ENV-PLN-0007

Biodiversity Offset Management Plan (BOMP)

1 Introduction

Foxleigh Management Pty Limited is the operator of the Foxleigh Joint Venture at the Foxleigh Mine. FoxleighCoal Pty Ltd (70% JV) holds an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act, Reference Number 2010/5421) to disturb protected matters (PM) - previously known as MNES (Matters of National Environmental Significance) - including Brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community (Brigalow TEC) and Squatter Pigeon Primary habitat (SPPH).

The EPBC 2010/5421 was originally issued on 14 May 2014 (May-14 EPBC) with key criteria:

- Term: 31 December 2034
- Brigalow TEC disturbance limit – 83.7ha
- SPPH disturbance limit – 181ha
- An Offset Management Plan (OMP) to meet conditions 4, 5, 6 was approved on 12 December 2016.

As part of a review of the Foxleigh 2021 OMP survey and review of the Life of Mine footprint three things were identified:

1. A number of previously identified and approved offset areas impacted by herbicide were not going to recover or be acceptable offset areas as originally intended;
2. The area of PM disturbance is different to the May-14 EPBC approval; and
3. The Life of Mine extended beyond the May-14 EPBC approval term.

Accordingly, an application for an extension and variation was lodged and granted on 30 September 2021 (Sep-21 EPBC) with key criteria:

- Term: 31 December 2050
- Brigalow TEC disturbance limit – 96.2ha
- SPPH disturbance limit – 202.5ha

The Sep-21 EPBC approval condition 4 requires that an OMP be submitted, approved in writing by the Minister and implemented. Conditions 5 and 6 describe the detail required in the OMP. This Biodiversity OMP (BOMP) is provided in compliance with clause 4.

Appendix E contains a reconciliation of proposed Life Of Mine Plan (LOMP) clearance areas as at 19 Oct-22 and identifies that a further variation for small additions will be required at a later date.

For ease of demonstrating compliance Table 1 identifies the Sep-21 EPBC approval conditions and sections of the BOMP that apply:

Table 1 EPBC conditions and BOMP applicable sections

EPBC #	EPBC Condition	BOMP section
5a	A summary of the residual impacts to PM that will be compensated for by the offset/s. This summary must include the area(s) of habitat for PM and its condition and quality at all impact sites which the offset/s are to address.	Table 2, Section 2.81 & 2.8.2
5b	Detailed survey methodologies for determining baseline conditions of the PM at each offset site.	Appendix 1

EPBC #	EPBC Condition	BOMP section
5c	The environmental objectives, relevant to the PM, and a reference to the EPBC Act approval conditions and other applicable conditions of approval (including State approval conditions), if any, to which the BOMP refers.	Table 13; Table 1
5d	A table of commitments made in the BOMP to achieve the environmental objectives, and a reference to where the commitments are detailed in the BOMP.	Table 13 & Table 32
5e	Reporting and review mechanisms, and documentation standards to demonstrate compliance with management and environmental commitments in the BOMP.	Section 6 & 7
5f	An assessment of risks to achieving environmental objectives and risk management strategies that will be applied.	Section 5
5g	Impact avoidance, mitigation and/or repair measures, and their timing.	Table 31
5h	A monitoring program, which must include:	Section 4
5hi	measurable performance indicators to monitor attainment of the offset completion criteria;	Section 3
5hii	trigger values for corrective actions; and	Section 3
5hiii	the timing and frequency of monitoring to detect trigger values and changes in the performance indicators;	Section 3
5i	proposed corrective actions if trigger values are reached or performance indicators not attained.	Table 31
6	The approval holder must, by 30 June 2022 or as otherwise agreed by the Minister in writing, register a legally binding conservation mechanism to provide protection in perpetuity over the offset areas specified in the BOMP.	Section 2.13

2 Project Offsets

2.1 Summary

The BOMP Offset Area (Figure 1) is the 2016 approved offset area. Figure 2 is a combination of retained 2016 areas and new 2021 nominated areas, creating the current offset areas.

The process followed for the update is:

- Use the approved 2016 OMP as a starting point
- Recognising that 5 previously approved herbicide affected offset areas (polygons 9-13, Figure 1) are not viable and have no likelihood of recovery within an acceptable time frame, the Commonwealth offset calculator was used to remove the offset hectares from the total
- Remap all remaining 2016 offset areas (2021 wet season survey report) and use these hectares
- Review status of other offset areas and determine whether replacements should be sourced
- Review the difference in PM disturbance areas between the May-14 and Sep-21 EPBC approval and calculate the new offset area required to acquit the new disturbance limits plus adjustments to 2016 offset areas identified above (herbicide affected, remap, replacement)

Appendix C contains GIS data for the old and new offset areas

2.2 Description of Protected Matters Impacted Values

The 2016 OMP Table 1 described the MNES (now Protected Matters) impacted values and is repeated below.

Table 2 Description of the PM approved to be impacted by the project

Protected Matter (PM)	EPBC Status	Description of Impacted Values
Brigalow (Acacia harpophylla dominant and co- dominant) threatened ecological community (TEC)#	Endangered	Brigalow TEC impacted includes areas of remnant and regrowth regional ecosystems (RE): • RE 11.3.1 (Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains) • RE 11.4.9 (Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains) • RE 11.9.5 (Acacia harpophylla and/or Casuarina cristata open forest on fine-grained sedimentary rocks)
Squatter Pigeon (Southern) (Geophaps scripta scripta)	Vulnerable	Impact on primary breeding and foraging habitat for the Squatter Pigeon. Breeding and foraging habitat for the Squatter Pigeon consists of dry, open sclerophyll woodlands and scrub dominated by Eucalyptus, Corymbia, Acacia and Callitris species, specifically: Foraging habitat (high value) – Gravelly, sandy, loamy soils, open-forest to woodland communities (dominated by Eucalyptus, Corymbia, Acacia or Callitris species), within 3 km of a permanent or seasonal water body. Breeding habitat (high value) – Well-draining, gravelly, sandy or loamy soils, open-forest to woodland communities with patchy, tussock understories, within 1 km of a permanent water body.

It is unclear what has contributed to the difference in PM areas as the mine footprint has not fundamentally changed. On this basis it is assumed that the incremental changes in PM area values is the same as the previously identified areas.

2.3 2016 Offset Individual Areas and Protected Matters

The 2016 approved OMP identifies the following total offset areas:

- Brigalow TEC – 149.34ha to acquit 83.7ha
- SPPH – 317.32ha to acquit 181ha

Figure 1 OMP Offset Areas (2016 approved)

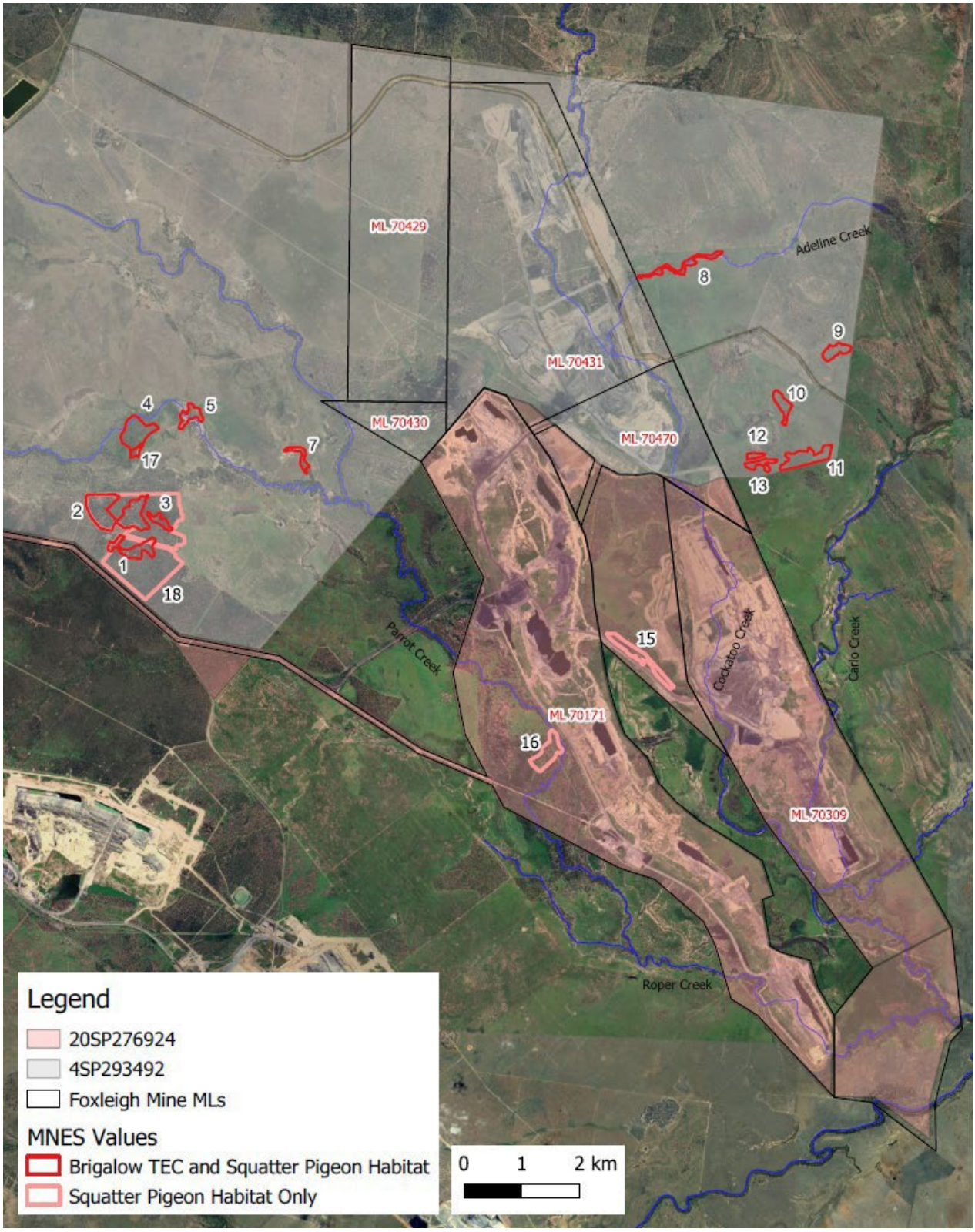
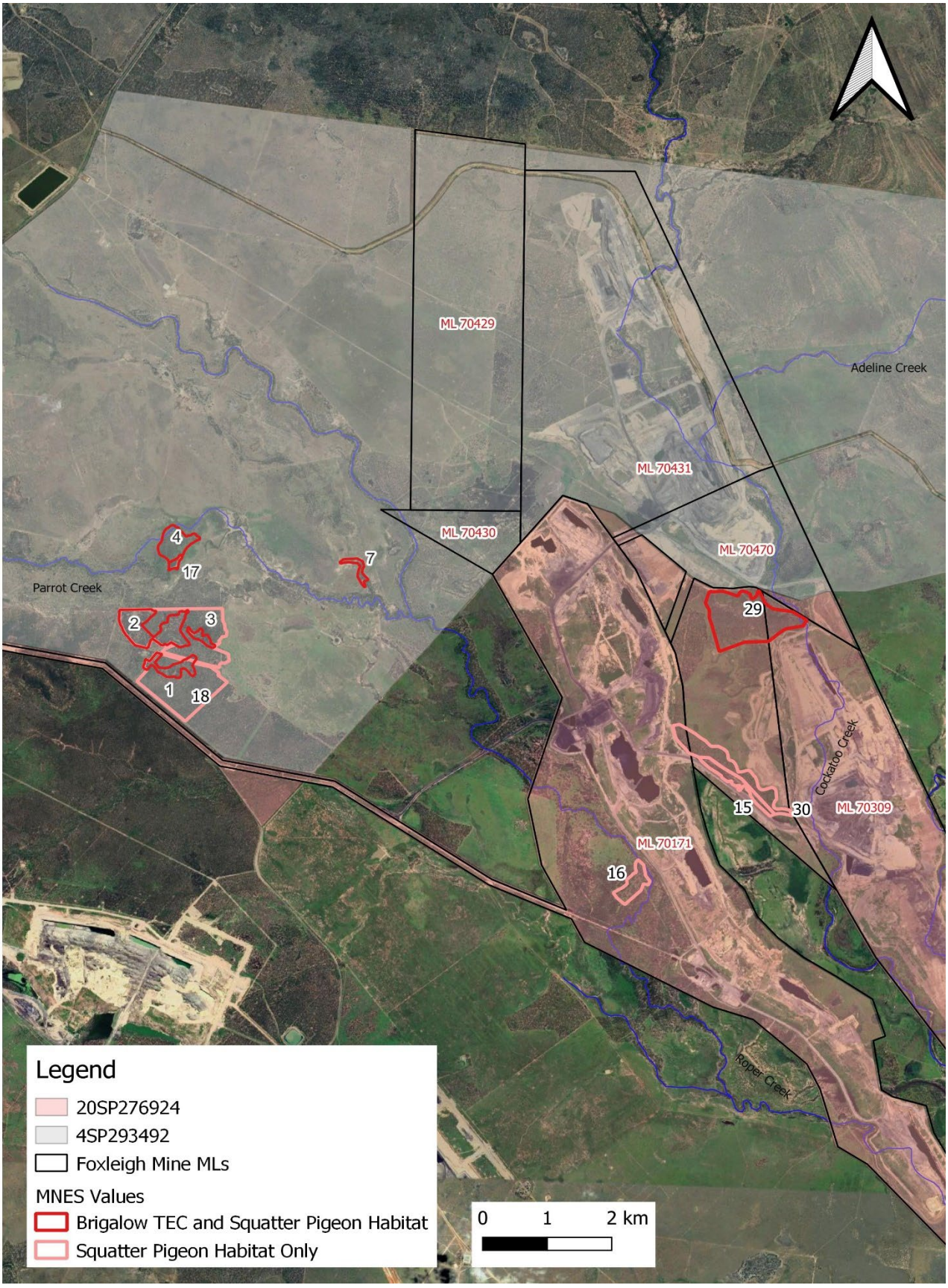


Figure 2 BOMP Offset Area (2021 update)



Areas used in 2016 OMP are shown in Table 3 (GIS data, Appendix C – CO_2 data used in 2016 OMP). There is a small difference of 0.02ha in relation to Brigalow TEC that can be considered as rounding.

Table 3 2016 OMP offset area by PM type

Polygon Number	2016 Polygon Area (Ha)	PM
1	14.02	TEC/SPPH
2	42.13	TEC/SPPH
3	4.99	TEC/SPPH
4	20.79	TEC/SPPH
5	8.00	TEC/SPPH
7	4.89	TEC/SPPH
8	9.73	TEC/SPPH
9	8.30	TEC/SPPH
10	7.88	TEC/SPPH
11	18.30	TEC/SPPH
12	2.39	TEC/SPPH
13	5.45	TEC/SPPH
15	15.07	SPPH
16	16.08	SPPH
17	2.47	TEC/SPPH
18	136.85	SPPH

TEC/SPPH	**149.33**
SPPH only	**167.99**
SPPH total	**317.32**

Herbicide affected	**42.32**

Note: Brigalow TEC is a 100% subset of SPPH for most offset areas except polygon 15, 16 and 18.

2.4 Removal of 2016 Herbicide Affected Areas

The 2016 OMP (section 2.5.1) noted

Several patches of Brigalow TEC within proposed offset areas have been impacted by herbicide (Graslan active constituent 200 g/kg Tebuthiuron), including dieback of regrowth vegetation Those patches cover an area of 42.32 ha and represent 28% of the total offset for Brigalow TEC and 13% of the total offset area for Squatter Pigeon habitat. It is expected that these areas will recover over the next five years. MMS will monitor these patches to determine whether dieback or lack of regeneration requires alternative offsets. If required, MMS will consider the suitability of Brigalow TEC located on its nearby land.

These areas, represented by polygons 9-13 inclusive (Table 3), have not recovered and have been removed as viable offset areas in the 2021 BOMP.

As these polygons (9-13) acquitted Brigalow TEC and SPPH, the area deduction applies equally to both PMs.

2.5 2021 Wet Season Survey Remapping

As part of the 2021 wet season survey, a remap of Brigalow TEC 2016 offset areas was undertaken. The results are shown in Figure 3 and Table 4. The remapped 2021 areas will form the basis of the acquittal going

forward. Reflecting vegetation boundary changes over the last 5 years, remapping shows a net shortfall:

- 4.00ha of Brigalow TEC
- 4.75ha of SPPH (additional reduction in polygon 18)

Figure 3 Comparison of spatial variations between 2016 and 2021 remapping survey

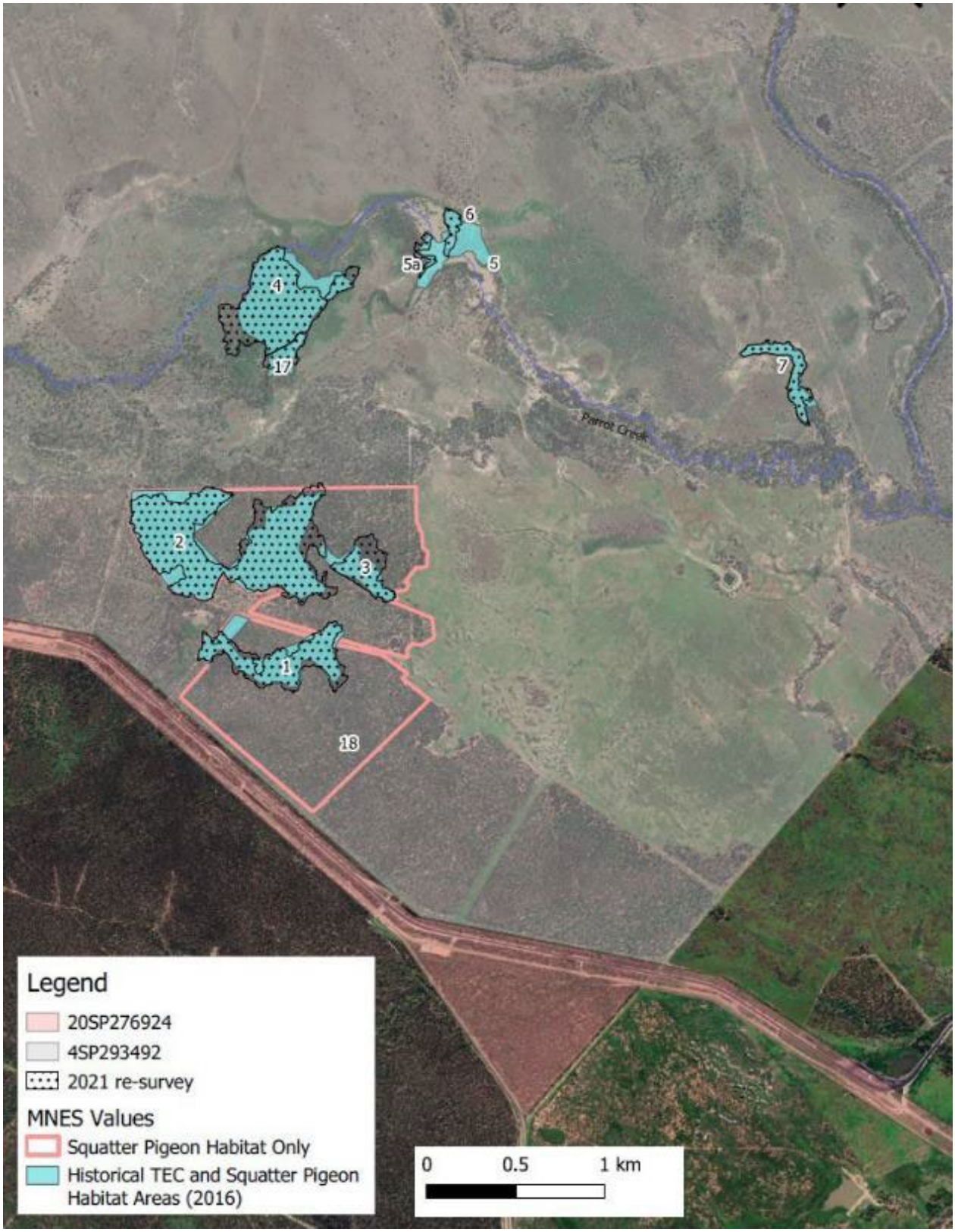


Table 4 Comparison of spatial variations between 2016 and 2021 remapping survey

Polygon Number	2016 Polygon Area (Ha)	2021 Polygon Areas (Ha)	PM
1	14.02	13.42	TEC/SPPH
2	42.13	42.74	TEC/SPPH
3	4.99	6.29	TEC/SPPH
4	20.79	22.08	TEC/SPPH
5 and 5a	8.00	1.03	TEC/SPPH
6	N/A	1.48	TEC/SPPH
7	4.89	4.62	TEC/SPPH
8	9.73	9.27	TEC/SPPH
9	8.30	n/a	TEC/SPPH
10	7.88	n/a	TEC/SPPH
11	18.30	n/a	TEC/SPPH
12	2.39	n/a	TEC/SPPH
13	5.45	n/a	TEC/SPPH
15	15.07	15.07	SPPH
16	16.08	16.08	SPPH
17	2.47	2.09	TEC/SPPH
18	136.85	136.09	SPPH
Herbicide Affected	**42.32**		

TEC/SPPH	149.33	103.01
	Total Difference	-46.32
	Change after herbicide removed	**-4.00**

SPPH	317.32	270.25
	Total Difference	-47.07
	Change after herbicide removed	**-4.75**

2.6 Removal of Polygons

2021 resurveyed polygons 5a, 6 and 8 are low aspect ratios offset areas. By definition, these polygons will only achieve low Landscape Based Scores (out of 20) which will impact poorly on the total BioCondition score. Accordingly they are removed.

Post 2021 survey acquitted offset areas:

- Polygon 8 – 9.27ha
- Polygon 5a – 1.03ha
- Polygon 6 – 1.48ha
- **Total** – 11.78ha

As these polygons are Brigalow TEC and SPPH, the spatial deduction applies equally to both PMs.

2.7 2021 Offset Area Reconciliation

Table 5 provides a summary of adjustments to achieve the final offset to comply with Sep-21 EPBC:

- Starting point is the approved 2016 OMP disturbance limits and offset area. The ratio of these numbers for relevant PM provides the calculator multiplier relevant to 2016 OMP.
- Acquitted offset herbicide affected areas of 42.32Ha (Section 2.5.1 2016 OMP) were removed.
- The 2021 wet season survey produced an acquitted shortfall of 4.00 and 4.75ha (TEC and SPPH, respectively) compared to that used in the 2016 OMP and must be replaced.
- Because of the narrow aspect ratio of polygons 5a, 6 and 8 (existing 2016 offsets, 2021 resurvey areas) they are removed, and replacement acquittal areas are sourced in polygons 29 and 30.
- The Sep-21 EPBC approval disturbance limits sets the basis for the total offset area to be provided. The difference between these disturbance limits and the existing adjusted offset, provides the basisof new offset areas to be added.
- On the ground surveys were conducted in Sep-21 of proposed replacement and additional offset areas; based on scoring a new 2021 multiplier is determined.

