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Perth WA 6004

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11 November 2025

[redacted]

Please find below the technical memorandum following a targeted flora and vegetation survey undertaken prior to the proposed clearing of various areas near Boddington. The field assessment was undertaken over one survey period, in September 2025, pending request for follow up targeted survey scheduled for December 2025.

The focus of this technical memorandum is to provide the results of the targeted flora and vegetation assessment to address the requirements of Ministerial Statement No. 1237. This includes mapping the extent of old growth forests, as outlined in ministerial statement at B12-4 in addition to recording locations and observations of threatened, priority and undescribed flora species, and threatened and priority ecological communities and vegetation type G4, as outlined in the ministerial statement at B12-5. This information can be used to confirm the number of plants in and/ or adjacent to planned disturbance footprints. Both condition B12-4 and B12-5 states that South32 are to ensure surveys occur prior to clearing each area to be disturbed in the Primary Assessment Area (PAA).

Yours sincerely

[redacted]

1 Introduction

South32 Pty Ltd (South32) commissioned Biologic Environmental (Biologic) to undertake a pre-clearance targeted flora and vegetation survey for various areas near Boddington; hereafter cumulatively referred to as the Survey Area (Figure 1.1), and totalling 2,282.8 ha.

The Minister for the Environment issued Ministerial Statement No. 1237 (MS 1237) on 20 December 2024, approving the implementation of the Worsley Mine Expansion – revised proposal. Conditions B12-4 and B12-5 of MS 1237 require pre-clearance surveys for Threatened and Priority flora, old-growth forest, Threatened and Priority Ecological Communities and vegetation type G4. within the Primary Assessment Area (PAA), as follows:

- Condition B12-4: Prior to clearing each area to be disturbed in the PAA, the proponent shall map the extent of old growth forest of that area in accordance with DBCA's Procedures for the assessment, identification and demarcation of old-growth forest, as amended or replaced from time to time.
- Condition B12-5 Prior to clearing each area to be disturbed in the PAA, the proponent must undertake targeted pre-clearance vegetation and flora survey(s) of that area, in accordance with *Technical guidance – Flora and vegetation surveys for environmental impact assessment*, or any approved updates of these guidelines. Targeted pre-clearance surveys shall:

  (1) target the following species and communities, but is not limited to:
    (a) threatened flora;
    (b) priority flora;
    (c) new species, or undescribed species; and
    (d) threatened and priority ecological communities and vegetation type G4.

  (2) require appropriate botanists with demonstrated experience in orchid surveys in the bioregion, for pre-clearance surveys of *Caladenia caesarea* subsp. Mooradung and threatened orchid species, including *Caladenia hopperiana*.

1.1 Objective and Scope of Works

The objective of the survey was as follows:

- A desktop assessment to understand the current knowledge and extent of old growth forests and significant flora within and adjacent to the Survey Area; and
- A targeted search in the Survey Area employing transects for Threatened/ Priority flora (with a particular focus on selected species specified by South32), Threatened and Priority Ecological Communities, and any new areas of old growth forest not previously mapped.

443000

446000

449000

6376000

6373000

6370000

Boddington

LEGEND

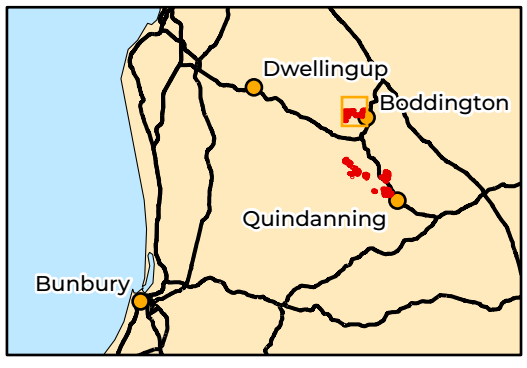
Survey Area

Traverse

Scale 1:30,000

0 0.5 1 Km

Coordinate System: GDA2020 MGA Zone 50
Transverse Mercator Created: 07/11/2025



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Saddleback Pre-Clearance Targeted Survey Memo

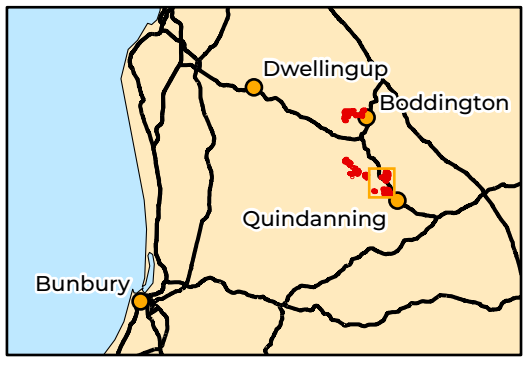
Figure 1.1a: Survey intensity and regional context

452000
455000
458000
6352000
6349000
6346000

LEGEND
- Survey Area
- State Road
- Traverse

Scale 1:30,000
0 0.5 1 Km

Coordinate System: GDA2020 MGA Zone 50
Transverse Mercator Created: 07/11/2025



Biologic Environmental

SOUTH32 PTY LTD
Saddleback Pre-Clearance Targeted Survey Memo

Figure 1.1c: Survey intensity and regional context

2 Desktop Assessment

2.1 Methods

A desktop assessment, comprising database searches and a review of other reports, was undertaken prior to the field survey (Table 2.1). The purpose of the desktop assessment was to collate information on the target species, vegetation communities and old growth forest communities present within the Survey Area. The team completed a search of other survey reports and publicly available databases holding information on the target species and communities. South32 provided Biologic with previous records of taxa within and surrounding (up to 10 km) the Survey Area, which was reviewed prior to field surveys.

Table 2.1: Details of database searches conducted

Provider	Database	Reference	Parameters
Western Australian Herbarium (WAH)	WAH Specimen database	WAH (1998 -)	Within the Survey Area and 10 km of Survey Area boundaries
Department of Biodiversity, Conservation and Attractions (DBCA)	Threatened and Priority Flora database	DBCA (2025)	Within the Survey Area and 10 km of Survey Area boundaries
South32	Spatial data of significant and introduced flora	South32 (2025)	Within the Survey Area and 10 km of Survey Area boundaries

In addition to the species and communities required for targeted survey by MS 1237 outlined in Section 1, South32 provided a list of significant flora taxa for particular focus during the targeted survey, as follows:

- *Caladenia caesarea* subsp. Mooradung (T);
- *Caladenia hopperiana* (T);
- *Diuris micrantha* (T);
- *Loricobbia pauciflora* (T) (formerly *Pultenaea pauciflora*);
- *Calytrix simplex* subsp. *simplex* (P1);
- *Gastrolobium* sp. Prostrate Boddington (P1);
- *Hibbertia ambita* (P1);
- *Synaphea panhesya* (P1);
- *Papistylus intropubens* (P1); and
- *Halgania corymbosa* (P3).

