VRX ARROWSMITH NORTH PROJECT:

Paracaleana dixonii SEARCH

IN

PROPOSED MINE AND PLANT AREA

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Prepared for VRX Silica Limited

By

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1.0 Introduction

VRX Silica Limited (VRX) is seeking to develop the Arrowsmith Silica Sand Project, a series of high-grade silica sand mines. There are two sites which make up the Arrowsmith Silica Sand Projects, Arrowsmith North and Arrowsmith Central.

The Arrowsmith North Project (hereafter, the 'Project') is located approximately 270 km north of Perth and lies primarily within mining lease M 70/1389, held by Ventnor Mining Pty Ltd, a wholly owned subsidiary of VRX. The location of the Arrowsmith North Project is shown in Figure 1.

The Project will involve sequentially mining 8 – 15 m of sand from below the surface of the soil profile. Mining will be performed in sections by removing blocks (typically 150 x 150 metres), with an estimated five blocks being mined per year. The Project will not only require clearing of native vegetation for mining, but also to develop a mine feed plant, moveable surface conveyor, pipeline, processing plant, stockpiles, freshwater supply bore, access corridor, laydown, administration, water storage and associated infrastructure including: gas fired power station, communications equipment, offices, workshop and additional laydown areas. An area of initial development of mining and processing has been proposed for the Arrowsmith North Project and includes the initial mining blocks, plant area and access road linking Brand Hwy (hereafter 'survey area').

Paracaleana dixonii (Sandplain Duck Orchid; WAH, 2022) is a Threatened flora species listed as 'Endangered' under the *Environmental Protection and Biodiversity Conservation Act 1999* (it is also known as *Caleana dixonii*; DCCEEW, 2022). It grows to between 130 and 180 mm high and is a late flowering orchid (late October to early December) and the basal leaf is usually withered at the time of flowering (Brown *et al*., 2013). It is known from the area between Moore River NP and Dongara, generally 'growing in deep sandy soils in shrublands' (Brown, 2022). *Paracaleana dixonii* was recorded at two locations about 5 km's east of the initial development area of the Arrowsmith North Project area (Iluka Resources, 2014).

VRX commissioned Brian Morgan, Consultant Botanist, in collaboration with Daniel Marsh (Botanist), Kevin Uhe (a member of the 'Western Australian Native Orchid Study and Conservation Group' with an interest in *Paracaleana dixonii*) and three environmental scientists from Preston Consulting Pty Ltd to undertake a survey for *Paracaleana dixonii* in the proposed mine (first stage), plant area and access road area (survey area) in December 2022.

