loam ☐	Brown ☐	Seasonally inundated ☐
Ridge ☐	Laterite ☐	30-50% ☒	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	50-100% ☐	Clay loam ☐	White ☐	Tidal ☐
Slope ☐	Limestone ☐		Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐		Peat ☐	Black ☐	
Open depression ☐	Specify other:		Specify other:	Specify other:	
Drainage line ☐					
Closed depression ☐					
Wetland ☐					

Specific **Landform** Element: _____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.); **3**. Isolated clumps of sedges (M.tetragona)

1. Eucalyptus leptocalyx and Eucalyptus micranthera woodland with open heathland.
2. _____
3. _____
4. _____

ASSOCIATED SPECIES:
Other (non-dominant) spp

Eucalyptus gomphocephala, Hakea pandanicarpa, Hakea cygnus, Acacia cyclops, Dampiera lavandulacea, Mesomelaena stygia, Sonchus oleraceus, Ursinia anthemoides, Grevillea nudiflora, Opercularia vaginata, Caustis dioica, Disa bracteata, Lepidosperma sp., Desmocladus sp., Rytidosperma sp.

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☐ Very good ☒ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT: _____

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

FLORA AUTHORISATION / LICENCE No: _____ Note if only observing plants (i.e. no specimens or plant material is taken) then no authorisation/licence is required. For further information on authorisation and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under authorisations/licences should be recorded above in the OTHER COMMENTS section.

SPECIMEN: KSW09023 Collectors No: WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

LODGEMENT: WA Herb Lodgement No: ACC10539

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☒ Other: _____

Submitter of Record: Katherine Walkerden Role: Environmental Officer Signed: _____ Date: 05/03/2024

Appendix 3: Description of Threatened and Priority Flora Species with the Potential to occur within the Farmers Road Gravel Pit Survey Area

Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site D – Farmers Road Gravel Pit' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2023d), WA Herbarium (DBCA 2023e) and Esperance District Threatened Flora (DBCA 2021).
Nt. Acronyms used in the table include priority flora (P), threatened flora (TF), Biodiversity Conservation (BC) Act 2018, Environmental Protection and Biodiversity Conservation (EPBC) Act 1999, critically endangered (CN) and endangered (EN).

Species	Conservation Status	Associated Habitat	Likely to occur	WA Herb	TPFL	ESP DBCA	Distance from site (km)
Lepidosperma sp. Mt Chester (S. Kern et al. LCH 16596)	P1	Eucalypt woodland on rocky slopes	no	x			5.09
Leucopogon sp. Cascades (M. Hislop 3693)	P1	Mallee woodland, brown sandy loam	yes	x			6.88
Synaphea sp. Jilakin Flat Rocks Rd (R. Butcher et. al RB200)	P1	Brown-grey sandy loam over laterite	no	x			3.66
Amanita inculta	P2	Damp, clayey soil.	no	x			14.92
Astartea reticulata	P3	Restricted to damp areas/seasonal wetlands – including road gutters	no	x			19.67
Austrobaeckea uncinella	P3	Yellow or white sand, clay loam. Edges of salt lakes, salt creeks, sandplains.	no	x			15.76
Boronia oxyantha var brevicalyx	P3	Mallee Heath	no			x	10.95
Bossiaea flexuosa	P3	Grows after fire in soil over gravel or deep sands, often near salt lakes	yes	x			15.29

Commersonia rotundifolia	P3	Woodland, often after fire	yes	X			8.16
Dampiera sericantha	P3	Sand sometimes with gravel. Associated with plains.	yes	X		X	8.77
Dampiera sp. Ravensthorpe (G.F. Craig 8277)	P3	Rocky outcrops or rocky soil	yes	X			5.48
Daviesia pauciflora	P3	Deep yellow sands	no	X		X	8.06
Persoonia brevirhachis	P3	White or yellow sand, gravelly sandy soils. Scrub Heath with Allocasuarina	yes	X		X	13.32
Thomasia pygmaea	P3	Stony sandy loam, clayey sand.	yes	X			12.33
Allocasuarina hystricosa	P4	Restricted to damp areas/seasonal wetlands – including road gutters	no	X			12.93
Caladenia arrecta	P4	Grows on loam, gravel, and laterite. Associated with moist conditions.	no			X	8.91
Caladenia x triangularis	P4	Closest herbarium record in near Tambellup, TPFL record potentially incorrect.	no		X		10.04
Grevillea fastigiata	P4	Red clay, granite. Munglinup record geographically inaccurate.	no	X			8.75
Lepidium pseudotasmanicum	P4	Loam, sand. Edge of creek.	no	X		X	12.86
Pultenaea calycina subsp. proxena	P4	Sand, clay, sandy clay or loam, with gravel, over magnesite. Moderate slopes, adjacent to creek beds.	no	X			7.08
Stachystemon vinosus	P4	Fine loamy sand, stony soils. Sandplains, rock crevices on breakaways.	no	X			10.50
Conostylis lepidospermoides	T	Grey or yellow-brown sand over laterite.	no	X	X	X	6.26
Rhizanthella johnstonii	T	Growing under *Melaleuca uncinata* in dense shrubland.	no	X			10.71

