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By email: [REDACTED]

4th June 2021

RE: Additional information regarding the nationally significant Giant Burrowing Frog *Heleioporus australiacus* for the Inquiry and Advisory Committee, Fingerboard Sand Mine, Glenaladale, Victoria

Dear Kirsty,

The following relates to my expertise of the Giant Burrowing Frog *Heleioporus australiacus* and detailed knowledge of the surveys undertaken by Ecology and Heritage Partners in the project area. I have been requested by White and Case on behalf of Kalbar Operations Pty Ltd to provide additional information to assist the Inquiry and Advisory Committee (IAC) in response to Brendan Casey's presentation on 20 May 2021 regarding the possible recorded call of the nationally significant Giant Burrowing Frog (i.e. currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) within the Fingerboards Mineral Sands Project Area (Submission Number 167). I have read and listened to Mr Casey's submission.

Ecology and Heritage Partners have undertaken comprehensive ecological surveys over several years to assess flora and fauna values within the project area, including targeted surveys for Giant Burrowing Frog (Ecology and Heritage Partners 2020). We also consulted with other subject matter experts with respect to the presence of the species in the region, survey methods for detection, the species' key habitat requirements, and the likelihood of the species occurring within the project area. This included Rohan Bilney who completed detailed Giant Burrowing Frog surveys in the nearby Mitchell River National Park (Bilney 2015).

In an effort to detect this cryptic species within the project area several survey methods were undertaken, including active searching, spotlighting, advertisement call surveys (call playback), and drive transects on roads and tracks. Given that Giant Burrowing Frog is known to emerge after heavy rain (>5 millimetres), when adult males call within or near free-standing water (Bilney 2015; DELWP 2011; author pers obs.), in order to maximise the likelihood of detection additional surveys were undertaken during optimal conditions over four nights (between 27 and 30 November 2018) which followed seven days of consecutive rainfall. It is important to note that field personnel also undertook terrestrial fauna surveys, including nocturnal surveys, along riparian / wetland habitats (i.e. the gullies, tributaries where Giant Burrowing Frog has the highest potential to occur) between 24 and 28 October 2016, 19 and 21 March 2018, and between 10 and 14 October 2018. However, no individuals (adults or juveniles) were detected (Ecology and Heritage Partners 2020). In addition, dip netting and fish surveys using nets in pools along the various gullies and drainage lines within the project area failed to detect tadpoles of the species, while habitat assessments determined that habitat was sub-optimal (i.e. lack of interconnected ephemeral pools, with suitable terrestrial forest habitat adjacent to drainage lines).

The surveys were undertaken in accordance with the survey standards for the species (DEWHA 2010; DELWP 2011). As such, based on survey results provided in the detailed ecological investigations conducted for the project (Ecology and Heritage Partners 2020), the highly modified landscape context (i.e. cleared areas supporting exotic vegetation within and adjacent to the gullies), and the lack of previous records in agricultural landscapes throughout the species geographical range, the likelihood of Giant Burrowing Frog occurring within the project area is low. Indeed, based on published literature of Giant Burrowing Frog and the species known habitat requirements (like many other frog species) the species has been documented to only temporarily occupy breeding habitat when habitat conditions are suitable (i.e. inundated pools), with adults spending most of their time in forested habitats (Penman *et al.* 2008). Penman *et al.* (2008) outlines the following:

‘We radio-tracked 33 individual Giant Burrowing Frogs in order to determine their habitat use and behaviour. Data from 33 frogs followed for between 5 and 599 days show that individuals spend little time near (<15 m) their breeding sites (mean 4.7 days for males and 6.3 days for females annually). Most time is spent in distinct non-breeding activity areas 20–250 m from the breeding sites. Activity areas of females were further from the breeding site (mean 143 m) than those of males (mean 99 m), but were not significantly different in size (overall mean 500 m²; males 553 m²; females 307 m²). Within activity areas, each frog used 1–14 burrows repeatedly, which we term home burrows’.

This research demonstrates that it is likely that Giant Burrowing Frog requires suitable terrestrial habitat (i.e. supporting high quality forest habitat) where individuals can occupy burrows outside the breeding period. Most of the terrestrial habitat surrounding the gullies and riparian habitat throughout the project area comprises cleared agricultural land containing introduced pasture grasses, or plantations, with most gullies not fenced and are currently experiencing ongoing threats associated with stock. Furthermore, most of the drainage lines / gullies remain dry throughout the year or would inundate for short periods of time, thus they are unlikely to be suitable for successful larval development and recruitment. This is contrary to the high-quality riparian habitats where the species has been detected along Stony Creek (in Mitchell Creek National Park and adjoining areas), located approximately 6-8 kilometres north east of the project area (Figures 1-3) (Bilney 2015; DELWP 2020; ALA 2021).

