Appendix 5 – Targeted Flora Search Myara North Region 2023 (WEPL, 2024)

Myara North Pre-Clearance Surveys 2022

Threatened and Priority Flora

Targeted Search

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Myara North Pre-Clearance Surveys 2022

Threatened and Priority Flora Targeted Search

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Executive Summary

Alcoa of Australia (Alcoa) proposes to transition to the new mine region of Myara North (MN) as part of its Huntly mining operations. The MN mine region is currently under assessment by the Environmental Protection Authority (EPA). Alcoa engaged Western Environmental Pty Ltd (WEPL) to undertake targeted pre-clearance Threatened and Priority flora surveys to support a preliminary or minor works application as part of the Part IV EPA approvals process.

The overall Survey Area comprised eight packages of work, most with partially overlapping boundaries, summarised in Table A below.

Table A: Survey Areas

Survey Area	Description of Survey Area	Area Approximate (ha)
Water Pipeline Alignment	Approx. 9 km long by 40m wide. Runs north from Serpentine Dam (4 km) then east along Balmoral Rd (3.5 km).	65 ha
Power Corridor Alignment	Approx. 8 km long by 40m wide. Centred on Balmoral Rd and unnamed forestry track. Shared alignment on Balmoral Rd with Water Pipeline Alignment.	
Frollet Road Intersection and Additional Frollet Road	Running east west along Jarrahdale Rd and covering the Jarrahdale Rd and Frollet Rd intersection.	15 ha
Albany Highway Intersection	Covering intersection of Jarrahdale Rd and Albany highway and verges of Albany Hwy running north south.	40 ha
MN Facilities Area	Facilities area, magazine and magazine access track. Centred on Balmoral Rd..	50 ha
HUNG_G_000473-000_B_Frollet Rd and Additional Survey Road	Access road corridor 8.2 km wide and 20-80 m wide. Running north south along Frollet Rd and Balmoral Rd between Jarrahdale Rd and the MN Facilities Area	35 ha
Total		**204.9 ha (exact)**

The Survey Area falls within the previous survey extent of the Mattiske (2021) *Alcoa of Limited Australia: Pinjarra Alumina Refinery Revised Proposal Detailed Flora and Vegetation Survey for Huntley Mine – Myara North Surveys.* This report, and other available desktop/background information was reviewed prior to the field survey.

No Threatened or Priority flora were identified as previously recorded within the Survey Area from Mattiske (2021) or Department of Biodiversity Conservation and Attractions (DBCA) database records. A pre-survey likelihood of occurrence assessment specific to the eight packages of work within the Survey Area was undertaken. The assessment identified that three species have a high likelihood of occurrence, 14 species a medium likelihood of occurrence and 22 species a low likelihood of occurrence. No Threatened species had a high or medium likelihood of occurrence.

The targeted searches were conducted across 25 person days from 7–30 November 2022 by the WEPL ecology team. Searches were undertaken as 20 m spaced grid searches. Due to generally open understory 20 m spacings were considered suitable. Where target species have specific micro habitat preferences, these receive a higher intensity of search effort. No significant limitations or constraints were encountered while undertaking the targeted searches.

No Commonwealth E*nvironment Protection and Biodiversity Conservation Act 1999* (EPBC) listed, or State Biodiversity Conservation (BC) Act listed Threatened flora or DBCA listed Priority flora were recorded in the Survey Area.

Following suitable targeted search effort, the likelihood of occurrence for all Threatened and Priority flora species identified by the desktop was reassessed as low. This assessment was reached considering:

- The results of the pre-survey likelihood of occurrence assessments, both by WEPL for the specific Survey Area and Mattiske (2021) for the MY project area.
- Having undertaken suitable targeted search efforts during the primary spring survey season and within the flowering period for the majority of species. For four species with flowering periods outside the survey period, three can be identified without flowering material.
- The absence or limited extent of habitat types identified by the desktop as containing a significant portion of the Threatened and Priority flora for the region (e.g. granites, breakaways, major drainages, wetlands, sandy soils).
- Disturbance to the understory in many areas through vehicle access for firewood collection and clearing of access tracks.
- The alignment of much of the Survey Area on existing disturbed areas, roads and forestry tracks.

The absence of Threatened and Priority flora was not an unexpected survey outcome considering the dominance of habitat with *Eucalyptus marginata* and *Corymbia calophylla* forest over laterite and the absence or limited extent of habitat types identified by the desktop as containing a significant portion of the Threatened and Priority flora for the region (e.g. granites, breakaways, major drainages, wetlands, sandy soils).

Acronyms and Abbreviations

Abbreviation	Full Title
°C	Degree Celsius
BoM	*Bureau of Meteorology*
BC Act	*Biodiversity Conservation Act 2016*
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection Biodiversity and Conservation Act 1999*
ESA	Environmentally Sensitive Area
GPS	Global Positioning System
ha	Hectare
IUCN	International Union for Conservation of Nature
km	Kilometres
m	Metres
MN	Myara North
MNES	Matters of National Environmental Significance
P	Priority
PF	Priority Flora
PMST	Protected Matters Search Tool
SVT	Site Vegetation Types
T	Threatened
TPFL	Threatened and Priority Flora Database
VU	Vulnerable
WA	Western Australia
WAH	Western Australian Herbarium
WEPL	Western Environmental Pty Ltd

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Tables

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Appendices

1. Introduction

1.1 Project Background

Alcoa proposes to transition to the new MN mine region as part of its Huntly mining operations. The MN mine region is currently under assessment by the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (Assessment No. 2253).

The Survey Area falls within the previous survey extent of the Mattiske (2021) *Alcoa of Australia Limited: Pinjarra Alumina Refinery Revised Proposal Detailed Flora and Vegetation Survey for Huntley Mine – MN Surveys.*

Alcoa engaged WEPL to undertake targeted pre-clearance Threatened and Priority flora surveys to support a preliminary or minor works application as part of the Part IV EPA approvals process.

1.2 Location

The overall Survey Area comprised eight packages of work, most with partially overlapping boundaries. The total Survey Area was 204.9 ha. See Figure 1 for Survey Area overview and Table 1 for descriptions.

Table 1: Location of the Survey Areas

Survey Area	Description of Survey Area	Area Approximate (ha)
Water Pipeline Alignment	Approx. 9 km long by 40m wide. Runs north from Serpentine Dam (4 km) then east along Balmoral Rd (3.5 km). Eastern portion centred on Balmoral Rd. Eastern portion overlaps with Power Corridor for parts.	65 ha
Power Corridor Alignment	Approx. 8 km long by 40m wide. Larger polygon of 150x800 m at west end. Centred on Balmoral Rd and unnamed forestry track. Eastern portion overlaps with Water Corridor for parts.	
Frollet Road Intersection and Additional Frollet Road	Running east west along Jarrahdale Rd and covering the Jarrahdale Rd and Frollet Rd intersection. Overlaps in parts	15 ha
Albany Highway Intersection	Covering intersection of Jarrahdale Rd and Albany highway and verges of Albany Hwy running north south.	40 ha
MN Facilities Area	Facilities area, magazine and magazine access track. Centred on Balmoral Rd. Overlaps in parts.	50 ha
HUNG_G_000473-000_B_Frollet Rd and Additional Survey Road	Access road corridor 8.2 km wide and 20-80 m wide. Running north south along Frollet Rd and Balmoral Rd between Jarrahdale Rd and the MN Facilities Area. Also additional road option polygon near the MN Facilities Area. Overlaps in parts.	35 ha
Total		**204.9 ha**

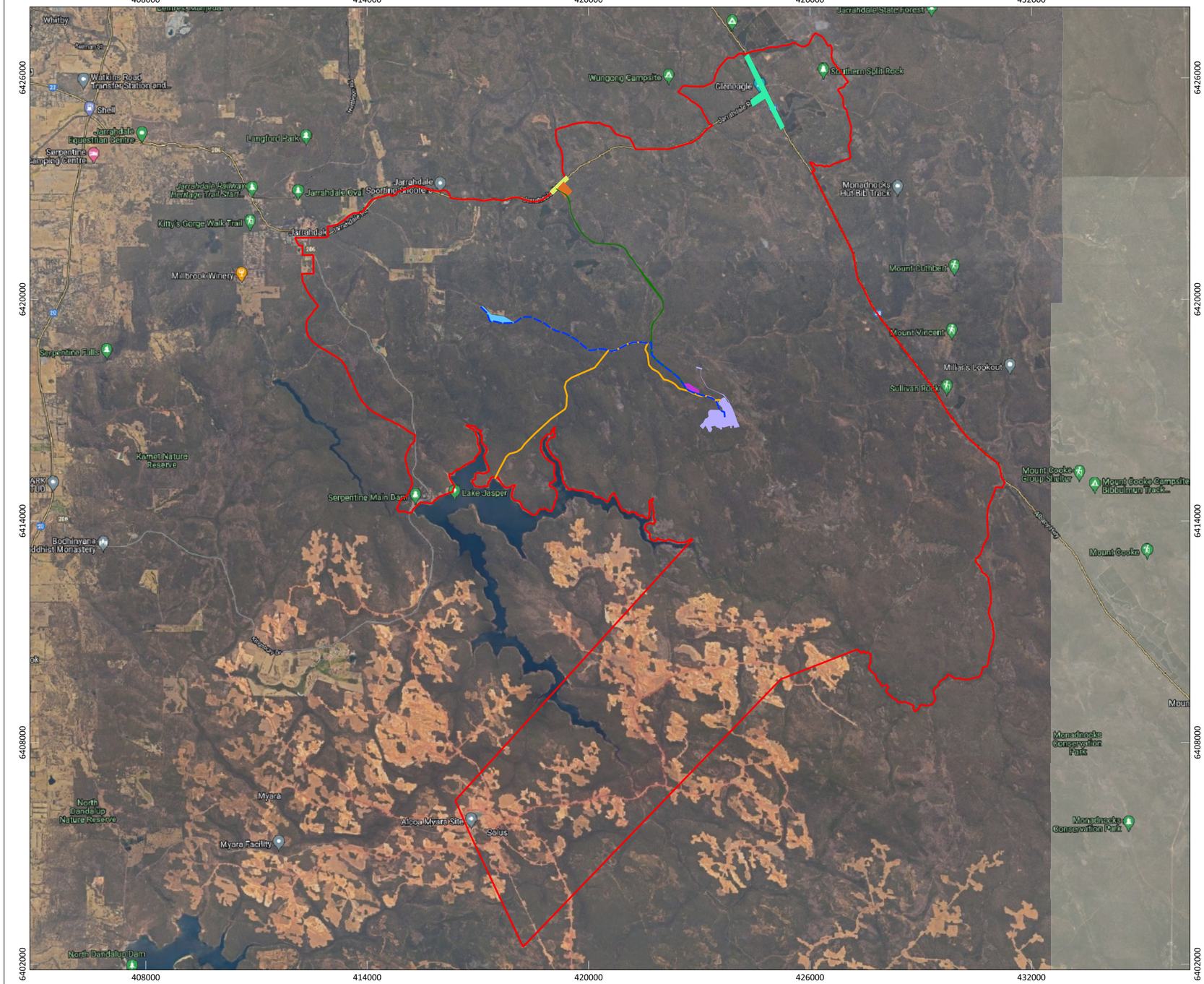
1.3 Scope and Objectives

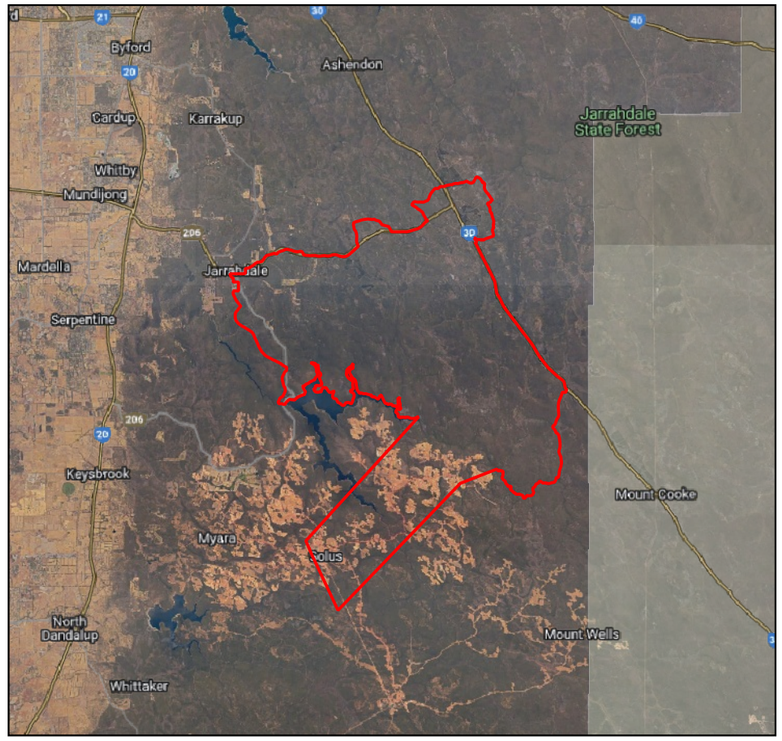
The objective of the survey was to identify the presence or likelihood of occurrence for Threatened and Priority flora.

