Thursday, 28 August 2025

Mr. Tim Clarke
Brightstar Resources Limited
Via email to: tim@brightstarresources.com.au

Re: WB1079 Memo Summary of findings from recent Targeted Survey for *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674).

Dear Tim,

We are pleased to provide this brief memo report following the recent Targeted flora survey for *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) conducted by Western Botanical at Brightstar Resources Limited - Menzies Project. The survey was conducted over two days (20th and 21st of August 2025) within the Menzies Project, focussing on three previously known sites recorded during the 2021 Detailed Flora and Vegetation Assessment of the Menzies Project (WB972), and five prospective sites located adjacent to the project.

Background

Brightstar Resources Limited are looking to further develop the Menzies Project, and as part of the development would like to gain a better understanding of the distribution and population size of a species of interest *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674). This novel taxon was originally discovered during the 2021 Detailed Flora and Vegetation Assessment of the Menzies Project (WB972) for Kingwest Resources Ltd.

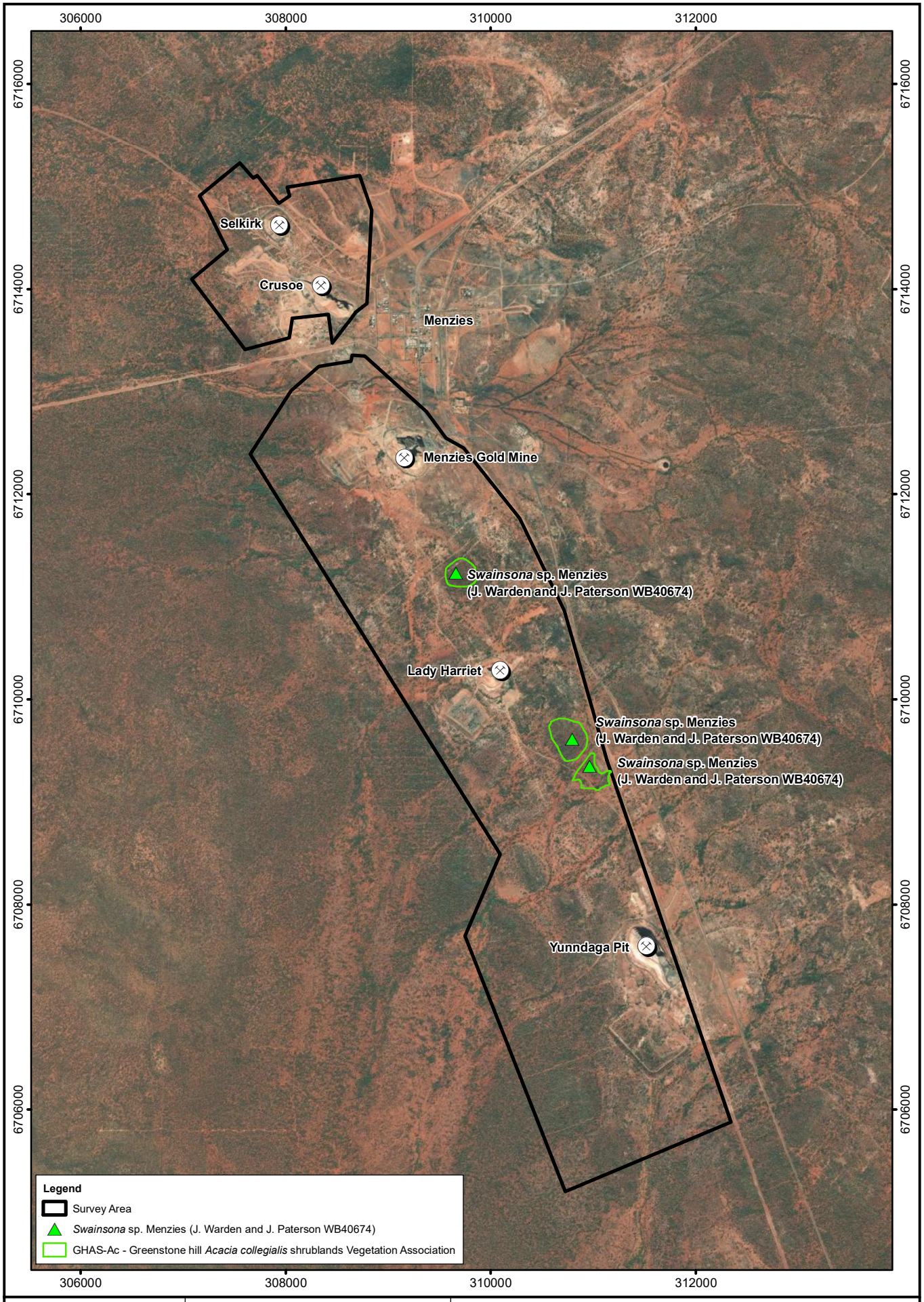
The original records comprised three locations, all recorded within quadrats and each occurring on weathered basalts and associated with the GHAS-Ac - Greenstone hill *Acacia collegialis* shrublands Vegetation Association. The discovery of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), described as a delicate herb to 0.05m (Plate 1), only became apparent during the specimen identification process when Western Botanical was unable to definitively identify the collection, following the second phase of the Detailed Survey.

