WHITE ROCK 2021 COMPLIANCE REPORTING (EPBC 2014/7388)

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Cumner Road Subdivision, White Rock, Ripley Valley, Queensland

(EPBC 2014/7388)

Compliance report

Period: 03 December 2020 to 03 December 2021

20/01/2022

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Executive Summary

Key points in this reporting period:

- The EPBC Act approved Action has commenced, with approximately 20% of the total urban development footprint cleared of vegetation.
- The project is in full compliance with the EPBC Act approval, and no incidents or non-conformances have occurred since project commencement.
- Baseline data has been collected and reported for the three key monitoring assets:
    - Koala (managed under the Koala Management Plan)
    - Native vegetation and weeds (managed under the Conservation Area Management Plan)
    - Pest Animals (managed under the Pest Management Plan)
- Final works and preparation for commencement in 2022 are also underway for:
    - Fire (managed under the Fire Management Plan)
    - Revegetation
- Baseline surveys within the offset area established for the project demonstrate that:
    - No native vegetation on site is at benchmark condition, with all 4 BioCondition sites sitting between 41-76% of the condition of the benchmark.
    - Target weeds *Lantana camara* and *L. montevidensis* are present in 100% and approximately 50% of all rapid weed assessment sites respectively, with different patterns in weed abundance across management zones.
    - During the koala monitoring, a single koala was observed in secondary habitat in a preferred food tree species (Queensland Blue Gum, *Eucalyptus tereticornis*), however evidence from scat surveys suggests the species utilises the entirety of the site at low densities.
    - All four target pest species were observed in the baseline survey, with pigs being the most numerous and wide-spread.

1 Introduction

On December 3, 2019, the Cumner Road subdivision, White Rock, Ripley Valley, Queensland (EPBC 2014/7388) was approved under sections 130(1) and 133(1) of *the Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act). The approved action is the development of a mixed-use subdivision zone and associated infrastructure, and environmental protection on Cumner Road, White Rock, Queensland.

The action commenced on 03 December 2019. The following report details progress of the action for the period 03 December 2020 to 03 December 2021 (Year 2) and is provided to meet the annual compliance reporting requirement within condition 10 of the Approval Notice.

Condition 10 states:

"10. The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or as otherwise agreed to in writing by the Minister. The approval holder must:

a. publish each compliance report on the website within 60 business days following the relevant 12 month period;

b. notify the Department by email that a compliance report has been published on the website within five business days of the date of publication;

c. keep all compliance reports publicly available on the website until this approval expires;

d. exclude or redact sensitive ecological data from compliance reports published on the website;

and

e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the department within 5 business days of publication. "

This report provides a summary to meet Condition 10 above. It also provides a summary of actions and compliance pertaining to the EPBC2014/7388 approval for year Year 2.

2 Progress of the action (EPBC 2014/7388)

Progress is reported against the Approval Conditions and associated performance criteria within Tables 1, 2 and 3 below.

Table 1: Response to condition in Attachment A of the EPBC Act approval for EPBC 2014/7388

Part A - Conditions specific to the action	
Condition	**Comments**
1. For the protection of the Koala and the Grey-headed Flying-fox, the approval holder must not clear Koala habitat and Grey-headed Flying-fox foraging habitat outside the area marked as the Development Footprint, enclosed by the red lines, as shown on the map at Attachment A.	Compliant.
2. To compensate for the clearing of 146.02 hectares of Koala habitat and Grey-headed Flying-fox foraging habitat, the approval holder must: a. Legally secure the Conservation Management Area. b. Provide the Department with evidence of the registration of legal security of the Zone 1 of the Conservation Management Area, within 3 years of the date of this approval. c. Provide the Department with evidence of the registration of legal security of Zone 2 of the Conservation Management Area within 5 years of the date of this approval. d. Commence implementation of the Conservation Area Management Plan, within 30 days of the date of this approval. e. The performance and completion criteria set out in Tables 1 and 2, at Attachment B (of the approval) must be achieved.	a) Legal security in progress, dependency b, c held until legal security obtained d) As per last compliance report (for year 1), this has been met e) In progress
3. The approval holder must not commence the action until the approval holder has commenced implementation of the Conservation Area Management Plan.	The CAMP was commenced in September of 2019 with the undertaking of baseline Koala surveys per the KMP. The approval holder commenced the action on 4/12/2019 with the initial works related to the road corridor for the Cumner Road extension. The department was notified of the commencement of the action on 11/12/2019 via email.
4. The approval holder must implement the Koala management plan.	Plan implemented and results included in this report
Part B - Standard administrative conditions	
Notification of date of commencement of the action 5. The approval holder must notify the Department in writing of the date of commencement of the action and the date of commencement of construction within 10 business days after the date of commencement of the action or commencement of construction respectively.	Achieved. The approval holder commenced the action on 4/12/2019 with the clearing of the road corridor for the Cumner Road extension. The department was notified of the commencement of the action on 11/12/2019 via email.
6. If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	N/A. The action has commenced.

Compliance records 7. The approval holder must maintain accurate and complete compliance records.	Accurate and complete compliance records have been maintained.
8. If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request. Note: Compliance records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the Department's website or through the general media.	No request has been received.
Preparation and publication of plans 9. The approval holder must: a. submit plans electronically to the Department for approval by the Minister; b. publish each plan on the website within 20 business days of the date of this approval or the date that the plan is approved by the Minister or of the date a revised action management plan is submitted to the Minister or the Department, unless otherwise agreed to in writing by the Minister; c. exclude or redact sensitive ecological data from plans published on the website or provided to a member of the public; and d. keep plans published on the website until the end date of this approval	All approved plans can be found at: https://intrapac.com.au/ripley/ No sensitive ecological data is contained within the plans.
Annual compliance reporting 10. The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or as otherwise agreed to in writing by the Minister. The approval holder must: a. publish each compliance report on the website within 60 business days following the relevant 12 month period; b. notify the Department by email that a compliance report has been published on the website within five business days of the date of publication; c. keep all compliance reports publicly available on the website until this approval expires; d. exclude or redact sensitive ecological data from compliance reports published on the website; and e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication. Note: Compliance reports may be published on the Department's website.	See above This document is the compliance report for the second 12-month period (Year 2) period following the commencement of the action.
Reporting non-compliance 11.The approval holder must notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify: a. the condition which is or may be in breach; and b. a short description of the incident and/or non-compliance	There was no incident or occurrence of non-compliance in the reporting year.
12. The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying:	As above

a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b. the potential impacts of the incident or non-compliance; and c. the method and timing of any remedial action that will be undertaken by the approval holder.	
Independent audit and independent Scientific Outcomes 13. The approval holder must ensure that independent audits of compliance with the conditions and/or Independent Scientific Verification of Outcomes are conducted as requested in writing by the Minister.	N/A. No independent audits were requested within the reporting year.
14. For each independent audit, the approval holder must: a. provide the name and qualifications of the independent auditor and the draft audit criteria to the Department; b. b. only commence the independent audit once the audit criteria have been approved in writing by the Department; and c. c. submit an audit report to the Department within the timeframe specified in the approved audit criteria.	N/A. No independent audits were conducted within the reporting year.
15. For each Independent Scientific Verification of Outcomes the approval holder must: a. provide the name and qualifications of the independent suitably qualified field ecologist and the draft brief to the Department; b. only commence the independent Scientific Verification of Outcomes once the independent suitably qualified field ecologist and the brief have been approved in writing by the Department; and c. submit an independent suitably qualified field ecologist's report to the Department within the timeframe specified in the approved brief.	N/A. No independent scientific verification of outcomes occurred within the reporting year.
16. The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	N/A. No independent audits were conducted within the reporting year.
Completion of the action 17. Within 30 days after the completion of the action, the approval holder must notify the Department in writing and provide completion data	N/A. The action has not been completed.

Table 2: Compliance criteria (Attachment B Table 1 of the EPBC approval)

Task	Establishment			Maintenance	Progress within Year 2 (03/12/2020 to 03/12/2021) * only progress toward preliminary management actions (highlighted green) are addressed within this compliance report as the reporting period (Year 2) is relevant to these only.
	Preliminary	Management			
	By end of year 3	Between end of year 3 and end of year 10	Year 11	Years 12-21	
Construction-related management actions					
Fencing / signage / (and maintenance) relating to Koala and GHFF management	Infrastructure installed.	No more than 5% of fencing compromised at any time			Fencing / signage / (and maintenance) relating to Koala and GHFF management has not yet commenced along the eastern edge of the mixed-use development area. Nonetheless, all Koala fencing has been completed along Sandstone Boulevard (the new road constructed as part of the action).
Sediment and erosion control (and maintenance)	Sediment / erosion works installed	Sediment and erosion control devices checked and repaired annually in Quarter 1			Sediment and erosion work required in regard to the clearing of the Cumner Rd extension have been installed and maintained as part of the Construction Environmental Management Plan. Construction Contractor reporting on this is available upon request.
Bushland management actions					
Fire Management	Bush fire management plan (BFMP) completed. Fire management works undertaken as specified in the BFMP.	Fire management works undertaken as specified in the BFMP			No bushfire management works were undertaken in the Year 2 period. Bushfire burn plan currently being developed and first burn planned for mid 2022.

Pest fauna management	Two survey events completed to determine the baseline of dogs / cats / foxes within the Conservation Management Area and reference sites within the adjacent White Rock Conservation Estate Area. Development of a pest management plan that specifies how feral dogs, cats and foxes will be reduced in the conservation Management Area Development of a survey methodology that is sufficient to demonstrate any reduction of feral dogs, cats and foxes in the Conservation Management Area, relative to the baseline and reference sites within the adjacent White Rock conservation Estate Area.	Between end of year 3 and end of year 6, no increase in pests against baseline, or, in the event of evidence of an increase of pests in the general area as measured at reference sites within the White Rock Conservation Estate Area, then demonstrated reduction in pests relative to the these reference sites, measured annually.	From beginning of year 7 to end of approval, maintain a reduction in pests relative to baseline, measured annually, or in the event of evidence of an increase of pests in the general area, as measured at reference sites within the White Rock Conservation Estate Area, then demonstrated reduction relative to the these reference sites, measured annually.	Two survey events (Spring and Autumn) were undertaken to determine the baseline (see Section 3.1.5).
Bushfire/recreation trails (and maintenance)	Fire access tracks established	At a minimum, bushfire management trails drivable at least one month prior to fire season as determined in BFMP. No more than 10% of designated multipurpose trails unwalkable at any time.		Existing fire access trails have been maintained as part of access requirements for the ongoing revegetation works. One new fire access trail has been established to access a dam in the south of the offset area. This was a long disused trail that was established in the past though needed re-establishment. No koala habitat trees or GHFF food trees were cleared as part of establishment of this track.
Revegetation requirements assessed	Revegetation requirements assessed every year prior to planting season until Year 8		n/a	The revegetation contractor has been engaged and is looking to do some planting in the coming months to take advantage of the la Nina.

Table 3: Completion criteria (Attachment B, Table 2 of the EPBC Act approval)

Completion Criteria	Relevant to Year 11	Relevant to Year 21	Comments
1. Both Zones 1 and 2 of the conservation area have been legally secured, ensuring protection for conservation purposes, within 5 years of date of the approval.	✔	✔	N/A for the Year 2 period.
2. With exception of minor initial works, bushland management actions commenced within 3 years of the date of the approval.	✔	✔	Commenced.
3. Documented increase in Koala and GHFF habitat value, as shown in an assessment against the management objectives of table 4 of the CAMP.	✔	✔	N/A for the Year 2 period.
4. All revegetation (planting works) completed by the end of year 11, with planted tree species comprising predominantly Koala food trees (including Forest Red Gum and Grey Gum) and winter foraging species for the GHFF (Broad-leaved Paperbark, Spotted Gum, Swamp Mahogany and Forest Red Gum).	✔	N/A	N/A for the Year 2 period.
5. Minimum 90% survival rate of revegetation or equivalent stem density (i.e. due to natural regeneration) by end of year 11.	✔	N/A	N/A for the Year 2 period.
6. All management zones contain primary Koala food trees and GHFF winter foraging trees in good health by end of year 11 and for the remaining duration of the approval.	✔	✔	N/A for the Year 2 period.
7. Across the planting area, tree canopy cover % within each management zone meets regional ecosystem benchmarks by end of year 11, 16 and 21, as defined by the Queensland Government's BioCondition Benchmarks for Regional Ecosystem Condition Assessment (2019). This includes: ● For RE 12.3.3: 53% ● For RE 12.9-10.7a: 58% ● For RE 12.9-10.2: 62% ● For RE 12.9-10.7: 40% ● For RE 12.8.17: 48% ● For RE 12.8.24: 53%	✔	✔	N/A for the Year 2 period.
8. By end of year 11, a density of at least 20 overstory trees (comprising Koala food trees and winter foraging resource trees for GHFF) and 250 mid or understory trees and/or shrubs per hectare will be present, and maintained for the duration of the	✔	✔	N/A for the Year 2 period.

	approval.			
9.	By end of year 11 rehabilitation and management results in vegetation communities that meet the descriptions of pre-existing and/or surrounding remnant regional ecosystem types and these are maintained for the duration of the approval.	✔	✔	N/A for the Year 2 period.

3 Actions within the CMA in this period

The Conservation Management Area Plan (CAMP) stipulates annual reporting on five key attributes:

- a summary of management actions,
- results of any vegetation monitoring,
- results of any koala monitoring,
- report on actions to support the bushfire management plan
- actions to support the pest management plan.

Attached to this document are detailed reports from relevant contractors within each action, and a summary of actions and results (Sections 3.1.1 to 3.1.5).

3.1 Management action report

Evolve Environmental Solutions were contracted to begin weed treatment works. Treatment areas are mapped in Figure 1. They have occurred in:

- July (in Area 5),
- August with some follow up spraying (Area 5) and slashing (Area 7),
- September spraying (in Areas 5, 2 and 3),
- October spraying (Area 4 and 5), and
- early November track slashing (Area 6).

3.2 Vegetation monitoring report

The CAMP stipulates that vegetation will be improved in three unique zones, each with their own actions:

- MZ1: Riparian restoration over a total of 30ha along drainage lines,
- MZ2: Assisted regeneration of 91ha through control of *Lantana camara* and other invasive species
- MZ3: Regeneration of the remaining 128ha through minor weed works

BioCondition surveys were conducted within the CAMP Area in September 2021, with 6 plots established across the site (Figure 2). The vegetation in best condition is remnant RE12.9-10.2, with all four sites scoring 2 out of 4 and ranging between 41-76% of the condition of the benchmark condition (for details see ELA 2021c).

Target weed species - *Lantana camara* and *L. montevidensis* - were monitored across all management zones (Figure 3). Across the site, 100% of monitored locations across all management zones (MZ) had *L. camara* present, and 45% had *L. montevidensis.* Average coverage, where occupied by the species, were 42% and 27% respectively, or average of 52% of the plot with some form of *Lantana* species overall (Figure 2).

Management zone 3 (good condition remnant) has the lowest *L. camara* cover, though all plots are occupied by the species. This management zone also has the highest *L. montevidensis* cover (Figure 3).

Both other management zones have approximately 50% *L. camara* cover and all plots are occupied, whilst *L. montevidensis* cover is lower but more than half of the regrowth MZ2 has *Lantana* species present (Figure 3). Examples of weed infestation on site can be seen in Figure 4, and all plots in the detailed report (ELA 2021c).

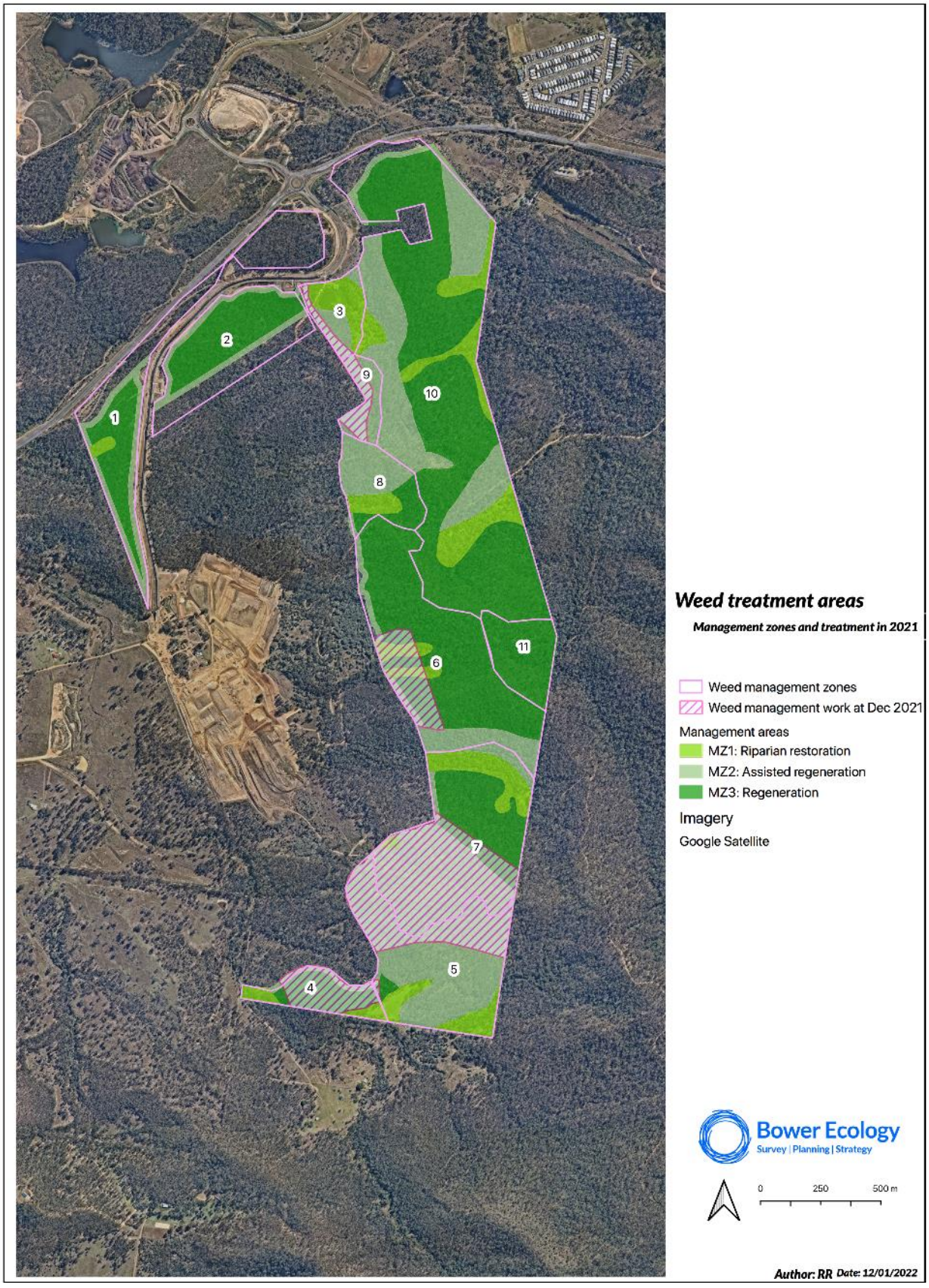

Figure 1: Evolve Weed Treatment Progress (as at 7/12/2021) (data from Evolve)

