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METSERVE

Supporting Information
Terrestrial Ecology

relating to Significant Residual Impacts
on Prescribed Environmental Matters

April 2021



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1 INTRODUCTION

The Vulcan Complex Project (VCP) is a proposed small-scale mining operation in the Bowen Basin, Queensland. As part of the Environmental Authority Application (APP0051420), a Terrestrial Ecology Assessment was undertaken (METServe 2020). During the assessment process, some details of the VCP were changed, and a Notice of Change to an Environmental Authority Application was submitted to the Department of Environment and Science (DES). In response to this notice, DES provided an information request (dated 19 March 2021).

One of the items of information requested by DES relates to the re-assessment of impacts of the VCP on terrestrial ecological values. This request is as follows:

> "Provide an assessment of how the change in disturbance footprint impacts on the maximum extent of impact to prescribed environmental matters. Justify how each impact will be avoided or alternatively, managed, or minimised (mitigated). If residual impacts to prescribed environmental matters re-assess their offset requirements.
>
> Provide shapefiles of the location and area (ha) of impacts of prescribed environmental matters."

DES also comment that:

> "[The re-assessment] should include a demonstration of how impacts have been avoided in the first instance; if avoidance cannot be reasonably achieved, there is a requirement to demonstrate that impacts have been carefully managed and minimised (mitigated). If there is still a residual impact on a prescribed environmental matter after all reasonable avoidance and mitigation measures have been taken, impacts should be assessed using the Significant Impact Assessment Guideline.
>
> An offset may be required where the impact is or is likely to be significant. Refer to the general guide for the Queensland Environmental Offsets Framework to assist in interpreting and implementing the Queensland environmental offsets framework."

This report has been prepared to satisfy the above information request and comments. This has been achieved by re-assessing the updated mine plan against the baseline ecological data presented by METServe (2020). Further detail regarding offsets has also been provided.

2 ENVIRONMENTAL VALUES

No additional surveys were considered necessary as there have been no changes to the listed environmental values within the vicinity of the VCP. For a detailed description of these values, refer to Section 4 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3 ECOLOGICAL IMPACTS OF PROPOSED ACTIVITIES

For a map showing the revised project footprint, refer to Figure 1 in Appendix A of the response table.

3.1 GENERAL IMPACTS

3.1.1 Clearing

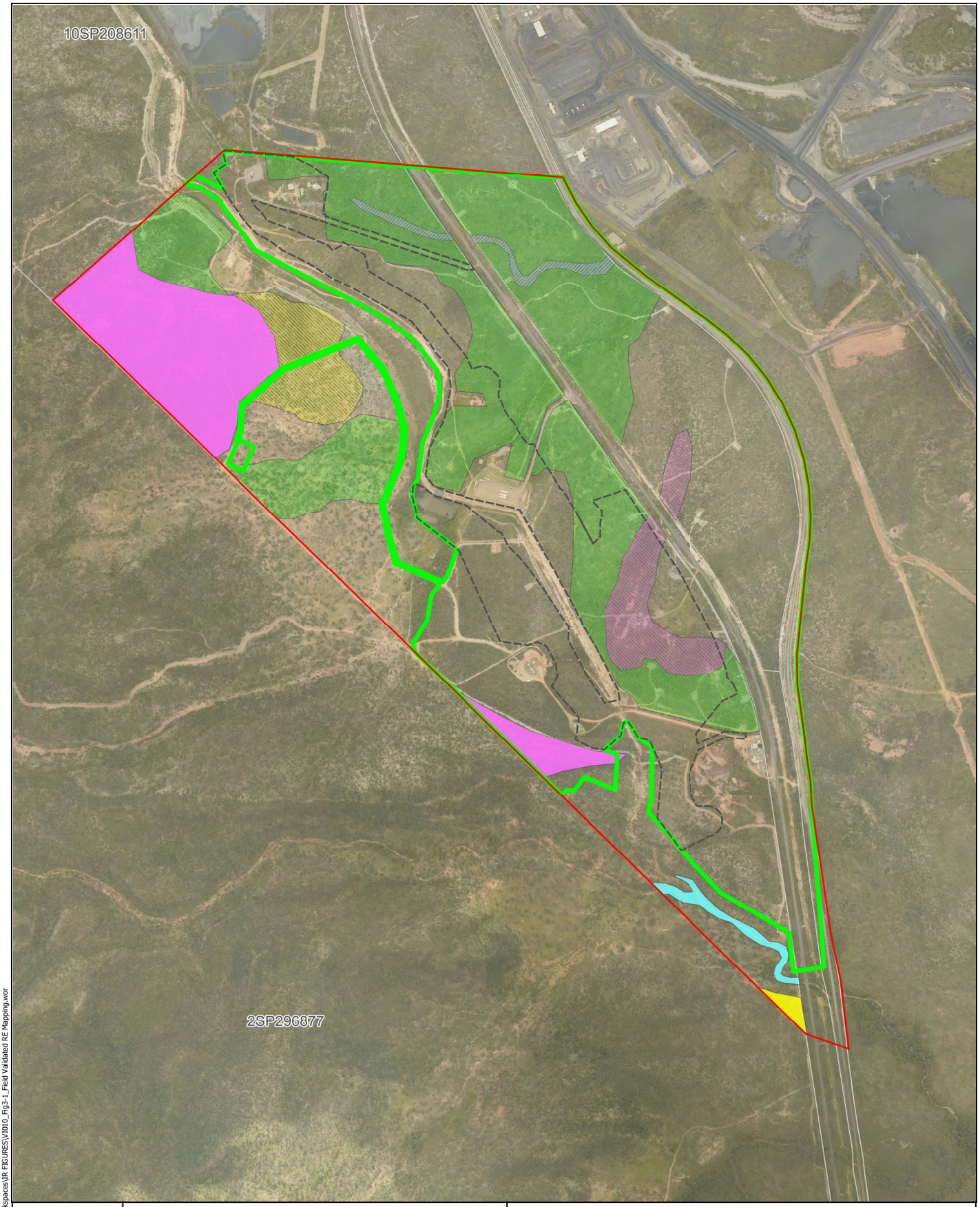
The clearing of vegetation to accommodate the pits, overburden stockpiles and infrastructure is the principal ecological impact of the VCP. The extent of this impact has been minimised to the greatest extent practicable by:

- primarily disturbing non-remnant vegetation (pastures and regrowth);
- utilising existing infrastructure in non-remnant pastures with low ecological value;
- utilising in-pit dumping of overburden, to reduce the overall size of the disturbance footprint;
- washing the coal in existing facilities off site; and
- accommodating the workforce in existing facilities in nearby towns.

