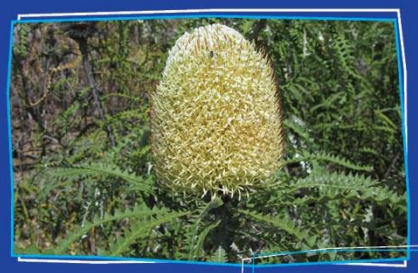
Vegetation, Flora, Fauna and Environmental Considerations, and Targeted Flora Report

Shire of Esperance Strategic Purpose Permit 21/22
Site W – Plowman road



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1 Executive Summary

This 'Vegetation, Flora, Fauna and Environmental Considerations and Targeted Flora Report' has been undertaken in accordance with the 'Environmental Protection Authority (EPA) Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016)' as part of the application to the Department of Water and Environmental Regulations (DWER) to clear 3.181 ha of native vegetation within a 9.75ha area for the purpose of widening and resheeting a rural road.

2 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 'Plowman Road' project as Site W under the '2021 Strategic Purpose Permit' (Figure 1), for the purpose of widening and resheeting the road. To complete these works, native vegetation up to 4 m from the current road footprint on both sides of the road is required to be cleared, increasing the active road footprint to 24 m. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation.

The proposed works are located ~35 km north east of Esperance, within the Shire of Esperance managed road reserve of Plowman road. Specifically, it is located from 1.71 to 21 km south of Dempster road, at straight line kilometre (SLK) 8.5 to 12.62 (Main Roads 2020). A point within the proposed clearing permit area is -33.643072 S, 122.074733 E or 122.074733 N, 414196.43 E (UTM Zone 51 H, GDA94).

Figure 1. Location of Strategic Purpose Permit 21/22 'Site W – Plowman road'

3 Environmental Background

3.1 Scope

The removal of native vegetation during the road widening at 'Site W – Plowman road' has the potential to affect a multiple environmental factors.

Possible impacts include;

- Threatened Flora (TF) and Priority Flora (PF).
- Threatened fauna, specifically, potential feeding, nesting and roosting habitat of endangered Carnaby's Black Cockatoo, *Calyptorhynchus latirostris.*
- Threatened Ecological communities (TEC) and Priority Ecological Communities (PEC), specifically the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia' (Kwongkan) TEC.

Assessing these impacts involves two approaches; desktop study and field survey. The desktop study gathered background information on the target area. The field survey allows for detailed understanding of vegetation communities, targeted flora surveys for possible TF or PF, environmental condition, presence of PEC and TEC, and overall potential impact of clearing.

3.2 Catchment

'Site W - Plowman road' is present within the Bandy Creek catchment area. It is located approximately 21km from the coast.

3.3 Climate

The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers (BoM 2020). The area receives an average annual rainfall of 618 mm.

3.4 Geology

One geological unit was identified within 'Site W – Plowman road' by Schoknecht et al. (2004). It was described as "Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand".

3.5 Soils

The soil of 'Site W – Plowman road' is broadly defined as both deep uniform sands and saline drainage lines (Schnoknecht et al. 2004). Within the area, there has been three soil types recorded. These include:

- Esperance 3sd Phase (245Es_3sd): Saline drainage lines. - 0.03 ha
- Esperance 2E3b Phase (245Es_2E3b): Deep uniform sand, Podzol > 80 cm (Corinup), Uc2.22, on gently undulating plain, 1-3% slope - 3.27 ha
- Esperance 1 a Phase (245Es_1E1a): Gravelly, yellow mottled duplex soil with < 30 cm of sand over gravel layer (Fleming (shallow)), Dy5.82, on level plain, <1% slope - 6.87 ha

3.6 Topography

During the field survey, topography was observed to be dominated by level plains and gently undulating plains. Using Schnoknect et al. (2004), the project topography is mapped at a fine scale, traversing between an elevation of 106m and 112m.

3.7 Vegetation

The site is located within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) Esperance Plains region (Esp2) and Recherche sub-region. 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 two vegetation association (VA) within the 'Site W – Plowman road' area, VA516 and VA47 (Table 1).

Table 1. Vegetation associations mapped by Beard (1973) within the 'Site W – Plowman road', and statistics on pre-European remaining areas.
Nt. Acronyms used include Interim Biogeographic Regionalisation of Australia (IBRA), Eastern Mallee bioregion (MAL01), local government area (LGA) and International Union of Conservation Nature (IUCN).

Vegetation Association		
Name	516	47
Description	Shrublands; mallee scrub, black marlock	Shrublands; tallerack mallee-heath
Pre-European extent in IBRA region ESP2 (%)	68.96	35.05
Pre-European extent in LGA (%)	44.92	13.43
Current extent conserved in IUCN area (%)	24	17.68

3.8 Land use

The area directly included in the clearing permit application 'Site W – Plowman road' is currently intact and vegetated 60 m wide road reserve, managed by the Shire of Esperance. The current road footprint occupies 16 m. The surrounding land use is agricultural land with several lakes in the surround area the closest being 600 metres away. The area is within rural zoning.

4 Methodology

4.1 Desktop study

A desktop study was completed prior to any site visit. Geographical Information System (GIS) review existing

- Existing site digital orthophotos, as sourced from LandGate (Merivale, 2018).
- Western Australian Local Government Association's (WALGA) 'Local Government Mapping (LGMap 2020)' program was used to assess spatial information of geology, topography, soil profiles, native and planted vegetation, water bodies and Interim Biogeographical Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) classification system.
- Data provided by Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Herbarium in July/August 2020 was used to assess threatened flora (TF), priority flora (PF), and threatened (TEC) and priority (PEC) ecological communities within 20 km radius of the site. Specifically, spatial data included;
    - WAHerb extract (DBCA 2020c).
    - Threatened and Priority Reporting (TPFL; DBCA 2020e).
    - Esperance District Threatened Flora (DBCA 2020f).
    - TEC and PEC 'Likely to Occur' buffer and boundary areas (DBCA 2020b).
    - Department of Agriculture, Water and the Environment Protected Matters Search Tool
    - Index of Biodiversity Surveys for Assessment (DWER, 2020).
- To assess fauna, the following databases were searched with a 20km buffer from the center of the site (33.6377S,122.0714E);
    - Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Museum (WAM) NatureMap data portal (2020)
    - BirdLife Australia's Atlas and Birdata datasets (Birdlife Australia, 2020)
    - Department of Agriculture, Water and the Environment Protected Matters Search Tool (AWE, 2020)
    - Atlas of Living Australia database (ALA, 2020)
    - Index of Biodiversity Surveys for Assessment (DWER, 2020)

