Final Report

Annual Report (Year 4): Ravenhall Industrial Precinct Offset Site, Victoria

Prepared for

Dexus

December 2023

Ecology and Heritage Partners Pty Ltd

MELBOURNE: 292 Mt Alexander Road, Ascot Vale VIC 3032 **GEELONG:** 230 Latrobe Terrace, Geelong West VIC 3218
BRISBANE: Level 22, 127 Creek Street, Brisbane QLD 4000 **ADELAIDE**: 78 Edmund Avenue, Unley SA 5061
CANBERRA: 19-23 Moor Street, Turner ACT 2612 **SYDNEY:** Level 5, 616 Harris Street, Ultimo NSW 2007
www.ehpartners.com.au | 1300 839 325

DOCUMENT CONTROL

Assessment	Annual Report for the Ravenhall Industrial Precinct Offset Reserve
Address	91-167 Palm Street, Ravenhall, Victoria
Project number	17136
Project director	Shannon LeBel (Associate Ecologist)
Project manager	Anneke Martin (Consultant Botanist)
Report reviewer	Claire Ranyard (Associate Botanist)
Report prepared by	Braden Callaway (Botanist), Anneke Martin (Consultant Botanist)
EHP Field Staff	Claire Mackay (Consultant Zoologist), Samantha Murray (Field Ecologist), Braden Callaway (Botanist), Madison Cassie (Ecologist), David Heaton (Consultant Zoologist), Lauren Sandy (Field Ecologist), Emma Hinde (Zoologist); Sarah Hill (Zoologist)
Mapping	Petra Sorensen (GIS Analyst)
File name	17136_EHP_Ravenhall_ Yr4Report _Final_12122023
Client	Dexus
Bioregion	Victorian Volcanic Plain
Catchment Management Authority	Melbourne Water
Local Government Authority	Melton City Council
DEECA region	Port Phillip
Acknowledgments	Andrew McDonald (Head of Developments [South]) – Dexus Wholesale Management Ltd
	Rachel Nelsson and the crew from Aus Eco Solutions for management works and reporting

Report version	Comments	Report updated by:	Report reviewed by:	Date submitted
Draft	Report sent to the client for review.	BC/AM	CR	11/12/2023
Final	Addition of Burn Report, and minor text edits.	AM	CR	12/12/2023

Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this annual report (EPBC 2015/7486: Ravenhall Offset Site: Year One Annual Report) is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
    a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
    b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.
    c. The above offences are punishable on conviction by imprisonment, a fine or both.

_____

Signed

Anneke Martin

_____

Full name (please print)

Ecology and Heritage Partners Pty Ltd

_____

Organisation (please print)

12/12/2023

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Date

GLOSSARY

Acronym	Description
CMP	Conservation Management Plan
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEECA	Victorian Department of Energy, Environment and Climate Action
DELWP	Victorian Department of Environment, Land, Water and Planning
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth)
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
MP	(Section 69) Management Plan

APPROVAL CONDITION STATUS

Table 1 below summarises the current compliance status of the EPBC 2015/7486 approval conditions.

Table 1 Compliance status of EPBC 2015-7486 Approval Conditions

Approval Condition	Status	Condition Met
1	No more than 18.02 hectares of NTGVVP, 40.23 hectares of SLL habitat and 13 SRF plants were impacted during the Year One monitoring period.	Yes
2	A CMP has been prepared detailing the management measures that will be undertaken to maintain and enhance the protected matters within the on-site offset site. The CMP is being implemented to ensure the protected matters in the on-site offset are protected during construction. This report addresses fencing requirements in Section 2.5.2.	Yes
3	The on-site offset contains at least 13.37 ha of NTGVVP, at least 28.98 ha of Striped Legless Lizard habitat and at least 86 Spiny Rice-flower plants.	Yes
4	Off-site offset in Ombersley secured.	Yes
5	A MP has been submitted to and approved by the Department. The MP is being implemented by the landowner of the off-site offset.	Yes
6	The Year 2 MP (2020/2021) was prepared addressing the requirements of Condition 6 by EcoLink (Bleak House Pty Ltd 2021; Appendix 4). A report detailing the quality of vegetation and Striped Legless Lizard population numbers has also been submitted to the Department (8th February 2017).	Yes
7	Shapefiles were provided to the Department on 11/09/2018	Yes
8	Not applicable	
9	Not applicable	
10	Report published online within one (1) month following approval by the Minister.	Yes
11	Report published online within three months of the 12-month anniversary.	Yes
12	Not applicable	
13	Not applicable	
14	Not applicable	
15	Not applicable	
16	Not applicable	
17	Not applicable	
18	Not applicable	
19	Not applicable	

EXECUTIVE SUMMARY

Ecology and Heritage Partners were engaged by Dexus to undertake the Year Four monitoring of the on-site offset reserve in accordance with the EPBC referral 2015/7486, and the corresponding Conservation Management Plan and (Section 69) Management Plan.

This report details the results of the Year Four ecological monitoring, including the status of three matters of National Environmental Significance; Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* population, Striped Legless Lizard *Delma impar* population and condition of the ecological community, *Natural Temperate Grassland of the Victorian Volcanic Plain*.

Natural Temperate Grassland of the Victorian Volcanic Plain

An assessment of the condition and extent of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) was undertaken to observe any changes in the native vegetation cover and weed extent within the grassland. The cover of NTGVVP has increased by 0.441 hectares within the offset site, from 17.169 hectares to 17.610 hectares; an increase of 2.57 percent. This is due to intensive weed control works along the southern boundary, which increased the cover of native grasses. The condition of NTGVVP overall improved too, due to extensive spraying of Serrated Tussock *Nassella trichotoma* and ecological burning within the western portion of the site. The habitat hectare score for these areas increased from 0.53 to 0.57.

Spiny Rice-flower

The existing population of Spiny Rice-flower present within the offset reserve were monitored during the flowering period of the species (April – August). An additional 55 plants were present in Year 4 compared to Year 3, with a total of 148 plants recorded. This demonstrates the population is persisting and increasing within the site.

Striped Legless Lizard

Ten tile grids, with 50 tiles in each, have been maintained within the offset site since March 2020. Six of the required eight surveys for Striped Legless Lizard have been conducted to date in Year 4, with the final two scheduled for mid-December. No Striped Legless Lizards have been recorded during the Year 4 surveys to date (compared to 21 in Year 1, 24 in Year 2, and 18 in Year 3), though the amount of Striped Legless Lizard habitat remains at the required 28.98 hectares. This results reflect those at other nearby Striped Legless Lizard offset sites, and may be due to generally high biomass levels within the site (due to the effects of the recent La Niña years) which may be offering sufficient shelter for the species and causing the species to utilise the tiles less.

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by DWPL Nominees Pty Ltd and Dexus Wholesale Management Ltd (herein referred to as 'Dexus') to undertake ecological monitoring and oversee management works for the Ravenhall Industrial Precinct offset site, located at 91-167 Palm Street, Ravenhall, Victoria (Figure 1). The on-site offset has been established to protect at least 13.37 hectares of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), 28.98 hectares of Striped Legless Lizard *Delma impar* habitat, and a population of Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* that contains at least 86 individuals. Several patches of Plains Grassland (PG) are also used to generate state offset credits in order to partially satisfy Condition 51 of Planning Permit PA2013-4050/5 issued by the City of Melton.

The following conditions apply to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval (EPBC 2015/7486):

Condition 2: Construction

2. *In order to protect NTGVPP, Striped Legless Lizard and Spiny Rice-flower to be retained in the on-site offset:*

   a. *The approval holder must ensure that no construction activities occur within the on-site offset, excluding activities required in the Conservation Management Plan for the on-site offset.*

   b. *After the construction phase is complete, the on-site offset must be protected by permanent fencing that restricts vehicle access to the on-site offset.*

   c. *The approval holder must implement the Construction Environmental Management Plan (CEMP).*

Condition 3: On-site offsets

3. *To compensate for the loss of up to 18.02 ha of NTGVVP, up to 40.23 ha of Striped Legless Lizard habitat, and up to 13 Spiny Rice-flower, the approval holder must secure the on-site offset with a covenant prior to commencement of construction. The on-site offset must contain at least 13.37 ha of NTGVVP, at least 28.98 ha of Striped Legless Lizard habitat and at least 86 Spiny Rice-flower plants.*

To partially satisfy Condition 3, an on-site offset was established and secured in perpetuity through a Section 69 agreement (VC_CFL-3086_01) under the *Conservation, Forest and Lands Act 1978*, and an on-site Management Plan (MP) was developed. A CMP was also developed and approved by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) – formally Department of Agriculture, Water and the Environment (DAWE) under the EBPC Act to guide the management, monitoring and auditing works, as per Condition 2.

The management, monitoring and auditing works required to be undertaken within the offset site are detailed in the CMP (Ecology and Heritage Partners 2019) and Management Plan (MP) prepared for the section 69 agreement (VC_CFL-3086_01). Specifically, the works relate to the protection and ecological monitoring of the quality of the native vegetation and significant ecological values present within the offset site, as specified in

the landowner agreement (VC_CFL-3086_01), including three matters of National Environmental Significance (NES); NTGVVP, Spiny Rice-flower and Striped Legless Lizard.

Ecology and Heritage Partners subcontracted Aus Eco Solutions Pty Ltd to implement pest plant and animal control, biomass reduction and revegetation for the ecological management works for the Year 4 works.

This report outlines the results of the Year 4 annual monitoring and addresses the management, in accordance with the CMP and MP. The section 69 agreement was secured on title on the 28 November 2019, and this report addresses the monitoring and reporting requirements of the approved management plan for the on-site offset site.

1.2 Objectives

The overall objective of the CMP is to protect and improve the quality and extent of native vegetation and significant ecological values present within the offset site, as specified in the landowner agreement (VC_CFL-3086_01). This includes the populations of nationally significant species listed under the EPBC Act, Spiny Rice-flower and Striped Legless Lizard, as well as the threatened ecological community, *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP). The approval conditions state that the site must protect at least 28.98 hectares of Striped Legless Lizard habitat, 13.37 hectares of NTGVVP and 86 Spiny Rice-flower plants.

1.3 Offset Site Security

Condition 3 of the EPBC Act approval specifies that the land identified as the on-site offset in approval 2015/7486 adjacent to the clearing site must be protected in perpetuity to compensate for impacts to the nationally significant ecological community NTGVVP, Spiny Rice-flower and Striped Legless Lizard using a conservation covenant. A Section 69 Agreement (VC_CFL-3086_01) was entered under the *Conservation, Forests and Lands Act 1987* between DWPL Nominees Pty Ltd and Dexus Wholesale Management as the landowners and DELWP (now DEECA) (title secured and registered 28 November 2019).

2 MONITORING METHODS

Baseline data to determine the condition and extent of Plains Grassland and NTGVVP, as well as the current population status of Striped Legless Lizard and Spiny Rice-flower within the offset site was undertaken on the 14 June 2019 to inform the CMP (Ecology and Heritage Partners 2019) and MP. Ecological management and monitoring will be actively undertaken annually over a period of 10 years to ensure that the quality conditions outlined within the CMP and MP are met. Years 1 – 3 have been completed.

Ecological monitoring in Year 4 was undertaken to monitor the quality and extent of PG and NTGVVP, as well as the population status of residing Striped Legless Lizard and the retained Spiny Rice-flower population within the offset site. The following section outlines the methods used to undertake the monitoring in Year 4, in accordance with the CMP (Ecology and Heritage Partners 2019) and MP (VC_CFL-3086_01).

2.1 Native Vegetation

The following methods have been undertaken in accordance with the CMP (Ecology and Heritage Partners 2019), MP (VC_CFL-3086_01) and associated federal policy documents, *Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland* (Commonwealth of Australia 2011a) and *Commonwealth Listing Advice on Natural Temperate Grassland of the Victorian Volcanic Plain* (Threatened Species Scientific Committee 2008):

- To assess changes in quality and extent of PG and NTGVVP, the following monitoring was undertaken:
    - The extent of PG and NTGVVP was mapped and a Habitat Hectare assessment (as per the *Vegetation Quality Assessment Manual: Guidelines for applying the habitat hectares scoring method* (DSE 2004) was undertaken to determine the overall quality (i.e. condition); and,
    - Photo point (see Figure 4) monitoring was undertaken at photo points established in Year 1, which were placed in areas of native vegetation and predominantly weeds:
- An assessment of suitable habitat (i.e. extent, quality and structure) for Striped Legless Lizard and Spiny Rice-flower was undertaken to determine the effectiveness of management for the existing populations;
- Weed Monitoring to determine the effectiveness of management:
    - Broad weed mapping to record the overall cover, extent and composition (i.e. herbaceous, grassy, woody) of weeds within the offset site; and,
    - The cover and extent of all high threat weeds, as per the CMP, was mapped and recorded.

2.2 Spiny Rice-flower

The following methods have been undertaken in accordance with the CMP (Ecology and Heritage Partners 2019), MP (VC_CFL-3086_01) and the survey guidelines outlined within *the Significant impact guidelines for the critically endangered Spiny Rice-flower* (*Pimelea spinescens* subsp. *spinescens*) (DEWHA 2009):

- Monitoring was completed by suitably qualified botanists (i.e. botanists with prior survey experience);

- Multiple surveys were undertaken to ensure the survey effort was adequate;
- Monitoring was conducted at least six months post fire;
- Monitoring was conducted between April and August when the species is flowering;
- Survey effort included all potential habitat areas i.e. remnant grassland including degraded grassland;
- Transects at less than 5 metre intervals were undertaken in all areas of potential habitat;
- The number and location of all plants were recorded and individually marked with a stake and GPS coordinates; and,
- A broad assessment of the vegetation condition within the site was also recorded.

Spiny Rice-flower monitoring is undertaken annually for the first four years, and then every second year (i.e. years 6, 8 and 10), as per the CMP (Ecology and Heritage Partners 2019).

2.3 Striped Legless Lizard

The following methods have been undertaken in accordance with the CMP (Ecology and Heritage Partners 2019), MP (VC_CFL-3086_01) and the *Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act* (Commonwealth of Australia 2011b):

- 10 tile grids (10 x 5 tiles per grid) were established in March 2020 (Figure 3), and are checked each year to ensure tiles remain in place and in good condition (and replaced if necessary);
- Tiles were established in areas of suitable habitat (i.e. tussock grassland or grassy habitat) at least three months before the survey period to allow 'bedding-in';
- Tiles will be checked a minimum of eight times between September and December under suitable conditions (early morning on warm, still days);
- Time of survey, weather conditions and the ambient temperature will be recorded for each grid; and,
- Morphological data including sex, body size and reproductive condition will be recorded for all individuals captured, as well as dorsal head shots for unique identification purposes.

Striped Legless Lizard monitoring will be undertaken annually for the first four years, and then every second year (i.e. years 6, 8 and 10), as per the CMP (Ecology and Heritage Partners 2019).

3 MONITORING RESULTS

3.1 Native Vegetation

Baseline data collection to determine the current condition and extent of native vegetation within the offset site was undertaken on 14 June 2019. The baseline data informed the EPBC Conservation Management Plan objectives and section 69 Management Plan associated with the offset site.

In Year 4, detailed vegetation monitoring was undertaken on 5 June, 5 July, 4 August, 5 October, and 2 November 2023, by a suitably qualified Botanist. A habitat hectare assessment was undertaken to assess any changes in the vegetation quality and/or extent, and a description is provided below. The most recent (2nd November 2023) habitat hectare scores for vegetation are provided in Appendix 1. Overall, the extent and quality of most vegetation patches remained consistent with the Year 3 results.

Western section

Native vegetation patches in the western section of the reserve remained relatively consistent compared to Year 3 results. Native vegetation patches PG1a, PG1b and PG1c on Figure 2 (i.e. zones 2B, 2C and 2H) were still dominated by Kangaroo Grass *Themeda triandra,* and included swathes of Wallaby-grass *Rytidosperma* spp. and Spear-grass *Austrostipa* spp. Biomass was high in these patches (approx. 5% bare ground), and there was limited inter-tussock space (i.e. 10cm) (Plate 1). However, Plains Grassland patches that qualified as NTGVVP (Figure 2) had lower weed cover than elsewhere (20%) and compared to Year 3 results, largely due to the high Kangaroo Grass and Wallaby-grass biomass limiting recruitment space and intensive weed control works within the burn areas. Herbaceous and grassy weeds were common throughout the western section; however, these were largely limited to the edges of patches, particularly along the boundaries of the offset site in 2D, 2E, and 2F, and surrounding the rock pile in 2A (Plate 3) (sections 3.5.2 and 3.5.3), which is an edge effect to be expected in this otherwise modified broader environment. While the rock pile in 2A contained approximately eight re-sprouting African Box-thorn *Lycium ferocissimum* (Plate 4), most woody weeds have been removed from the western portion; only limited emerging woody weeds (African Box-thorn) were observed (section 3.5.1), and these are scheduled for treatment in mid-December now that the species is actively growing again.

Scattered drifts and individuals of Serrated Tussock *Nassella trichotoma* and Chilean Needle-grass *Nassella neesiana* persist and will require follow-up work in Year 5 (Plate 2), however most high threat herbaceous weeds and grassy weeds within these areas have been successfully sprayed, and overall cover has not increased from previous levels. Weed cover from pasture grasses (typically annual weeds) was high (>60%) outside areas of mapped native vegetation, and moderate (approximately 30%) within patches of plains grassland.

Plate 1. High biomass comprised of Kangaroo Grass, Wallaby-grass and Soft Brome, with limited inter-tussock space within the western section of PG1b (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 2. Serrated Tussock scattered between Kangaroo Grass in PG1b (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 3. Large Quaking-grass along the rock pile in zone 2A (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 4. Re-sprouting African Boxthorn within the rock pile in zone 2A (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Eastern Section

The quality and extent of native vegetation in the eastern section of the offset site remained relatively consistent between Year 3 and Year 4, however saw a slight decrease in condition due to the increased weed cover, particularly of annual grasses and resulting increase in non-native organic litter. Aus Eco Solutions focused more heavily on the western section during Year 4 due to the need to conduct intensive pre- and post-burning weed control activities and continue to maintain the 2021 burn area. Plains Grassland patches in the eastern section were dominated by Wallaby-grass and Spear-grass (PG2b, PG3b, PG3d, PG3f, PG3g on Figure 2), with occasional swathes of scattered Kangaroo Grass (PG3f, PG3h on Figure 2) (Plate 5; Plate 6). Weed cover within this section was higher than previous years (up to 65% outside areas of NTG), with annual grasses increasing in cover and extent (Plate 7; Plate 8). High threat herbaceous weeds, including Artichoke Thistle *Cynara cardunculus* subsp. *flavescens* and Patterson's Curse *Echium plantagineum*, are still present within the eastern portion, however, decreased in overall cover from approximately 10% to 5% in Year 4 due to targeted control works by Aus Eco Solutions. High threat grassy weeds, including Serrated Tussock and Chilean Needle-

grass are present within the eastern section of the reserve, however the cover and extent has also reduced since Year 3 due to effective spot-spraying and high biomass reducing recruitable space. The cover of other high threat weed species including Ribwort *Plantago lanceolata*, Galenia *Aizoon pubescens* and Cat's-ear *Hypochaeris radicata* have remained relatively consistent throughout the offset site and in patches of mapped native vegetation. However, they have increased in isolated areas which they continue to dominate such as in portions of zone 4A and 4C, and portions of the linear area in 2D; work is scheduled in Year 5 to address the small areas dominated by these species.

