

LOT 8 WATTLE AVENUE WEST, NOWERGUP

FLORA AND VEGETATION SURVEY CPS 9197/1

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The logo for PGV Environmental is located in the bottom right corner of the page. It features the letters 'PGV' in a large, bold, white sans-serif font. Below 'PGV', the word 'ENVIRONMENTAL' is written in a smaller, white, all-caps sans-serif font. The background of the logo area is a vibrant orange with a subtle pattern of fine, white, curved lines that create a sense of movement and depth.

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1 INTRODUCTION

1.1 Background

Lot 8 Wattle Avenue West, Nowergup is located approximately 33km north-north-west of the Perth Central Business District in the City of Wanneroo (Figure 1). PMR Quarries Pty Ltd's have applied for a clearing permit (CPS 9197/1) for part of the lot (15.54ha) (hereafter referred to as 'the site' – Figure 2) for the purpose of Extractive Industry.

The site has previously been granted a Clearing Permit on 14 December 2012 (CPS 4924/2) to Oakford Land Company Pty Ltd. A request for the clearing permit to be extended was granted in 2019 (CPS 4924/3), however the granting of the permit was revoked by the Minister on appeal due to the ownership of the land having been transferred and the Purpose Permit was unable to be transferred to the proponent. As a result, the new application CPS 9197/1 has been applied for by PMR Quarries Pty Ltd over the same area of land.

In response to the clearing permit application the Department of Water and Environmental Regulation (DWER) commented on the original flora and vegetation survey undertaken on the site by Regeneration Technology in 2006. DWER considered the 2006 survey was old and may not reflect the current species presence or condition of the vegetation in the application area, including the possible presence of the Banksia Woodlands of the Swan Coastal Plain ecological community which was listed as a Threatened Ecological Community (TEC) after the 2006 survey was done. DWER also made a number of comments on the methodology used in the survey and the adequacy of the survey in assessing the possible presence of the following conservation significant flora species:

- *Eucalyptus argutifolia* (Threatened);
- *Melaleuca* sp. Wanneroo (Threatened);
- *Baeckea* sp. Limestone (Priority 1);
- *Haloragis luminosa* (Priority 1); and
- *Acacia benthamii* (Priority 2).

This Flora and Vegetation Survey was commissioned by WA Limestone to provide an updated survey of the flora and vegetation on the site.

1.2 Scope of Works

The Flora and Vegetation Survey was undertaken in alignment with EPA Technical Guidance *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016) with a targeted component for identified species that may be present on the site (as per Section 4.2 of the guidance) as well as a detailed survey of the flora and vegetation (as per Section 4.3 of the Guidance). The survey included the following:

- Review of all previous studies undertaken on the site including:
 - *Lot 8 Wattle Ave Nowergup Flora and Vegetation Assessment* (Regeneration Technology Pty Ltd, 2006); and
 - Clearing Permit Report for CPS 4924/3 (DWER, 2019).

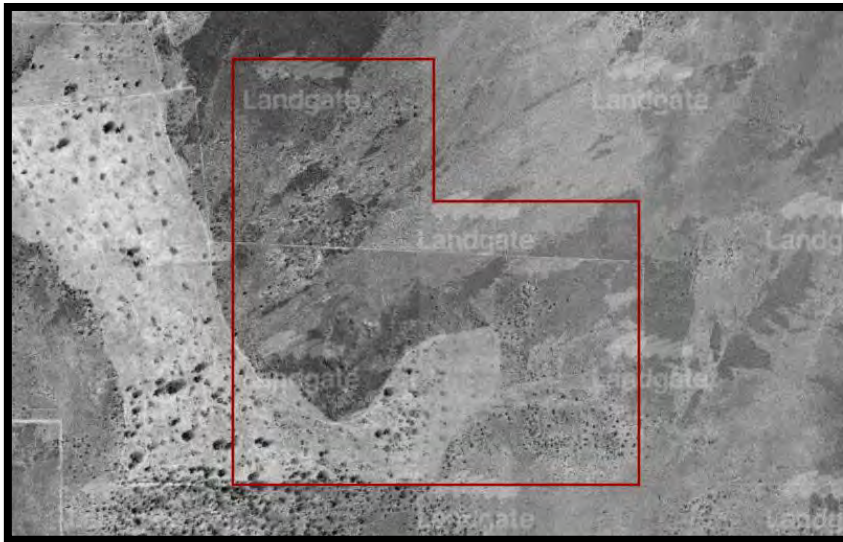
- Examination of historic and recent aerial photography and contour and soil maps to provisionally identify vegetation types and condition;
- Field survey using quadrats to record native and introduced species;
- A thorough site walkover of any areas of native vegetation at approximately 40m spacing;
- Recording of any significant plant species using a hand-held GPS;
- Description and mapping of vegetation types and vegetation condition;
- Compilation of a flora list; and
- Analysis of the conservation values of the flora and vegetation on the site.

2 EXISTING ENVIRONMENT

2.1 Land Use

The earliest available historic aerial photograph on-line from 1965 shows that the site contains native vegetation over most of the area with some partial clearing in the south-west quarter (Plate 1) (Landgate, 2022).

Plate 1: Aerial Photograph 1965 (Landgate, 2022)



Exploration for limestone resource is apparent in the aerial photograph from 1970 (Plate 2) (Landgate, 2022).

Plate 2: Aerial Photograph 1970 (Landgate, 2022)



Limestone quarrying commenced to the north-east of the site before 2000 and immediately north of the site in 2010 and remain active to the current time (Plate 3). The site itself remains naturally vegetated.

Plate 3: Aerial Photograph 2021 (Landgate, 2022)



2.2 Topography

The site is undulating and generally slopes down from the north-east at 94m Australian Height Datum (AHD) down to the south-west at 58 mAHD (Figure 2).

2.3 Geology and Soils

The site is mapped as part of the Spearwood System which has the highest relief of the dune systems on the Swan Coastal Plain (Bolland, 1998). The Spearwood system consists of slightly calcareous Aeolian sand remnant from leaching of the underlying Pleistocene Tamala limestone (Davidson, 1995).

The Spearwood soil unit mapped on the site is described as follows:

- Karrakatta shallow soils Phase (211Sp_KIs) which are on low hills and ridges with bare limestone or shallow siliceous or calcareous sand over limestone. Typically, these soils have dense low shrub dominated by *Banksia sessilis*, *Melaleuca huegelii* and species of *Grevillea* (DPIRD, 2022).

2.4 Hydrology

The maximum groundwater level beneath the site is approximately 21-25m AHD which is 40m to 69m below the surface level. Groundwater generally flows to the south-west (DWER, 2022). There are no wetlands or creeks mapped on the site according to the DBCA's Geomorphic Wetlands of the Swan Coastal Plain database (National Map 2022).

3 METHODOLOGY

3.1 Previous Surveys

A flora and vegetation survey of the whole of Lot 8 has previously been conducted by Regeneration Technology Pty Ltd in 2006 (Regeneration Technology Pty Ltd, 2006). The results of that survey were used to prepare a survey report in 2016 just for the clearing permit application area. No specific additional survey of the clearing permit application area has been seen by PGV Environmental. The clearing permit report does not include a reference for any survey other than the 2006 report.

As part of the clearing permit assessment for CPS 4924/2 a site survey was undertaken by DWER in 2018 (DWER, 2019).

The results of the 2006 survey and 2018 DWER survey were reviewed as part of this assessment.

3.2 Spring Survey

A detailed spring flora and vegetation survey of the site was conducted by Dr Paul van der Moezel on 10 October 2021. The site was thoroughly walked to record all species observed within the survey area (see Plate 4 for track log). Information on flora composition and vegetation structure was recorded in six 10 m x 10 m non-permanent quadrats in representative vegetation types.

Most plant species were identified in the field. Some specimens were photographed or samples collected for identification at the Perth Reference Herbarium or office using standard reference guides.

Plate 4: Track Log



3.2.1 Targeted Species

As part of the clearing permit application for CPS 9197/1 DWER listed five conservation significant species that they considered might occur on the site and should be specifically surveyed for. The species identified by DWER to have potential to occur on the site and associated notes are as follows:

- *Eucalyptus argutifolia* (Threatened) - can be confused with *E. petrensis*, when not in flower especially if plants are sterile. Surveys for this species should be conducted during the flowering period, from December through to April
- *Melaleuca sp. Wanneroo* (Threatened) - can be confused with *M. systema* when not in flower. Surveys for this species should be conducted during the flowering period, late November through to January
- *Baeckea sp. Limestone* (Priority 1) - recommended that this species be targeted during its flowering period, which is described as late spring as myrtaceous shrubs may be mis-identified when not in flower
- *Haloragis luminosa* (Priority 1) - this species is most conspicuous in spring when growing vigorously however fruit is required for accurate determination. Preliminary surveys should therefore be conducted in spring, with follow up surveys of suspected in summer. If suspected to be present, it is recommended that specimens be submitted to the WA Herbarium for confirmation
- *Acacia benthamii* (Priority 2) – most collections for this species have occurred from late July though to early October. The flowering period is listed as listed as August/September. It is recommended that surveys be conducted during the flowering period where possible.