Note: removed acquitted areas were converted to disturbance areas using 2016 approved multipliers and then subject to the 2021 multipliers for determining replacement areas

Table 5 Disturbance Limits and Offset Area Reconciliation

	Descriptor	Unit	Brigalow TEC	SPPH	Formula
a	2016 Disturbance limit (EPBC)	ha	83.7	181	
b	2016 multiplier		1.7842	1.7531	=c/a
c	2016 Offset acquittal (OMP)	ha	149.34	317.32	
d	Herbicide impacted area	ha	-42.32	-42.32	
d'	Remapping differential (2021 survey)	ha	-4.00	-4.75	
d''	Drop polygon 5a, 6, 8	ha	-11.78	-11.78	
e	Remaining (after Herbicide, '21 survey, polygon 5a,6,8)	ha	91.25	258.47	=c+d+d'+d''
f	Equivalent 2016 Disturbance area	ha	51.1	147.4	=e/b
g	Sep-21 EPBC Disturbance limit	ha	96.2	202.5	
h	Adjusted disturbance to be offset	ha	45.1	55.1	=g-f
i	2021 multiplier		1.7976	2.4334	Calculator
k	Offset area acquittal	ha	81.0	134.0	=h*i
l	Standalone SPPH Offset area (polygon 30)	ha		43.3	
m	Additional i. TEC; ii. combined TEC-SPPH in polygon 29	ha	9.7*	90.7	=k-l
n	Final Total Offset area	ha	181.9*	392.5	=e+k**

* Polygon 29 is using 90.7ha for SPPH but only 81.0 required for TEC acquittal – to simplify an extra 9.7ha is included for TEC acquittal

** formula for TEC Brigalow is = e + k +m as per above comment

A summary of 2021 offset spatial areas for each PM (Figure 2) is tabulated below in Table 6.

Table 6 Offset Area Reconciliation

Polygon Number	2021 Polygon Area (Ha)	PM
1	13.42	TEC/SPPH
2	42.74	TEC/SPPH
3	6.29	TEC/SPPH
4	22.078	TEC/SPPH
7	4.62	TEC/SPPH
15	15.07	SPPH
16	16.08	SPPH
17	2.09	TEC/SPPH
18	136.09	SPPH
29	90.7	TEC/SPPH
30	43.3	SPPH

TEC/SPPH	181.93
SPPH only	210.54
SPPH total	392.47

2.8 Policy Requirements of the Offset Areas

Compliance with EPBC Act Environmental Offsets Policy requirements is shown in Table 7.

Table 7 EPBC Act Environmental Offset Policy Requirements

Policy requirement	Foxleigh Coal Mine Offsets
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability ofthe aspect of the environment that isprotected by national environment law and affected by the proposed action	The proposed offsets acquit a minimum of 100% of the requirements for each PM in accordance with the OAG. Offset areas will be managed to maintain and/or improve the condition and viability of species habitat and vegetation communities in accordance with the objectives and outcomes of this offset management plan (BOMP). This BOMP sets out specific offset objectives as well as management and monitoring actions to be undertaken. The offset site will be managed and monitored until the objectives of this BOMP have been achieved.
Suitable offsets must be built around direct offsets but may include other compensatory measures	Direct land-based offsets will be used for acquittal. They have been identified in accordance with the EPBC Act Environmental Offsets Policy and OAG.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Threatened status of impacted PM is considered by the OAG in calculating the area to be provided. The offsets areas were specifically identified to be within the known distribution of each of the offset mattersand contain compliant vegetation communities and habitat requirements based on published scientific literature and species records. In addition, detailed field assessments were undertaken in accordance with the Queensland Government's Ecological Equivalence Methodology in order to accurately identify the type and condition of the vegetation.
Suitable offsets must be of a size and scale proportionate to the impacts on the protected matter	The size of the offset area to be secured has been calculated in accordance with the OAG. The inputs and justifications are based on theresults of detailed field assessments as presented in Appendix A

Policy requirement	Foxleigh Coal Mine Offsets
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	The use of 100% direct offsets is considered to provide greater certainty that the offset will deliver a conservation gain for the offset matters in comparison to the use of other compensatory measures. The implementation of the BOMP will include an assessment of the risks to offset success and specific management actions to improve habitat quality and reduce the risk of threatening processes on each of the offset.
Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude state or territory offsets)	The proposed offsets are zoned rural and rural activity under the Isaac Regional Council planning scheme. These areas have been historically used for cattle grazing. The proposed offset areas are subject to a number of current and potential threats, including weed outbreaks (e.g. *Megathyrsus maximus var. pubiglumis, *Harrisia martinii) and infiltration and/or expansion of pasture grasses (e.g. *Cenchrus ciliaris, *Urochloa mosambicensis), overgrazing, trampling, pest animals (e.g. Pigs (*Sus scrofa), potential future development and lack of long-term security.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	The principles and approach to identifying, securing, and establishing offsets are based on the key requirements of the EPBC Act Environmental Offsets Policy. Offset areas have been identified and deemed suitable using an evidence-based and scientifically robust approach, including by using the OAG. The offsets can be secured efficiently and in a timely manner, given they are in areas controlled by the approval holder and appropriate management actions will be implemented to ensure the offsets are effective.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The BOMP outlines a clear governance framework and delivery pathway to legally secure the offset areas on the property title, which will be monitored, measured using performance criteria, and audited/enforced in accordance with the project's EPBC Act approval.

2.9 Protected Matters Residual Impacts to be Acquitted - Baseline Surveys

2016 existing adjusted offset area was the focus of surveys undertaken for development of the 2016 OMP. These areas were resurveyed as part of the 2021 wet season monitoring survey and the shortfall difference, herbicide affected area removal, removal of narrow aspect areas and increased approval disturbance limits have been addressed. The 2016 survey included assessments in accordance with the Queensland Government's Ecological Equivalence Methodology (EEM), while the 2021 surveys were undertaken in compliance with the '*Guide to determining terrestrial habitat quality, version 1.3*' (DES 2020) (Habitat Quality Guide). The Habitat Quality Guide supersedes EEM, however the collation of data with respect to ecological condition are identical.

Field survey of potential offset areas was undertaken in Sep-21 by Engeny. Polygon 29 (Figure 2) provides the additional TEC acquittal and part of the SPPH acquittal. The survey results are presented in Appendix A.

Data presented is a combination of existing 2016 and new 2021 information.

While multiple targets were surveyed and scored in 2021, this report only references the two new polygons required to meet a minimum 100% acquittal (polygons 29 and 30).

2.9.1 Brigalow TEC

Habitat quality scores for vegetation that constitutes offset potential for Brigalow TEC are below.

Table 8 Habitat quality scores for potential offset areas for Brigalow TEC

RE type/ Assessment unit	No. polygons	Total area (ha)	Habitat quality score	Habitat features and threats
n-r 11.3.1 (AU 1)	29	90.7	3.83	▪ Patches of variable size but contiguous with remnant and high value regrowth, at least in part. Only a portion of patch (>100ha) is used. ▪ Excellent Gilgai development ▪ Potential and known habitat for threatened flora and fauna species ▪ Actively utilised by cattle ▪ Signs of predator species (Wild Dog, Pig) evident.
	Total (ha)	**90.7**		

It should be noted that this patch of Brigalow (polygon 29) does not currently satisfy the diagnostic criteria for the Brigalow TEC, wherein these patches have been substantively cleared within the last 15 years. Furthermore, this patch is mapped as Category X (non-remnant vegetation) on a Property Map of Assessable Vegetation (PMAV), which provides farmers with the ability to clear woody vegetation within these areas inperpetuity. It is understood that farmers are encouraged to seek advice in relation to potentially impacting MNES (e.g. TECs, habitat for Commonwealth listed species) however it is the experience of many ecologists working in Central Queensland that such advice is rarely sought and that deferral to the State mapping, which is actively monitored and updated through routine, generally biennial, review of aerial and SLATs imagery, is the primary source of 'approval checking' prior to clearing. Given that these areas are currently mapped as Category X, with most locked in forever, coupled with the fact that the regenerating vegetation is leguminousand subsisting on alluvial clayey loams, it is proposed that should farmers be given access this patch post- mining, it is considerably likely that these areas would be targeted for clearing and pasture improvement.

Furthermore, additionality is highly likely to be achieved using this patch. Ornamental Snake (*Denisonia maculata*) is highly likely to use this patch as is Australian Painted Snipe (*Rostratula australis*) due to the prevalence of regularly inundated Gilgai of variable size, depth, connectivity, and presence of micro-habitat. Both species are listed as vulnerable under both the EPBC Act and NC Act. This patch is also known to support populations of *Solanum elachophyllum* (no common name) and has the potential to support *Solanum adenophorum* (no common name), which was recorded in similar vegetation within the broader study area.

2.9.2 SPPH

Polygon 30 provides additional SPPH acquittal.

Habitat quality scores for vegetation that constitutes Squatter Pigeon habitat (AUs 1 and 2) are below.

Table 9 Habitat quality scores[1] for potential offset areas for Squatter Pigeon Habitat

RE type/ Assessment unit	Polygon No.	Total area (ha)	Habitat quality score[1]	Habitat features and threats
n-r 11.3.1 (AU 1)	29	90.7	3.07	▪ Permanent water located within 1 and/or 3 kmof patch with moderate diversity of grass species and areas of bare ground.
				▪ Assessment unit with variable potential to be suitable as breeding habitat due to distance from a reliable water source.
				▪ Potential issues with dust due to proximity to the haul road
				▪ Signs of predator species (e.g. Wild Dog, Pig) evident.
11.3.2 (AU 2)	30	43.3	3.49	▪ Permanent water located within 1 km of patch with moderate diversity of grass species and areas of bare ground.
				▪ Assessment unit with potential to be suitable asbreeding habitat due to underlying geology and distance from a reliable water source.
				▪ Potential issues with dust due to proximity to the haul road
				▪ Signs of predator species (e.g. Wild Dog, Pig) evident.
	Total (ha)	**134.0**		

Note that polygon 30 is contiguous with existing polygon 15, hence addition increases the size of the offsetarea and improves ability for the larger offset area to meet future scoring requirements

2.10 Offset Assessment Guide (OAG)

The additional offset areas to the previously assessed 2016 areas were assessed in accordance with the requirements under the EPBC Act Environmental Offsets Policy. The results of the field survey were used to assess the suitability and the size of the offset area under the EPBC Act OAG. BioCondition assessments undertaken in wooded ecosystems produce a score out of 100 which can be easily converted to a score out of 10 for use in the OAG. The BioCondition scores for PM were averaged and weighted according to the size of the patch to provide an overall combined site condition and context score. The summary and derivation are presented in Table 10 and Table 11.

2.11 Offset Area Acquittal Reconciliation (>100%)

Based on the results of the OAG, the Offset Area acquits over 100% of the project's offset requirements for Brigalow TEC and SPPH (Table 12). Detailed justifications for the inputs used as part of the OAG are presented in Section 2.10 and Appendix A.

Table 10 Summary of Scores Applied to the Brigalow TEC OAG

Input	Score	Justification
Quality of impact area	4	The Queensland Government's Ecological Equivalence Methodology was used to inform the quality score for the OAG. The quality score is a measure of how well a particular site supports and contributes to an ecological community's ongoing viability. For Brigalow TEC there are two components that contribute to the calculation of the quality score:
		• site condition, and
		• site context.
		The average BioCondition score in the 2016 OMP for Brigalow TEC was 41/100, which when rounded, equates to the score of 4.
Start Area Quality of offset area	4	The ecological condition score for polygon 29 is 3.83, which when rounded, equates to a 4.
Future Area without Offset		
Risk of loss without offset	0%	As non-remnant Brigalow regrowth (i.e. n-r RE 11.3.1) does not currently satisfy the diagnostic criteria for the Brigalow TEC, the *Guidance for deriving 'Risk ofLoss' estimates when evaluating biodiversity offset proposals under the EPBC Act Feb-17* for the Isaac region (8.42%) cannot be used. Accordingly, 0% has been used for the risk of loss.
Future quality without offset	3	It is anticipated that without a change in land management practices, the quality will continue to decline because of cattle grazing and weed invasion, in particular exotic grasses such as Buffel Grass (**Cenchrus ciliaris*). Areas will continue to be impacted by browsing, trampling and erosion and the natural regeneration of native vegetation will be suppressed. The likelihood of a high intensity fire is also increased without offset management due to the presence of Buffel Grass. A high-intensity fire can alter the Brigalow vegetation structure (Threatened Species Scientific Committee [TSSC] 2013). Additionally, Polygon 29 is mapped as Category X (non-remnant vegetation) on a Property Map of Assessable Vegetation (PMAV), which provides farmers with the ability to clear woody vegetation within these areas in perpetuity. Given this status, coupled with the fact that the regenerating vegetation is leguminous and subsisting on alluvial clayey loams, it is proposed that should farmers be given access to this patch, particularly post-mining, it is considerably likely that these areas would be targeted for clearing and pasture improvement. A deterioration to a THQ of 3.49 or lower is likely, hence a calculator score of 3.
Future Area with Offset		
Risk of loss with offset	0%	Offset areas will be secured in perpetuity through a Voluntary Declaration (VDec) under the VM Act.
Future quality with offset	6	Environmental management strategies that target the ecological improvement of non remnant Brigalow (Polygon 29) in the offset area have been developed in this BOMP and have been guided by the actions listed in the national recovery plan for Brigalow (Butler, 2007 and the conservation advice for this TEC (DoE 2013)). For example, strategic grazing regimes will be implemented to minimise livestock access, alleviate grazing pressures and over-utilisation and enable natural regeneration and allow vegetation to mature. This BOMP details specific control methods to manage exotic weeds such as Buffel Grass which, in turn, supports fire management by reducing fuel loads. To achieve this future quality score Brigalow TEC must attain a future quality score of 5.5 or higher.

Risk Related Time Horizon		
Time over which loss is averted (years)	20	The VDec will remain in place until the objectives of this management plan have been achieved and the offset areas are protected under Queensland legislation, ie are considered to be of remnant status.
Confidence in result	95%	Management actions have been developed based on published conservation recommendations, best practice and measures and land management practices that have proven to be successful in restoring Brigalow TEC (Butler 2007; Peeters, Butler 2012 and DoE 2013). The BOMP details the objectives and outcomes to ensure that the ecological condition and viability of the Brigalow TEC offset areas is improved. Monitoring will be conducted to measure the progress and ensure offset areas achieve their desired future quality. In addition, the VDec will be binding on current and future landholders until the offset areas are protected under Queensland Government legislation, ie are considered to be of remnant status.
Time until ecological benefit (years)		
Time until ecological benefit (years)	20	The implementation of site-specific land management actions through the development and application of this OMP will increase the quality of the offset area by reducing potential threats to Brigalow TEC. This has been informed by best practice management measures specifically addressing restoring Brigalow TEC in a realistic timeframe (Peeters and Butler 2012, DoE 2013). Desired outcomes for the TEC are planned to be achieved during the period of effect of approval for EPBC 2010/5421 (29 years) so the maximum of 20 years has been used.
Confidence in result – risk of loss	95%	Once mapped as remnant vegetation, all future landholders will be bound by the provisions of the VM Act (or subsequent vegetation protection legislation).

Table 11 Summary of Scores Applied to the SPPH OAG

Input	Score	Justification
Quality of impact area	5	The quality score for area of habitat is a measure of how well a particular site supports a particular threatened species and contributes to its ongoing viability. There are three components that contribute to the calculation of habitat quality: site condition; site context; and species stocking rates. BioCondition assessments were undertaken in the areas of breeding and foraging habitat for the Squatter Pigeon in the impact area as part of the Ecological Equivalence assessments. The other component of the quality score, species stocking rate, was determined based on a quantitative assessment of three factors; species presence, density of the species utilising the site and the role of site population in regard to the overall species population and was informed by fauna surveys which were undertaken in the impact area by Ecological Survey and Management in 2012. (Appendix G 2016 OMP). The scores for site condition and site context were given a weighting of 70% of the total score while species stocking rate was given a weighting of 30%, as the presence (stocking rate) of Squatter Pigeon is likely to be dependent on the site condition and site context. The weighted scores were added together to give an overall quality score of 5 for the impact area.
Start Area Quality of offset area	3	Same methodology was used to determine a quality score for the offset area. Score was 3.07 for polygon 29 and 3.49 for polygon 30, giving a weighted score of 3.16

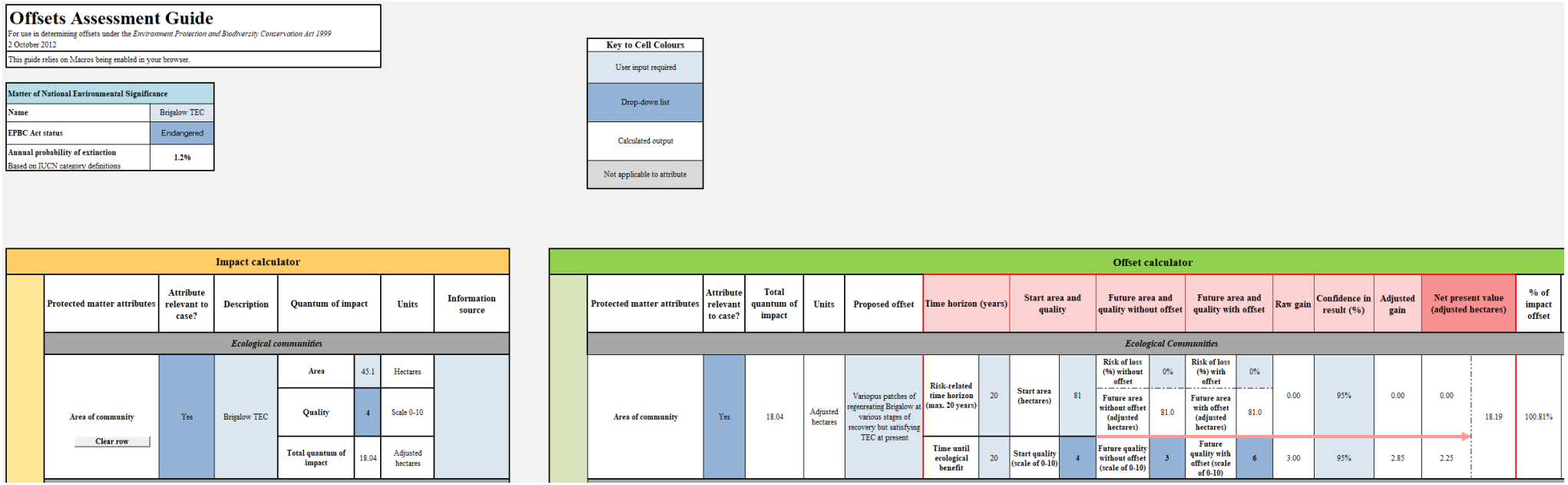
Future Area without Offset		
Risk of loss without offset	8%	The *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act Feb-17* for the Isaac region (8.42%) has been used.
Future quality without offset	3	Ongoing grazing and the prevalence of Buffel Grass will continue to decline the quality of SPPH within the offset area. Overgrazing and the spread of invasive weeds and exotic pasture grasses are all known threats to Squatter Pigeon and its habitat (Commonwealth Department of the Environment [DoE] 2014).
Future Area with Offset		
Risk of loss with offset	0%	Offset areas will be secured in perpetuity through a Voluntary Declaration (VDec) under the VM Act.
Future quality with offset	5	Management measures to manage threats and improve SPPH have been developed in this BOMP. Management measures are based on field surveys of the offset area, published conservation recommendations and best practice measures. The ecological value of SPPH will be improved through the limiting of stock and weed control including the control of Buffel grass. This will enable natural regeneration of the understory and will provide more grass seed for foraging (Cumberland Ecology, 2014). To attain a future condition class of 5 out of 10, SPPH within the offset area must attain a future quality score of 4.5 or higher, accounting for the consideration of species stocking rate remaining constant.
Risk Related Time Horizon		
Time over which loss is averted (years)	20	The VDec will remain in place until the objectives of this management plan have been achieved and the offset areas areprotected under Queensland legislation.
Confidence in result	95%	Once mapped as remnant vegetation, all future landholders will be bound by the provisions of the VM Act (or subsequent vegetation protection legislation).
Time until ecological benefit (years)		
Time until ecological benefit (years)	20	The offset area contains potential breeding and foraging habitat for the Squatter Pigeon and the species is known to utilise the site. By selecting offsets in areas where current habitat for the species already exists, the time lag between the establishment of the offset area and ecological benefit is reduced. Through implementation of the management measures designed to improve habitat for the Squatter Pigeon, including the strategic grazing and Buffel grass, the ecological benefit for the species is expected to be achieved during the period of effect of approval for EPBC 2010/5421, (29 years) so the maximum timeframe of 20 years has been used.
Confidence in result – risk of loss	95%	Once mapped as remnant vegetation, all future landholders will be bound by the provisions of the VM Act (or subsequent vegetation protection legislation).

2.11.1 Brigalow TEC

To determine the total Brigalow TEC offset area required for acquittal:

- Table 5 row h, indicates an additional 45.1ha of disturbance area is required to be offset
- Calculator used to calculate replacement offset area (Figure 4) – 81ha required.

Figure 4 Excerpt of 2021 Commonwealth calculator for Brigalow TEC acquittal



Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Brigalow TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

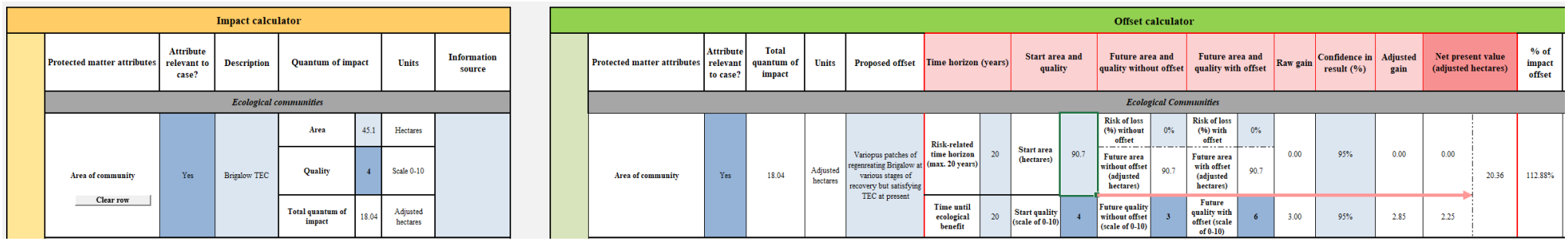
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community Clear row	Yes	Brigalow TEC	Area	45.1	Hectares	
			Quality	4	Scale 0-10	
			Total quantum of impact	18.04	Adjusted hectares	

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)		% of impact offset
Ecological Communities																		
Area of community	Yes	18.04	Adjusted hectares	Variopus patches of regenreating Brigalow at various stages of recovery but satisfying TEC at present	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	81	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	95%	0.00	0.00	18.19	100.81%
									Future area without offset (adjusted hectares)	81.0	Future area with offset (adjusted hectares)	81.0						
					Time until ecological benefit	20	Start quality (scale of 0-10)	4	Future quality without offset (scale of 0-10)	3	Future quality with offset (scale of 0-10)	6	3.00	95%	2.85	2.25		

- However, as regrowth non-remnant Brigalow in polygon 29 also meets SPPH requirements and there is a requirement for 90.7ha to meet SPPH in addition to polygon 30 (see section 2.10.2), 90.7ha will be acquitted for Brigalow TEC (Figure 5).