The revised VCP footprint contains 199.7 ha (a reduction of 24.8 ha to that previously proposed). Based on field-verified regional ecosystem mapping, a total of 4.1 ha of remnant vegetation (category B regulated vegetation), 64.7 ha of high-value regrowth (category C regulated vegetation) and 130.9 ha of cleared pasture is contained within the revised project footprint (a reduction of 0.2 ha, 6.5 ha and 18.1 ha, respectively, to that previously proposed). The composition of this vegetation is listed in Table 3-1 and its location is shown in Figure 3-1. No new regional ecosystems will be disturbed as a result of the revised project footprint. Clearing of this vegetation constitutes the main loss of habitat that will result from the VCP. How this habitat loss affects matters of State and National environmental significance is assessed in Section 3.3.

Table 3-1 Vegetation to be cleared for the Vulcan Complex Project

Regional Ecosystem	Description	Amount to be cleared (ha)
11.10.3	Acacia shirleyi open forest on coarse-grained sedimentary rocks. Crests and scarps.	4.1
High-value regrowth 11.3.25	Eucalyptus camaldulensis forest fringing drainage lines.	2.6
High-value regrowth 11.5.9	Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces.	59.2
High-value regrowth 11.10.3	Acacia shirleyi open forest on coarse-grained sedimentary rocks. Crests and scarps.	2.6
High-value regrowth 11.10.7	Eucalyptus crebra woodland on coarse-grained sedimentary rocks.	0.3
Non-remnant	Cleared pasture and young regrowth.	130.9
Total footprint		199.7



LEGEND

- Mining Lease Area
- Cadastral Boundary
- BSP Approved Maximum Disturbance Footprint
- VCP Revised Maximum Disturbance Footprint

Field Verified RE

- 11.10.3
- 11.10.7
- 11.3.25
- HVR 11.10.3
- HVR 11.10.7/11.10.3
- HVR 11.3.25
- HVR 11.5.9
- non-rem

Data Source: Property Boundary - QLD Gov. (2012-2019); MDL Application Area, Aerial Imagery - Vitrinite (2019).
Project Disturbance Footprint - Vitrinite (2021)

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Vulcan Complex Project

Field Verified Regional Ecosystem Mapping

0 500 1000
Metres
Scale: 1:18,000 (A4)

16/04/2021

Datum: GDA94
Projection: MGA55

FIGURE 3-1

S:\Projects\V1010_Vulcan Complex Project_Jupiter section\MapInfo\Workspaces\IR FIGURES\V1010_Fig3-1_Field Validated RE Mapping.wor

The habitats present within the revised project footprint are not unique in a local context. All vegetation to be disturbed is represented by extensive areas of remnant vegetation within the broader survey area (refer to Table 4-1 and Figure 4-3 in the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020)). Furthermore, all flora and fauna recorded within or near the revised project footprint were widespread within similar habitats across the survey area, with the following exceptions:

- the weed Jatropha gossypiifolia (Bellyache Bush) was recorded at a single site within the revised project footprint, but not elsewhere within the survey area;
- Two reptiles (the Common Dwarf Skink Menetia greyii, and Coral Snake Brachyurophis australis) were recorded at a trap site within heavily grazed regrowth (refer to site S30: Appendix A in the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020)), which was within the revised project footprint. Despite not being recorded elsewhere within the survey area, these species are geographically widespread and common (both are listed as Least Concern under the Nature Conservation Act 1992 (NC Act)). They are likely to occur widely within the survey area, but the highly degraded habitats they were recorded within were not a focus of survey effort.
- Several species not recorded elsewhere within the survey area were recorded in riparian vegetation around the small dam within the project area, but outside the revised disturbance footprint (Water Rat Hydromys chrysogaster, Green Tree Snake Dendrelaphis punctulatus, and Chestnut-breasted Mannikin Lonchura castaneothorax). This dam will not be cleared by the VCP. These three species are geographically widespread and common (all are listed as Least Concern under the NC Act), and are highly mobile. They almost certainly utilise riparian habitats around dams, natural wetlands and creeks across the survey area and broader region.

No locally unique ecological values will be disturbed by the proposed clearing of (mostly) regrowth and already-cleared pastures.

3.1.2 Habitat Fragmentation

The revised project footprint will not introduce new barriers to the movement of wildlife.

3.1.3 Edge Effects

The revised project footprint will not increase the total length of edges in remnant or regrowth habitats, as most of the project area currently contains a patchy mosaic of remnant, regrowth, cleared areas and roads with a high total edge length.

3.1.4 Direct Mortality

The revised project footprint will not result in substantially increased direct mortalities as the revised vegetation to be cleared is regrowth or pasture, where hollows are mostly absent, and fallen debris is relatively sparse compared with nearby remnant vegetation. Given that the revised project footprint is similar in size to that previously proposed, there has been no change in this risk.

3.1.5 Vehicle Collisions

The revised project footprint will not introduce any new roads to the region or significantly increase traffic using existing public roads (the main source of vehicle collisions). There is no change to the number of vehicles that will service the VCP since the previous proposal. As a result, this risk remains unchanged.

3.1.6 Dust

The revised project will not result in any change in the risk posed by dust from that described for the previous project.

No threatened plant species or communities are located within 2 km of any dust-generating activities.

