

# CPS 9818/1 - Supporting information - Targeted *Eremophila forrestii* subsp. *viridis* Survey at Onslow

| MEMORANDUM |  |         |                 |
|------------|--|---------|-----------------|
| TO         | [REDACTED]<br>Hastings Technology Metals Limited                                 |         |                 |
| FROM       | Eco Logical Australia  |         |                 |
| DATE       | 10 February 2021   | PURPOSE | For Information |
| SUBJECT    | Targeted <i>Eremophila forrestii</i> subsp. <i>viridis</i> (P3) Survey at Onslow |         |                 |

## Introduction

### Project Background

Hastings Technology Metals Limited (Hastings) plans to develop supporting infrastructure for the Yangibana Rare Earths Project at Onslow, WA, located approximately 370 kilometres (km) north of Carnarvon in the Shire of Ashburton, Western Australia (WA; Figure 1). The two alternate sites for planned infrastructure are located approximately 20 km south of Onslow townsite along Warrirda Rd between 2 km and 5.4 km from the Onslow Rd intersection.

Previous surveys undertaken throughout the area have recorded the presence of the Priority three taxon *Eremophila forrestii* subsp. *viridis* within these two sites. To establish regional context for the presence and size of populations of this species in the local area, Eco Logical Australia (ELA) was commissioned by Hastings in 2020 to conduct a targeted flora survey for *Eremophila forrestii* subsp. *viridis* in areas adjacent to the alternate sites at Onslow.

### Environmental Context

#### Regional Values

Environmental values for the region relevant to the survey area are presented in Table 1.

**Table 1: Environmental values of the region**

| Existing environmental attributes   | Project Area   |
|---|--|
| Interim Biogeographical Regionalisation for Australia (IBRA) Bioregion (DAWE 2020b) | Carnarvon (CAR)  |
| IBRA Subregion  | Cape Range subregion (CAR01)   |
| Geology, landform and soils   | <p>The Carnarvon bioregion has a low and gently undulating landscape with open drainage (Bastin and the ACRIS Management Committee 2008).</p> <p>The Carnarvon bioregion is composed of quaternary alluvial, aeolian and marine sediments overlying Cretaceous strata. Cape Range and Giralalia dunefields form the northern part of Carnarvon Basin. Rugged tertiary limestone ranges and extensive areas of red aeolian dunefield, Quaternary coastal beach dunes and mud flats.</p> |

### *Climate*

The Carnarvon bioregion climate is described as semiarid to arid with predominantly winter rainfall (Bastin and the ACRIS Management Committee 2008). Kendrick and Mau (2002) describe the Cape Range subregion as arid, semi-desert to subtropical, with variable summer and winter rainfall and potentially significant cyclonic systems that may affect the coast and hinterland annually.

The nearest weather station to the survey area was the Onslow airport weather station (number 5017). Yearly mean rainfall shown the first six months of the year on average as the wettest, with the greatest mean rainfall occurring in the months of February (58.9 mm), March (70.7 mm), May (47.2 mm) and June (46 mm). Table 2 displays the yearly rainfall data for Onslow airport weather station, showing that the three months leading up to the field survey experienced no rainfall until several days prior to the field survey.

**Table 2: Monthly Rainfall data recorded at the nearby Onslow airport weather station (BoM 2021).**

| Month                              | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug | Sep | Oct | Nov | Dec | Total |
|------------------------------------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-------|
| Total monthly rainfall 2020 (mm)   | 1.0  | 0.0  | 38.6 | 0.0  | 16.8 | 9.8  | 0.2  | 3.2 | 0.0 | 0.0 | 0.0 | 7.8 | 77.4  |
| Mean monthly rainfall 1940-current | 37.7 | 58.9 | 70.7 | 11.1 | 47.2 | 46.0 | 19.5 | 8.2 | 1.3 | 0.8 | 2.6 | 3.3 | 304.2 |