These species were specifically targeted in the spring flora survey.

3.2.2 Survey Conditions

The conditions that the survey was undertaken in are presented in Table 1 in order to assess the adequacy of the survey. Rainfall for Nowergup (Measured at Tamala Park, Site Number 009264, approximately 8 km from the site) was above average for July in 2021 being 245.9.0 mm and below average in August being 71.7 mm compared to mean values of 123.0 mm and 106.1 mm (BOM, 2021). The rainfall in September was 29.7 mm compared to an average of 59 mm, however October was above average with 99.7 mm compared to 33.4 mm (BOM, 2021). The above average rainfall in July is likely to have compensated for the low rainfall in August and September and is not considered to be a constraint on the survey.

Table 1: Statement of Botanical Survey Conditions

Issue	Constraints (Y/N)*	Comment
Competency/experience of the consultant conducting the survey	No	Dr Paul van der Moezel has extensive botanical survey experience on the Swan Coastal Plain, including the Nowergup area
Proportion of the flora identified^	No	The timing of the survey in October was optimal to identify most flora species on the site including all potential Threatened and Priority Flora. No follow-up survey required.

Issue	Constraints (Y/N)*	Comment
Sources of information (historic/recent or new data)	No	The flora of the Swan Coastal Plain is well documented. Previous survey by Regeneration Technology and DWER provided additional context.
Proportion of the task achieved and further work that may need to be undertaken	No	No follow-up survey required as no Threatened Flora expected to occur in other seasons.
Timing/weather/season/cycle	No	The spring survey was optimal for most flora species. 2021 was a good year for ephemeral species.
Disturbances (Fire)	No	The fire age of the vegetation was greater than 5 years.
Intensity of survey (e.g. In retrospect was the intensity adequate)	No	The time spent on the site was considered appropriate for the low diversity of vegetation types. Thick Parrot Bush vegetation prevented a closer spacing of traverses over the whole site.
Completeness (e.g. was relevant area fully surveyed)	No	
Resources (e.g. degree of expertise available for plant identification)	No	Experienced botanist undertook most plant identifications on site.
Remoteness and/or access problems	No	Easily accessible site in the Perth Metropolitan Region
Availability of contextual (e.g. bioregional) information for the study area.	No	Bush Forever

*Constraints have been rated as Significant, Moderate or No constraints

^Fungi and nonvascular flora (e.g. algae, mosses and liverworts) were not specifically surveyed for during the survey.

4 RESULTS

4.1 Flora

A total of 129 plant species were recorded in the survey area by PGV Environmental (Appendix 1). The total included 105 native and 24 introduced species (18.6%). The number of native species is higher than the number recorded by Regeneration Technology Pty Ltd in 2006 who recorded 85 plant species in the clearing permit area, including 76 native and 9 introduced species (cited in DWER 2019).

The plant Families with the highest representation of species were the Proteaceae (Banksia family - 13 species, all native), Asteraceae (Daisy family – 13 species, including 8 native and 5 introduced), Fabaceae (Pea and Wattle family – 12 species, all native) and the Poaceae (Grass family – 11 species, including 4 native and 7 introduced).

No conservation significant species were recorded during the survey.

Species richness in the six quadrats ranged from 29-43 (average 34.7) (Appendix 2). This is considered consistent for the vegetation type on shallow soil over limestone in Excellent condition.

4.2 Vegetation

4.2.1 Vegetation Complex

Vegetation complexes are a broad level of vegetation description which is based on the underlying geomorphology and rainfall (Heddle *et al.*, 1980). The areas of remnant native vegetation on the site are part of the Cottesloe Complex – Central and South which is described as:

Cottesloe Complex-Central and South - Mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *E. gomphocephala* – *E. marginata* (Jarrah) – *Corymbia calophylla* (Marri), closed heath on the limestone outcrops (Heddle *et al.*, 1980).



The general description of the vegetation complex matches the different types of native vegetation on the site.


4.2.2 Vegetation Types

Vegetation complexes are a very broad mapping unit used to map the vegetation at the scale of the Swan Coastal Plain for example. For small scale sites, such as the survey area, vegetation mapping can be further refined by using vegetation types which are based on the composition and structure of the dominant species rather than based on geomorphology.

Three vegetation types were described and mapped on the site. The vegetation types are described in Table 2 and mapped in Figure 3.

Table 2: Vegetation Types on the Site

Vegetation Type	Description	Photograph
<p>Bs <i>Banksia sessilis</i> Tall Shrubland to Tall Open Scrub over <i>Xanthorrhoea preissii</i>/<i>Hibbertia hypericoides</i>/<i>Melaleuca systema</i>/<i>Calothamnus quadrifidus</i> Closed Low Heath</p>	<p>This was the main vegetation type on the site occurring over about 90% of the site. <i>Banksia sessilis</i> was up to 2m high but never more than 25-30% cover. Other tall shrubs to 2m were <i>Xanthorrhoea preissii</i> and <i>Hakea trifurcata</i>. Smaller common species included <i>Melaleuca systema</i>, <i>Calothamnus quadrifidus</i>, <i>Hibbertia hypericoides</i>, <i>Mesomelaena pseudostygia</i>, <i>Lomandra maritima</i>, <i>Desmocladius flexuosus</i> and <i>Trachymene pilosa</i>.</p> <p>The soils are orange-brown sand with some surface limestone.</p> <p>Quadrats WA2, 3 and 6 are representative of this vegetation type.</p>	
<p>EdBs <i>Eucalyptus decipiens</i> Low Open Woodland over <i>Banksia sessilis</i> Shrubland over <i>Xanthorrhoea preissii</i>/<i>Hibbertia hypericoides</i> Open Low Heath</p>	<p>This vegetation type is very similar to the Bs type but with <i>Eucalyptus decipiens</i> as a tree mallee 7-8m high. Occurred as scattered patches on the site. Similar understorey species to Bs.</p> <p>The soils are orange-brown sand with some surface limestone.</p> <p>Quadrats WA1 and 4 are representative of this vegetation type.</p>	

Vegetation Type	Description	Photograph
<p>BaBg <i>Banksia attenuata</i>/<i>B. grandis</i> Low Open Woodland over <i>Xanthorrhoea preissii</i>/<i>Hibbertia hypericoides</i> Open Low Heath</p>	<p>One small area of this vegetation type occurred in the south-east corner of the site. The patch is continuous with other <i>Banksia</i> woodland vegetation on Lot 8 but outside the clearing permit application area. <i>Banksia attenuata</i> and <i>B. grandis</i> were sparse at around 10% cover and 3-4m high. Common shrub species included <i>Xanthorrhoea preissii</i>, <i>Hibbertia hypericoides</i>, <i>Mesomelaena pseudostygia</i>, <i>Calothamnus quadrifidus</i>, <i>Desmocladius flexuosus</i> and <i>Xanthorrhoea brunonis</i>.</p> <p>The soils are orange-brown sand with some surface limestone.</p> <p>Quadrat WA5 is representative of this vegetation type.</p>	

4.2.3 Floristic Community Type

Analysis of the quadrat data using the spreadsheet method resulted in all the vegetation types being most similar to Floristic Community Type (FCT) 28 'Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands'.

4.2.4 Vegetation Condition

The condition of the vegetation was assessed according to the system of Keighery as described in Bush Forever (Government of Western Australia, 2000) (Table 3).

Table 3: Vegetation Condition Rating Scale

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

All of the vegetation was rated as Excellent (Figure 4). Regeneration Technology Pty Ltd also rated all the vegetation as Excellent in 2006.

4.3 Conservation Significance of Flora and Vegetation

4.3.1 Flora

No Threatened or Priority flora species were recorded on the site.

Regeneration Technology Pty Ltd recorded the Priority species *Jacksonia sericea* on Lot 8 in the 2006 survey. The species identification was changed to *Jacksonia gracillima*, another Priority species, in the 2016 survey report for the clearing permit application area. The clearing permit decision report for CPS 4924/2 states that four individuals of *Jacksonia gracillima* were recorded in the Banksia/Jarrah woodland in the south-east corner of Lot 8 and five other individuals were recorded elsewhere on Lot 8 outside the application area. No precise co-ordinates of the individuals are given, or locations mapped in the report. No The plants resembling *J. gracillima* or *J. sericea* were recorded on the site by PGV Environmental. PGV Environmental recorded *Jacksonia calcicola* on the site in Banksia sessilis Heath. Regeneration Technology did not record *J. calcicola* anywhere on Lot 8. The identification of

Jacksonia gracillima is considered by PGV Environmental as an error as *J. gracillima* usually occurs on the Bassendean Dune system on winter-wet flats. Nevertheless, DWER considered that the potential clearing of *Jacksonia gracillima* was “not likely to impact on the conservation of this species”.