Historical spatial data supplied by South32 was analysed to determine abundance of each of these species previously recorded within the Survey Area.

2.2 Results and Discussion

2.2.1 Significant flora

A total of 19 Threatened and Priority taxa were identified from the database searches of the Survey Area and an approximate 10 km buffer (Table 2.2, Figure 2.1).

Table 2.2: Significant flora identified in the database searches

Conservation Code	Taxon
Threatened	*Caladenia dorrienii*
	Caladenia hopperiana^
	Loricobbia pauciflora (formerly *Pultenaea pauciflora*)
Priority 1	*Calytrix simplex* subsp. *simplex*^
	Hibbertia ambita^
	Isopogon sp. Canning Reservoir (M.D. Tindale 121 & B.R. Maslin)
	Papistylus intropubens
	Synaphea panhesya
Priority 3	*Asteridea gracilis*^
	Banksia subpinnatifida var. *imberbis*^
	Goodenia katabudjar
	Stylidium marradongense
	Tetratheca pilifera
Priority 4	*Acacia alata* var. *platyptera*
	Caladenia x triangularis
	Calothamnus quadrifidus subsp. *teretifolius*
	Cyanothamnus tenuis
	Lasiopetalum cardiophyllum^
	Senecio leucoglossus^

^ Previously recorded within the Survey Area

Of the focus list of significant flora provided by South32 (Section 2.1), three have previously been recorded in the Survey Area (Table 2.3). Total numbers of each of these taxa is shown in Table 2.3, where the spatial records provided by South32 included this data.

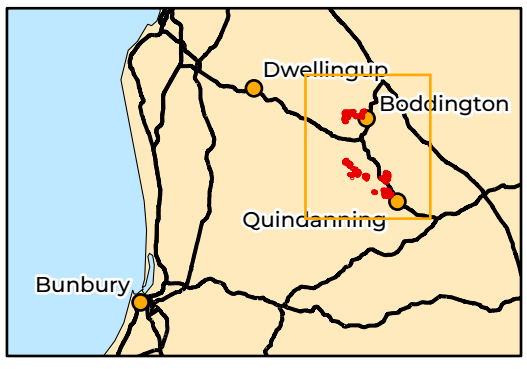
437000
451500
466000
6374500
6360000
6345500
Wandering
Dwarda
Ranford
Boddington
Quindanning
Barrister Marradong Rd
Albany Hwy
Pinjarra Williams Rd

LEGEND

Survey Area
State Road

Community - Category
Mount Saddleback heath communities - Priority 1
Old Growth Forest Area

Scale 1:150,000
0 3 6 Km
Coordinate System: GDA2020 MGA Zone 50 Transverse Mercator
Created: 07/11/2025



Biologic Environmental

SOUTH32 PTY LTD
Saddleback Pre-Clearance Targeted Survey Memo

Figure 2.1: Significant flora and ecological communities from the desktop assessment

444500

448000

6377000

6373500

6370000

Boddington

Bannister Marradong Rd

LEGEND

Survey Area

State Road

Community - Category

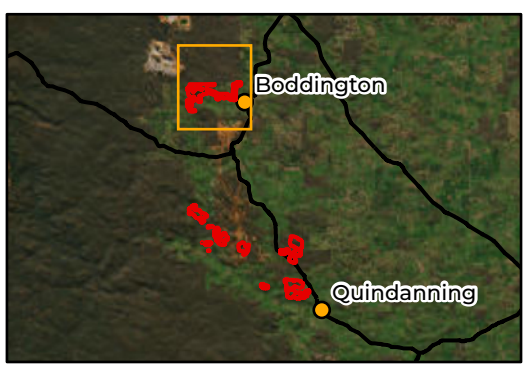
Mount Saddleback heath communities - Priority 1

Scale 1:35,000

0 0.5 1 1.5 Km

Coordinate System: GDA2020 MGA Zone 50 Transverse Mercator

Created: 07/11/2025



Biologic Environmental

SOUTH32 PTY LTD

Saddleback Pre-Clearance Targeted Survey Memo

Figure 2.1a: Significant flora and ecological communities from the desktop assessment

451500
455000
458500
6352500
6349000
6345500
Pinjarra Williams Rd

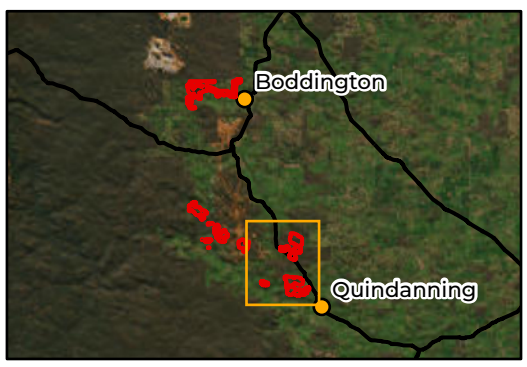
LEGEND

Survey Area
State Road

Community - Category
Mount Saddleback heath communities - Priority 1
Old Growth Forest Area

Scale 1:35,000
0 0.5 1 1.5 Km

Coordinate System: GDA2020 MGA Zone 50 Transverse Mercator
Created: 07/11/2025



Biologic Environmental

SOUTH32 PTY LTD
Saddleback Pre-Clearance Targeted Survey Memo

Figure 2.1c: Significant flora and ecological communities from the desktop assessment

Significant Flora

South32 (2025)

Threatened

- *Caladenia hopperiana*

Priority 1

- *Calytrix simplex subsp. simplex*
- *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130)
- *Hibbertia ambita*

Priority 3

- *Goodenia katabudjar*

Priority 4

- *Lasiopetalum cardiophyllum*

DBCA (2025)

Threatened

- *Caladenia dorrienii*
- *Caladenia hopperiana*
- *Pultenaea pauciflora*

Priority 1

- *Calytrix simplex* subsp. *simplex*
- *Hibbertia ambita*
- *Isopogon* sp. Canning Reservoir (M.D. Tindale 121 & B.R. Maslin)
- *Papistylus intropubens*
- *Synaphea panhesya*

Priority 3

- *Asteridea gracilis*
- *Banksia subpinnatifida* var. *imberbis*
- *Goodenia katabudjar*
- *Stylidium marradongense*
- *Tetratheca pilifera*

Priority 4

- *Acacia alata* var. *platyptera*
- *Caladenia x triangularis*
- *Calothamnus quadrifidus* subsp. *teretifolius*
- *Cyanothamnus tenuis*
- *Lasiopetalum cardiophyllum*
- *Senecio leucoglossus*

