Structural Vegetation and Condition Assessment

19.0 – 24.2 SLK Harvey-Quindanning Road, Harvey

SEPTEMBER 2024

SW environmental

Version control

Project number:	SW546			
Project file path:	SW546 R01 Harvey-Quindaning Road Vegetation			
Client:	Shire of Harvey			
Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
V1	11/09/24	Georgia Johnsen SW Environmental	Shane Priddle SW Environmental	Shane Priddle SW Environmental

CONTENTS

Photos

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Abbreviations and acronyms

Common terms	
DBCA	WA Department of Biodiversity, Conservation and Attractions
DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water
DWER	WA Department of Water and Environmental Regulation
Project	The proposed action
SLK	Straight Line Kilometres
RHS	Right-hand side vegetation regarding SLK location
LHS	Left-hand side vegetation regarding SLK location
Survey area	Pegged extent between 19.0 – 24.2 SLK Harvey-Quindanning Road, Harvey
The Shire	The Shire of Harvey
VU	Vegetation Unit
WA	Western Australia
Legislation	
BC Act	WA *Biodiversity Conservation Act 2016*
EP Act	WA *Environmental Protection Act 1986*
EPBC Act	Federal *Environment Protection and Biodiversity Conservation Act 1999*
Measurements	
DBH	Diameter at Breast Height in centimetres
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre

Executive Summary

The Shire of Harvey intends to undertake minor road widening between 19.0 and 24.2 Straight Line Kilometres (SLK) on the Harvey-Quindanning Road, Harvey, within the Shire of Harvey (the Shire). Harvey is located approximately 130 kilometres (km) south of Perth.

The Shire engaged SW Environmental to undertake a structural vegetation and condition assessment to inform the environmental assessment and approvals process inclusive of:

- Field survey to identify primary vegetation units and associated vegetation condition
- Mapping of vegetation units and condition
- Report compilation detailing assessment findings

The field survey was undertaken on the 2nd and 9th of September 2024. Vegetation mapping notes were recorded to assess the vegetation structure and condition within the Survey Area.

Five broad vegetation units were identified during the survey:

- **VU 1** (2.44 ha) is characterised by *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) dominated forest, occurring more commonly on the upper and mid slopes of the Survey Area.
- **VU 2** (0.24 ha) is characterised by the dominant presence of *Eucalyptus patens* (Blackbutt) along with *Corymbia calophylla* (Marri) and occasional *Eucalyptus marginata* (Jarrah). This VU occurred in the transition zone between VU 1 and VU 3 on the lower slopes of the Survey Area and in drainage lines.
- **VU 3** (0.28 ha) is characterised by the presence of *Eucalyptus rudis* (Flooded Gum) and *Melaleuca preissiana*, a species that indicates wetter or seasonally inundated habitats. This VU was found to occur in lowest part of the Survey Area, with inundation evident in patches throughout the VU extent.
- **VU 4** (0.06 ha) represents the vegetation within the transition line easement of previously cleared, regrowth native vegetation, representative of some VU 1 understorey species, inclusive of *Bossiaea aquifolium* and *Hypocalymma angustifolium* dominated shrubland, along with *Xanthorrhoea* sp., *Persoonia longifolia* and *Hakea* sp. No *Eucalyptus* or *Corymbia* spp. were observed regenerating within this area.
- **VU 5** (0.19 ha) is characterised by the presence of plantation Blue Gums over native understorey vegetation consistent with VU 1 and 2.

Vegetation condition ranged from Completely Degraded to Very Good condition, with almost 80 %the majority of the clearing envelope being in Good condition (2.35 ha), predominantly represented by VU 1. This VU was the most widely occurring VU described throughout the Survey Area. Approximately 0.19 ha (~6 %) of the mapped vegetation was in Completely Degraded condition, 0.06 ha (~ 2 %) was Degraded, and 0.61 ha (~ 19 %) was in Very Good Condition.

The structural vegetation and condition assessment confirmed that minor clearing will be required within the Survey Area, due to a large portion of existing vegetation being regenerative and/or partially cleared.

1 Introduction

1.1 Project Overview

The Shire of Harvey intends to undertake minor road widening between 19.0 and 24.2 Straight Line Kilometres (SLK) on the Harvey-Quindanning Road, Harvey, within the Shire of Harvey (the Shire) (Appendix A – Figure 1). Harvey is located approximately 130 kilometres (km) south of Perth.

The 'survey area' includes a circa 7.48 hectares (ha) the proposed development footprint between 19.0 and 24.2 SLK on the Harvey-Quindanning Road (Appendix A – Figure 1). A total of 3.20 ha of clearing would be required.

1.2 Scope of Works

The Shire engaged SW Environmental to undertake a structural vegetation and condition assessment to inform the environmental assessment and approvals process.

1.3 Survey Area

The 7.48 ha Survey Area for the assessment includes 4.28 ha of existing road formation and approximately 3.20 ha of vegetation (maintenance zone and remnant native vegetation) as delineated by the clearing envelope provided to SW Environmental by the Shire of Harvey (Appendix A – Figure 1). This encompasses a total of, including

1.4 Aims and Objectives

The primary aim of the project was to provide vegetation structure and condition information required to inform the clearing impact assessment. The Scope of Works was to include:

- Undertaking a field survey to identify structural Vegetation Units within the clearing envelope and their associated vegetation condition (EPA 2016)
- Mapping of vegetation units and condition of the Survey Area
- Compilation of a brief report detailing the findings of the assessment

2 Background

2.1 Existing Values

The Survey Area is located within the Jarrah Forest Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, specifically within the Northern Jarrah Forest (JAF01) IBRA subregion (DCCEEW, 2022, 2023). The Northern Jarrah Forest subregion is has a warm, mediterranean climate that is drier than the Southern Jarrah Forest subregion (Beard, 2015).