4.2 Field investigation: possible ecological impacts

The site was initially inspected on 02/09/2020, by Julie Waters and Sophie Willsher the Shire of Esperance's Environmental Coordinator and Field Assistant. An assessment of possible ecological impacts included historical clearing, artificial water way constructions, impact of fire regimes, regeneration from disturbance, waterlogging, senescence, weeds, erosion, sedimentation, invasive fauna, *Phytophthora cinnamomi* Dieback, and illegal dumping of rubbish.

Vegetation community was also assessed during the field survey. Broad vegetation types defined by structure and composition were recorded and described. Condition of vegetation was assessed using Keighery (1994) categories, as 'Excellent', 'Very Good', 'Good', 'Degraded' or 'Completely Degraded'. This illustrates how healthy vegetation is, determined by number of dead or dying plants, weed cover and other forms of degradation. 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.

Only a very basic fauna survey was conducted as per EPA (2020) guidelines. Observations of fauna presence, such as call sounds, footprints and scats were also noted, and the area assessed for suitability of endangered Carnaby's Black Cockatoo (*Calyptorhynchus latirostris)* feeding, roosting and nesting habitat. Additionally, species that corresponded with suitable habitat within 'Site W – Plowman road' identified in the desktop 20 km radius search were assessed, including *Falco peregrinus* and *Isoodon fusciventer.*

4.3 Field investigation: Assessing Threatened and Priority Ecological Communities

The vegetation community of 'Site W – Plowman road' was assessed for the presence a TEC or PEC, specifically the Environmental Protection and Biodiversity Conservation Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' TEC. 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.

PEC's do not have published approved conservation advice. Comparison of the vegetation community occurred using 'Priority Ecological Communities for Western Australia Version 30' (DBCA 2020d) definitions.

4.4 Field Investigation: Targeted flora survey

The targeted flora survey was undertaken following the Environmental Protection Authority's (EPA) 'Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016)'. The entirety of the proposed impact area was surveyed on foot in mid-spring, on 29/09/2020 by Julie Waters and Danika Penson, Shire of Esperance's Environmental Coordinator and Environmental Assistant. Due to the timing, the majority of species were flowering, decreasing the likelihood of missing species. The road was used as a continuous transect. Vegetation up to 5 meters from the edge of the existing road's back-slope was assessed to accurately cover the 24 m width proposed clearing permit area. Suitable associated habitat for TF or PF identified in the desktop study were particularly focused on, and extensively searched.

Due to the high diversity and complexity of Esperance's flora, all species were recorded to compile an incidental species list (Appendix 8.1, Table 11). All species unknown in the field were collected and identified exsitu, using keys, WA Herbarium's Florabase (DBCA 2020a), manuals and Esperance District Herbarium, to ensure no TF or PF were missed. Material was collected under Julie Waters' Regulation 61, Biodiversity Conservation Regulations 2018 Licence for Flora Taking, FT610000139, as well as Danika Penson's FB2000276 and Sophie Willsher's, FB6200278. Any species that were unable to be identified were submitted to the WA Herbarium for identification.

For PF or TF species identified in the desktop survey as possible to occur, scans of pressed specimens from the local Esperance District Herbarium were taken into the field. Any flora thought to be TF or PF was formally collected, counted and mapped using a Panasonic FS-G1 Toughpad with the program ROAM or a GPS Garmin GPS64. Specimens were then lodged with the WA Herbarium for formal verification. When PF were confirmed, TPFL forms were completed and submitted to the DBCA's District Conservation Officer, and Species and Communities Branch.

5 Results and Discussion

5.1 Ecological Impact

5.1.1 Vegetation Communities

Four vegetation communities were identified and mapped within the 'Site W – Plowman road', as defined by structure and composition (Table 2, Figure 2, Appendix 8.2). The incidental flora list identified a total of 120 native species across all vegetation communities. This is average diversity for the study area. It is believed that only one of the two Beard (1973) vegetation associations identified in Section 3.7 (VA47) is an appropriate match for the vegetation types observed.

Table 2. Vegetation communities identified within proposed 'Site W – Plowman road' project area.

Type	Description	Figures	Closest Beard Vegetation Association	Area (ha)	Diversity (native species)
A	Nuytsia, Banksia speciosa and *Eucalyptus tetraptera* open woodland over *Melaleuca striata* mixed shrubland	6, 7	VA 6048 - Shrublands; banksia scrub-heath on sandplain	6.965	82
B	*Melaleuca cuticularis* with Baumea juncea sedgeland	8, 9	VA41: Melaleuca open shrubland	0.86	22
C	*Eucalyptus pleurocarpa* over mixed Proteaceae dominated shrubland	10, 11	VA47: Shrublands; tallerack mallee-heath	0.882	49
D	Closed Mallee woodland over Melaleuca shrubland and Cyperaceae sedgeland	12, 13	VA1516; Shrublands; mallee scrub, black marlock & Forrest's marlock	0.230	21

Figure 2. Vegetation types within the 'Site W – Plowman road' area, from SLK 8.5 km to 12.62 along Plowman Road.

5.2 Vegetation Condition

Vegetation condition within 'Site W – Plowman road' varies from totally destroyed to very good, with one small section of vegetation type D in excellent condition (Figure 3). Significant degrading factors contributing to the variable vegetation condition include recent fire history following inappropriate fire regimes for some of the southern area resulting in boom and bust species such as *Acacia* saligna, high weed burden and impacts of vehicle movement causing incidental clearing.

Table 3. Vegetation condition classes of 'Site W - Plowman road'.

Vegetation condition	Area in hectares
Excellent	0.0519
Very good	1.605
Good	0.953
Degraded	0.289
Completely degraded	0.285

Figure 3. Vegetation condition across 'Site W – Plowman road' project, ranging from Completely Degraded to excellent condition, due primarily to degradation from weed burden and fire history.