Figure 5 Excerpt of 2021 Commonwealth calculator for Brigalow TEC and SPPH balance



Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community Clear row	Yes	Brigalow TEC	Area	45.1	Hectares	
			Quality	4	Scale 0-10	
			Total quantum of impact	18.04	Adjusted hectares	

Offset calculator

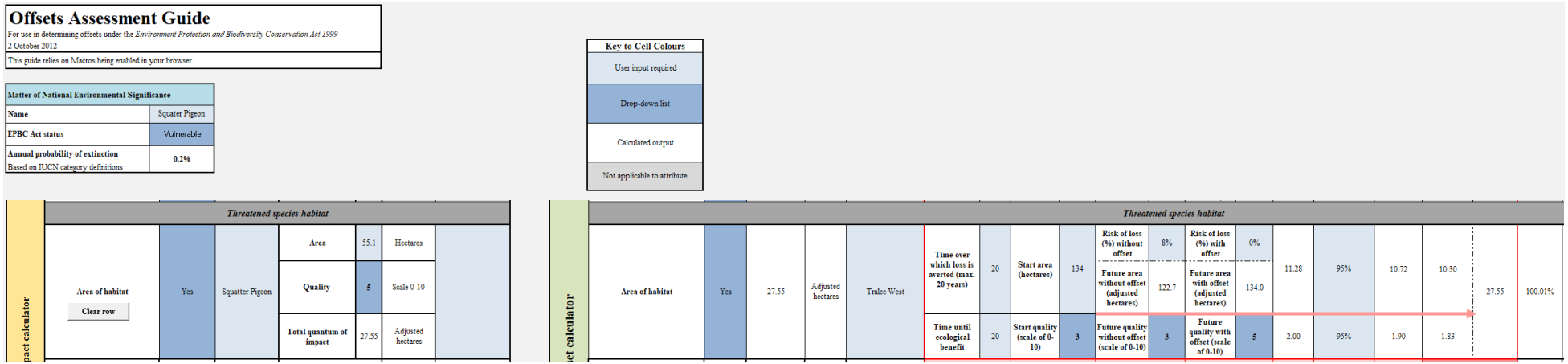
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)		% of impact offset
Ecological Communities																		
Area of community	Yes	18.04	Adjusted hectares	Variopus patches of regenreating Brigalow at various stages of recovery but satisfying TEC at present	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	90.7	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	95%	0.00	0.00	20.36	112.88%
									Future area without offset (adjusted hectares)	90.7	Future area with offset (adjusted hectares)	90.7						
					Time until ecological benefit	20	Start quality (scale of 0-10)	4	Future quality without offset (scale of 0-10)	3	Future quality with offset (scale of 0-10)	6	3.00	95%	2.85	2.25		

2.11.2 SPPH

To determine the total SPPH offset area required:

- Table 5 row h, indicates an additional 55.1ha disturbance area is required to be offset
- Calculator used to calculate replacement offset area (Figure 6) – 134ha required.
- Polygon 30 has 43.3ha SPPH only, requiring an additional 90.7ha of shared TEC/SPPH (Polygon 29 – see above)

Figure 6 Excerpt of 2021 Commonwealth calculator for SPPH only additional acquittal



Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012
This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Squater Pigeon
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Threatened species habitat						
Area of habitat Clear row	Yes	Squatter Pigeon	Area	55.1	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	27.55	Adjusted hectares	

Offset calculator

Threatened species habitat																		
Area of habitat	Yes	27.55	Adjusted hectares	Tralee West	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	134	Risk of loss (%) without offset	8%	Risk of loss (%) with offset	0%	11.28	95%	10.72	10.30	27.55	100.01%
									Future area without offset (adjusted hectares)	122.7	Future area with offset (adjusted hectares)	134.0						
					Time until ecological benefit	20	Start quality (scale of 0-10)	3	Future quality without offset (scale of 0-10)	3	Future quality with offset (scale of 0-10)	5	2.00	95%	1.90	1.83		

2.12 Total offset area and acquittal

The updated total offset areas and percentage acquittals are summarised in Table 12.

Table 12 Summary of the total offset area

Protected Matter	2021 Approved disturbance limit (ha)	Offset area Description	2016 component (ha)	2016 acquittal (%)	2021 component (ha)	2021 acquittal (%)	Total of offset areas (ha)	Weighted offset acquittal under OAG
Brigalow TEC	96.2	Remnant and regrowth vegetation communities comprising RE 11.4.9 and RE 11.3.1, as listed under EPBC Act conservation advice for Brigalow TEC	91.25	102.02%	90.7	112.88%	181.95	107.43%
Squatter Pigeon Primary Habitat	202.5	Vegetation comprising dry, open sclerophyll woodlands and scrub dominated by *Eucalyptus, Corymbia, Acacia* and *Callitris* species, providing suitable breeding and foraging habitat, including remnant and regrowth: RE 11.3.1, RE 11.4.9 and RE 11.4.9/11.5.2/11.5.3	258.47	103.00%	134.0	100.01%	392.47	101.98%

2.13 Vegetation Protection (VDec)

The offset areas will be protected by a Voluntary Declaration (VDec) under section 19E and 19F of the *Vegetation Management Act 1999* (VM Act). The VDec will be registered on property's title and be binding on current and future landholders until remnant status is achieved.

3 Conservation Management Strategy and Environmental Objectives

This section outlines management strategies and environmental objectives to protect and improve the condition of biodiversity values in the Offset Area. They focus on addressing the key threats to the biodiversity values, such as unauthorised activity, clearing, altered fire regimes, weeds, feral animals, and overgrazing.

Each strategy has been assigned:

- Key Performance Indicators
- Completion Criteria (noting Year 1 is 2022), and
- Trigger, Action, Response Plan (TARP), to identify corrective actions in the event of unexpected outcomes from implementing the BOMP, and to support adaptive implementation.

The ultimate responsibility for complying with this BOMP is the site General Manager. The General Manager is supported by staff whose roles include, but are not limited to, procurement, engagement and supervision of qualified consultants and contractors; report and data review; management implementation, report and program reviews and internal auditing.

Further, to ensure impact avoidance and mitigation, and compliance with BOMP, the approval holder will:

- adhere to the approved disturbance limits;
- ensure access to offset areas is limited and only as needed to implement environmental objectives;
- ensure that no other PM are impacted; and
- ensure Permit to Disturb (PTD) process is adhered to as part of avoidance and mitigation measures.

The BOMP is based on principles of adaptive management allowing for actions to be adapted to changing conditions and responses observed through monitoring. It is estimated that the objectives of offset areas will be achieved within 20 years; however, additional management will be considered at the end of management period should any of objectives not be met. Table 13 presents specific completion criteria and environmental objectives for each PM. Tables 14 to 27 present performance criteria and TARP for management strategies.

Table 13 PM Completion Criteria and Environmental Objectives, Management Objectives and Performance Targets

PM	Completion Criteria and Environmental Objectives	Management Objectives to improve condition	Performance Target Value
Brigalow TEC	Improve the ecological condition to achieve a site condition score of >51 and offset calculator (or future quality) score of >5.5 which rounds to 6 in calculator. Able to be mapped as remnant vegetation under the VM Act	Minimise degradation of by pest animals (pigs) Reduce the extent of Buffel Grass and other weed species to a relative abundance <25%. Control livestock grazing to allow ecological communities to regenerate and minimise soil compaction/ erosion and overgrazing. Use strategic grazing regimes and fire breaks to reduce the risk of a bushfire.	By 2033, relative abundance of Buffel Grass and other weed is <35% in at least 50% of the Brigalow TEC offsets. By 2033, an average future quality score of >4.5 (via a site condition score of 41) achieved across Brigalow offsets. By 2042, an average future quality score of >5.5 (via a site condition score of 51) achieved across Brigalow offsets

PM	Completion Criteria and Environmental Objectives	Management Objectives to improve condition	Performance Target Value
Squatter Pigeon Primary habitat (SPPH)	Improve the ecological condition to attain an offset calculator (or future quality) BioCondition score of > 5 Maintenance of a ground layer cover (native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs) at < 33% total projected ground cover species (DEE 2015)	Minimise degradation by pest animals (pigs, feral cats) Reduce the extent and abundance of *Buffel Grass and other weed species to a relative abundance of <25% in order to reduce competition with native, perennial tussock grasses and shrubs/forbs. Control livestock grazing to allow ecological communities to regenerate and minimise soil compaction and erosion. Strategic grazing regimes and controlled low intensity burns (excluding areas of Brigalow TEC) to reduce risk of high intensity bushfire causing further habitat degradation.	By 2038, BioCondition an average future quality score of 4.0 achieved across SPPH offsets By 2038, the projected cover of native perennial grasses is, with respect to the relevant regional ecosystem benchmark for groundcover: • >50% in Brigalow communities (REs 11.3.1, 11.4.9); and, • >10% in eucalypt communities (REs 11.3.2, 11.3.3, 11.5.2, 11.5.3). By 2042, an average future quality score of 5 across all SPPH offsets.

3.1 Controlled Activities

3.1.1 Prohibited Actions

The following activities will not be permitted within the Offset Area:

- littering or dumping foreign waste
- removal of firewood, native plants, animals, rocks, sand or gravel
- clearing or destruction of native vegetation, unless required to implement conservation strategies
- aerial application of pesticide from planes or helicopters
- continuous grazing
- keeping of European beehives and domestic cats and/or dogs

3.1.2 Exemption for Vegetation Clearing

Native vegetation cannot be cleared or disturbed within the Offset Area (based on Clause 20P VM Act) except for clearing to implement the conservation management strategies, being:

- infrastructure improvements
- control of weeds and vertebrate pests
- protect personal safety
- establish and/or maintain firebreaks, to manage fuel loads
- ground preparation or thinning to support revegetation activities.

To ensure compliance with all legal and environmental protection measures the Foxleigh Permit to Disturb (PTD) process (Appendix D) is used prior to any planned disturbance on site and triggers checks with the Sep-21 EPBC approval Attachment A (disturbance map) and/or if clearing activity is proposed within an approved offset area, the conditions of this BOMP.

3.1.3 Access

The Offset Area should have clear signage to ensure people are aware they are accessing a protected area. People accessing the area must be inducted on restrictions within and adjacent to this area before entry.

Vehicles can cause soil compaction, dispersal of weed seed and/or propagules, and vegetation disturbance. To minimise impact:

- vehicle access shall be restricted to authorised personnel only
- existing access tracks must be used
- vehicle speed will not exceed a maximum of 40kph.

3.1.4 Performance Criteria

Table 14 Access Performance criteria

Controlled Activities	Annual Criteria from Year 1 to Year 20	Completion Criteria
Prohibited actions	No reported incidents of prohibited actions undertaken by contractors, consultants, or other agents of Foxleigh	All actual or potential incidents or contraventions investigated and actions to prevent recurrence instigated.
Exemption of clearing vegetation	Exempt vegetation clearing undertaken with a PTD and doesn't exceed allowable limits.	PTDs on file for all exempt vegetation clearing.
Access	Fencing and signage regularly maintained.	Signage and fencing evident.
Monitoring	Biannual Management Monitoring completed.	Monitoring inspection reports available

3.1.5 Access TARP

Table 15 Access TARP

Trigger	Response and Action
Damage to conservation values through un/controlled activities	Report incident to relevant authority as soon as reasonably practicable. Include incident details in the Annual Report

3.2 Grazing Management

Strategic grazing may be used as a management tool to promote regeneration, control specific exotic pasture grasses, and reduce excessive fire fuel loads. Strategic grazing is preferred because the short duration and intensive regimes that prevent or minimise selective grazing, whilst maximising targeted grazing of problematic species (e.g., Buffel Grass) and thereby ensure that overall gains in biodiversity can be achieved.

- Grazing periods should not exceed four weeks.
- No grazing will occur during the wet season, being the period of greatest growth and likely higher soil moisture content that would result in 'plugging' and compaction.
- Periods of grazing will be followed by spelling for at least 3-4 months to allow for grass to seed and to facilitate recovery of perennial grasses and the herbaceous layer.

During periods where grazing is occurring within offset areas, visual monitoring will be increased to monitor the general health and stability of the offset area. If evidence of stress or slow recovery is observed (eg. death of trees/shrubs, large areas of poor vegetation recovery), options for either cessation of grazing or

assessment by a suitably qualified ecologist will be undertaken to determine management options.

3.2.1 Performance Criteria

Table 16 Grazing Performance Criteria

Strategic Grazing	Annual Criteria from Year 1 to Year 20	Completion Criteria
Unauthorised stock grazing	Boundary fences maintained; monitoringof uncontrolled cattle presence in offset areas	All actual contraventions investigated, resolved and documented.
Monitoring	Biannual Management Monitoring completed.	Monitoring inspection reports available

3.2.2 Grazing TARP

Table 17 Grazing TARP

Trigger	Response and Action
Fence damaged and not excluding stock from neighbouring property	Repair fence and continue Monitoring Inspections. Return stock to owner and discuss the importance of maintaining stock exclusion and options to improve the efficacy of exclusion.
Monitoring event recommend strategic grazing to reduce weed competition, fire risk and/or encourage regeneration of native plants.	Suitably qualified and experienced person in ecological land management to prepare grazing plan, to implement strategic grazing to control weeds, manage fire hazard and/or encourage regeneration. Record and report all strategic grazing activities andoutcomes.

3.3 Weed Control

Control of weed species is needed to restore natural composition, diversity and structure of vegetation communities across the Offset Area. Weeds are typically non-indigenous plants which invade after significant disturbance, such as land clearing or over grazing. They exclude native species, leading to a change in the composition and structure of plant communities and degrade the condition and functionality of the ecosystems. Weed control activities will focus on species that exclude or have the potential to exclude native species, disrupt recruitment of native species or impede ecological processes.

3.3.1 Control Methods and Target Weed Species

All chemical weed control should be in accordance with the registered label or current minor use permit, Safety Data Sheet (SDS) and appropriate safety standards.

Priority will be given to prohibited and restricted weed species listed under the *Biosecurity Act 2014*, particularly weeds of national significance (WoNS). In addition, pastoral grasses and herbaceous weeds, which pose the greatest risk to native species richness and recruitment, may be controlled through stock exclusion, dry season pulse grazing and/or cool ecological burns.

Weeds identified as part of the surveys include but not limited to:

- Rubber Vine (*Cryptostegia grandiflora*)
- Harrisia Cactus (*Harrisia martinii*)
- Green Panic (*Megathyrsus maximus* var. *pubiglumis)*

- Velvety Tree Pear (*Opuntia tomentosa)*
- Westwood Pear (*Opuntia streptacantha*)
- Common Prickly Pear (*Optunia Inermis*)
- Athel Pine (*Tamarix aphylla*)
- Prickly Acacia (*Vachellia farnesiana*).

Table 18 Weed Control Methods

Control Method	Potential use in control regime
Chemical Control	Spot application of herbicide is the preferred method of application; however, boom spray application may be used. Reporting: Records should be kept on the herbicide application.
Land Management	Weed hygiene: All machinery working in an offset area should be cleanedand washed down to reduce the spread of weed seed. Weed Identification: Any new infestation of weeds within the Offset Areamay be recorded and monitored during subsequent inspections
Grazing management	Grazing can be used to control specific exotic pastoral grasses ifproblematic. A grazing plan should be prepared prior to grazing.
Slashing to prevent seed production	Access tracks and/or firebreaks heavily infested with exotic grasses can be treated with slashing equipment mounted on a tractor prior to flowering to minimise vehicle spread, fuel load and encroachment into the Offset Area.

3.3.2 Performance Criteria

Table 19 Weed Performance Criteria

Parameter	Year 1 to Year 20	Completion Criteria
Weed control program	At least one weed control event per year. All actions recorded.	Weed control program completed each year. Ecological condition monitoring data has an increase in % of native ground cover grasses and shrubs over 3 consecutive assessments.
Monitoring	Complete Ecological and Management monitoring.	Ecological/ management monitoring conducted as per BOMP and triggers and response identified.

3.3.3 Weed TARP

Table 20 Weed TARP

Trigger	Response and Action
Ecological Monitoring indicate low native plant recruitment and regeneration and/or no trajectory to benchmark values and increase in exotic plant cover.	Increase the frequency of weed control events. Suitably qualified and experienced person to review weed control action.
New noxious weed is identified within the Offset Area.	Targeted weed control and focus on containment. Implement new hygiene controls.

3.4 Fire Management

Fire management should provide optimum fire frequencies for the maintenance of biodiversity, with specific reference to the vegetation and existing land use regime. It will target reducing the risk of uncontrolled

wildfire to as low as reasonably practical, without causing undue impact to environmental values. Where appropriate firebreaks should be installed and managed around offset areas.

When prescribed burns are undertaken it will be supported by a specific management plan from a suitably qualified person. Prescribed burns will establish a mosaic of burnt and unburnt areas by burning in a patchy fashion, which will provide for safer fire suppression efforts and improve the chances of success during suppression of uncontrolled wildfire.

Varying the seasonal timing of prescribed burning provides an opportunity for species that seed at different seasons, or have varied seasonal vulnerabilities, to co-exist whilst still achieving fuel hazard management objectives. Variability may also be required to meet the biological requirements of some plant communities, noting that some species require high intensity fires to break seed dormancy. While best endeavours will be taken to achieve this objective, it should be noted that the logistics and resources required for fire management activities will dictate the timing.

Table 21 General Fire Management Regimes for Specific Regional Ecosystems

Vegetation community	Prescribed burn season, intensity/interval if required	Prescribed burn strategy
Dry Sclerophyll forest with grassy understorey (REs 11.3.2, 11.5.2, and 11.5.3).	Early winter, Low fire intensity, burn every 6-10 years.	Burn <30% of area in one event. Plan for mosaic burn pattern. Ensure soil moisture is sufficient.
Riparian forest (RE 11.3.25a)	Do not burn.	Manage surrounding areas to limit extent /intensity of bushfire.
Brigalow woodland (REs 11.3.1, 11.4.9 +/-11.4.8	Do not burn.	Manage surrounding areas to limit extent /intensity of bushfire.
Freshwater wetlands (RE 11.3.27f).	Late summer to winter, Low fire intensity, burn every 15–30 years. Burn only when substrate is wet.	Burn between 30 – 60 % of area in one event. Plan for mosaic burn pattern. Ensure soil moisture is sufficient.

3.4.1 Performance Criteria

Table 22 Fire management Performance Criteria

Parameter	Year 1 to Year 20	Completion Criteria
Burns	Documented strategy and outcomes.	Fires comply with vegetation community burn strategy.
Monitoring	Complete Ecological and Management monitoring.	All monitoring events in the Monitoring Program, including outcomes, documented.

3.4.3 Fire Management TARP

Table 23 Fire management TARP

Trigger	Response and Action
Offset Area impacted by bushfire	Map fire damaged area. Reinstate infrastructure and monitor postfire as part of Management Monitoring Inspections to evaluate regenerative capacity and regeneration. Review fire management activities, e.g., placement of firebreaks.
Post fire monitoring indicate reduction in native plant cover and increase inexotic cover	Evaluate active regeneration, increase in weed control andimplement supplementary planting if appropriate.

3.5 Infrastructure Improvement

Construction of new or maintenance of existing infrastructure (such as access tracks/fire breaks, fences) will be required to maintain safe access to complete weed and feral animal control, fire management, and monitoring activities.

During the construction or maintenance of infrastructure the following guidelines apply:

- Vegetation clearing is only permissible for activities that are required to achieve the objectives of the BOMP, with vegetation clearing limited to:
  - maintenance of access tracks and/or fire breaks (up to 5m width)
  - fence construction and maintenance (up to 5m width on each side of the fence)
  - fallen timber and any other obstructions can be removed to maintain access
  - standing timber that poses an unacceptable safety risk can be felled
- New fencing should ideally be 1.4 m high, 4-strand barbed-wire fence, with plain wire as the top strand and the bottom wire set 350 mm from the ground to allow easy access by native wildlife.
- all works will be undertaken in a manner that minimises disturbance to soil and hydrological characteristics, and avoids erosion
- old fences should be removed, and unwanted tracks closed within the Offset Area
- site disturbance will be required to facilitate certain revegetation activities, such as soil cultivation and slashing.

3.5.1 Performance criteria

Table 24 Infrastructure Performance Criteria

Parameter	Annual Criteria from Year 1 to Year 10
Infrastructure improvements	Completed PTD for ground disturbance purposes
Monitoring	Complete Biannual Management monitoring

3.5.3 Infrastructure TARP

Table 25 Infrastructure management TARP

Trigger	Response and Action
Unauthorised clearing of vegetation	Report and review incident. If Offset Area habitat has been cleared, DAWE must be notified as part of annual compliance reporting.
Fencing continually damaged by flood waters.	Increase effort on infrastructure construction and maintenance.

3.6 Pest Animal Control

Pigs and feral cats are the main pest vertebrate species found in the Offset Area that have the potential to damage or destroy native flora and fauna. Regular surveillance of the Offset Area for damage caused by pest animals generally occurs through inspections.

Pest animal control activities will be conducted in accordance with the *Biosecurity Act 2014*.

To control feral pigs a targeted baiting program should be implemented annually in early to late spring when seasonal conditions will usually lead to a significant contraction of available surface water and living herbs and grasses to Gilgai within Brigalow areas, riparian corridors and wetlands.

3.6.1 Performance Criteria

Table 26 Pest Animal Performance Criteria

Parameter	Year 1 to Year 20	Completion Criteria
Vertebrate pest local control	One control event per year for observed species, and any other species recordedfrom monitoring activities. All actions recorded.	Inspections demonstrate a positive trajectory for all attributes recorded
Monitoring	Biannual Management monitoring completed.	All monitoring events in the Monitoring Program, including outcomes, documented.

3.6.2 Pest Animal TARP

Table 27 Pest animal TARP

Trigger	Response and Action
Ecological Monitoring results indicate no positive trajectory and evidence of vertebrate pests observed during Management Monitoring Inspections.	Increase the frequency and duration of control events. Suitably qualified and experienced person to review control actions.

4 Monitoring Program

Monitoring will occur to assess changes in vegetation and habitats of the Offset Area at two different scales:

- Ecological monitoring: to assess habitat regeneration and utilisation by quantifying changes in vegetation condition, structure, key fauna habitat features and bird assemblages in the short to medium-term.
- Management monitoring: involving regular inspections to identify emerging threats, potential contraventions, and action plan triggers, in the short-term, including new or increased weed infestations, increased abundance and damage caused by pest animals, increased fire fuel levels and effectiveness of fire management actions, condition of infrastructure or need for new infrastructure.

4.1 Monitoring Objectives

The overall objectives of this monitoring program are to detect whether the conservation objectives of the BOMP are being achieved, and that the BOMP is being effectively implemented.

The variables to be monitored are therefore comprised of:

- key performance, completion criteria and management triggers
- scenarios that represent risk to attainment of the conservation objectives, as assessed in Table 31.

The monitoring schedule is provided in Table 28, with ecological monitoring to be undertaken every 5 years.

Table 28 Monitoring Program Schedule

Monitoring	2022	2023	2024	2025	2026	2027	2028
Ecological Monitoring							
Vegetation		Mar-Apr					Mar-Apr
Fauna		Sep-Nov					Sep-Nov
Management Monitoring							
Inspections	Biannual						

4.2 Ecological Monitoring

These surveys initially documented the baseline condition, against subsequent years of monitoring data.

The ecological surveys generally test predictions about the expected change in vegetation/habitat condition resulting from implementation of the proposed conservation management strategies and investigate the presence and habitat usage of fauna. These surveys are designed to be repeatable and allow statistical analysis of the data according to testable predictions (hypotheses). Additional data may be collected to assist in interpreting ecological changes including incidental observations and photo reference points.