The Survey Area is situated on the Western Darling Range soil landscape zone (DPIRD, 2022a). This zone comprises soils consisting of laterite, lateritic colluvium, granite and gneiss, on moderately dissected, lateritic plateau with deeply incised valleys over granite (DPIRD, 2022a). Soils that intersect the Survey Area, as mapped by the Department of Agriculture (now the Department of Primary Industries and Regional Development) (DPIRD, 2022b), include:

- **Dwellingup subsystem (255DpDW)** - Divides, lower to upper slopes and hillcrests. Duplex sandy gravels and loamy gravels with minor areas of shallow gravels, deep sandy gravels, yellow deep sands and yellow and pale deep sands, often gravelly.
- **Mornington Hill subsystem (255DpMH)** - Low hills on laterite overlying granite, relief 40-80 m, slope5-20%. Soils are sandy and loamy gravels with some deep sands and loamy earths.
- **Yarragil subsystem (255DpYG)** - Shallow, narrow, upper valleys of the deeply dissected Murray, Bindoon and Helena units. Alluvial, clay and loam soils, moderately well drained, often gravelly, with some sands and loams. Salt prone. Woodland of *Eucalyptus wandoo, Eucalyptus accedens*.
- **Yarragil upstream valleys phase (255DpYGu)** - Relief 5-20 m, slopes 3-10%. Valley floor is broader than downstream phase. Soil parent material is mainly laterite. Soils are gravels and sands.

Soil landscape mapping across the Survey Area is presented in (Appendix A – Figure 2).

3 Methods

3.1 Field Survey

The structural vegetation and condition assessment was conducted on the 2nd and 9th of September 2024 by the personnel listed in Table 3-1. The weather during the survey was favourable and no constraints arose during the survey period. This survey period occurred during the optimal and recommended timing for flora-related surveys within the South-West Botanical Province (EPA, 2016).

The Survey Area was accessed by car and traversed on foot between road 19.0 and 24.2 SLK. Vegetation mapping notes were recorded detailing the vegetation condition, vegetation similarities or changes in vegetation observed whilst traversing the length of the Survey Area with photographs taken. The Survey Area was split into two areas, the left hand side (LHS) and right hand side (RHS) of the SLK.. GPS track logs were kept.

3.2 Vegetation Definition, Mapping and Description

Vegetation structural data was recorded within vegetation mapping notes at waypoints across the Survey Area, providing observations used to define Vegetation Units (VUs). Aerial photography of the Survey Area was interpreted along with vegetation mapping note data to generate VU boundaries with the use of Geographic Information Systems (GIS). Soil mapping was additionally reviewed during this process.

3.3 Vegetation Condition Mapping

The vegetation condition scale presented in Section 5.6 of the EPA Technical Guidance (EPA, 2016) for the South West and Interzone Botanical Provinces was used to describe the vegetation condition observed during the field survey. Vegetation condition scale descriptions are presented in Table 3-1.

Table 3-1 Vegetation Condition Scale (South West and Interzone Botanical Province) from EPA Technical Guidance (2016)

Vegetation Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. 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 disturbances. Retains basic vegetation structure or ability to regenerate it.

	Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, 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 areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

3.4 Limitations of Survey

Table 3-2 Limitations of Survey

Aspect	Constraint	Comment
Competency	No	Suitably qualified individuals carried out the work. Shane Priddle (Principal Ecologist) has approximately 25 years conducting ecological assessments, environmental impact assessment and technical surveys with approximately 18 of those in the southwest of WA. Georgia Johnsen (Ecologist) has approximately 2 years' experience as a consulting botanist / ecologist in WA and previous experience in bushland assessment, management and rehabilitation.
Scope	No	The scope is adequate to provide the information required to support the clearing impact assessment.
Proportion of task achieved and further work	No	The surveys were completed adequately, to a sufficient level with respect to the scope of works.
Timing/weather	No	The survey timing was not a limitation in completing the vegetation structure and condition assessment and the weather was favourable for the survey.
Intensity (in retrospect, was the intensity adequate)	Negligible	The survey was considered adequate to meet the project requirements. For a more comprehensive description of vegetation type, a Reconnaissance survey is required to analyse the vegetation in further detail.
Completeness (e.g. was relevant area fully surveyed)	No	The survey was completed adequately, to a sufficient level with respect to the scope. The entire length of the survey area was observed.
Remoteness and/or access problems	No	The site was located within a publicly accessible area on road verges.

4 Results

4.1 Field Survey

4.1.1 Vegetation Units

Five floristically similar, broad Vegetation Units (VUs) were identified during the survey. Evidence of previous clearing activity (road construction and maintenance) was observed across multiple patches of vegetation within the clearing envelope, with such areas existing as a regenerative form of their representative VU. During the survey, five broad VUs were identified, as listed:

- **VU 1** (2.44 ha) is characterised by *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) dominated forest, occurring more commonly on the upper and mid slopes of the Survey Area.
- **VU 2** (0.24 ha) is characterised by the dominant presence of *Eucalyptus patens* (Blackbutt) along with Marri and occasional Jarrah. This VU occurred in the transition zone between VU 1 and VU 3 on the lower slopes of the Survey Area and in drainage lines.
- **VU 3** (0.28 ha) is characterised by the presence of *Eucalyptus rudis* (Flooded Gum) and *Melaleuca preissiana*; species that indicate wetter or seasonally inundated habitats. This VU was found to occur in lowest part of the Survey Area, with inundation evident in patches throughout the VU extent.
- **VU 4** (0.06 ha) represents the vegetation within the transition line easement of previously cleared, regrowth native vegetation, representative of some VU 1 understorey species, inclusive of *Bossiaea aquifolium* and *Hypocalymma angustifolium* dominated shrubland, along with *Xanthorrhoea* sp., *Persoonia longifolia* and *Hakea* sp. No *Eucalyptus* or *Corymbia* spp. were observed regenerating within this area.
- **VU 5** (0.19 ha) is characterised by the presence of plantation Blue Gums over native understorey vegetation consistent with VU 1 and 2.