Appendix 4: Description of Threatened and Priority Fauna Species with the Potential to occur within the Farmers Road Gravel Pit Survey Area

Scientific Name	Common Name	Class	WA status	EPBC status	Habitat	Likely to occur	Distance	EPBC protected matters tool
Actitis hypoleucos	Common Sandpiper	Bird	MI	MI	Coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats	No	17.55	
Aphelocephala leucopsis	Southern Whiteface	Bird	-	VU	There were no records for this species within the Esperance region on the DBCA Protected fauna database.	No		X
Botaurus poiciloptilus	Australasian Bittern	Bird	EN	VU	Shallow vegetated freshwater or brackish swamps	No		X
Calidris acuminata	Sharp-tailed sandpiper	Bird	MI	MI	Grassy edges of shallow inland freshwater wetlands. They are also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches.	No	10.01	X
Calidris ferruginea	Curlew sandpiper	Bird	CR	CR & MI	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	No	17.55	X
Calidris melanotos	Pectoral sandpiper	Bird	MI	MI	Coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire.	No	17.60	
Calidris ruficollis	Red-necked stint	Bird	MI	MI	Coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and,	No	17.49	

					sometimes, on protected sandy or coralline shores.			
Calyptorhynchus baudinii	Baudin's cockatoo	Bird	EN	EN	Southern eucalypt forests of mainly Jarrah, Marri and Karri.	No	9.81	
Calyptorhynchus latirostris	Carnaby's cockatoo	Bird	EN	EN	Kwongkan shrub or heathland. Presence of Hakea, Banksia and Pine species indicate potential feeding habitat.	Yes	5.13	X
Daphnia jollyi	Water flea (inland south west)	Invertebrate	P1		Shallow freshwater pools over granite bedrock	No	11.38	
Dasyurus geoffroii	Chuditch, Western Quoll	Mammal	VU	VU	Open forest, low open forest, woodland, and open shrub. There are no known extant populations of the Chudditch within the Esperance region.	No		X
Falco hypoleucos	Grey Falcon	Bird	VU	VU	Arid and semi-arid zones where rainfall is less than 500mm. Timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses	No		X
Falco peregrinus	Peregrine falcon	Bird	OS		Most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water	No	9.88	
Hydroprogne caspia	Caspian Tern	Bird	MI	MI	Usually forages in open wetlands, including lakes and rivers.	No	17.60	
Isoodon fusciventer	Quenda, southwestern brown bandicoot	Mammal	P4		Scrubby, often swampy, vegetation with dense cover up to 1 m high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover	Yes	7.92	

Leipoa ocellata	Malleefowl	Bird	VU	VU	Semi-arid shrublands and low woodlands dominated by mallee and/or acacia.	No	7.01	X
Limosa lapponica	Bar-tailed godwit	Bird	MI	MI	Coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays	No	17.60	
Notamacropus irma	Western brush wallaby	Mammal	P4		The western brush wallaby's optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets.	No	14.63	
Numenius madagascariensis	Eastern curlew	Bird	CR	CR	Marshy and swampy wetlands and lakeshores.	No	17.60	
Oxyura australis	Blue-billed duck	Bird	P4		Prefers freshwater swamps, with dense vegetation including Typha; although it has appeared in lignum swamps in more coastal areas	No	17.39	
Pandion haliaetus	Osprey	Bird	MI	MI	Inhabits areas around shallow waters	No	17.60	
Pluvialis squatarola	Grey plover	Bird	MI	MI	Inhabit sheltered embayment's, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons.	No	17.60	
Psophodes nigrogularis	Western whipbird	Bird	EN		Dense heath-like shrubby thickets on coastal dunes, and mallee woodland or shrubland with an open upperstorey above a dense shrubby understorey. Preferred habitat is usually 2–3 metres tall and dominated by shrubs, usually with a dense shrubby understorey, and sometimes intermixed with stunted eucalypts such as Marri and Jarrah.	No	18.79	
Thalasseus bergii	Crested tern	Bird	MI	MI	Marine	No	17.60	