The scope of works included:

- Desktop assessment of existing records and previous flora and vegetation studies.
- Undertake a likelihood of occurrence assessment based on desktop information.
- Conduct targeted Threatened and Priority flora searches.
- Preparation of a technical report, maps and supporting spatial data; suitable for submission to the EPA to support a preliminary or minor works application.

This report presents the results of the desktop and field survey undertaken to support the above objective.





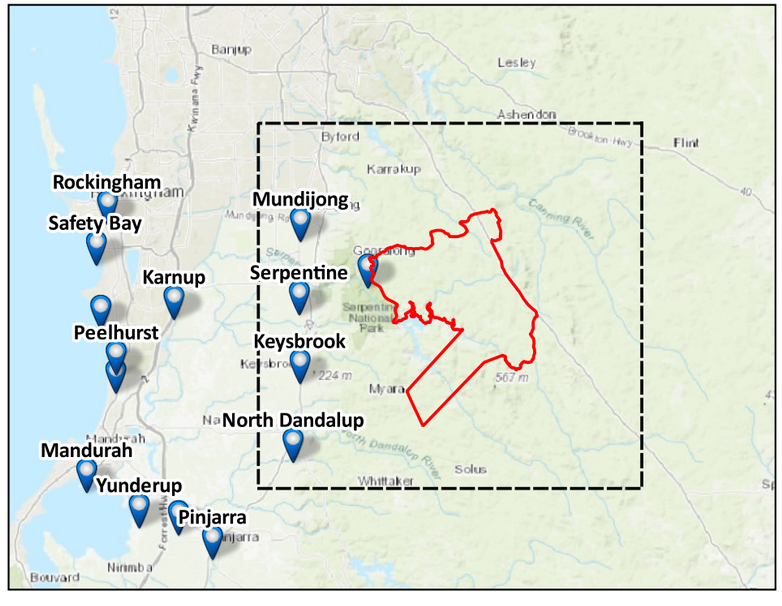


Figure 1: Survey Area

0 1 2 3 4 km

N

SCALE: 1:120,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT: Alcoa of Australia Limited

PROJECT NUMBER	VERSION
A22.055	0
DRAWN BY / REVIEWED BY: MD / LT	DATE: 9/3/2023

Legend

- Myara North Development Envelope
- Additional Frollett Road Survey Area
- Additional Survey Road
- Albany Hwy Intersectoin
- Frollet Road Intersection
- HUNG_G_000473-000_B_Frollet Rd
- Myara North Facilities
- Power Alignment
- Water Alignment
- Power Alignment

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	9/3/2023

NOTES:
Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

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G:\GIS\Project Data\A22.055\A22.055.qgs

1.4 Legislation and Guidance

This environmental assessment was conducted in accordance with Commonwealth and State legislation, guidelines and advice:

- *Environment Protection and Biodiversity Conservation Act 1999.* (EPBC Act) (Cth).
- *Environmental Protection Act 1986.* (EP Act) (WA).
- *Biodiversity Conservation Act 2016.* (BC Act) (WA).
- Biodiversity Conservation Regulations 2018 (WA).
- EPA. (2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment.* Known herein as the 'Flora and Vegetation Technical Guidance' (WA).
- Commonwealth of Australia. (2013). *Survey Guidelines for Australia's Threatened Orchids* (Cth).

Brief descriptions of relevant Commonwealth and State legislation is provided in Appendix A. While definitions and criteria for Commonwealth and State conservation codes is provided in Appendix B.

2. Existing Environment

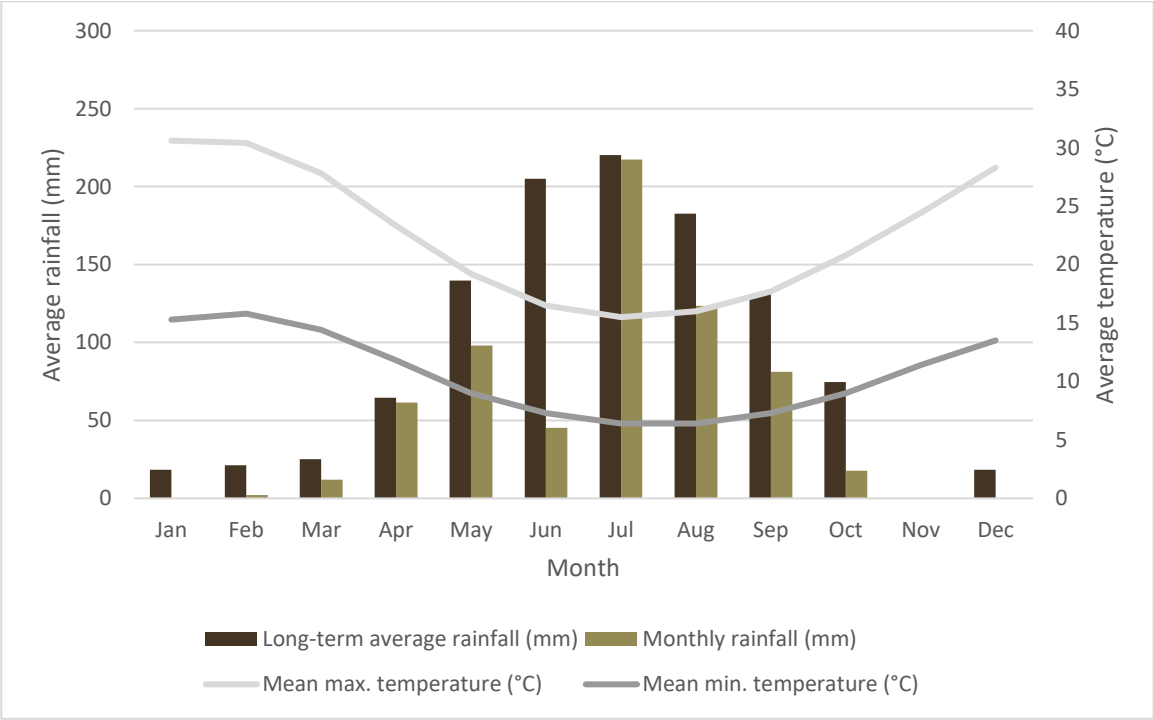
2.1 Climate and Pre-Survey Rainfall

The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Karnet WA (Station 009111), located approximately 14 km south-west of the Survey Area.

Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30-year interval (BoM, 2007), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate.

The long-term mean minimum temperature for Karnet ranges from 6.4˚C (July and August) to 15.8˚C (February) (1991 to 2022) and the long-term mean maximum temperature ranges from 15.5˚C (July) to 30.6˚C (January) (Graph 1) (BoM, 2022).

Karnet weather station recorded 668.1 mm of rain in the eleven months prior to the survey (December 2021 – October 2022), which is 432.9 mm below the long-term average of 1101.6 mm in the same period (BoM, 2022). Conditions during winter 2022 showed considerably below average rainfall in June (45.3 mm in 2022 compared to 205.1 mm) and slightly below average rainfall in July (217.4 in 2022 mm compared to 220.3 mm) and August (123.4 mm in 2022 compared to 182.7 mm) (BoM 2022). In the three months prior to the survey (August to October 2022), 222.3 mm of rainfall was recorded, which is 166.2 mm below the long-term average at 388.5 mm (BoM, 2022).



Graph 1: Long Term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Karnet WA (009111) (BoM, 2022)

3. Methodology

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the Survey Area and surrounds was reviewed prior to the field survey. The Mattiske (2021) detailed flora and vegetation survey report was reviewed in detail, the full report is provided as Appendix C.

Previous locations of Priority flora identified by Mattiske (2021) were provided by Alcoa.

3.1.2 Database Searches

The results of the Mattiske (2021) desktop assessment database searches were reapplied to identify potentially occurring Threated and Priority Flora. The database searches and dates are summarised below in (Table 2).

Table 2: Database Searches of the Survey Area

Database Name	Date	Search Type	Search Area
NatureMap (DBCA)	2021	Threatened and Priority Taxa	20 km buffer of point -32° 21' 54" S, 116° 10' 23" E.
Protected Matters Search Tool (PMST) (Department of Climate Change, Energy, the Environment and Water)	2021	Commonwealth listed Threatened flora and fauna and TECs	20 km buffer around the MN Project Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions)	2020	Threatened and Priority Flora	
Western Australian Herbarium (WAHerb) flora database search (Department of Biodiversity Conservation and Attractions)	2020	Threatened and Priority Flora	

3.1.3 Likelihood of Occurrence

A pre-survey likelihood of occurrence assessment, specific to the eight packages of work within Survey Area was undertaken. This was updated following survey to provide a post-survey likelihood of occurrence.

To identify potential habitat suitability the pre-survey likelihood of occurrence assessment considered:

- Intersection of Survey Area with Mattiske and Havel (1998) vegetation complexes. This was compared to the table listing relationship between locations of previous records and vegetation complex the records occurred in (Refer to *Table 6: Summary of Potential Threatened and Priority Flora Recorded in The MN Survey Area By Vegetation Complexes, And Dominant Landform And Soil Groupings* in Mattiske [2021]).

- Intersection with Site Vegetation Types (SVT) and Dominant Landform and Soil Groupings (Refer to *Table 11: Summary of Site-vegetation Types (SVT) on the Myara North Survey Area* in Mattiske [2021]).

- Review of aerial imagery to identify features such as granite outcrops, wetlands or sandy patches.

Further contextual information was gained through assessment of:

- Proximity of previous records from the Mattiske (2021) surveys.

- Proximity of previous records from DBCA database records.

- The findings of the previous likelihood of occurrence assessment (Refer to *Table 6: Summary of Potential Threatened and Priority Flora Recorded In The Myara North Survey Area By Vegetation Complexes, and Dominant Landform And Soil Groupings* in Mattiske [2021]).

The criteria presented in Table 3 were applied to determine final pre-survey likelihood of occurence.

Only species either recorded within the MN project area or considered as having a high or medium likelihood of occurrence under the Mattiske (2021) were included in the likelihood of occurrence assessment. Species classified by WEPL as having a low likelihood of occurrence will not be discussed unless a justification for this classification is required.

Table 3: Likelihood of Occurrence Criteria

Likelihood	Criteria
Recorded	Recorded in the Survey Area from database searches (if confident record is accurate), previous survey by others or by current survey.
High	Suitable habitat occurs within the Survey Area; and • Records of flora species <5 km from the Survey Area. With record <30 years old.
Medium	Suitable or marginally suitable habitat occurs within the Survey Area; and • Records of flora species <5 km from the Survey Area with record >30 years old. • Records 5-20 km from the Survey Area. • Species is strongly linked to a specific habitat, which occurs within the Survey Area and records are present >20 km from the Survey Area.
Low	• Records are >20km from the Survey Area • The species has a well understood and specific habitat preference/ requirements, which is absent from the Survey Area. • Records are historical only, or are pre mapping procedures (e.g. records assigned to towns or place names). • Suitable habitat is present, but there are no existing records of the species from the region despite reasonable previous search effort.

3.2 Field Survey

3.2.1 Field Survey Timing and Survey Team

The targeted field survey was conducted across 25 person days from 7–30 November 2022 by WEPL ecology team as summarised in Table 4.

Table 4: Survey Team and Effort According to Location

Survey Area and Date	Name	Position and years of Experience	DBCA Licence No.
The Water/Power Alignments 7-10 November 2022	Andrew Fry	Senior Environmental Scientist, 10 years	FB62000002-2
	Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468
Frollett Road intersection and additional Frollett Road survey area 17-18 November 2022	Andrew Fry	Senior Environmental Scientist, 10 years	FB62000002-2
	Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468
Albany Highway Intersection Survey 21-23 November 2022	Andrew Fry	Senior Environmental Scientist, 10 years	FB62000002-2
	Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468
MN Facilities	Andrew Fry	Senior Environmental Scientist, 10 years	FB62000002-2

Survey Area and Date	Name	Position and years of Experience	DBCA Licence No.
24, 29 & 30 November 2022	Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468
HUNG_G_000473-000_B_Frollet Rd and Additional Survey Road	Andrew Fry	Senior Environmental Scientist, 10 years	FB62000002-2
23, 28 & 29 November 2022	Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468

3.2.2 Targeted Searches

Threatened and Priority Flora identified during the desktop analysis and previous surveys as known or having potential to occur were targeted. Searches were undertaken as 20 m spaced grid searches. In some locations narrowed to 10-15 m where necessary. Due to open understory 20 m spacing were typical applied. Where target species have specific micro habitat preferences these receive a higher intensity of search effort.

The locations of any records were marked using a handheld GPS with the following data recorded:

- Observer, date, and time.
- Local abundance/population size and/or population boundary.
- Representative photos of each species and habitat.
- Collection of representative specimens.
- Notes on habitat and vegetation type.

3.2.3 Flora Taxonomy and Lodgement of Specimens

A pre-field survey identification guide was prepared from plant descriptions and images and by inspection of relevant species from Western Australian Herbarium (WAH) reference collection.

