

# Conservation Management Plan and Masterplan for Highett Plains Grassy Woodland



Prepared for Bayside City Council  
Report 23105, Version 1.0  
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## Version Control

Version	Responsibility	Name	Date
Draft (1.0)	Primary author/ field assessment	Geoff Carr	13/03/2024
	Author/ field assessment	Kylie Payze	21/03/2024
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# 1 Introduction

Abzeco was engaged by Bayside City Council to prepare a Conservation Management Plan (CMP) for the three-hectare area of land at 37 Graham Road, Highett. The subject land is referred to as Highett Plains Grassy Woodland. The site was formerly owned by the Federal Government and occupied by CSIRO, which was sold and transferred to Bayside City Council on 20 April 2023 to manage as a Conservation Reserve. This Conservation Management Plan has been developed in consultation with Council and Friends of Highett Grassy Woodland. It documents the ecological values of the site, outlines the management issues and threats for the site and prescribes management actions over a 10-year period.

There are three components to this project, of which the Conservation Management Plan of Highett Plains Grassy Woodland is the first report. The second report is an arboricultural assessment of indigenous trees for the site, that has been completed by Ryder Arboriculture and Environment and is provided in Attachment 2. The third component is the Highett Plains Grassy Woodland Masterplan that is given in Attachment 1.

The land is in the process of being rezoned from Residential Growth Zone, Schedule 3 (RGZ3) to Public Conservation and Resource Zone (PCRZ). At the Council Meeting on 19 March 2024, Council resolved to adopt Amendment C199Bays Part 1 as it relates to the rezoning of Highett Plains Grassy Woodland and submit to the Minister for Planning for approval in accordance with Section 31 of the Planning and Environment Act 1987. The application of the PCRZ for Highett Plains Grassy Woodland is an action listed in the Bayside Urban Forest Strategy 2022 and has been sought to ensure the future protection of the site as a conservation area.

## 1.1 Background

The subject land was previously part of a 9.28 ha area of land occupied by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) where they operated a research and education facility from 1940-2012. After CSIRO decommissioned the facility in 2012, the demolition and removal of buildings and much of the associated infrastructure followed; also removed were the gardens created for ornament and amenity, as well as planted trees and shrubs, largely non-indigenous species. Following demolition, geotechnical investigations revealed that a substantial area of surface soil had been contaminated by asbestos (BlueSphere Environmental 2024), then over an area of approximately 0.8 ha, topsoil was scalped to a depth of 100 mm and removed from the site. The site was rapidly colonised by a suite of indigenous and exotic plant species.

The CSIRO site has long been known for supporting remnant indigenous vegetation and its considerable conservation significance, first commented on by Thomas Hart (1939) who published an article in the *Victorian Naturalist* titled 'The Yellow Box and a lost vegetation'. A number of more recent studies have been conducted documenting the flora and fauna, notably Yugovic and Koehler (2004), and Crowfoot and Carr (2017, 2018). These studies have supported the assessment of high conservation values associated with the remnant indigenous grassy woodland vegetation, in particular the stands of *Eucalyptus camaldulensis* River Red-gum and *Eucalyptus melliodora* Yellow Box (see further discussion in Sections 5).

Bayside City Council acquired the CSIRO site (see Figure 1) in April 2023 as a conservation reserve, supported by Friends of Highett Grassy Woodland. The land to the north of the reserve, formerly owned by CSIRO, a much larger area than the conservation reserve, has no indigenous

vegetation, and is being developed as a residential estate. This also includes a new one hectare public park for passive recreation.

## 1.2 Objectives

The main objectives of this Conservation Management Plan and Masterplan are as follows:

- A review of the existing reports and literature for the site including the Environmental Audit/Environmental Management Plan.
- An assessment and documentation of vegetation condition on site (this includes completion of a vegetation quality assessment).
- Identification of management issues and threats.
- Create management zones based on vegetation condition and unifying management requirements.
- Identification of the most appropriate methods to manage identified issues.
- Create a management plan with a 10-year timeframe to guide the completion of specific restoration and management actions.
- Prepare an appropriate and cost-effective monitoring program that includes the establishment of permanent plots and photo points.
- Provide a concept landscape drawing to communicate the site management, including the location of infrastructure such as fencing, paths, seating etc.
- Engage with relevant stakeholders including Friends of Highett Grassy Woodland.

## 2 Methods

### 2.1 Data review

In the last 20 years or so a number of reports have been prepared documenting the vegetation of Highett Plains Grassy Woodland. A much earlier article by Hart (1939) published in the *Victorian Naturalist* provides important context for the Highett site. Most of the articles and reports on the vegetation of Highett Plains Grassy Woodland have been reviewed as background information and as sources of data about the vegetation and its significance (at least at the time the reports were prepared). Some reports cited by others have not been seen, including Cook (2003) and the series of reports by Yugovic (2005, 2007, 2010, 2011a and 2011b). The six reports by Yugovic relate to vegetation management at the Highett site and were commissioned by CSIRO. In retrospect, these reports are now somewhat redundant because major changes have occurred after CSIRO abandoned the site and all buildings and much infrastructure was removed accompanied by massive soil disturbance and topsoil stripping. The report by Yugovic and Koehler (2004) was reviewed and it provides important data and perspectives.

A report to CSIRO was completed for the site by Brett Lane and Associates in 2011, however it was peer reviewed by Yugovic (2011) and a number of errors were revealed. Therefore, the report by Brett Lane and Associates is not discussed further in this report.

Bayside City Council commissioned Ecology Australia to do work on the site. This included a letter to Council regarding the protection of remnant vegetation during the demolition works (Crowfoot and Carr, 4 August 2016).

Major reports by Ecology Australia followed in 2017 and 2018: Crowfoot and Carr (2017) – *Highett Plains Grassy Woodland, Graham Road, Highett: Flora and Fauna Values*; Crowfoot and Carr (2018) – *Highett Plains Grassy Woodland – Conservation Management Plan*. An arboricultural assessment was prepared by Cameron Ryder (2016) – *Assessment of trees within the southern area of the CSIRO site, Highett*. This arboricultural assessment has been updated by Cameron Ryder for the present report (Attachment 2).

### 2.2 Floristic inventory

A comprehensive floristic inventory of the site (indigenous species, naturalised weeds and horticultural plantings) was compiled by Crowfoot and Carr (2017). Since that time however a great deal has changed – massive soil disturbance, attrition of species/populations of indigenous species, and an ever-expanding suite of weed species. Field work on the site in the last few years has provided a comprehensive contemporary inventory of the flora and data on plant populations, management issues and observations. The site was visited by G. Carr on eight occasions: 22 July 2022, 8 August, 2 September 2022, 14 October 2022, 21 November 2023, 1 December 2023 and 12 January 2024. Data collected during these visits are incorporated in this report.

### 2.3 Vegetation Quality Assessment

The extent of native vegetation within the study area was mapped by a habitat hectare certified assessor on 16 February 2024. ArcGIS and Field Maps software were used with GPS accuracy of +/-3 metres.

Where a patch of native vegetation was present, a habitat hectare assessment was conducted in accordance with the *Vegetation Quality Assessment Manual: Guidelines for applying the habitat hectares scoring method, Version 1.3* (DSE 2004). These data are provided in Section 5.1.1.

## 2.4 Monitoring quadrats

Eight 10 x 10 m permanent plots were established in December 2023 and January 2024, to record the species composition and cover abundance of the indigenous and exotic flora (Figure 4, Appendix 1). A black star picket with a yellow plastic cap was installed in the north-west corner of the quadrat to mark the location. Photos of the quadrat were taken from the star picket, facing south-east, to document the condition of the vegetation. The indigenous and exotic flora species were assigned a cover/abundance value from the Domin-Krajina cover abundance scale (Mueller-Dombois and Ellenberg 1974):

Cover rating	Number of plants	Cover %
+	solitary, with insignificant cover	< 1
1	seldom, with insignificant cover	< 1
2	very scattered, with small cover	< 1
3	scattered	1 - 5
4	any number	5 - 10
5	any number	10 - 25
6	any number	25 - 33
7	any number	33 - 50
8	any number	50 - 75
9	any number	75 - < 100
10	any number	100

**Table 1: Domin-Krajina cover abundance scale**

These will serve as permanent plots and photo-points to monitor the changes in vegetation over time. Ongoing monitoring is addressed in Section 8. It will involve collecting these data every three years to compare against previous records, determine if management targets have been achieved and if the condition of native vegetation has improved.

## 2.5 Fauna assessment

Fauna surveys were completed by naturalists John Eichler and Pauline Reynolds on 1 March 2024. The results of this survey is given in Section 5.4.

The Friends of Nature Wildlife put out Anabat detectors and wildlife cameras in the Reserve for approximately two weeks during March 2024. The result of this assessment is provided in Section 5.4.

## 2.6 Weed invasions and identification of priority weed species

All exotic plant species within Highett Plains Grassy Woodland are undesirable and unwanted, except for some established planted trees (mostly exotic eucalypts) and some of their recruits which are to be retained (see Section 7.2.4). Table 4 lists all exotic and weedy species for which management is required.

Because a primary objective for revegetation/restoration is the elimination of exotic species, we have not assigned a level of threat to the exotic flora as in the *Advisory List of Environmental Weeds in Victoria* (White *et al.* 2018). However, the weed species are categorised in three groups: Priority 1, Priority 2 and Priority 3. The rationale for these groups is given in Section 7.1 and Table 4.

## 2.7 Recruitment (unassisted) of non-indigenous eucalypts and other trees and shrubs

Following the removal of the CSIRO buildings and much of the infrastructure on the site, as well as gardens, and scalping of contaminated soil there was massive recruitment of exotic as well as indigenous eucalypts, and other native plants. Mature non-indigenous eucalypts as well as their recruits were documented in 2023 and early 2024. The potential value of these mature trees and recruits was evaluated and the criteria given in Section 7.2.4. Some of the parent plants occur on residential properties on the east side of the reserve.

## 2.8 Consultation with Friends of Highett Grassy Woodland and other parties

A number of meetings were held with the Friends of Highett Grassy Woodland group to solicit information in relation to the site, and to obtain their views on the development of the Conservation Management Plan.

## 2.9 Plant and animal names

Flora names in this report follow the online *Flora of Victoria* (<https://vicflora.rbg.vic.gov.au/>) with one name coined by us: *Oxalis* sp. aff. *exilis* (glabrescent). This undescribed or unrecognised species is not conspecific with *O. exilis*, and it is mentioned in the online *Flora of Victoria* by Val Stajsic in a note under *O. exilis*: “this variant of *O. exilis* has the smallest leaves and flowers among the forms of *O. exilis*”. We have no doubt that the entity is indigenous. Yet another species not in the online *Flora of Victoria* is *Eucalyptus platypus* subsp. *congregata*; it is a new record as a naturalised species for Victoria. An asterik (\*) denotes exotic species.

For cultivated species this report follows the online *Horticultural Flora of South-eastern Australia* (<https://hortflora.rbg.vic.gov.au/>).

Fauna names are based on the online Victorian Biodiversity Atlas (DEECA 2024) or the most recent treatment in the recent peer-reviewed literature.



### 3 Study area

The study area – Highett Plains Grassy Woodland Reserve (Figure 1) - occupies approximately three hectares at the southern end of the land formerly owned by CSIRO at Highett, an inner south-eastern Melbourne suburb in the City of Bayside. The reserve abuts residential developments on the east and west sides, the latter along Middleton Street, and an industrial development along the southern boundary. At the northern end a new residential development is currently under construction that will occupy the bulk of the former CSIRO site; Highett Plains Grassy Woodland will thus be located within a residential landscape. The Reserve lies near the extreme western end of the Gippsland Plains Bioregion which is bound by the eastern shore of Port Phillip Bay, about 3.6 km to the west of Highett Plains Grassy Woodland; the Reserve is thus subcoastal in location.

#### 3.1 Geology

Costermans and Vandenberg (2022) present an excellent account of the geology of Port Phillip Bay as part of a much greater study area. Specifically relevant to our area of interest is their geographical overview of the Eastern Bayside and Mornington Peninsula region. The following quote (p. 329) summarises the geology as described and mapped by them:

*‘In the late Miocene – Early Pliocene (6-4 Ma), a shallow sea covered much of the area, depositing sands which include fossils, as found particularly at Beaumaris; subsequent marginal- marine sands are unfossiliferous, but are usually reddish (ferruginised) and often crossbedded. All these sands are now included in the Sandringham Sandstone’.*

The soils and the underlying sediments at the Highett Plains Grassy Woodland site, as revealed by the scalping of the asbestos-contaminated soils (Image 1), clearly reveal the geological features outlined in the quote above by Costermans and Vandenberg (2022).



**Image 1: Scalped soil in the north of the Reserve**

#### 3.2 Topography

The site is more or less level but gently undulating with elevation ranging from 31-32 m asl.

### 3.3 Soils

In the 'Flora of Melbourne' (Bull 2014), van de Graaf (2014) maps and gives a general overview of the soils of the Melbourne region. For the Sandringham Sandstone (see above) he provides the following information in the legend to the map (p. 38):

*'Dark grey sands, in areas overlying mottled clay subsoils but elsewhere very deep, with topsoil overlying bleached white sandy subsurface stratum, then coffee rock, then over yellow brown sand subsoil. Topsoils always strongly acidic and subsoils moderately acidic'.*

As noted by Costermans and VandenBerg (2022) the soil profiles in the study area can be strongly ferruginised at depth (as revealed by the scalping) (Image 1).

### 3.4 Climate

Climate data (rainfall and temperature) from Moorabbin Airport weather station (ID 086077), located c. 5 km south-east of the site, is provided by the Bureau of Meteorology (BOM 2024). The mean annual rainfall is 705.4 mm, ranging from a mean monthly rainfall of 43.6 mm in February to 70.5 mm in October (BOM 2024). The mean maximum temperature ranges from 13.8°C in July to 26°C in January and February.

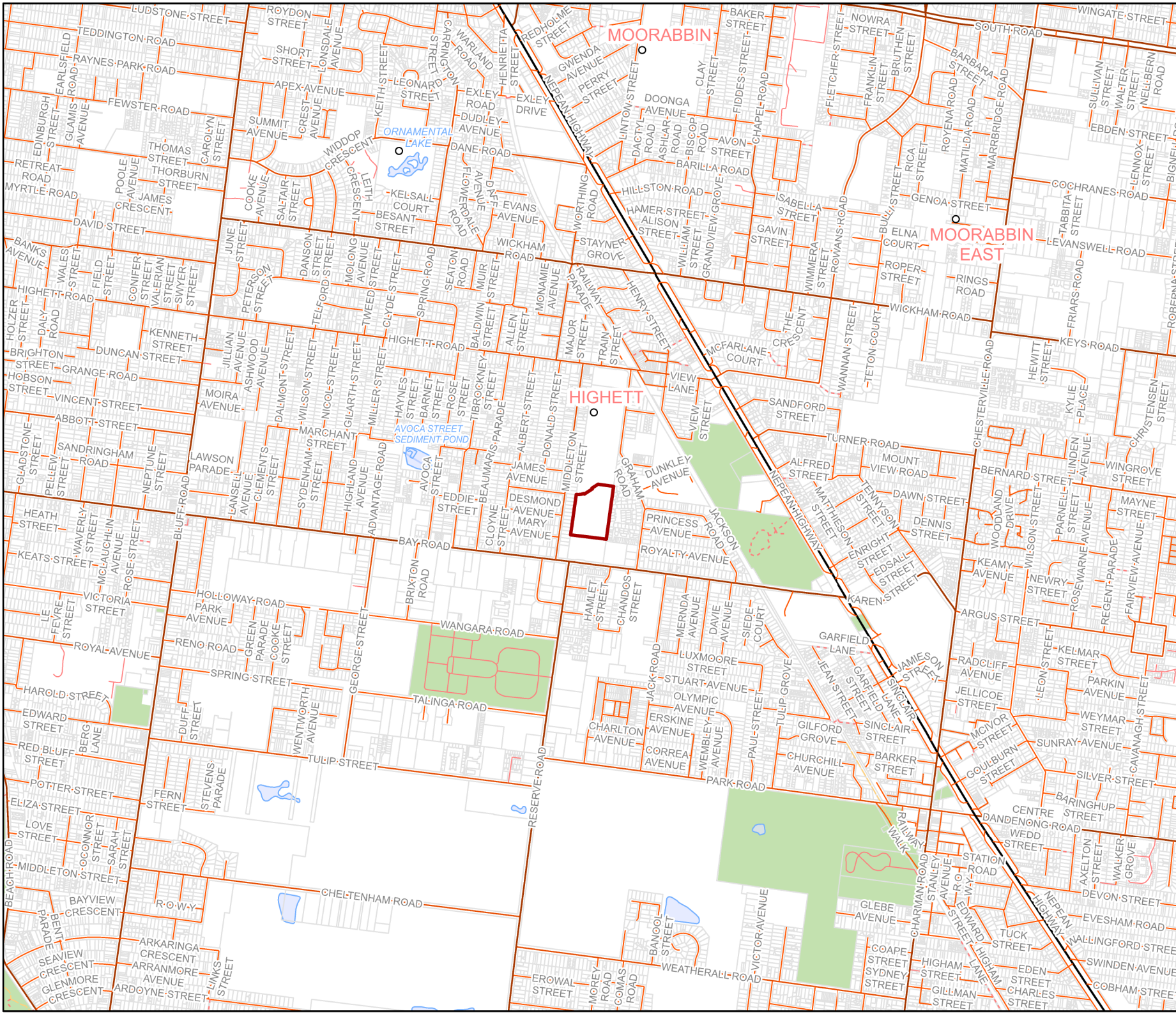
### 3.5 Site history

The majority of the site has been highly modified with little remaining of the former indigenous vegetation and with extensive alteration of soil profiles and surface drainage patterns, if not subsurface drainage patterns. Numerous buildings and infrastructure (rocks, carparks, drains, paths etc) remained when CSIRO abandoned the site in 2012. All buildings were subsequently demolished and removed, but substantial infrastructure remains (carparks, paving, kerbs, drainage etc) and will not be removed because of possible mobilisation of soil contaminants, notably asbestos; an extensive area of topsoil at the northern end of the Reserve was stripped and removed because of asbestos contamination.