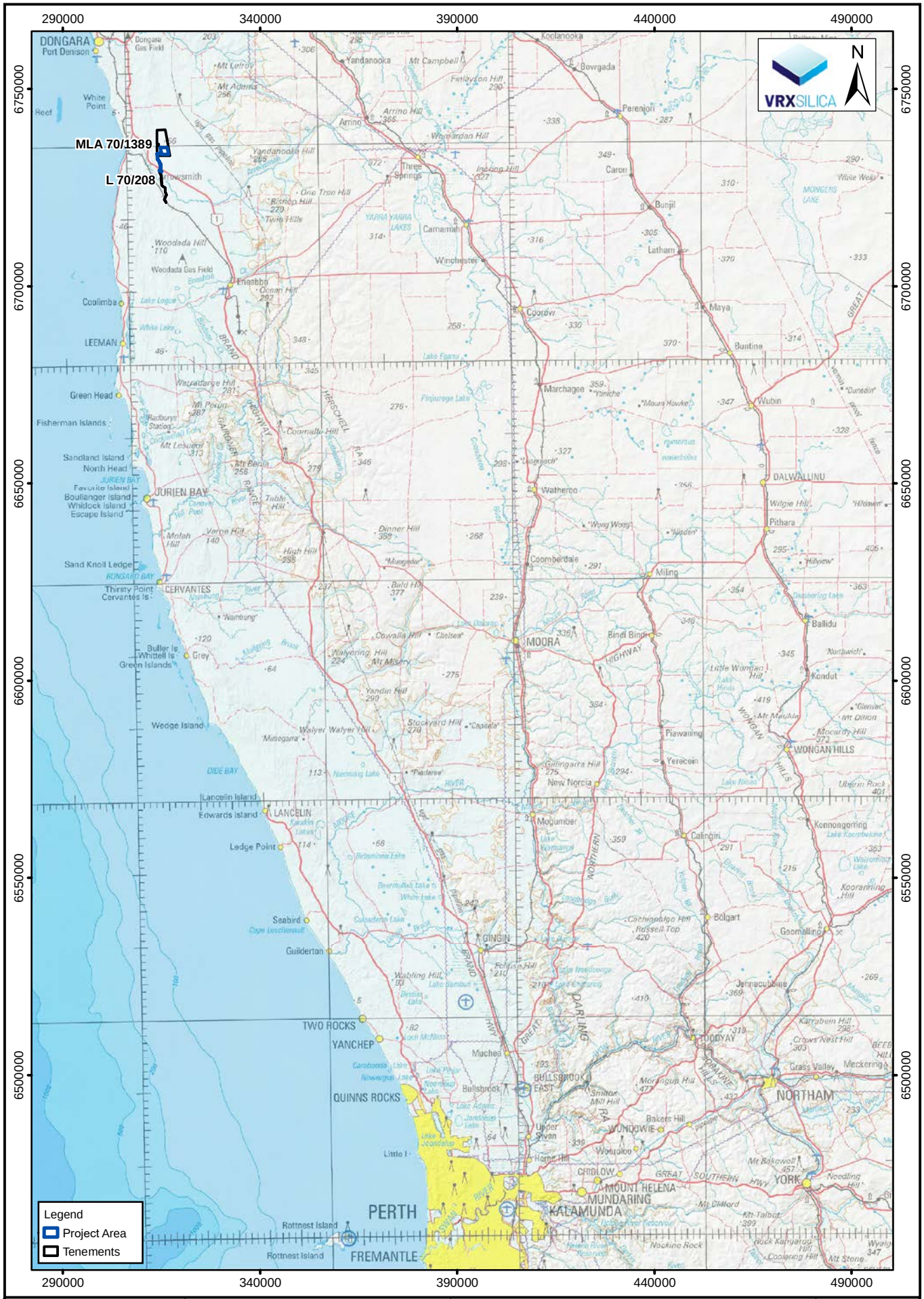

Figure 1 Location of the VRX Arrowsmith North Project

2.0 Methods

The *Paracaleana dixonii* survey area search was undertaken on the 10th and 11th of December, 2022.

As the timing of the survey was towards the end of the normal flowering season of *Paracaleana dixonii*, it was decided to firstly visit a location where there was a known population of flowering *Paracaleana dixonii* plants to determine their condition/stage of flowering at that time. Kevin Uhe knew of a population of *Paracaleana dixonii* along the Coolimba-Eneabba Rd (a few kilometres south-west of Eneabba) which had been seen in bud in mid-November 2022. This site was visited on the 10th of December 2022 and *Paracaleana dixonii* plants were found to be flowering and between the stages of full flowering and withered flowers (although still recognisable as *Paracaleana dixonii*) (Plates 1 and 2). The site was a grey sand, sand plain with heath vegetation 2 years after fire (Plate 3).

Plate 1. *Paracaleana dixonii* in full flower at Eneabba site, 10th December 2022.

Plate 2. *Paracaleana dixonii* with withered flower at Eneabba site, 10th December 2022.

Plate 3. Heath vegetation at the *Paracaleana dixonii* population near Eneabba.

Paracaleana dixonii plants were also reported to be found near Badgingarra on the 9th December 2022 (Beth Louden, *pers.comm* (for Diana Barry, Astron Environmental Services)).

The *Paracaleana dixonii* search at the Arrowsmith North Project survey area was conducted in a grid formation with 10 metre spacing between lines (GPS tracks shown in Figures 2 and 3). The 10 metre grid spacing was adopted to ensure that any orchids present could be readily sighted.