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the WAH. Identification of flora collections was primarily completed by senior ecologist Andrew Fry with suspected or potential conservation significant flora species submitted to the WAH for identification by Mike Hislop.

3.3 Survey Limitations and Constraints

Limitations and constraints of the targeted searches as outlined in the Flora and Vegetation Technical Guidance are detailed below in Table 5.

Table 5: Limitations and Constraints

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	Targeted pre-clearance searches following a detailed flora and vegetation survey was undertaken at a sufficient level of detail and in accordance with the *EPA Flora and Vegetation Technical Guidance.* Is considered appropriate to support approvals applications and EIA processes.
Availability of contextual information at a regional and local scale	Negligible	All data required to complete the scope of works including regional and local contextual information was available. Previous detailed surveys have been undertaken by Mattiske (2021) across the MN area. As part of that project, lower intensity targeted searched have been undertaken providing good contextual information. Available literature was reviewed, and publicly available databases were also searched. Contextual information is therefore not considered to be a limiting factor for this study.
Site Access	Negligible	The Survey Area was readily accessible by foot, and the entire the Survey Area was traversed.
Survey Intensity and Extent	Negligible	The entire Survey Area was traversed by foot to search to conservation significant flora. Sufficient time was allocated to survey, given the size and complexity of the Survey Area. The survey effort was considered adequate to assess values of the Survey Area and provide information required to support approvals applications.
Experience	Negligible	The field survey team and leading scientist (Andrew Fry) has suitable experience in conducting flora and vegetation surveys in the southwest. All flora collections of potential conservation significant species were submitted to the WAH for identification.
Timing, weather, season	Negligible	The recommended primary survey period for flora and vegetation surveys for the region as per the EPA Technical Guidance occurs during Spring (September through November). The survey was completed in November, after below average rainfall in July and August 2022 (see Graph 1). Observed conditions were good with many species in fruit and flower and annuals present. Survey period aligned with the flowering period for majority of the species but outside of flowering period for four species, three of which can be identified without flowering material. This limitation is discussed in Section 4.2 and was considered negligible
Mapping Reliability	Negligible	The entire of the Survey Area was traversed by foot and mapping reliability is considered high.
Disturbances (fire, flood etc.)	Moderate	Areas of disturbance associated with access tracks, previous clearing and weeds were recorded but were not a constraint on the results of the survey. There was recent fire (<2 years ago) at Albany Highway Intersection Survey Area, about 15% of the survey area affected. This represents a minor constraint for the specific Survey Area.

4. Results

4.1 Desktop Assessment

Previous records identified by the desktop search are shown in Figure 2. As discussed in Mattiske (2021) the use of a 20 km radius results in species that are restricted to the Swan Coastal Plain or occurring in areas on granite outcrops (e.g. Mt Cooke, Mr Windsor and Mt Wells), or species restricted to the eastern Jarrah forest being included.

The Mattiske (2021) desktop assessment identified 39 Threatened or Priority species as being previously recorded or having a high or moderate likelihood of occurrence, see Table 7.

Previous Records Mattiske (2021)

Mattiske (2021) undertook a detailed survey of the MN project area. The survey which ran across 302 person days included 6121 recording sites on a 120 m x 120 m grid system, 22 permanent quadrats, targeted searches throughout the area and mapping vegetation, soils and condition.

The Mattiske (2021) Threatened and Priority flora search area overlays the Survey Area for this project. No previous records of Threatened or Priority flora were identified as present. In the broader MN project area, no Threatened flora species and four new Priority flora locations were recorded. Species recorded are shown in the likelihood of occurrence assessment (Table 7) and in Figure 2.

Mattiske (2021) reported their results reflected the importance of granite outcrop areas and the sandier and sandy gravel soils, with many species associated with these. Fewer species occur on the gravellier laterite soils. It was also identified that a higher concentration of Priority flora species occurred on the eastern fringes of the MN area which supports species that are more tolerant of sandier soils and outcrops.

Previous Records DBCA Database

Ten Priority flora species as listed by DBCA have been recorded in the MN Survey Area and 25 Threatened or Priority species within the 20 km desktop search area, see Table 7. The remaining four species were only recorded from the PMST search.

Pre-Survey Likelihood of Occurrence Assessment

The pre-survey likelihood of occurrence assessment specific to the eight packages of work within the Survey Area is presented below in Table 7. The intersection with Mattiske and Havel (1998) vegetation complexes, which was used to understand habitat present is presented in Table 6.

The likelihood of occurrence assessment identified that three species have a high likelihood of occurrence, 14 species a medium likelihood of occurrence and 22 species a low likelihood of occurrence. No Threatened species had a high or medium likelihood of occurrence. The species assed as having a low likelihood or occurrence were typically associated with granites, drainage lines, wetlands or sandy habitats. These were identified as not occurring or having marginal/ restricted occurrences within the Survey Area.

Table 6: Vegetation Complexes Within the MN Survey Area

Vegetation Complex	Description	Water Pipeline Alignment	Power Corridor Alignment	Frollett Road Intersection and Additional Frollett Road	Albany Highway Intersection	MN Facilites	HUNG_G_000473-000_B_Frollett Rd and Additional Survey Road
Dwellingup 1	Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones.	x	x			x	x
Dwellingup 2	Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on lateritic uplands in subhumid and semiarid zones.	x	x	x	x		
Goonaping	Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata* (humid zones) and *Eucalyptus marginata* subsp. *thalassica* (semiarid to periarid zones) on the sandy gravels, low woodland of *Banksia attenuata* on the drier sandier sites (humid to periarid zones) with some *Banksia menziesii* (northern arid and periarid zones) and low open woodland of *Melaleuca preissiana – Banksia littoralis* on the moister sandy soils (humid to periarid zones).		x				
Murray 1	Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* - *Eucalyptus patens* on valley slopes to woodland of *Eucalyptus rudis – Melaleuca rhaphiophylla* on the valley floors in humid and subhumid zones.	x					
Pindalup	Open forest of *Eucalyptus marginata* subsp*. thalassica – Corymbia calophylla* on slopes and open woodland of *Eucalyptus wandoo* with some *Eucalyptus patens* on the lower slopes in semiarid and arid zones.						
Swamp	Mosaic of low open woodland of *Melaleuca preissiana – Banksia littoralis*, closed scrub of Myrtaceae spp., closed heath of Myrtaceae spp. and sedgelands of *Baumea* and *Leptocarpus* spp. on seasonally wet or moist sand, peat and clay soils on valley floors in all climatic zones.	x	x		x		x
Yarragil 1	Open forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones.	x				x	
Yarragil 2	Open forest of *Eucalyptus marginata* subsp. *thalassica – Corymbia calophylla* on slopes, woodland of *Eucalyptus patens – Eucalyptus rudis* with *Hakea prostrata* and *Melaleuca viminea* on valley floors.	x	x	x	x	x	x

Table 7: Pre-Survey Likelihood of Occurrence

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
Anthocercis gracilis	T	V	Low	Not recorded within MN area previously or during 2020 and earlier studies. Recorded in Dwellingup 1 in wider Jarrah Forest.	Sandy or loamy soils. Granite outcrops. Mainly near granites (Florabase records) and less likely in lateritic gravels.	Sep to Oct	Previous records >20km and preferred habitat not present.
Diuris drummondii	T	V	Low	Not recorded within MN area previously or during 2020 and earlier studies.	Low-lying depressions, swamps. Not likely in lateritic soils.	Nov to Dec or Jan	Previous records >20km and preferred habitat not present.
Diuris micrantha	T	V	Low	Not recorded within MN area previously or during 2020 and earlier studies.	Brown loamy clay. Winter-wet swamps, in shallow water. Not likely in lateritic soils.	Sep to Oct	Previous records >20km and preferred habitat not present.
Eleocharis keigheryi	T	V	Low	Not recorded within MN area previously or during 2020 and earlier studies.	Clay, sandy loam. Emergent in freshwater: creeks, claypans. Not likely in lateritic soils.	Aug to Nov	Previous records >20km and preferred habitat not present.
Grevillea flexuosa	T	V	Low	Recorded in Cooke in wider Jarrah Forest.	Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	Jul to Oct	Preferred habitat not present. Previously recorded in a vegetation complex that was not within the Survey Areas.
Lasiopetalum pterocarpum	T	E	Low	Recorded on Darling Scarp, Murray 1 and Helena 1 so may extend to granite outcrops. Not in lateritic soils.	Dark red-brown loam or clayey sand over granite. On sloping banks near creeklines.	Aug to Dec	Preferred habitat not present. Previously recorded in a vegetation complex that was not within the Survey Areas.
Verticordia fimbrilepis* subsp. *fimbrilepis	T	E	Low	Recorded in Swamps in wider Jarrah Forest. Some potential in lateritic soils.	Gravelly sandy or clayey soils. Flats, road verges.	Oct to Dec or Jan	Preferred habitat not present. Previously recorded in a vegetation complex that was not within the Survey Areas.
Verticordia plumosa* var. *ananeotes	T	E	Low	Not recorded within MN area North previously or during 2020 and earlier studies. Not likely in lateritic soils.	Sandy loam. Seasonally inundated plains.	Nov to Dec	Records 15 km west at base of scarp. Preferred habitat not present.

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
[2]***Andersonia* sp. Saxatilis (F. & J. Hort 3324)**	P1		Low	Recorded on Dwellingup, and Cooke.	Dry, brown loam, clay over granite. Slope, outcrops, granite.	Jan or Sep-Oct	Preferred habitat (granites) not present. Previously recorded in a vegetation complex that was not within the Survey Areas.
Calytrix simplex* subsp. *simplex	P1		Low	Recorded in Dwellingup 2 within wider Jarrah Forest. Potential in lateritic soils.	On sandplain. With *Eucalyptus tetragona*, etc.	Oct to Nov	Preferred habitat is not present within Survey Areas. The closest recording was 8.5 km away within Swamp complex with grey clay and loamy soil (WA Herb). This habitat was not present within the Survey Area.
Paracaleana gracilicordata	P1		Low	Not likely in lateritic soils as associated mainly with outcrops (may be localised small occurrences in Dwellingup 2, Pindalup) but more likely in Cooke	Growing on moss mats, granite.	Oct-Nov	Closest recording is 1.1 km from the Survey area (WA herb), however has strong association with moss mats on granite which was not present.
[2]***Paracaleana granitica***	P1		Low	Mainly on granite outcrops, not in lateritic soils, may be in other complexes if small, localised outcrops that are small in size Recorded on Dwellingup 2, Pindalup and Murray 1.	Growing on moss mats, granite.	Oct-Dec	Closest recording is 750 m from the Survey Area (WA herb), however habitat not present in Survey Areas.
Banksia recurvistylis	P2		Low	Recorded in Cooke and Dwellingup 2 within wider Jarrah Forest. Less likely in deeper lateritic soils.	Shallow, lateritic soils associated with granite outcrops.	Nov to Dec	Closest recording is 7.8 km from the Survey Area (WA herb), however preferred habitat (granites) not present.
Grevillea crowleyae	P2		Medium	Not recorded within MN previously or during 2020 and earlier studies. East of area in Dwellingup 2	Gravel. In gravel pit.	Aug to Nov	Previous record >5 km from the Survey Area (WA herb). Potentially suitable habitat present.
[2]***Grevillea manglesii* subsp. *ornithopoda***	P2		Low	Recorded in Dwellingup 1 and Murray 1. Less likely in deeper lateritic soils.	Loam, loam over clay, clay. Edge of riverbank and creek, dunes.	Sep-Nov	Vegetation complexes species previously recorded in present. Closest record 2.4 km from the Survey Area. However, the record is from 1901 (WA herb). Considered that preferred habitat is not present.
Millotia tenuifolia* var. *laevis	P2		Medium	Recorded in Dwellingup. Potential in lateritic and granite soils.	Granite or laterite soils.	Sep to Oct	Vegetation complexes previously recorded in present. Preferred habitat is present throughout the Survey Area. Previous recordings >10 km from the Survey Area (WA herb; TPFL).