### *Broad-scale vegetation mapping*

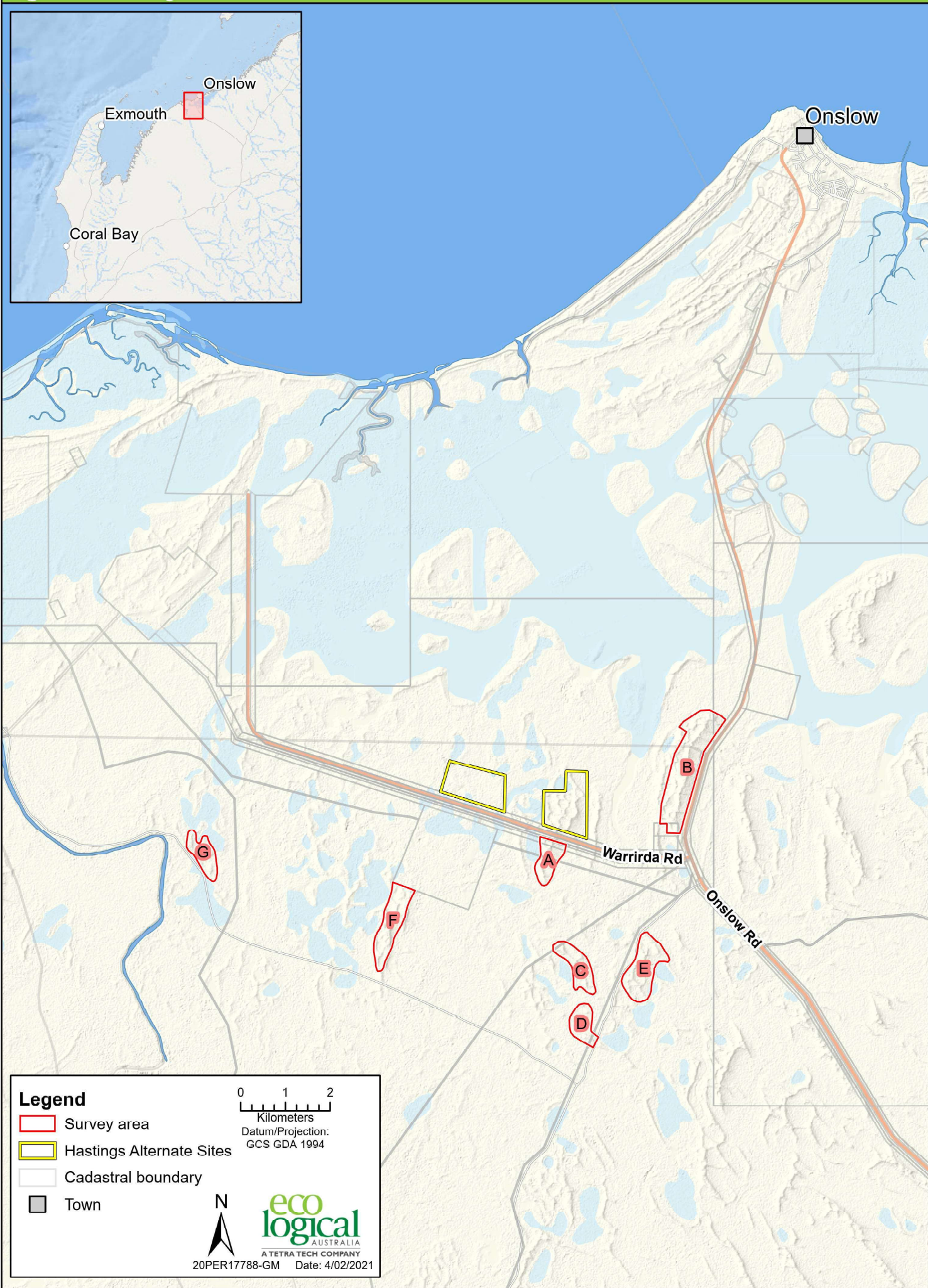
Vegetation type and extent have been mapped at a regional scale by Beard (1979), who categorised vegetation into broad vegetation associations. Based on this mapping at a scale of 1:1,000,000, the Department of Primary Industries and Regional Development (DPIRD; previously Department of Agriculture and Food Western Australia [DAFWA]) has compiled a list of vegetation extent and types across WA (Shepherd et al. 2002).

Five vegetation associations occur within several kilometres of the alternate sites, with the majority of this area falling within the association 'Cape Yannare Coastal Plain\_670' (Government of Western Australia 2019; Table 3).