4.2.1 Vegetation Condition

Ecological condition assessments should be conducted in compliance with the current bio-condition manual (*BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland.* Assessment Manual. Version 2.2 (Eyre et al. 2015)), which is specifically referenced in the Habitat Quality Guide.

Using this method for each monitoring event will ensure consistency of data collection. This method was used to establish baseline conditions for the 2016 (although referred to as the EEM at the time of survey)

and 2021 surveys and therefore allows meaningful comparison of data over the life of the offsets, and to determine when required habitat quality scores are attained. Brigalow will also be monitored against the condition thresholds and diagnostic criteria to determine when/if it meets the requirements to be considered the TEC (DoE 2013).

9 Assessment Units (AUs) have been identified to cover the offset areas. Monitoring locations (Habitat Quality Plots, HQPs) have been identified for 8 AUs through the 2016 BOMP and 2021 baseline survey for new offset areas. These are shown in Figure 7 and tabulated in Table 29, with coordinates in Appendix B. It was noted in the 2021 wet season survey that AU11 in the SPPH only areas did not have any HQPs, and it is recommended that a further2 HQPs be developed as part of the next survey to ensure representation of the broader patch.

Tertiary and Quaternary sites are supplementary assessment sites that comply with the *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland, Version 5.1* (Neldner et al, 2020). These sites provide greater insight to the consistency or potential variation of vegetation within a mapped polygon and are much less detailed than the HQP sites.

Median vegetation height data will be measured using a laser rangefinder (hypsometer) and the diameter of trees is to be measured (nominally 1.3 m above ground) with a diameter at breast height (DBH) tape. The coordinates of the start and end of each habitat quality plot centreline will be recorded using a GPS.

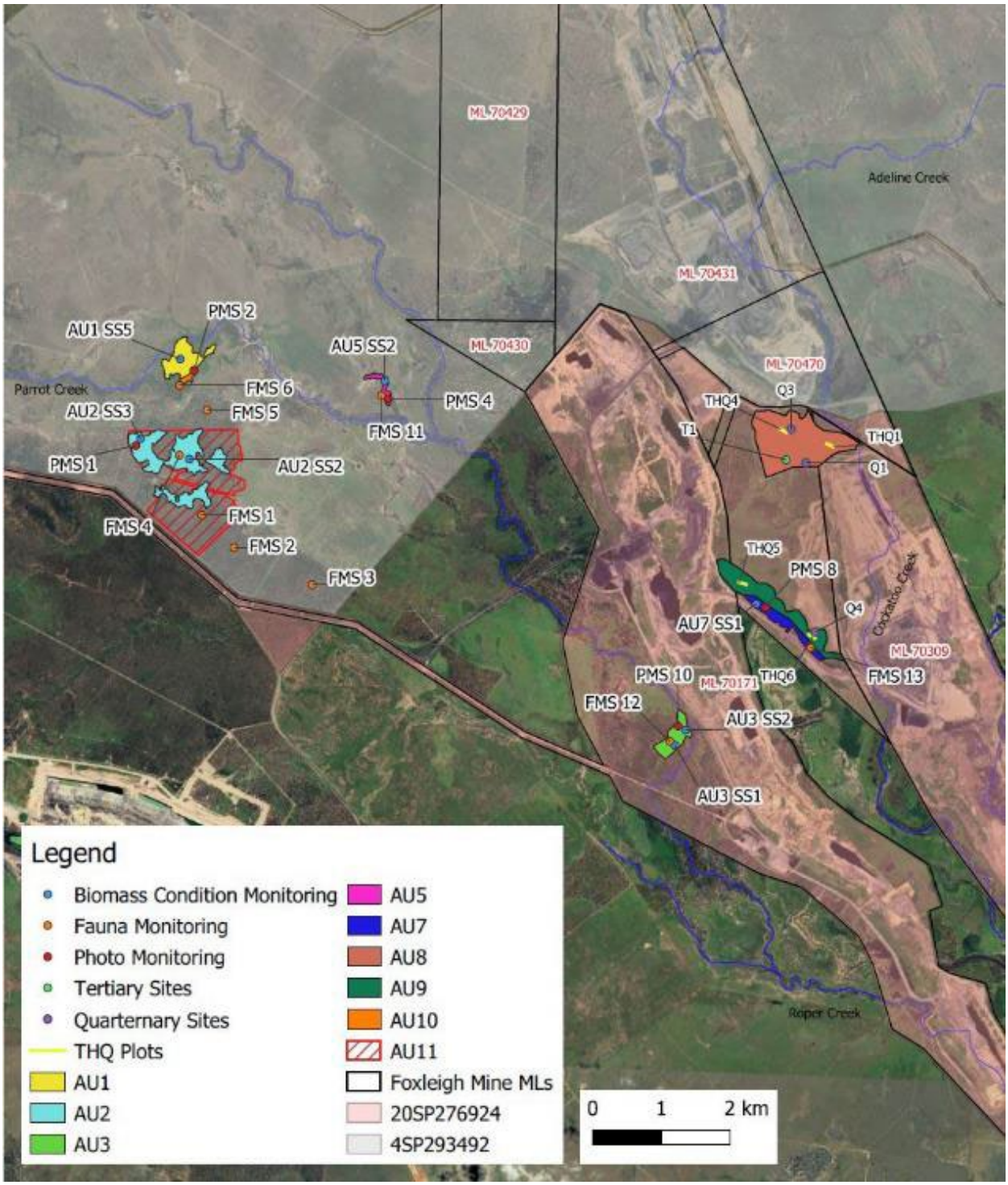
Photos should be taken and prepared in reports to provide the long-term reference for change at each HQP, therefore, it is important that a series of photos can be used for comparison. The following photography protocol must be followed and relates specifically to photo-monitoring of HQPs:

- Consistent with the *Guide to determining terrestrial habitat quality - methods for assessing habitatquality under the Queensland Environmental Offsets Policy, Version 1.3* (DES 2020) photo- monitoring points will be established at start and end points of each HQP, looking into the plot andalong the centreline. At the centre point of each HQP (i.e. 50m mark of the centreline), four photos are to be taken in the directions of north (0°), east (90°), south (180°) and west (270°), as well asphotos of the groundcover and soil, intersected by the central transect tape.
- Photos are to be taken in the directions of north (0°), east (90°), south (180°) and west (270°), as well asphotos of the groundcover and soil, intersected by the central transect tape.
- Photos must be captured from the same physical markers of GPS coordinates within each HQP at each monitoring event. The previous monitoring photos must be reviewed prior to capturing the next series of photos with the aim of replicating the same view.
- Biennial weed assessments will be undertaken, which will include:
    - Development of a weed species list for the Offset Area
    - Assessment of the distribution of large infestations and hotspots, with a particular focus on species listed under the *Biosecurity Act 2014* and/or WoNS
    - Recommendations regarding priorities for management.

Table 29 Number of habitat quality assessment sites measured per Assessment Unit

Assessment Unit	Regional Ecosystem	Area (ha)	Number of habitat quality sites as per Figure 7	Relevant Prescribed matter
AU1	11.3.1 HVR	24.172	1	Brigalow TEC/SPPH
AU2	11.4.8	62.469	4	Brigalow TEC
AU3	11.3.3	16.076	4	SPPH
AU5	11.3.1	4.616	3	Brigalow TEC/SPPH
AU7	11.3.2	15.071	3	SPPH
AU8	11.3.1	91.74	5	Brigalow TEC/SPPH
AU9	11.3.2	43.277	2	SPPH
AU10	11.3.1	2.1	2	SPPH
AU11	11.4.9R	198	1	SPPH
Total		**272.27**	**25**	

Figure 7 BioCondition Assessment Units and Monitoring Locations (HQPs)



4.3 Fauna

Patterns in the distribution and abundance of bird and reptile assemblages can be indicative of biodiversity as a whole and of environmental change. The objectives of the monitoring are to demonstrate ongoing habitat usage by Squatter Pigeon and other fauna sightings.

Representative fauna surveys should be undertaken by a suitably qualified ecologist and will involve two trap sites, four supplementary sites and Squatter Pigeon drive and/or foot traverse transects. Survey techniques to be employed at each of the sites includes:

- Trap sites – should be set for four consecutive nights and will consist of:
    - Pitfall traps: a trap line consisting of four 20 litre buckets and 30m of drift fence. Buckets are to be placed at 5m intervals and recessed into the ground so that the opening is level with the ground surface. The drift fence is to be positioned so that it runs over the centre of each bucket forming a barrier that guides fauna into the buckets.
    - Funnel traps: six positioned in pairs, one either side of the pitfall trap line drift fence, at either end of the drift fence and roughly in the centre of the drift fence.
    - Bird surveys: recording all birds seen and heard while checking traps at each of the two trap sites, and within a 50m radius of the trap site
    - Active searching: undertaken during optimal conditions for the detection of reptiles, frogs and small ground-dwelling mammals and will involve actively searching suitable microhabitat such as logs, bark, deep leaf litter, surface rocks and shedding bark
    - Spotlighting: on foot and from a slow-moving vehicle to locate fauna from eye shine.
    - Supplementary sites – involving a combination of bird survey, diurnal active searching and spotlighting as described for trap sites.
- Squatter Pigeon active search effort - whereby two observers will traverse the site via vehicle (less than 20 kph) paying particular attention to areas adjacent to permanent water points. Foot traverses will also be used to opportunistically assess for presence of any specimens of Squatter Pigeon.
- Opportunistic observations - also made during the monitoring period, while undertaking other activities, such as moving between sites throughout the Offset Area.

Survey locations must be kept consistent. The date and time of the survey will also be kept consistent for all monitoring events as far as is practical.

4.4 Management Inspections

Biannual management inspections at a minimum are to be undertaken in the Offset Area to ensure that there is regular systematic monitoring and early detection of conservation management triggers, potential threats or potential or actual incident. Biannual inspections to assess the following:

- physical condition of fencing and gates
- disturbance factors including fire and unauthorised access
- condition of erosion
- presence/activity of feral pest species
- new or increased infestations of exotic weed species

Inspection results should be recorded, which outlines outcomes and recommendations for action against the performance criteria for each conservation management strategy outlined in Section 3**.**

5 Risk Assessment

The risk assessment is undertaken in accordance with the following risk framework, having regard for the likelihood and consequence definitions used below. Table 31 details the identified risks to offset areas. Where the OMP needs to be revised, or an alternative offset may be required (marked in Table 31 by *), DAWE must be notified. Any revised BOMP must be submitted for approval by the Commonwealth Minister for the Environment.

Table 30 Risk and Contingency Assessment Matrix

		Consequence				
Likelihood		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate	Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High	Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major	The plan objectives are unable to be achieved: significant legislative, technical, ecological and/or administrative barriers to attainment with no evidenced mitigation strategies.
Critical	The plan objectives are unable to be achieved: may include widespread and severe environmental harm, with no evidenced mitigation strategies.

Table 31 Identified Risks

Objective	Scenario	Likelihood	Consequence	Risk level	Trigger	Corrective Action
To protect the conservation valueswithin the Offset Area.	Illegal access causing significant residual impact.	Unlikely	Moderate	Low	Failure in access control reported in the Annual Report.	Review access control and improve security measures.
	Uncontrolled bushfire impact on Offset Area.	Possible	High	Medium	Bushfire on extreme or catastrophic fire danger dayimpacts Offset Area.	Complete post fire survey, mapfire damaged areas, and revise the BOMP.*
To enhance the condition of biodiversity values of the Offset Area within 20 years.	No enhancement of condition in biodiversity values measured by the Ecological Monitoring by 2032.	Possible	Moderate	Medium	Review of Annual Reports andMonitoring data.	Assess influence on success from factors such as extreme climatic conditions/ bushfires. Consider new Conservation Management Strategies andrevise BOMP* Consider relocation of Offset.*
	No increase in extent of remnant RE from the regeneration of non-remnant REs as measured by the Ecological Condition Monitoring	Possible	Moderate	Medium		
	Brigalow TEC (RE 11.4.9 and RE 11.3.1) <20% of the dominant canopy species present as regeneration by 2032.	Possible	Moderate	Medium	2028 Survey report	Active regeneration (direct seeding/tube stock, thinning) assessed and implemented if considered viable. Consider relocation of Offset.*
To enhance and maintain the habitatvalues of Offset Areas within 20 years	Observed decrease in species richness and usage of the Offset Area as measured by the Fauna Monitoring	Possible	Moderate	Medium	Review of Annual Reports andMonitoring data.	Assess influence on success from other factors such as extreme climatic conditions, orbushfires. Consider new Conservation Management Strategies andrevise BOMP* Consider relocation of Offset*

6 Management Commitments and Reporting

6.1 Commitments

Table 32 is a summary of management commitments and timing.

Table 32 Identified Risks

Management Area	Sub-area	Frequency	Management Action	Evidence/Reporting*	BOMP
Controlled Activities	**Prohibited actions**	Annual	All incidents investigated and documented	Annual Compliance Report	3.1
	Exemption of clearing vegetation	Event driven	Any exempt vegetation clearing undertaken with a PTD, and in compliance with EPBC approval and this BOMP and doesn't exceed allowable limits.	PTDs on file for all exempt vegetation clearing.	3.1
	Access	6 monthly	Fencing and signage regularly maintained.	Documented inspection	3.1
Strategic Grazing	**Unauthorised stock grazing**	Event driven	All actual contraventions investigated, resolved and documented.	Documented investigation	3.2
Weed Control	**Weed control program**	Annual	At least one weed management cycle	Documented weed management	3.3
		Biennial	Inspection by appropriately qualified person	Documented report	
Fire Management	**Cold Burns in SPPH offset areas**	Event driven	Fires comply with vegetation community burn strategy	Documented evidence	3.4
Pest Management	**Vertebrate pest local control**	Annual	At least one pest management cycle	Documented evidence	3.6
Ecological Monitoring	**Vegetation**	2023, 2028, 2033, 2038, 2042	Mar-Apr seasonality - ecological survey	Ecological report	4
	Fauna	2023, 2028, 2033, 2038, 2042	Sep-Nov seasonality - ecological survey		

* All evidence/reporting for BOMP implementation is provided in the annual compliance report, as required.

6.2 Reporting and Documentation Standards

Two types of reporting are required under the Sep-21 EPBC approval:

- An annual compliance report must be submitted as per condition 15.
- Condition 15A and 15B provide timelines and requirements in relation to reporting of non-compliances.
- All reporting records defined in Table 32, and documentation required for implementation of this BOMP (including to track progress towards meeting completion criteria), will be retained for the duration of the approval.

7 Review

This plan will be reviewed in 2028 and then every **5 years** following the Ecological Monitoring report andupdated with lessons from the prior management period. Where this BOMP requires substantial revision, it will be submitted to the Commonwealth Minister for the Environment for approval.

Appendix A: 2021 Field survey baseline report

FOXLEIGH MINE – SUPPLEMENTARY ASSESSMENT FOR MNES OFFSET MANAGEMENT PLAN (POLYGONS 29 AND 30)

Engeny (on behalf of Foxleigh Management Pty Ltd)

January 2022

Disclaimer

Document History and Status

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Symbols and Abbreviations

*	(Preceding a plant species name) plant species not native to Australia
±	With or without, more or less
Biosecurity Act	(Queensland) *Biosecurity Act 2014*
BoM	Bureau of Meteorology
BPA	Biodiversity Planning Assessment
DAWE	(Commonwealth) Department of Agriculture, Water and the Environment
DES	(Queensland) Department of Environment and Science
EDL	Ecologically Dominant Layer
EPBC Act	(Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999*
GPS	Global positioning system
HVR	high value regrowth
ha	Hectares
km	Kilometres
MNES	Matters of national environmental significance (EPBC Act), now referred to as Protected Matters
NC Act	(Queensland) *Nature Conservation Act 1992*
PM	Protected Matters (EPBC Act)
RE	Regional Ecosystem as defined under the Queensland Vegetation Management Regulation 2000
REDD	Regional Ecosystem Description Database
SPPH	Squatter Pigeon Primary Habitat
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community
VM Act	(Queensland) *Vegetation Management Act 1999*
WoNS	Weeds of National Significance

Glossary

Term	Definition
Biodiversity Status	This is a DES classification dependent on condition of remnant vegetation *in addition* to the criteria used to determine class under the Queensland *Vegetation Management Act 1999*. This classification is used for a range of planning and management applications, i.e. to determine environmentally sensitive areas. A regional ecosystem is listed as 'endangered' if: ▪ Less than 10% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss; or ▪ 10-30% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 ha; or ▪ It is a rare regional ecosystem subject to a threatening process. A regional ecosystem is listed as 'of concern' if: ▪ 10-30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss. A regional ecosystem is listed as 'no concern at present' if: ▪ The degradation criteria listed above for 'endangered' or 'of concern' regional ecosystems are not met.
Bioregion	A geographically distinct biological region, which is a reporting unit for assessing the status of native ecosystems and their level of protection. Australia is divided into 89 bioregions. Bioregions form part of the regional ecosystem classification code system. The project site and potential offset areas are located in the Isaac-Comet Downs sub-region of the Brigalow Belt North Bioregion.
Endangered	Prescribed to a threatened ecological community, regional ecosystem or species under the Queensland *Vegetation Management Act 1999*, *Nature Conservation Act 1992* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
EPBC Act conservation status	The *Environment Protection and Biodiversity Conservation Act 1999* lists species and communities: Extinct in the wild: ▪ It is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or ▪ It has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a timeframe appropriate to its life cycle and form. Critically Endangered: ▪ It is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria. Endangered: ▪ It is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. Vulnerable: ▪ It is not critically endangered or endangered; and ▪ It is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria. Migratory: ▪ Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II); ▪ Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the Chine-Australia Migratory Bird Agreement (CAMBA);

Term	Definition
	▪ Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
Least Concern	Prescribed to regional ecosystems listed under the Queensland *Vegetation Management Act 1999*.
NC Act conservation status	Under the *Nature Conservation Act 1992*, native wildlife may be prescribed as: Extinct in the wild: ▪ There have been thorough searches conducted for the wildlife; and ▪ The wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife. Endangered: ▪ There have not been thorough searches conducted for the wildlife and the wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife; or ▪ The habitat or distribution of the wildlife has been reduced to an extent that the wildlife may be in danger of extinction; or ▪ The population size of the wildlife has declined, or is likely to decline, to an extent that the wildlife may be in danger of extinction; or ▪ The survival of the wildlife in the wild is unlikely if a threatening process continues. Vulnerable: ▪ The population size or distribution of the wildlife has declined, or is likely to decline, to an extent that the wildlife may become endangered because of a threatened process; or ▪ The population size of the wildlife has been seriously depleted and the protection of the wildlife is not secured; or ▪ The population of the wildlife is low or localised and dependent on habitat that has been, or is likely to be, adversely affected, in terms of quantity or quality, by a threatening process. Near Threatened: ▪ The population size or distribution of the wildlife is small and may become smaller; or ▪ The population size of the wildlife has declined, or is likely to decline, at a rate higher than the usual rate for population changes for the wildlife; or ▪ The survival of the wildlife in the wild is affected to an extent that the wildlife is in danger of becoming vulnerable. Least Concern: ▪ The Wildlife is common or abundant and is likely to survive in the wild.
Near Threatened	Prescribed to species listed under the Queensland *Nature Conservation Act 1992*.
Of Concern	Prescribed to regional ecosystems listed under the Queensland *Vegetation Management Act 1999*.
Regional ecosystem	A vegetation community within a bioregion that is consistently associated with a particular combination of geology, landform and soils.
Remnant vegetation	Defined under the Queensland *Vegetation Management Act 1999* as, woody vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.
Restricted invasive species	Plants and animals listed under the Queensland *Biosecurity Act 2014*.

Term	Definition
Significant species and vegetation	Refers to: ▪ Species listed as endangered, vulnerable or near threatened under the Queensland Nature Conservation (Wildlife) Regulation 2006 or critically endangered, endangered or vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* ▪ Threatened ecological community listed as critically endangered, endangered or vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* ▪ Regional ecosystems with an endangered or of concern biodiversity status or *Vegetation Management Act 1999* status.
Threatened ecological community	A community listed under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
Vegetation management Act status	This is a statutory classification under the Queensland *Vegetation Management Act 1999*. A regional ecosystem is listed as 'endangered' if: ▪ Remnant vegetation for the regional ecosystem is less than 10 % of its pre-clearing extent across the bioregion; or 10-30 % of its pre-clearing extent remains and the remnant vegetation for the regional ecosystem is less than 10,000 ha. A regional ecosystem is listed as 'of concern' if: ▪ Remnant vegetation for the regional ecosystem is 10-30 % of its pre-clearing extent across the bioregion; or more than 30 % of its pre-clearing extent remains and the remnant vegetation extent for the regional ecosystem is less than 10,000 ha. A regional ecosystem is listed 'least concern' if: ▪ Remnant vegetation for the regional ecosystem is over 30 % of its pre-clearing extent across the bioregion, and the remnant vegetation area for the regional ecosystem is greater than 10,000 ha.
Vulnerable	Prescribed to a threatened ecological community or species under the Queensland *Nature Conservation Act 1992* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

1 Introduction

1.1 Project background

Foxleigh Management Pty Ltd is the operator of the Foxleigh Joint Venture at the Foxleigh Mine. Foxleigh Coal Pty Ltd (70% JV) holds an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act, Reference Number 2010/5421) to disturb protected matters (PM), previously known as Matters of National Environmental Significance (MNES), which include:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community (Brigalow TEC)
- Squatter Pigeon (*Geophaps scripta scripta*, southern subspecies) primary habitat (SPPH).

Hansen Botanical Assessments Pty Ltd (HBA) was engaged to assist Engeny Pty Ltd in facilitating a review and revision of the Foxleigh Biodiversity Offsets Management Plan (BOMP). The BOMP was developed to mitigate impacts of an expansion of the Foxleigh Coal Mine to the aforementioned protected matters.

1.2 Scope of works

Two patches of vegetation, hereafter referred to as potential offset areas, were assessed as part of the current survey. These patches are located within Lot 20 on SP276924 (Figure 1). It should be noted that additional areas were assessed during this survey period in order to provide selection options for, and the context of, available offsets in the vicinity of the impact area.

This report assesses the terrestrial ecological values of each potential offset area and:

- summarises the results of the terrestrial flora and fauna surveys
- provides ground-truthed regional ecosystem (RE) mapping developed in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al. 2020), which was current at the time of the field survey
- assesses the likelihood of occurrence of PM, including species and communities protected under the Commonwealth EPBC Act, to occur within each potential offset area
- provides mapping of any threatened species listed under the EPBC Act and/or *Nature Conservation Act 1992* (NC Act) that were recorded within or in close proximity to each potential offset area during the field survey
- provides ecological condition and site context scores for Brigalow TEC and habitat quality scores for Squatter Pigeon primary habitat in accordance with the Queensland Department of Environment and Science (DES) '*Guide to determining terrestrial habitat quality, version 1.3'* (DES 2020), which was current at the time of the field survey.

1.3 Regional context

Foxleigh Mine is primarily located on the broad Cainozoic sand plains, Cainozoic clay plains and alluvial floodplains associated with Roper, Cockatoo, Parrot, Douglas and Carlo creeks approximately 15 km south-east of Middlemount in Central Queensland (Figure 1). Foxleigh Mine and the potential offset areas are located within the Isaac-Comet Downs sub-region of the Brigalow Belt North bioregion. This sub-region is located within the Fitzroy Drainage Basin. The region experiences sub-tropical conditions with average temperatures ranges recorded in Middlemount of between 22.4°C and 34.1°C in the summer months, and 8.5°C and 23.4°C in the winter months (BoM 2021). The region receives an annual average rainfall of approximately 633.2 mm with a pronounced wet season. Approximately 76% of the annual rainfall is typically recorded between October and March, inclusive (BoM 2021).

