



**Western
Botanical**

Targeted Flora and Vegetation Assessment of the Booster Station 3 Development Envelope

Prepared for: Covalent Lithium Pty Ltd

Report Ref: WB1048



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Executive Summary

Covalent Lithium Pty Ltd plan to upgrade water delivery to the Earl Grey Lithium minesite via a buried pipeline from the Goldfields supply to the minesite north of Mount Holland. To enable this, a booster station is required to be constructed on King Ingram Road, west of the minesite to increase delivery rate. The booster station requires a powerline to be constructed parallel to the water pipeline from the intersection of Southern Cross Road and Meranda North Road (western end) to the booster station 3 (BS3) site on King Ingram Road (eastern end), a distance of some 28 km.

Covalent engaged Western Botanical to undertake an assessment of flora and vegetation of a 3.0 ha proposed Development Footprint within a broader 100 ha Development Envelope for Booster Station 3. The site was assessed over two episodes: (i) a Targeted survey for Significant flora was conducted over two days (13th and 14th September 2024) while vegetation was described and mapped over two days in late October (31st October, 1st November 2024).

The BS3 site represents recently burnt vegetation within a Department of Biodiversity, Conservation and Attractions' Strategic Firebreak on the north side of King Ingram Road. Vegetation here consists of a narrow strip of both post-fire recovering (within 50m of the road alignment) and long-unburnt vegetation to the north and south of *Allocasuarina acutivalvis*, *A. spinosissima* and *A. corniculata* shrubland on shallow sand over exfoliating granite. The flora and vegetation of the site is highly representative of that occurring on the extensive sandsheets over laterite or granite in the local area.

The vegetation units mapped within the BS3 DE site support 174 flora species from 93 genera and 36 families. Most numerous and structurally important groups were *Acacia* (9 species), *Allocasuarina* (4 species), *Eucalyptus* (2 species), *Melaleuca* (8 species), and *Phebalium* (9 taxa). The majority of these are widespread, well known and not of conservation significance. The survey found that the BS3 Development Envelope (DE) supports no Threatened flora and no Threatened Ecological Communities. A small population of one species with conservation listing (*Balaustion grandibracteatum* subsp. *junctura* (P2)) is present within the proposed Development Envelope, associated with the S22 Vegetation Association. A further two species, *Boronia ternata* var. *promiscua* (P3) and *Verticordia mitodes* (P3) were recorded outside but adjacent to the DE. As the BS3 Development Footprint (DF) is small (3 ha), this can be moved and located within the larger DE without impacting any populations of Priority flora.

One minor northward range extension (*Melaleuca platycalyx*) was recorded and eight Species of Interest were recorded, possibly representing novel taxa that have been widely encountered in the region by Western Botanical from 2019 to present. Twenty specimens could not be fully identified due to lack of sufficient material.

Development of the BS3 site is not at variance with any of the EPA's 10 Clearing Principles.

1. Introduction

Covalent Lithium Pty Ltd plan to upgrade water delivery to the Earl Grey Lithium minesite via a buried pipeline from the Goldfields supply to the minesite north of Mount Holland. To enable this, a booster station is required to be constructed on King Ingram Road, west of the minesite to increase delivery rate. The booster station requires a powerline to be constructed parallel to the water pipeline from the intersection of Southern Cross Road and Meranda North Road (western end) to the Booster Station 3 (BS3) site on King Ingram Road (eastern end), a distance of some 28 km. The BS3 site lies within native vegetation on unallocated crown land (UCL).

1.1. Current Survey

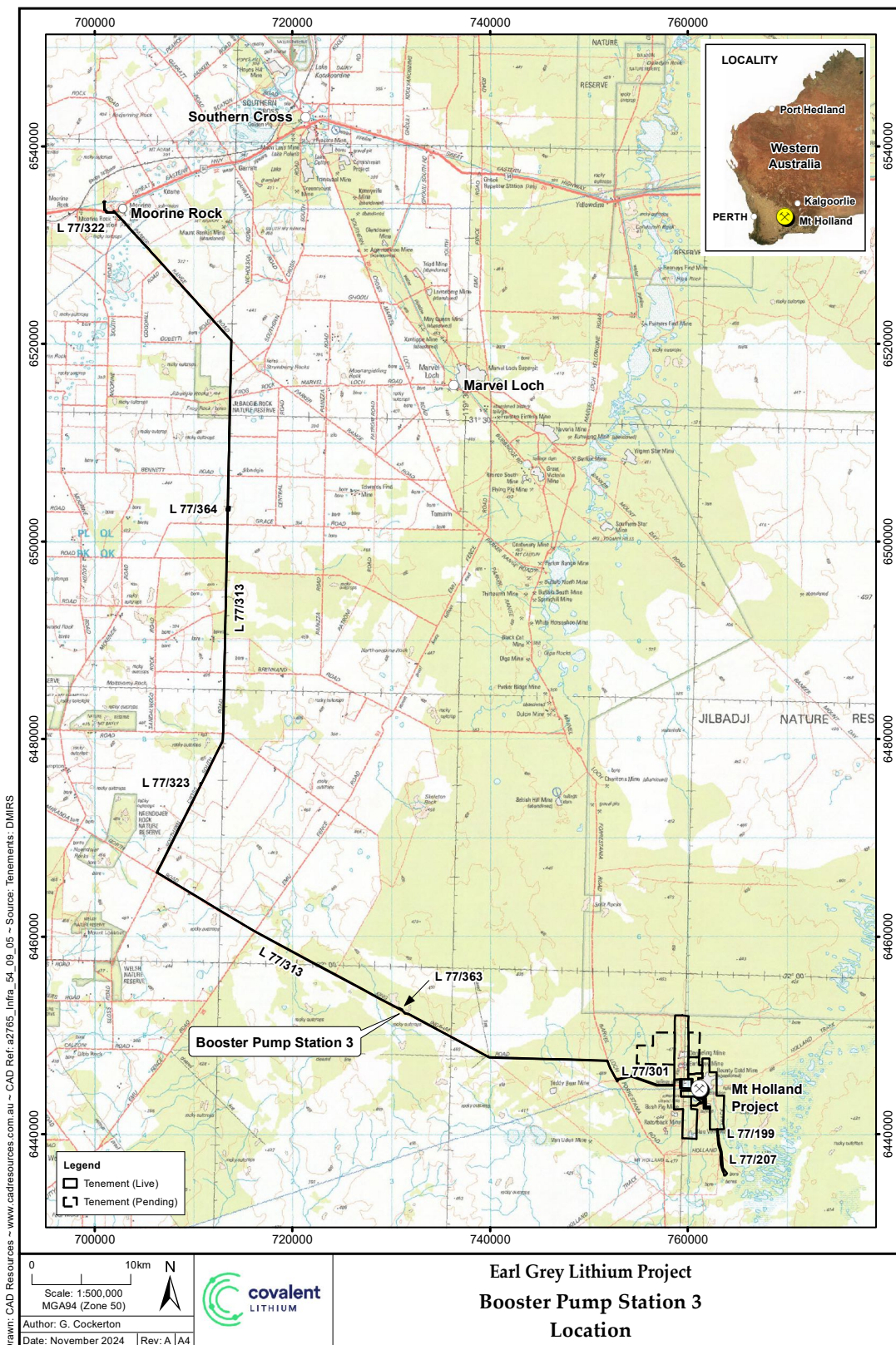
Covalent engaged Western Botanical to undertake an assessment of flora and vegetation of a 3.0 ha proposed Development Footprint within a broader 100 ha Development Envelope for Booster Station 3. The site was assessed over two episodes: (i) a Targeted survey for Significant flora was conducted over two days (13th and 14th September 2024) while vegetation was described and mapped over two days in late October (31st October, 1st November 2024).

This report presents information available to 10th October 2025 on the assessment of the flora and vegetation of the Booster Station 3 Development Envelope. Discussion of the flora and vegetation of the proposed powerline alignment will be addressed separately (Western Botanical 2025a, in prep.).

1.2. Study Area Location

The Booster Station 3 Study Area, L77/363, lies on the north side of King Ingram Road, some 22.7 km west of the Marvel Loch – Forrester Road and some 31.2 km west of Covalent Lithium's Earl Grey Lithium Project minesite near Mount Holland, Figure 1.

Figure 1. Booster Station 3 Study Area location



2. Methods

2.1. Desktop Assessment

No formal desktop assessment was undertaken prior this specific survey. However, the BS3 site represents the eastern terminus of the proposed powerline alignment between the intersection of the Southern Cross Road and Meranda North Road, westwards to the BS3 site (Western Botanical, in prep.). In preparation for the broader powerline assessment project, a Desktop Assessment was undertaken utilising DBCA's Threatened and Priority Flora Database (TPFL) and WA Herbarium (WAHERB) database (25-1222FL-TPFL_WAHERB) and the considerable local database of significant flora held by Covalent Lithium for the Earl Grey Lithium Project at Mt. Holland. Presence of Threatened or Priority Ecological Communities was assessed using the 09_1221EC TEC PEC database search. This informed the operators of species that may be present in the region. A field herbarium of known significant flora compiled by Western Botanical (2019 - present) was also utilised to confirm the identification of specimens as needed.

2.2. Field Survey

The vegetation mapping and description field assessment was conducted over two days, 31st October, 1st November 2024, by Senior Botanists Geoff Cockerton and Linda Dalglish. The site was traversed thoroughly where vegetation mapping was undertaken and a species inventory was prepared. Targeted surveys for the significant flora recognised were subsequently undertaken by three experienced botanical staff (Lindsay Shelton, Felicity Keet and Jason Paterson) on 31st October and 1st November 2024. Representative photographs of vegetation associations and specimens of many flora were taken for later verification.

2.2.1. Vegetation Mapping

Vegetation was mapped using an iPad with high resolution aerial imagery and traverses within the Study Area. Polygons were captured and coded in the field with associated notes at Relevé sites and recorded in an MS Excel spreadsheet in the field. Mapping was prepared for reporting by CAD Resources Pty Ltd. Vegetation is Mapped to NVIS Level V *Association*.

2.2.2. Flora Specimen Identification

Flora not readily recognised in the field were collected and pressed for later identification, together with information pertaining to the date, location, and field description. The identification of samples was carried out using the resources of both Western Botanical's herbarium and the Western Australian Reference Herbarium (WAH).