Table 4 summarise the results of the survey with respect to the five Threatened and Priority species identified by DWER as potentially occurring on the site.

In summary, the survey in October by an experienced botanist was considered adequate to have been able to identify all five species if they had occurred on the site.

Table 4: Summary of Targeted Species Survey

Species	Flowering	Survey Timing
<i>Eucalyptus argutifolia</i>	March-April (Grayling and Booker, 1992)	No shrub mallee eucalypts were recorded on the site by PGV Environmental, therefore the flowering time is not relevant. <i>Eucalyptus argutifolia</i> was surveyed by DWER in 2018. The Clearing Permit Decision report for CPS 4924/3 states: <i>Additionally, after an intensive site inspection by DWER in September 2018 and review of the flora survey, it is considered for the flora survey undertaken in 2006 to be adequate in identifying this species. Therefore, it is not considered for the proposed clearing to impact on habitat for this threatened flora species.</i>
<i>Melaleuca</i> sp. Wanneroo	November- January	Differentiated from <i>Melaleuca systema</i> by its flatter and longer leaves. Identifiable by experienced botanist when not in flower. Dr Paul van der Moezel surveyed and identified <i>Melaleuca</i> sp. Wanneroo on several nearby mining leases in 2021 and is therefore familiar with its identification.
<i>Baeckea</i> sp. Limestone	Late Spring	The survey was undertaken in the flowering period for this species. No <i>Baeckea</i> species have been recorded on the site in either the 2006 or 2021 surveys.
<i>Haloragis luminosa</i>	September	<i>Haloragis luminosa</i> is known from a single locality near Yanchep where it grows on a limestone ridge with TEC 26a vegetation with a tall shrubland of <i>Acacia rostelifera</i> with <i>Banksia sessilis</i> , <i>Melaleuca systema</i> and <i>M. huegelii</i> over <i>Xanthorrhoea preissii</i> and <i>Hibbertia hypericoides</i> (Wege and Orchard, 2020). The survey on Lot 8 was undertaken in spring during the flowering period. No FCT 26a vegetation or limestone ridges occur in the survey area. No <i>Haloragis</i> species have been recorded on the site in either the 2006 or 2021 surveys.
<i>Acacia benthamii</i>	August - September	The survey was just outside of the flowering time for this species, however is recognisable by its horizontal rigid and pungent phyllodes which are similar to <i>A. cochlearis</i> in appearance. <i>A. cochlearis</i> has not been recorded on the site in either the 2006 or 2021 surveys.

4.3.2 Vegetation

4.3.2.1 Vegetation Complex

The vegetation is part of the Cottesloe - Central and South Vegetation Complex. There is approximately 32.16% of the pre-European extent of the Cottesloe Complex-Central and South remaining on the Swan Coastal Plain portion of the Perth Metropolitan Region (DBCA, 2018). There is 14.58% of the original extent of the complex in secure reserves (DBCA, 2018).

The percentage retention is above EPA's target for minimum 30% retention of vegetation complexes State-wide in the Perth and Peel Region Constrained Areas and the area in protection is above the 10% minimum criteria for vegetation complexes.

4.3.2.2 Threatened and Priority Ecological Communities

All of the vegetation was assessed as being Floristic Community Type (FCT) 28 'Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands'. FCT 28 is not a TEC or PEC at State or Commonwealth level.

One very small area containing *Melaleuca huegelii* with *Banksia sessilis*, *Xanthorrhoea preissii* and *Hibbertia hypericoides* was recorded on the site but was too small to map. Areas with *Melaleuca huegelii* have potential to be the State listed TEC 26a '*Melaleuca huegelii*-*M. systema* shrublands on limestone ridges'. However, the very small size of the area containing *M. huegelii* and the absence of a limestone ridge meant the vegetation was not representative of the TEC. DWER (2019) also concluded that the clearing permit application area did not contain the State listed TEC 26a.

4.3.2.3 Banksia Woodlands of the Swan Coastal Plain Assessment.

The vegetation type (BaBg) containing *Banksia attenuata* trees in the south-east corner of the site has potential to be part of the Banksia Woodlands of the Swan Coastal Plain ecological community (Banksia Woodland TEC), which is listed as an Endangered TEC under the Commonwealth EPBC Act. However, the presence of *Banksia attenuata* trees is not of itself sufficient for the area of Banksia trees to meet the requirements of the Banksia Woodland TEC. The vegetation needs to meet specific criteria to be considered the TEC as follows.

The *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (Conservation Advice) describes the Banksia Woodland TEC as follows:

The ecological community is a woodland associated with the Swan Coastal Plain of southwest Western Australia. A key diagnostic feature is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range.

The size and condition of the patch of Banksia woodland is also important. The Banksia Woodland TEC must include vegetation that is in Good condition or more and at least 0.5ha in size.

The area of BaBg vegetation in the application area is around 0.36ha. The Banksia woodland vegetation extends outside the application area and covers around 2.7ha. The condition of the

Banksia woodland vegetation is rated as Excellent. A patch of Banksia woodland in Excellent condition needs to be at least 0.5ha to be the Banksia Woodland TEC. Therefore, the BaBg vegetation type meets the definition of the Banksia Woodland TEC as it is part of a continuous, larger patch of similar Banksia vegetation outside the application area.

DWER (2019) also concluded that the application area contained a small area (0.42ha) of the Banksia Woodlands of the Swan Coastal Plain TEC in the south-east corner.

5 SUMMARY AND CONCLUSIONS

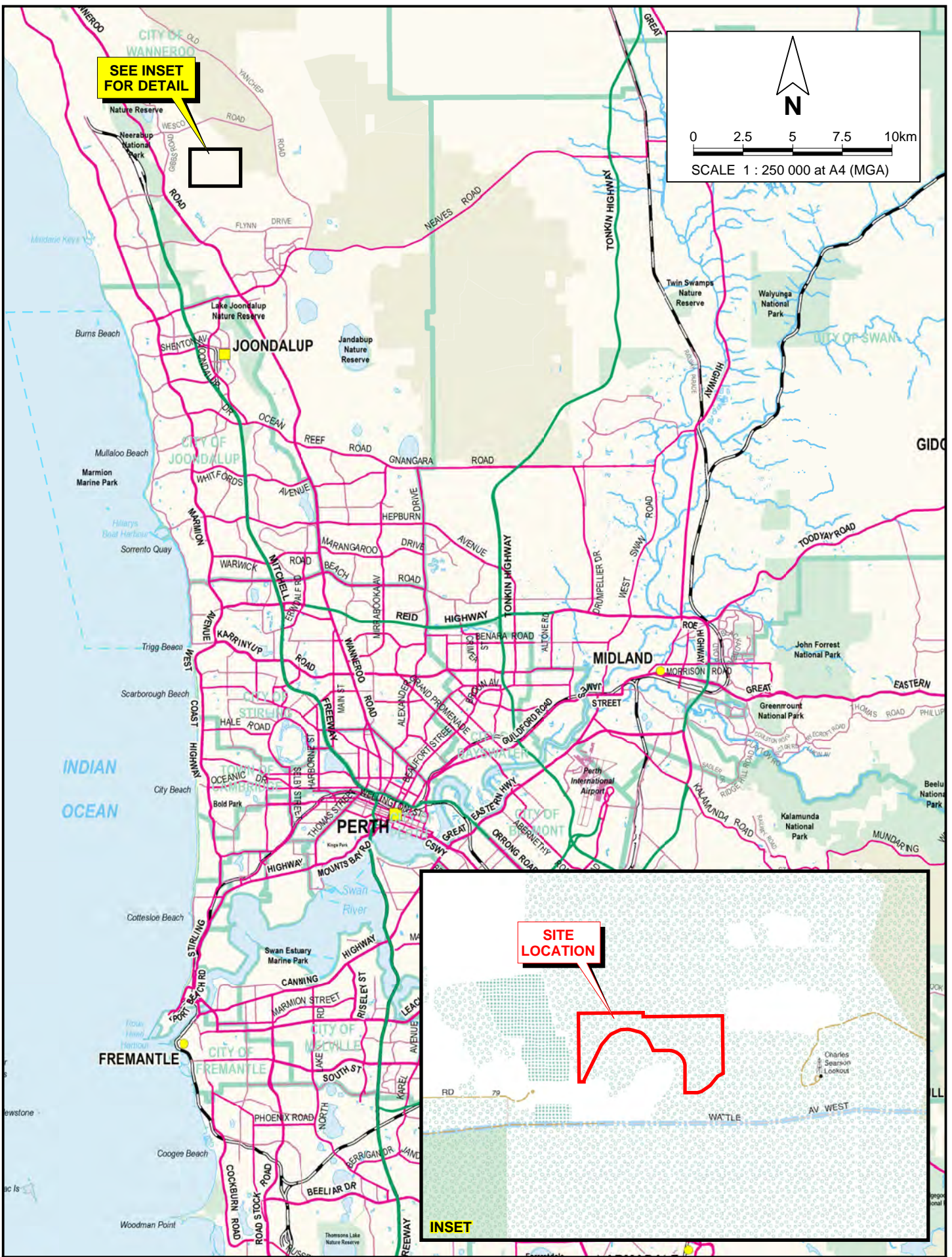
The 2021 detailed flora and vegetation survey of the clearing permit application area (CPS 9197/1) on Lot 8 Wattle Avenue West, Nowergup resulted in the following findings:

