James Dornan

Diversified Minerals Pty Ltd

Level 10, 56 Pitt Street, Sydney, NSW 2000

Reference: 19ARM-12518

7 March 2019

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Dear James,

Vegetation zone mapping and calculation of vegetation integrity scores for proposed crossing at Dargues Gold Mine

Dargues Gold Mine, near Majors Creek in the NSW Southern Tablelands (IBRA South Eastern Highlands), was approved on 7th February 2012. Since then, three modifications to the approval have been granted. Modification 3 included a heavy vehicle crossing of Spring Creek (Crossing 2) to allow access between the process plant and the tailings storage facility. However, a further modification is now being sought to move the creek crossing approximately 400 m upstream (Crossing 1).

In response to Modification 4 MP10_0054, the Office of Environment and Heritage (OEH) have requested that vegetation integrity scores (VIS) be calculated using Biodiversity Assessment Method Calculator (BAMC) for both crossings. This is to demonstrate that the proposed crossing (Crossing 1) has a lower VIS, and therefore a lesser impact on biodiversity, than the approved crossing (Crossing 2), and that a Biodiversity Assessment Report (BAR) would not be required.

Eco Logical Australia (ELA) were engaged by Diversified Minerals to undertake the vegetation assessment at Crossing 1 and Crossing 2, and to calculate vegetation integrity scores and the required maps.

Methods

A site inspection was initially undertaken by Karen Spicer (ELA Senior Ecologist) on the 21st November 2018 to obtain the extent of native vegetation and possible Plant Community Types (PCT) within the development footprint. Additional field assessments were undertaken on the 6th March 2019 by Senior Ecologist David Allworth (BAM Assessor BAAS18163) and Graduate Ecologist Clare Duck. Vegetation surveys consisted of two plots at the approved location and two plots at the proposed location. Vegetation plots were surveyed in accordance with the Biodiversity Assessment Method (BAM). The BAMC was used to obtain VIS for each plot. The development footprint of the approved location, Crossing 2, is approximately 8950 m^2 whilst the development footprint of the proposed location, Crossing 1 is approximately 5500 m^2.

PCT Mapping

The field surveys declared that both the approved location and the proposed location occur within the same vegetation type, being heavily disturbed *Acacia* regrowth. Both sites are heavily degraded and are eroded due to past alluvial mining activities. The overstory consists of *Eucalyptus viminalis* (Ribbon Gum), *Eucalyptus pauciflora* (Snow Gum) and *Acacia melanoxylon* (Blackwood) with a shrub regrowth of *Acacia mearnsii*. Ground cover consists of *Microlaena stipoides* (Weeping Grass), *Poa labillardierei* and *Themeda triandra* (Kangaroo Grass). Weeds such as *Holcus lanatus* (Yorkshire Fog Grass), *Paspalum dilatatum*, *Rubus* spp. agg (Blackberry) and *Phalaris aquatica* were abundant at both locations. Based on the surrounding vegetation and soil types, two PCTs are likely to occur within the development footprint. PCT 1101 “Ribbon Gum – Snow Gun grassy open forest

on flats and undulating hills of the eastern tableland South Eastern Highlands Bioregion" occurs on the gentle undulating terrain, and PCT 1100 "Ribbon Gum – Snow Gun grassy forest on damp flats eastern South Eastern Highlands Bioregion" occurs in the riparian zone of Spring Creek. Both PCTs are similar in species composition and both PCTs also conform in part to the Threatened Ecological Community (TEC) Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions listed as endangered under the *NSW Biodiversity Conservation Act 2016* (BC Act). However, given the highly degraded nature of the area it is unlikely that the TEC occurs within the development footprint. Maps are included below.

Vegetation Integrity Assessment

A vegetation integrity assessment using the BAMC was undertaken to determine the vegetation integrity score (VIS). Plot data was entered into the BAMC to calculate the current VISs for the approved location (Crossing 2) and for the proposed location (Crossing 1). Floristic data is appended to this letter.

Outputs from the assessment included the scores for composition, structure and function attributes. The current vegetation integrity scores are outlined in in Table 1 below. The proposed new crossing has a vegetation integrity score (VIS) of **11.9** for PCT 1100 (riparian vegetation) and **27.3** for PCT 1101 (surrounding grassy open forest). The approved crossing has a VIS of **41.3** for PCT 1100 and the **27.3** for PCT 1101.