The Foxleigh Mine lease areas are surrounded by rural lands, which are primarily used for cattle grazing, and limited dryland and/or irrigated cultivation. Across the landscape, intact, native vegetation is typically associated with drainage corridors and associated floodplains.

1.4 Regulatory framework

The key pieces of legislation relevant to this ecological assessment are detailed below.

1.4.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Commonwealth Government's principal piece of environmental legislation and is administered by the DAWE. It is designed to protect MNES, which include threatened species of flora and fauna, TECs, migratory species as well as other protected matters. Among other things, it defines the categories of threat for threatened flora and fauna, identifies key threatening processes to their survival and provides for the preparation of recovery plans for threatened flora and fauna.

Approval is required under the EPBC Act for any action (which includes a development, project or activity) that is likely to have a significant impact on MNES (including nationally threatened ecological communities and species, and listed migratory species).

1.4.2 Commonwealth Environmental Offsets Policy

Under the EPBC Act Environmental Offsets Policy 2012 (EPBC Act Environmental Offsets Policy) (SEWPaC 2012), environmental offsets are actions taken to counterbalance significant residual impacts on MNES. Offsets are used as a last resort in instances where an action will give rise to significant residual impacts, even after the application of management measures.

The EPBC Act Environmental Offsets Policy specifies that an offset package must be built around direct offsets (i.e. land-based), which should form a minimum of 90% of the total offset requirement. Foxleigh Mine is using 100% direct offsets.

Direct Offsets are those that result in a measurable conservation gain by:

- improving the condition and function of existing habitat for the protected matter
- creating new habitat for the protected matter
- reducing threats to the protected matter
- increasing the values of a heritage place
- averting the loss of a protected matter or its habitat that is under threat (the risk of loss is avoided as a result of securing an offset for conservation purposes or undertaking management to remove or reduce threats)
- being located strategically to enhance connectivity to existing areas of threatened ecological communities or species habitat.

2 Methods

The methodology used in this assessment culminated in ground-truthed vegetation mapping and habitat mapping for the Squatter Pigeon and/or Brigalow TEC.

2.1 Database searches and Government mapping

Database searches were undertaken for the study area to identify government mapping (e.g. vegetation communities, wetlands etc.) and records or potential occurrences of threatened and/or migratory species. Database searches were undertaken using a polygon that encompassed Foxleigh Mine and achieved a minimum 25 km radius from the boundary of the mine complex (the search area). The search area is representative of the broader region.

The following desktop searches were undertaken:

- EPBC Act Protected Matters Search Tool, accessed 10 September 2021 (DAWE 2021a)
- Queensland Wildlife Online database, accessed 10 September 2021 (DES 2021a)
- Vegetation management regional ecosystem map Version 12.0 (DR 2021a) and Vegetation management essential habitat map Version 10.0, at 1:100 000 scale (DR 2021b) (Figure 2)
- Protected Plants Flora Survey Trigger Map, Version 7.1, accessed 10 September (DES 2021b)
- Detailed surface geology - Queensland - version 6.13. accessed 10 September (DR 2018).

2.2 Review of aerial photography

Digital Globe aerial photography was viewed in relation to relevant biodiversity spatial layers. Aerial photography was used to identify features for ground-truthing during the field survey, to identify appropriate survey site locations and for determining and characterising potential terrestrial flora and fauna habitats.

2.3 Terrestrial field survey

The field survey of the potential offset areas (and additional patches) was undertaken between 21 and 26 September 2021.

2.3.1 Climatic conditions

The survey was completed during a period of low rainfall for the region, with no rainfall recorded at the nearby Booroondara weather station (station no. 035109) in the two weeks prior to the 21 September 2021 (BoM 2021). However, the region did receive above average rainfall at the beginning of July and end of August, with 54.6 and 21.6 mm recorded respectively (BoM 2021).

Conditions during the survey were typical for the time of year, with warm to hot with daytime temperatures between 24.6°C to 32.2°C and cool night time

temperatures ranging between 5.6°C and 13.3°C (BOM weather station Blackwater Airport, station no. 035134) (BoM 2021).

2.3.2 Field flora survey and vegetation mapping

The field flora survey methods were developed in order to:

- validate existing Queensland government regional ecosystem (RE) mapping for patches that have been identified as potential offset areas
- validate areas of Category X (non-remnant) vegetation as presented on Property Maps of Assessable Vegetation (PMAVs) that have been identified as potential offset areas
- target threatened flora species and communities (listed under Commonwealth and State legislation) and their habitats identified from database searches
- provide a basis for the mapping of habitat for the Squatter Pigeon.

This survey was conducted in accordance with the '*Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland'*, version 5.1 (Neldner et al. 2020), which was current at the time of the survey, to collect information on listed flora species, vegetation communities, and habitat types.

Detailed flora species lists were collated at all secondary sites. The less detailed sampling (i.e. tertiary and quaternary assessment sites) was conducted to provide additional information relating to the vegetative structure and composition and to assist in mapping the extent, distribution and remnant status of the identified REs within each potential offset area. Photo monitoring sites were also undertaken to capture supplementary information or record a noteworthy landscape, vegetation or habitat feature. A comparison of the data collected at each assessment site is provided in Table 1 below.

Table 1: Comparison of information collected at each type of flora assessment site

Information collected	Flora assessment site			
	Secondary	**Tertiary**	**Quaternary**	**Photo point**
Date and precise location (with reference to handheld GPS)	Yes	Yes	Yes	Yes
Soils, slope, aspect and landform observations	Yes	Yes	Notable features only	Notable features only
Ground-layer, mid-stratum and canopy species composition and abundance.	Yes	Yes	Yes	Notable features only
Structural characteristics.	Yes	Yes	Yes –EDL[#] only	No
Condition and disturbance of existing vegetation communities (including weed distribution)	Yes	Yes	Yes	No

Information collected	Flora assessment site			
	Secondary	Tertiary	Quaternary	Photo point
Quantitative and qualitative species composition within a 1,000 m^2 quadrat	Yes	No	No	No
Basal area of vegetation (Bitterlich Stick methodology)	Yes	Yes	No	No
Photographs of the community	Yes - north, east, south, west, groundcover and soils	Yes - north, east, south, west, groundcover and soils	Yes - usually north, east, south, west, groundcover	Notable features only

#Ecologically dominant layer (Neldner et al. 2020)

In addition, habitat quality plots were completed in accordance with the '*Guide to determining terrestrial habitat quality, version 1.3*' (DES 2020) (Habitat Quality Guide) within vegetation communities that provide potential Squatter Pigeon primary habitat and/or were representative or had the potential to become Brigalow TEC. This baseline information is used to determine the condition of the vegetation community and/or habitat present and can be used as part of future offset calculations in accordance with the EPBC Act Environmental Offset Policy. Habitat quality scoring is discussed further in Section 2.5.

A summary of the flora survey effort within offset area is provided in Table 2 below and shown in Figure 4.

Table 2: Summary of flora survey effort in the two potential offset areas

Flora assessment sites				
Secondary	**Tertiary**	**Quaternary**	**Photo point**	**Habitat quality plot**
4	1	2	1	4

2.3.3 Field fauna habitat assessment

The fauna assessment was not intended to be a full detailed survey, but rather a habitat assessment that allowed a prediction of the potential for the targeted threatened fauna species (i.e. Squatter Pigeon) to occur in each potential offset area. Techniques employed during the field assessments included, active searching and opportunistic observations. Notable fauna features were also recorded where observed.

The potential for threatened species to use a site can be assessed through knowledge of the species ecology, information on the occurrence of threatened species in the area and consideration of the habitat present in the site. The quality of fauna habitat in each proposed offset area was therefore assessed on the basis of the following criteria:

- **Low**: Many fauna habitat elements in low quality areas have been removed or altered such as mature, hollow-bearing trees, fallen timber and deep leaf

litter. Remnants are often small in size, support substantial weed infestations of high or moderate threat weeds (e.g. Buffel Grass (*_Cenchrus ciliaris_*)) and are poorly connected to other areas of remnant vegetation.

- **Moderate**: Some habitat components are present, but others are lacking. For example, a remnant may have a reasonably intact understorey but lack mature canopy species and fallen timber. Some weed infestations are present but are relatively small in size or comprise species of low to moderate threat. Linkages with other remnant habitats in the landscape may be lacking or somewhat tenuous.
- **High**: Most habitat components are present (e.g. old-growth trees, fallen timber, lack of weeds and deep leaf litter), the remnant is large enough to support species that are typically associated with large intact areas of habitat and it is well connected or contiguous with other areas of native vegetation.

To assist with determining Squatter Pigeon presence/absence a considerable amount of time was applied to walking and driving tracks within and adjacent to the various potential offset areas. Surveys were also conducted while traversing each potential offset area to assess the presence of this species. A log of the time spent walking and driving within the study area was maintained to demonstrate survey effort for this species.

In accordance with requirements of the Habitat Quality Guide, scoring rationale have been developed to determine the metric value of habitats deemed suitable for Squatter Pigeon within the potential offset areas. These are provided in Appendix A.

2.4 Threatened species habitat mapping

With reference to the SPRAT profile for this species (DAWE, 2021m), the following habitat has been identified within the proposed offset areas, based on the findings of the field survey.

- Breeding habitat – grassy woodlands dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* tree species, on sandy or gravelly soils (including but not limited to areas mapped as Queensland land zones 3, 5 or 7) within 1 kilometre of a waterbody.
- Foraging habitat – grassy woodlands dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* tree species, on sandy or gravelly soils (including but not limited to areas mapped as Queensland land zones 3, 5 or 7) within 3 kilometres of a waterbody.
- Dispersal habitat – forest or woodland occurring between patches of foraging or breeding habitat which facilitates movement between patches of foraging habitat, breeding habitat and/or waterbodies. Includes cleared and disturbed/degraded areas with scattered trees within 100 m of foraging and breeding habitats.

Within the broader study area, suitable waterbodies for this species primarily consisted of constructed dams and cattle troughs. Drainage lines within the study area were not considered to be waterbodies for the purposes of mapping Squatter

Pigeon habitat, given they are unlikely to hold water for extended periods of time and no pools were evident during the field survey.

Based on the above definitions, foraging habitat overlaps to some extent with breeding habitat (i.e. in areas ≤1 km from a waterbody).

2.5 Habitat quality scoring

The Queensland Government's Habitat Quality Guide sets out how to assess the suitability of an offset site relative to an impact site and determine the appropriate size and scale of an offset relative to an impact. The methodology involves the establishment of assessment units[1] (AUs) in which a suitable number of habitat quality plots (refer Section 2.3.2) were installed and then be used to undertake habitat quality scoring.

'Habitat quality' is the currency for measuring these values based on three key indicators:

- site condition - a general condition assessment of vegetation compared to a benchmark
- site context - an analysis of the site in relation to the surrounding environment
- species habitat index - the ability of the site to support a species.

This approach aligns with the EPBC Act Environmental Offsets Policy measure of 'habitat quality' and provides a consistent framework for environmental offsets in Queensland. A habitat quality score calculated in line with the Habitat Quality Guide is out of 10. A maximum score of 10 represents a fully intact system, scores of 4, 5 and 6 may indicate good quality regrowth or medium value habitat, and a minimum score of 1 would indicate a totally cleared area (DES 2020).

2.5.1 Site ecological condition

Ten attributes collected as part of each habitat quality plot were used as ecological condition indicators to compare each field-validated RE/AU against benchmark values and thereby determine an ecological condition score. The ten attributes included:

- recruitment of woody perennial species
- native plant species richness - trees
- tree canopy height
- tree canopy cover
- shrub canopy cover
- native perennial grass cover
- organic litter
- large trees

[1] Assessment units (AUs) are relatively homogenous and defined by a distinct RE

- coarse woody debris
- weed cover.

2.5.2 Site context

The landscape-scale attributes included in the final habitat quality score are determined through GIS spatial analysis and include the following three attributes:

- size of the patch in which each AU is located
- connectedness of the riparian monitoring area by measuring the percentage of the perimeter of each AU that relates to adjacent remnant vegetation
- context of each AU in terms of the percentage of remnant or cleared areas within a 1 km radius of each polygon in which a habitat quality plot is located.

2.5.3 Species habitat indices

The following habitat indices were assessed for Squatter Pigeon at each habitat quality plot in accordance with the Habitat Quality Guide:

- threats to species
- quality and availability of food and foraging habitat
- quality and availability of shelter
- species mobility capacity
- role of site location to species overall population in the state

HBA has developed a scoring system for these attributes that is based on the SPRAT profile, published research and field-based knowledge of the target species, i.e. Squatter Pigeon. The methodology for scoring these attributes is provided in Appendix A.

2.6 Limitations

The purpose of the field survey was to identify the on-ground ecological features of each proposed offset area with a specific focus on habitat for the Squatter Pigeon and vegetation that is analogous with or has the potential to become Brigalow TEC. Most key indicators of Squatter Pigeon habitat were likely to be identifiable at the time of the survey. Despite the lack of rainfall immediately prior to the surveys, plant community vigour was reasonably good, however annual grasses and forbs were noticeably absent or in low numbers. Therefore, the assessment of community condition was moderately influenced by climatic conditions.

Notwithstanding the above, ecological surveys often fail to record all species of flora and fauna present on a site for a variety of reasons such as seasonal absence or reduced activity during certain seasons. In addition, the ecology and nature of rare and/or cryptic species means that such species are often not recorded during short field visits. However, an assessment of habitat suitability is made for the target species, thereby applying a precautionary approach.

3 Desktop results

3.1 Vegetation communities

3.1.1 EPBC Act listed communities

The EPBC Act Protected Matters Report listed five TECs, as defined under the EPBC Act, as potentially occurring within the search area, namely:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC) – endangered
- Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin (Natural Grasslands TEC) – endangered
- Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC) - endangered
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT TEC) - endangered
- Weeping Myall Woodlands – endangered.

3.1.2 Regional ecosystems

The potential offset areas have been mapped by the Queensland Herbarium as supporting areas of remnant endangered, of concern and/or least concern REs (Figure 2). The geology mapping that underpins the application of REs is shown in Figure 3.

The Queensland Government also maps areas of high-value regrowth vegetation (i.e. non-remnant areas that have not been cleared in the last 15 years). High-value regrowth vegetation has the potential to reach remnant vegetation status over time and under an appropriate management regime.

It is noted that Category R vegetation is mapped on the basis of 50 m either side of a watercourse, regardless of vegetation being present or not.

Table 3 provides a summary of the REs, both remnant and high value regrowth, mapped within or immediately adjacent to the proposed offset areas.

Table 3: Regional ecosystems mapped by the Queensland Herbarium within or immediately adjacent to the proposed offset areas

RE code	Short description[1]	BVG[2] (1M)	Remnant Status
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains **VM Act status:** Endangered **Biodiversity status:** Endangered	25a	Remnant and High value regrowth
11.3.2	*Eucalyptus populnea* woodland on alluvial plains **VM Act status:** Of concern **Biodiversity status:** Of concern	17a	Remnant and High value regrowth

RE code	Short description[1]	BVG[2] (1M)	Remnant Status
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains **VM Act status:** Of concern **Biodiversity status:** Of concern	16c	Remnant and High value regrowth
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines **VM Act status:** Least Concern **Biodiversity status:** Of concern	16a	Remnant and High value regrowth
11.5.3	*Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces **VM Act status:** Least concern **Biodiversity status:** No concern at present	17a	Remnant and High value regrowth
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks **VM Act status:** Endangered **Biodiversity status:** Endangered	25a	Remnant

1 Short description taken from Queensland Herbarium (2021).

2 Broad vegetation groups (BVGs) are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid to arid climatic zones. Broad vegetation groups provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states.

Of the REs listed in Table 3, four are considered to potentially form part of a Commonwealth listed TEC, namely:

- REs 11.3.1 and 11.9.5 can be considered a component of the Brigalow TEC where patches satisfy the diagnostic criteria and condition thresholds of the corresponding conservation advice
- RE 11.3.2 can be considered a component of the Poplar Box TEC where patches satisfy the diagnostic criteria and condition thresholds of the corresponding listing advice
- RE 11.3.3, which is considered a component of the Coolabah TEC, although the study area is not located within the Brigalow Belt South Bioregion and as such fails to satisfy the diagnostic criteria for the TEC.

No other REs listed above are considered to form part of any TEC listed under the EPBC Act.

3.2 EPBC Act listed flora and fauna species

The various desktop searches identified 30 significant flora species as either being recorded or having the potential to be present within the search area (Table 4).

Table 4: Significant flora species returned from database searches

Scientific Name	Common Name	EPBC Act Status	Source[1]
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	PMST
Elseya albagula	Southern Snapping Turtle	Critically Endangered	PMST
Numenius madagascariensis	Eastern Curlew	Critically Endangered	PMST
Dasyurus hallucatus	Northern Quoll	Endangered	PMST
Dichanthium queenslandicum	King Bluegrass	Endangered	PMST
Lerista allanae	Retro Slider	Endangered	PMST
Neochmia ruficauda ruficauda	Star Finch (eastern), Star Finch (southern)	Endangered	PMST
Poephila cincta cincta	Southern Black-throated Finch	Endangered	PMST
Rostratula australis	Australian Painted Snipe	Endangered	PMST
Aristida annua	null	Vulnerable	PMST
Cadellia pentastylis	Ooline	Vulnerable	PMST
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	PMST
Daviesia discolor	*no common name*	Vulnerable	PMST
Delma torquata	Collared Delma	Vulnerable	PMST
Denisonia maculata	Ornamental Snake	Vulnerable	PMST, WO
Dichanthium setosum	bluegrass	Vulnerable	PMST
Egernia rugosa	Yakka Skink	Vulnerable	PMST
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	PMST
Eucalyptus raveretiana	Black Ironbox	Vulnerable	PMST
Falco hypoleucos	Grey Falcon	Vulnerable	PMST
Furina dunmalli	Dunmall's Snake	Vulnerable	PMST
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable	PMST, WO
Grantiella picta	Painted Honeyeater	Vulnerable	PMST
Macroderma gigas	Ghost Bat	Vulnerable	PMST
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	PMST
Petauroides volans	Greater Glider	Vulnerable	PMST, WO
Phascolarctos cinereus	Koala	Vulnerable	PMST, WO
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	PMST
Rheodytes leukops	Fitzroy River Turtle	Vulnerable	PMST
Samadera bidwillii	Quassia	Vulnerable	PMST

[1] Source:

- PMST – Protected Matters Search Tool
- WO – Wildlife Online database.

It should be noted that the EBPC Act Protected Matters Search Tool identifies significant species based on a combination of actual records and/or predictive modelling and does not necessarily indicate that a species has actually been recorded from the search area.

3.3 Biodiversity Assessment and Mapping

The Biodiversity Planning Assessment (BPA) for the Brigalow Belt North Bioregion has identified the following values within or adjacent to the potential offset areas:

- remnant vegetation identified as state biodiversity significant area
- within or adjacent to a regional ecological corridor.

4 Field survey results

4.1 Vegetation communities

A total of 15 patches of vegetation were assessed as part of the survey. These patches ranged in area from 1.6 to 145.1 ha and commonly supported remnant, non-remnant or high value regrowth vegetation that was comprised of Brigalow (*Acacia harpophylla*) on alluvial plains (RE 11.3.1), Poplar Box on alluvial plains (RE 11.3.2) or Poplar Box on Cainozoic sandplains (RE 11.5.3). However, only two of these patches, or part thereof, were considered any further in this report, these being polygons 29 and 30 (Figure 4).

To attribute ecological condition and habitat quality scores, the two polygons have been assigned into two assessment units (AUs).

4.1.1 EPBC Act listed communities

Vegetation communities that were representative of, or have the potential to become, representative of the Brigalow TEC were recorded within the study area.

Polygon 29, which representative of non-remnant RE 11.3.1 does not currently satisfy the TEC diagnostic criteria and condition thresholds.

Vegetation that was representative of Poplar Box TEC was also recorded within the study area. Polygon 30 supports vegetation that satisfies the diagnostic criteria and condition thresholds of the Poplar Box TEC (moderate quality).

4.1.2 Remnant regional ecosystems

One patch of of concern RE was mapped as a potential offset area during the field survey (Table 5; Figure 4).

Ecological condition of remnant vegetation in Polygon 30 (AU 9) was variable with signs of historical disturbance in the form of selective logging/thinning and vehicle tracks, which have resulted in a discontinuous canopy in some areas. There was a moderate abundance of exotic grasses throughout the understory.

Table 5: Potential offset areas that represent remnant regional ecosystems

RE Code	Assessment Unit (AU)	Short Description[1]	Area (ha)	Condition
11.3.2	2 (Polygon 30)	*Eucalyptus populnea* woodland on alluvial plains **VM Act status:** Of concern **Biodiversity status:** Of concern	43.3	▪ Some evidence of historic logging and thinning ▪ High levels of weed incursion, primarily in the ground layer ▪ Low levels of canopy dieback ▪ Active utilisation by cattle ▪ Low levels of recruitment of canopy species ▪ Connectivity to remnant vegetation to the north-west (RE 11.5.3) and south-east (RE 11.3.25).

[1] Short description taken from Queensland Herbarium (2021).

4.1.3 High-value regrowth

No patches of high value regrowth (HVR) were mapped as a potential offset areas during the field survey (Figure 4).

4.1.4 Non-remnant vegetation

One patch of non-remnant vegetation that is representative of an endangered RE during the field survey (Table 6; Figure 4).

The patch of n-r RE 11.3.1 was generally more consistently vegetated with exotic pasture grasses primarily limited to the periphery of the patch or were historic disturbance (e.g. drill pad) has considerably reduced the projected cover of woody vegetation.

Table 6: Potential offset areas that represent non-remnant regional ecosystems

RE Code	Assessment Unit (AU)	Short Description[1]	Area (ha)	Condition
n-r 11.3.1	1 (Polygon 29)	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains **VM Act status:** Endangered **Biodiversity status:** Endangered	90.7	▪ Discontinuous canopy in parts due to variable recovery, but also due to prevalence and breadth of naturally occurring gilgai ▪ Low levels of weed incursion encroaching in the ground layer in general, although dense at edges and in large canopy holes not relating to the presence of gilgai ▪ Active utilisation by cattle ▪ Low levels of canopy dieback ▪ Moderate levels of recruitment of canopy species evident ▪ Most canopy trees many times multi-leadered from base, potentially hampering height recovery of patch ▪ Connectivity to remnant vegetation to the north (REs 11.3.1 and 11.3.3), which fringes Cockatoo Creek, and to the west (RE 11.5.3).

[1] Short description taken from Queensland Herbarium (2021).

4.2 Flora species

4.2.1 EPBC Act listed flora

No EPBC Act listed flora species were recorded or considered likely to occur within the potential offset areas.

4.2.2 Introduced flora

The introduced pasture grass, Buffel Grass (**Cenchrus ciliaris*), was commonly recorded in the understorey throughout most of the potential offset areas, although primarily restricted to canopy holes and the edges of Polygon 29 (AU 8). Less commonly encountered species included Green Panic (**Megathyrsus maximus* var *pubiglumis*), Spiny Sida (**Sida spinosa*), Spiked Malvastrum (**Malvastrum americanum*), Sabi Grass (**Urochloa mosambicensis*), Red Natal Grass (**Melinis repens*), Buddha Pea (**Aeschynomene indica*), Indian Bluegrass (**Bothriochloa pertusa*) and Harrisia Cactus (**Harrisia martinii*).