Plate 5. Wallaby-grass and exotic annual grasses within the southern section of PG2b (zone 3B) (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 6. Swathe of Kangaroo Grass within PG3h (zone 5A (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 7. Annual grasses (Wild Oat and Rye Grass) within zone 4A, PG3f on Figure 2 (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 8. Wild Oat within PG3b and PG2b (zone 3B) (Ecology and Heritage Partners Pty Ltd 02/11/2023).

The previously recorded Patch PG2c (0.111 hectares in size, within habitat zone 3C) was no longer considered NTGVVP. While native grasses were still present within this area and amounted to greater than 25% of the perennial cover, they did not have the required cover (i.e. greater than 50%) to be considered NTGVVP. This was largely attributed to the high cover (>70%) of annual grasses collapsing and smothering native grasses. However, while at the time of survey this area did not qualify as NTGVVP, native grasses may be persisting underneath the annual grasses which could lead to this area being reclassified as NTGVVP in later seasons. The

biomass levels made it difficult to determine the extent of natives persisting beneath at the time of assessment. Conducting an ecological burn in this area would assist in reducing biomass levels.

Linear section

Zone 2D was subject to intensive weed control throughout Year 4 to prepare for direct seeding (over sowing) in Year 5. This action was designed to encourage native vegetation colonisation and expansion throughout the linear section of the offset site, ultimately improving the cover of tussock-grasses and quality of native vegetation, and therefore habitat for Striped Legless Lizard and Spiny Rice-flower. The intense weed control works undertaken opened up previously unavailable space for native grasses, and this resulted in the spread of native grasses into this area. Large areas along the southern boundary of 2D were previously not considered a patch, however a high rate of emergence of Wallaby-grasses and Kangaroo grass throughout 2023 re-established 1.409 hectares of Plains Grassland in this area (without the assistance of direct seeding which is schedule for Year 5). Large swathes on the southern boundary of 2D now also constitute NTGVVP (i.e. part of patch PG1b on Figure 2) (Plate 9). It is proposed to focus Year 5 direct seeding efforts on the adjoining areas that do not yet constitute Plains Grassland, including an area within the linear section in zone 2D which was dominated by Chilean Needle-grass, Serrated Tussock, Toowoomba Canary-grass *Phalaris aquatica*, Paspalum *Paspalum* sp., and Ribwort, with only scattered native species present.

Summary of Native Vegetation

Some areas of the offset site experienced an apparent reduction in native cover, predominantly due to growth in annual weeds. Four small areas (totalling 0.414ha) which were previously recorded as patches of PG no longer had the required cover to be considered a patch (i.e. less than 25% of the perennial plant cover was native) with the most common perennials including Chilean Needle-grass, Cocksfoot *Dactylis glomerata*, and Toowomba Canary-grass *Phalaris aquatica*. A large portion of the southern border of 4C was dominated by annuals such as Wild Oat *Avena fatua* and Wimmera Rye-grass *Lolium rigidum* and Ribwort, with the perennial species consisting of Prairie Grass *Bromus catharticus*, and Chilean Needle-grass. Ribwort was the dominant species and constituted up to 90% cover within zone 4C (Plate 10).

Similarly, an area within the linear section in zone 2D was dominated by Chilean Needle-grass, Serrated Tussock, Toowoomba Canary-grass *Phalaris aquatica*, Paspalum *Paspalum* sp., and Ribwort with only scattered native species present. Lastly, a 0.327-hectare area on the northern boundary of 2D and 2E had high cover of the annual weeds Ribwort, Soft Brome *Bromus hordeaceus,* and Wimmera Rye-grass, with the dominant perennial being Chilean Needle-grass, which together were preventing the growth of native grasses in this area. However, these areas only comprise a total of 1.44 percent of the 28.82 hectare offset site, and results from the ecological burning and intensive weed control completed in other areas of the offset site demonstrate that these areas can be returned to Plains Grassland. Conversely, the cover of NTGVVP has increased by 0.441 hectares across the offset site, from 17.169 hectares to 17.610 hectares, an increase of 2.57 percent. Maintaining a program of intensive weed control, ecological burning and direct seeding should translate to further improvements in future years, including an increase in Spiny Rice-flower and Striped Legless Lizard habitat.

In summary, the site is currently meeting approval condition number three, as more than 13.37 hectares of NTGVVP is currently protected within the on-site offset site.

Plate 9. Area previously not considered PG in Zone 2D, now NTGVVP dominated by Wallaby Grasses and Kangaroo Grass (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 10. Area dominated by Ribwort in zone 4C (previously PG3g) (Ecology and Heritage Partners Pty Ltd 02/11/2022).

3.2 Spiny Rice-flower

The objective of the Spiny Rice-flower monitoring was to ensure that the population is maintained or improved through management of threats to the population, based on the initial 86 individuals recorded within the offset site reserve as detailed in the CMP (Ecology and Heritage Partners 2019).

Monitoring in Year 4 was undertaken during the species flowering period, by suitably qualified botanists on 24 and 25 May 2023. Identified individuals were marked with a GPS.

Spiny Rice-flower were noted flourishing within the offset site during the Year 4 survey. Scattered Spiny Rice-flower were recorded in both the western and linear sections, however most existed in several clusters within zones 2C, 2D and 2E (within the western section), 2H)within the linear section) and 4A (within the eastern section)(Figure 2). These clustered populations were shown to be actively recruiting, with an additional 55 Spiny Rice-flower plants recorded within the offset area (63 in Year 1; 90 in Year 2; 93 in Year 3; 148 in Year 4) (Figure 2). The majority of Spiny Rice-flower observed contained flowering material and appeared in good health (Plate 11 - Plate 14). Only four individuals were noted to have died. Overall, 16 individuals could not be located, including several individuals in the western portion of PG1b (zone 2C) which could also not be located in previous years (Year 2 or 3). Given these individuals could not be located in three consecutive years they are presumed dead. However, biomass was high at the time of survey which impacted detectability of Spiny Rice-flower in this area. A burn took place in this area of the offset site on 30th of May (i.e. after the targeted surveys) which may encourage plants to re-sprout, so these locations should continue to be checked in future monitoring years.

Similarly, several individuals in the linear section of the site were not detected this year, but may be detected in future years. Overall, finding an additional 55 Spiny Rice-flower in Year 4 is a good sign that the plants are persisting within the offset site and the population is growing.

In summary, the site is currently meeting approval condition number three, as at least 86 Spiny Rice-flower plants are present.

Plate 11. Flowering Spiny Rice-flower within native grasses in PG1c (zone 2H) (Ecology and Heritage Partners 24/05/2023).

Plate 12. Staked and flagged Spiny Rice-flower within the PG3h (zone 4A) (Ecology and Heritage Partners 24/05/2023).

Plate 13. Young Spiny Rice-flower within zone 2D cluster (Ecology and Heritage Partners 25/11/2023).

Plate 14. Large flowering Spiny Rice-flower in good health within zone 4A (Ecology and Heritage Partners 24/05/2023).

High threat weeds such as Serrated Tussock, Chilean Needle-grass, Artichoke Thistle and Galenia have the potential to out-compete or smother Spiny Rice-flower plants and prevent recruitment. These species were either absent, or present in only low covers around the clusters of Spiny Rice-flower due to hand-weeding treatments. However, native grasses with high biomass (due to a lack of episodic disturbance such as fire), including Kangaroo Grass can also out-compete Spiny Rice-flower plants. Ongoing targeted weed control, including hand weeding around Spiny Rice-flower, and biomass removal through ecological burns will continue to mitigate these threats to the Spiny Rice-flower plants present and encourage them to recruit.

The one Spiny Rice-flower plant that had a water hose laid upon it during the unauthorised access incident in August 2022 has been monitored regularly and is showing no signs of damage (Plate 15). Similarly, the vegetation that was inundated during the incident is showing no signs of adverse impacts; its condition is consistent with previous surveys. This vegetation will continue to be checked in future monitoring years.

Plate 15. Spiny Rice-flower showing no signs of damage (Aus Eco Solutions 09/11/2023).

3.3 Striped Legless Lizard

Striped Legless Lizard monitoring was undertaken over six separate events on 27 October, 3, 8, 16 and 23 November, and 4 December by qualified Zoologists. The final two surveys are scheduled for mid-December. So far, no Striped Legless Lizard have been recorded, compared to 21 in Year 1, 24 in Year 2, and 18 in Year 3 (Table 1), despite surveys adhering to the *Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act* (Commonwealth of Australia 2011b). Four other grassland reptiles have been recorded using the artificial refuge, including Eastern Blue Tongue *Tiliqua scincoides* (Plate 16), Little Whip Snake *Suta flagellum* (Plate 17), Tiger Snake *Notechis scutatus* and Common Garden Skink *Lampropholis guichenoti.* Common Garden Skink has not been previously recorded using the tiles. Across the six surveys completed so far, there has been a reduction in the number of reptiles found compared to previous years (Table 1; Table 2).

This reduction may relate to the high biomass levels particularly within the eastern portion (zones 3A, 3B, 3C, 3D), driven by annual grassy weeds such as Wild Oat, Soft Brome and Wimmera Rye-grass, which have reduced the inter-tussock spacing below ideal levels (i.e. <10cm) in these areas. Average temperatures above and below the tiles were relatively similar to those of Year 3, though a little higher due to one hot day (4 December 2023) during which below tile temperatures reached between 50 and 60 degrees towards the end of the survey (despite the ambient air temperature remaining at or below 28 degrees for the duration of the survey).

Interestingly, a high number of Spotted Marsh Frog *Limnodynastes tasmaniensis* have been recorded over the past two years, compared to none in Years 1 and 2. This could be a symptom of the recent consecutive La Niña years which made the site wetter in areas and provided better conditions for frogs. They appear to be favouring the western portion of the site.

Given that 18 Stiped Legless Lizard were recorded on the site last year, it is assumed the species is still present, but is choosing to not use the tiles as refuge. It may be that the high biomass is providing sufficient shelter for the species. Similar results have been recorded within at least two nearby Striped Legless Lizard offset sites; biomass levels are high and no Striped Legless Lizard have been recorded this year.

Plate 16. Blue-tongue lizard observed on site (Ecology and Heritage Partners Pty Ltd 05/10/2023).

Plate 17. Little Whip Snake observed on site (Ecology and Heritage Partners Pty Ltd 04/12/2023).

Table 1. Total number of individuals recorded during Striped Legless Lizard tile checks.

Scientific Name	Common Name	Year 1	Year 2	Year 3	Year 4
REPTILES					
Delma impar	Striped Legless Lizard	21	24	18	0
Notechis scutatus	Tiger Snake	-	3	8	6
Suta flagellum	Little Whip Snake	1	21	25	14
Tiliqua scincoides	Eastern Blue Tongue	8	55	36	7
Lampropholis guichenoti	Common Garden Skink	-	-	-	2
Pseudonaja textilis	Eastern Brown Snake	-	-	-	1
FROGS					
Limnodynastes tasmaniensis	Spotted Marsh Frog	-	-	31	62
MAMMALS					
*Mus musculus**	House Mouse	-	6	1	2

Notes: * = Introduced species.

Table 2. Summary of survey results from Striped Legless Lizard surveys (Year 4).

Date	Observer	Time	Avg Air Temp °C	Avg Cloud Cover (avg)	Avg Wind Direction and Spd	Avg Above Tile Temp °C	Avg Under Tile Temp °C	Observations & Tile Grid No.									
								1	2	3	4	5	6	7	8	9	10
27/10/2023	CM & SM	9:26 - 12:33	14.5	5.5	15.75 (SE)	32.1	21.83	SMF X1	HM X1	SMF X3	SMF X3; LWS X1	SMF X16	-	LWS X2; EBT X1	-	HM X1; EBT X1	-
03/11/2023	SM & LS	8:57 – 11:49	13.37	100	16.27 (S)	19.23	14.89	-	-	SMF X1	TS X1	-	-	TS X1	-	EBT X2	TS X1; EBT X1
08/11/2023	CM & LS	8:59 – 11:01	26.13	1	16.8 (NNW)	41.98	29.25	-	-	-	-	-	-	TS X1	EBT X1	-	CGS X1
16/11/2023	DH & LS	10:09 – 13:02	16.4	86	21.9 (SSW)	29.8	23.3	-	-	-	-	-	CGS X1	-	-	EBT X1	-
23/11/2023	MC & BC	9:43 – 13:30	19.6	78	13.4 (SSE)	35.6	25.7	-	-	-	-	-	LWS X1	LWS X1	LWS X1	-	-
04/12/2023	SH & LS	9:49 – 12:23	26.5	21	15.5 (NW)	49.12	31.57	-	SMF X1	-	SMF X3	SMF X28; LWS X1	SMF X5; LWS X1	TS X1; LWS X2	TS X1; LWS X3	-	LWS X1; EBS X1; SMF X1

Notes: Avg = average; EBT = Eastern Blue Tongue; LWS = Little Whip Snake; TS = Tiger Snake; CGS = Common Garden Skink; SMF= Spotted Marsh Frog; HM= House Mouse; EBS=Eastern Brown Snake.

3.4 Management Action Plan

An assessment of completed actions to date against the Management Action Plan table in the section 69 MP is provided in the following sections.

3.5 Weeds

3.5.1 Overview

In Year 4, overall weed cover decreased within the offset site. While some species (such as Prickly Ox-tongue *Helminthotheca echioides*, Ribwort, Wild Oat, Quaking Grass *Briza maxima*, Flatweeds *Hypochaeris* spp. and Mustard weeds *Brassica* spp.) were observed in higher cover compared to Year 3 in some small discrete areas of the site, the weed management actions implemented, including the ecological burn and intensive weed control in key areas, have created positive results across the majority of the site. Large swathes of Serrated Tussock and Chilean Needle-grass have been effectively treated, which has reduced the cover of these high threat species by 5% each (Serrated Tussock reduced from 10% to 5% cover, and Chilean Needle-grass reduced from 5-15% to 5-10% cover).

Floristic species composition remains stable with no new weed introductions, and in addition to all the woody weeds, several herbaceous and grassy weed species were noted as having less than 1% cover (Capeweed *Arctotheca calendula,* Common Bindweed *Convulvulus arvensis,* Squirting Cucumber *Ecballium elaterium,* Blue Heron's-bill *Erodium crinitum,* Prickly Lettuce *Lactuca serriola,* Mallow *Malva* spp., Soursob *Oxalis pes-caprae,* Bathurst Burr *Xanthium spinosum,* Couch *Cynodon dactylon* spp. *dactylon,* Kikuyu *Cenchrus clandestinus,* Cane Needle-grass *Nassella hyalina,* and Paspalum *Paspalum dilatatum*). Weed cover remains highest at the edges of the offset site (as is expected due to edge effects, however this may decrease in future given the development to the north and south east has been completed), around rock piles, and within areas of disturbance (e.g. damp depressions, dams, tracks, and fence lines).

The eastern portion of the site generally recorded a higher cover of weeds than the western end and linear section, and would benefit from another ecological burn (the last burn in this area was in 2021). The dominant perennial weed species include Serrated Tussock, Chilean Needle-grass, Artichoke Thistle, Galenia, Patterson's Curse, Ribwort, Cat's-ear, Sweet Briar *Rosa rubiginosa*, and African Box-thorn.

While most woody weeds have been controlled through targeted management and were assessed as having less than 1% cover, several (approximately 10) re-sprouting African Boxthorn remain within the offset site, largely within the rock pile in zone 2A. However, they are scheduled for treatment in early December now that they are actively growing again. Similarly, approximately 15 mature Sweet Briar persist in the offset site clustered in the eastern end zone 2D, but will be treated in early December.

Sifton Bush *Cassinia sifton* has also been noted as an emerging woody weed within the linear portion of 2D, and within zones 3B and 3D. This species was recently classified by DEECA as an environmental weed outside the Goldfields bioregion, and thus should be considered a woody weed. DEECA will be contacted to clarify what permits may be required for its removal in Year 5. *Prunus* spp. has been eliminated from the site, with no specimens recorded.

3.5.2 Woody Weeds

Woody weed removal works throughout Year 4 have reduced the abundance of woody weeds. Overall cover of woody weeds across the offset site is low at <1% cover, which consists of predominantly scattered emerging individuals, with some re-sprouting (previously treated) mature plants. Woody weeds are typically restricted to the perimeter of the offset site, particularly in areas where rock/rubble piles are present, such as zones 2A and 2D with some emerging in zones 5A and 4B. African Box-thorn and Sweet Briar are the two most common; previously-treated African Box-thorn individuals are re-sprouting in zone 2A, and some flowering Sweet Briar individuals are located in zone 2D (Plate 20; Plate 21). Several individuals of both species are also emerging in the eastern-most portion of the linear are in 2D, and on the eastern side of zones 4A and 5A. However, Aus Eco Solutions was scheduled to treat these in the days directly prior to report submission, so these can be considered as treated.

Plate 18. Re-sprouting African Box-thorn on the western edge of the offset, within the rock pile in 2A (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 19. Sweet Briar flowering within zone 2D (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Action completed:

Table 3. Progress against Section 69 Management Plan targets

Target to be achieved	Action completed	Comment
Eliminate (to <1%) all listed woody weeds (i.e. those in Table 2 of Sec. 69 Agreement), with no mature plants present by the end of Year 2	No	Mature Sweet Briar and African Box-thorn still present. However, all plants scheduled for removal in December 2023.
Minimise off-target damage.	Yes	No off-target damage observed.
Monitor for any re-sprouting or seedlings and eliminate (either spot-spray or hand-pull).	Yes	On-going monitoring undertaken. Spot spraying / cut and paint of re-sprouting African Box-thorn within the rock pile and removal of emerging Sweet Briar is scheduled for December 2023.