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
Tetratheca phoenix	P2		Low	Recorded in mainly Cooke and occasionally in Dwellingup 4 in wider Jarrah Forest area. Most likely on granite. Not likely in deeper lateritic soils.	Brown gravelly loam over granite. Mid-upper slopes, often near large rock outcrops.		Preferred habitat (granites) not present. Previously recorded in a vegetation complex not within the Survey Area.
[1]***Acacia drummondii*** **subsp. *affinis***	P3		High	Potential in lateritic soils. Recorded in Yarragil 1 and Dwellingup 1 on soils associated with Dwellingup 2, Cooke and Yarragil 2 within wider Jarrah Forest. Recorded by Mattiske (2021) in Dwellingup 2, Cooke and Yarragil 2.	Lateritic gravelly soils.	Jul-Aug	Recorded within 2 km. Vegetation complexes association, soils and preferred habitat present.
[1]***Acacia horridula***	P3		High	Recorded in Dwellingup 2, Swamp, Yarragil 1 and Darling Scarp in wider Jarrah Forest. Potential in lateritic soils.	Gravelly soils over granite, sand. Rocky hillslopes.	May-Aug	Recent records <5 km from the Survey Area, within a vegetation complex (Swamp) that was present.
Acacia oncinophylla **subsp. *oncinophylla***	P3		Low	Recorded in Dwellingup 1 in wider Jarrah Forest. More likely on granites (Florabase, WAH 1998-).	Granitic soils.	Aug to Oct	Previously recorded in habitats associated with granite outcrops (WA herb) which was not present.
[2]***Andersonia*** **sp. Audax (F. Hort, B. Hort & J. Hort 3179)**	P3		Low	Recorded on Dwellingup 1, Dwellingup 2, Dwellingup 4, Yarragil 2, Swamp, Yarragil 2, and Cooke.	Loam, clay, sand, gravel. Granite slopes and drainage lines.	Oct-Nov	Previously recorded in habitats associated with granite outcrops (WA herb) which was not present.
[1]***Conospermum scaposum***	P3		Medium	Recorded in Yarragil 2. Not likely in lateritic soils.	White-grey sand, sandy clay. Low swampy areas, road verges.	Oct to Dec or Jan to Feb	Previously recorded 5.5 km from the Survey Area, within a vegetation complex that had minor coverage within the Survey Area. The preferred habitat was present in small patches of the Survey Area.
Grevillea manglesii **subsp. *dissectifolia***	P3		Medium	Recorded in in Dwellingup, Murray 1, Cooke and Pindalup. Potential in lateritic soils.	Gravelly loam, moist. Roadsides.	Jun or Sep or Nov	Previously recorded 7km east of Survey Area within a vegetation complex present in Survey Area.

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
Halgania corymbosa	P3		Medium	Recorded in Darling Scarp 2. Potential in lateritic soils.	Gravelly soils, soils over granite.	Aug to Nov	Previous records >10 km from Survey Area and >30 years old (WA herb) in a vegetation complex that was not present within the Survey Area. Potentially suitable habitat present.
Lasiopetalum glutinosum* subsp. *glutinosum	P3		Medium	Recorded in Dwellingup 1, Darling Scarp 2, and Murray 1, in wider area. Potential in lateritic soils.	Grows in open woodland and low scrub, mostly on the Darling Scarp near the Avon Wheatbelt, Jarrah Forest, Swan Coastal Plain.		Previous records >10 km from Survey Area and >20 years old (WA herb) in vegetation complexes present within the Survey Area.
Petrophile filifolia* subsp. *laxa	P3		Low	Recorded in Yarragil 1 in wider area. Not likely in lateritic soils.	White gritty sand, brown, red, yellow, white or grey sand, brown-yellow sandy clay. Winter-wet sites, flats, slopes, swamps, drainage lines.	Nov to Jan	Previous recording >10 km from Survey Area (WA herb). The preferred habitat was not present.
Pithocarpa corymbulosa	P3		Low	Recorded in Yarragil 2, Dwellingup 2 and Swamp. Not likely in deeper lateritic soils.	Gravelly or sandy loam. Amongst granite outcrops.	Jan to Apr	Previous records >10 km away from Survey area (WA herb) and in vegetation complexes that are within the Survey Area. Preferred habitat (granites) not present.
[2]***Stackhousia* sp. Redblotched corolla (A. Markey 911)**	P3		Medium	Recorded north of MN in Dwellingup 2 in wider Jarrah Forest. Potential for occurrence in lateritic soils.	Brown loamy sand clayey sand over laterite, white sandy clay over granite, grey clay. Slopes.	Sep-Nov	Previous records 1.9 km from the Survey Area, record is > 30 years old (WA herb). Vegetation complex association present within the Survey Area.
Synaphea pandurata	P3		Medium	Recorded in Pindalup, Swamp and Dwellingup 2 in wider Jarrah Forest and earlier studies.	Yellow-grey, yellow-brown, yellow-red sands and sandy loams, dark brown loam, laterite gravel, granite. In undulating areas.		Previous records >9 km from the Survey Area (WA herb) and within vegetation complexes present within the Survey Area.
Thysanotus anceps	P3		Medium	Recorded in Murray 1 and Dwellingup in wider Jarrah Forest. Potential for occurrence in lateritic soils.	White or grey sand, lateritic gravel, laterite.	Oct to Dec	Previous records in vegetation complexes present in Survey Area. Previous records >10 km from the Survey area and are >20 years old (WA herb). Preferred habitat was present in patches.

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
[2]*Boronia tenuis*	P4		Medium	Recorded in Dwellingup 2, Yarragil 1 and Murray 1 in wider Jarrah Forest. Potential in lateritic soils in valleys and on granite outcrops.	Laterite, stony soils, granite.	Aug-Nov	Previous records located <1 km from Survey Area, however >30 years old and listed as from Turtle Pool (WA herb). Likely inaccurate location. Vegetation complex association present within the Survey Area.
Chorizema ulotropis	P4		Medium	Recorded in Dwellingup 1 and Dwellingup 2 within wider Jarrah Forest. Potential in lateritic soils.	Moist to dry soils, white sand with gravel, laterite, granite. Outcrops, winter damp to dry areas, flats.	Jul to Sep	Previous records in vegetation complexes present within the Survey Area. Record is 5 km from the Survey Area (WA herb) and the preferred habitat is marginally suitable within the wider Survey Area.
Grevillea pimeleoides	P4		Medium	Recorded in Murray 1 Dwellingup 1, Dwellingup 2, Pindalup and Cooke in wider Jarrah Forest.	Gravelly soils over granite. Rocky hillsides. Although on outcrops, there is potential in lateritic soils.	May to Nov	Several records 5-10 km from Survey Area. Majority of records >30 years old (WA herb). Records <30 years old within vegetation complexes not present. Potentially suitable habitat considered present.
[2]*Hemigenia platyphylla*	P4		Medium	Recorded in Dwellingup 1. Less likely in deeper lateritic soils. Potential in sandy gravels.	Sandy and loamy soils. Granite rocks, slopes.	Sep-Nov	Previous records within vegetation complex present in the Survey Area. Record is >5 km away (WA herb). Habitat present marginally suitable.
Lasiopetalum cardiophyllum	P4		Low	Recorded on sandy gravels and further east in wider Jarrah Forest. May occur in lateritic soils.	Lateritic gravelly soils, sandy clay. Flats, hillslopes.	Aug to Dec or Jan	Previously records >20 km from Survey Area. Potentially suitable habitat present (WA herb).
Parsonsia diaphanophleba	P4		Low	Recorded in Murray 1 and Yarragil 1 in wider Jarrah Forest. Less likely in lateritic soils.	Alluvial soils. Along rivers.	Jan to Feb or Apr to Jun or Sep	Previous records either >30 years old or >20 km from the Survey Area, all records in association with riverbank (WA herb). Vegetation complexes that associated with previous records present, however preferred habitat not present.
[2]*Pimelea rara*	P4		Medium	Recorded in Dwellingup 1, Dwellingup 2, Murray 1, Yarragil 1, Yarragil 2 and to a lesser degree Cooke in wider Jarrah Forest. Potential to occur in lateritic soils.	Lateritic soils.	Dec-Jan	Vegetation complexes and preferred habitat present. Closest previous record 6.3 km from the Survey Area (WA herb).

Species	DBCA listed	EPBC Act listed	Likelihood of Occurrence	Vegetation Complex Previously Recorded in (up to 20 km Radius)	Preferred Habitat	Flowering Period	Justification
[2]***Stylidium ireneae***	P4		Low	Recorded in Yarragil 1 and Yarragil 2 in wider Jarrah Forest.	Sandy loam. Valleys near creek lines. Not likely in lateritic soils.	Oct-Dec	Previous records in vegetation complexes that cover smaller areas of the Survey Area. Previous records >8 km (WA herb) from the Survey Area and preferred habitat not present.
[1]***Stylidium scabridum***	P4		High	Less likely in lateritic soils, although was recorded in Dwellingup complexes. Recorded on Dwellingup 1, Dwellingup 2, Yarragil 2, Goonaping in range of soils and site conditions.	Sand. Open woodland or heath.	Sep-Nov	Records in five locations <2 km, within vegetation complexes that are common across the Survey Area. Preferred habitat was present in some patches.

[1]-Recorded by Mattiske 2021.

[2]-DBCA database.

This table based on *Table 6: Summary of Potential Threatened and Priority Flora Recorded In The Myara North Survey Area* in Mattiske (2021). Preferred habitat and flowering period from Florabase (WAH, 2022).

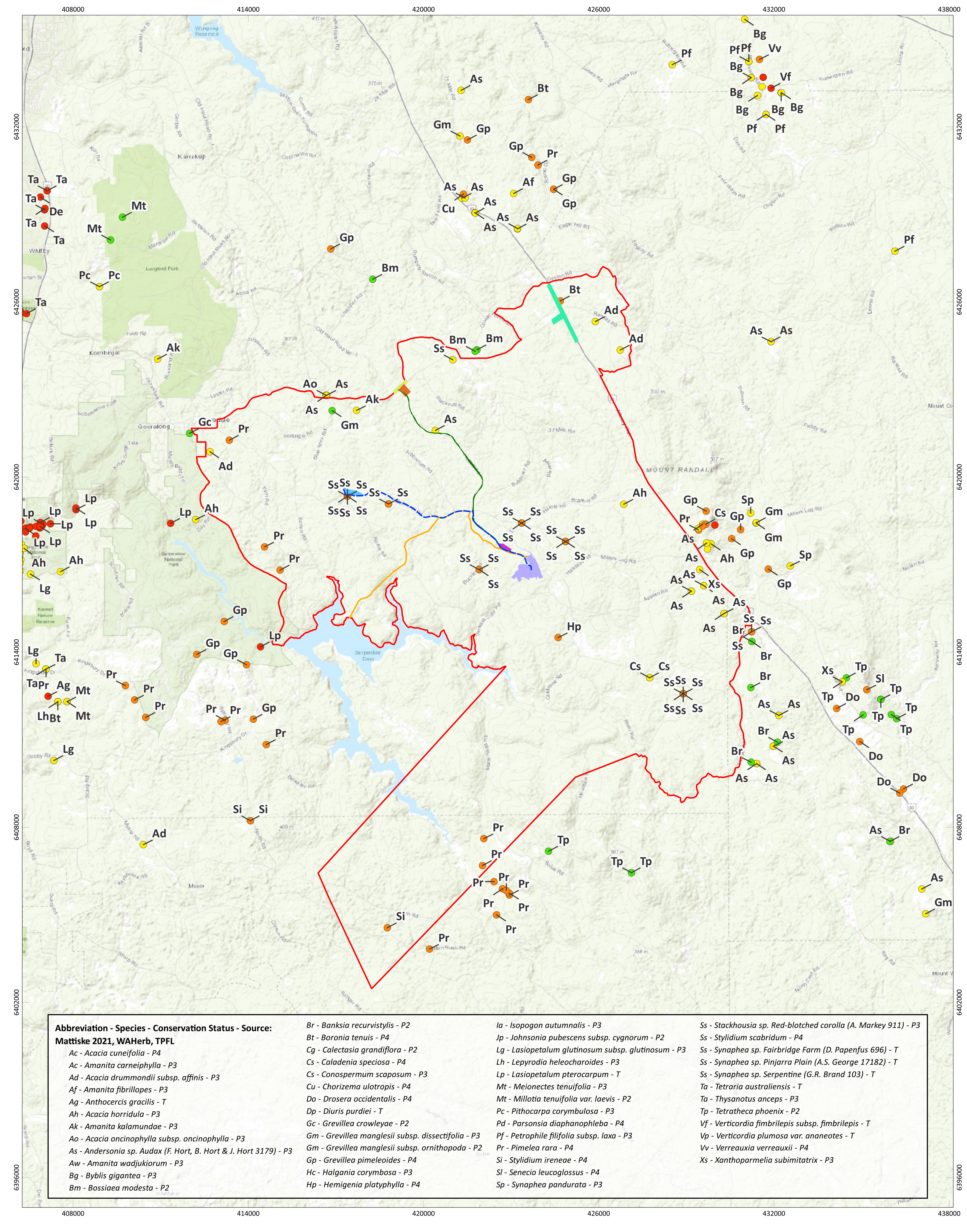


Figure 2: Flora of Conservation Significance Known From the Locality

N
0 900 1,800 2,700 3,600 m

SCALE: 1:120,000
SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
CLIENT: Alcoa of Australia Limited
PROJECT NUMBER: A22.055
VERSION: 0
DRAWN BY / REVIEWED BY: MD / LT
DATE: 14/3/2023

Legend
- Power Alignment
- Water Alignment
- Myara North Development Envelope
- HUNG G Frollet Rd
- Myara North Facilities
- Power Alignment

Site Boundary
- Additional Frollett Road Survey Area
- Additional Survey Road
- Albany Hwy Intersectoin
- Frollet Road Intersection

Previous Flora Records
- Threatened (DBCA)
- Priority 2 (DBCA)
- Priority 3 (DBCA)
- Priority 4 (DBCA)

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	14/3/2023

NOTES:
Cadastral boundary (LGATE-002)

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4.2 Field Survey Results

Threatened and Priority Flora

No Commonwealth EPBC Act listed, or State BC Act listed Threatened flora or DBCA listed Priority flora were recorded in the Survey Area. The absence of Threatened and Priority flora was not an unexpected outcome considering the absence or limited extent of habitat types identified by the desktop as containing a significant portion of the Threatened and Priority flora for the region (e.g. granites, breakaways, major drainages, wetlands, sandy soils).