Five significant weed species were recorded during the field survey as detailed in Table 7.

Table 7: Significant weed species recorded in the proposed offset areas

Species	Common name	Status[1]	Region Ecosystems recorded within
**Cryptocarya grandiflora*	Rubber Vine	WoNS RI (C3)	11.3.2 - Polygon 30 (infrequent)
**Harrisia martinii*	Harrisia Cactus	RI (C3)	11.3.1 - Polygon 29 (infrequent to occasional)
**Opuntia stricta*	Common Tree Pear	WoNS RI (C3)	11.3.1 - Polygon 29 (infrequent)
**Opuntia tomentosa*	Velvety Tree Pear	WoNS RI (C3)	11.3.1 - Polygon 29 (infrequent)
**Tamarix aphylla*	Athel Pine	WoNS RI (C3)	Adjacent to 11.3.2 - Polygon 30 (occasional)[2]

1. Status: WoNS, Weeds of National Significance; RI (C3), Restricted invasive species (Category 3) under Queensland's *Biosecurity Act 2014*.
2. The specimens of Athel Pine were observed as juvenile plants to 1.5 m in height in the floor of a recently constructed creek diversion.

4.3 Fauna species

4.3.1 EPBC Act listed fauna

One threatened fauna species listed under the EPBC Act was recorded during the field survey. Squatter Pigeon was recorded in three locations throughout the broader study area. Four birds were observed moving from regrowth Brigalow vegetation into dead low trees at the edge of regrowth Poplar Box woodland approximately 4 km to the south of AU. These specimens, along with several specimens near the carpark of the mine administration area, were photographed. Another pair were observed moving through regrowth Poplar Box toward regrowth Brigalow tall shrubland approximately 0.5 km north-east of Polygon 29, however, these were not photographed as they did not land nearby.

A preliminary likelihood of occurrence assessment also identified:

- a moderate to high potential of Ornamental Snake (*Denisonia maculata*) subsisting in polygon 29, and potentially utilising polygon 30 as dispersal habitat

- a moderate potential of Australian Painted Snipe (*Rostratula australis*) seasonally utilising portions of polygon 29
- a moderate potential for Koala (*Phascolarctos cinereus*) and Greater Glider (*Petauroides volans*) to utilise the eucalypt woodlands (i.e. polygon 30 and adjacent woodland communities in various years).

4.3.2 Squatter Pigeon habitat

The various ephemeral drainage lines (e.g. Cockatoo, Roper and Carlo creeks) and man-made creek diversions that traverse through the study area were not considered to be suitable waterbodies or watercourses for the purposes of mapping Squatter Pigeon. Nonetheless there are more permanent water sources within 3 km of the various potential offset areas, including Lake Lindsay and various constructed dams. Therefore, any eucalypt dominated woodlands (i.e. REs 11.3.2, 11.3.25 and 11.5.3) constitute Squatter Pigeon habitat for the purposes of this ecological assessment (Section 2.5). Similarly, patches of remnant or regrowth Brigalow woodland adjacent to or in the vicinity of these eucalypt woodlands provide foraging habitat for Squatter Pigeon. Approximately 134.0 ha of Squatter Pigeon habitat has been identified across the two proposed offset areas.

Geophaps scripta scripta (~4 km south of Polygon 30)

Geophaps scripta scripta [photo above cropped]

Geophaps scripta scripta (~4 km south of Polygon 30) [photo cropped]

Geophaps scripta scripta (mine administration carpark)

4.4 Other biodiversity values

Populations of one flora species listed solely under Queensland's *Nature Conservation Act 1992* (NC Act) was recorded within the broader survey area as illustrated in Figure 6 and described below.

Solanum elachophyllum (no common name), which is currently listed as endangered under the NC Act was recorded in Polygon 29 and regrowth Brigalow approximately 500 m to the north-east of Polygon 29. The specimens were generally recorded in poor vigour due to the time of year. It is anticipated that many more specimens would be recorded during more optimal conditions.

Solanum elachophyllum (Polygon 29)

Solanum adenophorum (no common name), which is currently listed as endangered under the NC Act was recorded at numerous locations within regrowth Brigalow approximately 12 km to the north-east of Polygon 29. There is a moderate potential for this species to subsist in Polygon 29.

Solanum adenophorum (~12 km north-east of Polygon 29)

5 Habitat quality of assessment units

A summary of habitat quality scores for assessment units that could provide an offset for Brigalow TEC and Squatter Pigeon habitat is presented in Appendix B. The raw data from which these scores have been derived is provided in Appendix C.

5.1 Brigalow TEC

Habitat quality scores for vegetation that constitutes offset potential for Brigalow TEC (i.e. AU 8) are presented in Table 8 and shown in Figure 5. Representative photographs for this AU are provided in Appendix D.

Table 8: Habitat quality scores[1] for potential offset areas for Brigalow TEC

RE type/ Assessment unit	Number of polygons	Total area (ha)	Habitat quality score[1]	Habitat features and threats
n-r 11.3.1 (AU 8)	1	90.7	3.83	▪ Patches of variable size but contiguous with remnant and high value regrowth, at least in part. Only a portion of this patch, which is in excess of 100 ha in area, has been proposed for use. ▪ Excellent gilgai development ▪ Potential and known habitat for threatened flora and fauna species ▪ Actively utilised by cattle ▪ Signs of predator species (e.g. Wild Dog, Pig) evident.
	Total (ha)	**90.7**		

[1] Calculated in accordance with the 'Guide to determining terrestrial habitat quality, version 1.3' (DES 2020).

It should be noted that this patch of Brigalow (i.e. AU 8) does not currently satisfy the diagnostic criteria for the Brigalow TEC, wherein these patches have been substantively cleared within the last 15 years[2]. Furthermore, this patch is mapped as Category X (non-remnant vegetation) on a Property Map of Assessable Vegetation (PMAV), which provides farmers with the ability to clear woody vegetation within these areas in perpetuity. It is understood that farmers are encouraged to seek advice in relation to potentially impacting MNES (e.g. TECs, habitat for Commonwealth listed species) however it is the experience of many ecologists working in Central Queensland that such advice is rarely sought and that deferral to the State mapping, which is actively monitored and updated through routine, generally biennial, review of aerial and SLATs imagery, is the primary source of 'approval checking' prior to clearing. Given that these areas are currently mapped as Category X, with most locked in forever, coupled with the fact that the regenerating vegetation is leguminous and subsisting on alluvial

[2] item 2c of the diagnostic criteria as prescribed in the *Approved Conservation Advice for the Brigalow* (Acacia harpophylla *dominant and co-dominant) ecological community*. (Department of the Environment 2013)

clayey loams, it is proposed that should farmers be given access this patch, particularly post-mining, it is considerably likely that these areas would be targeted for clearing and pasture improvement.

Furthermore, additionality is highly likely to be achieved using this patch of Brigalow. Ornamental Snake (*Denisonia maculata*) is highly likely to use this patch as is Australian Painted Snipe (*Rostratula australis*) due to the prevalence of regularly inundated gilgai of variable size, depth, connectivity, and presence of micro-habitat. Both species are listed as vulnerable under both the EPBC Act and NC Act. This patch is also known to support populations of *Solanum elachophyllum* (no common name) and has the potential to support *Solanum adenophorum* (no common name), which was recorded in similar vegetation within the broader study area.

5.2 Squatter Pigeon primary habitat

Habitat quality scores for vegetation that constitutes Squatter Pigeon habitat (i.e. AUs 1 and 2) are presented in Table 9 and shown in Figure 5. Representative photographs for each AU are provided in Appendix D.

Table 9: Habitat quality scores[1] for potential offset areas for Squatter Pigeon habitat

RE type/ Assessment unit	No. polygons	Total area (ha)	Habitat quality score[1]	Habitat features and threats
n-r 11.3.1 (AU 8)	1	90.7	3.07	▪ Permanent water located within 1 and/or 3 km of patch with moderate diversity of grass species and areas of bare ground. ▪ Assessment unit with variable potential to be suitable as breeding habitat due to distance from a reliable water source. ▪ Potential issues with dust due to proximity to the haul road ▪ Signs of predator species (e.g. Wild Dog, Pig) evident.
11.3.2 (AU 9)	1	43.3	3.49	▪ Permanent water located within 1 km of patch with moderate diversity of grass species and areas of bare ground. ▪ Assessment unit with potential to be suitable as breeding habitat due to underlying geology and distance from a reliable water source. ▪ Potential issues with dust due to proximity to the haul road ▪ Signs of predator species (e.g. Wild Dog, Pig) evident.
Total (ha)		**134.0**		

[1] Calculated in accordance with the 'Guide to determining terrestrial habitat quality, version 1.3' (DES 2020).

Polygon 30 (AU 9) is also adjacent to an existing offset of regrowth Poplar Box woodland. This existing offset is quite narrow and the addition of Polygon 30 will significantly improve the perimeter to area of the combined offset area.

6 Summary

This current assessment has been undertaken to ascertain the ecological values of potential offset areas. More specifically, this assessment has focussed on the presence/absence of habitat for the Squatter Pigeon with the view of highlighting which offset areas have the most potential to provide an environmental offset for impacts to these PMs associated with the Foxleigh Mine extension. Two potential offset areas were identified and described in detail within this report.

The identified Brigalow habitat has the potential to provide suitable offset capacity for impacts to Brigalow TEC, given the reasonable connectivity, patch size, prevalence of gilgai, low to moderate infiltration of Buffel Grass, and consistency and age of regrowth. This patch is adjacent to remnant vegetation fringing Cockatoo Creek, which flanked by similar regrowth Brigalow shrubland further to the east.

The identified Squatter Pigeon habitat has the potential to provide suitable breeding habitat due to the presence of permanent water sources within 1 km of most of these potential offset areas. However, the dense understorey in some of the proposed offset areas is also considered to be a potentially limiting factor to the useability of the habitat present. Despite this, numerous specimens of Squatter Pigeon were recorded in several places throughout the study area and within or near the potential offset areas.

Notwithstanding the above additional factors elevate the biodiversity value of these patches. One State listed flora species was recorded in Polygon 29, and another was recorded in nearby similar vegetation. There is also the potential for the potential offset areas to provide potential habitat for Ornamental Snake, Australian Painted Snipe, Koala and/or Greater Glider.

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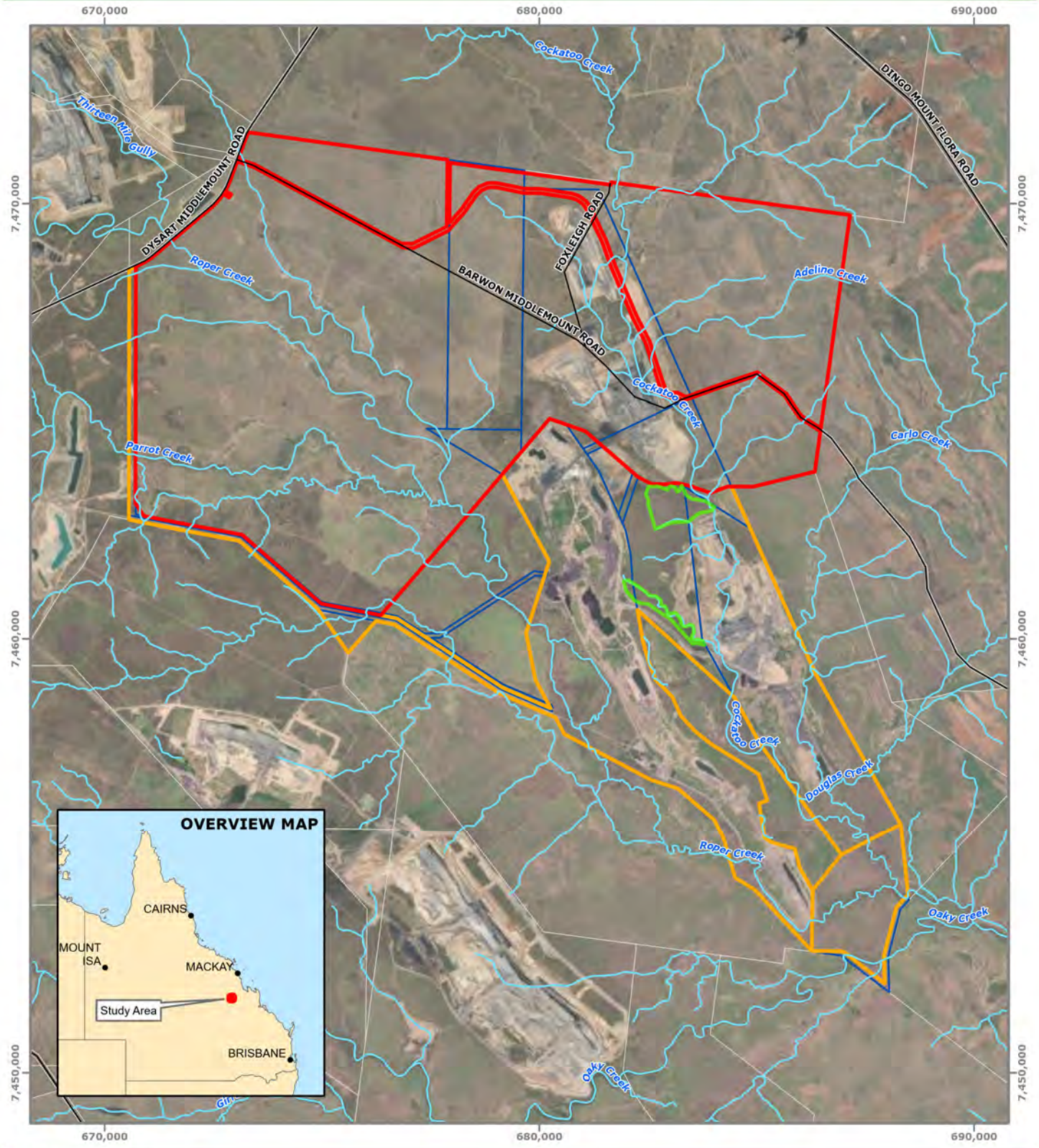
Figures



Legend

- Potential offset areas
- Lot 20 SP276924
- Lot 4 SP293492
- Mining lease boundaries
- Road
- Railway
- Vegetation Management Act watercourse
- Cadastral boundary

Figure 1 : Locality Plan

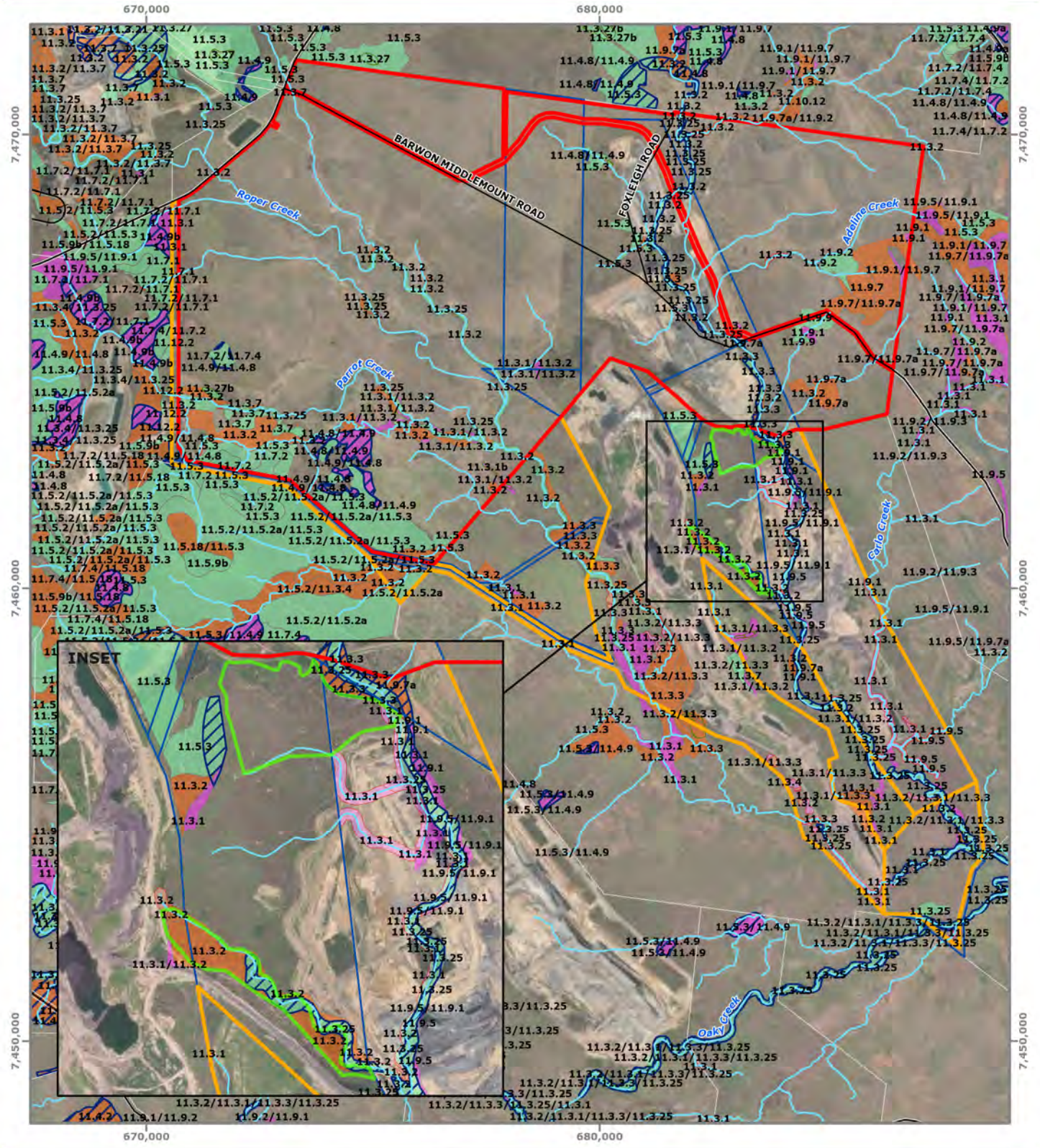
Foxleigh Mine BOMP Resubmission

Map Number: EGY01_01_A
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Rail, Watercourse, DCDB - (c)DNRM 2021

0 1 2 4 6
Kilometers

N

HBA



Legend

- Potential offset areas
- Lot 4 SP293492
- Lot 20 SP276924
- Mining lease boundaries
- Road
- Vegetation Management Act watercourse
- Railway
- Cadastral boundary
- Vegetation Management Essential Habitat - V10.0
- Vegetation Management Wetlands Map - V7.0

Vegetation Management Regional Ecosystem Map - V12.0

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern

Figure 2 : Queensland Government Regional Ecosystem Mapping

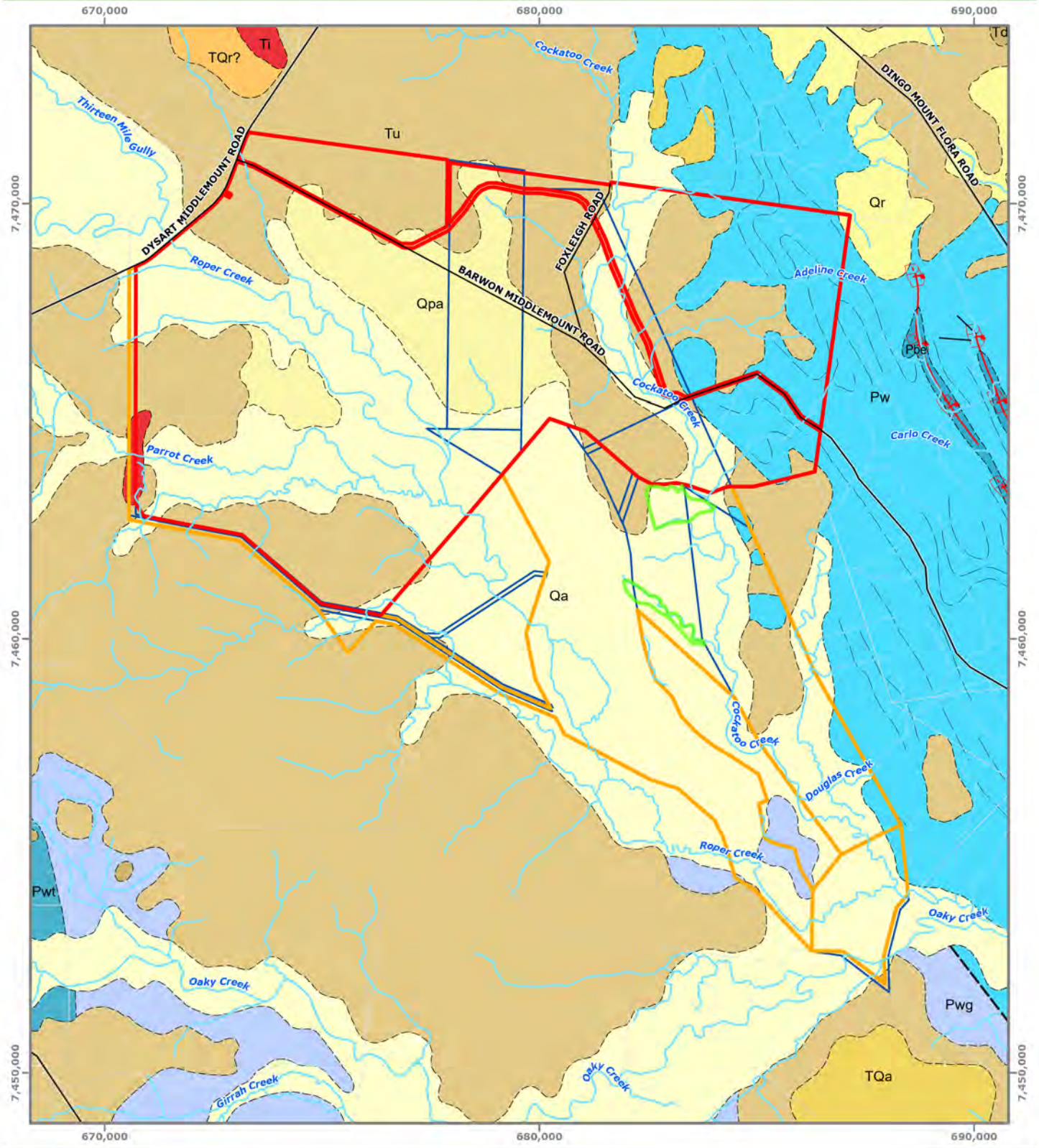
Foxleigh Mine BOMP Resubmission

Map Number: EGY01_02_B
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Rail, Watercourse, DCDB - (c)DNRM 2021

0 1 2 4 6
Kilometers

N

HBA
Hansen Botanical Assessments Pty. Ltd.