Extensive gardens and landscaping were created as part of the CSIRO development and these featured native Australian plants which were in vogue at the time. The gardens were removed along with the buildings and much of the infrastructure. Many trees remain however and some of the species have naturalised, some extensively from these parent plants. There was a massive recruitment of exotic eucalypts, *Acacia* etc on areas bared (mineral earth) by topsoil removal, along with some indigenous species.

The vegetation of the site at the time of preparation of this masterplan, as well as development implications and management, are discussed in Section 5.1.





- Study Area
- Parks and Conservation Reserves
- Waterbody
- Watercourse

**Figure 1**  
**Location of Study Area**  
*Highett Plains Grassy Woodland*  
*37 Graham Road, Highett*



Date: 7/03/2024 Scale: 1:20,000 (A4)  
Created by: JP GDA 1994 MGA Zone 55  
Job: 23105  
File: 23105\_BaysideCityCouncil\_37GrahamRdHighett  
Note: Location of property boundaries, watercourse, roads and topography indicative only.

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## 4 Degradation of the biota and threatening processes

The flora and fauna of Hightett Plains Grassy Woodland is very highly degraded, and most threats are ongoing. Identified below are factors in this degradation, many of which are intertwined and many of which are not amenable to management. These factors illustrate why restoration of the vegetation, rather than revegetation per se, is unachievable.

### 4.1 Extinctions of biota

Most species from the reconstructed flora of the site (Section 7.2) have become extinct, and now only 31 plant species are extant (reckoned to be c. 20% of the former flora). Of these, many are reduced to dangerously small populations. A similar fate has doubtlessly befallen the non-vascular flora (mosses, lichens etc) as well as fungi. Massive extinctions have also occurred in the fauna (vertebrates and invertebrates).

### 4.2 Ecological dysfunction, fragmentation and isolation

Ecological dysfunction, contingent on the massive extinctions of the fungi, flora and fauna, now prevails on the site. Functions, which include among others nutrient cycling, the fire regime, pollination, seed dispersal and mycorrhizal relationships are assumed to be severely disrupted or no longer exist. Compounding this dysfunction are the severe fragmentation and isolation that now prevails, as well as severely compromised genetics of (probably) most species. We assume that very few species from the original flora and fauna would be capable of unassisted re-colonising of the site.

### 4.3 Exotic organisms

The list of exotic plant and animal species on the site is large and severely compromises the indigenous biota. Some 147 weed species and planted trees, shrubs and perennial herbs have been recorded in the last year or so (Table 4). Other exotics which pose a direct or indirect threat to indigenous species include invertebrates (e.g. Honey Bees, European Wasps and Portuguese Millipeds); gastropods (there are probably six slug and snail species on the site); fungi, including pathogens; rodents (rats and mice); cats and dogs (at least historically); foxes and birds (Indian Myna).

### 4.4 Indigenous animals

Some indigenous animals can be very damaging or detrimental to the survival of indigenous flora and fauna on the site. Ring-tail and brush-tail Possums are highly damaging to tree health, and damage is not confined to the canopy of trees. Noisy Miners are extremely aggressive toward other bird species, which probably explains why so few bird species seem to occupy the site. Rainbow Lorikeets are very aggressive and compete with other birds species for nesting hollows.

## 5 Flora and fauna values

### 5.1 Current vegetation

The vegetation of Hightett Plains Grassy Woodland was described in an article by Hart (1939) *The Yellow Box and the lost vegetation*. He recorded 29 plant species, of which some are extant, though many with small or very small populations. The vegetation has been documented by several workers in the last 20 years and the information they gathered indicates a progressive reduction in the number of indigenous plant species persisting there. Yugovic and Koehler (2004) discussed the grassy woodland, as Grassy Woodland (modified) and enumerated the indigenous flora (20 species recorded).

Crowfoot and Carr (2017) documented the remnant indigenous vegetation, the exotic flora, and the planted horticultural flora of the site, after CSIRO abandoned the property but before all buildings and associated gardens were removed. Ryder (2016) carried out an aboricultural assessment of indigenous trees. Since the removal of buildings and gardens, the site has changed greatly with massive soil disturbance and stripping of the asbestos-contaminated soil at the northern end.

A contemporary picture of the vegetation given below is based on field work in 2022 to January 2024.

A discontinuous canopy of eucalypts occurs over most of the site except the treeless south-east corner (Zone 2).

For this Masterplan we recognise three zones (Figure 3; Section 6.2) the vegetation of which varies in structure and floristic composition; all zones support some indigenous species, mostly in small or very small populations (often only one or two plants). Eucalypts provide the highest cover, but in the herbaceous understorey cover would not exceed an estimated 1%.

The most important remnant vegetation are the populations of the two eucalypts, *Eucalyptus camaldulensis* subsp. *camaldulensis* Red Gum and *Eucalyptus melliodora* Yellow Box. Some trees, particularly *E. melliodora*, are fine old specimens. Cameron Ryder (2016) carried out an arboricultural assessment of indigenous trees and has updated the earlier findings in the present report (Attachment 2). In all, 29 mature River Red-gum and Yellow Box trees are present. There has been considerable recruitment of indigenous eucalypts (particularly River Red-gum) following soil disturbance caused by removal of buildings, infrastructure and contaminated soil. This natural recruitment will go a long way towards restocking the former woodland canopy. Large populations of non-indigenous eucalypts have also developed by unassisted recruitment from mature planted trees, particularly *Corymbia citriodora* subsp. *citriodora* Lemon Scented-gum and *C. maculata* Spotted Gum. Some nine species of non-indigenous eucalypts have recruited from mature trees onsite, and one species *Eucalyptus gomphocephala* Tuart on private property (two trees) to the east of the eastern fence next to the soil-stripped area. Many of the mature exotic eucalypts are fine specimens, particularly Lemon-scented Gum and some have important landscape amenity and faunal habitat values. Criteria to guide their removal or retention are addressed in Section 7.2.4.

A continual attrition of the indigenous flora is evident from the data collected by botanists over the last two decades and some of the species that have persisted are in considerable jeopardy, with (most species) populations being small or very small. Table 2 lists all the 44 indigenous plant species recorded on the site. We have recorded 31 species from our 2022-2024 field surveys.



Stripping of the contaminated topsoil resulted in a remarkable reappearance from soil-stored seed banks of 10 species that were not previously evident, or additional plants to those few already known. The species that recovered from soil-stored seed banks included:

- *Acacia implexa* (Lightwood)
- *Acacia mearnsii* (Black Wattle)
- *Acacia melanoxylon* (Blackwood)
- *Acacia paradoxa* (Hedge Wattle)
- *Bossiaea prostrata* (Creeping Bossiaea)
- *Dichondra repens* (Kidney-weed)
- *Kennedia prostrata* (Running Postman)
- *Lepidosperma leave* (Clustered Sword-Sedge)
- *Olearia ramulosa* var. *ramulosa* (Twiggy Daisy-bush)
- *Schoenus apogon* (Common Bog-sedge)

Other species colonised the site from wind-blown seed (e.g. *Lachnagrostis filiformis* Common Blown-grass).

The exotic flora of Highett Plains Grassy Woodland predominates throughout the site and in the understorey (field layers) exotic species comprise an estimated 99% of vegetation cover. Survey work in 2022-2024 has produced a list of 147 exotic species as provided in Table 4, the life forms of the exotic species are given. Perennial and annual weed species far outnumber the indigenous life forms.

**Table 2: Indigenous plant species that have been recorded from Highett Plains Grassy Woodland**

Note: Table includes species that are now extinct on site.

S – Species with soil-stored seed banks

W – Wind dispersal species

Botanical name	Common name	Recorded 2022-2024	Seed dispersal	No. of plants
<i>Acacia implexa</i>	Lightwood	+	S	30+ plants
<i>Acacia mearnsii</i>	Black Wattle	+	S	50+ plants
<i>Acacia melanoxylon</i>	Blackwood	+	S	1 plant
<i>Acacia paradoxa</i>	Hedge Wattle	+	S	c. 30 plants
<i>Acaena echinata</i>	Sheep's Burr	+		
<i>Allocasuarina verticillata</i>	Drooping Sheoak			
<i>Anthosachne scabra</i>	Common Wheat-grass			1 plant
<i>Austrostipa bigeniculata</i>	Kneed Spear-grass	+		2 plants
<i>Bossiaea prostrata</i>	Creeping Bossiaea	+	S	1 plant
<i>Cassinia longifolia</i>	Shiny Cassinia			
<i>Cotula australis</i>	Common Cotula			
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula			
<i>Crassula sieberiana</i>	Sieber Crassula			
<i>Dichondra repens</i>	Kidney-weed	+	S	<10 plants
<i>Dysphania pumilio</i>	Clammy Goosefoot			
<i>Einadia nutans</i> subsp. <i>nutans</i>	Nodding Saltbush	+		<10 plants
<i>Epilobium billardioreanum</i> subsp. <i>billardioreanum</i>	Smooth Willow-herb	+		1 plant
<i>Epilobium billardioreanum</i> subsp. <i>cinereum</i>	Grey Willow-herb	+		50+ plants
<i>Epilobium hirtigerum</i>	Hairy Willow-herb			Several plants

Botanical name	Common name	Recorded 2022-2024	Seed dispersal	No. of plants
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	River Red-gum	+		Scores of recruits
<i>Eucalyptus melliodora</i>	Yellow Box	+		Scores of recruits
<i>Exocarpos cupressiformis</i>	Cherry Ballart	+		1 plant
<i>Hackelia suaveolens</i>	Sweet Hound's-tongue			
<i>Juncus bufonius</i>	Toad Rush	+		
<i>Juncus pallidus</i>	Pale Rush	+		<10 plants
<i>Kennedia prostrata</i>	Running Postman	+	S	~20 plants
<i>Lachnagrostis filiformis</i> s.s.	Common Blown-grass	+	W	50+ plants
<i>Laphangium luteoalbum</i>	Jersey Cudweed	+	W	Occasional plants
<i>Lepidosperma laeve</i>	Clustered Sword-sedge	+	S	40-50 plants
<i>Lomandra filiformis</i>	Wattle Mat-rush	+		
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	+		~50 plants
<i>Microtis</i> sp.	Onion Orchid			
<i>Muellerina eucalyptoides</i>	Creeping Mistletoe	+		~10 plants
<i>Olearia ramulosa</i> var. <i>ramulosa</i>	Twiggy Daisy-bush		W	1 plant
<i>Oxalis</i> sp. aff. <i>exilis</i> (glabrescent)	Small-flowered Wood-sorrel	+		
<i>Oxalis perennans</i>	Grassland Wood-sorrel	+		
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	+		1 plant
<i>Pterostylis</i> sp.	Greenhood			
<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass			
<i>Rytidosperma geniculatum</i>	Knead Wallaby-grass	+		~ 10 plants
<i>Rytidosperma racemosum</i>	Slender Wallaby-grass	+		100+ plants

Botanical name	Common name	Recorded 2022-2024	Seed dispersal	No. of plants
<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	+		
<i>Schoenus apogon</i>	Common Bog-sedge	+	S	<10 plants
<i>Senecio quadridentatus</i>	Cotton Fireweed	+		~5 plants
<i>Thelymitra</i> sp.	Sun Orchid			

## 5.2 Native vegetation assessment

Based on pre-European modelling and mapping of the Ecological Vegetation Classes by DEECA, indigenous vegetation would have consisted of Heathy Woodland and Sand Heathland Mosaic (EVC 892) over the majority of the site, with Grassy Woodland and Damp Sands Herb-rich Woodland mosaic (EVC 716) in the north-east corner.

However, based on the field assessment and floristics observed (particularly River Red-gum), the native vegetation in the study area is attributable to EVC 55 Plains Grassy Woodland, which has a Bioregional Conservation Status of 'endangered' (DEECA 2023) in the Gippsland Plain bioregion. The occurrence of Plains Grassy Woodland (EVC 55) is now very rare in the south-east of Melbourne. As Crowfoot and Carr (2017) identified it was originally thought to occur on broad flat ridges and tops of hills composed of Brighton Sandstone. Crawford and Carr (2018) also noted this community can also be found at Alma Park in St Kilda, Royal Botanic Gardens in South Yarra and along the Sandringham Railway line.

### 5.2.1 Vegetation quality assessment

Four patches (habitat zones 1-4) of Plains Grassy Woodland (EVC 55) and four scattered trees were mapped within the Reserve and results of the habitat hectare assessment are outlined in Table 3. The habitat zones range from 0.03 and 0.49 ha in size. They are characterised by a moderate cover of River Red-gum and/or Yellow Box in the canopy. Several trees were large and recruitment was observed in the vicinity of the mature trees. All patches had a scattered indigenous shrub layer consisting of species such as *Acacia mearnsii* Black Wattle, *Acacia implexa* Lightwood and *Acacia paradoxa* Hedge Wattle. The cover of indigenous species in the ground layer was sparse and included *Rytidosperma racemosa* Slender Wallaby-grass, *Einadia nutans* subsp. *nutans* Nodding Saltbush, *Lomandra filiformis* Wattle Mat-rush, *Lepidosperma laeve* Clustered Sword-Sedge and *Microlaena stipoides* var. *spitoides* Weeping Grass. It was noted that the cover of these native grasses and herbs had decreased significantly from previous assessments and now only occurred in small, isolated populations.

Habitat zone 3 was the largest patch and supported the highest diversity of species in the understorey. The cover of Black Wattle and Lightwood was dense in some areas where they were regenerating. The understorey tree *Exocarpos cupressiformis* Cherry Ballart was also present in this habitat zone. There were a large number of logs in this patch however these were not included in the score as they had been placed there and did not naturally occur. These will be removed as part of this management plan.

All habitat zones had a moderate to high cover of weeds in the ground layer, common species included *Cenchrus clandestinus* Kikuyu, *Cynodon dactylon* var. *dactylon* Couch, *Aizoon pubescens* var. *pubescens* Galenia, *Bromus catharticus* var. *catharticus* Prairie Grass, *Ehrharta longiflora* Annual Veldt-grass, *Ehrharta erecta* Panic Veldt-grass and *Vulpia* spp. Fescue. There were also a number of recruiting exotic eucalyptus particularly *Corymbia citriodora* subsp. *citriodora* Lemon-scented Gum and *Corymbia maculata* Spotted Gum.





**Image 2: Habitat zone 1 within Hihett Plains Grassy Woodland (Abzeco 16 February 2024)**



**Image 3: Habitat zone 2 within Hihett Plains Grassy Woodland (Abzeco 16 February 2024)**



**Image 4: Habitat zone 3 within Hihett Plains Grassy Woodland (Abzeco 16 February 2024)**



**Image 5: Habitat zone 4 within Highett Plains Grassy Woodland (Abzeco 16 February 2024)**

**Table 3: Habitat hectare assessment for Highett Plains Grassy Woodland**

GP – Gippsland Plain bioregion

PGW – Plains Grassy Woodland

E - Endangered

Habitat Zone			HZ1	HZ2	HZ3	HZ4
Bioregion			GP	GP	GP	GP
EVC Name			PGW	PGW	PGW	PGW
EVC Number			55	55	55	55
EVC Conservation Status			E	E	E	E
		Maximum score				
Site Condition	Large Old Trees	10	9	9	9	10
	Canopy Cover	5	4	4	4	5
	Understorey	25	5	5	15	5
	Lack of Weeds	15	4	7	4	4
	Recruitment	10	6	6	6	5
	Organic Matter	5	3	3	3	3
	Logs	5	0	0	0	0
	Standardising multiplier		1	1	1	1
	Subtotal =		31	34	41	32
Landscape Context	Patch size	10	1	1	1	1
	Neighbourhood	10	0	0	0	0
	Distance to core	5	1	1	1	1
Total condition score		100	33	36	43	34
Habitat Score (condition score out of 1)		/100	0.33	0.36	0.43	0.34
Total Area (ha)			0.08	0.08	0.49	0.03
Total habitat hectares			0.026	0.029	0.211	0.01





- Study Area
- Plains Grassy Woodland (EVC 55)
- Scattered Tree
- Contour (1m)

**Figure 2**  
**Assessed Native Vegetation**  
*Highett Plains Grassy Woodland*  
37 Graham Road, Highett



Date: 12/03/2024 Scale: 1:1,250 (A4)  
Created by: JP GDA 1994 MGA Zone 55  
Job: 23105  
File: 23105\_BaysideCityCouncil\_37GrahamRdHighett  
Note: Location of property boundaries, watercourse, roads and topography indicative only.