There was high weed invasion across the entirety of the proposed 'Site W – Plowman road'. Overall, 36 invasive species were identified within the project area (Appendix 8.1). Of these, the most extensive and of serious concern were Victorian Tea Tree (*Leptospermum laevigatum)* and invasive grasses such as African lovegrass (*Eragrostis curvula)* and Annual veldt Grass (*Ehrharta longiflora)*. It is highly likely that proposed works will increase the distribution of weeds and degrade vegetation along the entire road reserve where works occur. However, as the vast majority of the project area is already experiencing degradation, this is not of a large conservation consequence.

5.3 Phytophthora Dieback

Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2020) data shows positive *Phytophthora cinnamomi* or other *Phytophthora* sp. Dieback sample results in the immediate area. In 2018 positive records of *P. cinnamomi* were observed in *Lambertia inermis* plants on Wittenoom Road (~300 m south of Plowman Rd). There are more than ten further locations within a 20 km radius of the project site with positive *Phytophthora* results. Due to the fire it was difficult to detect any signs of *P. cinnamomi* dieback disease within the clearing permit area. It is known to take at least five years after fire for visual markers of Dieback to become apparent due to the tolerance of juveniles to the adverse effects of *P. cinnamomi.* Clear signs of dieback were present in vegetation type A, with many large dead *Banksia speciosa* plants. It therefore could be inferred that *P. cinnamomi* infestations are present within the project area and the site will be treated as such. Vegetation types A and C are the most susceptible to dieback with Proteaceae species having a strong presence in the vegetation community. 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. However, there is always a possibility that proposed works will extensively spread *P. cinnamomi* dieback along Plowman road due to proposed works. Most importantly, all machinery will be washed down after leaving the site, to prevent spreading it in the wider Esperance landscape.

5.4 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 W – Plowman road' project area. No other TEC's or priority ecological communities (PEC) were identified by the desktop study as being within 'Site W – Plowman road' or within a 20 km buffer of the site.

Due to the site recently being burnt, 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. Two vegetation communities Vegetion type A, described as 'Nuytsia, *Banksia speciosa*, and *Eucalyptus tetraptera* open woodland over *Melaleuca striata* mixed shrubland' and vegetation type C described as '*Eucalyptus pleurocarpa* over mixed Proteaceae dominated shrubland' met criteria to be considered as Kwongkan TEC. However, due to multiple degrading factors, only areas within these vegetation communities in very good condition were considered as TEC (Figure 4). In total, 0.106 ha of vegetation within a 0.883ha area was considered as Kwongkan TEC present within 'Site W – Plowman road' area.

Figure 4. Vegetation communities of vegetation type 1 'Nuytsia, *Banksia speciosa*, and *Eucalyptus tetraptera* open woodland over *Melaleuca striata* mixed shrubland' and 2 '*Eucalyptus pleurocarpa* over mixed Proteaceae dominated shrubland' in very good condition met threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' within 'Site W – Plowman road'.

5.5 Threatened and Priority Flora

Two threatened flora (TF) and 30 priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Table 4; DBCA 2021a, DBCA 2020c, DBCA 20203). Of these, 11 PF or threatened species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site W – Plowman road'

Table 4. Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site W – Plowmans Rd Resheet' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2020c), WA Herbarium (DBCA 2020c) and Esperance District Threatened Flora (DBCA 2021a). 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	Cons status	Associated Habitat	Likely to occur
Acacia bartlei	P3	Small, localised populations, flat or gently undulating landscapes (mostly cleared for ag) often in waterlogged depressions in brown or grey sandy loam or clay loam often with E. occidentalis	Unlikely
Acacia euthyphylla	P3	Grey white sand, clay loam, margins of salt lakes and marshes, seasonal swamps	Unlikely – no salt lakes
Anigozanthos bicolor subsp minor	T	Sand and well-watered sites	Possibly, PERTH 00993204 is 459m to east of project area. 1986 collection ~16 miles E of Gibson
Astroloma sp. Grass Patch	P2	Coobidge Creek to east of Grass Patch. Grey-white fine sand over clay on the margins of salt lakes, associated with myrtaceous shrubs and halophytes	Unlikely – no salt lakes
Baeckea sp Gibson	P1	3 populations near Beaumont and Gibson associated with Callitris tuberculate, Eucalyptus grossa, Melaleuca uncinata, Hakea bicornata, Acacia lasiocalyx and Spartochloa scirpoidea	Unlikely
Beyeria physaphylla	P1	Only two populations near Scaddan. Grows in mallee Eucalypt woodlands	No – outside of correct location
Brachyloma mogin	P3	Grey clayey sand swamp flat	No
Comesperma calcicola	P3	Calcareous or semi-saline clay loams, limestone – areas around saline waters	Unlikely – no saline waters
Conostephium marchantiorum	P3	Grey or light yellow sandy soil in open mallee and shrub heath communities	Possibly
Dampiera sericantha	P3	Sand sometimes with gravel plains	Possibly
Darwinia sp Gibson	P1	Margins of salt lakes and road verges on grey-brown sandy loam and white sand, with M.	unlikely