Plate 1. *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) plant and habitat.

During the identification process character combinations of the specimen did not match any current known specimens held within the WA Reference Herbarium, nor did the specimen fit within the current taxonomic key using the defining characters. The specimen was shown to Robert Davis, a resident taxonomist at the Western Australian Herbarium, whom confirmed that it most likely represented an undescribed novel species and should be treated as such (Per. Comms. Robert Davis. Friday 15th October 2021). However, with only one specimen collected, he required further material to formally confirm and describe it. The initial attempts in late October 2021 to relocate the species during targeted priority flora searches were unable to relocate any plants. Given the annual and cryptic nature of these plants, future targeted surveys would be time-dependent as environmental conditions would be critical to recapture this species.

Locations of the initial populations of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) are presented in Figure 1 .

Figure 1. *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) Locations Across the Menzies Study Area (2021).



Imagery: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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MGA94 (Zone 51)

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Date: September 2025 | Rev: A | A4

Western Botanical

Author: J. Warden | WB Ref:

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Brightstar Resources Limited

Swainsona sp. Menzies (J. Warden and J. Paterson WB40674)

Locations Across the Menzies Study Area (2021)

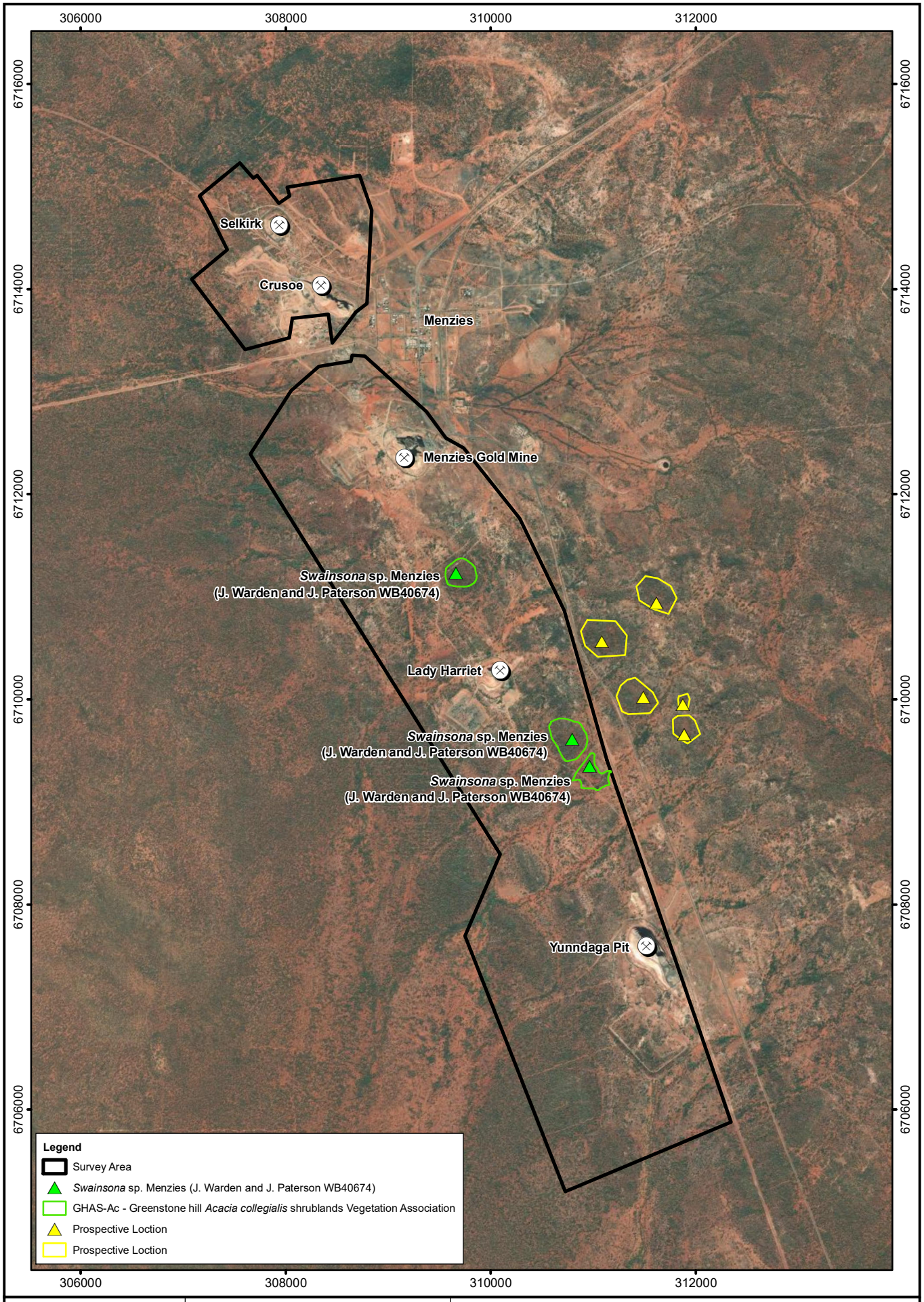
Methods

Brightstar Resources Limited recently acquired the Menzies project and commissioned Western Botanical to assess the current population size and distribution of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), to gain a better understanding of this novel species. The environmental conditions were assessed and considered similar to conditions experienced in 2021 with slightly less rainfall recorded in the current season. The survey focussed on the GHAS-Ac - Greenstone hill *Acacia collegialis* shrublands Vegetation Association, targeting the three mapped polygons