

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191

Compliance Assessment Report

2024 - 2025

Main Roads WA

Revision 0

28-Aug-25





Document control record

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Document control						
Report title		BORR (South) Ministerial Statement 1191 Compliance Assessment Report (2024-2025)				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	12-Dec-24	SWGA Draft	D.P	A.G.		A.M.
B	19-Mar-25	SWGA Review	A.G.	E.R.		A.M.
C	27-Aug-25	Main Roads Review	A.G.	Main Roads	N.M. & P.W.	M.S.
0	28-Aug-25	Issued	A.G.	Main Roads		M.S.
Current revision		0				

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1 Introduction

1.1 Background

The Commissioner of Main Roads Western Australia (MRWA) has been granted conditional approval for the construction and operation of the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

1.2 Purpose and scope

This Compliance Assessment Report (CAR) addresses the compliance of the Bunbury Outer Ring Road (BORR) Southern Section (the Proposal) with conditions set out in Ministerial Statement 1191 (MS 1191).

Condition 12-6 of MS 1191 requires an annual compliance assessment report to be submitted to the Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER).

MS 1191: Condition 12-6

The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO. The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;*
- (2) include a statement as to whether the proponent has complied with the conditions;*
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;*
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and*
- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 12-1.*

This CAR incorporates a 12-month audit period from 31 May 2024 to 30 May 2025. This is the third CAR to be submitted under Ministerial Statement 1191.

This CAR has been produced in accordance with condition M12.6 and has been endorsed by the Commissioner for Main Roads' delegate (Appendix A).

1.3 Proposal overview

The Proposal includes the construction and operation of 10.5 kilometres of the BORR Southern Section, located about 200 km south of Perth. The 200 hectare development envelope occurs mainly within the Shire of Capel (including the localities of Gelorup, North Boyanup and Statham) and a small component within the City of Bunbury. The location and physical extent of the Proposal are summarised in Table 1 and Figure 1.

Table 1. Location and authorised extent of physical and operational elements.

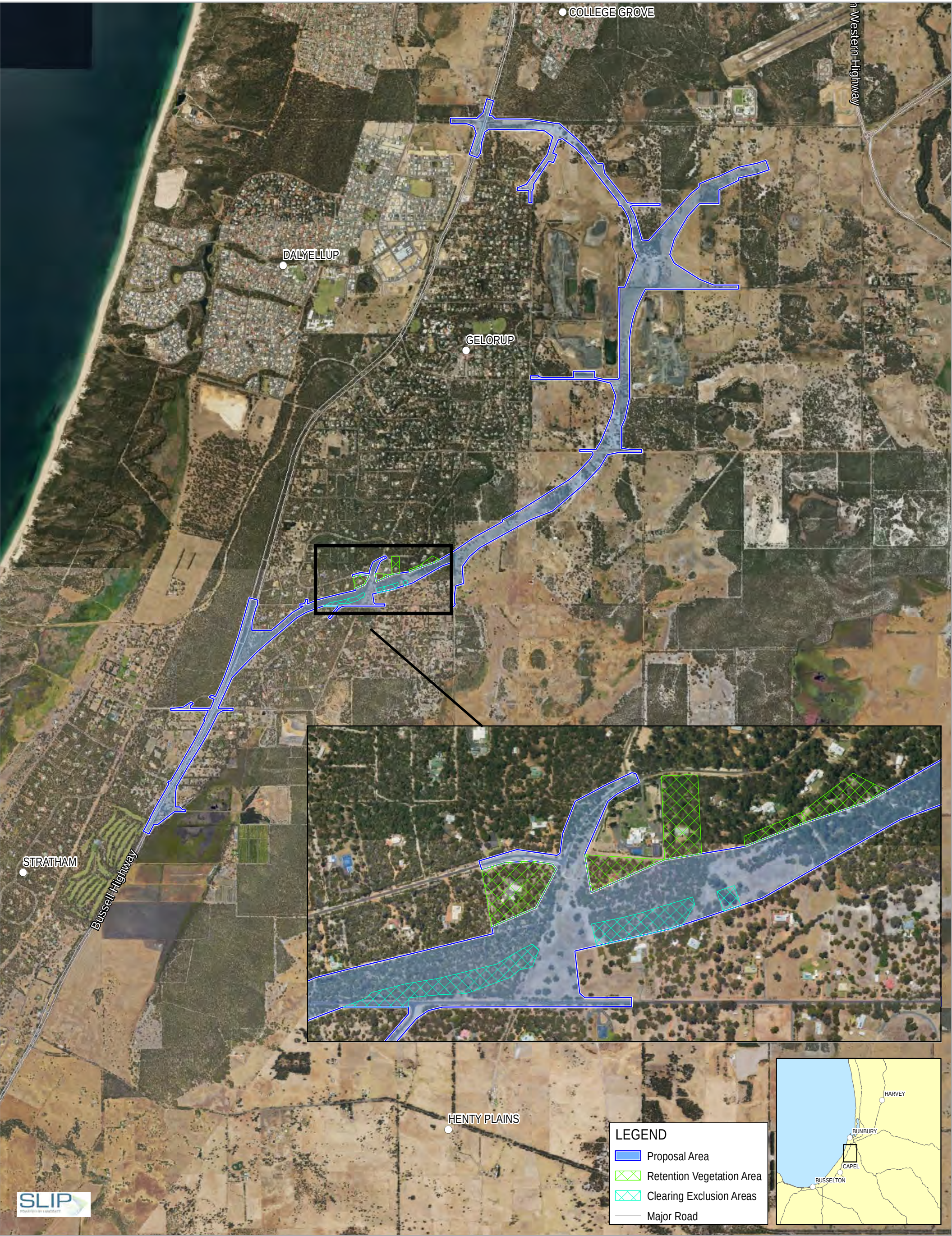
Element	Location	Authorised Extent
Freeway standard dual carriageway, grade separated interchanges and vehicle bridges, regional distributor roads, local road modifications, drainage structures, and other infrastructure, including but not limited to, noise walls, screen walls, fauna-crossings and land-bridges, possum rope-bridges, pedestrian underpass/overpass, principle shared path, lighting, fencing, signage, and safety barriers.	Located within the Development Envelope as shown in Figure 1.	Clearing and disturbance of no more than 71.5 ha of native vegetation within the 200 ha Development Envelope.

1.4 Proponent details

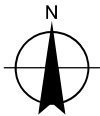
The proponent for the Proposal is Main Roads Western Australia (Main Roads).

Main Roads awarded a contract to South West Gateway Alliance (SWGA) to design and construct the Bunbury Outer Ring Road.

Figure 1. Proposal location.



Paper Size ISO A3
0 250 500 750 1,000
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994



Main Roads Western Australia
Bunbury Outer Ring Road Southern Section
Proposal Area

FIGURE 1

2 Summary of Proposal's Implementation Status

2.1 Clearing during the reporting period

Construction of the Proposal (BORR Southern Section) commenced on 1 August 2022. Clearing of 0.30 hectares (ha) of native vegetation has occurred during the reporting period (Table 2;

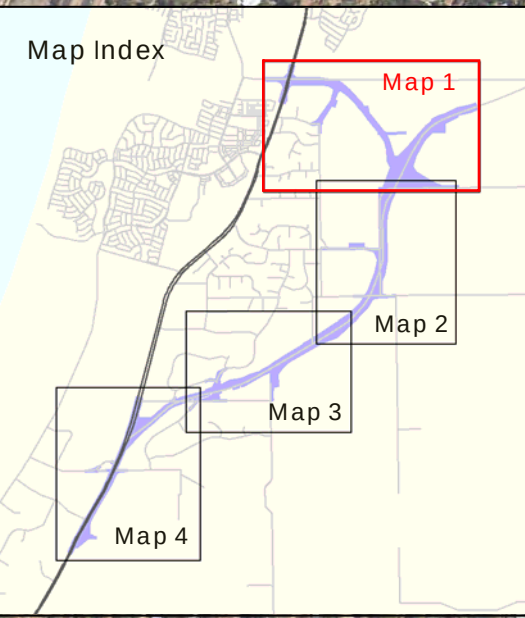
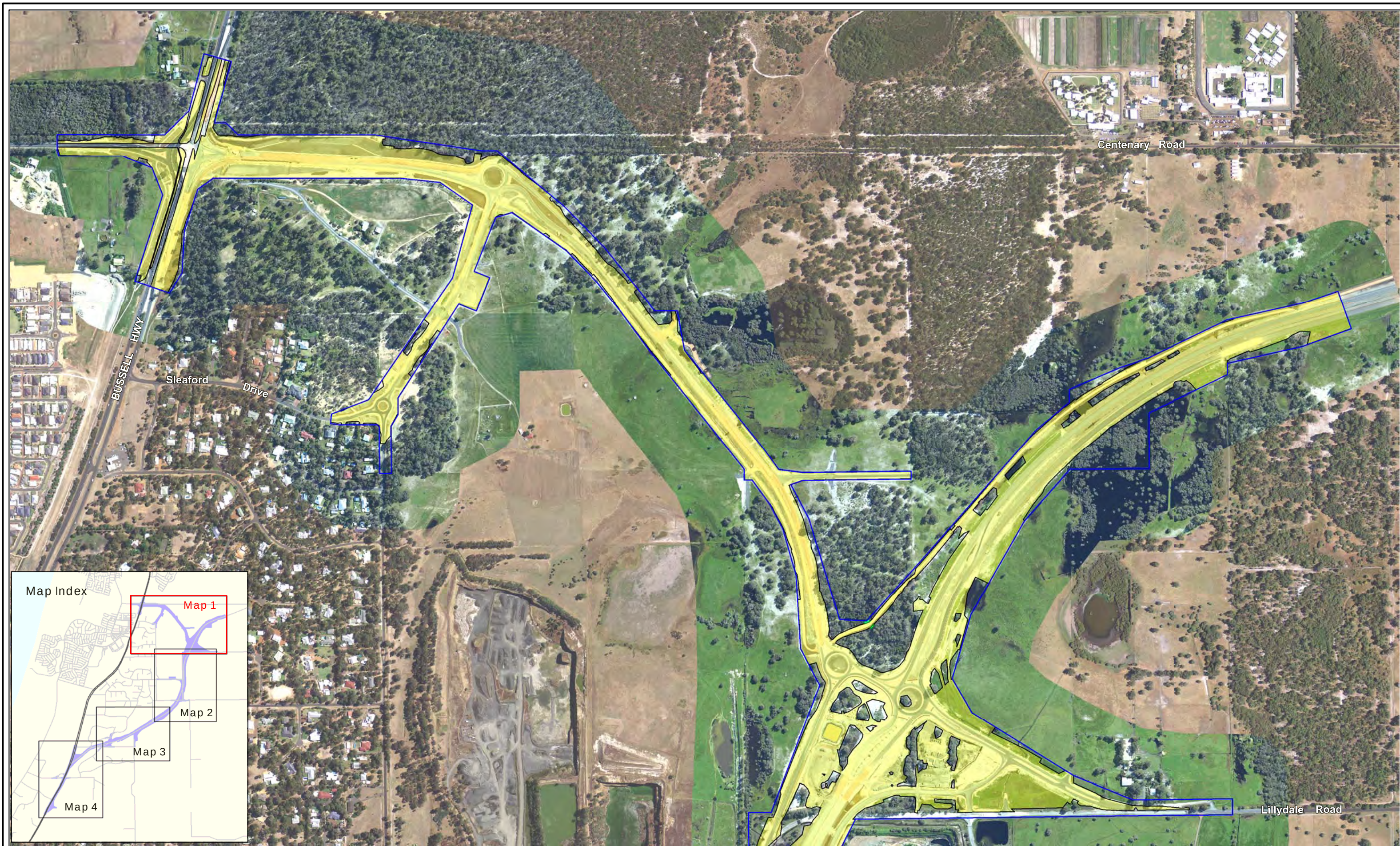
Figure 2a). Clearing of key environmental aspects as identified in MS 1191 are all within the associated specified limits.

Table 2. Clearing metrics during the reporting period.

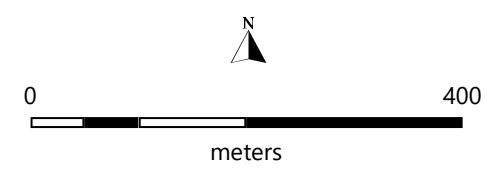
Environmental Aspect	Area / quantity specified in Ministerial Statement 1191	Area / quantity cleared during the 2022 - 2023 reporting period	Area / quantity cleared during the 2023 – 2024 reporting period	Area / quantity cleared during this 2024 – 2025 reporting period	Total area / quantity cleared
Native vegetation	71.5 ha (within a 200 ha development envelope)	29.72 ha	18.47 ha	0.30 ha	48.49 ha
Conservation Category Wetlands	0.2 ha	0 ha	0.11 ha	0 ha	0.11 ha
Resource Enhancement Wetlands	1.4 ha	0.52 ha	0 ha	0 ha	0.52 ha
Vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (Banksia Woodlands)	23.4 ha	11.49 ha	6.16 ha	0.05 ha	17.70 ha
Vegetation representative of the Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands)	4.4 ha	2.06 ha	1.42 ha	0 ha	3.48 ha
Vegetation representative of the Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC	4.5 ha	2.15 ha	1.42 ha	0 ha	3.58 ha
Western Ringtail Possum habitat	60.9 ha	24.39 ha	17.94 ha	0.19 ha	42.52 ha
Brush-tailed Phascogale habitat	39.2 ha	18.09 ha	11.72 ha	0.08 ha	29.89 ha
Black-stripe Minnow habitat (potential)	5.5 ha	2.16 ha	0.25 ha	0.04 ha	2.45 ha
Black Cockatoo habitat	60.9 ha	24.39 ha	17.94 ha	0.19 ha	42.52 ha
	No more than 1088 trees with a diameter at breast height of > 500 mm	397 trees	305 trees	0	702 trees
	no more than 11 trees with suitable nest hollows	3 trees	0 trees	0 trees	3 trees



Figure 2a. Ground disturbance and clearing extents during the reporting period.



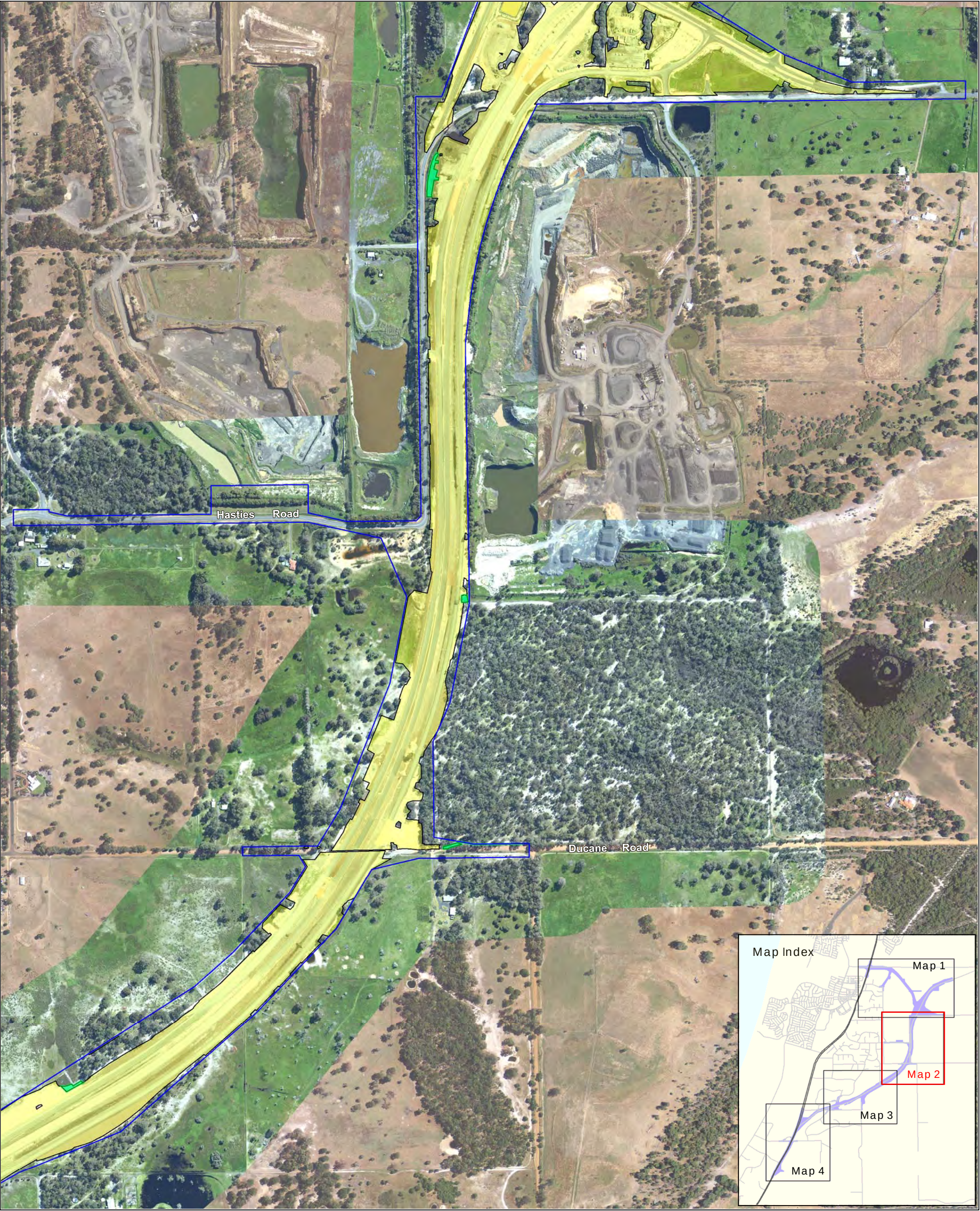
- LEGEND**
-  Proposal approval boundary (MS1191)
 -  Ground disturbance and clearing extents 2022 - 2024
 -  Ground disturbance and clearing extents 2024 - 2025



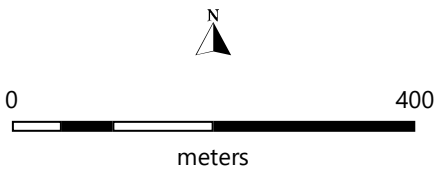
BORR South Imagery September 2024

Ground Disturbance and Clearing Extents Map 1 of 4





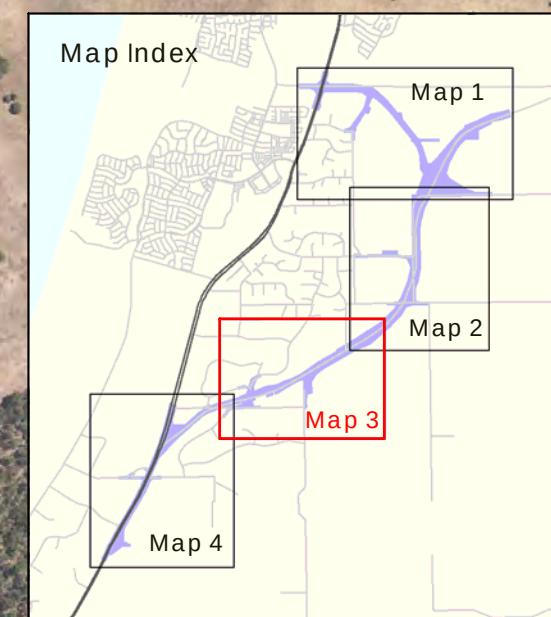
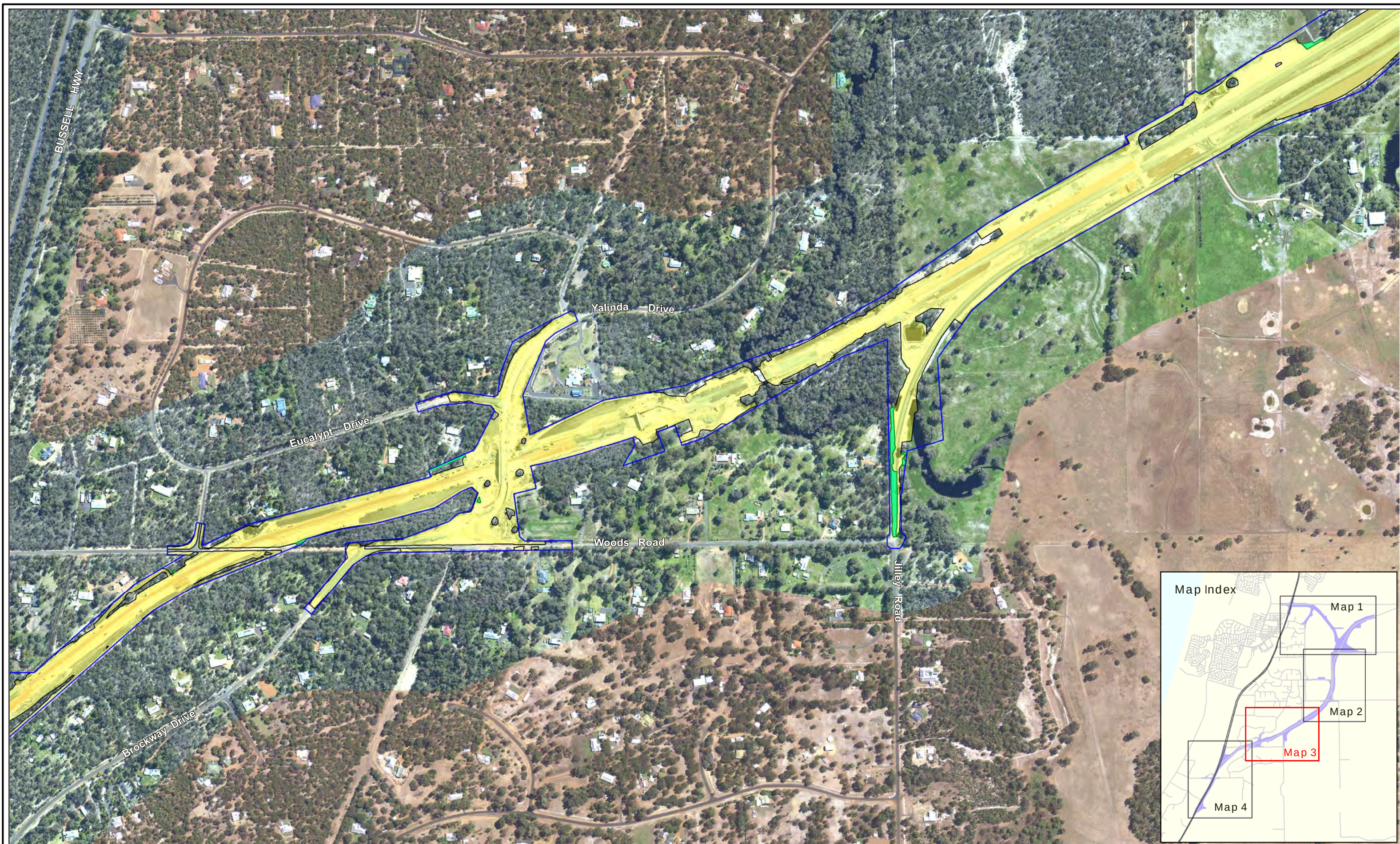
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025



Ground Disturbance and Clearing Extents
Map 2 of 4

BORR South Imagery September 2024





Location Map



LEGEND

-  Proposal approval boundary (MS1191)
-  Ground disturbance and clearing extents 2022 - 2024
-  Ground disturbance and clearing extents 2024 - 2025



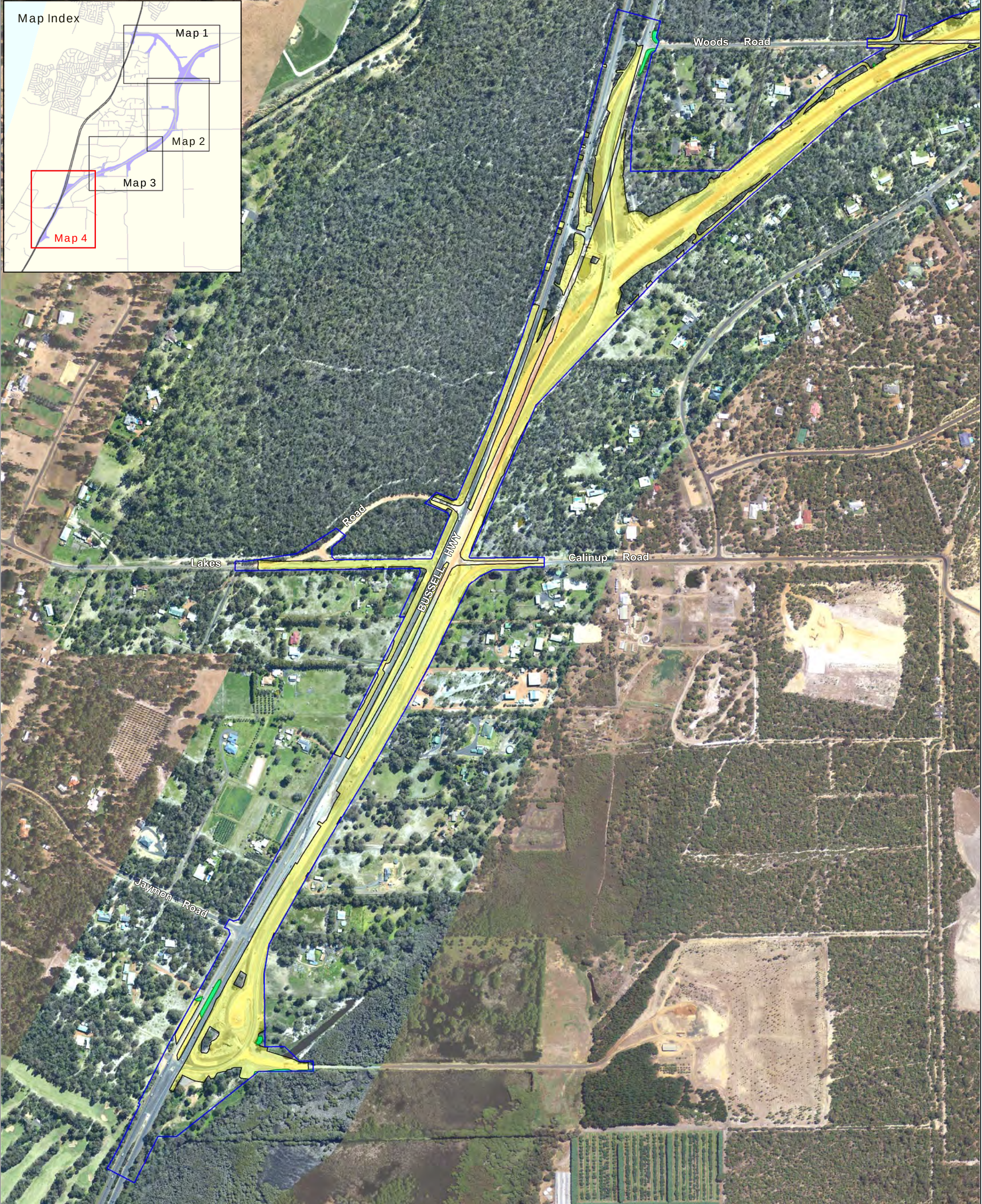
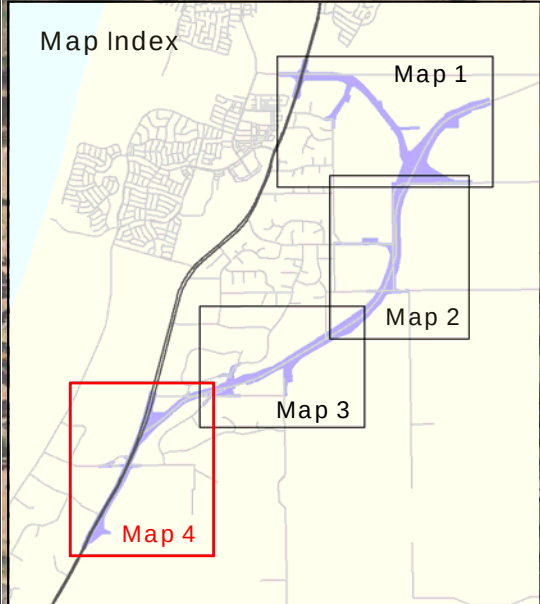
0 400
meters

BORR South Imagery September 2024

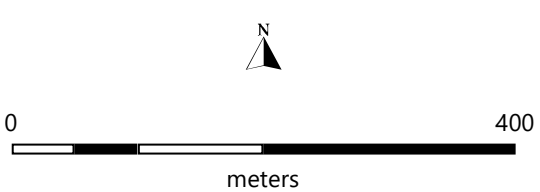
Ground Disturbance and Clearing Extents Map 3 of 4

Biota
Environmental
Sciences





- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025



Ground Disturbance and Clearing Extents

Map 4 of 4

BORR South Imagery September 2024



2.2 Clearing staging during the reporting period

Clearing was conducted across four (4) separate clearing stages during the reporting period (Table 2; Figure 2b).

Table 3. Clearing staging during the reporting period.

Clearing staging during the reporting period				
Clearing stage	Category	Patch	Commencement	Completion
Bussell - Hasties	1/2/3	2,4	6 Mar '24	26 Jul '24
Woods - Bussell	1/3	8,9	16 Apr '24	26 Aug '24
Woods - Ducane	1/2/3	6,7	23 Apr '24	31 Jul '24
Ducane	1/3	5	3 Jul '24	9 Oct '24

3 Compliance Reporting

3.1 Background

This Compliance Assessment Report (CAR) has been prepared in accordance with the Office of the Environmental Protection Authority (OEPA) *Post Assessment Guideline No. 3 – Post Assessment Guideline for Preparing a Compliance Assessment Report (PAG 3)* (OEPA, 2012b) to address conditions 12-3 and 12-6 of MS 1191, which state:

MS 1191: Condition 12-3

After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 12-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 12-1.

MS 1191: Condition 12-6

The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO. The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;*
- (2) include a statement as to whether the proponent has complied with the conditions;*
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;*
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and*
- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 12-1.*

Condition 12-1 of MS 1191 referenced above states:

MS 1191: Condition 12-1

The proponent shall prepare and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 12-6, or prior to implementation of the proposal, whichever is sooner.

3.2 Objective

This CAR has been developed to align with the structure indicated in the approved Compliance Assessment Plan (CAP; SWGA 2022), which was prepared in accordance with the requirements of condition 12-2 and the Office of the Environmental Protection Authority (OEPA) *Post Assessment Guideline for Preparing a Compliance Assessment Plan, Post Assessment Guideline No. 2* (OEPA, 2012a).

The proposed table of contents from the CAP is presented in Table 4. The table includes reference to sections in the CAR that correspond to the required content.

This CAR includes:

- Statement of compliance prepared in accordance with the *OEPA Post Assessment Form for a Statement of Compliance and endorsed by the proponent's Managing Director or a person delegated to sign on the Managing Director's behalf* (Appendix A).
- Ministerial Statement audit table in accordance with Appendix 1 of the CAP (Appendix B).
- Subsidiary management plan audit tables (Appendix C, D, E, F, G)
- Evidence (related to potential non-compliances/non-conformances only) (Appendix H).
- Summary table of evidence (Appendix I).
- Relevant survey reports and/or monitoring and management plans prepared to demonstrate compliance (Appendix J).

Table 4. Table of contents for Compliance Assessment Reporting as outlined in the CAP.

Heading	Description	Section
Introduction	Brief about the Proposal, including: • Proposal background • Proposal approvals • Proponent details	Section 1
Summary of proposal's implementation status	Summary of the current implementation status of the Proposal, specifically milestones/achievements within the audit period	Section 2
Statement of compliance	Statement of whether the proponent has complied with the conditions, prepared in accordance with the <i>OEPA Post Assessment Form for a Statement of Compliance and endorsed by the proponent's Managing Director or a person delegated to sign on the Managing Director's behalf</i>	Appendix A
Details of declared compliance status	Endorsed by Main Roads Managing Director or a person delegated to sign on the Managing Director's behalf	Appendix A
Non-compliances and corrective actions, if any	Identify all non-compliances and corrective actions	Appendix A, G
MS 1191 audit table	Ministerial Statement audit table in accordance with Appendix 1 of the CAP	Appendix B
MS 1191 CFMP audit table	Construction Fauna Management Plan audit table	Appendix C
MS 1191 HFMP audit table	Habitat Fragmentation Management Plan audit table	Appendix D
MS 1191 AMP audit table	Amenity Management Plan audit table	Appendix E
MS 1191 OMP audit table	Offset Management Plan audit table	Appendix F
MS 1191 TNMP audit table	Traffic Noise Management Plan audit table	Appendix G
Summary table of supporting evidence (related to potential non-compliances/non-conformances only)	Supporting/ verifying information/ documentation	Appendix H

Heading	Description	Section
Summary table of supporting evidence demonstrating compliance	Supporting/ verifying information/ documentation	Appendix I
Detailed reporting for monitoring and management plans	Relevant management plans, reports and/or monitoring prepared to ensure and demonstrate compliance	Appendix J, K, L, M

3.3 Reporting Period

This CAR addresses a compliance period of 31 May 2024 to 30 May 2025 and will be submitted to the CEO of DWER by 31 August 2025. Subsequent CARs will address the compliance period from 31 May to 30 May with each report submitted to the CEO of the DWER by the annual date of 31 August following the conclusion of the compliance period.

4 Compliance Assessment

4.1 Assessment approach

The audit to determine the status and evidence of compliance was completed by SWGA, external specialist consultants and Main Roads.

The Proposal has been subject to routine external inspections and audits during the reporting period to review compliance against MS 1191 including independent daily site inspection / audits during clearing within clearing category 1 areas (Preston Consulting).

4.2 Criteria

Criteria were based on the MS 1191 conditions of approval. The audit table in Appendix B presents all the approval conditions and the performance of the Proposal to these conditions for the reporting period. The audit table contains each condition separated into audit elements for auditing purposes (i.e., the audit criteria) and includes the following headings:

- Audit Code: Ministerial Statement reference number.
- Subject: The environmental subject/issue.
- Requirement: Wording of the relevant implementation condition, procedure, or commitment.
- How: The way the proponent intends to achieve the requirement.
- Evidence: Information or data collected to verify compliance, i.e., report/letter/site inspection requirements.
- Phase: Proposal phase.
- Timeframe: Specific timing and/or location.
- Status: Notes about the fulfilment of compliance.
- Further Information: Additional details and supporting information to verify compliance status.

The 'Status' field of the audit tables in Appendix B, Appendix C and Appendix D, Appendix E, Appendix F and Appendix G describes the implementation of the action and compliance with the condition, procedure or commitment. Although the CEO of DWER makes the final determination of compliance, it is necessary to update this field each audit period, as the Proposal progresses. DWER has prepared updated guidance related to the preparation of compliance audits, including generic expressions that are used to identify the status of each item as defined in Appendix B.

4.3 Compliance with conditions

A Statement of Compliance in relation to the conditions of MS 1191 for the period addressed in the CAR has been included in Appendix A.

The Proposal was compliant with all construction-based requirements of MS 1191 during the reporting period. However, one non-compliance has been recorded with regard to the implementation of the Offset Management Plan; as documented in the MS 1191 Approval Audit Table (Appendix B) and Offset Management Plan Audit Table (Appendix F).

4.4 Subsidiary plans

Conditions of MS1191 require the implementation of a number of subsidiary plans (Table 5), referenced in the Audit Table (Appendix B).

Table 5. Subsidiary plans to be implemented in accordance with MS1191 conditions.

Condition	Plan Implementation
3.5	Phytophthora Dieback Management Plan
5.2	Construction Fauna Management Plan (CFMP)
6.3	Habitat Fauna Management Plan (HFMP)
7.2	Traffic Noise Management Plan (TNMP)
8.3	Amenity Management Plan (AMP)
9.4	Offset Management Plan (OMP)
12.1	Compliance Assessment Plan (CAP)

Compliance with the requirement to implement specific Environmental Management Plans required in accordance with Conditions 5, 6, 8, 9 and 12 of MS 1191 has been assessed and reported using the Audit Tables in Appendices C, D, E, F, and G.

4.5 Retention of Compliance Statements

All Compliance Assessment Reports will be retained by Main Roads in accordance with relevant record keeping legislation including the:

- *State Records Act, 2000.*
- *Evidence Act, 1906.*
- *Electronic Transactions Act, 2011.*
- *Freedom of Information Act, 1992.*

Main Roads will retain CARs (including all associated compliance assessments) and evidence used to verify compliance for the life of the proposal and then for a minimum of seven years after the end of the life of the proposal. Main Roads will continue to implement the proposal until the CEO has determined all conditions of MS1191 have been satisfactorily met.

CARs will be retained on Main Roads' Electronic Document and Records Management System that Main Roads is required to maintain and operate in accordance with its obligations under the *State Records Act, 2000*.

4.6 Public Availability of Compliance Reports

In line with Condition 13-1 and the *Post Assessment Guideline 4: Making Information Publicly Available* (OEPA 2012d), compliance assessment reports will be made publicly available by publishing them on the Main Roads Western Australia website. This will occur within 14 days of the report being submitted to the CEO.

4.7 Department Compliance Review

In 2023, DWER initiated a review of Main Roads' compliance with MS 1191. It is understood that the review is ongoing and has not been finalised.

5 References

Minister for Environment. 2022. Ministerial Statement 1191 – Bunbury Outer Ring Road Southern Section, May 2022 https://www.epa.wa.gov.au/sites/default/files/1MINSTAT/Statement%201191_0.pdf

OEPA. 2012a. Post Assessment Guideline for Preparing a Compliance Assessment Plan, Post Assessment Guideline No. 2. August. Office of the Environmental Protection Authority. Perth, Western Australia.

OEPA. 2012b. Post Assessment Guideline for Preparing an Audit Table, Post Assessment Guideline No. 1. August. Office of the Environmental Protection Authority. Perth, Western Australia.

OEPA. 2012c. Post Assessment Guideline for Preparing a Compliance Assessment Report, Post Assessment Guideline No. 3. August. Office of the Environmental Protection Authority. Perth, Western Australia.

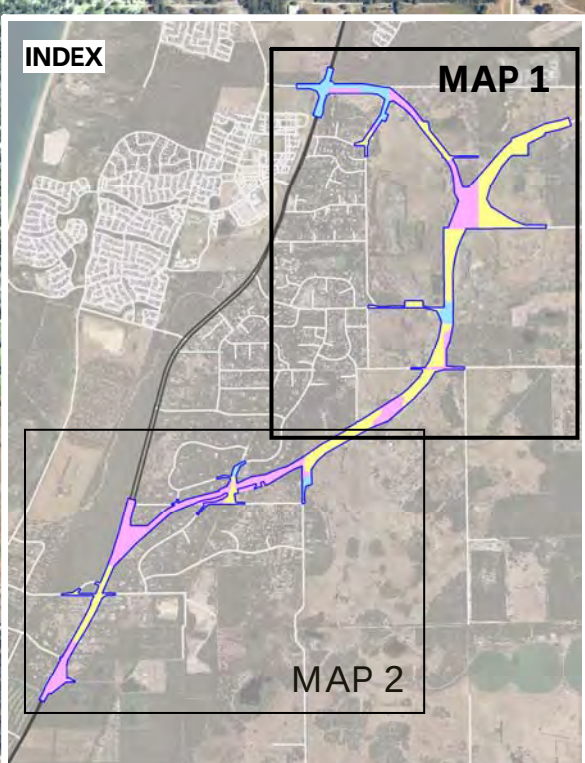
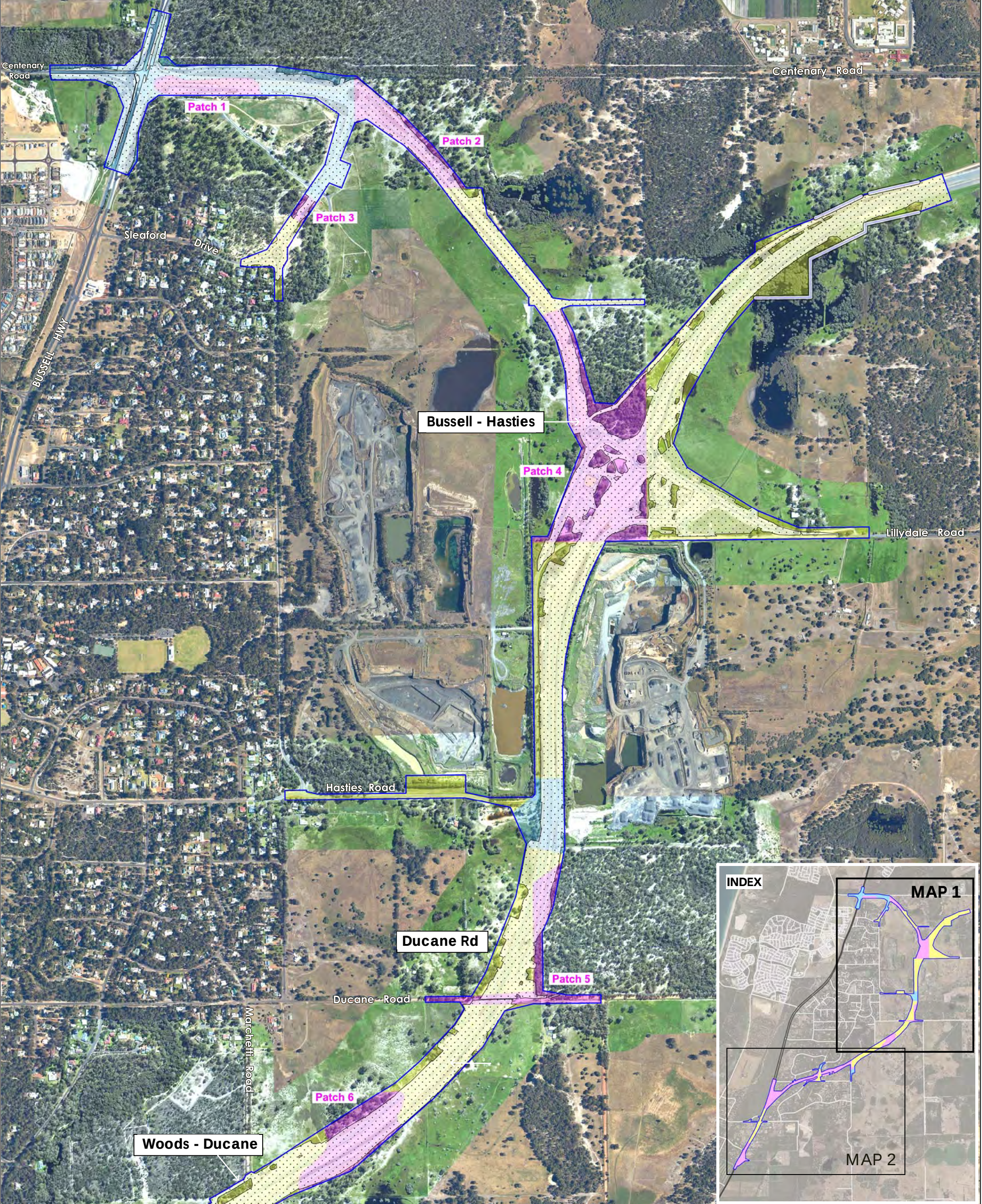
OEPA. 2012d. Post Assessment Guideline for Making Information Publicly Available, Post Assessment Guideline No. 4. August. Office of the Environmental Protection Authority. Perth, Western Australia.

SWGA, 2022. Compliance Assessment Plan, South West Gateway Alliance, Perth Western Australia.

6 Figures

Figure	Title
Figure 2b	Clearing stages during the reporting period
Figure 3	Ground disturbance and clearing extents during the reporting period in relation to native vegetation and potential Black-stripe minnow habitat
Figure 4a	Ground disturbance and clearing extents during the reporting period in relation to Western ringtail possum habitat and South-western brush-tailed phascogale habitat
Figure 4b	Ground disturbance and clearing extents during the reporting period in relation to Black cockatoo habitat and habitat trees
Figure 5	Ground disturbance and clearing extents during the reporting period in relation to Threatened and Priority Ecological Communities and inland waters (wetlands)

Figure 2b. Clearing stages during the reporting period.