**Table 3: Vegetation associations within the survey area**

| Vegetation association         | Description  | Pre-European extent (ha) within CAR01 Cape Range subregion | Current extent (ha) within CAR01 Cape Range subregion | Percentage remaining |
|--------------------------------|--|--|---|----------------------|
| Cape Yannare Coastal Plain_117 | Hummock grasslands, grass steppe; soft spinifex  | 12,424.35  | 10,907.99   | 87.80                |
| Cape Yannare Coastal Plain_127 | Bare areas: Tidal Mud Flat   | 100,987.52   | 99,790.74   | 98.81                |
| Cape Yannare Coastal Plain_589 | Mosaic: Short bunch grassland - savanna / Hummock grasslands, grass steppe; soft spinifex  | 78,100.80  | 77,834.93   | 99.66                |
| Cape Yannare Coastal Plain_670 | Hummock grassland with scattered shrubs or mallee <i>Triodia</i> spp. <i>Acacia</i> spp., <i>Grevillea</i> spp. <i>Eucalyptus</i> spp. | 147,808.61   | 147,792.06  | 99.99                |
| Cape Yannare Coastal Plain_676 | Succulent steppe; samphire. <i>Tecticornia</i> spp. communities in saline areas.   | 29,193.60  | 28,442.66   | 97.43                |

**Figure 1: Survey area**





## Methodology

### Desktop Assessment

A series of target areas were determined prior to the field survey to identify habitat(s) most likely to support *Eremophila forrestii* subsp. *viridis*.

Previous targeted surveys of the area indicated that *E. forrestii* subsp. *viridis* is most likely to occur on linear red-dune sands in the area and therefore this was defined as the targeted environment for survey (RPS 2019). These environments were observed within the landscape using a range of environmental factors including slope, topography, vegetation cover, landscape, and soils mapping. This data was collected from satellite imagery, historical mapping (RPS 2019; GHD 2011), and publicly available datasets. Linear dune shapes that occurred within the 'Dune System' land system (DPIRD 2018) and appeared to have areas of vegetative cover (detected by analyzing normalized difference vegetation index (NDVI) values) were delineated as the targeted survey areas. These areas were ranked to inform the field survey, with areas closest to known historical locations of *E. forrestii* subsp. *viridis* searched as a priority.

### Field Survey

#### *Survey Team and Timing*

The targeted flora survey was undertaken over four days from the 13<sup>th</sup> to 16<sup>th</sup> December 2020 by a single ELA Senior Ecologist with the assistance of three Hastings staff as field assistants. Relevant qualifications, experience and licences of ELA staff are provided below in Table 4.

The Project is located within the Eremaean Botanical Province, as such survey timing falls outside the recommendations stated in the *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016); March – June. This survey timing holds less importance for the detection of *E. forrestii* subsp. *viridis* as the species is a perennial shrub that is readily identifiable from vegetative characteristics only.

**Table 4: ELA survey personnel**

| Name / Role                        | Qualifications                         | Relevant Experience   | Licenses  |
|------------------------------------|--|---|---|
| Dr. Jeff Cargill / Senior Botanist | BSc. Hons. PhD. Environmental Sciences | Jeff has over 13 years' experience conducting botanical and ecological studies throughout Western Australia including baseline (Reconnaissance and Targeted) flora and vegetation studies, Targeted Threatened and Priority species surveys, MNES surveys, weed assessments and vegetation rehabilitation and monitoring programs. Jeff has significant experience undertaking similar assessments throughout the WA and the Pilbara. | Flora collection: FB62000138<br>DRF permit: TFL 48-1920 |

#### *Targeted Flora Survey*

Survey methodology involved personnel walking meandering parallel traverses in target areas identified by the desktop assessment. Locations of survey traverses are shown in Figure 2. Where suitable habitat for *Eremophila forrestii* subsp. *viridis* was identified in the field, i.e. outside of target areas identified by the desktop assessment, additional traverses were undertaken.

The Targeted flora survey was conducted in accordance with the Environmental Protection Authority (EPA) *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016). The current Targeted flora survey was specifically undertaken to identify and record the conservation significant flora species *Eremophila forrestii* subsp. *viridis* (P3).

Several previously recorded populations of *Eremophila forrestii* subsp. *viridis* were visited to ensure personnel were familiar with the species. It was not the intention of this survey to validate known records, but rather to search for additional records in the local area. For any individuals or populations of the targeted flora species identified the following data was collected:

- A colour photograph;
- GPS coordinate location (points for individual plants);
- Number of individuals in the population (recording a range of co-ordinates if necessary);
- Reproductive phase (flowering, fruiting etc.);
- Associated habitat/landscape element;
- Time and date observed; and
- Observer details.