Table 1: Vegetation integrity data

Veg Zone	PCT ID	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
Crossing 1 Proposed	1100	0.08	21.2	4.6	16.9	11.9
Crossing 1 Proposed	1101	0.46	19.9	64.8	15.8	27.3
Crossing 2 Approved	1100	0.24	17.8	63.8	61.8	41.3
Crossing 2 Approved	1101	0.65	17.8	63.1	18.1	27.3

No threatened plants were observed on site, however Gang-gang Cockatoos (*Callocephalon fimbriatum*) were observed at both locations. Gang-gang cockatoos are dual listed species and are only species-credit species for breeding. The approved crossing (Crossing 2) requires the removal of mature native vegetation which is likely to include hollows for nesting Gang-gang cockatoos. The proposed new crossing (Crossing 1) will not require the clearing of mature native vegetation. The proposed crossing already has concrete within the creek, as the site was previously used as a vehicle crossing and is highly disturbed,

Conclusion

As per ELAs previous report (reference 18ARM-9625, dated 23 November 2018), the impacts to biodiversity were shown and compared for the approved location (Crossing 2) and the proposed location (Crossing 1). The vegetation integrity scores created using the BAMC and following the BAM protocol further support the

conclusions made previously that the proposed crossing will have a lower impact on biodiversity than the approved crossing. The reasons for this are:

- The proposed new crossing has a lower vegetation integrity score than the approved crossing location, 11.9 compared to 41.3.
- The proposed new crossing is shorter and a more direct route
- The proposed new crossing has concrete within the creek, and has already been used as a creek crossing
- No mature native vegetation will be removed at the proposed new crossing

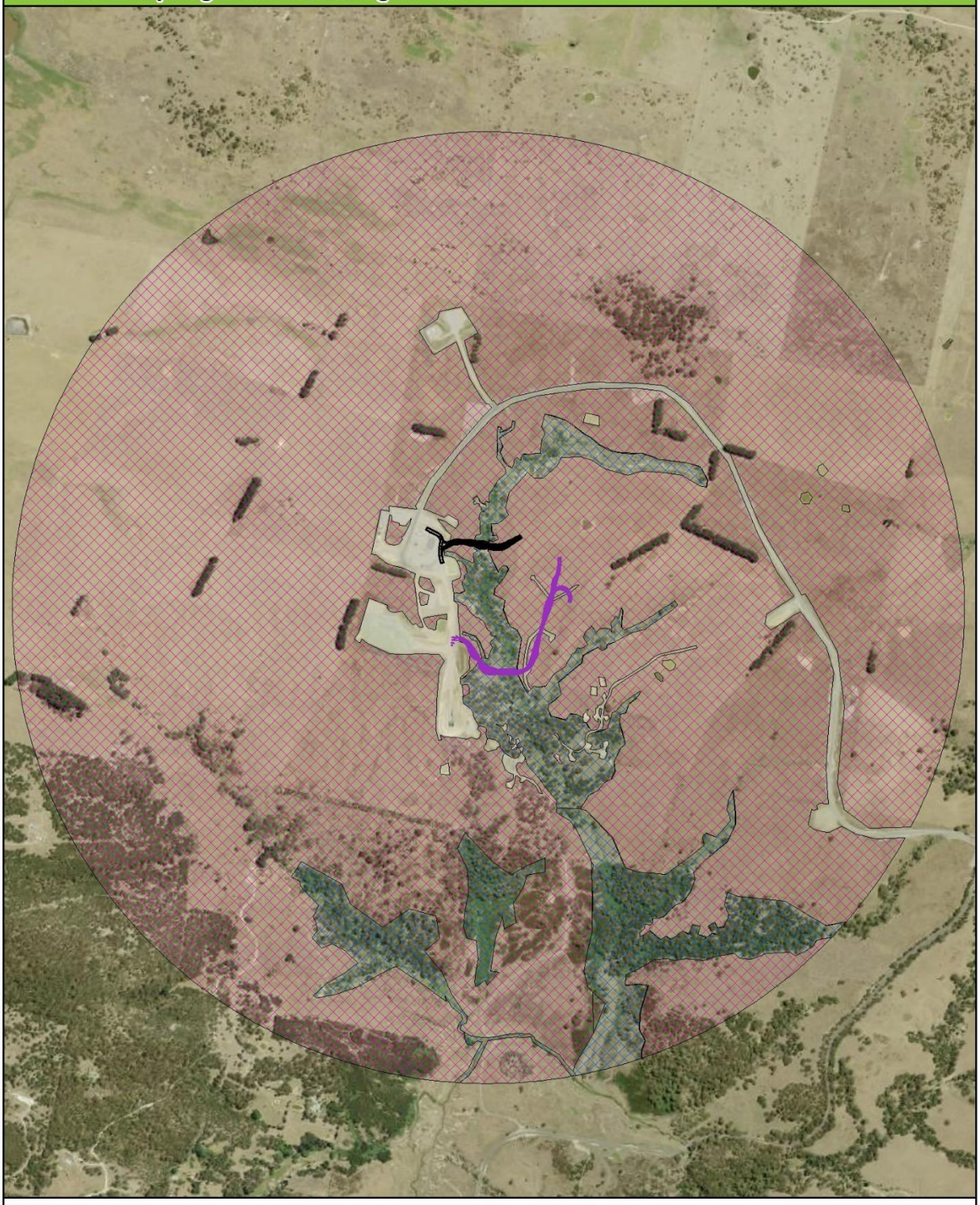
The proposed new crossing will not increase the impact on biodiversity values and a BDAR is not required to be submitted with Modification 4.