		cuticularis, M. brevifolia, leucopogon and samphire	
Darwinia sp Mt Burdett	P4	Open shrub mallee on sandy loams associated with Melaleuca pulchella, Phymatocarpus maxwellii, Micromyrtus elobata, Beaufortia micrantha and Banksia sp.	Unlikely
Daviesia pauciflora	P2	White or grey sand over laterite or limestone, flats	Unlikely
Desmocladus biformis	P3	Sand, sandy clay. Lateritic soils dry sites	Possibly
Eremophila glabra subsp Scaddan	P1	Only from the Scaddan area, growing in open mallee woodland on grey, brown clayey sand	no
Eucalyptus balanopelex (taxon removed from census)	P1	Grey sand, sandy loam low wet areas	Possibly
Eucalyptus dolichorhyncha	P4	Small areas south of Salmon gums flats or slightly rising ground with whitish to yellowish sandy clay soil	no
Eucalyptus foliosa	P3	Only in small area around Gibson/Scaddan	no
Eucalyptus merrickiae	V	Sandy, loamy depressions around salt lakes and saline flats in open shrub mallee, often with dense scrub beneath	unlikely
Eucalyptus preissiana subsp lobata	P4	Coastal limestone rises and sand dunes	no
Eucalyptus semiglobosa	P3	White sand over laterite, silty sand on edge of granite shelf, limestone. Hillslopes, gullies and cliffs	unlikely
Eucalyptus sweedmaniana	P2	Single known population in Cape Arid National Park on lower coastal slopes	no
Grevillea baxteri	P4	Sand, sandy loam and granitic loam in low heath to tall open shrubland and open mallee	Possibly
Hydrocotyle asterocarpa	P2	Plants grow in sandy loam soils surrounding the margins of inland salt lakes, in low open Shrub land, often in sheltered positions around mature plants	Unlikely
Isopogon alcicornis	P3	Grey/brown sandy loam in mallee shrubland	Possibly
Kunzea salina	P3	White sand over clay at the margins of salt playa lakes, restricted to marginal sand dunes	no
Leucopogon interruptus	P3	Grey sand over granite	possibly
Melaleuca eximia	P2	Occurs in sandy soils associated with granite outcrops	possibly
Melaleuca viminea subsp	P2	Near creeks or wet depressions in clayey soils, possibly associated with granite.	Unlikely

apressa			
Stachystemon vinosus	P4	Sandy duplex and gravelly soils in scrub heath in associated with Eucalyptus spp.	possibly
Tecticornia indefessa	P2	White to brown-grey sand near the edge of a salt lake (in one conservation reserve north of Esperance in the mallee region)	Unlikely
Thysanotus parviflorus	P4	Grey sand	possibly

No TF species, were identified within the clearing footprint, however one PF species, *Grevillea baxteri* (P4), was located just outside the proposed clearing permit footprint, in the northern portion of the works area. Queries of spatial datasets were requested specifically for this species, to interrogate impact of proposed works on species sustainability (DBCA 2021c; DBCA 2020e; DBCA 2020f). DBCA do not actively manage or monitor the majority of low priority species, due to their prevalence in the landscape relative to TF. There are 136 species recorded as priority three or four conservation status within the Shire of Esperance boundaries (DBCA 2020f).

Two Eucalypts were unable to be identified, these were compared with the threatened and priority Eucalypts within the 20km search radius, and these threatened and priority specie were ruled out. An Ericaceae was also unable to be identified, this was compared with the threatened and priority Ericaceae within the 20km search radius, and these threatened and priority specie were ruled out.

Specimen's unknown to surveyors were collected and verified at the WA Herbarium as non-threatened species, such as *Tricostularia compressa and Schoenus nitens* (Accession #8974; JW03121, JW03021).

5.5.1 *Grevillea baxteri,* Priority Four

A specimen of *Grevillea baxteri* was sent to the WA Herbarium for identification confirmation (KW123; Accession 8652 with specimen not retained by WA Herbarium). It was confirmed as *Grevillea baxteri* by Michael Hislop on 10/12/20. A Threatened and Priority Reporting Form (TPFL) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 15/01/21 (Appendix 2). The *Grevillea baxteri* that was found was not part of a previously known population. It is unlikely that the single specimen will be impacted upon as it was located 7 metres from the edge of the works area, the specimen will be flagged out and the construction team will be briefed on the plant and its whereabouts to ensure the specimen is not accidentally cleared.

Figure 5. Map of the single *Grevillea baxteri* plant's location within 'Site W – Plowman road', in green.

Figure 6. *Grevillea baxteri* in flower, photo taken by Kate White

31 records were listed for *Grevillea baxteri* within the Shire of Esperance on DBCA (2020c) and a total of 47 populations were listed in a Threatened and Priority Flora database (DBCA 2021) and on file at DBCA from not yet databased TPFL forms (Table 6). Many of these records are very old with only brief description of locations, resulting in land tenure of many of these records being unknown, it is also difficult to say whether these past populations still exist. Significantly sized populations appear to exist in Cape Arid National Park and surrounding crown land. Other populations also exist in Shire of Esperance Road Reserves. A wide distribution of 200km throughout the shire was seen in these records, with previous distribution noting a variety of suitable environments, including heaths, banksia scrubland and open mallee (Makinson, 2000). Due to the wide distribution of the species throughout the Shire of Esperance and the healthy population within the Cape Arid National Park the Shire does not believe this project poses any significant risk to the species or the specimen in close proximity to the project area.

Table 6. *Grevillea baxteri* population data obtained from a DBCA (DBCA 2021)

Locality	Date	Frequency	Tenure
4 miles S of Truslove.	19/04/1953		Unknown
SW of Island Bay Lake [Israelite Bay]	1/11/1954		National Park
29 miles SW of Mount Ragged	6/12/1960		Unknown
6.6 miles W of Israelite Bay settlement.	9/12/1960		National Park
550 mile peg between Esperance and Salmon Gums [Ca 4 km S of Grass Patch].	5/11/1962	Occasional	Road reserve
Near Mount Ragged, W of Israelite Bay	24/10/1963		National Park
Near Scaddan.	July 1963		Unknown
Ca 30 km W of Mount Ragged	10/09/1964		Misc Crown Land
Cape Arid septentrionalem versus [N of Cape Arid].	12/02/1966		
Prope Cape Arid, septentrionalem versus [Near Cape Arid, N of].	12/02/1966	Rare	National Park
31 miles N of Esperance	9/09/1966		Unknown
13 miles S of Gibson.	15/05/1968		Unknown
c. 8 km W of Israelite Bay, (Israelite Bay os c. 185 km E of Esperance) Eucla Division	1/10/1968		National Park
21 miles W of Israelite Bay	29/10/1969		National Park
39 miles S of Salmon Gums.	15/02/1970		Unknown
29 miles SW of Mount Ragged	19/10/1970		Unknown
14-16 miles W of Israelite Bay on track to Esperance	20/10/1970		National Park
Scaddan.	25/11/1970		Unknown
Ca 5 km directly ca NNW of Mt Arid.	30/06/1976	Frequent	National Park
On Fisheries Road, opposite Aroona Station, E of Esperance.	30/06/1976		Shire Road reserve