Biologic Environmental

Table 2.3: Significant flora taxa for targeted survey focus

Taxon	Description (WAH, 1998 -)	Number of previous records in the Survey Area	Number of previous records outside the Survey Area (within 10 km)
Loricobbia pauciflora (T) (formerly *Pultenaea pauciflora*)	Erect shrub, spindly shrub (broom-like), flowering yellow in October or November. Occurs on sandy & clay lateritic soils in undulating country.	Not previously recorded within Survey Area.	NA
Diuris micrantha (T)	Tuberous, perennial, herb, 0.3-0.6 m high, flowering yellow and brown between September and October, with up to 6 small flowers, 7-10 mm across. Occurs on brown loamy clay in winter-wet swamps, in shallow water.	Not previously recorded within Survey Area.	NA
Caladenia caesarea subsp. Mooradung (T)	Herb, 160-300 mm high with a hairy leaf 70–150 mm long by 3-6 mm wide and up to three lemon-yellow flowers 50–80 mm across. Flowers in September to October. Grows in red-brown loam on the margins of seasonal drainage lines and in grey sandy-clay in seasonally damp flats.	Not previously recorded within Survey Area.	NA
Caladenia hopperiana (T)	Herb, perennial, 200–350 mm high with a hairy leaf 70–150 mm long by 2–10 mm wide and up to four creamy-yellow and white flowers 40–50 mm across. Flowers in September to October. Grows in sandy-clay soil on the edges of seasonally wet flats and watercourses.	29	0
Calytrix simplex subsp. *simplex* (P1)	Shrub to 0.2 m high, flowering purple October to November. High probability that there is an association with more shallow soils associated with granite areas within heath communities. Flats and slopes on laterite on red-brown gravelly loam, well drained soils.	Not previously recorded within Survey Area.	NA
Gastrolobium sp. Prostrate Boddington (M. Hislop 2130) (P1)	Prostrate, mat-like shrub, to 0.05 m high, flowering yellow/red in October. Occurs on littered brown loam, clay, laterite soils on lower slopes and rises, valley bottoms, supporting forests of wandoo (*Eucalyptus wandoo*) and jarrah-marri (*Eucalyptus marginata – Corymbia calophylla*) as the dominant overstorey. Appears to tolerate some disturbance as it occurs on several road verges.	1,714	102,829
Hibbertia ambita (P1)	Shrub, 0.3-0.6 m high, erect or sprawling.	140	836

Taxon	Description (WAH, 1998 -)	Number of previous records in the Survey Area	Number of previous records outside the Survey Area (within 10 km)
Halgania corymbosa (P3)	Erect shrub, 0.35-1 m high, flowering blue-purple between August and November. Occurs on gravelly soils, soils over granite.	Not previously recorded within Survey Area.	NA
Synaphea panhesya (P1)	Erect shrub, 0.3-0.6 m high, flowering yellow between August and September. Occurs on gravelly loam & sandy gravel.	Not previously recorded within Survey Area.	NA
Papistylus intropubens (P1)	Erect, slender shrub, to 0.5 m high. Flowers in August with inflorescence of contracted, many-flowered cymes.. Occurs in heath vegetation.	Not previously recorded within Survey Area.	NA

2.2.2 Old-growth Forest

The Conservation Commission of Western Australia (2003) defines old-growth forest as "areas greater than two hectares of ecologically mature forest, where the overstorey is in a late mature to senescent growth stage, and where the effects of disturbance (e.g., dieback, timber production, grazing) are either absent or now negligible." No areas of old-growth forest have previously been mapped within the Survey Area (DBCA, 2024a) (Figure 2.1).

2.2.3 Threatened and Priority Ecological Communities

Multiple instances of the Priority 1 Ecological Community Mount Saddleback heath communities have been recorded in proximity to, or within the Survey Area (Figure 2.1). A number of areas of overlap relate to the mapped buffer of instances of this community (as applied by DBCA) and may not actually contain the community itself.

This community is defined as a set of variants of site-vegetation type G, as defined by Havel (1975) and areas associated with shallow soils and granite outcrops (Mattiske, 2019). The heath types comprise a number of variants, including but not limited to:

- Site-vegetation Type G: Open Heath of *Grevillea bipinnatifida*, *Hakea undulata*, *Banksia squarrosa* subsp. *squarrosa*, *Hakea incrassata* and *Petrophile serruriae* over *Borya sphaerocephala* on shallow soils and outcrops;
- Site-vegetation Type G1: Mosaic of open heath of Proteaceae – Myrtaceae species, with emergent patches of *Eucalyptus drummondii* on shallow soils on slopes; and
- Site-vegetation Type G3: Open heath of *Banksia squarrosa* subsp. *squarrosa*, *Hakea incrassata*, *Hakea undulata*, *Petrophile heterophylla* and *Petrophile serruriae* on shallow soils over granite outcrops on slopes with occasional emergent *Eucalyptus drummondii*.

Site-vegetation Type G4 is not part of this PEC; however, Mattiske (2019) suggests that the PEC community has affinities with components of G4. This vegetation type is described as open scrub and tall shrubland of *Hakea trifurcata* and *Hakea undulata* with admixtures of mallee species including *Eucalyptus latens* and *Eucalyptus aspersa* on clay to clay-loam soils over outcrops on slopes.

3 Field Survey

3.1 Methods

3.1.1 Compliance

The field survey was conducted in line with relevant state and federal guidance and requirements; thus of a standard for Environment Impact Assessment (EIA) through the Environmental Protection Authority (EPA) and/or the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Specifically, the assessment was undertaken with consideration of the following survey guidelines and recommendations, where applicable:

- EPA (2018) Statement of environmental principles, factors and objectives;
- EPA (2016a) Environmental Factor Guideline: Flora and Vegetation;
- EPA (2016b) Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment;
- DBCA (2017) Threatened and Priority Flora Report Form – Field Manual;
- DoE (2013) Significant impact guidelines 1.1: Matters of National Environmental Significance;
- DoE (2014) Survey Guidelines for Australia's Threatened Orchids: Guidelines for Detecting Orchids Listed as 'Threatened' under the Environment Protection and Biodiversity Conservation Act 1999;
- Conservation Commission of Western Australia (2013) Forest Management Plan 2014 – 2023;
- DBCA (2023) Threatened Ecological Community list;
- DBCA (2024b) Priority Ecological Community list; and
- DCCEEW (2021) Environmental Protection and Biodiversity Conservation Act 1999 – list of Threatened Ecological Communities.

3.1.2 Survey Timing and Personnel

One targeted field survey was conducted from the 8th to the 14th of September 2025 by four Biologic personnel, totalling 28 person days. The field survey was led by Senior Botanist Sam Coultas supported by Botanists Hannah Anthony and Beth Curtin and Graduate Botanist Louis Copping. Personnel involvement, project roles and licenses are listed in Table 3.1.