Species and population data will be submitted along with Threatened and Priority Report forms to DBCA, as required by conditions of collection licenses issued under the BC Act. Nomenclature used for the flora species within this report follows the WA Plant Census as available on FloraBase (DBCA 2021).

### Limitations

The EPA *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) recommends including discussion of the constraints and limitations of the survey methods used. Constraints and limitations for the Targeted flora survey have been summarised in Table 5 below.

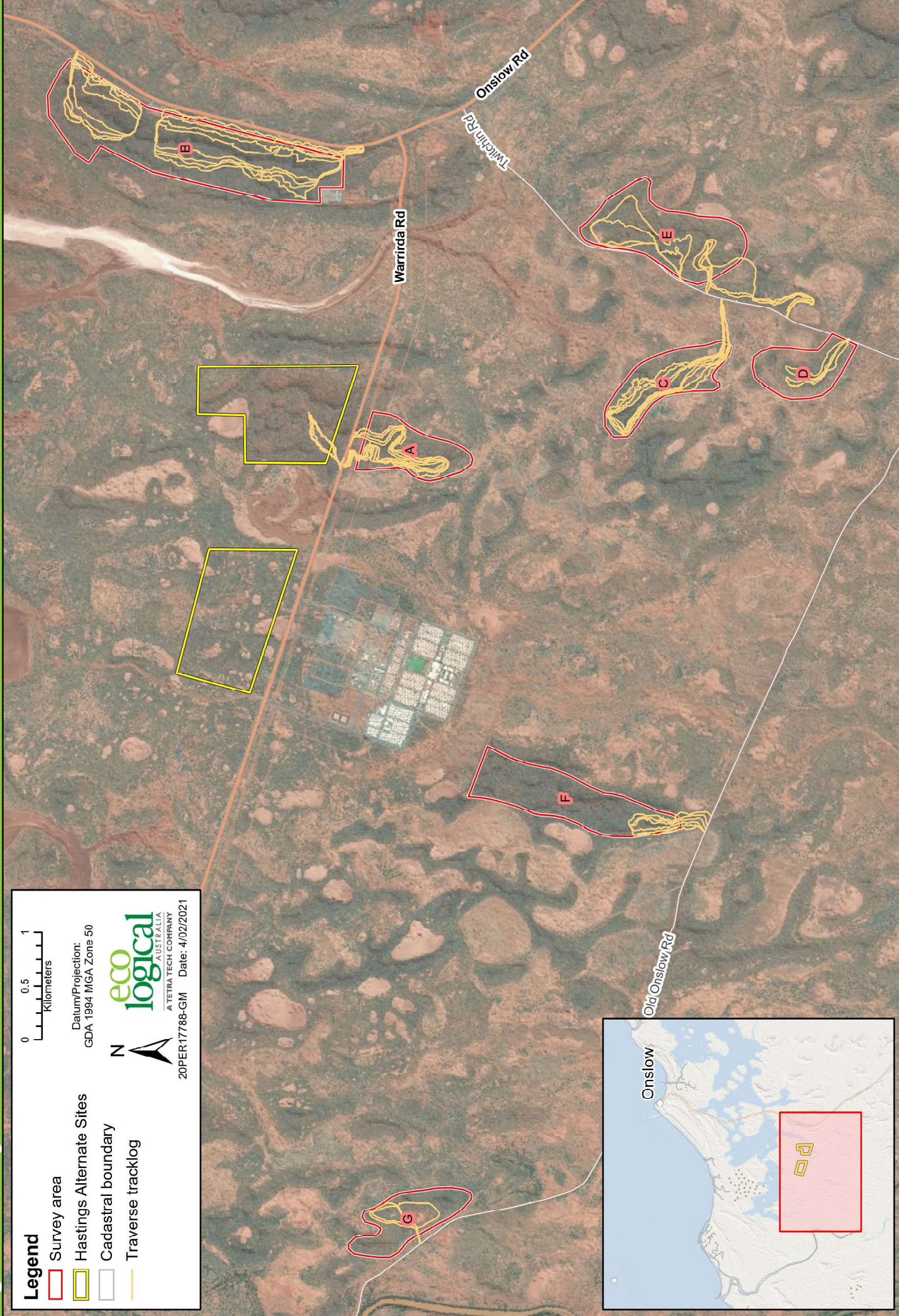
**Table 5: Survey limitations**

| Potential Survey Limitation   | Impact on Survey   |
|---|--|
| Sources of information and availability of contextual information (i.e. pre-existing background versus new material). | <b>Not a constraint.</b> Contextual information relevant to the project including species and communities' profiles, geospatial imagery and historical flora and vegetation mapping were readily available to inform the field survey and therefore were not considered a limitation.  |
| Scope (i.e. what life forms, etc., were sampled).   | <b>Not a constraint.</b> The requirement to undertake a Targeted <i>Eremophila forrestii</i> subsp. <i>viridis</i> flora survey in accordance with relevant State and Federal legislation and EPA guidance documents was adequately met.   |
| Completeness and further work which might be needed (i.e. was the relevant survey area fully surveyed).               | <b>Potential constraint.</b> Sufficient coverage of the local area was undertaken to meet requirements outlined in the scope of works with target areas identified in the desktop assessment visited and searched. It is however, recognised that the current report is not a comprehensive census of <i>E. forrestii</i> subsp. <i>viridis</i> populations in the area and further populations may occur in the areas not visited during field works. |
| Mapping reliability.  | <b>Not a constraint.</b> Coverage of the survey area was considered by ELA to be good, with areas considered suitable supporting habitat identified both during the desktop phase and in the field. High quality aerial maps were used to inform the field survey.   |

| Potential Survey Limitation   | Impact on Survey   |
|---|--|
| Timing, weather, season, cycle.   | <b>Potential Constraint.</b> The survey was undertaken during December, following a three-month period of almost no rainfall and outside the recommended survey period for the Eremaean region under the Technical guidance (EPA 2016). <i>Eremophila forrestii</i> subsp. <i>viridis</i> is readily recognisable in this region regardless of season due to the distinctive habit and vegetative characteristics of the species, therefore was able to be adequately surveyed as the sole focus of the field works. |
