

Table 13. Summary of flora statistics for systematic species list.

Flora Statistics	Category	Number of Species	Proportion of 100%
	Families	50	
	Genera	136	
	Species	389	100%
	# Species to 2015	268	69%
	# Species in 2016-17	292	75%
	Number of species recorded in only 1 data set	218	56%
	Number of species recorded in both data sets	171	44%
Dominant Families			
	Fabaceae	69	18%
	Poaceae	46	12%
	Chenopodiaceae	45	12%
	Scrophulariaceae	37	10%
	Asteraceae	31	8%
	Malvaceae	22	6%
	Myrtaceae	17	4%
Dominant Genera			
	<i>Acacia</i>	51	13%
	<i>Eremophila</i>	37	10%
	<i>Maireana</i>	18	5%
	<i>Senna</i>	13	4%
	<i>Sida</i>	11	3%
	<i>Eragrostis</i>	8	2%
Weeds	Weed Species	6	1.5%
	Mulga Varieties	31	Incl. potential hybrids 8%
	Mulga species	13	Excl. hybrids 3%
Note:	263 species reported in WB860 (Sept 2016) review		

Appendix 2. Priority Flora Descriptions

***Aristida jerichoensis* var. *subspinulifera* – Priority 3**

Aristida ?jerichoensis var. *subspinulifera* P3 is an upright perennial grass to 0.8 m. It was recorded at one location within the bed of Jones Creek at 51J 261412 mE, 6965908 mN on the north-eastern edge of the Proposal Study Area (Figure 16).

The identification and conservation status of the specimen was not determined until after field works were concluded and therefore there is no contextual information for the species at this site. The record within the MKS Proposal Study Area represents a slight range extension to the south (Figure 15 & Figure 16).

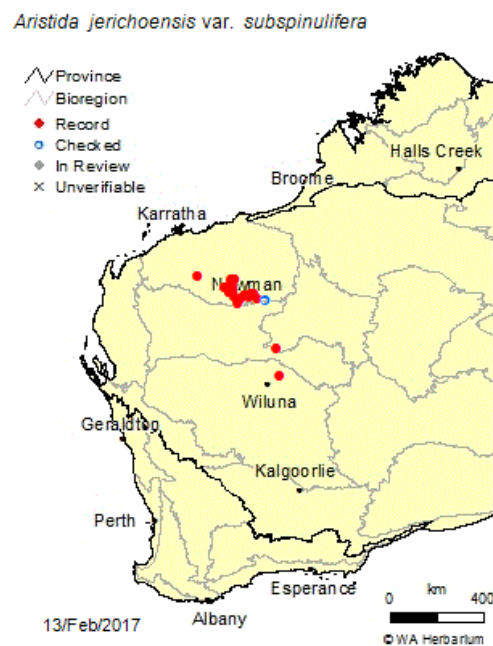
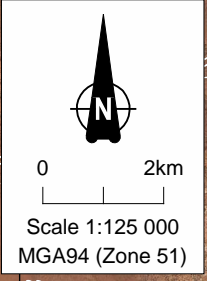


Figure 15. Distribution of *Aristida jerichoensis* var. *subspinulifera* P3 in Western Australia (Western Australian Herbarium, 2017).

Figure 16. Distribution of *Aristida ?jerichoensis* var. *subspinulifera* P3 within the MKS Proposal Study Area.



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



Mt Keith Operations

Mt Keith TSF

Goldfields Highway

Wanjarri Nature Reserve

LEGEND

-  Priority Species
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

Mount Keith Satellite
Aristida ?jerichoensis
var. *subspinulifera* P3
 Author: Western Botanical Date: December 2017

Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ December 2017 ~ A4 ~ Rev: A ~ CAD Ref g2414_R02_03_PS_AJ.dgn ~ Imagery: Landgtc (2011)

***Anacampseros* sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248) Priority 1**

Anacampseros sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248) is a small, succulent, erect herbaceous perennial to 10 cm tall. It has crowded, rounded, succulent basal leaves and a subterranean tuber. Flowers are terminal, solitary, on short ascending stems with 5 white petals (Plate 1). It occurs in small, discrete populations within pockets of sandy soil that collects in the pitted surface of the weathered Achaean granite breakaways and on granite outcrops. The above ground parts are ephemeral.