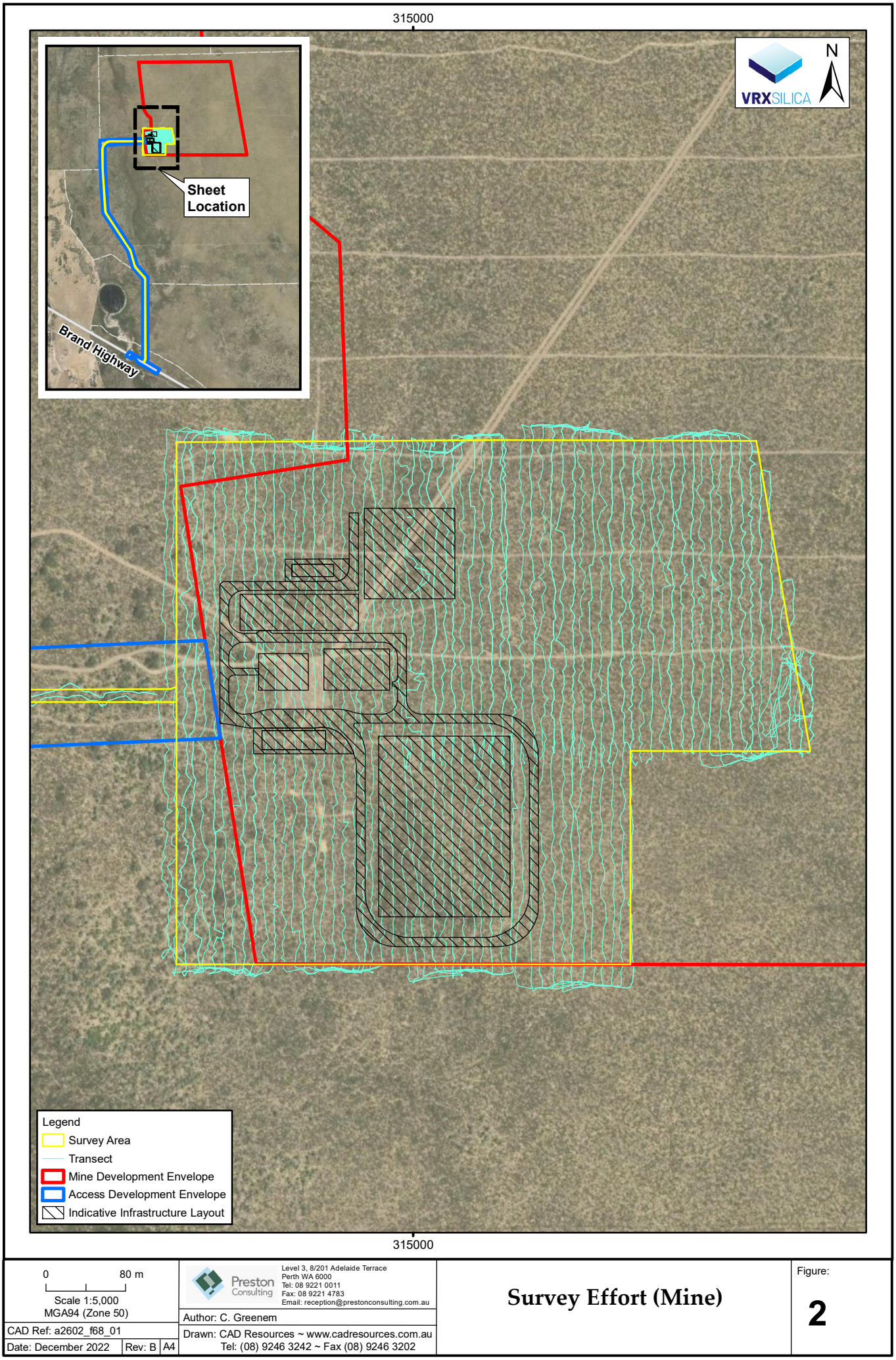

Figure 2. The *Paracaleana dixonii* search area at the Arrowsmith North Project– initial mining and plant area