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### 5.3 Monitoring quadrats

The species composition and cover abundance of flora was recorded using the Domin-Krajina cover abundance scale for eight 10 x 10 m quadrats and the results are given in Appendix 1. Additional information was noted such as the cover of leaf litter, bare ground, gravel and any other observations such as erosion within the quadrat. Photos of each quadrat are also provided in Appendix 1. These will serve as permanent plots and photo-points to monitor the change in vegetation over time.

The results demonstrated that exotic vegetation overwhelmingly predominates in the understorey (field layer) and comprises an estimated 95% of vegetation cover. The most abundant herbaceous weed species in the understorey below the indigenous eucalypts, *Acacia implexa* Lightwood and *Acacia mearnsii* Black Wattle and the non-indigenous trees (mostly eucalypts) are listed below:

- *Aizoon pubescens* var. *pubescens* (Galenia)
- *Avena barbata* (Bearded Oat)
- *Bromus catharticus* var. *catharticus* (Prairie Grass)
- *Cenchrus clandestinus* (Kikuyu)
- *Cynodon dactylon* var. *dactylon* (Couch)
- *Dactylis glomerata* (Cocksfoot)
- *Ehrharta erecta* (Panic Veldt-grass)
- *Ehrharta longiflora* (Annual Veldt-grass)
- *Oxalis pes-caprae* (Soursob)
- *Paspalum dilatatum* (Paspalum)
- *Plantago lanceolata* (Ribwort)
- *Romulea rosea* var. *australis* (Common Onion-grass)
- *Setaria parviflora* (Slender Pigeon Grass)
- *Sonchus oleraceus* (Common Sow-thistle)
- *Tradescantia fluminensis* (Wandering Jew)
- *Vulpia* spp. (Fescue)



## 5.4 Fauna assessment

Records from the fauna assessment completed by naturalists John Eichler and Pauline Reynolds from surveys on 1 March 2024 are provided below. The majority of records below have had identifications confirmed to at least genus on inaturalist.

*Amegilla* sp. Blue-banded Bee  
*Amorbus rubiginosus* Tip-wilter Bug  
*Delias harpalyce* Imperial Jezebel  
Gum Leafhoppers (Tribe Eurymelini)  
*Platysus* sp.  
*Nyssus coloripes* Spotted Ground Swift Spider  
*Meritastis laganodes*  
*Paropsisterna cloelia* Eucalyptus variegated Beetle  
*Deliochus zelvira*  
*Hippodamia variegata* Variegated Lady Beetle  
*Papilio anactus* Dainty Swallowtail  
*Lasioglossum lanarium* Woolly Sweat Bee  
*Epidesmia merope* Common Brown  
*Opodiphthera eucalypti* Emperor Gum Moth  
Dotted Paropsine Leaf Beetle  
*Pseudomantis albofimbriata* False Garden Mantis  
Wingless Grasshopper, *Phaulacridium vittatum*  
Giant Green Slantface Grasshopper, *Acrida Conica*  
European Wasp, *vespula germanica*  
Cabbage White Butterfly, *Pieris rapae*  
Common Grass-blue Butterfly, *Zizinea Otis*  
Blowfly, *Calliphora augur* or *C. dubia*  
Black Field Cricket, *Teleogryllus commodus* (heard)  
Dragonfly (unidentified)

Only one reptile was recorded – *Christinus marmoratus* Southern Marbled Gecko.

	
<p>Imperial Jezebel on Yellow Box – photo by Pauline Reynolds</p>	<p>Emperor Gum Moth – photo by Pauline Reynolds</p>

Friends of Nature Wildlife put out Anabat detectors and wildlife cameras on the site for approximately two weeks in March 2024. Very few bats were recorded during this time – on average three were recorded per night. This included:

- *Chalinolobus gouldii* Gould's Wattled bat (most common)
- *Vespadelus vulturnus* Little Forest bat
- *Nyctophilus* sp. Long-eared bat
- *Astronomus australis* White-striped Freetail bat (possible record)

The wildlife cameras also recorded two *Vulpes vulpes* Red Fox within the Reserve.

Fauna surveys were previously undertaken by Crowfoot and Carr in May 2016. They recorded 14 vertebrate species, 10 of which were native (including nine common bird species and *Pseudocheirus peregrinus* Common Ringtail Possum). Introduced species observed consisted of Red Fox and European Rabbit *Oryctolagus cuniculus*. The results of this survey can be found in the report *Highett Plains Grassy Woodland, Graham Road, Highett: Flora and fauna values* (Crowfoot and Carr 2017).

## 6 Management issues and zones

### 6.1 Management issues

There are many management issues or factors to consider as part of this project. These are outlined below and addressed in Section 7:

- Weed management
- Revegetation
- Tree health
- Pest animals
- Dogs
- Mowing/slashing
- Management of existing conditions
- Rubbish
- Fencing
- Signage and education
- Placement of paths and seating
- Aspirational goals – use of non-renewable resources

### 6.2 Management zones

Three zones are recognised and mapped (Figure 3) for the Highett Plains Grassy Woodland site based on their current condition, vegetation and proposed revegetation treatments:

#### Zone 1 (1.95 ha)

Western side of this zone carries most of the remnant indigenous eucalypts – *Eucalyptus camaldulensis* subsp. *camaldulensis* River Red-gum and *Eucalyptus melliodora* Yellow Box. Many of the eucalypts especially Yellow Box are fine old specimens. The eastern side of the zone only has a small number of remnant indigenous eucalypt specimens. Former CSIRO infrastructure occurs in the east and west, including car park, kerbs, former garden beds etc, with mature planted eucalypts, notably *Corymbia citriodora* subsp. *citriodora* Lemon-scented Gum and *Corymbia maculata* Spotted Gum. This area will be fully revegetated by conventional planting of tubestock, divisions and direct seeding.



**Image 6: Western side of management zone 1, showing remnant indigenous eucalypts**



**Image 7: Eastern side of management zone 1 showing planted exotic eucalypts in former car park**

#### **Zone 2 (0.29 ha)**

Treeless (mostly) exotic grassland/dicot herbfields in the south-eastern corner of the site. This area is proposed for establishing grassland, particularly of *Themeda triandra* Kangaroo Grass. Direct seeding is most appropriate following thorough weed control.



**Image 8: Management zone 2 – exotic grassland is south-east corner of site**

#### **Zone 3 (0.79 ha)**

Approximately 100 mm of topsoil was scalped from this area because of contamination with asbestos. Massive recruitment of exotic and indigenous eucalypts and many other plants including indigenous species from the soil-stored seedbank, occurred on the newly bared mineral soil of the site. Much of the area has significantly eroded, but growth of vegetation and the deposition of litter by the eucalypts has arrested much erosion. The initial treatment



proposed is to fell the unwanted eucalypts, *Acacias* etc, and use them to cover any bare soil to stabilise the site. When this occurs revegetation can commence.



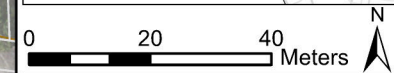
**Image 9: Management zone 3 in the north-east of the site**





- Study Area
- Management Zone 1
- Management Zone 2
- Management Zone 3
- Contour (1m)

**Figure 3**  
**Management Zones**  
*Highett Plains Grassy Woodland*  
*37 Graham Road, Highett*



Date: 7/03/2024  
Created by: JP  
Job: 23105  
File: 23105\_BaysideCityCouncil\_37GrahamRdHighett  
Scale: 1:1,250 (A4)  
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## 7 Management actions

### 7.1 Weed management

Weed invasion is and will remain the most important and sometimes technically difficult management issue into the distant future. At no point in time will the recreated vegetation of the site become self-sustaining or resilient enough to resist weed invasion. At any time in the future weeds will again dominate the vegetation and destroy most indigenous plants that have been established if it is not managed to a high level.

A total of 147 species of weeds has been listed from the site since 2022 (see Section 7.1) but additional weed species will inevitably appear. These will be detected via routine monitoring of the site. Of the 147 weed species listed in Table 4, some persist from former plantings and are very unlikely to recruit. The weed species recorded are amongst the worst, most invasive transforming species, to species of little consequence for the integrity of the indigenous vegetation. Some are of little ecological consequence, but they have negative visual impacts. The weed species listed in Table 4 include all exotic species on site and they are ranked according to priority of control, or hierarchy of seriousness of threat they pose, as for example in the state *Advisory List of Environmental Weeds* (White *et al.* 2018). All are undesirable and should ideally be eliminated, however some of the mature exotic eucalypts will be retained (Section 7.2.4).

The sources of the weed species on the site include the regional ambient exotic flora, species naturalised from on-site cultivated parents or just off-site parents (including nine eucalypts species – *Eucalyptus* and *Corymbia*); species dispersed into the site from off-site sources by birds, wind, contaminated vehicles, or propagules contaminating the clothes of people. Some of the weed species are rare in Victoria, and some have not been recorded anywhere else in the State, e.g. *Eucalyptus platypus* subsp. *congregata* Oval-leaved Moort from Western Australia; about 100 plants occur on site.

In Table 4 additional information is given relevant to management:

- Family
- Life form
- Whether the species is fire sensitive or not
- Seed bank (soil-stored, canopy-stored, or not relevant i.e. no seedbank)
- Control methods
- Priority of control (short-term)

In respect of weed suppression or control in relation to revegetation, no mulched (chipped) plant material must be used to cover the ground. Mulching is now widely discredited and anathema to revegetation because it prevents germination, smothers young plants and may impede infiltration of water (rainfall).

No revegetation should be attempted without thorough site preparation, that is weed elimination before planting/vegetation establishment is attempted. To achieve this, several seasons may need to elapse to effect control/elimination of the species involved. This is particularly relevant to weed species with subterranean perennating organs, that is bulbs, corms and rhizomes of the geophytes notably *Oxalis* spp. (bulbs), *Romulea rosea* var. *australis* Onion Grass (corms), *Salpichroa organifolia* Pampas Lily-of-the-Valley (fleshy rhizomes) and *Cynodon dactylon* var. *dactylon* Couch (slender rhizomes).

### 7.1.1 Weed management strategy

The elements of a weed management strategy for Highett Plains Grassy Woodland are outlined below.

#### **Existing conditions**

1. Document and map (as appropriate) the weed flora of the site – naturalised species – as well as unwanted exotic planted species. This was done in late 2023 – early 2024 (Table 4).

#### **Implement control of weeds**

1. Aim to eliminate (or effectively eliminate) priority 1 and 2 weeds over a 5-year period (see Section 7.1.2 below).
2. Tackle weeds/weed populations across the whole site rather than in zones or defined areas (to prevent reinfestation by dispersal of propagules from untreated areas).
3. As an interim measure, prevent seeding of weed species (particularly woody species) if plants cannot be killed immediately.
4. Remove all unwanted planted trees and their recruits (eucalypts) according to the criteria outlined in Section 7.2.4.
5. Utilise one or more of the seven control techniques for each weed species given in Table 4.
6. High-quality plant ID skills are mandatory, as well as expert supervision.

#### **Documentation and monitoring**

1. All management activities and treatments are to be adequately documented and monitored.
2. All additional weed species not previously recorded are to be noted and mapped (as appropriate).

### 7.1.2 Priority for control of weed species

The main priority is to prevent further seed crops from ripening and dispersal or prevent further vegetative recruitment (e.g. *Oxalis pes-caprae* Soursob, *Cenchrus clandestinus* Kikuyu).

#### **Priority 1**

Very seriously invasive species (mostly herbaceous) that have achieved, or will achieve high cover on the site, either by recruitment from seed or by vegetative reproduction (e.g. corms, bulbs, rhizomes, stolons). Also, species currently bearing seed crops or that will initiate seed crops in early 2024 (*Cassinia sifton*). These seed crops will be committed to long-term (decades) soil-stored seed banks if not removed e.g. *Cassinia sifton* Drooping Cassinia.

#### **Priority 2**

Species that are currently young, pre-flowering plants, or that are low-level invasive species. Some of these have recently been removed by Council staff.

#### **Priority 3**

Planted species that have not recruited, nor are likely to recruit.



Table 4: Exotic species (weeds) recorded for Highett Plains Grassy Woodland (2022-2024)

Lifeform

A	annual	Lss	large shrub suckering	Ss	subshrub
B	biennial	Pr	Perennial herb-rhizomatous or stoloniferous	T	tree
Gb	bulbous geophyte	Pt	Perennial herb-tufted or tussock forming	Ts	small tree
Gc	cormous geophyte	Px	succulent perennial herb	Tsu	woody vine
Gr	rhizomatus geophyte	Rc	root-stem climber	V	herbaceous vine
Gt	tuberous geophyte	Sx	succulent shrub	Vh	suckering tree
Ls	large shrub	S	small to medium shrub		

Noxious weeds/WONS

CaLP Act	Listed under the <i>Catchment and Land Protection Act 1994</i>
WONS	Weed of National Significance

Seed bank

SS	Soil stored – relatively long lived
CS	Canopy stored
ST	Short-term soil-stored
NR	Not relevant (no seedbank or vegetative propagation only)

Control method(s) – integrated weed management important. Application must be appropriate to the size of the population at Highett (often a few plants only)

1. Herbicide applied to foliage with spray; annuals must be sprayed well before seed ripening. Note: for grasses spray grass-specific herbicide.
2. Cut and paint herbicide to stumps or stems, or bark “frilled” and herbicide applied.
3. Drill into stem and inject herbicide.
4. Hand removal – most suitable for small infestations; avoid soil disturbance.
5. Cut at ground level – woody species unable to resprout from basal buds.
6. Ringbark
7. Solarisation – heat soil under clear plastic sheet to kill plants and soil-stored seed. This is only appropriate in the open south-east corner
8. Biological control agents

Scientific Name	Common Name	Family	Lifeform	Listed species	Fire sensitive	Seed bank	Control methods	Priority of control
<i>Acacia baileyana</i>	Cootamundra Wattle	Mimosaceae	Ts		Y	SS	5	2
<i>Acacia floribunda</i>	White Sallow-wattle	Mimosaceae	Ts		Y	SS	5	2
<i>Acacia howittii</i>	Sticky Wattle	Mimosaceae	Ts		Y	SS	5	2
<i>Acacia iteaphylla</i>	Flinders Range Wattle	Mimosaceae	Sl		Y	SS	5	2
<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle	Mimosaceae	Sl, Ts		Y	SS	5	2
<i>Acacia pravissima</i>	Ovens Wattle	Mimosaceae	Sl		Y	SS	5	2
<i>Acacia provincialis</i>	Wirilda	Mimosaceae	Ls, Tsu		Y	SS	5/2	2
<i>Acacia saligna</i>	Golden Wreath Wattle	Mimosaceae	Ts		Y	SS	5	2
<i>Acer negundo</i>	Box-elder Maple	Sapindaceae	T		?	NR	2	2
<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	Agapanthus	Amaryllidaceae	Pt		N	SS	4	1
<i>Agonis flexuosa</i>	Willow Myrtle	Myrtaceae	T		N	CS	2	3
<i>Agrostis capillaris</i>	Brown-top Bent	Poaceae	Pr		N	?	1	1