11 km by road N of Gibson.	2/07/1976	Frequent	Shire Road reserve
Ca 48 km NW of Point Malcolm.	20/09/1976		National Park
Scaddan	6/11/1978		Unknown
Near Boyatup Hill, ca 117 km E of Esperance.	13/05/1980		Misc Crown Land
7 km S of [The] Diamonds Hill, ca 37 km WSW of Israelite Bay, Cape Arid National Park.	6/11/1980	Scattered	National Park
6 km NE of Boyatup Hill	11/10/1983		Misc Crown Land
5 km E of Cape Arid National Park on Fisheries Road,	21/11/1986		National Park
19.4 km N along Mount Ragged track from junction with Fisheries Road, some 10 m off track	18/10/1987		Unknown
Along road to Cape Arid National Park, Esperance	30/09/1992		Shire road reserve
Speddingup, NSM Highway [Coolgardie-Esperance Highway]	26/09/1993		Unknown
Savages Road, 24 km NW of Condingup,	24/12/1995	Several plants	Shire road reserve
W of Cape Arid National Park boundary towards Esperance, Eyre District,	11/02/1998		National Park
Speddingup Wildflower Farm, Scaddan,	10/09/2000	common.	Private land
The Diamonds, N of Cape Paisley, Cape Arid National Park	21/09/2002	dominant.	National Park
Israelite Bay. N of Camp Ground. High heath on N track. Eyre	22/09/2002	abundant.	National Park
50 to 100 m E of West Kalgoorlie Esperance Railway between railway line and cleared farmland, 150 m S of Speddingup, 14.5 km N of Gibson	1/07/2003	50 plants adjacent to 200 m of track.	Shire road reserve
2km E of the main road N of Scaddan along Wilson Road; Scaddan Well	18/12/2004		Shire Road reserve
Corner of Wittenoom Hills Road and Scaddan Road, Esperance	6/08/2007	2-5 plants.	Shire road reserve
The Diamonds Hill	24/09/2007	6-20 plants.	National Park
Fisheries Road, on W boundary of Cape Arid National Park	4/11/2009		Shire Road reserve
0.2 km E of railway on Flemming Grove Road, Gibson	5/11/2009		C class reserve, for government purposes
On boundary of Cape Arid National Park, c. 2.5 km N of where Fisheries Road ends, 66 km E of Condingup	28/10/2013	200+ plants.	Misc Crown Land

Howick Rd, 600m SE of Parmango Rd (SW side of rd)	7/07/2016	2	Shire road reserve
Plowman Rd, 1.95km east of Wittenoom rd, NE road reserve	29/09/2020	1	Shire road reserve
Firebreak north of Cape Arid NP. North of Fisheries rd near junction of Grewar rd	26/05/2012	1	Unallocated Crown land
4km south of Scaddan	22/08/2002	4	Road Reserve - Main Roads
Boyatup Hill, Fisheries rd Entrance from Fisheries rd, N side of rd into gravel pit	16/11/2006	30+	Unallocated Crown land

5.6 Fauna

Within a 20 km radius of the 'Site W – Plowman Road Resheet', 205 fauna have previously been recorded. Of these, eleven species are threatened fauna, priority fauna and fauna protected under international agreement have been recorded (Table 5). Only the Carnaby's Black Cockatoo has suitable habitat within the proposed clearing permit area.

Table 5. Potential threatened, priority and protected under international agreement fauna recorded within a 20 km radius of the proposed 'Site W – Plowman Road Resheet'. Acronyms used include priority (P), threatened (T), and protected under international agreement (IA).

Scientific Name	Common Name	Cons Status	Likelihood of occurring	Associated habitat
Calidris acuminata	Sharp tailed sandpiper	IA	No	Shorebird – wrong habitat
Calidris ferruginea	Curlew sandpiper	T	No	Shorebird – wrong habitat
Calidris ruficollis	Red necked stint	IA	No	Shorebird – wrong habitat
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	T	Possibly	Kwongkan shrub or heathland. Presence of Hakea, Banksia and Pine species indicate potential feeding habitat.
Cereopsis noveahollandiae	Cape Barren Goose	T	No	Associated with offshore islands, improved pastures or clovers, salty ground with native succulents, camps on margins of dams, fresh or brackish swamps and lakes
Falco peregrinus	Peregrine Falcon	S	Unlikely	Broad habitat range, but prefer woodlands or tall trees for nesting
Hydroprogne caspia	Caspian Tern	P4	No	Shorebird – wrong habitat
Isoodon fusciventer	Quenda/southwestern brown bandicoot	P4	Unlikely	Dense understory around swamps and banksia and jarrah woodlands
Limosa lapponica	Bard-tailed godwit	IA	No	Shorebird – Wrong habitat
Thinornis rubricollis	Hooded plover	P4	No	Shorebird – Wrong habitat
Tringa nebularia	Common greenshank	IA	No	Shorebird – Wrong habitat

5.6.1 Carnaby's Black Cockatoo, *Calyptorhynchus latirostris*, threatened fauna

Carnaby's Black Cockatoo's are unlikely to nest within the 'Site W – Plowmans road' project area, as no large trees are present with hollows. There are no large trees present within each of the vegetation types of the proposed site. Carnaby's Black Cockatoos forage on Proteaceae species nuts, such as hakea and banksia species. Vegetation types A and C have suitable foraging habitat for the cockatoo with plenty of Proteaceae species, with over 10 different Proteaceae species in both these vegetation types for their food source. Since a considerable portion of the site is regenerating from a previous fire event, the foraging and roosting habitat within these vegetation types may increase over time and become more suitable for the Carnaby's Cockatoo.

No evidence of invasive fauna, such as scats or digging, were observed. However, it is highly likely that foxes, rabbits and feral cats are extensive throughout the area. The neighbouring landowner (Wallace, 2020) told Shire staff that an ex-pet carpet python (*Morelia spilota*) belonging to the previous landowner lives in the area.