Table 3.1: Project team and licences

Biologic Personnel	Project Involvement	Flora Licenses	Experience
Principal Botanists			
Clinton van den Bergh	• Project management support • QA/QC	FB62000453 TFL 2223-0030	19 years
Senior Botanist			
Sam Coultas	• Project management • Field lead	FB62000017-3 TFL-2526-0028	12 years
Botanists			
Hannah Anthony	• Field team		2 years
Beth Curtin	• Field team	FB2000859	5 years
Graduate Botanist			
Louis Copping	• Field team	FB62000881 TFL-2526-0070	1 year

3.1.3 Targeted Survey

The targeted survey comprised three components, i.e., significant flora, old-growth forests and TECs and PECs (Sections 3.1.3.1, 3.1.3.2 and 3.1.3.3). The field team completed targeted traverses along transect lines approximately 25 to 50 m apart across the majority of the Survey Area.

3.1.3.1 Targeted out of season survey for Threatened and Priority species

Areas of clearing and relevant buffers were inspected for individuals and habitat of the list of species as specified by South32 (Section 2.2.1), to support the requirements of Conditions B12-4 and B12-5 of MS 1237.

Field personnel familiarised themselves with photographs, reference samples and descriptions of relevant taxon before conducting the survey. Existing records of significant flora in the Survey Area were ground-truthed when applicable to assess population health, confirm counts and update the accuracy of the previous data (Figure 2.1).

Where areas were highly degraded or disturbed due to agriculture, botanists targeted prospective habitat rather than undertaking transect lines to concentrate on areas more likely to support significant flora. The distance between transect lines varied with consideration for habitat suitability, terrain, vegetation present and time constraints.

It should be noted that searching for occurrences of orchid taxa (i.e., *Caladenia hopperiana*, *Caladenia caesarea* subsp. Mooradung and *Diuris micrantha*) was removed from the scope during the survey due to timing (the survey occurred too early for the flowering periods of

these taxa). Biologic was advised that subsequent survey for orchids would be undertaken at a more appropriate time. Biologic recorded suitable habitat for these taxa where observed.

When significant flora were encountered (and not already captured in previous data or if Biologic was updating previous data) a GPS coordinate of the individual was taken, when occurring in isolation, or a central GPS coordinate was taken for a small population (central coordinate with an approximate 10–20 m radius). Information collected at each location comprised:

- GPS track logs of search effort;
- Number of individuals, for a small population or the extent of the population (if many);
- Condition and reproductive status of the plants in each population;
- Photographs of individuals and of the broad vegetation community/ habitat; and
- Broad information on vegetation type and condition.

Biological photo points, which comprise a GPS location, short description and photographs, were also established throughout the Survey Area to capture areas of unsuitable habitat for the priority target taxon and/or inaccessible areas.

3.1.3.2 Old-growth Forest Mapping

Personnel familiarised themselves with existing locations of old-growth forest mapping (DBCA, 2024a) prior to the survey. During the targeted survey, biological photo points were captured throughout the Survey Area to record the level of historical disturbance and overstorey maturity.

3.1.3.3 Threatened and Priority Ecological Communities

Personnel familiarised themselves with vegetation descriptions, soil types/ geology and indicator taxa of the Mount Saddleback heath communities and vegetation type G4 prior to the survey (Section 2.2.3) (DBCA, 2024b). When typical soils/ geology or indicator taxa of the PEC were observed, personnel assessed the area to determine whether vegetation aligned with the vegetation descriptions of any of the PEC components or vegetation type G4.

3.1.4 Nomenclature and Specimen Identification

Flora nomenclature used in this report is consistent with the WAH's plant census, provided on Florabase (WAH, 1998 -). All species nomenclature is current at the time of report preparation.

Twenty-seven specimens from the Survey Area were submitted to the WAH for authoritative identification by WAH specialist taxonomist Mike Hislop (ACC/TR/0058; returned on 06/11/2025; Appendix C) (WAH, 2015).

Threatened and Priority Flora Report Forms (TPRFs) will be completed and submitted to the Department of Biodiversity, Conservation and Attractions (DBCA), as required under the flora collecting permits. Specimens of conservation significant flora will be vouchered with the WAH where required and appropriate.

3.2 Results and Discussion

3.2.1 Significant Flora

One significant flora taxon from South32 focus list, *Hibbertia ambita* (P1), was recorded in the Survey Area. An estimated total of 20,730 individual plants were recorded at 189 locations (Figure 3.1 ,Appendix B).

Hibbertia ambita (P1) is a shrub to 0.6 m in height, either erect or sprawling in growth habit. This taxon is known from a broad range of jarrah forest habitat types ranging from open forest to woodland of *Eucalyptus marginata* and *Corymbia calophylla* on sandy loam to sandy gravels on slopes and ridges within *Eucalyptus marginata*/ *Corymbia calophylla*/ *Allocasuarina fraseriana* forests and woodlands, in *Eucalyptus marginata* and *Allocasuarina fraseriana* forests, and in *Eucalyptus* wandoo woodlands on mid to upper slopes and ridges on clay/ loam/ gravelly soils (WAH, 1998 -). Seventeen records are held at the WAH, all from around the Boddington township area (WAH, 1998 -). A total of 140 records of *H. ambita* (P1) have been previously recorded in the Survey Area. A further 836 records have been previously recorded outside the Survey Area within approximately 8 km of Survey Area boundaries. Photographs of specimens collected during the survey and formally identified at the WAH are shown in Plate 3.1, with photographs of respective collection are shown in Plate 3.2.

One *Hibbertia ambita* (P1) population of 240 individuals was found approximate 7 km northwest of the most northerly previously known population. This population represents the furthest north occurrence of this species given the data currently available.

25 potential specimens of *Hibbertia ambita* (P1) were sent to the West Australian Herbarium for formal identification; 11 were confirmed as *H. ambita* while the remaining 14 were identified as Hibbertia ovata, an unlisted (not recognised as threatened or priority flora), co-occurring species that appears superficially very similar. Following formal identification confirmations, Mike Hislop (expert taxonomist from the Western Australian Herbarium) gave advice on the taxonomic differences between the species. This advice is summarised in the following paragraph.

Hibbertia ambita (P1) and *Hibbertia ovata* are within the *Hibbertia commutata* species group,. a group of which the taxonomy is not yet settled. *Hibbertia ovata* primarily differs from *H. ambita* in having moderately dense to dense hairs distributed across the carpels

whereas the carpels of *H. ambita* are either glabrous or have a few hairs at the carpel suture. *Hibbertia ovata* also generally has longer and denser hairs on the abaxial sepal surface than *H. ambita*. In addition, *H. ovata* has hairy leaf undersurfaces whereas in *H. ambita* these are almost always glabrous.