3.1.7 Groundwater Drawdown

The revised project does not propose new extraction of bore water, other than that described for the previous project, and the VCP is therefore not expected to affect any sensitive receptors (other land uses or groundwater-dependent ecosystems) through the drawdown of groundwater.

3.1.8 Noise and Vibration

The revised project will not result in any changes to the impacts posed by noise relative to the previous project, which were negligible.

3.1.9 Artificial Lighting

The revised project does not propose any artificial lighting additional to those proposed for the previous project, which were unlikely to significantly impact ecological values.

3.1.10 Waste

The revised project will not have any additional effects on waste, compared to the previous project.

3.1.11 Weeds and Pest Animals

No additional effects of weed invasion are expected to arise as a result of the revision of the project and no extra controls are necessary (Refer to Section 5.1.11 of the Terrestrial Ecology Assessment for Complex Project (METServe 2020)).

The revised project footprint will not have any additional effects on pest animal populations.

3.1.12 Cumulative Impacts

The small scale of the VCP relative to large existing mines in close proximity, and its lack of impacts to remnant vegetation, means that the revised project footprint is unlikely to contribute significantly towards cumulative impacts of mining within the region.

3.1.13 Summary

The clearing of 64.7 ha of regrowth vegetation (6.5 ha less than previously proposed) and 4.1 ha of remnant vegetation (0.2 ha less than previously proposed) is the principal impact of the revised project footprint on ecological matters.

3.2 Recommended Mitigation Measures

As part of a site-specific application for a new environmental authority for a resource activity, supporting information must include “strategies for avoiding, mitigating or managing the predicted impacts on the environmental values”.

The revised project will not result in any change in mitigation measures from that described for the previous project. Refer to Table 5-3 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020) for a list of recommended measures for reducing each of the impacts listed in Section 3.1.

3.3 Residual Impacts on Prescribed Matters

3.3.1 Regulated Vegetation

As it is a resource activity under the Environmental Protection Act 1994, section 107, the revised project footprint represents exempt clearing work under the Vegetation Management Act 1999. Nevertheless, any disturbance to vegetation classed as a prescribed matter may be subject to offsets.

The vegetation to be disturbed for the revised project footprint is listed in Table 3-2 (24.8 ha less than previously proposed). No new vegetation categories will be disturbed as a result of the revised project footprint. The only vegetation category to be disturbed that qualifies as a matter of State environmental significance is category R, which occurs within 50 m of watercourses. However, offsets are not required for Category R vegetation as it is not a prescribed matter (DES 2020).

Table 3-2 Regulated vegetation to be disturbed by the Vulcan Complex Project

Regulated Vegetation Category	Description	MSES*	Prescribed Matter†	Area to be disturbed (ha)		Total area within survey area (ha)
				Field-verified Map	Regulated Vegetation Map	
A	Declared area, offset area or other protected vegetation*	Yes	Yes	0	0	0
B	Remnant vegetation: Endangered*	Yes	Yes	0	0	145.7
	Remnant vegetation: Of Concern*	Yes	Yes	0	0.05	129.3
	Remnant vegetation: Least Concern	No	No	4.1	0.7	4,041.6
C	High-value regrowth: Endangered	Yes	No	0	0.1	4.0
	High-value regrowth: Of Concern	Yes	No	0	2.8	148.6
	High-value regrowth: Least Concern	No	No	64.7	99.4	632.8
R	Non-remnant vegetation within 50 m of a watercourse	Yes	No	10.1	0	111.5
X	Already-cleared areas or other exempt areas not regulated by vegetation management laws	No	No	120.8	96.6	1,353.0
Total				199.7	199.7	6,566.5

*Matters of State Environmental Significance (MSES) are defined in the State Planning Policy 2017.

†MSES that constitute prescribed matters are defined within Schedule 2 of the Environmental Offsets Regulation 2014.

Most of the vegetation categories (all but X) that do not individually constitute matters of State environmental significance are classed as significant if they occur "within a defined distance from the defining banks of a relevant watercourse". Any such watercourse vegetation that is remnant vegetation is also listed as a prescribed matter. Watercourse vegetation to be disturbed by the revised project footprint is listed in Table 3-3.

Table 3-3 Area of each vegetation category contained within a defined distance of the defining banks of relevant watercourses

Regulated Vegetation Category	Description	MSES*	Prescribed Matter†	Area to be disturbed (ha)		Total area within survey area (ha)
				Field-verified Map	Regulated Vegetation Map	
A	Declared area, offset area or other protected vegetation	Yes	Yes	0	0	0
B	Remnant vegetation: Endangered	Yes	Yes	0	0	1.9
	Remnant vegetation: Of Concern	Yes	Yes	0	0	28.9
	Remnant vegetation: Least Concern	Yes	Yes	0	0	384.2
C	High-value regrowth: Endangered	Yes	No	0	0.01	0

Regulated Vegetation Category	Description	MSES*	Prescribed Matter†	Area to be disturbed (ha)		Total area within survey area (ha)
				Field-verified Map	Regulated Vegetation Map	
	High-value regrowth: Of Concern	Yes	No	0	1.8	8.6
	High-value regrowth: Least Concern	Yes	No	5.9	10.8	28.6
R	Non-remnant vegetation within 50 m of a watercourse	No	No	6.7	0	111.4
Total				12.6	12.6	563.6

*Matters of State Environmental Significance (MSES) are defined in the State Planning Policy 2017.

†MSES that constitute prescribed matters are defined within Schedule 2 of the Environmental Offsets Regulation 2014.

Overall, the only Regulated Vegetation that is a matter of State environmental significance to be disturbed by the revised project footprint is 10.1 ha of category R vegetation and 12.6 ha of watercourse vegetation (made up of category C or R). Neither of these is a prescribed matter and these impacts are therefore not subject to offsets.

3.3.2 Groundwater-dependent Ecosystems

The revision of the project is not associated with any change to the risks to groundwater-dependent ecosystems. These risks remain negligible. Refer to Section 5.3.2 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020) for a detailed assessment of these risks.