- Remnant native vegetation occurs on about 15ha of the site;
- Three vegetation types were recorded with *Banksia sessilis* Tall Shrubland to Tall Open Scrub the most common type. Stands of *Eucalyptus decipiens* over *Banksia sessilis* were scattered throughout the site. One small area of *Banksia attenuata*/*B. grandis* Low Open Woodland was recorded in the south-east corner;
- The vegetation is all in Excellent condition;
- A total of 129 plant species was recorded on the site, including 105 native and 24 introduced species;
- No Threatened or Priority flora species were recorded on the site. The timing of the survey and experience of the botanist was considered adequate to have been able to identify all five species listed by DWER as potentially occurring on the site, if they had occurred there;
- The main vegetation types were all assessed as being FCT 28 'Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus marginata* woodlands' which is not a Threatened or Priority Ecological Community at State or Commonwealth level;
- The small area of *Banksia attenuata*/*B. grandis* Low Open Woodland in the south-east corner of the site (0.4ha) is part of a larger stand measuring 2.7ha and was assessed as being a part of the Banksia Woodlands of the Swan Coastal Plain ecological community which is a Priority Ecological Community at State level and a Threatened Ecological Community under the EPBC Act.

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FIGURES



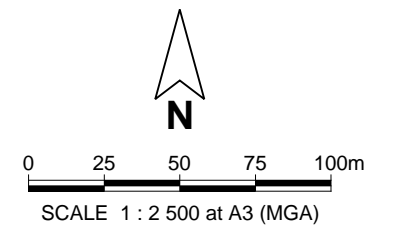
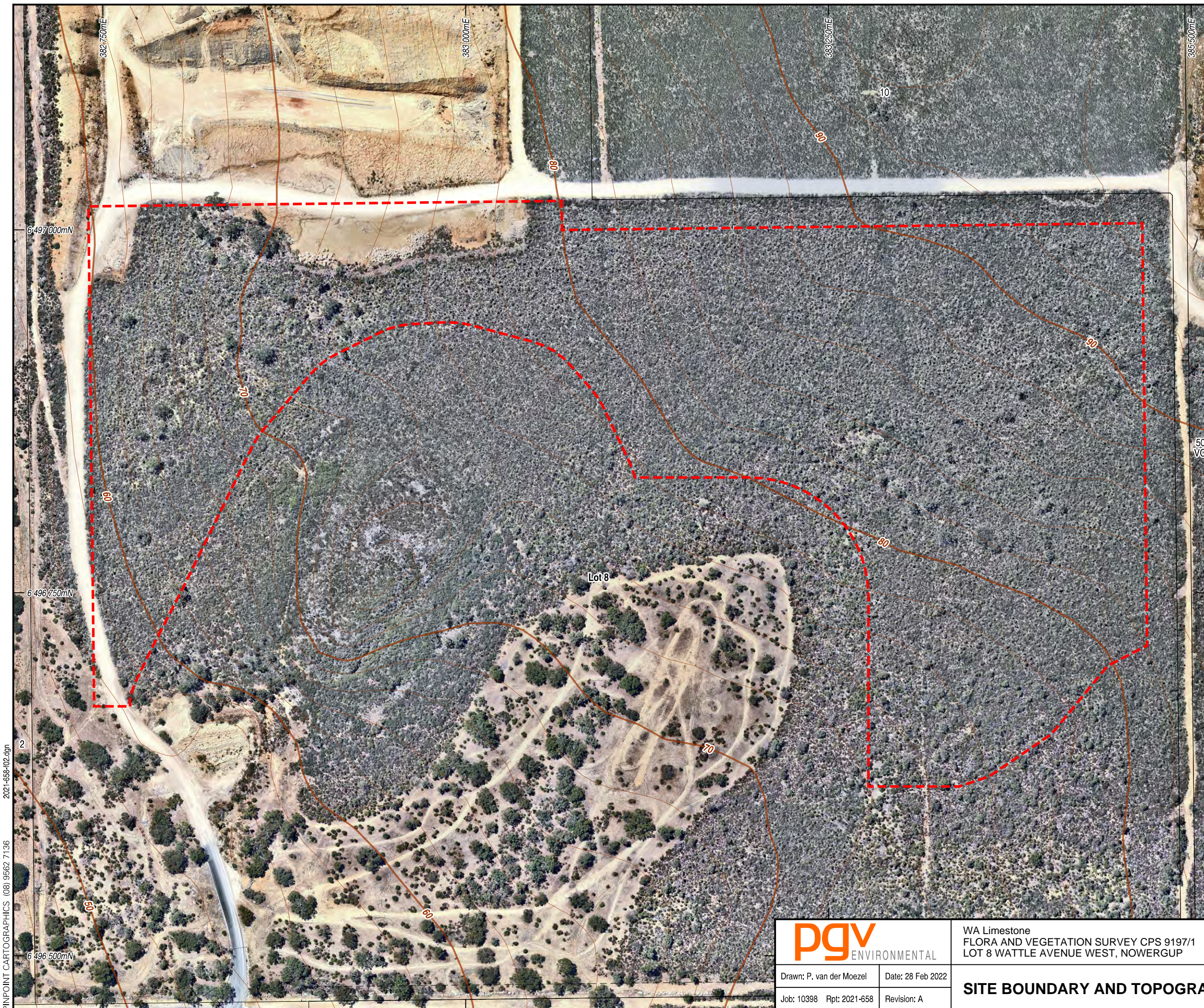
PINPOINT CARTOGRAPHICS (08) 9562 7136
 2021-658-101.dgn