Legend

Potential offset areas
Mining lease boundaries
Lot 4 SP293492
Lot 20 SP276924
Road
Vegetation Management Act watercourse

Map Symbol	Rock Unit Name	Lithological Summary	Dominant Rock	Age
Pw	Blackwater Group	Feldspathic and lithic sandstone, silty sandstone, calcareous sandstone, ashstone and cherty mudstone, carbonaceous mudstone and coal; commonly abundant plant fossils and fossil wood	SEDIMENTARY ROCK	LATE PERMIAN
Pbe	Blenheim Formation	Carbonaceous and micaceous labile sandstone, siltstone, shale, coquinite, minor conglomerate	SEDIMENTARY ROCK	LATE PERMIAN
Pwg	Burngrove Formation	Mudstone, siltstone, sandstone, coal, tuff	ARENITE-MUDROCK	LATE PERMIAN
Tu	Duaringa Formation	Mudstone, sandstone, conglomerate, siltstone, oil shale, lignite, basalt	SEDIMENTARY ROCK	EOCENE - OLIGOCENE
Pwt	Fair Hill Formation	Lithic and feldspathic labile sandstone, quartzose sublabile sandstone, siltstone, mudstone, calcareous and tuffaceous sandstone, volcanic conglomerate, carbonaceous mudstone, coal	SEDIMENTARY ROCK	LATE PERMIAN
Qa	Qa-QLD	Clay, silt, sand and gravel; flood-plain alluvium	ALLUVIUM	QUATERNARY
Qpa	Qpa-QLD	Clay, silt, sand and gravel; flood-plain alluvium on high terraces	ALLUVIUM	PLEISTOCENE
Qr	Qr-QLD	Clay, silt, sand, gravel and soil; colluvial and residual deposits	COLLUVIUM	QUATERNARY
Td	Td-QLD	Duricrusted palaeosols at the top of deep weathering profiles, including ferricrete and silcrete; duricrusted old land surfaces	FERRICRETE	TERTIARY
Ti	Ti-St Lawrence-YARROL/SCAG	Intrusive rhyolite, trachyte and microsyenite	FELSITES (LAVAS, CLASTICS & HIGH-LEVEL INTRUSIVES)	EARLY TERTIARY
TQa	TQa-QLD	Locally red-brown mottled, poorly consolidated sand, silt, clay, minor gravel; high-level alluvial deposits (generally related to present stream valleys but commonly dissected)	ALLUVIUM	LATE TERTIARY - QUATERNARY
TQr?	TQr?-QLD	Clay, silt, sand, gravel, soil; colluvial and residual deposits	COLLUVIUM	LATE TERTIARY - QUATERNARY

Figure 3 : Geology Mapping of the study area

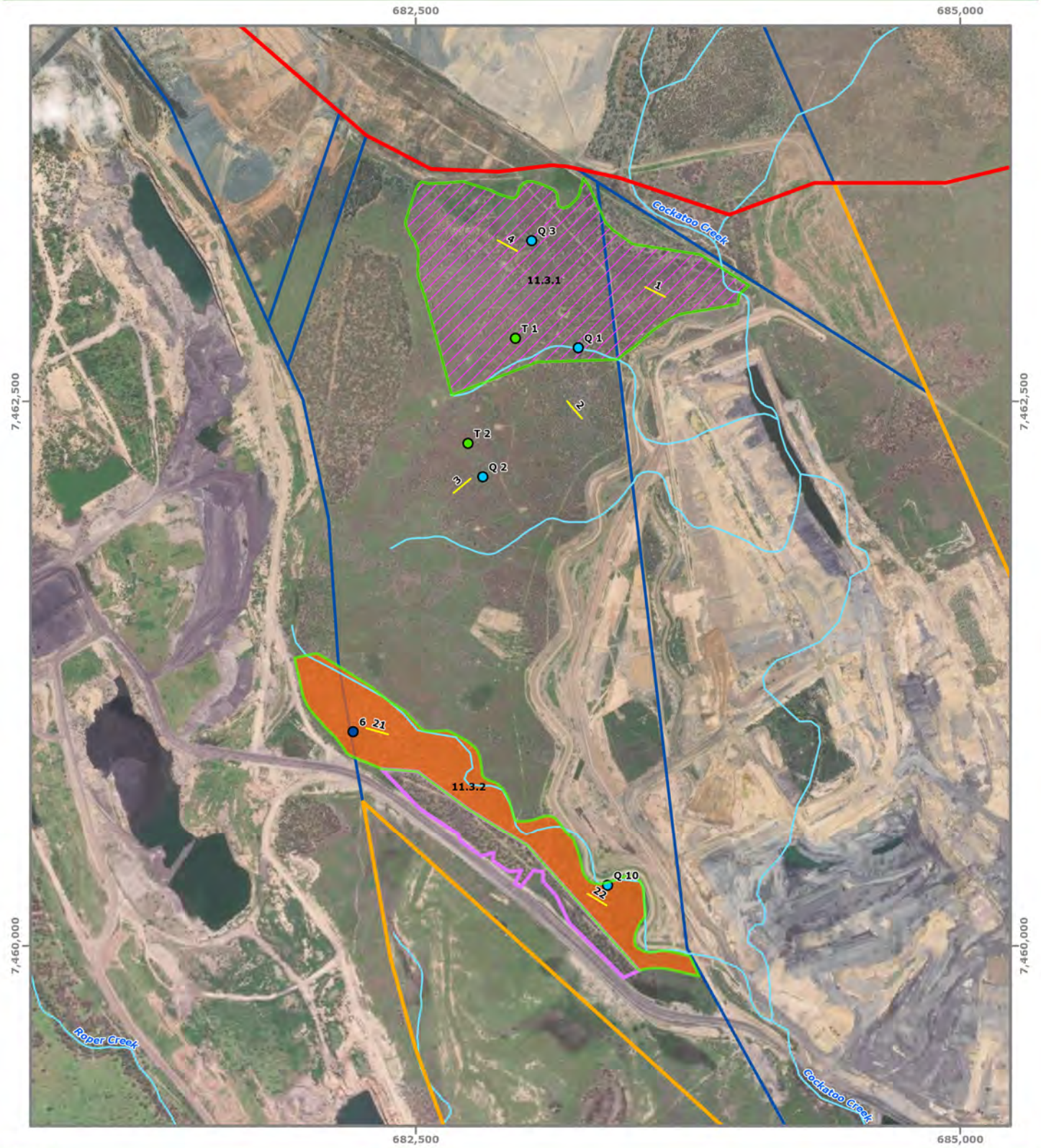
Foxleigh Mine BOMP Resubmission

Map Number: EGY01_03_A
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Rail, Watercourse, DCDB - (c)DNRM 2021

0 1 2 4 6
Kilometers

N

HBA



Legend

- Potential offset areas
- Existing offsets
- Lot 4 SP293492
- Lot 20 SP276924
- Mining lease boundaries
- Vegetation Management Act watercourse
- Cadastral boundary

Remnant vegetation

- Of concern

Non-remnant

- Endangered

Vegetation assessment sites

- Tertiary site
- Quaternary site
- Photo point
- THQ plot

Figure 4 : Field-validated vegetation mapping of proposed offset areas

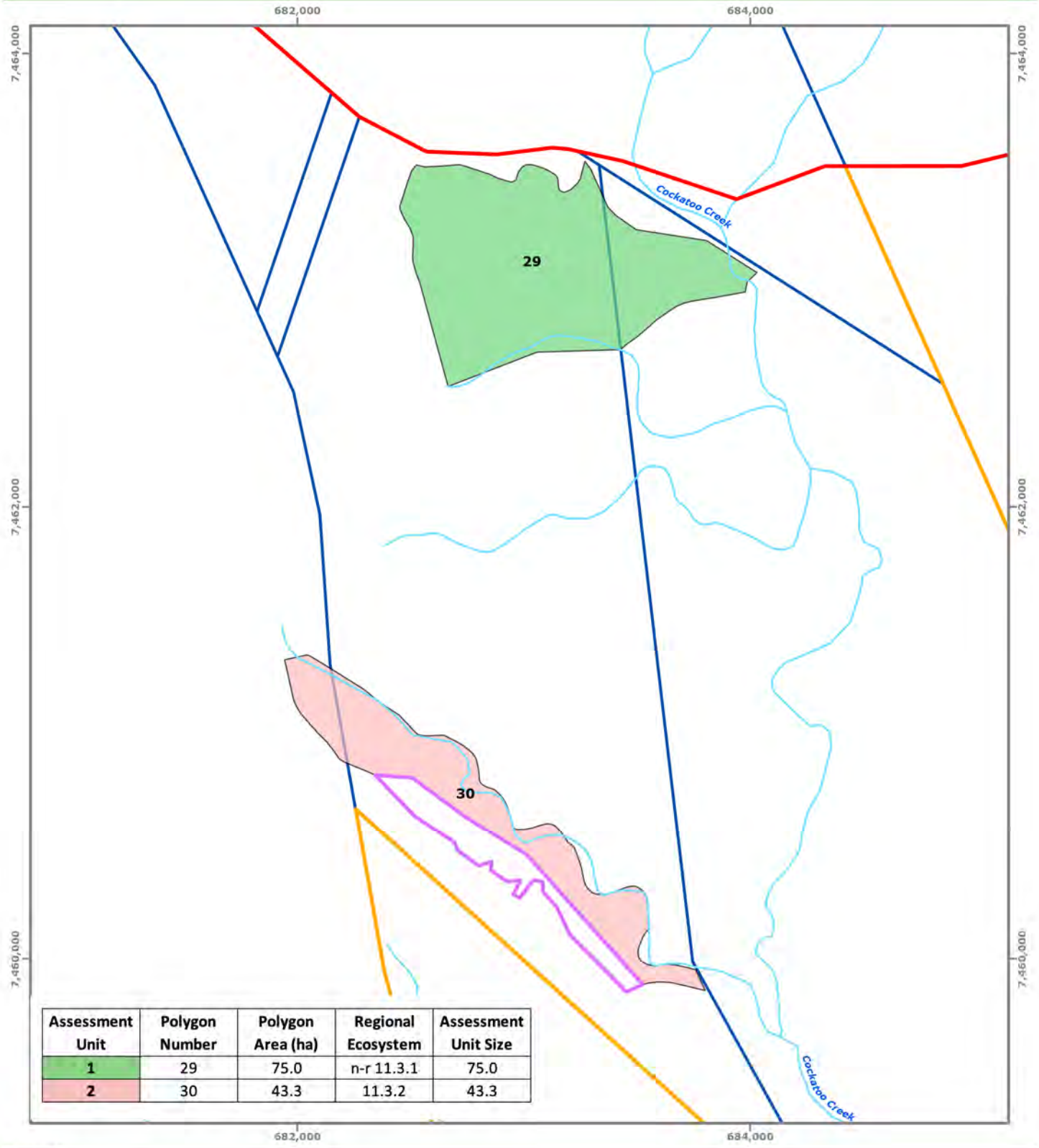
Foxleigh Mine BOMP Resubmission

Map Number: EGY01_04_A
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2021

0 0.25 0.5 1
Kilometers

N

HBA
Hansen Botanical Assessments Pty. Ltd.



Assessment Unit	Polygon Number	Polygon Area (ha)	Regional Ecosystem	Assessment Unit Size
1	29	75.0	n-r 11.3.1	75.0
2	30	43.3	11.3.2	43.3

Legend

- Existing offsets
- Lot 4 SP293492
- Lot 20 SP276924
- Mining lease boundaries
- Vegetation Management Act watercourse
- Cadastral boundary

Assessment Unit (Polygon number)

- 1 - n-r 11.3.1
- 2 - 11.3.2

Figure 5 : Assessment Units

Foxleigh Mine BOMP Resubmission

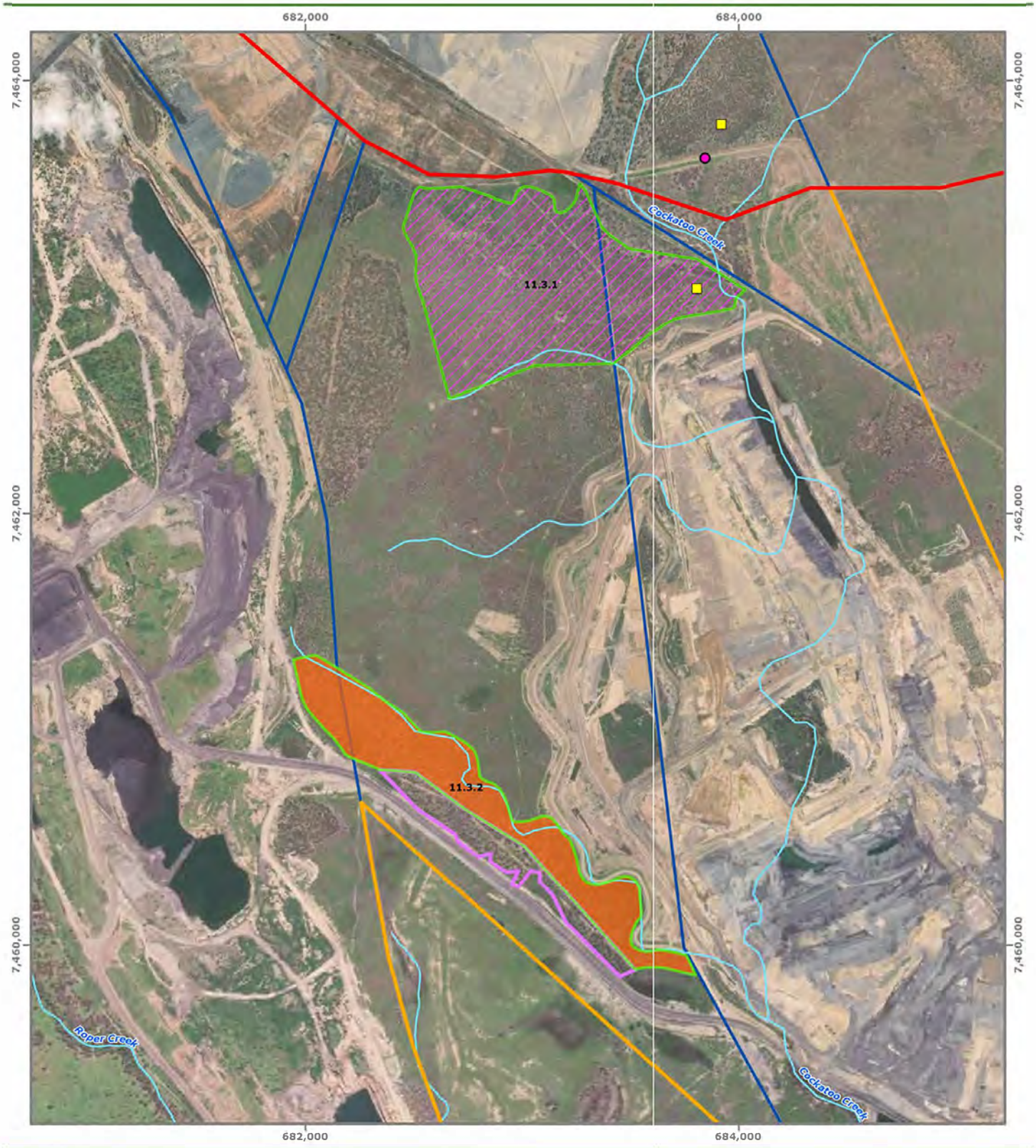
Map Number: EGY01_05_A
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Rail, Watercourse, DCDB - (c)DNRM 2021

0 0.25 0.5 1

Kilometers

N

HBA



Legend

- Potential offset areas
- Existing offsets
- Lot 4 SP293492
- Lot 20 SP276924
- Mining lease boundaries
- Vegetation Management Act watercourse
- Cadastral boundary

Remnant vegetation

- Of concern

Non-remnant

- Endangered

Recorded Location

- *Solanum elachophyllum* (no common name) [Endangered (NC Act)]
- Squatter Pigeon (*Geophaps scripta scripta*) [Vulnerable (NC Act, EPBC Act)]

Figure 6 : Records of conservation significant species

Foxleigh Mine BOMP Resubmission

Map Number: EGY01_06_A
Date: 19 November 2021
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Rail, Watercourse, DCDB - (c)DNRM 2021

0 0.25 0.5 1
Kilometers

N

HBA

Appendix A

Species habitat indices scoring rationale

Squatter Pigeon – southern subspecies (*Geophaps scripta scripta*)

1. *Quality and availability of foraging habitat*

Indicator	Description			Score
Within 3 km of or permanent seasonal, or temporary water	**0** **No**		**15** **Yes**	**15**
Grass species richness	**0** **<3**	**3** **3-10**	**5** **>10**	**5**
% Bare ground	**0** **<25%**	**3** **>75%**	**5** **25% – 75%**	**5**
			Total	**25**

Rationale

The greatest weight has been given to the proximity of an assessment unit to a permanent or seasonal water source. The species is known to access suitable water bodies to drink on a daily basis (DoEE, 2020). Natural foraging habitat for the Squatter Pigeon (southern) is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by *Eucalyptus, Corymbia, Acacia* or *Callitris* species, on sandy or gravelly soils, within 3 km of a suitable, permanent or seasonal water body (DoEE, 2020). This may result in only portions of an assessment unit being considered as suitable habitat. It is noted in the species profile that the preferred breeding and foraging habitat is on Land Zones 5 and 7 (as described in Wilson and Taylor (2012). This appears to be a limiting factor more to nesting rather than foraging as the profile also states that if a suitable water source is in the vicinity, the species may forage on a number of other Land Zones. As a result, specific Land Zones have not been used as a habitat quality indicator for quality and availability of foraging habitat.

The subspecies mainly forages on seeds which have fallen to the ground from low vegetation, such as grasses, herbs and shrubs (DAWE, 2020). The preferred food species is not specified; however, it is assumed that a variety of grass species is more likely to provide foraging material throughout the seasons. As a result, grass species richness has been used as an indicator of foraging habitat quality. This will be assessed as part of the habitat quality plots.

Typically, the groundcover vegetation layer in suitable foraging and breeding habitat is considerably patchy consisting of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs. This patchy, ground layer of vegetation rarely exceeds 33% of the ground area (DAWE, 2020). The percentage of bare ground will be assessed during habitat quality plots with the optimal range being between 25 and 75%.

2. Quality and availability of habitat required for shelter and breeding

Indicator	Description			Score
Within 1km of permanent or seasonal water	**0** **No**	**10** **Yes**		**10**
Underlying geology of well drained gravelly soils (i.e. Land zones 5 or 7)	**0** **No**	**10** **Yes**		**10**
% Grass Cover	**0** **< 25%**	**0** **> 75%**	**5** **25-75%**	**5**
			Total	**25**

Rationale

Equal weight has been given to the distance of an assessment unit to a permanent or seasonal water body and the Land Zone which describes the geology. Breeding habitat is known to occur within 1 km of a permanent or seasonal water body (DAWE, 2020). This may result in only portions of an otherwise suitable assessment unit being considered as breeding habitat. Given the species nests in shallow depressions in the ground, it requires well-draining soil (DAWE, 2020). Suitable soil types are known to occur on Land Zones 3, 5 and 7.

The nest is a depression scraped into the ground beneath a tussock of grass, bush, fallen tree or log and sparsely lined with grass (DAWE, 2020). Personal observations of active nests in Central Queensland suggest that the species uses tussock grasses to both shelter and camouflage the nest. A moderate (25% to 75%) cover of grasses would appear to be the ideal vegetation structure for the species during breeding periods.

3. Quality and availability of habitat required for mobility

Indicator	Description			Score
Connectivity of assessment unit to suitable habitat	**1** No dispersal habitat within 100 m of assessment unit.	**15** Dispersal habitat within 100 m that provides connectivity to suitable foraging habitat and other suitable water bodies within 3 km.	**25** Dispersal habitat within 100 m that provides connectivity breeding / foraging habitat and other suitable water bodies within 1 km.	**25**
			Total	**25**

Rationale

An assessment unit that is directly connected or connected via adjacent woodland or forest to other areas of suitable breeding or foraging habitat and has other suitable water bodies within 1 km is likely to facilitate movement of the species through the area. The presence of multiple water bodies in an area will allow populations to move through an area as availability of habitat resources such as water

and food varies with conditions. This indicator will be assessed during both field surveys and desktop analysis.

4. Absence of threats

Indicator	Description			Score
Risk of habitat loss and fragmentation	**0** **High** Habitat loss or fragmentation likely	**5** **Moderate** Habitat loss or fragmentation possible	**10** **Low** Habitat loss or fragmentation not likely	**10**
Weed Dominance	**0** **High** Weeds species dominant	**3** **Moderate** Weed species but not dominant	**5** **Low** No weed species present	**5**
Overstocking	**0** **High**	**3** **Moderate**	**5** **Low**	**5**
Predation Risk	**0** **High** Predator signs abundant	**3** **Moderate** Predator signs common	**5** **Low** No predator signs or no more than would be expected in a natural system	**5**
			Total	**25**

Rationale

The main threats to the species are the degradation, loss and fragmentation of habitat and predation (DAWE, 2020). In this species habitat attribute, the greatest weight has been applied to habitat loss and fragmentation. This is to reflect the importance of contagious suitable habitat for maintaining a viable population in an area and the time and resources required to re-establish suitable habitat once it has been altered. The risk of habitat loss will be determined by assessing current land uses and the state and federal status of the vegetation which defines an assessment unit.

The intrusion of exotic plant species, particularly stoloniferous pasture grasses can reduce foraging and breeding habitat quality by altering ground cover vegetation structure, particularly by out competing native tussock grass and reducing the patches of bare ground. The species has been observed utilising stock and cattle yards. However, across a large area, over grazed ground cover is likely to limit foraging and breeding suitability of an assessment unit. This indicator will be determined through habitat quality plots.

Cats and Foxes have been attributed to the local decline of the species DAWE, 2020. The presence and abundance of cats and foxes within an assessment unit will influence the quality of the habitat. This will be assessed by either direct observation or the observation of scats and tracks.

References

DAWE. 2020. *Geophaps scripta scripta — Squatter Pigeon southern SPRAT Profile*. Department of the Environmen and Energy, Australian Government, Canberra. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64440

Appendix B

Summary of habitat quality scores for Brigalow TEC and SPPH

Table B-1: Habitat quality scores for Brigalow TEC

Site condition				
Polygon	***29***		**Average**	**30**
RE	n-r 11.3.1			11.3.2
Condition	33.5	35	34.25	n/a
Quality of feed	*n/a*			
Quality of shelter				
	Total Score		0.428125	
	Score/10		4.28125	
	Weighted (80%)		3.425	

Site context				
RE	n-r 11.3.1		**Average**	11.3.2
Context	4	4	4	n/a
Threats	*n/a*			
Species mobility				
Role of site				
	Total Score		0.2	
	Score/10		2	
	Weighted (20%)		0.4	

Species stocking rate

n/a

Habitat quality score (not TEC)

3.825

[Site Condition + Site Context]

Area of non TEC (ha)

75.0

Table B-2: Habitat quality scores for Squatter Pigeon primary habitat

Site condition						
Polygon	***29***		**Average**	***30***		**Average**
RE	n-r 11.3.1			11.3.2		
Condition	33.5	35	34.25	46	45	45.5
Quality of feed	20	20	20	18	23	20.5
Quality of shelter	5	5	5	15	15	15
Total Score		0.461538		**Total Score**		0.623077
Score/10		4.615385		**Score/10**		6.230769
Weighted (30%)		1.384615		**Weighted (30%)**		1.869231

Site context						
RE	n-r 11.3.1		**Average**	11.3.2		**Average**
Context	4	4	4	5	5	5
Threats	9	11	10	21	21	21
Species mobility	15	15	15	1	1	1
Total Score		0.230769		**Total Score**		0.207692
Score/10		2.307692		**Score/10**		2.076923
Weighted (30%)		0.692308		**Weighted (30%)**		0.623077

Species stocking rate

0 : No evidence the species is present at the site;

1: Evidence of species presence at the site during surveys conducted for the purpose of the EPBC environmental assessment;

2: There is a statistically significant increase in species density relative to the species density determined for a score of 1 or species density is equal to or greater than the species density at a reference site (not required to be an important population);

3: Equivalent to the species density at a reference site associated with an important population; and

4: Equivalent to the maximum species density measured at a DoEE agreed number of reference sites associated with important populations.