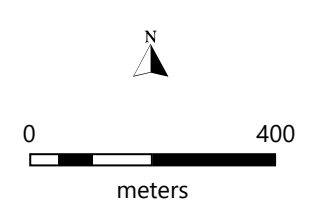


LEGEND

- Proposal approval boundary
- Ground disturbance and clearing areas (up to 31 May 2025)

Clearing Categories

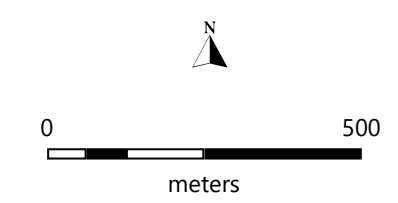
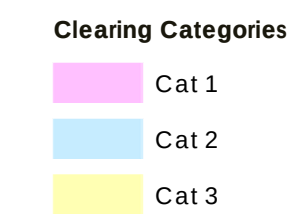
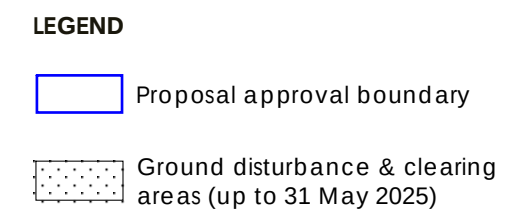
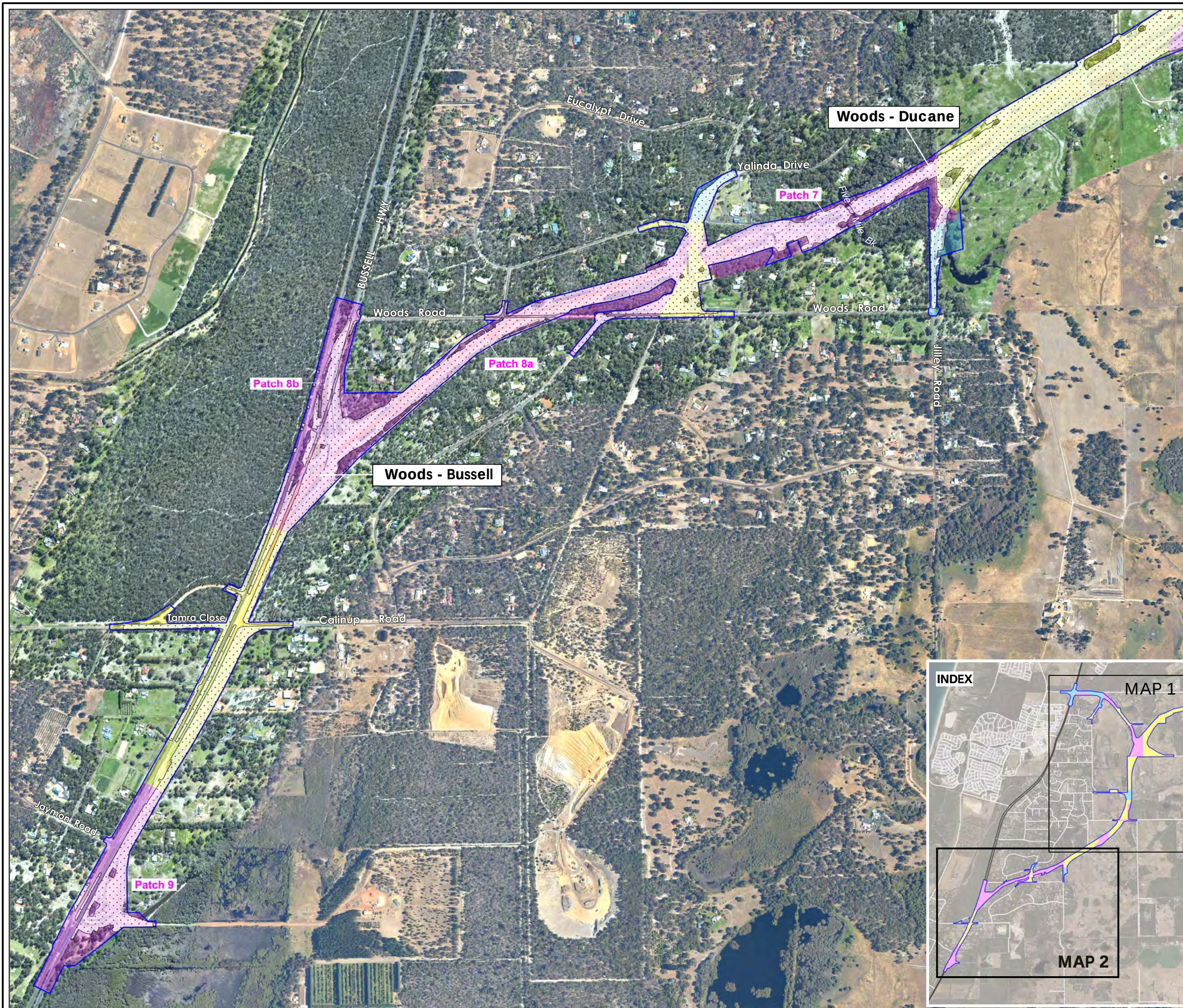
- Cat 1
- Cat 2
- Cat 3



BORR South Imagery Sept 2024

**BORR South Clearing Areas
End of May 2025
Map 1**





BORR South Imagery Sept 2024

Author: Biota Drawn: P Sawers Job No.: 1855
Date: 23 Mar 2025 Revised:
Projection: MGA Z50 (GDA94) Scale: 1:12,000 @ A3

**BORR South Clearing Areas
End of May 2025
Map 2**

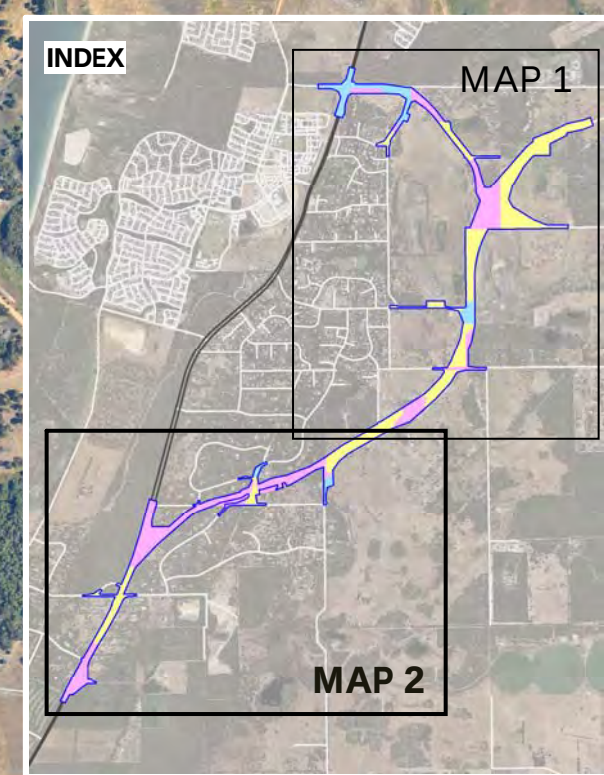
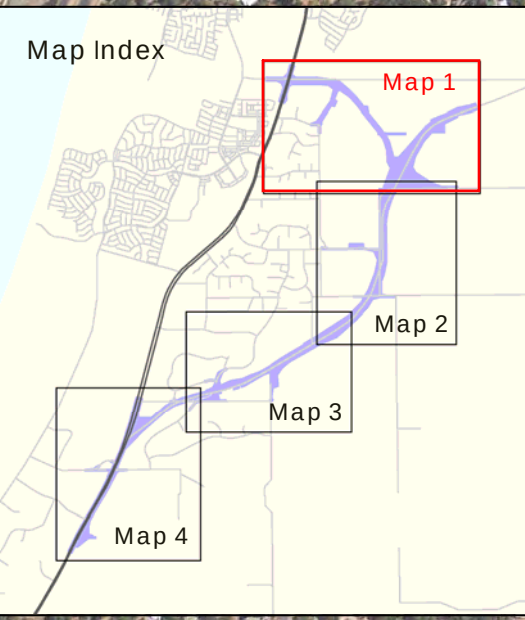
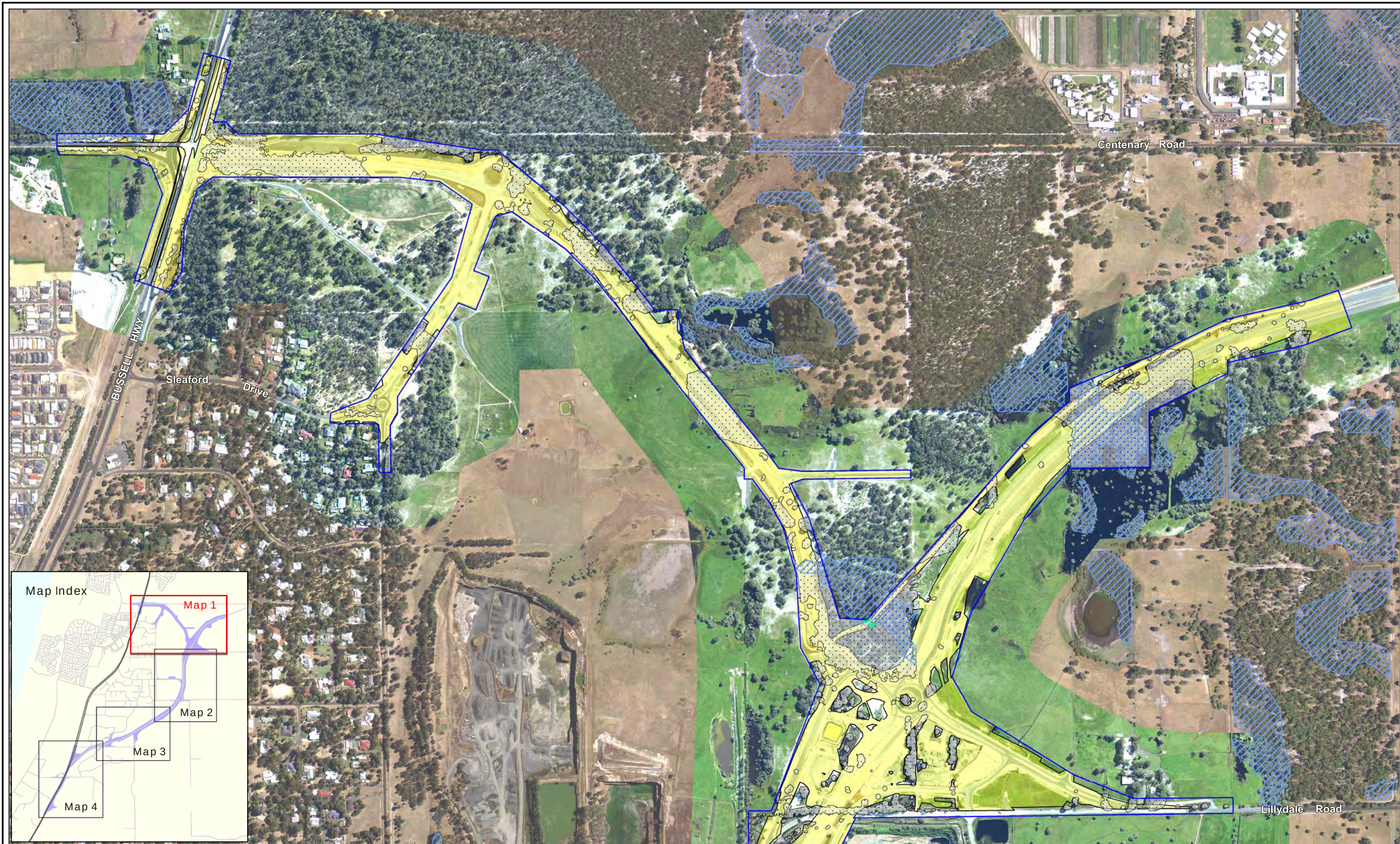
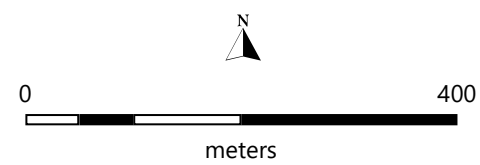


Figure 3. Ground disturbance and clearing extents during the reporting period in relation to native vegetation and potential Black-stripe minnow habitat.



LEGEND

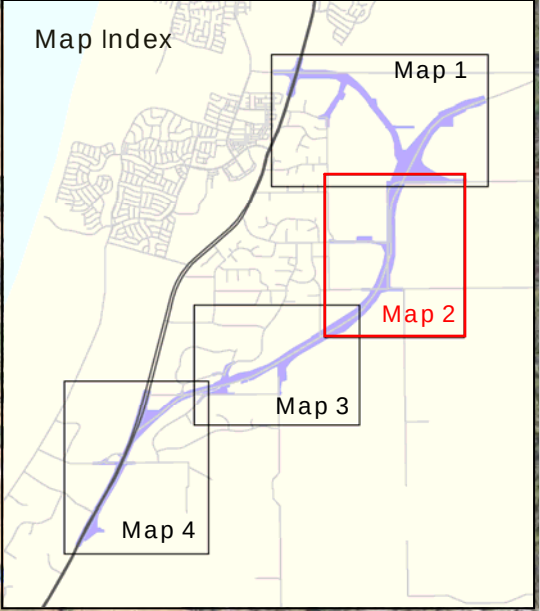
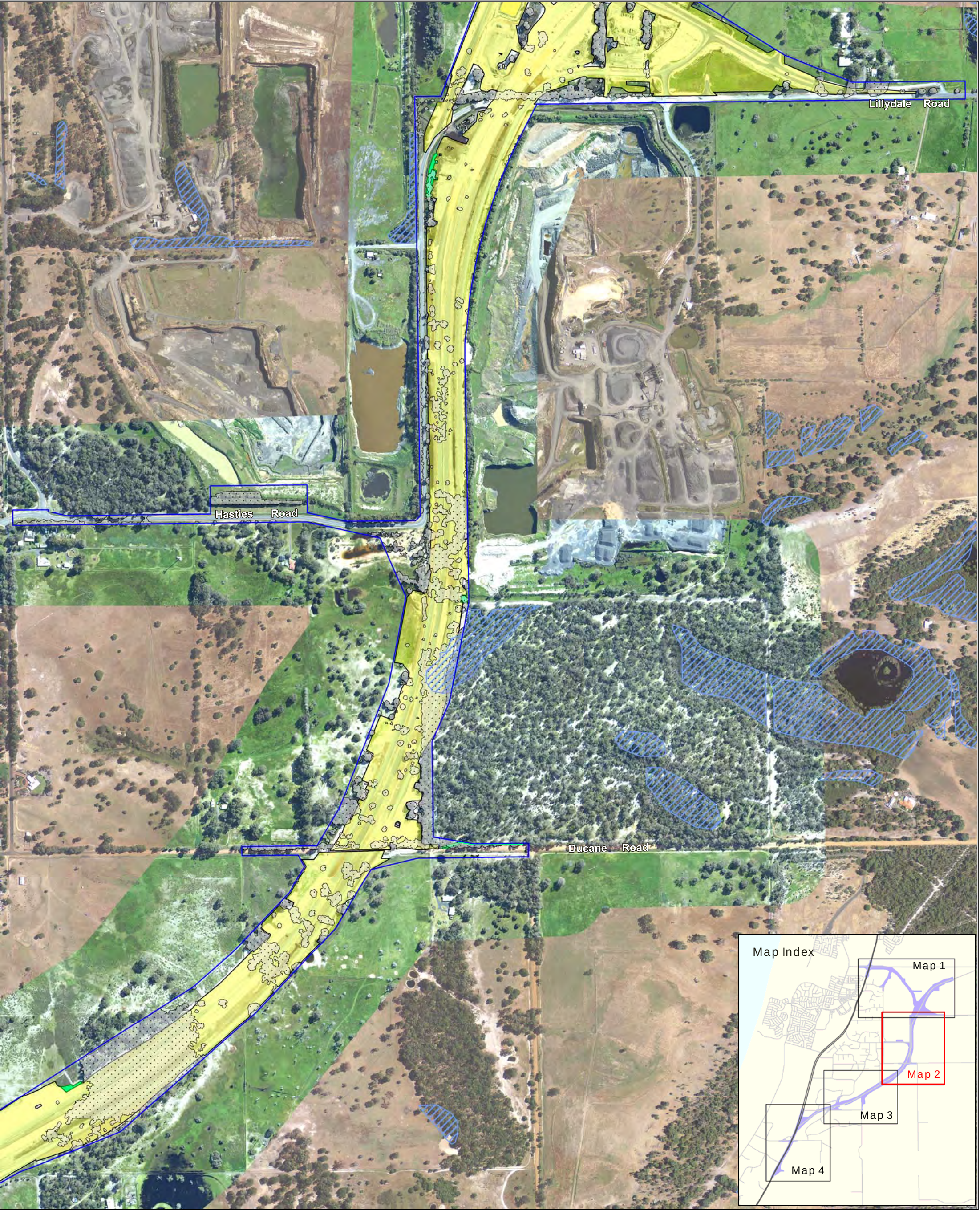
- | | |
|---|---|
|  Proposal approval boundary (MS1191) |  Potential Black-stripe minnow habitat |
|  Ground disturbance and clearing extents 2022 - 2024 |  Native vegetation |
|  Ground disturbance and clearing extents 2024 - 2025 | |



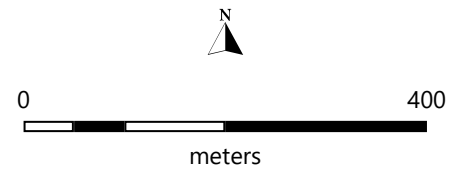
BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 1



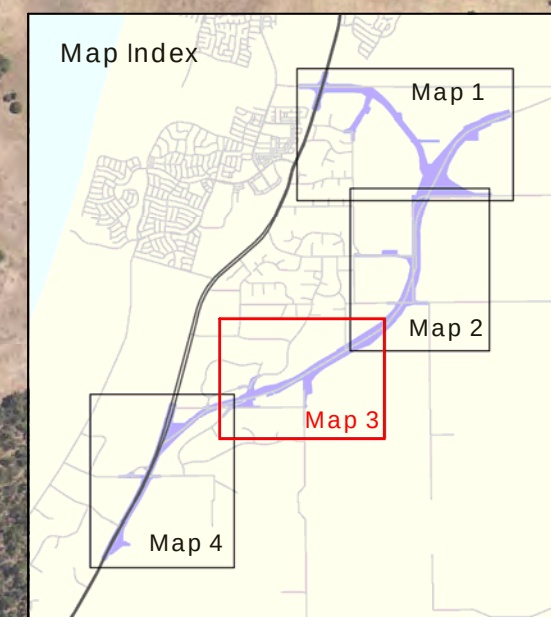
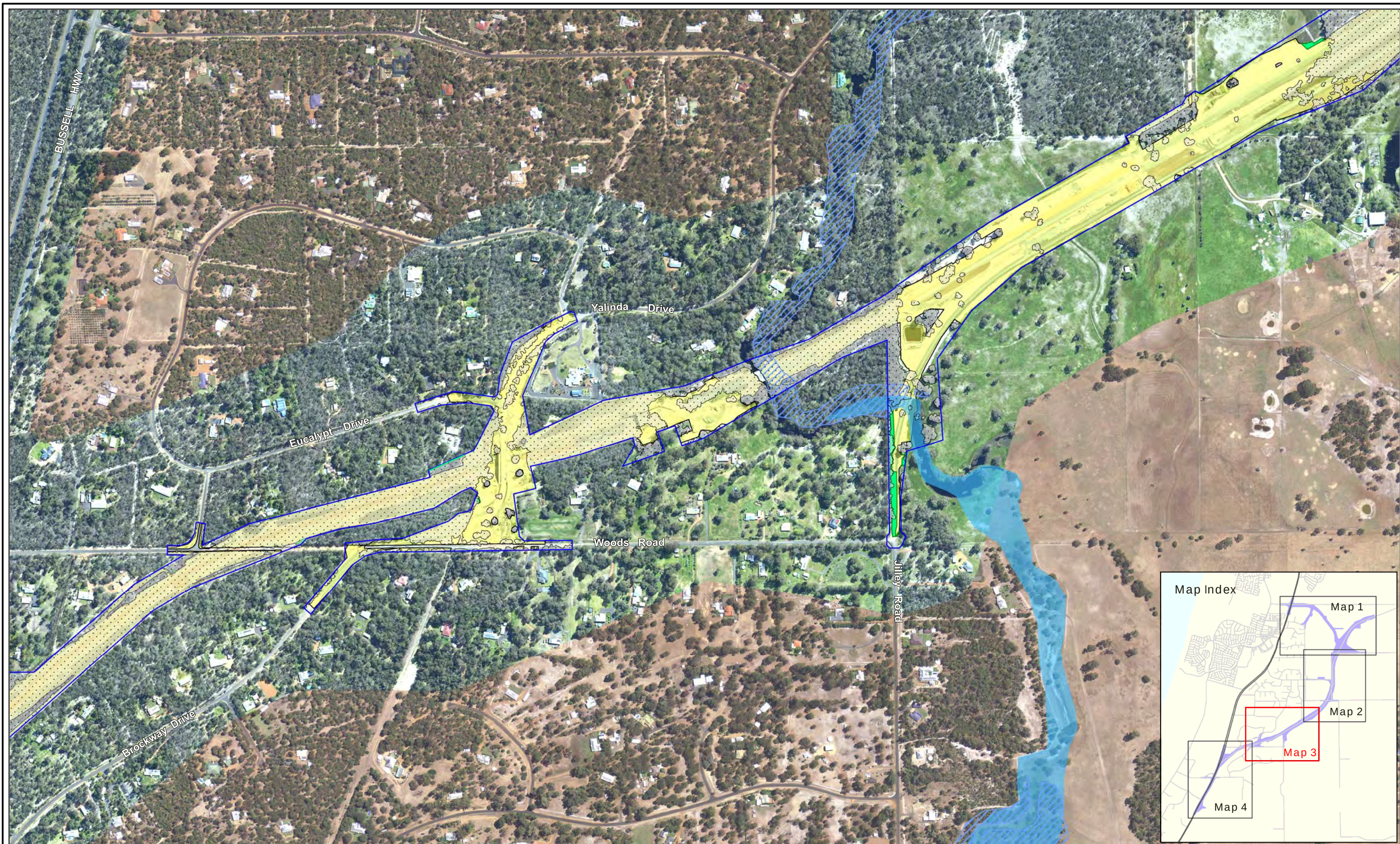


- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black-stripe minnow habitat
 - Native vegetation



Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 2

BORR South Imagery September 2024



Location Map



LEGEND

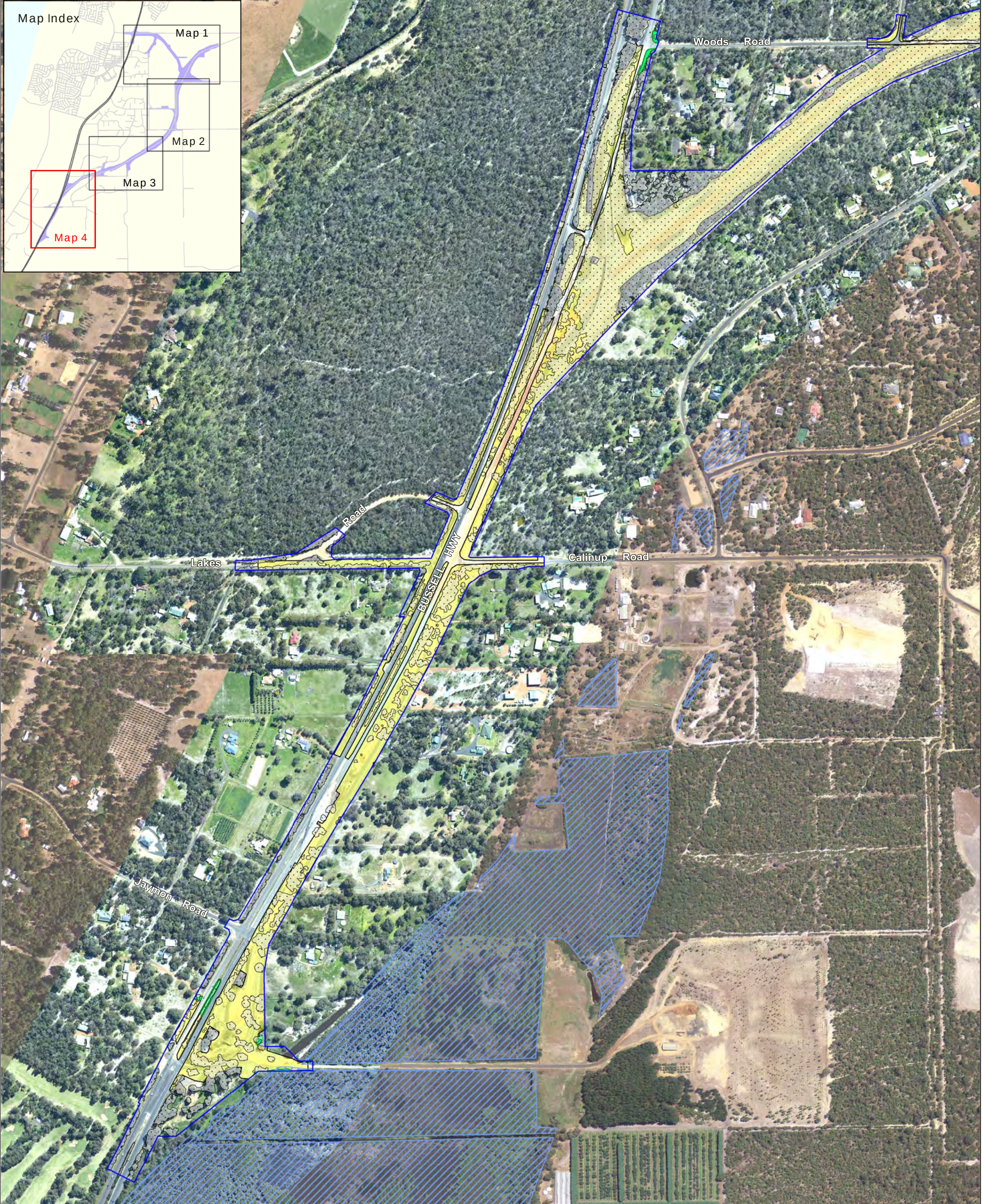
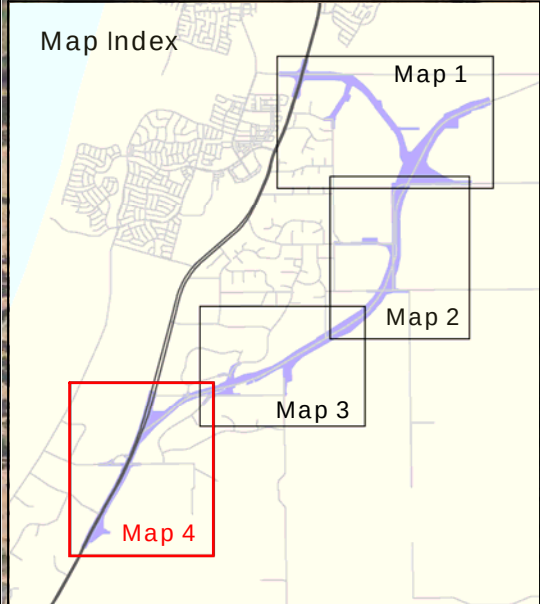
- | | |
|---|---------------------------------------|
| Proposal approval boundary (MS1191) | Black-stripe minnow habitat |
| Ground disturbance and clearing extents 2022 - 2024 | Potential Black-stripe minnow habitat |
| Ground disturbance and clearing extents 2024 - 2025 | Native vegetation |



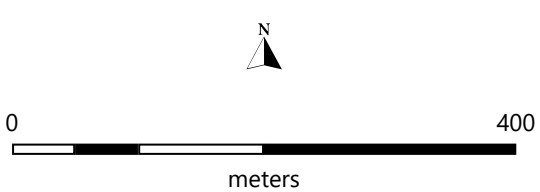
0 400
meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 3



- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Potential Black-stripe minnow habitat
 - Native vegetation

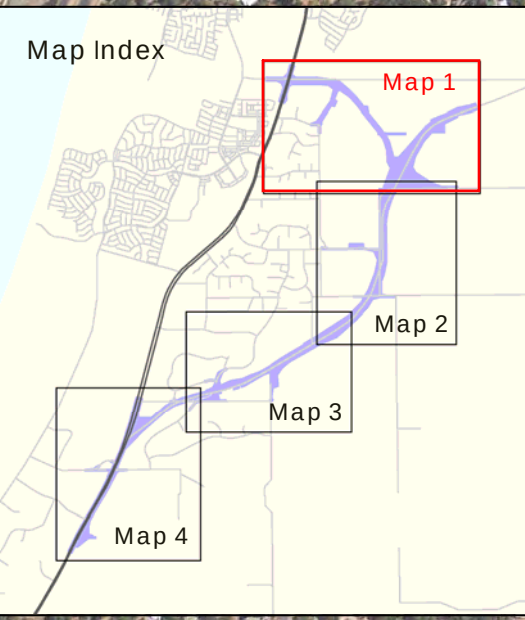
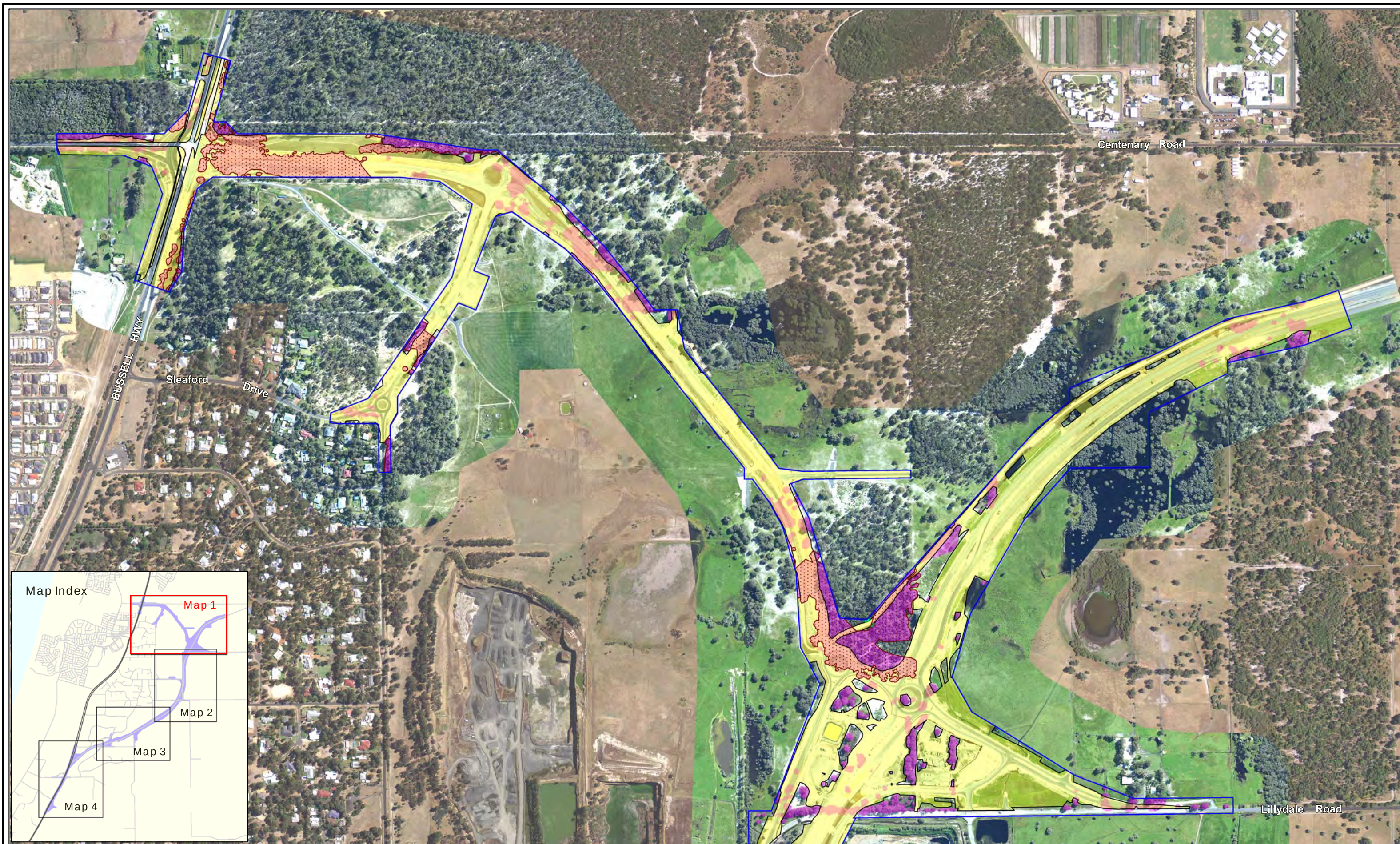


BORR South Imagery September 2024

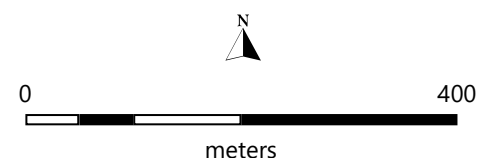
Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 4



Figure 4a. Ground disturbance and clearing extents during the reporting period in relation to Western ringtail possum habitat and South-western brush-tailed phascogale habitat.

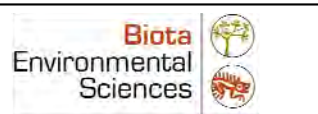


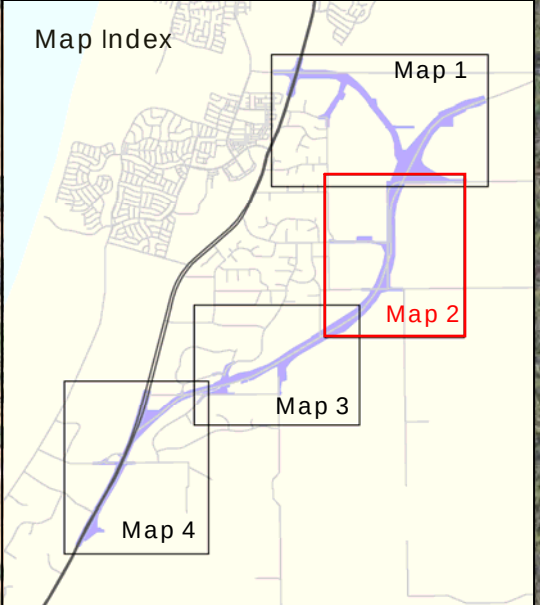
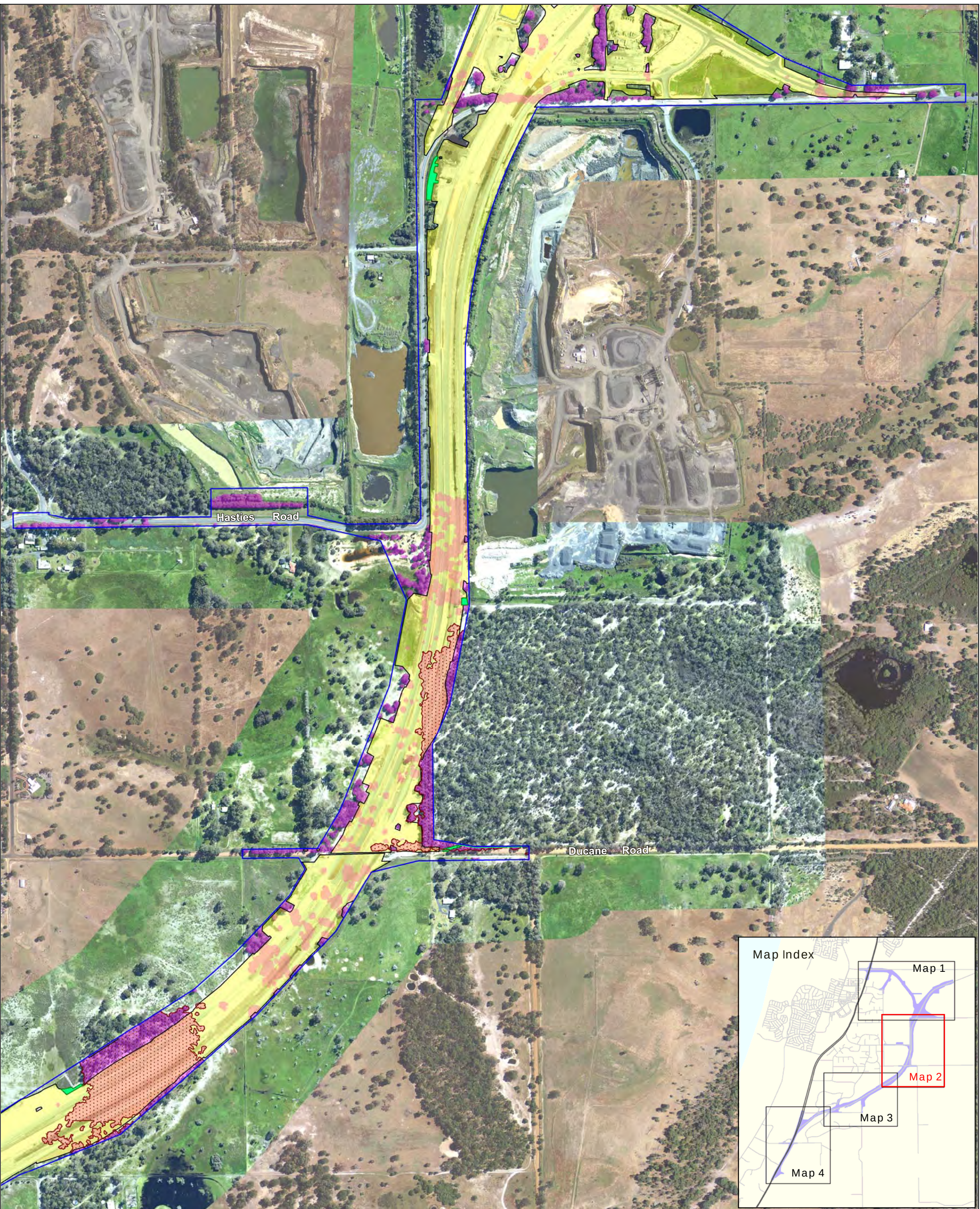
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Western Ringtail Possum habitat
 - Brush-tailed Phascogale habitat



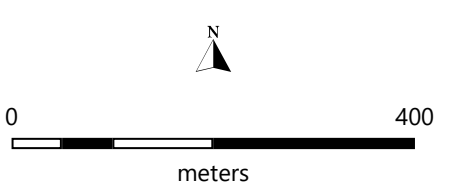
BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat - Map 1





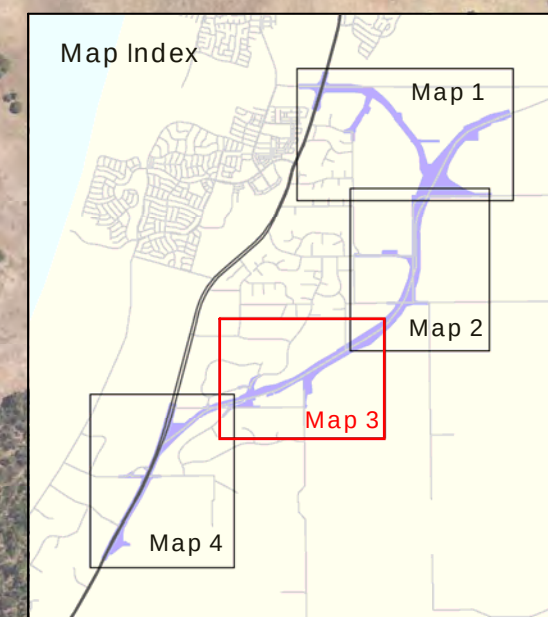
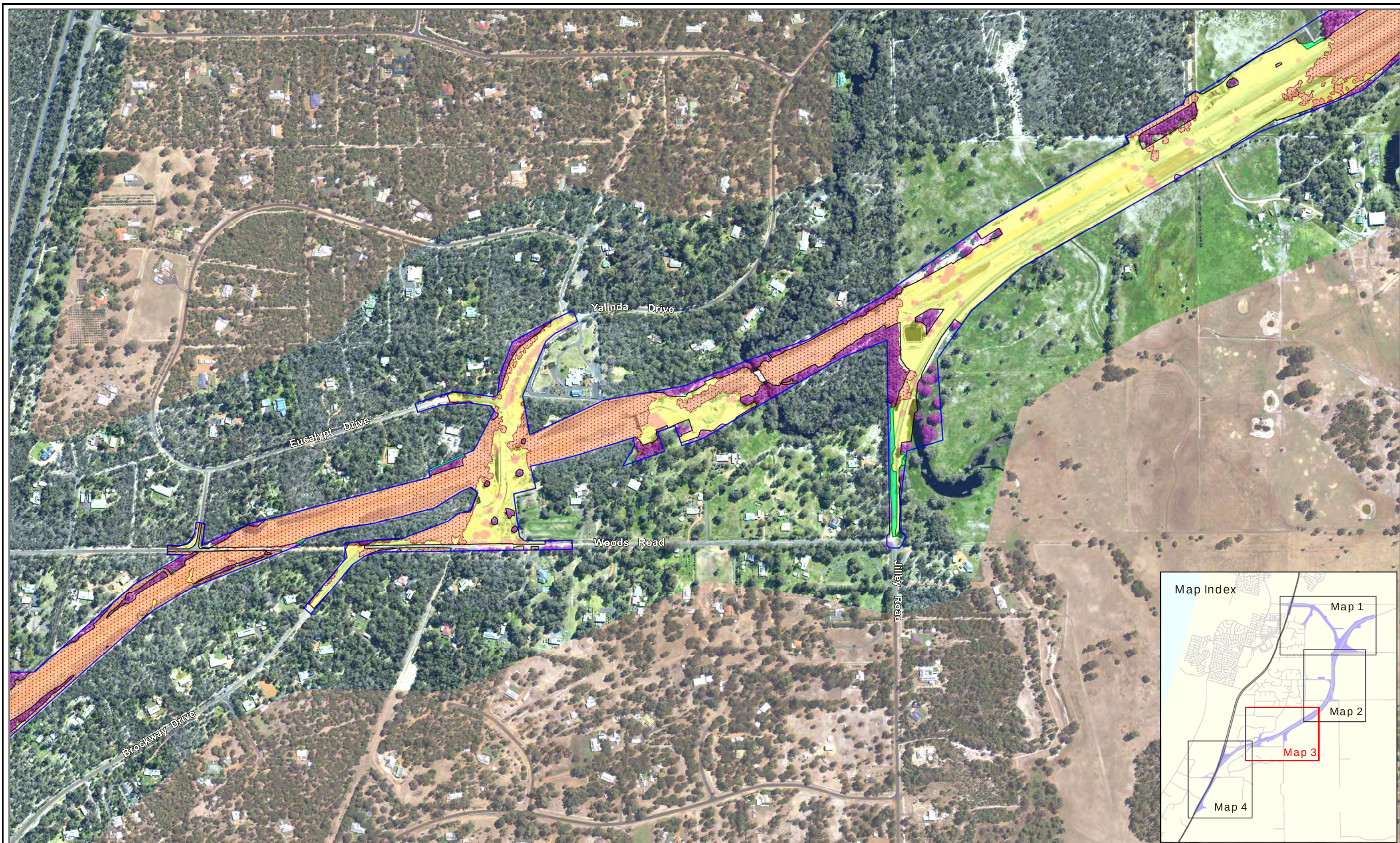
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Western Ringtail Possum habitat
 - Brush-tailed Phascogale habitat



Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat
Map 2

BORR South Imagery September 2024





Location Map

KARRATHA
PERTH
KALGOORLIE
W A
Map Area

LEGEND

Proposal approval boundary (MS1191)	Western Ringtail Possum habitat
Ground disturbance and clearing extents 2022 - 2024	Brush-tailed Phascogale habitat
Ground disturbance and clearing extents 2024 - 2025	

0 400
meters

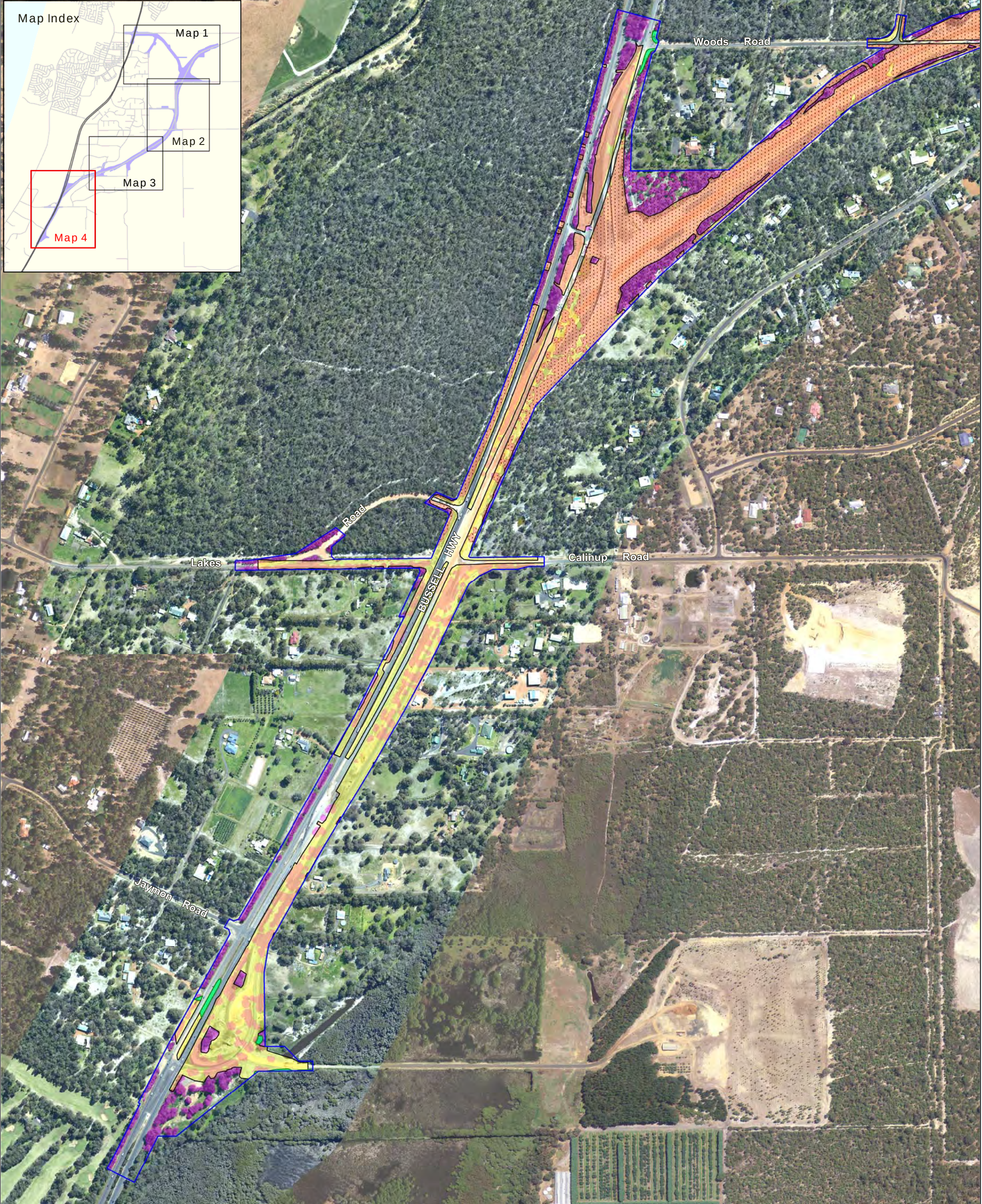
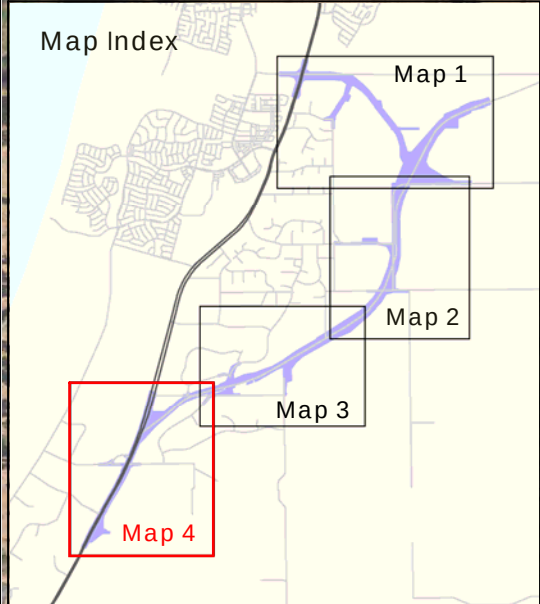
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BORR South Imagery September 2024

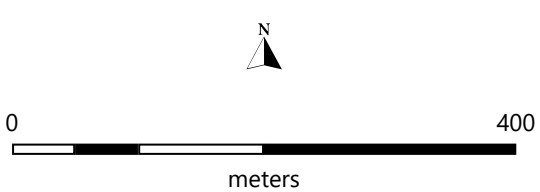
Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA2020) Scale: 1:7,250 @ A3

Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat - Map 3

Biota Environmental Sciences



- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Western Ringtail Possum habitat
 - Brush-tailed Phascogale habitat

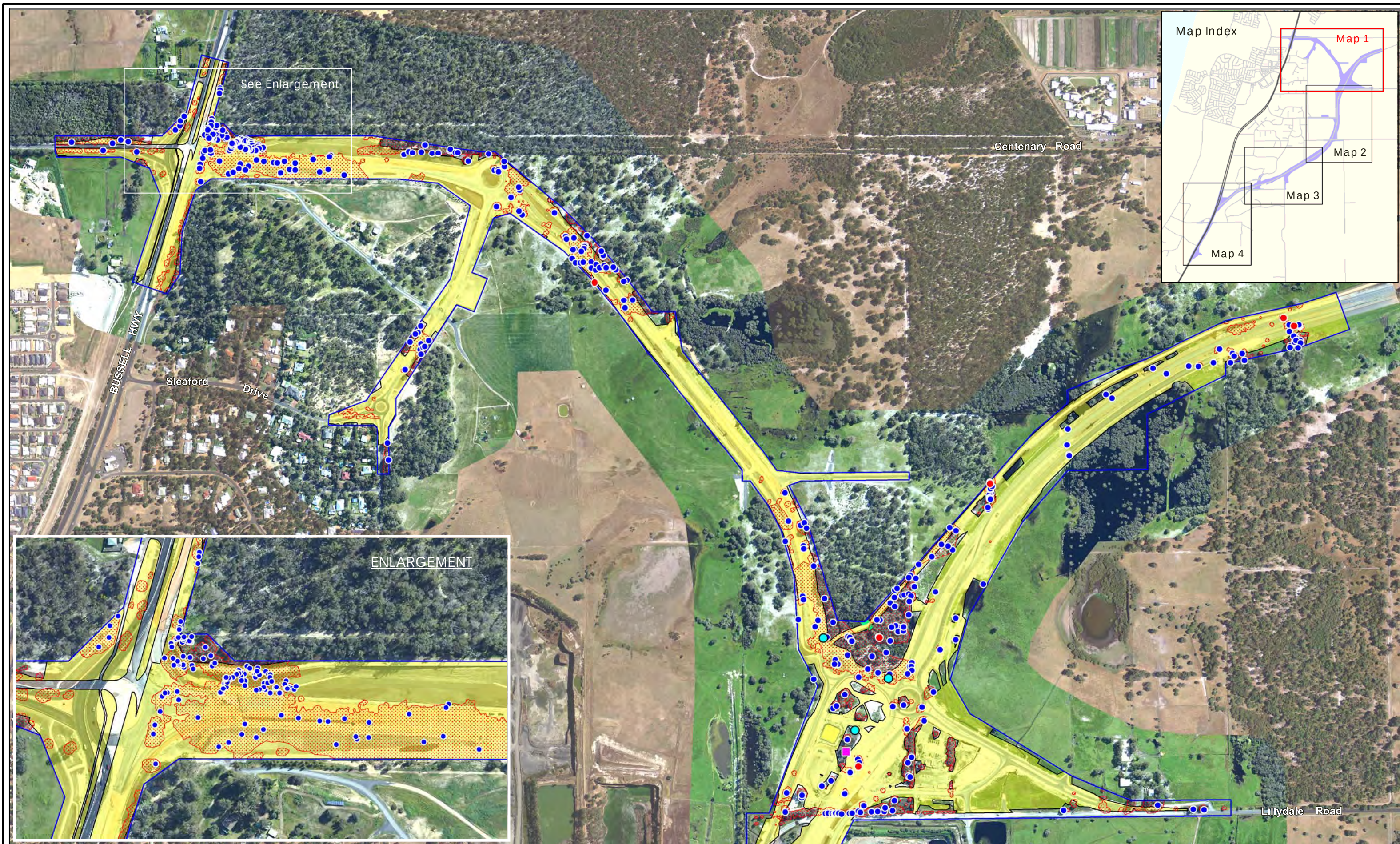


Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat
Map 4

BORR South Imagery September 2024



Figure 4b. Ground disturbance and clearing extents during the reporting period in relation to Black cockatoo habitat and habitat trees.