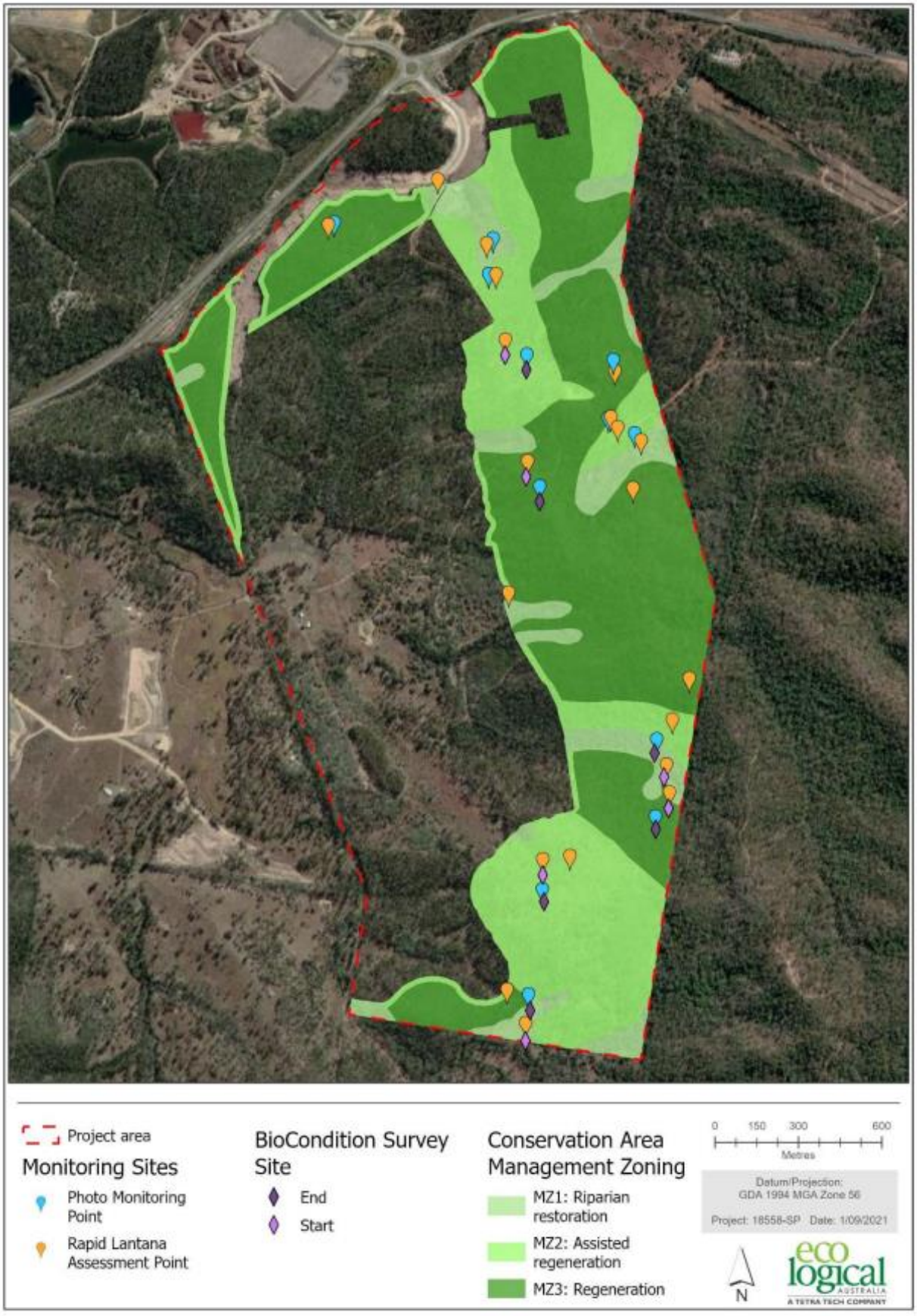

Figure 2: Location of the BioCondition plots, Lantana camara monitoring plots and photo monitoring plots within the CAMP Area and management zones. (From ELA 2021c)

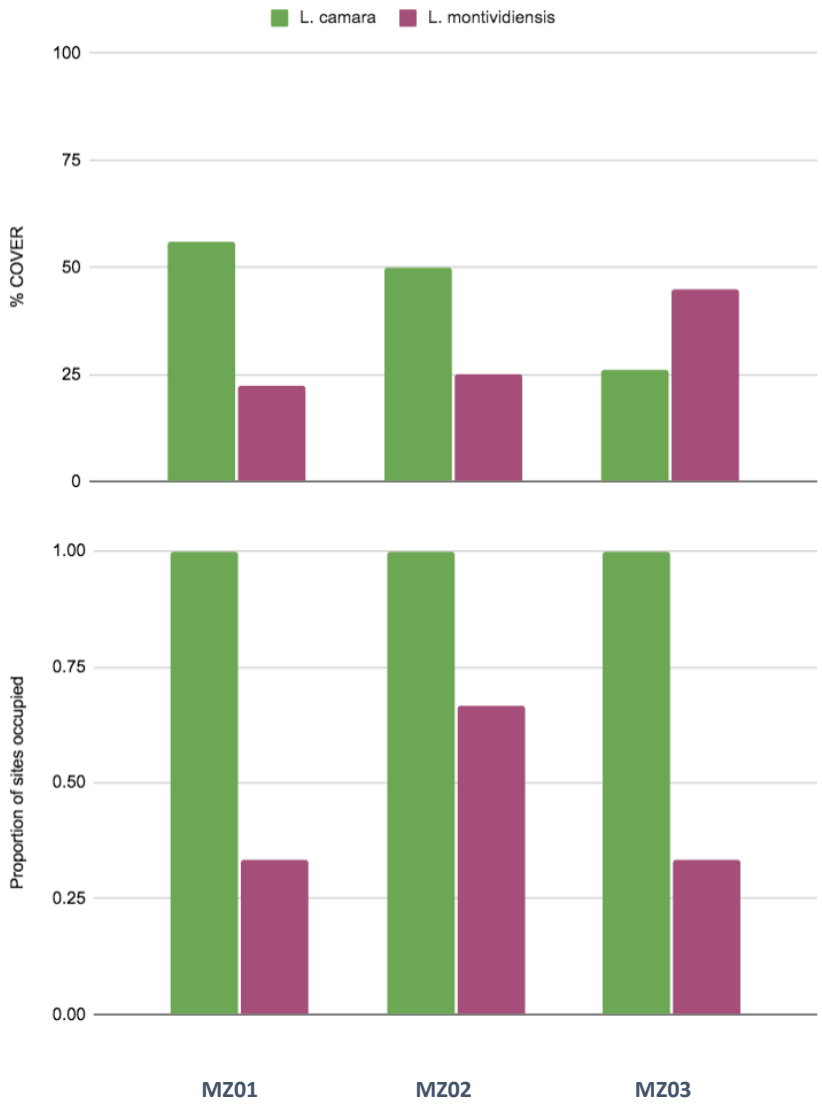

Figure 3: Summarised results of weed monitoring for *Lantana spp*. across 20 sites in each management zone. (from ELA 2021c)

Figure 4: Example photos from BioCondition plots and photoplots showing the range of Lantana camara coverage found in the CAMP Area. Photo monitoring site 6 (top, left and right), rapid Lantana monitoring plot 8 (centre left and right), and BioCondition 6 (bottom left and right). (From ELA 2021c)

3.3 Koala monitoring report

The Conservation Management Area has a designated Koala Management Plan which has management actions to improve habitat value from the baseline condition:

- Planting and assisted regeneration
- Fire management (see Section 3.1.4)
- Weed control (see Section 3.1.1)
- Feral species management (see Section 3.1.5)
- Restrict vehicle access

The impact of these actions on koala populations is to be monitored every two years commencing with a baseline survey prior to work beginning (this occurred in 2019). A report was prepared in September 2021, 2 years after commencement of works, when approximately 15% of the proposed development footprint had been cleared.

This survey reported the following results, visualised in Figure 5:

- No koalas detected in strip transects
- One koala detected on September 6th during spotlighting in a *Eucalyptus tereticornis*
- Male calls recorded at Site 3 over a 4-day period in September
- RGSATS showed 2 sites occupied out of 33 surveyed, average activity level at *occupied* sites of 7%

Koalas were found utilising secondary habitat that dominates the study area.

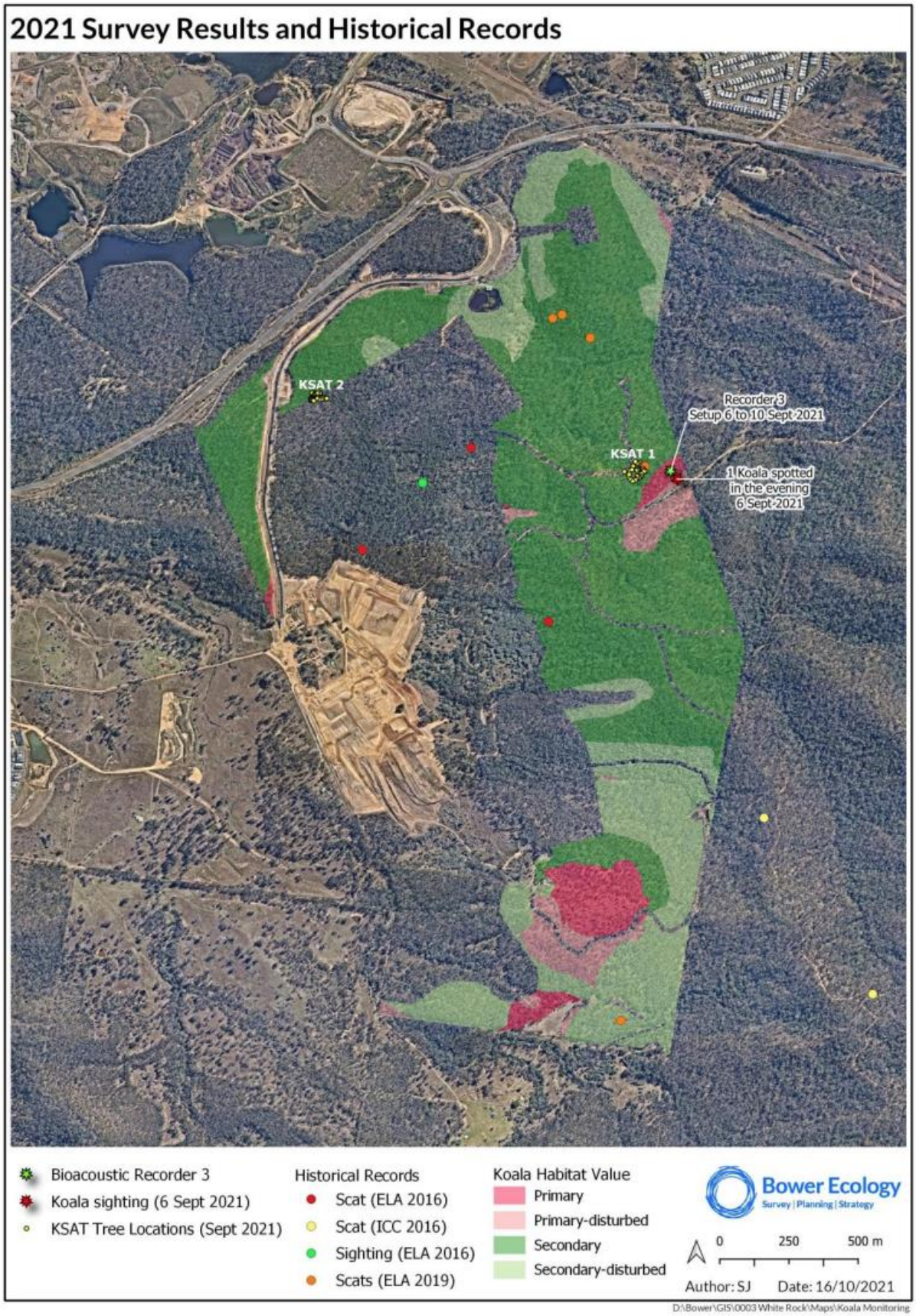

Figure 5: Mapped results of koala survey findings

3.4 Bushfire management report

The Conservation Management Area has three core fire management zones (Figure 6), each with their own strategy:

- Protection Zone
  - *Fine fuel layer not to exceed low to moderate risk or 5 tonnes/ha*
- Wildfire Mitigation Zone
  - *Maximum overall fuel hazard less than high or <8 tonnes/ha in ground and shrub layer,*
  - *Planned burns occur at lower end of recommended intervals, and area treated is 0-80% of the block (Table 4)*
  - *Fuel management by slashing, selective shrub clearing and trail construction*
- Conservation Zone
  - *Planned burns occur at lower end of recommended intervals, and area treated is 0-80% of the block (Table 4)*

Table 4: Recommended intervals for planned burns in wildfire mitigation and conservation zones

Regional Ecosystem	Recommended interval	Recommended season	% burnt in this reporting interval	% burnt in history of CAMP implementation
12.9-10.2	4-25y	Summer - Winter	0	0
12.9-10.7a	4-25y	Summer - Winter	0	0
12.8.24	4-25y	Summer - Winter	0	0
12.9-10.17	8-20y	Summer - Winter	0	0
12.8.17	3-6y	Summer - late Autumn	0	0
12.3.3	3-6y	Summer - late Autumn	0	0

No fire management actions occurred in this reporting interval. The first round of mosaic burns are planned for mid-2022.

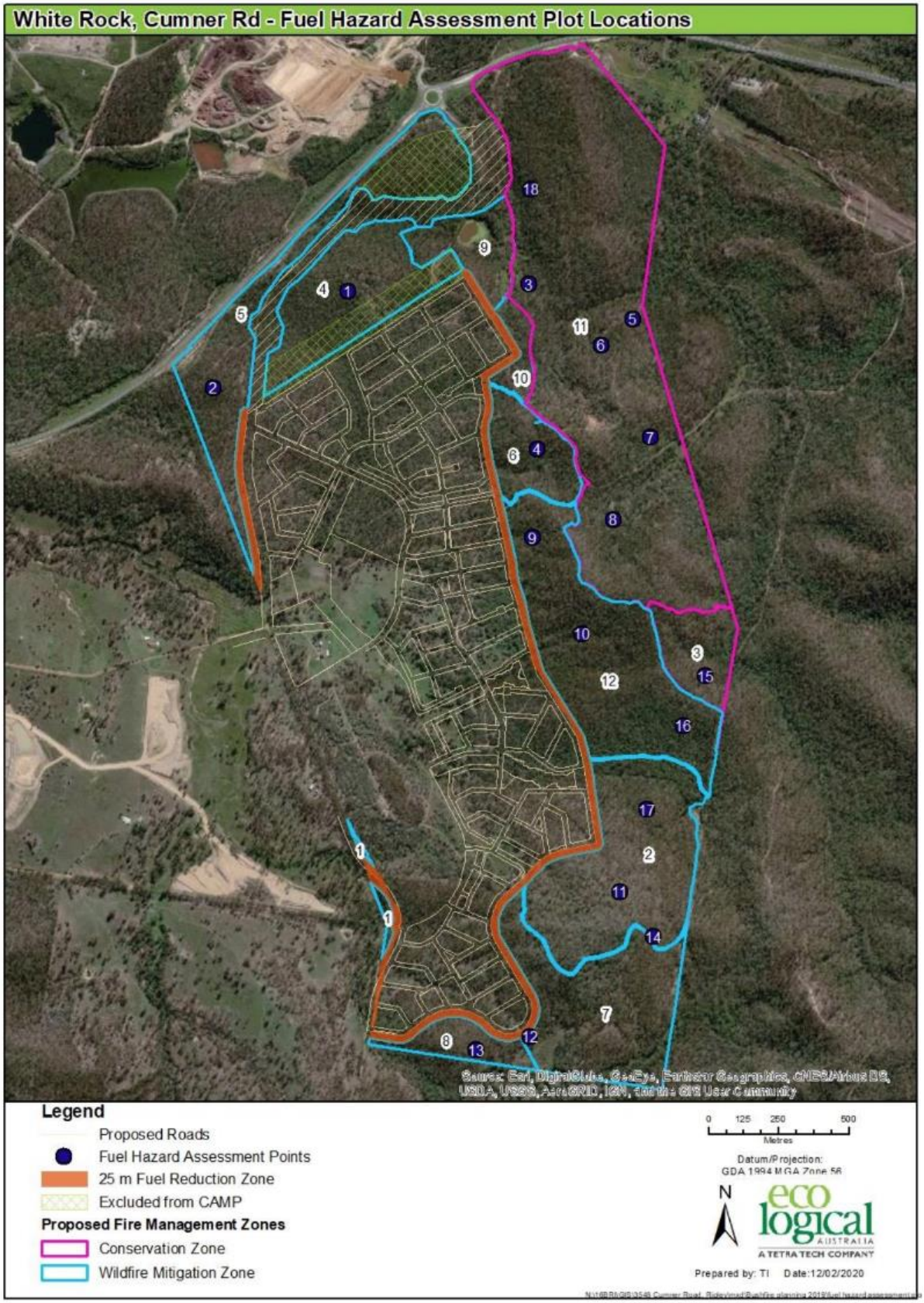

Figure 6: Fire management zones

3.5 Pest management report

The Conservation Management Area has a designated Pest Management Plan which outlines how management actions will achieve the aims of:

- No increase in fox, cat or dog numbers within the first five years, or in the event of an increase within the site, no increase in comparison to reference sites in White Rock-Spring Mountain Conservation Estate,
- Maintenance of reduction in pest numbers relative to baseline from the fifth year to the 21st year

This reporting period saw the first two of four required baseline monitoring events. Surveys occurred in Spring and Autumn as required. All four target species were identified across the CAMP Area and adjacent Conservation Estate over the full year, but not in all seasons (Table 6, Figure 7, Figure 8).

Pigs were concentrated in the south-west of the Conservation Estate. A single cat was identified in both seasons within the CAMP Area, though it is difficult to identify if this is one individual or multiple with indirect signs (tracks, pug marks) found in the south as well as camera trap observations. One wild dog was seen on camera in Autumn in the Conservation Estate, as well as tracks and scats in the southern border between the CAMP Area and adjacent Conservation Estate (Figure 8).

Once the two remaining baseline survey events (due in 2022) occur, a definitive baseline can be established. This will be reported on in the next EPBC Act Compliance Report due at the end of 2022.