3.3.3 Threatened Species

3.3.3.1 Koala

No primary habitat for Koalas will be removed as a result of the revised VCP footprint (Figure 3-2). All primary habitat is located further than 100 m from the VCP. A small amount of primary habitat is located less than 200 m, but further than 100 m, outside the southern end of the revised VCP footprint. However, the only infrastructure proposed within 500m of this habitat is a mine water dam, which will have no associated lighting or noise. No operational areas (e.g., mine pit, waste rock dump, offices, ROM) that are affected by lighting and/or noise will be within 500m of this habitat. Any impacts to the species from lighting or noise are likely to be negligible.

The revised project footprint will result in 3.0 ha of secondary habitat and 59.2 ha of marginal habitat for Koalas being removed. This is 0.4 ha more secondary habitat and 7.1 ha less marginal habitat than that previously proposed to be removed. This impact will last until mature food trees have been re-established in rehabilitated areas post-mining. It is expected to take 15 years post-planting for trees to be large enough to be used by Koalas. Re-colonisation of rehabilitated sites after 6 years has been recorded in wetter climates in south-east Queensland (Critescu et al. 2013), but a more conservative estimate is adopted here due to the drier climate and slower growth rates expected. As the final blocks of disturbed land can only commence rehabilitation at the cessation of mining activities (four years after the commencement of the VCP), the duration of disturbance is estimated to be 19 years. Viable populations of Koalas are expected to be maintained in extensive neighbouring undisturbed habitats throughout this disturbance period, providing a source of recruitment to rehabilitated areas in the future.

The location of this disturbance adjacent to existent mining operations means that no new barriers to dispersal are anticipated to arise as a result of the revised project footprint.

No changes to the realignment of Saraji Road are proposed. This realignment will have a net positive effect on the Koala (refer to the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020)). The road's new position will be further from primary and secondary habitats than the current

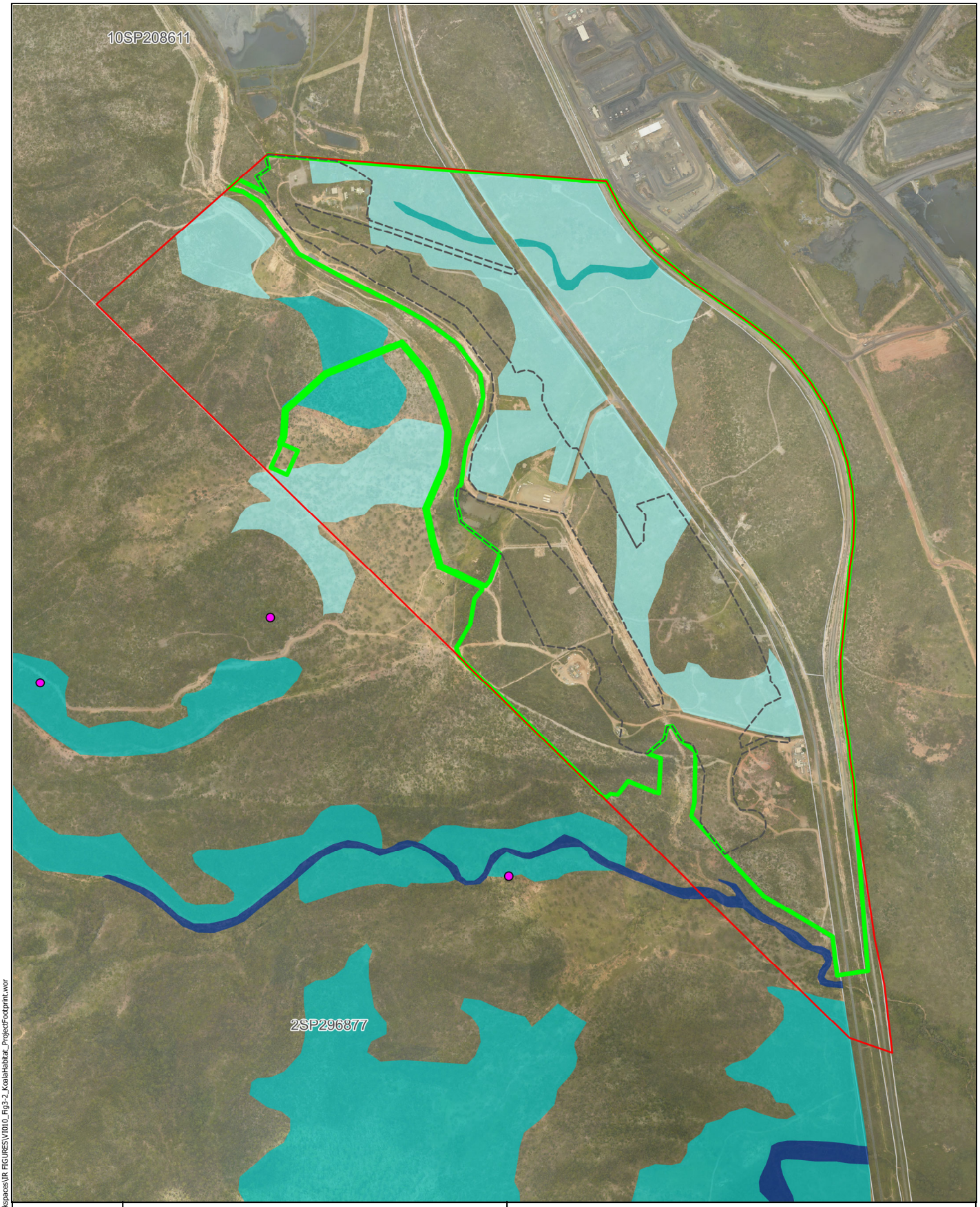
road, and its location between the Vulcan Complex Project and the Peak Downs Mine means that Koalas are unlikely to occur in its vicinity. This will reduce risk of collisions with vehicles.