Location Map

KARRATHA
W A
PERTH
KALGOORLIE
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2023 - 2024
- Ground disturbance and clearing extents 2024 - 2025
- Black cockatoo habitat

BC Tree Habitat Hollow Assessment 2025

- Potentially suitable
- Unlikely suitable
- Not suitable
- Tree suitable DBH - no hollows

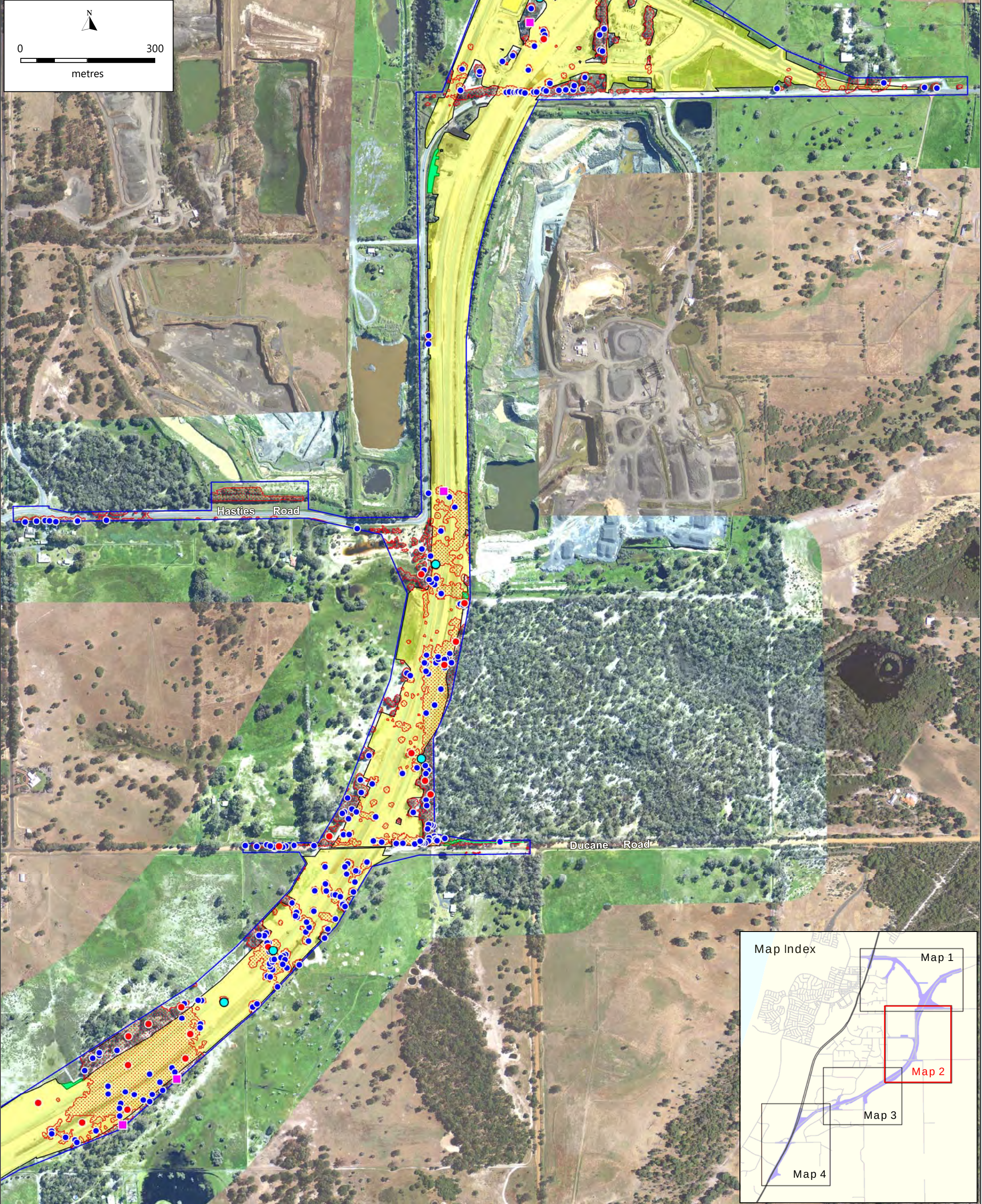
Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitats - Map 1

0 400 metres

BORR South Imagery September 2025

Author: Biota Drawn: P Sawers Job No.: 1855 Date: 21 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:8,2500 @ A3

Biota Environmental Sciences

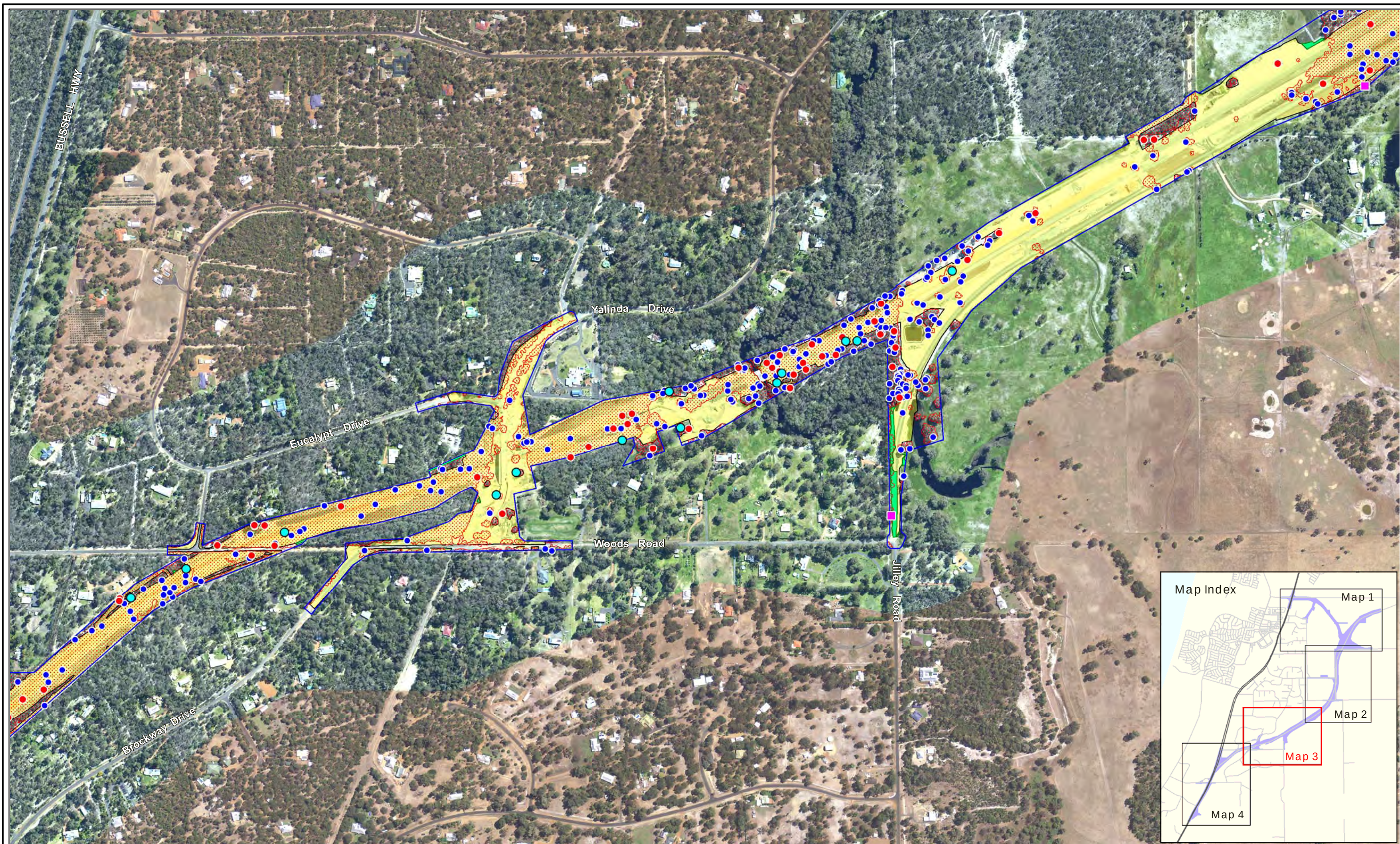


- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black cockatoo habitat

- BC Tree Habitat Hollow Assessment 2025**
- Potentially suitable
 - Unlikely suitable
 - Not suitable
 - Tree suitable DBH - no hollows
- BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat
Map 2





Location Map



LEGEND

- Environmental Boundary (MS 1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025
- Black cockatoo habitat

BC Tree Habitat Hollow Assessment 2025

- Potentially suitable
- Unlikely suitable
- Not suitable
- Tree suitable DBH - no hollows

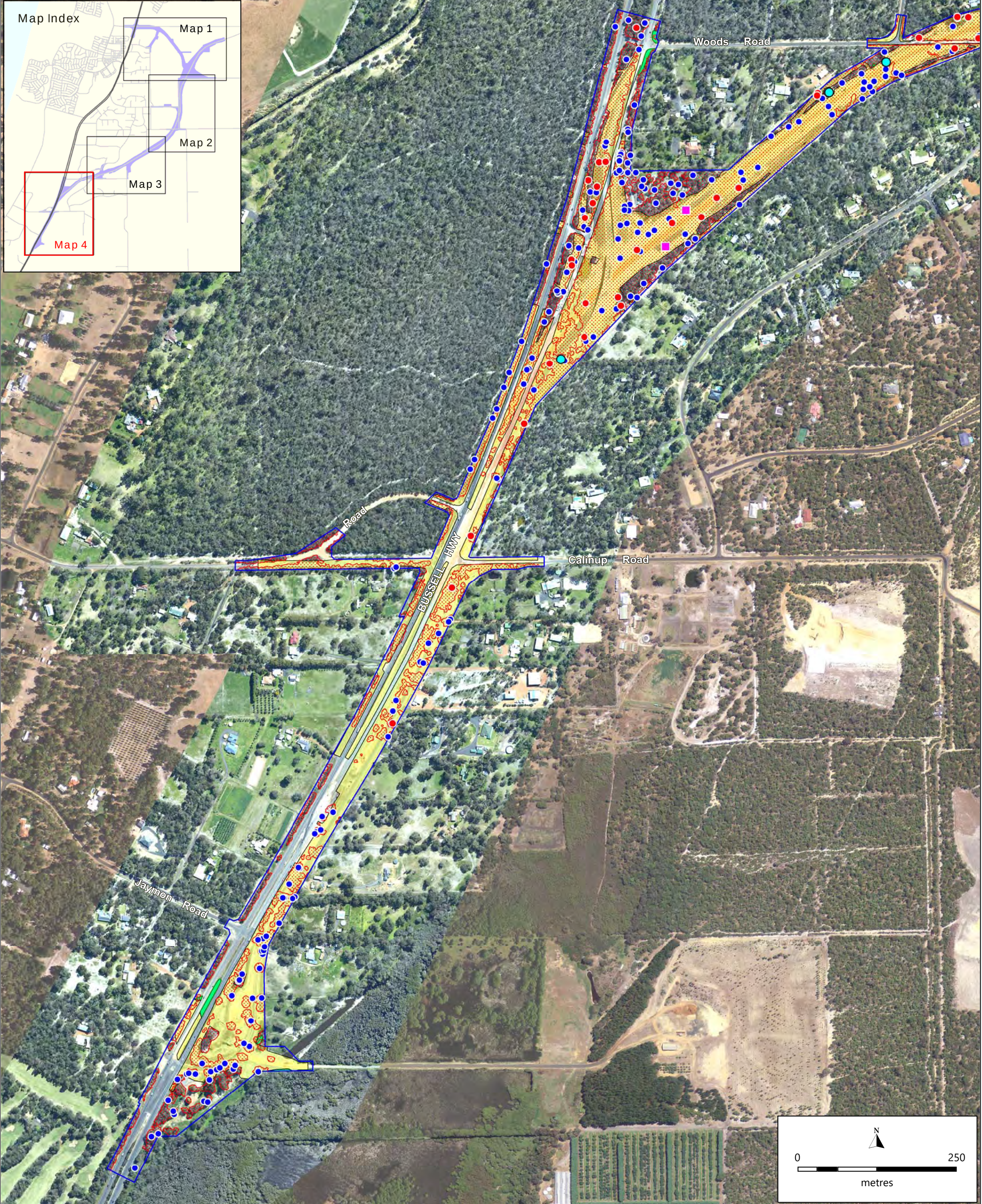


0 400
meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat - Map 3





- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black cockatoo habitat

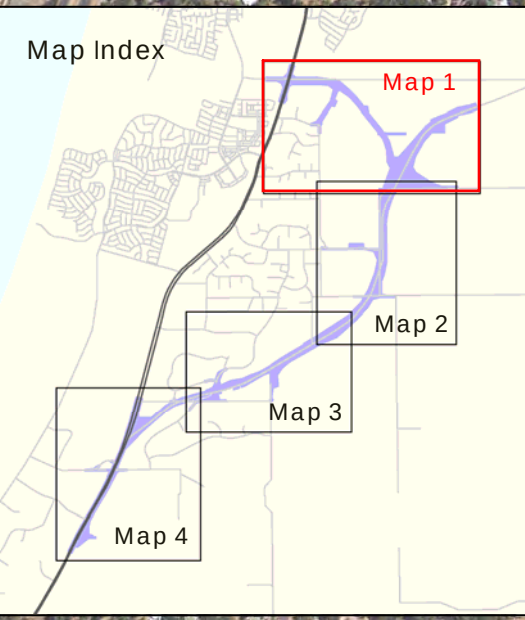
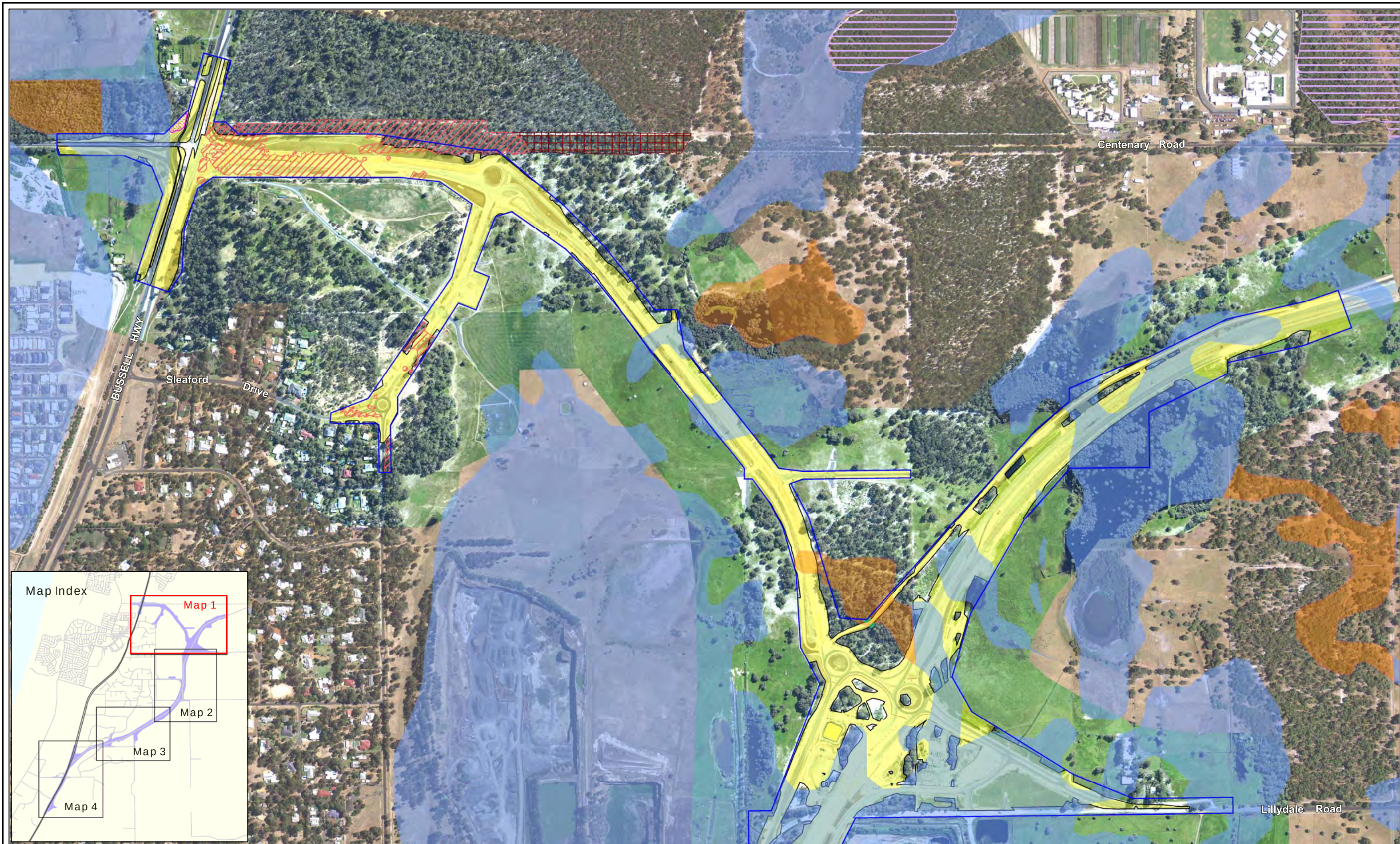
- BC Tree Habitat Hollow Assessment 2025**
- Potentially suitable
 - Unlikely suitable
 - Not suitable
 - Trees suitable DBH - no hollows

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat
Map 4

BORR South Imagery September 2024



Figure 5. Ground disturbance and clearing extents during the reporting period in relation to Threatened and Priority Ecological Communities and inland waters (wetlands).



Location Map

KARRATHA
W A
PERTH
KALGOORLIE
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC
- Tuart Woodland TEC/PEC
- Tuart-Peppermint Woodland PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands
- Resource Enhancement Wetlands

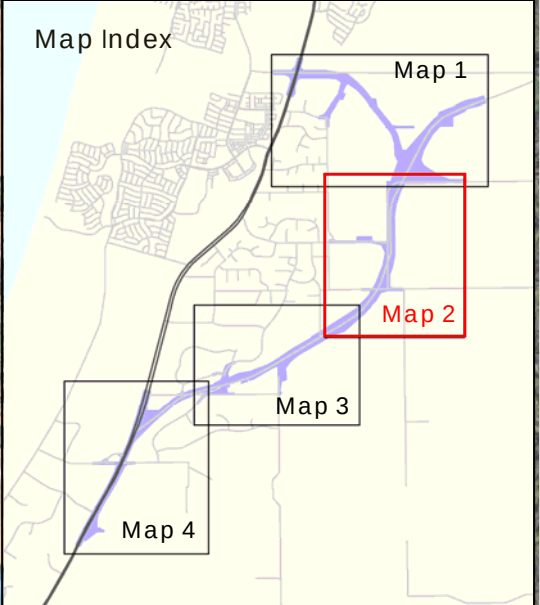
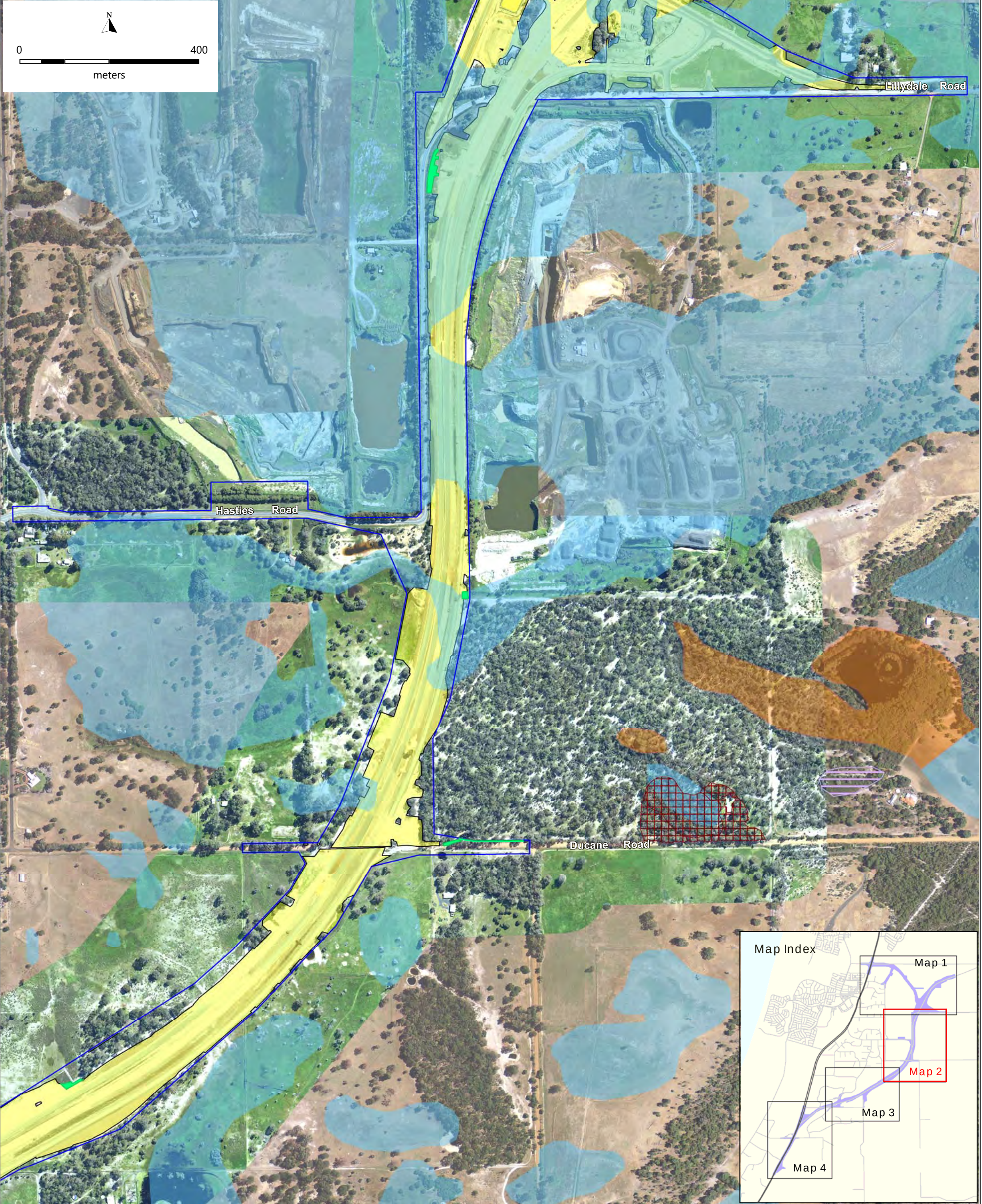
0 300
meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 1

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:8,2500 @ A3



LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025

BORR South Imagery September 2024

TEC PEC

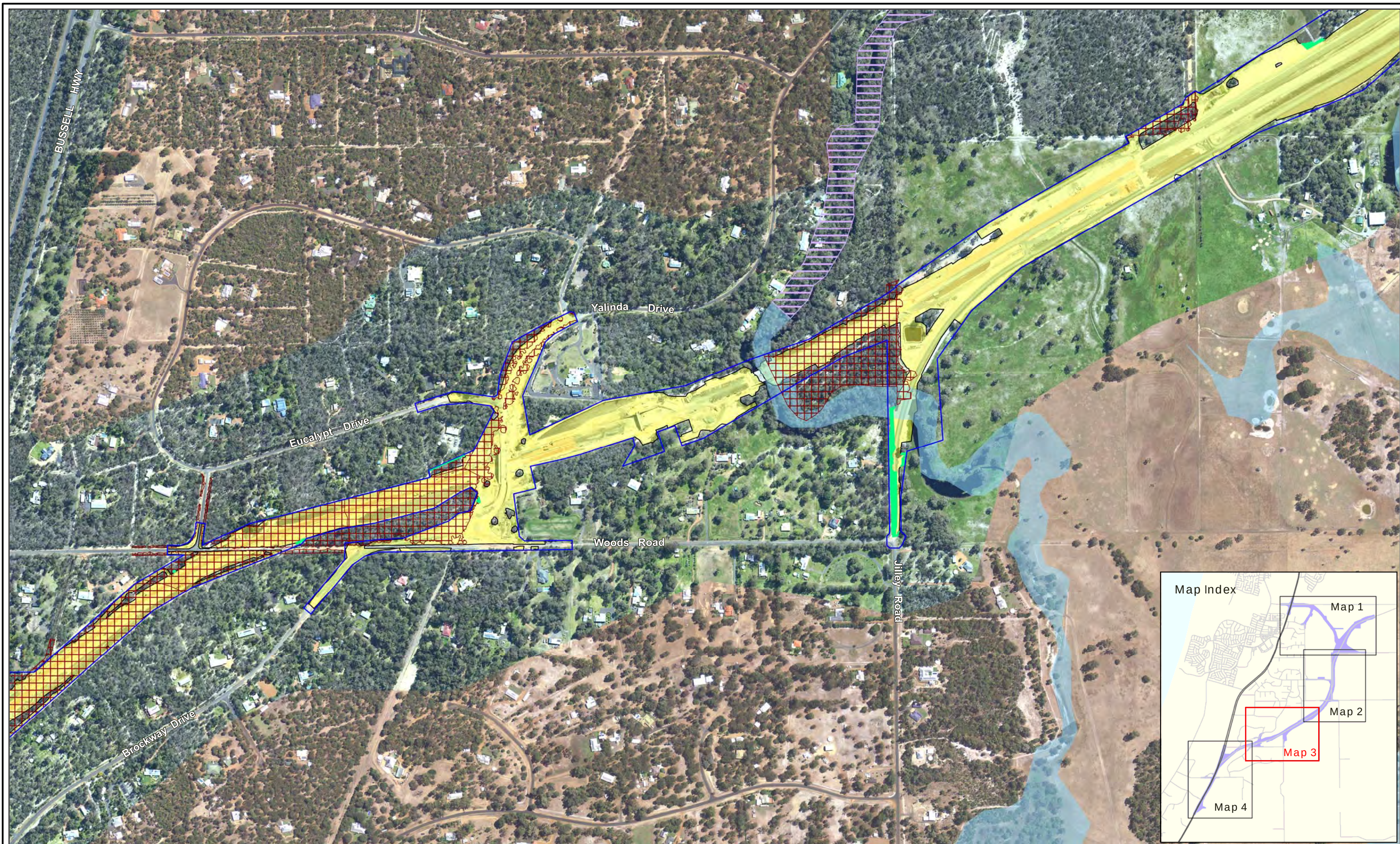
- Banksia Woodland TEC/PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Resource Enhancement Wetlands
- Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands Map 2

Biota Environmental Sciences



Location Map

KARRATHA
W A
KALGOORLIE
PERTH
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2023
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands

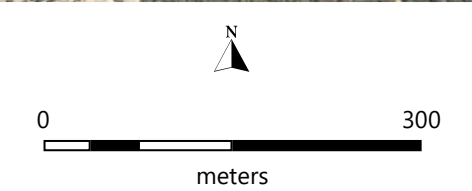
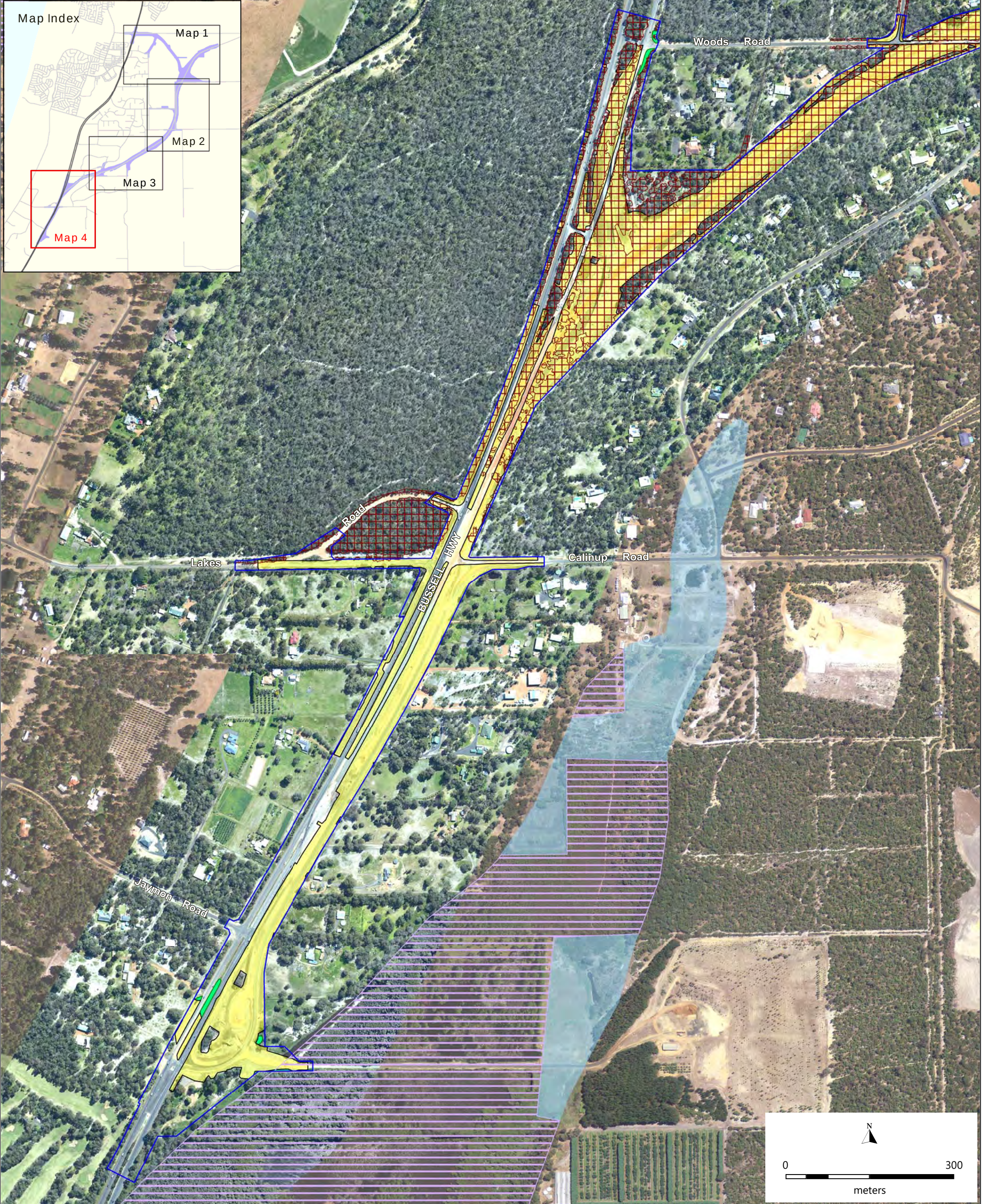
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meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 3

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:7,250 @ A3



- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025

- TEC PEC**
- Banksia Woodland TEC/PEC
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)**
- Conservation Category Wetlands
 - Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands
Map 4



BORR South Imagery September 2024

7 Appendices

Appendix	Title
Appendix A	MS 1191 Statement of Compliance
Appendix B	MS 1191 Audit Table
Appendix C	MS 1191 Construction Fauna Management Plan Audit Table
Appendix D	MS 1191 Habitat Fragmentation Management Plan Audit Table
Appendix E	MS 1191 Amenity Management Plan Audit Table
Appendix F	MS 1191 Offset Management Plan Audit Table
Appendix G	MS 1191 Traffic Noise Management Plan
Appendix H	Evidence (related to potential non-compliance/non-conformance only)
Appendix I	Summary table of evidence
Appendix J	M2-4 Environmental Performance Report – Inland waters
Appendix K	M3-4 Environmental Performance Report – Flora and vegetation (PEC)
Appendix L	M4-7 Environmental Performance Report – Black Cockatoos
Appendix M	M5-3 Environmental Performance Report – Construction Fauna Management Plan



Appendix A

Statement of Compliance

Statement of Compliance**1 Proposal and Proponent Details**

Proposal Title	<i>Bunbury Outer Ring Road (Southern Section)</i>
Statement Number	<i>1191</i>
Proponent Name	<i>Main Roads Western Australia</i>
Proponent's Australian Company Number (where relevant)	<i>50 860 676 021</i>

2 Statement of Compliance Details

Reporting Period	<i>31/05/24 to 30/05/25</i>
------------------	-----------------------------

Implementation phase(s) during reporting period (please tick ✓ relevant phase(s))					
Pre-construction		Construction	✓	Operation	
				Decommissioning	

Audit Table for Statement addressed in this Statement of Compliance is provided at Attachment:	B
An audit table for the Statement addressed in this Statement of Compliance must be provided with this Statement of Compliance. The audit table must be prepared and maintained in accordance with the Office of the Environmental Protection Authority's (OEPA) <i>Post Assessment Guideline for Preparing an Audit Table</i> , as amended from time to time. The 'Status Column' of the audit table must accurately describe the compliance status of each implementation condition and/or procedure for the reporting period of this Statement of Compliance. The terms that may be used by the proponent in the 'Status Column' of the audit table are limited to the Compliance Status Terms listed and defined in The CAP.	

Were all implementation conditions and/or procedures of the Statement complied with within the reporting period? (please tick ✓ the appropriate box)			
No (please proceed to Section 3)	✓	Yes (please proceed to Section 4)	

Each page (including Attachment 2) must be initialed by the person who signs Section 4 of this Statement of Compliance. INITIALS: 

3 Details of Non-compliance(s) and/or Potential Non-compliance(s)

The information required Section 3 must be provided for each non-compliance or potential non-compliance identified during the reporting period covered by this Statement of Compliance.

Non-compliance/potential non-compliance

Which implementation condition or procedure was non-compliant or potentially non-compliant?
Condition 9 Offsets The approved Offset Management Plan notes that management actions at Offset Site 8 (Lot 27 Tredrea Place, Myalup) will include fox baiting with 1080 annually after fence installation. No fox baiting was conducted during the reporting period. The Offset Management Plan prepared to comply with Condition 9 includes more than 100 management actions that Main Roads has developed. Except for one management action, all management actions were complied with. The single management measure that was non-compliant related to not baiting for foxes with 1080 baits within Offset Site 8 (Lot 27 Tredrea Place, Myalup). A feral animal survey to determine the presence of foxes at the site will be undertaken in Q4 2025. The scale and nature of the autumn/winter 2026 baiting will be guided by the outcome of the feral animal survey. It should be noted that Main Roads has elected to undertake baiting at the property even though the values being offset by this only relate Tuart Woodlands PEC and Tuart- Peppermint Woodlands PEC.
Was the implementation condition or procedure non-compliant or potentially non-compliant?
Non-compliant
On what date(s) did the non-compliance or potential non-compliance occur (if applicable)?
May 2024-May 2025 reporting period.

Was this non-compliance or potential non-compliance reported to the General Manager, OEPA?	
☒ Yes ☒ Reported to OEPA verbally Date 28/08/2025 ☐ Reported to OEPA in writing Date _____ ☐ No	

What are the details of the non-compliance or potential non-compliance and where relevant, the extent of and impacts associated with the non-compliance or potential non-compliance?
As per the approved Offset Management Plan for the project Lot 27 Tredrea Place is an offset for the residual impact to Tuart Woodlands PEC and Tuart- Peppermint Woodlands PEC.

Each page (including Attachment 2) must be initialed by the person who signs Section 4 of this Statement of Compliance. INITIALS: 

The noted non-compliance in respect to fox baiting has had no substantive impact on the values of the environmental offset. The presence of foxes at the site has not impacted the existing Tuart Woodlands PEC and Tuart- Peppermint Woodlands PEC.

What is the precise location where the non-compliance or potential non-compliance occurred (if applicable)? (please provide this information as a map or GIS co-ordinates)

Lot 27 Tredrea Place, Myalup (115.7074127° E, 33.1139195° S).

What was the cause(s) of the non-compliance or potential non-compliance?

Availability of resources to manage and implement feral animal surveys and subsequent 1080 baiting.

What remedial and/or corrective action(s), if any, were taken or are proposed to be taken in response to the non-compliance or potential non-compliance?

Regular visits to the property have not identified the presence of foxes. An feral animal survey to determine the presence of foxes at the site will be undertaken in Q4 2025. Based on the outcome of this assessment, fox control using 1080 baits will be undertaken in autumn/winter 2026.

What measures, if any, were in place to prevent the non-compliance or potential non-compliance before it occurred? What, if any, amendments have been made to those measures to prevent re-occurrence?

Project compliance management is currently managed through a number of spreadsheets.

Main Roads is currently in the process of implementing an on-line compliance management system for this project.

Please provide information/documentation collected and recorded in relation to this implementation condition or procedure:

- in the reporting period addressed in this Statement of Compliance; and
- as outlined in the approved Compliance Assessment Plan for the Statement addressed in this Statement of Compliance.

(the above information may be provided as an attachment to this Statement of Compliance)

The Compliance Assessment Plan for MS 1191 was approved on 22/07/2022. The information provided above in Section 3 reflects the non-compliance information as detailed in Section 2.5 of the approved CAP:

Proponent Declaration

I, Martine Scheikema (full name and position title) declare that I am authorised on behalf of the Commissioner of Main Roads Western Australia (being the person responsible for the proposal) to submit this form and that the information contained in this form is true and not misleading.

Signature: Martine Scheikema Date: 28.08.25

Please note that:

- it is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give or cause to be given information that to his knowledge is false or misleading in a material particular; and
- the Chief Executive Officer of the DWER has powers under section 47(2) of the *Environmental Protection Act 1986* to require reports and information about implementation of the proposal to which the statement relates and compliance with the implementation conditions.

4 Submission of Statement of Compliance

One hard copy and one electronic copy (preferably PDF on CD or thumb drive) of the Statement of Compliance are required to be submitted to the Chief Executive Officer, DWER, marked to the attention of Manager, Compliance (Ministerial Statements).

Please note, the DWER has adopted a procedure of providing written acknowledgment of receipt of all Statements of Compliance submitted by the proponent, however, the DWER does not approve Statements of Compliance.

5 Contact Information

Queries regarding Statements of Compliance, or other issues of compliance relevant to a Statement may be directed to Compliance (Ministerial Statements), DWER:

Manager, Compliance (Ministerial Statements)

Department of Water and Environmental Regulation

Postal Address: Locked Bag 33
Cloisters Square
PERTH WA 6850

Phone: (08) 6364 7000

Email: compliance@dwer.wa.gov.au

6 Post Assessment Guidelines and Forms

Post assessment documents can be found at www.epa.wa.gov.au

Each page (including Attachment 2) must be initialed by the person who signs Section 4 of this Statement of Compliance. INITIALS: MS

ATTACHMENT 1**Table 1 Compliance Status Terms**

Compliance Status Terms	Abbrev	Definition	Notes
Compliant	C	Implementation of the proposal has been carried out in accordance with the requirements of the audit element.	This term applies to audit elements with: - ongoing requirements that have been met during the reporting period; and - requirements with a finite period of application that have been met during the reporting period, but whose status has not yet been classified as 'completed'.
Completed	CLD	A requirement with a finite period of application has been satisfactorily completed.	This term may only be used where: - audit elements have a finite period of application (e.g. construction activities, development of a document); - the action has been satisfactorily completed; and - the Office of the Environmental Protection Authority (OEPA) has provided written acceptance of 'completed' status for the audit element.
Not required at this stage	NR	The requirements of the audit element were not triggered during the reporting period.	This should be consistent with the 'Phase' column of the audit table.
Potentially Non-compliant	PNC	Possible or likely failure to meet the requirements of the audit element.	This term may apply where during the reporting period the proponent has identified a potential non-compliance and has not yet finalized its investigations to determine whether non-compliance has occurred.
Non-compliant	NC	Implementation of the proposal has not been carried out in accordance with the requirements of the audit element.	This term applies where the requirements of the audit element are not "complete" have not been met during the reporting period.

Each page (including Attachment 2) must be initialed by the person who signs Section 4 of this Statement of Compliance. INITIALS: 

Compliance Status Terms	Abbrev	Definition	Notes
In Process	IP	Where an audit element requires a management or monitoring plan be submitted to the OEPA or another government agency for approval, that submission has been made and no further information or changes have been requested by the OEPA or the other government agency and assessment by the OEPA or other government agency for approval is still pending.	The term 'In Process' may not be used for any purpose other than that stated in the Definition Column. The term 'In Process' may not be used to describe the compliance status of an implementation condition and/or procedure that requires implementation throughout the life of the project (e.g. implementation of a management plan).