Thirty-five collections were made in the field for identification to check for potential threaten and priority species. Five collections (four *Acacia* and one *Pimelea*) were subsequently submitted to the WAH to confirm identifications. It was confirmed that none of the collections were Priority species.

The survey was undertaken outside of the flowering period of four species assessed as having a high or medium likelihood of occurrence. This potentially limits the ability to detect or confirm identification. These are discussed below.

- *Acacia drummondii* subsp. *affinis* (P3) flowers Jul-Aug: Medium size perennial shrub, is identifiable in the field without flowers by pinnae dimensions and hair structures. Four collections were submitted to the WA herbarium for confirmation. All were identified as other *Acacia* sp. Not considered a survey limitation.

- *Acacia horridula* (P3) flowers May-Aug: Perennial shrub, is identifiable in the field without flowers by robust, harsh single stemmed form. Not considered a survey limitation.

- *Chorizema ulotropis* (P4) flowers Jul-Sep: Flowers required for positive identification. No suspected occurrence was identified. All *Chorizema* collections were positively identified as common species. Due to form as a spawning or twining shrub detection may be more difficult if not in flower. May represent minor survey limitation.

- *Pimelea rara* (P4) flowers Dec-Jan: Likely identifiable by having concolorous dull leaves and small (<40 cm) size vs common species present which have sheen an adaxial leaf surface and are larger. One collection was submitted to the WA herbarium and was confirmed as not as Priority species.

Brief descriptions of survey effort, the habitats encountered and comments on vegetation condition and disturbance for the eight packages of work within the Survey Area are provided below.

Survey Area Descriptions

Water/Power Alignment

Eight person days of survey effort, see tracklogs in Figure 3a-3c and Figure 4a-4d. Follows Balmoral Rd or forestry tracks for majority of area. Water Corridor runs through bushland with limited disturbance in southern branch.

Geology throughout was lateritic with gravel and shallow loams. The vegetation was considered Good to Very Good with patches of Very Good to Excellent condition. Due to the activity of firewood harvesting along the edges of Balmoral Rd and the forestry tracks the ground stratum was sparse with vehicle disturbance present. The vegetation was consistent *Eucalyptus marginata* and *Corymbia calophylla* forest.

HUNG_G_000473-000_B_Frollet Rd and Additional Survey Road

Five person days of survey effort, see tracklogs in Figure 5a-5d. Survey Area follows Frollet Rd and Balmoral Rd verges. 1.6 km of the Survey Area intersected pine plantations, these were not traversed. Ground stratum was generally sparse with vehicle disturbance present.

Majority geology was lateritic gravel and shallow loams. Some lower lying areas with a more clay loam soil was present. On lateritic soils vegetation was comparable to the Power Alignment with *Eucalyptus marginata* and *Corymbia calophylla* forest. Where the soil type was associated with the Swamp vegetation complex *Melaleuca preissiana* and myrtaceous shrublands were present.

MN Facilities Area

Five person days of survey effort, see tracklogs in Figure 6a-6d. Extending north and south of Balmoral Rd and north along proposed magazine access track.

Majority of the area was associated with lateritic gravel and *Eucalyptus marginata* and *Corymbia calophylla* forest. The southwest corner was associated with a soil type of grey sand over laterite supporting myrtaceous shrubland. This area received additional focus as the desktop identified several species associated with this habitat type.

Vegetation was Very Good to Excellent condition with minor forestry tracks going through the area. Firewood collection disturbance was common around tracks.

Frollett Road Intersection and Additional Frollett Road Survey Area

Two person days of survey effort, see tracklogs in Figure 7. Survey Area followed verges and intersection of Jarrahdale Rd and Frollet Rd.

Geology throughout the was lateritic gravels with *Eucalyptus marginata* and *Corymbia calophylla* forest. The vegetation was in Good condition. The ground stratum was sparse with low species diversity. This is the main access road to a firewood harvesting block, hence the vegetation was disturbed from the high

concentration of vehicles and people accessing firewood. Additionally, a part of the area was historically cleared for a borrow pit which was revegetated.

Albany Highway Intersection Survey Area

Five person days of survey effort, see tracklogs in Figure 8. Follows the verges of Albany Highway and Jarrahdale Rd. Several sections of pine plantation were present, these were not traversed. The survey area along the northern side of Jarrahdale Road had recently burnt (<2 years prior) impacting around 15% of the Survey Area. Most of the mid and ground stratum had not re-established limiting ability to undertake searches. This is considered a minor limitation in the context of the overall survey effort.

Majority of the area was associated with the Dwellingup 2 complex with lateritic gravels but had pockets of the Swamp complex with clay loam soils and Yarragil 2 complex also with clay loam soils. In the clay loam areas dense thickets of myrtaceous shrubland were present. In the southern corner a moderate size drainage line was present with flowing water. In this area the soil type was loamy. This area received additional focus as the desktop identified several species associated with this habitat type.

The vegetation along Albany Highway was disturbed with partial clearing present for access tracks and pine plantations. Outside of clearing impacts vegetation Good to Very Good condition.

Post Survey Likelihood of Occurrence Assessment

Following suitable targeted search effort, the likelihood of occurrence for all Threatened and Priority flora species identified by the desktop was reassessed as low. This assessment is discussed further in Section 5.

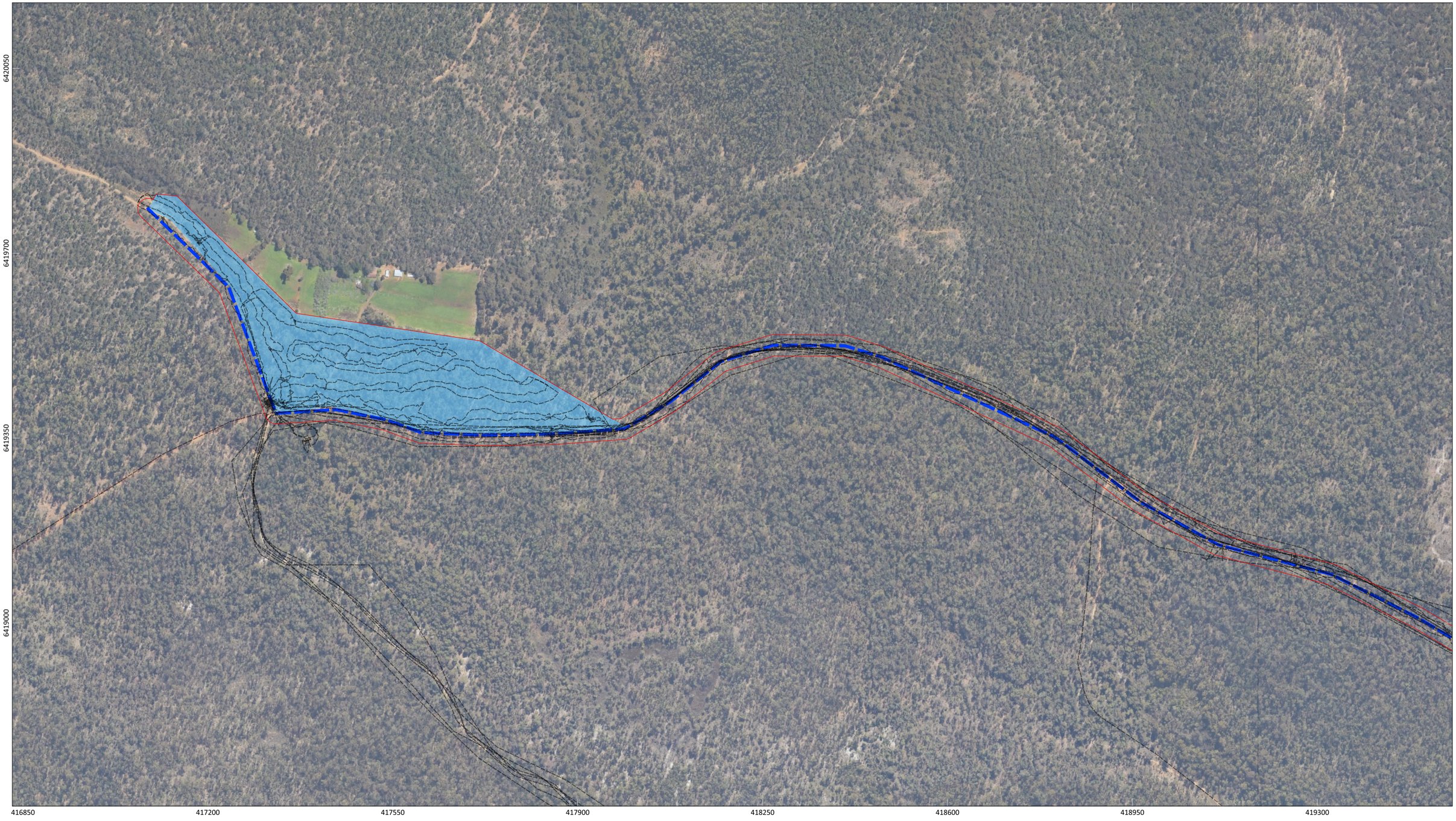

Figure 3a: Survey effort: Power Alignment

N

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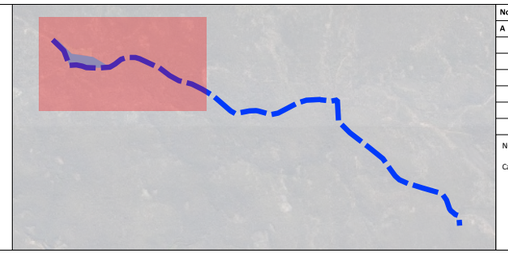
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.055 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	DRAWN BY / REVIEWED BY: MD / LT / DATE: 13/3/2023

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT: Alcoa of Australia Limited

Legend

- Survey Area
- Power Alignment
- Power Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:
Cadastral boundary from LANDGATE 2022

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westenv.com.au

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Figure 3b: Survey effort: Power Alignment

N

0 100 200 300 400 m

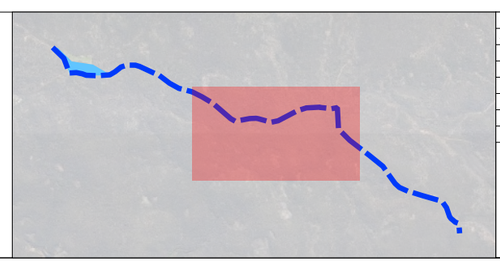
SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.055 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	DRAWN BY / REVIEWED BY: MD / LT / DATE: 13/3/2023

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT: Alcoa of Australia Limited

Legend

- Survey Area
- Power Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

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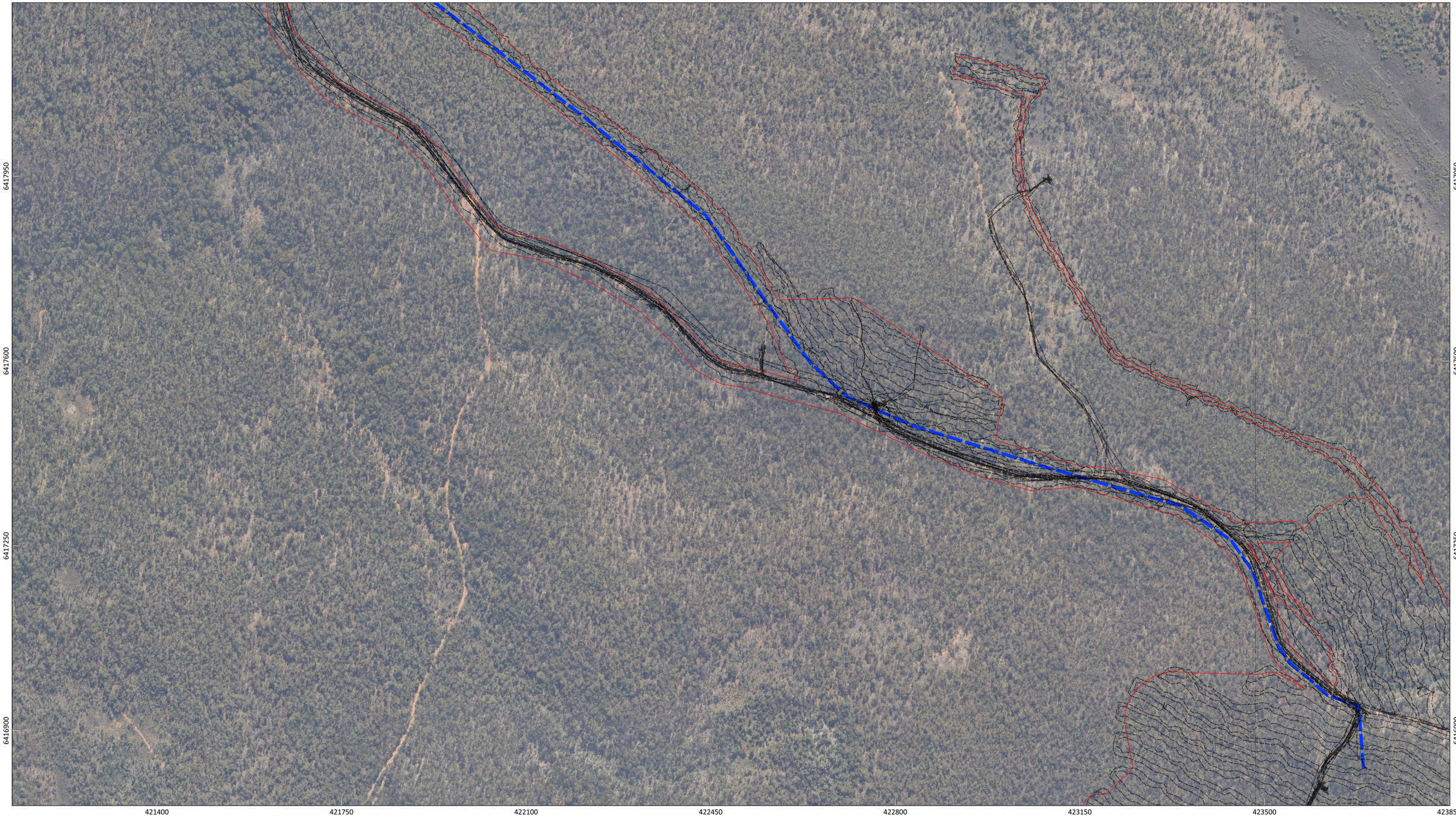