| Disturbances (fire, flood, accidental human intervention, etc.).                                | <b>Not a constraint:</b> Disturbances within the survey area were minor and did not negatively impact the ability to meet objectives outlined in the scope of works.   |
| Intensity (in retrospect, was the intensity adequate).  | <b>Not a constraint.</b> The survey area was adequately searched for conservation significant species by field staff undertaking traverses across the survey area.   |
| Resources (i.e. were there adequate resources to complete the survey to the required standard). | <b>Not a constraint.</b> The number of personnel conducting this field survey in the given time was adequate to undertake the required level of survey. Additional resources, including equipment available, additional support and personnel were adequate.   |
| Access problems (i.e. ability to access survey area).   | <b>Not a constraint.</b> All relevant areas within the survey area were able to be accessed and surveyed.  |
| Experience levels (e.g. degree of expertise in plant identification to taxon level).            | <b>Not a constraint.</b> The personnel conducting this field survey were suitably qualified to identify specimens, having previously undertaken biological surveys in the Carnarvon bioregion of Western Australia or being familiarised with the target species and working closely with the ELA senior consultant.   |



Figure 2: Survey effort





## Results

### Desktop Assessment

GIS analysis of known environmental values in the area surrounding the two alternate sites identified seven areas potentially containing suitable habitat to support *Eremophila forrestii* subsp. *viridis*, shown in Figure 1 as Survey areas A through G. Of these seven areas, two contained existing records, survey areas A and G (Figure 3, Table 6). A total of 703 individuals of *E. forrestii* subsp. *viridis* are currently known to occur in the local area, with 342 of those recorded within Hastings' two alternate site locations.

### Targeted flora survey

One DBCA listed Priority flora species *Eremophila forrestii* subsp. *viridis* (listed as P3) was recorded during the field survey.

#### *Eremophila forrestii* subsp. *viridis*

A total of 2856 individuals of *Eremophila forrestii* subsp. *viridis* were recorded during the field survey. These individuals were recorded within or nearby Survey areas A through F, located between 13 and 20 km south of Onslow townsite. The population summary data is displayed below in Table 6. The locations of *E. forrestii* subsp. *viridis* recorded during the survey are displayed in Figure 3 and the point-data is listed in Appendix B. No occurrences of *E. forrestii* subsp. *viridis* were recorded within Survey area G, this area was noted to be in a degraded condition, subject to sustained cattle grazing and dominated by Buffel grass (*Cenchrus ciliaris*).