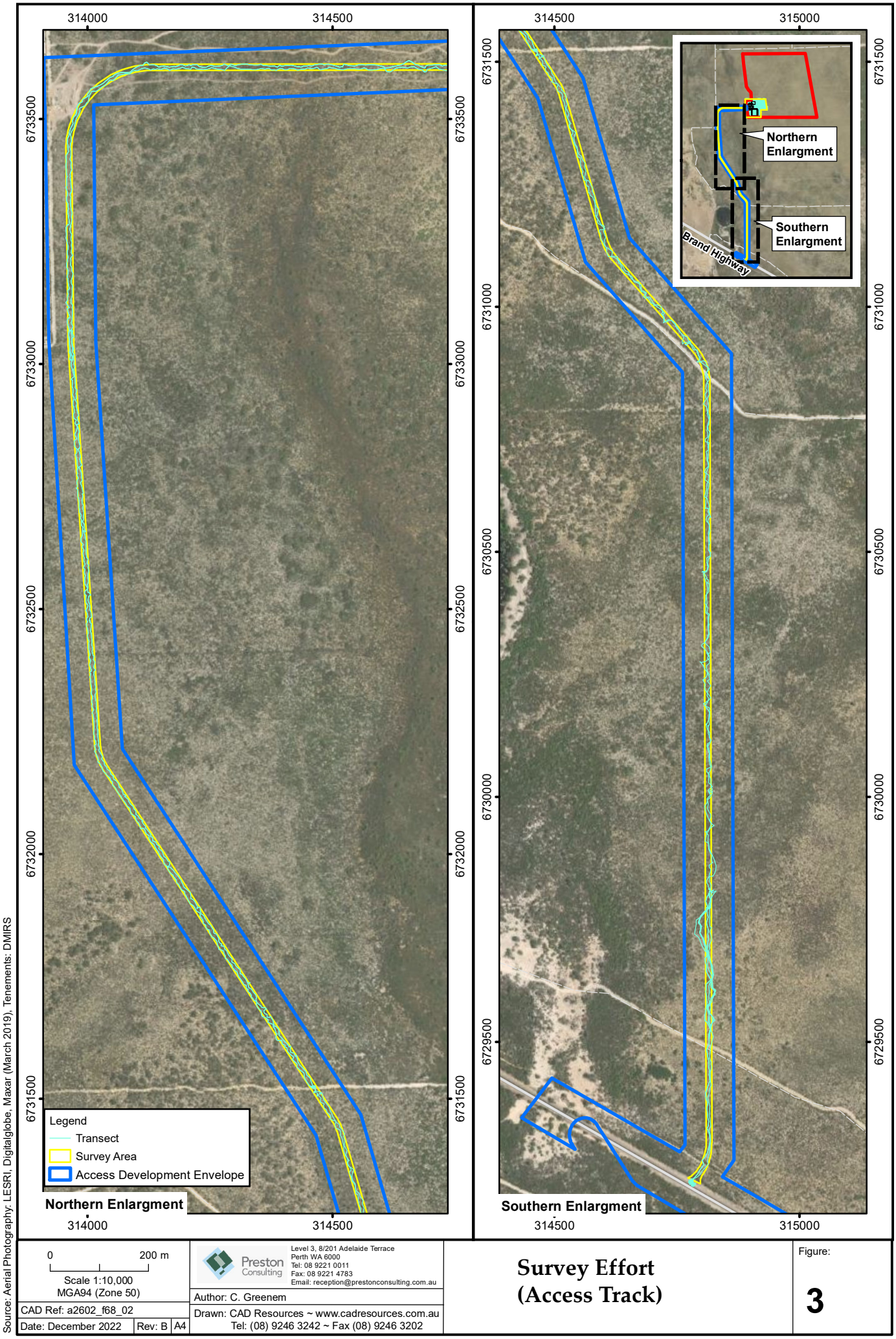

Figure 3. The *Paracaleana dixonii* search area at the Arrowsmith North Project – access track

3.0 Results and Discussion

No *Paracaleana dixonii* plants were recorded during the targeted searches in the survey area (Figures 2 and 3).

The survey area was considered to be unlikely habitat and associated vegetation for the occurrence of *Paracaleana dixonii*. The soils in the mining and processing plant part of the survey area were yellow sands with numerous outcroppings of limestone rock (which is typical of the broader Project Area), and were mostly not low lying (Figure 7 and 8). Yellow sands also occurred throughout most of the access track area. Dense heaths covered the proposed mining and plant areas of the survey area (Plates 4 and 5) and the access road component of the survey area passed through areas of *Banksia prionotes* Low Woodland and extensive areas of *Acacia* spp. Tall Shrublands and Tall Closed Shrublands.
Paracaleana dixonii has been mostly found on grey sands amongst heath vegetation. Over a 10 year period that Kevin Uhe (member of the 'Western Australian Native Orchid Study and Conservation Group') has been involved with *Paracaleana dixonii* surveys and studies, he has only found it on grey or white sands, typically in shallow depressions on broad sand plains and growing amongst more open shrublands/heaths.
In summary, the survey area was not considered likely habitat for *Paracaleana dixonii* due to:

- presence of mostly yellow sands and yellow sands over limestone;
- general absence of areas of flat, low plains with shallow depressions (survey area was mostly more elevated landscape); and
- presence of unlikely associated vegetation (dense heath in proposed mining and plant area and woodlands and Acacia closed tall shrublands along the proposed access track).