2.2.3. Significant Flora

The locations of all significant flora recognised during the field survey were recorded by staff walking parallel transects at 10 m spacings, using iPads running the ESRI Field Maps application. Specimens of Significant Flora (EPA, 2016), represented by Threatened or Priority flora, flora

considered novel or undescribed or flora representing an extension to the current known range for that species, were retained for verification.

2.2.4. Weeds

The locations of any weeds recognised during the field survey were recorded using iPads.

2.2.5. Vegetation Condition

Vegetation Condition was assessed for the WPA Extensions, following the Vegetation Condition Scale presented in EPA (2016a).

3. Results and Discussion

3.1. Physical Environment

3.1.1. Climate

The BS3 Study Area is situated to the west of the southern Goldfields region, which is characterised by an extra-dry Mediterranean climate with hot, dry summers and cool, wet winters (Waddell and Galloway, 2023). Majority of rainfall occurs from late autumn across winter and is influenced by the southern hemisphere subtropical high-pressure ridge moving north over the area in winter (Waddell and Galloway, 2023).

Average annual rainfall is 342.6 mm, as recorded at the Bureau of Meteorology (BoM) Hyden weather station (number 010568), located approximately 68 km south-west of the Study Area (BoM, 2025a). Average monthly rainfall peaks over winter with the highest average rainfall occurring in June (47.8 mm). Mean maximum daily temperatures range from 16.5°C in July to 33.9°C in January, with mean minimum temperatures ranging from 4.7°C in July to 15.9°C in February (BoM, 2025a), (Figure 2).

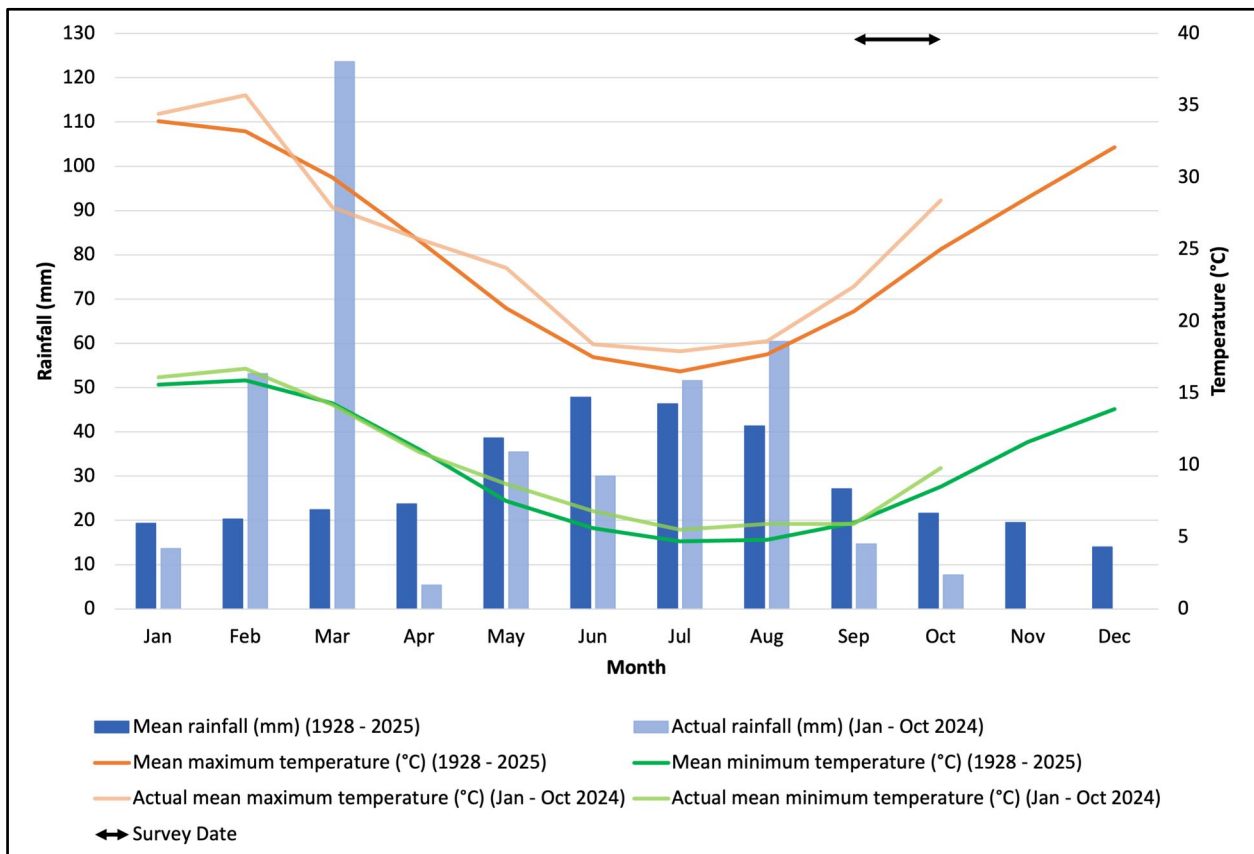


Figure 2. Long-term average climate data for Hyden (weather station 010568) (1928 - 2025) and climate data preceding Study Area surveys (Jan to Oct 2024) (BoM, 2025a).

3.1.2. Geology

The Study Area comprises two surface geological units, as presented in Surface Geology of Australia (Raymond *et al.*, 2012), **Table 1**. The majority of the Study Area is located within the Cz1 geological unit.

Table 1. Surface geology of the Study Area (Raymond *et al.*, 2012)

Code	Description
Cz1	Ferruginous duricrust, laterite; pisolitic, nodular, vuggy; may include massive to pisolitic ferruginous subsoil, mottled clays, magnesite, reworked products of ferruginous and siliceous duricrusts, calcrete, gossan; residual ferruginous saprolite
Czs	Sand or gravel plains; may include some residual alluvium; quartz sand sheets commonly with ferruginous pisoliths or pebbles; local clay, calcrete, laterite, silcrete, silt, colluvium

3.1.3. Soil and Landscape Zones

The Study Area is located within the Youanmi South Zone which is described as a gently undulating and deeply weathered plateau on crystalline basement of the Youanmi Terrane, dominated by granite and occasional greenstone; landforms are interfluvial sandplains and broad valleys with occluded salt lake chains – both landforms have occasional granite and greenstone outcrops; straddles the central continental divide between Bonnie Rock, Credo, Forrestania and Norseman (Waddell and Galloway, 2023). Vegetation of this zone broadly consists of spinifex-mallee sandplain, *Acacia-Allocasuarina-Melaleuca* scrub or mallee-dominated heathland, and halophytic shrublands around salt lakes (DPIRD, 2022). Soils include:

- Pale deep sands with ironstone gravels,
- Yellow sandy loam earths
- Deep yellow sands ± ironstone gravels,
- Sandy duplex soils, and
- Calcareous loamy earths ± gravel (Waddell and Galloway, 2023).

3.1.4. Hydrology and Hydrogeology

The Department of Water and Environmental Regulation (DWER) groundwater salinity database indicates groundwater salinities in the Study Area range from 14,000 mg/L to 35,000 mg/L (DWER, 2022). The Study Area sits on the boundary of two hydrological zones: the Southern Cross Zone and South East Zone of Ancient Drainage, falling within the latter (Table 2). The Study Area is located within the Yilgarn sub-catchment of the Avon River Basin (DPIRD, 2022).

Table 2. Hydrological Zones of the Study Area (DPIRD, 2022)

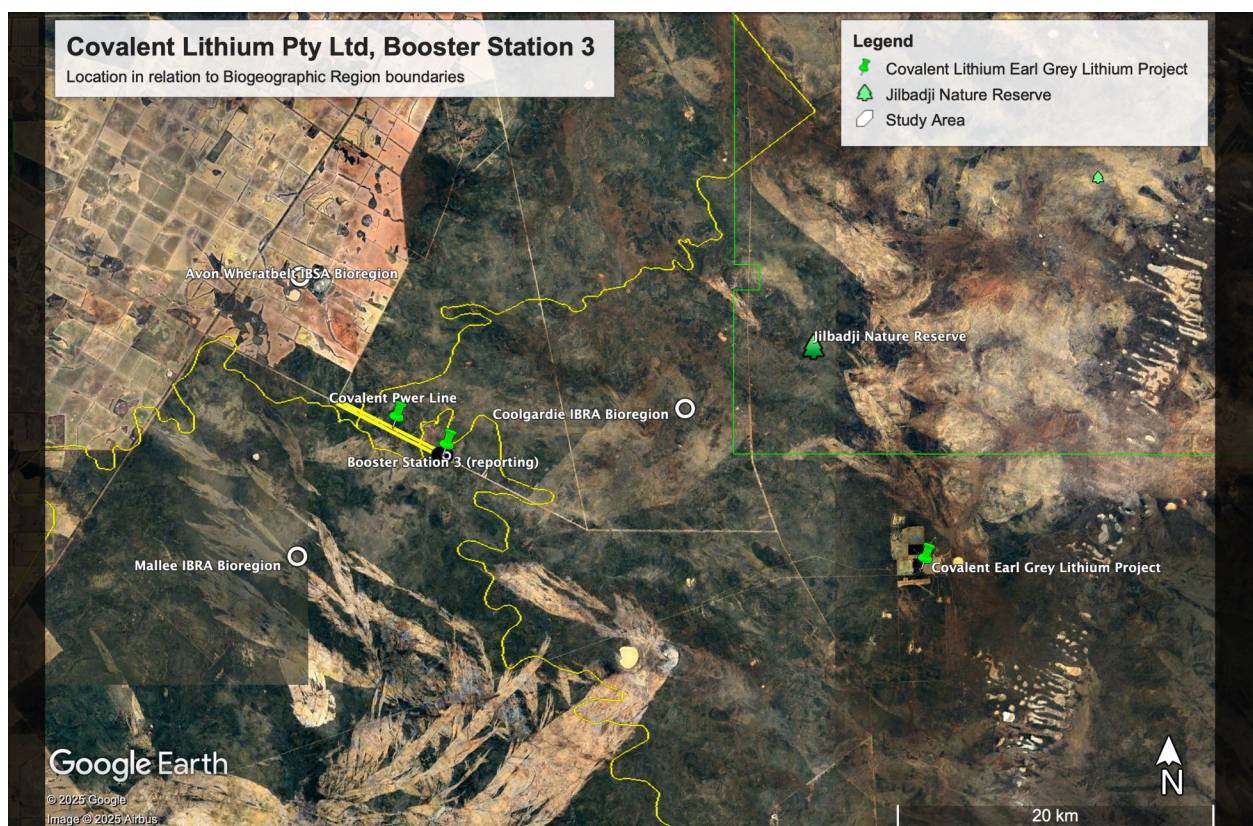
Hydrological Zone	Name	Description
HZ10_SEAD	South East Zone of Ancient Drainage	A smooth to irregularly undulating plain dominated by salt lake chains in the main valleys with duplex & lateritic soils on the uplands. Mallee vegetation on duplex soils, Proteaceous vegetation on gravels & sands.
HZ09_SC	Southern Cross Zone	Rises & low hills on Archaean greenstones, with broad valleys often containing salt lake chains. Soils are usually red, loamy to clayey & calcareous.