Table 5: Results of camera trap surveys in Spring and Autumn 2021

Species / Triggers	**CAMP Area**		**Adjacent White Rock Conservation Estate**	
	Spring	**Autumn**	**Spring**	**Autumn**
Total cameras triggered	3	7	3	3
Pig	9	17	5	0
Cat	1	1	0	0
Fox	1	2	0	2
Wild Dog	0	0	0	1

Figure 7: Images from both camera trapping intervals across both CAMP Area and WRSM Conservation Estate. Pigs (top, left), cat (top, right), fox (bottom, left) and wild dog (bottom, right). (From ELA 2021a,b)

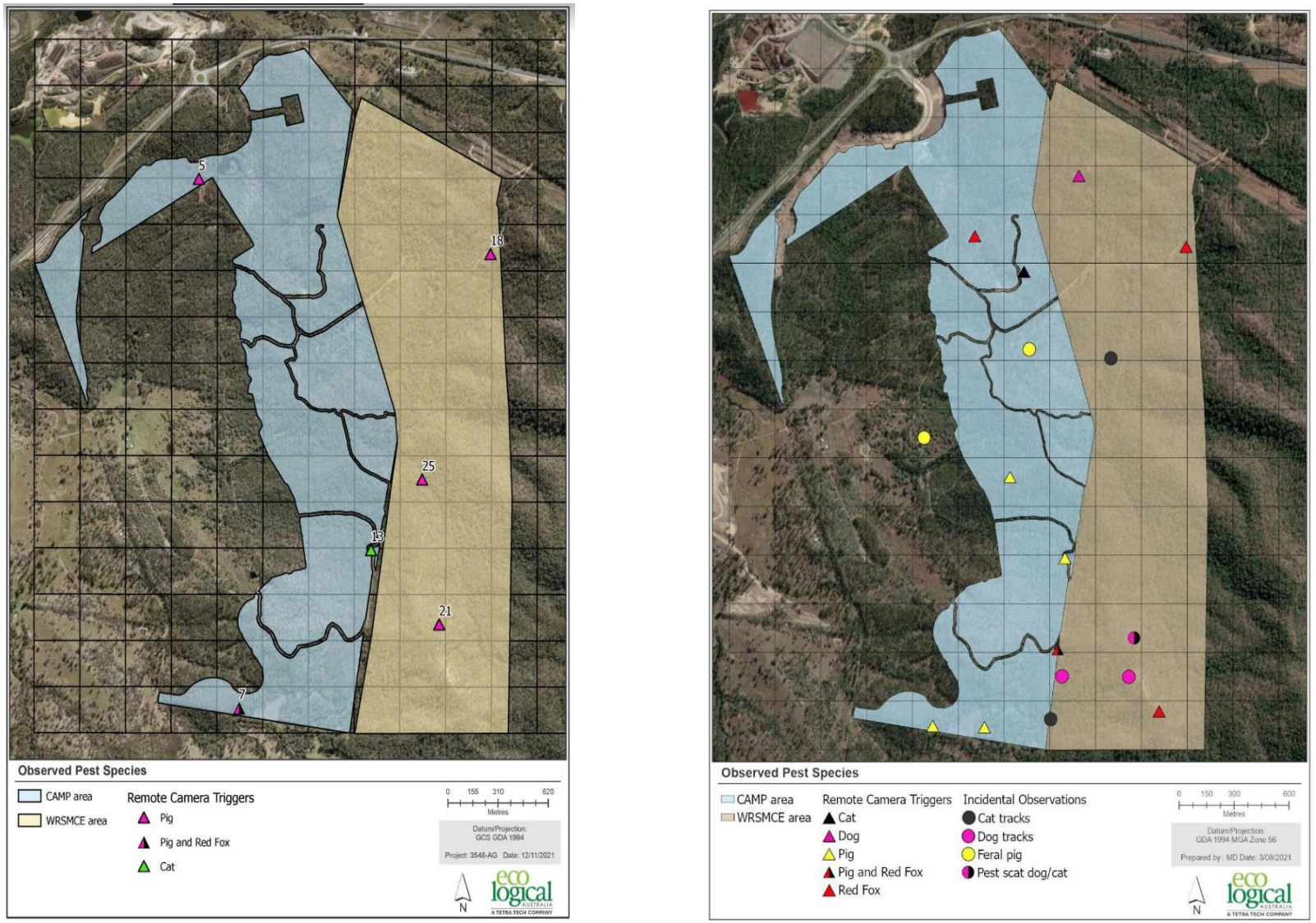

Figure 8: Maps of the CAMP area (blue) and adjoining conservation estate (beige) in autumn (left) and spring (right) showing locations where target pest animals were observed. (From ELA 2021a,b)

4 Conclusion

Though some delays have occurred in commencement of the action due to the La Nina weather event, baseline surveys for vegetation and weeds, koala and pest animals have all been completed. Weed management has also occurred as per CAMP requirements. Fire management planning is in the final stages of preparation and the introduction of mosaic burns is planned to begin in 2022.

The project is in full compliance with the EPBC Act approval, and no incidents or non-conformances have occurred since project commencement.

5 References

Bower Ecology 2021. *White Rock Koala Monitoring Report - Report No. 2 (2021).* Prepared for Intrapac Property Pty Ltd.

ELA 2020a. *White Rock Urban Development, Bushfire Management Plan for Conservation Area*. Prepared for Intrapac.

ELA 2020b. *White Rock Conservation Management Plan*. Prepared for Intrapac Property Pty Ltd.

ELA 2020c. *White Rock Koala Management Plan*. Prepared for Ripley Land Holdings Pty Ltd, Northrow (Qld) Pty Ltd and TDC (Qld) Pty Ltd (the proponents).

ELA 2020d. *White Rock Conservation Area Pest Management Plan*. Prepared for Intrapac Property Pty Ltd.

ELA 2021a. *White Rock Autumn 2021 Pest Survey - Results Summary*. Prepared for Intrapac Property Pty Ltd.

ELA 2021b. *White Rock Spring 2021 Pest Survey - Results Summary*. Prepared for Intrapac Property Pty Ltd.

ELA 2021c. *White Rock Vegetation Monitoring Report - Baseline*. Prepared for Intrapac Property Pty Ltd.

White Rock Koala Monitoring Report

Report No. 2 (2021)

Prepared for Intrapac White Rock Pty ltd

11 November 2021

Bower Ecology
Survey | Planning | Strategy

Document Tracking

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Prepared By	JF
Reviewed By	SJ
Approved By	SJ
Version	1
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This report should be cited as 'Bower Ecology Pty Ltd 2021, *White Rock Koala Monitoring Report - Report No. 2 (2021)*. Prepared for Intrapac Property Pty Ltd.'

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1. Introduction

1.1. Project background

Ripley Land Holdings Pty Ltd, Northrow (Qld) Pty Ltd and TDC (Qld) Pty Ltd (the proponents) received approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in December 2019 for the proposed development of a mixed use sub-division and associated infrastructure at White Rock in Ripley Valley (EPBC 2014/7388).

The White Rock development includes five subject lots, covering a total of 472.8 ha, with the proposed development footprint encompassing a total of 224 ha (Figure 1). The development will result in a number of end uses, including residential, commercial, greenspace, recreation/sporting, educational, roads and easements for internal services.

A koala offset area of approximately 240 was established to the north and east of the project area adjoining the White Rock - Spring Mountain Conservation Estate (Figure 1). The initiative aims to enhance habitat quality and landscape connectivity of local koala populations.

A Koala Management Plan (KMP) and Conservation Area Management Plan (CAMP) have been prepared in support of assessment requirements under the EPBC Act. These plans outline management actions to avoid and minimise impacts of the development on koala, as well as describing management and monitoring of this proposed koala offset area. The plans require monitoring and reporting to be undertaken every two years.

1.2. Objectives and scope of work

The purpose of the monitoring survey is to undertake a targeted survey within the study area to determine the current koala population and health.

Specifically, the objectives of the monitoring are to:

- Confirm the population size on within the study area via a systematic survey
- Identify the landscape usage, and hence important areas of habitat for foraging, breeding and connectivity
- Identify the incidence / severity of disease, especially Chlamydia
- Compare current population data with baseline population data

This report presents the second koala monitoring event and has occurred during a time when approximately 15% of the proposed development footprint has been cleared of vegetation (Figure 1).

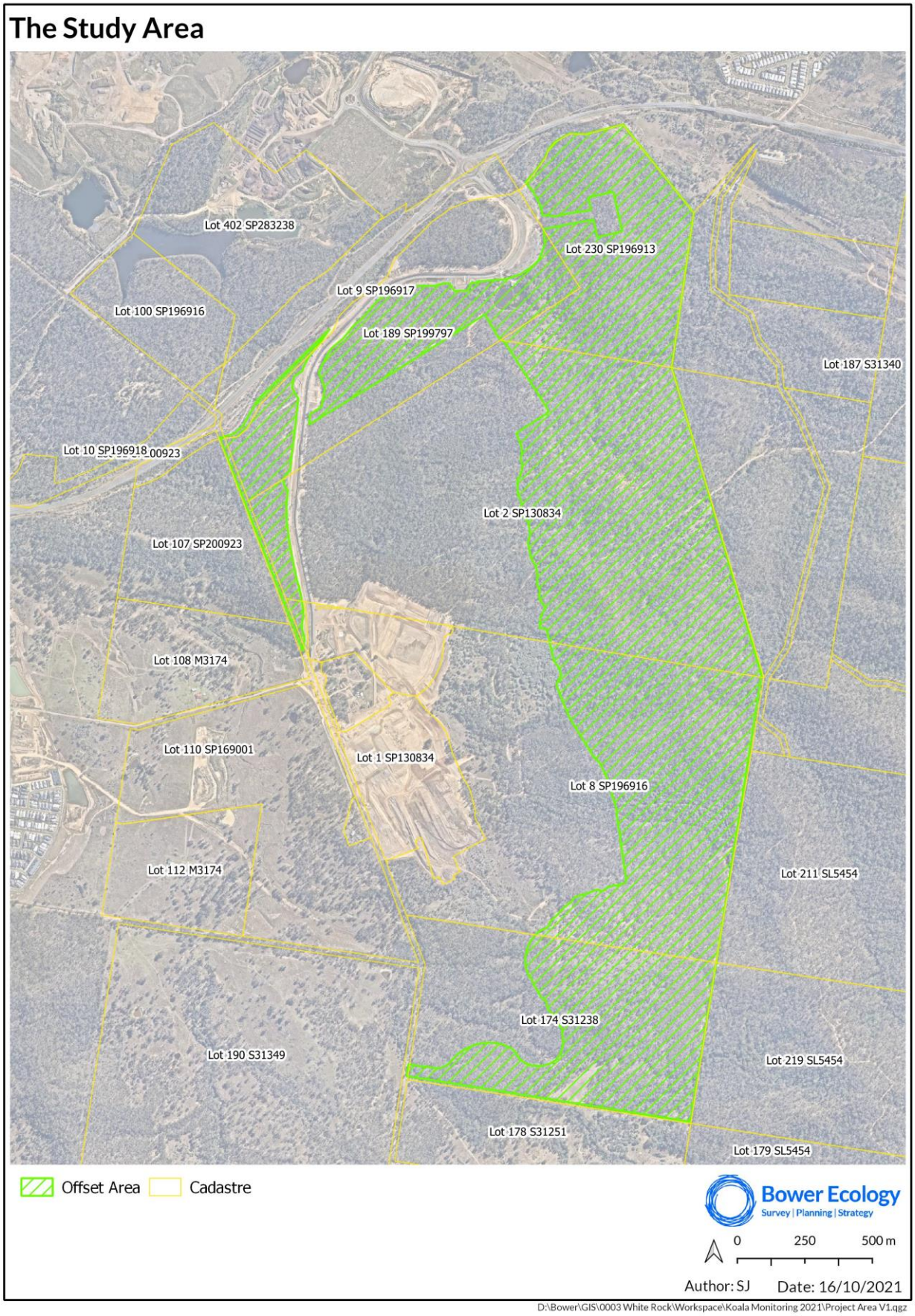

Figure 1: Project area and location

1.3. Koala habitat within the study area

Koala habitat is defined as any woodland or forest which contains koala food tree species, or shrubland with emergent food trees (DoE 2014). Koala food trees are generally considered to be any tree of the following genus: *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Melaleuca* (DoE 2014).

The study area (koala offset area) comprises a total area of 240.8 ha, of which 233 ha have been mapped as primary and secondary koala habitat (disturbed and undisturbed) as shown in Figure 2. Eight different vegetation communities have been mapped within the study area (Table 1 and Figure 2).

Past surveys undertaken by Natural Solutions (2008) and Enviro-Studio (2013) within the study area and surrounds have failed to detect koalas within the area. However, several koala scats were recorded to the east in White Rock-Spring Mountain Conservation Estate as part of Ipswich City Council's koala surveys undertaken in September 2015.

ELA has also previously conducted targeted surveys for koala in September 2016 with multiple scats encountered, as well as one koala sighting in forest towards the north of the development area (Figure 2).

In 2019, an initial baseline survey was conducted following CAMP and KMP protocols (ELA 2019). This survey, established the baseline under these management plans, in accordance with sections 6.2 and 6.3 of the KMP. Several scats were recorded in the north and south of the site during the baseline survey (Figure 2).

Table 1: Summary of study area and habitat type

Habitat Value	Dominant vegetation community	Area (ha)	Proportion of area (%)
Primary	Narrow leaved Ironbark, Red Gum and Silver leaved Ironbark; Forest Red Gum, Swamp Box and Ironbark	12.13	5.04
Primary (disturbed)	Acacia +/- scattered Eucalypts; Forest Red Gum on alluvium; Forest Red Gum, Swamp Box and Ironbark; Narrow leaved Ironbark, Red Gum and Silver leaved Ironbark;	11.91	4.95
Secondary	Spotted Gum, Ironbark and other Eucalypts; White Mahogany, Grey Gum and Spotted Gum	145.43	60.93
Secondary (disturbed)	Exotic Grassland +/- sparse Acacia and Eucalypts; Spotted Gum; Spotted Gum, Ironbark and other Eucalypts; White Mahogany, Grey Gum and Spotted Gum	63.80	26.49
Non-habitat	-	7.55	3.13
	Total:	**240.82**	**100.00**

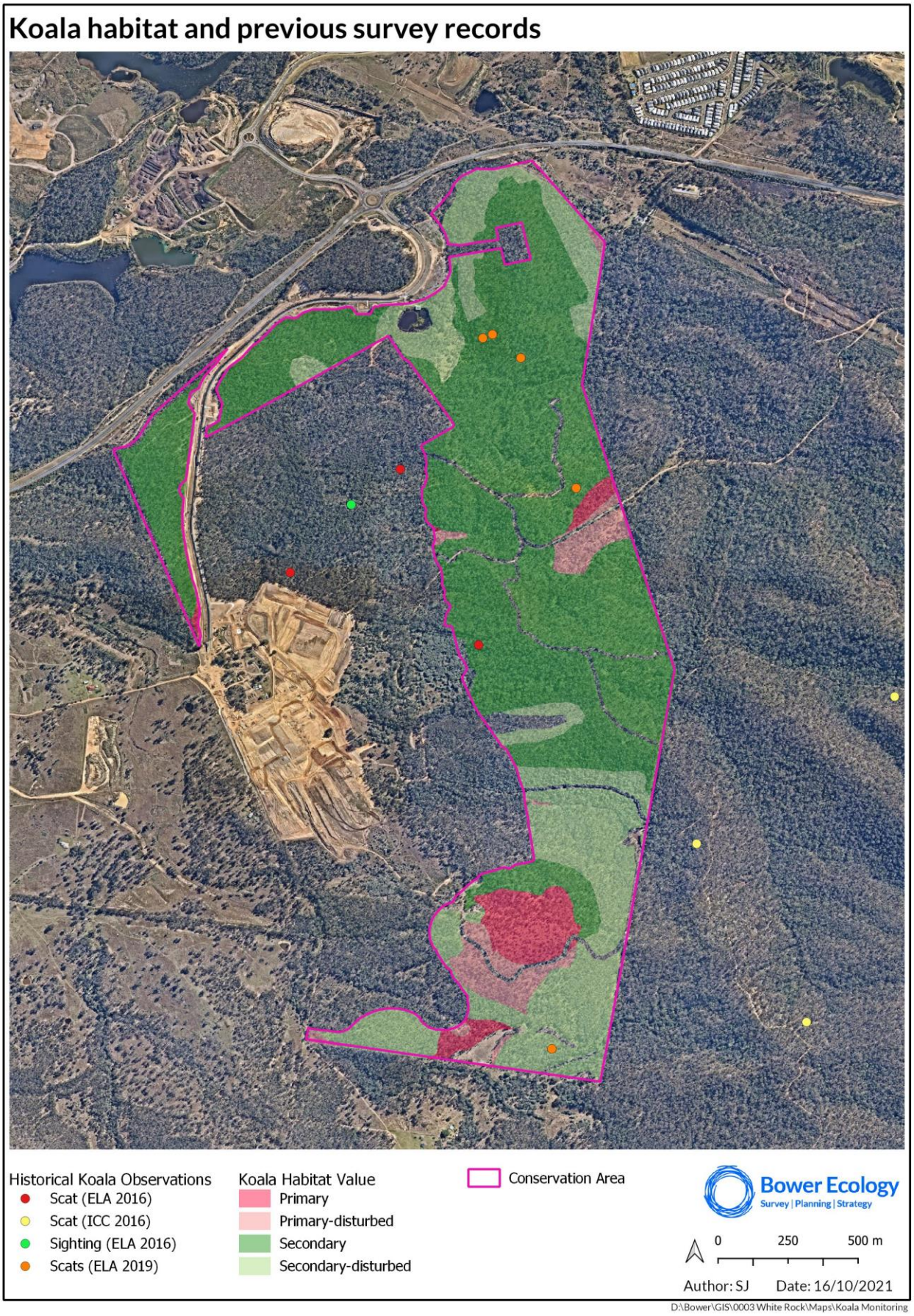

Figure 2: Koala habitat and previous survey records

2. Methodology

Field surveys were undertaken over six days between 6 and 29 September 2021, inclusive.

The monitoring survey consisted of data collection using the following four methodologies:

- strip transects
- spotlighting and call playback
- acoustic detectors
- Regularised Grid-based Spot Assessment Technique (RGSAT) surveys.

In accordance with recommendations set out in the *EPBC Act referral guidelines for the vulnerable koala* (DoE, 2014) koala surveys were carried out during September, over a period of six days and six nights. Koala activity is at its peak between August – January (breeding season) and resident breeding females are most easily observed. The following sections outline the methods undertaken for each monitoring component.

2.1. Field survey methods

2.1.1 Strip transects

Strip transect surveys were undertaken in accordance with the method described in Dique et al. (2004). Systematic searches of multiple strip transects with fixed boundaries were undertaken across the study area.

Prior to the baseline survey event (2019), the location of survey transects was allocated at desktop level and refined during the baseline field survey (ELA 2019). Preliminary mapping of the location of transects was also undertaken in 2019 to ensure adequate coverage (min. 30% of the study area) was achieved. Transects were arranged systematically to provide adequate coverage of all habitat types within the study area and were located perpendicular to the contours of the landscape where possible.

The location of the 2019 baseline monitoring strip transects was replicated for the 2021 survey. A total of 35 strip transects comprising a survey area of approximately 63 ha were conducted across study area. Location of strip transects are presented in Figure 3.

Using a compass and binoculars field team members traversed the transects by walking approximately 15 m apart from each other at a fixed bearing to search all trees within the transect for koalas.

Koala density was calculated for the study area using the number of independent koalas detected per hectare of bushland searched.

2.1.2 Spotlight and call playback

The 2019 baseline monitoring spotlighting and call playback methods were replicated for this 2021 survey.

Spotlighting and call playback was conducted over six nights from 6 – 29 September 2021 by two field members. Two survey methods were utilised and comprised of slow driving transects to allow for maximum survey area coverage and slow walking transects.

Spotlighting during walking transects was complimented with intermittent call playback recording for koala. Two call playback sessions were conducted per survey night and involved playing recording for three minutes, followed by a two-minute listening period and then subsequent spotlight search of area. A total of 2.5 hours of spotlighting was conducted each night, with a total survey effort of 30 search hours. Spotlighting transect and call playback locations are illustrated in Figure 3.

2.1.3 Acoustic detectors

Acoustic detectors were used to determine koala presence / abundance within study area. Unattended acoustic recorders were placed within study area in vegetation providing koala habitat.

Three Frontier Lab Bioacoustic Recorders were deployed across the study area between 6 – 10 September 2021, inclusive. Each of the three bioacoustic recorders were in operation for nine hours per night for five consecutive nights. Recording began 1 hour before sunset and finished 8 hours after sunset. A total of 15 nights (135 hours) of recording time was captured and analysed for koala calls. Bioacoustic recorders 1 and 2 were relocated midway through the survey to increase coverage across the study area. The locations where the recorders were deployed are illustrated in Figure 3.

2.1.4 Regularised grid-based SPOT Assessment Technique survey

As per Biolink (2008), the RGBSAT survey technique is an adaptation of the Spot Assessment Technique (SAT) methodology originally developed by Phillips and Callaghan in 2011. It enables the detection of koala habitat use at a low carrying capacity as well as the delineation of the areal extent that is currently utilised or occupied.

The 33 RGBSAT sites surveyed during the 2019 baseline event were re-surveyed during this 2021 monitoring event (Figure 3). During field survey, once located, each point was sampled using the SAT Methodology as per Phillips and Callaghan (2011).

The location of koala scats identified during this process were recorded and a sample of the scat was collected. Koala scats identified incidentally, either during the strip transects or whilst walking in between sites were also recorded and a sample collected.

Figure 3: Transect, call playback, RGSAT and bioacoustic recorder locations

2.2. Data analysis

Acoustic data was analysed with software specifically designed for handling sound files visually presenting spectrograms. This enabled visual and audial review of each hour of recording data to identify koala calls.

All scats collected were sent for confirmation of species by scat experts at Scatsabout.

The results of the RGBSAT surveys were used to calculate a koala activity level across the study area in accordance with the method described in Phillips and Callaghan (2011). The koala activity level is calculated as the percentage equivalent of the proportion of surveyed trees where koala scat are identified. For the purposes of this assessment, an average koala activity level for the study area was calculating as the number of trees where scats were identified divided by the total number of trees surveyed and the result converted to a percentage.