3.5.3 *Grassy Weeds*

The overall cover of grassy weeds (both perennial and annual) has decreased in Year 4, and while it varies between zones, annual grass cover is generally higher than perennial grass cover (which is preferable given that annual grasses pose a lesser threat). Wild Oats, Soft Brome, and Wimmera Rye-grass are the dominant annual species (Plate 20; Plate 21); their cover varies throughout with Soft Brome cover highest (15-30%) in areas of the western portion such as zone 2C and 2D. The dominant weed species in the eastern zones, such as areas 3A, 3B, 3C and 3D are also typically these three species, however much of the eastern section still classifies as NTGVVP. These species had higher cover in areas outside mapped NTGVVP, and within patch PG3b (primarily zone 3B) where cover was recorded as high as 65%.

Large areas of Serrated Tussock and Chilean Needle-grass have been effectively sprayed throughout Years 3 and 4 resulting in large areas devoid of vegetation. A large drift of Serrated Tussock on the eastern edge of the western portion (in zones 2D, 2E, and 2G) was successfully treated (Plate 22). This was the largest drift of Serrated Tussock within the offset and its removal represents a significant reduction in cover of Serrated Tussock (i.e. overall cover reduced by one third, from 15% to 10%). Chilean Needle-grass was also effectively treated, and was recorded at 5-10% cover (compared to 5-15% in Year 3). The highest concentration of these species tends now to be on the fringes of patches where the patch borders with the edge of the offset area or areas of high weed cover, such as the western end of the linear section in zone 2D. Aus Eco Solutions undertook spraying in these areas also, in particular to buffer the two ecological burn areas (Aus Eco Solutions 2023a)(Appendix 3).

While both Serrated Tussock and Chilean Needle-grass saw a reduction in cover from targeted management actions, isolated drifts and scattered individuals persist elsewhere in the site, and set seed in Year 4 (Plate 23). Year 5 control works should focus on targeting these individuals within patches of native vegetation to prevent their spread through these areas and complement the successful control elsewhere.

Other high threat grassy weeds were observed only in low numbers, with reduced cover compared to Year 3. Kikuyu *Cenchrus clandestinus* and Couch *Cynodon dactylon* var. *dactylon* were previously recorded in low lying areas in the eastern section of the offset site (e.g. 3A – 3E, 4A – 4C) and sprayed by Aus Eco Solutions in Years 3 and 4. These control works reduced the overall cover of these high threat grassy weeds to less than 1% in Year 4, with only scattered individuals persisting, particularly around rock piles and disturbed areas such as the site edges.

Grassy weed control was also undertaken in and around the 2023 burn area in zone 2C (Figure 2; Appendix 2). Native grasses, particularly Kangaroo Grass, flourished in this area (>65% cover) alongside grassy weeds, particularly Soft Brome, which had approximately 20% cover. Ongoing weed control is required in Year 5 to reduce the overall cover of grassy weeds within this area and further facilitate native vegetation growth and spread.

Action completed:

Progress against the Section 69 Management Plan targets for both grassy and herbaceous weeds are detailed in Table 4, below *Section 3.5.4 Herbaceous Weeds.*

Plate 20. High cover of Wild Oats throughout zone 3B and 3D (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 21. Annual grasses (*Brome* spp.) within the eastern portion of zone 2D (Ecology and Heritage Partners Pty Ltd 05/10/2023).

Plate 22. Large area of treated Serrated Tussock on eastern boarder of zones 2E, 2G, and 2D (Ecology and Heritage Partners Pty Ltd 05/06/2023).

Plate 23. Chilean Needle-grass drift in the eastern linear portion of 2D (Ecology and Heritage Partners Pty Ltd 02/11/2023).

3.5.4 Herbaceous Weeds

The overall cover of herbaceous weeds decreased from low-moderate in Year 3 to low in Year 4. While high threat herbaceous weeds such as Artichoke Thistle and Paterson's Curse occur in all zones, overall cover has been reduced due to targeted management actions. Overall cover varies, with some areas being dominated (up to 80% cover) by herbaceous weeds. The western end of the linear section in 2D has many mature and emerging Artichoke Thistle and is often dominated by other herbaceous weeds such as Oxtongue *Helminthotheca echioides*, Cat's-ear, Rough Sow-thistle *Sonchus asper*, and Ribwort (Plate 24). The dominant herbaceous species include Ribwort, Patterson's Curse, Rough Sow-thistle, Ox-tongue, Artichoke Thistle, Galenia, Blue Heron's-bill *Erodium crinitum*, (Plate 25). The occurrence of several herbaceous weeds listed as dominant in Year 3 have reduced in cover and now only exist as scattered individuals. Cape Weed *Arctotheca calendula* and Soursob *Oxalis pes-caprae* were in very low cover (<1%) and only existed as scattered individuals in the western end of the linear section of 2D.

Herbaceous weed cover is lowest (1-5%) within high-quality patches of native vegetation, particularly within most zones in the western section of the offset site, excluding 2D, 2G and 2F. Within high-quality areas, weed cover is largely restricted to the perimeter of native vegetation, particularly in rock/rubble piles, or in areas regularly disturbed (i.e. management tracks and fence lines). A high cover (10 – 80%) of herbaceous weeds was observed throughout zones 2D, 2G, 2F, 3B, 4A, 4C and 5A with Ribwort becoming the dominant species in areas which are no longer patches of Plains Grassland, especially zone 2D and 4C. Ribwort within portions of the linear section of zone 2D (Figure 2) has increased to approximately 60-80%. Similarly, the area of treated Serrated Tussock spanning the eastern boarder of 2D, 2E, and 2G was largely cleared of vegetation with the removal of the Serrated Tussock. This area was since colonised by Ribwort which is now the dominant species in this area (up to 50% cover) (Plate 26).

In Year 4, Aus Eco Solutions have continued to focus on herbaceous (broadleaf weed control in Aus Eco Solutions 2023a)(Appendix 3). weed control works in the north-eastern corner of the western section (zone 2E), along the southern boundary in the western section (zone 2D), the western section of the linear strip (zone 2D).

Plants had been sprayed with an appropriate herbicide and were observed as dead/dying in November. Management actions reduced the cover of Artichoke Thistle throughout the offset site as many clusters were successful treated, however, many mature individuals are still present and set seed in Year 4 (Plate 27; Plate 28). Additionally, many new emerging individuals of Artichoke Thistle were noted, particularly in areas with higher abundance such as 2D.

Plate 24. High cover of Cat's-ear within the linear portion of zone 2D (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 25. Galenia overgrowing the rock pile in zone 1A (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 26. Area of successfully treated Serrated Tussock now dominated by Ribwort (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 27. Cluster of treated and dying Artichoke Thistle in zone 2A (Ecology and Heritage Partners Pty Ltd 04/08/2023).

Plate 28. Mature Artichoke Thistle within zone 2D (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Action completed:

Progress against the Section 69 Management Plan targets for both grassy and herbaceous weeds are detailed in Table 4, below.

Table 4. Progress against Section 69 Management Plan targets

Target to be achieved	Action completed	Comments
No increase in cover beyond the cover listed in Table 6 (of the section 69 Management Plan) for each zone for all grassy weeds.	Yes (All zones except 3C – see comments)	Zones 2H, 3D, 4A, 5A, 5B, and 6B have less than 45% cover, as required. Zones 2B, 2C, 2E, 2I and 3A have less than 21% cover, as required. Zones 1A, 2A, 2D, 2F, 2G, 3B, 4B, 4C and 6A have less than 80% cover, as required. Zone 3C has >70% cover, however this is mostly annual grasses (which are less of a threat than

Target to be achieved	Action completed	Comments
		perennial grasses) and this zone is only 0.111 hectares in size, which constitutes 0.38% of the whole offset site.
Minimise off-target damage (avoid all native plants).	Yes	No off-target damage observed.
<1% cover of all new and emerging grassy and herbaceous weeds at the end of Year 10.	Yes	All new and emerging grassy and herbaceous weeds are at <1% cover in Year 4.

3.6 Biomass Management

An Ecological Burn was undertaken by Aus Eco Solutions on 30 May 2023 (Plate 29 – Plate 32) within a 2.60 hectare area of PG1b in the western section of the site (zone 2C; Figure 2), according to the Burn Plan prepared (Aus Eco Solutions 2023b)(Appendix 4). The Burn Report is provided in Appendix 5. The Ecological Burn reduced the overall cover of biomass within the western section of the reserve (Figure 2). Pre-burn weed control works were undertaken on 17 March by Aus Eco Solutions. Herbaceous and grassy weeds were targeted within the burn area to reduce their cover and ability to respond post-burn.

Prior to the Ecological Burn, this area was dominated by Kangaroo Grass, and swaths of Wallaby-grass and Spear-grass, with high threat grassy weeds occurring as drifts and individuals. The native grasses have responded well post-burn; a thick cover of Kangaroo Grass *Themeda triandra* was observed within the burn area in October and November 2023, noted by both Ecology and Heritage Partners and Aus Eco Solutions (Aus Eco Solutions 2023a)(Appendix 3). Ecology and Heritage Partners estimated the cover of Kangaroo Grass to be between 60 – 75% within the burn area, and also observed Spiny Rice-flower and Wallaby Grass specimens resprouting. As is to be expected, post-burn weed growth remained a focus; dominant species such as Ribwort *Plantago lanceolata* and Soft Brome underwent spot-spraying and were noted to be dying on 5 October 2023. Other species within the burn area included Cape Weed *Arctotheca calendula*, Spear Thistle *Cirsium vulgare*, Sow Thistle *Sonchus spp*, Serrated Tussock and Wild Oat, however their cover was limited (i.e. <2% of the burn area). Follow-up herbaceous and grassy weed control took place on 13 June, 7 July, 1 August, 7 August and 3 November 2023 (Aus Eco Solutions 2023a)(Appendix 3).

It is proposed to conduct an ecological burn in between the 2021 and 2023 burn areas in the western section of the site in 2024 (indicative area on Figure 2). The proposed ecological burn would aid in controlling high threat weeds, annual weeds and reducing biomass, thus increasing inter-tussock space, promoting germination and establishment of herbaceous species, and improving species diversity and Striped Legless Lizard habitat. While the southern end of the eastern section would also benefit from biomass reduction activities but has been burnt within the last five years (i.e. 2021), it is proposed to conduct slashing/thatch removal in this area in Year 5.

High threat grasses and herbaceous species within the burn area will remain a focus in Year 5, to promote native species growth and spread.

Plate 29. Autumn burn underway by Aus Eco Solutions crew members (ecological burn on Figure 2) (Aus Eco Solutions 30/05/2023).

Plate 30. Completed ecological burn (ecological burn on Figure 2) (Aus Eco Solutions 30/05/2023).

Plate 31. Ecological burn area re-growing and dominated by Kangaroo Grass (ecological burn on Figure 2) (Ecology and Heritage Partners Pty Ltd 05/10/2023).

Plate 32. Spiny Rice-flower re-sprouting within ecological burn area (ecological burn on Figure 2) (Ecology and Heritage Partners Pty Ltd 05/10/2023).

3.7 Pest Animals

Evidence of pest animals was observed by both Ecology and Heritage Partners and Aus Eco Solutions in Year 4. As outlined in their annual report (Aus Eco Solutions 2023a)(Appendix 3), Aus Eco Solutions observed European Rabbit *Oryctolagus cuniculus* within the rock piles in the western section. Ecology and Heritage Partners observed occasional European Rabbit droppings and scratchings in the western end of the offset site and sighted a Red Fox *Vulpes vulpes* in the western rock pile on 1 June and 2 November 2023. Sightings of European Rabbit were consistently recorded in all areas of the offset site throughout Year 4 (Plates 33 and 34), though in low numbers, with 1-2 individual's sighted per visit. No large areas of diggings or disturbance were observed, only small scratchings here and there (Plate 33).

It is possible that pest animal numbers remain higher than Year 2 numbers since a portion of the offset site fence was removed along the north-western boundary during adjacent construction works in 2022 (see Section 3.6 of Ecology and Heritage Partners Year 3 Annual Report [Ecology and Heritage Partners 2023a] for

details). However, as the rabbit-proof fencing has been re-installed, it is considered achievable to control these pest species. Harbour removal (in the form of re-sprouting or newly germinating woody weeds) has continued through Year 4, and one night of spotlighting was undertaken on 30 November 2023 (Aus Eco Solutions 2023a), to confirm which parts of the site are being used by pest species and determine numbers, to then prepare an appropriate management response. However, no pest animals were observed during the spotlighting, so pest animal numbers are considered to be low.

The rock pile in the west is the only likely harbour. While no warrens are known to be present there, fumigation of the rock pile is not possible regardless, as entrance points cannot be covered over. While no pest animals were observed it in during the spotlighting, it could be fenced off and ferreted to be certain. However, it is more likely that pest animals had been moving through the site rather than harbouring in it, so now that rabbit-proof fencing is re-installed, it is considered that any low numbers present can be controlled through a program of baiting, trapping and/or shooting.

The following Section 69 Management Plan targets have been met in Year 4;

- No active rabbit warrens to be present.
- No active fox dens to be present.
- No rubbish.
- Minimal artificial piles of logs and rocks.
- Control numbers of rabbits and foxes.
- Control numbers of any new and emerging pest animals.

There is only very minimal surface disturbance by way of small discrete areas of scratchings, such as that pictured in Plate 33 below.

Plate 33. Rabbit evidence (scratching) within the offset site in zone 3B (Ecology and Heritage Partners 02/011/2023).

Plate 34. Rabbit within the offset site in zone 2D (Ecology and Heritage Partners 02/011/2023).

3.8 Fencing / Stock Exclusion

As the construction on neighbouring land has now been completed, all previous fencing issues have now been rectified, with fencing re-installed to DEECA standards for rabbits (DELWP 2009) along the north-western boundary of the offset site where the breach occurred in 2022 (Plate 35-38). The gate at the north-western end has also been reinstated, and rabbit-proof netting installed at the bottom. All signage around the perimeter of the offset site has also been reinstated where it was removed/damaged, and details that unauthorised access is not permitted (Plate 41). As such, the Section 69 Management Plan targets have been met (i.e: Fencing has been erected and maintained to the DEECA fencing standards in BushBroker Information Sheet 12 – Standards for Management – Fencing, and fencing is rabbit-proof).

Plate 35. Reinstated fencing along north-western boundary (Ecology and Heritage Partners 05/10/2023).

Plate 36. Rabbit proofing on reinstated fencing (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 37. Rabbit proofing on bottom of reinstated gate (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 38. Example of signage on boundary fencing (Ecology and Heritage Partners 02/11/2023).

3.8.1 Unauthorised Human Access

Since the incidents of unauthorised access documented in the Year 3 report, there have been no other incidents of fence breaches or construction equipment or materials being put within or impacting the offset

site. However, it is noted that two people (assumed staff from nearby warehouses), were seen jumping the fence and walking across the offset site to take a shorter route to the Caroline Springs train station car park in August.

Conversations then took place with staff from Hello Fresh (an adjacent warehouse), who were keen to understand what the offset site was, to help inform how to keep staff out. No unauthorised access has been observed since this time.

Dexus' asset management team continues to work with the businesses leasing the adjacent warehouses, to ensure all staff are aware that no unauthorised access is permitted within the offset site.

3.9 Rubbish

Removal of a further eight bags of rubbish took place during Year 4, however it is noted that the amount of rubbish blowing in from the adjacent properties (that were under construction last year), has reduced significantly. While rubbish still blows in from time to time, it is anticipated it presents a lower threat to the site now, and will continue to be removed by Aus Eco Solutions, as necessary (Plate 39; Plate 40).

Plate 39. Rubbish observed on the northern boundary of zone 2F (Ecology and Heritage Partners Pty Ltd 02/11/2023).

Plate 40. Windblown rubbish within the offset site (Ecology and Heritage Partners Pty Ltd 02/11/2023).

4 CONCLUSION AND RECOMMENDATIONS

The Year 4 monitoring results demonstrate that while some small areas of the offset site have decreased in quality, most of the site has experienced improvements by way of increased native cover, increased vegetation quality and/or a reduction in weed cover.

The site experienced a net increase in the cover of NTGVVP by 0.441 hectares (i.e. 2.57%) across the site, due to intensive weed control works undertaken in previously weedy areas such as the southern section of Zone 2D. Those areas subject to the ecological burn in Year 4 also responded well, with a thick cover of Kangaroo Grass returning and maintaining this area as NTGVVP. The total cover of NTGVVP on site now amounts to 17.610 hectares, which is 4.24 hectares more than the 13.37 hectares required to meet approval condition number three. Intensive weed control works within previously burnt areas continued in year 4, and is likely to gradually increase the quality of these areas of NTGVVP over time. Indeed, the NTGVVP patches on site experienced an increase in habitat hectare score from 0.53 in Year 3 to 0.57 in Year 4.

The cover of herbaceous and grassy weed species did not increase beyond current levels in Year 4 except for in the small (i.e. 0.111 hectare) site 3C; rather, they decreased due to intensive weed control activities and ecological burning in the west of the site. As such, the management target relating to grassy and herbaceous control within the Section 69 agreement has been met, except for in Site 3C (which is due to a high cover of low-threat, annual grassy weeds).

Some areas of the offset site experienced an apparent reduction in native cover, predominantly due to growth in annual and perennial weeds; four small areas (totalling 0.414ha) which were previously recorded as patches of Plains Grassland no longer had the required cover to be considered a patch (i.e. less than 25% of the perennial plant cover was native). The total cover of Plains Grassland decreased in Year 4 to 23.818 hectares, compared to 24.210 hectares in Year 3 (i.e. decreased by 1.62%). Importantly, these reductions were recorded in areas that were already quite degraded compared to other areas within the site, and may have been assessed as no longer Plains Grassland due to difficulty observing perennial plant cover beneath a high biomass of exotic grasses. It is recommended that intensive weed control be undertaken in these areas in Year 5, with the objective of undertaking direct seeding in Year 6 (to complement the direct seeding taking place in Zone 2D in Year 5). It is expected direct seeding can return these areas to Plains Grassland within 1 to 3 years. The completion of construction to the north and south east is likely to see reduced levels of weed spread into the site, given these areas are now road/carpark/warehouses rather than land infested with weeds. Similarly, rubbish spread from these areas is expected to reduce now that construction packaging will no longer be blowing into the site.