Full descriptions of the above VUs are detailed in Table 4-1, with vegetation mapping presented in Figure 3 (Appendix A). The most widely represented VU within the Survey Area was VU 1 (~ 2.44 ha) (Table 4-2). Introduced *Pinus* sp. trees were also present scattered throughout the Survey Area, with the majority observed on mid and lower slope areas.

Table 4-1 Broad Vegetation Units of the Survey Area

VU	Description	Survey Area Extent (ha)	Representative Photos
VU 1	Mid open forest of *Eucalyptus marginata* subsp. *marginata* and *Corymbia calophylla* over over isolated or clumps of trees (*Banksia* spp.), generally towards the eastern end of the Survey Area, over open shrubland (inc. *Hakea* spp. *Bossiaea aquifolium*), with isolated grass-trees (*Xanthorrhoea* sp.) and cycads (*Macrozamia riedlei*) over open shrubland (*Hypocalymma angustifolium*, *Hibbertia* spp.) and open fernland areas.		 

VU 2	Mid, open forest of *Eucalyptus patens*, *Corymbia calophylla* and occasional *Eucalyptus marginata* subsp. *marginata* over isolated trees (*Banksia* and *Acacia* spp.) over open shrubland (inc. *Bossiaea aquifolium*, *Trymalium odoratissimum* subsp. *trifidum*) with isolated grass-trees (*Xanthorrhoea* sp.) and cycads (*Macrozamia riedlei*) over open shrubland (inc. *Hypocalymma angustifolium*) and open fernland areas.		 

VU 3	Isolated trees of *Eucalyptus patens* over woodland of *Eucalyptus rudis* and *Melaleuca preissiana* over sparse to open shrubland over sparse to open sedgeland over open forbland.		 

VU 4	Isolated trees of *Persoonia longifolia* over sparse (RHS) to open (LHS) shrubland dominated by *Bossiaea aquifolium* and *Hypocalymma angustifolium*.		 

			
VU 5	Open woodland of Blue Gums over scattered, isolated trees (inc. *Persoonia longifolia*) over sparse understorey shrubland (inc. *Hypocalymma angustifolium*, *Trymalium odoratissimum* subsp. *trifidum*, *Bossiaea aquifolium*).		

Note that a regenerative form of the representative Vegetation Units is evident across the majority of the clearing envelope due to previous clearing disturbance.

4.1.2 Vegetation Condition

Vegetation condition throughout the Survey Area was described and mapped using the vegetation condition scale presented in the EPA Technical Guidance (EPA, 2016), following the methodology discussed in Section 3.4.

Within the Survey Area, vegetation within the clearing envelope ranges in condition from Completely Degraded to Very Good, having been subject to edge effects and previous maintenance clearing in many areas. Almost 80 % (approximately 2.35 ha) of the vegetation mapped within the Survey Area was in Good condition. This area was almost entirely represented by VU 1 (Table 4-2). A relatively small area (0.19 ha representing ~6 % of the Survey Area) was mapped as Degraded, and 0.06 (~2 %) Completely Degraded. The remainder of the vegetation (0.61 ha, ~19 %) was in Very Good Condition (Table 4-2).

Outside of the clearing envelope, vegetation was in generally Very Good to Excellent condition (Photo 3). None of the vegetation to be cleared was observed to be in Excellent condition due to edge effects, however a proportion of the Survey Area was mapped as Very Good, particularly on the downslopes of the RHS SLK road verge, where cut batters had not been constructed (Photo 3).

Blue Gum plantation vegetation (VU 5) was considered to be Completely Degraded, due to the complete alteration in vegetation structure. Degraded areas occurred on cleared cut batters where no regrowth vegetation was observed (Photo 1). Vegetation within the transmission line easement (VU 4) was also considered to be Degraded, as basic vegetation structure had been severely impacted by previous disturbances (likely widescale clearing). No dominant tree species that were characteristic of the surrounding vegetation were evident regenerating within this VU. In roadside vegetation described as 'Good' condition, regenerative native species that were representative of adjacent, intact areas existed (Photo 2). These areas were deemed as 'able to regenerate basic vegetation structure', as stated in the condition scale presented in EPA Technical Guidance (EPA, 2016).

Photo 1 Degraded roadside cut batter surrounded by VU 1 vegetation, severely impacted by clearing disturbance with no regrowth species currently present.

Photo 2 Roadside vegetation, subject to significant alteration by previous, clearing disturbance, native regrowth evident with ability to regenerate to surrounding VU 1 vegetation, considered as Good condition.

Photo 3 Roadside vegetation (VU 1) with obvious signs of disturbance (edge effects) that is intact and uncleared within clearance envelope, considered as Very Good condition

Table 4-2 presents the area of each VU and corresponding condition rating mapped within the field survey. Figure 4 (Appendix A) presents the vegetation condition mapping of the Survey Area.