2.3. Survey limitations

All fauna assessments are subject to inherent limitations in the detection success of targeted species. These limitations often result in a degree of false-absence records (i.e. a species is present, but not detected). It is important that the limitations to surveys are identified and the survey results are viewed with these constraints in mind.

Limitations that may have affected the koala monitoring assessment include:

- Koala have large home ranges and may not have been present in this this part of their home range during the survey. This is particularly relevant to the current survey area, which is located directly adjacent to large tracts of suitable koala habitat within the White Rock Conservation Area.
- Biological factors such as sex, age-class, and breeding biology, which may influence koala habitat use and detectability during different times of year, although surveys were undertaken during the spring breeding period in order to maximise detection.
- Some sections within the study area were inaccessible for the majority of survey techniques due to difficult terrain, but also on occasion due to high weed infestations of *Lantana camara* shrubland.

Irrespective of the limitations identified, the combination of survey timing, design and study area coverage ensured the best possible chances for koala detection.

Importantly, these limitations do not affect the repeatability of survey technique in future years.

3. Results

3.1. Survey timing and conditions

Climate data was obtained from recordings taken at Greenbank (Defence) weather station located approximately 14 km east of study area (BoM, 2021). Weather conditions leading up to and at the time of survey are presented in Table 2. Rainfall in the three months leading up to survey period was 98.4 mm which was similar to that of the long term average of 103.1 mm for the same months.

Table 2: Weather conditions preceding and during the field survey

Date	Temperature (0C)		Total rainfall (mm)	Max wind gust (km/h)
	Minimum	Maximum		
June 2021	0.3	24.5	18	39
July 2021	1.0	26.6	61.8	57
August 2021	0.2	27.6	18.6	48
6 September 2021	6.2	24.6	0.0	19
7 September 2021	3.3	23.9	0.0	30
8 September 2021	3.1	24.9	0.0	24
13 September 2021	11	31.9	0.0	28
27 September 2021	13.2	20.2	1.8	26
29 September 2021	10.4	22.7	0.0	33

3.2. Strip transects

No koalas were detected during diurnal strip transect surveys, however one koala was incidentally detected within a strip transect during spotlighting activities (see below).

3.3. Spotlight and call playback

One koala was detected during spotlighting on 6 September 2021. It was located in a 15 m high *Eucalyptus tereticornis*, close to Acoustic Recorder Site 3 (see Figure 4).

3.4. Acoustic detectors

Male koala calls were recorded at Bioacoustic Recorder Site 3 (Figure 4) on the nights of 7, 8, 9 and 10 September 2021 (Table 3). This was roughly the same location at which a koala was observed during spotlighting on 6 September 2021 and given the low density of koala abundance across the site, it is suspected that it was the same koala making the calls.

Table 3: Koala calls recorded during the survey

Date	Times
7/09/2021	22:31
	0:08
	0:25
8/09/2021	0:49
	0:50
	0:52
	1:56
	2:12
	2:13
	2:15
	2:29
9/09/2021	23:10
10/09/2021	0:46

3.5. Regularised grid-based Spot Assessment Technique survey

Koala scats were confirmed at a total of two of the 33 RGSAT survey locations: Koala Spot Assessment Technique (KSAT) Site 1, in the secondary koala habitat in the east of the study area, and KSAT Site 2 in the secondary habitat in the west (Figure 4). The average koala activity level for the entire study area was calculated to be 0.41%. When calculated in isolation from the whole study area, both KSAT Site 1 and KSAT Site 2 had individual koala activity levels of 6.7%.

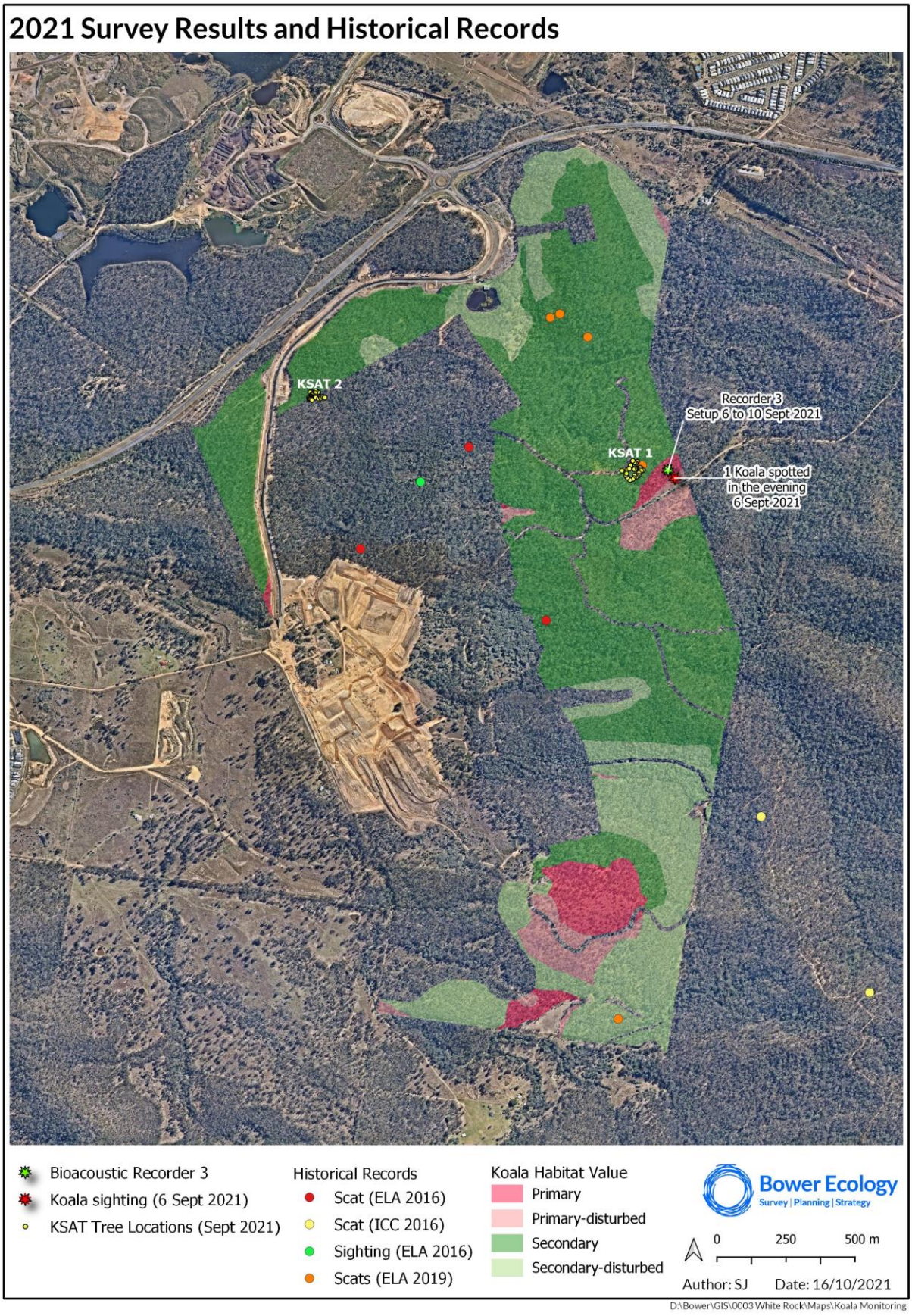

Figure 4: Results of the 2021 koala surveys, including historical records

3.6. General fauna observations

A total of six fauna species were opportunistically observed during spotlighting surveys and are summarised in Table 4.

Table 4: Fauna observations

Animals	Observations
Birds	Pheasant coucal (*Centropus phasianinus*)
Macropods	Grey kangaroo (*Macropus giganteus*)
Arboreal mammals	Two arboreal mammals were observed: common brushtail possum (*Trichosurus vulpecula*) and black flying fox (*Pteropus alecto*).
Reptiles	Two snakes were observed: red-bellied black snake (*Pseudechis porphyriacus*) and carpet python (*Morelia spilota*).

4. Discussion

4.1. Koala monitoring outcomes

Only one koala was detected within the study area via direct sighting. The single koala that was sighted is also likely to be the koala that was recorded on Bioacoustic Recorder No. 3 due to the close proximity of the koala sighting to the acoustic recorder location.

The species' presence was also confirmed via scats in the east and west of the study area (Figure 4).

Based on the results of this survey, koala were determined to be utilising secondary habitat that dominates the study area. However, given the spatial spread of scats in this survey and historical observations of koala and scats across the study area, it is expected that koalas utilise all habitat (primary, secondary and disturbed) across the entire study area.

Koala population density within the study area is considered to be low. The mean koala activity level for the study area was calculated to be 0.41%, one individual was observed and four scats were detected. This is despite comprehensive coverage of the study area and appropriate survey methods and effort. These results show a slightly reduced activity level from the 2019 baseline survey that found a mean koala activity level of 0.51% across the site. Interestingly, the two KSAT locations at which scats were found (Figure 4) both had individual activity levels of 6.7%, indicating medium koala use in these specific areas.

Only one direct observations of a koala was made. The koala was in a *Eucalyptus tereticornis* tree 15m above ground and was spotted at night. Due to this, a health assessment was difficult to undertake. Nonetheless, from what could be seen, the koala appeared in reasonable health and there was no obvious signs of blindness or wet bottom. It was noted that the koala was not observed again (i.e. was not in the same tree and could not be re-located) when surveyed the next day.

4.2. Audit against monitoring requirements

Table 5 provides an audit of how each of the monitoring objectives from the KMP have been achieved during this survey.

Table 5: Monitoring objectives and results

Monitoring objectives	Survey results
Confirm the population size within the study area via a systematic survey	Koala are confirmed to be utilising habitat within the study area via the detection of scats in secondary habitat. Whilst a numerical Koala population size could not be established, is expected to be low due to the minimal koala sightings during strip transects and the low koala activity level calculated for the study area.
Identify the landscape usage, and hence important areas of habitat for foraging, breeding and connectivity	Several historical Koala records are located within the study area and surrounding region. Koala are confirmed to be utilising secondary habitat in the study area via the detection of scats. Koala are also expected to be utilising the small areas of primary, primary (disturbed) and secondary (disturbed) habitat within the study area, as these areas have been determined to have greater koala habitat value and there are no known barriers to koala utilisation. As scats were recorded in the eastern and western extents of the study area, the entire study area is predicted to provide important foraging, breeding and connectivity habitat for koala.
Identify the incidence / severity of disease, especially Chlamydia	This was undertaken during this monitoring event (despite limitations stated in Section 4.1) and this element of the scope will be continued to be monitored in future monitoring events.
Compare current population data with baseline population data.	The average koala activity level for the study area was determined to be 0.41% and scats were identified in two locations. This is a slight reduction in the koala activity level of 0.51% determined by the baseline survey in 2019, as discussion in section 4.1.

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White Rock Vegetation Monitoring Report - Baseline

Intrapac Property Pty Ltd

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Template 2.8.1

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Abbreviations

Abbreviation	Description
CAMP	Conservation Area Management Plan
DoEE	Department of Environment and Energy
ELA	Eco Logical Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ICC	Ipswich City Council
RE	Regional Ecosystem
VM Act	*Vegetation Management Act 1999*
MZ	Management Zone

1. Introduction

1.1 Project background

Intrapac Property QLD Pty Ltd (Intrapac) received approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the proposed development of a mixed-use sub-division and associated infrastructure (the development) at White Rock in Ripley Valley (EPBC 2014/7388) in 2019.

The development covers a total of 473 ha (Project Area), which includes a Conservation Area covering an approximate 249 ha (***Figure 1***). The Conservation Area aims to achieve multiple environmental benefits, including in-situ biodiversity offsets aimed at reducing project-related impacts. More specifically, the Conservation Area includes 249 ha of offset area relating to Koala and Grey-headed Flying Fox (GHFF) habitat values defined within the EPBC Act.

Eco Logical Australia Pty Ltd (ELA) was engaged by Intrapac to prepare a Conservation Area Management Plan (CAMP) for the development's Conservation Area. The CAMP (ELA 2020) directly responded to approval conditions stated in EPBC Act 2014/7388, approved by the Department of the Environment and Energy on 3 December 2019 (the approval). The CAMP serves as a prescriptive document to ensure the offset area achieves the Koala and GHFF related habitat targets as prescribed within the approval. The CAMP prescribes the following:

- Plan objectives (specific to koala and GHFF habitat, and bushland in general); and
- Location of management zones; and
- Management actions and responsibilities; and
- Monitoring, reporting and handover procedures.

Under the conditions of the approval, annual monitoring reports are required and will inform the Annual Compliance Report. The CAMP incorporates an adaptive management approach to ensure monitoring results will guide management practices for subsequent years. Annual management, monitoring, and reporting requirements are described in detail in the CAMP, for the following:

- Vegetation rehabilitation and management
- Koala population monitoring
- Bushfire management
- Pest monitoring and management

CAMP implementation commenced in 2019 (with the undertaking of Koala baseline monitoring) and will continue throughout the on-maintenance period of the project (first 11 years), before handover to Ipswich City Council (ICC) and integration into the existing adjacent White Rock – Spring Mountain Conservation Estate (WRSMCE). This report specifically addresses baseline vegetation monitoring requirements, involving the establishment of permanent monitoring sites for annual monitoring throughout the duration of the on-maintenance period. Vegetation monitoring will also assist to inform the following areas of the CAMP performance criteria (**Appendix D, *Table 10***):

- Revegetation management requirements

- Weed control
- Bushfire management
- Native tree management

The overarching goal of the Conservation Area is to provide a conservation gain for species listed as MNES - the Koala and GHFF, and to meet performance and completion criteria stated in the approval. The CAMP categorised the Conservation Area into three different management zones (MZ) to describe the degree and type of effort required to reach rehabilitation objective. The zones include MZ1 Riparian Restoration, MZ2 Assisted Regeneration and MZ3 Regeneration (***Figure 2***).

- **MZ1: Riparian Restoration** - represents the portion of the Conservation Area adjacent to drainage lines and the property boundary, a total area of approximately 30 ha. This zone includes areas of exotic pasture with no canopy present, and is characterised by higher amounts of water, nutrients, and disturbance, and as such, exotic species are present in higher densities.
- **MZ2: Assisted Regeneration** - represents the portion of the Conservation Area that has currently low resilience or is likely to have low resilience in the future, a total area of approximately 91 ha. This zone includes areas of dense lantana towards the south of the site and a 20 m buffer on all development edge which will be subject to greater impacts in the future.
- **MZ3: Regeneration** - represents the remainder of the Conservation Area with a total area of approximately 128 ha. This zone is in good condition with low weed density throughout.

1.2 Objectives and scope of work

The objective of this report is to provide the results of the baseline vegetation monitoring survey, which was undertaken prior to commencement of works to establish a benchmark for performance. The works specifically address the CAMP performance criteria set out within the preliminary stage of the establishment phase (***Table 10*** in **Appendix D**). The criteria requires that monitoring points be installed, and baselines be established prior to commencement of CAMP work.

In addition to establishing baseline, this report fulfills annual reporting requirements. The next monitoring event (year 1) will occur in 2022. Ongoing monitoring will then occur on an annual basis for the first 11 years (on-maintenance period) of the CAMP program.

1.2.1 Monitoring requirements

Specifically, this baseline vegetation monitoring requires BioCondition assessments (Eyre *et al* 2015), a rapid assessment Lantana survey and an assessment of the results against the CAMP objectives and EPBC Act approval conditions.

Monitoring will establish monitoring sites within the three management zones (MZ1, MZ2, MZ3) to capture the baseline condition of the Conservation Area. Parts of the Conservation Area are heavily impacted by Lantana species, both *Lantana camara* (Lantana) and *L. montevidensis* (Creeping Lantana) are the dominant weed species across the site. To capture the baseline severity of lantana infestation and monitor improvement following weed removal works, a rapid lantana assessment is required to be undertaken.

1.3 Study site description

The development is located south of Centenary Highway in the Ripley Valley, 35km from the Brisbane CBD, 15km from the Ipswich CBD, 4km east of the Ripley urban core and 8 km west of the Springfield Town Centre.

The development is bounded to the north by the Centenary Highway. The area to the west of the development has been cleared for agricultural purposes in lowland areas and is likely to transition into urban development in the coming years as part of the Ripley Valley Priority Development Area (PDA). The Conservation Area includes a matrix of maturing / mature vegetation that continues to the east of the boundary into the WRSMCE, which is part of a large contiguous area of vegetation associated with the Flinders Karawatha Corridor (DEHP 2014).

1.3.1 Vegetation communities

Within the Conservation Area, eight broad vegetation communities were identified during initial ecological surveys (ELA 2017). These communities, and their areas, are listed in **Table 1** and shown in **Figure 3**.

Table 1: Vegetation communities within the Conservation Area (ELA 2017)

Community	Area (ha)
Acacia +/- scattered Eucalypts (i.e. *Eucalyptus tereticornus, Eucalyptus crebra)*	3.8
Dam	1.1
Exotic Grassland +/- sparse Acacia and Eucalypts (i.e *E. tereticornus, E. crebra)*	5.5
E. tereticornis (Forest Red Gum) on alluvium	0.8
E. tereticornis, *Lophostemon suaveolens* (Swamp Box) and *E. crebra* (Narrow-leaved Ironbark).	8.1
E. crebra, *E. tereticornis*, *E. melanophloia* (Silver Leaved Ironbark)	15.6
Corymbia citriodora (Spotted gum)	9.8
C. citriodora, *E. crebra, E. melanophloia*, and other Eucalypts	183.1
E. acmenoides (White Mahogany), *E. major* (Grey Gum), *C. citriodora*	21.6
Total	249.4

The central part of the Conservation Area is dominated by *Corymbia citriodora* (spotted gum) forest and woodland on sandstone slopes.

The north of the Conservation Area is dominated by *Eucalyptus acmenoides* (White Mahogany), *Eucalyptus major* (Grey Gum) and Spotted Gum Forest. The lower elevations of the Conservation Area, especially in the south, are dominated by *Eucalyptus tereticornis* (Forest Red Gum), *Lophostemon suaveolens* (Swamp Box) and *Eucalyptus crebra* (Narrow-leaved Ironbark).

There is also a basalt hill in the south of the Conservation Area that contains Narrow-leaved Ironbark, Forest Red Gum and *Eucalyptus melanophloia* (Silver Leaved Ironbark).

White Rock–Spring Mountain Conservation Estate to the east of the Conservation Area consists of over 2,500 ha of mostly intact and generally remnant vegetation.