The threatened and priority flora report form field manual (DEC 2017) provides flexible guidelines for determining the nature of clusters and individuals of threatened or priority flora as a population or subpopulation. The advised guideline recommends a spacing of 500 m between individuals to establish separate populations with clusters within that boundary considered sub-populations. This can vary depending on functional boundaries, or in situations where it is pertinent to the population in question.

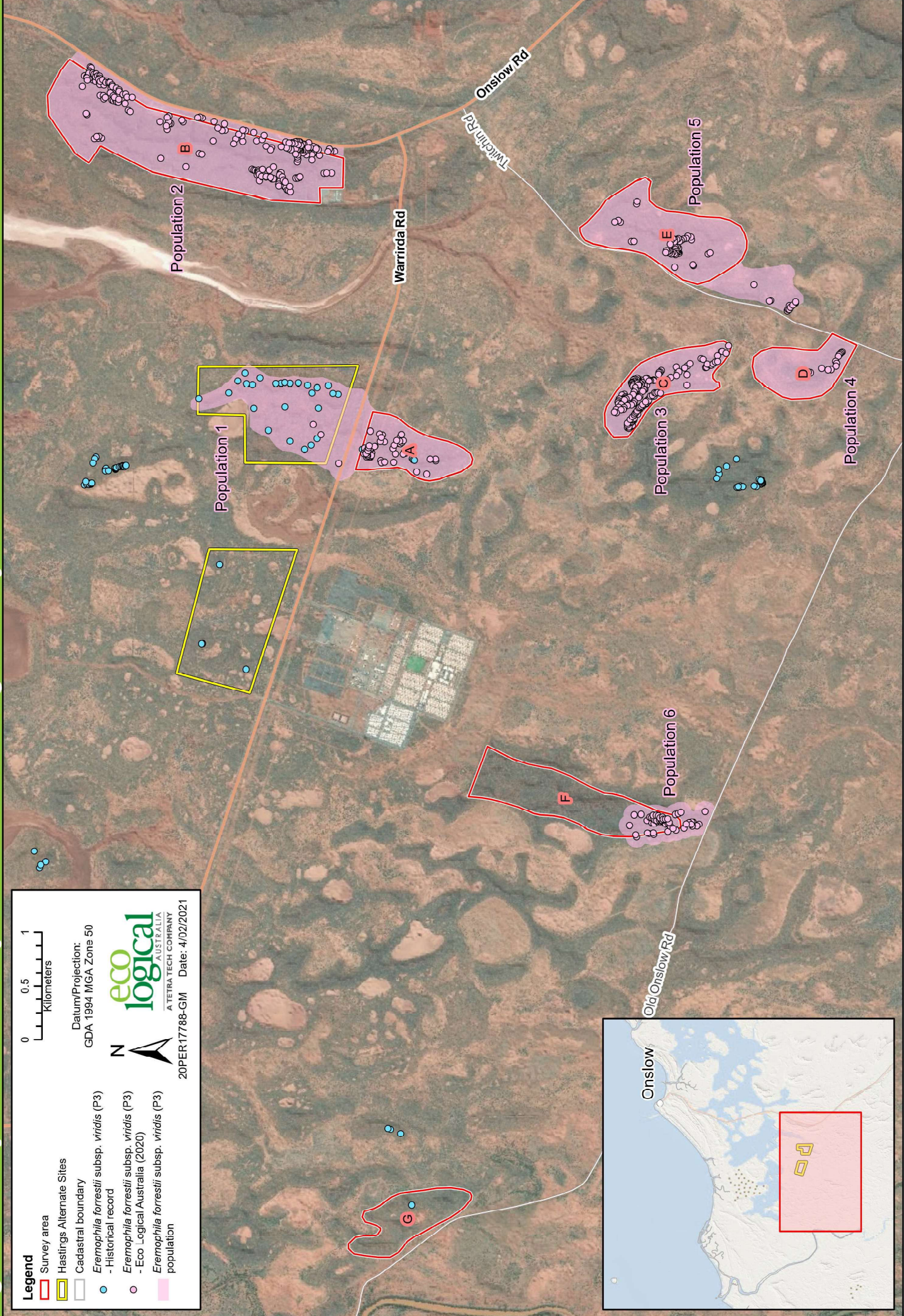
Based upon these guidelines, *E. forrestii* subsp. *viridis* recorded during the survey can be assigned to six (6) populations, as outlined in Table 6 and displayed in Figure 3. The numbering system used here is for the purposes of this report only and does not represent any official codes that will be assigned to these populations by DBCA in the future.