Scientific Name	Common Name	Family	Lifeform	Listed species	Fire sensitive	Seed bank	Control methods	Priority of control
<i>Aizoon pubescens</i> var. <i>pubescens</i>	Galenia	Aizoaceae	Pr		N	SS	4	1
<i>Allocasuarina torulosa</i>	Rose Sheoak	Casuarinaceae	Ts		Y	CS	5	3
<i>Aloe arborescens</i>	Tree Aloe	Aspodelaceae	Sx		N	NR	4	3
<i>Angophora costata</i> subsp. <i>costata</i>	Smooth-barked Apple	Myrtaceae	T		N	CS	2/6	-
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	Poaceae	Pt		N	SS	1, 4	1
<i>Araujia sericifera</i>	White Bladder-flower	Apocynaceae	V		Y	SS	4	1
<i>Avena barbata</i>	Bearded Oat	Poaceae	A		Y	SS	1, 4	1
<i>Brassica fruticulosa</i>	Twiggy Turnip	Brassicaceae	Pt		?	SS	1, 4	2
<i>Bromus catharticus</i> var. <i>catharticus</i>	Prairie Grass	Poaceae	Pt		N	SS	1, 4	1
<i>Bromus diandrus</i>	Great Brome	Poaceae	A		Y	SS	1, 4	1
<i>Callistemon</i> sp. / hybrid	Bottlebrush	Myrtaceae	Ls		N	CS	2	3
<i>Cassinia sifton</i>	Drooping Cassinia	Asteraceae	S		?	SS	4	1
<i>Casuarina glauca</i>	Swamp Oak	Casuarinaceae	Tsu		N	CS	2	3
<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>	River Oak	Casuarinaceae	T		N	CS	2	3
<i>Catapodium rigidum</i>	Fern Grass	Poaceae	A		Y	SS	1, 4	2
<i>Cenchrus clandestinus</i>	Kikuyu	Poaceae	Pr		N	?	1	1
<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	Caryophyllaceae	A		Y	?	1, 4	2
<i>Chamaecytisus palmensis</i>	Tree Lucerne	Fabaceae	Ls		Y	SS	4, 6	1
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	African Boneseed	Asteraceae	S	CaLP Act, WONS	Y	SS	4	1
<i>Cinnamomum camphora</i>	Camphor Laurel	Lauraceae	T		Y	NR	2, 4	3
<i>Cirsium vulgare</i>	Spear Thistle	Asteraceae	A/B	CaLP Act	N	?	4, 1	1
<i>Clytostoma callistegioides</i>	Argentine Trumpet Vine	Bignonaceae	V		?	NR	4	3
<i>Coleonema pulchellum</i>	Pink Diosma	Rutaceae	S		Y	SS	2, 4	3
<i>Coprosma repens</i>	Mirror Bush	Rubiaceae	Ls		N	?	2, 4	2
<i>Correa alba</i> var. <i>alba</i>	White Correa	Rutaceae	S		N	SS	4	3
<i>Cortaderia selloana</i> s.l.	Pampas Grass	Poaceae	Pt		N	?	1	1
<i>Corymbia calophylla</i>	Marri	Myrtaceae	T		N	CS	2, 4	3
<i>Corymbia citriodora</i> subsp. <i>citriodora</i>	Lemon-scented Gum	Myrtaceae	T		N	CS	2, 6	2
<i>Corymbia maculata</i>	Spotted Gum	Myrtaceae	T		N	CS	2, 6	2
<i>Cotoneaster pannosus</i>	Velvet Cotoneaster	Rosaceae	Ls		N	ST	2	1
<i>Cotoneaster glaucophyllus</i>	Large-leaf Cotoneaster	Rosaceae	Ls		N	ST	2	1
<i>Crinum moorei</i>	Crinum	Amaryllidaceae	Gb		N	NR	4	3
<i>Cynara cardunculus</i> subsp. <i>flavescens</i>	Artichoke Thistle	Asteraceae	Pt		N	ST	1	1
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	Poaceae	Pr		N	?ST	1	1
<i>Cyperus eragrostis</i>	Drain Flat-sedge	Cyperaceae	Pt		N	?ST	1, 4	1
<i>Dactylis glomerata</i>	Cocksfoot	Poaceae	Pt		N	ST	1, 4	1
<i>Dianella callicarpa</i>	Swamp Flax-lily	Aspodelaceae	Pt		N	SS	4	2
<i>Dianella</i> sp. aff <i>revoluta</i>	Black-anther Flax-lily	Aspodelaceae	Pr		N	SS	4	2
<i>Dietes grandiflora</i>	Wild Iris	Iridaceae	Pt		N	?ST	4	2
<i>Ehrharta erecta</i>	Panic Veldt-grass	Poaceae	Pt		Y	ST	1, 4	1

Scientific Name	Common Name	Family	Lifeform	Listed species	Fire sensitive	Seed bank	Control methods	Priority of control
<i>Ehrharta longiflora</i>	Annual Veldt-grass	Poaceae	A		Y	ST	1, 4	1
<i>Erigeron bonariense</i>	Flaxleaf Fleabane	Asteraceae	A		Y	SS	4	1
<i>Erigeron sumatrensis</i>	Tall Fleabane	Asteraceae	A		Y	SS	4	1
<i>Eriobotrya japonica</i>	Loquat	Rosaceae	Ts		?	NR	2, 6	3
<i>Eucalyptus botryoides</i>	Southern Mahogany	Myrtaceae	T		N	CS	2, 6	?
<i>Eucalyptus cladocalyx</i> s.l.	Sugar Gum	Myrtaceae	T		N	CS	2, 6	3
<i>Eucalyptus cornuta</i>	Yate	Myrtaceae	T		N	CS	2, 6	2
<i>Eucalyptus globulus</i> subsp. <i>bicostata</i>	Eurabbie	Myrtaceae	T		N	CS	2,6	2 (all recruits)
<i>Eucalyptus gomphocephala</i>	Tuart	Myrtaceae	T		N	CS	2, 6	2 (all recruits)
<i>Eucalyptus nicholii</i>	New England Peppermint	Myrtaceae	T		N	CS	2, 6	3
<i>Eucalyptus occidentalis</i>	Swamp Yate	Myrtaceae	T		N	CS	2, 3, 6	2 (all recruits)
<i>Eucalyptus platypus</i> subsp. <i>congregata</i>	Moort	Myrtaceae	T		Y	CS	5	2
<i>Eucalyptus tricarpa</i> subsp. <i>tricarpa</i>	Red Ironbark	Myrtaceae	T		N	CS	2, 6	2
<i>Euphorbia peplus</i>	Petty Spurge	Euphorbiaceae	A		Y	SS	1, 4	1
<i>Fascicularia bicolor</i>	Fascicularia	Bromeliaceae	Pt		N	NR	4	3
<i>Festuca arundinacea</i>	Tall Fescue	Poaceae	Pt		N	?ST	1, 4	1
<i>Fraxinus angustifolia</i> subsp. <i>angustifolia</i>	Desert Ash	Oleaceae	T		N	?ST	2, 3	1
<i>Fumaria muralis</i> subsp. <i>muralis</i>	Wall Fumitory	Papaveraceae	A		Y	?SS	1, 4	1
<i>Galium aparine</i>	Cleavers	Rubiaceae	A		Y	ST	1, 4	1
<i>Gastrolobium celsianum</i>	Swan River Pea	Fabaceae	S		N	SS	2, 4	2
<i>Genista linifolia</i>	Flax-leaf Broom	Fabaceae	S	CaLP Act, WONS	?	SS	2, 4	1
<i>Grevillea robusta</i>	Silky Oak	Proteaceae	T		N	ST	4, 6	3
<i>Hardenbergia violacea</i> (from planted material)	Purple Coral-pea	Fabaceae	V		N	SS	4	2
<i>Hedera hibernica</i>	Atlantica Ivy	Araliaceae	Rc		Y	?ST	1, 4	1
<i>Helminthotheca echinoides</i>	Ox-tongue	Asteraceae	Pt		N	?ST	1, 4	1
<i>Holcus lanatus</i>	Yorkshire Fog	Poaceae	Pt		N	?SS	1, 4	1
<i>Hordeum leporinum</i>	Barley-grass	Poaceae	A		Y	SS	1, 4	1
<i>Hypochaeris radicata</i>	Flatweed	Asteraceae	Pt		Y	?ST	1, 4	1
<i>Jasminum polyanthum</i>	Winter Jasmine	Oleaceae	V		?	NR	4	3
<i>Lactuca serriola</i> f. <i>serriola</i>	Prickly Lettuce	Asteraceae	A		Y	?ST	1, 4	1
<i>Lavandula dentata</i> var. <i>candicans</i>	Toothed Lavender	Lamiaceae	S		Y	?SS	4	2
<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	A, B		Y	ST	1, 4	1
<i>Leptospermum laevigatum</i>	Coast Tea-tree	Myrtaceae	Ls		Y	CS	5, 4	1
<i>Ligustrum ovalifolium</i>	Hedge Privet	Oleaceae	Ts		Y	?ST	2	1
<i>Ligustrum vulgare</i>	European Privet	Oleaceae	Ls		Y	?ST	2	1
<i>Liquidambar styraciflua</i>	Liquidamber	Hamamelid	T		?	NR	1	3
<i>Lolium perenne</i>	Perennial Rye-grass	Poaceae	Pt		N	?ST	1, 4	1
<i>Lotus angustissimus</i>	Slender Bird's-foot Trefoil	Fabaceae	A		Y	SS	1, 4	1
<i>Lotus uliginosus</i>	Greater Bird's-foot Trefoil	Fabaceae	Pt		N	SS	1, 4	1
<i>Lysimachia arvensis</i> (Red-flowered variant)	Scarlet Pimpernel	Primulaceae	A		Y	SS	1, 4	1

Scientific Name	Common Name	Family	Lifeform	Listed species	Fire sensitive	Seed bank	Control methods	Priority of control
<i>Malva nicaeensis</i>	Mallow of Nice	Malvaceae	A/B		Y	SS	1, 4	1
<i>Medicago polymorpha</i>	Burr Medic	Fabaceae	A		Y	SS	1, 4	1
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle	Myrtaceae	Ls/Ts		Y	CS	5, 4	2
<i>Melaleuca styphelioides</i>	Prickly Paperbark	Myrtaceae	T		N	CS	2	3
<i>Melilotus indicus</i>	Sweet Melilot	Fabaceae	A		Y	SS	1, 4	1
<i>Modiola caroliniana</i>	Red-flower Mallow	Malvaceae	Pr		N	SS	1	1
<i>Nassella trichotoma</i>	Serrated Tussock	Poaceae	Pt	CaLP Act, WONS	N	SS	4	1
<i>Nerium oleander</i>	Oleander	Apocynaceae	Ls		N	NR	2	3
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	Oleaceae	T		N	?ST	2, 4	2
<i>Olea europaea</i> subsp. <i>europaea</i>	Common Olive	Oleaceae	T		N	?ST	2, 4	2
<i>Oxalis pes-caprae</i>	Soursob	Oxalidaceae	Gb	CaLP Act	N	NR	1	1
<i>Oxalis purpurea</i>	Large-flower Wood-sorrel	Oxalidaceae	Gb		N	NR	1	1
<i>Oxalis</i> sp.	Wood Sorrel	Oxalidaceae	Gb		N	NR	1, 4	1
<i>Pandorea jasminoides</i>	Wonga Vine	Bignoniaceae	V		?	NR	4	3
<i>Paraserianthes lophantha</i>	Cape Wattle	Fabaceae	Ls		Y	SS	5, 4	1
<i>Paspalum dilatatum</i>	Paspalum	Poaceae	Pt		N	?ST	1	1
<i>Paspalum distichum</i>	Water Couch	Poaceae	Pr		N	?ST	1	1
<i>Phalaris aquatica</i>	Toowoomba Canary-grass	Poaceae	Pt		N	?ST	1	1
<i>Phytolacca octandra</i>	Red-ink Weed	Phytolacceae	Ss		Y	SS	1, 4	1
<i>Pittosporum undulatum</i>	Sweet Pittosporum	Pittosporaceae	T		Y	ST	2, 3	1
<i>Plantago coronopus</i> subsp. <i>coronopus</i>	Buck's-horn Plantain	Plantaginaceae	Pt		N	?ST	1, 4	1
<i>Plantago lanceolata</i>	Ribwort	Plantaginaceae	Pt		Y	?ST	1, 4	1
<i>Plumbago auriculata</i>	Cape Leadwort	Plumbaginaceae	Ls		?	NR	4	3
<i>Prunus cerasifera</i>	Cherry Plum	Rosaceae	Ts		N	ST	2, 3	2
<i>Prunus</i> sp.	Garden Plum	Rosaceae	Ts		N	ST	2, 3	2
<i>Punica granatum</i>	Pomegranate	Lythraceae	Ls		?	?ST	4	2
<i>Roldana petasitis</i>	Velvet Groundsel	Asteraceae	Ss		?	NR	2	3
<i>Romulea rosea</i> var. <i>australis</i> s.s.	Common Onion-grass	Iridaceae	Gc		N	?ST	1, 7	1
<i>Rosa canina</i>	Dog Rose	Rosaceae	Ls		N	ST	2	1
<i>Rubus anglocandicans</i>	Common Blackberry	Rosaceae	Ls		N	ST	1, 2	1
<i>Rumex pulcher</i> subsp. <i>pulcher</i>	Fiddle Dock	Polygonaceae	B, Pt		N	SS	1, 4	1
<i>Salpichroa origanifolia</i>	Pampas Lily-of-the-Valley	Solanaceae	Pr	CaLP Act	N	?	1	1
<i>Senecio pterophorus</i>	African Daisy	Asteraceae	Ss	CaLP Act	Y	?SS	4	1
<i>Setaria parviflora</i>	Slender Pigeon Grass	Poaceae	Pr		N	ST	1	1
<i>Solanum nigrum</i>	Black Nightshade	Solanaceae	A		Y	SS	1, 4	1
<i>Sonchus oleraceus</i>	Common Sow-thistle	Asteraceae	A		Y	?ST	1, 4	1
<i>Sporobolus africanus</i>	Rat's-tail Grass	Poaceae	Pt		N	?SS	1, 4	1
<i>Stellaria pallida</i>	Lesser Chickweed	Caryophyllaceae	A		Y	SS	1	1
<i>Symphotrichum subulatum</i>	Aster-weed	Asteraceae	A, Pt		Y	?ST	1, 4	1
<i>Syzygium paniculatum</i>	Magenta Cherry	Myrtaceae	T		?	ST	2, 3, 6	3

Scientific Name	Common Name	Family	Lifeform	Listed species	Fire sensitive	Seed bank	Control methods	Priority of control
<i>Taraxacum</i> sp.	Dandelion	Asteraceae	Pt		N	?ST	1	1
<i>Tradescantia fluminensis</i>	Wandering Jew	Commelinaceae	Px		N	NR	1, 8	1
<i>Tribolium acutiflorum</i> s.s.	Crested Desmazeria	Poaceae	Pt		N	?ST	1	1
<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover	Fabaceae	A		Y	SS	1	1
<i>Trifolium dubium</i>	Suckling Clover	Fabaceae	A		Y	SS	1	1
<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae	A		Y	SS	1	1
<i>Trifolium repens</i> var. <i>repens</i>	White Clover	Fabaceae	Pr		N	SS	1	1
<i>Ulex europaeus</i>	Gorse	Fabaceae	S	CaLP Act, WONS	N	SS	1, 2, 4	1
<i>Viburnum tinus</i>	Laurestinus	Viburnaceae	Ls		N	ST	2	3
<i>Viola odorata</i>	Common Violet	Violaceae	Pr		N	?SS	1, 4	1
<i>Vulpia bromoides</i>	Squirrel-tail Fescue	Poaceae	A		Y	?ST	1	2
<i>Vulpia myuros</i> f. <i>myuros</i>	Rat's-tail Fescue	Poaceae	A		Y	ST	1	2
<i>Yucca</i> sp.	Yucca	Asparagaceae	S		N	NR	4	3

## 7.2 Reconstructing the floristic composition of the pre-European Plains Grassy Woodland

Reconstructing the pre-European flora of Highett Plains Grassy Woodland is an essential prerequisite for implementing revegetation of the site. The reconstruction provides a floristic, and by implication, structural model that is central to the aims of revegetation. Previous studies have recorded the indigenous species that have persisted on the site (Table 2). In total 44 indigenous species have been recorded and only 31 indigenous species were recorded in 2022-24; many of these have small or very small populations.

### 7.2.1 Reconstruction methods

The strategy to reconstruct the flora relies on identifying plant species that are ecologically plausible candidates for the Plains Grassy Woodland vegetation (dominated by *Eucalyptus melliodora* Yellow Box and *Eucalyptus camaldulensis* subsp. *camaldulensis* River Red-gum) on similar soils based on our familiarity with the biology and ecology gleaned over many years of field studies, as well as likely associations of plant species (i.e. which species are often/usually found together).

The comprehensive *Flora of Melbourne* (Bull 2014) was used as a prompt list to evaluate the potential occurrence species by species. *A priori* this was expected to yield a list of c. 150 species; it yielded a list of 156 species but this excludes most orchid species. The site probably supported 15-20 orchid species, most of which are doubtfully amenable to revegetation. Additional support was provided for some species if their distribution given in the online Flora of Victoria included the suburbs near Highett on similar terrain. Supporting information was also provided by annotation in *Flora of Melbourne* of species occurring in Ecological Vegetation Class 55 Plains Grassy Woodland (Bull and Sinclair 2014).

We have high confidence that the reconstructed flora (Table 5) is a valid list for the Highett site. Some species were excluded in the absence of confirmatory data on distribution e.g. *Erodium cicutarium* Blue Heron's-bill.