described in WB972. A desktop assessment of satellite imagery revealed similar landforms occurring on the eastern side of the Goldfields Highway, within tenements M 2900410, P 2902695, P 2902702 and P 2902456, these sites were considered prospective for further populations. Considering the limited extent of known habitat for *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), it was considered important to assess potential sites located close to the known population (Figure 2).

Western Botanical assessed the sites over two days, with the first and part of the second day focussed on the known locations (Q21, Q22 and Q30) where it was previously recorded. Initially the survey focussed on the quadrat sites, with each searched systematically for any indication of the species. The search was then expanded to within the mapped GHAS- Ac - Greenstone hill *Acacia collegialis* shrublands Vegetation Association polygon. Each botanist was spaced at approximately 20 m apart, systematically searching the polygon, using a hand held Garmin GPS to aid navigation (±5m accuracy) and to record the location details of any plants observed.

The prospective sites were visited on the second day to provide an on ground assessment focussed on locating potential new populations and determining if the habitat was suitable for *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) to occur.

Figure 2. Known and Prospective *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) populations.



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Scale: 1:50,000
MGA94 (Zone 51)

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Author: J. Warden | WB Ref:

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Brightstar Resources Limited

Swainsona sp. Menzies (J. Warden and J. Paterson WB40674)

Known and Prospective Populations

Results and Discussion

The seasonal conditions prior to the survey show that the monthly rainfall levels occurring over recent months (2025) from Leonora Aero Weather Station (12241) appear to be slightly lower than levels recorded during the 2021 period, with an average reduction of 10mm between May and July. Corresponding to this, the mean temperature over the same period appears to be 1°C higher on average, Figure 3. The proposed timing for the survey matches the successful 2021 survey work.