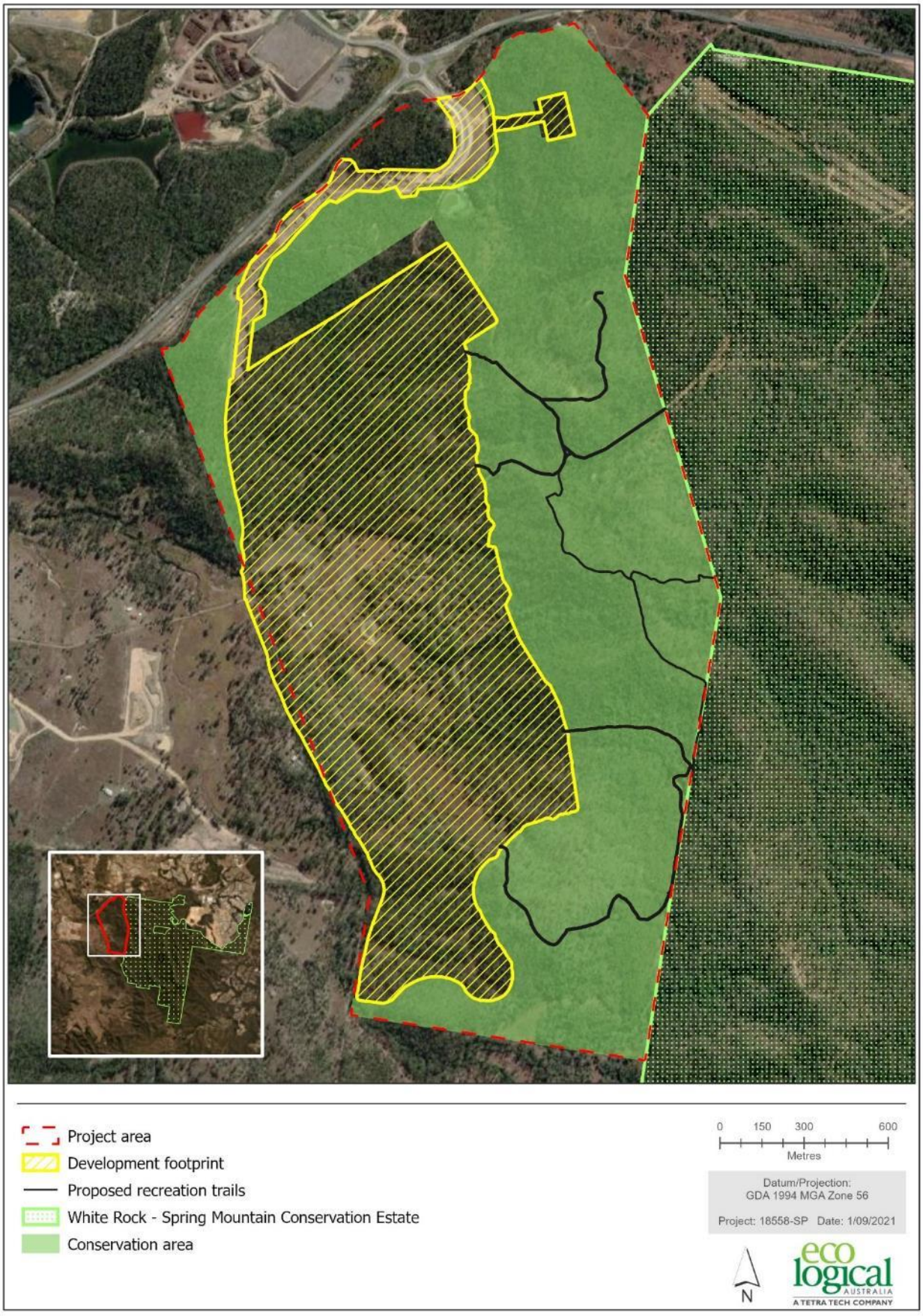

Figure 1: White Rock Project Area Characteristics

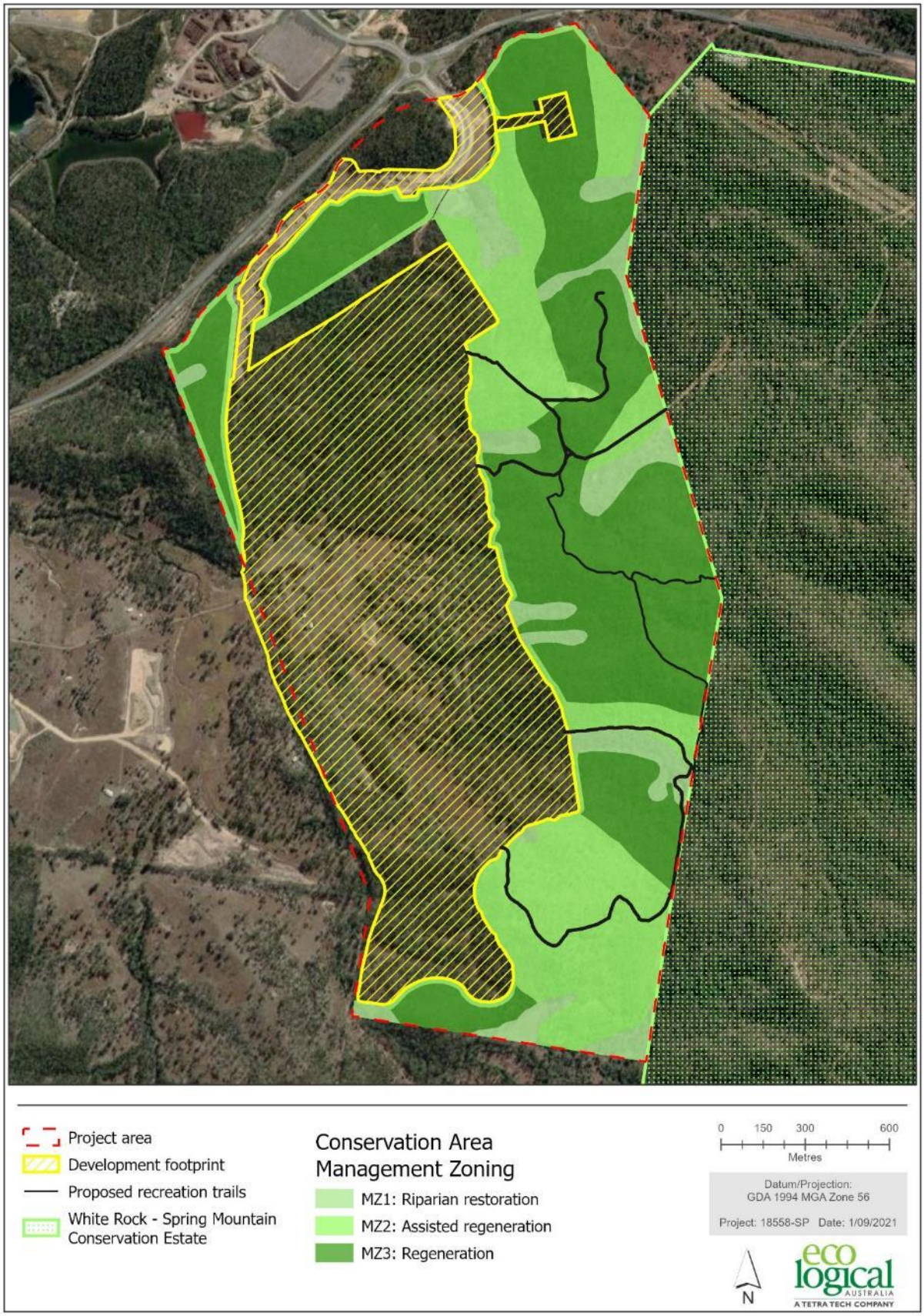

Figure 2: Conservation Area Management Zones

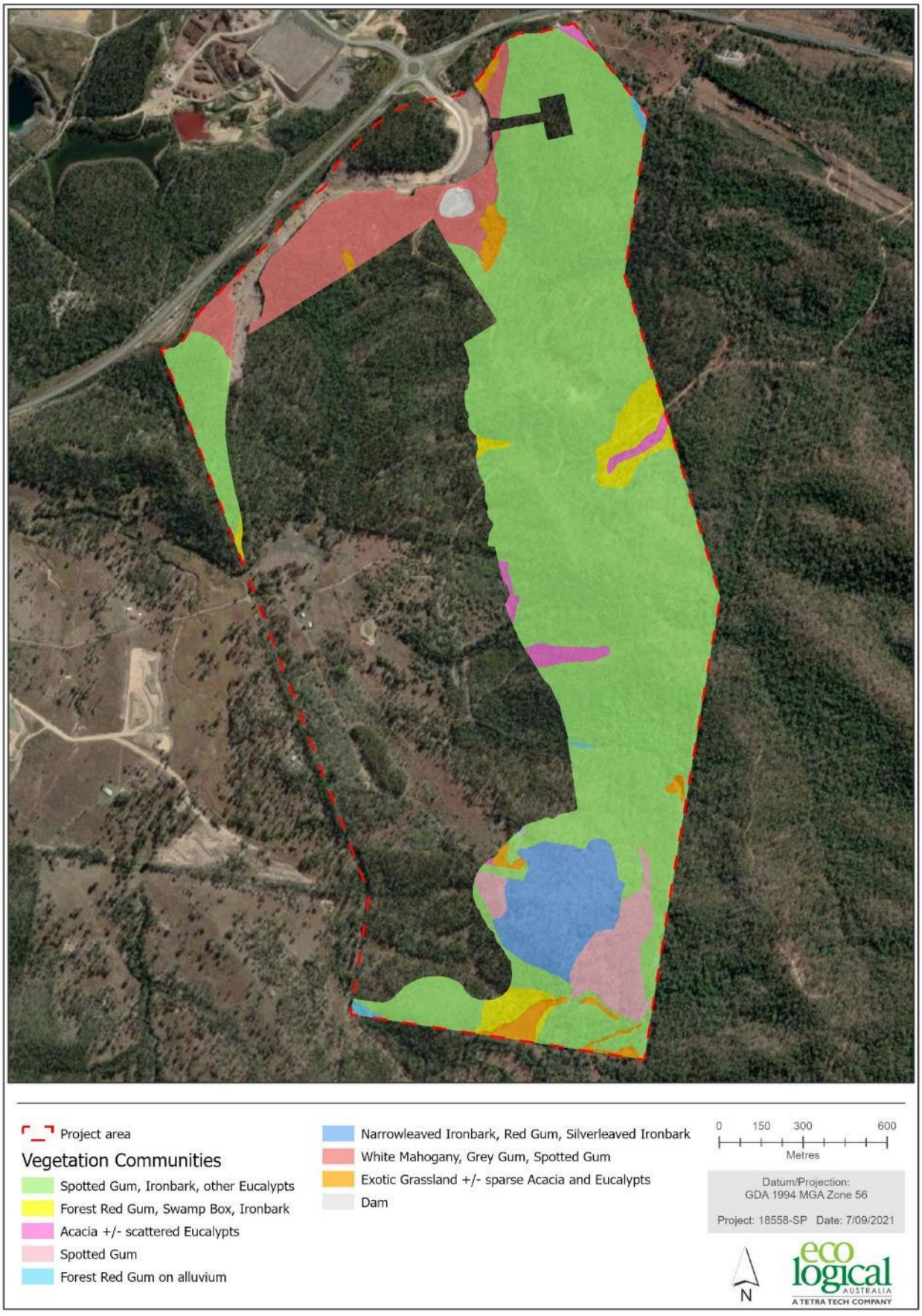

Figure 3: Vegetation Communities

2. Methodology

2.1 Desktop assessment

A desktop assessment was undertaken to review current ecological information available for the Conservation Area including previous ecological reports conducted by ELA (ELA 2017), relevant databases, and online mapping tools to determine the likely distribution of native vegetation and threatened flora species within the Conservation Area. The following resources were reviewed:

- White Rock Conservation Area Management Plan – ELA 2021
- White Rock Ecological Assessment – ELA 2017
- RE mapping (version 12)
- Atlas of Living Australia records
- Protected Matters Search Tool (PMST) Report
- WildNet database search
- *Vegetation Management Act 1999* (VM Act) watercourse data
- Protected Plant High Risk Trigger mapping.

2.2 Field survey methods

Field surveys were conducted by two suitably qualified ecologists over three days, between 25th-27th May 2021. Surveys established six BioCondition plots (two per MZ), a rapid lantana assessment and 12 photo monitoring points. Methods are outlined below and are as per the requirements of the CAMP (ELA 2020).

2.2.1 BioCondition assessments

BioCondition assessments were undertaken within the Project Area in accordance with the BioCondition Manual (Eyre *et al.* 2015). A total of six BioCondition assessment sites were established as permanent vegetation monitoring plots, demarcated with a unique tree tag at the 0 m and 100 m centre points.

BioCondition assessment included collection of the following ten site-based attributes within a 100 m x 50 m (0.5 ha) nested sampling plot:

- Recruitment of woody perennial species
- Native species richness (tree, shrub, forb, grass)
- Tree canopy height
- Tree canopy cover
- Shrub canopy cover
- Native perennial grass cover
- Organic litter cover
- Number of large trees
- Coarse woody debris abundance
- Non-native plant cover.

Digital photographs were taken from the centre point of the transect (facing the start and end points) at each of the BioCondition survey sites.

2.2.2 Photo monitoring

Photo monitoring sites are used as permanent reference points to provide a visual guide of vegetation change in the Project Area. A total of 12 photo monitoring sites were established (four per MZ) (***Figure 5***). Sites were targeted at areas of high lantana infestation and/or high canopy species density (such as *Acacia* or *Eucalypt* sp.) and demarcated with a unique tree tag which became the centre point for the digital data collection (NB – star pickets were not used due to the potential occurrence of unexploded ordinances (UXOs) see section 2.4 for details). Five digital photos were taken at five compass points:

- north, south, east, west; and
- north-east, 10 meters from the centre point, and facing the centre point with the tree tag in view as best as possible.

A 20 m tape, and compass was used to establish a straight line between opposite compass points, and a GPS point was taken for each of the five photo points.

2.2.3 Rapid assessment of lantana infestations

The rapid assessment method is used to assist the monitoring of lantana growth or reduction across the Conservation Area. A total of 20 sites were assessed (***Figure 6***). A Rapid Lantana Assessment (RLA) was performed by randomly selecting a survey site and running a 20 m tape to delineate a 10 m by 20 m survey plot. Percentage cover of lantana within the survey plots was estimated, and two centre-facing photographs at the 0 m and 20 m point were taken to aid visual comparison between monitoring events.

2.3 Data analysis

2.3.1 Site-based attributes

Site-based attribute data collected during the field survey was scored relative to the Queensland Herbarium Benchmarks as per the BioCondition Assessment Manual Version 2.2 (Eyre *et. al.*, 2015).

The BioCondition score for each site is calculated by adding the scores obtained for each site-based attribute and then dividing by the maximum possible score for the ecosystem type (i.e., woodland = maximum score of 80).

2.3.2 Landscape-scale attributes

The landscape surrounding the Project Area and its influence on the site's vegetation quality is measured via assessment of the following four attributes:

- Size of patch
- Context
- Connectivity.

The assessment of landscape-scale attributes was undertaken as per the BioCondition Assessment Manual Version 2.2 (Eyre *et. al.*, 2015). A landscape-scale attribute numerical score out of 20 was generated.

2.4 Survey limitations

2.4.1 Flora species detectability

All flora assessments are subject to inherent limitations in the detection success of flora species. It is important that the limitations to surveys are identified and the survey results are viewed with these constraints in mind.

In general, and in addition to the above, various factors are likely to influence the occurrence of some flora species. These factors include:

- timing (season) of the survey period
- availability of reproductive material such as flowers, fruits and/or seed capsules
- difficulties with species identification, such as cryptic species and species that occur in low densities

Irrespective of the limitations identified, the combination of survey timing, design and Project Area coverage ensured comprehensive baseline monitoring surveys.

Importantly, these limitations do not affect the repeatability of survey technique in future years.

2.4.2 Permanent markers

The preferred use of 6ft star pickets to permanently mark monitoring sites was unable to be undertaken due to the potential presence of unexploded ordinances (UXOs) on the site. Driving star pickets into the ground carried the risk of detonating potential unknown UXOs potentially causing serious harm to those undertaking monitoring. Due to this limitation, forestry tree tags (***Plate 1***) and flagging tape have been used to mark BioCondition plots and photo monitoring sites.

Plate 1. Tree tag used as assessment site marker

3. Results

3.1 Survey timing and conditions

The baseline vegetation survey was originally scheduled for March 2021 to coincide with the end of the summer rainfall growing season, as is the recommended optimal time of year in the BioCondition manual (Eyre *et al.* 2015). Uncharacteristically high rainfall in March (***Table 2***) and COVID19 restrictions resulted in the delay of the vegetation survey to May 2021. The vegetation survey was still conducted under optimal conditions in May, after rainfall eased. Weather conditions leading up to and at the time of survey are presented in ***Table 3***. Rainfall in the three months leading up to the survey period was 487.6 mm, higher than that of the previous three years rainfall for that time of year (February – April) (***Table 2***). Climate data was obtained from recordings taken at Greenbank (Defence) weather station located approximately 14 km east of Project Area (BoM, 2021).

Table 2: Summer rainfall conditions (mm) of 2019, 2020, and 2021 (BOM 2021)

Date	2019	2020	2021
February	40.4	320	150
March	131.6	82.2	248.8
April	75.6	3.0	88.8
Total Rainfall (mm)	**247.6**	**405.2**	**487.6**

Table 3: Weather conditions preceding and during the field survey (BOM 2021)

Date	Temperature (^{0}C)		Total rainfall (mm)	Max wind gust (km/h)
	Minimum	Maximum		
November 2020	14.7	30.8	28.8	48
December 2020	20.0	31.1	190.4	41
January 2021	18.6	30.4	64.6	37
February 2021	18.9	30.5	150	48
March 2021	18.4	28.8	248.8	41
April 2021	12.5	26.2	88.8	33
25th May 2021	8.8	24.8	0	17
26th May 2021	7.8	25.3	0	20
27th May 2021	9.4	24.5	0	17

3.2 BioCondition assessments

As per the requirements of the CAMP, six permanent BioCondition assessment sites were established in representative sites of vegetation communities and MZs (***Figure 4***). Two sites were established in each of the MZs (MZ1, MZ2, and MZ3) and occurred in two regional ecosystems in remnant condition and

one non-remnant area (***Table 5***). Assessment sites are detailed in **Appendix A, *Table 7***, and a full species list for each site is presented in **Appendix E, *Table 11***.

The BioCondition classes are classified in the BioCondition manual, as the following:

- BioCondition class 1: >0.80;
- BioCondition class 2: >0.60 to 0.80;
- BioCondition class 3: 0.40 to 0.59; and
- BioCondition class 4: <0.40.

BioCondition scores categorised as a rating of 1 are considered 'functional' biodiversity condition, whilst scores of 4 are considered 'dysfunctional' biodiversity condition. BioCondition scores at the Project Area range from 0.59 – 0.85.

The average score for MZ1 was 3, for MZ2 was 2.5 and for MZ3 was 2. The majority of sites (1, 2, 5 and 6) scored a class of 2, representing vegetation approaching functional biodiversity condition. One site, site 4 received a lower score of class 3, representing vegetation approaching dysfunctional biodiversity condition. Site 3 is in a non-remnant condition, and consequently scored the lowest BioCondition class of 4 (**Table 4**).