Further advice given after the completion of formal identification confirmations suggest that while our collections key to *H. ovata*, its current known distribution does not quite extend south of the Boddington area, resulting in the records of *H. ovata* recorded during this survey as extending the known distribution by approximately 20 km southeast.

One additional significant taxon, *Lasiopetalum cardiophyllum* (P4), was also recorded, with an estimated 669 individual plants at 11 locations. *L. cardiophyllum* is an erect, multi-stemmed shrub to 0.5 m in height, flowering pink generally between August and December (Plate 3.3). It occurs on lateritic gravelly soils and sandy clay on flats and hillslopes (WAH, 1998 -). It has previously been recorded in the Survey Area, though numbers are not known (DBCA, 2025; South32, 2025). Photos of various plants sourced from The Atlas of Living Australia are shown in Plate 3.3.

The majority of the Survey Area that had been mapped as suitable habitat for target significant flora taxa was heavily degraded through clearing, logging and agriculture.

Plate 3.1: Photos of collected *Hibbertia ambita* (P1) flowers, leaf characters, and growth habit (spreading and upright) (Source: Biologic).

Plate 3.2: Photos of habitat where *Hibbertia ambita* (P1) was collected (Source: Biologic).

Plate 3.3: *Lasiopetalum cardiophyllum* (P4) growth habit, flowers and leaf morphology (Source: Atlas of Living Australia)

442700
444600
446500
448400
450300
6372600
6370700
6368800
Boddington
Bannister Marradong Rd

LEGEND

Survey Area

State Road

Significant Flora

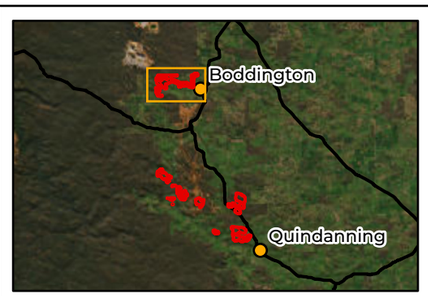
Hibbertia ambita - P1

Biologic Environmental

Scale 1:25,000

0 0.5 1 Km

Coordinate System: GDA2020 MGA Zone 50
Transverse Mercator Created: 11/11/2025



SOUTH32 PTY LTD
Saddleback Pre-Clearance Targeted Survey Memo

Figure 3.1a: Significant flora recorded in the Survey Area

443000
446000
449000
6358000
6355000
6352000
6349000
Pinjarra Williams Rd

LEGEND

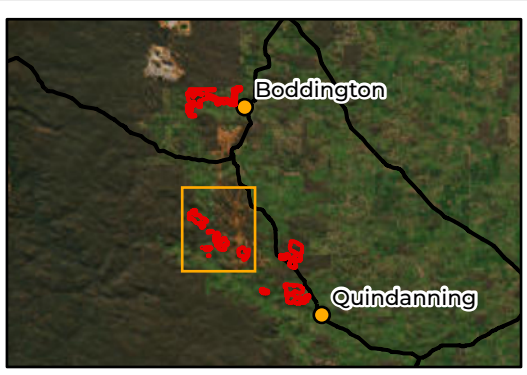
Survey Area
State Road
Rail

Significant Flora

Hibbertia ambita - P1
Hibbertia ovata
Lasiopetalum cardiophyllum - P4

Scale 1:35,000
0 0.5 1 1.5 Km

Coordinate System: GDA2020 MGA Zone 50
Transverse Mercator Created: 11/11/2025



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SOUTH32 PTY LTD
Saddleback Pre-Clearance Targeted Survey Memo

Figure 3.1b: Significant flora recorded in the Survey Area

452000
455000
458000
6352000
6349000
6346000
Pinjarra Williams Rd

LEGEND

Survey Area
State Road
Rail

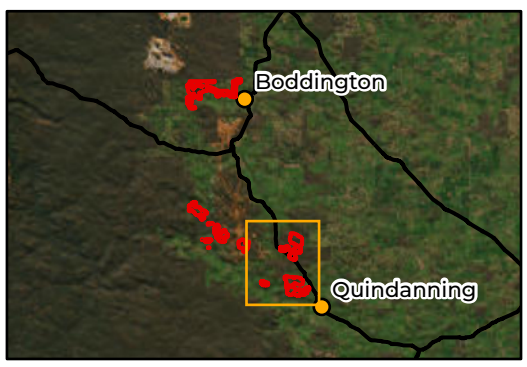
Significant Flora

Hibbertia ovata

Scale 1:35,000

0 0.5 1 1.5 Km

Coordinate System: GDA2020 MGA Zone 50
Transverse Mercator Created: 11/11/2025



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Saddleback Pre-Clearance Targeted Survey Memo

Figure 3.1c: Significant flora recorded in the Survey Area

3.2.2 Old-growth forest

No new areas of old-growth forest were observed within the Survey Area during the survey.

3.2.3 Threatened and Priority Ecological Communities

No vegetation indicative of TECs or PECs, or of vegetation type G4, were observed during the survey. A substantial amount of vegetation associated with mapped instances of the Priority 1 Ecological Community Mount Saddleback heath communities within the Survey Area had been historically disturbed by pastoral activities, mining and rehabilitation, or in some cases had been completely cleared.

3.2.4 Survey Adequacy

All appropriate habitat for the priority target taxon was surveyed, and previous records were ground-truthed and updated when applicable in the Survey Area.

3.3 Constraints and Limitations

The EPA (2016b) outlines several potential limitations to flora surveys. These aspects are assessed and discussed in Table 3.2. Two constraints, with regards to taxonomic identifications, were identified for the survey (Table 3.2).