Anacampseros sp. Eremaean is a relatively newly recognised taxon in Western Australia and is the only species of *Anacampseros* known in Western Australia. WA Herbarium records show that the species is known from 6 specimens, representing 4 populations from Menzies, Yakabindie, Lake Mason and Coolcalalaya Stations (Figure 17). Given the diminutive stature, distribution and habitat specificity of *Anacampseros* sp. Eremaean, it may be more widespread and numerous at all locations where it has been recorded than figures indicate to date.

No *Anacampseros* sp. Eremaean plants have been recorded within the MKS Development Envelope and only two close-by populations are known (i) one plant within the Wanjarri Nature Reserve east of the MKS transport corridor and (ii) one population in the eastern portion of the MKS Proposal Study Area. Several populations have been noted in the region near the MKS project and the species is always found associated with the granitoid landscapes. Within and nearby the MKS Proposal Study Area, it is known to be associated with shallow soils around the base of granite outcrops and on the breakaway plateaux (BRX-P habitat unit) (Figure 18).

Two populations (45 individuals in total) of *Anacampseros* sp. Eremaean were noted within the Sir Samuel block, now ceded into Wanjarri Nature Reserve. One population of six plants was high in the landscape on an Achaean granite breakaway (BRX habitat unit) at the NW corner of the project area, and the other larger population at the foot of a granite rock in the southern central part of the Sir Samuel block (Plate 1). At the first location, the species is associated with *Calytrix uncinata* P3 and *Dodonaea petiolaris* while on the lower lying granite rock, *Acacia quadrimarginea* and grasses including *Aristida contorta*, *Eriachne pulchella* and *Cymbopogon ambiguus* are present. Western Botanical also recorded a population of approximately 50 plants at Niagara Dam, ~15km NE of Menzies, in April 2006 (Plate 1).

No plants of *Anacampseros* sp. Eremaean are known within the proposed Development Envelope of the MKS project though the breakaway habitat is known to support the species close by.

Anacampseros sp. Eremaean (F. Hort, J. Hort & J. Shanks 3)

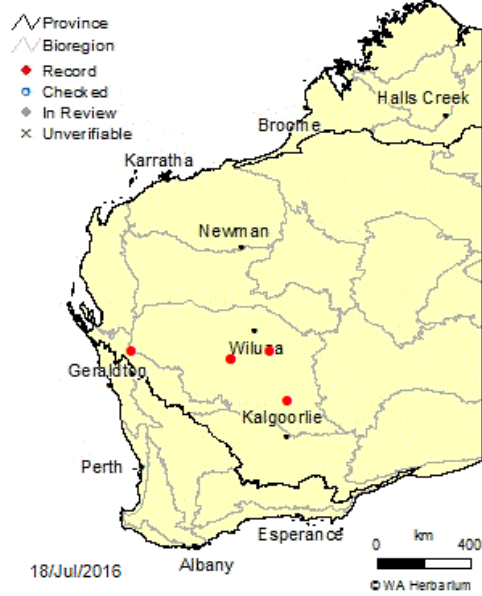


Figure 17. Distribution of *Anacampseros* sp. Eremaean in Western Australia (Western Australian Herbarium, 2016).