Regards,

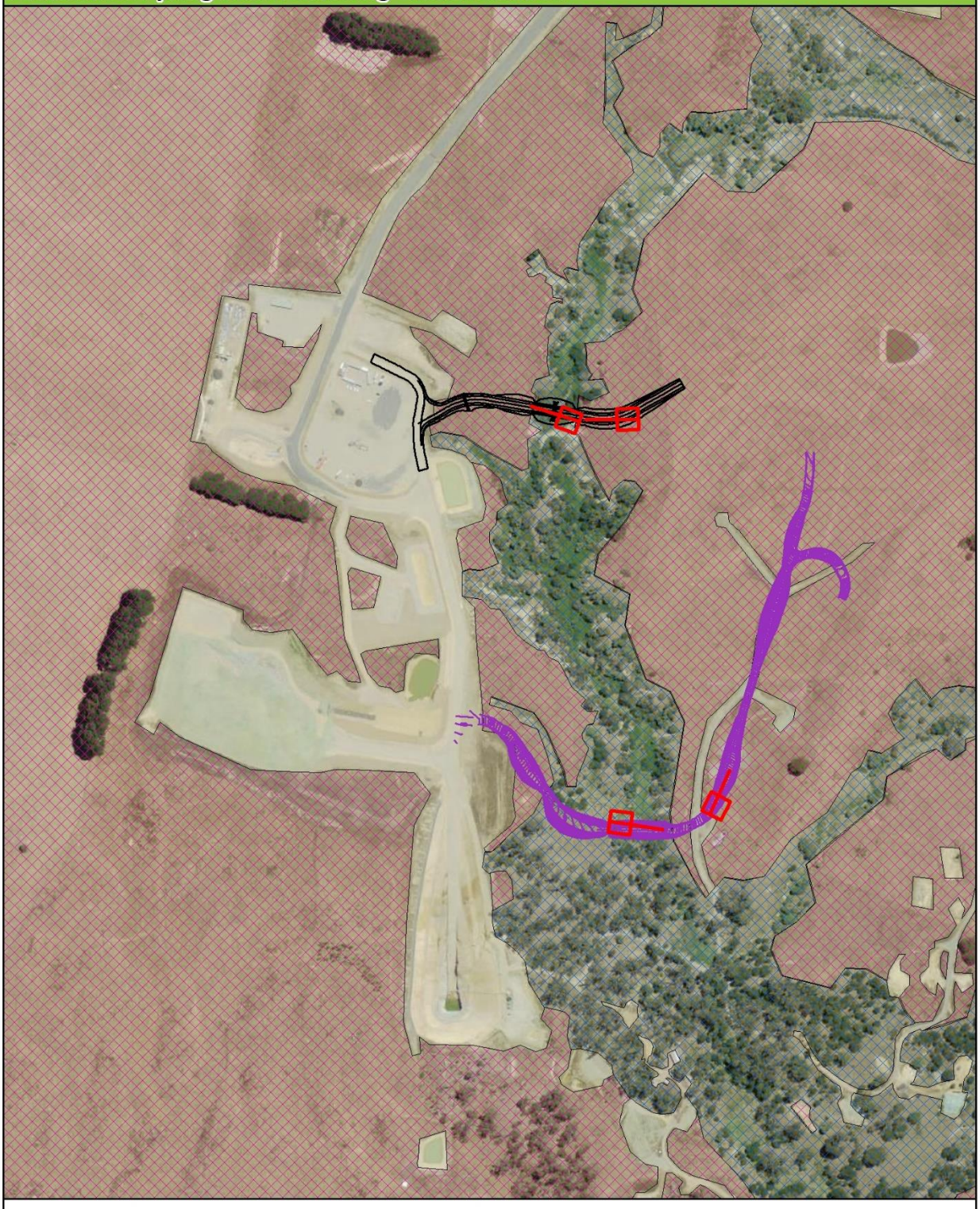
Dr Cheryl O'Dwyer
Senior Ecologist
BAAS18153