6 Conclusion; assessment of Department of Water and Environmental Regulations clearing principles

The 'Site W – Plowman Road Resheet' 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). The Shire acknowledges that principles (a), (b), (d) and (j) are likely to be at variance and that principles (c) and (f) may be at variance.

Table 10. Shire of Esperance Assessment against Clearing Principles of the proposed 'Site W – Plowman road'.

Assessment against Clearing Principles	Conclusion
Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	Biodiversity at this site is low with only 120 native species across four vegetation communities.
Principle (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The area contains foraging habitat for Carnaby's cockatoo but no nesting habitat. A ex-pet carpet python also resides in the area (Wallace 2020)
Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	The Priority 4 species *Grevillea baxteri* was recorded just outside the clearing footprint. No plants will be removed.
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.	Two vegetation communities (Type A and C) met criteria to be considered as Kwongkan TEC. However parts of these were not intact enough to be considered as Kwongkan. In total, 0.106 ha of vegetation within a 0.883ha area was considered as Kwongkan TEC present within 'Site W – Plowman road'.
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.	The general area has been highly cleared, however 60m wide road reserve in this area will still act as a wildlife corridor even with the road widening going ahead to 24m (even though

	some sections of the west side of the road are completely degraded).
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.	Vegetation area D described as "Closed Mallee woodland over Melaleuca shrubland and Cyperaceae sedgeland" is not riparian vegetation as such, however is close to Bandy Creek. The Bandy Creek crossing has previously been upgraded and this area is not part of the application.
Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Soil types in the area are unlikely to erode or become degraded due to this road widening.
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.	Clearing of the vegetation is unlikely to have an impact on the environmental values of any adjacent or nearby conservation area all over 10km away.
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.	Unlikely to have any impacts.
Principle (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	There is a good vegetation buffer on Bandy creek at the north of the application area. The creek crossing has previously been upgraded and this area is not part of the application.

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8 Appendix

8.1 Appendix 1 Incidental species list

Table 11. Incidental species list by vegetation type from 'Site W – Plowman road'

Family	Genus	Species	Common Name	Weed	Cons Stat	Vegetation Type			
						A	B	C	D
Anarthriaceae	*Anarthria*	*scabra*				x			
Araliaceae	*Trachymene*	*cyanopetala*						x	
Asparagaceae	*Laxmannia*	*brachyphylla*				x			
Asphodelaceae	*Asphodelus*	*fistulosus*	Onion Weed	x		x	x		
Asteraceae	*Arctotheca*	*calendula*	Cape Weed, Cape Dandelion	x		x	x	x	x
Asteraceae	*Circium*	*vulgare*	Spear Thistle	x		x			
Asteraceae	*Cotula*	*coronopifolia*	Waterbuttons	x			x		
Asteraceae	*Hypochaeris*	*radicata*	Flatweed	x		x	x		
Asteraceae	*Lactuca*	*serriola*	Prickly Lettuce,	x		x			
Asteraceae	*Pseudognaphalium*	*luteoalbum*	Jersey Cudweed			x			
Asteraceae	*Sonchus*	*oleraceus*	Common Sowthistle	x		x	x	x	
Asteraceae	*Ursinia*	*anthemoides*	Solar Daisy	x		x		x	
Asteraceae	*Vellereophyton*	*dealbatum*	Hairy pompom head	x		x			
Brassicaceae	*Brassica*	*napus*	Canola	x		x			
Brassicaceae	*Brassica*	*tournefortii*	Turnip	x		x	x		
Brassicaceae	*Raphnus*	*raphanistrum*	Wild Radish	x		x	x	x	
Campanulaceae	*Wahlenbergia*	*capensis*	Cape bluebell	x				x	
Caryophyllaceae	*Spergularia*	*marina*					x		
Casuarinaceae	*Allocasuarina*	*humilis*				x	x	x	x
Casuarinaceae	*Allocasuarina*	*lehmanniana ssp. ecarinata*							x
Casuarinaceae	*Allocasuarina*	*thuyoides*	Horned Sheoak			x			
Crassulaceae	*Crassula*	*decumbens*				x			
Cucurbitaceae	*Cucumis*	*myriocarpus*	Paddy melon	x		x			
Cyperaceae	*Caustis*	*dioca*	Puzzle Grass			x		x	
Cyperaceae	*Cyperus*	*tenellus*	Tiny flatsedge			x			
Cyperaceae	*Ficinia*	*nodosa*	Knotted Club Rush				x		
Cyperaceae	*Gahnia*	*trifida*	Saw Sedge			x		x	
Cyperaceae	*Isolepis*	*marginata*	Tiny Cyperaceae				x		
Cyperaceae	*Lepidosperma*	*squamatum*				x		x	
Cyperaceae	*Lyginia*	*imberbis*				x			
Cyperaceae	*Mesomelaena*	*stygia ssp. stygia*						x	
Cyperaceae	*Mesomelaena*	*tetragona*	Semaphore Sedge			x	x	x	