3.2. Biological Environment

3.3. Interim Biogeographic Regionalisation of Australia

The Study Area lies in the northern portion of the Mallee biogeographic region in a complex area where three bioregions meet (Mallee, Avon-Wheatbelt and Coolgardie), Figure 3. Due to matters of scale of data capture, the boundaries between these three bioregions at this point are convoluted and indistinct, with similar geologies, soils, landforms and vegetation associations being found in all three regions in this locality.

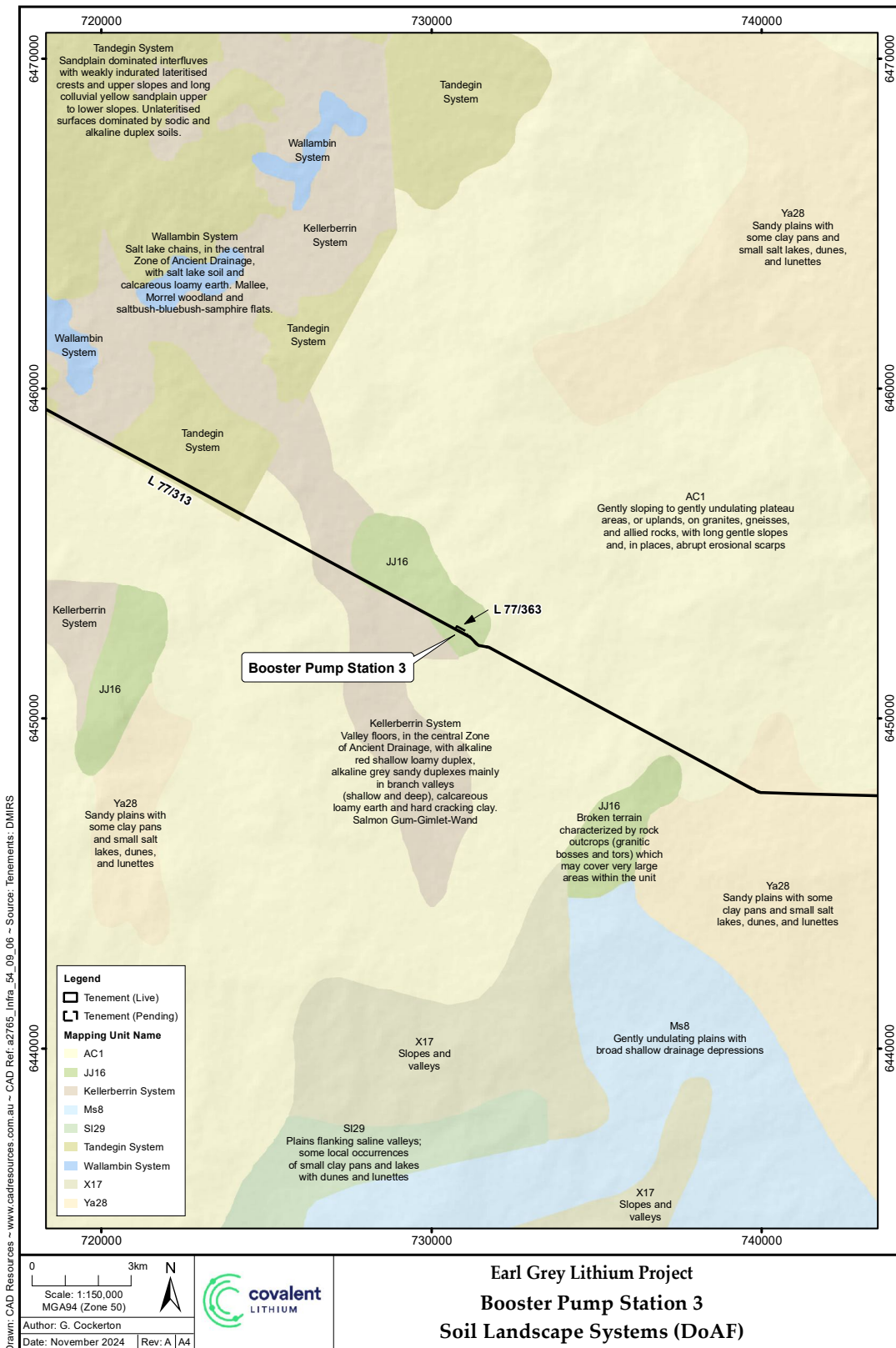
Figure 3. Study Area and IBRA Bioregions



3.4. Soil Landscapes of the Study Area

Soil-landscape systems of south-Western Australia have been mapped and described by the Department of Primary Industries and Regional Development (previously Department of Agriculture). A regional mapping program was conducted across the south-west agricultural areas of Western Australia from 1989 to 2003, covering approximately 25 million hectares (Schoknecht *et al.*, 2004). The BS3 Study Area is located within the Broken Terrain (250j7) soil landscape system which is characterised as “rock outcrops (granitic bosses and tors) which may cover very large areas within the unit”, Figure 4.

Figure 4. Soil Landscapes of the Study Area

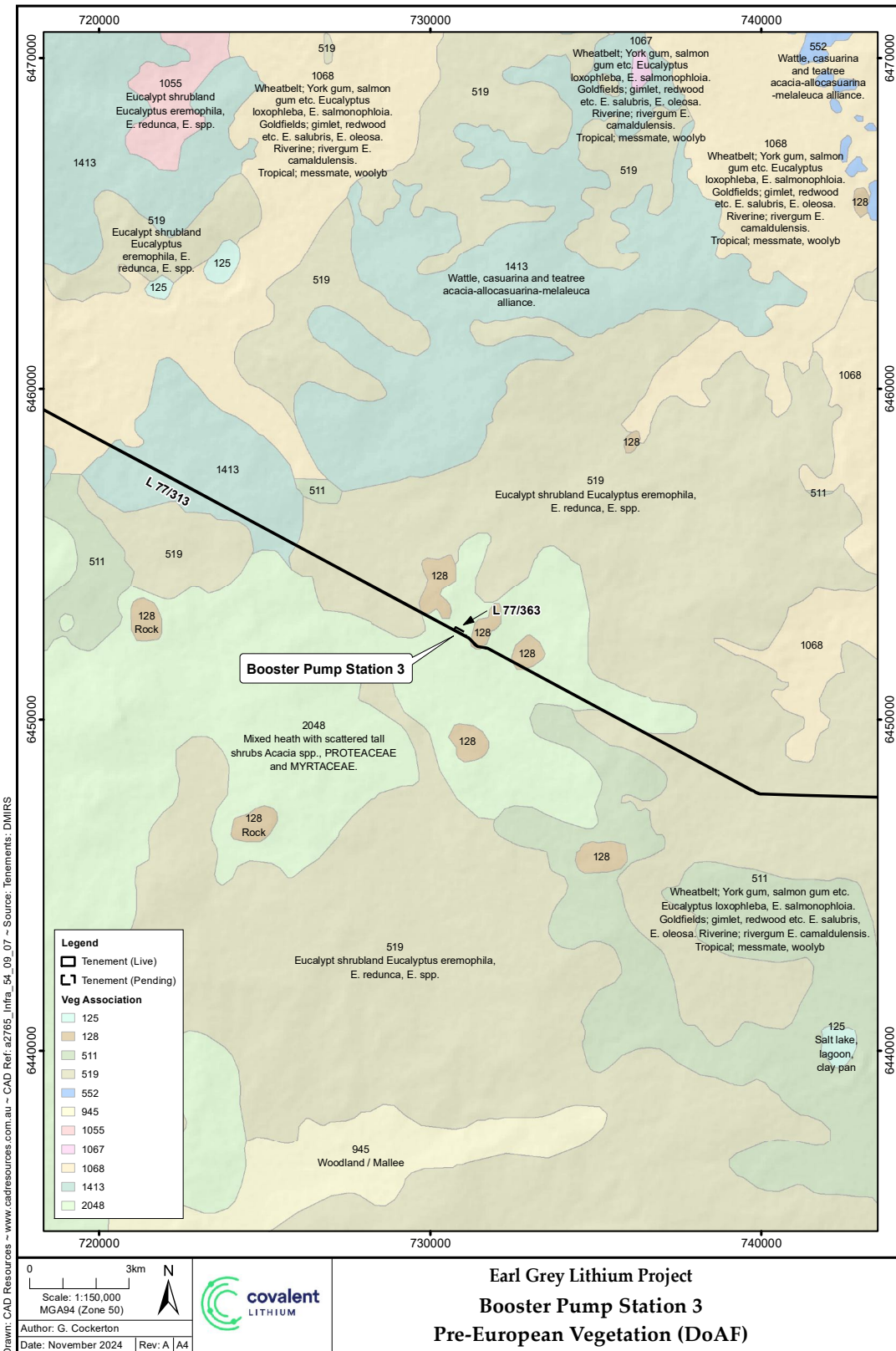


3.4.1. Pre-European Vegetation

The pre-European vegetation mapping of Western Australia dataset maps the original native vegetation presumed to have existed prior to European settlement. It is based predominantly on the published and unpublished mapping of J. S. Beard. The first broad-scale vegetation mapping of Western Australia was conducted by Beard in 1979 with several revisions and updates resulting in the most recent and comprehensive iteration, detailed in Beard *et al.* (2013).

The BS3 Study Area lies within the “2048 Mixed heath with scattered tall shrubs *Acacia* spp., *PROTEACEAE* and *MYRTACEAE*” Pre-European vegetation system, Figure 5. These are small in area and disjunct in this region.

Figure 5. Pre-European Vegetation Systems of the Study Area.