It is important to note that documented records of the species available on the Victorian Biodiversity Atlas [administered by the Department of Environment, Land, Water and Planning (DELWP)] (DELWP 2020) and the Atlas of Living Australia (ALA 2021) are located in areas characterised by high quality riparian vegetation connected to extensive areas of high quality forest habitat which is consistent with the species’ habitat preferences (Penman *et al.* 2004; Bilney 2015). While the recent record of the species along Stony Creek by Mr Casey is of interest and of high conservation importance (Figures 1-3), it is important not to draw too many similarities between this site (located in a different catchment and waterway system) and the riparian habitats present along the drainage lines within the project area. Indeed, given the presence of extensive areas of contiguous high quality riparian and terrestrial habitat suitable for Giant Burrowing Frog (i.e. comparatively less areas that have been cleared for agriculture), and the confirmed presence of the species along multiple sections of Stony Creek, it is not surprising that the species was positively identified at an additional site along the Creek (see Figures 1-3). In contrast, high quality riparian and aquatic habitat (breeding habitat) is largely absent from the project area, where most drainage lines have previously and/or are currently experiencing a high degree of disturbance from stock (cattle) and plantation operations.



Figure 1. Giant Burrowing Frog recorded by Mr Casey along Stony Creek, approximately eight kilometres from the boundary of the proposed Fingerboards Mineral Sands Project (ALA 2021). The project area is further to the south west of where it says Glenaladale.



Figure 2. Giant Burrowing Frog recorded by Mr Casey along Stony Creek, approximately eight kilometres from the project area. The orange dot with the red circle shows the location of the recent record of the species (i.e. May 2020). The other orange dots show the locations of the previously documented records of the species along Stony Creek.



Figure 3. Giant Burrowing Frog recorded (blue dot) by Mr Casey (May 2020) along Stony Creek, approximately eight kilometres to from the project area. Of note is the extensive areas of high-quality forest habitat to the south and west of Stony Creek (red polygon) and the availability of breeding habitat along Stony Creek (blue polygon).

I provide the following responses to Mr Casey's submission:

- Despite Mr Casey's best intentions to accurately validate the suspected Giant Burrowing Frog call (i.e. seeking confirmation from other subject matter experts), the information provided in his submission remains inconclusive, with the call data either requiring further analysis (by other experts), or for additional acoustic surveys to be undertaken at the subject survey location(s). While a resident population of the species could conceivably persist in modified agricultural environments (including within small sections of the project area – i.e. principally drainage lines), further empirical data would be required to unequivocally confirm the presence of the species within the project area.
- Although Mr Casey stated that the bioacoustics monitors were placed near the geographic centre of the proposed mine, he did not provide information on exact location(s) of the frog recordings. In the absence of available information, it is impossible to confirm the location of the suspected Giant Burrowing Frog record.
- Giant Burrowing Frog has a distinct call that can be readily identified and distinguished from other species that occur in the same geographic area. Despite this, none of the five experts that were consulted by Mr Casey could conclusively identify the call as belonging to Giant Burrowing Frog, even though 58 calls were recorded. Mr Casey stated that the main reason why a positive identification could not be made was the higher than expected peak frequency of the sound that could potentially be explained as an environmental response to acoustic interference (i.e. rain) at the time of the recording. I have over 25 years' experience undertaking frog surveys, including over 15 years analysing hundreds of frog calls each year as part of the Melbourne Water's Frog Census, and other projects throughout south-eastern Australia. Based on my extensive experience with frog call analysis there is a high probability of accurately identifying this species in recordings provided that the audio is clear

(i.e. no major interference with the microphone or background noise such as wind), and as such, I am confident that I could verify the record (provided it is of reasonable quality) if it is indeed a Giant Burrowing Frog. However, unfortunately I have not had the opportunity to listen to Mr Casey's acoustic recordings from the project area.

- In Mr Casey's submission, he notes that rain can be heard in the recording taken in early April 2021, although the exact date is not provided. However, this contradicts data from the Bureau of Meteorology (BOM), with data at the closest weather station at Mitchell River at Glenaladale (station number 085270) recording no rainfall between 29 March and 8 April 2021 (Appendix 1). Calling activity from Giant Burrowing Frog has been documented to occur within a week of heavy rainfall (Bilney 2015; Penman *et al.* 2004; author pers. obs.), yet the record in early April does not correspond to any rainfall events (BOM 2021). Indeed, there was only a single day (i.e. 28 March 2021) where more than 5.4 millimetres of rain was recorded. On 24 March, 37 millimetres of rain was recorded (Appendix 1) from the weather station at Mitchell River at Glenaladale and calling activity from any resident individuals would have been expected to occur closer to this date.