Cyperaceae	*Schoenus*	*breviculmis*				x			
Cyperaceae	*Schoenus*	*nitens*				x			
Cyperaceae	*Tricostalaria*	*compressa*				x			
Cyperaceae	*Tricostularia*	*aphylla*	Medusa Sedge			x			
Dilleniaceae	*Hibbertia*	*acerosa*				x			
Dilleniaceae	*Hibbertia*	*gracilipes*				x		x	x
Dilleniaceae	*Hibbertia*	*hibbertioides ssp. meridionalis*				x	x		
Dilleniaceae	*Hibbertia*	*oligantha*				x			
Dilleniaceae	*Hibbertia*	*racemosa*	Stalked Guinea Flower			x			
Droseraceae	*Drosera*	*glanduligera*	Scarlet Sundew,			x			
Droseraceae	*Drosera*	*menziesii*				x			
Ericaceae	*Andersonia*	*parvifolia*				x			
Ericaceae	*Lysinema*	*ciliatum*	Curry Flower					x	
Fabaceae	*Acacia*	*aemula*				x			
Fabaceae	*Acacia*	*cyclops*	Coastal Wattle			x	x	x	x
Fabaceae	*Acacia*	*pycnantha*	Golden Wattle	x		x			
Fabaceae	*Acacia*	*saligna*	Orange Wattle			x		x	
Fabaceae	*Aotus*	*sp. Esperance*				x			
Fabaceae	*Chamaecytisus*	*palmensis*	Tagasaste	x		x			
Fabaceae	*Chorizema*	*aciculare*	Needle Leaf Chorizema			x		x	
Fabaceae	*Davesia*	*teretifolia*				x		x	
Fabaceae	*Ornithopus*	*compressus*	Yellow serradella	x		x	x		
Fabaceae	*Ornithopus*	*sativus*	Pink serradella	x			x		
Fabaceae	*Templetonia*	*retusa*	Cockies tongues					x	x
Fabaceae	*Trifolium*	*subterraneaum*	Subterraneum clover			x			
Geraniaceae	*Erodium*	*cicutarium*	Storksbill Pelargonium	x		x			
Goodeniaceae	*Coopernookia*	*polygalacea*						x	x
Goodeniaceae	*Coopernookia*	*strophiolata*							x
Goodeniaceae	*Dampiera*	*parvifolia*				x			
Goodeniaceae	*Dampiera*	*sacculata*						x	
Goodeniaceae	*Goodenia*	*pterigosperma*	Wing-seeded Goodenia			x			
Goodeniaceae	*Goodenia*	*scapigera*						x	
Goodeniaceae	*Goodenia*	*trinervis*				x			
Haemodoraceae	*Conostylis*	*beliana*	Angel trumpets					x	
Haemodoraceae	*Conostylis*	*seorsiflora*				x			
Hemerocallidaceae	*Agrostocrinum*	*scabrum*	Blue Grass Lilly						x
Hemerocallidaceae	*Dianella*	*brevicaulis*	Flax Lilly			x	x		
Hemerocallidaceae	*Dianella*	*revoluta*	Flax Lilly					x	

Hemerocallidaceae	*Tricoryne*	*elatior*	Yellow autumn Lily					X	
Iridaceae	*Freesia*	*sp.*	Freesia	x		x			x
Iridaceae	*Patersonia*	*lantana*	Purple Flag			x			
Iridaceae	*Patersonia*	*occidentalis*	Wooly Purple Flag					x	
Iridaceae	*Romulea*	*rosea*	Guildford grass	x		x	X		
Juncaceae	*Juncus*	*pallidus*	Pale Rush				x		
Lauraceae	*Cassytha*	*racemosa*					x		x
Loranthaceae	*Nuytsia*	*floribunda*	Munji, Christmas Tree			x	x		
Menyanthaceaea	*Ornduffia*	*parnassifolia*					X		
Myrtaceae	*Beaufortia*	*schaueri*						x	
Myrtaceae	*Calothamnus*	*gracilis*	One-sided Bottle Brush			x		x	
Myrtaceae	*Chamelaucium*	*axillare*	Esperance Wax			x			
Myrtaceae	*Conothamnus*	*aureus*				x		x	
Myrtaceae	*Cyathostemon*	*ambiguus*						x	
Myrtaceae	*Eucalyptus*	*angulosa*				x			
Myrtaceae	*Eucalyptus*	*densa*							x
Myrtaceae	*Eucalyptus*	*kessellii*						x	x
Myrtaceae	*Eucalyptus*	*leptocalyx*	Hopetoun mallee						x
Myrtaceae	*Eucalyptus*	*leucoxylon*	Red Flowering Gum	x				x	
Myrtaceae	*Eucalyptus*	*occidentalis*	Swamp yate, Flat-topped yate			x			
Myrtaceae	*Eucalyptus*	*pleurocarpa*	Tallerack			x		x	x
Myrtaceae	*Eucalyptus*	*tetraptera*	Four winged mallee			x			
Myrtaceae	*Eucalyptus*	*uncinata*	Hook Leaved Mallee			x		x	
Myrtaceae	*Leptospermum*	*laevigatum*	Victoria Tea Tree	x		x			
Myrtaceae	*Leptospermum*	*spinescens*	Spiny Tea tree					x	
Myrtaceae	*Melaleuca*	*cuticularis*	Saltwater Paper Bark			x	x		
Myrtaceae	*Melaleuca*	*pentagona ssp. latifolia*						x	
Myrtaceae	*Melaleuca*	*scabra*				x			x
Myrtaceae	*Melaleuca*	*striata*				x			
Myrtaceae	*Melaleuca*	*undulata*	Hidden Honeymyrtle						x
Myrtaceae	*Phymatocarpus*	*maxwelli*				x	x	x	x
Myrtaceae	*Taxandria*	*spathulata*				x	x	x	
Myrtaceae	*Verticordia*	*minutiflora*				x	x		

Onagraceae	*Oenothera*	*stricta*	Evening Primrose	x		X			
Orchidaceae	*Caladenia*	*decora*	Esperance King Spider			x			
Orchidaceae	*Caladenia*	*flava ssp. flava*	Cowslip Orchid			x			
Orchidaceae	*Diuris*	*pulchella*	Beautiful Donkey Orchid			x			
Orchidaceae	*Microtis*	*media*	Mingonette Orchid			x			
Orobanchaceae	*Orobanche*	*minor*	Lesser Broomrape	x		x			
Pinaceae	*Pinus*	*pinaster*	Pine tree	x		x			
Pittosporaceae	*Billardiera*	*fusiformis*	Australian Blue Bell			x		x	x
Poaceae	*Avena*	*fatua*	Wild oats	x		x			
Poaceae	*Briza*	*maxima*	Blowfly grass	x		x			
Poaceae	*Bromus*	*diandrus*	Ripgut Brome	x		x			
Poaceae	*Ehrharta*	*calycina*	Perennial Veld Grass	x		x			
Poaceae	*Eragrostis*	*curvula*	Love Grass	x		x	x	x	
Poaceae	*Erharta*	*longiflora*	Annual veldt grass	x		x			x
Poaceae	*Lolium*	*perenne*	Perennial rye grass	x		x			
Poaceae	*Neurachne*	*alopecuroidea*	Foxtail mulga grass			x		x	x
Polygonaceae	*Persicaria*	*prostrata*	Creeping Knotweed			x			
Polygonaceae	*Rumex*	*crisdpus*	Curled Dock	x		x			
Primulaceae	*Lysimachia*	*arvensis*	Scarlet Pimpernel	x		x			
Proteaceae	*Adenanthos*	*cuneatus*	Coastal Jug Flower			x	x		
Proteaceae	*Banksia*	*armata*	Prickly Dryandra			x		x	x
Proteaceae	*Banksia*	*obovata*	Wedge Leaf Dryandra			x			
Proteaceae	*Banksia*	*pulchella*				x			
Proteaceae	*Banksia*	*repens*	Creeping Banksia					x	
Proteaceae	*Banksia*	*speciosa*	Showy Banksia			x			
Proteaceae	*Banksia*	*violacea*				x			
Proteaceae	*Conospermum*	*leianthum ssp. leianthum*				x			
Proteaceae	*Franklandia*	*fucifolia*	lanoline bush			x			
Proteaceae	*Grevillea*	*baxteri*			P3			x	
Proteaceae	*Hakea*	*corymbosa*	Cauliflower Hakea					x	