Table 4-2 Extent of Vegetation Condition within each VU

VU	Survey Area Extent (ha)					
	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
VU 1	–	0.40	2.04	–	–	2.44
VU 2	–	0.21	0.03	–	–	0.24
VU 3	–	–	0.28	–	–	0.28
VU 4	–	–	–	0.06	–	0.06
VU 5	–	–	–	–	0.19	0.19
Total (ha)	0	0.61	2.35	0.06	0.19	3.20
Total (%)	0	19	73	2	6	100

5 Discussion and Conclusions

The findings of the structural vegetation and condition assessment at 19.0 – 24.2 SLK Harvey-Quindanning Road found vegetation existing within the clearing envelope to be a condition ranging from Degraded to Very Good. Vegetation within the Survey Area consists of predominantly regenerating native species, with evidence of previous clearing disturbance existing through some areas. Upslope areas of the clearing envelope consisted generally of gravelly loam substrate, in comparison to lower, seasonally inundated areas of sandy flats.

Five broad vegetation units were described and mapped within the Survey Area, with the majority of the clearing envelope representing VU 1 – Jarrah-Marri dominated forest on upper and midslope areas (2.44 ha). In areas between VU 1 and VU 3, Blackbutt-Marri dominated forest exists on lower slopes and in drainage lines (VU 2) (0.24 ha), transitioning to Flooded Gum-*Melaleuca preissiana* seasonally inundated vegetation (VU 3) (0.28 ha) at the base of slopes. One 0.19 ha patch of planted Blue Gum forest (VU 5) exists over native understorey vegetation. Vegetation within a transmission line easement (VU 4) covers 0.06 ha of the Survey Area, consisting of regenerative native vegetation, but in absence of characteristic tree species of adjacent VUs.

The structural vegetation and condition assessment confirmed that minor clearing will be required within the Survey Area due to a large portion of existing vegetation being regenerating and/or partially cleared.

6 References

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Appendix A Figures

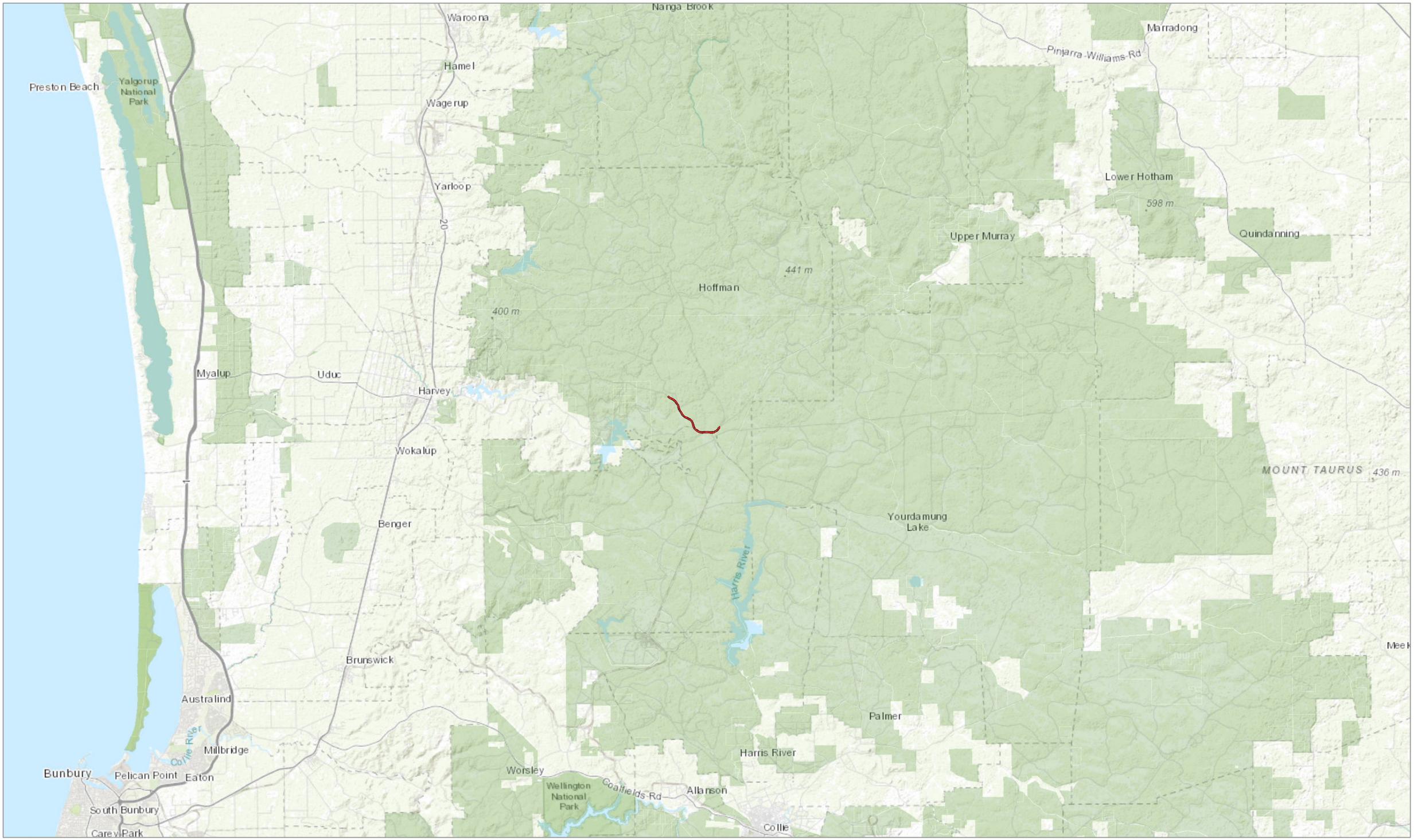

Figure 1 - Location

Project extent

DBCA managed land

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

A3 @ 1:250000

0 1 2 4 km

GRID: GDA zone 50

N

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Date: 11/09/2024 Author: SP

Source: Base map © Esri and its data suppliers. SLIP Landgate (2024)