Each page (including Attachment 2) must be initialed by the person who signs Section 4 of this Statement of Compliance. INITIALS: 



Appendix B

MS 1191 Audit Table

MS 1191 Audit Table

Note:

- Phases that apply in this table = Pre-Construction, Construction, Operation, Decommissioning, Overall (several phases).
- This audit table is a summary and timetable of conditions and commitments applying to this Proposal. Refer to the Minister's Statement for full detail/precise wording of individual elements.
- Code prefixes: M = Minister's condition, P = Proponent's commitment.
- Acronyms list: CEO = Chief Executive Officer of OEPA; DEC = Department of Environment Regulation; DPAW = Department of Parks and Wildlife; DIA = Department of Indigenous Affairs; DMP = Department of Mining and Petroleum; DWER = Department of Water and Environmental Regulation; EPA = Environmental Protection Authority; DoH = Department of Health; DoW = Department of Water, Minister for Env = Minister for the Environment; OEPA = Office of the Environmental Protection Authority.
- Compliance Status: C = Compliant, CLD = Completed, NA = Not Audited, NC = Non – compliant, NR = Not Required at this stage. Please note the terms VR = Verification Required and IP = In Process are only for OEPA use.

Audit Table for Ministerial Statement 1191

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M1.1	Limitations and extent of proposal	When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extents: Clearing and disturbance of no more than 71.5 ha of native vegetation within a 200 ha development envelope.	Implement Proposal in accordance with limitations and extents.	Annual Compliance Assessment Report (CAR)	Overall	Ongoing	C	Clearing and disturbance of 0.30 ha of native vegetation has occurred during the reporting period. Clearing and disturbance of a total of 48.49 ha of native vegetation has occurred since clearing for the Proposal commenced (and at the end of this reporting period). Clearing for the Proposal is well below the 71.5 ha permitted. Refer to Table 3 and Figure 2 of this CAR.
1191:M2.1	Inland Waters	The proponent shall implement the proposal to achieve the following environmental outcomes: (1) clear no more than: (a) 0.2 ha of Conservation Category Wetlands; and (b) 1.4 ha of Resource Enhancement Wetlands.	Implement Conditions M2-2 and M2-3. Implement Proposal and clearing in accordance with limitations and extents of Condition M2-1(1).	Annual CAR	Overall	Ongoing	C	Clearing and disturbance of 0 ha of Conservation Category Wetland has occurred during the reporting period. Clearing and disturbance of a total of 0.11 ha of Conservation Category Wetland has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 0.2 ha permitted. Clearing and disturbance has not occurred within areas classified as Resource Enhancement Wetland during the reporting period. Clearing and disturbance of a total of 0.52 ha of Conservation Category Wetland has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 1.4 ha permitted. Refer to Table 3 and Figure 5 of this CAR.
		(2) no project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions: (a) Five Mile Brook (incorporating Multiple Use Wetland UFI-1163 and Conservation Category Wetland UFI-931); (b) Conservation Category Wetland (UFI-14478); (c) Resource Enhancement Wetlands (UFI-1117 and UFI-15493) and; (d) black-stripe minnow (<i>Galaxiella nigrostriata</i>) habitats defined and mapped in the proponent's Action Management Plan Conservation Significant Fauna (Revision 2 August 2021) that are within or adjoins the development envelope, except for the black-stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).					C	There have been no project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions: (a) Five Mile Brook (incorporating Multiple Use Wetland UFI-1163 and Conservation Category Wetland UFI-931); (b) Conservation Category Wetland (UFI-14478); (c) Resource Enhancement Wetlands (UFI-1117 and UFI-15493) and; (d) Black-stripe minnow (<i>Galaxiella nigrostriata</i>) habitats Refer to Appendix J: M2-4 Environmental Performance Report – Inland Waters.
1191:M2.2	Inland Waters	Prior to ground-disturbing activities, the proponent shall undertake monitoring of the hydrological regimes of the values listed in condition 2-1(2) and submit a report to the CEO about the preconstruction baseline conditions and predicted post-development hydrological regime.	Prepare Hydrological Regime Report.	Baseline Hydrological Regime Report	Pre-construction	Prior to ground-disturbing activities	CLD	The Baseline Hydrological Regime Report was submitted to DWER on the 18 July 2022, prior to ground-disturbing activities. Refer to M2-2, Baseline Hydrological Regime Report.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M2.3	Inland Waters	The proponent shall continue to undertake monitoring of hydrological regime and water quality during and post-construction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 2-1(2) have been met.	Monitoring of hydrological regimes and water quality.	Annual Hydrological Regime Report Annual CAR	Overall	During construction, and until the CEO is satisfied that the proponent has demonstrated the outcomes in Condition M2-1(2) have been met	C	Monitoring of hydrological regimes and water quality has been conducted during the reporting period. Refer to Appendix J: M2-4 Environmental Performance Report – Inland Waters.
1191:M2.4	Inland Waters	The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall: (1) outline the monitoring that was undertaken during the implementation of the proposal; (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1(2) were achieved; (3) report whether that the outcomes in condition 2-1(2) were achieved; and (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 2-1(2).	Prepare an annual Environmental Performance Report (EPR) in relation to Inland Waters.	EPR as part of Annual CAR	Overall	By 31 August 2023 and annually thereafter	C	Refer to Appendix J: M2-4 Environmental Performance Report – Inland Waters.
1191:M2.5	Inland Waters	The proponent shall not construct bridge footings, drainage structures and abutments within the area depicted in Figure 5.	The Proposal shall be designed and constructed in accordance with Condition M2-5.	Annual CAR	Overall	Ongoing	C	No construction of bridge footings, drainage structures and abutments has occurred within the area depicted in Figure 5.
1191:M3.1	Flora and Vegetation	The proponent shall implement the proposal to achieve the following environmental outcomes: (1) clear no more than: (a) 23.4 ha of vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (<i>Banksia Woodlands</i>); (b) 4.4 ha of vegetation representative of the Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and (c) 4.5 ha of vegetation representative of the Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC.	Implement Proposal and clearing in accordance with limitations and extents of Condition M3-1(1). Implement Conditions M3-2 and M3-3 with regard to Baseline and Annual PEC Reports. Implement Condition M3-5.	Annual CAR Baseline and Annual PEC Reports Design, survey, and GIS files	Overall	Until the CEO is satisfied that the proponent has demonstrated the outcomes in Condition M3-1(2) have been met	C	Clearing and disturbance has included: (a) 0.05 ha of vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (<i>Banksia Woodlands</i>) during the reporting period. Clearing and disturbance of a total of 17.70 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 23.4 ha permitted. (b) 0 ha of vegetation representative of the Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands) during the reporting period. Clearing and disturbance of a total of 3.48 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 4.4 ha permitted. (c) 0 ha of vegetation representative of the Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC during the reporting period. Clearing and disturbance of a total of 3.58 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 4.5 ha permitted. Refer to Table 2 and Figure 5 of this CAR.
		(2) ensure there are no project attributable indirect impacts, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands, and Tuart-Peppermint Woodlands within twenty (20) metres outside the development envelope (defined in Figure 2a and Figure 2b) and within the clearing exclusion areas (defined in Figure 1).					C	There have been no project attributable indirect impacts, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands, and Tuart-Peppermint Woodlands. Refer to Appendix K, M3-4 Environmental Performance Report – Flora and Vegetation (PEC).

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M3.2	Flora and Vegetation	Prior to ground-disturbing activities, the proponent shall undertake monitoring of the values listed in condition 3-1(2) and submit a report about the preconstruction baseline conditions to the CEO.	Prepare and submit Baseline PEC / TEC Report.	Baseline PEC / TEC Report	Pre-construction	Prior to ground-disturbing activities	CLD	The Baseline PEC / TEC Report was submitted to DWER on the 18 July 2022, prior to ground-disturbing activities. Refer to M3-2, Baseline PEC / TEC Report.
1191:M3.3	Flora and Vegetation	The proponent shall continue to undertake monitoring during and postconstruction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 3-1(2) has been met.	Annual PEC / TEC Report.	Annual PEC Report Annual CAR	Overall	Until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 3-1(2) has been met	C	Refer to Appendix K, M3-4 Environmental Performance Report – Flora and Vegetation (PEC).
1191:M3.4	Flora and Vegetation	The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall: (1) outline the monitoring that was undertaken during the implementation of the proposal; (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 3-1(2) were achieved; (3) report whether that the outcomes in conditions 3-1(1) and 3-1(2) were achieved; and (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in conditions 3-1(1) and 3-1(2).	Prepare an annual Environmental Performance Report (EPR) in relation to Flora and Vegetation.	EPR as part of Annual CAR	Overall	By 31 August 2023 and annually thereafter	C	Refer to Appendix K, M3-4 Environmental Performance Report – Flora and Vegetation (PEC).
1191:M3.5	Flora and Vegetation	The proponent shall undertake the following actions within the development envelope during construction and for five (5) years post-construction: (1) implement hygiene protocols consistent with the Management of <i>Phytophthora cinnamomi</i> for Biodiversity Conservation in Australia, Part 2 National Best Practice Guidelines as amended or replaced from time to time; and (2) undertake weed control and management to prevent the introduction or spread of environmental weeds.	Implement Dieback Management Plan. Implement weed control and management.	Dieback Management Plan Annual CAR	Overall	During construction and for 5 years post-construction	C	Refer to M3-5, SWGA Phytophthora Dieback Management Plan (SWGA-30-134-20-PLN-0001-0). Refer to M3-5, Phytophthora Dieback Re-Assessment Report(s). Refer to M0, SWGA Construction Environmental Management Plan (SWGA-00-134-20-MPL-0002-0). Refer to M3-5, SWGA Topsoil and Mulch Management Plan (SWGA-30-134-20-PLN-0002-0).
1191:M4.1	Terrestrial Fauna (Construction)	The proponent shall implement the proposal to achieve the following environmental outcomes: (1) clear no more than: (a) 60.9 ha of habitat for western ringtail possum; (b) 60.9 ha of black cockatoo foraging and breeding habitat; (c) 1088 black cockatoo potential nesting trees, and 11 trees with suitable hollows; (d) 39.2 ha of habitat for south-western brush-tailed phascogale; and (e) 5.5 ha of habitat for black-stripe minnow.	Implement Proposal and clearing in accordance with limitations and extents of Condition M4-1(1).	Annual CAR Design, survey, and GIS files	Overall	During implementation of the proposal	C	Clearing and disturbance has included: (a) 0.19 ha of habitat for western ringtail possum during the reporting period. Clearing and disturbance of a total of 42.52 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 60.9 ha permitted. (b) 0.19 ha of black cockatoo foraging and breeding habitat during the reporting period. Clearing and disturbance of a total of 42.52 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 60.9 ha permitted. (c) 0 black cockatoo potential nesting trees during the reporting period. Clearing of a total of 702 trees has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 1088 trees permitted. No trees with potentially suitable hollows for Black cockatoo nesting were cleared during the reporting period. Clearing of a total of three (3) trees has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 11 trees permitted.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
								(d) 0.08 ha of habitat for south-western brush-tailed phascogale during the reporting period. Clearing and disturbance of a total of 29.89 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 39.2 ha permitted. (e) 0.04 ha of potential habitat for black-stripe minnow during the reporting period. Clearing and disturbance of a total of 2.45 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 5.5 ha permitted. Refer to Table 2 and Figures 4a and 4b of this CAR.
1191:M4.2	Terrestrial Fauna (Construction)	Prior to ground-disturbing activities the proponent shall undertake the following actions: (1) within seven (7) days prior to clearing, using a qualified and licensed terrestrial fauna spotter with experience in surveying for black cockatoos, inspect all potential nesting trees hollows within the development envelope to determine if any hollows are being used for nesting by black cockatoos; (2) if any hollows are in use by black cockatoos, the proponent shall not disturb or clear the nesting tree, or vegetation within a ten (10) metre radius of the nesting tree, until after the cockatoos have naturally completed nesting (young have fledged and dispersed) and an appropriately qualified terrestrial fauna spotter has verified that the hollow(s) are no longer being used by black cockatoos; and	Undertake Black cockatoo surveys in accordance with Condition M4-2(1) within 7 days prior to clearing. Implement pre-clearing protocols of Conditions M4-2(1) and M4-2(2).	Survey Report Annual CAR	Pre-construction & Construction	Prior to ground-disturbing activities for each stage of clearing	C	Pre-clearing survey reports in relation to Black cockatoos have been prepared for each clearing stage (refer to CAR, Table 3 for clearing stages). Refer to M4-2, Black cockatoo pre-clearing survey reports.
		(3) within seven (7) days prior to clearing (or if staged, prior to each stage) implement pre-clearance protocols to minimise impacts to terrestrial fauna.					C	Refer to Appendix C: Construction Fauna Management Plan (CFMP) Audit Table including in relation to 'sensitive clearing protocols'.
1191:M4.3	Terrestrial Fauna (Construction)	During the construction of the proposal the proponent shall: (1) ensure the presence of appropriately qualified fauna spotters during clearing activities;	Engage appropriately qualified fauna spotters during clearing activities. Implement Condition M4-3(2) and M4-3(3).	Annual CAR	Construction	During the construction of the proposal	C	At least one appropriately qualified fauna spotter(s) (depending on habitat category) was present during clearing activities. Refer to M0 Independent Daily Inspection Reports. Fauna spotter accreditation: Regulation 28: Fauna Taking (Relocation) Licence. Licence Number: FR28000016-11 Licence Number: FR28000016-10b Licence Number: FR28000318-4b Section 40: Authorisation to Take or Disturb Threatened Species. Amendment Number: TFA – 2019 – 0188c Authorisation Number: TFA – 2425 - 0182 Authorisation Number: TFA – 2223 – 0034 Authorisation Number: TFA – 2020-0013f
		(2) not clear or cause any project attributable indirect impacts to the clearing exclusion areas as defined in Figure 1; and					C	No clearing or project attributable indirect impacts have occurred to vegetation within the clearing exclusion areas. Refer to Appendix K, M3-4 Environmental Performance Report – Flora and Vegetation (PEC).
		(3) ensure foraging species for black cockatoos are not planted within ten (10) metres of the road.					C	No potential black cockatoo foraging species have been planted within 10m of the road.
1191:M4.4	Terrestrial Fauna (Construction)	The proponent must install one artificial black cockatoo nesting hollow for each suitable hollow that cannot be avoided in the 11 trees with suitable hollows identified in condition 4-1(1)(c).	Install artificial black cockatoo nesting hollows.	Annual CAR	Overall	Prior to commencement of the next black cockatoo breeding	C	No trees with potentially suitable hollows for Black cockatoo nesting were cleared during the reporting period. Clearing of a total of three (3) trees has occurred since clearing for the Proposal commenced (and at the end of this reporting period).

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
						season following clearing.		The installation of three (3) nesting hollows was reported in the 2022-2023 CAR. Three (3) artificial nesting hollows were installed in June 2023 in accordance with Condition 4.4. Refer to M4-4_4-6 Report: Installation of Four Artificial Nest Hollows, Ducane Reserve WA (Australian Black Cockatoo Specialists, June 2023).
1191:M4.5	Terrestrial Fauna (Construction)	Each artificial black cockatoo nesting hollow required by condition 4-4 must be installed prior to commencement of the next black cockatoo breeding season following clearing.	Install artificial black cockatoo nesting hollows required under Condition M4-4 prior to commencement of the next black cockatoo breeding season following clearing.	Annual CAR	Overall	Prior to commencement of the next black cockatoo breeding season following clearing.	C	Clearing of a total of three (3) trees has occurred since clearing for the Proposal commenced (and at the end of this reporting period). Three (3) artificial nesting hollows were installed in June 2023 in consultation with DBCA, prior to the following breeding season in Spring. Refer to M4-4_4-6 Report: Installation of Artificial Nest Hollows, Ducane Reserve WA (Australian Black Cockatoo Specialists, June 2023).
1191:M4.6	Terrestrial Fauna (Construction)	The artificial black cockatoo nest hollow(s) required by condition 4-4 of must: (1) be installed at the locations identified by DBCA within property locations as set out and described in Table 1 of condition 9-2. (2) be designed and placed in accordance with the specifications details in How to design and place artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline; and (3) be monitored and maintained in accordance with the specifications detailed in How to monitor and maintain artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline, for a period of at least ten (10) years.	Design and install artificial black cockatoo nesting hollow required under Condition M4-4 in consultation with DBCA and according the DBCA guidelines. Monitor artificial nesting hollows for a period of 10 years.	Correspondence from DBCA Annual CAR & EPR	Overall	Prior to commencement of the next black cockatoo breeding season following clearing and monitored and maintained for at least 10 years	C	The installation of nesting hollows was reported in the 2022-2023 CAR. Three (3) artificial nesting hollows were installed in June 2023. All hollows were installed in accordance with DBCA's Fauna Note on Artificial Hollows for Black Cockatoos (2023). The three artificial hollows were inspected in March 2024. No signs of prospecting or nesting by Black Cockatoos were recorded. Monitoring of the three artificial hollows will continue for at least 10 years. Refer to M4-4_4-6 Report: Installation of Artificial Nest Hollows, Ducane Reserve WA (Australian Black Cockatoo Specialists, June 2023). Refer to Appendix L, M4-7 Environmental Performance Report – Black Cockatoos.
1191:M4.7	Terrestrial Fauna (Construction)	The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, for a period of at least ten (10) years, that shall: (1) outline the monitoring and maintenance that was undertaken in accordance with the specifications detailed in How to monitor and maintain artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline; and (2) outline the results of the monitoring and maintenance undertaken.	Prepare an annual Environmental Performance Report (EPR) in relation to Condition M4-7.	EPR as part of Annual CAR	Overall	Annually for at least 10 years	C	Three (3) artificial nesting hollows have been required to be installed to date. The three artificial hollows were inspected in March 2024. No signs of prospecting or nesting by Black Cockatoos were recorded. Refer to M4-4_4-6 Report: Installation of Artificial Nest Hollows, Ducane Reserve WA (Australian Black Cockatoo Specialists, June 2023). Refer to Appendix L, M4-7 Environmental Performance Report – Black Cockatoos.
1191:M5.1	Construction Fauna Management Plan	The proponent shall implement the proposal to achieve the following environmental objective: (1) during construction, minimise and manage project attributable adverse impacts to conservation significant terrestrial fauna including western ringtail possum and south-western brush-tailed phascogale.	Implement Construction Fauna Management (CFM) Plan	Annual CAR CFM Plan	Construction	During construction	C	The CFMP has been implemented to reduce the risk of project attributable adverse impacts to conservation significant terrestrial fauna. Refer to Appendix C: Construction Fauna Management Plan Audit Table, for management actions and outcomes.
1191:M5.2	Construction Fauna Management Plan	The proponent shall prepare a Construction Fauna Management Plan and submit to the CEO prior to ground-disturbing activities.	Prepare CFM Plan.	CFM Plan Annual CAR	Pre-construction	Prior to ground-disturbing activities	CLD	Letter of approval for the CFMP was received from DWER on 22 July 2022 (DWER Ref: DWERT10554). A copy of the CFMP is available on the Main Roads website. Refer to M5-2, Construction Fauna Management Plan.
		This Plan shall: (1) specify the passive relocation management actions to be implemented prior to and during clearing;					C	Refer to Section 2.1 of the CFMP.

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Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(2) define the low-risk clearing timeframe for western ringtail possum applicable to Category 1 Clearing Areas and append supplementary survey evidence to justify the chosen timeframe;					C	Refer to Table 1-5 of the CFMP.
		(3) specify monitoring that: (a) includes a baseline survey to be undertaken within thirty (30) days prior to clearing (or if staged, prior to each clearing stage) to confirm presence/absence and number of western ringtail possum and south-western brush-tailed phascogale individuals within the development envelope and at receival sites. The baseline survey shall be prepared and undertaken on advice of DBCA during the preparation of the Construction Fauna Management Plan; (b) records whether threatened or priority fauna is encountered during clearing, and reports to the CEO and DBCA within thirty (30) days after clearing (or each clearing stage) on the number of individuals relocated in accordance with any requirements of the lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i>; (c) evaluates the suitability, adequacy, and effectiveness of passive relocation management actions at reducing impacts to western ringtail possum individuals displaced by clearing from Category 1 Clearing Areas defined in Figure 3; (d) evaluates impacts to residential western ringtail possum individuals at receival sites; and (e) uses monitoring methods including, but not limited to, radio telemetry with robust sample sizes (the minimum number of tagged animals to be determined in consultation with DBCA).					C	Refer to Table 2-1 and Section 2.3 in the CFMP.
		(4) identify and spatially define the study area(s) and reference sites proposed for monitoring and evaluation and provide rationale for the location of the sites;					C	Refer to Figures 7 – 9 in the CFMP.
		(5) specify management actions; management targets; monitoring locations, methodologies, indicators, and timing; and actions and investigations in the event of a failure to meet a management target to demonstrate that the objective in condition 5-1 will be met; and					C	Refer to Tables 2-1, 2-2, and 2-3 of the CFMP for management actions, management targets and monitoring locations.
		(6) be prepared in consultation with the DBCA and in accordance with any requirements of a lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i> .					C	Refer to Section 4 of the CFMP.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M5.3	Construction Fauna Management Plan	The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall: (1) outline the monitoring that was undertaken during the implementation of the Construction Fauna Management Plan required in condition 5-2; (2) outline the results of the monitoring undertaken to report whether that the environmental objective specified in condition 5-1(1) was achieved; (3) report whether that the objective in condition 5-1(1) was achieved; and (4) outline any management actions undertaken during the implementation of the Construction Fauna Management Plan required in condition 5-2 to meet the objective in condition 5-1(1).	Prepare an annual Environmental Performance Report (EPR) in relation to Construction Fauna Management (Condition M5-3).	EPR as part of Annual CAR	Overall	By 31 August 2023 and annually thereafter	C	Refer to Appendix M, M5-3 Environmental Performance Report - CFMP.
1191:M5.4	Construction Fauna Management Plan	The proponent shall not commence ground-disturbing activities until the CEO has confirmed in writing that the Construction Fauna Management Plan satisfies the requirements of condition 5-2.	Prepare and submit CFM Plan. Approval of CFM Plan by CEO.	Correspondence from CEO Annual CAR	Pre-construction	Prior to ground-disturbing activities	CLD	Letter of approval for CFMP (Rev1A; July 2022) received from DWER on 22 July 2022 (DWER Ref: DWERT10554). A copy of the CFMP is available on the Main Roads website. Refer M5-4, Construction Fauna Management Plan – Approval.
1191:M5.5	Construction Fauna Management Plan	The proponent shall implement the latest revision of the Construction Fauna Management Plan approved by the CEO.	Implement latest version of CFM Plan. Undertake baseline fauna survey for WRP and BPh within 30 days prior to clearing. Record and report priority fauna encountered during clearing. Monitoring including radio-telemetry surveys.	Annual CAR CFM Plan Pre-clearing fauna survey reports Priority fauna records and reports Monitoring surveys Correspondence with CEO	Overall	Until the CEO has confirmed that the proponent has demonstrated that the requirements of the Construction Fauna Management Plan have been achieved	C	Refer to Appendix C, Construction Fauna Management Plan (CFMP) Audit Table. Refer to Appendix M, M5-3 Environmental Performance Report - CFMP. Refer to M5-5, Baseline pre-clearing terrestrial fauna surveys. Refer to M5-5, Fauna records during clearing.
1191:M5.6	Construction Fauna Management Plan	The proponent: (1) may review and submit proposed amendments to the Construction Fauna Management Plan; or (2) shall review and submit proposed amendments to the Construction Fauna Management Plan when directed by the CEO.	CFM Plan reviewed as required.	CFM Plan	Overall	As required or when directed by the CEO	NR	Not required at this stage.
1191:M5.7	Construction Fauna Management Plan	The proponent shall continue to implement the Construction Fauna Management Plan as approved by the CEO in writing, until the CEO has confirmed by written notice that the proponent has demonstrated that the requirements of the Construction Fauna Management Plan have been achieved.	Implement CFM Plan.	CFM Plan Annual CAR Correspondence from CEO	Overall	Until the CEO has confirmed that the proponent has demonstrated that the requirements of the Construction Fauna Management Plan have been achieved	C	Refer to Appendix C, Construction Fauna Management Plan (CFMP) Audit Table.
1191:M6.1	Habitat Fragmentation Management Plan	The proponent shall ensure the implementation of the proposal achieves the following environmental objectives: (1) minimise the impacts of habitat fragmentation that are attributable to the proposal on western ringtail possum; and (2) minimise the impacts from predation that are exacerbated by the proposal on western ringtail possum.	Implement Habitat Fragmentation Management (HFM) Plan in accordance with Condition M6-3.	Annual CAR HFM Plan	Overall	Ongoing	C	Refer to Appendix D Habitat Fragmentation Management Plan (HFMP) Audit Table.
1191:M6.2	Habitat Fragmentation Management Plan	The proponent shall ensure the implementation of the proposal achieves the following environmental outcome: (1) abundance and persistence of the western ringtail possum in the receival sites returns to pre-	Implement HFM Plan.	Annual CAR HFM Plan	Overall	Within a maximum of 15 years from the commencement of construction	C	Refer to Appendix D, Habitat Fragmentation Management Plan (HFMP) Audit Table. Refer to Appendix L, M5-3 Environmental Performance Report - CFMP.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		disturbance levels within a maximum of fifteen (15) years from the commencement of construction.						
1191:M6.3	Habitat Fragmentation Management Plan	The proponent shall prepare a Habitat Fragmentation Management Plan and submit to the CEO prior to ground-disturbing activities.	Prepare and submit HFM Plan, including consultation with DBCA.	HFM Plan Consultation with DBCA	Pre-construction	Prior to ground-disturbing activities	CLD	Habitat Fragmentation Management Plan (HFMP) submitted to CEO on 22 July 2022. A copy of the HFMP is available on the Main Roads website. Refer to M6-3, Habitat Fragmentation Management Plan.
		This Plan shall: (1) when implemented, substantiate, and ensure that conditions 6-1 and 6-2 are being met;					C	The approved HFMP has been developed to achieve the objectives of Conditions 6.1 and 6.2 and the ongoing monitoring will demonstrate these objectives have been met. Refer to Appendix D, Habitat Fragmentation Management Plan (HFMP) Audit Table. Refer to Appendix M, M5-3 Environmental Performance Report – CFMP.
		<i>Fauna crossings, land-bridges and fragmentation</i> (2) specify the locations, dimensions and designs of fauna crossings to reconnect terrestrial fauna habitats, including tree-canopy connections to fauna crossings for western ringtail possum (and brush-tailed phascogale);					C	Refer to Section 2.3 of the HFMP.
		(3) specify the locations and designs of a minimum of two (2) fauna land bridges, which are to be: (a) a minimum width of five (5) metres at the Yalinda Drive traffic bridge; and (b) between five (5) and ten (10) metres at the dedicated fauna land bridge east of Yalinda Drive (to be determined in consultation with DBCA);					C	Refer to Section 2.3.2 of the HFMP.
		(4) specify the revegetation and maintenance requirements of the fauna land bridges to maximise utilisation by western ringtail possums and ensure revegetation is self-sustaining or otherwise managed to ensure its ongoing survival;					C	Refer to Section 2.3.2.2 and 2.3.2.3 of the HFMP.
		(5) specify monitoring methodologies to evaluate the effectiveness and utilisation of fauna crossings and fauna land bridges by western ringtail possum against the objectives in condition 6-1 which must include, but not be limited to, monitoring of DNA scat analysis and camera-monitoring;					C	Refer to Section 2.3.3 of the HFMP.
		(6) specify monitoring methodologies to evaluate the project attributable effects of fragmentation on the demographics and genetics of the local western ringtail possum population and the effectiveness of minimisation measures to demonstrate whether the objective in condition 6-1(1) and outcome in condition 6-2 will be met; Predator control;					C	Refer to Section 2.3.3 of the HFMP.
		(7) specify actions to undertake targeted predator control to reduce predation impacts to conservation significant fauna, to be implemented: (a) one (1) month prior to clearing; (b) during construction of the proposal; and (c) at entrances/exits to fauna crossings and fauna land bridges for a minimum of five (5) years post-construction, subject to the five (5) yearly review required by condition 6-3(12); Abundance and persistence of western ringtail possum;					C	Refer to Section 2.4 of the HFMP.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(8) specify monitoring methodologies to evaluate the abundance and persistence of the western ringtail possum at the receival sites to demonstrate whether the outcome in condition 6-2 will be met; Protection and enhancement of adjacent habitat;					C	Refer to Table 2.4 of the HFMP.
		(9) demonstrate how the habitat within the clearing exclusion areas (excluding the 'Grey Giant' Heritage Place No. 26059 site) and vegetation retention areas (defined in Figure 4) in Gelorup will be maximised for benefits to western ringtail possums and, where relevant, include provisions to establish revegetation of degraded areas;					C	Refer to Section 2.6.1 of the HFMP.
		(10) include provisions to monitor revegetation required by condition 6-3(9), and undertake maintenance and remedial measures as required to demonstrate it is self-sustaining and habitat is maximised for benefits to western ringtail possums;					C	Refer to Sections 2.6.1 and 2.6.2 of the HFMP.
		(11) outline the long-term management and protection mechanism of the clearing exclusion areas and the vegetation retention areas as defined in Figure 4; General plan provisions;					C	Refer to Section 2.6.2 of HFMP.
		(12) be implemented for a minimum of fifteen (15) years post-construction, or otherwise agreed to by the CEO and on advice of DBCA following review of effectiveness every five (5) years;					NR	Review not yet required, refer to Section 3.3 for details on the HFMP review schedule.
		(13) specify management actions; management targets; monitoring locations, methodologies, indicators, and timing; and contingency actions and investigations in the event of a failure to meet a management target to demonstrate that the objectives in condition 6-1 and outcome in condition 6-2 will be met; and					C	Refer to Table 2-1, 2-2, and 2-3 of the HFMP.
		(14) be prepared in consultation with DBCA and in accordance with any requirements of a lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i> .					C	Refer to Section 4 of the HFMP.
1191:M6.4	Habitat Fragmentation Management Plan	The proponent shall include a report of a peer review carried out by an independent person or independent persons with suitable technical experience to review the Draft Habitat Fragmentation Management Plan, required under condition 6-3, to report on the adequacy of that content to achieving the objectives and outcome specified in conditions 6-1 and 6-2.	Engage an independent person to undertake peer review. Submit peer review of HFM Plan to CEO.	Peer review of HFM Plan Correspondence with CEO	Pre-construction	Prior to ground-disturbing activities	CLD	A Peer Review of the HFMP was completed on 8 June 2022, prior to ground disturbance. Refer to Appendix C of the HFMP for the Peer Review Report.
1191:M6.5	Habitat Fragmentation Management Plan	The proponent shall submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, following the review of effectiveness every five (5) years, required by condition 6-3(12), that shall: (1) outline the monitoring that was undertaken during the implementation of the Habitat Fragmentation Management Plan required in condition 6-3; (2) outline the results of the monitoring undertaken to report whether that the environmental objectives and outcome specified in conditions 6-1 and 6-2 was achieved; (3) report whether that the objectives and outcome specified in conditions 6-1 and 6-2 was achieved; and (4) outline any management actions undertaken during the implementation of the Habitat Fragmentation Management Plan required in condition 6-3 to meet	Prepare an Environmental Performance Report (EPR) in relation to the HFM Plan.	EPR as part of Annual CAR	Overall	Every 5 years	NR	Not required at this stage. EPR in relation to the HFMP due in 2027.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		the objectives and outcome specified in conditions 6-1 and 6-2.						
1191:M6.6	Habitat Fragmentation Management Plan	The proponent shall include a report of a peer review carried out by an independent person or independent persons with suitable technical experience to review the Environmental Performance Reports, required under condition 6-5, with the report and to report on the adequacy of that content to achieving the objectives and outcome specified in conditions 6-1 and 6-2.	Peer review of EPR required under Condition M6-5.	Peer review and report	Overall	Every 5 years	NR	Peer Review of EPR in relation to the HFMP due in 2027.
1191:M6.7	Habitat Fragmentation Management Plan	The proponent shall not commence ground-disturbing activities until the CEO has confirmed in writing that the Habitat Fragmentation Management Plan satisfies the requirements of condition 6-3.	Prior to ground-disturbing activities, confirmation from CEO that HFM Plan satisfies Condition M6-3.	HFM Plan Correspondence from CEO	Pre-construction	Prior to ground-disturbing activities	CLD	Letter of approval for HFMP (Rev1A; July 2022) was received from DWER on 22 July 2022 (DWER Ref: DWERT10552). Refer to M6-7, Habitat Fragmentation Management Plan – Approval.
1191:M6.8	Habitat Fragmentation Management Plan	The proponent shall implement the latest revision of the Habitat Fragmentation Management Plan approved by the CEO.	Implement latest version of HFM Plan.	HFM Plan Annual CAR	Overall	When HFM Plan has been updated	C	Refer to Appendix D, Habitat Fragmentation Management Plan (HFMP) Audit Table.
1191:M6.9	Habitat Fragmentation Management Plan	The proponent: (1) may review and submit proposed amendments to the Habitat Fragmentation Management Plan; or (2) shall review and submit proposed amendments to Habitat Fragmentation Management Plan when directed by the CEO.	Review HFM Plan as required.	HFM Plan Correspondence from CEO	Overall	As required or when directed by the CEO	NR	Not required at this stage.
1191:M6.10	Habitat Fragmentation Management Plan	The proponent shall continue to implement the Habitat Fragmentation Management Plan as approved by the CEO in writing, until the CEO has confirmed by written notice that the proponent has demonstrated that the environmental objectives and outcomes detailed in conditions 6-1 and 6-2 of the Habitat Fragmentation Management Plan have been achieved.	Implement HFM Plan.	Annual CAR HFM Plan Correspondence from CEO	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objectives and outcomes in conditions 6-1 and 6-2 of the Habitat Fragmentation Management Plan have been achieved	C	Refer to Appendix D, Habitat Fragmentation Management Plan (HFMP) Audit Table.
1191:M7.1	Social Surroundings (Noise)	The proponent shall implement the proposal to meet the following environmental objective: (1) minimise operational noise impacts on existing noise sensitive receptors, as far as practicable.	Implement Conditions M7-2 to M7-7	Annual CAR TNM Plan	Overall	Ongoing	C	Refer to Appendix G Traffic Noise Management Plan (TNMP) Audit Table.
1191:M7.2	Social Surroundings (Noise)	At least six (6) months prior to the operation of the proposal and in order to meet the requirements of condition 7-1, the proponent shall prepare a Traffic Noise Management Plan to include: (1) outdoor noise management targets; (2) indoor noise management targets to apply to noise sensitive receptors where the construction of noise walls is not feasible or practicable; (3) the noise management actions to ensure the noise management targets are met during the operation of the proposal; (4) where noise walls will be constructed, the location, height, and timing of construction of the walls; (5) where acoustic treatment of houses will be implemented, the standard of treatments, timing, and evidence of consultation with affected stakeholders; (6) road design measures to minimise noise emissions where relevant and appropriate, including low noise road surfaces and selection of appropriate bridge expansion joints; (7) post-construction noise monitoring to demonstrate that noise management actions meet the relevant outdoor noise management targets; and	Prepare Traffic Noise Management (TNM) Plan.	Annual CAR TNM Plan	Construction	At least 6 months prior to the operation of the proposal	CLD	Traffic Noise Management Plan (TNMP) was submitted to DWER on 15 August 2024 and approved on 3 December 2024.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(8) contingency actions in the event relevant noise management targets are not met.						
1191:M7.3	Social Surroundings (Noise)	The Traffic Noise Management Plan shall be approved by notice in writing from the CEO prior to the commencement of operation.	Submission of TNM Plan.	Correspondence confirming approval of TNM Plan Annual CAR TNM Plan	Construction	Prior to the commencement of operation	CLD	The Traffic Noise Management Plan was approved by DWER CEO on 3 December 2024.
1191:M7.4	Social Surroundings (Noise)	The proponent: (1) may review and revise the Traffic Noise Management Plan; or (2) shall review and revise the Traffic Noise Management Plan when directed by the CEO by notice in writing.	TNM Plan will be reviewed annually and revised if required or as directed by the CEO.	Annual CAR TNM Plan	Overall	As required or when directed by the CEO	NR	Not required at this stage.
1191:M7.5	Social Surroundings (Noise)	The proponent shall implement the approved Traffic Noise Management Plan, or the most recent version, which the CEO has confirmed by notice in writing satisfies the requirements of condition 7-2.	Implement TNM Plan.	Annual CAR TNM Plan	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objective in condition 7-1 is being and will continue to be met	C	Refer to Appendix G, Traffic Noise Management Plan (TNMP) Audit Table.
1191:M7.6	Social Surroundings (Noise)	The proponent shall continue to implement the Traffic Noise Management Plan, or any subsequently approved revisions until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objective in condition 7-1 is being and will continue to be met.	Implement Traffic Noise Management Plan.	Annual CAR TNM Plan	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objective in condition 7-1 is being and will continue to be met	C	Refer to Appendix G, Traffic Noise Management Plan (TNMP) Audit Table.
1191:M7.7	Social Surroundings (Noise)	In the event of failure to implement management actions detailed in the approved Traffic Noise Management Plan, the proponent shall meet the requirements of condition 12-6 (Compliance Reporting) and shall immediately implement management actions to meet the requirements of condition 7-1.	Traffic Noise Corrective Actions Report. Revised Traffic Noise Management Plan.	Annual CAR Traffic Noise Corrective Actions Report	Overall	Immediately implement management actions	NR	Not required at this stage.
1191:M8.1	Social Surroundings (Amenity Management Plan)	The proponent shall demonstrate that the proposal is designed and constructed in order to meet the following environmental objective: (1) minimise the impacts to social connectivity and visual amenity.	Implement Amenity Management (AM) Plan in accordance with Condition M8.	AM Plan	Overall	Ongoing	C	Refer to Appendix E, Amenity Management Plan (AMP) Audit Table.
1191:M8.2	Social Surroundings (Amenity Management Plan)	The proponent shall demonstrate that the proposal is implemented to meet the following environmental outcome: (1) ensure no project attributable direct or indirect impacts to significant trees.	Implement Amenity Management (AM) Plan in accordance with Condition M8. Conduct surveys and monitoring of significant trees.	Annual CAR AM Plan Significant Tree Survey Reports	Overall	Ongoing	C	No significant trees have been impacted. Refer to Appendix J, M3-4 Environmental Performance Report – Flora and Vegetation (PEC)
1191:M8.3	Social Surroundings (Amenity Management Plan)	The proponent shall prepare an Amenity Management Plan and submit to the CEO within twelve (12) months of the issue of the statement. The Plan shall include, but not be limited to: (1) outcomes of consultation undertaken with the local community and relevant stakeholders regarding: (a) the specifications and locations of amenity infrastructure such as screen-walls, noise-walls, vegetative screening, landscaping, revegetation, pedestrian overpasses/underpasses, walking trails, foot/cycle paths, and any other relevant infrastructure; (2) a map of the amenity infrastructure to be constructed/installed; (3) the roles and responsibilities for on-going maintenance of the amenity infrastructure; and	Prepare AM Plan.	AM Plan Annual CAR	Overall	By 31 May 2023	CLD	The Bunbury Outer Ring Road (Southern Section) Amenity Management Plan (Main Roads WA Reference: D23#500728) was submitted to the CEO on 30 May 2023. The Bunbury Outer Ring Road (Southern Section) Amenity Management Plan (Rev 2 Oct 2023) was approved on 25 October 2023 (App-0398). Refer to M8-3, Amenity Management Plan.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(4) information to demonstrate how the objective in condition 8-1 and outcome in condition 8-2 will be achieved by the Amenity Management Plan.						
1191:M8.4	Social Surroundings (Amenity Management Plan)	After submitting the Amenity Management Plan and receiving approval by notice in writing from the CEO the proponent shall implement the Amenity Management Plan.	Implement AM Plan.	Annual CAR Correspondence with CEO	Overall	After receiving approval by the CEO	C	The Bunbury Outer Ring Road (Southern Section) Amenity Management Plan (Rev 2 Oct 2023) was approved on 25 October 2023 (App-0398). Refer to M8-4, Amenity Management Plan – Approval. Refer to Appendix E, Amenity Management Plan (AMP) Audit Table.
1191:M8.5	Social Surroundings (Amenity Management Plan)	Following construction, the proponent shall prepare and submit a report to demonstrate that the requirements of the Amenity Management Plan have been implemented and the objective of condition 8-1 and outcome of condition 8-2 has been achieved.	Prepare and submit a report on AM Plan implementation.	Report (Condition M8-5) Correspondence with CEO	Operation	Following construction	C	Refer to Appendix E, Amenity Management Plan (AMP) Audit Table.
1191:M9.1	Offsets	The proponent shall implement offset measures to counterbalance the significant residual impacts to the following environmental values: (1) 60.9 ha of habitat for western ringtail possum; (2) 60.9 ha of black cockatoo foraging and breeding habitat; (3) 39.2 ha of habitat for south-western brush-tailed phascogale; (4) 23.4 ha of Banksia Woodlands of the Swan Coastal Plain PEC (Banksia Woodlands); (5) 4.4 ha of Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and (6) 4.5 ha of Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC.	Implement Conditions M9-2 to M9-14.	Annual CAR	Overall	Ongoing	C	Refer to Appendix F, Offset Management Plan (OMP) Audit Table.
1191:M9.2	Offsets	To meet the requirement of condition 9-1 the proponent shall undertake offset measures to the extents and at the locations as set out and described in Table 1.	Implement offset measures in accordance with Table 1 and the BORR Southern Section Offset Management Plan (OMP).	Annual CAR	Overall	Ongoing	C	Refer to Appendix F, Offset Management Plan (OMP) Audit Table.
1191:M9.3	Offsets	Within twelve months of the commencement of ground-disturbing activities, the proponent shall revise the existing Bunbury Outer Ring Road (BORR) Southern Section Offset Management Plan to the requirements of the CEO, and to meet the following objectives: (1) counterbalance the significant residual impacts listed in condition 9-1; (2) improve connectivity of western ringtail possum habitats; (3) ensure a net-gain in western ringtail possum populations in secure conservation tenure within fifteen (15) years from the commencement of construction; and (4) demonstrate a strategic conservation benefit for the western ringtail possum species.	Revise OM Plan and submit to CEO.	OM Plan Annual CAR	Overall	Within twelve months of the commencement of ground-disturbing activities	C	The Offset Management Plan (Rev A, 10 Jun 2022) was submitted to DWER on 10 Jun 2022. The Offset Management Plan (Rev C, Nov 2022) was submitted to DWER on 23 Dec 2022. The Offset Management Plan (Rev 1, Feb 2024) was submitted to DWER and approved on 11 March 2024. Refer to M9-3, Offset Management Plan.
1191:M9.4	Offsets	The BORR Southern Section Offset Management Plan shall: (1) demonstrate that the objectives in condition 9-3 will be met; (2) describe how the offset measures will be implemented consistent with condition 9-2; (3) be prepared in consultation with DBCA, the Shire of Capel and the Shire of Dardanup; (4) consistent with condition 9-2, spatially identify the areas (Proposed Offset Conservation Areas) of:	Prepare OM Plan.	OM Plan Annual CAR	Overall	Within twelve months of the commencement of ground-disturbing activities	C	The Offset Management Plan (Rev 1 Feb 2024) was approved by DWER on 11 March 2024. Refer to Appendix F, Offset Management Plan (OMP) Audit Table.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(a) acquired lands offset areas to receive on-ground management and/or revegetation offset measures; (b) DBCA lands to receive on-ground management and revegetation offset measures. (5) demonstrate how the environmental values within the Proposed Offset Conservation Areas will be maintained and improved in order to counterbalance the significant residual impact to the environmental values in condition 9-1 through application of the principles of the WA Environmental Offsets Policy and completion of the WA Offsets Template, as described in the WA Environmental Offsets Guidelines, and the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide, or any subsequent revisions of these documents; (6) for the land acquisition offsets identified in condition 9-2: (a) demonstrate that the Proposed Offset Conservation Areas contain the minimum extents of the environmental values identified in condition 9-2; (b) identify how the Proposed Offset Conservation Areas will be protected, being either the sites are ceded to the Crown for the purpose of management for conservation, or the sites are managed under other suitable mechanism for the purpose of conservation as agreed by the CEO by notice in writing; (c) specify the quantum of works associated with establishing the Proposed Offset Conservation Areas, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase or approval of the offset management plan where relevant; and (d) identify the relevant management body for the on-going management of the Proposed Offset Conservation Areas, including its role, and the role of the proponent, and confirmation in writing that the relevant management body accepts responsibility for its role. (7) For revegetation and/or on-ground management offsets identified in condition 9-2: (a) state the completion criteria for revegetation and/or on-ground management for each offset site, which will demonstrate attainment of the 'future quality with offset' score in Schedule 3. For revegetation offsets relating to western ringtail possum environmental values, this shall include, but not be limited to: (i) western ringtail possum target densities; (ii) completion criteria to measure (at a minimum) ringtail possum abundance/distribution, habitat structure and vegetation condition; and (iii) adaptive management to inform successful habitat revegetation for western ringtail possum. (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans;						

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
		(c) detail the on-ground management actions, with associated timeframes for implementation and completion, to achieve the targets identified in condition 9-4(7)(a); and (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions identified under conditions 9-4(7)(a) and 9-4(7)(c). (8) for the predator control program within the Ludlow Tuart State Forest/Tuart Forest National Park (consistent with the proponent's Offset Strategy Revision 3 August 2021): (a) state the targets to be achieved by the predator control program which will result in a tangible improvement to the environmental values being offset; (b) demonstrate the consistency of the targets with the objectives of any relevant guidance, including but not limited to, recovery plans or area management plans; (c) detail the on-ground management actions, with associated timeframes for implementation and completion to achieve the targets identified in condition 9-4(8)(a), and how the implementation of the predator control program will facilitate the achievement of the objectives in conditions 9-3(3) and 9-3(4); and (d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions, including but not limited to, a review of the program's effectiveness to demonstrate that the objective of conditions 9-3(3) and 9-3(4) will be met. (9) for the establishment of a Wildlife Carer's Peppermint Orchard: (a) identify the location of the Wildlife Carer's Peppermint Orchard and state the completion criteria for this offset measure in accordance with DBCA requirements; and (b) detail the monitoring, reporting and evaluation mechanisms to demonstrate the completion criteria identified under condition 9-4(9)(a) will be met.						
1191:M9.5	Offsets	The proponent: (1) may review and revise the BORR Southern Section Offset Management Plan; or (2) shall review and revise the BORR Southern Section Offset Management Plan as and when directed by the CEO by a notice in writing.	OM Plan will be reviewed annually and revised if required or as directed by the CEO.	Revised OM Plan Annual CAR	Overall	As required or when directed by the CEO	NR	The Offset Management Plan annual internal review was conducted in April 2025, no changes to the plan were required.
1191:M9.6	Offsets	The CEO shall confirm in writing that the BORR Southern Section Offset Management Plan satisfies the requirements of conditions 9-3 and 9-4 ¹ .	Develop and submit OM Plan.	Correspondence from CEO	Pre-construction	Within twelve months of the commencement of ground-disturbing activities	CLD	The Offset Management Plan (Rev 1 Feb 2024) was submitted to DWER and approved on 11 March 2024 (APP-0000381). Refer to M9-6, Offset Management Plan – Approval.
1191:M9.7	Offsets	The proponent shall implement the latest revision of the BORR Southern Section Offset Management Plan approved by the CEO.	Implement latest version of OM Plan.	Annual CAR OM Plan	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objectives in condition 9-3 are being met.	C	Refer to Appendix F, Offset Management Plan (OMP) Audit Table.