The amount of Striped Legless Lizard habitat on site remains at the required 28.98 hectares. While no Striped Legless Lizard were recorded during the targeted surveys completed to date, these results follow a pattern observed at other nearby Striped Legless Lizard offset sites this year, which also experienced a reduction in individuals observed. As the species is cryptic and 18 individuals were recorded in Year 3, it is assumed the species is still present, but is perhaps relying less on the tiles for shelter due to the high biomass levels on site. Importantly, only six of the eight surveys have been completed so far, so the species may be recorded in the final two surveys scheduled in December.

The Spiny Rice-flower targeted surveys demonstrated that the species is persisting and recruiting and/or re-shooting on site, with an additional 55 individuals recorded during Year 4 (bringing the total to 148

individuals). The EPBC Act approval conditions state that at least 86 plants must be present, so this approval condition has been met. A program of intensive weed control will continue, including hand weeding around the Spiny Rice-flower plants, ecological burning and direct seeding should translate to further vegetation improvements in future years (by way of reduced biomass and increased native vegetation cover), including an increase in the quality of Spiny Rice-flower and Striped Legless Lizard habitat.

There is confidence now that unauthorised access and other similar breaches of the fence line (that were reported in Year 3) will be better prevented from now on given that all perimeter fencing has been reinstated to DEECA standards (including rabbit-proofing), signs are in place around the boundaries again, and the adjacent construction to the north and southeast is completed. Further, arrangements are in place with Dexus' asset management team to ensure that businesses within the industrial estate understand the importance of the offset site and that no access is permitted at any time without permission.

Given that the site is now fully fenced to DEECA standards again, pest animal activity is very low, biomass reduction activities continue and threats from unauthorised access and rubbish are reduced (now that adjoining construction is complete), the main threat to the site is weeds. With promising improvements reported this year following ecological burning and intensive weed control activities, more improvements in the extent and quality of native vegetation, Spiny Rice-flower numbers and Striped Legless Lizard habitat on site should be expected in Year 5.

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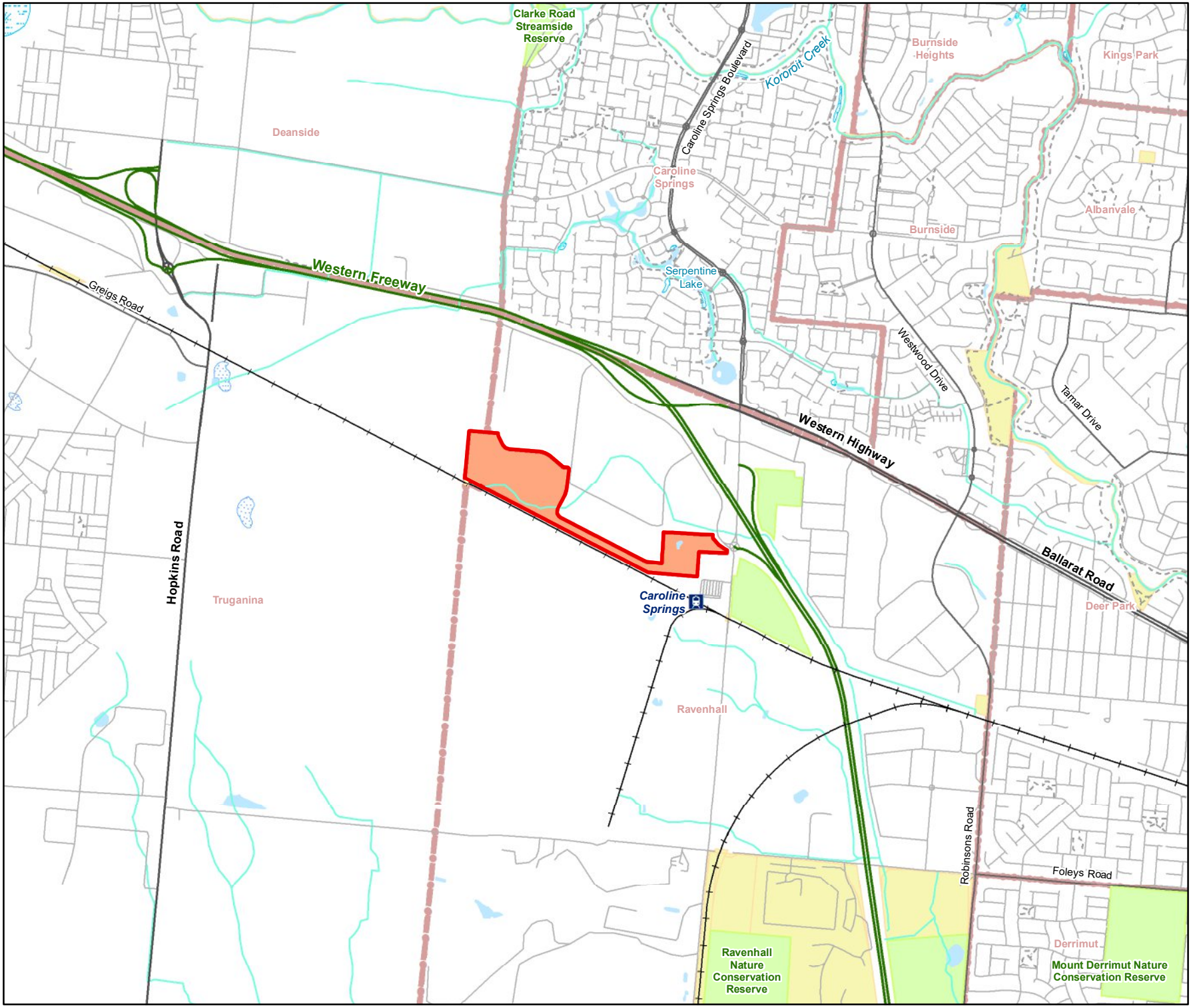


Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the study area

Ravenhall Industrial Precinct
On-site Offset Reserve

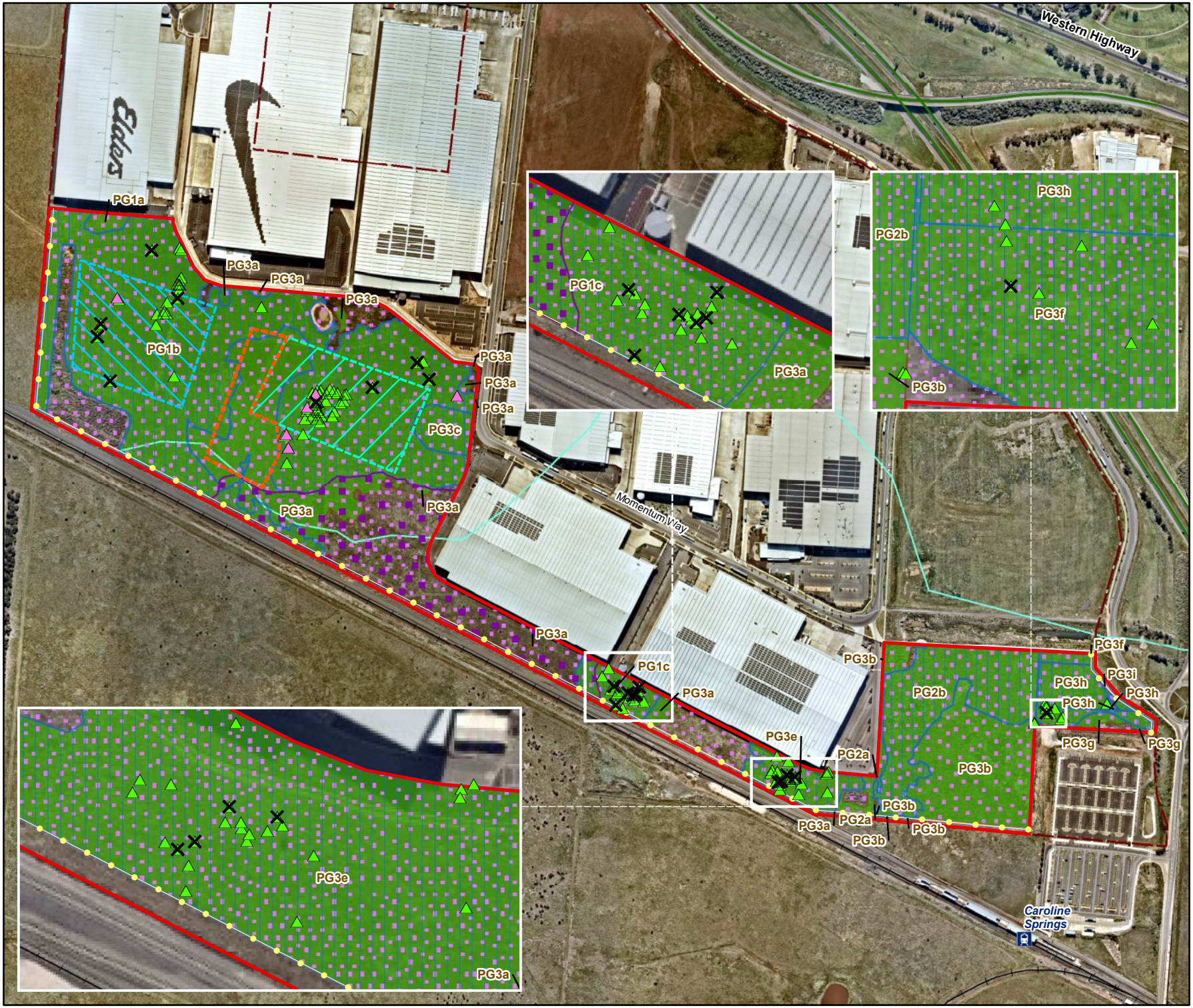
N

0 500 1,000

Metres

Map Scale: 1:30,000 @ A4
Coordinate System: GDA 1994 MGA Zone 55

ecology & heritage partners



Legend

- Study Area
- Property boundary
- Internal 6m buffer
- Indicative Proposed 2024 Ecological Burn
- 2023 Ecological Burn
- 2022 Ecological Burn
- Proposed direct seeding area
- New Spiny Rice-flower record (2023 survey)
- Spiny Rice-flower
- Previously surveyed Spiny Rice-flower could not be located or dead (2023)
- Striped Legless Lizard habitat

Ecological Vegetation Class

- Plains Grassland (EVC 132)