3.4.2. Groundwater Dependent Ecosystems

Given the BS3 site lies relatively high in the landscape on shallow soils overlaying granite rock, it is considered highly unlikely that vegetation in this specific area is groundwater dependent.

3.4.3. Significant Wetlands

There are no wetlands of international (Ramsar) significance within 100 km of the Study Area (DBCA, 2025a). The nearest Ramsar wetland is Toolibin Lake, located approximately 200 km south-west of the Study Area. There is one wetland of national significance within 100 km of the Study Area: Lake Cronin, located approximately 40 km south-east (DBCA, 2025b).

3.4.4. Conservation Reserves in the Region

There are 12 conservation reserves (DBCA – Legislated Lands) within approximately 50 km of the Study Area (Table 3). The nearest of these is Jilbadji Nature Reserve (~207,213 ha in size), located approximately 14 km to the north-east. Jilbadji Nature Reserve serves as an important fauna refugia site and contains a high diversity of fauna species and flora species endemism (DCCEEW, 2025).

Table 3. DBCA legislated land within 50 km of the Study Area (DBCA, 2025d).

Name	Reserve No.	Reserve Class	Reserve Purpose	~ Distance from Study Area
Jilbadji Nature Reserve	24049		Conservation of Flora and Fauna	18 km E
Welsh Nature Reserve	30305		Conservation of Flora and Fauna	34 km WNW
Lake Cronin Nature Reserve	36526	A	Conservation of Flora and Fauna	39 km SE
Neendojer Rock Nature Reserve	34776		Conservation of Flora and Fauna	39 km NW
Unnamed	28047	A	Conservation of Flora and Fauna	39 km SSW
Unnamed	37289		Conservation of Flora and Fauna	40 km W
Bushfire Rock Nature Reserve	29535		Conservation of Flora and Fauna	41 km SSW
Lake Liddelow Nature Reserve	29810	A	Conservation of Flora and Fauna	44 km SSW
Unnamed	36003	A	Conservation of Flora and Fauna	45 km WSW
Unnamed	28323	A	Conservation of Flora and Fauna	46 km NW

Name	Reserve No.	Reserve Class	Reserve Purpose	~ Distance from Study Area
Marble Rocks Nature Reserve	20528		Conservation of Flora and Fauna and Water	47 km SSW
Sloss Nature Reserve	13565		Conservation of Flora and Fauna	48 km WNW

3.5. Threatened and Priority Ecological Communities

While two Priority Ecological Communities are known in the area nearby the BS3 Study Area, neither occur within close proximity. The Ironcap Hills vegetation complexes (Mt Holland, Middle, North and South Ironcap Hills, Digger Rock and Hatter Hill) (banded ironstone formation) Priority 3 PEC lies to the east and south of the Study Area. The Plant Assemblages of the Parker Range System Priority 3 PEC (Vulnerable) lies considerably to the north-east.

3.6. Landforms

The Study Area lies within a gently undulating landscape of primarily sandplains to the east, duplex soils with sand over sandy clay to the south and both yellow sandplains and heavier loamy soils to the west. The area immediately north of the BS3 site abuts a low granite outcrop. These granite outcrops are uncommon in the immediate area but widespread regionally. The BS3 site avoids direct impact to this landform and is situated on the west facing gentle slope of pale yellow silty sand, south and south-west of the granite outcrop.

3.7. Vegetation Mapping

The Study Area supports four vegetation associations at NVIS IV *Association* level and one mosaic, Table 4. Each of these associations have (i) a recently burnt (approximately 2 years prior to field survey) strip of approximately 50m in width extending from the northern road margin along King Ingram Rd and (ii) a long unburnt component south of King Ingram Road as well as to the north of the recently burnt section. The long unburnt areas are mature and characteristically species-poor, while the recently burnt areas are very species rich. These associations are all locally common and extensive in area. These were mapped and described at ten Relevé sites in the local area, two of which lie within the BS3 Study Area.

A systematic species vs sites table is presented in Appendix 1.

Table 4. Vegetation Associations of the Study Area

Veg Code	Vegetation Name	TEC?	Fire History	Area (ha)
S20	Melaleuca hamata, Allocasuarina campestris Shrubland on yellow clayey sand.		Unburnt	0.10
S20	Melaleuca hamata Shrubland on yellow clayey sand.		Recently chained and burnt	1.13
S21	Allocasuarina spp., Hakea spp., Melaleuca spp. inc. M. calyptroides Shrubland on yellow clayey sand.		Unburnt	0.07
S21	Gastrolobium floribundum, Grevillea excelsior, Melaleuca calyptroides and emergent Gyrostemon racemiger		Recently chained and burnt	0.32
S22	Callitris preissii, Hakea meisneriana tall shrubs over Beaufortia puberula, B. micrantha, Verticordia chrysantha and V. roei subsp. roei low shrubs on yellow clayey sand.		Unburnt	0.23
S22	Beaufortia puberula, Verticordia chrysantha, V. roei subsp. roei low shrubs, emergent Callitris preissii Shrubland on yellow clayey sand.		Recently chained and burnt	0.41
S23	Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand.		Unburnt	0.01
S23	Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii on yellow silty sand.		Recently chained and burnt	0.29
S23	Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand.		Unburnt	0.14
S23	Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii Shrubland on yellow silty sand.		Recently chained and burnt	0.35
S21/S23	Mosaic of Allocasuarina spp., Hakea spp., Melaleuca spp. Shrubland and Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand		Unburnt	0.10
S21/S23	Mosaic of Gastrolobium floribundum, Grevillea excelsior, Melaleuca calyptroides and emergent Gyrostemon racemiger and Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii on yellow silty sand.		Recently chained and burnt	0.29
	Total Area (ha)			3.24

3.8. Flora

The vegetation units mapped within the BS3 DE site support 174 flora species from 93 genera and 36 families. Most numerous and structurally important groups were *Acacia* (9 species), *Allocasuarina* (4 species), *Eucalyptus* (2 species), *Melaleuca* (8 species), and *Phebalium* (9 taxa). The majority of these are widespread, well known and not of conservation significance.

A systematic species vs sites table is presented in Appendix 1.

Nineteen species were not able to be identified to species level, due to lack of flowering material, Table 7. This represents 10.9% of the flora encountered and are listed in Table 5.

Table 5. Specimens not fully identified

Taxon	Collection #	Status
Acacia sp. Indet. resinous veins lax GCLD 2392	GCLD 2470	Indet
Acacia sp. Indet. resinous veins upright GCLD 2392	GCLD 2471	Indet
Calytrix sp. GCLD 2437a	GCLD 2437a	Indet
Calytrix sp. GCLD 2459	GCLD 2459	Indet
Dampiera sp. GCLD 2377	GCLD 2377	Indet
Dampiera sp. GCLD 2429	GCLD 2429	Indet
Dicrastylis sp. low grey GCLD 1921	GCLD 1921	Indet
Drosera sp. GCLD 2404	GCLD 2404	Indet
Drosera sp. GCLD 2405	GCLD 2405	Indet
Leucopogon sp. INDET vegetative	GCLD 2423a	Indet
Micromyrtus sp. GCLD 2401	GCLD 2401	Indet
Micromyrtus sp. sterile GCLD 2438	GCLD 2438	Indet
Myrtaceae sp. Sterile GCLD 2399	GCLD 2399	Indet
Petrophile sp. GCLD 1884	GCLD 1884	Indet
Pimelea sp. Indet (GCLD 2398) vegetative	GCLD 2398	Indet
Pimelea sp. Indet GCLD 2397 vegetative, no close matches	GCLD 2397	Indet
Pityrodia sp. grey (GCLD 2428)	GCLD 2428	Indet
Stylidium sp. GCLD 2140	GCLD 2140, 2160	Indet
Verticordia sp. blue-green leaves GCLD 2390	GCLD 2390	Indet

3.9. Significant Flora

Three Priority flora were recorded within and nearby the BS3 Table 5 Envelope. Two small sub-populations of *Balaustion grandibracteatum* subsp. *junctiona* P2 were located approximately centrally within the DE, but can be avoided by locating the Development Footprint away from this species. This species has been found to be very abundant in appropriate landforms and soils in the region (304,539 individuals known regionally in data collected for Covalent by various consultants 2018 to present) and is readily assessed in mid-spring, being particularly abundant after fire.

A further two Priority flora, *Boronia ternata* subsp. *promiscua* P3 and *Verticordia mitodes* P3, were recorded outside the BS3 Development Footprint and will not be impacted. Outside the BS3 DF, a few dead individuals of *Gyrostemon ditrigynus* P4 were recorded. These are also listed in Table 6 and locations of significant flora are presented in Figure 6.