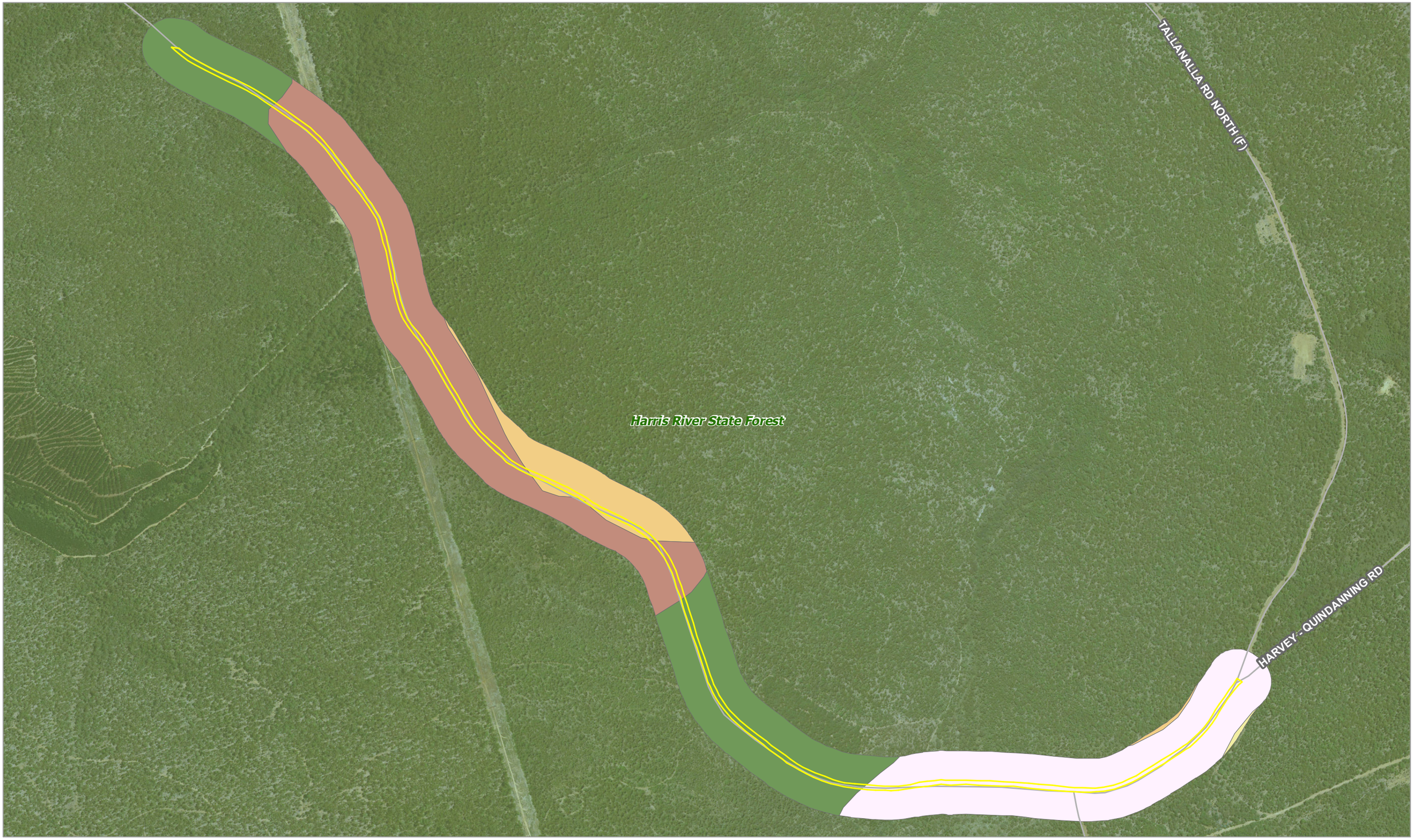
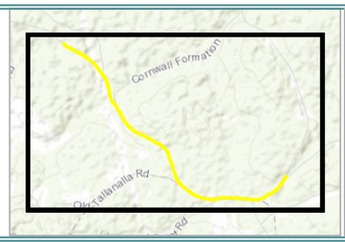


Figure 2 - Soil Landscape mapping

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Project extent
Road
Soil landscape(SLIP 2024)
Dwellingup Subsystem
Dwellingup ironstone gravel divides Phase
Mornington Hill Subsystem
Yarragil Subsystem
Yarragil upstream valleys Phase
DBCA managed land



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Ref: SW546
Date: 11/09/2024 Author: SP

Source: Base map © Esri and its data suppliers. SLIP Landgate (2024)

HARVEY - QUINDANNING RD

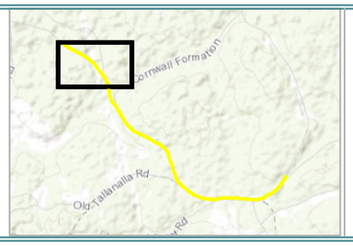
19.1
19.2
19.3
19.4
19.5
19.6
19.7
19.8
19.9
20.0
20.1