Table 3.2: Potential limitations and constraints

Limitation	Constraint	Comment
Availability of data and information	No	Sufficient contextual information was available for the Survey Area, including broad information on land systems and vegetation associations. Significant flora spatial data from multiple surveys was provided by South32.
Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	No	The field survey was led by Senior Botanist Sam Coultas who has 12 years' field experience. This meets the minimum requirements of the EPA (2016b) to manage a flora and vegetation field survey/ team in the Jarrah Forest bioregion. Sam was supported by Botanists and Graduate Botanists with 1 – 5 years' experience.
Proportion of flora recorded/collected and any identification issues	No	All flora records were identified in-field. Representative collections of significant flora were made and submitted to the WAH for formal identification.
Was the appropriate area fully surveyed (effort and extent)	No	The majority of suitable habitat for significant flora within the Survey Area was systematically traversed at 25-50 m spacing on foot, which aligns with EPA guidance for a targeted survey in the Jarrah Forest. Spacing was increased up to 50 m where habitat was deemed unsuitable for the taxa in the list. As substantial portions of the Survey Area were degraded (e.g., farm blocks, rehabilitation in progress), the team targeted prospective habitat rather than undertaking grid searching (across cleared and highly disturbed paddocks) in some instances to maximise

Limitation	Constraint	Comment
		efficiencies and concentrate on areas more likely to support significant flora.
Survey timing, rainfall, season of survey	No	Fieldwork was conducted in September (spring), which is optimal timing for flora surveys in the southwest. Seasonal timing was appropriate for most target species, with the exception of some of the orchid species, including *Caladenia hopperiana* (T). South32 advised that a separate consultant would be surveying for orchid species at a later date; as such, this is not considered a limitation for this survey.
Access restrictions within the Survey Area	No	The majority of the Survey Area was accessible via gravel access tracks which provided adequate access across most of the Survey Area. Walking traverses were limited to a maximum distance of <1 km from the vehicle for safety reasons. Access was not permitted to some areas in the north, and some areas in the south were not surveyed due to time constraints. The majority of the unsurveyed areas have already been cleared or disturbed, except for the main Quindanning block areas which were not surveyed due to time constraints.

4 Conclusion

The key findings of this survey are as follows:

- Two significant flora were recorded:
  - *Hibbertia ambita* (P1) – 20,730 individual plants recorded at 189 locations; and
  - *Lasiopetalum cardiophyllum* (P4) – 669 individual plants at 11 locations;
- Old-growth forest had not been previously mapped in the Survey Area, and no new instances were recorded during the field survey;
- Multiple instances of the Priority 1 Ecological Community Mount Saddleback heath communities have previously been mapped within the Survey Area, but no vegetation aligning with this PEC were recorded during the survey; and
- No vegetation aligning with the description of vegetation type G4 were recorded during the survey.

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Appendix A: Important Note

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Appendix B: Priority flora recorded from the Survey Area

Latitude	Longitude	TaxonName	Conservation status	No.
-32.97380913	116.435294	*Hibbertia ambita*	P1	10
-32.97267749	116.435907	*Hibbertia ambita*	P1	2
-32.9736964	116.4363488	*Hibbertia ambita*	P1	100
-32.9732248	116.4364473	*Hibbertia ambita*	P1	100
-32.9702805	116.4320304	*Hibbertia ambita*	P1	10
-32.96853286	116.4282558	*Hibbertia ambita*	P1	5
-32.96440563	116.4327398	*Hibbertia ambita*	P1	300
-32.96516629	116.4327231	*Hibbertia ambita*	P1	100
-32.96654268	116.4318234	*Hibbertia ambita*	P1	2
-32.9586485	116.4236632	*Hibbertia ambita*	P1	50
-32.9594882	116.4236452	*Hibbertia ambita*	P1	50
-32.9594936	116.4236459	*Hibbertia ambita*	P1	250
-32.9596486	116.4238689	*Hibbertia ambita*	P1	4
-32.95981155	116.4234681	*Hibbertia ambita*	P1	80
-32.96021522	116.4238489	*Hibbertia ambita*	P1	25
-32.96028409	116.4238171	*Hibbertia ambita*	P1	5
-32.96051153	116.4238913	*Hibbertia ambita*	P1	10
-32.96059032	116.4237339	*Hibbertia ambita*	P1	4
-32.79753109	116.4017129	*Hibbertia ambita*	P1	100
-32.79920033	116.4016439	*Hibbertia ambita*	P1	20
-32.7981489	116.4006897	*Hibbertia ambita*	P1	45
-32.79803658	116.3995404	*Hibbertia ambita*	P1	25
-32.96522017	116.4321229	*Hibbertia ambita*	P1	100
-32.7997958	116.4024857	*Hibbertia ambita*	P1	40
-32.7991766	116.4009394	*Hibbertia ambita*	P1	2
-32.7982429	116.3997052	*Hibbertia ambita*	P1	5
-32.9515045	116.414551	*Hibbertia ambita*	P1	1
-32.9722461	116.4364432	*Hibbertia ambita*	P1	1
-32.7931757	116.40318	*Hibbertia ambita*	P1	3
-32.9656233	116.426595	*Hibbertia ambita*	P1	6
-32.96584	116.4267333	*Hibbertia ambita*	P1	5
-32.9659983	116.426765	*Hibbertia ambita*	P1	1
-32.965895	116.4267217	*Hibbertia ambita*	P1	1

Latitude	Longitude	TaxonName	Conservation status	No.
-32.96593	116.42668	*Hibbertia ambita*	P1	2
-32.965965	116.4266717	*Hibbertia ambita*	P1	5
-32.9659967	116.4266417	*Hibbertia ambita*	P1	1
-32.9660033	116.426615	*Hibbertia ambita*	P1	1
-32.9659917	116.42663	*Hibbertia ambita*	P1	1
-32.9660167	116.4266133	*Hibbertia ambita*	P1	1
-32.9662233	116.42648	*Hibbertia ambita*	P1	5
-32.966185	116.426685	*Hibbertia ambita*	P1	6
-32.96627	116.4266517	*Hibbertia ambita*	P1	10
-32.9663017	116.426725	*Hibbertia ambita*	P1	16
-32.9662817	116.426785	*Hibbertia ambita*	P1	15
-32.96642	116.4267	*Hibbertia ambita*	P1	16
-32.9662667	116.4258	*Hibbertia ambita*	P1	1
-32.965925	116.4260117	*Hibbertia ambita*	P1	3
-32.9659767	116.4257333	*Hibbertia ambita*	P1	10
-32.9665433	116.4268383	*Hibbertia ambita*	P1	1
-32.966545	116.4268	*Hibbertia ambita*	P1	2
-32.9666563	116.4269395	*Hibbertia ambita*	P1	1
-32.9666142	116.42672	*Hibbertia ambita*	P1	1
-32.9670833	116.4270983	*Hibbertia ambita*	P1	2
-32.9671117	116.4271	*Hibbertia ambita*	P1	2
-32.9640249	116.4275332	*Hibbertia ambita*	P1	5
-32.9639343	116.4275921	*Hibbertia ambita*	P1	1
-32.9639056	116.4276355	*Hibbertia ambita*	P1	1
-32.9638638	116.4276677	*Hibbertia ambita*	P1	3
-32.9637756	116.4276968	*Hibbertia ambita*	P1	30
-32.9637021	116.427764	*Hibbertia ambita*	P1	50
-32.9636613	116.4278729	*Hibbertia ambita*	P1	50
-32.9637643	116.4279252	*Hibbertia ambita*	P1	15
-32.9637343	116.4280114	*Hibbertia ambita*	P1	30
-32.9636336	116.428105	*Hibbertia ambita*	P1	100
-32.9635535	116.4281574	*Hibbertia ambita*	P1	100
-32.963445	116.4282402	*Hibbertia ambita*	P1	100
-32.9633091	116.42818	*Hibbertia ambita*	P1	50