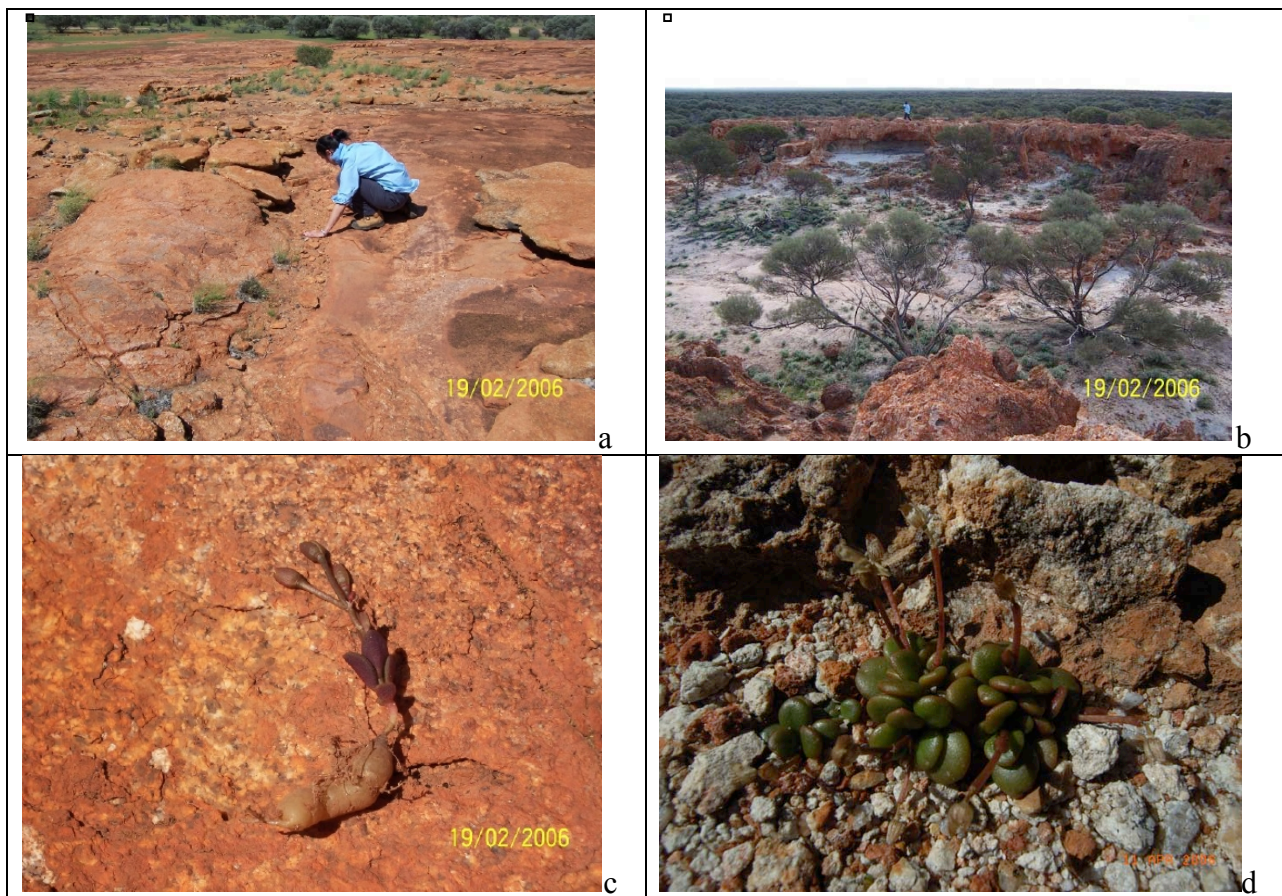
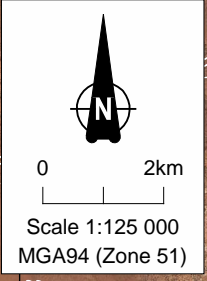


Plate 1. (a, b, c) *Anacampseros* sp. Eremaean, plants in situ, Sir Samuel Block, now within Wanjarri Nature Reserve, and (d) Niagara Dam north of Menzies.

Figure 18. Known distribution of *Anacampseros* sp. Eremaean within and adjacent to the MKS Proposal Study Area.