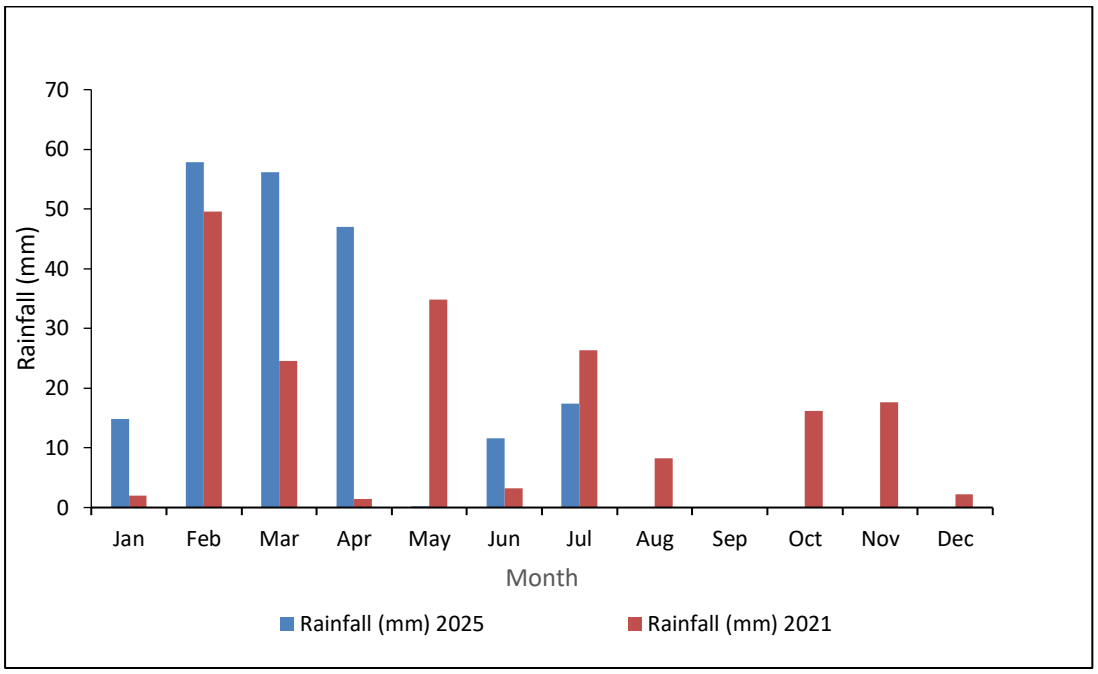


Figure 3. Rainfall (mm), January 2021 to July 2025, Leonora Aero Weather station 12241 (Bureau of Meteorology 2025).

Habitat

Swainsona sp. Menzies (J. Warden & J. Paterson WB40674) is associated with weathered basalts of the GHAS-Ac - Greenstone hill *Acacia collegialis* shrublands Vegetation Association. It was first encountered by Jason Paterson and Jonathan Warden during a field assessment in August 2021. An additional targeted survey was conducted during late October 2021; however, no new plants were encountered and no existing plants could be relocated. In August 2025 another targeted survey was conducted to identify the extent and distribution of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674). During this survey, 51 plants were observed on a rehabilitated drill pad, with no previously recorded plants relocated (Figure 4).

It's likely that *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), within its associated undisturbed habitat, either did not germinate or perished shortly after germination due to unsuitable seasonal conditions. Several annual species associated with the GHAS-Ac Vegetation Association observed during the 2025 survey were noted as being stunted (less than

5 cm tall) and in full flower e.g. *Ptilotus helipteroides*, *Roepera iodocarpa*, and *Stackhousia muricata*. While the amount of rainfall received for the region was roughly comparable to the year *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) was first encountered, the distribution of rainfall throughout the year was markedly different (Figure 3). Germination profiles of range restricted flora species is sometimes dictated by highly specific climate interactions (Elliot et al. 2019). Further, water relations of worked soil are significantly different to undisturbed soils due to changes in infiltration, runoff, and retention. The germination profile of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) is not yet known and may be dependent on highly specific seasonal conditions.