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¹ This condition has been amended as part of the s45C signed 22 June 2022.

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Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M9.8	Offsets	The proponent shall continue to implement the BORR Southern Section Offset Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objectives in condition 9-3 are being met.	Implement OM Plan.	Annual CAR Correspondence from CEO	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objectives in condition 9-3 are being met	C	Refer to Appendix F, Offset Management Plan (OMP) Audit Table.
1191:M9.9	Offsets	When a notification to the CEO occurs in accordance with condition 12-5, the proponent shall provide a report to the CEO within sixty (60) days if the actions, objectives, or targets in the BORR Southern Section Offset Management Plan are unable to be met and provide details and timing of contingency actions to be undertaken, to the satisfaction of the CEO.	Prepare and submit a report to CEO.	Report (Condition M9-9) Correspondence from CEO	Overall	Within 60 days if the actions, objectives, or targets in the BORR Southern Section Offset Management Plan are unable to be met	NR	This condition has not been triggered.
1191:M9.10	Offsets	The proponent shall report to the CEO on the outcomes of the contingency actions as required by condition 9-9 within sixty (60) days of completion.	Prepare and submit a report to CEO.	Report (Condition M9-10)	Overall	Within 60 days of completion of the contingency actions	NR	This condition has not been triggered.
1191:M9.11	Offsets	The proponent shall continue to implement contingency actions as required by condition 9-9 until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objectives in condition 9-3 are being met.	Implement contingency actions required under Condition M9-9.	Correspondence from CEO	Overall	Until the CEO has confirmed that the proponent has demonstrated that the objectives in condition 9-3 are being met	NR	This condition has not been triggered.
1191:M9.12	Offsets	If, after receiving the Environmental Performance Report required by condition 6-5 the CEO determines that the proposal has not met the environmental outcome in condition 6-2 and has resulted in an additional significant residual impact to western ringtail possum, and after notifying the proponent in writing, the proponent must undertake an additional offset to counterbalance the significant residual impact from the additional impact to western ringtail possum in habitats adjoining the development envelope.	Implement additional offsets and revise OM Plan.	Correspondence with CEO OM Plan Annual CAR	Overall	Upon the request of the CEO	NR	This condition has not been triggered.
1191:M9.13	Offsets	Within twelve (12) months of receiving notice in writing from the CEO that an additional offset is required under condition 9-12, the proponent shall update the BORR Southern Section Offset Management Plan required by condition 9- 3 to include additional offsets to counterbalance the significant residual impacts to western ringtail possums.	Update OM Plan to include additional offsets requirements and submit to CEO.	Updated OM Plan Annual CAR Correspondence from CEO	Overall	Within 12 months of receiving notice from the CEO that an additional offset is required under condition 9-12	NR	This condition has not been triggered.
1191:M9.14	Offsets	The proponent shall implement the latest version of the BORR Southern Section Offset Management Plan, which the CEO has confirmed in writing satisfies the requirements of condition 9-4.	Implement latest version of OM Plan.	OM Plan Annual CAR Correspondence from CEO	Overall	As required when OM Plan is updated	C	The Offset Management Plan (Rev 1 Feb 2024) was submitted to DWER and approved on 11 March 2024 (APP-0000381). Refer to Appendix F, Offset Management Plan (OMP) Audit Table.
1191:M10.1	Contact Details	The proponent shall notify the CEO of any change of its name, physical address, or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.	Submit written notification to the CEO of changes to contact details.	Written notification to CEO	Overall	Within 28 days of a change of name, physical address, or postal address.	NR	No changes occurred within this reporting period.
1191:M11.1	Time Limit for Proposal Implementation	The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.	Implement the proposal and Condition M11-2.	Written notification to CEO	Overall	By 31 May 2027	CLD	This CAR is also considered to be written confirmation that the proponent has substantially commenced construction.
1191:M11.2	Time Limit for Proposal Implementation	Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.	Submit written notification to the CEO.	Written notification to CEO	Overall	By 31 May 2027	CLD	This CAR is also considered to be written confirmation that the proponent has substantially commenced construction.

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Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M12.1	Compliance Reporting	The proponent shall prepare and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 12-6, or prior to implementation of the proposal, whichever is sooner.	Prepare a Compliance Assessment Plan and submit to the CEO for approval.	Compliance Assessment Plan (CAP) CEO approval of CAP	Overall	By 28 February 2023 or prior to implementation	CLD	The Compliance Assessment Plan (CAP) was submitted to the CEO on 20 July 2022 and approved on 21 July 2022. A copy of the CAP is available on the Main Roads website. Refer to M12-1, Compliance Assessment Plan.
1191:M12.2	Compliance Reporting	The Compliance Assessment Plan shall indicate: (1) the frequency of compliance reporting; (2) the approach and timing of compliance assessments; (3) the retention of compliance assessments; (4) the method of reporting of potential non-compliances and corrective actions taken; (5) the table of contents of Compliance Assessment Reports; and (6) public availability of Compliance Assessment Reports.	Prepare and submit to the CEO a CAP addressing all requirements.	CAP CEO approval of CAP	Overall	By 28 February 2023 or prior to implementation	CLD	Refer to the CAP.
1191:M12.3	Compliance Reporting	After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 12-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 12-1.	Undertake compliance assessments in accordance with the approved CAP.	Annual CAR	Overall	Ongoing	C	The CAP was approved by the CEO on 21 July 2022 (WERVT10374). Refer to M12-3, M12-1 Compliance Assessment Plan – Approval.
1191:M12.4	Compliance Reporting	The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 12-1 and shall make those reports available when requested by the CEO.	Prepare and retain annual compliance assessment reports in accordance with the approved CAP. Make CARs available to CEO on request.	Annual CAR	Overall	Ongoing	C	This CAR. Annual compliance assessment reports developed in accordance with the CAP are available on the Main Roads website.
1191:M12.5	Compliance Reporting	The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.	Written correspondence to CEO within 7 days of any potential non-compliance.	Annual CAR Correspondence to CEO advising of potential non-compliances.	Overall	Within 7 days of that non-compliance being known	C	A non-compliance has been identified during this reporting period. It is detailed in Appendix A.
1191:M12.6	Compliance Reporting	The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO. The Compliance Assessment Report shall: (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf; (2) include a statement as to whether the proponent has complied with the conditions; (3) identify all potential non-compliances and describe corrective and preventative actions taken; (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 12-1.	Submit Annual CAR.	Annual CAR Transmittal documentation of CAR.	Overall	By 31 August 2023 and annually thereafter	C	This is the third Compliance Assessment Report for MS1191.
1191:M13.1	Public Availability of Data	Subject to condition 13-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (maps), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.	Publish on Main Roads Western Australia website or provide reports as directed by the CEO.	Transmittal documentation of request for data Website link	Overall	Ongoing	C	This CAR will be published on the Main Roads Western Australia website within 14 days of the report being submitted to the CEO. Other approved management plans and/or reports are available on the Main Roads website.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status	Further Information
1191:M13.2	Public Availability of Data	If any data referred to in condition 13-1 contains particulars of: (1) a secret formula or process; or (2) confidential commercially sensitive information; the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.	Provide the CEO with an explanation and reasons why data should not be made publicly available.	Correspondence with CEO, request for confidentially, if applicable	Overall	Ongoing	NA	To date no data has been excluded from the Proposals documentation.

Appendix C

MS 1191 Construction Fauna Management Plan Audit Table

Audit Table for Construction Fauna Management Plan (CFMP) - Requirements to be implemented in accordance with Condition 5 of Ministerial Statement 1191.

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
WRP and BTP Management Actions and Performance Targets Pre construction Section 2.1 Table 2-1	- Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	Prior to clearing, the final road design shall be assessed against the proposed clearing area to ensure the required clearing area is no more than the approved area.	Avoid direct impacts to WRP and BTP individuals Minimise indirect impacts on adjacent receival habitat Preclude use of refuge sites within the Development Envelope prior to construction Reduce predator population within the Development Envelope and adjacent habitat	The road design is within the specified clearing limits for the Proposal. Refer this CAR, Table 2 and Figures 2-5.	Compliant
		- At least six (6) weeks prior to clearing, install artificial dreys, artificial watering points and protective natural structures (such as felled trees) in receival sites outside the development envelope, exclusion areas and other areas where appropriate (refer to Section 1.4.1.1.3). - At least six (6) weeks prior to clearing, install arboreal ropes where practical to provide connections from habitat inside the development envelope to receival sites outside the development envelope to minimise the need for WRP to go to ground (refer to Section 1.4.1.1.3).		In consultation with WRP expert Barbara Jones, and Biota Environmental Sciences, SWGA have installed: - artificial dreys and watering points a minimum of six weeks prior the commencement of Category 1 clearing stages during the reporting period. - arboreal ropes where appropriate to provide connections from habitat inside the development envelope to receival sites outside the development envelope. Refer to M0 Independent Daily Inspection Reports.	Compliant
		Within thirty (30) days prior to clearing (or if staged, prior to each clearing stage) survey for WRP and BTP shall be undertaken to confirm presence / absence and number individuals within the development envelope and at receival sites (refer to Section 2.3.2).		Fauna surveys for WRP and BTP have been conducted within the 30 days prior to clearing activities commencing within clearing stages during the reporting period. Refer to M5-5 Terrestrial Fauna Surveys Refer to Appendix M: M5.3 Environmental Performance Report - CFMP.	Compliant
		Deploy soft-jaw traps within the Development Envelope during the 30-day period prior to the clearing based on field observations (refer to Section 1.4.1.1.2).		Experienced specialist consultants have been engaged to undertake predator control within and adjoining the Development Envelope. This includes the deployment of soft-jaw traps during the 30-day period prior to clearing. Refer to M6-8 Predator Control Progressive Report.	Compliant
		Vacant dreys suitable for WRP or BTP shall be removed, and hollows blocked prior to clearing were deemed appropriate and safe.		All clearing of native vegetation has involved specialist fauna consultants with specific experience in relation to WRP / BTP. A component of their daily activities on site is inspection of hollows and the removal of vacant dreys prior to clearing. Refer to M0 Independent Daily Inspection Reports.	Compliant
		Prior to clearing, control of WONS, declared plants and aggressive environmental weeds recognised as threats to WRP habitat will be undertaken within the Development Envelope.		SWGA have engaged suitably qualified contractors to undertake weed control throughout the Proposal area.	Compliant
		All WRP and BTP habitat that is to be retained within the Development Envelope shall be delineated prior to site works to ensure it is conserved.		All WRP and BTP habitat that is to be retained is pegged and flagged accordingly to ensure it is conserved. SWGA has a detailed ground disturbance and clearing protocol outlined in the <i>SWGA Construction Environmental Management Plan</i> and reflected in the and <i>SWGA Ground Disturbance and Clearing Permit</i> . Refer to M0 SWGA Construction Environmental Management Plan. Refer to M0 Independent Daily Inspection Reports.	Compliant
		- Clearing of vegetation shall be confined to daylight hours. - Movement / disturbance of recently cleared vegetation (within 24 hours and prior to downsize / chipping) shall be confined to daylight hours.		SWGA commence clearing one hour after sunrise and complete clearing one hour before sunset as per the Geoscience Australia astronomical definitions. All movement / disturbance of cleared vegetation is checked by fauna spotters and confined to daylight hours (as per the requirements above). Refer to M0 Independent Daily Inspection Reports.	Compliant
		Cleared vegetation shall be chipped immediately (i.e., not stockpiled) or transported at least 100 m from WRP and BTP habitat before further processing.		The clearing process implemented across the Proposal includes the downsizing and mulching (chipping) of cleared vegetation on the same day that it is cleared. Refer to M0 Independent Daily Inspection Reports.	Compliant
		- All buildings requiring demolition for the Proposal shall be inspected for WRP and BTP twice a day for two days prior to demolition works. - Where WRP or BTP are observed, or suspected, to be in any building to be demolished attempts shall be made to capture the animal prior to the demolition works commencing. - A licensed fauna-spotter shall be on-site at all times during the demolition of buildings suspected or observed to house WRP or BTP. - Machinery operators shall maintain radio communication with their spotter. - Any pest animal baits used in buildings to be demolished shall be in bait stations and disposed of prior to demolition.		All demolition activities have included the pre-demolition inspections and risk assessment, conducted by specialist fauna consultants. No WRP or BTP have been recorded prior to or during demolition activities. All pest animal baiting has involved the use of appropriate bait stations.	Compliant

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
During clearing Section 2.1 Table 2.1	- Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	Sensitive Clearing Protocols Patches of WRP habitat to be cleared will be delineated prior to clearing.	Avoid direct impacts to WRP and BTP. Minimise indirect impacts on adjacent receival habitat. Avoid indirect impacts to WRP in adjacent habitat. Restore and maintain connectivity between known WRP and BTP habitat areas.	SWGA has a detailed ground disturbance and clearing protocol outlined in the <i>SWGA Construction Environmental Management Plan</i> and reflected in the <i>SWGA Ground Disturbance and Clearing Permit</i> . This includes demarcation of clearing and exclusion areas prior to clearing utilising licenced surveyors. Prior to clearing, the clearing areas are subject to walk-through inspections involving representatives from all major relevant disciplines (environment, engineering, construction, survey, machine operators, fauna spotters, Aboriginal heritage monitors, independent quality certifiers, client). Refer to M0 SWGA Construction Environmental Management Plan. Refer to M0 Independent Daily Inspection Reports.	Compliant
		Clearing timeframes for Category 1, 2 and 3 Habitat Clearing Categories (Table 1-5) shall be followed.	Reduce predator population within the Development Envelope and adjacent habitat.	All clearing works are completed within the clearing timeframes defined in the CFMP. Category 1 clearing is undertaken between the period of March 1 st and August 30 th . During the reporting period, the category 1 clearing dates are listed below. 2023: May 31/05/2023 – August 30/08/2023 2024: April 03/04/2024 – May 30/05/2024 2025: May 31/05/2024 – July 14/07/2025	Compliant
		Spotlighting of potential WRP and BTP habitat shall be undertaken by a suitably experienced person for two nights within the seven (7) days prior to clearing. Trees containing WRP will be tagged and checked during pre-clearing fauna searches.		Suitably experienced persons have been engaged to undertake the pre-clearing, clearing and post clearing assessments. All engaged consultants are recognised zoologists or ecologists with prior experience in assessment and management of WRP / BTP during construction activities. Lead personnel have over 20 years' experience in this regard. All clearing of native vegetation including potential WRP and BTP habitat has included pre-clearing nocturnal surveys for 2 nights within 7 days prior to clearing utilising specialised fauna consultants with specific experience in relation to WRP / BTP surveys. Trees with the potential to contain WRP / BTP are tagged and checked during pre-clearing fauna searches. Refer to M5-5 Terrestrial Fauna Surveys Refer to M0 Independent Daily Inspection Reports.	Compliant
		Pre-clearing fauna searches shall be conducted immediately prior to (i.e., on the day of) and during clearing operations and will include hollows, dreys, ground debris, dense ground-level vegetation, fallen timber and logs.		All clearing of native vegetation has involved specialised fauna consultants with specific experience in relation to WRP / BTP, and management during clearing activities. Pre-clearing fauna searches have been conducted immediately prior to and during clearing operations. Vacant dreys / vacant tree hollows suitable for WRP or BTP, have been removed prior to clearing where appropriate. Refer to M0 Independent Daily Inspection Reports.	Compliant
		- Clearing shall be conducted congruent with the habitat clearing categories as detailed in Table 1-5 and shown in Figure 2. - Habitat clearing is to be staged, commencing from existing cleared edges / roads, and progressing towards habitat that will be retained to direct WRP and BTP towards these areas as per the proposed clearing staging (Figure 2).		Clearing has been congruent with the habitat clearing categories and staged accordingly towards retained habitat.	Compliant
		Where western ringtail possums (WRP) are observed during clearing operations, the tree containing the animal shall be left for up to two consecutive nights to allow for the animal to vacate or move into an artificial drey (installed within or near trees known to contain possums prior to clearing), while clearing continues in adjacent vegetation. If the tree continues to be occupied after two consecutive nights, the animal will be safely coerced / relocated to a safe area outside of the clearing footprint by the authorised fauna spotter(s). Where possums have been identified as likely to occur (i.e., observed hollow), trees shall be 'bumped gently' with a machine prior to felling. The machinery operator and fauna spotter(s) will wait and observe the tree for a period of time to allow fauna to move off on its own accord into the surrounding vegetation. If the animal remains in the tree, the tree shall be felled slowly and controlled onto vegetation, as directed by the fauna spotter(s). The 'soft felling' of habitat trees will provide a 'cushion' for the vegetation being felled, minimising the risk of injury to the animal and allow any WRP the opportunity to safely vacate.		All clearing of native vegetation has involved specialised fauna consultants with specific experience in relation to WRP / BTP, and management during clearing activities. When observed during clearing operations, trees containing WRP or BTP have been left for up to two consecutive nights at the discretion of specialist fauna spotters. Trees observed to support WRP after two consecutive nights have been treated in accordance with the sensitive clearing protocols, and on advice by specialised fauna spotters with specific experience in relation to management of WRP. Refer to M5-5 Terrestrial Fauna Surveys Refer to M0 Independent Daily Inspection Reports.	Compliant

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
		- Artificial dreys may be installed within or near trees known to contain WRP prior to clearing, as WRP appear to preferentially move into artificial dreys. Entrances of inhabited dreys will be safely blocked, and both the drey and WRP will be securely relocated into nearby receival site habitat, as has been successfully implemented in other local clearing projects (Dr. Mike Bamford, pers. comm.). Alternatively, where practical, the hollow may be cut from the tree with the WRP in situ, and relocated to nearby receival habitat, as has been successfully implemented in other local clearing projects (Dr. Mike Bamford, pers. comm.). - In situations where connections to adjacent receiving habitat have been reduced by ongoing clearing or potentially cause stress or take of the animal, a licensed fauna spotter may coerce / move the animal to a safe area outside of the clearing footprint. Where practical, WRP will be encouraged to move along the branches of one tree to the next, into receival site habitat. Experience shows that WRP will also step onto a net and allow themselves to be carried on the net to trees in receival habitat (Dr. Mike Bamford, pers. comm.).		All clearing of native vegetation has involved specialised fauna consultants with specific experience in relation to WRP / BTP, and management during clearing activities. Hollows containing WRP or BTP may be safely removed from a tree and relocated to adjacent receival habitat if appropriate for the circumstances. Fauna spotters present on site during clearing may coerce or relocate WRPs, where practicable, to adjacent habitat outside the clearing boundary where appropriate. Refer to M0 Independent Daily Inspection Reports.	Compliant
		- Felled trees with hollows shall be checked immediately for fauna after felling (by fauna spotter) and prior to further processing. If it is not possible to fully inspect the hollow, the tree will be left on the ground overnight to allow time for any undetected fauna to vacate. - Vacant dreys within felled trees will be destroyed immediately to prevent animals re-entering them.		All clearing of native vegetation has involved specialised fauna consultants with specific experience in relation to WRP/BTP being present on site during the clearing activities. A component of their daily activities on site is an inspection of trees and vegetation immediately on felling to inspect for fauna. If it is not possible to fully inspect the trees, hollows, or vegetation, these are left as a minimum overnight to allow time for any undetected fauna to vacate. Vacant dreys within felled trees are immediately dismantled to prevent animals re-entering them. Refer to M0 Independent Daily Inspection Reports.	Compliant
		A post-clearing survey shall be undertaken (by fauna spotter) immediately following each day's clearing operations and the following morning to identify the presence of any injured animals.		All clearing of native vegetation has involved specialised fauna spotters with specific experience in relation to WRP/BTP being present on site during the clearing activities. A component of their daily activities on site is a post-clearing inspection to review cleared areas, and to identify any potential injured animals. Refer also to M0 Independent Daily Inspection Reports.	Compliant
		Terrestrial Fauna Handling Fauna handling shall only be conducted by licensed fauna spotters.		SWGA have engaged highly experienced and licensed personnel to undertake the pre-clearing, clearing and post clearing assessments. All engaged consultants are recognised zoologists or ecologists with prior experience in assessment and management of WRP during construction activities (SW Environmental personnel each have around 20 years' experience in this regard). Refer to Appendix A CAR Audit Table M4-3(1) Fauna spotter accreditation.	Compliant
		- Any WRP and BTP showing signs of injury or illness shall be caught, bagged, and taken to an experienced wildlife veterinarian. - If an injured WRP or BTP has not already been captured, then the appointed fauna-spotter must attempt to capture the animal for the purposes of veterinary assessment and treatment. - All treatment of injured fauna shall be undertaken by a veterinarian.		SWGA has access to a number of experienced wildlife veterinarians and wildlife carers should they be required.	Compliant
		Where clearing operations abut existing roads, in addition to standard traffic management measures, visual message boards shall be installed to warn drivers of the potential for fauna to cross the road during clearing operations.		Vehicle Message Boards have been installed to notify drivers of the potential for fauna to cross the road, for clearing works abutting roads. Refer to M0 Independent Daily Inspection Reports.	Compliant
During construction Section 2.1 Table 2.1	- Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	Road construction activities (i.e., activities undertaken after clearing has been completed) adjacent to WRP habitat will only be undertaken during daylight hours where practicable.	Avoid direct impacts to WRP and BTP. Minimise indirect impacts on adjacent receival habitat. Avoid indirect impacts to WRP in adjacent habitat. Restore and maintain connectivity between known WRP and BTP habitat areas. Reduce predator population within the Development Envelope and adjacent habitat.	Normal construction hours are 7am – 5pm, Monday to Friday (excluding Public Holidays). Out of hours work is restricted and regulated. Out of hours works were completed within this reporting period. It should be noted that clearing works commence at least one hour after sunrise and are completed at least one hour prior to sunset as per the Geoscience Australia astronomical definitions.	Compliant
		Post-clearing, possum exclusion fencing (temporary and permanent) shall be installed adjacent at known habitat areas to exclude WRP and BTP moving onto the road (Figure 6). The fencing will be 1.5 m high and be constructed to prevent possums being able to climb over or dig under it. Possum exclusion fencing shall take account of and complement noise and screen walls in excluding fauna from moving onto the road.		The Proposal design reports and drawings include the requirements for installation of fauna fencing in accordance with CFMP. Installation of fauna fencing within the Proposal area is ongoing.	Compliant
		Deploy soft-jaw traps bi-monthly within the Development Envelope during construction based on the outcomes of site assessments.		Experienced specialist consultants have been engaged to undertake predator control within and adjoining the Development Envelope. This includes bi-monthly deployment of soft-jaw traps during construction.	Compliant

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
				Refer to M6-8 Predator Control Progressive Reports.	
		Loss of ecological connectivity - Construct two fauna bridges at Yalinda Drive and 350 meters to the east, at least 5 meters in width. - Install permanent possum rope bridges / underpasses at key location(s) to enable fauna including WRP to move between retained habitat areas, see Figure 6. - Install tree-canopy connections to all crossing structures. - The size and design of all movement devices will be based on MRWA Design of Fauna Underpasses (MRWA, 2010), topography at the site, expert advice (Barbara Jones, pers. comm.), information from relevant studies and reports (QDMR, 2000; Harper, M., Mccarthy, M. & van der Ree, R., 2008) and in line with the concept designs. - Underpass dimensions will be based on the fauna recorded or expected to occur in the vicinity. - The final underpass designs will incorporate the following features known to encourage use by fauna and reduce the risk of predation: - Connection to nearby habitat via overhead rope hawsers and poles (minimum 2.5 m high) (Plate 1); - Objects for fauna to shelter on, under or in (furniture) will be locally sourced and will include sand, mulch, logs, and rocks; - Revegetation using fast growing species at underpass entrances to provide cover for animals approaching, entering, and leaving the underpasses; - Natural flooring such as sand or gravel; - Possum fencing to direct fauna towards the underpass entrance; and - Dual-use underpasses will have a concrete substrate and will not contain furniture (furniture would be washed away by drainage flows). - The Proposal Area boundary will be fenced according to the detailed design to restrict pedestrian and vehicular access to retained WRP habitat.		Construction of Fauna connectivity structures (e.g., Fauna underpasses and bridges) commenced during the previous reporting period. The construction of the fauna connectivity structures continued throughout this reporting period. These structures are as per the Proposal design reports and drawings.	Compliant
Post construction		Deploy soft-jaw traps bi-annually at fauna crossing structure access and egress points (once in each of the spring and autumn seasons) for five years post-construction based on the outcomes of site assessments.	Minimise predation at crossing structures.	Not required at this stage.	Not required at this stage
SMART Performance Standards for WRP and BTP Section 2.1.2. Table 2-2	- Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	- No WRP injuries or mortalities as a consequence of construction activity. - No WRP or BTP injuries or mortalities as a consequence of construction activity.	Avoid direct impacts to WRP and BTP individuals. Preclude use of refuge sites within the Development Envelope prior to construction.	No Project attributable injuries or mortalities to WRP and BTP individuals occurred during this reporting period.	Compliant
		Not more than 60.9 ha of WRP and 39.2 ha of BTP habitat cleared.	Minimise indirect impacts on adjacent receival habitat Reduce clearing of WRP and BTP habitat to the extent practicable in final design.	Refer this CAR (Table 2 and Figure 4) for clearing or WRP and BTP habitat during the reporting period. Clearing and disturbance has included: 0.19 ha of habitat for WRP during the reporting period. Clearing and disturbance of a total of 42.52 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 60.9 ha permitted. 0.08 ha of habitat for BTP during the reporting period. Clearing and disturbance of a total of 29.89 ha has occurred since clearing for the Proposal commenced (and at the end of this reporting period); and does not exceed the 39.2 ha permitted.	Compliant
Post construction	Western Ringtail Possum (WRP,	WRP abundance trends at monitored receival sites commensurate with (i.e., not greater than 5 % different to) those at reference sites.	Minimise indirect impacts on WRP in adjacent receival habitat.	Not required at this stage.	Not required at this stage

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
Section 2.1.2. Table 2-2	<i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	- Quality / condition of WRP and BTP monitored receival sites adjacent to the Development Envelope is maintained at baseline or any change is commensurate with (i.e., not greater than 5% different to) that at reference site habitat. - WONS, Declared weeds and / or environmental weeds recognised as threats to WRP within the Development Envelope are below baseline survey levels.	Maintain condition rating in adjacent WRP and BTP receival habitat.	Not required at this stage.	Not required at this stage
		Installation of engineered movement structures as per specification.	Restore and maintain connectivity between known WRP and BTP habitat areas.	The installation of fauna movement structures have been completed during the reporting period.	Compliant
		Monitor and implement predator management at crossings to ensure observation do not increase by 25%.	Minimise predation at crossing structures.	Not required at this stage.	Not required at this stage
WRP Monitoring Program Section 2.3.7. Table 2-3	- Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>) - South-western brush tailed Phascogale (BTP, <i>Phasogale tapoatafa</i>)	- Injury or death of WRP recorded by Fauna spotters (with lawful authority) and reported to Manager Environment within 24 hours of incident occurring. - Main Roads to consult with DBCA of the WRP injury or mortality occurring.	Avoid direct impacts to WRP individuals.	No Project attributable injuries or mortalities to WRP and BTP individuals occurred during this reporting period.	Compliant
		Relocation of WRP recorded by Fauna spotters (with lawful authority) and reported to DBCA / DWER within thirty (30) days after clearing (for each clearing stage).		Records of whether threatened or priority fauna (WRP / BTP) are encountered during clearing, are reported to the CEO and DBCA within thirty (30) days after clearing (or each clearing stage), including the number of individuals relocated in accordance with any requirements of the lawful authority obtained under the <i>Biodiversity Conservation Act 2016</i> . Refer to M5-5 Fauna records during clearing.	Compliant
		Area of WRP habitat cleared reported to Manager Environment monthly.	Reduce clearing of WRP habitat to the extent practicable in final design Minimise indirect impacts on adjacent receival habitat.	Area of WRP habitat cleared is reported to the Manager Environment daily during Category 1 clearing and reported monthly. This CAR details the total WRP habitat cleared during the reporting period (and to date) (Table 2, Figure 4a).	Compliant
		- Report annually as part of Environmental Performance Report against performance measures and contribution of measures to achievement of the environmental objectives. The EPR or response summary will include: - Bi-monthly surveys - WRP presence / absence, abundance, and distribution (within DE and at receival habitat and reference sites) monitored by a continuation and expansion of the bi-monthly strip sampling surveys that have been conducted within the Development Envelope, receival sites and reference sites since October 2019. - WRP monitoring - telemetry study (including GPS collars), and mark-resight study. - Habitat monitoring – WRP habitat (within the Development Envelope and at receival sites) monitored via assessment of 3D aerial imagery.	Restore and maintain connectivity between known WRP habitat areas. Minimise indirect impacts on WRP in adjacent receival habitat. Maintain condition rating in adjacent WRP receival site habitat.	This CAR. Refer to Appendix M: M5.3 Environmental Performance Report - CFMP.	Compliant
Site Induction Training Program Section 2.4.3. Table 2-5		- Awareness of Main Roads Environmental Policy. - Identification of the environmental values in the Development Envelope. - Identification of key environmental risks associated with the Proposal, and the identification of management requirements to control such risks. - Roles and responsibilities of all personnel in the protection and management of the environment, including identification of key personnel that have specific roles or responsibilities. - Awareness of importance of compliance with the environmental requirements (including penalties for non-conformance with the environmental requirements). - Pegging of the area of works, and other pegging types (for example, trees to be retained). - Clearing of native vegetation and management of topsoil. - Hygiene procedures for Phytophthora Dieback and weed management. - Appropriate disposal of wastes. - Environmental incidents, including the requirements for management and reporting. - The environmental benefits of improved personal performance.	Site induction training program.	All personnel on the Proposal are required to complete an online and face to face induction. The induction addresses the details listed. Refer to M0 SWGA Construction Environmental Management Plan.	Compliant

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
Environmental Audit Schedule Pre construction Section 3.1. Table 3-1		Review of construction procedures to ensure CFMP management / monitoring actions are incorporated within works procedures.	Prior to construction.	A pre-commencement audit was completed in July 2022 (Preston Consulting), prior to the commencement of construction works associated with the Proposal.	Completed
Environmental Audit Schedule Construction Section 3.1. Table 3-1		- Inspections by site environmental personnel during the clearing of Habitat Category 1 areas. - Inspections by site environmental personnel to identify compliance with CFMP. - Independent audit for assessment of compliance with CFMP.	Daily. Periodic (generally weekly). Once during construction.	Independent auditors are on site daily during clearing within Category 1 areas, including specific review of compliance against the CFMP. Refer to M0 Independent Daily Inspection Reports. SWGA environmental personnel are on site daily during clearing of Category 1 areas. Daily inspections include identifying compliance with the CFMP. In December 2024, an independent audit was conducted on the implementation of the CFMP.	Compliant
Environmental Audit Schedule Post construction Section 3.1. Table 3-1		Independent audit for assessment of compliance with CFMP.	Once during 3 year post construction period.	Not required at this stage.	Not required at this stage
CFMP Review Schedule Construction		CFMP will be reviewed and updated, as necessary with adaptive management measures following completion of year 1 clearing.	Prior to recommencing of Category 1 Habitat in 2023.	The CFMP is subject to ongoing review (with the most recent undertaken in April 2025). No updates have been required to date.	Completed
CFMP Review Schedule Construction and Post Construction		- Review CFMP management and monitoring actions. - Review of opportunities for an improvement in environmental performance. - Revise CFMP (if appropriate) and seek DWER approval of revised CFMP.	Annually (once during construction). Once every three years post construction for nine (9) years.	An annual review of the CFMP was completed in April 2025.	Compliant

Appendix D

MS 1191 Habitat Fragmentation Management Plan Audit Table

Audit Table for *Habitat Fragmentation Management Plan (HFMP)* - Requirements to be implemented in accordance with Condition 6 of Ministerial Statement 1191.

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
WRP Management Actions and Performance Targets Prior to construction Section 2.1 Table 2-1 During construction Section 2.1 Table 2-1	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	Undertake pre-construction baseline 3D aerial surveys of habitat condition in Development Envelope, receival sites and reference sites to assess if pre-construction condition rating in adjacent WRP receival habitat is maintained post construction.	Maintain pre-construction condition rating in adjacent WRP receival habitat (Section 2.6) through pre and post construction condition monitoring.	Baseline aerial surveys of habitat condition within and adjacent to the Proposal area were completed in July 2022. Further aerial surveys have been undertaken in February 2023, September 2023, March 2024, September 2024; and April 2025. Refer to Appendix M, M5.3 Environmental Performance Report - CFMP.	Compliant
		Construct two fauna bridges at Yalinda Drive and 350 meters to the east, both at least 5 meters in width.	- No significant reduction in adjacent receival habitat condition (CFMP and Section 2.6) due to indirect impacts associated with the Proposal detected through pre and post construction condition monitoring. - Restore connectivity between known WRP habitat areas (Section 2.3), through installing crossing structures and subsequent utilisation monitoring. - Ensure revegetation is planted to the design criteria specified in Section 2.3.2.1 and 2.3.2.2.	These are incorporated in the Proposals design and construction of the fauna bridges. Construction commenced during the last reporting period and has been ongoing during the reporting period.	Compliant
		Install permanent possum rope bridges / underpasses at key location(s) (section 2.3) to enable WRP to move between retained habitat areas (Figure 3). Install tree-canopy connections to all crossing structures. The size and design of all movement devices will be based on MRWA Design of Fauna Underpasses (MRWA, 2010), topography at the site, expert advice (Barbara Jones, pers. comm.), information from relevant studies and reports (QDMR, 2000; Harper, M., Mccarthy, M. & van der Ree, R., 2008) and in line with the concept designs (Figure 5). Underpass dimensions will be based on the WRP fauna recorded or expected to occur in the vicinity (Figure 5 HFMP).		This is incorporated in the Proposal design; the construction of possum rope bridges and underpasses was completed during the reporting period.	Compliant
		- The final underpass designs will incorporate the following features known to encourage use by WRP and reduce the risk of WRP predation: - Connection to nearby habitat via overhead rope hawsers and poles (minimum 2.5 m high) - Objects for WRP to shelter on, under or in (furniture) will be locally sourced and will include sand, mulch, logs, and rocks - Revegetation using fast growing species at underpass access and egress points to provide cover for WRP approaching, entering, and leaving the underpasses - Natural flooring such as sand or gravel - Possum fencing to direct fauna towards the underpass entrance - Dual-use underpasses will have a concrete substrate and will not contain furniture (furniture would be washed away by drainage flows).		The features discussed in the Habitat Fragmentation Management plan in relation to reducing the risk of predation have been incorporated in the Proposal's design, and construction of fauna underpasses.	Compliant
		- Install possum fence adjacent to known habitat areas to limit WRP access to the Development Envelope, see Figure 3 (HFMP). - The possum fence will be 1.5 m high and constructed to prevent WRP being able to climb over or dig under it, see Figure 4 (HFMP).		The Proposal design reports, and drawings include the requirements for installation of fauna fencing (to 1.5m high) in accordance with the HFMP. The construction of possum fencing adjacent to known habitat areas is ongoing during this reporting period.	Compliant
		- Undertake targeted revegetation: - at fauna crossing structure access and egress points (adjacent to the Development Envelope) to make utilisation of the structures attractive and effective for WRP - on fauna land bridge decks - in degraded portions of vegetation retention areas and clearing exclusion areas.		Construction of the fauna structures (crossing structures and land bridges) commenced during the last reporting period and was completed during this reporting period. Revegetation associated with these fauna crossing structures commenced, but was not completed, during this reporting period.	Not required at this stage
Post construction Section 2.1 Table 2-1	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	Deploy soft-jaw traps, or other appropriate approach or technique, within the Development Envelope during construction (refer to Section 2.4.2).	Reduce predator population within the Development Envelope and adjacent habitat compared to baseline survey results.	Specialist consultants have been engaged to undertake predator control within and adjoining the Proposal area. Soft-jaw traps are the primary approach to predator (fox) control. Implementation of the feral and invasive animal management occurs prior to, during, and post-clearing. Refer to M6-8 Predator Control Progressive Report.	Compliant
		- Install design features at WRP crossing structure locations (adjacent to the Development Envelope) to ensure access to water is maintained and to encourage utilisation of the structures. - Ongoing 3D aerial surveys of habitat condition in Development Envelope, receival sites and reference sites.	Maintain connectivity between known WRP habitat areas (Section 2.3) through installing crossing structures and demonstrating WRP usage through structure utilisation monitoring.	The Proposal is in the construction phase. This management action will be implemented post-construction. Aerial surveys of habitat condition within and adjacent to the Proposal area have been completed in July 2022 (prior to construction), February 2023, September 2023, March 2024, September 2024; and April 2025. and are ongoing. Refer also to Appendix M, M5.3 Environmental Performance Report - CFMP.	Not required at this stage

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
		Supplement revegetation at fauna crossing structure access and egress points (adjacent to the Development Envelope) where required to achieve completion criteria (Table 2-7).	Revegetation to meet completion criteria specified in Table 2-7.	Construction of the fauna structures (crossing structures and land bridges) commenced during the previous reporting period and were completed during this reporting period. Revegetation associated with these fauna crossing structures commenced during the reporting period.	Compliant
		Deploy soft-jaw traps, or other appropriate approach or technique, bi-annually at fauna crossing structure access and egress points (once in each of the spring and autumn seasons) for the period of EPBC Act/EP Act approvals or as otherwise agreed by the Minister/CEO (refer to Section 2.4.2).	Reduce predator population within the Development Envelope and adjacent habitat.	The Proposal is in the construction phase. Fauna crossing structures construction has been ongoing during this reporting period. This management action relates to the post-construction phase. Predator control for post construction will commence in late 2025.	Not required at this stage
		Motion sensor IR cameras will be installed on fauna crossing structures to assist with determining crossing structure efficacy.	Cameras will be deployed for a minimum of four weeks annually for a minimum of fifteen (15) years post construction.	Fauna crossing structures construction has been ongoing during this reporting period. Motion sensor IR camera installation has commenced during this reporting period.	Compliant
SMART Performance Standards for WRP Management Objectives Section 2.1.3 Table 2-3		No reduction in receival site vegetation condition against pre-construction habitat survey results (Section 2.3.3.2), or any trends in condition change are consistent with changes to reference site habitat condition over the same period.	Maintain or improve condition rating in adjacent WRP receival habitat.	Refer to Appendix M, M5.3 Environmental Performance Report - CFMP. Refer to Appendix K, M3-4 Environmental Performance Report – Flora and Vegetation.	Compliant
		WRP abundance and persistence trends at receival sites returns to pre-disturbance levels within 15 years from commencement of the action.	Minimise or avoid indirect impacts on WRP in adjacent receival habitat.	Specialist consultants have undertaken bi-monthly WRP surveys within and adjoining the Proposal area since 2019 to identify trends in WRP abundance within and adjoining the Proposal area and at reference sites. Refer to Appendix M, M5-3 Environmental Performance Report – CFMP.	Compliant
		Restore and maintain connectivity between known WRP habitat areas.	Structures utilised within 5 years of construction	Connectivity has been maintained and restored through the installation of fauna bridges, crossings, and underpasses. The installations of the connectivity structures commenced during the reporting period.	Compliant
		As detailed in Table 2-7 for the fauna land bridges and forecourt areas and fauna crossing structure access and egress points and Table 2-10 for vegetation retention and clearing exclusion areas.	Ensure revegetation meets design criteria. Ensure revegetation achieves success criteria.	Rehabilitation for the fauna land bridges and forecourt areas, fauna crossing structure access and egress points commenced during the reporting period.	Compliant
SMART Performance Standards for HFMP Outcomes Section 2.1.3 Table 2-4	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	WRP abundance at monitored receival sites return to pre-disturbance levels.	Abundance and persistence of the western ringtail possum in the receival sites returns to pre-disturbance levels within fifteen (15) years from the commencement of construction.	Longer-term management requirement. Refer to Appendix M, M5-3 Environmental Performance Report - CFMP.	Not required at this stage
Land-bridge Revegetation Monitoring Section 2.3.2.3. Table 2-7	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	- Installation of logs and timber (furniture), minimum 2 per ha, to provide cover for ground fauna. - Weed cover within revegetation area less than 20 % by area. - No weed occurrence is to extend more than 50 % of the bridge deck width. - Bare ground cover within revegetation area no more than 10 % by area. - Plant density equivalent to at least 20 stems per 25 m2. - Native vegetation cover 80 % by area across all strata. - Evidence of juvenile native plant recruitment. - Native vegetation cover 80 % by area across all strata and - Evidence of juvenile native plant recruitment. - A minimum of 50 % of the range of species planted present.	- Presence of fauna furniture. - Weed cover by area based on quadrats. - Bare ground cover by area based on quadrats. - Plant density. - Native vegetation cover by area based on quadrats. - Natural recruitment of native species. - Presence/absence of pests. - Diversity of species present.	Construction of the fauna crossing structures commenced in late 2024 and was completed during this reporting period. Revegetation and monitoring of the documented attributes will commence in the second half of 2025 (outside this reporting period).	Compliant
WRP Habitat Fragmentation Monitoring Section 2.3.3. Table 2-8	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	Habitat monitoring – WRP habitat (within the Development Envelope and at receival sites) monitored via assessment of 3D aerial imagery.	Maintain condition rating in adjacent WRP receival site habitat.	Refer to Appendix M, M5-3 Environmental Performance Report – CFMP. Refer to Appendix K, M3.4 Environmental Performance Report – Flora and Vegetation.	Compliant
		- WRP monitoring – - Telemetry study (including GPS collars), and - Mark-resight study.	Minimise indirect impacts on WRP in adjacent receival habitat.	Refer to Appendix M, M5-3 Environmental Performance Report – CFMP.	Compliant
		Genetic relatedness study – genetic analyses of the population and relational dynamics (degree of relatedness) of WRP within the Development Envelope and receival sites.	Abundance and persistence of the western ringtail possum in the	Refer to Appendix M, M5-3 Environmental Performance Report – CFMP.	Compliant

Management Plan Reference No.	Species	Management Action	Performance Target	Comments / Evidence	Compliance status
		Bi-monthly surveys - WRP presence / absence, abundance, and distribution (within DE and at receival habitat and reference sites) monitored by a continuation and expansion of the bi-monthly strip sampling surveys that have been conducted within the Development Envelope, receival sites and reference sites since October 2019.	receival sites returns to pre-disturbance levels within fifteen (15) years from the commencement of construction.	Refer to Appendix M, M5-3 Environmental Performance Report – CFMP.	Compliant
		- Conduct visual assessment of constructed / in construction WRP movement structures to confirm these are as per detailed design and provision of as constructed plans. - Possum fencing intact and effective. Conduct inspections of fencing for damage and effective function. - WRP recorded or filmed using rope bridge or underpass. - WRP presence / absence (at structures).	Restore and maintain connectivity between known WRP habitat areas.	Construction of the fauna crossing structures commenced during the previous reporting period. Visual checks of the structures during construction have been completed. The fauna crossing structures were completed during the reporting period as per the detailed design Other management actions are estimated to commence late in 2025 and will be ongoing.	Compliant
		- Revegetation to design specification. - Revegetation success, see Section 2.6.3.	- Ensure revegetation meets design criteria. - Ensure revegetation achieves success criteria.	Revegetation has commenced during the reporting period as per the design specification, and this will be ongoing.	Compliant
WRP Predator Control Monitoring Aspects Section 2.4.3 Table 2-9	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	- Predator control efficacy, based on feral predator presence within the Development Envelope and receival sites. - Predator control implementation schedule and field records	- Reduce predator population within the DE and adjacent habitat. - Minimise predation at crossing structures.	Experienced specialists consultants have been engaged to undertake predator control within and adjoining the Development Envelope. Refer to M6-8 Predator Control Progressive Reports.	Compliant
Reporting Requirements Section 2.7.1 Table 2-11	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	Implementation of HFMP.	Annually (as part of annual compliance reporting).	The HFMP has been implemented during the reporting period. Refer to this CAR.	Compliant
		Non-compliance with HFMP or Environmental incident.	Report - As soon as reasonably practicable but not more than seven business days after becoming aware of the incident or non-compliance (DWER).	No non compliances with the HFMP have been recorded during this reporting period.	Compliant
HFMP Review Construction and Post construction Section 3.3 Table 3-2	Western Ringtail Possum (WRP, <i>Pseudocheirus occidentalis</i>)	- Review of HFMP management and monitoring actions. - Review of opportunities for an improvement in environmental performance	Annually (Once during construction)	The HFMP is subject to ongoing review (with the most recent undertaken in April 2025). No updates have been required to date.	Compliant
		Revise HFMP (if appropriate) and seek approval of EPA for revised HFMP	Once every three years post construction for at least nine (9) years*.	Not required at this stage.	Not required at this stage
HFMP Review Post construction Section 3.3 Table 3-2		Peer review of EPR	Every five years post construction for 15 years.	Not required at this stage. Required in 2027.	Not required at this stage



Appendix E

MS 1191 Amenity Management Plan Audit Table

Audit Table for *Amenity Management Plan (AMP)* - Requirements to be implemented in accordance with Condition 8 of Ministerial Statement 1191.