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



Mt Keith Operations

Mt Keith TSF

Goldfields Highway

Wanjarri Nature Reserve

LEGEND

-  Priority Species
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

Mount Keith Satellite
Anacampteros sp. Eremaean
(F. Hort, J. Hort & J. Shanks 3248) P1
 Author: Western Botanical Date: December 2017

Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ December 2017 ~ A4 ~ Rev: A ~ CAD Ref g2414_R02_03_PS_AE.dgn ~ Imagery: Landgtg (2011)

Cratystylis centralis Priority 3

Cratystylis centralis sens. lat., Priority 3, is a long lived dense domed shrub to 1 m high x 1 m wide with blue-grey foliage and tightly constricted terminal flowers (Plate 2). It is known from few populations in Western Australia (Yakabindie Station and near Laverton in the Murchison biogeographic region, near Norseman, and near Kambalda in the Coolgardie biogeographic region). Specimens from populations in Western Australia are curated under *Cratystylis centralis sens. lat.* which is more commonly recorded in the central southern Northern Territory (Figure 19).

Wilson & Albrecht (2002) note that the Western Australian specimens differ in the number of florets in the flowering head (capitula) from those in the Northern Territory. However, the lack of good flowering material made it difficult to separate the two groups adequately. They record the species as a putative hybrid between *C. conocephala* and *C. microphylla* with a Western Australian distribution. The species, while currently considered within *C. centralis sens. lat.* and with a P3 conservation listing in W.A. due to the distribution in W.A. and N.T., remains of taxonomic and conservation interest (Mike Hislop, pers. comm.). It is more likely that the Western Australian species is a new taxon and worthy of a revised conservation ranking.



Plate 2. *Cratystylis centralis*, west of the MKS Proposal Study Area, May 2016.