Drawn: P. van der Moezel	Date: 28 Feb 2022
Job: 10398 Rpt: 2021-658	Revision: A

WA Limestone
 FLORA AND VEGETATION SURVEY CPS 9197/1
 LOT 8 WATTLE AVENUE WEST, NOWERGUP

SITE LOCATION

Figure 1

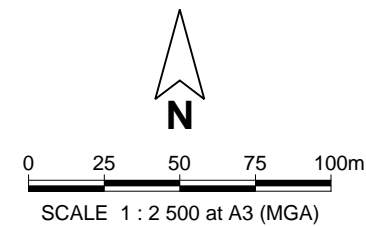
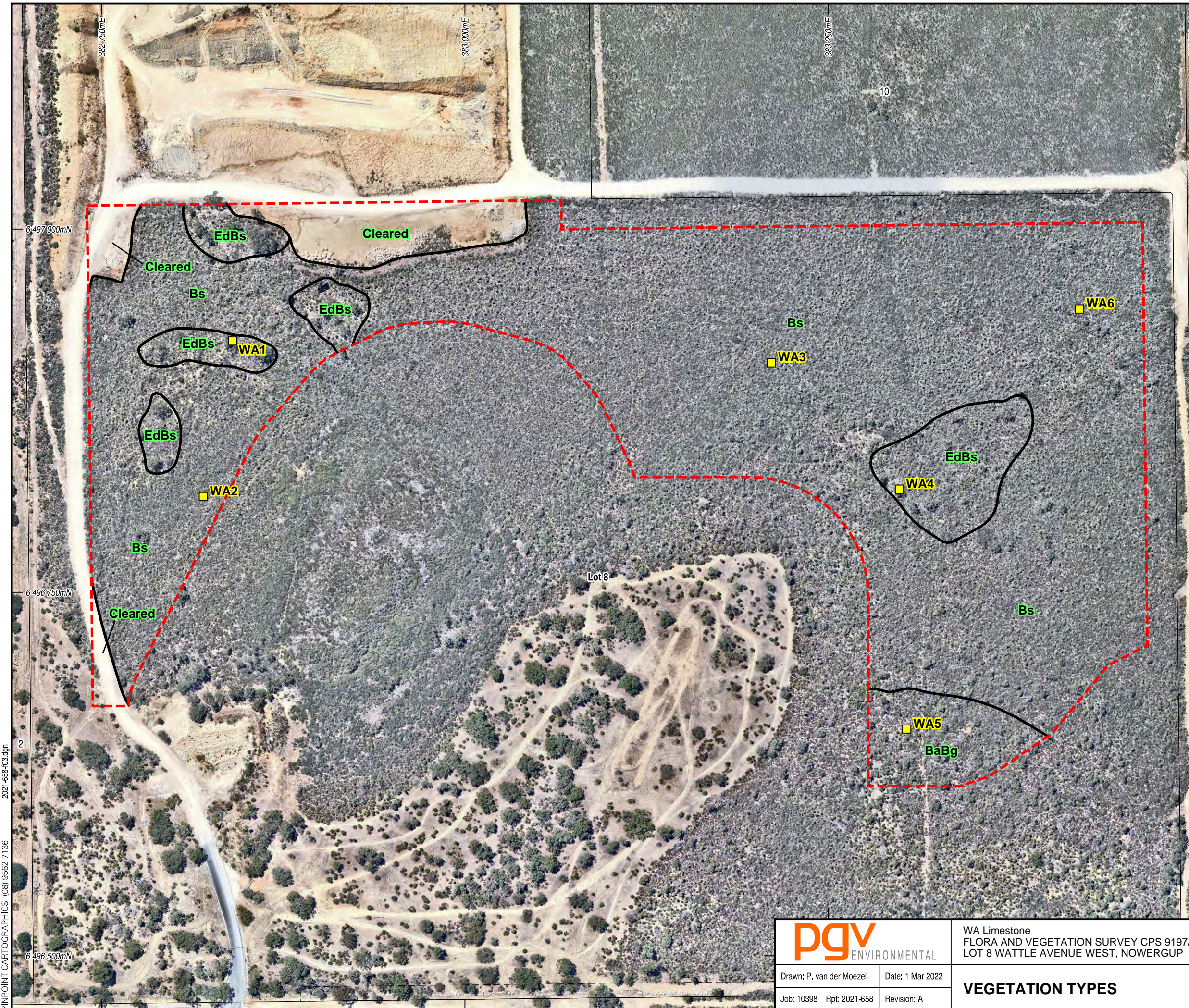


- Legend**
- - - Site Boundary
 - Cadastral Boundary
 - - - Easement Boundary
 - Topographic Contour

CONTOUR SOURCE: Dept. of Agriculture, 2000.
 CADASTRAL SOURCE: Landgate, February 2022.
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2022.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-658-102.dgn

	WA Limestone FLORA AND VEGETATION SURVEY CPS 9197/1 LOT 8 WATTLE AVENUE WEST, NOWERGUP		<h2 style="margin: 0;">SITE BOUNDARY AND TOPOGRAPHY</h2>
	Drawn: P. van der Moezel	Date: 28 Feb 2022	
Job: 10398 Rpt: 2021-658		Revision: A	<h2 style="writing-mode: vertical-rl; transform: rotate(180deg); margin: 0;">Figure 2</h2>



- Legend**
- - - Site Boundary
 - Cadastral Boundary
 - Easement Boundary
 - Quadrat Location
 - Vegetation Type Boundary
 - Bs Vegetation Type

- Vegetation Types**
- Bs**
Banksia sessilis Tall Shrubland to Tall Open Scrub over *Xanthorrhoea preissii*/*Hibbertia hypericoides*/*Melaleuca systena*/*Calothamnus quadrifidus* Closed Low Heath
- EdBs**
Eucalyptus decipiens Low Open Woodland over *Banksia sessilis* Shrubland over *Xanthorrhoea preissii*/*Hibbertia hypericoides* Open Low Heath
- BaBg**
Banksia attenuata/*B. grandis* Low Open Woodland over *Xanthorrhoea preissii*/*Hibbertia hypericoides* Open Low Heath

CADASTRAL SOURCE: Landgate, February 2022.
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2022.



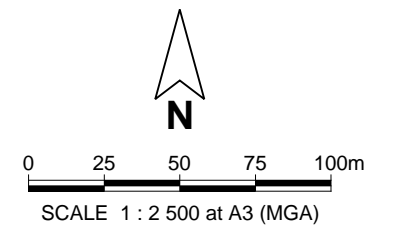
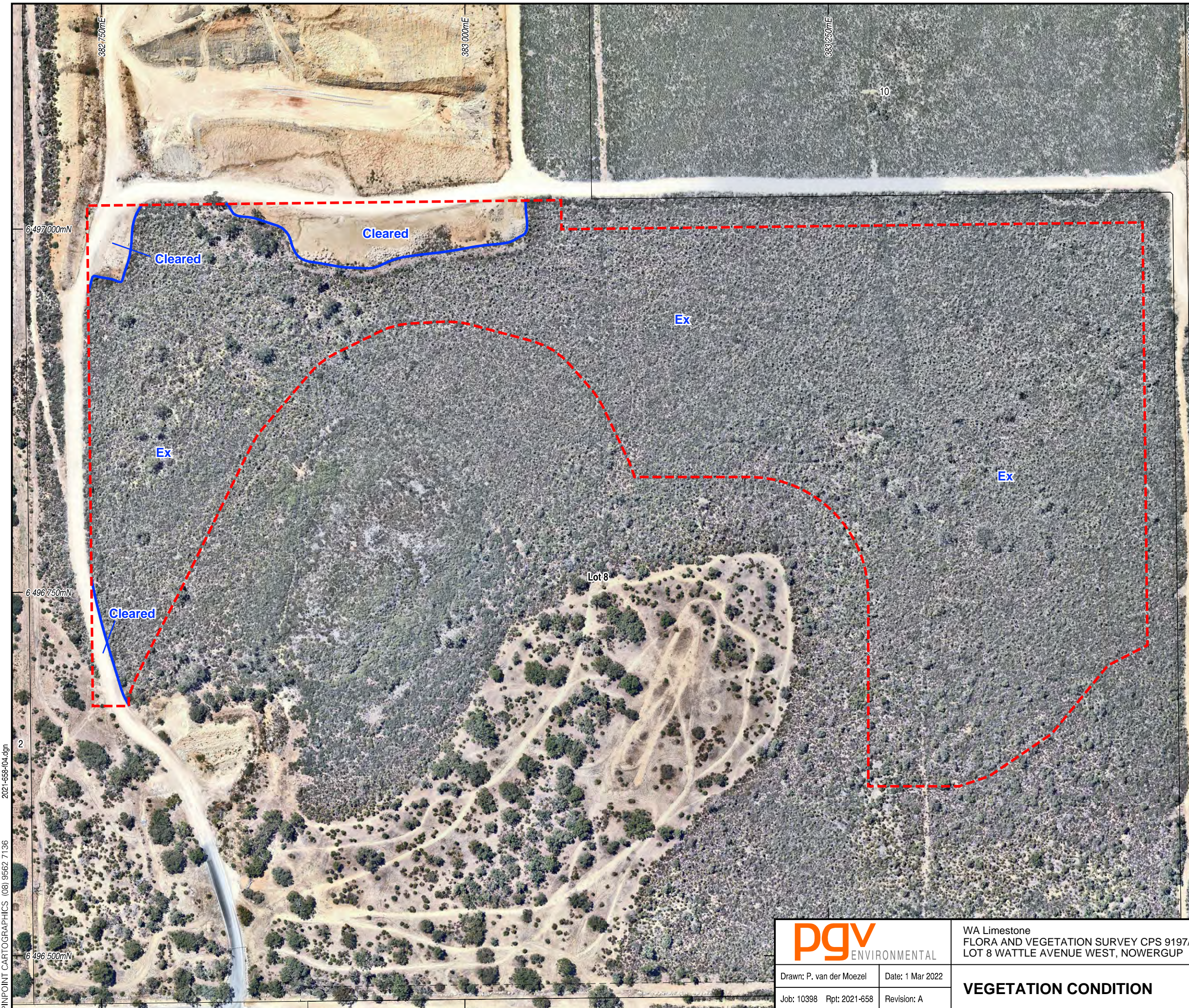
WA Limestone
 FLORA AND VEGETATION SURVEY CPS 9197/1
 LOT 8 WATTLE AVENUE WEST, NOWERGUP

Drawn: P. van der Moezel Date: 1 Mar 2022
 Job: 10398 Rpt: 2021-658 Revision: A

VEGETATION TYPES

Figure 3

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-658-103.dgn



- Legend**
- - - Site Boundary
 - Cadastral Boundary
 - - - Easement Boundary
 - Vegetation Condition Boundary
 - Ex Vegetation Condition

Vegetation Condition
(SOURCE: Bush Forever, Govt. of W.A., 2000)

P - Pristine
Pristine or nearly so, no obvious signs of disturbance.