Management Plan Reference No.	Management Target	Management Action	Monitoring / Timing	Comments / Evidence	Compliance status
Table 4: Social Connectivity	Improve pedestrian connectivity within Gelorup	Construct pedestrian underpasses at Five Mile Brook (Figure 2, Appendix A) and Yalinda Bridge. Indicative designs of proposed pedestrian underpasses are shown in Appendix B (Landscape Drawings: SWGA-32-980-00-DRG-0102 and 0103).	Compliance with as constructed drawings	The construction of pedestrian underpasses at Five Mile Brook and Yalinda Bridge commenced in 2024 and were completed during the reporting period. The pedestrian underpass and Yalinda bridge were constructed as per Project design drawings.	Compliant
	Improve connectivity between Gelorup and Stratham.	Construct pedestrian crossing across Bussell Highway to Jaymon Road linking Gelorup to Stratham. Indicative design of proposed pedestrian crossing is shown in Appendix B (General Arrangement Drawings: SWGA-32-310-00-DRG-0108).		Not required at this stage. Project is still in construction.	Compliant
	Improve pedestrian and cyclist connectivity through the Proposal Area.	- The proposed PSPs to be constructed as part of the Proposal will provide a link from Bussell Highway at Gelorup to South Western Highway at Picton via Centenary Road, Bunbury Outer Ring Road and Willinge Drive. Construct the following connectivity features: - Principal Shared Path (PSP) (3.0 m) on the northern side of BORR, from its intersection with the South Western Highway to the Lillydale Road intersection (Appendix B – General Arrangement Drawings: SWGA-31-310-00-DRG-0101 to 0106) - PSP (3.0 m) on southern side of Lillydale Road, from its intersection with BORR connecting to a Shared Path (2.5 m) on the western side of Bussell Highway (Appendix B – General Arrangement Drawings: SWGA-31-310-00-DRG-0106, 0122, 0123, 0124, 0125 and 0141) - Shared Path (2.5 m) on western side of Jules Road North from BORR to Sleaford Drive intersection (Appendix B – General Arrangement Drawings: SWGA-31-310-00-DRG-0124 and 0131) - Walking Trail (2.0 m) connecting Yalinda Drive (north of BORR), under the Five Mile Brook Bridge, to Jilley Road (south of BORR) (Appendix A – Figure 3 and Appendix B – Landscape Drawings: SWGA-32-980-00-DRG-0101 to 102 and SWGA-32-310-00-DRG-1011) - Shared Path (2.5 m) from the northern to the southern side of BORR from along Yalinda Drive from Cokelup Road across the Yalinda Drive Bridge to Woods Road (Appendix B – Landscape Drawings: SWGA-32-980-00-DRG-0103).		Construction of the proposed PSPs commenced in 2024 and has continued during the reporting period. The construction is as per Proposal design reports and drawings.	Compliant.
	Improve movement on local roads.	- Undertake works on Shire of Capel roads (e.g., Yalinda Drive, Jilley Road, Jules Road and Hasties Road) to provide improved connectivity for local shire roads within Gelorup. - Construct shared paths, cycling and walking paths, drainage, off road carparking on local roads. - Indicative designs of proposed upgraded to local road network are shown in Appendix B (General Arrangement Drawings: SWGA-31-310-00-DRG-0106 to 113, 0121, 0124, 0131).		Construction commenced on Shire of Capel Roads (as per Proposal design reports and drawings) during the previous reporting period and has been completed during this reporting period. The construction of the Shire of Capel roads are as per General Arrangement Drawings (Appendix B)	Compliant.
	Improve social connectivity by reducing the amount of heavy vehicles using local roads within Gelorup.	Close Hasties Road to remove thoroughfare for heavy vehicles from Holcim from Jules Road. Indicative designs of proposed upgrades to local road network are shown in Appendix B (General Arrangement Drawings: SWGA-31-310-00-DRG-0151).		Although open to traffic the currently constructed BORR is not the ultimate project design. The ultimate design includes an interchange at the intersection of BORR and Lilydale Road which will include access from the eastern section of Hasties Road. This will then facilitate the closure of Hasties Road between Allenville Road and Jules Road.	Not required at this stage
Table 4: Visual Amenity	Minimise visual amenity impacts on local residents.	- Construction noise and screening walls as per SWGA project designs and locations shown in Figure 4 (Appendix A), including the following: - Noise walls will be constructed of painted concrete panels and steel posts and meet the requirements of SPP 5.4 (WAPC, 2009). - Where appropriate, generally where the height of walls is proposed to be above 2.5 – 3.8 m, high density acrylic / perspex may be used in the top section of the wall to reduce visual impacts and to assist light transfer to adjacent residences. - Construction additional screen walls to further improve noise and visual amenity along the Gelorup corridor. - Noise walls will be extended along the road verge as screen walls. This will be in areas where gaps existed due to predicted levels being below mitigation trigger levels, except where the road	- Compliance with As Constructed drawings - Post Construction noise monitoring	Construction of the noise and screen walls commenced during the previous reporting period and was completed during this reporting period. The construction of the noise and screen walls is as per project design reports and drawings.	Compliant.

Management Plan Reference No.	Management Target	Management Action	Monitoring / Timing	Comments / Evidence	Compliance status
		is in a large cutting, between Five Mile Brook bridge and Yalinda Drive bridge, and therefore sunk well below existing ground levels. - Continuation of screen walls between the noise walls will also reduce visual impacts by providing additional screening of road traffic.			
	Where possible, retain native vegetation.	• Retain native vegetation wherever possible, in addition to the Retention Vegetation Areas and Vegetated Exclusion Areas included in Figure 4 of MS 1191, for passive recreation and link to walk trails. Proposed areas to be retained, such as around Five Mile Brook, are shown in Figure 2 and Figure 3 (Appendix A).	• Compliance with As Constructed drawings	Refer to Figure 3 of this CAR.	Compliant.
	Minimise visual impacts of the view of the road and street lighting	• Installation and maintenance of vegetation screening and landscape planting to mitigate visual impacts of the view of the road and street lighting. The ULDF (BORR IPT, 2020a) includes a range of measures to mitigate visual and landscape impacts during detailed design such as: - Feature planting and feature planting mixes to interchanges - Screen planting of native shrubs and trees to edges interfacing residential land uses - Median planting, where appropriate, of native shrubs and groundcovers to tie into the character of the wider road journey. - Riparian planting to rivers: drainage / swale planting to basins and swales. The proposed locations of vegetation screening and landscape planting area shown in Appendix B (Landscape Drawings: SWGA-32-980-00-DRG-0000).		Revegetation has commenced during the reporting period.	Compliant.
	Minimise privacy intrusion and reduce headlight glare impacts.	• Screen walls are included in the Proposal at various locations for the purposes of providing visual privacy to nearby residences and protection from headlight glare. A headlight glare study was undertaken to assess potential glare issues on nearby residences. Visual mitigation recommendations were provided to the design team and headlight screen walls incorporated into the Proposal design. • Proposed planting includes native screening vegetation to the Proposal Area boundary between the new road and viewer, therefore over time, this would screen views of the road from areas without screen walls. The proposed locations for noise and screen walls from Jilley Road to Bussell Highway are shown in Figure 4 (Appendix A).		Construction of the noise and screen walls commenced during the previous reporting period and was completed during this reporting period. The construction of the noise and screen walls is as per project design reports and drawings. Screen planting occurred in late 2024 and is ongoing. Screen planting will continue until revegetation markers are achieved.	Compliant.
Table 4: Significant Trees	No direct or indirect impact to the Giant Tuart ('Grey Giant') or culturally modified tree attributable to the Proposal.	• <u>Giant Tuart:</u> Establish a "Construction Exclusion Zone" around the Giant Tuart for the project duration, as per Site Exclusion Area in General Arrangement Drawings: SWGA-32-310-00-DRG-0102 for the Giant Tuart (Appendix B). - Avoidance areas within the Permit area must be demarcated prior to commencement of clearing. This includes flagging, fencing and/or sign posting of sites adjacent to construction areas for avoidance. - Exclusion zones shall be demarcated so that a line of sight can be seen between demarcation pegs. - Ground disturbance (direct or indirect) shall not occur within designated exclusion zones. • <u>Culturally modified tree:</u> The culturally modified tree (noting that this is dead), is located in Boyanup, occurs outside the Proposal Area. This tree has intentionally been avoided during the Proposal design development phase and is not expected to be directly or indirectly impacted by the Proposal. For the purpose of protecting culturally significant information, this location has not been mapped in the AMP. The culturally modified tree is located in private property outside the direct management of Main Roads.	• Monthly visual inspections, throughout the construction of the project, of exclusion areas to monitor that there has been no disturbance within these areas.	A "Construction Exclusion Zone" has been established around the Giant Tuart for the project duration. The culturally modified tree remains <i>in situ</i> outside the Proposal Area.	Compliant.
Table 5 Construction	Environmental audit and monitoring schedule	• Periodic inspections by site environmental personnel to identify compliance with the AMP	• Periodic (generally monthly)	Routine site inspections are completed by SWGA environmental personnel to identify compliance with various EMPs. Compliance against this AMP is included during these inspections.	Compliant
		• Audit for assessment of compliance with the AMP	• Annually	AMP was approved in October 2023. An audit for assessment of compliance with the AMP is undertaken as part of the compliance report for MS 1191. Compliance with the AMP was assessed and reported on in the 2023/24 Compliance Assessment Report and was published in August 2024.	Compliant

Management Plan Reference No.	Management Target	Management Action	Monitoring / Timing	Comments / Evidence	Compliance status
Table 5 Post Construction		Audit for assessment of compliance with the AMP	Annually (once per calendar year for up to 3 years).	Not applicable at this stage.	Not required at this stage.
Table 5 Operation		- At completion of soft landscaping works SWGA shall ensure the following completion criteria are met prior to handover to Main Roads WA: - Non irrigated areas: A minimum of 50% projected foliage cover (excluding any weeds) over any treated area of 100 m2, with no bare soil areas > 2 m2. - All irrigated planting areas: - A minimum of 70% projected foliage cover (excluding any weeds) over any treated area of 100 m2, with no bare soil areas > 0.5 m2. - All non-irrigated areas of grass: - A minimum 70% grass foliage cover (excluding any weeds) over any treated area of 100 m2, with no bare soil areas > 1 m2. Following completion of construction maintenance period the site will be handed over from SWGA to Main Roads WA and will be subject to on-going operational monitoring through standard network surveillance and maintenance.	- As required during SWGA maintenance period. - Ongoing following handover to Main Roads WA.	Not applicable at this stage.	Not required at this stage.



Appendix F

MS 1191 Offset Management Plan Audit Table

Audit Table for *Offset Management Plan (OMP)* - Requirements to be implemented in accordance with Condition 9 of Ministerial Statement 1191.

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
Offset Site #1 Management actions and Time frames Ducane Area Lots 153, 267 and 268 Queelup Road Gelorup' offset (Ducane Offset Site). Section 3.4.4 Table 3-5	Vehicle access	Install gates and other barriers such as boulders, steel roadside barriers to restrict unauthorised vehicle access.	Installation late 2023 Ongoing twice-yearly inspections Commencing late 2023	The installation of gates and other barriers commenced during the previous reporting period and were completed within the current reporting period.	Completed
	Artificial hollows	Install artificial nesting hollows.	Installation winter 2023 Ongoing annual inspections commencing winter 2023	Initial installation of artificial nesting hollows has been completed. Refer to Appendix L, M4.7 EPR Black Cockatoo Artificial Hollows.	Completed
	Weed control	Conduct baseline weed survey.	Commencing spring 2023	The weed baseline survey was undertaken during October 2023.	Completed
		Ongoing weed control program (WONS and Declared weeds) with a particular focus around wetland areas.	Twice-yearly in spring and autumn or as required for years 1 and 2, annually thereafter up to 20 years. Commencing 2024	Weed control was not considered necessary during the reporting period. Weed surveys did not identify any WONS or Declared weeds.	Compliant
	Pest control	Kangaroo control using shooting.	Twice-yearly at six-month intervals for years 1-5 with additional culling if required, annually thereafter based on site observations of grazing impact. Commencing spring 2024.	Not applicable at this stage. Kangaroo impact to native vegetation at the site is not considered to warrant active management during this reporting period.	Not applicable
		Fox control using 1080 baiting.	Conduct annually in late winter to autumn based on site observation of fox presence. Commencing late winter 2024.	Surveillance was completed in December 2024, baiting and / or trapping is planned to commence in spring 2025; this will be ongoing.	Compliant
		Rabbit control using Rabbit Haemorrhagic Disease Virus (RHDV) and Pindone.	Conduct annually in spring to autumn based on site observation of rabbit presence. Commencing spring 2024	Expert predator control contractors have been engaged to undertake rabbit control (rabbit baiting). Rabbit baiting was undertaken in July 2024. This will be ongoing.	Compliant
		Feral cat control using trapping.	Conduct annually in spring to autumn based on site observation of cat presence. Commencing autumn 2024	Based on annual survey undertaken by expert predator control contractors during the reporting period feral cat trapping will be targeted when required during the 2024/2025 reporting period. Minimal sightings were observed during the December 2024 survey.	Compliant
	Fire management	Maintain 3 m wide firebreak around the offset area boundary.	Ongoing annual inspections and maintenance.	Three-metre-wide firebreaks around the offset boundaries were established in 2020. Maintenance works were previously carried out during 2023-2024 reporting period, and again during this reporting period.	Compliant
	Rubbish removal	Rubbish will be removed from the site opportunistically to improve vegetation condition and limit the attraction of pest animals.	Rubbish removed from the site opportunistically	Rubbish has been opportunistically removed from site; this will be ongoing as required.	Compliant
Offset Site #1 Monitoring Program Ducane Area Lots 153, 267 and 268 Queelup Road Gelorup' offset (Ducane Offset Site). Section 3.4.5 Table 3-6	Presence and condition of fencing	Visual inspection of fence.	Report annually as part of annual compliance reporting Commencing spring 2023	Visual inspections of fencing commenced in Spring 2023 and have been conducted routinely; this will be ongoing.	Compliant
	Condition of firebreaks	Visual inspection of firebreaks (Annually commencing 2021)	Report annually as part of annual compliance reporting commencing spring 2021	Visual inspections of firebreaks are undertaken annually and are included in the Main Roads annual firebreak program.	Compliant
	Fox, feral cat and rabbit control	Field survey for visual evidence of fox, feral cat or rabbit presence (Annually in autumn commencing 2024)	Conduct annually in autumn Commencing 2024	Expert predator control contractors have been engaged to conduct fox, feral cats and rabbit surveys. Field surveys were undertaken in July and December 2024; this will be ongoing.	Compliant
	WRP Density/observations	Nocturnal field survey (including in Reference Sites).	Every three years in October/ November commencing in 2023/2024 (baseline)	WRP nocturnal baseline field survey was undertaken in December 2023. The next survey required is for 2026.	Compliant
	Black cockatoo habitat	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows	Every two years in spring Commencing 2023/24 (baseline) 2024 for artificial hollows	Black cockatoo field surveys were completed in March 2024 and December 2024. Refer to Appendix L, M4.7 EPR Black Cockatoo Artificial Hollows.	Compliant
	Condition of vegetation assessed against EPA (2016)	Field survey.	Annually in spring commencing 2023 (baseline).	The baseline flora and vegetation survey was completed in October 2023. The annual spring field survey was completed in October 2024.	Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
	WONS and Declared weed species distribution and diversity	Presence and distribution (location) of WONS and Declared weed species present.	Annually in spring for five years, commencing 2023 then every two years thereafter	Field survey for WONS and declared weed species was included in the flora and vegetation monitoring survey undertaken in October 2023. An annual field survey for 2024 was completed in October as part of the spring flora surveys.	Compliant
	Vegetation cover and structure	Drone footage (3D imagery).	Three-yearly in autumn or spring Commencing 2023 (baseline)	Baseline 3D aerial imagery of the offset site was captured as part of the BORR South corridor in 2023 and re-captured in March 2024. Further 3D aerial imagery capture is scheduled for 2027.	Compliant
Offset Site #2 Management actions and time frames 29 Queelup Road Gelorup' offset (Lot 29 Offset Area) Section 4.4.4 Table 4-5	Fencing	Install boundary fence to rural fence specifications.	Installation 2023 Ongoing quarterly inspections Commencing 2023	Boundary fencing has been installed as per the rural fencing specifications and fencing inspections are regularly conducted.	Compliant
	Artificial hollows	Install artificial nesting hollows.	Installation 2024 Ongoing annual inspections Commencing 2024	Inspection / nesting survey of three (3) artificial nesting hollows (AFH) installed in June 2023 was conducted on 7 March 2024. Refer to Appendix L, M4.7 EPR Black Cockatoo Artificial Hollows.	Compliant
	Weed control	Conduct baseline weed survey.	Spring 2023 Commencing 2024	Weed baseline survey was completed in November 2023. The annual weed survey was completed in November 2024 for this reporting period.	Completed
		Ongoing weed control program (WONS and Declared weeds) with a particular focus in the area of the south eastern boundary.	Twice-yearly in spring and autumn or as required for years 1 and 2 Annually thereafter based on site observations Commencing 2024	A weed control program is in progress; and ongoing.	Compliant
	Pest control	Fox control using 1080 baiting.	Annually in late winter to autumn based on site observation of fox presence commencing autumn 2024	A fox control program is in progress, and ongoing.	Compliant
		Rabbit control using RHDV and Pindone.	Annually in spring to autumn based on site observation of rabbit presence Commencing autumn 2024	Expert predator control contractors have been engaged to undertake rabbit control (surveillance (identifying presence and or absence of rabbits) and rabbit baiting). Rabbit control was undertaken in July 2024.	Compliant
	Fire management	Establish and maintain 3 m wide firebreak around the offset area boundary.	Autumn 2023 Commencing autumn 2023, maintenance ongoing	Three-metre-wide firebreak has been established around the offset area boundary. Maintenance and monitoring are incorporated in the Main Roads annual firebreak program; this will be ongoing.	Compliant
Offset Site #2 Monitoring Program Lot 29 Queelup Road Offset Area Table 4-6 Section 4.4.5	Fencing	Visual inspections of fence.	Annually Commencing spring 2023	Opportunistic visual inspections of fencing have been undertaken during the reporting period; and will be ongoing.	Compliant
	Firebreaks	Condition of fire breaks.	Annually commencing spring 2023	Visual monitoring of firebreaks has been undertaken during the reporting period (included in the Main Roads annual firebreak program); and will be ongoing.	Compliant
	Fox and rabbit control	Field survey for visual evidence of fox or rabbit presence.		Expert predator control contractors have been engaged to complete the Fox, and rabbit field surveys annually. Additionally, opportunistic field surveys have been undertaken throughout the reporting period.	Compliant
	WRP	Nocturnal field survey.	Every three years in October / November Commencing in 2023/2024	The nocturnal field survey for WRP was conducted during the reporting period in November 2023. The next nocturnal survey will be conducted in 2026; this will be ongoing.	Compliant
	Distribution / observations				
	WRP density			WRP density was included with the nocturnal field survey conducted in November 2023 during the reporting period. The next density survey will be conducted in 2026.	Compliant
	Number of WRP / ha				
	Black cockatoo habitat/quality	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows.	Every two years in spring Commencing 2023 (baseline) 2023 for artificial hollows	A black cockatoo habitat field survey was completed in November 2023, the next habitat field survey will be conducted in spring 2025. Inspection of Lot 29 Queelup to assess suitability to install artificial hollows was completed in March 2024.	Compliant
	Vegetation	Vegetation field Survey.	Annually in spring Commencing 2023 (baseline)	The baseline flora survey was completed in spring 2023; the 2024 Annual Spring Flora survey was completed in November 2024.	Compliant
	Condition of vegetation assessed against EPA (2016)				
	WONS and Declared weed species distribution and diversity	Field survey (meander with opportunistic recording).	Twice-yearly for two years (commencing 2023) (baseline) Annually thereafter	Field survey for WONS and declared weed species was included in the 2023 baseline survey; and 2024 spring surveys. No WONS nor declared weeds were recorded within any of the data sites during the 2023 survey, however Bridle Creeper and Arum Lily were both recorded on site in 2024.	Partially Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
	Presence and distribution (location) of WONS and Declared weed species present			Further surveys and weed control will be undertaken in 2025.	
	Cover and structure of vegetation	Drone footage (3D imagery).	Three-yearly in autumn or spring Commencing 2023 (baseline)	Baseline 3D aerial imagery was captured as part of the BORR South corridor in 2023. Further 3D aerial imagery capture is scheduled for 2026.	Compliant
Offset Site #3 Management actions and timeframes Lot 301 Marchetti Road Gelorup (now Yalinda Drive) 16' offset (Lot 301 Offset Area) Section 5.4.4 Table 5-5	Fencing	Replace existing rural boundary.	Installation autumn 2022 Ongoing quarterly inspections Commencing autumn 2022	Visual inspections are undertaken. Maintenance of the existing rural boundary is planned for late 2024; and will be ongoing.	Compliant
	Artificial hollows	Install artificial nesting hollows.	Installation autumn 2024 Ongoing annual inspections Commencing autumn 2024	In March 2024 it was determined that no suitable locations for artificial nesting hollows existed within this offset site. Consequently, the proposed installation of artificial nesting hollows was relocated to the Wheatbelt offset site, where the hollows were installed and then inspected in December 2024.	Compliant
	Signage	Install signage to exclude dog- walking from this offset area.	Installation Q1/Q2 2024, signage to remain in place for 20 years from the date of approval Q1/Q2 2024	Signage installation has been completed.	Compliant
	Weed control	Conduct baseline weed survey.	Spring 2023 Commencing spring 2023	Weed baseline survey was undertaken in November 2023.	Completed
		Ongoing weed control program (WONS and Declared weeds) with a particular focus around Five Mile Brook.	Twice-yearly in spring and autumn or as required for years 1 and 2. Annually thereafter based on site observations	Woody weed (Sydney Golden Wattle) control was undertaken during the reporting period in and around Five Mile Brook; woody weed control is ongoing. Arum Lily has been identified within and around the Five Mile Brook area, with weed control planned to be undertaken in 2025.	Partially Compliant
	Pest control	Fox control using 1080 baiting.	Annually in late winter to autumn based on site observation of fox presence	Fox control was undertaken throughout the reporting period based on the use of soft jaw traps. An assessment of potential risks prior to undertaking baiting identified there was an unacceptable risk that family pets and other non target species, particularly in the Gelorup area, may be poisoned. The next revision of the OMP will reflect the approach of not using baiting in high risk areas.	Partially Compliant
		Rabbit control using RHDV and Pindone.	Annually in spring to autumn based on site observation of rabbit presence Commencing autumn 2024	Expert predator control contractors have been engaged to undertake rabbit control, including surveillance (identifying presence and or absence of rabbits) and rabbit baiting. Rabbit baiting was undertaken in July 2024.	Compliant
	Fire management	Establish and maintain 3 m wide firebreak around the offset area boundary.	Autumn 2023 Commencing autumn 2024	Three-metre-wide firebreak is established around the offset area boundary. Maintenance and annual monitoring is incorporated into the Main Roads annual firebreak program.	Compliant
Offset Site #3 Monitoring Program Lot 301 Marchetti Road (now Yalinda) Gelorup 16' offset (Lot 301 Offset Area) Table 5-6 Section 5.4.5	Fencing	Visual inspection of fence.	Annually Commencing 2023	Opportunistic visual inspections of fencing have been conducted throughout the reporting period; This is ongoing.	Compliant
	Firebreaks	Inspection of the firebreaks.		Visual monitoring of firebreaks have been undertaken during the reporting period; they are included in the Main Roads annual firebreak program; this is ongoing.	Compliant
	Fox and rabbit control	Field survey for visual evidence of fox or rabbit presence.	Annually Commencing 2024	Expert predator control contractors have been engaged to complete field surveys fox and rabbit presence. Field survey was undertaken in July 2024.	Compliant
	WRP distribution	Nocturnal field survey.	Every three years in October / November Commencing in 2023/2024	Nocturnal field survey (Biota) for WRP was completed from the 30 October to the 1 November 2023.	Compliant
	WRP density			WRP density and distribution (Biota) review was completed from the 30 October to the 1 November 2023.	Compliant
	Black cockatoo habitat/quality	Field survey of black cockatoo foraging and potential nesting habitat and artificial hollows.	Every two years in spring Commencing 2023, 2024 for artificial hollows	Black cockatoo habitat field survey was completed in 2023, the next habitat field survey will be conducted in spring 2025. In March 2024 it was determined that no suitable locations for artificial nesting hollows existed within this offset site. Consequently, the proposed installation of artificial nesting hollows was relocated to the Wheatbelt offset site, where the hollows were installed and then inspected in December 2024.	Compliant
	Condition of vegetation assessed against EPA (2016)	Field survey.	Annually in spring Commencing 2023 (baseline)	A baseline vegetation field survey was undertaken in November 2023. The 2024 annual spring vegetation condition field survey was completed on the 8 November 2024.	Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording).	Twice-yearly for two years Commencing 2023 (baseline) Annually thereafter	A baseline field survey was undertaken in November 2023; with further surveys conducted in November 2024 to identify any WONS and Declared Weeds. Surveys were undertaken at the optimal time to identify whether unwanted species were present. Arum Lily was identified during the 2023 and 2024 baseline surveys. No other WONS nor declared weeds were recorded within the study site. As the presence of Arum Lily was well understood, additional surveys were not required, with Arum Lily control, via spray operators, occurring in 2025 at the optimal treatment time.	Partially Compliant
	Vegetation cover and structure	Drone footage (3D imagery).	Every three years in autumn or spring Commencing 2023 (baseline)	Baseline 3D aerial imagery was captured as part of the BORR South corridor in 2023. Further 3D aerial imagery is scheduled for 2026.	Compliant
Offset Site #4 Management actions and timeframes Lot 104 (North) Willinge Drive, Davenport Section 6.4.4 Table 6-5	Clearing / stockpiling stumps	Clearing of regrowth bluegums as required, vegetative material to be mulched.	Commencing autumn 2023 or prior	The clearing of regrowth blue gums has been completed and the vegetation mulched.	Completed
	Fencing	- Survey fence location to obtain accurate calculation of Offset Area - Removal of dilapidated fence - Installation of new fence (fauna fence specification) (noting that seasonal inundation limits site access, fence can be installed during summer only).	Commencing autumn 2023 or prior	The installation of fauna fencing has been competed as per the design specifications.	Completed
	Earthworks / drainage	- Installation of constructed wetlands / nutrient basins - Contouring the revegetation area to reduce areas of standing water - Installation of maintenance access / fire tracks - Rip / furrowing of unvegetated areas in preparation for planting.	Commencing summer 2022 / 2023 or prior	Earthworks and drainage works are being undertaken, in progress.	Compliant
	Weed control	Baseline weed survey.	Baseline weed survey to be conducted spring 2023	Preliminary weed control commenced 2015 / 2016. Baseline weed survey was completed in November 2023.	Completed
	Weed control	- Initial herbicide application prior to planting including treatment of woody weeds (Blue gums) - Revegetation areas treated with pre-emergent herbicide where required prior to planting - Ongoing management of WONS and Declared weeds	Estimated two treatments in Years 1-3 post rehabilitation Annually thereafter as required based on site observations	Preliminary weed control commenced 2015 / 2016. The management of WONS and declared weed species has been ongoing throughout the reporting period.	Compliant
	Pest animal control	Rabbit baiting using a combination of RHDV and Pindone.	Commencing autumn 2023 or prior Annually from spring through to late autumn as required based on site observations	Expert predator control contractors have been engaged to undertake rabbit control, including routine surveillance (identifying presence and or absence of rabbits) and rabbit baiting. Rabbit baiting was undertaken in July 2024; and is ongoing.	Compliant
		Fox baiting using 1080 (sodium fluoroacetate).	Commencing autumn 2023 or prior Annually during late winter through to autumn as required based on site observations	Fox control was undertaken in October 2023 during this reporting period; and is ongoing as required.	Compliant
	Remediation / rubbish removal	- Dieldrin assessment – testing is due November 2021, remediate if required. - Disposal of tyres / waste.	Completed	Dieldrin testing was completed during 2023. Waste disposal has been undertaken as required.	Completed
		Rubbish removal, opportunistically and as required.	Ongoing, opportunistically	Opportunistic waste disposal has been undertaken; and is ongoing as required.	Compliant
	Firebreak maintenance	Maintenance of fire breaks to remove flammable material.	Annually and opportunistically	Firebreak maintenance is included in the Main Roads annual firebreak program.	Compliant
	Rehabilitation	Seed Collection / Propagation. - Seed collections to be ordered annually as required - Seedling propagation / cuttings taken annually as required Revegetation – Commencing 2022 - Site is to be fully planted (no direct seeding) - Rip / mound, plant out in 2022 and annually thereafter as required	Seed collection and propagation commencing 2023. The remaining tasks will commence within 12 months of the completion of construction. Revegetation works are expected to continue for five years	Seed collection is ordered in advance as part of rehabilitation scheduling. Seedling propagation is not required at this stage. However, forward planning of seed propagation and cuttings required annually for revegetation are planned as per the rehabilitation schedule. Rip / mound, plant out occurred in 2022 and 2023, this will continue annually for the next 5 years.	Compliant
Offset Site #4 Monitoring Program	Presence and condition of fencing	Visual inspection of fence.	Annually commencing spring 2023	Opportunistic visual inspections of fencing have been conducted routinely throughout the reporting period; and is ongoing.	Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
Lot 104 (North) Willinge Drive, Davenport Section 6.4.5 Table 6-6	• Condition of firebreaks	• Visual inspection of firebreaks.	Annually commencing spring 2023	Visual inspections of the firebreaks are undertaken as part of the Main Roads annual firebreak program.	Compliant
	• Fox and rabbit control	• Field survey for visual evidence of fox or rabbit presence.	Annually in autumn commencing 2023	Expert predator control contractors have been engaged to complete fox, and rabbit field surveys annually. These surveys are in progress; and ongoing.	Compliant
	• WRP observations/number	• Nocturnal field survey.	Baseline assessment in 2023/2024 then every three years in October / November Commencing 2030 (six years post-rehabilitation).	Nocturnal field survey and density / distribution (Biota) of WRP has been completed.	Compliant
	• Condition of vegetation assessed against EPA (2016)	• Field survey (meander).	Baseline assessment 2023 then annually in spring from 2028 onwards (five years post-rehabilitation)	A base line survey was completed in 2023. Vegetation monitoring will commence during 2028 (post – rehabilitation).	Compliant
	• WONS and Declared weed species distribution and diversity	• Field survey (meander with opportunistic recording).	Annually for five years commencing 2023, every two years thereafter	Field survey for WONS and declared weeds commenced in November 2023, the second annual survey was completed in November 2024.	Compliant
	• Cover and structure of native vegetation.	• Drone footage (3D imagery).	Every three years in autumn or spring commencing 2023 (baseline)	Baseline 3D aerial imagery of the offset site was captured in March 2024. Further 3D aerial imagery is scheduled for 2026.	Compliant
Offset Site #5 Management actions & timeframes Ludlow State Forest / Tuart Forest National Park' offset (Ludlow Offset Area). Section 7.4.4.2 Table 7-6C	• Weed Control Site 2	• Post revegetation – ongoing weed control targeting Arum lily, Bridal creeper and other WONS and Declared weeds as required.	Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter	Weed control is planned to commence in Spring 2025, post revegetation.	Compliant
	• Weed Control Site 4	• Post revegetation – ongoing weed control targeting Arum lily, Bridal creeper and other WONS and Declared weeds as required.	Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter	Weed control is planned to commence in Spring 2025, post revegetation.	Compliant
	• Weed Control Site 12	• Herbicide application targeting Arum lily, Bridal creeper WONS and Declared weeds as required.	Up to two treatments annually in late winter/early spring and summer/autumn in years 1-3 post revegetation and annually thereafter	Not required at this stage.	Not required at this Stage
	• Pest Control Site 2 • Pest Control Site 4	• Pest animal control.	Rabbit baiting ongoing annually as required based on site observations. Fox baiting not currently required (requirement monitored annually) Cat trapping to commence spring 2025 and continue annually as required based on site observations	Expert predator control contractors have been engaged to undertake rabbit control including surveillance (identifying presence and or absence of rabbits) and rabbit baiting. Rabbit, fox and cat monitoring and controls will be completed as required.	Compliant
	• Pest Control Site 12	• Pest animal control.	Rabbit baiting to commence spring 2025 and continue annually as required based on site observations Fox baiting to commence in spring 2025 and continue annually or biannually. as required based on site observations Cat trapping to commence spring 2025 and continue annually as required based on site observations	Not required at this stage.	Not required at this Stage
	• Fencing Site 2 • Fencing Site 4	• Ongoing maintenance of existing fence as required.	Fence installed in 2017 Fence installed in 2021	Visual fencing inspections have been implemented encompassing fencing maintenance as required; this will be ongoing.	Compliant Compliant
	• Fencing Site 12	• Construction of revegetation area fences to fauna fence specification • Fauna gates to be installed • Fence locations surveyed to obtain accurate calculation of Offset Area • Ensure fence position maintains fire and fauna access.	Fence to be installed 2024	Preparation for the construction of the fencing commenced in 2024. The installation of fencing at Site 12 was delayed due to contractual challenges and resourcing issues. Fencing works will be completed in 2025.	Partially Compliant
	• Rubbish Removal, all sites	• Rubbish removal as required.	Q1 2024 and ongoing.	Rubbish removal has been undertaken; this will be ongoing as required.	Compliant
	• Revegetation - seed collection / propagation	• Order seed collections • Order seedlings	Sites 2 and 4 - seedlings for infill planting ordered annually as required based on	No infill planting was required during this reporting period.	Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
	Sites 2, & 4	Seedling propagation.	monitoring results to enable achievement of completion criteria		
	Revegetation - seed collection / propagation Site 12	- Order seed collections - Order seedlings - Seedling propagation.	Site 12 - Seed and seedlings to be ordered in 2024	Objective of this commitment is to ensure revegetation is undertaken immediately following the installation of the fencing. With fencing scheduled to be completed by 2025, revegetation will commence in winter 2026.	Partially Compliant
	Revegetation - site preparation Site 12	Rip and furrow-line throughout open areas, hand-augur in amongst existing vegetation in preparation for planting.	Site preparation works to commence in 2025	Not required at this stage.	Not required at this Stage
	Revegetation – planting and seeding Sites 2 and 4	Infill planting as required.	Infill planting will be undertaken annually as required	No infill planting was undertaken during this reporting period.	Compliant
	Revegetation – planting and seeding Site 12	- Direct seedling of areas with low weed burden. - Rip / furrow planting with seedlings. - Targeted planting required for areas of remnant vegetation. - Infill planting as required.	Planting to commence in winter 2025 and be completed in winter 2029 (5-year revegetation program) Post-2029, infill planting will be undertaken annually as required	Objective of this commitment is to ensure revegetation is undertaken immediately following the installation of the fencing. With fencing scheduled to be completed by 2025, revegetation will commence in winter 2026.	Partially Compliant
	Rehabilitation completion, all sites	Rehabilitation meets completion criteria (excluding WRP density criteria, which will be completed within 15 years of revegetation commencing).	10 years from commencement of rehabilitation	Not required at this stage.	Not required at this stage
Offset Site #5 Management actions & timeframes Ludlow State Forest / Tuart Forest National Park' offset (Ludlow Offset Area). Section 7.4.5 Table 7-7	Presence and condition of fencing	Visual inspection of fence.	Annually Commencing spring 2024	Visual inspections of fencing are conducted annually; and this will be ongoing.	Not required at this stage
	Condition of firebreaks	Visual inspection of firebreaks.	Annually Commencing spring 2023	Visual inspections of the firebreaks are conducted annually, they are included in the Main Roads annual firebreak program.	Compliant
	Fox, feral cat and rabbit control	Field survey for visual evidence of fox, feral cat, or rabbit presence.	Annually in autumn Commencing 2024 (baseline)	The feral predator control program was planned to commence immediately following the installation of fencing at Site 12. Given fencing is now scheduled to be completed in Q4, 2025, the feral fauna surveys and subsequent control actions are now scheduled to be undertaken in 2025.	Partially compliant
	- WRP Distribution - WRP Density	Nocturnal field survey.	Baseline assessment in 2023/2024 then every three years in October/ November Commencing 2030 (six years post-commencement of rehabilitation)	Western ring tail possum baseline spotlighting surveys were undertaken during the reporting period in November 2023 and April 2024. WRP distribution surveys were conducted during the reporting period on 27 November 2023 and 5 December 2023.	Compliant Compliant
	Black cockatoo Presence and/or foraging evidence	Field survey.	Annually in spring Commencing 2028	Not required at this stage.	Not required at this stage
	- Number of species per 100m2 - Native foliage cover	Field survey using 10 x 10 m floristic quadrats.	Annually in spring Commencing year 2023 (baseline)	Baseline field survey reports for site 1, site 2, Site 4, site 7, and site 12 were completed 2023, The annual field surveys were undertaken in October and November 2024.	Compliant
	Condition of vegetation assessed against EPA (2016)	Field survey.		Baseline field survey reports for site 1, site 2, Site 4, site 7, and site 12 were completed 2023, The annual field surveys were undertaken in October and November 2024.	Compliant
	(Presence and distribution (location) of WONS and Declared weed species present)	Field survey (meander with opportunistic recording).	Annually in spring for five years commencing 2023, every two years thereafter	Field surveys for sites 1, 2, 4, 7, and site 12 commenced in 2023. The annual spring field survey was completed in October and November 2024.	Compliant
	Vegetation cover and structure	Drone footage (3D imagery).	Every three years in autumn or spring commencing 2023 (baseline)	Baseline 3D aerial imagery of the offset site was captured in February 2023 Further 3D aerial imagery is scheduled for 2026.	Compliant
	Offset Site #6 Monitoring program Ludlow Peppermint Orchard	Presence and condition of fencing	Annually commencing 2022	Visual inspections of fencing have been conducted annually; this will be ongoing.	Compliant
	Condition of Firebreaks	Visual inspection of firebreaks.	Annually commencing 2022	Visual inspections of the firebreaks are conducted annually and are included in Main Roads annual firebreak program.	Compliant

Management Plan Reference No.	Aspect	Management Action	Requirement	Comments / Evidence	Compliance status
Section 8.4.5 Table 8-5	Orchard development, plant height	Field survey identifying plant height in Peppermint orchard is greater than 2m at two years.	Annually commencing spring, 2021	Opportunistic regularly monitoring of Peppermint Orchard has not observed any plants higher than 2m. Plant measurements will commence once plants obtain a height of more than 2m.	Compliant
	Orchard development, plant health and flowering	Field survey.	Annually commencing spring 2024	To be undertaken when plants exceed 2m in height.	Compliant
	Orchard development, orchard area, size of Peppermint orchard	Size of Peppermint orchard – Orchard area is less than one hectare in any monitoring period.	Annually commencing spring, 2021	Peppermint Orchard size is greater than 1 hectare.	Complaint
Offset Site #7 Monitoring Program Supplementation of DBCA's TFNP fox baiting program Section 9.1.3 Table 9-3	Fox bait uptake	Visual inspection, camera detection rates, monitor number of baits take	Monthly commencing winter 2023 (baseline) for years 1-5 Then three-monthly for years 6-8 ²⁵ Annual report will be submitted to DWER as part of the CAR	DBCA manages the fox control program.	Compliant
	Fox relative abundance/trends	Camera detection rates and trapping / shooting results, monitor fox relative abundance.		DBCA provides an annual report in December each year.	Compliant
Offset Site # 8 Management actions and timeframes Lot 27 Tredrea Place, Myalup Section 10.4.4 Table 10-5	Fencing	Replace existing rural boundary.	Installation 2023/2024 Ongoing annual inspections and maintenance Commencing 2024	The replacement of the existing rural boundary has been completed. Annual fencing inspections commenced in 2024.	Compliant
	Weed Control	Conduct baseline weed survey.	Commencing spring 2023	Baseline weed survey has been completed in November 2023.	Completed
		Ongoing weed control program (WONS and Declared weeds).	Commenced 2018 Twice-yearly in spring and autumn or as required for years 1 and 2. Annually thereafter based on site observations	Weed control was completed during this reporting period and is ongoing.	Compliant
	Pest Control	Fox control using 1080 baiting.	Annually in late winter to autumn based on site observation of fox presence. Commencing after fence installed	No fox baiting was undertaken during this reporting period. Refer to Appendix A.	Non-Compliant
		Rabbit control using RHDV and Pindone.	Annually in spring to autumn based on site observation of rabbit presence. commencing after fence installed	Expert predator control contractors have been engaged to undertake rabbit control, including surveillance (identifying presence and or absence of rabbits) and rabbit baiting. Rabbit baiting was undertaken in July 2024; and is ongoing.	Compliant
	Targeted revegetation	In bare / Completely degraded / Degraded areas 25m².	2025 and 2026. Ongoing annual inspections Commencing winter 2025	Not required at this stage.	Not required at this Stage
	Firebreak	Maintain 3 m wide firebreak around the offset area boundary	Ongoing annual inspections and maintenance	Three-metre-wide firebreak has been established around the offset site boundary. Fencing maintenance is included in the Main Roads annual firebreak program.	Compliant
Offset Site # 8 Management actions and timeframes Lot 27 Tredrea Place, Myalup Section 10.4.5 Table 10-6	Presence and condition of fencing	Visual inspection of fence.	Annually Commencing 2023	Opportunistic visual inspections of fencing have been completed annually; this is ongoing.	Compliant
	Condition of firebreaks	Visual inspection of firebreaks.	Annually commencing 2023	Visual inspections of the firebreaks are included in the Main Roads annual firebreak program.	Compliant
	Condition of vegetation assessed against EPA (2016)	Field survey.	Annually in spring commencing year 2023 (baseline).	The baseline flora condition field survey was completed in 2023. The annual spring survey was completed of November 2024	Compliant
	Presence and distribution (location) of WONS and Declared weed species present	Field survey (meander with opportunistic recording).	Twice-yearly for two years commencing year 2023. Annually thereafter.	Field surveys have been completed annually, with the control of Cotton Bush undertaken during the reporting period	Partially Compliant
	Fox and rabbit control, evidence of recent (<2 months old) fox or rabbit presence	Field survey for visual evidence of fox or rabbit presence.	Annually in autumn commencing 2024	Inspections for visual evidence of pest and predators in undertaken monthly.	Compliant



Appendix G

MS 1191 Traffic Noise Management Plan Audit Table

Audit Table for *Traffic Noise Management Plan (TNMP)* - Requirements to be implemented in accordance with Condition 7 of Ministerial Statement 1191.

Management Plan Reference No.	Management Target	Management Action	Monitoring / Timing	Comments / Evidence	Compliance status
Noise management targets Table 5 Section 3.2	Management Action 1 Outdoor noise management targets.	Determination and modelling of outdoor noise management targets with regard to SPP No 5.4. <i>(Where a residence is within the trigger distance to an existing major road, the 'Road Upgrade' criteria are applicable (60 dB LAeq(Day) / 55 dB LAeq(Night)). Outside of this, the 'New Road' criteria are applicable (55 dB LAeq(Day) / 50 dB LAeq(Night))</i>	Pre-/Post-construction noise monitoring	Not Required at this stage. Post construction outdoor noise monitoring will commence in June 2025. This is within 6 to 18 months timeframe of the Proposal being in operation.	Not Required at this stage.
	Management Action 2 Indoor noise management targets to apply to noise sensitive receptors where the construction of noise walls is not feasible or practicable.	Determination and modelling of indoor noise management targets with regard to SPP No 5.4. <i>(Indoor noise target 40 dB LAeq; Day; living and work areas and 35 dB LAeq Night bedrooms)</i>		Not Required at this stage. Post construction indoor monitoring will be undertaken within 6 to 18 months timeframe of the Proposal being in operation.	Not Required at this stage.
Noise management actions Table 5 Section 3.2	Management Action 3 The noise management actions to ensure the noise management targets are met during the operation of the proposal.	Implementation of the following noise management actions: Construction of noise walls and screen walls (Management Action 4).	As-constructed drawings	Noise walls and screen walls have been constructed as per the design drawings. These were completed during this reporting period.	Compliant
		Acoustic treatment of houses, where required (Management Action 5).		Acoustic treatments are currently being re-considered in conjunction with design changes to road surface treatments. Some property owners have elected to take funding and manage the installation of treatments themselves. Consultation with landowners has been on-going during the reporting period.	Compliant
		Road design measures, (Management Action 6).		All management actions listed in Management action 6 have been incorporated in the road design to reduce noise emissions.	Compliant
		Post-construction noise monitoring (Management Action 7).		Not Required at this stage. The Proposal is still under construction.	Not Required at this stage.
Noise walls Table 5 Section 3.2	Management Action 4 Where noise walls will be constructed, the location, height and timing of construction of the walls.	Construct noise and screening walls as per project designs (Figure 2 and Appendix B): - Noise walls have been constructed of concrete panels and meet the requirements of SPP No. 5.4. - Screen walls have been constructed to further improve noise and visual amenity along the Gelorup corridor. Noise walls will be extended along the road verge as screen walls).	As-constructed drawings	The construction of noise and screen walls within the Proposal have been completed during this reporting period, as per the Proposal designs.	Compliant
Acoustic treatments of houses Table 5 Section 3.2	Management Action 5 Where acoustic treatment of houses will be implemented, the standard of treatments, timing and evidence of consultation with affected stakeholders;	Implement acoustic treatments on houses in consultation with affected stakeholders.	Post-completion inspection and sign-off	Acoustic treatments are currently being re-considered in conjunction with design changes to road surface treatments. Some property owners have elected to take funding and manage the installation of treatments themselves. Consultation with landowners has been on-going during the reporting period.	Not Required at this stage.
Road design measures Table 5 Section 3.2	Management Action 6 Road design measures to minimise noise emissions where relevant and appropriate, including low noise road surfaces and selection of appropriate bridge expansion joints.	Incorporate road design measures to minimise noise emissions where practicable, including low noise road surfaces and appropriate bridge expansion joints. As-constructed drawings. <i>((Project Wide Locations: Interchanges and ramps (including fly-over ramps in Section 32). Treatment 14 mm Dense Graded Asphalt (DGA14) (Section 32 Main alignment (full length through Section 32) and Bussell Highway to Ch 109665.4 (MCS2). Treatment 10 mm Stone Mastic Asphalt (SMA10) (Section 32 Location : Bridge 1905; BORR over Five Mile Brook). Treatment Mageba Polyflex Flexible Plug).</i>	As-constructed drawings	Road design measures to minimise noise emissions where it is practicable have been incorporated into the proposal design and implemented during construction. Road construction incorporating the noise reducing measures was completed during this reporting period.	Compliant
Post construction noise monitoring Table 5 Section 3.2	Management Action 7 Post-construction noise monitoring to demonstrate that noise management actions meet the relevant outdoor noise management targets.	Conduct post-construction noise monitoring to demonstrate that noise management actions meet the relevant outdoor noise management targets. <i>(Within 6 months of practical completion of Separable Portion 3 (i.e. application of final seal, to be undertaken between 6 months and 18 months after the project is open to the public) noise levels at select locations shall be measured and the results extrapolated to the design year (2041)). (At each residence, an automatic noise data logger will be located outside the most exposed habitable façade (or other location as requested)</i>	- Post-construction noise monitoring - At the time of monitoring, road traffic counts shall also be undertaken. (This allows the noise data to then be extrapolated to the design year of 2041)	Not Required at this stage. The Proposal has not achieved practical completion within the reporting period.	Not Required at this stage.