Six locations for prospective populations of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) were identified with aerial imagery (Figure 2). The first five of these prospective locations were briefly traversed noting the vegetation association, soil type, and topography. From the field observations it was noted that prospective site 1 did not have a suitable habitat, whilst the remaining four locations are assumed to be suitable habitat for *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), however, no plants were observed on this occasion. The lack of *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) populations observed at the prospective sites is assumed to be due to unsuitable seasonal conditions.

Plant Description

During the survey 51 plants were recorded, with many in flower and with fruit set. Herbarium specimens were collected and will be vouched at the Western Australian Herbarium for formal taxonomic description and recognition.

Swainsona sp. Menzies (J. Warden & J. Paterson WB40674) is described as an upright annual herb to ca. 13 cm high. Stems ca. 1 mm wide, with sparse, spreading to appressed, flattened basifixed hairs. Leaves 14 – 31 mm long odd pinnately compound, with sparse spreading to appressed flattened hairs. Leaflets 4 –15 mm long, 1– 3 mm wide, petiolulate, lamina elliptic, slightly keeled, mostly glabrous, apex retuse. Stipules triangular, with entire margins. Inflorescence 34 – 60 mm long, slender raceme 1 – 3 flowered, pulvinus absent. Flowers cream and sometimes new buds flushed with magenta. Bracteoles triangular, with sparse spreading to appressed flattened hairs. Calyx tube lobed, slightly expanding towards the apex, with sparse spreading to appressed flattened dark hairs. Upper wing surface without markings. Stamens fused at base and for 2/3 length, free at apex. Anthers circular, basifixed. Style geniculate with abaxial tuft of hairs at style apex. Ovary evenly covered in flattened appressed hairs. Fruit 25 – 28 mm long and 3.2 – 4 mm wide, inflated, pendulous, mostly straight with adaxial furrow and sparse spreading to appressed hairs. Seeds glabrous and reniform.

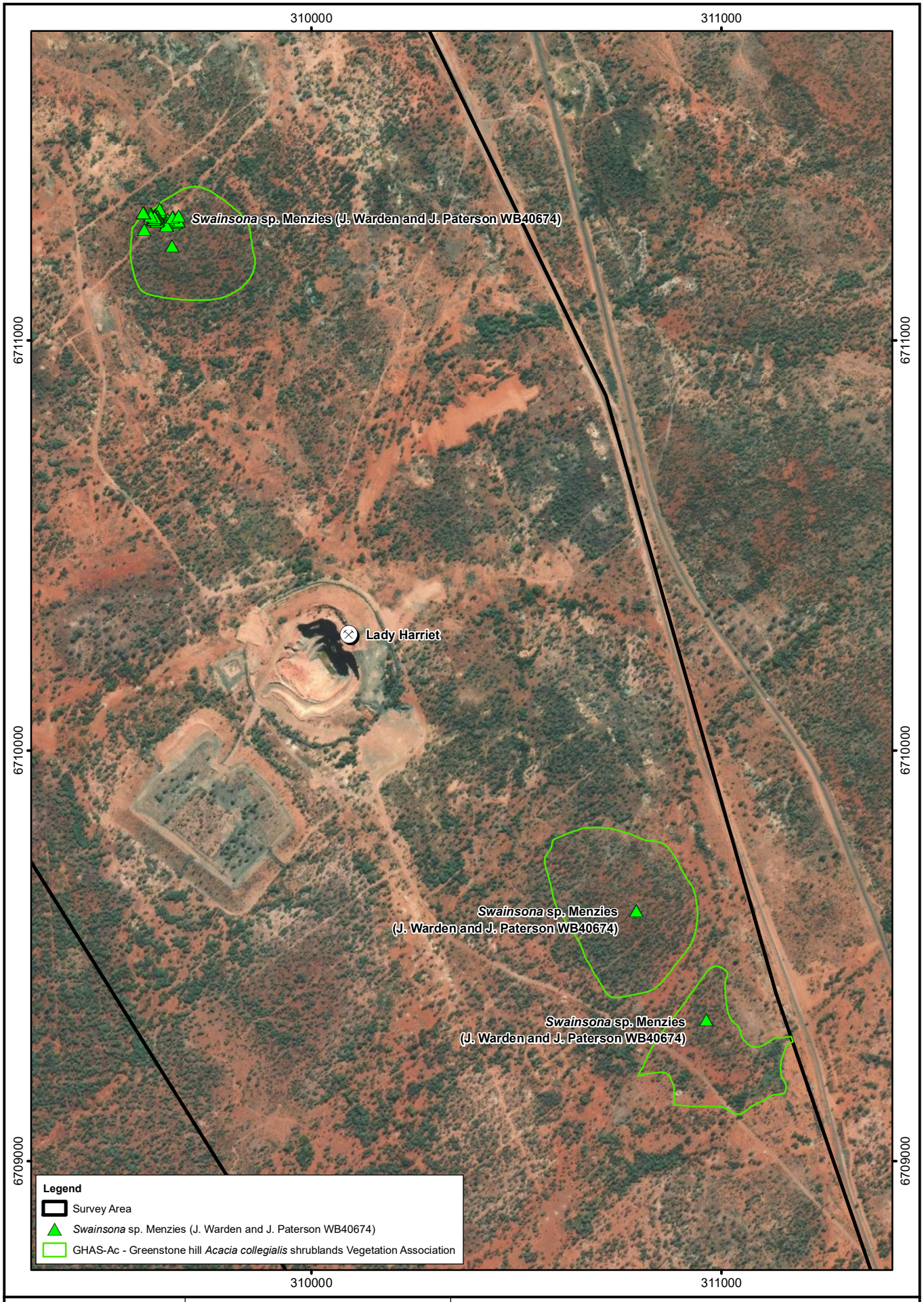
Swainsona sp. Menzies (J. Warden & J. Paterson WB40674) is a novel entity within the genus *Swainsona* (personal communication with Robert W. Davis authority on Swainsona species within Western Australia 2021). It is distinct from the other *Swainsona* species known from the study area; *S. canescens*, *S. kingii*, *S. laciniata*, *S. oliveri*, and *S. rostellata*. When using the