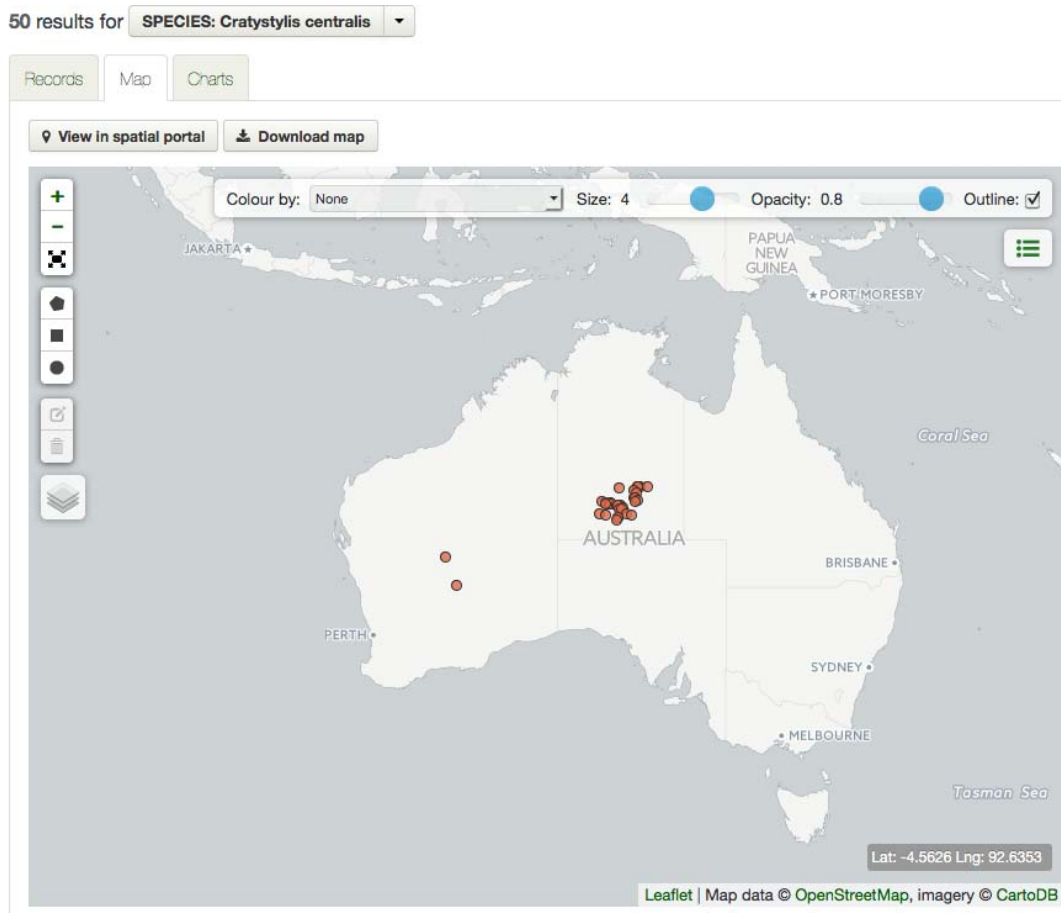


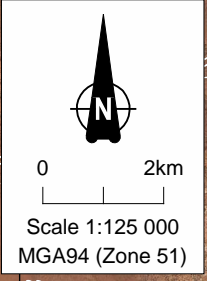
Figure 19. Distribution of *Cratystylis centralis sens. lat.* in Western Australia and the Northern Territory (AVH, July 2016).

Preliminary investigations undertaken by WB in August 2016 on specimens housed at the WA Herbarium have shown the WA species (Armstrong, P.G. (07/970)) has two flowers per capitula (flower head) while those from the Northern Territory (specimen on loan from NT Herbarium, collected by P.K. Latz) have four. This is considered a significant difference (P. Wilson pers. comm.) and indicates that the WA taxon requires further taxonomic investigation.

Cratystylis centralis sens. lat. is known from the carbonate influenced soils within the *Eucalyptus gypsophila* – *Eremophila pantonii* Woodland (EGPW) community west of the proposed haul road alignment, north of the MKS's Six Mile orebody area (Figure 20).

While no *Cratystylis centralis* are known to exist within the MKS Development Envelope, it has been included in this assessment as it occurs near the western margin of the proposed haul road to Mt Keith and further assessments in the appropriate habitats may record the species within the MKS Proposal Study Area.

Figure 20. Distribution of *Cratystylis centralis sens. lat.* near the MKS Proposal Study Area.



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Mt Keith Operations

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Wanjarri Nature Reserve

LEGEND

- Priority Species
- Study Area
- Disturbance Footprint
- Wanjarri Nature Reserve
- Tenements
- Surface Water

Mount Keith Satellite

Cratystylis centralis P3

Author: Western Botanical Date: December 2017

Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ December 2017 ~ A4 ~ Rev: A ~ CAD Ref g2414_R02_03_PS_CC.dgn ~ Imagery: Landgtte (2011)

***Eremophila pungens* Priority 4 (including *Eremophila* sp. Leinster R.J. Cranfield 6767)**

Eremophila sp. Leinster (R.J. Cranfield 6767) is an erect, viscid shrub, which grows between 0.5-1.5 m high and produces purple or violet flowers during July-August (Plate 3). It occurs on colluvial plains, stony ironstone and quartz ridges, Archaean granite breakaways and laterite duricrust overlaying other geologies.

The taxon present within the MKS Proposal Study Area is a new species, which was until recently circumscribed under *Eremophila pungens* P4 and is therefore discussed here. It was reassessed recently and curated under *Eremophila conglomerata* (Det: Andrew Brown, 16th June 2009) (Figure 21). However, the authors remain concerned over its identity and the species should be regarded as a new taxon until the group is fully revised. The taxon and its close relatives are in need to thorough taxonomic review.