The removal of secondary and marginal habitat may qualify as a significant residual impact under the Queensland Environmental Offsets Policy Significant Residual Impact Guideline (DEHP 2014), as the extent of occurrence of the species will be locally reduced (at least for 19 years, until habitat is rehabilitated post-mining), and ecologically significant locations (feeding and resting sites) will be disturbed over an estimated 19-year period. The habitat to be removed also qualifies as "habitat critical to the survival of the koala" under the EPBC Act.

3.3.3.2 Greater Glider

No habitat for Greater Gliders is expected to be removed as a result of the VCP (Figure 3-3). The VCP will not introduce any new barriers to dispersal for the Greater Glider, as continuous tracts of riparian habitat remain connected along all waterways in the survey area.

A small amount of habitat is located less than 200 m, but further than 100 m, outside the southern end of the revised project footprint. However, the only infrastructure proposed within 500m of this habitat is a mine water dam, which will have no associated lighting or noise. No operational areas (e.g., mine pit, waste rock dump, offices, ROM) that are affected by lighting and/or noise will be within 500m of this habitat. Any impacts to the species are likely to be negligible.



LEGEND

- Mining Lease Area
- Cadastral Boundary
- BSP Approved Maximum Disturbance Footprint
- VCP Revised Maximum Disturbance Footprint

Koala Habitat

- Primary
- Secondary
- Marginal
- Koala Sighting

Data Source: Property Boundary - QLD Gov. (2012-2019); MDL Application Area, Aerial Imagery - Vitrinite (2019).
Project Disturbance Footprint - Vitrinite (2021)

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Vitrinite

Vulcan Complex Project
Koala Habitat

0 500 1000

Metres

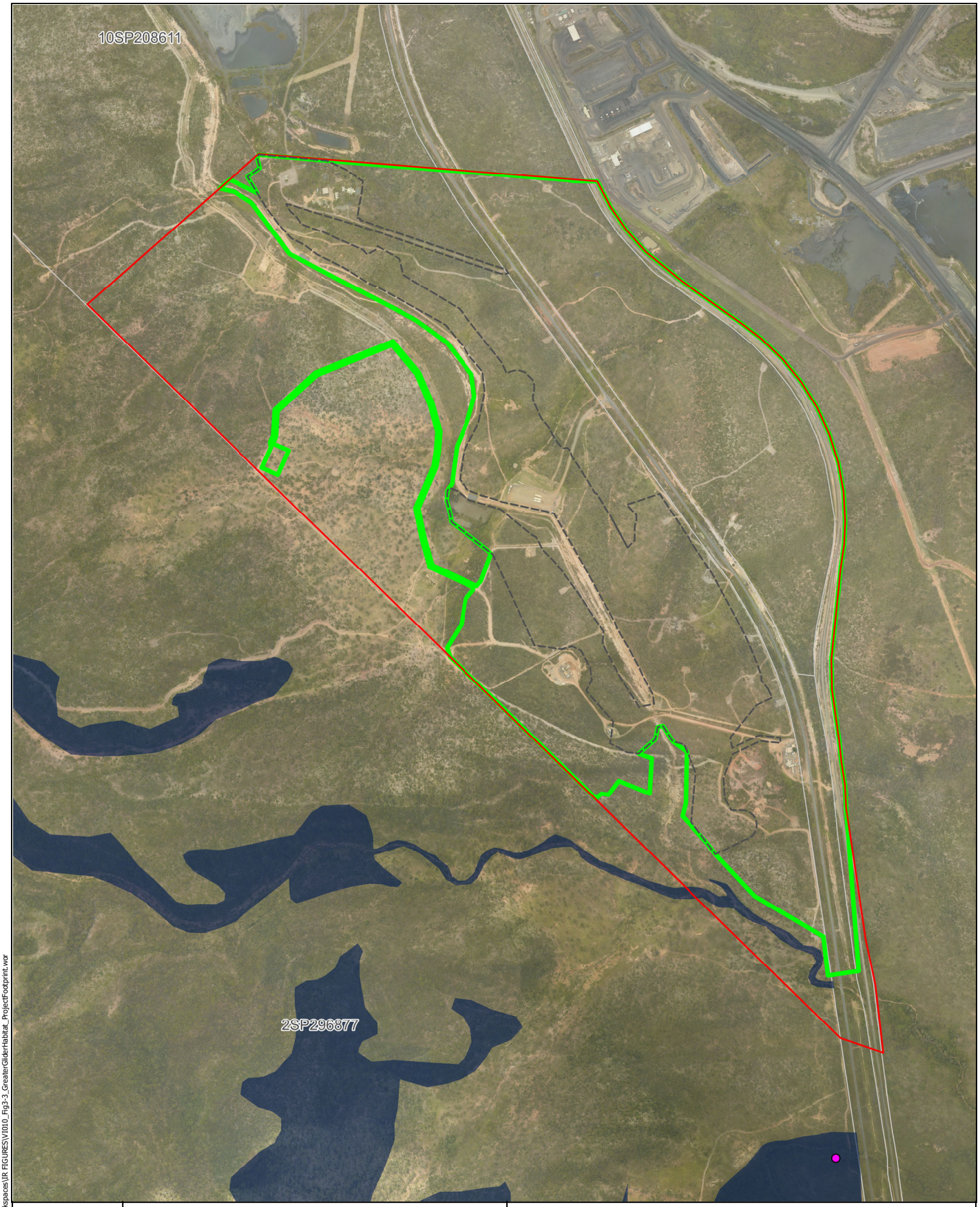
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Datum: GDA94
Projection: MGA55

FIGURE 3-2

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LEGEND

- Mining Lease Area
- Cadastral Boundary
- BSP Approved Maximum Disturbance Footprint
- VCP Revised Maximum Disturbance Footprint
- Greater Glider Habitat
- Greater Glider Sighting