Ex - Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

VG - Very Good
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G - Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D - Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD - Completely Degraded
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

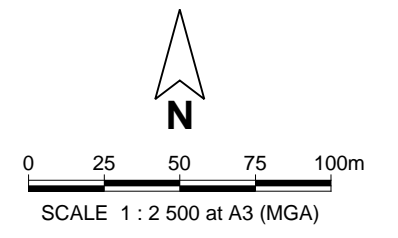
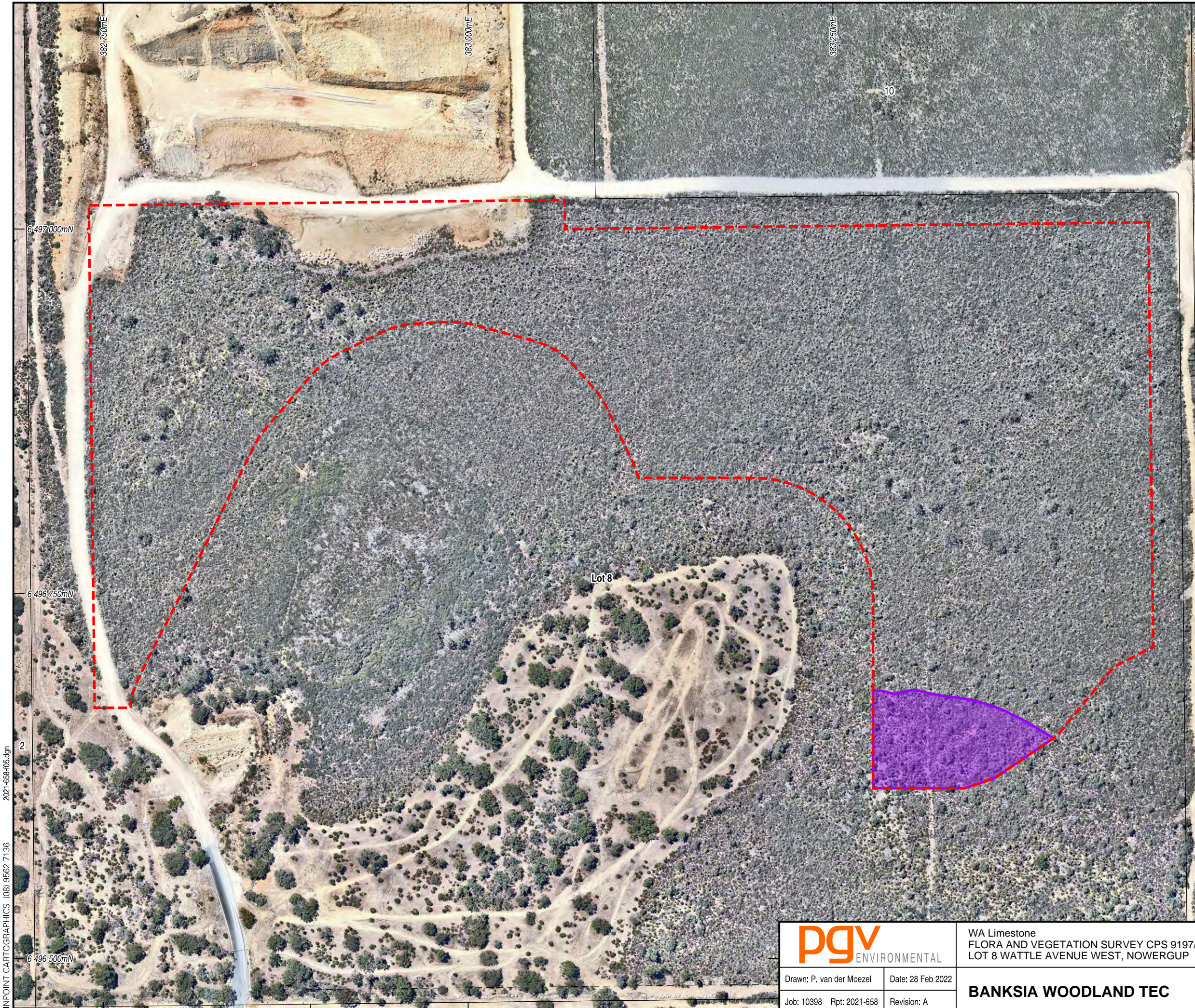
Cl - Cleared
No native vegetation remaining.

CADASTRAL SOURCE: Landgate, February 2022.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2022.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-658-104.dgn

		WA Limestone FLORA AND VEGETATION SURVEY CPS 9197/1 LOT 8 WATTLE AVENUE WEST, NOWERGUP	
		VEGETATION CONDITION	
Drawn: P. van der Moezel	Date: 1 Mar 2022		
Job: 10398 Rpt: 2021-658	Revision: A		

Figure 4



- Legend**
- - - Site Boundary
 - Cadastral Boundary
 - Easement Boundary
 - Banksia Woodland TEC

CADASTRAL SOURCE: Landgate, February 2022.
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown January 2022.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-658-105.dgn

		WA Limestone FLORA AND VEGETATION SURVEY CPS 9197/1 LOT 8 WATTLE AVENUE WEST, NOWERGUP		BANKSIA WOODLAND TEC	Figure 5
		Drawn: P. van der Moezel Job: 10398 Rpt: 2021-658	Date: 28 Feb 2022 Revision: A		

APPENDIX 1
Flora Species List

SPECIES LIST –Wattle Ave West CPS 9197

GYMNOSPERMS

CYCADACEAE

Macrozamia riedlei

MONOCOTYLEDONS

ASPARAGACEAE

Acanthocarpus preissii

**Asparagus asparagoides*

Lomandra maritima

Lomandra sp

Sowerbaea laxiflora

Thysanotus patersonii

Thysanotus thyrsoideus

COLCHICACEAE

Burchardia congesta

CYPERACEAE

Caustis dioica

Lepidosperma pubisquameum

Mesomelaena pseudostygia

Morelotia octandra

Schoenus clandestinus

HAEMODORACEAE

Anigozanthos humilis

Conostylis aculeata subsp. *aculeata*

Conostylis candicans subsp. *calcicola*

Conostylis setigera

Haemodorum laxum

HEMEROCALLIDACEAE

Dianella revoluta var. *divaricata*

Tricoryne elatior

IRIDACEAE

**Gladiolus caryophyllaceus*

**Moraea flaccida*

Patersonia occidentalis

**Romulea rosea*

ORCHIDACEAE

Caladenia flava

Eriochilus dilatatus

Microtis media

Pyrorchis nigricans

Thelymitra benthamiana

Thelymitra sp

POACEAE

Austrostipa elegantissima

Austrostipa flavescens

Austrostipa sp

**Briza maxima*

**Briza minor*

**Bromus diandrus*

**Ehrharta calycina*

**Ehrharta longiflora*

**Pentameris airoides* subsp. *airoides*

Poa porphyroclados

**Vulpia myuros*

RESTIONACEAE

Desmocladus flexuosus

XANTHORRHOEACEAE

Xanthorrhoea brunonis

Xanthorrhoea preissii

DICOTYLEDONS

APIACEAE

Daucus glochidiatus

Xanthosia huegelii

ARALIACEAE

Trachymene pilosa

ASTERACEAE

**Arctotheca calendula*

Hyalosperma cotula

**Hypochaeris glabra*

Lagenophora huegelii

Olearia axillaris

Podolepis gracilis

Podotheca gnaphalioides

Pterochaeta paniculata
Siloxerus humifusus
**Sonchus oleraceus*
**Urospermum picroides*
**Ursinia anthemoides*
Waitzia suaveolens var. *suaveolens*

BRASSICACEAE

**Heliophila pusilla*
**Raphanus raphanistrum*

CAMPANULACEAE

Isotoma hypocrateriformis

CARYOPHYLLACEAE

**Petrohragia dubia*
**Spergula arvensis*

CASUARINACEAE

Allocasuarina fraseriana
Allocasuarina humilis

DILLENIACEAE

Hibbertia hypericoides
Hibbertia racemosa

ERICACEAE

Leucopogon parviflorus
Styphelia erubescens
Styphelia polymorpha

FABACEAE

Acacia lasiocarpa
Acacia pulchella
Bossiaea eriocarpa
Gastrolobium capitatum
Gompholobium tomentosum
Hardenbergia comptoniana
Hovea trisperma var. *trisperma*
Jacksonia calcicola
Jacksonia sternbergiana
Kennedia prostrata
Mirbelia spinosa
Templetonia retusa

GENTIANACEAE

**Centaurium erythraea*

GERANIACEAE

**Pelargonium capitatum*

GOODENIACEAE

Dampiera linearis

LAMIACEAE

Hemiandra pungens

LAURACEAE

Cassytha flava
Cassytha racemosa

LORANTHACEAE

Nuytsia floribunda

MONTIACEAE

Calandrinia corrigioloides
Calandrinia liniflora

MYRTACEAE

Calothamnus quadrifidus
Calothamnus sanguineus
Eucalyptus decipiens
Kunzea glabrescens
Melaleuca huegelii
Melaleuca systema