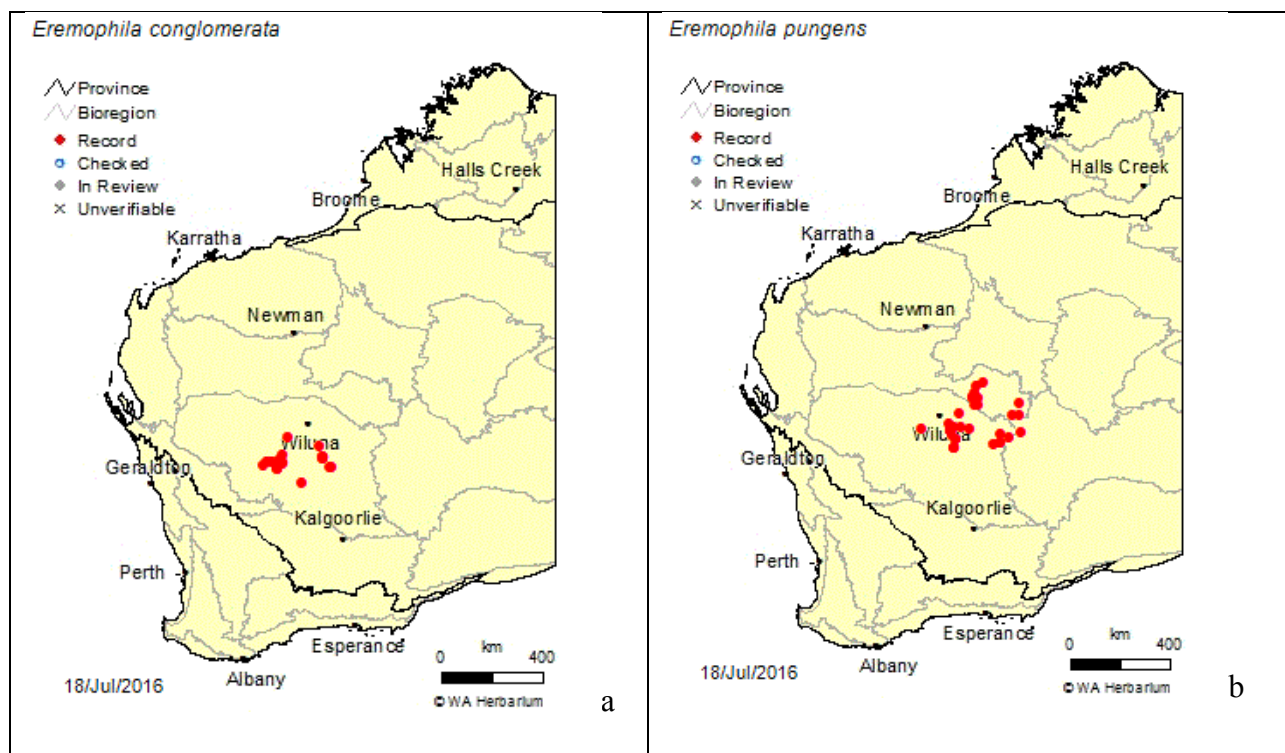


Figure 21. Distribution of (a) *Eremophila conglomerata*, and (b) *Eremophila pungens* P4 in Western Australia (Western Australian Herbarium, 2016).

Eremophila sp. Leinster (R.J. Cranfield 6767) is common between Leinster and Mt Keith on ironstone and occasionally on granitoid landforms. The population of *Eremophila* sp. Leinster (R.J. Cranfield 6767) within the MKS Proposal Study Area has been estimated at 1,986 plants, the majority being north-west of the Six Mile orebody area and on the western edge of the proposed transport corridor, within the SIMS, SILS and BRX-P vegetation associations (Figure 22).



Plate 3. *Eremophila* sp. Leinster (R.J. Cranfield 6767).

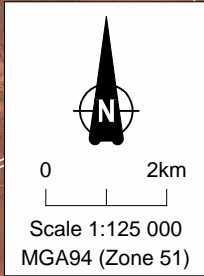
Chinnock (2007) prepared a monograph of *Eremophila*. In this document he described *Eremophila pungens* from a specimen collected north-east of Wiluna on Carnegie Station (R.J. Chinnock 4672) but then illustrated the species using a specimen from the same region (R.J. Chinnock 4720) (pages 371 to 373). He then presented a photograph of another specimen. The specimen photographed by Chinnock is regarded as being conspecific with *Eremophila* sp. Leinster (R.J. Cranfield 6767).