Table 6. Priority Flora within and nearby the BS Study Area

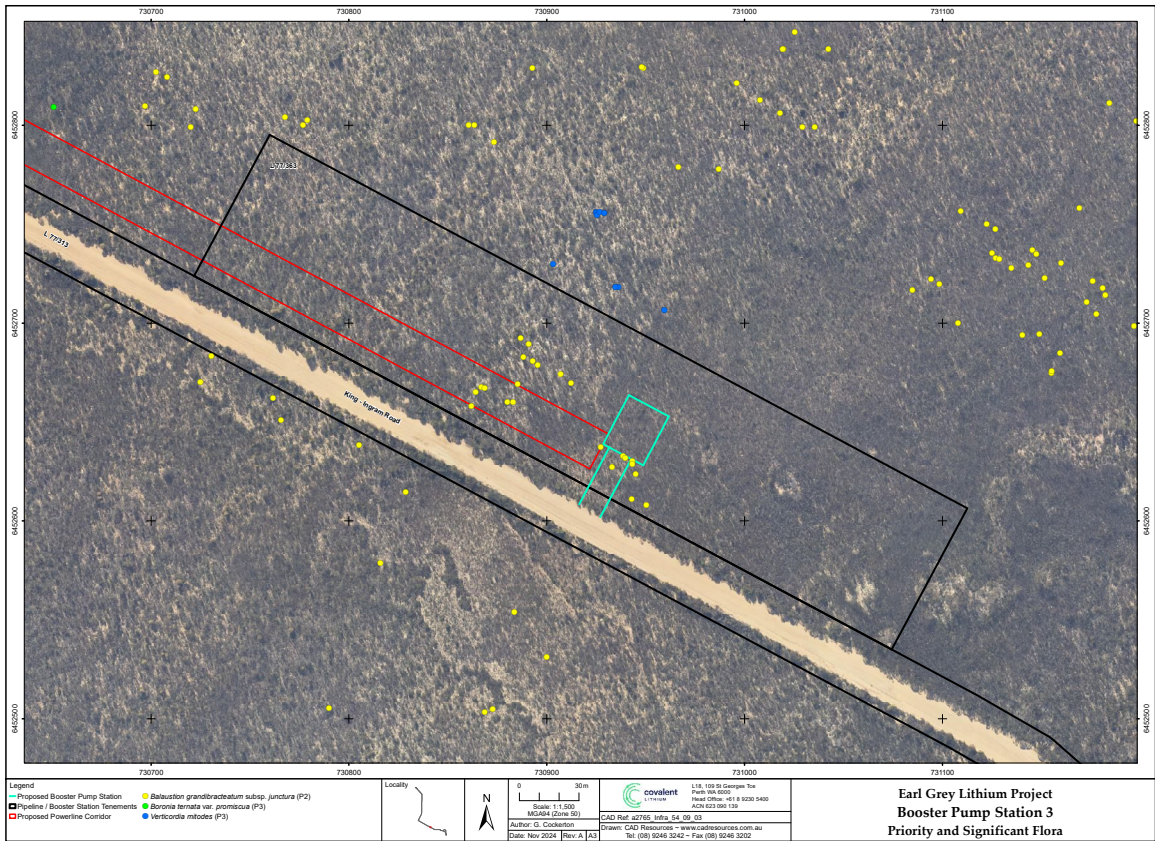
Taxon	Cons_Code	Collection Number	Proposed Impact
Balaustion grandibracteatum subsp. junctura	P2	GCLD 2141	0
Boronia ternata subsp. promiscua	P3	GCLD 2216	0
Gyrostemon ditrigynus	P4	GCLD 2013	0
Verticordia mitodes	P3	Not collected	0

3.10. Weeds

No weeds were recorded within the Study Area.

Figure 6. Significant Flora of the BS3 Study Area

Insert a2765_Infra_54_09_03 - BS3 Pump Station - Sig Flora.pdf as PDF



3.11. Species of Interest

The occurrence of one species (*Melaleuca platycalyx*) represents a slight northerly range extension.

Eight species are regarded as Species of Interest (SOI) and appear to represent new species, subspecies or varieties. These taxa have frequently been encountered by Western Botanical in the Forrestania – Marvel Loch region since 2019 and none are considered to be rare or under threat. These include:

- *Persoonia*, sp. Parker Range Rd (D. Lievense 030) which was formerly known as *P. angustiflora* subsp. *burracoppinensis*. This was sunk into *P. angustiflora* sens. lat. some years ago and, based on morphology and a distinct distribution in the south-eastern range of the broader species group, is proposed by Western Botanical to be reinstated as a taxon.
- Six *Phebalium* species are regarded and likely being separate taxa, however, resolution of this requires a major taxonomic revision of the WA *Phebalium* species, which is outside the scope of this project.
- One *Eremophila* species collected has been found to represent a common and widespread species in the *Eremophila drummondii* complex with a range throughout the central and south-eastern Avon-Wheatbelt.

None of these SOI species are currently recognised by the WA Herbarium, pending taxonomic revisions, and none appear on the Florabase website.

Table 7. Species of Interest of the BS3 Study Area

Taxon	Collection #	Status
<i>Melaleuca platycalyx</i>	GCLD 2442	slight northerly RE
<i>Persoonia</i> sp. Parker Range (DL153a)	GCLD 1949	SOI
<i>Phebalium</i> aff. <i>laevegatum</i> (excurrent leaves) GCLD 2382	GCLD 2395, 2382, 2448	SOI
<i>Phebalium</i> aff. <i>laevegatum</i> (white fls) GCLS 2136	GCLD 2136	SOI
<i>Phebalium</i> aff. <i>laevegatum</i> warty stems GCLD 2384	GCLD 2384	SOI
<i>Phebalium</i> aff. <i>laevegatum</i> white fls GCLD 1953	GCLD 1953	SOI
<i>Phebalium</i> sp. <i>tuberculata</i> (GC 394)	GCLD 2455	SOI
<i>Eremophila</i> aff. <i>drummondii</i> short leaf (GCLD 2303) SOI	GCLD 2303	SOI, new species, not yet formally recognised

3.12. Vegetation Associations

Five vegetation associations were recognised in the BS Development Envelope. Each of these had corresponding long unburnt and recently (~2 yrs. ago) chained and burnt areas, the latter within a Department of Biodiversity, Conservation and Attractions (DBCA) strategic firebreak. The communities are summarised in Table 8 and described in the following text. A species vs sites matrix is presented in Appendix 1.

Table 8. Vegetation Associations of the BS3 Development Envelope

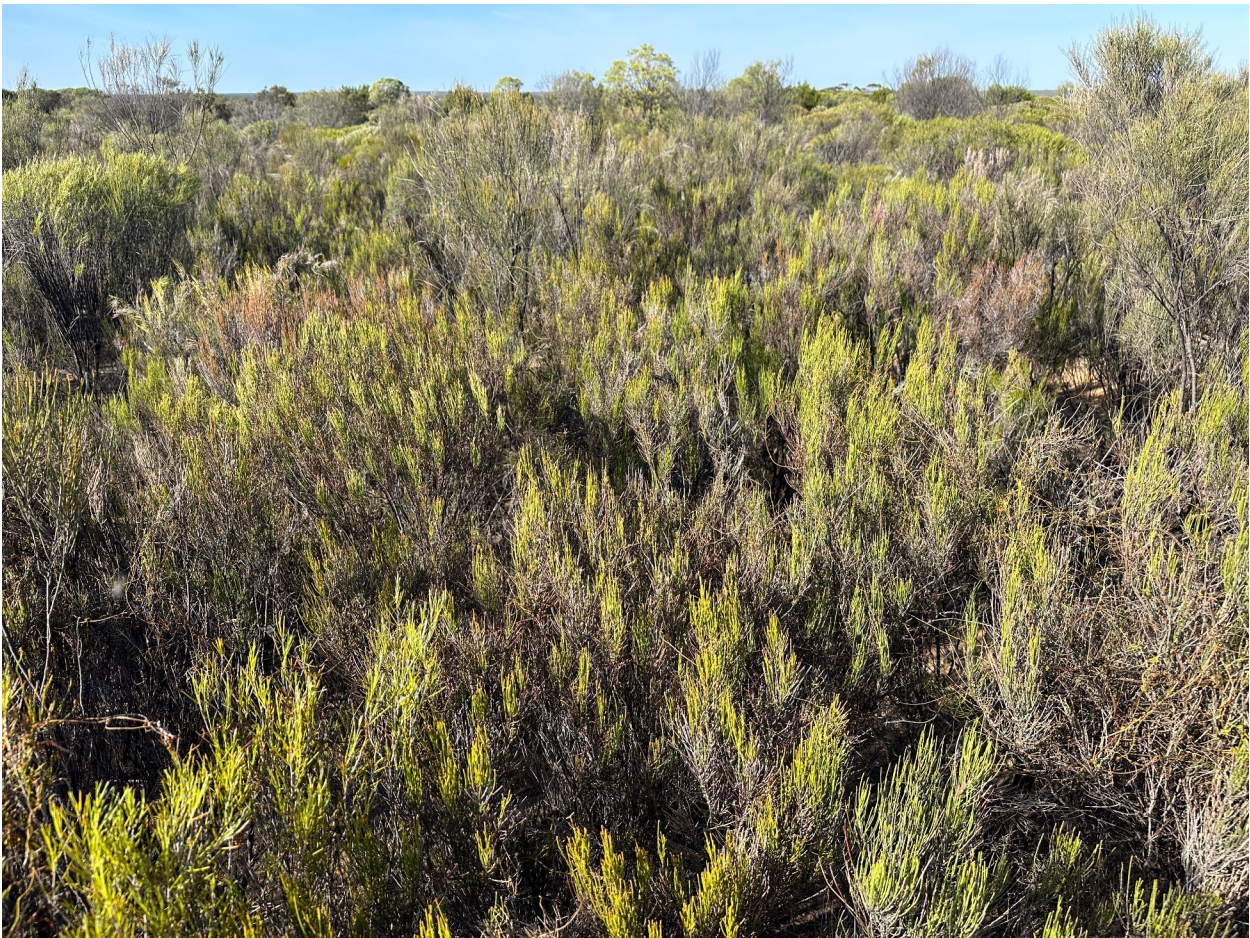
Releve #	Veg Code	Vegetation Association Name	Fire History
58	S20	Melaleuca hamata, Allocasuarina campestris Shrubland	Long unburnt
57	S20	Melaleuca hamata Shrubland	Recently chained and burnt
62	S21	Callitris preissii, Hakea meisneriana Shrubland over Beaufortia puberula, B. micrantha, Verticordia chrysantha and V. roei subsp. roei	Long unburnt
61	S21	Beaufortia puberula, Verticordia chrysantha, V. roei subsp. roei, emergent Callitris preissii Shrubland	Recently chained and burnt
60	S22 on map	Allocasuarina spp., Hakea spp., Melaleuca spp. Shrubland	Long unburnt
59	S22	Gastrolobium floribundum, Grevillea excelsior, Melaleuca calyptroides and emergent Gyrostemon racemiger	Recently chained and burnt
64	S23	Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana Shrubland with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand	Long unburnt
63	S23	Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii	Recently chained and burnt
66	S24	Granite Complex Shrubland	Long unburnt
65	S24	Granite Complex Shrubland	Recently chained and burnt

3.13. Vegetation Descriptions

3.13.1. S20 *Melaleuca hamata* Shrubland

Relevé 58 Long unburnt S20 *Melaleuca hamata*, *Allocasuarina campestris* Shrubland

Long unburnt *Melaleuca hamata* 1.7m, *Allocasuarina campestris* 1.7m, *Melaleuca laxiflora* 1.5m, *M. lateriflora* 1.5m, emergent *Santalum acuminatum* 2m, *Acacia beauverdiana* 2.7m, PFC 70% on yellow sandy clay with scattered lateritic pisolites. Patches of *Melaleuca* dominated shrubland vs patches of *Casuarina campestris* dominated shrubland observed, mapped as one unit.