Figure 3c: Survey effort: Power Alignment

N

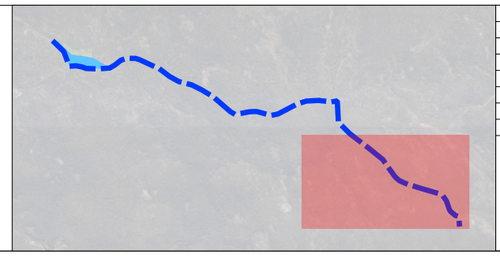
0 100 200 300 400 m

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- Power Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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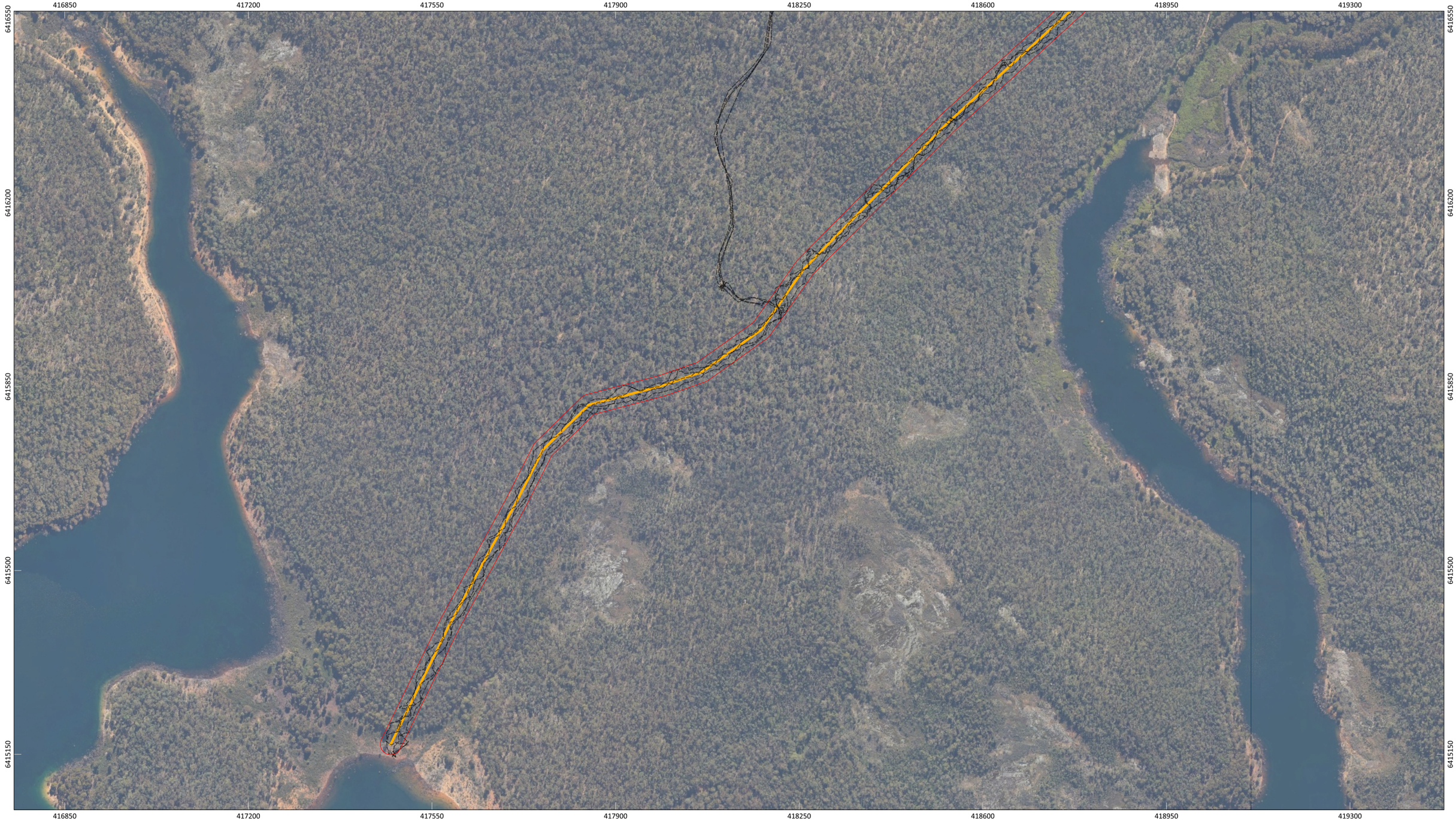

Figure 4a: Survey effort: Water Alignment

N

0 100 200 300 400 m

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.055 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	DRAWN BY / REVIEWED BY: MD / LT / DATE: 13/3/2023

PROJECT/REPORT NAME
Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT
Alcoa of Australia Limited

Legend

- Survey Area
- Water Alignment
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

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Figure 4b: Survey effort: Water Alignment

N

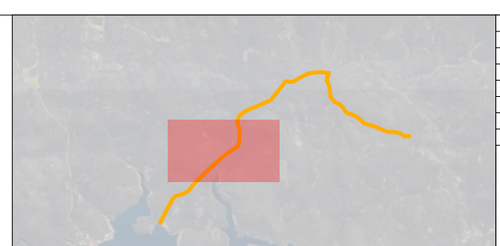
0 100 200 300 400 m

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- Water Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

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Figure 4c: Water Alignment

0 100 200 300 400 m

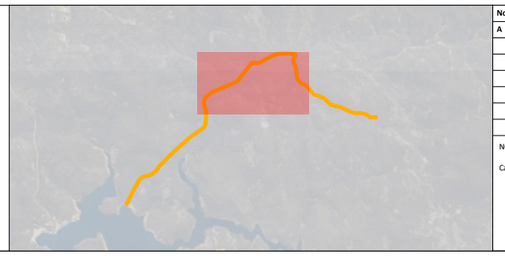
N

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- Water Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

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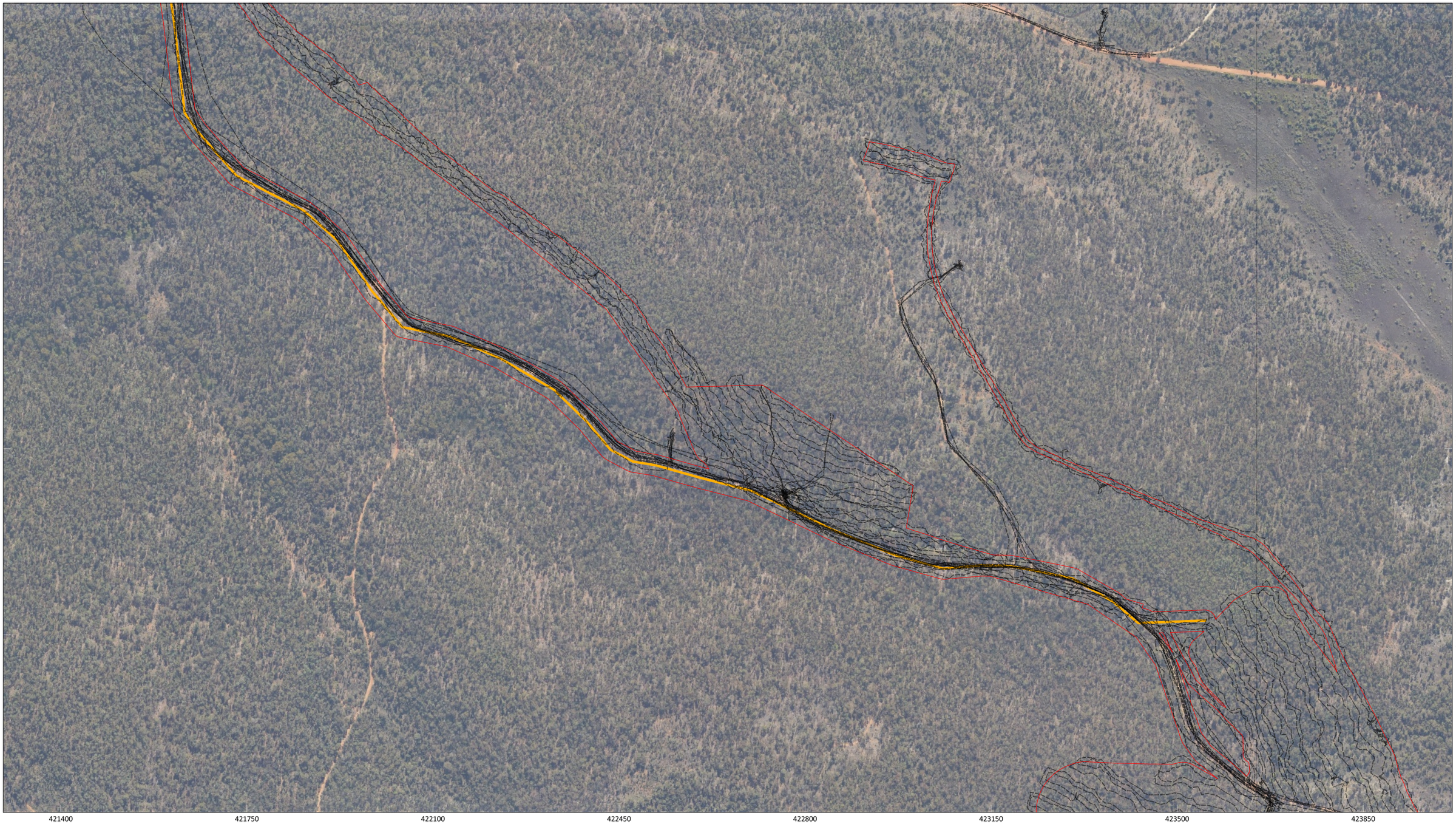

Figure 4d: Water Alignment

0 100 200 300 400 m

N

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COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

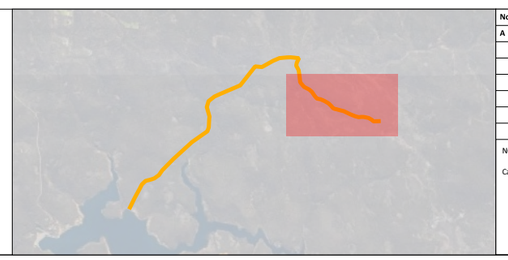
PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT: Alcoa of Australia Limited

PROJECT NUMBER	VERSION
A22.055	0
DRAWN BY / REVIEWED BY	**DATE**
MD / LT	13/3/2023

Legend

- Survey Area
- Water Alignment
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

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Figure 5a: Survey Effort: HUNG_G_000473-000_B_Frollet Rd and Additional Survey Area

N

0 100 200 300 400 m

SCALE	1:7,000
SHEET SIZE	A3 COLOUR
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022
PROJECT/REPORT NAME	Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
CLIENT	Alcoa of Australia Limited
PROJECT NUMBER	A22.055
VERSION	0
DRAWN BY / REVIEWED BY	MD / LT
DATE	13/3/2023

Legend

- Survey Area
- HUNG_G_000473-000_B_Frollet Rd
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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Figure 5b: Survey Effort: HUNG_G_000473-000_B_Frollet Rd and Additional Survey Area

N

0 100 200 300 400 m

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- HUNG_G_000473-000_B_Frollet Rd
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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Figure 5c: Survey Effort: HUNG_G_000473-000_B_Frollet Rd and Additional Survey Area

N

0 100 200 300 400 m

PROJECT/REPORT NAME	Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
SCALE	1:7,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.055
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022
DRAWN BY / REVIEWED BY	MD / LT
DATE	13/3/2023