Plate 4. Searching the heath vegetation in the Arrowsmith survey area (proposed mining and plant area).

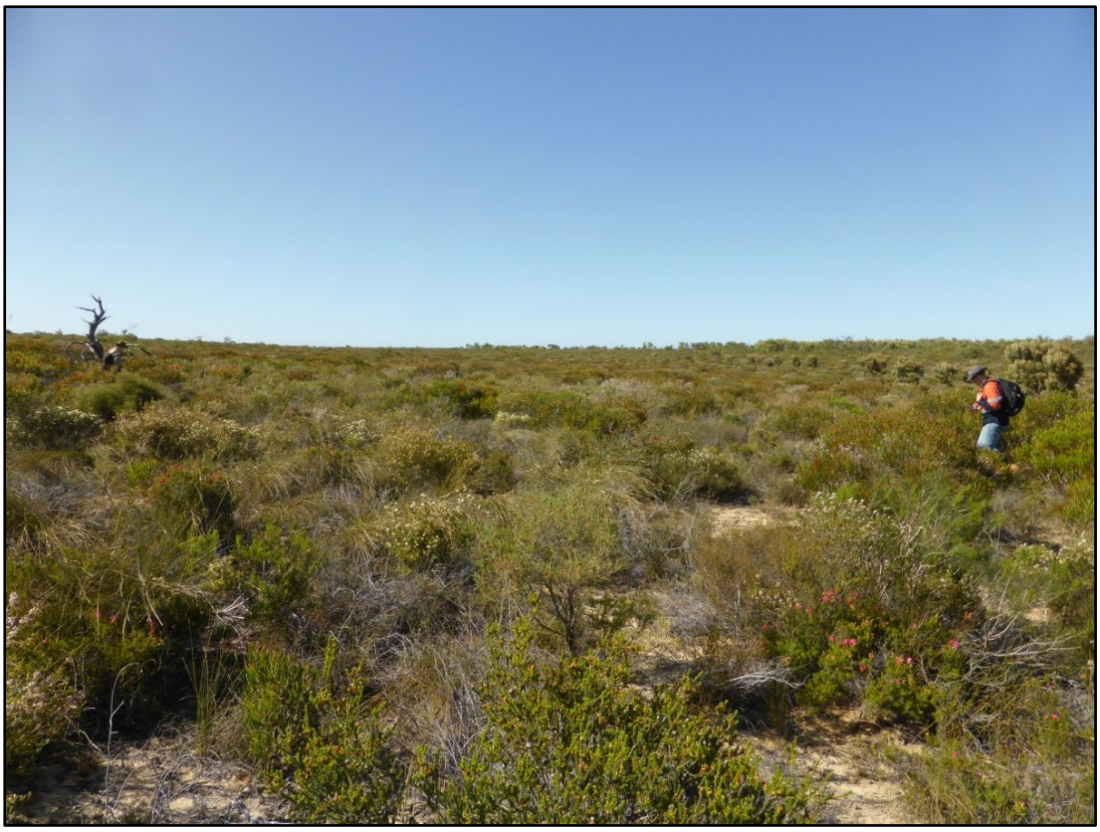

Plate 5. Heath vegetation in the Arrowsmith survey area (proposed mining and plant area).

Plate 6. Tall Shrubland vegetation in part of the access track survey area at Arrowsmith.

Plate 7. Yellow sands occurred throughout the survey area.

Plate 7. Numerous limestone outcroppings occurred in the survey area.

4.0 Acknowledgements

Kevin Uhe (long term member of the Western Australian Native Orchid Study and Conservation Group) led the search for *Paracaleana dixonii* search at the known population location near Eneabba, assisted with the search for *Paracaleana dixonii* in the survey area and provided advice on the suitability of the survey area habitat for *Paracaleana dixonii*.

5.0 References

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