The list of species generated (Table 5) has been broken down into life forms as the most appropriate way of categorising the flora. This life-form designation implacably categorises the structural role the species will play in the revegetation. Lifeform categories are as follows:

1. Trees (10 species)
2. Large shrubs (6 species)
3. Small-medium shrubs (11 species)
4. Subshrubs (3 species)
5. Woody climbers (4 species)
6. Herbaceous climbers/scramblers (3 species)
7. Rhizomatous or stoloniferous perennial herbs (22 species)
8. Tufted/tussock forming perennial herbs (22 species)
9. Annuals (16 species)
10. Summer-dormant tuberous or perennial herbs (dicots, orchids and lilies) (19 species)
11. Grasses and graminoids (35 species)
12. Mistletoes and aerial parasites (4 species)



## 7.2.2 Plains Grassy Woodland vegetation structure and composition

A total of 156 plant species have been identified for the reconstructed pre-European flora of Highett Plains Grassy Woodland (Table 5) and 31 indigenous species currently persist on the site (Table 2). For the site we envisage an open woodland dominated by *Eucalyptus camaldulensis* subsp. *camaldulensis* River Red-gum and *Eucalyptus melliodora* Yellow Box with a scattered understorey of small trees, low shrubs and a moderately dense grassy field layer. Some of the planted exotic eucalypts and their progeny (naturally recruited) will be retained according to the criteria given in Section 7.2.4. We believe that small trees and large shrubs should not be too densely planted or recruited in order to retain good views across the site – not obscured by walls of foliage for aesthetic/visual reasons, and because excessive density of mid-storey plants will cast too much shade in the field layer which will inhibit the small shrubs and herbaceous plants, as well as use excessive moisture, also inhibiting these plants. In revegetation exercises we often observe that plants are planted too densely, thus careful attention needs to be paid to planting densities here.

Scattered small trees will include the species that persist on the site: *Acacia implexa* Lightwood (suckering), *Acacia mearnsii* Late Black Wattle and *Exocarpos cupressiformis* Cherry Ballart. Of the latter only one persists and it is an excellent specimen, regrettably *Exocarpos* (as a root parasite) is difficult to propagate. *Acacia melanoxylon* Blackwood is less clear-cut as an indigenous species, and the several that exist on the site have likely been planted. *Allocasuarina verticillata* Drooping Sheoak (also suckering) is proposed as a scattered small tree as are *Banksia marginata* Silver Banksia (tree form) and *Bursaria spinosa* subsp. *spinosa* Sweet Bursaria. A few Sweet Bursaria have been planted in the south-west corner of the site; they should not be retained because the provenance is unknown and they are poor specimens.

Large shrubs likely did not have high cover on the site and the cover of this lifeform should remain low (approximately 5% cover). Six species are proposed, of which *Acacia pycnantha* Golden Wattle and *Ozothamnus ferrugineus* Tree Everlasting are present on site. *Leptospermum continentale* Prickly Tea-tree should be restricted to the seasonally moist (currently treeless) south-east corner of the site (Zone 2).

A suite of 10 small shrub and three subshrub species is proposed, and most of these could have had substantial populations. A total of six woody and herbaceous climbers/scramblers is nominated and they should only have a scattered presence.

Perennial dicot herbs, both rhizomatous and stoloniferous, as well as tufted/caespitose (tussock-forming) number some 48 species. All should have scattered and relatively low cover; most will occupy inter-tussock spaces in the predominantly grassy herbaceous field layer.

Annuals, of which 17 species are identified, are all small or very small plants (except *Euchiton sphaericus* Annual Cudweed and *Disphania pumilio* Clammy Goosefoot) and will have low or very low cover even though individual plants can be very numerous.

A suite of 19 geophyte plants mostly with summer deciduous foliage and summer-dormant corms or tubers includes nine lilies, eight orchids and two sundews. Most of these would have had very low overall cover in the vegetation except *Arthropodium strictum* Chocolate Lily which can have high cover. Orchids are perhaps difficult in that they are highly vulnerable to the predations of slugs and snails, Portuguese Millipeds and slaters (wood-louse). To this extent their use should be experimental; all species except *Thelymitra pauciflora* Slender Sun-orchid and *Thelymitra peniculata* Trim Sun-orchid are colony forming to enhance the prospect of them persisting.

Grasses and graminoids will be dominants of the potentially dense field layer, especially tussock forming or shortly rhizomatous grasses, of which 19 species have been identified. Highest cover of grasses will likely be *Rytidosperma* spp. Wallaby-grasses (particularly *Rytidosperma geniculatum* Knead Wallaby-grass and *Rytidosperma racemosum* Slender Wallaby-grass), *Microlaena stipoides* var. *stipoides* Weeping Grass and *Themeda triandra* Kangaroo Grass and perhaps *Austrostipa* spp. Spear-grasses.

A few species of sedges have been identified (six species), of which only the extensively rhizomatous *Lepidosperma leave* Clustered Sword-sedge will provide potentially high cover. A spectacular recovery of this species occurred from soil-stored seed after stripping topsoil in Zone 3, where plants continue to thrive; outside of this area only one plant is known. *Xanthorrhoea minor* subsp. *lutea* Small Grass-tree will be the most prominent and robust graminoid in the understorey.

One mistletoe species occurs at Highett: *Muellerina eucalyptoides* Creeping Mistletoe (host *Eucalyptus camaldulensis* subsp. *camaldulensis*). Two additional mistletoes occur in the region: *Amyema pendula* subsp. *pendula* (host *Acacia mearnsii*) and *Amyema miquelii* Box Mistletoe (host *Eucalyptus melliodora*) and they can be sown as seeds on branches of their respective hosts. There is a low risk that introducing mistletoe will prove problematic and may require management because of excessive numbers. Mistletoes have very high habitat values for birds (nectar, fruits and nest sites) and are the food plants of *Delias harpalyce* Imperial Jezebel butterfly (recorded at Highett).

### **Revegetation procedures**

Techniques appropriate for revegetation include:

- Planting tubestock.
- Planting direct divisions (e.g. grasses).
- Direct seeding (particularly grasses).
- Scalping topsoil to stimulate germination of soil-stored seed-banks (not considered appropriate considering the massive soil disturbance already experienced at the site).
- Burning to stimulate germination of soil stored seed-banks (perhaps of doubtful application for logistic and safety considerations).

Revegetation is a long-term project and will require ongoing intervention after the site is effectively vegetated; how much intervention is required will depend on many factors but particularly the extent to which plant populations are able to recruit unassisted. If weed control is effective there may be little or no impediment for many plant species to recruit. On the basis of this premise, the approach to revegetation advocated here is to plant herbaceous species (at least) at stocking rates substantially below what would be a natural density or population size in anticipation that many will self-recruit and fill in the gaps. Failure of recruitment could be due to many factors alone or in combination, for example: failure of pollination; genetic problems such as inbreeding depression; failure of seed dispersal; predation of seed or seedlings by indigenous or exotic invertebrates; disease etc. Thus, the extent to which we plant stock remains an open question pending the degree to which unassisted recruitment occurs. It is certain that many grasses (e.g. *Rytidosperma* spp. Wallaby-grasses) will naturally recruit.

For the purposes of the revegetation we advocate treating the whole site as one, and not compartmentalised into repeating vegetation templates indicating plant species appropriate,



numbers of plants and plant density in a given area. Note however that Zone 2 (currently treeless in south-east corner) is proposed as an area for establishing a grassland dominated by *Themeda triandra* Kangaroo Grass among others. Zone 3, the area stripped of topsoil, may be treated differently to Zone 1 and 2 but this cannot be fully evaluated until the area is cleared of woody weeds, mostly eucalypts.

Tasks prior to revegetation, and the order of revegetation according to lifeform are outlined below. Note that a 2-year lead time is essential to achieve high-quality weed control before revegetation commences.

### **Actions**

- Remove woody weeds including unwanted exotic eucalypts and their recruits.
- Determine if any of the natural recruitment of the indigenous eucalypts River Red-gum and Yellow Box need to be thinned, i.e. if they are overstocked in some places
- Identify and remove any naturally recruited hybrid eucalypts *Eucalyptus camaldulensis* River Red-gum x *Eucalyptus botryoides* Southern Mahogany. This hybrid was recorded by Crowfoot and Carr (2017) and some of the young eucalypt recruits are clearly this entity.
- Produce the tubestock and plant the woody species across the site where they are to be placed – these are additional River Red-gums and Yellow Gums, large shrubs and woody vines.
- Continue revegetation with the small shrubs, dicot herbs, graminoids and grasses.
- Document and monitor all actions and outcomes to a high standard.

For the above tasks and all revegetation actions, the design and implementation will be carried out by the persons familiar with the flora, the ultimate sizes of plants and their general biology and ecology. Judgements and decisions need to be made on the ground, not by reference to landscape architects plans.

### Table 5: Reconstructed flora of Highett Plains Grassy Woodland and life forms represented

Species in bold have been recorded from the site (see Table 2).

Plant names follow the online *Flora of Victoria* (<https://vicflora.rbg.vic.gov.au>)

#### Lifeforms

1. Trees (10 species)
2. Large shrubs (6 species)
3. Small-medium shrubs (11 species)
4. Subshrubs (3 species)
5. Woody climbers (4 species)
6. Herbaceous climbers/scramblers (3 species)
7. Rhizomatous or stoloniferous perennial herbs (22 species)
8. Tufted/tussock forming perennial herbs (22 species)
9. Annuals (16 species)
10. Summer-dormant tuberous or perennial herbs (dicots, orchids and lilies) (19 species)
11. Grasses and graminoids (35 species)
12. Mistletoes and aerial parasites (4 species)

Species in bold have been recorded from the site in 2022 -24 surveys.

#### Key to fields

1. Structural role in vegetation  
A – High cover – locally dominant or co-dominant in retrospective stratum of community  
B – Moderate cover and frequency  
C – Low or very low cover; sparse/scattered plants, mostly small populations
2. Longevity of plants (years) – estimated or based on direct observation.
3. Seed banks  
A – Soil stored, long-lived  
B – Canopy stored (e.g. *Eucalyptus*)  
C – Seed banks – relatively short-term soil-stored

D – Temporary bird-dispersed seed crops

4. Response to fire (planned or unplanned burn)

A – Fire sensitive – killed by fire

B – Post-fire resprouter

5. Potential sources of plant material

A – Indigenous nurseries

B – Dedicated collection from in situ populations

C – Other

6. Propagation

A – Seeds

B – Cuttings

C – Division

D – Seeds of semi-parasites (mistletoes) sown directly onto appropriate plant stems

Scientific name	Common name	1	2	3	4	5	6
<b>Trees</b>							
<i>Acacia implexa</i>	Lightwood	B	50+	A	B		A
<i>Acacia mearnsii</i>	Black Wattle	B	30	A	A		A
<i>Acacia melanoxylon</i>	Blackwood	C	50+	A	B		A
<i>Allocasuarina littoralis</i>	Black Sheoak	C	50	B	A		A
<i>Allocasuarina verticillata</i>	Drooping Sheoak	C	100+	B	B		A
<i>Banksia marginata</i> (tree form)	Silver Banksia	C	100+	C	B		A, B
<i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i>	River Red-gum	A	200+	B	B		A
<i>Eucalyptus melliodora</i>	Yellow Box	A	200+	B	B		A
<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	Coast Manna-gum	B	200	B	B		A
<i>Exocarpos cupressiformis</i>	Cherry Ballart	C	80+	A	B		?
<b>Large shrub</b>							

Scientific name	Common name	1	2	3	4	5	6
<i>Acacia pycnantha</i>	Golden Wattle	C	25	A	A		A
<i>Cassinia aculeata</i> subsp. <i>aculeata</i>	Common Cassinia	C	25	A	A		A
<i>Cassinia longifolia</i>	Shiny Cassinia	C	25	A	A		A
<i>Daviesia latifolia</i>	Hop Bitter-pea	C	50	A	B		A, B
<i>Leptospermum continentale</i>	Prickly Tea-tree	C	50+	B	B		A
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	C	25	A	A		A
<b>Small – medium shrub</b>							
<i>Acrotriche serrulata</i>	Honey-pots	C	50+	?	B		A
<i>Daviesia leptophylla</i>	Narrow-leaf Bitter-pea	C	40	A	B		A, B
<i>Dillwynia cinerascens</i> s.l.	Grey Parrot-pea	C	50+	A	B		A, B
<i>Hibbertia riparia</i>	Erect Guinea-flower	C	50+	A	B		A, B
<i>Hibbertia sericea</i>	Silky Guinea-flower	C	50+	A	B		A, B
<i>Indigofera australis</i> subsp. <i>australis</i>	Austral Indigo	C	30	A	B		A
<i>Leucopogon virgatus</i> var. <i>virgatus</i>	Common Beard-heath	C	50+	?	B		A
<i>Olearia ramulosa</i>	Twiggy Daisy-bush	C	25	A	A		A, B
<i>Pimelea humilis</i>	Common Rice-flower	C	50	?	B		A
<i>Platylobium obtusangulum</i>	Common Flat-pea	B	50	A	B		A
<i>Styphelia humifusa</i> (prostrate form)	Cranberry Heath	B	30	A	B		A
<b>Subshrubs</b>							
<i>Bossiaea prostrata</i>	Creeping Bossiaea	B	30	A	B		A
<i>Einadia nutans</i> subsp. <i>nutans</i>	Nodding Saltbush	B	25	?	?		A, B
<i>Pimelea curviflora</i> var. <i>sericea</i>	Curved Rice-flower	C	30	?	B		A
<b>Woody climbers</b>							
<i>Billardiera mutabilis</i>	Common Apple-berry	C	30	A	B		A
<i>Clematis microphylla</i>	Small-leaved Clematis	C	40	?	B		A

Scientific name	Common name	1	2	3	4	5	6
<i>Comesperma volubile</i>	Love Creeper	C	25	?	B		A, B
<i>Hardenbergia violacea</i>	Purple Coral-pea	C	30	A	B		A
<b>Herbaceous climbers/scramblers</b>							
<i>Glycine clandestina</i> var. <i>clandestina</i>	Twining Glycine	C	20	A	A		A
<i>Glycine tabacina</i>	Variable Glycine	C	20	A	?		A
<i>Kennedia prostrata</i>	Running Postman	B	15	A	A		A
<b>Rhizomatous or stoloniferous perennial herbs</b>							
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	C	10	?C	B		A
<i>Asperula conferta</i>	Common Woodruff	C	20+	?C	B		A, C
<i>Chrysocephalum apiculatum</i> subsp. <i>apiculatum</i>	Common Everlasting	C	25+	?C	B		A, B, C
<i>Comesperma polygaloides</i>	Small Milkwort	C	25+	?C	B		A, C
<i>Convolvulus angustissimus</i> subsp. <i>angustissimus</i>	Blushing Bindweed	C	15+	?A	B		A
<i>Coronidium scorpioides</i> s.s.	Button Everlasting	C	15+	?C	B		A, C
<i>Dichondra repens</i>	Kidney-weed	A-B	30+	A	B		A, C
<i>Euchiton japonicus</i> s.l.	Clustered/Creeping Cudweed	C	15+	A	B		A, C
<i>Galium gaudichaudii</i> subsp. <i>gaudichaudii</i>	Rough Bedstraw	C	15+	?A	B		A
<i>Glycine latrobeana</i>	Clover Glycine	C	15+	A	B		A
<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia	C	30+	?A	B		A, C
<i>Hackelia suaveolens</i>	Sweet Hound's-tongue	C	20+	A	B		A, C
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	B	30+	?A	B		A, C
<i>Oxalis perennans</i>	Grassland Wood-sorrel	B	20+	?A	B		A
<i>Pelargonium australe</i>	Austral Stork's-bill	C	10	A	A		A
<i>Plantago varia</i>	Variable Plantain	C	30+	?A	B		A, C
<i>Stackhousia subterranea</i>	Plains Stackhousia	C	30+	?A	B		A, C
<i>Veronica gracilis</i>	Slender Speedwell	C	25+	?A	B		A, C

Scientific name	Common name	1	2	3	4	5	6
<i>Veronica plebeia</i>	Trailing Speedwell	C	20	?A	?B		A
<i>Wahlenbergia capillaris</i>	Tufted Bluebell	C	25+	?A	B		A, C
<i>Wahlenbergia multicaulis</i>	Branching Bluebell	C	25+	?A	B		A, C
<i>Wahlenbergia stricta</i> subsp. <i>stricta</i>	Tall Bluebell	C	25+	?A	B		A, C
<b>Tufted (caespitose perennial herbs)</b>							
<i>Acaena agnipila</i>	Hairy Sheep's Burr	C	15	?C	B		A
<i>Acaena echinata</i>	Sheep's Burr	C	15	?C	B		A
<i>Ajuga australis</i>	Austral Bugle	C	10	?C	B		A, C
<i>Brunonia australis</i>	Blue Pincushion	C	20	?C	B		A
<i>Chrysocephalum semipapposum</i> subsp. <i>semipapposum</i>	Clustered Everlasting	C	25	?C	B		A, B
<i>Craspedia variabilis</i>	Variable Billy-buttons	C	10	?C	B		A
<i>Cymbonotus preissianus</i>	Austral Bear's-ear	C	10	?C	?A		A
<i>Epilobium billardioreanum</i> subsp. <i>cinereum</i>	Grey Willow-herb	C	5	?C	B		A, B
<i>Geranium gardneri</i>	Rough Crane's-bill	C	5	A	B		A
<i>Geranium retrorsum</i>	Grassland Crane's-bill	C	5	A	B		A
<i>Goodenia geniculata</i>	Bent Goodenia	C	5+	?A	B		A, C
<i>Laphangium luteoalbum</i>	Jersey Cudweed	C	2	?A	A		A
<i>Lagenophora gunniana</i>	Coarse Bottle-daisy	C	5	?C	?B		A
<i>Leptorhynchos squamatus</i> subsp. <i>squamatus</i>	Scaly Buttons	C	5	?C	B		A
<i>Leptorhynchos tenuifolius</i>	Wiry Buttons	C	5	?C	B		A
<i>Linum marginale</i>	Native Flax	C	3	?C	?A		A
<i>Lotus australis</i>	Austral Trefoil	C	5	A	B		A
<i>Podolepis decipiens</i>	Common Podolepis	C	5+	?C	B		A
<i>Senecio hispidulus</i>	Rough Fireweed	C	3	A	A		A
<i>Senecio phelleus</i>	Stony Fireweed	C	3	A	A		A