A review of the *Eremophila* sp. Leinster / *E. pungens* group in 2009 was conducted by Western Botanical using available WA Herbarium records of *E. pungens*. The review suggested splitting *E. pungens* into three taxa: *Eremophila pungens sensu stricto* with prominent pungent spines on the leaf tips; *Eremophila* sp. Meekatharra (D.J. Edinger 4430) with very small leaves and calyx lobes, and *Eremophila* sp. Leinster (R.J. Cranfield 6767) which lacks the pungent spines of the type species. *Eremophila* sp. Meekatharra has already been cleaved off as a separate species and is listed as a Priority 1 taxon (<https://florabase.dpaw.wa.gov.au/browse/profile/34600>). The distribution of the two remaining species within *Eremophila pungens* (*Eremophila pungens sensu stricto* and *Eremophila* sp. Leinster (R.J. Cranfield 6767) as discerned in the above review by Western Botanical is presented in Figure 23.

Twenty four plants of *Eremophila* sp. Leinster are known within the mine pits and wastedump areas of the MKS Development Envelope with a further 114 plants in the MKS transport corridor (total 138 plants) as it crosses the breakaway system north of the MKS resource area. In

comparison to the regional population enumerated to date of 3,922 plants (considered a significant under-estimate), this represents a proportional impact of 3.17% on the known number of individuals of this species.

Figure 22. Populations of *Eremophila* sp. Leinster (R.J. Cranfield 6767) within and nearby the MKS Proposal Study Area.



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Mt Keith
Operations

Mt Keith
TSF

Goldfields
Highway

Wanjarri Nature Reserve

LEGEND

-  Species of Interest
-  Study Area
-  Disturbance Footprint
-  Wanjarri Nature Reserve
-  Tenements
-  Surface Water

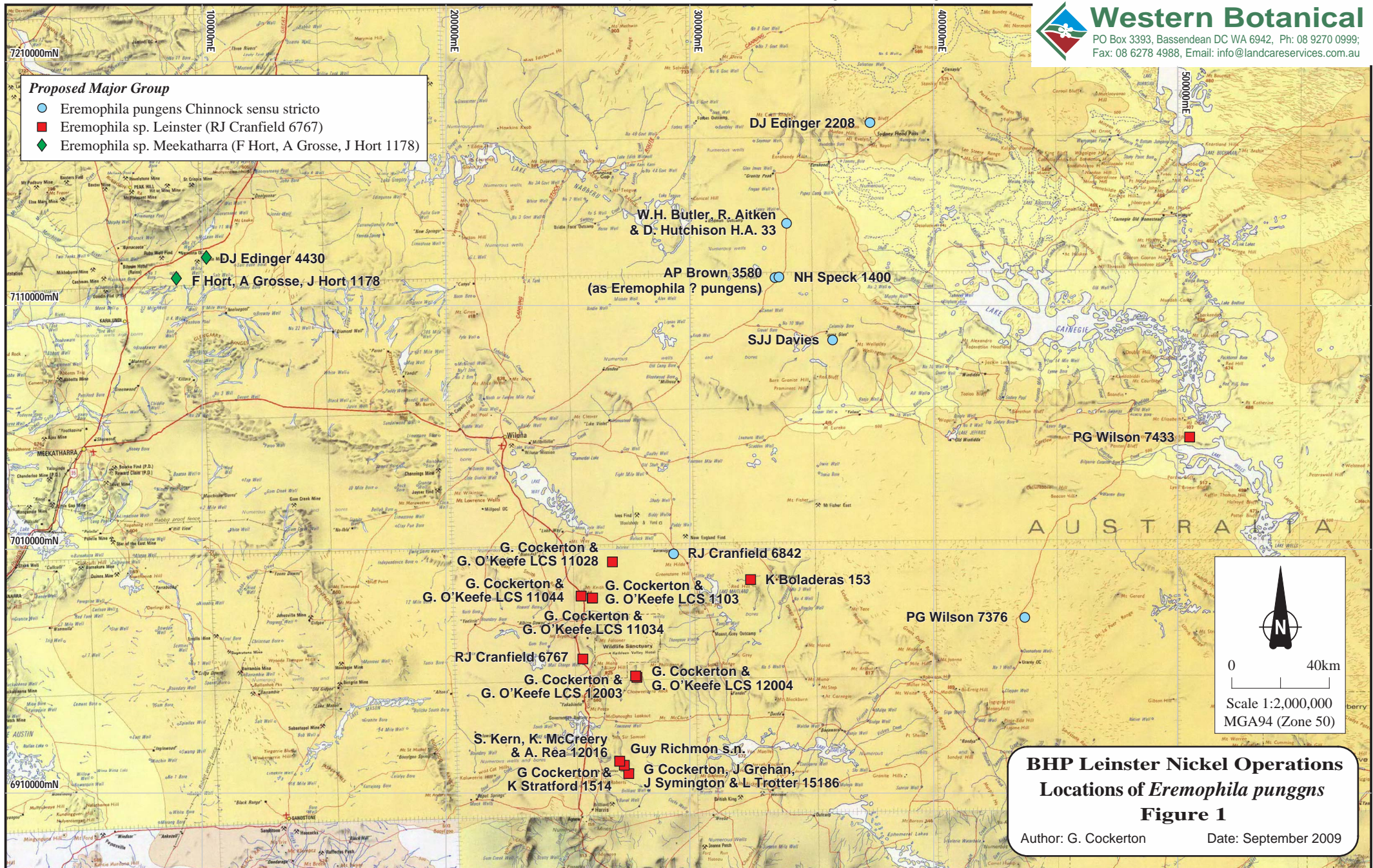
Mount Keith Satellite
Eremophila sp Leinster
(R.J. Cranfield 6767)