**Table 6: *Eremophila forrestii* subsp. *viridis* (P3) population summary**

| Population | Survey Area | Location                | Number of individuals recorded | Historical number of individuals | Total number of individuals known in population |
|------------|-------------|-------------------------|--------------------------------|----------------------------------|---|
| 1          | A           | Warrirda Rd             | 248                            | 317                              | 565   |
| 2          | B           | Onslow Rd (West side)   | 802                            |                                  | 802   |
| 3          | C           | Twitchin Rd (West side) | 1087                           | 1                                | 1088  |
| 4          | D           | Twitchin Rd (West side) | 57                             |                                  | 57  |
| 5          | E           | Twitchin Rd (East side) | 373                            |                                  | 373   |
| 6          | F           | Old Onslow Rd           | 289                            |                                  | 289   |



**Figure 3: *Eremophila forrestii* subsp. *viridis* recorded during the survey effort**





## Discussion

### *Eremophila forrestii* subsp. *viridis*

*Eremophila forrestii* subsp. *viridis* is a much-branched shrub to 1.5 meters (m) high with pink to cream flowers and scarcely hairy deep green leaves. This taxon is distinguished from other *E. forrestii* subspecies by its bright green leaves and usually pale pink corolla. The leaves and stems are also typically less hairy than other subspecies (DBCA and WAH 2021, Brown and Buirchell 2011). In the area near Onslow, it is known to inhabit red to red-brown sands and sandy loams in association with the dunes and interdunal flats (DBCA and WAH 2021).

It is known from five records listed on DBCA's Florabase database (DBCA and WAH 2021). Three of these records occur between 15 and 25 km south of Onslow townsite, with an additional record from 75 km south-east of Onslow, just off the NW Coastal Hwy. The final record is approximately 1100 km to the east, from a collection made at well 38 on the Canning Stock Route.

Conditions were considered poor at the time of the survey, with no rainfall being recorded in the three months preceding the field survey. Precipitation in December occurred on the 8<sup>th</sup> (6.6 mm) and the 10<sup>th</sup> (1 mm) (BOM 2021) several days prior to the field survey. This is unlikely to have had a significant effect on the flora and vegetation present, with *E. forrestii* subsp. *viridis* found to be in a vegetative state with no recent flowering material (Figure 4). The taxon was able to be distinguished in the field in spite of the conditions due to the difference in leaf coloration and sparse indumentum as compared to the only other subspecies of *E. forrestii* in the area – subsp. *forrestii*, which has a dense tomentum covering the leaves and stems, giving it a blueish coloration. Survey conditions therefore, although not ideal, were not considered a significant constraint for the identification of *E. forrestii* subsp. *viridis* in the field.



Figure 4: *Eremophila forrestii* subsp. *viridis* photographed during the field survey

The additional 2856 records of *E. forrestii* subsp. *viridis* that make up the six populations recorded in this survey will substantially increase the known population count for the species in this region. With five of

the six populations recorded previously unknown, and population one now recording additional occurrences outside the Hastings alternate site, the proportion of known *E. forrestii* subsp. *viridis* within the two alternate sites is much reduced.

As the survey was limited in scope to several days in the field, high value targets had to be searched to the exclusion of the broader area. As such, only those areas identified in the desktop assessment were visited (survey areas A – G) with any populations found followed to establish the population boundary regardless of survey area placement. This meant there is potential for further populations to occur in areas not surveyed during field works and it must be recognised that the current report is not a comprehensive census of *Eremophila forrestii* subsp. *viridis* populations in the Onslow area.

## Summary

Hastings Technology Metals Limited (Hastings) plans to develop supporting infrastructure for the Yangibana Rare Earths Project at Onslow, WA, located approximately 370 kilometres (km) north of Carnarvon in the Shire of Ashburton. Two alternate sites for planned infrastructure are located approximately 20 km south of Onslow townsite along Warrirda Rd between 2 km and 5.4 km from the Onslow Rd intersection.