most current taxonomic key to *Swainsona*, *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) keys to node 8 and the following species, none of which are a match for it; *Swainsona cyclocarpa*, *Swainsona halophila*, *Swainsona katjarra*, *Swainsona unifoliata*, *Swainsona oroboides*, and *Swainsona picta*. *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674).

***Swainsona sp.* Menzies (J. Warden & J. Paterson WB40674)** **Fabaceae**

Plate 2. *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674) A; Flowers, B; Developing fruit pod, C; Habit (Photographs: Lindsay Shelton)

Figure 4. Location and distribution of *Swainsona sp.* Menzies (J. Warden & J. Paterson WB40674) recorded during August 2025 Survey



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Author: J. Warden | WB Ref:

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

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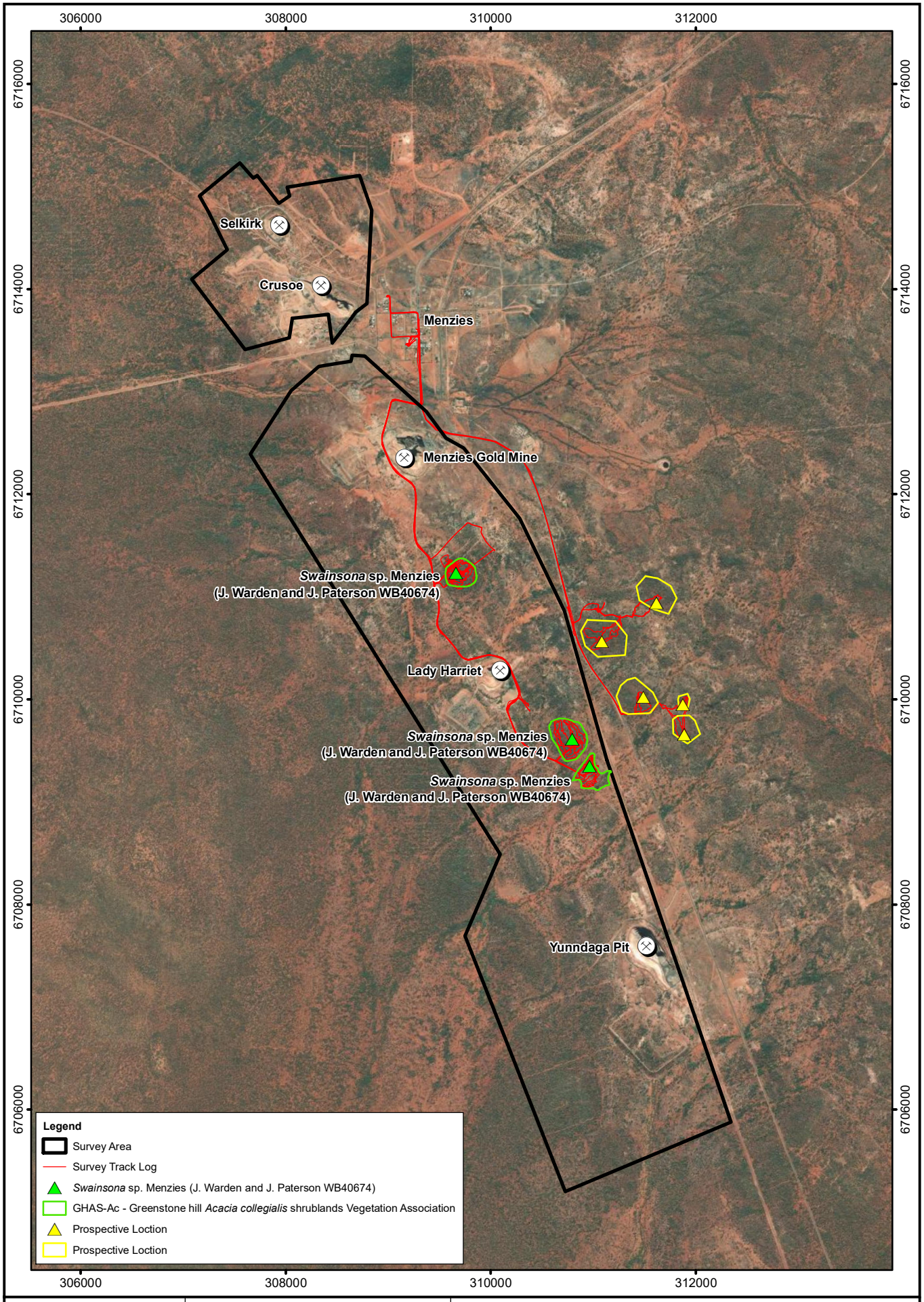
Swainsona sp. Menzies (J. Warden and J. Paterson WB40674)

Recorded during August 2025 Survey

Figure 5. Survey effort for *Swainsona sp.* Menzies (J. Warden & J. Paterson WB40674)



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Scale: 1:50,000
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Author: J. Warden | WB Ref:

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

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Swainsona sp. Menzies (J. Warden and J. Paterson WB40674)

Survey Effort

Conclusion