Legend

- Survey Area
- HUNG_G_000473-000_B_Frollet Rd
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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Figure 5d: Survey Effort: HUNG_G_000473-000_B_Frollet Rd and Additional Survey Area

N

0 100 200 300 400 m

PROJECT/REPORT NAME	Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
SCALE	1:7,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.055
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022
DRAWN BY / REVIEWED BY	MD / LT
DATE	13/3/2023

Legend

- Survey Area
- HUNG_G_000473-000_B_Frollet Rd
- Additional Survey Area
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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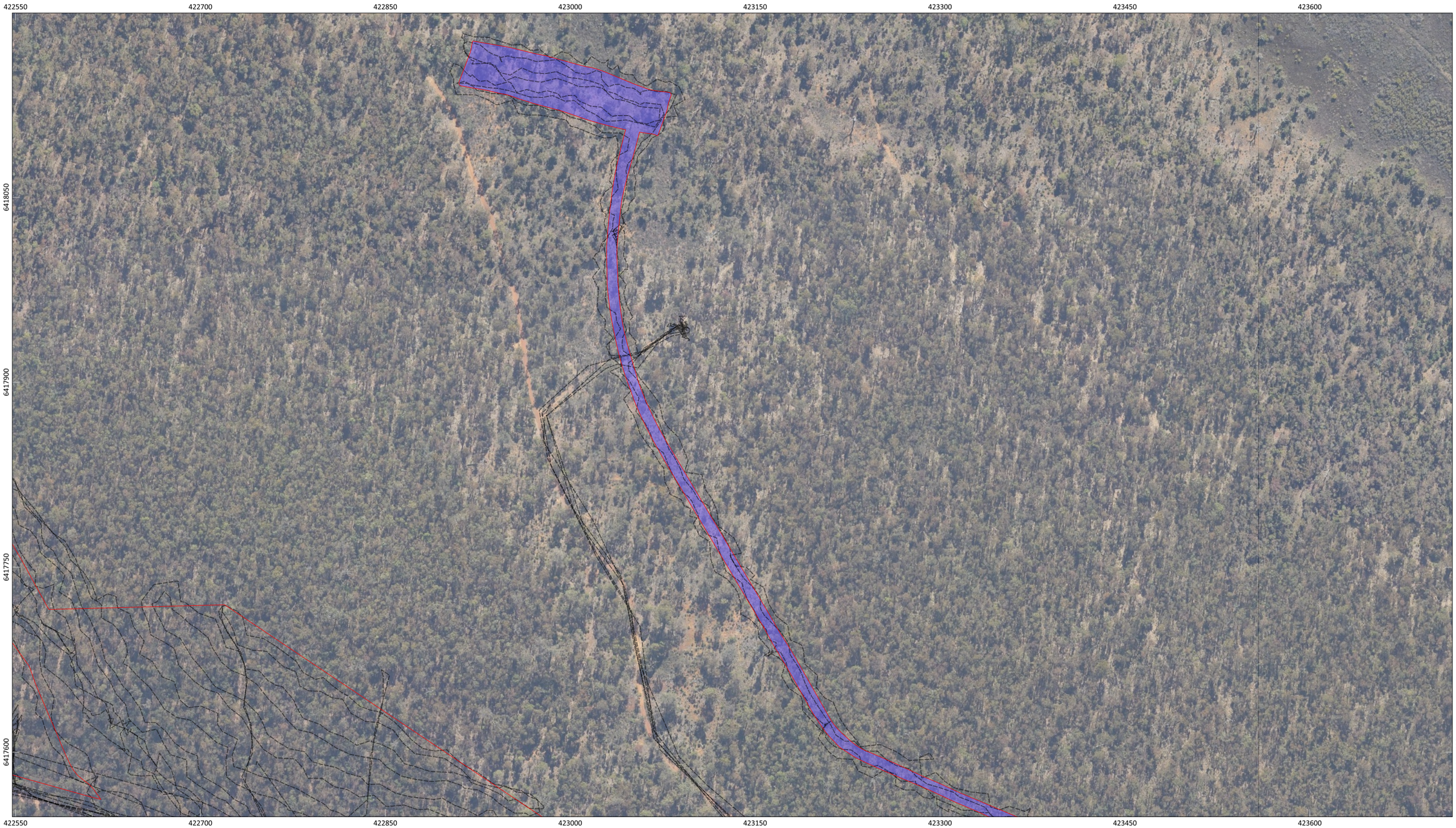

Figure 6a: Survey Effort: Myara North Facilities

N

0 40 80 120 160 m

SCALE: 1:3,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- Myara North Facilities
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

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Figure 6b: Survey Effort: Myara North Facilities

N

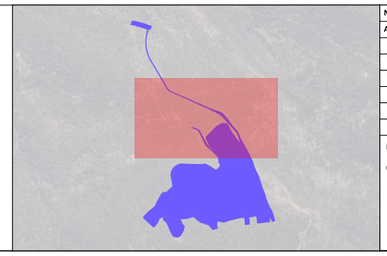
0 40 80 120 160 m

SCALE: 1:3,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
CLIENT: Alcoa of Australia Limited		
PROJECT NUMBER: A22.055	VERSION: 0	
DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023	

Legend

- Survey Area
- Myara North Facilities
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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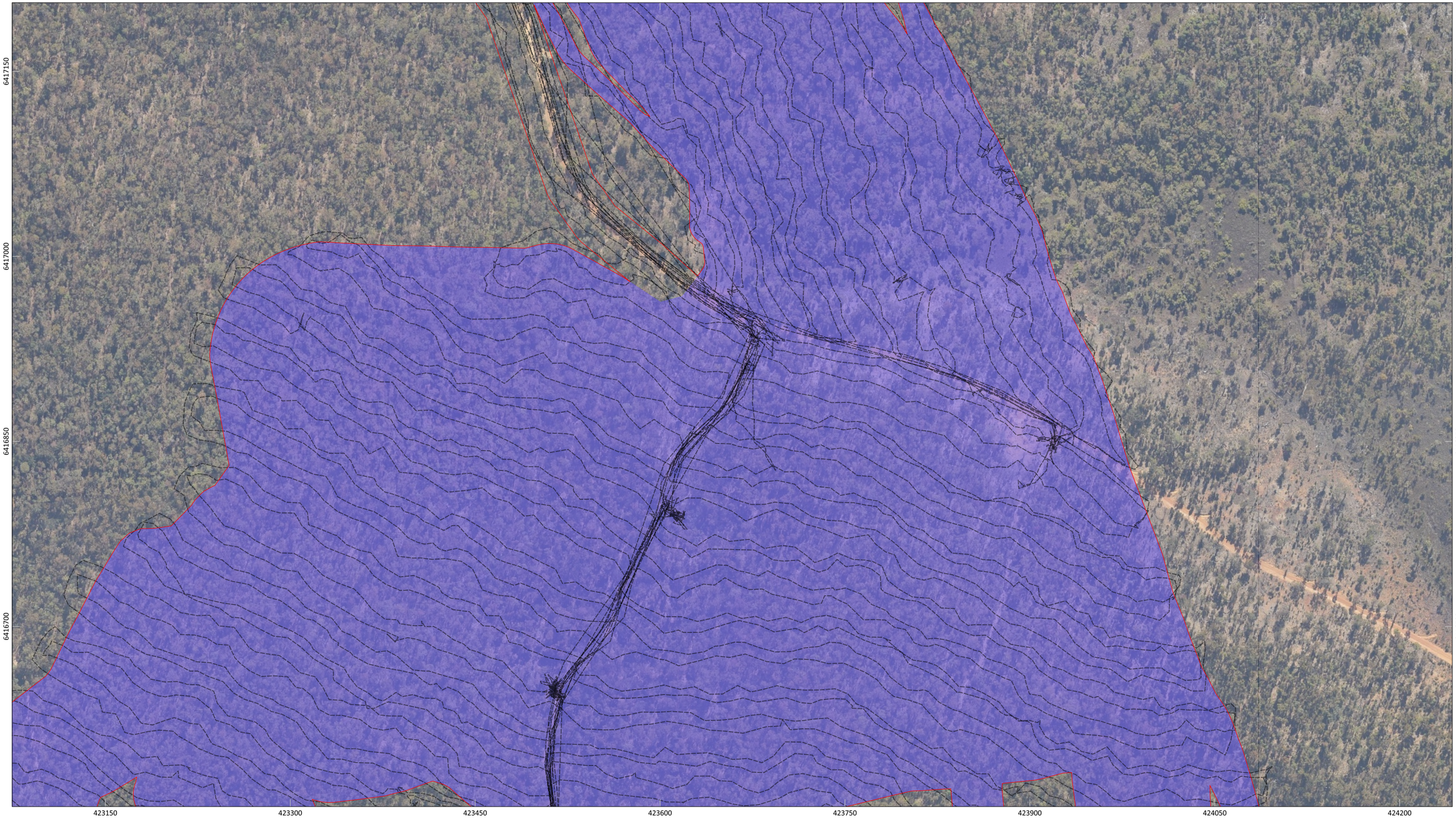


Figure 6c: Survey Effort: Myara North Facilities

N

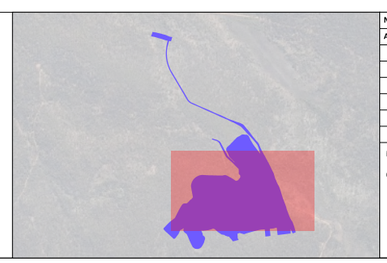
0 40 80 120 160 m

SCALE	1:3,000
SHEET SIZE	A3 COLOUR
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022

PROJECT/REPORT NAME	Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
CLIENT	Alcoa of Australia Limited
PROJECT NUMBER	A22.055
VERSION	0
DRAWN BY / REVIEWED BY	MD / LT
DATE	13/3/2023

Legend

- Survey Area
- Myara North Facilities
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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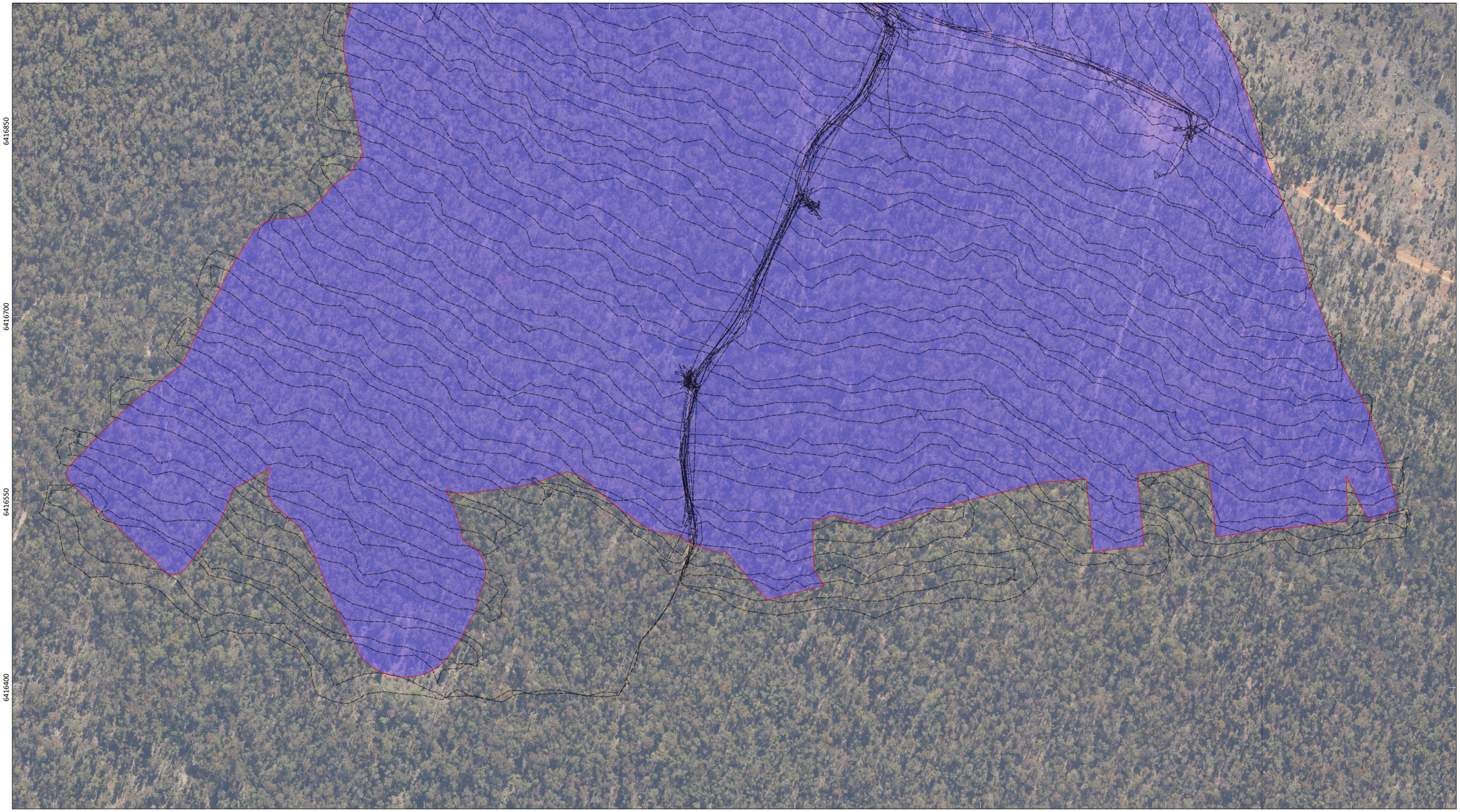