The Priority three flora *Eremophila forrestii* subsp. *viridis* has been recorded within these alternate sites during previous surveys, therefore Eco Logical Australia (ELA) was commissioned by Hastings in 2020 to conduct a targeted *E. forrestii* subsp. *viridis* survey in areas adjacent to the alternate sites to establish local context for the presence and size of populations of this species in the area.

Prior to the field survey, likely habitat for the species was determined through analysis of known habitat, occurrence records and topographical features of the area to establish seven target survey areas for the field survey. These survey areas were traversed on foot and any populations of *E. forrestii* subsp. *viridis* were counted and marked with GPS coordinates.

A total of 2856 individuals of *Eremophila forrestii* subsp. *viridis* were recorded during the field survey, comprising six populations. Five of these populations were new populations not previously recorded and the remaining one (population one) is considered an extension of an existing known population recorded from within the alternate areas. One survey area with a known record was revisited but no *E. forrestii* subsp. *viridis* was found within the area, it was noted that this area was quite degraded.

The season the field survey was conducted was outside that recommended for biological surveys in the Eremaean region (EPA 2016). This was not considered to be a significant constraint on the survey however, as *E. forrestii* subsp. *viridis* is readily identifiable at all times of the year as a perennial shrub with distinctive vegetative characteristics separating it from other *Eremophila* species.

Overall, this survey has increased the known populations and abundance of *E. forrestii* subsp. *viridis* in the area, leading to a proportional decrease in known individuals occurring within the alternate sites.



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## Appendix A Framework for conservation significant flora ranking

### CATEGORIES OF THREATENED SPECIES UNDER THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT)

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act. Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

| Category                   | Definition   |
|----------------------------|--|
| Extinct (EX)               | There is no reasonable doubt that the last member of the species has died.   |
| Extinct in the Wild (EW)   | Taxa known to survive only in captivity or as a naturalised population well outside its past range; or taxa has not been recorded in its known and/or expected habitat at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.  |
| Critically Endangered (CR) | Taxa considered to be facing an extremely high risk of extinction in the wild.   |
| Endangered (EN)            | Taxa considered to be facing a very high risk of extinction in the wild.   |
| Vulnerable (VU)            | Taxa considered to be facing a high risk of extinction in the wild.  |
| Near Threatened (NT)       | Taxa has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.  |
| Least Concern (LC)         | Taxa has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.  |
| Data Deficient (DD)        | There is inadequate information to make a direct, or indirect, assessment of taxa's risk extinction based on its distribution and/or population status.  |
| Not Evaluated (NE)         | Taxa has not yet been evaluated against the criteria.  |
| Migratory (M)              | <p>Not an IUCN category.</p> <p>Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including:</p> <ul style="list-style-type: none"><li>• the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal) for which Australia is a range state;</li><li>• the agreement between the Government of Australian and the Government of the People's Republic of China for the Protection of Migratory Birds and their environment (CAMBA);</li><li>• the agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); or</li><li>• the agreement between Australia and the Republic of Korea to develop a bilateral migratory bird agreement similar to the JAMBA and CAMBA in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (ROKAMBA).</li></ul> |

## CONSERVATION CODES FOR WESTERN AUSTRALIA FLORA AND FAUNA

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Specially protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

### Threatened species (T)

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

| Category                      | Code | Description   |
|-------------------------------|------|---|
| Critically Endangered species | CR   | <p>Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p> |
| Endangered species            | EN   | <p>Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.</p>   |

| Category           | Code | Description   |
|--------------------|------|---|
| Vulnerable species | VU   | <p>Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)© of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.</p> |

### Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild, as follows:

| Category                    | Code | Description  |
|-----------------------------|------|--|
| Extinct species             | EX   | <p>Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.</p>   |
| Extinct in the wild species | EW   | <p>Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.</p> |

### Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

Categories are detailed below.



| Category  | Code | Description   |
|---|------|---|
| Migratory species   | MI   | <p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.</p> <p>Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p> |
| Species of special conservation interest (conservation dependent fauna) | CD   | <p>Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).</p> <p>Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>  |
| Other specially protected species                                       | OS   | <p>Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).</p> <p>Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>  |

### Priority species (P)

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

| Category   | Code | Definition  |
|------------|------|---|
| Priority 1 | P1   | <p>Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>                                      |
| Priority 2 | P2   | <p>Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>  |
| Priority 3 | P3   | <p>Poorly-known species</p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>  |
| Priority 4 | P4   | <p>Rare, Near Threatened and other species in need of monitoring</p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>© Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p> |