Table 4: Summary of BioCondition results

Site ID	MZ	RE	Condition	Benchmark used	Overall BioCondition score	BioCondition class
1	2	12.9-10.2	Remnant	12.9-10.2	0.61	2
2	3	12.9-10.2	Remnant	12.9-10.2	0.76	2
3	1	12.9-10.7 (pre-clear)	Non-remnant	12.9-10.7	0.33	4
4	2	12.8.17	Remnant	12.8.17	0.59	3
5	3	12.9-10.2	Remnant	12.9-10.2	0.67	2
6	1	12.9-10.2	Remnant	12.9-10.2	0.61	2

Table 5: Ground truthed region ecosystems within the Project Area

MZ	RE	Site ID	Condition	Short description	Field description	VM Act status[1]	Biodiversity status[2]
1, 2 and 3	12.9-10.2	BC1, BC2, BC5, BC6	Remnant	*Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks	This vegetation community forms the dominant RE of the Project Area. *Corymbia citriodora* (Spotted gum) occurs as the dominant canopy species throughout the area in the tree layer amongst a variety of canopy species including *E. tereticornis, E. major, E. crebra, C. intermedia, C. tessellaris,* and *Lophostemon confertus.* The subcanopy was made up of juvenile canopy species in addition to common shrubby trees such *as Alphitonia excelsa, Acacia disparrima* and *A. maidenii*. The understory and ground layer was characterised by a high cover of organic leaf litter, woody debris, and sedimentary rock, interspersed with a variety of native grasses, forbs and sedges. Common native grass species included *Heteropogon contortus*, *Panicum effusum, Imperata cylindrica, and Cymbopogon refractus.* Common sedge and forb species included *Gahnia aspera, Cyperus subulatus, Desmodium rhytidophyllum* and *Passiflora foetida.* Both *Lantana camera* and *L. montevidensis* are present within this RE, as well as other exotic grass and forb species such as *Bidens* pilosa, *Melinis repens*, Megathyrsus maximus, and *Malvastrum americanum.*	Least Concern (LC)	No concern (NC)
2	12.8.17	BC4	Remnant	*Eucalyptus melanophloia* +/- *E. crebra, E. tereticornis, Corymbia tessellaris* woodland on Cainozoic igneous rocks	This vegetation community occupies a small area in the southern corner of the Project Area. The dominant canopy species include ironbark species *Eucalyptus crebra and E. melanophloia* as well as other Myrtaceae sp., *Corymbia tessellaris*, and *E. tereticornis.* The understory layer was occupied by a variety of shrubby trees including *A. disparrima*, *A. salicina*, and *Alphitonia excelsa*. The ground cover was well vegetated, containing a variety of native forbs, vines, grasses and sedges. Species included *Glycine cyrtoloba, Passiflora foetida, Heteropogon contortus, Themeda triandra,* and *Cyperus subulatus*. Both *Lantana camera* and *L. montevidensis* are present within this RE, as well as other exotic species such as *Bidens pilosa* and *Malvastrum americanum.*	LC	NC
1	Non-remnant	BC3	Non-remnant	-	Non-remnant vegetation were areas which had previously been exposed to high volumes of disturbance such as clearing and grazing. These areas were almost entirely absent of regenerating native canopy species and dominated by a dense shrub layer of Baccharis halimifolia (groundsel bush). Non-remnant vegetation was predominantly occupied with exotic species including *Lantana camera, L. montevidensis*, *Biden pilosa* and *Megathyrsus maximus*.	-	-

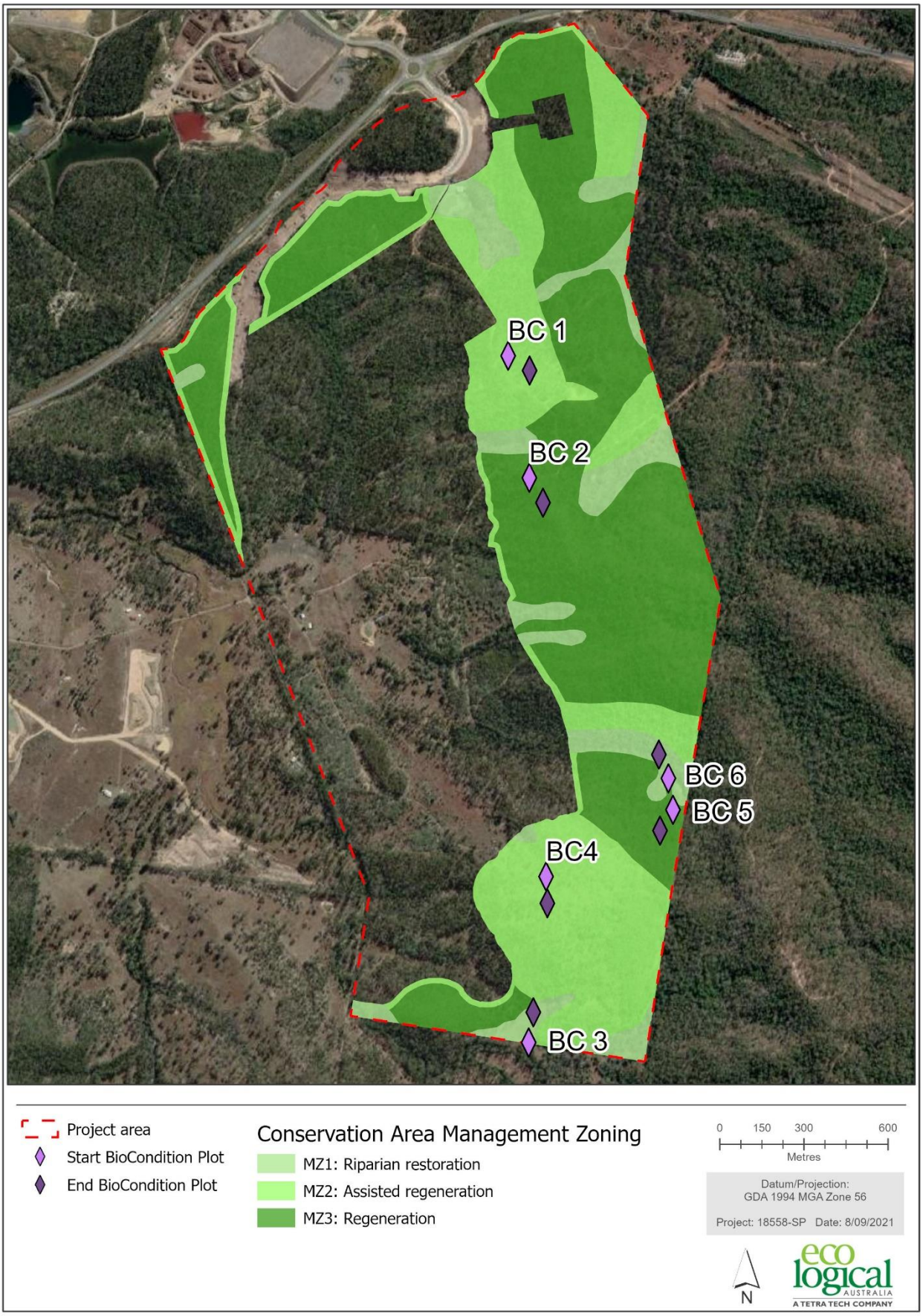

Figure 4: BioCondition Survey Sites

3.3 Photo monitoring

A total of 12 photo monitoring sites were stablished across the three different MZ, four in each zone in the Conservation Area (***Figure 5***), six of which are co-located with the six BioCondition survey sites (**Figure 7**). Photo monitoring sites are designed to deliver comparative results over the course of the CAMP, and as such no interpretive results are available following the baseline monitoring event. Digital photos taken at each site are available in **Appendix B** (**Table 7**).

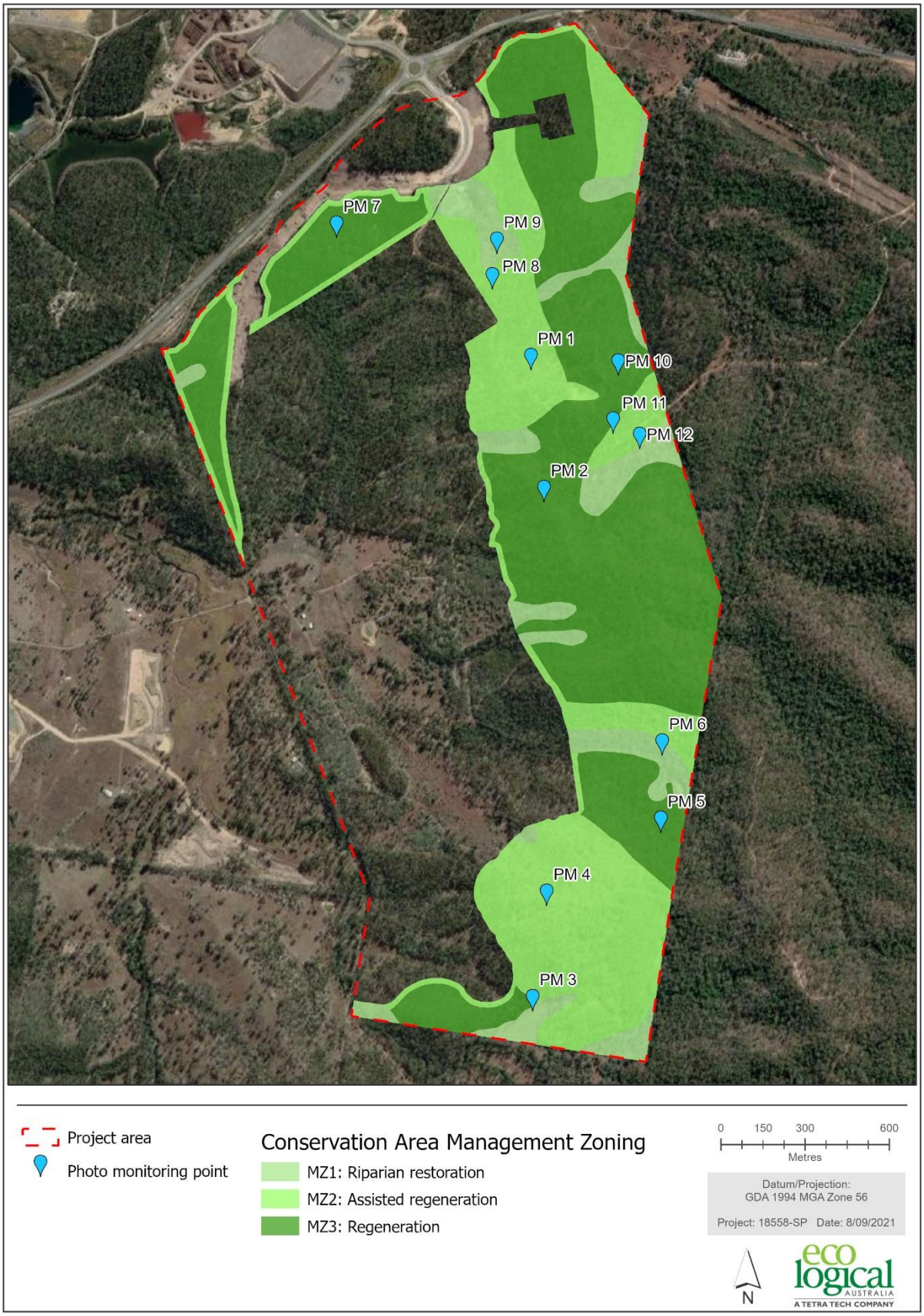

Figure 5: Photo Monitoring Survey Sites

3.4 Rapid assessments of lantana infestations

A total of 20 rapid lantana assessment sites were established across the Project Area: six sites in MZ1, seven sites in MZ2, and seven sites in MZ3 (***Figure 6***). *Lantana camara* (lantana shrub) was recorded at all 20 sites, and *Lantana montevidensis* at ten of the sites. The average (mean) percentage cover of lantana across all rapid assessment sites was 52.1% (**Table 6**). Photos taken at each site are available in **Appendix C, *Table 9***.

Table 6: Rapid Assessment of Lantana - percentage cover (%)

MZ	Site ID	Percent Cover Shrub	Percent Cover Creeping	Percentage Cover Total
2	RL1	35	0	35
3	RL2	10	10	10
1	RL3	80	0	80
1	RL4	10	0	10
2	RL5	35	50	85
2	RL6	30	30	60
3	RL7	5	0	5
1	RL8	80	0	80
3	RL9	35	0	35
2	RL10	50	0	50
1	RL11	30	5	35
3	RL12	35	35	35
2	RL13	40	5	45
2	RL14	80	15	95
1	RL15	80	0	80
3	RL16	1	55	56
1	RL17	55	40	85
3	RL18	70	0	70
2	RL19	65	0	65
3	RL20	10	0	10
	Site Mean	**41.8**	**12.3**	**52.1**

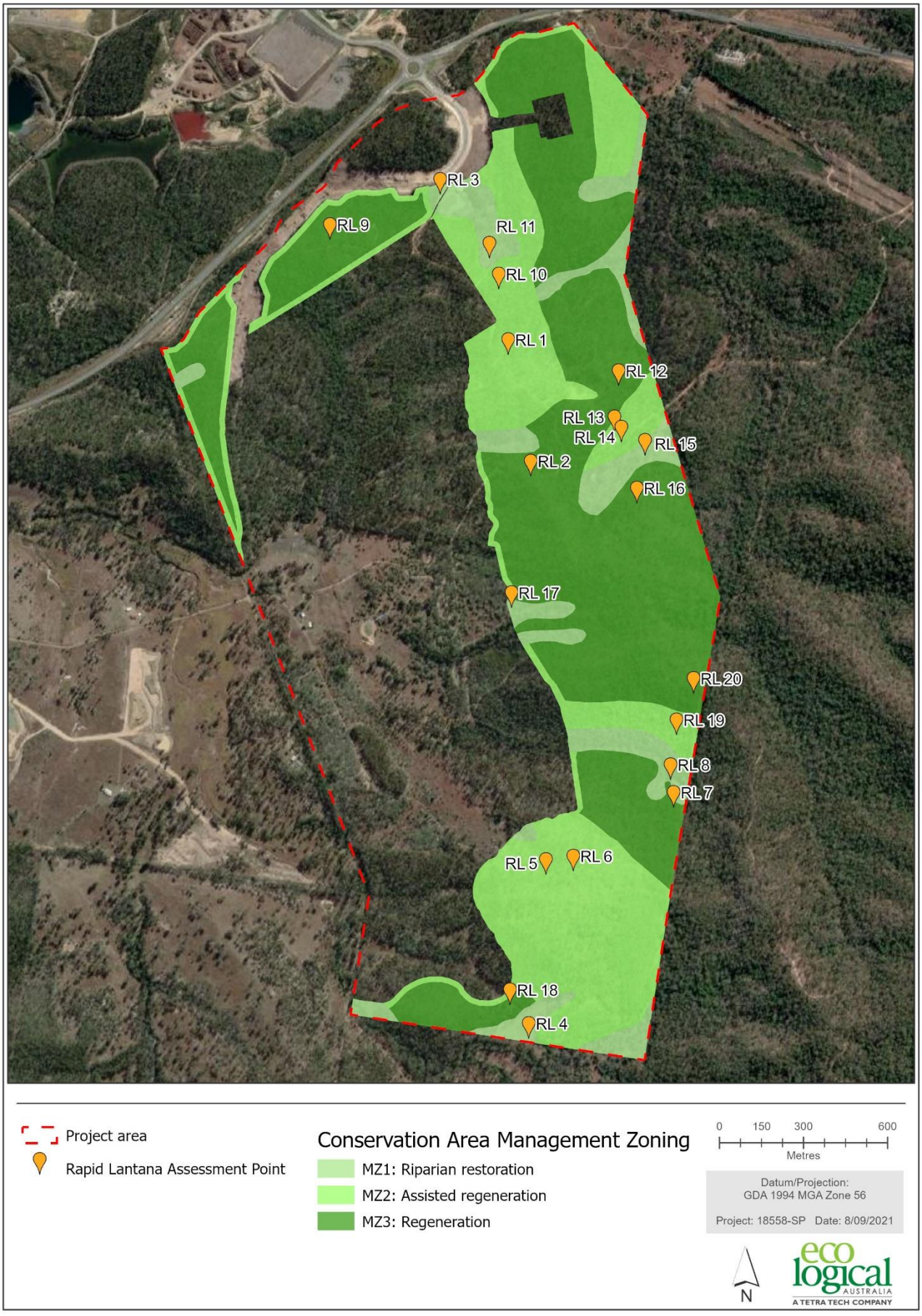

Figure 6: Rapid Lantana Assessment Survey Sites

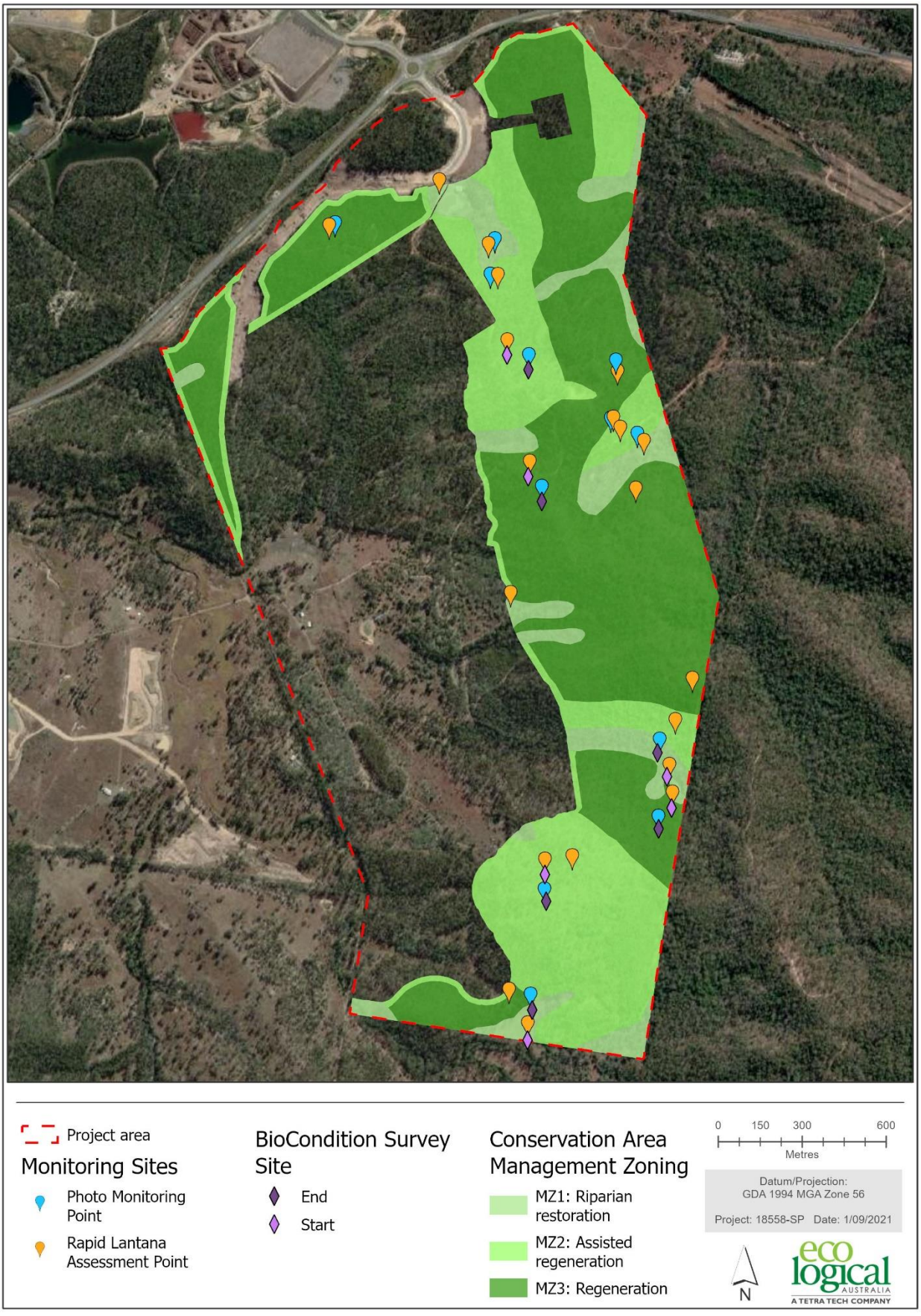

Figure 7: White Rock vegetation monitoring sites

4. Discussion

The purpose of this report is to deliver the baseline condition of vegetation in the White Rock Conservation Area prior to commencement of works. Comparative analysis is therefore not provided. All monitoring survey sites were successfully installed prior to commencement of works as per the performance criteria of the CAMP report (**Appendix D**, ***Table 10***). This included the equal distribution of monitoring sites between the three management zones (MZ1, MZ2, MZ3).

The baseline condition will inform adaptive management actions throughout the duration of the on-maintenance period and will assist to inform initial land management during early works. This will include the identification of areas for targeted weed control and subsequent bushfire mitigation.

BioCondition baseline results illustrate that the general vegetation condition of the Conservation Area ranges from class 2 to class 4. It is expected that subsequent monitoring events will illustrate improvement in condition of vegetation as management efforts are implemented to achieve the Conservation Area outcomes. In subsequent monitoring years, post field analysis should focus on identifying site-based attributes where active restoration changes can be measured (i.e., reduction in exotic cover, and increased scores for site-based parameters relating to grass, forbs, and fallen woody debris that influence an improved BioCondition class score).

The baseline photo points will deliver results in the following years' monitoring event when a comparison can be achieved. Similarly, rapid lantana assessment surveys are expected (and designed) to deliver results in subsequent years following widespread weed removal efforts. Photos are expected to illustrate reduction in lantana coverage, and early recovery signs of native vegetation through the emergence of forbs, grasses, and tree saplings.

The results of this survey determined the baseline vegetation condition for future monitoring events, with the next formal monitoring event scheduled for 2022, after the commencement of construction works. Subsequent monitoring is then to be carried out every year over a twenty-year maintenance phase as per the CAMP.