OROBANCHACEAE

**Orobanche minor*

PHYLLANTHACEAE

Phyllanthus calycinus
Poranthera microphylla

POLYGALACEAE

Comesperma confertum
Comesperma integerrimum

PRIMULACEAE

**Lysimachia arvensis*

PROTEACEAE

Banksia attenuata

Banksia dallanneyi

Banksia grandis

Banksia sessilis

Grevillea preissii

Hakea lissocarpha

Hakea prostrata

Hakea ruscifolia

Hakea trifurcata

Petrophile linearis

Petrophile macrostachya

Petrophile serruriae

Templetonia retusa

RHAMNACEAE

Spyridium globulosum

RUBIACEAE

Opercularia vaginata

RUTACEAE

Philotheca spicata

STYLIDIACEAE

Levenhookia pusilla

Stylidium brunonianum

Stylidium calcaratum

Stylidium diuroides

Stylidium repens

Stylidium scariosum

VIOLACEAE

Hybanthus calycinus

APPENDIX 2

Quadrat Data

QUADRAT WA1

50 382840 E 6496929 N

Vegetation: *Eucalyptus decipiens* Low Open Woodland over *Banksia sessilis*
Shrubland over *Xanthorrhoea preissii*/*Hibbertia hypericoides* Open
Low Heath

Condition: Excellent

Soil Type: Orange-brown sand, some surface limestone

Landform: Gentle slope

Date: 10.11.21

Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus decipiens</i>	7	10
<i>Banksia grandis</i>	2	1
<i>Banksia sessilis</i>	1-2	20
<i>Allocasuarina humilis</i>	1.7	2
<i>Xanthorrhoea preissii</i>	1	3
<i>Banksia attenuata</i>	1	<1
<i>Calothamnus quadrifidus</i>	0.7	2
<i>Acacia pulchella</i>	0.7	1
<i>Hibbertia hypericoides</i>	0.6	30
<i>Melaleuca systema</i>	0.5	2
* <i>Ehrharta longiflora</i>	0.5	<1
* <i>Gladiolus caryophyllaceus</i>	0.5	<1
<i>Austrostipa flavescens</i>	0.5	<1
<i>Morelotia octandra</i>	0.4	2
* <i>Briza maxima</i>	0.4	1
<i>Haemodorum laxum</i>	0.3	<1
<i>Hakea trifurcata</i>	0.3	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>*Bromus diandrus</i>	0.3	<1
<i>Waitzia suaveolens</i>	0.2	<1
<i>Bossiaea eriocarpa</i>	0.2	<1
<i>Isotoma hypocrateriformis</i>	0.2	<1
<i>Desmocladius flexuosus</i>	0.1	1
<i>Stylidium calcaratum</i>	0.1	<1
<i>Conostylis setigera</i>	0.1	<1
<i>Xanthosia huegelii</i>	0.1	<1
<i>Eriochilus dilatatus</i>	0.1	<1
<i>Trachymene pilosa</i>	0.1	<1
<i>*Pentameris airoides</i> subsp. <i>airoides</i>	0.1	<1
<i>*Lysimachia arvensis</i>	0.1	<1
<i>Kennedia prostrata</i>	<0.1	<1
<i>*Hypochoeris glabra</i>	Flat	<1
<i>Pyrorchis nigricans</i>	Flat	<1
<i>Cassytha racemosa</i>	Climber	2

* introduced species

QUADRAT WA2

50 382820 E 6496816 N

Vegetation: *Banksia sessilis* Tall Open Scrub over *Xanthorrhoea preissii*/*Hibbertia hypericoides*/*Melaleuca systema*/*Calothamnus quadrifidus* Closed Low Heath

Condition: Excellent

Soil Type: Orange-brown sand, some surface limestone

Landform: Gentle slope

Date: 10.11.21

Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Banksia sessilis</i>	1-2	30
<i>Melaleuca systema</i>	1.9	25
<i>Xanthorrhoea preissii</i>	1.9	25
<i>Xanthorrhoea brunonis</i>	1	1
<i>Calothamnus quadrifidus</i>	0.9	3
<i>Leucopogon parviflorus</i>	0.8	<1
* <i>Gladiolus caryophyllaceus</i>	0.7	<1
<i>Hakea lissocarpha</i>	0.6	<1
* <i>Gladiolus caryophyllaceus</i>	0.6	<1
<i>Hibbertia hypericoides</i>	0.5	60
<i>Bossiaea eriocarpa</i>	0.5	<1
<i>Poa drummondiana</i>	0.5	<1
<i>Thysanotus thyrsoides</i>	0.5	<1
<i>Mesomelaena pseudostygia</i>	0.4	4
<i>Calothamnus sanguineus</i>	0.4	<1
<i>Lepidosperma pubisquamum</i>	0.4	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>Acacia lasiocarpa</i>	0.4	<1
<i>Morelotia octandra</i>	0.4	<1
<i>Lomandra maritima</i>	0.3	<1
<i>Stylidium brunonianum</i>	0.3	<1
* <i>Ursinia anthemoides</i>	0.2	1
<i>Waitzia suaveolens</i>	0.2	<1
* <i>Petrorhagia dubia</i>	0.2	<1
* <i>Vulpia myuros</i>	0.2	<1
<i>Haemodorum laxum</i>	0.2	<1
<i>Conostylis aculeata</i>	0.2	<1
<i>Banksia dallanneyi</i>	0.2	<1
* <i>Bromus diandrus</i>	0.2	<1
* <i>Lysimachia arvensis</i>	0.2	<1
<i>Desmodium flexuosus</i>	0.1	<1
<i>Trachymene pilosa</i>	0.1	<1
<i>Stylidium calcaratum</i>	0.1	<1
* <i>Pentameris airoides</i> subsp. <i>airoides</i>	0.1	<1
* <i>Sonchus oleraceus</i>	0.1	<1
<i>Conostylis setigera</i>	0.1	<1
* <i>Hypochaeris glabra</i>	Flat	<1
<i>Cassytha flava</i>	Climber	<1
<i>Cassytha racemosa</i>	Climber	<1

* introduced species

QUADRAT WA3

50 383211 E 6496908 N

Vegetation: *Banksia sessilis* Tall Shrubland over *Xanthorrhoea preissii*/*Hibbertia hypericoides*/*Melaleuca systema* Closed Low Heath
Condition: Excellent
Soil Type: Orange-brown sand, some surface limestone
Landform: Gentle slope
Date: 10.11.21
Recorder: Paul van der Moezel



Quadrat (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Banksia sessilis</i>	1.5-2	25
<i>Xanthorrhoea preissii</i>	2	5
<i>Hakea trifurcata</i>	1.9	1
<i>Hakea prostrata</i>	1.4	1
<i>Comesperma confertum</i>	1.2	<1
<i>Xanthorrhoea brunonis</i>	1	2
<i>Acacia pulchella</i>	1	1
* <i>Gladiolus caryophyllaceus</i>	1	<1
<i>Melaleuca systema</i>	0.6	10
<i>Hibbertia hypericoides</i>	0.5	30
<i>Calothamnus sanguineus</i>	0.4	1
<i>Lomandra maritima</i>	0.4	1
<i>Lepidosperma pubisquameum</i>	0.4	1
<i>Hakea lissocarpa</i>	0.4	<1
<i>Morelotia octandra</i>	0.4	<1
<i>Bossiaea eriocarpa</i>	0.3	1
<i>Mesomelaena pseudostygia</i>	0.3	1
<i>Leucopogon parviflorus</i>	0.3	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>Hibbertia racemosa</i>	0.3	<1
<i>Acacia lasiocarpa</i>	0.3	<1
<i>Haemodorum laxum</i>	0.3	<1
<i>Desmocladius flexuosus</i>	0.2	1
* <i>Briza maxima</i>	0.2	<1
<i>Gompholobium tomentosum</i>	0.2	<1
* <i>Ehrharta longiflora</i>	0.2	<1
<i>Trachymene pilosa</i>	0.1	<1
<i>Stylidium calcaratum</i>	0.1	<1
* <i>Hypochaeris glabra</i>	Flat	<1
<i>Lagenophora huegelii</i>	Flat	<1
<i>Cassytha racemosa</i>	Climber	<1

* introduced species

QUADRAT WA4

50 383299 E 6496821 N

Vegetation: *Eucalyptus decipiens* Low Open Woodland over *Banksia sessilis*
Shrubland over *Xanthorrhoea preissii*/*Hibbertia hypericoides* Open
Low Heath