Thinornis rubricollis	Hooded plover, hooded dotterel	Bird	P4		Inhabits ocean beaches and the edges of near-coastal and inland salt-lakes.	No	1.02	
Tringa glareola	Wood sandpiper	Bird	MI	MI	Inland shallow freshwater wetlands	No	17.60	
Tringa nebularia	Common greenshank	Bird	MI	MI	Coastal and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	No	5.79	
Tringa stagnatilis	Marsh sandpiper	Bird	MI	MI	Commonly seen singly, or in small to large flocks in fresh or brackish (slightly salty) wetlands.	No	18.92	

Appendix 5: State Threatened and Priority Flora and Fauna Definitions

Category	Definition
T – Threatened	Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedules 1 to 4 of the Wildlife Conservation (Rare Flora) Notice under the WC Act). Threatened flora are further ranked by the DBCA to align with IUCN Red List categories and criteria: **CR:** Critically Endangered – considered to be facing an extremely high risk of extinction in the wild (Schedule 1); **EN:** Endangered – considered to be facing a very high risk of extinction in the wild (Schedule 2); or **VU:** Vulnerable – considered to be facing a high risk of extinction in the wild (Schedule 3). **EX:** Presumed Extinct – taxa that have been adequately searched for and there is no reasonable doubt that the last individual has died (Schedule 4)
P1 – Priority 1 (Poorly known taxa)	Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2 – Priority 2 (Poorly known taxa)	Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3 – Priority 3 (Poorly known taxa)	Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4 – Priority 4 (Rare, Near Threatened and other taxa in need of monitoring)	**1. Rare** - Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. **2. Near Threatened** - Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. **3.** Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy

Appendix 6: Commonwealth Definition of Threatened Flora and Fauna Species (Environment Protection and Biodiversity Conservation, EPBC Act 1999)

Category Code	Category
Ex	**Extinct** Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild** Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered** Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered** Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable** Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent** Taxa which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Appendix 7: State Definition of Threatened Ecological Communities

Category Code	Category
PTD	**Presumed Totally Destroyed** An ecological community will be listed as Presumed Totally Destroyed if there are no recent records of the community being extant and either of the following applies: (i) records within the last 50 years have not been confirmed despite thorough searches or known likely habitats or; (ii) all occurrences recorded within the last 50 years have since been destroyed.
CE	**Critically Endangered** An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one of the following criteria: (i) The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; (ii) The current distribution is limited ie. highly restricted, having very few small or isolated occurrences, or covering a small area; (iii) The ecological community is highly modified with potential of being rehabilitated in the immediate future.
E	**Endangered** An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. The ecological community must meet any one of the following criteria: (i) The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification; (ii) The current distribution is limited ie. highly restricted, having very few small or isolated occurrences, or covering a small area; (iii) The ecological community is highly modified with potential of being rehabilitated in the short term future.
V	**Vulnerable** An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one of the following criteria: (i) The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated; (ii) The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution; (iii) The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.

Appendix 8: State Definition of Priority Ecological Communities

Category Code	Category
P1	**Poorly-known ecological communities** Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist.
P2	**Poorly-known ecological communities** Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.
P3	**Poorly known ecological communities** (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) Communities known from a few widespread occurrences, which are either large or within Significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
P5	**Conservation Dependent ecological communities** Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix 9: Commonwealth Definition of Threatened Ecological Communities

Three categories exist for listing threatened ecological communities under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Listing Category Code	Explanation of Category
Critically endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium term future.

Appendix 10: Categories and Control of Declared (Plant) Pests in Western Australia

Control Category	Control Measures
C1 (Exclusion) '(a) Category 1 (C1) — Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented' Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.	In relation to a category 1 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C2 (Eradication) '(b) Category 2 (C2) — Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is feasible'. Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.	In relation to a category 2 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C3 (Management) '(c) Category 3 (C3) — Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to — (i) alleviate the harmful impact of the declared pest in the area; or (ii) reduce the number or distribution of the declared pest in the area; or (iii) prevent or contain the spread of the declared pest in the area.' Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.	In relation to a category 3 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to — (a) alleviate the harmful impact of the declared pest in the area for which it is declared; or (b) reduce the number or distribution of the declared pest in the area for which it is declared; or (c) prevent or contain the spread of the declared pest in the area for which it is declared.