Bilney (2005) states the following with respect to the weather conditions when Giant Burrowing Frog was detected at sites in Mount Alfred State Forest and Lower Mitchell River National Park, East Gippsland:

'the role of rainfall in stimulating calling varied. Most detections followed recent rainfall (<7 days: a product of survey bias), but the two incidental records were obtained 13 and 15 days since rainfall of >5 mm. Temperature and humidity were not recorded during these two calling events (in February and August), but at other calling times air temperature ranged from 10.1 to 17.50C, with 65 to 97% relative humidity. Wind strength was mostly calm during surveys (<10 km/h), but three detections occurred with light breeze (10–20 km/h). Although numerous surveys were undertaken when creeks were flowing moderately, all calling events were at times of no or slow creek flow'.

Although there is a low likelihood that a resident population of Giant Burrowing Frog occurs within the Fingerboards Mineral Sands project area, the precautionary principle can be applied through the post-approval conditions for the project (assuming the project is approved) by including the requirement to prepare an Environmental Management Plan and a Species Conservation Management Plan (Ecology and Heritage Partners 2020). These plans will outline any necessary requirements for targeted surveys (to determine species presence and population size) prior to any disturbance of habitats, and include ongoing monitoring for significant fauna species, including Giant Burrowing Frog. Any additional targeted Giant Burrowing Frog surveys would need to occur along drainage lines (aquatic environments / tributaries) within and directly adjacent to the project footprint. In the event that a resident population of the species be detected within the project area, and if confirmed habitat is proposed to be disturbed (i.e. not avoided), measures such as salvage of adults and tadpoles, captive management and breeding, and experimental re-introduction procedures may need to be included in the Species Conservation Management Plan. Collaboration with key subject matter experts (i.e. experienced herpetologists), DELWP and other organisations such as Zoos Victoria would be required.

There have been recent conservation efforts undertaken for Giant Burrowing Frog where tadpoles have been collected in early 2021 from sites in far East Gippsland and these tadpoles are currently being reared at the Melbourne Zoo as part of the captive-breeding program for the species (ABC article dated 31 March 2021) (ABC 2021). There are several other amphibian conservation and research programs in Australia that are

currently being managed by experienced herpetologists, including for Green and Golden Bell Frog *Litoria aurea*, Booroolong Frog *Litoria booroolongensis* Frog, Yellow-spotted Bell Frog *Litoria castanea*, Spotted Tree Frog *Litoria spenceri*, Baw Baw Frog *Phyllorhina frosti*, and Southern Corroboree Frog *Pseudophryne corroboree*. Any salvage operations, captive management and breeding, and potential re-introduction of Giant Burrowing Frog into suitable habitats in the local area of the proposed mine would need to be approved by DELWP's Translocation and Evaluation Panel and be undertaken by experienced herpetologists.

I trust this information assists IAC and should you have any questions or require clarification on anything outlined above please do not hesitate in contacting me on [REDACTED]

Yours sincerely

Aaron Organ









Director / Principal Ecologist

Ecology and Heritage Partners Pty Ltd

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Appendix 1. Rainfall data for 2021 at Mitchell River at Glenaladale (BOM 2021).

2021 ▾	Jan	Feb	Mar	Apr	May	Jun
Graph						
1st	0	0	0	0	0	
2nd	0	9.4	0	0	0	
3rd	0.2	0.2	0	0	2.4	
4th	9.4	0	0	0	5.8	
5th	0.2	0	0.8	0	11.4	
6th	6.0	26.2	0	0	6.4	
7th	6.4	0.2	0	0	0.6	
8th	1.2	0	0	0.2	0	
9th	0	0	17.0	0.8	0	
10th	0	0	0.2	0	0	
11th	0	0	0	2.6	14.0	
12th	0	0.6	10.8	2.8	26.6	
13th	0	0.4	0.2	0	0.4	
14th	0	0.6	16.0	0	1.8	
15th	0	0	0	0.4	0.8	
16th	1.6	0	0	2.2	0.4	
17th	0.4	0	0	0.2	5.8	
18th	0	0	0	0	0	
19th	0	0	0	0	0	
20th	0	0	0	0	0	
21st	0	0.6	0.2	6.8	0.2	
22nd	0	0.4	0	0	0	
23rd	0	0.2	10.0	0	0.2	
24th	0	0	37.2	0	0	
25th	0	0	0.6	0	0	
26th	0	0	0	0	3.0	
27th	8.6	0	0	0	0	
28th	0	0	5.4	0	1.0	
29th	0		0	0	0	
30th	14.8		0	0	0	
31st	1.0		0		0.2	
Highest Daily	14.8	26.2	37.2	6.8	26.6	
Monthly Total	49.8	38.8	98.4	16.0	81.0	

Annual total to May this year = 284.0 mm