Author: Western Botanical

Date: December 2017

Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ December 2017 ~ A4 ~ Rev: A ~ CAD Ref g2414_R02_04_SOI_EL.dgn ~ Imagery: Landgtg (2011)

Figure 23. Populations of *Eremophila pungens* P4 group (inclusive of *E. sp. Leinster* (R.J. Cranfield 6767) in north-eastern Goldfields region.



Proposed Major Group

- *Eremophila pungens* Chinnock sensu stricto
- *Eremophila* sp. Leinster (RJ Cranfield 6767)
- ◆ *Eremophila* sp. Meekatharra (F Hort, A Grosse, J Hort 1178)

BHP Leinster Nickel Operations
Locations of *Eremophila pungens*
Figure 1
 Author: G. Cockerton Date: September 2009

***Grevillea inconspicua* – Priority 4**

Grevillea inconspicua is an intricately branched, spreading shrub, which grows 0.6 – 2 m high and produces white or pink flowers between June and August (Western Australian Herbarium), (Plate 4). It has simple leaves 10 - 45 mm long and 0.5 - 1.5 mm wide. It occurs on gravel and loam, along drainage lines, on rocky outcrops and along creek lines and is distributed through the Murchison Biogeographic Region (Western Australian Herbarium) (Figure 24).



Plate 4. *Grevillea inconspicua* at Leinster, 2006, within the Bevon Land System and SIMS habitat unit.

In the Leinster – Mt Keith – Mt Magnet regions, Western Botanical has encountered *Grevillea inconspicua* in close association with metabasalt geology of the greenstone ranges and subcropping or outcropping basalt rocks are always present where the plants exist.

An estimated 413 plants of *Grevillea inconspicua* are scattered sparsely throughout the western and southern portions of the MKS Proposal Study Area (Figure 25). This value is considered an incomplete census of the species within the MKS Development Envelope. At MKS this species is associated with outcropping/subcropping metabasalts in the Bevon and Violet Land Systems within the Violet Range Priority Ecological Community. Significant populations of this species are associated with the Violet Range, south-west of the MKS Proposal Study Area though they have not been assessed in detail and no population numbers are available. Estimates made in