Location of Springs Creek crossing, Dargues Gold Mine Majors Creek

Location of Spring Creek Crossing - Modification 4



Location of Spring Creek Crossing - Modification 4



Flora species List

Species list and the percentage cover within each 20 x 20 m BAM plot.

Species	Plot 1 Crossing 1	Plot 2 Crossing 1	Plot 3 Crossing 2	Plot 4 Crossing 2
Acacia melanoxylon			15	
Acetosella vulgare		0.1	0.1	0.1
Anagallis arvensis			0.1	0.1
Aristida ramosa	0.1		0.1	
Aristida vagans	0.1			
Asperula conferta				0.1
Asperula sp.	0.1			
Bothriochloa macra	5	1	0.5	
Carex inversa		0.1		0.1
Centaurium sp.	0.1			
Centella asiatica	0.1		0.1	
Chenopodium sp.			0.1	
Chrysocephalum apiculatum	0.2			
Cirsium vulgare	0.2		0.1	
Conyza sp.	0.1		0.1	
Cynodon dactylon				0.1
Cyperaceae sp.			0.2	
Cyperus sp				0.1
Desmodium varians		0.1		
Digiteria sp.		0.1		
Einadia nutans			0.1	
Elusine tristachya				0.1
Eragrostis sp.		0.2		
Eucalyptus pauciflora	3			
Eucalyptus viminalis			2	

Species	Plot 1 Crossing 1	Plot 2 Crossing 1	Plot 3 Crossing 2	Plot 4 Crossing 2
Geranium solanderi var solanderi			0.1	0.1
Geranium sp. 2				0.1
Gonocarpus tetragynus		0.1		
Holcus lanatus			10	0.5
Hydrocotyle sp		0.1	0.1	
Hypochaeris glabra		0.1	0.1	0.2
Hypochaeris radicata	0.1			
Juncus sp.		0.1		0.5
Juncus usitatus	2			
Lepidium sp			0.1	
Modiola caroliniana			0.1	0.1
Microlaena stipoides		10	35	25
Oxalis sp	0.1	0.1	0.1	
Panicum effusum		0.1	0.2	10
Panicum sp.				0.1
Paspalum dilatatum	5	10	5	30
Persicaria sp				0.1
Phalaris aquatica	10	2	5	
Plantago lanceolata	0.2	0.2	0.2	2
Poa labillardieri	2	25	3	20
Polystichum sp 1.			0.5	
Polystichum sp 2,			0.1	
Pteridium esculentum			0.4	
Rubus fruiticosus sp agg.	10	0.1	2	0.3
Rumex brownii	0.1			0.1
Rytidosperma sp.	0.2		0.2	0.2
Schoenus sp.				0.1

Species	Plot 1 Crossing 1	Plot 2 Crossing 1	Plot 3 Crossing 2	Plot 4 Crossing 2
Sporobolus creba		0.1	0.1	
Sporobolus elongatus				0.1
Taraxacum officinale	0.1	0.1		
Themeda triandra	2	25	0.2	
Tricoryne elatior		0.1		
Trifolium repens	0.5		0.1	0.1
Typha domingensis	50			
Ulex europaeus		0.1	3	
Vittadinia muelleri	0.1			
Wahlenbergia communis	0.1		0.1	