EPBC Act listed community

- Natural Temperate Grassland of the Victorian Volcanic Plain

Figure 2

Ecological features

Ravenhall Industrial Precinct
On-site Offset Reserve

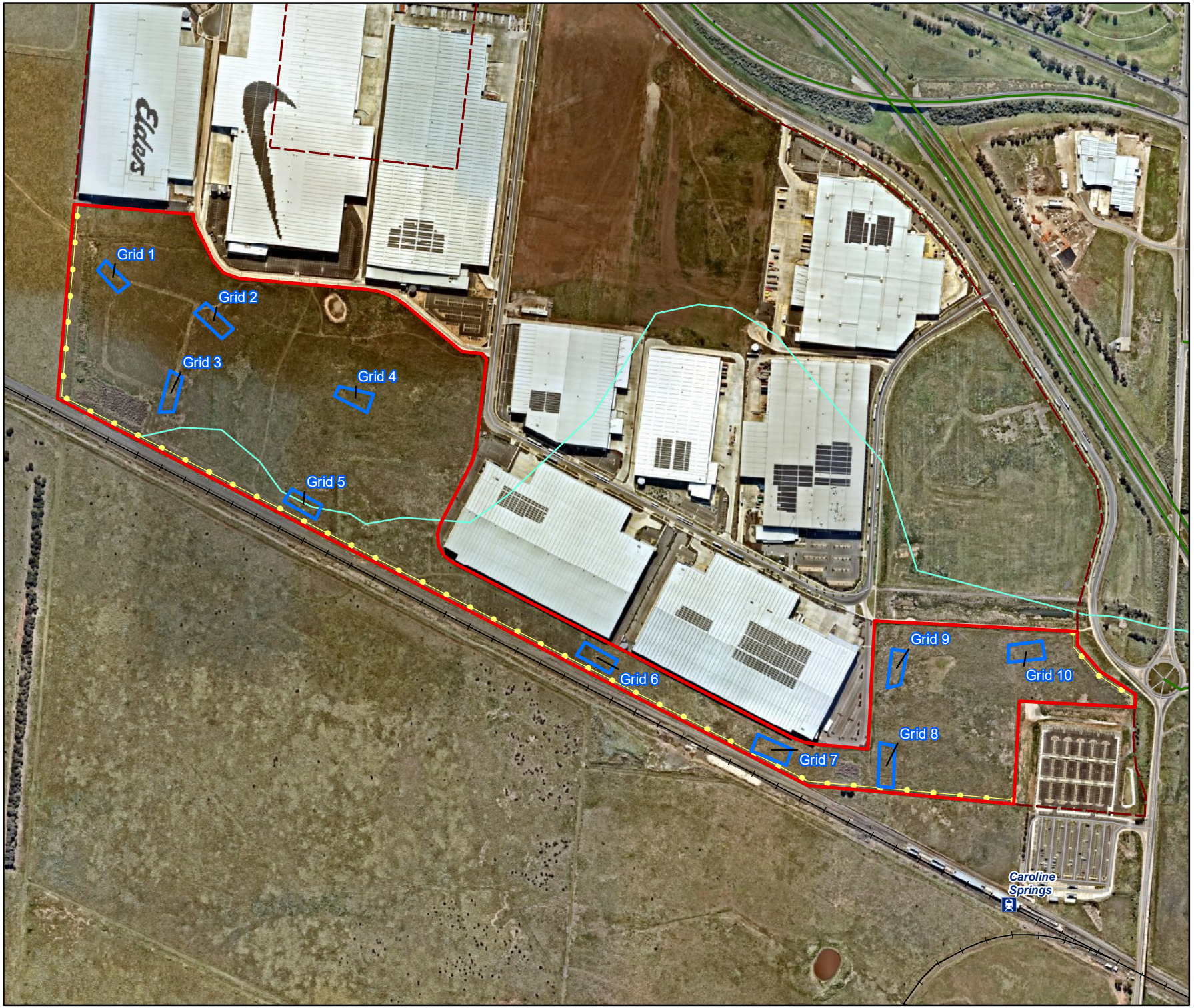
N

0 100 200
Metres

ecology & heritage partners

17136_Fig02_EcoFeat_SRF 11/12/2023 melsley

Aerial source: Nearmap 2023



Legend

- Study Area
- Property boundary
- Internal 6m buffer
- Tile grid locations

Figure 3

Striped Legless Lizard tile grid locations

Ravenhall Industrial Precinct
On-site Offset Reserve

N

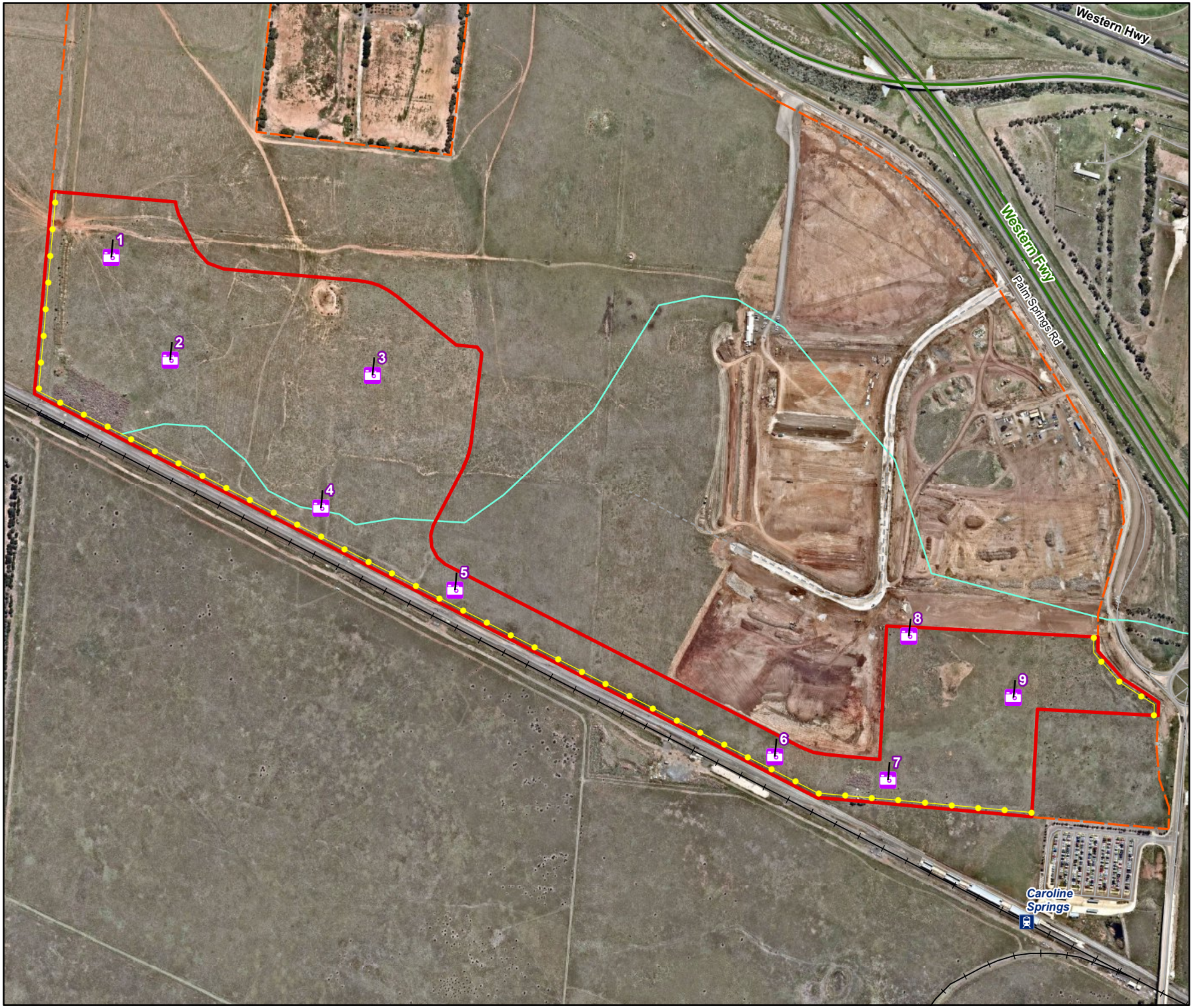
0 100 200
Metres

Map Scale: 1:7,300 @ A4
Coordinate System: GDA 1994 MGA Zone 55

ecology & heritage partners

17136_Fig03_SLLGrids 14/11/2023 psorensen

Aerial source: Nearmap 2023



Legend

- Study Area
- Property boundary
- Internal 6m buffer
- Photo points

Figure 4

Photo points

Ravenhall Industrial Precinct
On-site Offset Reserve

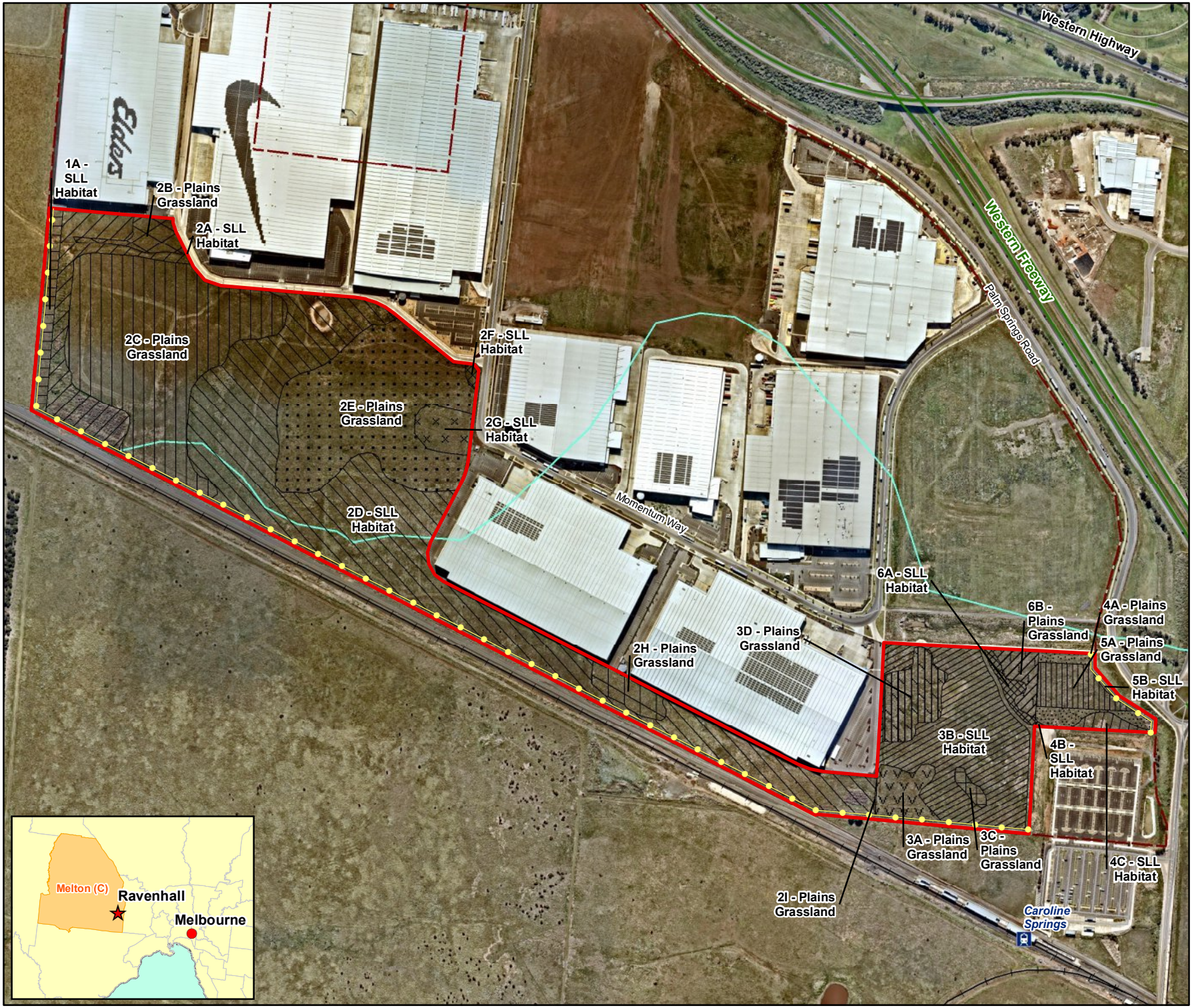
N

0 100 200
Metres

ecology & heritage partners

13434_Fig04_Photopoints 5/10/2020 melsley

Aerial source: Nearmap 2020



Legend

- Study Area
- Property boundary
- Internal 6m buffer

Habitat Zones

- 1, A
- 2, I
- 2, H
- 2, C
- 2, B
- 2, A
- 2, G
- 2, F
- 2, E
- 2, D
- 3, A
- 3, B
- 3, C
- 3, D
- 4, A
- 4, C
- 4, B
- 5, B
- 5, A
- 6, B
- 6, A

Figure 5

Habitat Zone Plan

Ravenhall Industrial Precinct
On-site Offset Reserve

N

0 100 200

Metres

ecology & heritage partners

17136_Fig05_HabZones 29/11/2023 psorensen

Aerial source: Nearmap 2023

APPENDICES

Appendix 1. Habitat Hectare Assessment

Table A1.1. Habitat hectare assessment for Year 4.

Management Zone		1a, 1b, 1C	2a, 2b, 2c	3a, 3b, 3c, 3d, 3f - 3i
Vegetation Zone		PG1	PG2	PG3
Bioregion		VVP	VVP	VVP
EVC / Tree		PG	PG	PG
EVC Number		132_61	132_61	132_61
EVC Conservation Status		Endangered	Endangered	Endangered
Patch Condition	Large Old Trees /10	NA	NA	NA
	Canopy Cover /5	NA	NA	NA
	Under storey /25	15	10	5
	Lack of Weeds /15	7	2	2
	Recruitment /10	6	3	3
	Organic Matter /5	3	2	2
	Logs /5	NA	NA	NA
	Treeless EVC Multiplier	1.36	1.36	1.36
	Subtotal =	42.16	23.12	16.32
Landscape Value /25		15	15	15
Habitat Points /100		57.16	38.12	31.32
Habitat Score		**0.57**	**0.38**	**0.31**

Notes: PG = Plains Grassland, VVP = Victorian Volcanic Plain.

Appendix 2. Photo Points

A2.1 Year One Photo Points

Plate A2.1. Photo point 1 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.2. Photo point 2 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.3. Photo point 3 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.4. Photo point 4 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.5. Photo point 5 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.6. Photo point 6 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.7. Photo point 7 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.8. Photo point 8 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

Plate A2.9. Photo point 9 (Ecology and Heritage Partners Pty Ltd 02/11/2023)

A.2.2 Photo Point Data

Date	Time	Photo Point ID	Direction	Coordinates (lat/long)
2/11/2023	3:09	1	South	-37.7579, 144.7223
2/11/2023	3:13	2	North	-37.7592, 144.7232
2/11/2023	3:19	3	West	-37.7594, 144.7263
2/11/2023	3:24	4	North	-37.7611, 144.7255
2/11/2023	3:28	5	East	-37.7621, 144.7276
2/11/2023	3:37	6	East	-37.7643, 144.7325
2/11/2023	3:45	7	North East	-37.7646, 144.7343
2/11/2023	3:49	8	South	-37.7628, 144.7347
2/11/2023	3:54	9	East	-37.7636, 144.7363

Appendix 3. Ravenhall Grassland Offset– Final Report 2023 (Aus Eco Solutions 2023a)

Aus Eco Solutions
restoring native ecosystems

Ravenhall Grassland Offset - Annual Report 2023 - V3

Report for Dexus / Ecology & Heritage Partners

PREPARED BY:

Rachel Nelsson, Aus Eco Solutions
11 Smallmans Rd, Ballan, 3342
| rachel@ausecosolutions.com.au
www.ausecosolutions.com.au

Ravenhall Offset Final Report 2023

INTRODUCTION

Control works objectives:

1. Weed control - noxious Nassella species and herbaceous weeds
2. Woody weed control
3. Pest Animal control.
4. Biomass reduction (Ecological burn 2023)
5. Remove rubbish from site
6. Spiny Rice Flower management
7. Fence monitoring
8. Challenges
9. Appendix 1: Management works conducted onsite.

All management activities were guided by the Conservation Management Plan: Ravenhall Industrial Precinct 2019 (Ecology and Heritage Partners).

Serrated Tussock control in Western zone 2023

Ravenhall Offset Mapping

Image 1: Ravenhall Offset site

1. Weed Control - Noxious Grasses & Herbaceous Weeds

1.1 Works Completed Western Block

- The herbaceous weed control works for the Western block were conducted across the whole block, the focus areas for emerging Herbaceous weeds was around the 2023 Burn area, the 2022 Burn area and the boundaries for the Western block. Weed control works were also conducted around the buffers of each burn area to help reduce weed seed spreading into the high quality grass areas and provide native species more room for growth.
- The grassy weed control works for the Western block focused on reducing the weed densities of high threat invasive weeds including Chilean Needle Grass and Serrated Tussock. The Works completed were in and around the 2023 and 2022 burn areas and the boundaries of the Western block.

1.2 Works completed Eastern Block

- Herbaceous weed control works were completed around the whole of the Eastern block including the eastern rock piles, the boundaries and the 2021 burn area.
- Grassy weed control works for the Eastern side were completed across the section for Serrated Tussock and Chilean Needle Grass. Work was also done near the dam area for Cane Needle Grass.

1.3 Works completed Linear section

- The herbaceous weed control works for the Linear section focused around the higher quality areas to the East and West of this area and buffering these areas from the lower quality middle section.
- Similar to the herbaceous weed control for the Linear section the grassy weed control works focused around the higher quality areas to the East and West of this section.

1.4 Site Observations/ Recommendations

- As invasive weeds around the outside of the Ravenhall boundary continue to be unmanaged their weedy seeds will continue spreading into the Ravenhall reserve. Until the areas around the Ravenhall reserve are treated they will continue to spread weedy seeds that will require ongoing weed control.
- Some of the main invasive weeds around the outside of the Ravenhall boundaries include Artichoke thistles along Palms Springs road, Paterson's Curse in the large area adjacent to the V/line car park and Artichoke Thistle/ Serrated Tussock in the Linear section between Ravenhall and the V/line rail.
- There is still a large patch of Chilean Needle Grass and Serrated Tussock in the middle of western section (this is the untreated section in the below Nassella controlled map). This area has been buffered back from both the burns areas and the boundaries to help reduce it and provide the native higher quality areas room to further spread.
- The 2022 and 2023 burn areas have come back really well with dense amounts of native grasses in them, it would be beneficial to conduct a burn in the middle section of the Western block between the 2022 and 2023 burn areas to help reduce the overall weed densities in the area and further prompt native seed germination.
- There has been significant reduce in overall weed species inducing Artichoke Thistles and Pattersons Curse across the high value areas including the burn areas. This reduction has opened up more ground space for Native species including Pink Bindweed and Lemon Beauty Heads which had been observed in large numbers over the site.

1.4 Site Observations/ Recommendations continued

- Follow up treatment is required for the small amount of new Cane Needle Grass growing near the dam of the Eastern zone
- It would be beneficial to start doing some broad scale direct seeding in areas treated for weeds with low to no native grasses. This would assist in native species growth in some of the lower quality areas and help bridge the gaps between the higher quality areas.
- Invoicing information has been attached as a Zip file, this includes dates of works, details of works performed and cost (costings include the cost of chemicals for works). A daily works diary has also been attached. See appendix 1 below for additional information regarding the management works undertaken. This year there was a total of 701.5 hours spent conducting the management works on site. The majority of the hours spent on site were for weed management.

Images:
Top left is Serrated Tussock control in 2022 burn area, Bottom left is Pattersons Curse control in Eastern Zone, Top right is Artichoke Thistle control in 2022 burn area.

The map below shows approximate areas treated.
Areas treated for Nassella grasses in Green and treated for herbaceous weeds in Purple.

2. Woody Weed Control

2.1 Works Completed

- Cutting and Painting emerging Bria rose and Boxthorn seedlings coming up in the Western and Eastern blocks and through the linear section.

2.2 Site Observations/ Recommendations

- The ongoing cutting and painting works for woody weeds has reduced the overall woody weed seeds across the site.
- Follow up cutting and painting will need to be done on Boxthorn and Briar Rose coming up along the boundary of the Eastern block and the Linear section.
- Re-treatment of the 2 adult Boxthorn in the large rock pile of the Western section will also need to be performed as a priority now that they are actively growing.
- There are also a number of Sifton Bush (Cassinia Siftons) plants coming up in the Eastern Zone and Linear zone that if not controlled will become more invasive. Further investigation should be conducted into the potential removal and required approvals/ permits for this. These plant seeds have spread into the reserve from adjoining properties.

Above image of cut and paint seedlings in Eastern zone

Emerging seedling that will require cutting and painting along boundary of Eastern zone

3. Pest Animal Control

3.1 Works Complete

- A spotlight inspection was performed across the Ravenhall site on the 30th/11/2023. The crew of 2 arrived onsite at 8:30 pm to get set up in the first spot lighting survey point. The team conducted the first spot light once the sun had set completely and there was no residual light left from the sunset. The Team used a large Blitz handheld light with 100w output to conduct the spot lighting and stood on the steps of the Vehicle to get a higher alleviation for the spotlight. The team also used a Lynx thermal telescope to conduct a thermal survey of each zone. At each survey point the team did a 360 degree spot light of the areas twice.
- No pest animals were observed during the spotlight using either the spotlight or the thermal camera. Some of the factors that may have contributed to this include the weather and the area was still quite damp. Due to the length and height of the rocks in the Western rock pile, getting full coverage of the middle and back of the rocks was not possible as there were a number of areas within the rock pile that could only get partially hit with the light beam. The ambient light from the surrounding buildings made the thermal camera difficult to use due to the brightness.

3.2 Site Observations/ Recommendations

- The large rock pile in the Western corner still provides the only potential harbour onsite. Our team has not observed any pest animal activity across the site when conducting the onground works for this project nor did they find any when conducting the spotlight session onsite. It is recommended that the Western rock pile be fenced off to prevent it being used as harbour in future, and conducting ferreting of the rock pile to ensure there are no pest animals within the area.

4. Biomass Reduction (Ecological Burn)

4.1 Works Completed

- Aus Eco Solutions created and implemented the burn plan for Autumn 2023 burn.
- Aus Eco Solutions completed all the fire preparation including pre burn weed control, fire break creation and notifications. The notifications included a letter drop in advance of the burn to the buildings and Caroline Springs train station in the surrounding area. On the day notifications included Vic fire permits notification, Door knocks to the surrounding buildings and a phone notification to V/ line centrol.
- The ecological burn was conducted by Aus Eco Solutions on the 30/05/2022 within a 2 hectare area of the Ravenhall grassland offset site in the Western portion of the reserve. The burn area was selected due to the weed control that has already been conducted in this section and the densities of natives that would benefit from the burn. See the post burn report for additional details about the burn.

4.2 Site Observations/ Recommendations

- The site for the 2023 burn is coming back with a large densities of natives including SRF and Kangaroo grass. There is still some invasive weeds coming up in the burn area that will require treatment.
- The two sections that have been burnt in 2022 and 2023 have been recovering really well, it would be beneficial to the Western block if we conducted a burn in the middle of this block to help further reduce the overall seed bank of weedy seeds and further encourage native seed germination.
- The southern end of the Eastern block would also benefit from a burn as this section has not previously been burnt, a burn there would also help reduce the weedy biomass for the site.

Autumn 2023 before burn pictures of Western section

Autumn 2023 post burn pictures of Western section

5. Rubbish Removal

5.1 Works Completed

Rubbish collection of materials that have come from adjacent development was completed this year and there was 8 bags of rubbish collected from the Western zone. Monitoring of the Eastern and Linear zone was also performed across the management year with no rubbish removal required.

5.2 Site Observations/ Recommendations

Ongoing monitoring and follow up rubbish removal will need to be performed for the Western zone and there is still construction occurring on the block of land near the North East corner of the Western zone, ongoing monitoring will also need to be done to monitor and remove any small food wrappers from lunches that may be blown into the site.

6. Spiny Rice Flower Management

6.1 Works completed

- All invasive weeds within two meters of the Spiny Rice Flowers have been hand weeded. Aus Eco Solutions have also been pinning out the Spiny Rice Flowers across the site as they find them.
- Ongoing monitoring was also performed for the Spiny Rice Flower that was impacted by the hose incident from 2022. The Spiny Rice Flower has recovered from this incident and continued to grow.

6.2 Site Observations/ Recommendations

- Spiny Rice Flowers have been located by our team as weed control commenced. The site is home to over 100+ Spiny Rice Flowers, Serval new specimens were found in Year 4. The plants have been staked / flagged accordingly to assist with weed control onsite and to avoid these areas when driving.
- Spiny Rice Flowers have been found in a few areas adjoining the offset including S/W boundary where 16 plants were found. It is recommended that this area be surveyed to determine the exact number.
- The Spiny Rice Flowers in the 2023 burn area have bounced back really well.

SRF in eastern section that was impacted by the 2022 hose incident

7. Fence monitoring

7.1 Works completed

- Ongoing monitoring of the fence was performed across the project for any breaches and no breaches were observed in Year 4.
- Ongoing monitoring of the area in the Eastern zone where there was a hose breach in 2022 was also performed, the area has recovered from the water logging caused by the hose. The SRF in this zone has also recovered well. We observed no further breaches from the adjoining construction after the removal of the water hose in 2022.

7.2 Site Observations/ Recommendations

- A new fence was installed along the Northern boundary of the Western block adjacent to the new development. The fence had a rabbit proof skirting installed along the bottom of it.
- There has been some erosions occurring within the Western block along the fence line adjacent to Hello Fresh, back filling and direct seeding will need to be performed in this section to prevent further erosion.

Image of area impacted by the 2022 hose incident and the recovery of the vegetation, this image was taken in November 2023

Erosion occurring along fence adjacent to Hello Fresh

8. Challenges/ site recommendations

Consistent challenges that the Ravenhall Offset faces include:

Noxious weed invasion from neighbouring properties and soil disturbance along fence lines with developments happening around the area. However it is anticipated that soil disturbance will decrease now that the adjacent construction along the Northern boundary is complete and they have installed the new fence along that section.

Recommendations:

It is recommended that for the year 5 works Aus Eco set up a GIS map with field collector for recording of all groundworks, this will assist with providing better tracking of areas treated for weed control and help with overall site monitoring and reporting.

Images of adjacent land that has high densities of invasive weeds.