The successful recollection of *Swainsona sp.* Menzies (J. Warden & J. Paterson WB40674) was achieved with 51 plants recorded within the Menzies Project footprint. Once these plants are processed through the Western Australian Herbarium system and formally recognised it is likely to receive a Priority 1 listing within WA.

Unfortunately, the seasonal conditions were such that no plants were recorded within the previously recorded sites or within the undisturbed GHAS-Ac - Greenstone hill *Acacia collegialis* shrublands Vegetation Association. Western Botanical is of the opinion that *Swainsona* sp. Menzies (J. Warden & J. Paterson WB40674), within its associated undisturbed habitat, either did not germinate or perished shortly after germination due to unsuitable seasonal conditions. The avoidance of this Association will be the best solution to avoid any future impacts to this plant.

Kind regards,

Jonathan Warden and Lindsay Shelton

Bibliography

Bureau of Meteorology (2025). Climate data online. Australian Government, Bureau of Meteorology. Retrieved from http://www.bom.gov.au/.

Elliott, C. P., Lewandrowski, W., Miller, B. P., Barrett, M., & Turner, S. R. (2019). Identifying germination opportunities for threatened plant species in episodic ecosystems by linking germination profiles with historic rainfall events. *Australian Journal of Botany*, *67*(3), 256–267. https://doi.org/10.1071/BT18215

Western Botanical (2021) Detailed Flora and Vegetation Assessment of the Menzies Gold Project, December 2021. Consultant's report to Kingwest Resources Ltd Report Ref: WB972.