Latitude	Longitude	TaxonName	Conservation status	No.
-32.9630005	116.4281236	*Hibbertia ambita*	P1	1
-32.9630034	116.4280874	*Hibbertia ambita*	P1	2
-32.9628672	116.428243	*Hibbertia ambita*	P1	5
-32.9627904	116.4282399	*Hibbertia ambita*	P1	10
-32.9627378	116.42831	*Hibbertia ambita*	P1	20
-32.9626187	116.4283246	*Hibbertia ambita*	P1	50
-32.962487	116.4282922	*Hibbertia ambita*	P1	20
-32.9624186	116.4282519	*Hibbertia ambita*	P1	15
-32.9623615	116.4283184	*Hibbertia ambita*	P1	20
-32.9621968	116.4282987	*Hibbertia ambita*	P1	3
-32.9621009	116.4282358	*Hibbertia ambita*	P1	12
-32.9619592	116.428166	*Hibbertia ambita*	P1	1
-32.961756	116.4291712	*Hibbertia ambita*	P1	10
-32.961801	116.4280609	*Hibbertia ambita*	P1	10
-32.9616728	116.4280286	*Hibbertia ambita*	P1	5
-32.961668	116.4280784	*Hibbertia ambita*	P1	30
-32.9615795	116.4281725	*Hibbertia ambita*	P1	20
-32.9615329	116.4282505	*Hibbertia ambita*	P1	30
-32.9613198	116.4286548	*Hibbertia ambita*	P1	50
-32.9612102	116.4280863	*Hibbertia ambita*	P1	100
-32.9612085	116.4285717	*Hibbertia ambita*	P1	150
-32.9611793	116.4287638	*Hibbertia ambita*	P1	50
-32.9613048	116.4289643	*Hibbertia ambita*	P1	100
-32.9613262	116.4291112	*Hibbertia ambita*	P1	15
-32.9613879	116.4292041	*Hibbertia ambita*	P1	200
-32.9614529	116.4293545	*Hibbertia ambita*	P1	100
-32.9615874	116.4295126	*Hibbertia ambita*	P1	200
-32.9615744	116.4297415	*Hibbertia ambita*	P1	150
-32.9618025	116.4297247	*Hibbertia ambita*	P1	50
-32.9620597	116.4295959	*Hibbertia ambita*	P1	100
-32.9622252	116.429562	*Hibbertia ambita*	P1	100
-32.9623883	116.4294806	*Hibbertia ambita*	P1	150
-32.9626114	116.4294215	*Hibbertia ambita*	P1	100
-32.9628329	116.4292078	*Hibbertia ambita*	P1	250

Latitude	Longitude	TaxonName	Conservation status	No.
-32.9630871	116.4291241	*Hibbertia ambita*	P1	250
-32.9633353	116.4288036	*Hibbertia ambita*	P1	200
-32.9634842	116.4287245	*Hibbertia ambita*	P1	150
-32.9636113	116.428698	*Hibbertia ambita*	P1	200
-32.9636858	116.4283807	*Hibbertia ambita*	P1	150
-32.9636962	116.4283544	*Hibbertia ambita*	P1	30
-32.9603459	116.4247805	*Hibbertia ambita*	P1	20
-32.9603068	116.4248733	*Hibbertia ambita*	P1	20
-32.9602315	116.4249155	*Hibbertia ambita*	P1	15
-32.960194	116.4249957	*Hibbertia ambita*	P1	50
-32.9601161	116.4251622	*Hibbertia ambita*	P1	50
-32.9600133	116.4252879	*Hibbertia ambita*	P1	50
-32.9600472	116.4254443	*Hibbertia ambita*	P1	2
-32.9599926	116.4255492	*Hibbertia ambita*	P1	2
-32.9599052	116.4256648	*Hibbertia ambita*	P1	5
-32.9598568	116.4258599	*Hibbertia ambita*	P1	4
-32.9601017	116.4260711	*Hibbertia ambita*	P1	1
-32.9597248	116.4267461	*Hibbertia ambita*	P1	1
-32.9595824	116.4264901	*Hibbertia ambita*	P1	1
-32.959508	116.4264176	*Hibbertia ambita*	P1	1
-32.9594583	116.426468	*Hibbertia ambita*	P1	5
-32.9593362	116.426349	*Hibbertia ambita*	P1	10
-32.9592156	116.4262373	*Hibbertia ambita*	P1	1
-32.959104	116.4261767	*Hibbertia ambita*	P1	10
-32.958985	116.4261848	*Hibbertia ambita*	P1	50
-32.9588458	116.426384	*Hibbertia ambita*	P1	100
-32.9586486	116.4265706	*Hibbertia ambita*	P1	200
-32.958584	116.4269198	*Hibbertia ambita*	P1	300
-32.9584112	116.4270067	*Hibbertia ambita*	P1	150
-32.9581741	116.4268264	*Hibbertia ambita*	P1	250
-32.9579347	116.4265255	*Hibbertia ambita*	P1	300
-32.957832	116.4262278	*Hibbertia ambita*	P1	50
-32.9576799	116.4253653	*Hibbertia ambita*	P1	1
-32.9576897	116.425326	*Hibbertia ambita*	P1	15