Figure 3 – Vegetation Unit

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Road
Clearing

Vegetation unit
VU 1
VU 2
VU 3
VU 4
VU 5



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GRID: GDA zone 50

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Date: 4/09/2024 Author: SP

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Figure 3 – Vegetation Unit

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Road
Clearing

Vegetation unit
VU 1
VU 2
VU 3
VU 4
VU 5

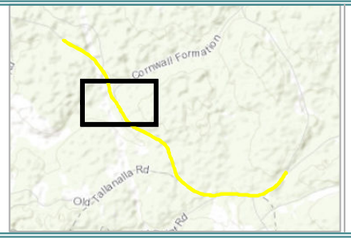

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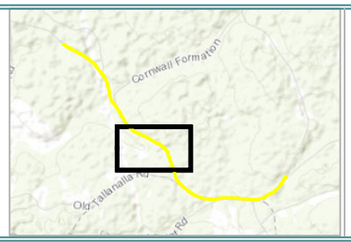
Figure 3 – Vegetation Unit

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Road
Clearing
Vegetation unit
VU 1
VU 2
VU 3
VU 4
VU 5

Ref: SW546
Date: 4/09/2024 Author: SP



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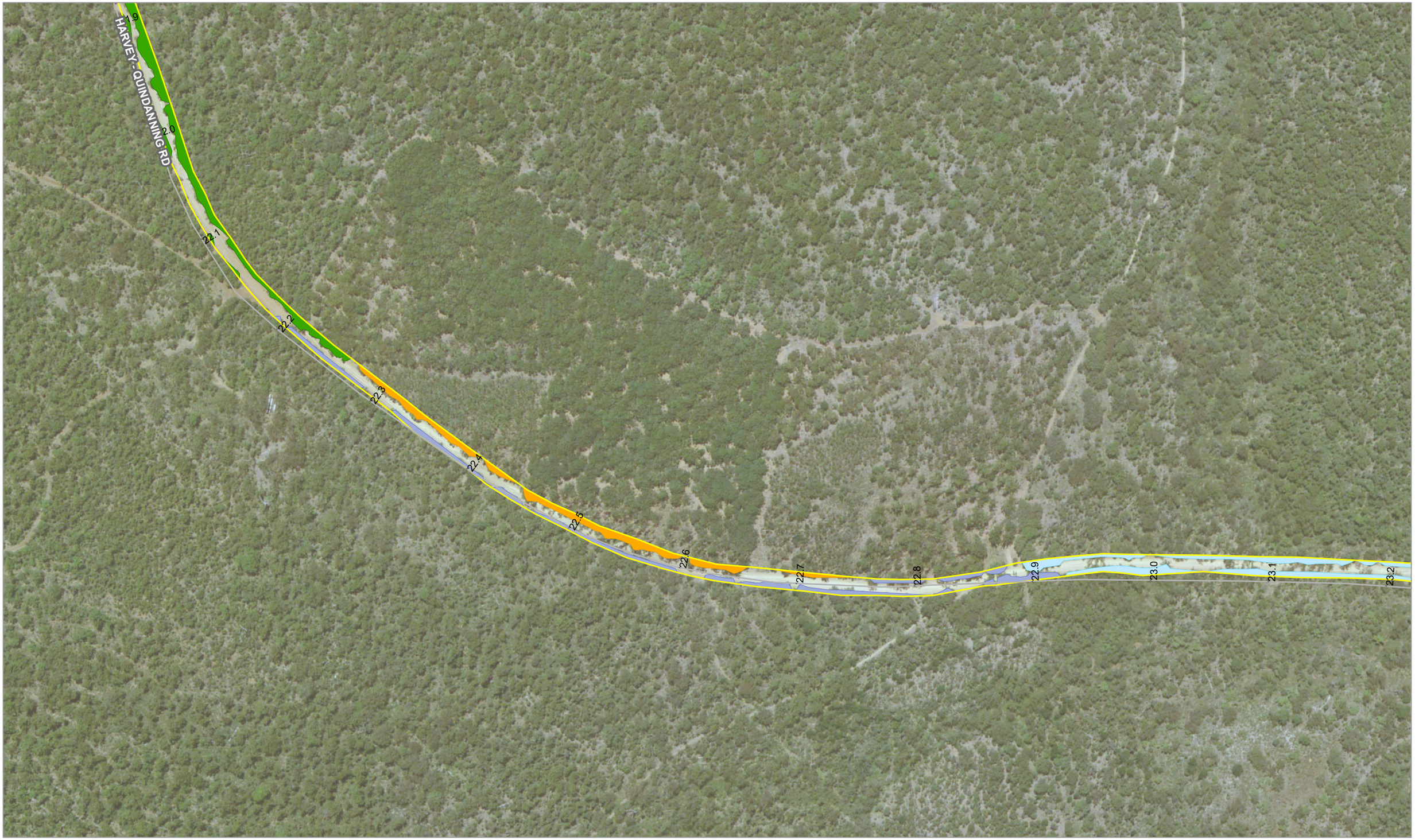

Figure 3 – Vegetation Unit

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Road
Clearing
Vegetation unit
VU 1
VU 2
VU 3
VU 4
VU 5

Ref: SW546
Date: 4/09/2024 Author: SP

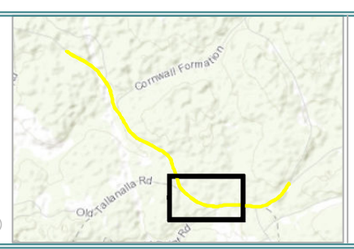

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Figure 3 – Vegetation Unit

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

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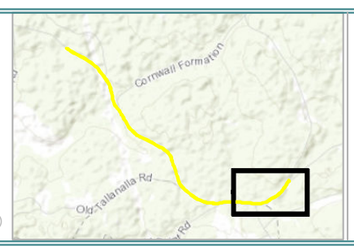
Road
Clearing