Data Source: Property Boundary - QLD Gov. (2012-2019); MDL Application Area, Aerial Imagery - Vitrinite (2019).
Project Disturbance Footprint - Vitrinite (2021)

Vitrinite

Vulcan Complex Project
Greater Glider Habitat

0 500 1000
Metres
Scale: 1:18,000 (A4)

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Datum: GDA94
Projection: MGA55

FIGURE 3-3

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3.3.3.3 Squatter Pigeon

While attempts were made to position infrastructure away from habitat for the Squatter Pigeon, due to the large scale of this habitat across the local region, disturbance of this habitat could not be completely avoided. The revised project footprint was designed to avoid clearing a dam that the species uses for drinking. Furthermore, the overall project footprint was minimised by utilising in-pit dumping of overburden. This negates the need for constructing large out-of-pit waste rock dumps, and means that no void will remain after mining. Not only does this reduce the overall disturbance footprint, but it results in a relatively flat post-mining landform that is conducive to recreating habitat for the Squatter Pigeon. Squatter Pigeon habitat values have been incorporated into rehabilitation completion criteria within the Progressive Rehabilitation and Closure Plan.

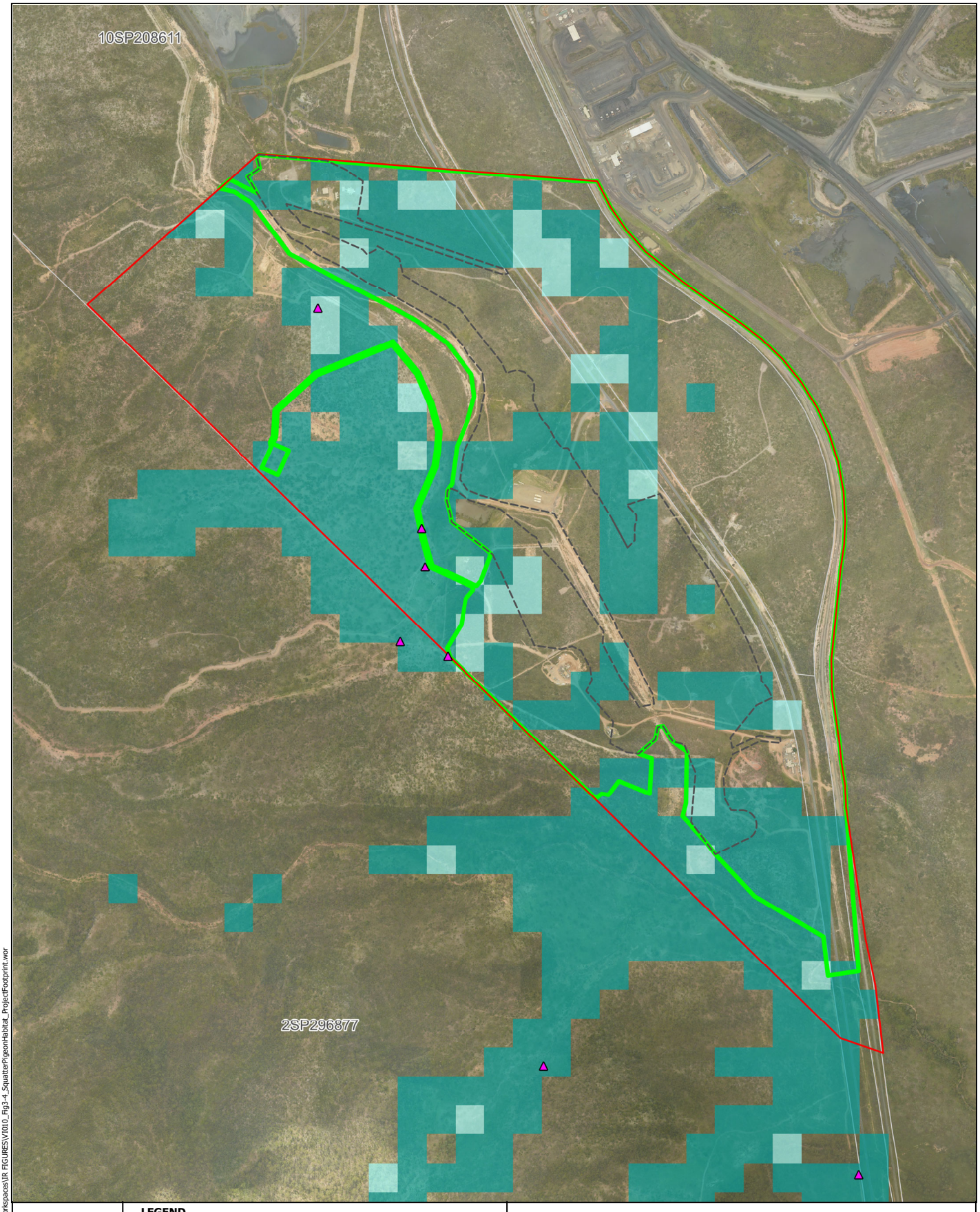
The revised project footprint requires the clearing of 61.1 ha of primary habitat for Squatter Pigeons and 15.8 ha of secondary habitat for Squatter Pigeons (Figure 3-4). This is 12.0 ha less primary habitat and 0.2 ha more secondary habitat than that previously proposed. No sources of water used by Squatter Pigeons are expected to be removed by the VCP.

The size of the average home range of a pair of Squatter Pigeons is not known, but the related Partridge Pigeon (Geophaps smithii) is thought to occupy a home range of approximately 8 ha (Fraser et al. 2003). Assuming Squatter Pigeons are similar—a likely scenario, given their similar biology—the VCP could impact up to 9 pairs of Squatter Pigeons.

Assuming all potential habitat mapped within the survey area is occupied by Squatter Pigeons, and each pair occupies 8 ha, up to 364 pairs of Squatter Pigeons could inhabit the broader survey area. This is very likely to be an over-estimate, and occupancy rates of 50% within potential habitat are more consistent with rates of detection in the field. In this scenario, approximately 182 pairs of Squatter Pigeons are predicted to inhabit the survey area. This local population is likely to extend west and south of the survey area. With respect to the overall population, the VCP is unlikely to have a significant impact on the overall size of the local population.