Polygon 29

Habitat quality score

3.076923

[Site Condition + Site Context + Species Stocking Rate]

Area of habitat (ha)

75.0

Polygon 30

Habitat quality score

3.492308

[Site Condition + Site Context + Species Stocking Rate]

Area of habitat (ha)

43.3

Appendix C

Habitat quality scores for potential offset areas – raw data

Table C-1: AU 8 [n-r 11.3.1]

Assessment Type:		OFFSET					
LOT ON PLAN		Lot 20 on SP276924 (ML 70171)					
Assessment Site No.:		THQ 1			THQ 4		
Polygon No. (Figure 21047_PRE_01A, 1B & 1C		29					
Polygon area (ha)		75					
Total Assessment Unit Area (ha):		**75.00**					
Regional Ecosystem:	11.3.1	n-r 11.3.1					
BVG1M:	25a	25a					
Ecological Condition Indicator	**Benchmark**	**Field value**	***% of Benchmark***	***Score***	**Field value**	***% of Benchmark***	***Score***
1. Recruitment of woody perennial species (%)	*100*	100	*100.00%*	*5*	100	*100.00%*	*5*
2. Native plant species richness (No.):							
- Trees	*3*	2	*66.67%*	*2.5*	2	*66.67%*	*2.5*
- Shrubs	*5*	3	*60.00%*	*2.5*	0	*0.00%*	*0*
- Grasses	*4*	9	*225.00%*	*5*	8	*200.00%*	*5*
- Forbs	*8*	10	*125.00%*	*5*	9	*112.50%*	*5*
3. Tree canopy height (m):							
- Canopy Layer	*14*	1.10	*7.86%*	*0*	1.55	*11.07%*	*0*
- Sub-Canopy Layer	*4*	0.00	*0.00%*	*0*	0.00	*0.00%*	*0*
- Emergent Layer	*n/a*		*n/a*	*n/a*		*n/a*	*n/a*
Average Score				*0*			*0*
4. Tree canopy cover (%):							
- Canopy Layer	*29*	50.00	*172.41%*	*5*	48.85	*168.45%*	*5*
- Sub-Canopy Layer	*9*	0.00	*0.00%*	*0*	0.00	*0.00%*	*0*
- Emergent Layer	*n/a*		*n/a*	*n/a*		*n/a*	*n/a*
Average Score				*2.5*			*2.5*
5. Shrub canopy cover (%):	*8*	0	*0.00%*	*0*	0	*0.00%*	*0*
6. Native perennial grass cover (%):	*8*	1	*12.50%*	*1*	14	*176.25%*	*5*
7. Organic litter (%):	*34*	31	*92.35%*	*5*	46	*135.00%*	*5*
8. Large trees/ha [combined: euc & non-euc]							
- euc (> cm)	*n/a*		*n/a*			*n/a*	
- non-euc (>29 cm)	*70*	0			0		
Total Large Trees	*70*	0	*0.00%*	*0*	0	*0.00%*	*0*
9. Coarse woody debris (m/ha):	*1752*	65	*3.71%*	*0*	0	*0.00%*	*0*
10. Non-native plant cover (%):	*0*	18	*18.40%*	*5*	6	*6.00%*	*5*
Site Condition Score				***33.5***			***35***
1. Size of patch (Fragmented) [ha]	*n/a*	0	-	*0*	0	-	*0*
2. Connectedness (Fragmented) [%]	*n/a*	16	-	*2*	16	-	*2*
3. Context (Fragmented) [%]	*n/a*	17	-	*2*	17	-	*2*
Site Context Score:				***4***			***4***
1. Quality & availability of food and habitat for foraging				20			20
2. Quality & availability of habitat required for shelter and breeding				5			5
3. Quality and availability of habitat required for mobility				15			15
4. Absence of threats				9			11
Species Habitat Attributes [{Squatter Pigeon}]:				***49***			***51***
SH Score			***4.9***			***5.1***	

Habitat quality scoring

	THQ 1	*THQ 2*
SC score	*0.4*	*0.4*
AU SC Score	0.2	
Weighted SC Score	*0.163132714*	
Site Condition Score	**1.6**	

THQ 1

Squatter Pigeon	A	B	C	D	
1	15	0	5		20
2	0	0	5		5
3	15				15
4	0	3	3	3	9
				Total	49

THQ 4

Squatter Pigeon	A	B	C	D	
1	15	0	5		20
2	0	0	5		5
3	15				15
4	0	5	3	3	11
				Total	51

Table C-2: AU 9 [11.3.2]

Assessment Type:		OFFSET					
LOT ON PLAN		Lot 20 on SP276924 (ML 70171)					
Assessment Site No.:		THQ 21			THQ 22		
Polygon No. (Figure 21047_PRE_01B_A)		30					
Polygon area (ha)		43.3					
Total Assessment Unit Area (ha):		**43.3**					
Regional Ecosystem:	11.3.2	11.3.2					
BVG1M:	17a	17a					
Ecological Condition Indicator	**Benchmark**	**Field value**	***% of Benchmark***	***Score***	**Field value**	***% of Benchmark***	***Score***
1. Recruitment of woody perennial species (%)	*100*	100	*100.00%*	*5*	100	*100.00%*	*5*
2. Native plant species richness (No.):							
- Trees	*2*	4	*200.00%*	*5*	3	*150.00%*	*5*
- Shrubs	*2*	9	*450.00%*	*5*	4	*200.00%*	*5*
- Grasses	*9*	6	*66.67%*	*2.5*	3	*33.33%*	*2.5*
- Forbs	*17*	15	*88.24%*	*2.5*	11	*64.71%*	*2.5*
3. Tree canopy height (m):							
- Canopy Layer	*18*	17.20	*95.56%*	*5*	15.60	*86.67%*	*5*
- Sub-Canopy Layer	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
- Emergent Layer	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Average Score				*5*			*5*
4. Tree canopy cover (%):							
- Canopy Layer	*40*	33.10	*82.75%*	*5*	39.45	*98.63%*	*5*
- Sub-Canopy Layer	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
- Emergent Layer	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Average Score				*5*			*5*
5. Shrub canopy cover (%):	*2*	2.00	*100.00%*	*5*	7.80	*390.00%*	*3*
6. Native perennial grass cover (%):	*35*	4.70	*13.43%*	*1*	3.10	*8.86%*	*0*
7. Organic litter (%):	*30*	35.70	*119.00%*	*5*	42.30	*141.00%*	*5*
8. Large trees/ha [combined: euc & non-euc]							
- euc (> 40 cm)	*22*	8	*n/a*		4	*n/a*	
- non-euc (n/a)	*n/a*	*n/a*			*n/a*		
Total Large Trees	*22*	8	*36.36%*	*5*	4	*18.18%*	*5*
9. Coarse woody debris (m/ha):	*1752*	117	*6.68%*	*0*	535	*30.54%*	*2*
10. Non-native plant cover (%):	*0*	62.30	*62.30%*	*0*	95.00	*95.00%*	*0*
Site Condition Score				***46***			***45***
1. Size of patch (Fragmented) [ha]	*n/a*	43	-	*5*	43	-	*5*
2. Connectedness (Fragmented) [%]	*n/a*	0	-	*0*	0	-	*0*
3. Context (Fragmented) [%]	*n/a*	4	-	*0*	4	-	*0*
Site Context Score:				***5***			***5***
1. Quality & availability of food and habitat for foraging				18			23
2. Quality & availability of habitat required for shelter and breeding				15			15
3. Quality and availability of habitat required for mobility				1			1
4. Absence of threats				21			21
Species Habitat Attributes [{Squatter Pigeon}]:				***55***			***60***
SH Score			***5.5***			***6***	

Habitat quality scoring	*THQ 21*	*THQ 22*
SC score	*0.6*	*0.6*
AU SC Score	0.6	
Weighted SC Score		*0.56875*
Site Condition Score		**5.7**

THQ 21

Squatter Pigeon	A	B	C	D	
1	15	3	0		18
2	0	10	5		15
3	1				1
4	10	5	3	3	21
				Total	55

THQ 22

Squatter Pigeon	A	B	C	D	
1	15	3	5		23
2	0	10	5		15
3	1				1
4	10	5	3	3	21
				Total	60

Appendix D

Photographs of assessment units

Assessment Unit 1 – n-r 11.3.1

Polygon 29 **(THQ 1)**

Polygon 29 **(THQ 4)**

Assessment Unit 2 – 11.3.2

Polygon 30 **(THQ 21)**

Polygon 30 **(THQ 22)**

Appendix B: Offset Area fixed monitoring location sites

Site Name	Protected matter	Easting (GDA94, Zone 55)	Northing (GDA94, Zone55)
Photo Monitoring			
PMS 1		673538	7463079
PMS 2		674250	7464034
PMS 4		677127	7463730
PMS 8		682660	7460635
PMS 10		681459	7458889
Biomass Condition Monitoring			
AU1 SS5	Both	674116	7464259
AU5 SS2	Both	677102	7463940
AU7 SS1	SPPH	682523	7460687
AU3 SS1	SPPH	681328	7458667
AU3 SS2	SPPH	681459	7458889
AU2 SS2	Both	674251	7462798
AU2 SS3	Both	673538	7463079
Fauna Monitoring			
FMS 1		674432	7461983
FMS 2		674904	7461508
FMS 3		676042	7460965
FMS 4		674105	7462855
FMS 5		674504	7463513
FMS 6		674191	7463975
FMS 11		677098	7463754
FMS 12		681328	7458667
FMS 13		683317	7460049
Tertiary Sites			
T1		682957	7462788
Quaternary Sites			
Q1		683245	7462744
Q3		683031	7463236
Q4		683380	7460277
THQ Plots			
THQ1		683593	7463003
THQ4		682917	7463214
THQ5		682316	7460988
THQ6		683330	7460211

Appendix C: GIS data files

Pack 1: 2016 Shapefiles (CO_2)

ID	Layer (Metadata) GDA94 / MGA zone 55	Description	Polygons
1	Offset Areas 2016 (CO_2)	Offset assessment areas Assessment Units (AUs) 1-10	10
2	Commonwealth Offset Area 2016 (CO_2)	Polygons of Commonwealth offsets areas OQ AU 1-5and 7-10.	10
3	Mine Leases (CO_2)	Polygons of mine lease areas.	10
4	Foxleigh Mine Properties	Foxleigh Mine Properties 20SP276924 and 4SP293492.	5
5	Squatter Pigeon (CO_2)	Squatter Pigeon habitat 2016.	1

Pack 2: 2021 Wet Season Survey Shapefiles (Nitro)

ID	Layer (Metadata) GDA94 / MGA zone 55	Description	Polygons
1	Offset Areas New 2021 (Nitro)	Features are AUs 1-10 across 22 EEM plots.	22
2	Brigalow TEC 2021 (Nitro)	Brigalow TEC areas within AUs 1-10.	7

Pack 3: 2021 Shapefiles (Engeny)

ID	Layer (Metadata) GDA94 / MGA zone 55	Description	Polygons
1	Squatter Pigeon 2021 (Engeny)	Squatter Pigeon Habitat 2021 with AU areas 1-5 and 7-10.	9
2	Proposed Offsets Area poly 29 and 30 2021 (HBA)	Proposed offset areas polygons 29 and 30.	2
3	Proposed Offsets Polys 2021_2(Engeny)	Proposed offset areas, polygons 1-4, 7, 15-18, 29-30	11

Appendix D: Permit to disturb proforma

Part A Activity Details			
Permit name		**Permit number**	
Activity description			
Location (ML/EPC/Lot)			
Relevant Environmental Authority (EA)			
Activity start date		**Activity completion date**	
Permit holder (disturber)		**Contact phone**	

Part B Clearance Checklist (to be completed by Permit Holder)			
Clearance checklist	**Yes**	**No**	**NA**
Has the site Environmental Representative been briefed on the activity?	☐	☐	☐
Has the Manager/Superintendent responsible for the area been briefed on the activity?	☐	☐	☐
Has a *Disturbance Work Plan* for this activity been provided with this permit? (minimum requirements are included in Appendix 1 of this form).	☐	☐	☐
Is the proposed disturbance within the approved disturbance footprint of the relevant Environmental Authority (EA)? Attach map. Works outside the approved disturbance footprint can incur a government penalty.	☐	☐	☐
Is the proposed disturbance within the current *Estimated Rehabilitation Calculator* (ERC) boundaries? Attach map.	☐	☐	☐
Have relevant services layers been reviewed to ensure no interaction with underground services? If so, a copy of an approved *Permit to Dig* must accompany this completed and uploaded permit.	☐	☐	☐
Is disturbance inside the "Actual and Proposed Mining Area" footprint of Attachment A, EPBC 2010-5421 (30 Sep-21)? This ensures we do not clear in excess of allowed "Protected Matters."	☐	☐	☐
Is disturbance **outside** an approved "Offset Area"? If inside additional requirements, see Part C.	☐	☐	☐
Is a valid *Burn Permit* available if required? An approved *Burn Permit* must accompany this completed and uploaded permit if required.	☐	☐	☐
Does the designed disturbance ensure that clean water runoff is kept separate as much as possible to water run-off from disturbance areas?	☐	☐	☐
Have adequate sediment controls been implemented/designed as per the site ESMP? Details of controls must be included in the *Disturbance Work Plan*. **If the disturbance is within 50 meters of a creek or other natural watercourse, additional approval must be sought from a site Environmental Representative.**	☐	☐	☐
Has all consideration been given to the following environmental aspects? Any identified considerations/controls must be detailed in the *Disturbance Work Plan*. • Entry restrictions ie Biodiversity offsets, rehabilitated areas, external parties • Cultural heritage (Aboriginal and European) • Material impacts to site water catchment map (WRM water balance map) • Have any observations of important fauna been made within the disturbance area?	☐	☐	☐
Has consideration been given to the equipment to be used in conducting the works?	☐	☐	☐

Part B Clearance Checklist (to be completed by Permit Holder)			
Clearance checklist	**Yes**	**No**	**NA**
If topsoil is to be stripped and stockpiled as part of these clearing works, has the stockpile location been identified? If no, provide comment. ***Topsoil is to be cleared within four weeks of vegetation clearing to minimize loss.**	☐	☐	☐
If any checklist points in Part B were checked No, further approval must be sought from a site Environmental Representative. A *Disturbance Work Plan* must accompany the *Permit to Disturb*.			

Part C – Clearance Checklist (to be completed by site Environmental Representative)			
Clearance checklist	**Yes**	**No**	**NA**
Is the area to be cleared and the activity to be conducted authorised under a current Environmental Authority or license?	☐	☐	☐
Are there any regulatory permits required (eg fauna, watercourses, cultural heritage, etc)?	☐	☐	☐
Is the proposed disturbance going to impact restricted areas (eg rehabilitation or rehab trial areas, contaminated lands areas, environmental monitoring locations, 50m of a creek or other natural watercourse?	☐	☐	☐
Is the clearance within an Approved Biodiversity Offset Area? If so, very limited clearing is required without federal department approval – consult BOMP to determine allowable clearing and conditions.	☐	☐	☐
Please provide a list of additional environmental controls to be used at the work site (eg sediment/erosion controls, weed controls, etc).			

Part D Approvals					
Permit Holder name and position		**Signature**		**Date**	
Environmental Representative name		**Signature**		**Date**	
Technical Services Manager		**Signature**		**Date**	

Appendix 1: Minimum requirements for a Disturbance Work Plan

- The *Disturbance Work Plan* must be of sufficient quality to release to personnel conducting the activity. It forms part of the operator work instructions.
- The following elements must be included in the *Disturbance Work Plan*:
  - Map(s) clearly indicating the boundary of the disturbance. Maps must:
    - be clearly demarcated so it is easy to identify the approved disturbance area.
    - include a title, legend, north arrow and a reference number (or naming).
  - Must include survey coordinates of the area to be disturbed.
  - Must include other relevant task instructions pertinent to additional controls in Part B of the permit.
  - Must be signed off by the Technical Services Manager.

After approval of this *Permit to Disturb*, the following must be done before disturbance works proceed:

- The proposed disturbance area must be clearly demarcated by survey staff with pegs or similar.
- All machinery and plant being used in activities must be site approved.
- All operators must be briefed on the nature of the disturbance works to be undertaken and must review the *Disturbance Work Plan*. Operators must sign a register indicating that they have reviewed the necessary documents and understand the activity.

A signed copy of this *Permit to Disturb* must be submitted to the site Environmental Representative and uploaded to the site database for record keeping. A copy of the *Disturbance Work Plan* must be attached to any JSA related to the disturbance works.

Appendix E: ~~MNES~~ PM Disturbance Reconciliation

Figure E1 Attachment B of EPBC 2010/5421 MNES polygons original and disturbed under LOMP

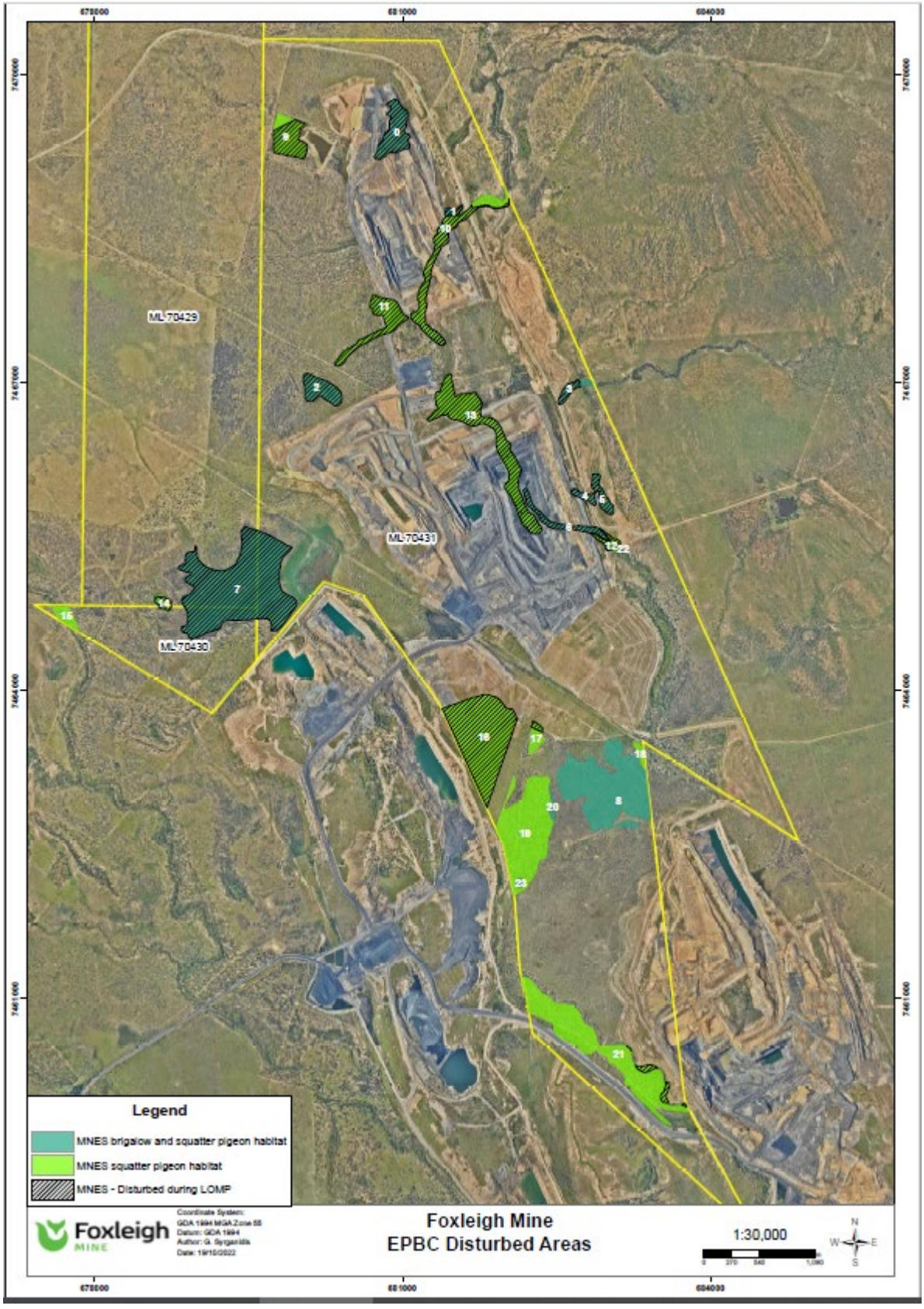


Table E1 Attachment B of EPBC 2010/5421 MNES polygons original and disturbed under LOMP

Polygon	Type	EPBC MNES Attachment B (ha)	LOMP Disturb (ha)
0	MNES brigalow and squatter pigeon habitat	10.6	10.6
1	MNES brigalow and squatter pigeon habitat	1.0	1.0
2	MNES brigalow and squatter pigeon habitat	7.3	7.3
3	MNES brigalow and squatter pigeon habitat	2.8	2.0
4	MNES brigalow and squatter pigeon habitat	1.7	1.7
5	MNES brigalow and squatter pigeon habitat	3.3	3.3
6	MNES brigalow and squatter pigeon habitat	4.9	4.9
7	MNES brigalow and squatter pigeon habitat	71.9	71.9
8	MNES brigalow and squatter pigeon habitat	51.4	0.0
20	MNES brigalow and squatter pigeon habitat	1.1	0.0
23	MNES brigalow and squatter pigeon habitat	0.5	0.0
	Subtotal	**156.6**	**102.8**
9	MNES squatter pigeon habitat	10.7	9.0
10	MNES squatter pigeon habitat	16.8	13.6
11	MNES squatter pigeon habitat	10.4	10.4
12	MNES squatter pigeon habitat	2.1	2.1
13	MNES squatter pigeon habitat	27.5	27.5
14	MNES squatter pigeon habitat	1.6	1.6
15	MNES squatter pigeon habitat	3.2	
16	MNES squatter pigeon habitat	41.7	41.7
17	MNES squatter pigeon habitat	3.4	0.6
18	MNES squatter pigeon habitat	1.6	
19	MNES squatter pigeon habitat	39.4	
21	MNES squatter pigeon habitat	45.2	2.0
22	MNES squatter pigeon habitat	0.2	
	Subtotal	**203.8**	**108.4**

Table E2 LOMP Proposed Disturbed versus EPBC approval

	EPBC Approval	Required Area	Variance
MNES brigalow and squatter pigeon habitat	96.2	102.8	-6.6
MNES squatter pigeon habitat	106.3	108.4	-2.1
	202.5	**211.2**	

Figure E1 replicates the MNES (now PM) as per Attachment B of EPBC 2010/5421. The hashed areas indicated the proposed disturbance under the LOMP for these PM areas. This information is tabulated in Table E1 to show the total PM areas and the corresponding proposed disturbance areas.

A reconciliation then occurs to the approved 30 Sep-21 EPBC in Table E2.

This shows that at some time in the future as disturbance and the mine progresses that additional areas of disturbance will need to be applied for and corresponding offsets provided:

- Brigalow TEC and SPPH – 6.6ha
- SPPH – 2.1ha

Foxleigh completes an annual compliance report showing the amount of PM disturbed at the end of each year and will apply for a variation to EPBC 2010/5421 at the time.

Foxleigh commits to supplying any required further offsets at the time of a variation request.