Management Plan Reference No.	Management Target	Management Action	Monitoring / Timing	Comments / Evidence	Compliance status
Contingency actions Table 5 Section 3.2	Management Action 8 Contingency actions in the event relevant noise management targets are not met.	Implement contingency actions in the event relevant noise management targets are not met.	Post-construction noise monitoring	Not required at this stage.	Not required at this stage.
Auditing Section 5.1	TNMP Audit	TNMP will be audited annually by Main Roads following commencement of operation of the Proposal	Once per calendar year for the first three years	Not required at this stage. Annual audit of the TNMP will be undertaken late in 2025.	Not required at this stage.
Review Section 5.1	TNMP Review	TNMP will be reviewed annually following commencement of operation of the Proposal.	Once per calendar year for the first three years	Not required at this stage. Annual review of the TNMP will be completed in December 2025, 12 months post approval. (This is outside the reporting period)	Not required at this stage.
Data Management Section 5.3	Data Management	Main Roads will maintain records on the implementation of this AMP in accordance with Main Roads' corporate standard document control procedures.	Until 2040	All documentation and records related to this Proposal is maintained in Main Roads document management system. The retention of records held by Main Roads (including external communications) are maintained and managed in accordance with the Western Australian State Records Act 2000.	Compliant
Environmental Management roles and responsibilities Section 5.4	Environmental Management	Where management actions are undertaken by employees and/ or contractors of Main Roads, these will be communicated and documented to the relevant personnel through relevant environmental training.	Until 2040	All personnel on the Proposal are required to complete an online and face to face induction. The induction addresses the details listed. Refer to M0 SWGA Construction Environmental Management Plan.	Compliant
Emergency Management Section 5.5	Emergency contact Details	Emergency contact details will be signposted at appropriate locations within the Proposal Area. (Emergency response procedures will be followed in the event of an emergency / environmental incident).	Until 2040	Emergency contact details are sign posted within the Proposal area. During this reporting period, emergency contact details were sign posted across the site offices.	Compliant
External communications Section 6.2	Communication register	Main Roads (and /or its Contractors) will maintain a register of communications (including any public concerns/ complaints) for the Proposal.	Until 2040	All public concerns / complaints are managed through the Main Roads Connect system. This program maintains a register of communications and is accessible by both the Main Roads customer information centre (CIC) and the South West Gateway Alliance's Community Stakeholder Engagement Team.	Compliant

Appendix H

Evidence (related to potential non-compliance/
non-conformance only) - Not Required



Appendix I

Evidence Summary Table

Cond.	Evidence Reference	Description
M1-1	Ground disturbance and clearing (Figures and shapefiles)	Figures and shapefiles in relation to ground disturbance and clearing during the reporting period (31 May 2024 to 31 May 2025) for specified environmental aspects / values
M2-1 (2)	M2-2 Baseline Hydrological Regime Report M2-4 Environmental Performance Report	MS1191 M2-2 Baseline Hydrological Regime Report MS1191 M2-4 Environmental Performance Report
M2-2	M2-2 Baseline Hydrological Regime Report	MS1191 M2-2 Baseline Hydrological Regime Report
M2-3, 2-4	M2-4 Environmental Performance Report	MS1191 M2-4 Environmental Performance Report
M2-5	Attachment 2 to Statement 1191	MS1191 S45C(5) amendment to Condition 2-5
M3-1 (2)	M3-2 Baseline PEC / TEC Report M3-4 Environmental Performance Report	MS1191 M3-2 Baseline PEC / TEC Report MS1191 M3-4 Environmental Performance Report
M3-2	M3-2 Baseline PEC / TEC Report	MS1191 M3-2 Baseline PEC / TEC Report
M3-3, 3-4	M3-4 Environmental Performance Report	MS1191 M3-4 Environmental Performance Report
M3-5(1)	M3-5 Phytophthora Dieback Management	MS1191 M3-5 Phytophthora Dieback Management Plan MS1191 M3-5 Phytophthora Dieback Re-Assessment Reports
M3-5(2)	M3-5 Weed Control and Management	MS1191 M3-5 Weed Control and Management
M4-2	M4-2 Black cockatoo pre-clearing surveys	MS1191 M4-2 Black cockatoo pre-clearing survey Reports
M4-3(1)	M4-3 Fauna spotters	MS1191 M4-3 Fauna spotter accreditation
M4-3(2)	M3-4 Environmental Performance Report M5-3 Environmental Performance Report	MS1191 M3-4 Environmental Performance Report MS1191 M5-3 Environmental Performance Report
M4-4 - 4-6	M4-4_4-6 Black cockatoo artificial hollows	MS1191 M4-4_4-6 Black cockatoo artificial hollows Report
M4-7	M4-7 Environmental Performance Report	MS1191 M4-7 Environmental Performance Report
M5-2	M5-2 Construction Fauna Management Plan	MS1191 M5-2 Construction Fauna Management Plan
M5-3	M5-3 Environmental Performance Report	MS1191 M5-3 Environmental Performance Report
M5-4	M5-4 Construction Fauna Management Plan - Approval	MS1191 M5-4 Construction Fauna Management Plan – Approval
M5-5	M5-5 Terrestrial fauna surveys	MS1191 M5-5 Pre-clearing terrestrial fauna surveys
M5-5	M5-5 Fauna records during clearing	MS1191 M5-5 Fauna records during clearing
M6-3	M6-3 Habitat Fragmentation Management Plan	MS1191 M6-3 Habitat Fragmentation Management Plan
M6-7	M6-7 Habitat Fragmentation Management Plan - Approval	MS1191 M6-7 Habitat Fragmentation Management Plan - Approval
M6-8	M6-8 Predator Control Progressive Report	MS1191 M6-8 Predator Control Progressive Reports
M8-3	M8-3 Amenity Management Plan	MS1191 M8-3 Amenity Management Plan
M8-4	M8-4 Amenity Management Plan - Approval	MS1191 M8-4 Amenity Management Plan - Approval
M9-3	M9-3 Offset Management Plan	MS1191 M9-3 Offset Management Plan
M9-6	M9-6 Offset Management Plan - Approval	MS1191 M9-6 Offset Management Plan - Approval
M12-1	M12-1 Compliance Assessment Plan	MS1191 M12-1 Compliance Assessment Plan
M12-3	M12-1 Compliance Assessment Plan	MS1191 M12-1 Compliance Assessment Plan - Approval



Cond.	Evidence Reference	Description
M0 Multiple	M0 SWGA CEMP	SWGA Construction Environmental Management Plan
M0 Multiple	M0 Independent Daily Inspection Reports	Independent Daily Audit - Inspection Reports (Preston)

Appendix J

M2.4 Environmental Performance Report - Inland Waters

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191: M2-4

Environmental Performance Report

Inland Waters (2024 - 2025)

Main Roads WA

Revision 0

28-Aug-25



Document control record

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Document control						
Report title		Ministerial Statement 1191 M2-4 Environmental Performance Report – Inland Waters				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	23-July-25	SWGA Review	A.G. & D.P.	A.G.		A.M.
B	12-Aug-25	SWGA	AG			A.M.
C	27-Aug-25	Main Roads Review	AG	Main Roads		M.S.
0	28-Aug-25	Issued	AG	Main Roads		M.S.
Current revision		0				

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2.3	Key References and Reports	6

Report

Annual Groundwater Report (AECOM and SWGA, 2025)

Report

Annual Aquatic Fauna and Surface Water Report (SLR Consulting, 2025)

Figures

- Figure 1. Ground disturbance and clearing extents during the reporting period in relation to inland waters (wetlands).
- Figure 2. Ground disturbance and clearing extents during the reporting period in relation to potential Black-stripe minnow habitat.

Tables

- Table 1. Ground disturbance and clearing in relation to Inland Waters during the reporting period (May 2024 – 25).

1 Introduction

1.1 Background

The Commissioner of Main Roads Western Australia (MRWA) has been granted conditional approval for the Bunbury Outer Ring Road (BORR) Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (EPA Report 1714, October 2021), the EPA noted that in relation to Inland Waters, there was the potential for direct and indirect impacts to hydrological regimes and water quality in adjacent Conservation Category Wetlands (CCWs), Resource Enhancement Wetlands (REWs), the Five Mile Brook and black stripe minnow habitats.

To address these impacts, under Condition 2 of MS1191, the EPA required pre-disturbance monitoring of hydrological regimes and baseline conditions, and monitoring of these elements during and post-construction, with reporting requirements, to meet the objective that there be no project-attributable impacts to the hydrological regime and water quality of CCW and REW wetlands, Five Mile Brook or black-stripe minnow habitat.

Ministerial Statement 1191, therefore, includes the following conditions in relation to Inland Waters:

Condition 2-1(2)

No project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions:

- (a) Five Mile Brook (incorporating MU Wetland UFI-1163 and CC Category Wetland UFI-931),*
- (b) CC Category Wetland (UFI-14478),*
- (c) RE Wetlands (UFI-1117 and UFI-15493), and*
- (d) black-stripe minnow (*Galaxiella nigrostriata*) habitats defined and mapped in the proponent's Action Management Plan CC Significant Fauna (Revision 2 August 2021) that are within or adjoins the development envelope, except for the black-stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).*

Condition 2-2

Prior to ground-disturbing activities, the proponent shall undertake monitoring of the hydrological regimes of the values listed in condition 2-1(2) and submit a report to the CEO about the preconstruction baseline conditions and predicted post-development hydrological regime.

Condition 2-3

The proponent shall continue to undertake monitoring of hydrological regime and water quality during and post-construction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 2-1(2) have been met.

2 Environmental Performance Report

2.1 Purpose and scope

This Environmental Performance Report (EPR) addresses the compliance of the Bunbury Outer Ring Road (BORR) Southern Section (the Proposal) with Condition 2-4 set out in MS 1191.

Condition 2-4 of MS 1191 requires an annual Environmental Performance Report (EPR) to be submitted to the Chief Executive Officer (CEO) of the EPA as part of the Compliance Assessment Report (CAR).

MS 1191: Condition 2-4

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:

- (1) outline the monitoring that was undertaken during the implementation of the proposal;*
- (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1(2) were achieved;*
- (3) report whether that the outcomes in condition 2-1(2) were achieved; and*
- (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 2-1(2).*

This EPR has been prepared to address Conditions 2-1(2), 2-3 and 2-4 of MS 1191 during the reporting period.

This EPR incorporates a 12-month audit period from 31 May 2024 to 31 May 2025. This is the third EPR associated with Condition 2-4 to be submitted under MS 1191.

Two reports have been prepared reviewing hydrological regime and water quality:

- Annual Groundwater Report (prepared by AECOM - Attachment 1).
- Annual Aquatic Fauna and Surface Water Report (prepared by SLR Consulting - Attachment 2).

2.2 Clearing metrics in relation to Inland Waters during the reporting period

Construction of the Proposal commenced on 1 August 2022.

Clearing and disturbance of Inland Waters during the reporting period is summarised in **Table 1** and **Figure 1**.

Table 1. Ground disturbance and clearing in relation to Inland Waters during the reporting period (May 2024 –25).

Environmental Aspect	Area / quantity specified in Ministerial Statement 1191	Area / quantity cleared during the 2022 – 2023 reporting period	Area / quantity cleared during this 2023 – 2024 reporting period	Area / quantity cleared during this 2024 – 2025 reporting period	Total area / quantity cleared
Conservation Category Wetlands	0.2 ha	0 ha	0.11 ha	0	0.11 ha
Resource Enhancement Wetlands	1.4 ha	0.52 ha	0 ha	0	0.52 ha
Black-stripe minnow habitat (potential)	5.5ha	2.16 ha	0.25 ha	0.04	2.45 ha

2.3 Key References and Reports

A number of key references and reports have informed the preparation of this report:

Appeals Convenor (2022). Appeals Convenor's Report to the Minister for Environment: Appeals objecting to Report and Recommendations of EPA Report 1714 – Bunbury Outer Ring Road Southern Section. Appeal 045/21, April 2022. Office of the Appeals Convenor, Perth, Western Australia.

Bunbury Outer Ring Road Integrated Planning Study BORR IPT (2019). Wetland Study (BORR-02-RP-EN-007, Jan 2019).

Bunbury Outer Ring Road Integrated Planning Study BORR IPT (2020). Groundwater and Surface Water Quality Monitoring 2019-20 (BORR-00-RP-EN-005 Rev 1, August 2020).

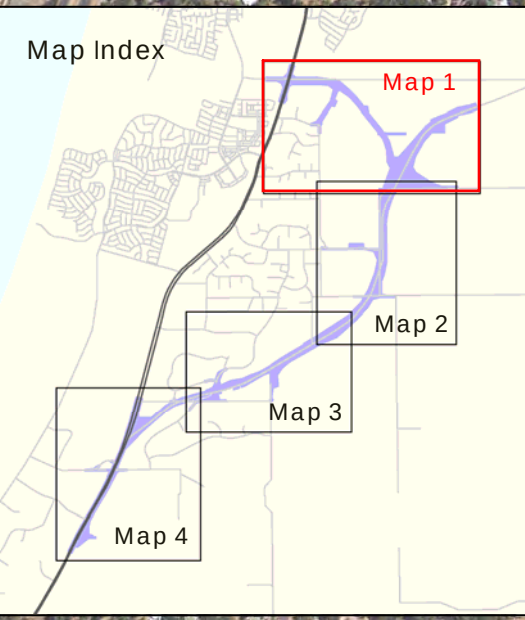
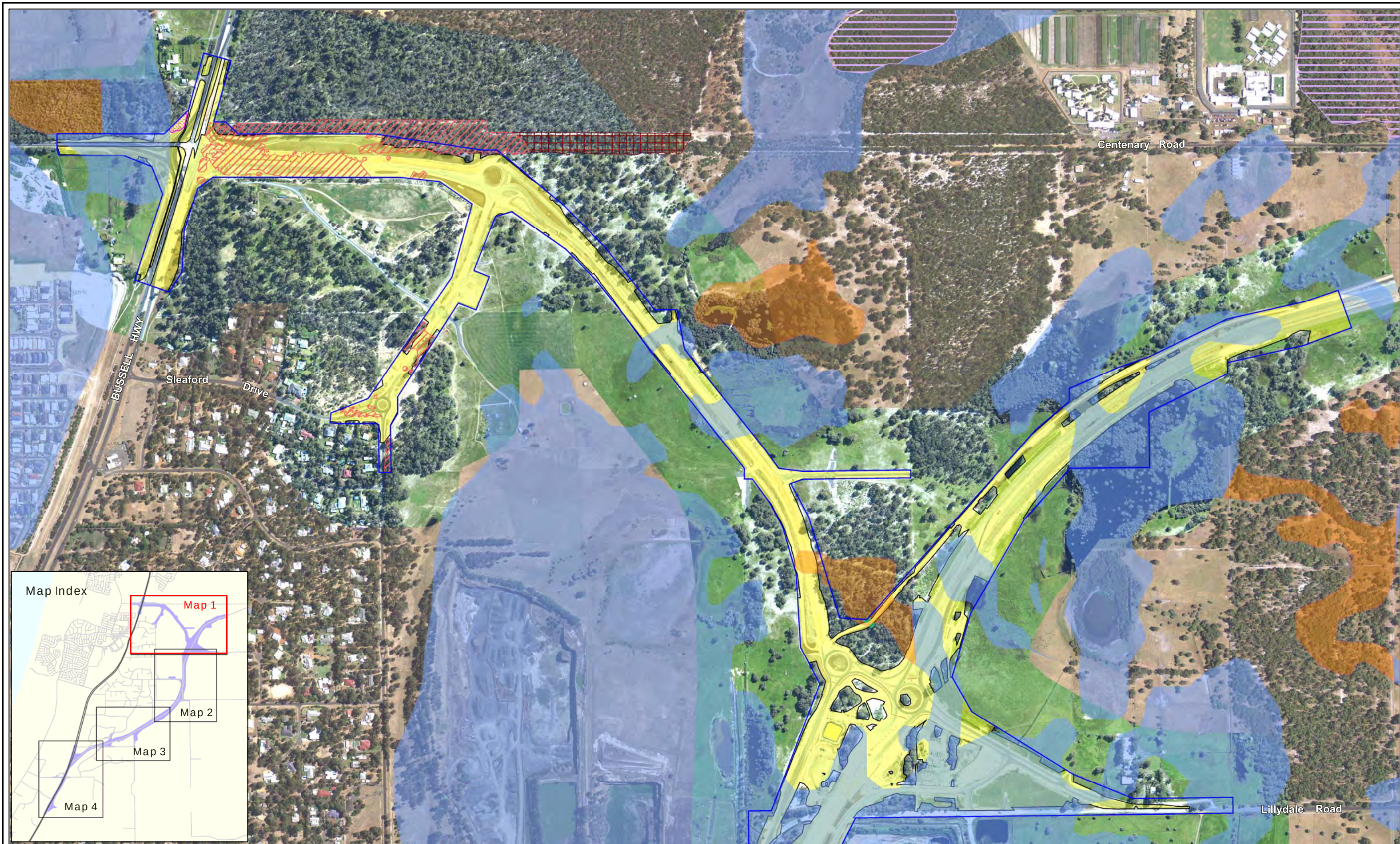
Environmental Protection Authority (2021). Bunbury Outer Ring Road Southern Section, Commissioner for Main Roads Western Australia. Report 1714, October 2021. Environmental Protection Authority, Perth, Western Australia.

South West Gateway Alliance (2021). Bunbury Outer Ring Road Determination of Design Groundwater Levels (SWGA-00-270-00-REP-0001, September 2021).

Southwest Gateway Alliance (2022). Bunbury Outer Ring Road (Southern Section) Baseline Hydrological Regime Report. (SWGA-00-134-00-REP-0006, July 2022).

WRM (2021) Bunbury Outer Ring Road Southern Section: Targeted Conservation Significant Aquatic Fauna Monitoring 2021. Unpublished report by Wetland Research and Management to SWGA. December 2021.

Figure 1. Ground disturbance and clearing extents during the reporting period in relation to inland waters (wetlands).



Location Map

KARRATHA
W A
PERTH
KALGOORLIE
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC
- Tuart Woodland TEC/PEC
- Tuart-Peppermint Woodland PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands
- Resource Enhancement Wetlands

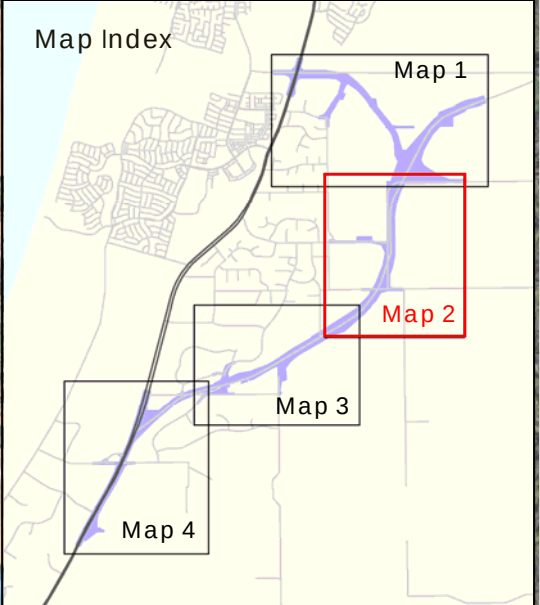
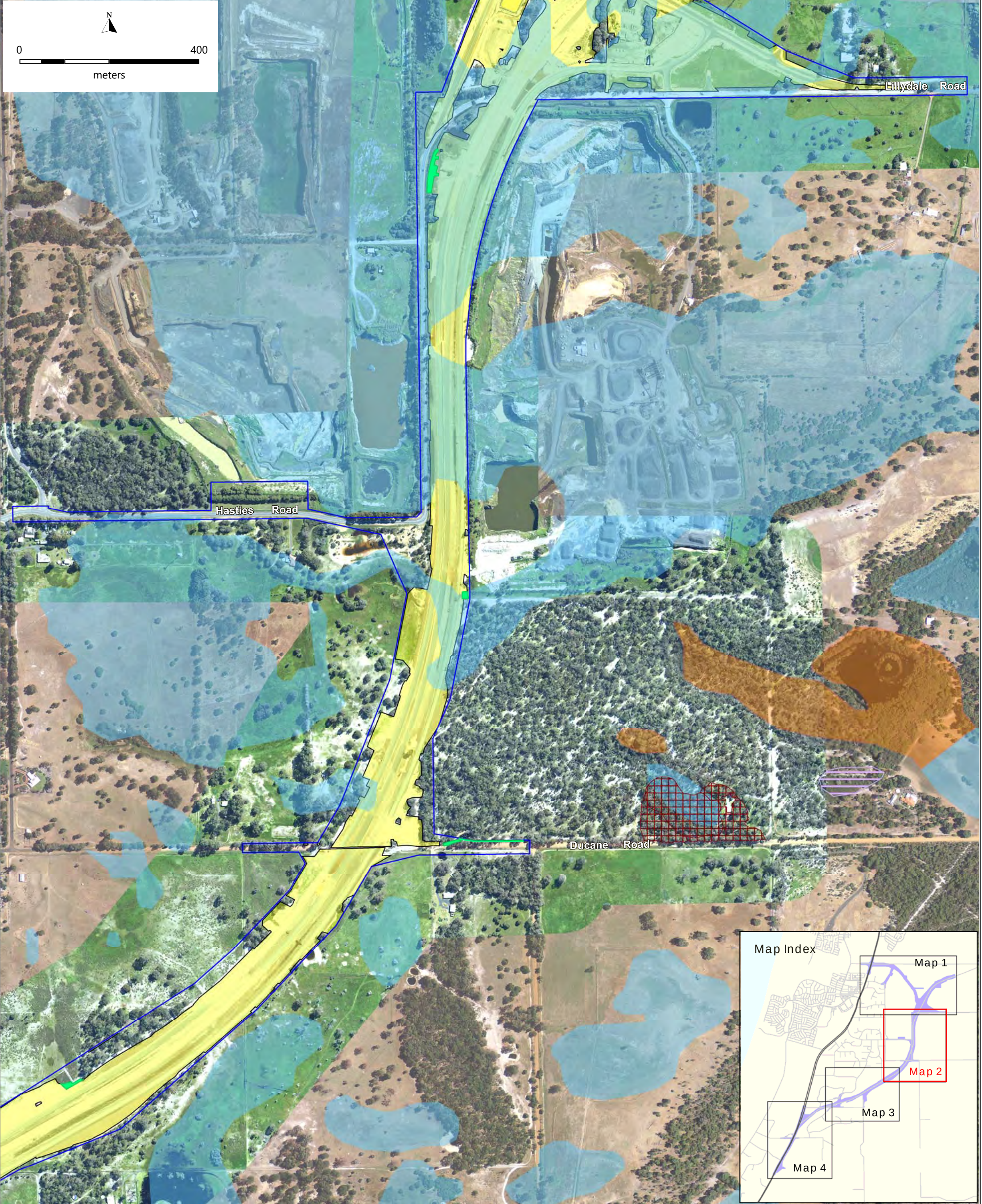
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meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 1

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:8,2500 @ A3

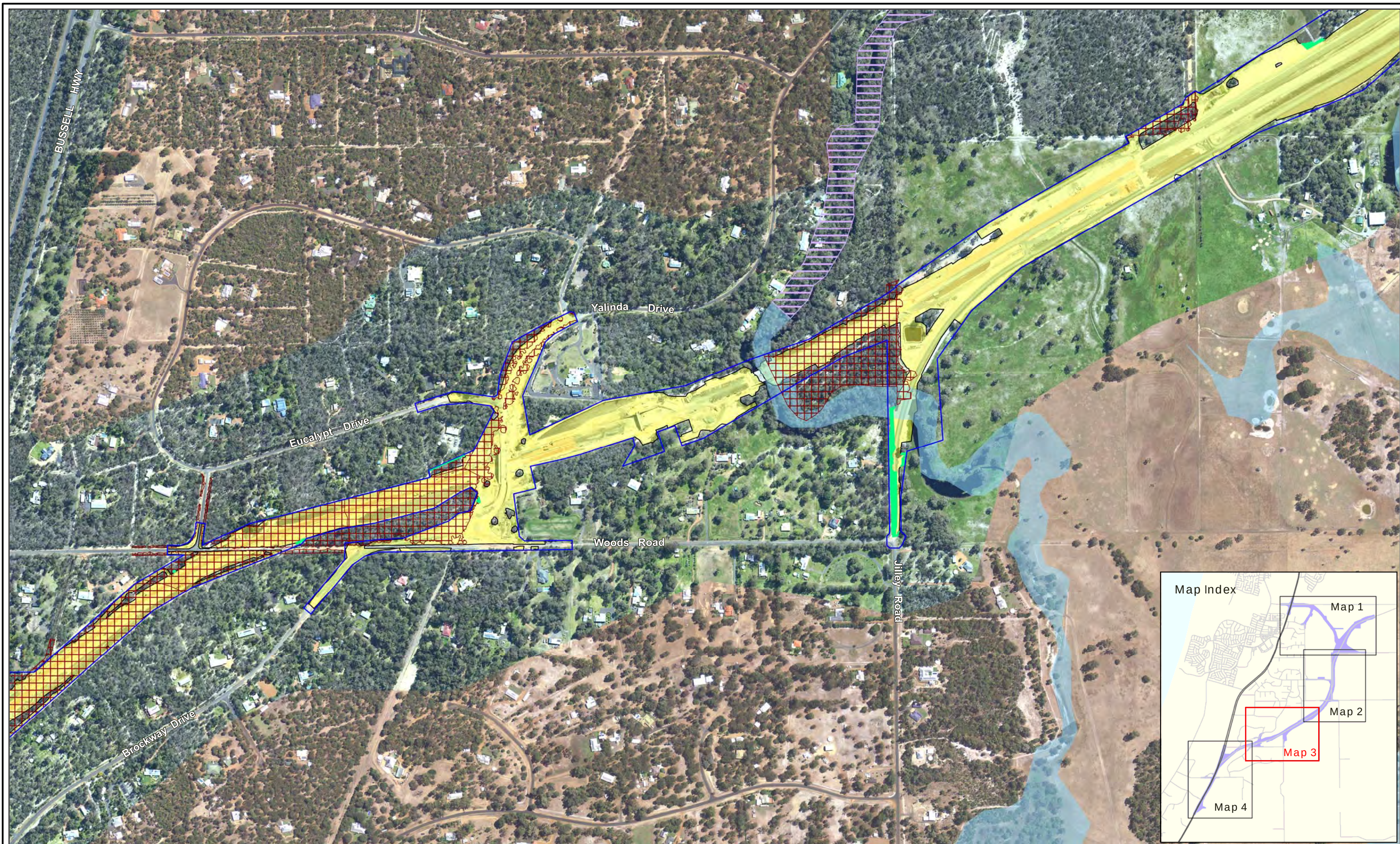


- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
- BORR South Imagery September 2024

- TEC PEC**
- Banksia Woodland TEC/PEC
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)**
- Conservation Category Wetlands
 - Resource Enhancement Wetlands
 - Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands
Map 2





Location Map

KARRATHA
W A
KALGOORLIE
PERTH
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2023
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands

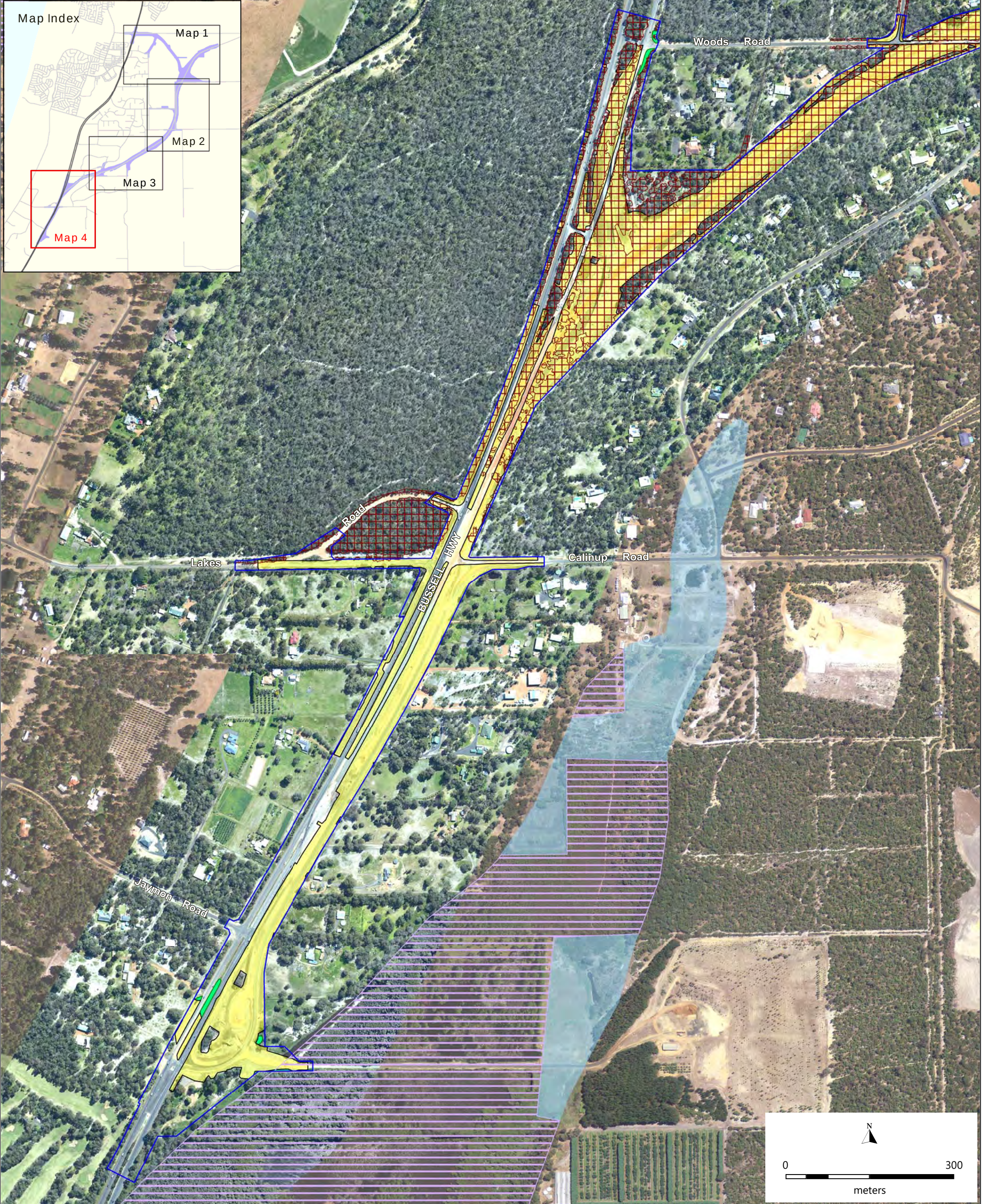
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meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 3

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:7,250 @ A3



LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025

BORR South Imagery September 2024

TEC PEC

- Banksia Woodland TEC/PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

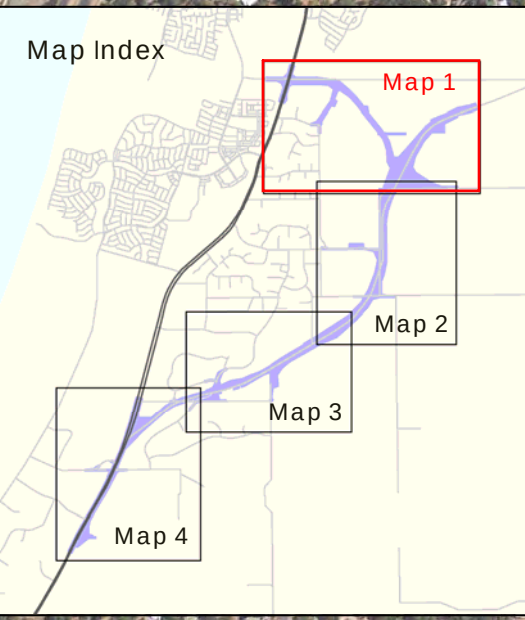
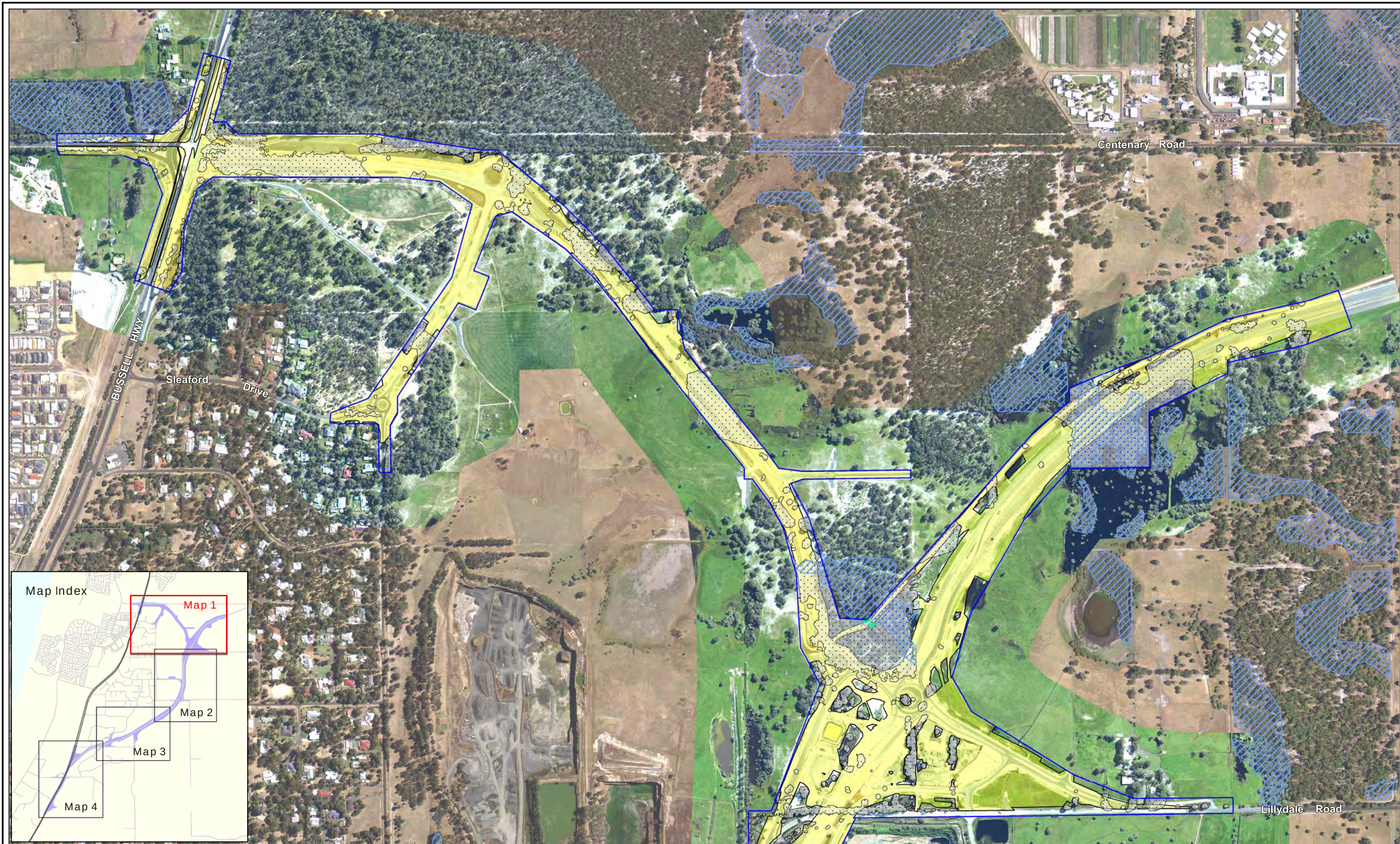
- Conservation Category Wetlands
- Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands

Map 4

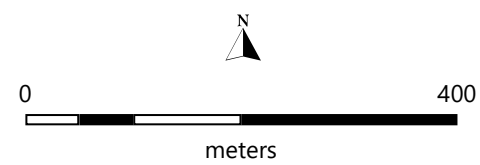
Biota Environmental Sciences

Figure 2. Ground disturbance and clearing extents during the reporting period in relation to potential Black-stripe minnow habitat.



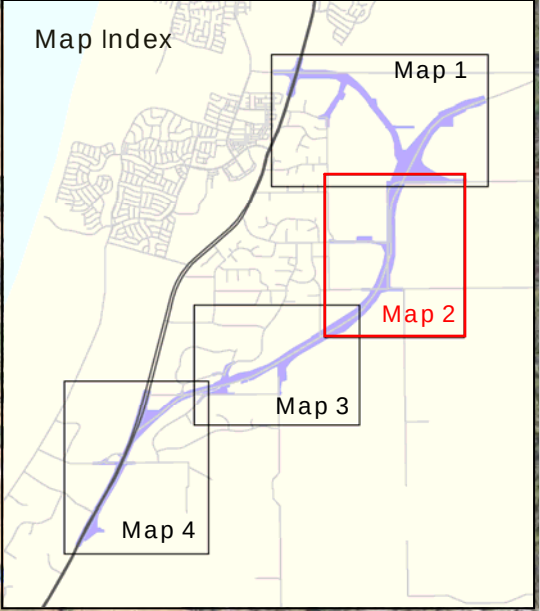
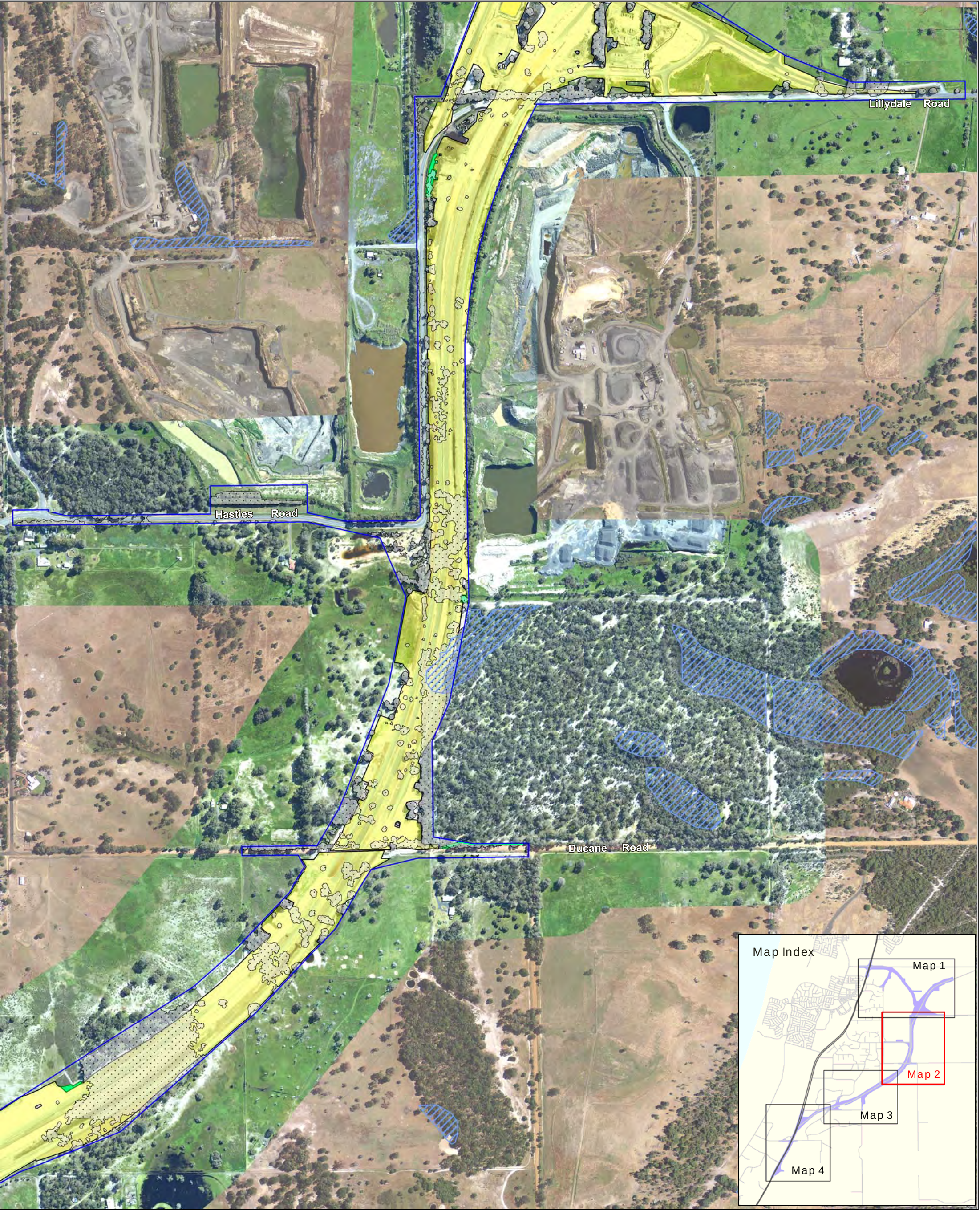
LEGEND

- | | |
|---|---------------------------------------|
| Proposal approval boundary (MS1191) | Potential Black-stripe minnow habitat |
| Ground disturbance and clearing extents 2022 - 2024 | Native vegetation |
| Ground disturbance and clearing extents 2024 - 2025 | |