Relevé 57 S20 Recently chained and burnt *Melaleuca hamata* Shrubland

Recently chained and burnt *Melaleuca hamata* 0.6m, *M. lateriflora* 0.5m, *M. laxiflora* 0.2m, *Acacia yorkrakinensis* subsp. *acrita* 0.3m, *Santalum acuminatum* 0.5m, *Phebalium tuberosum* sens. lat. 0.2m, *Westringia rigida* 0.2m with emergent *Gyrostemon racemiger* 1.8m (senescing), occasional *Gyrostemon ditrigynus* P4 1m (dead, outside the DF), PFC 30% Shrubland with herbaceous perennials and annuals *Glischrocaryon aureum* 0.4m (dominant), *Jacksonia nematoclada* 0.2m, *Dampiera wellsiana* 0.2m abundant, PFC 15%. Soil is a firm yellow clayey sand with discontinuous lag gravel of subangular to subrounded laterite pisolites to 10mm and angular quartz to 6mm. Angular chips of granite brought to surface in road grading works. A relatively level site.



3.13.2. S21 *Callitris preissii*, *Hakea meisneriana* Shrubland over *Beaufortia puberula*, *B. micrantha*, *Verticordia chrysantha* and *V. roei* subsp. *roei*

Relevé 62 S21 Long unburnt *Callitris preissii*, *Hakea meisneriana* Shrubland over *Beaufortia puberula*, *B. micrantha*, *Verticordia chrysantha* and *V. roei* subsp. *roei*.

Long Unburnt Shrubland of *Callitris preissii*, *Hakea meisneriana* to 2.5m, PFC 25% over low shrubland of *Beaufortia puberula*, *B. micrantha*, *Verticordia chrysantha* and *V. roei* subsp. *roei* to 0.7m, PFC 25% on shallow silty yellow sand over laterite gravel. Appears to be a low point in the local landscape and winter-wet, favouring some species and excluding a wide range of other common species such as *Allocasuarina*. In the central part of this community, large shrubs are absent and vegetation is dominated by low Proteaceae and Myrtaceae spp, resembling a Kwongan vegetation association.



Relevé 61 S21 Recently chained and burnt *Beaufortia puberula*, *Verticordia chrysantha*, *V. roei* subsp. *roei* Shrubland with emergent *Callitris preissii*

Recently chained and burnt Shrubland of *Beaufortia puberula*, *B. micrantha* 0.4 to 0.8m, *Verticordia roei* subsp. *roei* 0.6m, emergent *Callitris preissii* PFC 30% on shallow clayey sand over lateritic pizolitic gravel. Notably different vegetation unit, small in area.



3.13.3. S22 *Allocasuarina* spp., *Hakea* spp., *Melaleuca* spp. Shrubland

Relevé 60 S22 Long Unburnt *Allocasuarina* spp., *Hakea* spp., *Melaleuca* spp. Shrubland

Long Unburnt *Allocasuarina acutivalvis*, *A. spinosissima*, *A. corniculata*, *Callitris preissii*, *Santalum acuminatum*, *Hakea invaginata*, *Melaleuca calyptroides*, *M. spicigera*, *M. laxiflora*, *M. hamata* Shrubland on yellow silty sand.



Relevé 59 S22 Recently chained and burnt *Gastrolobium floribundum*, *Grevillea excelsior*, *Melaleuca calyptroides* and emergent *Gyrostemon racemiger*.

Recently chained and burnt S22 shrubland dominated by *Gastrolobium floribundum* 0.3m, *Grevillea excelsior* 0.7m, *Melaleuca calyptroides* 0.6m, with abundant emergent *Gyrostemon racemiger* 2m, PFC 30% on yellow silty sand with abundant lateritic pizolitic gravel. Occasional *Balaustion grandibracteatum* subsp. *junctura* (P2) present, outside Development Footprint.



3.13.4. S23 *Allocasuarina corniculata*, *A. spinosissima*, *A. acutivalvis* *Acacia beauverdiana* with emergent *Eucalyptus sporadica*, *E. ecdysiastes* mallee, over *Thryptomene kochii*

Relevé 64 S23 Long Unburnt *Allocasuarina corniculata*, *A. spinosissima*, *A. acutivalvis* *Acacia beauverdiana* with emergent *Eucalyptus sporadica*, *E. ecdysiastes* mallee, over *Thryptomene kochii* on yellow silty sand.

Long Unburnt shrubland of *Allocasuarina corniculata*, *A. spinosissima*, *A. acutivalvis* 2.5m, PFC 40% with emergent mallee shrubland of *Eucalyptus ecdysiastes* 4m, *E. sporadica* 3.5m, PFC 10% over *Thryptomene kochii* PFC 10% on yellow sand. Higher in the landscape than S22 community.



Relevé 63 S23 Recently chained and burnt *Acacia beauverdiana*, *Melaleuca cordata*, *Thryptomene kochii* Shrubland

Recently chained and burnt Shrubland of *Acacia beauverdiana*, *Melaleuca cordata*, *Thryptomene kochii*



3.13.5. S24 Granite Complex Shrubland

Relevé 66 S24 Long unburnt Granite Complex Shrubland

Long unburnt Granite Complex Shrubland: Tall shrubland of *Allocasuarina campestris*, *Thryptomene australis* subsp. *australis*, *Malleostemon tuberculatus* over *Lepidosperma rigidulum* and *L. tenue*



Relevé 65 S24 Recently chained and burnt Granite Complex Shrubland

Recently chained and burnt Granite Complex Shrubland: Tall shrubland of *Allocasuarina campestris*, *Thryptomene australis* subsp. *australis*, *Malleostemon tuberculatus* over *Lepidosperma rigidulum* and *L. tenue*.



3.14. Vegetation Condition

The Study Area incorporates two sub-units with respect to vegetation condition. The northern part of the Study Area is represented by long unburnt native vegetation in Excellent Condition, with no evidence of disturbance or impacts attributable to humans.

The southern part of the study area, an approximately 50 m wide section aligned with and adjacent to the King Ingram Road, has been chained and burnt by the Department of Biodiversity, Conservation and Attractions (DBCA) in development of a Strategic Firebreak approximately 2 years prior to assessment. Here the majority of native vegetation is regenerating from rootstock and soil store seeds, however, geosporous species such as *Allocasuarina* species are largely absent or present in low densities. It is regarded as being in Excellent Condition.

4. Assessment Against the 10 Clearing Principles

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

The BS3 Study area supports vegetation associations which contain 174 species in four vegetation associations with two fire regimes, one recently burnt (~2 years) and one long un-burnt. The long unburnt associations have species richness values ranging from 20 to 37 species and species richness values ranging from 35 to 87 species in those recently burnt. The numbers of species noted here are expected for relatively young post-fire vegetation in this region as the natural processes of recovery include longer lived species as well as annuals and short-lived herbaceous perennials. These values match those observed recently in the southern portion of the Marvel Loch – Forrestania road alignment assessments undertaken for Covalent (Western Botanical, 2023).

The Project is not at variance with this principle.

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 BS3 site is small in area, 3 ha in area, and is surrounded by a vast area of remnant vegetation in Excellent Condition. The site is considered unlikely to be critical for survival of any given fauna species.

The Project is not at variance with this principle.

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

No Threatened flora were recorded within the BS3 Study Area. Further, none of the species that may represent undescribed taxa are considered to be locally restricted in distribution. No impacts to Priority flora are foreseen and therefore the conservation status of any Priority flora species will not be influenced by this development.

The Project is not at variance with this principle.

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.

While the Eucalypt Woodlands of the Western Australian Wheatbelt PEC (Priority 3) is known in the region many kilometres north and west of the BS3 Study Area, and is synonymous with the Commonwealth listed TEC of the same name under the *EPBC Act*, it does not occur within or nearby the BS3 Study area. Further, the BS3 Study Area lies within the western portion of the

Great Western Woodlands, specifically excluding woodlands of tall eucalypts from being included in the TEC description.

The Project is not at variance with this principle.

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 BS3 Development Footprint is small, 3 ha within a 100 ha Development Envelope. It lies within a vast portion of uncleared Unallocated Crown Land.

The Project is not at variance with this principle.

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

There are no water courses or wetlands within or nearby the BS3 DE.

The Project is not at variance with this principle.

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

The BS3 Development Footprint is small, 3 ha within a 100 ha Development Envelope. It lies within a vast portion of uncleared Unallocated Crown Land. Development of the BS3 site will cause any appreciable land degradation.

The Project is not at variance with this principle.

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.

The BS3 Study Area lies outside of any Environmentally Sensitive Area or DBCA managed lands. It will not impact on any conservation area.

The Project is not at variance with this principle.

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.

There are no water courses or wetlands within or nearby the BS3 DE. The BS3 site is small, 3 ha in area, and is unlikely to impact any groundwater values.

The Project is not at variance with this principle.

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

The BS3 site is small in area, 3 ha, and is unlikely to impact any surface or subsurface drainage or infiltration patterns. It is unlikely to cause any significant alteration to surface flows and therefore is not likely to exacerbate the incidence of flooding.

The Project is not at variance with this principle.

5. Limitations

Limitation	Discussion
Available sources of contextual information	<p>Western Botanical has undertaken extensive surveys in the region both west and east of the BS3 Study Area. Consequently, the flora and vegetation are well known.</p> <p>This is not a limitation for the proposal.</p>
The Scope of the survey	<p>The project was adequately scoped and sufficient resources were made available for all aspects of the Study.</p> <p>This is not a limitation for the proposal.</p>
Proportion of flora collected and identified	<p>90.1 % of the flora collected was identified confidently. None of the species not fully identified matched any known significant flora species.</p> <p>This is not a limitation for the proposal.</p>
Completeness and further work which may be needed	<p>Sufficient field time was available for adequate survey. There is an on-going survey being conducted west of the BS3 site by Western Botanical. The site was thoroughly covered for both mapping and significant species assessments.</p> <p>This is not a limitation for the proposal.</p>
Mapping reliability	<p>The site was thoroughly covered for both mapping and significant species assessments.</p> <p>This is not a limitation for the proposal.</p>
Timing: weather, season	<p>Field assessments were conducted at times that were specifically well-suited to the majority of flora on site. Some species lacked flowering and/or fruiting material, however, that may have been due to seasonal conditions rather than timing of survey.</p> <p>This is not a limitation for the proposal.</p>
Disturbances	<p>Part of the BS3 Study Area was long-unburnt while some of the area was recently disturbed by chaining and burning which proved beneficial for exposing disturbance opportunists otherwise latent in the soil. The latter was species-rich compared to the long undisturbed areas adjacent.</p> <p>This is not a limitation for the proposal.</p>
Intensity	<p>The BS3 Study Area was assessed for significant species at 10m spacings between operators in parallel transects while vegetation mapping was undertaken in traverses throughout the BS3 DE.</p> <p>This is not a limitation for the proposal.</p>
Resources	<p>Sufficient resources were made available for all aspects of the Study.</p> <p>This is not a limitation for the proposal.</p>

Limitation	Discussion
Access	Access was excellent throughout the Study Area. This is not a limitation for the proposal.
Experience levels	Vegetation Mapping was undertaken by Geoff Cockerton (40 years of experience in the flora of the State) and Linda Dalglish (12 years of experience in WA flora). Targeted Surveys were undertaken by Western Botanical staff with 3+ years of experience in the flora of the Mt Holland region. This is not a limitation for the proposal.