Proteaceae	*Hakea*	*laurina*	Pin Cushion Hakea					x	x
Proteaceae	*Hakea*	*pandanicarpa ssp. pandicarpa*	Cricket Ball Hakea					x	
Proteaceae	*Hakea*	*prostrata*						x	
Proteaceae	*Hakea*	*trifurcata*	Two-leaf hakea			x	x		
Proteaceae	*Isopogon*	*polycephalus*	Clustered Conehead			x	x	x	
Proteaceae	*Isopogon*	*trilobus*	Barrel Coneflower			x			
Proteaceae	*Lambertia*	*inermis*				x	x	x	x
Proteaceae	*Petrophile*	*fastigiata*				x		x	
Proteaceae	*Petrophile*	*teretifolia*						x	
Proteaceae	*Synaphea*	*media*						x	
Proteaceae	*Synaphea*	*oligantha*				x			
Restionaceae	*Chordifex*	*crispatus*				x			
Restionaceae	*Chordifex*	*sphacelatus*				x			
Restionaceae	*Desmocladus*	*fasciculatus*				x			
Restionaceae	*Desmocladus*	*myriocladus*							
Restionaceae	*Lepidobolus*	*pressiana*				x		x	
Restionaceae	*Leptocarpus*	*crebriculmis*					x		
Restionaceae	*Lepyrodia*	*macra*				x			
Rubiaceae	*Opercularia*	*vaginata*	Dogweed			x	x	x	
Rutaceae	*Boronia*	*ramosa ssp.anethifolia*				x			
Solanaceae	*Solanum*	*nigrum*	Nightshade	x		x	x	x	
Xanthorrhoeaceae	*Chamaescilla*	*corymbosa*	Blue Squill			x		x	
Xanthorrhoeaceae	*Xanthorrhoea*	*platyphylla*	Grass Tree			x			

8.2 Appendix 2 TPFL Forms

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

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 http://kbnlwww.wa.gov.au/ under ***Standard Report Forms***

TAXON: Grevillea baxteri **TPFL Pop. No:**

OBSERVATION DATE: 29/09/20 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Julie Waters and Danika Pnson **PHONE:** 9083 1518

ROLE: Environmental Officer **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~31 km north-east of Esperance townsite. On Plowmans Rd, 1.95 km east of Wittenoom and Plowmans Rd intersection. On north-east side of road reserve. Near driveway to private property

Reserve No:

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

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 6279390 m N

Long / Easting: 413203 m E

ZONE: 51 H

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	1			
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: ____%

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)
• Road widening - proposed in 21/22 will clear the single plant present	?M-H	H	S
•			
•			

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: _____ **Sheet No.:** _____ **Record Entered in Database** ☐

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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 ☐			Sand over gravel		
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 (Mesomelaena tetragona)

1. Open Eucalyptus pleurocarpa woodland over mixed Proteaceous shrubland
2.
3.
4.

ASSOCIATED SPECIES: Hakea pandanocarpa, Banksia armata, Isopogon polycephalus, Hakea corymbosa

Other (non-dominant) spp

* 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.)

KW123, Accession 8652. Confirmed by Michael Hislop at WA Herbarium on 10/12/20. Specimen not retained

DRF PERMIT/ LICENCE No: FB62000139 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

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

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

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

Submitter of Record: Katie White Role: Environmental Officer Signed: KW Date: 15/01/21

8.3 Appendix 3 – Site Photos

Figure 6. Vegetation area A described as "Nuytsia, *Banksia speciosa* and *Eucalyptus tetraptera* open woodland over *Melaleuca striata* mixed shrubland". Photo taken by Katherine Walkerden 18/06/2021.

Figure 7. Vegetation area A described as "Nuytsia, *Banksia speciosa* and *Eucalyptus tetraptera* open woodland over *Melaleuca striata* mixed shrubland". Photo taken by Katherine Walkerden 18/06/2021.

Figure 8. Vegetation area B described as "*Melaleuca cuticularis* with *Baumea juncea* sedgeland". Photo taken by Katherine Walkerden on 18/06/2021.

Figure 9. Vegetation area B described as "*Melaleuca cuticularis* with *Baumea juncea* sedgeland". Photo taken by Katherine Walkerden on 18/06/2021.

Figure 10. Vegetation area C described as "*Eucalyptus pleurocarpa* over mixed Proteaceae dominated shrubland". Photo taken by Katherine Walkerden on 18/06/2021.

Figure 11. Vegetation area C described as "*Eucalyptus pleurocarpa* over mixed Proteaceae dominated shrubland". Photo taken by Katherine Walkerden on 18/06/2021.

Figure 12. Vegetation area D described as “Closed Mallee woodland over Melaleuca shrubland and Cyperaceae sedgeland”. Photo taken by Katherine Walkerden on 18/06/2021.

Figure 13. Vegetation area D described as “Closed Mallee woodland over Melaleuca shrubland and Cyperaceae sedgeland”. Photo taken by Katherine Walkerden on 18/06/2021.

Figure 14. Completely degraded area. Photo taken by Katherine Walkerden on 18/06/2021.