Condition: Excellent

Soil Type: Orange-brown sand, some surface limestone

Landform: Gentle slope

Date: 10.11.21

Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Eucalyptus decipiens</i>	8	5
<i>Banksia sessilis</i>	1.5-2	25
<i>Calothamnus quadrifidus</i>	1.9	2
<i>Kunzea glabrescens</i>	1.8	1
<i>Xanthorrhoea preissii</i>	1.5	8
<i>Acacia pulchella</i>	1.4	1
<i>Xanthorrhoea brunonis</i>	0.8	1
* <i>Gladiolus caryophyllaceus</i>	0.6	<1
<i>Hibbertia hypericoides</i>	0.5	40
<i>Morelotia octandra</i>	0.5	2
<i>Mesomelaena pseudostygia</i>	0.5	1
<i>Burchardia congesta</i>	0.5	<1
<i>Calothamnus sanguineus</i>	0.4	5
<i>Haemodorum laxum</i>	0.4	<1
<i>Hakea lissocarpa</i>	0.4	<1
<i>Austrostipa compressa</i>	0.4	<1
<i>Thysanotus thyrsoideus</i>	0.4	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>Desmocladius flexuosus</i>	0.3	1
<i>Hovea trisperma</i>	0.3	<1
<i>Thelymitra benthamiana</i>	0.3	<1
* <i>Briza maxima</i>	0.3	<1
* <i>Centaurium erythraea</i>	0.2	<1
* <i>Pentameris airoides</i> subsp. <i>airoides</i>	0.2	<1
<i>Microtis media</i>	0.2	<1
<i>Waitzia suaveolens</i>	0.2	<1
<i>Conostylis aculeata</i>	0.2	<1
<i>Isotoma hypocrateriformis</i>	0.2	<1
* <i>Ursinia anthemoides</i>	0.2	<1
* <i>Aira caryophyllea</i>	0.1	<1
<i>Dampiera linearis</i>	0.1	<1
* <i>Orobanche minor</i>	0.1	<1
<i>Stylidium brunonianum</i>	0.1	<1
<i>Tricoryne elatior</i>	0.1	<1
<i>Stylidium diuroides</i>	0.1	<1
* <i>Vulpia myuros</i>	0.1	<1
<i>Pterochaeta paniculata</i>	0.1	<1
<i>Trachymene pilosa</i>	<0.1	<1
<i>Levenhookia pusilla</i>	<0.1	<1
<i>Schoenus clandestinus</i>	<0.1	<1
<i>Kennedia prostrata</i>	<0.1	<1
<i>Pyrorchis nigricans</i>	Flat	<1
* <i>Hypochaeris glabra</i>	Flat	<1
<i>Cassytha racemosa</i>	Climber	<1

* introduced species

QUADRAT WA5

50 383304 E 6496656 N

Vegetation: *Banksia attenuata*/*B. grandis* Low Open Woodland over
Xanthorrhoea preissii/*Hibbertia hypericoides* Open Low Heath

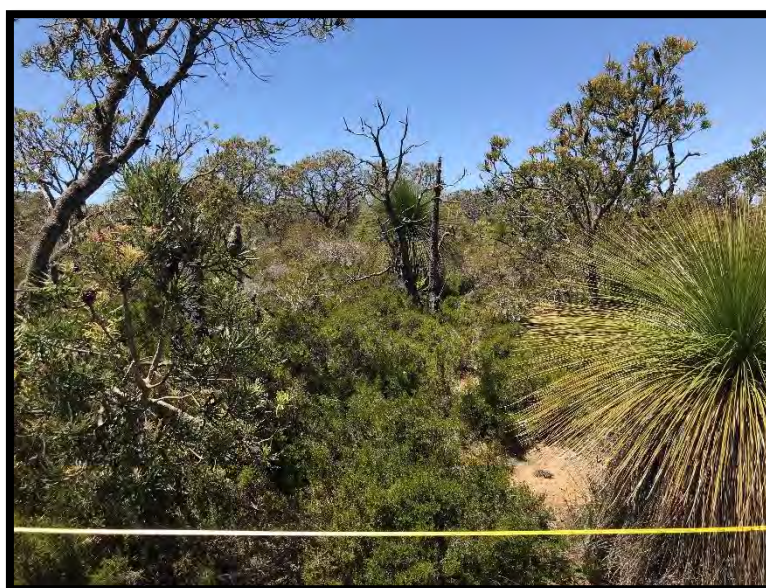
Condition: Excellent

Soil Type: Orange-brown sand, some surface limestone

Landform: Flat

Date: 10.11.21

Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Banksia attenuata</i>	4	10
<i>Banksia grandis</i>	3	5
<i>Xanthorrhoea preissii</i>	1.7	5
<i>Acacia pulchella</i>	1.1	1
<i>Calothamnus quadrifidus</i>	1.1	1
<i>Xanthorrhoea brunonis</i>	0.8	1
<i>Hibbertia hypericoides</i>	0.6	70
<i>Petrophile macrostachya</i>	0.6	<1
* <i>Gladiolus caryophyllaceus</i>	0.6	<1
<i>Austrostipa flavescens</i>	0.6	<1
<i>Gompholobium tomentosum</i>	0.5	<1
<i>Mesomelaena pseudostygia</i>	0.4	1
<i>Stylidium brunonianum</i>	0.4	<1
<i>Sowerbaea laxiflora</i>	0.4	<1
<i>Austrostipa flavescens</i>	0.4	<1
<i>Desmocladius flexuosus</i>	0.3	1
<i>Styphelia erubescens</i>	0.3	<1
<i>Opercularia vaginata</i>	0.3	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>*Ursinia anthemoides</i>	0.3	<1
<i>Haemodorum laxum</i>	0.3	<1
<i>*Ehrharta longiflora</i>	0.3	<1
<i>*Briza maxima</i>	0.2	<1
<i>*Lysimachia arvensis</i>	0.1	1
<i>Stylidium diuroides</i>	0.1	<1
<i>Podolepis gracilis</i>	0.1	<1
<i>Stylidium calcaratium</i>	0.1	<1
<i>Trachymene pilosa</i>	0.1	<1
<i>*Pentameris airoides subsp. airoides</i>	0.1	<1
<i>Schoenus clandestinus</i>	<0.1	<1
<i>Poranthera microphylla</i>	<0.1	<1
<i>Siloxerus humifusus</i>	<0.1	<1
<i>Levenhookia pusilla</i>	<0.1	<1
<i>*Hypochaeris glabra</i>	Flat	1
<i>Pyrorchis nigricans</i>	Flat	<1
<i>Lagenophora huegelii</i>	Flat	<1

* introduced species

QUADRAT WA6

50 383423 E 6496945 N

Vegetation: *Banksia sessilis* Tall Shrubland over *Xanthorrhoea preissii*/*Hibbertia hypericoides*/*Melaleuca systema*/*Calothamnus quadrifidus* Closed Low Heath

Condition: Excellent

Soil Type: Orange-brown sand, some surface limestone

Landform: Gentle slope

Date: 10.11.21

Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
<i>Xanthorrhoea preissii</i>	2.1	5
<i>Banksia sessilis</i>	1-2	25
<i>Hakea trifurcata</i>	2	1
<i>Xanthorrhoea brunonis</i>	1	1
<i>Acacia pulchella</i>	0.8	2
<i>Acacia lasiocarpa</i>	0.7	2
<i>Melaleuca systema</i>	0.6	10
<i>Calothamnus quadrifidus</i>	0.6	4
<i>Allocasuarina humilis</i>	0.6	1
<i>Hibbertia hypericoides</i>	0.5	75
<i>Jacksonia calcicola</i>	0.4	1
<i>Austrostipa flavescens</i>	0.4	<1
* <i>Gladiolus caryophyllaceus</i>	0.4	<1
<i>Lomandra maritima</i>	0.4	<1
<i>Opercularia vaginata</i>	0.3	1
<i>Desmodcladus flexuosus</i>	0.3	1
<i>Banksia dallanneyi</i>	0.2	<1

SPECIES	HEIGHT (m)	COVER (%)
<i>*Ehrharta longiflora</i>	0.2	<1
<i>*Urospermum picroides</i>	0.2	<1
<i>*Centaurium erythraea</i>	0.2	<1
<i>Trachymene pilosa</i>	0.1	1
<i>Conostylis candicans</i> var. <i>calcicola</i>	0.1	<1
<i>Hovea trisperma</i>	0.1	<1
<i>Daucus glochidiatus</i>	0.1	<1
<i>Stylidium calcaratum</i>	0.1	<1
<i>*Briza minor</i>	0.1	<1
<i>*Pentameris airoides</i> subsp. <i>airoides</i>	0.1	<1
<i>*Lysimachia arvensis</i>	<0.1	<1
<i>Lagenophora huegelii</i>	Flat	<1

* introduced species