Appendix 1:
Management works conducted onsite.

Quarter 1

DATE	ACTIVITY	CREW (1 CREW = 2 OPS)
17/01/2023	Herbaceous and Grassy weed control	1 crew x 2 ops
23/01/2023	Herbaceous Weed control	1 crew x 2 ops
25/01/2023	Herbaceous and Grassy weed control	1.5 crew x 3 ops
31/01/2023	Herbaceous Weed control	1.5 crew x 3 ops
01/02/2023	Herbaceous Weed control & SRF management works	1 crew x 2 ops
17/03/2023	Herbaceous and Grassy weed control across the 2022 burn area and the proposed 2023 Burn area	2 crews x 4ops

Quarter 2

DATE	ACTIVITY	CREW (1 CREW = 2 OPS)
12/04/2023	Brushcutting fire break for 2023 burn	2 crew x 4 ops
28/04/2023	Finishing brushcutting for 2023 burn and hand weeding around SRF's	3 crew x 6ops
02/05/2023	Invasive grass spraying in linear section	1crew x 2ops
09/052023	Cutting and painting woody weeds in Eastern section, Hand weeding Herbaceous weeds around rocks and spot spraying invasive weeds in eastern section.	1crew x 2 ops
30/05/2023	Ecological Burn	6.5 crew x 9 ops
06/06/2023	Cutting and painting woody weeds in Western Zone and hand weeding around SRF in Western zone.	1 crew x 2ops
13/06/2023	Herbaceous weed control in and buffering around 2023 burn area.	1 crew X 2ops

Quarter 3

DATE	ACTIVITY	CREW (1 CREW = 2 OPS)
03/07/2023	Invasive grassy weed control in 2023 burn area and buffering burn area	1 crew x 2 ops
04/07/2023	Hand weeding around SRF, watering and mark pins for SRF in western section and linear section.	1 crew x 2 ops
07/07/2023	1 crew spot spraying invasive broadleaved weeds in linear section and boundary of eastern block. 1 crew spot spraying invasive broadleaved weeds near dam and buffering dam in eastern block.	2 crew x 4 ops
11/07/2023	1 crew spot spraying invasive broadleaved weeds in 2022 burn area and linear section from Western end. 1 crew spot spraying invasive broadleaved weeds in Eastern block around rock piles and eastern boundary.	2 crew x 4 ops
14/072023	Rubbish removal (6 bags) from area in Western block adjacent to construction works and hand weeding around SRF in eastern section.	1crew x 2 ops
01/08/2023	Spot spraying new emerging invasive broadleaved weeds in 2023 burn area and buffer	1 crew x 2ops
03/08/2023	Hand weeding around SRF in burn area, cutting and painting emerging woody weeds around 2023 burn area.	1.5 crew x 3 ops
07/08/2023	Spot spraying broadleaved invasive weeds further into the buffer of the 2023 burn area.	1 crew x 2ops
23/08/2023	Spot spraying invasive grassy weeds in Western zone working from Western Boundary	1 crew X 2ops
28/08/2023	Spot spraying invasive grassy weeds in and around 2022 burn area and spot spraying emerging invasive weeds around rock piles in Eastern block.	1 crew X 2ops
31/08/2023	Spot spraying invasive broadleaved weeds around boundary of Eastern block .	1 crew X 2ops
05/09/2023	Spot spraying invasive weedy grasses around boundary of Western block.	1 crew X 2ops
14/09/2023	Spot spraying emerging invasive broadleaved weeds along the Northern boundary of the Eastern block	1 crew X 2ops
18/09/2023	Rubbish removal from western block (2 bags)	1 crew X 2ops

DATE	ACTIVITY	CREW (1 CREW = 2 OPS)
02/10/2023	Invasive broadleaved weed control across the boundary of the Eastern block	1 crew x 2 ops
06/10/2023	Invasive broadleaved weed control across the middle of the Eastern Block and the Eastern rock area.	1 crew x 2 ops
03/11/2023	Invasive grass spraying in and around 2023 burn area	1crew x 2 ops
30/11/2023	Spotlighting for invasive pest animals across site	1 crew x 2ops

Ravenhall Offset Site Management Diary

Activity Date	Memo/Description

Dexus Property Services Pty Limited

A2512- P3878 Ravenhall Offset Site

Date	Activity	Hours
2023-01-17	Rig spraying broadleaves - Pattersons curese, Artichoke and Oxtongue	8
2023-01-17	Rig spraying broadleaves - Pattersons curese, Artichoke and Oxtongue	8
2023-01-23	Rig spraying broadleaves including fleabane, thistles, artichokes	8
2023-01-23	Rig spraying broadleaves including fleabane, thistles, artichokes	8
2023-01-25	Spraying broadleaf weeds including oxtongue, thistles, pattersons curse and galenia in Ravenhall grassland area	7
2023-01-25	Spraying broadleaf weeds including oxtongue, thistles, pattersons curse and galenia in Ravenhall grassland area	7
2023-01-25	Spraying broadleaf weeds including oxtongue, thistles, pattersons curse and galenia in Ravenhall grassland area	7
2023-01-31	Rig spraying broadleaves and grasses and knapsacking - ox tongue, artichoke thistle and scotch thistle	8
2023-01-31	Rig spraying broadleaves and grasses and knapsacking - ox tongue, artichoke thistle and scotch thistle	8
2023-01-31	Rig spraying broadleaves and grasses and knapsacking - ox tongue, artichoke thistle and scotch thistle	8
2023-02-01	Spraying broadleaf weeds in grassland reserve and hand weeding SRF	8
2023-02-01	Spraying broadleaf weeds in grassland reserve and hand weeding SRF	8
2023-02-15	Burn plans	1.5
2023-03-17	Spot spraying nasellas and broadleaves including serrated tussock, chilean needle grass, ox tongue and flea bane	8
2023-03-17	Spot spraying nasellas and broadleaves including serrated tussock, chilean needle grass, ox tongue and flea bane	8
2023-03-17	Spot spraying nasellas and broadleaves including serrated tussock, chilean needle grass, ox tongue and flea bane	8
2023-03-17	Spot spraying nasellas and broadleaves including serrated tussock, chilean needle grass, ox tongue and flea bane	8
2023-04-12	Brush cutting firebreak for burn	6
2023-04-12	Brush cutting firebreak for burn	6
2023-04-12	Brush cutting firebreak for burn	6
2023-04-12	Brush cutting firebreak for burn	6
2023-04-21	Quarterly report writing	3
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-04-28	Brush cutting fire break as part of pre burn prep.	8
2023-05-02	Rig spraying grasses including serrated tussock, chilean needle grass, artichoke thistle and boxthorn	8
2023-05-02	Rig spraying grasses including serrated tussock, chilean needle grass, artichoke thistle and boxthorn	8
2023-05-09	Spot spraying, cut and painting and hand weeding pattersons curse, oxtongue, artichoke, pidgeon grass, paspalum, briar rose, boxthorn, cane and chilean needle grass in Eastern section of site.	8
2023-05-09	Spot spraying, cut and painting and hand weeding pattersons curse, oxtongue, artichoke, pidgeon grass, paspalum, briar rose, boxthorn, cane and chilean needle grass in Eastern section of site.	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8

2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-05-30	Ecological burn	8
2023-06-06	Cutting and painting artichoke thistle, nasella species, plantain and boxthorn	8
2023-06-06	Cutting and painting artichoke thistle, nasella species, plantain and boxthorn	8
2023-06-13	Spray galenia on rocky area with trike, spot spray broadleaves in burn areas.	8
2023-06-13	Spray galenia on rocky area with trike, spot spray broadleaves in burn areas.	8
2023-07-03	Spot spray in and around burn area pushing out into unburnt area SE corner of burn for ST, CNG, phalaris and paspalum	8
2023-07-03	Spot spray in and around burn area pushing out into unburnt area SE corner of burn for ST, CNG, phalaris and paspalum	8
2023-07-04	Hand weeding	8
2023-07-04	Hand weeding	8
2023-07-07	Rig spraying broadleaves along corridoor and stage 1	8
2023-07-07	Rig spraying broadleaves along corridoor and stage 1	8
2023-07-07	Rig spraying broadleaf weed, pattersons curse, brassica, ox tongue, erodium, thistle	8
2023-07-07	Rig spraying broadleaf weed, pattersons curse, brassica, ox tongue, erodium, thistle	8
2023-07-10	Quarterly report writing	5
2023-07-11	Rig spraying broadleaf weeds	8
2023-07-11	Rig spraying broadleaf weeds	8
2023-07-11	Rig spraying broadleaf weeds	8
2023-07-11	Rig spraying broadleaf weeds	8
2023-07-14	Picked up and removed rubbish from site (6 bags). Hand weed around pimeleas	8
2023-07-14	Picked up and removed rubbish from site (6 bags). Hand weed around pimeleas	8
2023-08-01	Spot spraying broadleaves around burn area / create buffer	8
2023-08-01	Spot spraying broadleaves around burn area / create buffer	8
2023-08-03	Replacing broke SLL tiles, handweeding woody and broadleaf weeds. Replaced 10 tiles	8
2023-08-03	Replacing broke SLL tiles, handweeding woody and broadleaf weeds. Replaced 10 tiles	8
2023-08-03	Replacing broke SLL tiles, handweeding woody and broadleaf weeds. Replaced 10 tiles	8
2023-08-07	Spraying broadleaf weed around burn area - Plantain, Artichoke and Pattersons curse	8
2023-08-07	Spraying broadleaf weed around burn area - Plantain, Artichoke and Pattersons curse	8
2023-08-08	Spraying broadleaf weed around burn area - Plantain, Artichoke and Pattersons curse	8
2023-08-08	Spraying broadleaf weed around burn area - Plantain, Artichoke and Pattersons curse	8
2023-08-23	Spot spraying serrated tussock, chilean needle grass, paspalum, Pidgeon grass and phalaris	8
2023-08-23	Spot spraying serrated tussock, chilean needle grass, paspalum, Pidgeon grass and phalaris	8
2023-08-23	Spot spraying serrated tussock, chilean needle grass, paspalum, Pidgeon grass and phalaris	8
2023-08-23	Spot spraying serrated tussock, chilean needle grass, paspalum, Pidgeon grass and phalaris	8
2023-08-28	Sprayed weedy grasses Serrated tussock, Chilean needle grass in 2022 burn area and sprayed broadleaf weeds Patersons curse, Artichoke thistle and Flat weed in eastern paddock.	8
2023-08-28	Sprayed weedy grasses Serrated tussock, Chilean needle grass in 2022 burn area and sprayed broadleaf weeds Patersons curse, Artichoke thistle and Flat weed in eastern paddock.	8
2023-08-31	Spot spraying broadleaved weeds in the eastern paddock near the Vline car park side of the reserve.	8
2023-08-31	Spot spraying broadleaved weeds in the eastern paddock near the Vline car park side of the reserve.	8
2023-09-05	Spot spraying weedy grasses in Western part of reserve and hand weeding around SRF's throughout site. Weeds controlled include serrated tussock and chilean needle grass.	8
2023-09-05	Spot spraying weedy grasses in Western part of reserve and hand weeding around SRF's throughout site. Weeds controlled include serrated tussock and chilean needle grass.	8
2023-09-14	Spraying broadleaf weeds in front paddock including artichokes, brassica, pattersons curse and othe thistles	8
2023-09-14	Spraying broadleaf weeds in front paddock including artichokes, brassica, pattersons curse and othe thistles	8
2023-09-18	Rubbish collection	3.5
2023-09-18	Rubbish collection	3.5
2023-10-02	Spraying broadleaf weeds in eastern paddock	8
2023-10-02	Spraying broadleaf weeds in eastern paddock	8
2023-10-06	Spraying broadleaf weeds in eastern paddock	8
2023-10-06	Spraying broadleaf weeds in eastern paddock	8

2023-11-03	Spot spraying Serrated tussock and chilean nedle grass	8
2023-11-03	Spot spraying Serrated tussock and chilean nedle grass	8
2023-11-30	Spot light count	4
2023-11-30	Spot light count	4

Appendix 4. Ravenhall Grassland Reserve Autumn Ecological Burn Plan 2023 (Aus Eco Solutions 2023b)

Ravenhall Grassland Reserve
Autumn Ecological Burn Plan 2023

Developed by
Rodney Bright

PUAFIR412 Conduct Simple Prescribed Burn

PUAFIR413 Develop Simple Prescribed Burn

Burn Plan	
Project No:	A2512
Project Name:	Ravenhall Grassland Offset Year 4
Address:	Palm Springs Road, Ravenhall
Client:	Ecology & Heritage Partners / Dexus
Client Contact:	Samantha Barron
Revision No.:	1
Date	06/04/2023
Burn Window	Autumn 2022

Table of Contents

1. Objectives

This plan contains excerpts from the Conservation Management Plan: Ravenhall Industrial Precinct, Victoria. Ecology and Heritage Partners, 2019. It also contains objectives laid out by Ecology & Heritage Partners in October 2022.

Native grassland offset site dominated by a mixture of native and exotic grass species including; Kangaroo Grass (*Themeda triandra*) Spear Grasses (*Austrostipa spp*) and Wallaby Grasses (*Rytidosperma spp)*. Kangaroo Grass requires frequent biomass removal to prevent senescence of Kangaroo Grass and the build up of detritus.

The objectives of an Autumn, low intensity and patchy burn within Ravenhall offset are to achieve:

- Conduct any burns in a patchy or mosaic fashion over no more than one third to half the site. A high percentage of bare ground to be available for recruitment of native species, potentially increasing site biodiversity.

- Reduction of weedy biomass existing in a specific area of the offset - post herbicide treatments.

- Reduction in overall biomass to increase efficiency of weed control (easily located) and reduce off-target damage as there will be less obstruction from native plants.

- Deplenish weed seed stock in the soil bank.

An ecological burn is planned to occur within an 2.6 hectare area of the Ravenhall grassland offset site in the western portion of the reserve. The burn area has been selected due to the weed control that has already been conducted in this section. Burning in conjunction with continued weed control will significantly contribute to achieving the Management Plan's goal of ensuring weed density does not increase beyond the level attained at year 10 of management and that the Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community is maintained or improved.

2. Threatened Species Management

The conservation reserve supports two Ecological Vegetation Classes (EVCs), Heavier-soils Plains Grassland (EVC 132_61) and Plains Grassy Wetland (EVC 125), as well as areas of predominantly exotic vegetation. Both EVCs present are grass tussock dominated vegetation types, devoid of trees or large shrubs. Plains Grassland typically occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall (DSE 2011). Plains Grassy Wetland is characterised by a ground cover dominated by grasses, and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas (DSE 2011).

Both EVCs have a conservation significance rating of Endangered. Within the areas of Plains Grassland, one nationally listed ecological community, listed as critically endangered under the EPBC Act, was recorded: Natural Temperate Grassland of Victorian Volcanic Plain (NTGVVP).

The following critically endangered flora species have been observed within Ravenhall offset:

- *Pimelea spinescens* subsp. spinescens - Spiny Rice Flower

The following vulnerable fauna species have been observed within Ravenhall offset:

- *Delma impar* - Striped Legless Lizard

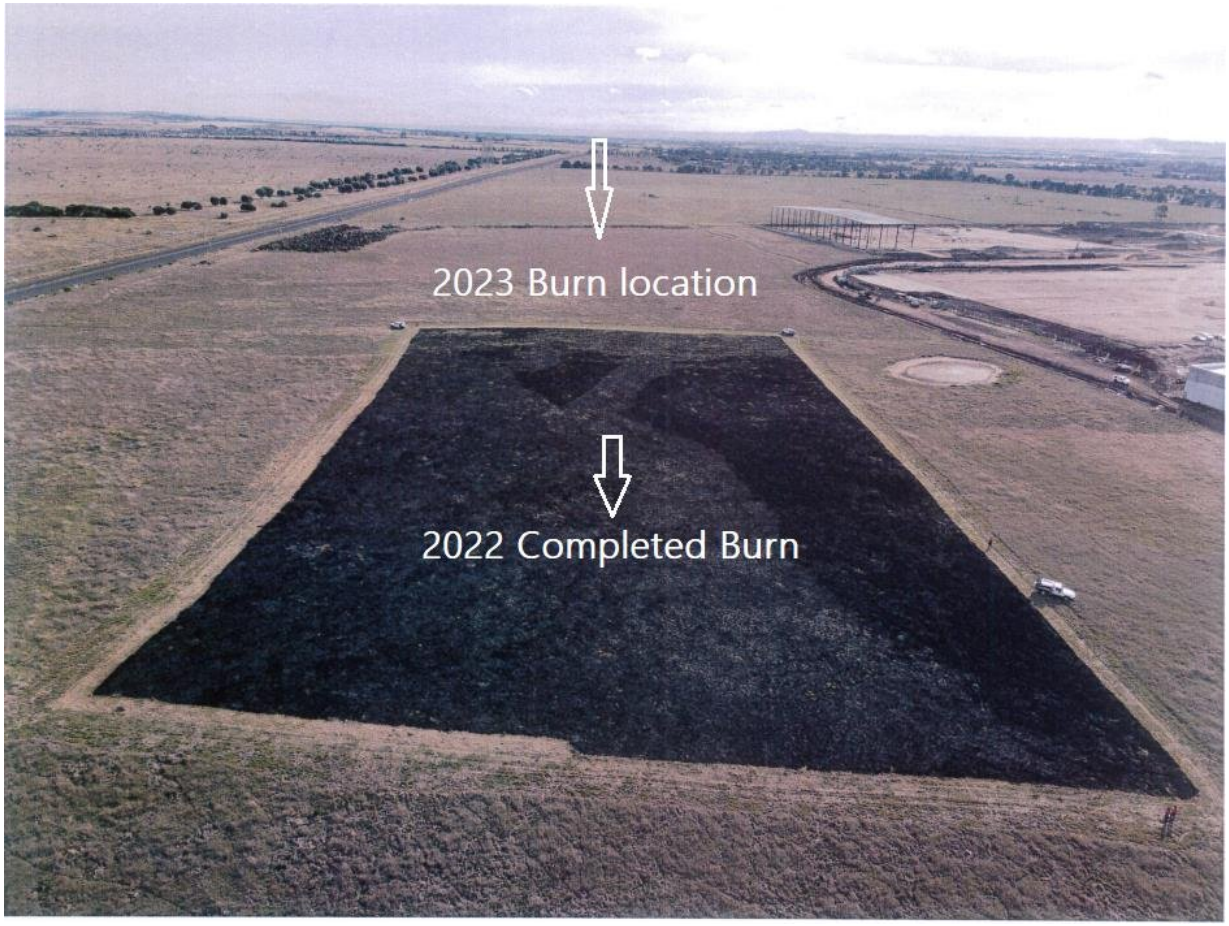
The proposed burn area has 10 previously recorded and mapped Spiny Rice Flowers within the burn area. The EPBC Act, guidelines for managing *Pimelea spinescens,* recommends implementing a fire management plan of cool, quick mid-Autumn fires. Planned burning is an essential tool in managing this species as it helps the plants to re-sprout, regrow as well as promote germination.