Figure 6d: Survey Effort: Myara North Facilities

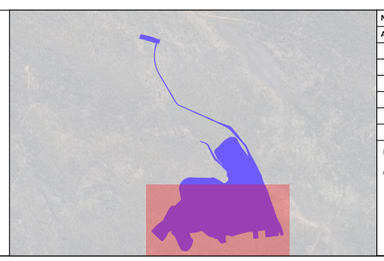
N

0 40 80 120 160 m

PROJECT/REPORT NAME: Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North		
SCALE: 1:3,000	SHEET SIZE: A3 COLOUR	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.055	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 2022	DRAWN BY / REVIEWED BY: MD / LT	DATE: 13/3/2023

Legend

- Survey Area
- Myara North Facilities
- Track Log



No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

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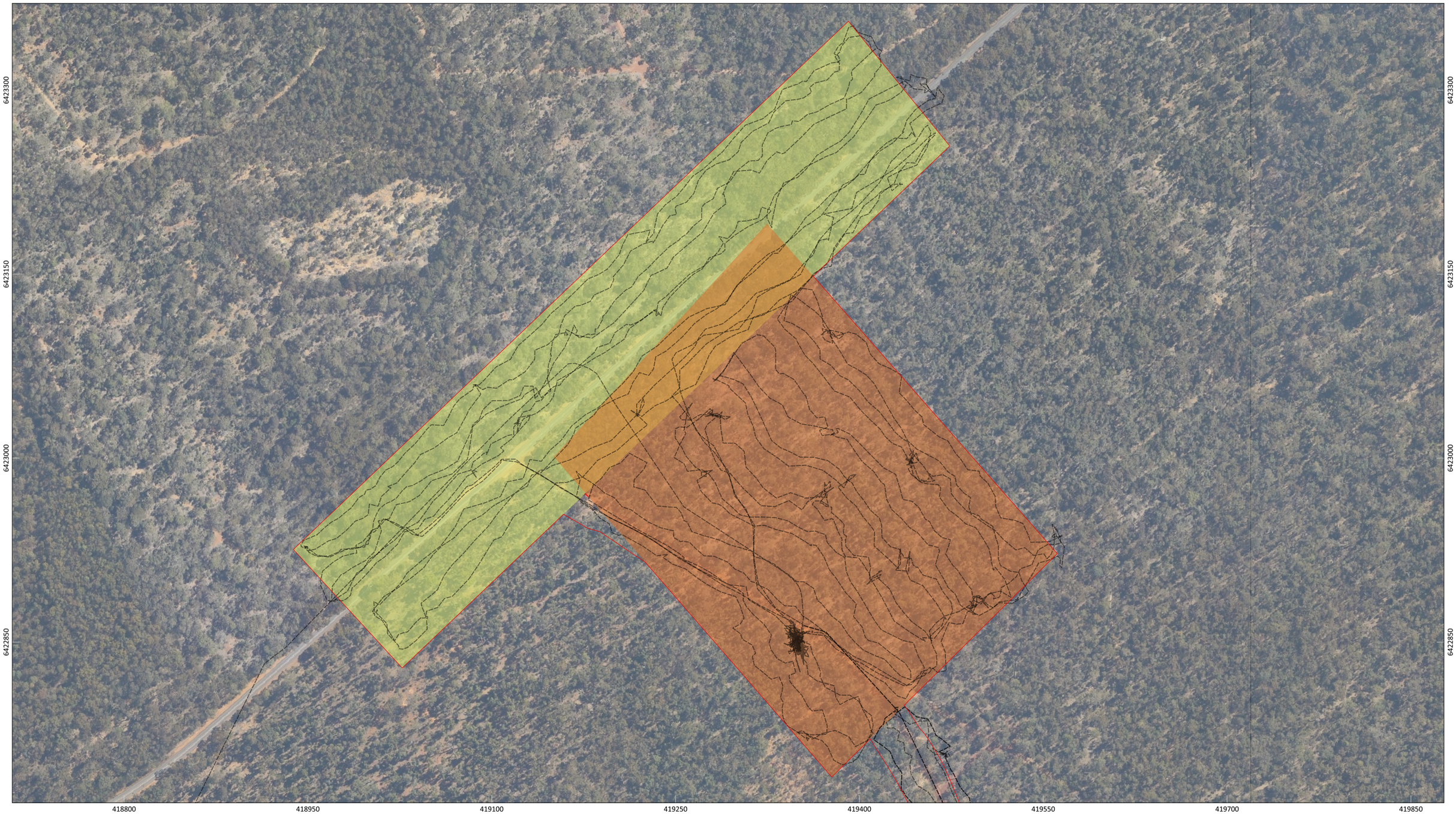

Figure 7: Survey effort: Frollett Road Intersection and Additional Frollett Road Survey Area

N

0 40 80 120 160 m

SCALE	1:3,000
SHEET SIZE	A3 COLOUR
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022

PROJECT/REPORT NAME
Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search
Myara North

CLIENT	Alcoa of Australia Limited	
PROJECT NUMBER	A22.055	VERSION 0
DRAWN BY / REVIEWED BY	MD / LT	DATE 13/3/2023

Legend

- Survey Area
- Additional Frollett Road Survey Area
- Frollet Road Intersection
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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Figure 8: Survey Effort - Albany Highway Intersection

0 50 100 150 200 m

N

PROJECT/REPORT NAME	Pre-Clearance Survey 2022/23: Targeted Threatened and Priority Flora Search Myara North
SCALE	1:7,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.055
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 2022
DRAWN BY / REVIEWED BY	MD / LT
DATE	13/3/2023

Legend

- Survey Area
- Albany Hwy Intersectoin
- Track Log

No	Description	Drawn	Approved	Date
A	Original issue	MD	LT	13/3/2023

NOTES:

Cadastral boundary (LGATE-002)

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5. Discussion

No Commonwealth EPBC Act listed, or State BC Act listed Threatened flora or DBCA listed Priority flora were recorded in the Survey Area.

The pre-survey likelihood of occurrence assessment identified three species as having a high likelihood of occurrence, 14 species medium and 22 species low. No Threatened species had a high or medium likelihood of occurrence. The species assed as having a low likelihood of occurrence were typically associated with granites, drainage lines, wetlands or sandy habitats. These were identified as not occurring or having marginal/ restricted occurrences within the Survey Area.

Following suitable targeted search effort, the likelihood of occurrence for all Threatened and Priority flora species identified by the desktop was reassessed as low. This assessment has been reached considering:

- The results of the pre-survey likelihood of occurrence assessments, both by WEPL for the specific Survey Area and Mattiske (2021) for the MY project area.
- Having undertaken suitable targeted search efforts during the primary spring survey season and within the flowering period of the majority of species. For the four species with flowering periods outside the survey period, three can likely be identified without flowering material.
- The absence or limited extent of habitat types identified by the desktop as containing a significant portion of the Threatened and Priority flora for the region (e.g. granites, breakaways, major drainages, wetlands, sandy soils).
- Disturbance to the understory in many areas through vehicle access for firewood collection and clearing of access tracks.
- The alignment of much of the Survey Area on existing disturbed areas, roads and forestry tracks.

The absence of Threatened and Priority flora was not an unexpected survey outcome considering the dominance of habitat with *Eucalyptus marginata* and *Corymbia calophylla* forest over laterite and the absence or limited extent of habitat types identified by the desktop as containing a significant portion of the Threatened and Priority flora for the region (e.g. granites, breakaways, major drainages, wetlands, sandy soils).

6. References

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Mattiske. (2021). *Alcoa of Limited Australia: Pinjarra Alumina Refinery Revised Proposal Detailed Flora and Vegetation Survey for Huntley Mine – MN*.

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Appendix A
Legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters of national environmental significance (MNES). Under the EPBC Act, the Commonwealth Department of Climate Change, Energy and the Environment lists Threatened species and communities in categories determined by criteria set out in the EPBC Act.

Projects likely to cause a significant impact on MNES should be referred to the DCCEEW for assessment under the EPBC Act.

Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 aims to conserve and protect biodiversity and biodiversity components within the State and to promote ecologically sustainable use of biodiversity components in the State.

Environmental Protection Act 1986

Declared Rare Flora (DRF) and Threatened Ecological Communities (TECs) are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Exemptions for a clearing permit do not apply in an ESA. In addition, habitat necessary for the maintenance of indigenous fauna is considered in the clearing principles and assessed during consideration of applications for a clearing permit.

Biosecurity and Agricultural Management Act 2007

Plants may be 'Declared' by the Minister for Agriculture and Food under the BAM Act. The Western Australian Organism List contains information on the area(s) in which a plant is declared and the control and keeping categories to which it has been assigned in Western Australia. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties.

Weeds of National Significance

The Australian Government along with the State and Territory governments has endorsed 32 WoNS. Four major criteria were used in determining WoNS:

- The invasiveness of a weed species.
- A weed's impacts.
- The potential for spread of a weed.
- Socio-economic and environmental values.

Each WoNS has a national strategy and a national coordinator, responsible for implementing the strategy. WoNS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

Department of Biodiversity, Conservation and Attractions Priority Lists

DBCA lists 'Priority' flora and fauna that have not been assigned statutory protection as "Threatened" under the BC Act and are under consideration for declaration as Threatened. Flora and fauna assessed as Priority 1-3 are considered to be in urgent need of further survey. Priority 4 flora requires monitoring every 5 -10 years.

DBCA maintains a list of Priority Ecological Communities (PECs) which identifies plant communities that require further investigation before possible nomination for TEC status. Once listed, a community becomes a PEC and, when endorsed by the WA Minister for Environment, becomes a TEC and protected as an ESA under Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

Informal Recognition of Flora and Fauna

Certain populations or communities of flora and/or fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, specific locations of flora and may be locally significant because they are range extensions to the previously known distribution, or are newly discovered taxa (and have the potential to be of more than local significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

Appendix B
Definitions and Criteria

EPBC Act Categories for Flora, Fauna and Ecological Communities

Category	Threatened Species	Threatened Ecological Communities
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	N/A.
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it 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.	N/A.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish. (ii) the species is the focus of a plan of	N/A.

Category	Threatened Species	Threatened Ecological Communities
	management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised. (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory. (iv) cessation of the plan of management would adversely affect the conservation status of the species.	

Conservation Codes for Western Australian Flora and Fauna (DBCA)

Conservation Codes for Western Australian Flora and Fauna	
Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] 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. **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*.** **Categories of Threatened, Extinct and Specially Protected fauna and flora are:**	
T	**Threatened species** 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 International Union for Conservation of Nature (IUCN) Red List categories and criteria as detailed below.
CR	**Critically endangered species** 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". Listed as critically endangered undersection 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.
EN	**Endangered species** 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". 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

Conservation Codes for Western Australian Flora and Fauna	
	Flora) Notice 2018 for endangered flora.
VU	**Vulnerable species** 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". Listed as vulnerable undersection 19(1)(c) 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.
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.**	
EX	**Extinct species** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	**Extinct in the wild species** 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). 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.
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.**	
MI	**Migratory species** 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). 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. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Conservation Codes for Western Australian Flora and Fauna	
CD	**Species of special conservation interest (conservation dependent fauna)** 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). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	**Other specially protected species** 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). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
P	**Priority species** 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.
1	**Priority 1: Poorly-known species** 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.
2	**Priority 2: Poorly-known species** 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.
3	**Priority 3: Poorly-known species** 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.

Conservation Codes for Western Australian Flora and Fauna	
4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (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. (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. (c) Species that have been removed from the list of Threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens.

DBCA Definitions and Criteria for TECs and PECs

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B. All occurrences recorded within the last 50 years have since been destroyed.
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years). ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years). ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.

Criteria	Definition
	iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short-term future (within approximately 20 years). ii. modification throughout its range is continuing such that in the short-term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short-term future (within approximately 20 years). ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes. iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C): A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated. B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few

Criteria	Definition
	locations. C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.
Priority Ecological Communities	
Priority One	**Poorly known ecological communities** Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	**Poorly known ecological communities** Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority Three	**Poorly known ecological communities** i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or. ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or. iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.
Priority Four	**Ecological communities that are adequately known, rare but not Threatened or meet criteria for Near Threatened, or that have been recently removed from the Threatened list**. These communities require regular monitoring. i. Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of Threatened communities during the past five years.

Criteria	Definition
Priority Five	**Conservation Dependent Ecological Communities** Ecological Communities that are not Threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming Threatened within five years.

Appendix C
Mattiske (2021) Detailed Flora and Vegetation Survey for Huntly Mine – Myara North