Vegetation unit

VU 1
VU 2
VU 3
VU 4
VU 5



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GRID: GDA zone 50

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HARVEY - QUINDANNING RD

19.1
19.2
19.3
19.4
19.5
19.6
19.7
19.8
19.9
20.0
20.1

Figure 4 – Vegetation Condition

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Ref: SW546
Date: 4/09/2024 Author: SP

- Road
- Clearing

Vegetation condition

- Very Good
- Good to Very Good
- Good
- Degraded
- Completely Degraded

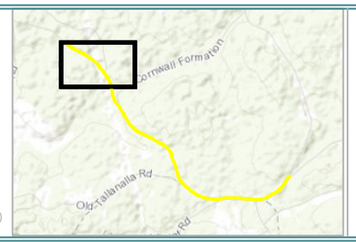

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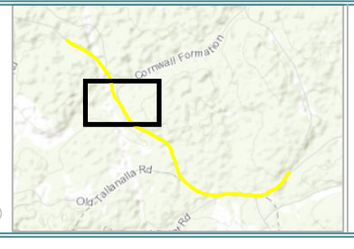
Figure 4 – Vegetation Condition

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Ref: SW546
Date: 4/09/2024 Author: SP

Road
Clearing

Vegetation condition
Very Good
Good to Very Good
Good
Degraded
Completely Degraded



A3 @ 1:3000

0 20 40 80 m

N

GRID: GDA zone 50

SW environmental
www.swenvironmental.com.au

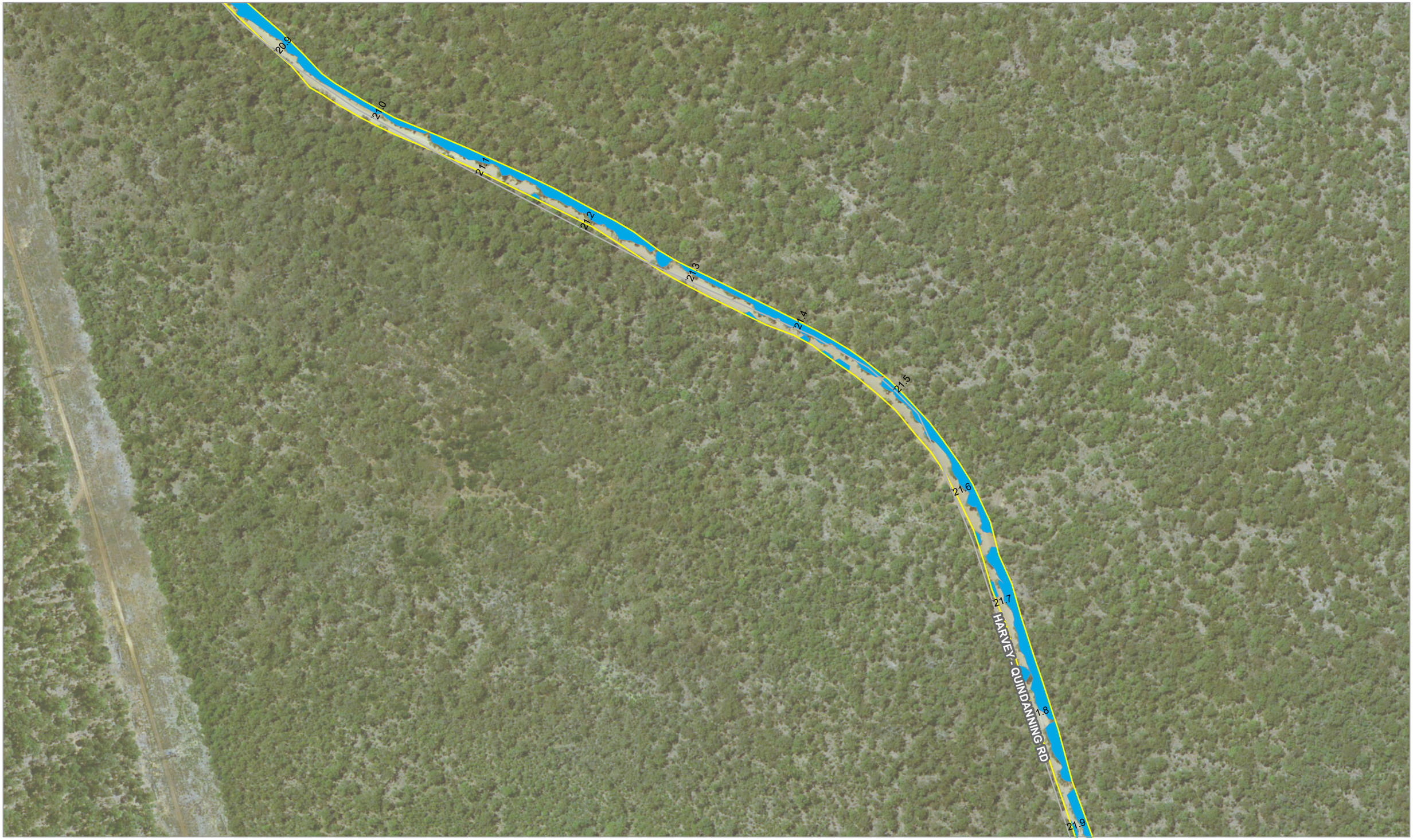


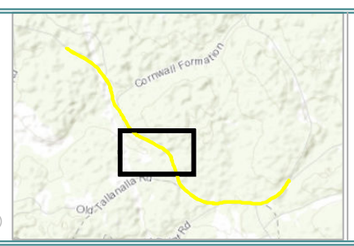
Figure 4 – Vegetation Condition

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Ref: SW546
Date: 4/09/2024 Author: SP