3. Site Description

The Ravenhall Industrial Precinct is located at 91-167 Palm Springs Road, Ravenhall, Victoria, south of the Western Highway, north of the Ballarat train line and west of Christies Road, approximately 21 kilometres west of the Melbourne CBD. For the most part, the study area is relatively flat consisting of both indigenous and exotic grassland vegetation, with areas of intact remnant grassland containing embedded and loose basalt rocks. The Ravenhall offset area appears to have been predominantly used for agricultural purposes, and was grazed by horses until March 2020.

This conservation reserve will form the on-site offset location, and will be managed to protect and enhance at least 13.37 hectares of the Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) nationally significant ecological community, 28.98 hectares of confirmed habitat for the nationally significant Striped Legless Lizard *Delma impar*, and 86+ nationally significant Spiny Rice-flower *Pimelea spinescens subsp. spinescens specimens*.
The conservation reserve provides strategic connectivity between designated conservation areas to the immediate south (Ravenhall North Grassland) and west (Deer Park Quarry Grassland) that have been identified as part of the Melbourne Strategic Assessment and the Biodiversity Conservation Strategy, as well as an existing conservation reserve on Christies Road, to the immediate east.

Only a portion of the offset will be burnt this Autumn, leaving the remainder of the site for harbour for native species refuge while the burnt portion recovers over the rest of Spring. The proposed burn area is set within the far Eastern side of the offset.



Above image: Drone photo of completed burn in 2022 and location of planned 2023 burn to the west of the 2022 location.

4. Mapping

Above image: The orange shape is the burn area. The green polygon is the Ravenhall Grassland Reserve. Approximate burn size 2 Ha.

Above image: Green is the site boundary, Orange is representing the 6m slashed vegetation break. White is the burn area

5. Burn Sequence

Slashed fire breaks will be implemented prior to burning on all stages around the perimeter and internal firebreaks. These firebreaks will be approximately 6m in width. These firebreaks will be slashed with brushcutters and a slasher. All slashed areas will be wet down before beginning the burn sequence.

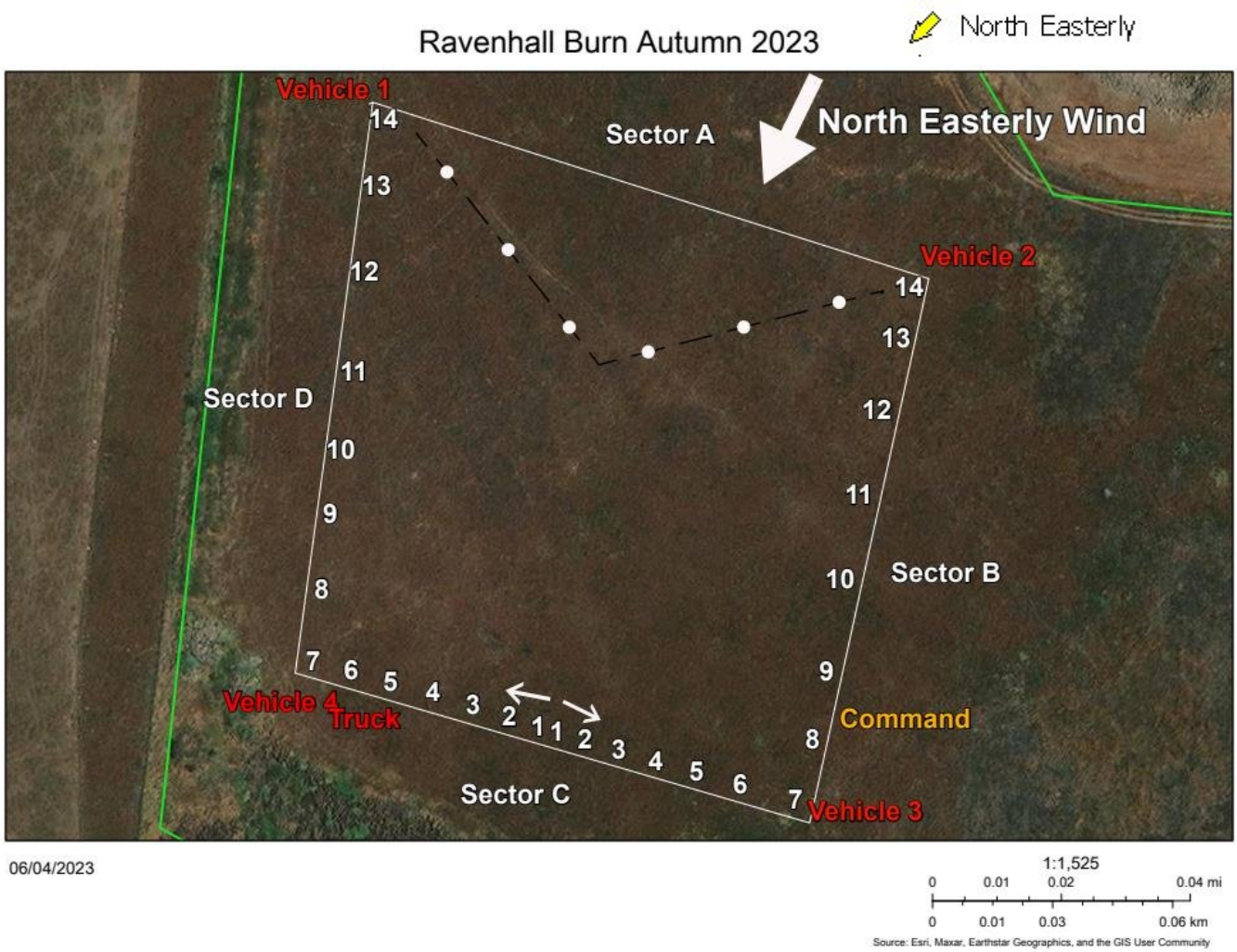
A burn briefing will be held prior to the burn at the Ballan depot. The fire crew will be briefed on the burn plan using the SMEACS system. On arrival at the grassland reserve, a second briefing will be held to confirm fire crew roles and responsibilities, highlight evacuation points and check equipment and water levels prior to the burn.

A walkthrough will be conducted prior to the burn to confirm no hard rubbish or flammable materials has been thrown over the fences into the reserve.

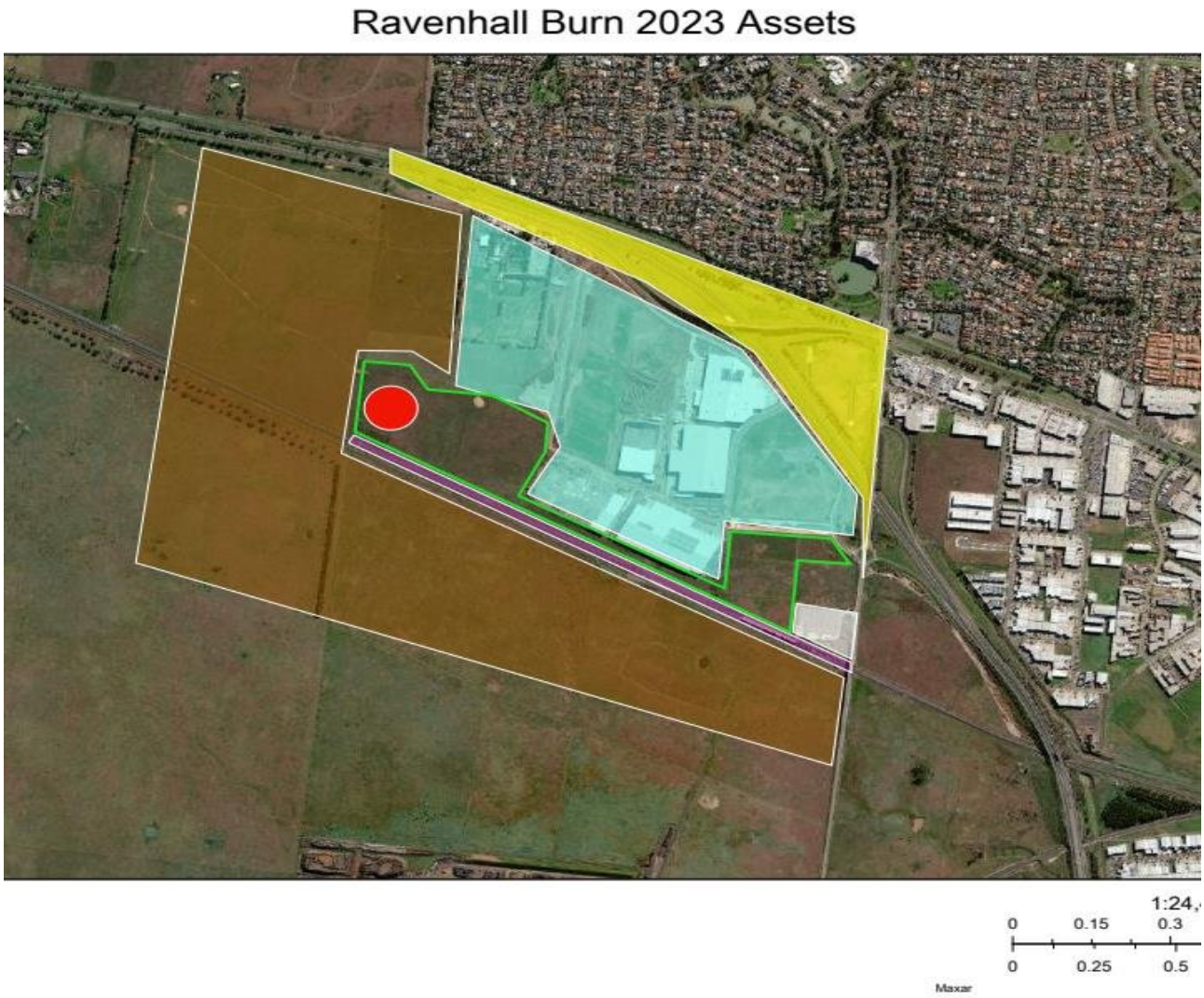
Prior to the official ignition, a small patch of grass to the North of the reserve will be ignited in order to blow smoke across the site and alert any native fauna that a burn is imminent.

Ignition will begin along the mid section of the Sector C control line. Two drip touch operators will spot ignite every 2-3m simultaneously. The progress of the burn will be monitored as the spots back burn into the wind. Spot ignition will also be used on the Sector D & B control lines until both drip touch operators reach Sector A. Once the fire has burnt in approximately 2-3m along Sector D & B and the control lines are secured, a line ignition will be conducted in an arc formation to join the back burning fire and create a relatively high intensity burn.

A post-burn debrief will be held to discuss what went well and what can be improved on next time. A mop-up team will stay behind to monitor the burn site to ensure all vegetation has been extinguished and the fire breaks are safe and secure.



Above image: Ravenhall Ignition Sequence. Note that each side has been designated a sector, vehicles are highlighted red and the ignition sequence numbered.



Above Image: The noticeable assets and threats for the Ravenhall offset burn include:

- Rail track/Reserve/Infrastructure (Purple)
- Adjacent Roadways (Western FWY and Palm Springs Road & Christies Road) (Yellow)
- Industrial areas (Blue)
- Caroline springs train station (White)
- Grasslands outside of Ravenhall Reserve (Brown)
- Proposed burn area (Red Circle)
- Ravenhall Grasslands border (Green line)

7. Burn Plan Details

Burn Details

CFA Station Area	Caroline Springs CFA District 14	**Incident Controller (IC)**	Rodney Bright	**Nominated Burn Controller**	Michael Rykers
Burn Location	Palm Springs Road, Ravenhall				
Map Reference (Melways)	MAP358 E4		**Area(ha)** 1.92ha	**Traffic Management Required?**	☒ Yes ☐ No
Proposed Date	Autumn		**Season**	☐ Winter ☐ Summer	☐ Spring ☒ Autumn
Burn Type	☐ Fire Prevention	☐ Windrow	☐ Rubbish	☒ Environmental	☐ Other

Physical Properties

Slope	Flat 0°-5° ☒	Gentle 6°-15° ☐	Steep 16°- 20° ☐	Very Steep 21°+ ☐
Aspect N/A	North ☐	South ☐	East ☐	West ☐

Fuel Type	Grass ☒	Heath ☐	Scrub ☐	Forest ☐	Other ☐

Containment Lines

Fire break	Slashed ☒	Mineral earth ☐	Natural (Creek line) ☐
Wet Edge	Water ☒	Foam ☐	Retardant ☐

Natural Barriers (Description)	• Palm Spring Road (East) • Vline Rail and Train Station (South) • Western FWY (North) • Hopkins Road (West)

Ignition Method	**Perimeter** ☒Hand ☐ Flamethrower ☐Aerial	**Internal** ☒Hand ☐ Flamethrower ☐Aerial ☐ N/A

Lighting Pattern	Line ☒	Spot ☒	Distance between Spots (m) 2-3m

Overall Fuel Hazard	Moderate ☒	High ☐	Very High ☐	Extreme ☐	Curing 80%	t/ha 6

Prescribed Burn Prescription

Burn Class	**FDI (Max)**	**Temp**	**RH(%)**	**Wind Speed km**	**Preferred Wind Direction**	**FFMC (%)**
Low intensity mosaic	0-11 Low-Mod	15-25	50-60	1-18	Northeast	12-14%
Notifications:						
Vicfire 1800 668 511 ☒	Neighbours (door knock) ☒	CFA / Council ☒	Vline ☒	Vicroads ☒	Development (Dexus, Rokon, Quantum, E&HP) ☒	Boral Quarry ☒
Notification Comments:						
Stakeholders / Consultation						
Neighbours ☒	CFA ☒	Vicroads ☒	Vline and Train Station ☒	Boral Quarry ☒		
Consultation comments:						
Authorization (tick box for approval granted)						
VicRoads ☐	Council ☐	Vline ☐	CFA ☐	VicTrack ☐	Dexus (and subcontractors) ☐	
Follow-up Patrol / Mop Up	Yes ☒	No ☐				

Table 1. Burn plan details.

8. Communication Systems / Calls

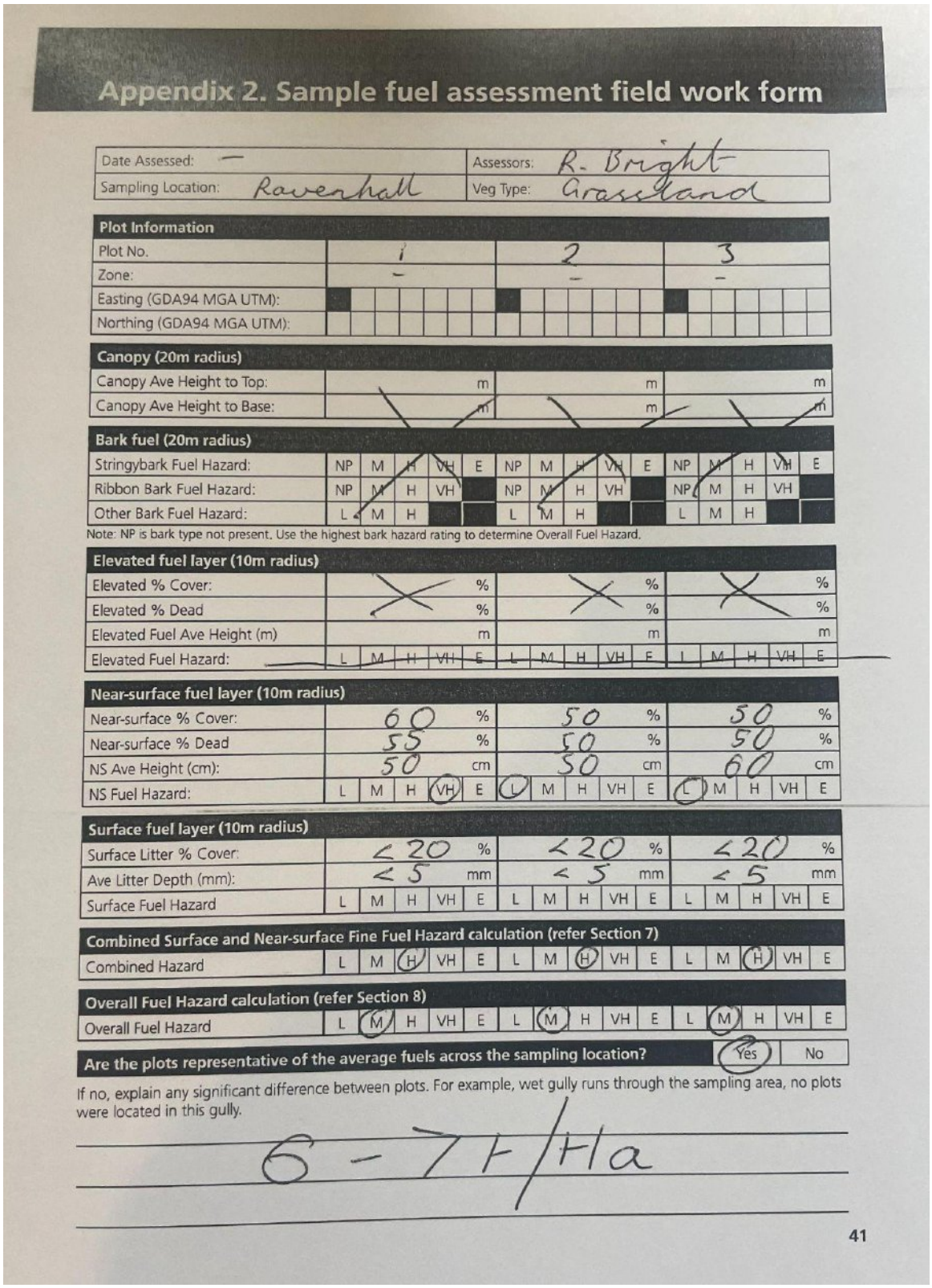
On the fireground Aus Eco Solutions will be using **UHF Channel 14** (or the best available channel with minimal interference with call signs as per the command matrix.