Appendix 11: Definition of Vegetation Condition Scale

For the south west and interzone botanical provinces

Condition Rating Description	Condition Rating Description
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance
Excellent (2)	Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species.
Very Good (3)	Vegetation structure altered; obvious signs of disturbance For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; & grazing.
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; & grazing
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; &grazing.
Completely Degraded (6)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix 12: Carnaby's Cockatoo foraging habitat scoring template

Adapted from Tables A1 and A2 of Department of Agriculture, Water and the Environment (2022)

Starting score	**Carnaby's Cockatoo**		
10	**Start at a score of 10** if your site is native shrubland, kwonkgan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. ***This tool only applies to sites equal to or larger than 1 hectare in size.**		
Attribute	**Subtractions**	**Context adjustor (attributes reducing functionality of foraging habitat)**	**Site D – Farmers Road Gravel Pit – Vegetation type A**
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	**0 -** Further south along Farmers Road outside of the project area Carnaby's Cockatoo was identified through evidence of foraging on *Banksia baueri, B. obovata, and B. violacea* seed cones and flowers. Given that each of these species were also present within the project area it is highly likely that Carnaby's Cockatoos have utilised the project area.
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 1km of your site.	**0 -** Additional foraging habitat was limited but was present within Farmers Road Reserve outside of the project area. Small patches of native vegetation were also present within 1km of the project area.
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12km from breeding habitat.	**-2** - Carnaby's Black Cockatoo is not known to breed within the Esperance region.

Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20km from a known night roosting habitat.	**0 –** The project area was 17.9km form the closest known roosting habitat. Planted windbreaks also provided potential suitable exotic roosting habitat surrounding the project area.
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is preferred food plants present.	**-1** There were several positive phytophthora samples within a close proximity to the project area along Farmers Road. Due to fire the southern portion of the site was uninterpretable and it is highly likely that Phytophthora species is present within the project area.
Total score	**Enter score**		**7**
Other considerations for assessment of foraging habitat	- The presence, extent and density (including foliage cover and flowering density) of all plant species that provide foraging, including non-native food sources used - The distribution and size of foraging habitat in proximity (e.g. up to 12 km) to the impact site. - Site degradation (such as cleared, disturbed or degraded areas). - The fire history of the impact site. - Landscape characteristics around the impact site, including details of roosting and breeding habitat in proximity (e.g. up to 20km for roosting and 12km for breeding); and - The location and details of watering points that could support the use of the foraging habitat.		Four dams were less than 1km from the project area, with the closest being 200m from the project area. Additional foraging habitat surrounding the site was limited, with a majority of foraging habitat within 1km of the project area being inside Farmers Road Reserve. The closest area of significant native vegetation is 3.5km from the project area.
Appraisal	To support your habitat score, you should provide an overall appraisal of the habitat on the impact site and within 20km of the impact area to clearly explain and justify the score. It should include discussion on the foraging habitat's proximity to other resources (e.g. exact distance to proximate resources), frequency of use of proximate sites, the degree of evidence and description of vegetation type and condition.		

Appendix 13: EPBC Act Protected Matters Report

Listed Threatened Ecological Communities

		Presence	
Community Name	**Threatened Category**	**Rank**	**Text**
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Likely	Community likely to occur within area

Listed Threatened Species

Scientific Name	Common Name	Simple Presence	Threatened Category	Migratory Status
Calidris ferruginea	Curlew Sandpiper	May	Critically Endangered	Migratory
Botaurus poiciloptilus	Australasian Bittern	May	Endangered	
Conostylis lepidospermoides	Sedge Conostylis	Likely	Endangered	
Anigozanthos bicolor subsp. minor	Little Kangaroo Paw, Two-coloured Kangaroo Paw, Small Two-colour Kangaroo Paw	Likely	Endangered	
Ricinocarpos trichophorus	Barrens Wedding Bush	May	Endangered	
Zanda latirostris	Carnaby's Black Cockatoo	Likely	Endangered	
Leipoa ocellata	Malleefowl	May	Vulnerable	
Aphelocephala leucopsis	Southern Whiteface	May	Vulnerable	
Dasyurus geoffroii	Chuditch, Western Quoll	Likely	Vulnerable	
Falco hypoleucos	Grey Falcon	May	Vulnerable	
Calidris acuminata	Sharp-tailed Sandpiper	May	Vulnerable	Migratory