- Road
- Clearing

Vegetation condition
- Very Good
- Good to Very Good
- Good
- Degraded
- Completely Degraded



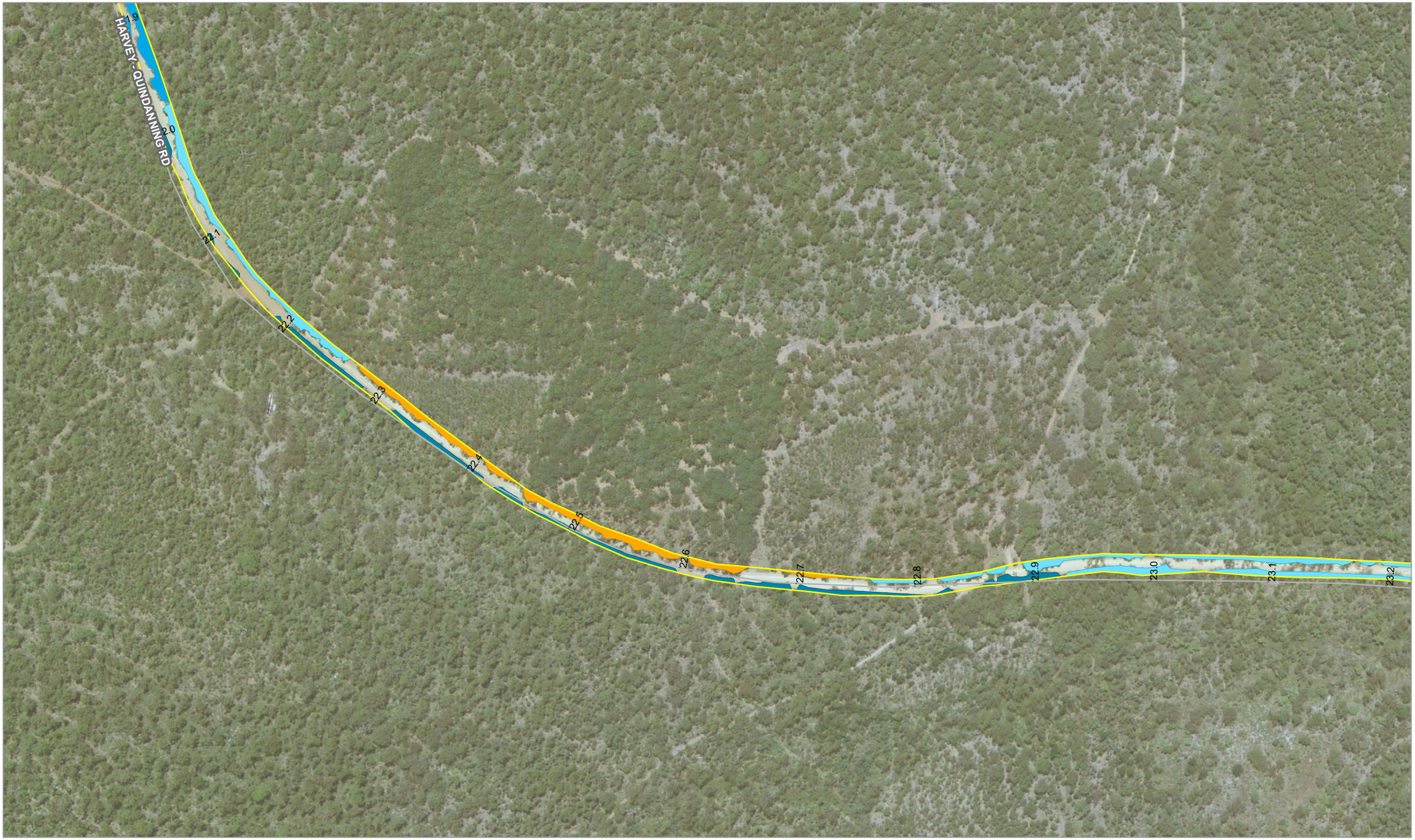
A3 @ 1:3000

0 20 40 80 m

GRID: GDA zone 50

N

SW environmental
www.swenvironmental.com.au

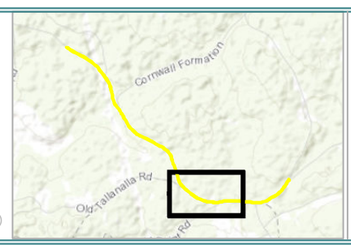


VEGETATION CONDITION

HARVEY QUINDANNING ROAD
19.0 - 24.2 SLK

Road
Clearing

Vegetation condition
Very Good
Good to Very Good
Good
Degraded
Completely Degraded



A3 @ 1:3000

0 20 40 80 m

N

GRID: GDA zone 50

Ref: SW546
Date: 4/09/2024 Author: SP

SW environmental
www.swenvironmental.com.au

Figure 4 – Vegetation Condition

HARVEY QUINDANNING ROAD 19.0 - 24.2 SLK

Ref: SW546
Date: 4/09/2024 Author: SP

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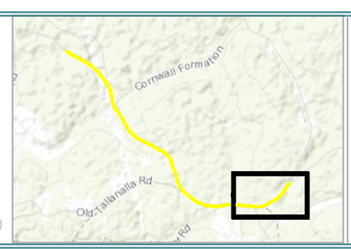

A3 @ 1:3000

0 20 40 80 m

GRID: GDA zone 50

N

SW environmental
www.swenvironmental.com.au