Latitude	Longitude	TaxonName	Conservation status	No.
-32.957735	116.4246215	*Hibbertia ambita*	P1	5
-32.9587624	116.4232941	*Hibbertia ambita*	P1	7
-32.9643394	116.4280294	*Hibbertia ambita*	P1	40
-32.9642266	116.4285972	*Hibbertia ambita*	P1	50
-32.963929	116.4287986	*Hibbertia ambita*	P1	100
-32.9636883	116.4292428	*Hibbertia ambita*	P1	250
-32.9634195	116.4294329	*Hibbertia ambita*	P1	250
-32.9631542	116.4295392	*Hibbertia ambita*	P1	200
-32.9630142	116.4297811	*Hibbertia ambita*	P1	100
-32.962913	116.4301007	*Hibbertia ambita*	P1	100
-32.9628803	116.4304461	*Hibbertia ambita*	P1	75
-32.9628573	116.4305918	*Hibbertia ambita*	P1	100
-32.9628272	116.43077	*Hibbertia ambita*	P1	200
-32.962468	116.4306515	*Hibbertia ambita*	P1	250
-32.9621395	116.4308635	*Hibbertia ambita*	P1	50
-32.9616452	116.43113	*Hibbertia ambita*	P1	250
-32.9613665	116.4309055	*Hibbertia ambita*	P1	250
-32.9613348	116.4305857	*Hibbertia ambita*	P1	100
-32.9614527	116.4304095	*Hibbertia ambita*	P1	200
-32.9617278	116.43009	*Hibbertia ambita*	P1	200
-32.9619715	116.4295953	*Hibbertia ambita*	P1	150
-32.9622904	116.4295435	*Hibbertia ambita*	P1	250
-32.9625809	116.4292437	*Hibbertia ambita*	P1	250
-32.962928	116.4291773	*Hibbertia ambita*	P1	250
-32.9633767	116.4286885	*Hibbertia ambita*	P1	250
-32.9637996	116.4285186	*Hibbertia ambita*	P1	50
-32.9644785	116.4285997	*Hibbertia ambita*	P1	100
-32.9643462	116.4297476	*Hibbertia ambita*	P1	10
-32.9641335	116.4300075	*Hibbertia ambita*	P1	100
-32.9638261	116.4302802	*Hibbertia ambita*	P1	300
-32.9636127	116.4306518	*Hibbertia ambita*	P1	288
-32.9633043	116.4309112	*Hibbertia ambita*	P1	1000
-32.963163	116.4314084	*Hibbertia ambita*	P1	1000
-32.9632592	116.4318027	*Hibbertia ambita*	P1	1000

Latitude	Longitude	TaxonName	Conservation status	No.
-32.9633452	116.4320419	*Hibbertia ambita*	P1	100
-32.9636376	116.4319501	*Hibbertia ambita*	P1	100
-32.9640342	116.4315711	*Hibbertia ambita*	P1	150
-32.9642299	116.4310173	*Hibbertia ambita*	P1	150
-32.9643619	116.4304237	*Hibbertia ambita*	P1	100
-32.9588364	116.4260628	*Hibbertia ambita*	P1	250
-32.9586239	116.4267197	*Hibbertia ambita*	P1	500
-32.9582806	116.427153	*Hibbertia ambita*	P1	500
-32.9578909	116.4271701	*Hibbertia ambita*	P1	1000
-32.9574272	116.4272116	*Hibbertia ambita*	P1	1000
-32.957126	116.4272253	*Hibbertia ambita*	P1	200
-32.9571584	116.4269013	*Hibbertia ambita*	P1	150
-32.9574713	116.4266064	*Hibbertia ambita*	P1	1000
-32.9578583	116.4262621	*Hibbertia ambita*	P1	50
-32.9580278	116.42603	*Hibbertia ambita*	P1	500
-32.9583187	116.4258102	*Hibbertia ambita*	P1	250
-32.9603571	116.4232845	*Hibbertia ambita*	P1	25
-32.9599911	116.4232862	*Hibbertia ambita*	P1	23
-32.9598909	116.4233221	*Hibbertia ambita*	P1	20
-32.9597281	116.4232668	*Hibbertia ambita*	P1	15
-32.9578191	116.4272416	*Lasiopetalum cardiophyllum*	P4	3
-32.9571262	116.4272926	*Lasiopetalum cardiophyllum*	P4	6
-32.95436895	116.4269552	*Lasiopetalum cardiophyllum*	P4	25
-32.95462924	116.4271182	*Lasiopetalum cardiophyllum*	P4	30
-32.95575369	116.4272809	*Lasiopetalum cardiophyllum*	P4	30
-32.95539076	116.4266797	*Lasiopetalum cardiophyllum*	P4	15
-32.95445386	116.4258793	*Lasiopetalum cardiophyllum*	P4	30
-32.9547769	116.4257858	*Lasiopetalum cardiophyllum*	P4	30
-32.9547662	116.4291683	*Lasiopetalum cardiophyllum*	P4	100
-32.9546435	116.4289545	*Lasiopetalum cardiophyllum*	P4	250
-32.9544862	116.4288441	*Lasiopetalum cardiophyllum*	P4	150

Appendix C: WAH Accession

WAH Accession no.	Coll #	Collection Name	WA Herbarium ID
TR 0058	SADBC.001	Hibbertia ?ambita1	*Hibbertia ovata*
TR 0058	#SADBC.007	Hibbertia ?ambita BC1	*Hibbertia ovata*
TR 0058	#SADBC.008	Hibbertia ?ambita BC2	*Hibbertia ovata*
TR 0058	SADBC.009	Hibbertia ?ambita BC3	*Hibbertia ovata*
TR 0058	SADBC.010	Hibbertia ?ambita BC4	*Hibbertia ovata*
TR 0058	#SADBC.011	Hibbertia ?ambita BC5	*Hibbertia ovata*
TR 0058	SADBC.012	Hibbertia ?ambita BC6	*Hibbertia ambita*
TR 0058	#SADBC.014	Hibbertia ?ambita BC8	*Hibbertia ambita*
TR 0058	SADBC.015	Hibbertia ?ambita BC9	*Hibbertia ambita*
TR 0058	SADBC.017	Hibbertia ?ambita BC10	*Hibbertia ambita*
TR 0058	SADBC.019	Lasiopetalum heart leaf	*Lasiopetalum cardiophyllum*
TR 0058	#SADHA.001	Hibbertia ?ambita	*Hibbertia ovata*
TR 0058	SADHA.003	Hibbertia sp. smooth flat leaf	*Hibbertia semipilosa*
TR 0058	SADHA.005	Hibbertia ambita	*Hibbertia ambita*
TR 0058	SADLC.001	Hibbertia ?ambita	*Hibbertia ovata*
TR 0058	SADLC.003	Hibbertia ?ambita dark green	*Hibbertia ovata*
TR 0058	SADLC.006	Hibbertia ?ambita laterite	*Hibbertia ovata*
TR 0058	SADLC.007	Hibbertia ?ambita laterite recoll	*Hibbertia ovata*
TR 0058	#SADLC.008	Hibbertia ?ambita granite	*Hibbertia ambita*
TR 0058	SADLC.009	Hibbertia ?ambita	*Hibbertia ambita*
TR 0058	#SADLC.011	Hibbertia ?ambita prostrate	*Hibbertia ambita*
TR 0058	#SADSC.02	Hibbertia ambita SC 01	*Hibbertia ovata*
TR 0058	#SADSC.04	Hibbertia ambita SC 02	*Hibbertia ambita*
TR 0058	SADSC.09	Hibbertia ambita SC 03	*Hibbertia ambita*
TR 0058	SADSC.10	Hibbertia ambita SC 04	*Hibbertia ovata*
TR 0058	#SADSC.11	Hibbertia ambita hairy upright	*Hibbertia ovata*
TR 0058	Office.01	Hibbertia ambita	*Hibbertia ambita*