5. References

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Appendix A BioCondition scores

Table 7: BioCondition analysis and scoring

Management zone	2		3		1		2		3		1	
Site ID / RE	BC1 / RE12.9-10.2		BC2 / RE12.9-10.2		BC3 / RE12.9-10.7		BC4 / RE12.8.17		BC5 / RE12.9-10.2		BC6 / RE12.9-10.2	
Value Type	**Field value**	**core**	**Field value**	**Score**	**Field value**	**Score**	**Field value**	**Score**	**Field value**	**Score**	**Field value**	**Score**
Field based attributes												
Recruitment	100	5	60	3	100	5	25	3	50	3	25	3
Native tree sp. richness	3	2.5	5	2.5	1	2.5	4	2.5	4	2.5	4	2.5
Native shrub sp. richness	3	2.5	7	5	1	0	3	2.5	6	2.5	3	2.5
Native grass sp. richness	6	2.5	5	2.5	2	2.5	7	2.5	8	5	7	5
Native forb sp. richness	10	2.5	7	2.5	3	0	10	2.5	8	2.5	10	2.5
Tree Canopy Height	14	3	20	5	5	0	22	5	17	5	22	5
Tree Canopy Cover	40.5	5	36	5	1	0	32	5	80	5	32	2
Shrub canopy cover	58	3	0.5	0	2.5	5	25.5	3	9	5	25.5	3
Native perennial grass cover	0	0	23	5	2.4	0	0.6	0	5	1	0.6	0
Organic litter cover	89.6	5	60	5	17.6	5	48.4	3	78.4	5	48.4	5
Large trees	6	5	6	5	0	0	2	5	8	5	2	5
Coarse woody debris	222	2	255	5	0	0	340	5	30	0	340	5
Weed cover	35	3	2	10	90	0	80	0	10	5	80	0
Total Field based attributes		**41.0**		**55.5**		**20.0**		**39.0**		**46.5**		**40.5**
GIS based attributes												
Fragmented - Patch size		10		10		5		10		10		10
Fragmented - Connectivity		5		5		4		5		5		5
Fragmented - Context		5		5		4		5		5		5
Total GIS attributes		**20**		**20**		**13**		**20**		**20**		**20**
Total BioCondition Score		**61.0**		**75.5**		**33.0**		**59.0**		**66.5**		**60.5**
Weighted Ecosystem Score		**0.61**		**0.76**		**0.33**		**0.59**		**0.67**		**0.61**
Final Classification		**2**		**2**		**4**		**3**		**2**		**2**

Appendix B BioCondition site photos

BioCondition Site 1 – centre looking to start

BioCondition Site 1 – centre looking to end

BioCondition Site 2 – centre looking to start

BioCondition Site 2 – centre looking to end

BioCondition Site 3 – start	BioCondition Site 3 - End
	

BioCondition Site 4 – start	BioCondition Site 4 - End
	

BioCondition Site 5 – centre looking to start

BioCondition Site 5 – centre looking to end

BioCondition Site 6 – centre looking to start

BioCondition Site 6 – centre looking to end

Appendix C Photo monitoring site

Table 8: Photo monitoring digital images

Photo monitoring site 1	
 (N)	 (S)
 (E)	 (W)
 (NE)	

Photo monitoring site 2

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 3

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 4

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 5

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 6

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 7

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 8

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 9

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 10

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 11

(N)

(S)

(E)

(W)

(NE)

Photo monitoring site 12

(N)

(S)

(E)

(W)

(NE)

Appendix D Lantana Rapid Assessment Photos

Table 9: Rapid Lantana Assessment digital images

RL 1 - 0 m centre point	20 m meter point
	
RL 2 - 0 m centre point	**20 m meter point**
	

RL 3 - 0 m centre point	20 m meter point
	

RL 4 - 0 m centre point	20 m meter point
	

RL 5 - 0 m centre point	20 m meter point
	
RL 6 - 0 m centre point	**20 m meter point**
	

RL 7 - 0 m centre point	20 m meter point
	

RL 8 - 0 m centre point	20 m meter point
	

RL 9 - 0 m centre point	20 m meter point
	

RL 10 - 0 m centre point	20 m meter point
	

RL 11 - 0 m centre point	20 m meter point
	
RL 12 - 0 m centre point	**20 m meter point**
	

RL 13 - 0 m centre point	20 m meter point
	

RL 14 - 0 m centre point	20 m meter point
	

RL 15 - 0 m centre point	20 m meter point
	

RL 16 - 0 m centre point	20 m meter point
	

RL 17 - 0 m centre point	20 m meter point
	

RL 18 - 0 m centre point	20 m meter point
	

RL 19 - 0 m centre point	20 m meter point
	

RL 20 - 0 m centre point	20 m meter point
	

Appendix E CAMP Performance criteria

The performance criteria required for the site have been identified in ***Table 10*** and are consistent with the EPBC Act approval. Performance criteria specifically related to the baseline vegetation surveys is highlighted green in **Table 10** below. Performance criteria are considered as interim targets, which will guide works towards the completion criteria stated in the CAMP. If monitoring indicates that the management actions are not resulting in achievement of the performance criteria, the program may require revision in consultation with ICC and all other relevant authorities.

Table 10: CAMP performance criteria

Task	Establishment			Maintenance
	Preliminary	Management		
	By end of year 3*	Between end of year 3 and end of year 10*	Year 11*	Years 12-21*
Construction-related management actions				
Translocation of habitat / logs	Translocation undertaken, minimal damage to CA vegetation.	N/A		
Fencing / signage / (and maintenance)	Infrastructure installed.	No more than 5% of fencing compromised at any time		
Sediment and erosion control (and maintenance)	Sediment / erosion works installed	Sediment and erosion control devices checked and repaired annually in Quarter 1		
Waste	Initial waste removal undertaken, ongoing waste removed quarterly / as required	Waste removed Quarterly and as required		
Bushland management actions				
Fire management	Bush fire management plan (BFMP) completed. Fire management works undertaken as specified in the BFMP.	Fire management works undertaken as specified in the BFMP.		
Significant flora management	Undertaken as per specifications in Section 7.3. After works are complete, monitoring of planted / seeded individuals must be undertaken			N/A

Task	Establishment			Maintenance
	Preliminary	Management		
	By end of year 3*	Between end of year 3 and end of year 10*	Year 11*	Years 12-21*
Pest fauna management	Two survey events completed to determine baseline of dogs/cats/foxes within the Conservation Management Area and reference sites within the adjacent White Rock Conservation Estate Area. Development of a pest management plan that specifies how feral dogs, cats and foxes will be reduced in the Conservation Management Area. Development of a survey methodology that is sufficient to demonstrate any reduction of feral dogs, cats and foxes in the Conservation Management Area, relative to the baseline and reference sites within the adjacent White Rock Conservation Estate Area.	Between end of year 3 and the end of year 6, no increase in pests against baseline, or in the event of evidence of an increase in pests in the general area as measured at reference sites within the White Rock Conservation Estate Area, then demonstrated reduction in pests relative to the reference sites, measured annually.	From the beginning of year 7 to end of approval, maintain a reduction in pests relative to baseline, measured annually, or in the event of evidence of an increase of pests in the general area, measured at reference sites within the White Rock Conservation Estate Area, then demonstrated reduction relative to these reference sites, measured annually.	
Bushfire/recreation trails (and maintenance)	Fire access tracks established	At a minimum, bushfire management trails drivable at least one month prior to fire season as determined in BFMP. No more than 10% of designated multipurpose trails unwalkable at any time.		
Revegetation requirements assessed	Revegetation requirements assessed every year prior to planting season until Year 8			N/A
Revegetation works	N/A	Revegetation is undertaken to planting specifications and consistent with the Regional Ecosystem type. All revegetation to be completed by the end of Year 8 (at least 20% of works will be completed by the end of each year [years 4 to 8]). Minimum 90% survival rate of revegetation or equivalent stem density (i.e. through natural regen) at the end of each year and by the end of Year 11.		N/A
Weed control	Targeted primary treatment over approximately 10% of area.	Primary and secondary works undertaken in all areas by the end of Year 8 (at least 20% of	A minimum of three years of maintenance undertaken in all areas	

Task	Establishment			Maintenance
	Preliminary	Management		
	By end of year 3*	Between end of year 3 and end of year 10*	Year 11*	Years 12-21*
	Targeted primary treatment within all mosaic burn areas (post burn), estimated to be 10% pending preparation of BFMP	works will be completed by the end of each year [years 4 to 8]). Targeted primary treatment within all mosaic burn areas (post burn).	<5% coverage of mature woody weeds in any zone <25% exotic groundcover in Management Zone 1 and Management Zone 2 <10% exotic groundcover in each zone in Management Zone 3 Targeted primary treatment within all mosaic burn areas (post burn).	
Native tree management	Identification of tree thinning areas	All thinning activities undertaken as specified in Section 7.7 by the end of Year 8	All management zones and portions thereof have koala food trees present consistent with the associated Regional Ecosystem type.	
Monitoring and reporting				
Monitoring and annual reporting	Monitoring points installed / baseline established prior to works	Annual and final monitoring undertaken in as specified in **Section 9** of the CAMP		
CAMP Review, aiming to minimise threatening processes to koalas and GHFF	N/A	CAMP reviewed and updated at Year 6, 11, 16 and 21		

Appendix F Species List

Table 11: Flora species list

Species	BC1	BC2	BC3	BC4	BC5	BC6
Acacia disparrima	Y	Y		Y	Y	Y
Acacia excelsa		Y				
Acacia falcata		Y				
Acacia maidenii					Y	Y
Acacia salicina				Y		
Acacia sp.	Y	Y		Y	Y	
Ageratum conyzoides						Y
Alphitonia excelsa	Y			Y	Y	Y
Aristida vagans	Y	Y				
Asistida sp.				Y	Y	y
Baccharis halimifolia			Y			
*Bidens pilosa**			Y	Y		
Bruenella australe		Y				
Bulbostylis sp.		Y				
Capillipedium sp.				Y		
Cassytha filiformis				Y		
Cheilanthes sp.	Y					
Chloris gayana			Y			
Chloris ventricosa				Y		
Chloris virgata			Y			
Chrysocephalum apiculatum	Y					
Corymbia citriodora subsp. variegata	Y	Y			Y	Y
Corymbia intermedia		Y				
Corymbia tessellaris		Y		Y		
Cymbopogan refractus	Y	Y	Y	Y	Y	Y
Cyperus subulatus				Y		Y
Desmodium gangeticum				Y		Y
Desmodium rhytidophyllum	Y	Y			Y	Y
Dianella caerulea		Y				
Digitaria sp.					Y	
Entolasia stricta		Y				Y
Eragrostis sororia	Y				Y	Y
Eucalyptus crebra		Y		Y	Y	Y
Eucalyptus major		Y				
Eucalyptus melanophloia				Y		
Eucalyptus tereticornis	Y		Y	Y	Y	Y

Species	BC1	BC2	BC3	BC4	BC5	BC6
Fimbristylis nutans			Y			Y
Flemingia parviflora					Y	
Forb 1	Y	Y	Y			Y
Forb 2			Y			Y
Forb 3					y	Y
Forb 4				Y		Y
Forb 5					Y	
Forb 6				Y		
Forb 7				Y		
Forb 8	Y	Y				
Forb 9				Y		
Gahnia aspera	Y	Y		Y	Y	
Glochidion sp.	Y					
Glycine crytoloba				Y		
Gompherna sp.	Y					
Gomphocarpus physocarpus			Y			
Goodenia sp.		Y				
grass 1	Y					Y
Heteropogoan contortus	Y		Y	Y	Y	
Imperata cylindrica	Y	Y			Y	Y
Jacksonia scoparia		Y			Y	
Juncus usitatus						Y
*Lantana camara**	Y		Y	Y	Y	Y
*Lantana montevidensis**	Y		Y	Y	Y	Y
Lomandra filiformis		Y				Y
Lomandra longifolia						Y
Lophostemon confertus	Y	Y			Y	
Lophostemon suaveolens						Y
*Malvastrum americanum**				Y		
Melichrus					Y	
*Melinis repens**	Y				Y	Y
Mirbelia sp.	Y	Y			Y	Y
Oxalis sp.			Y			Y
Panicum effusum	Y	Y			Y	Y
*Panicum maximum**	Y		Y			
Paspalidium distans				Y	Y	
Passiflora foetida	Y		Y	Y	Y	
Phyllanthus	Y					
Plantago debilis				Y		
Rhynchosia minima				Y		
Scleria sp.				Y		

Species	BC1	BC2	BC3	BC4	BC5	BC6
Sida sp.	Y					
Styphelia sp.	Y	Y			Y	Y
Themeda triandra				Y		
Xanthorrhoea		Y				
yellow daisy			Y			

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RESULTS SUMMARY – BASELINE ROUND 1 OF 4

Under the Conservation Area Management Plan (CAMP) for the approved multi-use subdivision at White Rock, baseline pest surveys are required to help gain an understanding of the size and distribution of the target pest species (including foxes, cats, pigs and wild dogs) to guide management actions over the life of the project. Pest baseline surveys are required to be carried out in autumn and spring for two years (a total of four surveys) within the first three years of the CAMP implementation (2020 to 2022).

ELA conducted the first round of baseline pest surveys in late autumn in accordance with methods set out in the Pest Management Plan (PMP) prepared by ELA. This brief report provides a summary of the findings for round 1 of the baseline pest surveys.

30 camera traps were active over a two-week period (02/05/2021 to 06/06/2021) at 15 locations within the CAMP area and 15 locations within the White Rock - Spring Mountain Conservation Estate (WRSMCE), as seen in Figure 1. Camera site locations were drafted at a desktop level using a 250 m x 250 m grid over the study area (CAMP area and WRSMCE) to distribute survey sites as evenly as possible. These draft sites were then micro-sited by field ecologists on the ground to areas of preferred habitat for target species e.g. drainage lines, den areas (rocky outcrops). Due to planned burns in the northern area of the WRSMCE, some camera sites had to be relocated to the south.

Cameras were set up opposite bait stations to lure the target species. Wet cat food mixed with dry oats was used as bait. In addition to remote cameras being set, incidental sightings of target pest species, including scats and tracks, were recorded. These incidental sightings were recorded during the deployment of remote cameras.

During the two-week survey period, a total of 10 cameras were triggered multiple times identifying all four target species (22 individuals in total). Table 1 provides details of these triggers. Further detailed data is provided in Appendix A.

Table 1. Camera Trigger Data Summary

Survey Area	Number of cameras triggered	Number of individuals identified for each target pest species*			
		Pig	Cat	Fox	Wild Dog
CAMP Area	7	17	1	2	0
WRSMCE	3	0	0	2	1
Total	10	17	1	4	1

**Whilst every effort was made to identify individuals, it cannot be guaranteed that the same individual did not trigger multiple cameras.*

In addition to camera trigger data, incidental observations of pest presence on-site were recorded. These are provided in Figure 2 below; they include Cat, Dog and Pig tracks as well as sighting of several pigs.

The distribution of feral pigs was concentrated in the south-west of the Conservation Area, cameras 1, 2, and 7 identifying 14 different individual pigs. Of the observed populations, there was eight adults and six juveniles, as seen in Plate 1. Whist Red Foxes appeared at sites 4, 8, 10, and 21, as seen in plate 2, it is unclear if these are separate individuals because definitive individual markings were not observed.

A single cat was identified over serval nights on camera 23; see plate 1. However, the monocoloured appearance of the feral cat makes it difficult to identify as the same individual. On-site observations also found recent cat tracks and pug marks to the south, this may indicate additional individuals not picked up on camera. The one wild dog identified had a similar distribution to the cat, located at camera 24, see plate 3; there was also dog tracks and scats identified in the southern area of WRSMCE that bordered the CAMP boundaries.

In addition to target pest species, 21 species triggered the remote cameras on-site, 20 native and one non-native. Details of these species is provided in the detailed data summary, Appendix A.

The next round of baseline surveys (round two of four) will be conducted in Spring 2021 per the requirements of the PMP. The locations, bait and study period will be kept consistent to ensure a robust baseline survey.

A full baseline report, undertaking a combined analysis across all four events, will be provided when all baseline surveys have been completed.

Plate 1. Cat (left) and feral pig (right) observed on site

Plate 2. Red fox (left) and Red Fox (right)