Scientific name	Common name	1	2	3	4	5	6
<i>Senecio quadridentatus</i>	Cotton Fireweed	C	3	A	A		A
<i>Solenogyne dominii</i>	Smooth Solenogyne	C	5	?C	?B		A
<b>Annuals</b>							
<i>Cotula australis</i>	Common Cotula	C	1	?C	B		A
<i>Crassula colorata</i> var. <i>acuminata</i>	Dense Crassula	C	1	?A	B		A
<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula	C	1	?A	B		A
<i>Crassula sieberiana</i>	Sieber Crassula	C	1	?A	B		A
<i>Daucus glochidiatus</i>	Australian Carrot	C	1	A	B		A
<i>Dysphania pumilio</i>	Clammy Goosefoot	C	1	?A	B		A
<i>Euchiton sphaericus</i>	Annual Cudweed	C	1	A	B		A
<i>Hyalosperma demissum</i>	Moss Sunray	C	1	A	B		A
<i>Isolepis marginata</i>	Little Club-sedge	C	1	A	B		A
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	Soft Millotia	C	1	A	B		A
<i>Poranthera microphylla</i>	Small Poranthera	C	1	A	B		A
<i>Ranunculus sessiliflorus</i>	Annual Buttercup	C	1	A	B		A
<i>Siloxerus multiflorus</i>	Small Wrinklewort	C	1	A	B		A
<i>Stuartina muelleri</i>	Spoon Cudweed	C	1	A	B		A
<i>Triptilodiscus pygmaeus</i>	Common Sunray	C	1	A	B		A
<i>Wahlenbergia gracilentia</i>	Annual Bluebell	C	1	A	B		A
<b>Summer-dormant tuberous/cormous perennials (dictos, monocots and orchids)</b>							
<i>Arthropodium strictum</i>	Chocolate Lily	B	20	?A	B		A
<i>Bulbine bulbosa</i>	Bulbine Lily	B	20	?A	B		A
<i>Burchardia umbellata</i>	Milkmaids	B	20	?A	B		A
<i>Caesia calliantha</i>	Blue Grass-lily	B	20	?A	B		A
<i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>	Blue Stars	B	15	?A	B		A

Scientific name	Common name	1	2	3	4	5	6
<i>Drosera aberrans</i>	Scented Sundew	C	20	?C	B		C
<i>Drosera auriculata</i>	Tall Sundew	C	20	?C	B		A
<i>Diuris sulphurea</i>	Tiger Orchid	C	20+	C	B		C
<i>Microtis unifolia</i>	Common Onion-orchid	C	20+	C	B		C
<i>Pauridia glabella</i> var. <i>glabella</i>	Tiny Star	C	5	?C	B		A
<i>Pauridia vaginata</i> var. <i>vaginata</i>	Yellow Star	C	5	?C	B		A
<i>Pterostylis curta</i>	Blunt Greenhood	C	20+	C	B		C
<i>Pterostylis nutans</i>	Nodding Greenhood	C	20+	C	B		C
<i>Pterostylis pedunculata</i>	Maroonhood	C	20+	C	B		C
<i>Thelymitra antennifera</i>	Rabbit Ears	C	20+	C	B		C
<i>Thelymitra pauciflora</i>	Slender Sun-orchid	C	20+	C	B		C
<i>Thelymitra peniculata</i>	Trim Sun-orchid	C	20+	C	B		C
<i>Thysanotus patersonii</i>	Twining Fringe-lily	C	20	?A	B		A
<i>Thysanotus tuberosus</i> subsp. <i>tuberosus</i>	Common Fringe-lily	C	20	?A	B		A
<b>Grasses and graminoids</b>							
<i>Austrostipa mollis</i>	Supple Spear-grass	B	5	?C	B		A
<i>Austrostipa rudis</i> subsp. <i>rudis</i>	Veined Spear-grass	B	5	?C	B		A
<i>Austrostipa scabra</i> subsp. <i>falcata</i>	Rough Spear-grass	B	5	?C	B		A
<i>Austrostipa semibarbata</i>	Fibrous Spear-grass	B	5	?C	B		A
<i>Austrostipa stiposa</i>	Quizzical Spear-grass	B	5	?C	B		A
<i>Carex breviculmis</i>	Common Grass-sedge	B	5	?C	B		A
<i>Carex inversa</i> s.l. (tussock forming)	Knob Sedge	C	10	?C	B		A, C
<i>Dianella laevis</i>	Smooth Flax-lily	C	25	A	B		A, C
<i>Dianella</i> sp. aff. <i>revoluta</i> (East Gippsland)	Flax Lily	C	25	A	B		A, C
<i>Eragrostis brownii</i>	Common Love-grass	C	5	?C	B		A


Scientific name	Common name	1	2	3	4	5	6
<i>Imperata cylindrica</i>	Blady Grass	C	15	?C	B		A, C
<i>Juncus subsecundus</i>	Finger Rush	C	10	?C	B		A
<i>Lachnagrostis aemula</i> s.s.	Leafy Blown-grass	C	5	?C	B		A
<b><i>Lachnagrostis filiformis</i> s.s.</b>	Common Blown-grass	C	3	?C	A		A
<b><i>Lepidosperma laeve</i></b>	Clustered Sword-Sedge	A, B	40	A	B		A, C
<i>Lepidosperma laterale</i>	Variable Sword-sedge	C	30	A	B		A
<b><i>Lomandra filiformis</i> subsp. <i>filiformis</i></b>	Wattle Mat-rush	C	30	?A	B		A, C
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Mat-rush	C	30	?A	B		A, C
<i>Lomandra nana</i>	Dwarf Mat-rush	C	25	?A	B		A
<i>Luzula meridionalis</i> var. <i>densiflora</i>	Common Woodrush	C	5	?A	B		A
<b><i>Microlaena stipoides</i> var. <i>stipoides</i></b>	Weeping Grass	A, B	30	?C	B		A, C
<i>Pentapogon quadrifidus</i>	Five-awned Spear-grass	B	5	?C	B		A, C
<i>Poa morrisii</i>	Soft Tussock-grass	C	10	?C	B		A, C
<i>Poa rodwayi</i>	Velvet Tussock-grass	C	10	?C	B		A, C
<i>Poa sieberiana</i> var. <i>hirtella</i>	Grey Tussock-grass	C	10	?C	B		A, C
<i>Rytidosperma erianthum</i>	Hill Wallaby-grass	C	5	?C	B		A, C
<i>Rytidosperma fulvum</i>	Copper-awned Wallaby-grass	B	5	?C	B		A, C
<b><i>Rytidosperma geniculatum</i></b>	Knead Wallaby-grass	B	5	?C	B		A, C
<i>Rytidosperma pilosum</i>	Velvet Wallaby-grass	A, B	5	?C	B		A, C
<b><i>Rytidosperma racemosum</i></b>	Slender Wallaby-grass	A	5	?C	B		A, C
<b><i>Rytidosperma setaceum</i></b>	Bristly Wallaby-grass	A	5	?C	B		A
<b><i>Schoenus apogon</i></b>	Common Bog-sedge	B	1-5	A	B		A, C
<i>Themeda triandra</i>	Kangaroo Grass	A	15	?C	B		A, C
<i>Tricoryne elatior</i>	Yellow Rush-lily	C	25	A	B		A
<i>Xanthorrhoea minor</i> subsp. <i>lutea</i>	Small Grass-tree	C	50	?C	A		A

Scientific name	Common name	1	2	3	4	5	6
<b>Mistletoes and aerial parasites (+ host species)</b>							
<i>Amyema miquelii</i> ( <i>Eucalyptus melliodora</i> )	Box Mistletoe	C	30	D	A		A
<i>Amyema pendula</i> subsp. <i>pendula</i> ( <i>Acacia mearnsii</i> , <i>Acacia melanoxylon</i> )	Drooping Mistletoe	C	30	D	A		A
<i>Cassytha pubescens</i> s.s. (Very wide host range)	Downy Dodder-laurel	C	25	A	A		A
<i>Muellerina eucalyptoides</i> ( <i>Eucalyptus camaldulensis</i> subsp. <i>camaldulensis</i> )	Creeping Mistletoe	C	30	D	A		A



A selection of flora species listed in Table 5 above are illustrated in photos below and provide an example of some of the lifeforms and diversity of species that will be planted within the Reserve. These photos have been provided by Bayside City Council and were taken by Pauline Reynolds, local photographer and member of the Friends of Highett Grassy Woodland.

## Trees


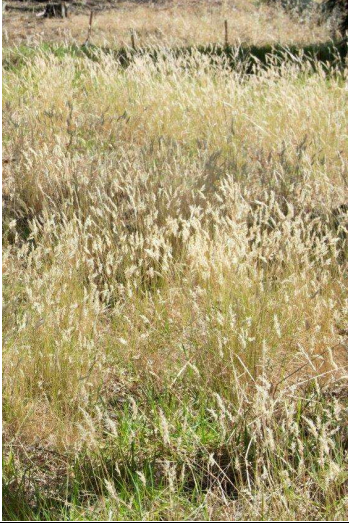

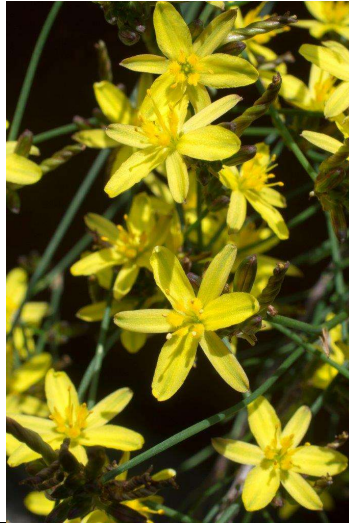
			
<i>Acacia mearnsii</i> Black Wattle	<i>Allocasuarina verticillata</i> Drooping Sheoak	<i>Banksia marginata</i> Silver Banksia	<i>Eucalyptus melliodora</i> Yellow Box



## Large shrubs and small to medium shrubs

		
<i>Hibbertia sericea</i> Silky Guinea-flower	<i>Indigofera australis</i> subsp. <i>australis</i> Austral Indigo	<i>Leptospermum continentale</i> Prickly Tea-tree

## Grasses and graminoids

			
<i>Microlaena stipoides</i> var. <i>stipoides</i> Weeping Grass	<i>Rytidosperma racemosum</i> Slender Wallaby-grass	<i>Themeda triandra</i> Kangaroo Grass	<i>Tricoryne elatior</i> Yellow Rush-lily

### 7.2.3 Revegetation strategy

The elements of a revegetation strategy for Highett Plains Grassy Woodland are outlined below. Some of the tasks overlap with those in the Weed Management Strategy.

#### Existing conditions

1. Document remnant indigenous vegetation persisting on the site (Table 2).
2. Conduct arboricultural assessment of indigenous trees (Attachment 2).
3. Identify weed flora and exotic planted flora and its management (Section 7.1, Table 4).
4. Record and mark small populations of remnant indigenous vegetation and protect them from potential harm (e.g. off-target herbicide damage).

#### Identify weed flora and exotic planted flora

1. Determine appropriate methods of control of weeds (Table 4).
2. Identify exotic trees and eucalypt recruits to be selectively retained (according to criteria defined in Section 7.2.4).

#### Floristic composition and structure of revegetation

1. Reconstruct the pre-European floristic composition of the plains grassy woodland (Table 5).
2. Determine structural role of the species in the revegetation (Table 5).

#### Plant establishment: revegetation techniques

The following are potential options:

- Planting tubestock.
- Direct planting of divisions (e.g. grasses).
- Direct seeding (predominantly grasses and mistletoes), including scalping soil and sowing seeds (if direct seeding methods not suitable other methods such as hydroseeding can be used instead).
- Encouraging recruitment of in situ populations by natural recruitment (especially grasses).
- Using fire to stimulate germination in soil-stored seed bank.
- Establishing seed orchards on site to increase seed production (especially grasses).

#### Genetic considerations

Genetic diversity in planted populations is highly desirable.

#### Site preparation

1. Ensure at least a 2-year lead time to fully kill standing crop of weeds, particularly species with underground storage organs from which to regenerate (Table 4) e.g. *Oxalis pes-caprae* Soursob, *Romulea rosea* Onion-grass, *Salpichroa origanifolia* Pampas Lily-of-the-Valley, *Cenchrus clandestinum* Kikuyu, *Cynodon dactylon* var. *dactylon* Couch.
2. Remove pile of tree trunks and logs (cut into manageable rounds).

#### Sourcing plant materials for revegetation

1. Types of materials relevant: seeds, cuttings, divisions, plants dug up from donor site.
2. Ensure that all plant material is correctly identified (according to the online *Flora of Victoria* (<https://vicflora.rbg.vic.gov.au/>)).

3. Identify sources/potential sources of material.
4. Ensure that all accessions of plant material are recorded according to the proforma given in Appendix 2.

#### **Implementation of revegetation**

1. Projected time lines.
2. Devise methods of establishment from data in Table 5.
3. Who is to carry out the works?

#### **Monitoring and documentation**

1. All aspects of the on-site works – weed management, vegetation establishment, etc – are to be fully monitored and documented as a permanent record.
2. Sources of all plant material used in revegetation are to be recorded according to the proforma in Appendix 2.
3. Permanent plots and photo-points are to be established. Eight 10 x 10 m permanent plots were established in late 2023 and early 2024. All indigenous and exotic plant species recorded are assigned a cover/abundance value (Section 8).

### **7.2.4 Retention of exotic eucalypts**

Many non-indigenous eucalypts were planted by CSIRO and many have been removed as undesirable exotic species. There has also been abundant recruitment from these planted parents, particularly in zone 3, the scalped area, as well as abundant recruitment of the indigenous River Red-gum and Yellow Box. While these non-indigenous species are exotics, the retention of some – mature trees and recruits – is advocated for the following reasons:

- visual amenity; especially of the fine mature Lemon-scented Gums and Spotted Gums;
- cost of removal of all trees would be very high;
- a major constraint is to avoid soil disturbance so that soil contaminants (asbestos) are not mobilised; massive soil disturbance would ensue with tree removal; and
- habitat components for wildlife, including vertebrates (birds, *Pteropus poliocephalus* Grey-headed Flying Fox and microbats) and invertebrates viz. nectar, pollen, foliage, tree hollows etc.

The decisions about which mature trees and recruits to remove will be made on the ground at the appropriate time.

### **7.2.5 Seed collection of indigenous species**

It is important to collect seeds of indigenous species which will be used for future revegetation of the reserve. Some of the indigenous species recorded are opportunistic wind-dispersed colonisers responding to conditions produced by the soil scalping, namely bare ground and seasonally ponded water. These species are: *Epilobium billardierianum* subsp. *billardierianum* Smoot Willow-herb, *Epilobium hirtigerum* Hairy Willow-herb, *Laphangium luteoalbum* Jersey Cudweed and *Lachnagrostis filiformis* Common Blown-grass, and habitats suitable for them may not occur in the plains grassy woodland proposed for revegetation. Several other species that were recorded were represented by one plant and may not yet be fertile, e.g. *Ozothamnus ferrugineus* Tree Everlasting and *Olearia ramulosa* Twiggy Daisy-bush. These will need to be propagated by cuttings. Other species are permanent members of the indigenous flora and seed collection is not a priority at the moment (*Eucalyptus*, *Exocarpos*, *Muellerina*). It is particularly important to collect seeds as soon as practicable of the species that recruited so spectacularly from soil-stored seed-banks on the

scalped area, including *Bossiaea prostrata* Creeping Bossiaea, *Lepidosperma leave* Clustered Sword-Sedge, *Schoenus apogon* Common Bog-sedge and *Kennedia prostrata* Running Postman. Note that many of these occur predominantly or exclusively on the scalped area.

### 7.2.6 Tree guards

Guards to protect newly planted tubestock etc are not required. They are generally used to guard against rabbit grazing while plants become established. Rabbits should instead be managed in accordance with Section 7.3.6.



## 7.3 Additional management issues

### 7.3.1 Timelines and management elements

#### 1. Protection of indigenous plant populations

- Record populations or areas with scattered field layer plants to ensure their protection (against inadvertent damage).

#### 2. Site preparation and amelioration

- Remove pile of unwanted logs
- Determine which of the naturally recruited indigenous *Eucalyptus camaldulensis* and *E. melliodora* (young plants) to retain; in some locations these may be overstocked.
- Remove unwanted exotic trees and exotic eucalypt recruits; the latter includes the self-recruited hybrid *Eucalyptus camaldulensis* x *E. botryoides*.