The impacts of habitat clearance will persist at least for the short- to medium-term, until vegetation is re-established on mined land. Being a ground-dwelling bird, they are not dependent on old trees, and rehabilitated sites are expected to meet their requirements for a low, protective tree cover within 15 years post-rehabilitation (Ngugi and Neldner 2015). It is unknown whether the relatively simple understorey vegetation communities that typically establish on rehabilitated sites (Grigg et al. 2000; Ngugi and Neldner 2015) will meet the ecological needs of Squatter Pigeons. Their readiness to feed on introduced pasture species such as Urochloa mosambicensis and Stylosanthes spp. (Crome 1976; C.Wiley pers. obs. 2019) suggests that re-establishing appropriate food plants is likely to be achievable. Consequently, it is estimated that the duration of impacts will be approximately 19 years, although this estimate has low confidence, given the lack of data on the dietary requirements of the species.

Ecologically significant locations for threatened species in Queensland are defined by the Queensland Environmental Offsets Policy Significant Residual Impact Guideline (DEHP 2014) as “breeding, feeding, nesting, migration or resting sites”. As habitat mapped for Squatter Pigeons can contain sites used for feeding and nesting, any disruption to this habitat could constitute a significant impact to the species, according to this guideline. The scale of this disruption is, however, very small relative to the total extent of “ecologically significant locations” available for the species locally.



LEGEND

- Mining Lease Area
- Cadastral Boundary
- BSP Approved Maximum Disturbance Footprint
- VCP Revised Maximum Disturbance Footprint

Squatter Pigeon Habitat
- Primary
- Secondary

Squatter Pigeon Sighting

Data Source: Property Boundary - QLD Gov. (2012-2019); MDL Application Area, Aerial Imagery - Vitrinite (2019).
Project Disturbance Footprint - Vitrinite (2021)

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Vulcan Complex Project
Squatter Pigeon Habitat

0 500 1000
Metres
Scale: 1:18,000 (A4)

15/04/2021

Datum: GDA94
Projection: MGA55

FIGURE 3-4

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3.3.3.4 Short-beaked Echidna

Short-beaked Echidnas occupy home ranges of 50-100 ha (Nichol et al. 2011). The removal of 199.7 ha (24.8 ha less than previously proposed) of potential habitat for the revised project footprint therefore amounts to a loss of 2–4 territories. Given the extensive and continuous matrix of potential habitat to the west and south of the Vulcan Complex Project, these prescribed actions will have a negligible effect on local populations. As the habitat being removed could be used for feeding and breeding, it qualifies as an ecologically significant location according to the Queensland Environmental Offsets Policy Significant Residual Impact Guideline (DEHP 2014). Nevertheless, there are no habitat features of the revised project footprint that make it locally significant, and extensive tracts of habitat will be retained to the west. This retained habitat is of higher quality than that being removed, because much of it is remnant vegetation and thus contains an abundance of fallen timber, important for denning and providing termites. Sandstone areas to the west also contain an abundance of boulders, which provide den sites. Short-beaked Echidnas are expected to rapidly recolonise rehabilitated sites once grass cover and ants/termites have established (within one year of planting). This implies than any impacts to the echidna will be for a maximum of five years.

3.3.3.5 Rufous Fantail

The revised project footprint will not result in any meaningful change to the assessment of Rufous Fantails. Refer to Section 5.3.3.5 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.6 Fork-tailed Swift

The revised project footprint will not result in any change to the assessment of Fork-tailed Swifts. Refer to Section 5.3.3.6 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.7 Ornamental Snake

The revised project footprint will not result in any change to the assessment of Ornamental Snakes. Refer to Section 5.3.3.7 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.8 Latham's Snipe and Australian Painted-snipe

The revised project footprint will not result in any change to the assessment of the Latham's Snipe or Australian Painted-snipe. Refer to Section 5.3.3.8 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.9 Common Death Adder

Primary habitat for the Common Death Adder within the Harrow Range (remnant vegetation with sandstone boulders) will not be disturbed by the VCP. Nevertheless, the species could potentially utilise any vegetated habitats (remnant and regrowth) on site, and 68.8 ha of marginal habitat (lowland areas with an abundance of Cane Toads and few rocks) will be removed for the proposed mine and associated infrastructure (6.7 ha less than previously proposed).

The entire revised project footprint already supports high densities of Cane Toads, a major threat to Common Death Adders. The installation of sediment ponds and drainage infrastructure may cause temporary pooling of surface runoff, in which toads may breed. Given the close proximity of existing surface water to the VCP, and the short duration that drainage infrastructure will be in place, the VCP is likely to have a negligible impact on local toad populations.

Overall, it is anticipated that the VCP will have a negligible effect on local populations of the Common Death Adder.

3.3.3.10 Red Goshawk

Red Goshawks are probably extinct in the local region. Potential habitat for the species that occurs on site is of poor quality; escarpments and nearby waterways mostly lack surface water, and the surrounding landscape is already highly modified through mining and clearing for grazing. The Red Goshawk rarely breeds in areas with fragmented native vegetation (TSSC 2015), and never more than 1 km from water. Consequently, the importance of the region to the species is considered to be low. The loss of 68.8 ha (6.7 ha less than previously proposed) of local habitat for the species is, therefore, considered inconsequential for its long-term conservation.

3.3.3.11 Yakka Skink

The revised project footprint will not result in any change to the assessment of Yakka Skinks. Refer to Section 5.3.3.11 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.12 Annual Wiregrass

The revised project footprint will not result in any change to the assessment of Annual Wiregrass. Refer to Section 5.3.3.12 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.13 Ghost Bat

The VCP will not disturb any roosts for Ghost Bats or remove foraging habitat within 1-10 km of known roost sites. It is unlikely that the revised project footprint is used in any capacity by the species, and no residual impacts on Ghost Bats are anticipated.