9. Command Matrix

Incident Controller (IC): Rodney Bright						
Nominated Burn Controller: M.Rykers Vehicle 1						
V1		V2		V 3		Truck
TBC	TBC	TBC	TBC	TBC	TBC	TBC

Table 2. Command Matrix

10. Overall Fuel Hazard Checklist



Appendix 2. Sample fuel assessment field work form

Date Assessed:	—	Assessors:	R. Bright
Sampling Location:	Ravenhall	Veg Type:	Grassland

Plot Information			
Plot No.	1	2	3
Zone:	–	–	–
Easting (GDA94 MGA UTM):			
Northing (GDA94 MGA UTM):			

Canopy (20m radius)			
Canopy Ave Height to Top:	m	m	m
Canopy Ave Height to Base:	m	m	m

Bark fuel (20m radius)															
Stringybark Fuel Hazard:	NP	M	H	VH	E	NP	M	H	VH	E	NP	M	H	VH	E
Ribbon Bark Fuel Hazard:	NP	M	H	VH		NP	M	H	VH		NP	M	H	VH	
Other Bark Fuel Hazard:	L	M	H			L	M	H			L	M	H		

Note: NP is bark type not present. Use the highest bark hazard rating to determine Overall Fuel Hazard.

Elevated fuel layer (10m radius)															
Elevated % Cover:	%					%					%				
Elevated % Dead	%					%					%				
Elevated Fuel Ave Height (m)	m					m					m				
Elevated Fuel Hazard:	L	M	H	VH	E	L	M	H	VH	E	L	M	H	VH	E

Near-surface fuel layer (10m radius)															
Near-surface % Cover:	60 %					50 %					50 %				
Near-surface % Dead	55 %					50 %					50 %				
NS Ave Height (cm):	50 cm					50 cm					60 cm				
NS Fuel Hazard:	L	M	H	(VH)	E	L	M	H	VH	E	L	M	H	VH	E

Surface fuel layer (10m radius)															
Surface Litter % Cover:	< 20 %					< 20 %					< 20 %				
Ave Litter Depth (mm):	< 5 mm					< 5 mm					< 5 mm				
Surface Fuel Hazard	L	M	H	VH	E	L	M	H	VH	E	L	M	H	VH	E

Combined Surface and Near-surface Fine Fuel Hazard calculation (refer Section 7)															
Combined Hazard	L	M	(H)	VH	E	L	M	(H)	VH	E	L	M	(H)	VH	E

Overall Fuel Hazard calculation (refer Section 8)															
Overall Fuel Hazard	L	(M)	H	VH	E	L	(M)	H	VH	E	L	(M)	H	VH	E

Are the plots representative of the average fuels across the sampling location?	(Yes)	No

If no, explain any significant difference between plots. For example, wet gully runs through the sampling area, no plots were located in this gully.

6 - 7 t/Ha

41

Table 3. OFH Checklist - Average 6t/ha.

11. Administration and Tasks:

Fireground Operations	Tasks
Incident Controller	Overseeing entire operation
Nominated Burn Controller	Drip Torch ignition
Rig 1	Wet line and patrol as per ignition plan
Rig 2	Wet line and patrol as per ignition plan
Rig 3	Wet line and patrol as per ignition plan
Rig 4	Wet line and patrol as per ignition plan
Truck	Tanker on site 3000 lt water capacity

Table 4. Tasks.

12. Resources List:

Equipment	Required
First Aid Kit / Burn Kit and mobile phone (must be operational and in service)	X1 per rig
PPC / PPE: (Per Person)	Gloves Hard hat (if applicable) Steel capped boots Cotton drill long pants and long sleeve shirt Safety glasses P2 Respirator mask V/Line vest (if applicable)
UHF radios	All AES personal to have
Wind readers	X1 per car
Drip torches and Matches	3+
Fuel (jerry cans)	3+
Flagging Tape	X1
Burn Plan	X1 per vehicle
Warning signs (Traffic, pedestrians)	n/a
Functioning spray hoses	x2 per rig, x1 truck
Water	As much as required to complete works
Standpipes	x3
Filler Hoses	x3
Fire Extinguisher	1 per rig (3)
Shovel / rake hoe	1-2 per rig (4-8)
Leaf Blower	1
4WD Ford Ranger	-
4WD Toyota Landcruiser	-
Truck - 3000L water tank	-
500L Slip on Units	X1
600L Slip on Units	X1
400L Slip on Units	X1

Table 5. Resources List.

13. Safety - Risk / Control Measures

The documents that are required to be completed prior to the burn include:

- Site specific burn plan
- Pre-work briefing
- Job Safety and Environmental Analysis (JSEA) / Job Safety Brief (JSB)
- Safe Operating Procedures (SOP) for conducting burns and using all equipment onsite.
- Daily Work Report (DWR) - Site specific
- Fire permit (if required)
- A burn report will follow up after the implementation of the prescribed burn.

These documents are also required to be on the fireground on the day of the burn.
The Incident Controller will be in charge of these documents, as well as the burn plan.

See below Table 6 for potential site/activity hazards and their associated control measures.

Risk / Control Measure		
Risk	**Preventive Control**	**Mitigation Control**
Flammable liquids (diesel/unleaded Petrol)	Use a fuel mix ratio of Diesel 70%, Unleaded 30% to reduce flammability. Use minimum amounts of fuel and only as required. All vehicles contain spill kits and fire extinguishers. Use only industry standard fuel containers	- Continually monitoring of the usage of flammable liquids used onsite - Ensure fuel is protected from hot sun and hot materials including drip torches. - Store fuel away from dry organic matter and away from burn control areas.
Injury from fire (burns / scalds / blisters)	Training to be undertaken by crew on safe procedures and equipment safety (i.e. drip torches). Follow all burn procedures outlined in company SOP. Work in pairs/groups and act as a spotter for your partner/s. All vehicles must contain up to date and stocked first aid kits. Ensure all crew are briefed on site specific burn plan and procedure prior to burn commencing Carry UHF radios to communicate with other crew	- Crew burn briefings - Pair up inexperienced operators -Wear appropriate PPE including cotton long pants, long sleeved shirt, leather boots and gloves. -No Rubber boots, gloves or polyester clothing is to be worn. -Be aware of surroundings and trip hazards.
Change in weather conditions (wind, temperature, RH)	Check weather conditions prior to burn commencing. Commence burn only if forecasts indicate low to moderate wind speeds Monitor wind speeds and direction via mobile weather app throughout the progress of the burn.	Be mindful and aware of change in wind direction. Ensure fire breaks are placed around the entire burn perimeter to prevent spread in the event of wind changing direction/s. Measure wind speeds via a hand held wind meter to account for variances from weather apps. Do no burn in wind speeds exceeding 18-20 km/hr Do not burn on days where total fire bans have been put in place
Smoke hazards on the community & employees.	Burn on days when the wind direction will carry the smoke to have the least effect on local communities and establishments. Notify landholders in the area 24-48 hours prior to the scheduled burn Employees wear appropriate PPE including P2 masks and safety goggles/glasses. Task rotation to minimise smoke exposure.	Notify landholders in the area 24-48 hours prior to the scheduled burn.
Fire escaping control area	Produce fires of low intensity only and burn small sections at a time.	Follow fire break plan layout and procedure as per burn plan

	Burn a large fire break at the end of the control zone to which the wind is directed and work backwards from this point. Burns will be restricted to daylight hours only to ensure high light visibility	
Fire restarting after patrol period	Ensure 2-3m of control area boundaries are blacked out with water spray units (cold, wet) to prevent escape. Ensure logs and livestock feces are extinguished to prevent embers or flare up within or adjacent to the control area.	Patrol the area for 1-5 hours after no smoke or smoldering is visible from the control area (time is dependent on area and weather conditions).

Table 6. Risk / control measures.

Fire Crew Sign In:

Name	Role	Signature	Date
	IC		
	Ignition Control		
	Wet Lines		
	Wet Lines		
	Wet Lines		
	Wet Lines		
	Wet Lines		
	Wet Lines		

Table 7. Fire crew sign in.

Visitor Sign In:

Name	Role	Signature	Date

Table 8. Visitor sign in.

12. BURNING OPERATION CHECKLIST *(new checklist to be completed on each burn day)*

Burn Checklist				
Burn IC	Rodney Bright	**Burn Approved**	☐Y ☐N	**Sectors -**
Notifications Completed	☐Y ☐ N	**Pre Burn Work Completed**	☐ Y ☐N	**Sector Leaders -**
Briefing Complete	☐ Y ☐ N	**Operators signed onto JSB**	☐ Y ☐ N	**Date -** _____

Weather					
Forecast	Max Temp	Max Wind	Min RH	Max FDI	Wind Direction
Day 1					
Day 2					
Day 3					
Actual (On Site)	**NOTE: Record more regularly if noticeable change in fire behaviour is recorded**				
Commencement					
30 min					
1 hr					
1.5 hr					
2 hr					
2.5 hr					
3 hr					
Completion					

FMC %	Pre Burn		**Lighting Crew**					
	On the Day							
Hot Debriefing	Completed		**Lighting Pattern**	Strip ☐		Spot ☐		Distance between Spots (m)
	Y ☐	N ☐						
Risk Assessment	Completed		**Risk Mitigation**	Completed		**Traffic Management**	In place	
	Y☐	N ☐		Y ☐	N ☐		Y ☐	N ☐

Resources On Site

Truck	**1**	Slip-ons	**4**	Other		Command Vehicle	**1**	Quick Fill		Drip Torches	4
UHF	14	Signage	Y	Lighter Fuel		Catering		Total Personnel			
Fire Behavior											
Flame Height Average			**Scorch Height**			**Spotting Distance**		**ROS**			
Patrol Organized	Y ☐ N☐	**Responsible Person**		**Times**				**Operations Completed**		Time	Date
Objectives Achieved		Y ☐ N☐	**Comments**								
Risks / Safety Issues		Y ☐ N☐	**Comments**								

Table 9. Burn operation checklist.

Appendix 5. Ravenhall Grassland Reserve Burn Report Autumn 2023 (Aus Eco Solutions 2023c)

Aus Eco Solutions
restoring native ecosystems

Ravenhall Grasslands Reserve Burn Report Autumn 2023

by Rodney Bright

Summary

This prescribed burn was conducted on 30/05/2023, within the Autumn specified period. The weather predictions on the day were largely in accordance with the burn plan. The wind direction was North West to West as opposed to the preferred wind direction of North East. However this did not impact the burn on the ground and smoke did not impact the surrounding assets such as the rail line to the South and the businesses to the East. The smoke lifted before racing these assets.

The objectives of this burn were to:

- Conduct any burns in a patchy or mosaic fashion over no more than one third to half the site. A high percentage of bare ground to be available for recruitment of native species, potentially increasing site biodiversity.
- Reduction of weedy biomass existing in a specific area of the offset - post herbicide treatments.
- Reduction in overall biomass to increase efficiency of weed control (easily located) and reduce off-target damage as there will be less obstruction from native plants.
- Deplenish weed seed stock in the soil bank.

These objectives were met with an approximately 2ha site area burnt.

Burn Briefing

On 30/05/23 at roughly 9:00am, I conducted the first burn briefing at our Depot in Ballan. I conducted this briefing using the SMEACS briefing format, covering the Situation, Mission, Executions, Administration,
Command and Communications and finally Safety. We also ran through the LACES format, covering Lookouts, Awareness, Communication, Escape Routes and Safety Refuge.

The crew were briefed on the schedule for the day, how long the burn was estimated to take (including mop up), the ignition sequence, the current weather forecast and prescriptions, the burn plan and the equipment list.

The briefing was then open to questions and the team had some questions for anything that needed to be clarified. Once we felt all questions were dealt with, and there were not going to be any further questions, the briefing was concluded.

Notifications

Burn off Notification submitted to Fire Permits Victoria on 29/5/2023. Accepted 29/5/2023
Notification was also made to Samantha Barron (Ecology and Heritage partners) on the 29th/05/2023 via Email, Sam confirmed she would advise Dexus of the burn date. .
On day notifications:
Metro Centrol was called at roughly 11am
Surrounding businesses were visited and at 10.30am

On Site Briefing

Before arriving on site the 3000L Truck, 3 slip-on units and a trailer tank and pump slip-on were filled with water, fuel jerry cans and drip torches were also filled with fuel (diesel and petrol - ratio 75:25 respectively).

The on-site briefing for the burn was completed at 10.am . Onsite conditions were discussed and safety aspects were reinforced

I assessed conditions prior to the ignition on site at roughly 11.10am, this was achieved by using a wind reader and online information and assessing on ground conditions

Fire Danger Index (FDI) was moderate
Temperature was 18.5 degrees
Relative Humidity (RH) was 76%
Wind Direction was WNW
Fine Fuel Moisture Content was 12%

Wind Speeds, Temperature and Rh was taken with a Kestrel wind reader-

11.10am 18.5 degrees, WNW direction, AVG 6.6 kph, MAX 7.2 kph, 76 Rh

12.21pm 18.5 degrees, WNW direction, AVG 4.2 kph, MAX 5.0 kph, Rh not taken

12.50pm 18.5 degrees, WNW direction, AVG 8.0 kph, MAX 9.9 kph, 56 Rh

Conditions were somewhat as forecast in regards to temperature, humidity and wind speeds. Wind direction was different.
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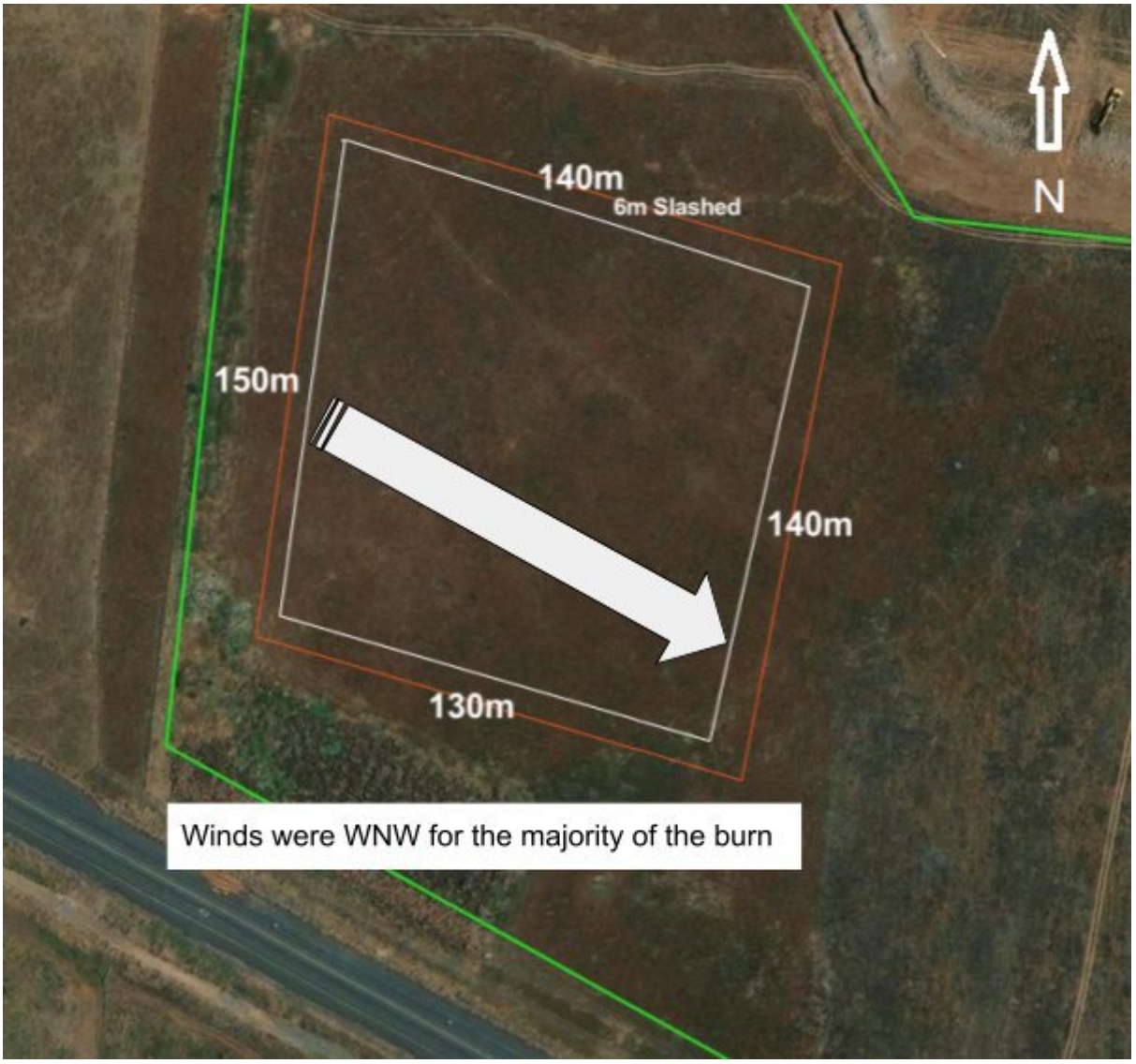
Prescribed Burn Prescription						
Burn Class	FDI (Max)	Temp	RH(%)	Wind Speed km	Preferred Wind Direction	FFMC (%)
Low intensity mosaic	0-11 Low-Mod	18-25	50-60	1-15	North / Northeast	12-14%

5. The Burn



Once wet lines were put in place and the crew positioned as per the burn plan, a test patch was lit at 12.00 pm to observe fire behaviour in the conditions. This went well and the burn went ahead. Starting at the middle of the Eastern side of the burn area and letting the fire move back into the fairly constant WNW wind. Making spot ignitions along the eastern edge of the burn site, one drip torch operator moved north and another moved south. Wet line operators moved with the drip torch operators to re-enforce wet lines if needed during this time. Drip torch operators then moved along the Northern and Southern edges of the site. Once safe to do so a line ignition was conducted along the Western edge.

The burn was out at 12.53pm. A crew stayed behind to monitor the site till 4.00pm

6m wide fire breaks implemented with brushcutters

Spot ignition line on the Northern edge

Spot ignition line Northern edge

View of from South west corner, *smoke blew in a WNW direction but lifted before reaching businesses*

Post line ignition of the western edge of the burn site

Post burn

Some plants, including a couple of Spiny Rice Flowers did not not burn in the fire

6. Post Burn Debrief

After the burn, the team came in for a hot debrief. The crew discussed how the conditions were favourable and consistent during the burn.