#### 3. Construct infrastructure – paths, fences, meeting area, signs etc.

#### 4. Weed management

- Ensure a 2-year weed-control program throughout the site to effect full control of weeds, particularly those summer dormant species with subterranean storage organs (corms, rhizomes, bulbs), notably *Oxalis* spp., *Romulea rosea* and *Salpichroa origanifolia*.
- Record the location and size of populations of weed species as they are newly recorded for the site.
- As an interim measure: destroy crops of weed seed and remove them before they ripen and disperse; this particularly applies to species with long-lived soil-stored seed banks (e.g. *Genista* and *Chamaecytisus*).
- Export all cut woody material from the site except in Zone 3 where it may be used to protect bare soil against erosion.

#### 5. Revegetation

- Ensure a 2-year lead time for given zones to fully control weeds before planting or direct seeding.
- Collect seeds of indigenous species on site to propagate or direct-seed.
- Start a seed-bank of plant species on site or regionally that will be used for revegetation.
- Produce nursery stock with suitable time-lines in readiness for planting.
- Compile an inventory of zones supporting plant populations that may be used for revegetation.

#### 6. Problematic animals

- Determine the presence of exotic gastropods – probably six slug and snail species occur on site; they can be very damaging to plants.
- Determine how to kill such gastropods and devise an appropriate on-going management program.
- Kill all colonies of European Wasps detected on site according to standard protocols (Permethrin dust).

- Maintain a look-out for Portugese Millipeds and attempt to determine potential negative impacts on the indigenous biota.
- Maintain a watch for possum damage to trees and other plants (browsing of leaves, flowers and fruits); devise means to protect plants for possums as appropriate (see Section 7.3.5).
- Maintain a watch for rabbits and implement management as appropriate (see Section 7.3.6).

### 7.3.2 Tree health

During the field assessment in December 2023 the health of some mature eucalypts, located on the western side of Habitat Zone 3, was declining. After revisiting the site in January and February 2024 tree health had markedly improved, which was most likely a result of the recent period of high rainfall.

The health of all trees should be monitored regularly. If they show signs of stress from long periods of low rainfall, the following should be considered/implemented (Ryder Arboriculture and Environment, 2024):

- Removal of exotic grasses in the understorey (this should be a priority as part of the weed management);
- Mulching under the tree canopy; and
- Irrigation.

Removal of exotic understorey and irrigation are the preferred methods before mulching as this will prevent regeneration of native flora including the recruitment of eucalypts. Mulching should only be used as a last resort if the tree health does not improve satisfactorily with these other two methods. If mulch is used it must be sourced from locally indigenous material.

Other sources of stress could include possum browsing, insect attack and high numbers of Mistletoes (Ryder Arboriculture and Environment, 2024). If possums are causing the decline of tree health, install tree guards as outlined in Section 9.4. If Mistletoes are responsible for the decline in tree health, remove the Mistletoe from the tree branches, taking care to remove the roots as well. Any insect damage must be treated using an appropriate pesticide.

Tree health should be monitored quarterly, with an inspection by a qualified arborist undertaken every 1-3 years to reduce the risk of branch failure (see Section 5.12 in Attachment 2).

### 7.3.3 Management of existing conditions

The northern section of the site that has previously been scalped has some erosion from water run-off and water pooling. This area will need to be planted appropriately to remediate and prevent further erosion. As an interim measure the huge population of self-recruited eucalypts (see Section 7.2.4) and other woody weeds such as *Acacia* spp. Wattle should be cut and laid on the bare soil as a means of controlling erosion. We also advocate sowing seeds of *Rytidosperma* spp. Wallaby-grasses (*R. geniculatum* and *R. setaceum*) on suitably prepared soil as an important means of soil stabilisation.

### 7.3.4 Cultural burning

Cultural burning is currently inappropriate because the use of fire at Highett Plains Grassy Woodland is not about fuel reduction, rather it is about individual responses of plants to fire e.g.

stimulating recruitment by seed. The vegetation is unlikely to be developed enough to carry a fire for some years and if fuel loads are sufficient there are the important questions of fire, safety and risk. Any proposal for cultural burning would have to be adequately tested against ecological arguments for burning.

### 7.3.5 Possum browsing

Browsing by Ringtail and Brushtail possums was the cause of significant damage to eucalypts at Highett Plains Grassy Woodland in the past (Biosis 2004, 2011). Tree collars were installed to prevent further damage. The trees that exhibited a decline in health during field assessments in December 2023 had tree guards installed, so possum browsing was not the cause.

Monitoring of all trees for evidence of possum browsing should be undertaken regularly to ensure tree health is not deteriorating. All tree guards currently installed have a build-up of organic material underneath that need to be cleaned out. These can either be temporarily removed to clean underneath or replaced with a larger tree guard if necessary.

### 7.3.6 Rabbit grazing

Rabbits were recorded from the Highett site by Crowfoot and Carr (2018) but we have not seen evidence of rabbits in the last two years. If rabbits occur at the site, or appear in future, they should be dealt with as follows:

- Strategic fencing to keep rabbits off vegetation.
- Warren fumigation and destruction.
- Shooting, which is permitted in this urban context by suitably licensed practitioners.

Baiting, where the rabbit population is small and possibly dispersed, is ineffective; it only works where rabbit populations are large and its application is designed such that all bait is consumed in one night. Baiting in this urban context is risky, posing a danger to pets and to children.

### 7.3.7 Dogs

To ensure the future protection of the site as a conservation area, dogs will not be permitted within the Reserve. It is proposed to list Highett Plains Grassy Woodland as a new Conservation site under Order No. 5 as a dog 'Prohibited Area' (under point 7 of the order) and listed with the other conservation reserves in Bayside. This recognises the conservation status of the site and is required to fulfill the key purpose of the Public Conservation and Resource Zone (PCRZ) which is to *'protect and conserve the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values'*.

### 7.3.8 Paths and seating within the Reserve

A walking trail will wind through the Reserve from the northern boundary (central point) to a gate in the south-east corner. This main track will be approximately three metres wide to enable access by fire trucks in case of an emergency. A network of bush trails will come off the main track to provide access into other areas of the Reserve. In the north-east of the site where the soil is prone to erosion, boardwalks will be installed to prevent impacts to the soil.

A designated meeting place will be located near the entrance to the site that will include seating / table and chairs, in addition to signage informing visitors about the Reserve.

An entrance for maintenance vehicles is proposed in the north-west corner and will utilise the existing gate and gravel surface. A maintenance shed is also proposed to be located here which would be for contractors and Friends of Highett Grassy Woodland.

See the Masterplan in Attachment 1 for a map of the paths proposed within the Reserve.

### 7.3.9 Fencing

Boundary fencing will remain in place along the northern and southern perimeter of the reserve. The site entrance for public will be via two gates: one along the northern boundary (centre point) and one in the south-eastern corner. An entrance for maintenance vehicles will be located in the north-west corner. All fencing and gates should remain in good working condition. Gates/access directly from neighbouring residential properties is prohibited.

Within the reserve, fencing will be used to protect areas of sensitive or regenerating vegetation, as well as keeping pedestrians to paths and outside areas of vegetation. Areas to be fenced are outlined on the Masterplan (Attachment 1).

Fencing of vegetation within the Reserve will be similar to other conservation reserves and consist of post and wire fencing to prevent access to the area. Signage will also be placed along the path to inform pedestrians to stay outside fenced areas and protect the native vegetation. A photo of the fencing currently used within the site is shown in Image 10 below.



**Image 10: Example of fence used to protect areas of native vegetation**

### 7.3.10 Signage and education

Educational signage is essential to inform visitors about the history, ecological values, and importance of the Highett Plains Grassy Woodland. This will encourage visitors to respect and protect the Reserve. High quality information is required. Information should be located at the entrance to the site and include some of the key flora and fauna species visitors can observe within the Reserve, as well as information on the revegetation works being undertaken. Contact details should also be provided for Friends of Highett Grassy Woodland and how people can get involved to help protect the site.

Signage should also outline any activities that are restricted/prohibited within the Reserve, including:

- Stay within designated walking tracks;

- Dogs are prohibited within the Reserve;
- Keep out of fenced areas / areas of revegetation;
- No littering or dumping of waste;
- No collecting of firewood.

Any rules associated with previous asbestos contamination, should also be listed. This includes keeping outside the fenced tree in the north of the site and no digging/removal of soil/surface debris.

Signage should also be placed throughout the reserve reminding pedestrians to keep to designated tracks and outside fenced areas protecting native vegetation.

### 7.3.11 Mowing/slashing

Mowing or slashing should only occur based on advice by a qualified ecologist and not undertaken as routine maintenance as this will inhibit the growth and regeneration of native species.

### 7.3.12 Rubbish

Remove all existing and any new rubbish that enters the reserve (i.e. any illegal dumping). This includes old fencing and geotextile fabric that was previously used widely across the site. Only the geotextile material above ground should be removed and anything below the ground must remain in the soil to avoid potentially exposing any asbestos. All logs that were placed within the Reserve should be cut up and removed from the site. These should only be retained as seating within the meeting area.

### 7.3.13 Aspirational goals – non-renewable resource use

Importing of non-renewable resources should be eliminated or minimised on the site. This includes the use of granitic sand and cypress pine, as outlined below.

#### *Granitic sand*

Granitic sand has been proposed as a surface for tracks. While this may be an attractive and generally functional material for its intended purpose, it has important disadvantages. The material is mined from areas of granitic geology as a non-renewable resource, the exploitation of which in Victoria has transformed thousands of hectares of terrain into eroding wastelands, devoid of vegetation and which are likely to remain so, an example of which is the You Yangs. In our experience none of the mined areas are revegetated, indeed revegetation may be prohibitively expensive or technically difficult. The scenario we thus face in Victoria (at least) is exponential demand for the material and creation, ultimately, of vast areas likened to a moonscape. Use of this material, except in narrowly circumscribed situations, is unethical and environmentally indefensible.

A further objection to the use of granitic sand and other geological materials is that it is very highly erodible by water (even on the gentlest of slopes), while track users scuff it off the track. Consequently, it must be periodically replenished in a cycle of yet further unsustainable consumption.

Points against the use of granitic sand were cogently made by Jeff Yugovic and Neville Rosengren (2018). This issue, far from being confined to granitic sand but relevant to the use of geological materials generally, is what is called *anthropogenic geomaterial*. The alien geological material, in this case granitic sand is foreign to the landscape where it is placed and sends a



mixed message in respect of landscape interpretation. It is inconsistent with geology, geomorphology, soils and hydrology (Yugovic and Rosenberg 2018). Highett Plains Grassy Woodland has developed on a sedimentary landscape, that is Sandringham Sandstone, geologically very different from the granitic sand. A further consideration is the ecological cost (carbon footprint) of mining and trucking sand over great distances. Finely chipped bark or wood is the most suitable material to surface walking tracks.

#### *Cypress pine*

Cypress pine (*Callitris glaucophylla*) is a conifer harvested from 'natural' stands on the Western Slopes and Plains of New South Wales. It is a very slow growing softwood and is alleged to be very resistant to rotting, hence its popularity in landscaping and municipal horticulture generally. Whatever the merits of the durability as fence-post wood, its use raises issues which have never been addressed.

Because *Callitris* is very slow-growing with a defined annual growth period it produces very clear annual rings (a typical conifer). Thus, it is easy to accurately age any given fence post by counting the rings. Inspection shows that these annual rings are about one millimetre (1 mm) wide. Thus, a square fence post of 25 cm x 25 cm is 250 years old. There is some ill-defined philosophical problem here: should we really use wood that is 250 years old (the tree from which it was cut was much older), for use as a fence post? And then there are the impacts of *Callitris* silviculture and harvesting: the NSW forestry agency denies that there are any negative impacts, however observation (Carr unpublished data) would suggest otherwise.

The *Callitris* estate over vast areas of NSW occurs on land explicitly managed for *Callitris*. Almost all *Eucalyptus* species and individuals in these former eucalyptus grassy woodlands have been deliberately destroyed because of perceived competition with *Callitris*. Huge areas are now effective *Callitris* monocultures. These *Callitris* woodlands support a very important flora and fauna, particularly orchids and reptiles, many of which are critically endangered and listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

Cypress pine should therefore not be used for fence posts within the Reserve. The most suitable alternative is to use treated pine.

## 8 Monitoring documentation and reporting

To fully realise the conservation and scientific values of the Highett Plains Grassy Woodland project, all aspects of management must be documented and outcomes monitored to form a permanent archive/record. Interpretation of the results of monitoring will allow informed judgements about management actions, and potentially, if they need modification. This relates to the management of the site, but also in the wider context lessons learned at Highett may be valuable for similar revegetation projects elsewhere, particularly in similar environments. Valuable information about the biology, ecology and behaviour of plant species about which we know little is likely to emerge.

Regular monitoring (quarterly) is essential for the success of management works and, following interpretation of the results, to enable adaptive management. This should include:

- Weed Management
  - Weed management activities and species targeted
  - A list of exotic flora species (including cover) that are a priority for management and will be undertaken in the next 3-6 months.
  - Success of weed management trials (e.g. cover of weed species before and after)
- Revegetation
  - A list of flora species recently planted
  - Provenance and other details relating to plant accessions used in revegetation (see proforma in Appendix 2).
  - Survival of vegetation planted (note success or causes of failures)
  - Additional plantings required
- Natural recruitment
  - Record present natural recruitment of indigenous flora species
  - Pest animals present
  - Note any evidence of pest animals (e.g. possum or rabbit browsing) and detail pest animal management to be implemented.
- Management issues
  - Compile a list of any other management issues that need to be addressed (e.g. tree health, fencing, illegal dumping of waste etc).

All management activities should be recorded in a logbook with receipts/invoices for works carried out by contractors. A running inventory of fauna records should also be compiled with opportunistic contributions such as the data on insect species observed at the site recently collected by John Eichler and Pauline Reynolds (see Section 5.4). The citizen science platform iNaturalist will form a valuable means of identifying faunal, as well as fungal records. Some insect records, e.g. pollinators, are of direct relevance to the biology and ecology of plant species, for example the presence of the solitary bee *Lasioglossum lanarium* recently recorded by John Eichler and Pauline Reynolds.

Additional monitoring should also be undertaken for Highett Plains Grassy Woodland that is similar to the Bayside Native Vegetation Works Program (Ecology Australia 2013). This includes the following:

- Visual assessment and photographic inspection (annually);
- Collection of floristic data and assessment of monitoring quadrats (every 3 years); and
- Vegetation quality assessment (every 5 years).

#### **Visual assessment and photographic inspection (annual)**

A visual assessment and photographic inspection should be undertaken annually and will involve a basic assessment of the vegetation condition within each quadrat, including any threats or management issues, as well as a photo of the vegetation taken from the star-picket (facing south-east) to provide context. A general assessment of the vegetation condition of the entire reserve is also required, noting any management issues or threats and providing appropriate management recommendations in response. This data should then be compared to data in previous years to determine if the recommended works have been adequately completed, and if the condition of the vegetation is improving.

#### **Collecting floristic data and assessment of monitoring quadrats (every 3 years)**

Floristic data (species composition and cover abundance) and photo-point data is provided for the eight 10 x 10 m quadrats in Appendix 1. The methodology is outlined in Section 2.4. This will serve as a baseline to monitor the changes in vegetation over time. This collection of floristic data using the Domin-Krajina cover abundance scale (Mueller-Dombois and Ellenberg 1974) and photo points (facing south-east from the star picket) will need to be undertaken every three years to monitor the vegetation condition and provide specific recommendations in relation to management.

#### **Habitat Hectare Assessment**

A habitat hectare assessment should be undertaken in years 5 and 10 for all vegetation within the Reserve. The assessment should follow the Department of Sustainability and Environments Vegetation Quality Assessment Manual (DSE 2004).

#### **Adaptive management**

Given the nature of land management and that environmental conditions cannot be predicted, management of the Reserve should be adaptive and respond appropriately to changes in conditions or new occurrences of pest plants and animals.

## 9 Management action plan

Management actions for Highett Plains Grassy Woodland are outlined in Table 6 below. This is intended to guide the ongoing management of the Reserve over the next 10 years to ensure the desired management outcomes are achieved. It is the responsibility of Bayside City Council to ensure this plan is implemented and all staff and contractors comply with the procedures to the required standard. This management plan is recommended to be updated upon completion of this 10-year management plan.