3.3.3.14 Dunmall's Snake

The revised project footprint will not result in any change to the assessment of the Dunmall's Snake. Refer to Section 5.3.3.14 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.15 Allan's Lerista

The revised project footprint will not result in any change to the assessment of the Allan's Lerista. Refer to Section 5.3.3.15 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.16 Special Least Concern Birds

The revised project footprint will not result in any change to the assessment of Special Least Concern Birds. Refer to Section 5.3.3.16 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.17 King Bluegrass

The revised project footprint will not result in any change to the assessment of King Bluegrass. Refer to Section 5.3.3.17 of the Terrestrial Ecology Assessment for Vulcan Complex Project (METServe 2020).

3.3.3.18 Significant Residual Impacts

Significant residual impacts to matters of State environmental Significance may require offsetting under the Environmental Offsets Act 2014. In Queensland, the significance of residual impacts to prescribed matters is defined by the Queensland Environmental Offsets Policy Significant Residual Impact Guideline (DEHP 2014), which is administered under the Environmental Offsets Act 2014.

As the criteria differ for threatened wildlife and special least concern wildlife, these are assessed separately in Table 3-4 and Table 3-5, respectively. This assessment found that it is likely that the VCP will have a significant residual impact on one matter of State environmental significance (Squatter Pigeon). Two additional species (the Koala and Short-beaked Echidna) could also experience residual

impacts, but the small scale of this disturbance and the low quality of habitat being disturbed means that these impacts may not qualify as significant.

Table 3-4 Assessment of significance of impacts to threatened species of state significance

Threatened Species	Will there be a long-term decrease in the size of a local population?	Will the extent of occurrence of the species be reduced?	Will an existing population be fragmented?	Will it cause genetically distinct populations to form through isolation?	Will it result in harmful invasive species?	Will it introduce disease?	Will it interfere with the recovery of the species?	Will it cause disruption to ecologically significant locations?*
Koala	No	Minor	No	No	No	No	No	Minor
Greater Glider	No	No	No	No	No	No	No	No
Squatter Pigeon	No	Minor	No	No	No	No	No	Yes
Ornamental Snake	No	No	No	No	No	No	No	No
Australian Painted-snipe	No	No	No	No	No	No	No	No
Common Death Adder	No	No	No	No	No	No	No	No
Red Goshawk	No	No	No	No	No	No	No	No
Yakka Skink	No	No	No	No	No	No	No	No
Annual Wiregrass	No	No	No	No	No	No	No	No
Ghost Bat	No	No	No	No	No	No	No	No
Dunmall's Snake	No	No	No	No	No	No	No	No
Allan's Lerista	No	No	No	No	No	No	No	No
King Blue-grass	No	No	No	No	No	No	No	No

*Ecologically significant locations are defined as breeding, feeding, nesting, migration or resting sites.

Table 3-5 Assessment of significance of impacts to Special Least Concern species of state significance

Special Least Concern Species	Will there be a long-term decrease in the size of a local population?	Will the extent of occurrence of the species be reduced?	Will an existing population be fragmented?	Will gene flow among populations be reduced?	Will ecologically significant locations be disrupted?*
Short-beaked Echidna	No	No	No	No	Minor
Fork-tailed Swift	No	No	No	No	No
Latham's Snipe	No	No	No	No	No

Rufous Fantail	No	No	No	No	No
Sharp-tailed Sandpiper	No	No	No	No	No
Oriental Cuckoo	No	No	No	No	No
Gull-billed Tern	No	No	No	No	No
Black-faced Monarch	No	No	No	No	No
Satin Flycatcher	No	No	No	No	No
Glossy Ibis	No	No	No	No	No

*Ecologically significant locations are defined as breeding, feeding or nesting sites.

3.3.4 Matters of National Environmental Significance

The revised project footprint will not result in any meaningful change to the assessment of MNES. Vitrinite has referred the VCP to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE). As a controlled action, the VCP is being assessed through Preliminary Documentation, which is yet to be submitted. This Preliminary Documentation will conclude that the Koala and Squatter Pigeon are MNES that are likely to experience significant residual impacts under federal definitions. An Environmental Offset Strategy is being developed to offset these residual impacts to the Koala and Squatter Pigeon. This will be submitted for assessment to DAWE as part of the Preliminary Documentation material. The Preliminary Documentation, including the Environmental Offset Strategy will be based on the revised project description.

3.4 OFFSET REQUIREMENTS

Offsets are required under the Environmental Offsets Act 2014, Environmental Offsets Regulation 2014 and the Queensland Environmental Offsets Policy 2020 if the residual impacts to prescribed matters, after avoidance and mitigation measures have been implemented, are considered significant.

Based on the assessment contained in Section 3.3, significant impacts to the vulnerable Squatter Pigeon (loss of 61.1 ha of primary habitat and 15.8 ha of secondary habitat) are likely to occur as a result of the VCP. Additional residual impacts to the vulnerable Koala (loss of 3.0 ha of secondary habitat and 59.2 ha of marginal habitat) and special least concern Short-beaked Echidna (loss of 199.7 ha of habitat) may be significant.

Impacts to the Koala and Squatter Pigeon are in the process of being assessed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and the VCP has been deemed by the minister as a controlled action. Therefore, under section 1.1.3 of the Queensland Environmental Offsets Policy, neither species is eligible for reassessment by the Queensland Government for the purposes of offsets.

The Short-beaked Echidna is not assessed under the EPBC Act and therefore the Queensland Government has the authority to condition the VCP with providing offsets for this species, if this is judged to be required. In light of the small spatial scale of the VCP, limited timeframe of any impacts, and retention of extensive, connected, high-quality habitat within the broader landscape, no offsets for the Short-beaked Echidna are proposed.

No significant residual impacts to any other prescribed matters are expected to result from the VCP and therefore no offsets are proposed for any matters additional to the Koala and Squatter Pigeon.

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