6. List of Participants

Staff Member	Field Surveys	Specimen Identification	Data Analysis	Report Preparation
Geoff Cockerton B.Sc. (Biology) Flora Taking (Biological Assessment) License No. – FB62000542	1	1	1	1
Linda Dalgliesh B.Sc. (Hons) Flora Taking (Biological Assessment) License No. – FB62000613	1	1	1	1
Lindsay Shelton B.Sc. (Hons) Flora Taking (Biological Assessment) License No. – FB62000496	1	1		
Jason Paterson B.Sc. (Hons) Flora Taking (Biological Assessment) License No. – FB62000643	1	1		
Felicity Keet B.Sc. (Hons) Flora Taking (Biological Assessment) License No. – FB62000530	1	1		
Natacha Issler B.Sc. (Hons)	1			

7. Acknowledgements

- Accommodation for our team provided by Mount Hampton Farmstay is greatly appreciated.
- Mapping and CAD Services were provided by CAD Resources Pty Ltd.

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Appendix 1. Systematic Species vs Sites Table

Notes:

- Presence of a species within a vegetation association is shown as “1” within cell.
- Grey shading within a cell indicates a species is dominant within that vegetation association.

Legend

Veg Code	Vegetation Name	TEC?	Fire History
S20	Melaleuca hamata, Allocasuarina campestris Shrubland on yellow clayey sand.	No	Unburnt
S20	Melaleuca hamata Shrubland on yellow clayey sand.	No	Recently chained and burnt
S21	Allocasuarina spp., Hakea spp., Melaleuca spp. inc. M. calyptroides Shrubland on yellow clayey sand.	No	Unburnt
S21	Gastrolobium floribundum, Grevillea excelsior, Melaleuca calyptroides and emergent Gyrostemon racemiger	No	Recently chained and burnt
S22	Callitris preissii, Hakea meisneriana tall shrubs over Beaufortia puberula, B. micrantha, Verticordia chrysantha and V. roei subsp. roei low shrubs on yellow clayey sand.	No	Unburnt
S22	Beaufortia puberula, Verticordia chrysantha, V. roei subsp. roei low shrubs, emergent Callitris preissii Shrubland on yellow clayey sand.	No	Recently chained and burnt
S23	Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand.	No	Unburnt
S23	Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii on yellow silty sand.	No	Recently chained and burnt
S23	Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand.	No	Unburnt
S23	Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii Shrubland on yellow silty sand.	No	Recently chained and burnt
S21/S23	Mosaic of Allocasuarina spp., Hakea spp., Melaleuca spp. Shrubland and Allocasuarina corniculata, A. spinosissima, Acacia beauverdiana with emergent Eucalyptus sporadica, E. ecdysiastes mallee, over Thryptomene kochii on yellow silty sand	No	Unburnt
S21/S23	Mosaic of Gastrolobium floribundum, Grevillea excelsior, Melaleuca calyptroides and emergent Gyrostemon racemiger and Acacia beauverdiana, Melaleuca cordata, Thryptomene kochii on yellow silty sand.	No	Recently chained and burnt

			Releve #	57	58	59	60	61	62	63	64	65	66
			Study Area	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env
			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
			Fire History	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt
Family	Taxon	Coll'n #	Cons Code										
Amaranthaceae	Ptilotus polystachyus	nc										1	
Apiaceae	Actinotus humilis	nc		1									
Apiaceae	Platysace trachymenioides	nc		1	1	1	1		1	1			
Asteraceae	Gnephosis tenuissima	GCLD 2409		1									
Asteraceae	Podotheca gnaphalioides	GCLD 2097, 2180, 2321		1									
Asteraceae	Pterochaeta paniculata	GCLD 2407		1									
Asteraceae	Waitzia acuminata	nc		1									
Boryaceae	Borya constricta	GCLD 2320, 2381					1		1			1	
Casuarinaceae	Allocasuarina acutivalvis subsp. acutivalvis	nc			1		1	1			1		
Casuarinaceae	Allocasuarina campestris (typical)	nc		1	1								1
Casuarinaceae	Allocasuarina corniculata	nc			1		1			1	1		
Casuarinaceae	Allocasuarina spinosissima	nc					1			1	1		
Celastraceae	Stackhousia scoparia	GCLD 2432				1				1			
Celastraceae	Tripterococcus brunonis	GCLD 2433				1							
Cupressaceae	Callitris preissii	GCLD 1851			1			1	1				

			Releve #	57	58	59	60	61	62	63	64	65	66
			Study Area	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env
			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
			Fire History	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt
Cyperaceae	Lepidosperma rigidulum	GCLD 2418, 2460										1	1
Cyperaceae	Lepidosperma sanguinolentum	GCLD 2103		1	1	1	1	1	1				
Cyperaceae	Lepidosperma sp. 2.5mm wide glossy leaf, GCLD 2412	GCLD 2412		1		1							
Cyperaceae	Lepidosperma sp. 8mm wide, plano-convex, glossy, smooth, yellow base, juvenile GCLD 2413	GCLD 2413		1		1							
Cyperaceae	Lepidosperma tenue	GCLD 2461										1	1
Cyperaceae	Schoenus breviculmis	GCLD 2402		1									
Cyperaceae	Schoenus brevisetis	GCLD 2436				1	1	1			1		
Cyperaceae	Schoenus hexandrus	GCLD 1946		1	1		1			1			
Dilleniaceae	Hibbertia eatoniae	nc		1	1	1				1	1		
Dilleniaceae	Hibbertia glomerosa	nc		1									
Droseraceae	Drosera macrantha	GCLD 1800								1			
Droseraceae	Drosera sp. GCLD 2404	GCLD 2404	Indet	1									
Droseraceae	Drosera sp. GCLD 2405	GCLD 2405	indet.	1		1	1	1					
Ericaceae	Leucopogon sp. Coolgardie (M. Hislop & F. Hort MH 3197)	GCLD 2440						1					

			Releve #	57	58	59	60	61	62	63	64	65	66
			Study Area	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env
			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
			Fire History	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt
Ericaceae	Leucopogon sp. INDET vegetative	GCLD 2423a	Indet					1					
Ericaceae	Lysinema ciliatum	GCLD 2444									1		
Ericaceae	Styphelia serratifolia	nc						1	1				
Euphorbiaceae	Beyeria sulcata var. sulcata	GCLD 2391		1			1	1	1	1	1		
Euphorbiaceae	Poranthera microphylla	GCLD 2408		1									
Fabaceae	Acacia assimilis subsp. assimilis	nc		1						1			
Fabaceae	Acacia beauverdiana	nc			1		1			1	1		
Fabaceae	Acacia dielsii	GCLD 2389		1									
Fabaceae	Acacia aff. filifolia	GCLD 2393		1									
Fabaceae	Acacia hemiteles	nc		1									
Fabaceae	Acacia sp. Indet. resinous veins GCLD 2392	GCLD 2392	Indet	1									
Fabaceae	Acacia sp. Indet. resinous veins lax GCLD 2392	GCLD 2470	Indet									1	1
Fabaceae	Acacia sp. Indet. resinous veins upright GCLD 2392	GCLD 2471	Indet									1	1
Fabaceae	Acacia yorkrakinensis subsp. acrita	nc		1						1			
Fabaceae	Daviesia grahamii (southern form)	GCLD 2149		1						1			
Fabaceae	Eutaxia neurocalyx subsp. papillosa	GCLD 2449								1			

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			Study Area	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env	BS3 Dev Env
			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
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Fabaceae	<i>Gastrolobium floribundum</i>	GCLD 2023		1		opp		1		1			
Fabaceae	<i>Gompholobium gompholobioides</i>	GCLD 2434, 2400		1		1				1			
Fabaceae	<i>Jacksonia nematoclada</i>	nc		1		1	1			1	1	1	
Fabaceae	<i>Leptosema daviesioides</i>	nc		1						1			
Fabaceae	<i>Mirbelia rhagodioides</i>	nc		1									
Goodeniaceae	<i>Dampiera eriocephala</i>	GCLD 2424				1							
Goodeniaceae	<i>Dampiera</i> sp. Forrestania (F. Lullfitz L 4034)	GCLD 2411		1		1							
Goodeniaceae	<i>Dampiera</i> sp. GCLD 2377	GCLD 2377	Indet	1						1			
Goodeniaceae	<i>Dampiera</i> sp. GCLD 2429	GCLD 2429	Indet			1				1			
Goodeniaceae	<i>Dampiera stenostachya</i>	GCLD 2447								1			
Goodeniaceae	<i>Dampiera wellsiana</i>	GCLD 2211, 2430		1		1				1			
Goodeniaceae	<i>Darwinia</i> sp. Karonie (K.R. Newbey 8503)	GCLD 2463										1	1
Goodeniaceae	<i>Goodenia glareicola</i>	GCLD 2376		1		1		1		1		1	
Goodeniaceae	<i>Goodenia scapigera</i> subsp. <i>scapigera</i>	GCLD 2388		1		1				1			
Goodeniaceae	<i>Goodenia tomentosa</i>	GCLD 2385, 2446		1		1				1		1	
Goodeniaceae	<i>Scaevola helmsii</i>	nc		1		1				1		1	
Gyrostemonaceae	<i>Codonocarpus cotiniifolius</i>	nc		1		1							