Plate 3. Wild dog

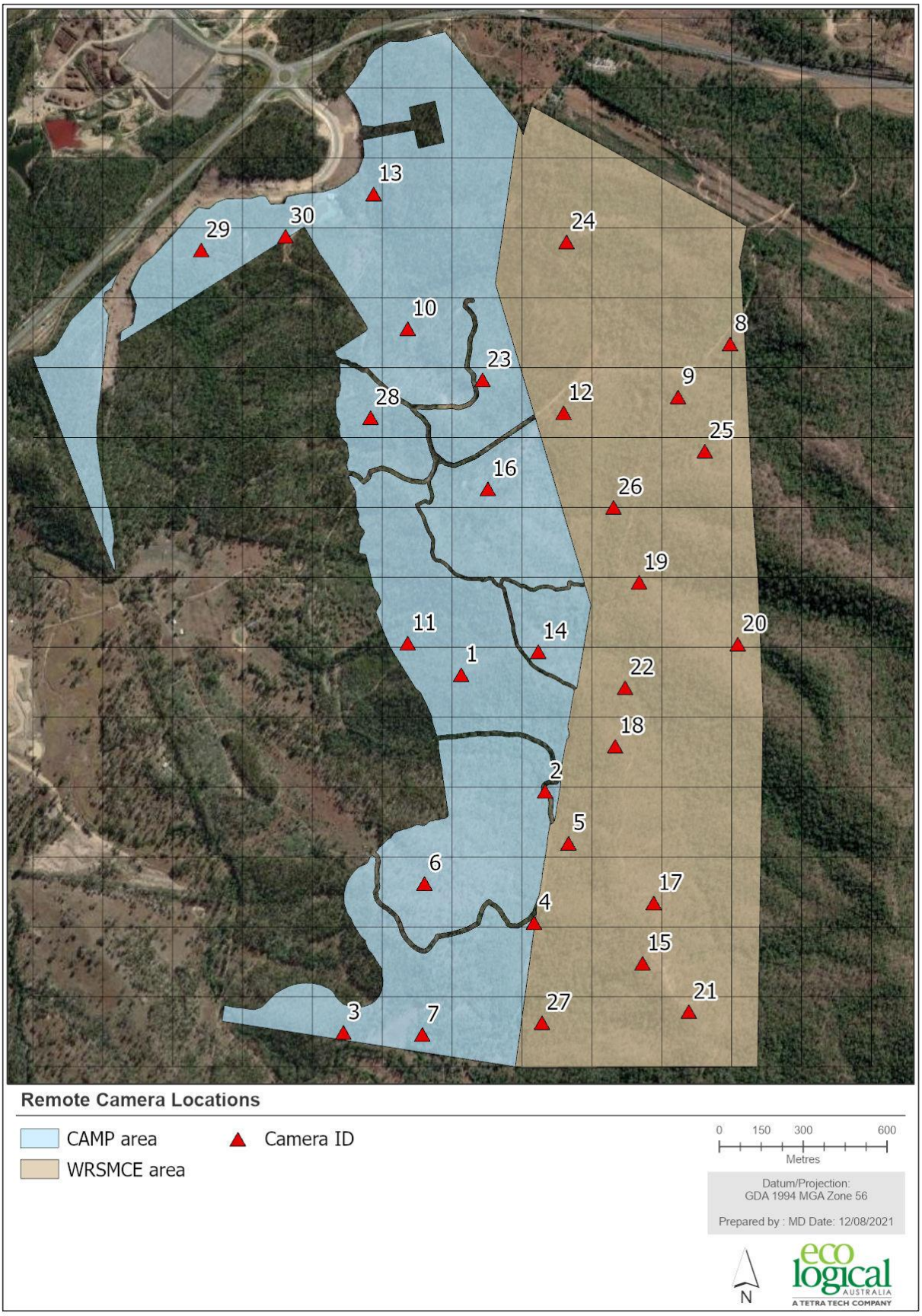

Figure 1. Camera locations

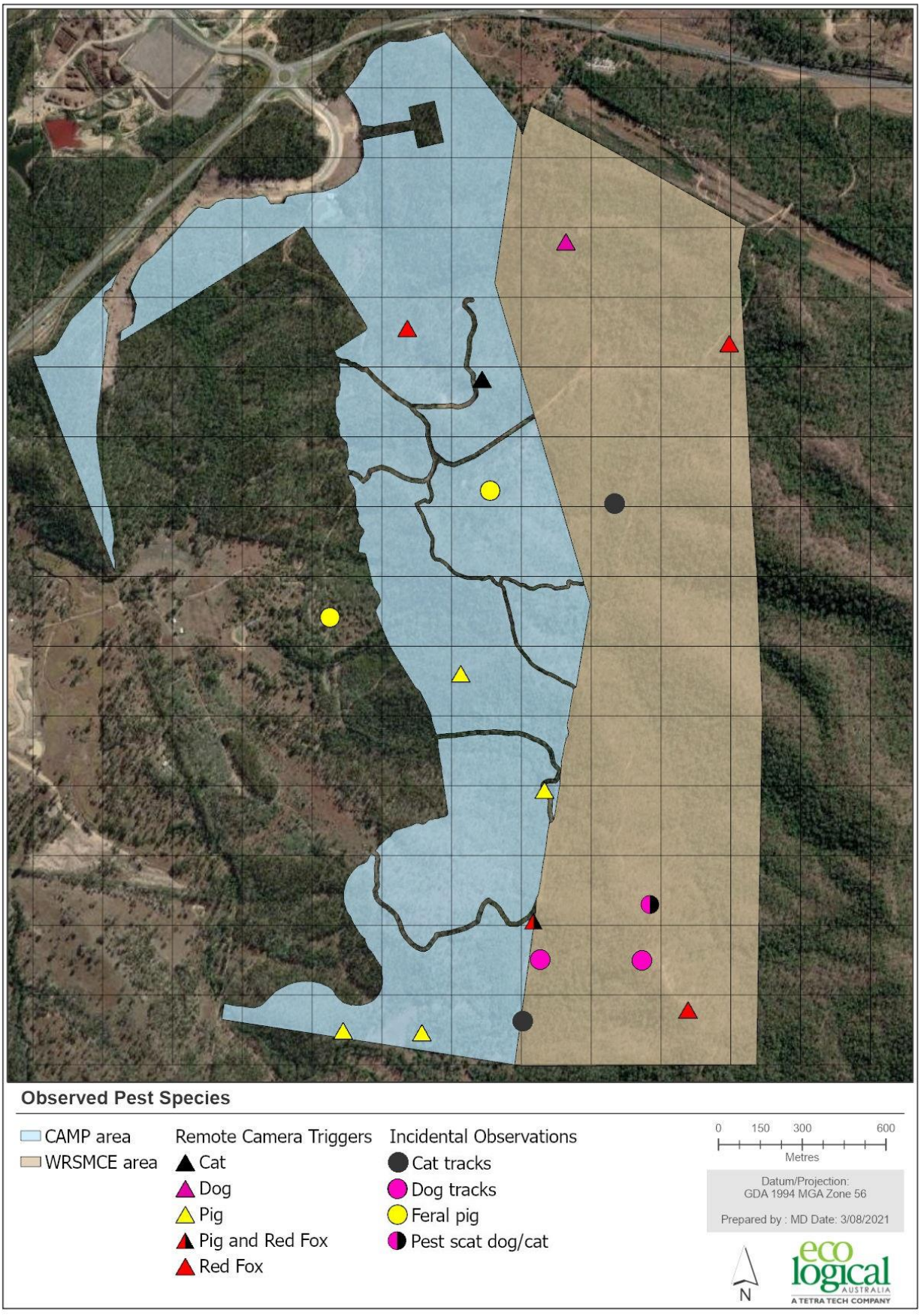

Figure 2. Observed pest species and incidental observations

APPENDIX A: DETAILED SURVEY RESULTS

Table 2. Target Species Detailed Results

Camera	Species Common Name	Species Scientific Name	Date	Comments
1	Pig	Sus scrofa	6/06/21	2 adult; 2 juvenile
	Pig	Sus scrofa	6/06/21	1 adult
2	Pig	Sus scrofa	28/05/21	3 adult
	Pig	Sus scrofa	2/06/21	1 adult
3	Pig	Sus scrofa	6/06/21	1 adult; 1 juvenile
4	Red Fox	Vulpes vulpes	29/05/21	
	Pig	Sus scrofa	4/06/21	1 adult
7	Pig	Sus scrofa	24/05/21	1 adult; 3 juvenile
	Pig	Sus scrofa	2/06/21	1 adult
8	Red Fox	Vulpes vulpes	20/05//2021	
10	Red Fox	Vulpes vulpes	25/05/21	
23	Cat	Felis catus	20/05/21	
24	Dog	Canis familiaris	7/06/21	
21	Red Fox	Vulpes vulpes	27/05/21	

Table 3. All Fauna Sightings Summary

	Camera ID:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Identified Target Species	Cat																							✓							
	Pig	✓	✓	✓	✓			✓																							
	Red Fox				✓				✓		✓											✓									
	Dog																								✓						
Identified Non-native Species	European Hare																				✓										
Identified Native Species	Australian Brush Turkey	✓								✓		✓											✓	✓		✓					
	Australian Magpie				✓												✓	✓						✓							
	Bar-shouldered Dove			✓																				✓	✓						
	Brushtail Possum			✓		✓					✓	✓	✓		✓		✓	✓	✓			✓	✓								
	Brush-tailed Phascogale	✓	✓	✓	✓			✓	✓	✓	✓				✓			✓	✓		✓		✓		✓	✓					
	Common bronzewing															✓															
	Eastern Grey Kangaroo	✓					✓					✓					✓					✓									
	Eastern Yellow Robin			✓															✓							✓					
	Echidna										✓							✓								✓					
	Grey Shrike-thrush			✓				✓																	✓						

	Camera ID:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Identified Native Species	Kookaburra																							✓							
	Mouse (Unidentified)			✓				✓								✓	✓	✓				✓	✓		✓						
	Noisy Friarbird				✓																										
	Northern Brown Bandicoot			✓				✓																							
	Red Necked Wallaby	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	Spotted Quail-thrush														✓																
	Torresian Crow		✓		✓	✓			✓		✓	✓	✓						✓												
	Whiptail Wallaby																✓														
	White-Faced Heron		✓																												
	Yellow-faced Honeyeater			✓																		✓									

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Template 2.8.1

RESULTS SUMMARY – BASELINE ROUND 2 OF 4

Under the Conservation Area Management Plan (CAMP) for the approved multi-use subdivision at White Rock, baseline pest surveys are required to help gain an understanding of the size and distribution of the target pest species (foxes, cats, pigs and wild dogs) to guide management actions over the life of the project. Pest baseline surveys are required to be carried out in autumn and spring for two years (a total of four surveys) within the first three years of the CAMP implementation (2020 to 2022).

ELA conducted the first round of baseline pest surveys in late autumn 2021 in accordance with methods set out in the Pest Management Plan (PMP) prepared by ELA. The second round of baseline surveys were conducted in spring 2021 in accordance with the PMP. This brief report provides a summary of the findings for round 2 of the baseline pest surveys.

30 camera traps were active over a two-week period (19/10/2021 to 02/11/2021) at 15 locations within the CAMP area and 15 locations within the White Rock - Spring Mountain Conservation Estate (WRSMCE), as seen in Figure . Camera site locations were drafted (prior to round 1 surveys) at a desktop level using a 250 m x 250 m grid over the study area (CAMP area and WRSMCE) to distribute survey sites as evenly as possible. These draft sites were then micro-sited by field ecologists on the ground to areas of preferred habitat for target species e.g. drainage lines, den areas (rocky outcrops). All camera sites remained the same as for round 1, aside from one camera (camera 28) which was moved slightly north due to access issues associated with wet weather at the time of deployment.

Cameras were set up opposite bait stations to lure the target species. Wet cat food mixed with dry oats was used as bait. In addition to remote cameras being set, incidental sightings of target pest species during the deployment and recovery of remote cameras, including scats and tracks, were intended to be recorded (as occurred in round 1) however, no incidental observations were made during this round of camera deployment or recovery. This is likely attributed to wet weather washing away tracks and causing reduced activity in target species.

During the two-week survey period, a total of six cameras were triggered multiple times identifying three of the four target species (16 individuals in total; wild dogs weren't observed). Table 1 provides details of these triggers. Further detailed data is provided in Appendix A. Camera trigger locations are shown in Figure 2.

Table 1. Camera trigger data summary for target species.

Survey Area	Number of cameras triggered	Number of individuals identified for each target pest species*			
		Pig	Cat	Fox	Wild Dog
CAMP Area	3	9	1	1	0
WRSMCE	3	5	0	0	0
Total	6	14	1	1	0

**Whilst every effort was made to identify individuals, it cannot be guaranteed that the same individual did not trigger multiple cameras.*

Feral pigs were observed throughout the CAMP and WRSMCE areas. In the CAMP area, feral pigs were concentrated in the north-west region with camera 5 identifying a large group of 6 pigs over one night.

Pig were spread evenly throughout the WRSMCE area, with cameras 18, 25, and 21 identifying 5 different individuals. Of the observed populations, there were eleven adults and three juveniles. An example of the pigs observed on site is shown in Plate 3.

For the other target species, a single red fox and single cat were observed at cameras 7 and 13 respectively, while no wild dogs were observed. The cat is shown in Plate 1, while the red fox is shown in Plate 2.

In addition to target pest species, 19 species triggered the remote cameras on-site, 18 native and one non-native. Details of these species is provided in the detailed data summary, Appendix A.

The next round of baseline surveys (round three of four) will be conducted in Autumn 2022 per the requirements of the PMP. The locations, bait and study period will be kept consistent to ensure a robust baseline survey.

A full baseline report undertaking a combined analysis across all four events will be provided when all baseline surveys have been completed (end 2022).

Plate 1. Cat observed onsite at camera 13.

Plate 2. A fox observed onsite at camera 7.

Plate 3. Pigs observed onsite at camera 21.

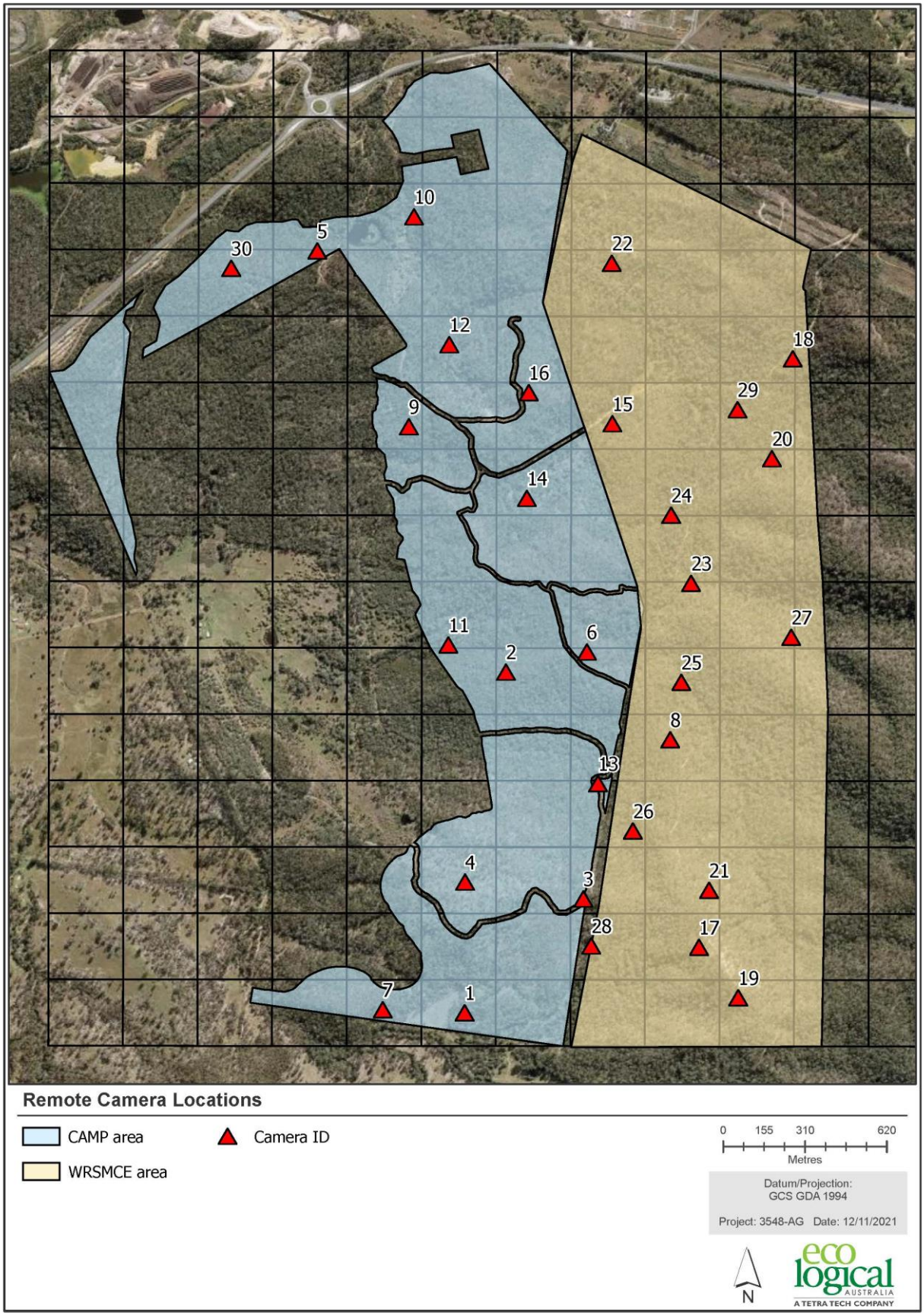

Figure 1. The remote camera locations.

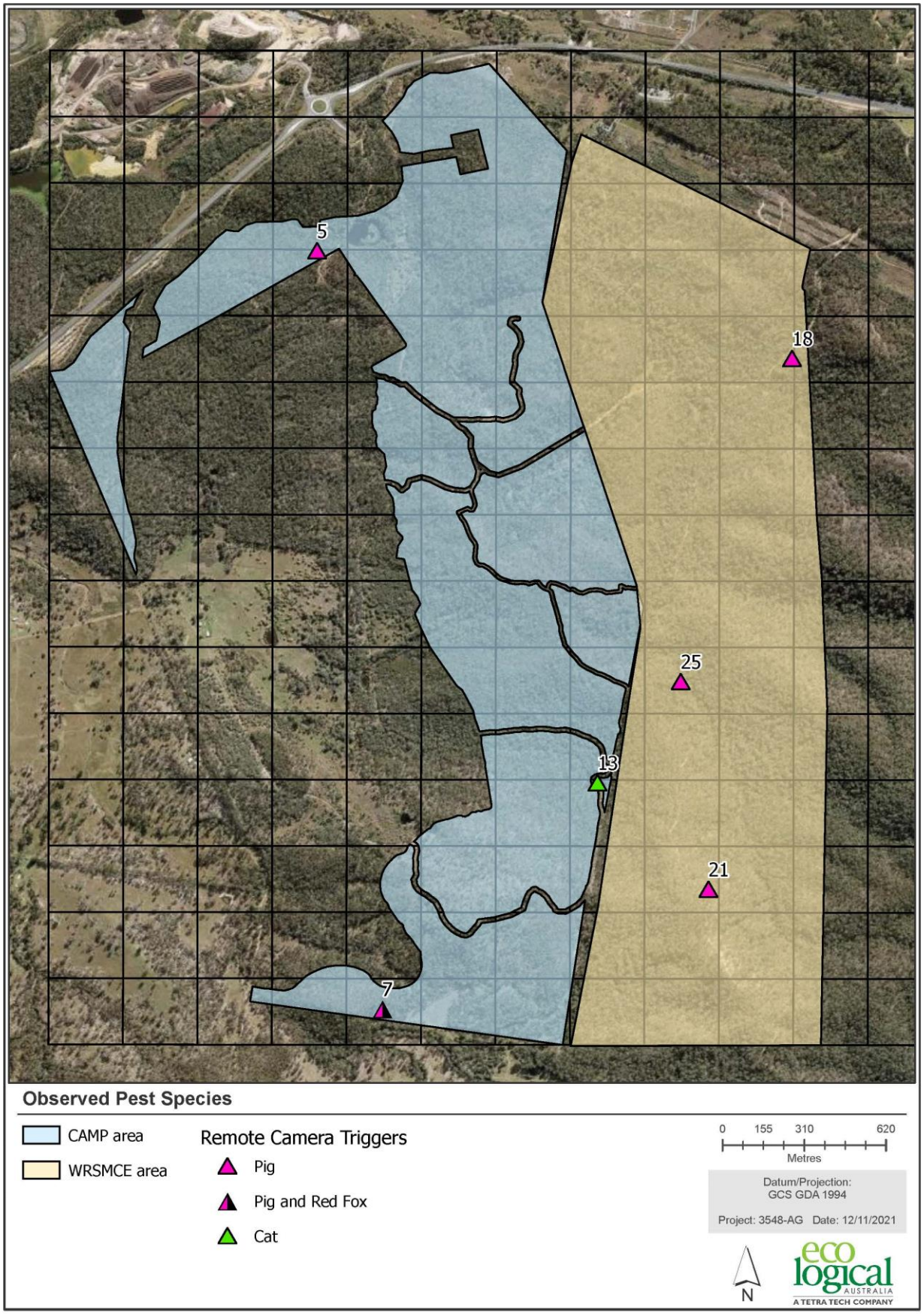

Figure 2. The observed pest species and associated remote camera locations.

APPENDIX A: DETAILED SURVEY RESULTS

Table 2. The detailed survey results for the target species.

Camera	Species Common Name	Species Scientific Name	Date	Comments
5	Pig	Sus scrofa	30/10/21	4 adults; 2 juveniles
	Pig	Sus scrofa	21/10/21	2 adults
7	Pig	Sus scrofa	22/10/21	1 adult
	Fox	Vulpes vulpes	26/10/21	1 adult
18	Pig	Sus scrofa	23/10/21	1 adult
13	Cat	Felis catus	27/10/21	1 adult
21	Pig	Sus scrofa	27/10/21	2 adults
25	Pig	Sus scrofa	1/11/21	1 adult; 1 juvenile

Table 3. A summary of all fauna seen throughout the observation period.

	Camera ID:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Identified Target Species	Cat													✓																	
	Pig					✓		✓											✓			✓				✓					
	Red Fox							✓																							
Identified Non-native Species	European Hare							✓																							
Identified Native Species	Australian Brush Turkey							✓	✓			✓		✓	✓				✓		✓					✓		✓			
	Australian Magpie			✓	✓									✓			✓										✓				
	Brushtail Possum			✓		✓		✓	✓		✓	✓	✓	✓	✓				✓		✓		✓			✓	✓		✓		✓
	Brush-tailed Phascogale			✓		✓	✓	✓	✓				✓		✓					✓		✓	✓			✓	✓		✓		
	Common bronzewing																	✓	✓												
	Eastern Grey Kangaroo	✓			✓							✓																✓			
	Eastern Yellow Robin																						✓								
	Echidna																							✓				✓			
	Grey Shrike-thrush																						✓								
	Kookaburra																✓										✓				
	Red Necked Wallaby		✓			✓	✓	✓	✓	✓		✓	✓	✓			✓				✓	✓	✓	✓							

	Camera ID:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Torresian Crow			✓	✓	✓				✓	✓	✓		✓				✓	✓		✓		✓							✓	
	Pale-headed Rosella								✓																						
	Red-necked Pademelon									✓																					
	Lace Monitor										✓	✓						✓			✓		✓								
	Eastern Water Dragon													✓																	
	Noisy Miner																	✓									✓				

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