Table 6: 10-year management action plan for Highett Plains Grassy Woodland

Year	Management issue	Management zone 1	Management zone 2	Management zone 3
Years 1-2	Weed Management	<ul style="list-style-type: none"><li>Implement weed management, monitor the results of weed management and adapt accordingly.</li><li>Maintain a watching brief for new weed species.</li><li>Determine which exotic mature eucalypts and recruits are to be retained or removed.</li></ul>	<ul style="list-style-type: none"><li>Implement weed management, monitor the results of weed management and adapt accordingly.</li><li>Maintain a watching brief for new weed species.</li></ul>	<ul style="list-style-type: none"><li>Implement weed management, monitor the results of weed management and adapt accordingly.</li><li>Maintain a watching brief for new weed species.</li><li>Determine which exotic mature eucalypts and recruits are to be retained or removed.</li></ul>
	Native recruitment	<ul style="list-style-type: none"><li>Determine which indigenous recruits should be removed due to overstocking.</li><li>Identify the hybrid River Red-gum x Southern Mahogany for removal.</li></ul>		<ul style="list-style-type: none"><li>Determine which indigenous recruits should be removed due to overstocking.</li></ul>
	Revegetation	<ul style="list-style-type: none"><li>Identify and record the location of indigenous plant species that occur in the understorey.</li><li>Avoid inadvertent harm to these individuals (e.g. while undertaking weed management).</li><li>Compile inventory of sites containing populations that might provide material for propagation (seeds, cuttings, divisions).</li><li>Plan the procedures for revegetation, what sort of treatments, where they will go, what tubestock or other material required, ensure stock available and good condition.</li></ul>	<ul style="list-style-type: none"><li>Identify and record the location of indigenous plant species that occur in the understorey.</li><li>Avoid inadvertent harm to these individuals (e.g. while undertaking weed management).</li><li>Compile inventory of sites containing populations that might provide material for propagation (seeds, cuttings, divisions).</li><li>Plan the procedures for revegetation, what sort of treatments, where they will go, what tubestock or other material required, ensure stock available and good condition (revegetation of this area should not be undertaken until year 3 to ensure all weeds have been eliminated).</li></ul>	<ul style="list-style-type: none"><li>Identify and record the location of indigenous plant species that occur in the understorey.</li><li>Avoid inadvertent harm to these individuals (e.g. while undertaking weed management).</li><li>Compile inventory of sites containing populations that might provide material for propagation (seeds, cuttings, divisions).</li><li>Implement direct seeding of wallaby grasses in areas of bare ground (hydroseeding or jute matting).</li><li>Plan the procedures for revegetation, what sort of treatments, where they will go, what tubestock or other material required, ensure stock available and good condition.</li></ul>
	Pest animals	<ul style="list-style-type: none"><li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly.</li><li>Conduct survey for exotic gastropods (slugs and snails) and devise methods to treat them.</li><li>Remove tree guards and clean build up of organic matter.</li></ul>	<ul style="list-style-type: none"><li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly.</li><li>Conduct survey for exotic gastropods (slugs and snails) and devise methods to treat them.</li></ul>	<ul style="list-style-type: none"><li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly.</li><li>Conduct survey for exotic gastropods (slugs and snails) and devise methods to treat them.</li></ul>
	Tree health	<ul style="list-style-type: none"><li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li></ul>		<ul style="list-style-type: none"><li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li></ul>
	Fencing and signage	<ul style="list-style-type: none"><li>Ensure fencing is maintained in good condition.</li><li>Install new fencing and signage in accordance with Masterplan (see Attachment 1).</li></ul>	<ul style="list-style-type: none"><li>Ensure fencing is maintained in good condition.</li><li>Install new fencing and signage in accordance with Masterplan (see Attachment 1).</li></ul>	<ul style="list-style-type: none"><li>Ensure fencing is maintained in good condition.</li><li>Install new fencing in accordance with Masterplan (see Attachment 1).</li></ul>

Year	Management issue	Management zone 1	Management zone 2	Management zone 3
	<b>Other</b>	<ul style="list-style-type: none"> <li>Remove logs taking care to minimise soil disturbance and avoid harming native indigenous plants.</li> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>	<ul style="list-style-type: none"> <li>Exotic eucalypt recruits and any other woody weeds need to be cut and spread across the site to arrest erosion (ensure they not seed bearing). This should be undertaken prior to direct seeding of wallaby grasses.</li> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>
	<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>
<b>Year 3-4</b>	<b>Weed Management</b>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species.</li> <li>Any additional exotic eucalypt recruits are to be regarded as undesirable and removed.</li> </ul>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species.</li> </ul>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species.</li> <li>Any additional exotic eucalypt recruits are to be regarded as undesirable and removed.</li> </ul>
	<b>Native recruitment</b>	<ul style="list-style-type: none"> <li>Determine which indigenous recruits should be removed due to overstocking.</li> </ul>		<ul style="list-style-type: none"> <li>Determine which indigenous recruits should be removed due to overstocking.</li> </ul>
	<b>Revegetation</b>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Implement revegetation in accordance with Section 7.2.3.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Implement revegetation in accordance with Section 7.2.3.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Implement revegetation in accordance with Section 7.2.3.</li> </ul>
	<b>Pest animals</b>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>
	<b>Tree health</b>	<ul style="list-style-type: none"> <li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li> </ul>		<ul style="list-style-type: none"> <li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li> </ul>
	<b>Fencing</b>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>
	<b>Other</b>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds (Section 5.4).</li> </ul>



Year	Management issue	Management zone 1	Management zone 2	Management zone 3
	<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>
<b>Years 5-10</b>	<b>Weed Management</b>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species. Any additional exotic eucalypt recruits are to be regarded as undesirable and removed.</li> </ul>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species. Any additional exotic eucalypt recruits are to be regarded as undesirable and removed.</li> </ul>	<ul style="list-style-type: none"> <li>Implement weed management, monitor the results of weed management and adapt accordingly.</li> <li>Maintain a watching brief for new weed species. Any additional exotic eucalypt recruits are to be regarded as undesirable and removed.</li> </ul>
	<b>Indigenous recruitment</b>	<ul style="list-style-type: none"> <li>Determine if any indigenous eucalypt recruits should be removed due to overstocking.</li> <li>Conduct periodic surveys to determine the level of recruitment in the planted flora or the indigenous species that currently persist on the site.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct periodic surveys to determine the level of recruitment in the planted flora or the indigenous species that currently persist on the site.</li> </ul>	<ul style="list-style-type: none"> <li>Determine if any indigenous eucalypt recruits should be removed due to overstocking.</li> <li>Conduct periodic surveys to determine the level of recruitment in the planted flora or the indigenous species that currently persist on the site.</li> </ul>
	<b>Revegetation</b>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Continue the implementation of revegetation in accordance with Section 7.2.3.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Continue the implementation of revegetation in accordance with Section 7.2.3.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and record the location of additional indigenous plant species that occur in the understorey to avoid inadvertent harm.</li> <li>Continue the implementation of revegetation in accordance with Section 7.2.3.</li> </ul>
	<b>Pest animals</b>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a watching brief for rabbits and possums on the site and implement measures accordingly (quarterly).</li> <li>Implement exotic gastropod monitoring on an ongoing basis and control as appropriate.</li> </ul>
	<b>Tree health</b>	<ul style="list-style-type: none"> <li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li> </ul>		<ul style="list-style-type: none"> <li>Monitor the health of mature trees quarterly in accordance with Section 7.3.2.</li> </ul>
	<b>Fencing</b>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure fencing is maintained in good condition.</li> <li>Monitor impacts of visitors.</li> </ul>
	<b>Other</b>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds.</li> </ul>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds.</li> </ul>	<ul style="list-style-type: none"> <li>Document fauna opportunistically or formally on an ongoing basis, such as the species list recently (March 2024) collected by John Eichler and Pauline Reynolds.</li> </ul>
	<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Implement documentation and monitoring in accordance with Section 8. Respond with adaptive management in response to the monitoring outcomes.</li> </ul>

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Appendix 1: Monitoring quadrat data for Highett Plains Grassy Woodland collected December 2023 and January 2024

P – planted  
N – naturalised  
\* – exotics

Origin	Status	Scientific name	Common name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Quadrat 6	Quadrat 7	Quadrat 8
Location details				-37.95451 145.0392	-37.95473 145.0398	-37.95487 145.0405	-37.95409 145.0394	-37.95463 145.0399	-37.9542 145.0403	-37.95366 145.0402	-37.95341 145.0407
Indigenous species											
		<i>Acacia implexa</i>	Lightwood						4		3
		<i>Acacia mearnsii</i>	Black Wattle				4	3	4	3	3
		<i>Acacia paradoxa</i>	Hedge Wattle				3 (dead)				3
		<i>Dichondra repens</i>	Kidney-weed				3			2	
		<i>Einadia nutans</i> subsp. <i>nutans</i>	Nodding Saltbush					2			
		<i>Epilobium</i> <i>billardiereum</i> subsp. <i>cinereum</i>	Grey Willow-herb							2	
		<i>Eucalyptus</i> <i>camaldulensis</i> subsp. <i>camaldulensis</i>	River Red-gum	6	3		3	3			
		<i>Eucalyptus</i> <i>melliodora</i>	Yellow Box		2			5	3		
		<i>Juncus pallidus</i>	Pale Rush								1
		<i>Kennedia prostrata</i>	Running Postman								3
		<i>Lachnagrostis</i> <i>filiformis</i>	Common Blown-grass							2	
		<i>Laphangium</i> <i>luteoalbum</i>	Jersey Cudweed							1	
		<i>Lepidosperma laeve</i>	Clustered Sword-Sedge								3
		<i>Lomandra filiformis</i>	Wattle Mat-rush					1			
		<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass						3		
		<i>Oxalis perennans</i>	Grassland Wood-sorrel					1			
		<i>Rytidosperma</i> <i>racemosum</i>	Slender Wallaby-grass		3			2	3	2	2
*	N	<i>Acacia howittii</i>	Sticky Wattle							3	
*	N	<i>Acacia iteaphylla</i>	Flinders Range Wattle							3	
*	N	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Coast Wattle							3	

Origin	Status	Scientific name	Common name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Quadrat 6	Quadrat 7	Quadrat 8
*	N	<i>Acacia saligna</i>	Golden Wreath Wattle		3						
*		<i>Aira elegantissima</i>	Delicate Hair-grass			2					
*		<i>Aizoon pubescens</i> var. <i>pubescens</i>	Galenia		4		3		3	3	
*		<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass			5					
*		<i>Araujia sericifera</i>	White Bladder-flower					2			
*		<i>Avena barbata</i>	Bearded Oat	1	1			2	3	1	2
*		<i>Brassica fruticulosa</i>	Twiggy Turnip						2	2	
*		<i>Bromus catharticus</i> var. <i>catharticus</i>	Prairie Grass	3	3	3		3			
		<i>Bromus hordeaceus</i>	Soft Brome		1						
*		<i>Bromus diandrus</i>	Great Brome	2	3	2					
*	N	<i>Callistemon</i> spp.	Bottlebrush				2				
*		<i>Catapodium rigidum</i>	Fern Grass		1						
*		<i>Cenchrus clandestinus</i>	Kikuyu	5	3	5		3	3	3	3
		<i>Cenchrus setaceus</i>	Fountain Grass							2	
*		<i>Cirsium vulgare</i>	Spear Thistle							1	
*	N	<i>Cortaderia selloana</i> subsp. <i>selloana</i>	Pampas Grass								1
*	P, N	<i>Corymbia calophylla</i>	Marri								3
*	P, N	<i>Corymbia citriodora</i> subsp. <i>citriodora</i>	Lemon-scented Gum				4		4 (3 planted trees, 1 naturalised seeding)	4	
*	P, N	<i>Corymbia maculata</i>	Spotted Gum				4		4 (1 planted tree, 1 naturalised seedling)	3	
*		<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	5				3	3		
*		<i>Dactylis glomerata</i>	Cocksfoot	1							
*		<i>Ehrharta erecta</i>	Panic Veldt-grass	3	2		3	3	3		2
*		<i>Ehrharta longiflora</i>	Annual Veldt-grass	3	2			2	2		2
*		<i>Erigeron sumatrensis</i>	Tall Fleabane		1	1					1
*	P, N	<i>Eucalyptus gomphocephala</i>	Tuart							2	3
*	P, N	<i>Eucalyptus occidentalis</i>	Swamp Yate							2	3







Origin	Status	Scientific name	Common name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Quadrat 6	Quadrat 7	Quadrat 8
*	P, N	<i>Eucalyptus platypus</i> subsp. <i>congregata</i>	Moort				4				
*		<i>Festuca arundinacea</i>	Tall Fescue			2					
*	P, N	<i>Fraxinus angustifolia</i> subsp. <i>angustifolia</i>	Desert Ash								2
*		<i>Galium aparine</i>	Cleavers	1							
*	N	<i>Grevillea robusta</i>	Silky Oak				2				
*		<i>Holcus lanatus</i>	Yorkshire Fog							1	
*		<i>Hordeum leporinum</i>	Barley-grass		1						
*		<i>Hypochaeris radicata</i>	Flatweed	1	2	1		1		1	1
*		<i>Lepidium africanum</i>	Common Peppercress		2						
*	P	<i>Liquidambar</i> <i>styraciflua</i>	Liquidamber							2	
*		<i>Lotus uliginosus</i>	Greater Bird's-foot Trefoil			1					
*		<i>Modiola caroliniana</i>	Red-flower Mallow		2		1				
*		<i>Paspalum dilatatum</i>	Paspalum			2				3	
*		<i>Plantago coronopus</i> subsp. <i>coronopus</i>	Buck's-horn Plantain							1	1
*		<i>Plantago lanceolata</i>	Ribwort			3				1	
*		<i>Prunus cerasifera</i>	Cherry Plum	+							
*		<i>Romulea rosea</i> var. <i>australis</i> s.s.	Common Onion- grass			3					
*		<i>Salpichroa</i> <i>organifolia</i>	Pampas Lily-of- the-Valley	6							
*		<i>Setaria parviflora</i>	Slender Pigeon Grass							1	
*		<i>Solanum nigrum</i>	Black Nightshade					1	1		
*		<i>Sonchus oleraceus</i>	Common Sow- thistle	1	1	1		1	1		
*		<i>Sporobolus africanus</i>	Rat-tail Grass			1					
*		<i>Taraxacum</i> sp.	Dandelion				2			1	
*		<i>Trifolium arvense</i> var. <i>arvense</i>	Hare's-foot Clover		1						
*		<i>Vulpia</i> sp	Squirrel-tail Fescue		4	3			2	3	
			<b>Bare ground</b>	NA / 0	4	0	3	0		8	7
			<b>Gravel</b>		6		0				

Origin	Status	Scientific name	Common name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Quadrat 6	Quadrat 7	Quadrat 8
			Litter	Abundant (mostly native)	Variable (some areas high, others bare)	Abundant (non-native)	9 (mostly non-native)	9 (mostly native)		5	8
			Other		Eucalyptus recruits (10 River Red-gums < 2m, 2 Yellow Box < 50 cm)	Site seasonally waterlogged	Dense stand of Eucalypts (mostly exotic young recruits) <i>Eucalyptus platypus</i> subsp. <i>congregata</i> , a Mallet from Western Australia is a new record of a naturalised plant for Victoria.	Concrete path running north-south through quadrat, approx. 1 m wide. Site of now extinct population of <i>Hackelia suaveolens</i> Sweet Hounds-tongue.	Edge of carpark kerb. Old dead <i>Acacia implexa</i> , now with multiple vigorous suckers to c. 2.5 m high.	Area scalped to 100 m deep because of asbestos contamination leaving bare substrate (soil/rock derived from Sandringham Sandstone). Gentle eastern-north-eastern slope, now eroding.	Area scalped to c. 100 m deep because of asbestos contamination. Erosion significant.



Monitoring quadrat photo-points

The images below were taken in December 2023 and January 2024 and are provided as a baseline for comparison of the site condition over time.

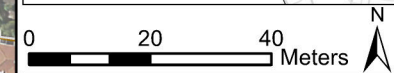
Monitoring quadrat -1	Monitoring quadrat - 2	Monitoring quadrat - 3	Monitoring quadrat - 4
			
Monitoring quadrat - 5	Monitoring quadrat - 6	Monitoring quadrat - 7	Monitoring quadrat - 8
			





- Study Area
- Quadrat Stake
- Quadrat
- Contour (1m)

**Figure 4**  
**Monitoring Quadrats**  
*Highett Plains Grassy Woodland*  
37 Graham Road, Highett



Date: 7/03/2024  
Created by: JP  
Job: 23105  
File: 23105\_BaysideCityCouncil\_37GrahamRdHighett  
Note: Location of property boundaries, watercourse, roads and topography indicative only.

Suite 1, 4 Brisbane Street Eltham,  
Victoria 3095. Ph 03 9431 5444  
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## Appendix 2: Proforma for collections of plant material

### Proforma for collections of each accession of plant material

Species name: .....

Sources of material (location where collected and coordinates: .....

.....

In situ ☐ or ex situ ☐ plants/populations

Type of material:

- ☐ seed
- ☐ cuttings
- ☐ divisions
- ☐ whole plants

Collector(s): .....

Collection number: .....

Who propagated the material? .....

Who identified the plant species? .....

Who supplied the plants (nursery, individuals etc): .....

Number of plants/size of population providing the propagating material: .....

.....

Where seeds kept/ live plants grown: .....



## Attachment 1: Masterplan of Highett Plains Grassy Woodland – Bayside City Council



**Attachment 2: Arboricultural Assessment: Assessment of trees as part of the development of the Masterplan for Highett Plains Grassy Woodland (Ryder Arboricultural and Environment 2024)**