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
			Fire History	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt
Gyrostemonaceae	Gyrostemon ditrigynus	GCLD 2013	P4	1									
Gyrostemonaceae	Gyrostemon racemiger	GCLD 2414		1						1			
Gyrostemonaceae	Gyrostemon subnudus	nc										1	
Haloragaceae	Glischrocaryon aureum	GCLD 2403		1		1		1		1		1	
Haloragaceae	Glischrocaryon flavescens	GCLD 2457										1	
Haloragaceae	Haloragodendron glandulosum	GCLD 2452										1	
Lamiaceae	Cyanostegia angustifolia	nc				1							
Lamiaceae	Cyanostegia microphylla	nc								1			
Lamiaceae	Dicrastylis parvifolia	GCLD 2386		1									
Lamiaceae	Dicrastylis sp. low grey	GCLD 1921	Indet	1									
Lamiaceae	Hemigenia westringioides	GCLD 2163				1							
Lamiaceae	Pityrodia lepidota	nc		1		1				1			
Lamiaceae	Pityrodia sp. grey (GCLD 2428)	GCLD 2428	Indet				opp			1			
Malvaceae	Alyogyne hakeifolia	GCLD 2454										1	
Malvaceae	Androcalva aphrix	nc		1		1		1		1			
Malvaceae	Guichenotia sarotes	GCLD 2378, 2450		1						1			
Myrtaceae	Aluta aspera subsp. hesperia	GCLD 1865									1		
Myrtaceae	Astus suberosus	nc		1									

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
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Myrtaceae	Baeckea elderiana	GCLD 2464										1	1
Myrtaceae	Balaustion grandibracteatum subsp. junctura	GCLD 2141	P2			1							
Myrtaceae	Balaustion quinquelobum	GCLD 2126, 2439						1					
Myrtaceae	Beaufortia micrantha	nc						1	1				
Myrtaceae	Beaufortia puberula	GCLD 2415		1		1		1	1				
Myrtaceae	Calytrix sp. GCLD 2437a	GCLD 2437a	Indet					1					
Myrtaceae	Calytrix sp. GCLD 2459	GCLD 2459	Indet									1	
Myrtaceae	Cassytha sp. Indet.	nc				1	1	1					
Myrtaceae	Ericomyrtus drummondii	GCLD 2438						1					
Myrtaceae	Ericomyrtus tenuior	GCLD 1994		1				1	1				
Myrtaceae	Ericomyrtus tenuiramea	GCLD 2462										1	1
Myrtaceae	Eucalyptus ecdysiastes	nc									1		
Myrtaceae	Eucalyptus sporadica	GCLD 2443									1		
Myrtaceae	Euryomyrtus leptospermoides	nc					1						
Myrtaceae	Homalocalyx pulcherrimus	GCLD 2456				1				1	1	1	1
Myrtaceae	Leptospermopsis erubescens	GCLD 1860, 2124, 2467					1				1		
Myrtaceae	Leptospermopsis fastigiata	GCLD 2276		1			1	1	1		1		

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
			Fire History	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt	Chained and Burnt ~2 yrs. ago	Long unburnt
Myrtaceae	Leptospermopsis roei	GCLD 2465										1	1
Myrtaceae	Malleostemon tuberculatus	GCLD 2469										1	1
Myrtaceae	Melaleuca calyptroides	GCLD 2426				1	1						
Myrtaceae	Melaleuca cordata	GCLD 2468				1	1	1	1	1		1	1
Myrtaceae	Melaleuca ctenoides	nc		1	1				1				
Myrtaceae	Melaleuca hamata	nc		1	1	1	1			1	1		
Myrtaceae	Melaleuca hamulosa	GCLD 1910, 2419										1	
Myrtaceae	Melaleuca lateriflora	nc		1	1		1						
Myrtaceae	Melaleuca platycalyx	GCLD 2442	slight N RE						1				
Myrtaceae	Melaleuca spicigera	GCLD 2316		1			1						
Myrtaceae	Microcorys ericifolia	GCLD 2161		1		1				1		1	
Myrtaceae	Micromyrtus sp. GCLD 2401	GCLD 2401	Indet	1				1					
Myrtaceae	Micromyrtus sp. sterile GCLD 2438	GCLD 2438	Indet				1						
Myrtaceae	Myrtaceae sp. Sterile GCLD 2399	GCLD 2399	Indet	1									
Myrtaceae	Thryptomene australis subsp. australis	GCLD 2417											1
Myrtaceae	Thryptomene kochii	nc		1	1		1			1	1		
Myrtaceae	Verticordia chrysantha	GCLD 2165		1		1	1	1		1	1	1	

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
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Myrtaceae	Verticordia helmsii	GCLD 2453										1	1
Myrtaceae	Verticordia roei subsp. roei	GCLD 2416				1		1				1	
Myrtaceae	Verticordia sp. blue-green leaves	GCLD 2390	Indet	1									
Orchidaceae	Microtis media subsp. media	GCLD 2472											1
Orchidaceae	Prasophyllum sargentii	GCLD 2441				1							
Phormiaceae	Dianella revoluta	nc		1									
Pittosporaceae	Cheiranthra filifolia	GCLD 1965		1									
Poaceae	Amphipogon caricinus subsp. caricinus	nc		1						1			
Poaceae	Austrodanthonia sp.	GCLD 1876		1									
Poaceae	Austrostipa hemipogon	GCLD 2394		1									
Poaceae	Neurachne alopecuroidea	GCLD 2313		1		1	1	1		1		1	
Poaceae	Spartochloa scirpoidea	GCLD 1986		1	1							1	
Polygalaceae	Comesperma spinosum	nc		1		1	1	1	1				
Polygonaceae	Duma florulenta	nc										1	
Polygonaceae	Muehlenbeckia adpressa	nc		1									
Proteaceae	Grevillea anethifolia	GCLD 1881		1									
Proteaceae	Grevillea eryngioides	nc				1							
Proteaceae	Grevillea excelsior	nc		1		1							
Proteaceae	Grevillea paradoxa									1		1	

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
			? TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC	Not TEC
			Species Richness	87	20	51	37	35	20	55	24	36	16
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Proteaceae	<i>Grevillea yorkrakinensis</i>	nc		1									
Proteaceae	<i>Hakea francisiana</i>	nc					1						
Proteaceae	<i>Hakea invaginata</i>	GCLD 1837, 2423b			1		1				1		
Proteaceae	<i>Hakea meisneriana</i>	GCLD 1843					1	1	1				
Proteaceae	<i>Hakea multilineata</i>	nc									1		
Proteaceae	<i>Halgania lavandulacea</i>	nc				1				1			
Proteaceae	<i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>	GCLD 2019					1	1	1				
Proteaceae	<i>Persoonia coriacea</i>	nc				1	1			1	1		
Proteaceae	<i>Persoonia saundersiana</i>	GCLD 1840					1						
Proteaceae	<i>Persoonia</i> sp. Parker Range (DL153a)	GCLD 1949	SOI		1								
Proteaceae	<i>Persoonia teretifolia</i>	GCLD 1839								1			
Proteaceae	<i>Petrophile</i> sp. GCLD 1884	GCLD 1884	Indet					1	1				
Rhamnaceae	<i>Cryptandra granticola</i>	GCLD 2379		1	1	1		1					
Rhamnaceae	<i>Cryptandra nutans</i>	GCLD 2451								1			
Rubiaceae	<i>Opercularia vaginata</i>	GCLD 2458										1	
Rutaceae	<i>Boronia ternata</i> subsp. <i>promiscua</i>	GCLD 2216	P3			1							
Rutaceae	<i>Drummondita hassellii</i> sens. str.	nc				1		1	1	1	1		

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
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Rutaceae	Phebalium aff. laevegatum (excurrent leaves) GCLD 2382	GCLD 2395, 2382, 2448	SOI	1						1			
Rutaceae	Phebalium aff. laevegatum (white fls) GCLD 2136	GCLD 2136	SOI					1					
Rutaceae	Phebalium aff. laevegatum warty stems GCLD 2384	GCLD 2384	SOI	1									
Rutaceae	Phebalium aff. laevegatum white fls GCLD 1953	GCLD 1953	SOI						1				
Rutaceae	Phebalium filifolium (12 to 15mm leaf)	GCLD 2020		1	1		1	1		1	1		
Rutaceae	Phebalium sp. tuberculata (GC 394)	GCLD 2455	SOI	1								1	1
Rutaceae	Phebalium tuberosum sens. lat.	nc		1	1		1			1			
Rutaceae	Phebalium tuberosum sens. str.	nc					1		1				
Rutaceae	Philotheca rhomboidea	nc		1									
Santalaceae	Choretrum leptospermoides	GCLD 2445									1		
Santalaceae	Exocarpos sparteus	nc								1			
Santalaceae	Santalum acuminatum	nc		1	1		1						
Sapindaceae	Dodonaea amblyophylla	GCLD 2317								1			

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			Veg Code	S20	S20	S22	S22	S21	S21	S23	S23	S24	S24
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Sapindaceae	<i>Dodonaea bursarifolia</i>	nc		1		1				1			
Scrophulariaceae	<i>Eremophila</i> aff. <i>drummondii</i> short leaf (GC LD 2303) SOI	GCLD 2303	SOI, new species, not yet formally recognised	1 (roadside)								1	
Stylidiaceae	<i>Stylidium limbatum</i>	GCLD 2387, 2435		1		1				1			
Stylidiaceae	<i>Stylidium</i> sp. GCLD 2140	GCLD 2140, 2160	Indet	1		1		1					
Stylidiaceae	<i>Stylidium</i> sp. raised rosettes GCLD 2160	GCLD 2160								1			
Thymelaeaceae	<i>Pimelea aeruginosa</i>	GCLD 2396		1									
Thymelaeaceae	<i>Pimelea angustifolia</i>	GCLD 2410, 2437b		1		1	1						
Thymelaeaceae	<i>Pimelea</i> sp. Indet (GCLD 2398) vegetative	GCLD 2398	Indet	1									
Thymelaeaceae	<i>Pimelea</i> sp. Indet GCLD 2397 vegetative, no close matches	GCLD 2397	Indet	1									
Thymelaeaceae	<i>Pimelea suaveolens</i> subsp. <i>flava</i>	GCLD 2427				1							
Violaceae	<i>Pigea epacroides</i>	GCLD 2466										1	
Violaceae	<i>Pigea floribunda</i>	GCLD 1980, 2016				1				1			



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