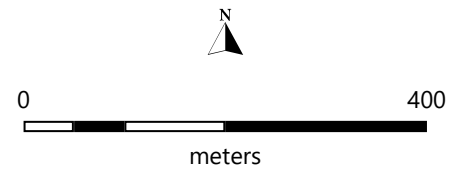


BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 1



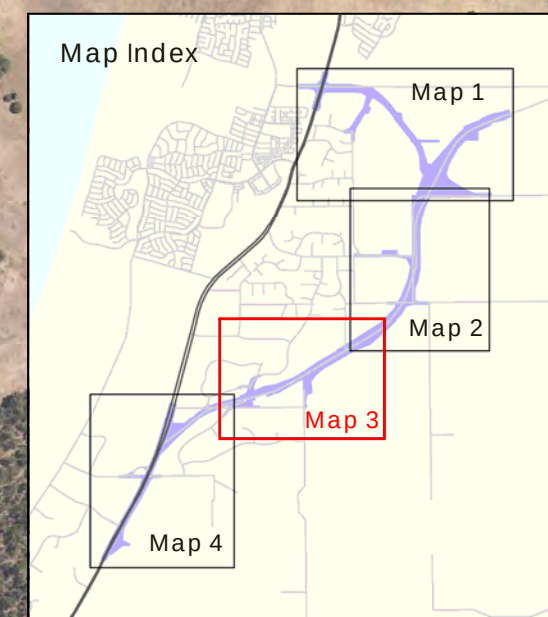
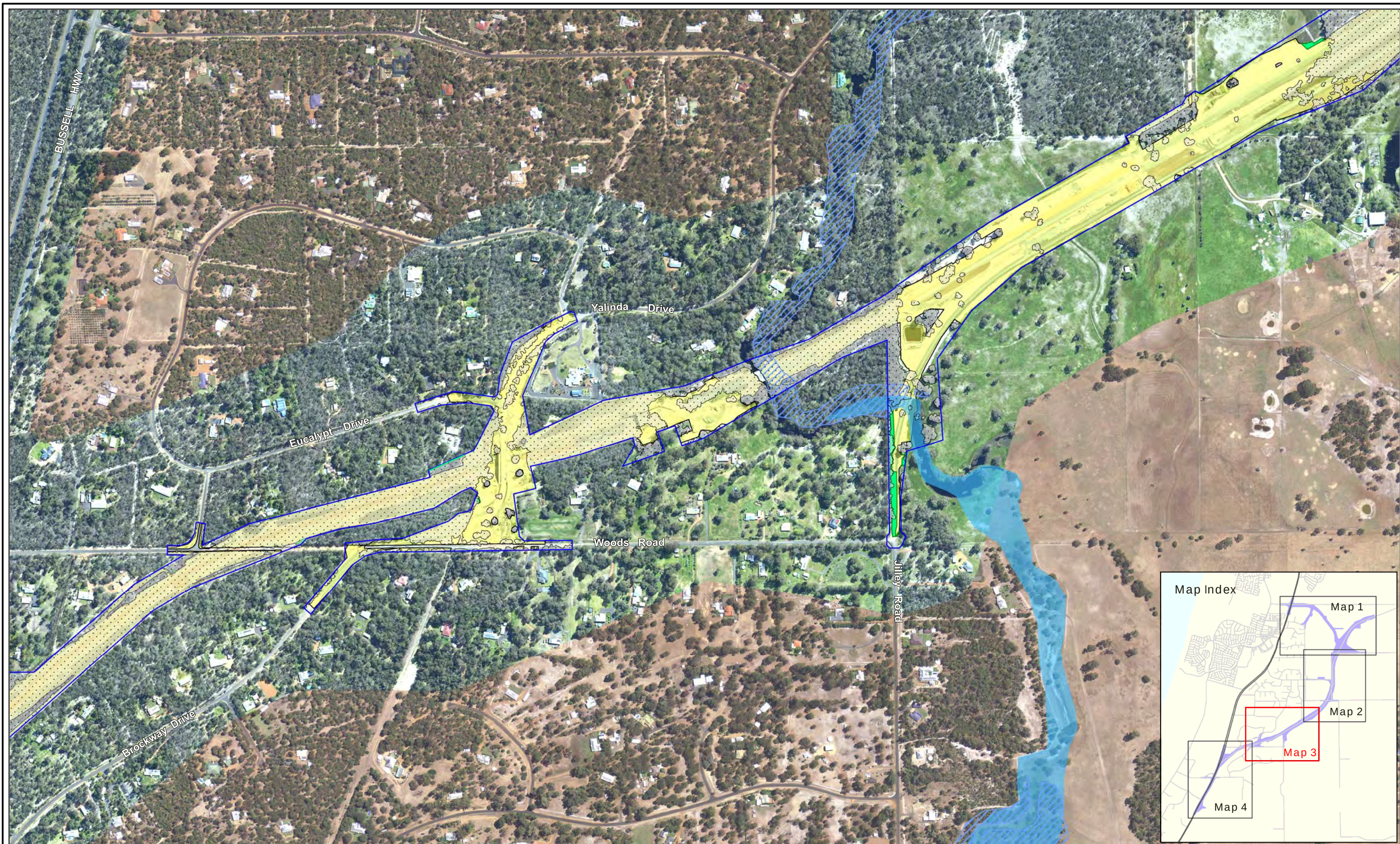
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black-stripe minnow habitat
 - Native vegetation



Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 2

BORR South Imagery September 2024



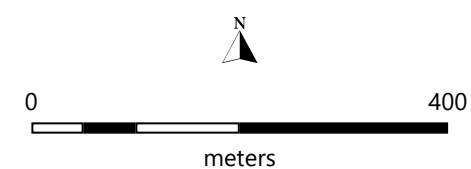


Location Map



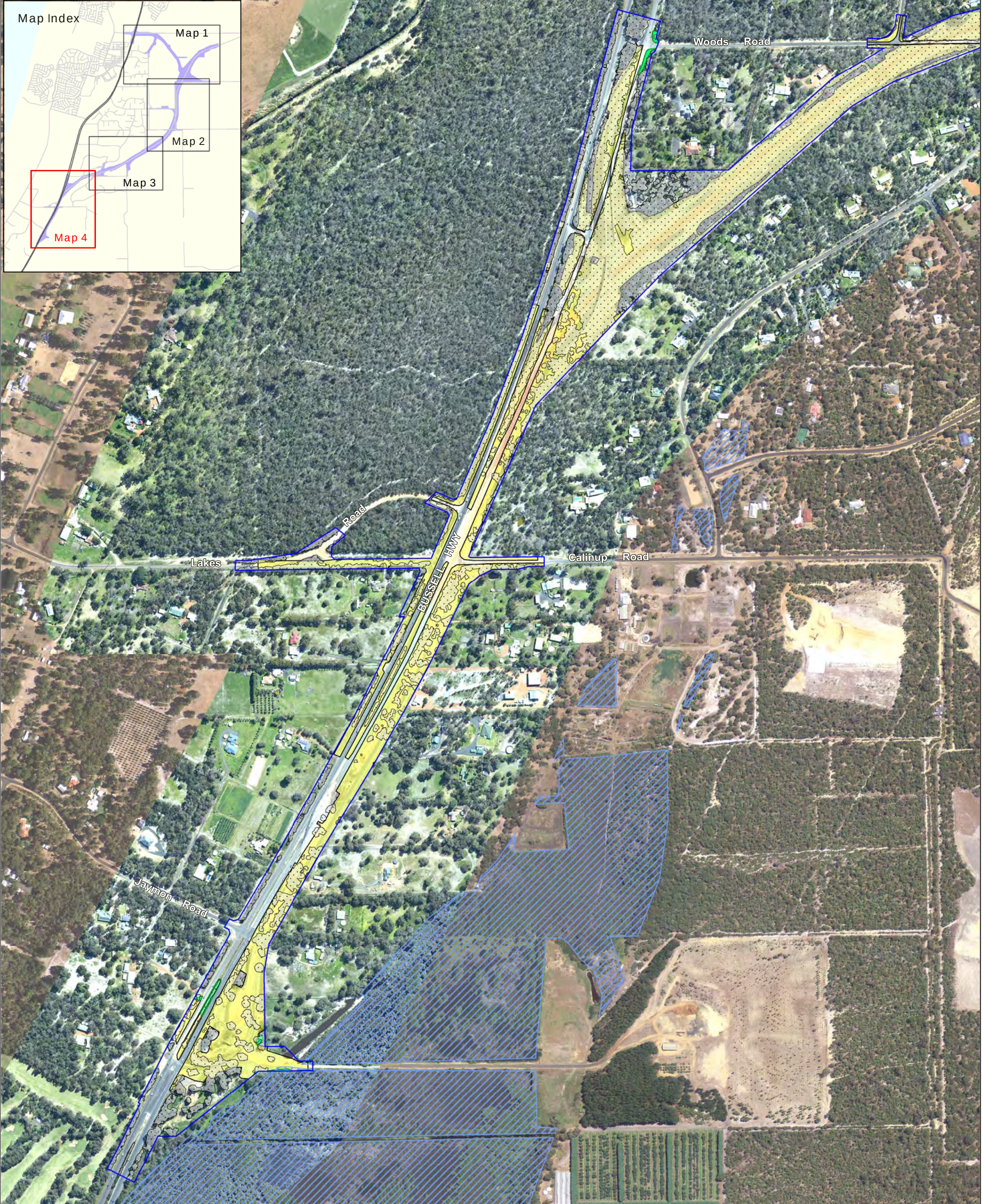
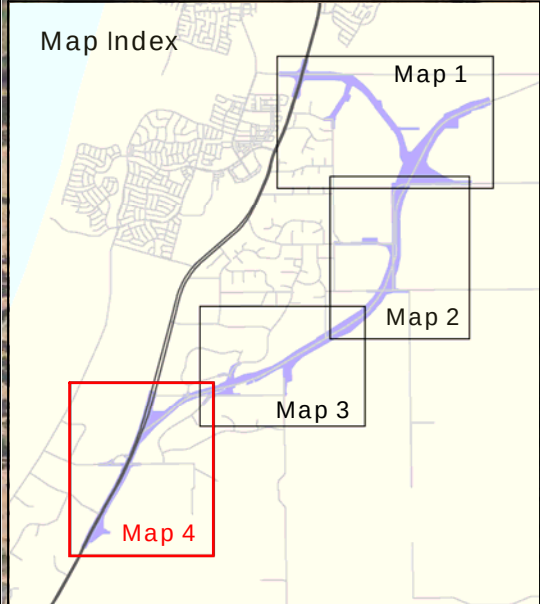
LEGEND

- | | |
|---|---------------------------------------|
| Proposal approval boundary (MS1191) | Black-stripe minnow habitat |
| Ground disturbance and clearing extents 2022 - 2024 | Potential Black-stripe minnow habitat |
| Ground disturbance and clearing extents 2024 - 2025 | Native vegetation |

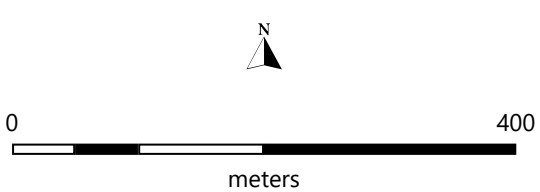


BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 3



- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Potential Black-stripe minnow habitat
 - Native vegetation



BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black-stripe Minnow Habitat and Native Vegetation - Map 4



Report

Annual Groundwater Report (AECOM and SWGA, 2025)

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191

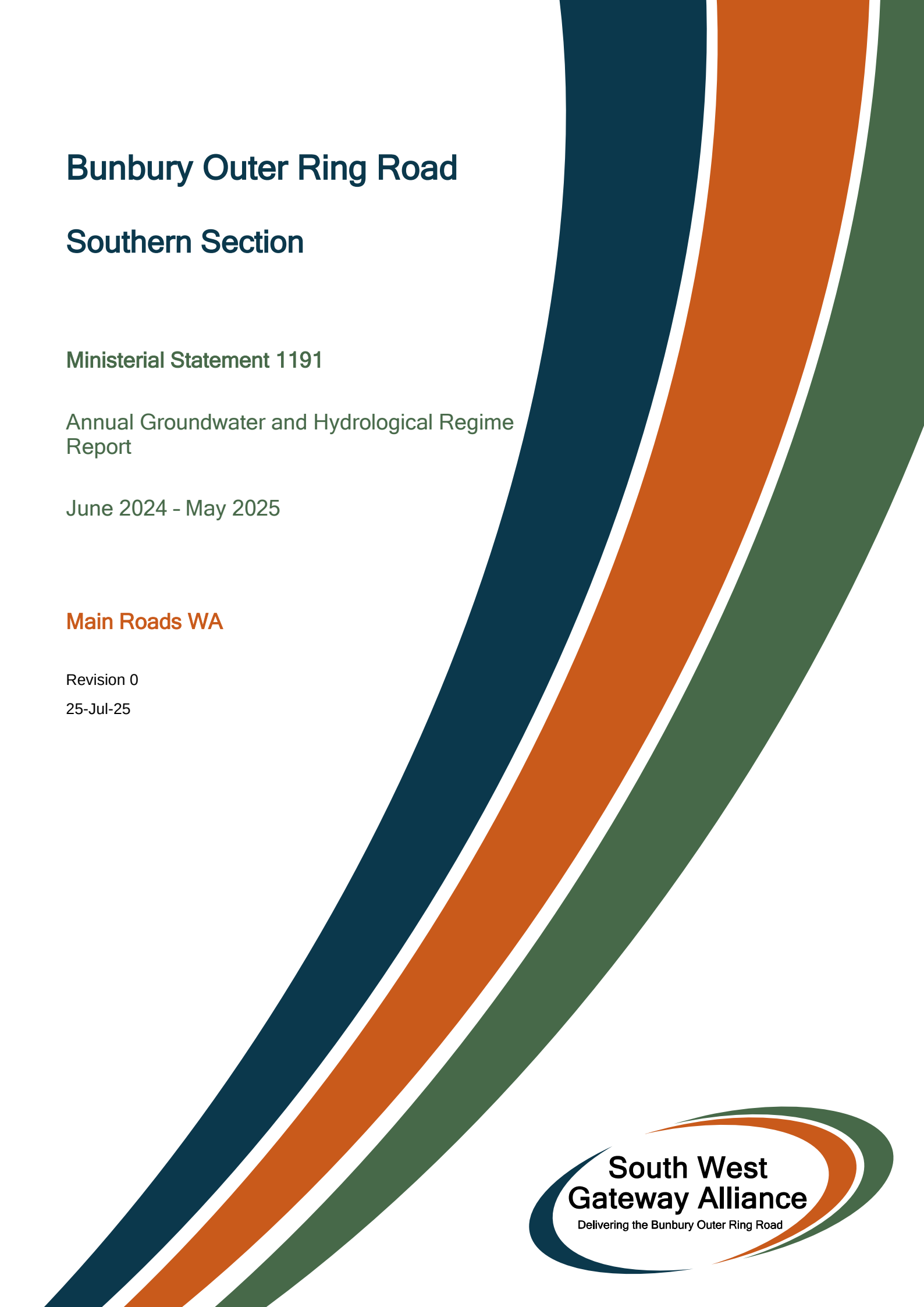
Annual Groundwater and Hydrological Regime
Report

June 2024 - May 2025

Main Roads WA

Revision 0

25-Jul-25



**South West
Gateway Alliance**

Delivering the Bunbury Outer Ring Road

Document control record

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Document control						
Report title		BORR Southern Section - Annual Groundwater Report and Hydrological Review (2024-25)				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	20 June 2025	SWGA Review	SB	GB		
0	25 July 2025	SWGA Review	GB	AG		A.M.
Current revision		Final 0				

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1 Executive Summary

As a regulatory condition (Conditions 2-1(2) and Condition 2-3) of Ministerial Statement 1191 for the Bunbury Outer Ring Road (Southern section), Main Roads is required to complete an annual review to assess the hydrological regime and water quality when compared to preconstruction baseline conditions of:

- Five Mile Brook (incorporating Multiple Use Wetland UFI-1163 and Conservation Category Wetland (UFI-931).
- Conservation Category Wetland (UFI-14478).
- Resource Enhancement Wetlands (UFI-1117 and UFI-15493).
- Black-stripe minnow (*Galaxiella nigrostriata*) habitat.

This monitoring review assesses compliance with the relevant Ministerial Statement conditions and summarises the groundwater and surface water monitoring data for the reporting period from June 2024 to May 2025 in context with local baseline conditions.

Targeted groundwater and surface water levels and quality have been monitoring since 2019, prior to construction commencement and continued through 2025. In context to construction related activities, key findings from monitoring during the 2024 to 2025 monitoring assessment include:

- Increased rainfall relative to 2023- 2024 have resulted in the return of surface water ponding in the southern areas that are known to form Black Striped Minnow habitat areas.
- Shallow water table levels continue to respond to rainfall recharge events.
- Groundwater levels linked to all geomorphic wetlands and TEC/PEC areas follow trends within or slightly higher than the historic ranges that are consistent with regional trends.
- The larger average seasonal groundwater level fluctuation in 2024-2025 can be attributed to the higher seasonal rainfall and resulting increased recharge to the Superficial Aquifer.
- Groundwater salinity remained fresh to slightly brackish with a spike in levels noted after high rainfall. BORR_MW11 showed a dramatic increase in EC following rain as it has in the past. This is likely due to a build-up of salts in the sediments being flushed out after rain. One surface water sample was available for collection for analysis in August 2024.
- No Hydrocarbons were detected in groundwater during the 2024-2025 period.

Groundwater monitoring was completed in accordance with the outlined monitoring program. This report includes results from MB11 and MB14, replacement bores for MB09 and BH27.1 respectively.

Based on the review, groundwater monitoring remains within historical ranges and no changes compared with baseline data as presented in *Bunbury Outer Ring Road, North, Central and Southern Section's Groundwater and Surface Water Monitoring 2019-2020* (SWGA, 2020) and the *Bunbury Outer Ring Road (Southern Section) Baseline Hydrological Regime Report* (SWGA, 2022) are attributed to the project.

It is concluded that Main Roads WA (MRWA) was compliant with Condition 2-1(2) and Condition 2-3 of Ministerial Statement 1191 during the reporting period.

2 Introduction

2.1 Project Background

Main Roads is currently constructing a 27-kilometre highway, the Bunbury Outer Ring Road (BORR), that links Forrest Highway to Bussell Highway. The Project includes 19 kilometres (km) of dual carriageway connecting the Forrest Highway at Kingston, to the South-Western Highway, south of Centenary Road in the Shire of Capel (Figure 1).

The Project area is located approximately 170 km south of Perth and occurs within the City of Bunbury and Shires of Capel, Dardanup and Harvey. The majority of the land within the Project area is zoned rural (cleared agricultural land), with remaining land zoned as a mix of railways, urban, urban deferred, regional open space and industrial. The alignment predominately comprises cleared rural land with some areas of remnant vegetation, predominately associated with road reserves and drainage lines.

Construction commenced on 24 February 2022 and the BORR was officially opened in December 2024. Minor construction activities have been undertaken since the opening.

2.2 Purpose and Scope

The Commissioner of Main Roads was granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Project is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

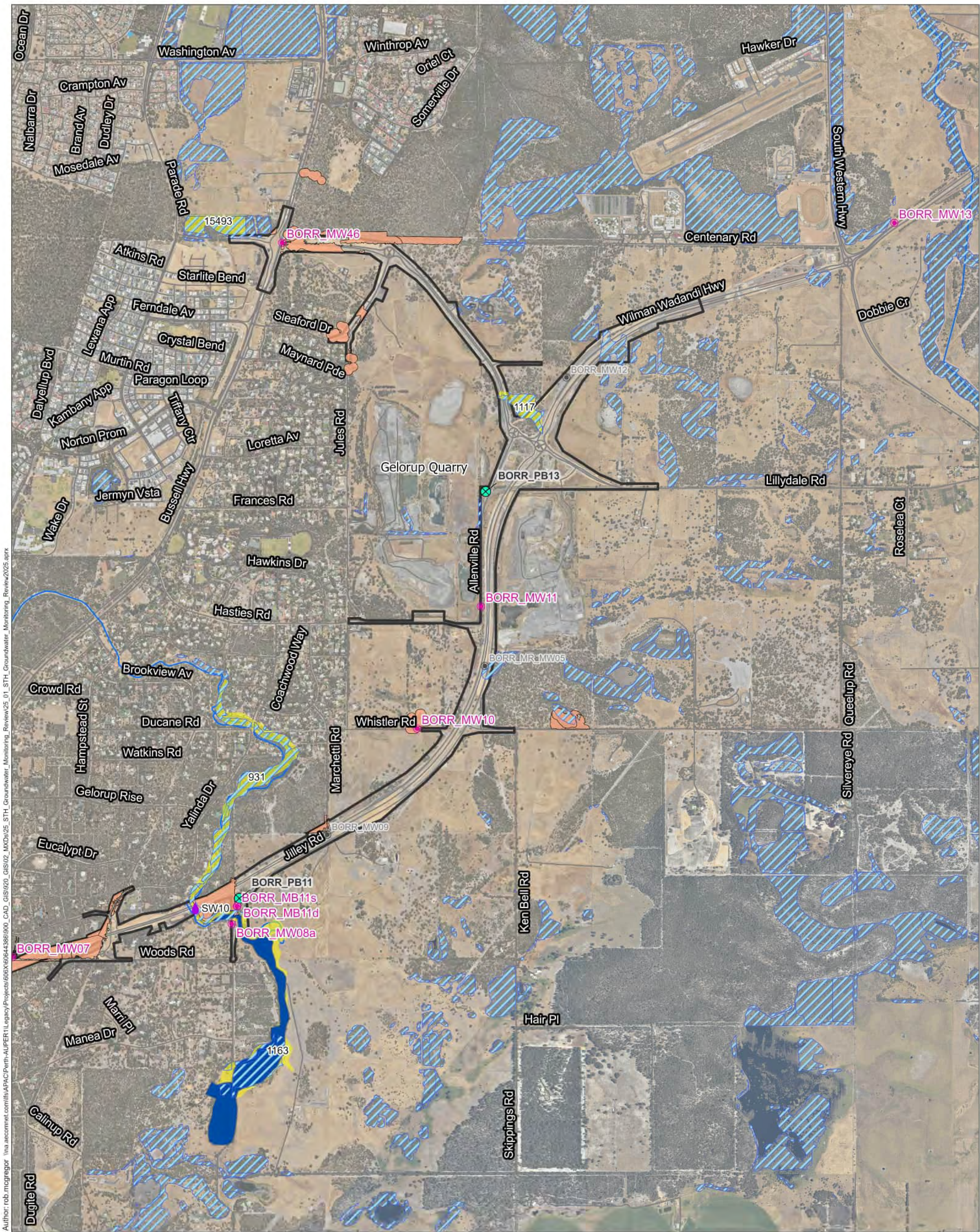
Conditions 2-1(2) and Condition 2-2 of MS1191 requires that:

No project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions:

- (a) Five Mile Brook (incorporating MU Wetland UFI-1163 and CC Wetland (UFI-931),*
- (b) CC Wetland (UFI-14478),*
- (c) RE Wetlands (UFI-1117 and UFI-15493), and*
- (d) black-stripe minnow (Galaxiella nigrostriata) habitats defined and mapped in the proponent's Action Management Plan CC Significant Fauna (Revision 2 August 2021) that are within or adjoins the development envelope, except for the black-stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).*

This monitoring review assesses the compliance with the above conditions and summarises the groundwater and surface water monitoring data for the reporting period from June 2024 to May 2025 in context with local baseline conditions. Locations of geomorphic wetlands, Threatened and Priority Ecological Communities (TECs/PECs), and groundwater monitoring bores are shown on (Figure 1).

The objective of this report is to assess the impact (if any) on the hydrological regime and water quality of the identified geomorphic wetlands and TECs/PECs, as a result of construction related activities of the BORR Southern Section. To achieve this, ongoing groundwater level and quality monitoring data is compared with baseline data as presented in the *Bunbury Outer Ring Road, North, Central and Southern Section's Groundwater and Surface Water Monitoring 2019-2020* (SWGA, 2020) and the *Bunbury Outer Ring Road (Southern Section) Baseline Hydrological Regime Report* (SWGA, 2022).



Author: rob.mcgregor via aecommet.com/its/APAC/Perth-AU/PER/1/legacy/Projects/606X6064396/000_CAD_GIS/020_GIS/020_STH_Groundwater_Monitoring_Review/2025.aprx

Legend

- | | |
|--------------------------------------|--------------------------------|
| Ministerial Boundary 1191 (STH SWGA) | Surface Water Sampling Point |
| TECPEC South | Groundwater Boreholes |
| Black-Stripe Minnow Wetland Habitat | Monitoring Bores |
| Potential Black Stripe Habitat | Monitoring Bore Decommissioned |
| Rivers | Production Bore Decommissioned |



A3 scale: 1:25,000
0 500 1,000 Metres

Date: 20/06/2025 25_01_001_GW_Monitoring
Coordinate System: GDA 1994 Perth Coastal Grid 1994PCG94





South West Gateway Alliance
Delivering the Bunbury Outer Ring Road

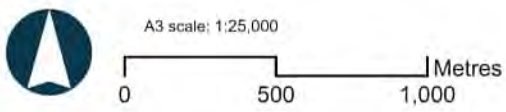
Sources: Data frame - Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Metro Maps Imagery January 2020; Inset - Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.

Author: rob.mcgregor via aecommet.com/its/APAC/Perth/AUPER/1/legacy/Projects/606X/60644366/000_CAD_GIS/020_GIS/020_STH_Groundwater_Monitoring_Review/25_01_STH_Groundwater_Monitoring_Review/2025.aprx

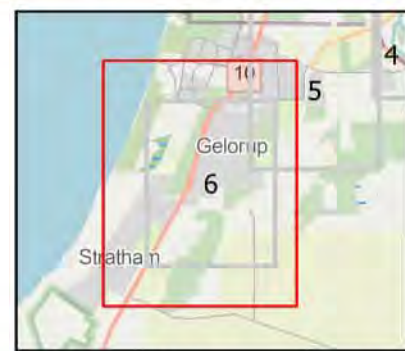


Legend

- | | |
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Date: 20/06/2025 25_01_001_GW_Monitoring
Coordinate System: GDA 1994 Perth Coastal Grid 1994PCG94





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Sources: Data frame - Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodastystrelen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Metro Maps Imagery January 2020; Inset - Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community.

3 Site Characteristics

3.1 Climate

The Project area falls within the Swan Coastal Plain. This area is typically described as a warm Mediterranean climate. It characterised by a hot, dry summer and a mild, wet winter. Table 1 presents Bunbury (ID 009965) monthly rainfall data in context with the project (BOM, 2024).

In context to the assessment of environmental change, rainfall predominantly occurs during winter months. Historical (1995 to 2022) average annual rainfall recorded at the Bunbury meteorological station is 632 mm/yr. During baseline monitoring, rainfall water reported below averaging in all periods prior to construction commencing in 2022. During the current reporting period, annual rainfall (822.8mm) was above both the historical (662.6 mm for the 2018 to 2025 average) and the previous two years (634 mm) (Table 2). This increased rainfall resulted in higher groundwater levels in the project area.

Table 1 Bunbury Monthly Rainfall Data (BOM Station 009965)

Month	1995-2021	Reporting Period							2021 to 2025 Average
		2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	
	Pre-Construction Historical Average	Baseline			Construction Period				
		mm							
Jun	135.7	178	182	152.2	101.0	110.4	167.4	171.8	137.65
Jul	145.5	165.2	94.6	129.0	199.8	226.2	168.6	232	206.65
Aug	118.2	146.2	91.8	65.6	108.2	132.8	126.8	237.8	151.4
Sep	79.7	29.2	30.0	88.2	95.2	70.2	72.4	40.6	69.6
Oct	36.4	37.6	53.2	NR	123.4	30.6	11.8	44.8	52.65
Nov	21.4	3.0	15.4	NR	12.6	18.0	2.6	22.6	13.95
Dec	15.8	5.8	0.2	5.0	10.6	0.0	1.0	4.8	4.1
Jan	10.4	NR	1.2	0.2	0.0	0.6	0.0	8.4	2.25
Feb	8.4	NR	12.4	54.6	2.8	0.0	0.0	1.4	1.05
Mar	19.7	21.2	35.2	36.4	8.6	15.8	0.4	17.4	10.55
Apr	41.1	16.2	23.6	74.0	61.6	112.4	0.0	41.2	53.8
May	97.2	34.8	114.4	147.8	111.0	37.0	177.4	31.4	89.2
Total	632.3	602.4	539.6	605.2	723.8	717.0	551.0	822.8	703.65
Note: Bolded totals are below the 1995-2021 pre-construction historical average.									

3.2 Topography

Topography ranges from 5 to 39 m above the Australian Height Datum (AHD) with the more elevated areas associated with the Spearwood sands and Bassendean sands and the least elevated areas associated with drainage lines (5 to 10 m AHD) (GoWA, 2020).

3.3 Groundwater

The Project area occurs within the Bunbury Groundwater Area, which is proclaimed under the Rights in Water and Irrigation Act 1914 (RIWI Act) and therefore has numerous licenced and unlicensed private and commercial bores.

In context to the project, the primary groundwater units underlying the Southern Section of the BORR alignment are:

- The Superficial Aquifer: a thin (0 to 40 m thick) surficial, predominantly unconfined layer that is recharged by direct infiltration of rainfall. This forms a key aquifer for local private groundwater abstraction.
- The Leederville Aquifer: a confined formation ranging from 15 to 300 m below ground level (m bgl), which is recharged by downward seepage from the overlying Superficial aquifer and direct infiltration in outcrop areas. This forms an aquifer for local private and commercial abstraction.
- The Yarragadee Aquifer: a confined aquifer (within the Project area) underlying the Leederville Aquifer and ranging from 600 m to 1,200 m thick. The Yarragadee Aquifer is recharged by direct infiltration of rainfall where unconfined, and elsewhere through limited seepage from the overlying Leederville Aquifer (Department of Water, 2009). This forms a key aquifer for local private and project related abstraction (PB11 and PB14).

A total of nineteen (19) groundwater wells were installed in the Southern Section in 2018 for the targeted groundwater and Acid Sulfate Soil (ASS) investigations (BORR IPT, 2020). Water level data was initially monitoring using both telemetered and non-telemetered loggers.

Groundwater typically flows in a westerly direction towards the Indian Ocean (BORR IPT, 2020). Depth to groundwater in the Southern Section is generally driven by topography with the lower-lying areas having groundwater that are shallow, with seasonal variability of up to 2 m, ranging between groundwater that is close to or at the surface, to between 5 m and 17 m bgl (BORR IPT, 2020). In more elevated areas linked to the coastal sand ridgeline, the depth to groundwater can be over 18 m bgl.

Groundwater salinity in the Superficial Aquifer is generally fresh to marginally brackish (<500 to <2,000 mg/L Total Dissolved Solids (TDS)). There is, however, likely to be some localised variation because of poor drainage and subsequent shallow perched water tables leading to evapoconcentration of salts during the summer months.

The underlying Leederville and Yarragadee Aquifers are generally fresh, particularly so for the upper sandier parts. Deeper in the aquifer, salinities can increase somewhat, reported to be up to the region of 800 mg/L TDS (Commander, 1984).

3.4 Surface Water

3.4.1 Watercourses

Five Mile Brook is the most northern waterway in the Geographe Catchment, and the key waterway within the Southern Section. The catchment supports an agricultural industry dominated by beef grazing. Rural lifestyle lots and urban residential areas associated with the southern extension of Dalyellup Estate are key land uses in the lower reaches of the catchment.

Five Mile Brook typically flows only in the winter months, discharging to Geographe Bay at Minninup Beach. The waterway is modified into an artificial drain for several kilometres before reaching the bay. In the summer months the mouth of the creek closes over due to lack of flow. When the flow intensifies in the winter months the drain fills, the sandbar breaks and water flows into Geographe Bay. Since 2000, the mean annual flow for Five Mile Creek is 5 GL/year of a total of 203 GL/year for the waterways of the Geographe catchment (DWER, 2023).

Five Mile Brook generally has poor water quality, likely resulting from a combination of soils which do not retain nutrients, and intensive land uses within the catchment (DWER, 2023). The nutrient loads in Five Mile Brook are driven by intensive agricultural land-uses, with a high proportion of beef grazing in the catchment. Due to the seasonal nature of this waterway, there are limited data on which to assess water quality. The available data show phosphorus and nitrogen concentrations to be above water quality targets (DWER, 2023).

3.4.2 Wetlands

3.4.2.1 Wetlands of International Significance

No Ramsar wetlands (Ramsar Sites (DBCA-010)) are located within 10 km of the Southern Section of the Project area. The Ramsar listed Peel-Yalgorup System is located approximately 20 km to the north of the project alignment and the Vasse-Wonnerup System is located approximately 19 km to the south-west of the project alignment (GoWA, 2020).

3.4.2.2 Geomorphic Wetlands

Wetlands on the Swan Coastal Plain have been classified using a geomorphic-hydrologic approach to wetland classification (Hill, Semeniuk, Semeniuk, & del Marco, 1996; Semeniuk & Semeniuk, 1995). Wetlands have also been evaluated and assigned an appropriate management category which provides guidance on the nature of wetland management and protection that the wetland should be afforded. These include Conservation Category Wetlands (CCW), Multiple Use Wetlands (MUW) and Resource Enhancement Wetlands (REW).

The identified wetland areas within the southern sections of the project include:

- *MUW UFI-1163 – a multiple use wetland (sumpland basin) forming semi-permanent pools within Five Mile Brook south of the proposed alignment.*
- *CCW UFI-931 – a conservation category wetland (sumpland basin) forming semi-permanent pools within Five Mile Brook north of the proposed alignment.*
- *CCW UFI-14478 - a conservation category wetland (sumpland basin) forming a low-lying basin south of the alignment on Bussell Highway.*
- *REW UFI-1117 - a resource enhanced sumpland basin formed in a low-lying basin near Lilydale Road and partially within the alignment.*
- *REW UFI-15493 - a resource enhanced dampland formed in a low-lying basin west of the alignment near Bussell Highway.*

3.4.1 Black-stripe Minnow Habitat

The Black Striped Minnow is endemic to south-western Australia and is now rare throughout its distribution. Black-Stripe Minnow have been confirmed within the Five Mile Brook, located within the Southern Section of the Project (WRM 2021). Figure 1 presents the potential habitats in the Southern Section.

Typical habitat conditions include tannin-stained water bodies with large areas of intact riparian vegetation. Importantly, given the high mobility of the species, it is possible that colonisation/recolonisation would occur after a large rainfall event if the wetlands become connected.

3.5 Construction Related Activities

Construction activities commenced in the southern section in August 2022 and have continued throughout the 2024 to 2025 reporting period, with the Project completion approaching. Activities undertaken during this time that may influence minor changes to the local hydrological regime include:

- Modified landuse with roadside landscaping has seen the planting of vegetation in areas adjacent to the curb.
- Completion of bridge construction in the Five Mile Brook areas. The bridge construction is unlikely to be detrimental to the Black-stripe minnow's habitat given the creature's high mobility during periods of surface water inundation and the connectivity of these wetlands. Ecologically it is likely that the bridge will be beneficial as the bridge footing is a preferred habitat for Carter's Freshwater Mussel.
- Addition of fill material modifying drainage and surface water ponding areas.
- Lowering of the water table due to groundwater abstraction for water supply (PB11, PB13 and PB14) in late 2024 before the discontinuation of production bores in March 2025.
- Cessation of use of water supply production bores (PB11, PB13 and PB14) in March 2025.

4 Monitoring Program

Monitoring commitments to assess the potential impacts of the project are summarised below in Table 2. Monitoring locations are presented on Figure 1 and align with *Galaxiella nigrostriata* habitat monitoring sites. During this reporting period the usage of project related water supply bores (PB11, PB13 and PB14) decreased substantially and they have been removed from the monitoring program. Abstraction from the production bores ceased fully in March 2025. Details of monitoring bore construction are presented in Appendix A.

Groundwater and surface water levels from monitoring sites have been used to compare against pre-construction baseline and trends in reference monitoring wells as presented in the *Bunbury Outer Ring Road - Groundwater and Surface Water Monitoring Report (2019-2020)* (BORR IPT, 2020) and the *Bunbury Outer Ring Road (Southern Section) Baseline Hydrological Regime Report* (SWGA, 2022).

4.1 Project Related Water Supply Monitoring

Water supply production bores PB11, PB13 and PB14, were installed in the southern section of the alignment to provide construction water. To minimise local impacts on other users and potential environmental receptors, production bores were designed to draw groundwater from deeper zones up to 80m depth, from within the Yarragadee Formation.

Due to the proximity to several private groundwater users in the Gelorup region, as recommended by the Department of Water and Environmental Regulation (DWER email correspondence 10 November 2022), an integrated monitoring programme of both PB11 and PB14 was initiated to record the rate of discharge and how the local aquifer responds. Monitoring provides information of the longer-term aquifer response to pumping in this area, whether changes during bore operations are within expected ranges, and allow efficient response to groundwater related issues as local construction and water use ramps up.

Groundwater level data loggers are installed in monitoring bores adjacent to each pumping bore that target both the Superficial Aquifer (shallow) and Yarragadee Aquifer (deep). With the reduced requirement for construction water supplies, production bores operated under the same cyclic abstraction of 16 hr/day for 5 days per week as the previous years, to December 2024 with only minor intermittent abstraction through to January 2025. Locations are provided on **Figure 1**.

4.2 Applied Guidelines

Water quality for physio-chemical parameters and nutrients has been compared against ANZECC/ARMCANZ (2000) freshwater guideline values for the protection of slightly/moderately disturbed wetland ecosystems in the southwest of Western Australia as these are the most recent locally specific guidelines. Results have also been compared to historical data from the pre-development monitoring program (BORR IPT 2020, SGWA 2021).

Table 2 Monitoring Requirements

Monitoring Location ¹	Locality	Environmental Value ²	Monitoring Requirements	Comments
GROUNDWATER				
BH27.1 (9 m) ³	West of Five Mile Brook	-	<u>Monthly</u> Water level data logging – telemetry and manual <u>Quarterly</u> - Field parameters: pH, temperature, conductivity, redox, total oxygen - Laboratory analysis: Inorganics: pH, EC, TDS Acidity and Alkalinity: Carbonate as CaCO₃, Bicarbonate as CaCO₃, Hydroxide as CaCO₃, Total Alkalinity, Acidity Major Ions: Calcium, Magnesium, Potassium, Sodium, Chloride, Sulphate, Cations, Anions, Ionic Balance, Sulfide Nutrients: Ammonium, ammonia, Nitrogen (oxidised), Total Nitrogen, Reactive Phosphorus, Kjeldahl Nitrogen, Total Phosphorus Metals: Aluminium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Selenium, Zinc BTEXN: Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene TRH: Total Recoverable Hydrocarbons	Impacted by construction
MB14s (14.55 m) and MB14d (60.5 m)				Replacement for BH27.1 and water table drawdown from abstraction (PB14)
BORR_MW46 (6 m)		RE Wetland UFI-15493		
BORR_MW04 (13 m)	South of Five Mile Brook	CC Wetland UFI-14478		
BORR_MW05 (8 m)		CC Wetland UFI-14478		
BORR_MW06 (8 m)		-		
BORR_MW07 (10.50 m)		-		Limited saturated thickness to collect water sample
BORR_MW08a (6.0 m)		MU Wetland UFI-1163 (5-mile Brook)		
BORR_MR_MW05 (5 m) ³		-		Impacted by construction
BORR_MW09 (5.5 m)		CC Wetland UFI-931		Impacted by construction
BORR_MW10 (4 m)	Preston River to Five Mile Brook	CC Wetland UFI-931		
BORR_MW11 (4.0 m)		-		
BORR_MW12 (4.5 m) ³		RE Wetland UFI-1117		Landholder access restrictions Impacted by construction Nov 23
MB11s (15.15 m) and MB11d (60 m)		MU Wetland UFI-1163 (5-mile Brook)		Replacement for BORR_MW9 and water table drawdown from abstraction (PB11)
SURFACE WATER				
Surface Water 10 (SW10)	Five Mile Brook	Black Striped Minnow (Galaxiella nigrostriata) habitat	<u>Quarterly</u> - Field parameters: pH, temperature, electrical conductivity (EC), redox, total oxygen, turbidity - Laboratory analysis: <u>In addition to the above</u> Inorganics: TSS Pesticides: Organophosphates, Glyphosate	Sample collected in August 2024. Sample location was found to be dry otherwise.

¹ Bore ID and Depth (m bgl)

² MU – Multiple Use; CC – Conservation Category; RE - Resource Enhanced

³ – Destroyed or no access available

5 Methodology

Fieldwork was undertaken as described in Table 3.

Table 3 Field work methodology and demonstration of compliance

Activity / Item	Details
Groundwater Bore - Gauging	All monitoring bores were gauged using an interface probe to determine the depth to groundwater prior to the commencement of sampling. Groundwater gauging recorded information is presented in Appendix B
Groundwater Bore - Sampling Method	All bores were sampled using low-flow technique (peristaltic pump). Ex-situ measurements of water quality parameters were taken on site using a multi-parameter instrument (YSI Pro DSS) fitted with a flow-through-cell. The parameters included pH, dissolved oxygen (DO), redox potential, temperature, and electrical conductivity (EC). Field parameters are presented in Appendix E
Surface Water - Sampling Method	The YSI Pro DSS was used to take in-situ measurements of water quality parameters, including the parameters taken at groundwater bores and water turbidity. Where water level permitted, the measurements were profiled at different depths. Field parameters are presented in Appendix E
Sample Analysis	Primary samples were analysed by ALS, a NATA accredited laboratory, using standard methods. Laboratory QA/QC measures included duplicate and rinsate samples. Duplicate samples were taken at one groundwater bore and one surface water location each round, and rinsates were taken at a frequency of one per day of sampling.
Field Documentation	All field records were logged on standardised field forms and included the date and time, location, field personnel, quality assurance / quality control (QA/QC) sample information and details of the sampling observations, provided in Appendix E.
Sample Preparation, Preservation and Transportation	Sampling was undertaken in accordance with AS/NZS 5667.1:1998. Samples were placed in laboratory-supplied bottles containing appropriate preservatives. Samples for dissolved metals were not field filtered. Samples were labelled in accordance with the monitoring location, field personnel and date, placed in eskies chilled with ice and forwarded to the laboratory under standard chain of custody (COC) procedures. Copies of the laboratory documentation are presented in Appendix D.
Decontamination Procedure	Decontamination of all non-disposable equipment was completed between sample locations. Disposable equipment such as bladders and gloves were replaced between each location.

6 Monitoring Results

6.1 Groundwater Levels

Table 2 outlines the ten groundwater monitoring bore locations and one surface water location have formed the Southern Section groundwater level monitoring program for the past 12 months. This report sees the addition of monitoring bore to replace the impacted / decommissioned monitoring bores. BH27.1 has been replaced by MB14s and MB14d. MW09 has been replaced by MB11s and MB11d. Both replacement locations offer shallow and deep aquifer monitoring and were fully accessible throughout the reporting period.

Groundwater level monitoring of MB11s and MB14s, in relation to water supply abstraction from production bores, PB11 (5-Mile Brook) and PB14 (Bussell Hwy), provided additional data to replace bores impacted during construction. With the reduced abstraction and subsequent decommissioning of the production bores only minor changes were noted in the corresponding monitoring bores.

The groundwater levels and water quality in available bores were monitored over a 12-month period June 2024 to May 2025 as per Table 2.

Groundwater levels from current and historical monitoring are presented in tabular and graphical formats Appendix B. Where available, each hydrograph presents historical data logger information and manual groundwater levels alongside Bunbury monthly rainfall totals, bore screened interval and design groundwater levels (predicted historical maximum). To provide some context to baseline conditions, hydrographs include data from August 2018 to May 2025.

A noteworthy contextual change is the increased rainfall during this reporting period, (Table 1) compared to baseline conditions (1995 to 2021) and the recent construction period (2021 to 2025). Overall, there was 33% more rain in the 2024- 2025 period than in the previous period. This increase was seen throughout the year with summer experiencing significantly more rain than the previous period.

To assess groundwater related observations, the Southern Section has been divided into four discrete topographic zones incorporating:

- Eastern Topographic Flats – lower elevations linked to Palusplain and shallow sediments overlaying Bunbury Basalt: *Areas of potential Black-stripe Minnow habitat*
- Five Mile Brook area: *Areas of known Black-stripe Minnow habitat*
- Residential Ridgeline – elevated residential areas linked to the coastal dunes and limestone ridgeline
- West of ridgeline – western flank of the ridgeline and towards the ocean: *Areas of potential Black-stripe Minnow habitat*

Shallow groundwater level observations for the 2024-2025 reporting period include:

Eastern Agricultural Flats: CC Wetland UFI-931 and RE Wetland UFI-1117 – outside influence of the Gelorup quarry (BORR_MW9, BORR_MW10, and MR_MW05, MB11s):

- The pre-construction (baseline) depth to groundwater ranged between 1.78 m bgl (winter high) and 3.21 m bgl (summer low) with influences from local drainage features and links to the depth of the underlying Bunbury Basalt.
- The 2024-2025 seasonal depth to groundwater ranged between 0.91m bgl (winter high) and 2.44 m bgl (summer low).
- Groundwater elevation ranges between 10.55 m AHD (MB11s; June 2024) and 20.59 m AHD (BORR_MW11; August 2024) with groundwater flow gradients generally towards the west or local drainages.
- Average high seasonal variability of 3.34 m when compared with a baseline of up to 1.43 m. relating to the return of high rainfall after a dry 2023- 2024.
- Abstraction from PB11 (Yarragadee Aquifer) reported no measurable response in the water table superficial aquifer as measured in MB11s.

Quarry influence (BORR_MW11):

- A seasonal low groundwater level was in March and May 2025 (<4 mbgl) with the bore drying up. In August 2024 a high level of 0.21 m bgl was realised following winter rainfall. This is like pre-construction baseline conditions (2018-2021) that had a summer low of 3.98 m bgl rising to a winter high of 0.58m bgl.
- The local groundwater level had a seasonal range of 3.8 m compared to baseline conditions of 3.4 m with fluctuations likely linked to levels in the adjacent quarry lake.

Five Mile Brook: MU Wetland UFI-1163 (BORR_MW08a):

- The depth to groundwater for the 2024-2025 period, ranging between 1.648 m bgl (winter high; August 2024) and 4.34 m bgl (summer low; July 2024) These are like the pre-construction baseline values of 1.84 m bgl to 4.24 m bgl, likely a result of the increased rainfall and recharge to the Superficial Aquifer.
- A seasonal variation of 2.86 m compared with baseline value of 2.40 m – these values reflect the similarity of rainfall data between the two. 2023-2024 recorded a seasonal variation of 1.23m, indicative of the low rainfall experienced at this time.
- Observed local surface water inundation (near this bore) following winter rain and drainage towards Five Mile Brook in August 2024.

Residential Ridgeline (BORR_MW07):

- The groundwater level in monitoring bore BORR_MW07 ranged between 10.09 m bgl (winter) and 10.40 m bgl (summer) in the 2024-2025 review period. This compares with the baseline levels of between 9.89 m bgl and 10.29 m bgl respectively showing a relatively consistent groundwater level throughout the seasons.
- A very low seasonal variation in the groundwater level of between 0.31 m (2024-2025 reporting period) and 0.41 m (baseline) was observed. This again highlights the current similarity with baseline conditions in the higher elevation areas.
- The topographic high ridgeline with underlying limestone and well drained sand stratigraphy and therefore not forming suitable habitat for the Black Striped Minnow.
- This area forms a widespread residential area with private landowners reliant on groundwater use and therefore likely impacting on groundwater levels and quality throughout the year peaking during the summer dry season.

West of Ridgeline: RE Wetland UFI-15493 and CC Wetland UFI-14478 (BORR_MW04, BORR_MW05, BORR_MW06, BORR_MW46, BH27.1, MB14s):

- MW04 reported a shallow seasonal minimum (summer) likely due to increased summer rainfall recharge.
- Depth to groundwater ranged between 4.06 m bgl (MW46; winter high) and 5.88 m bgl (MW05; summer low) compared to baseline conditions of between 4.77 m bgl (winter) and 5.46 m bgl (summer) with seasonal high levels driven by local drainage features.
- Groundwater elevation ranges between 2.14 mAHD and 6.87 m AHD with groundwater flow gradients generally westward.
- A seasonal variability of up to 1.82 m compared with a baseline of up to 0.69m, reflecting the impact of the increased rainfall.

Groundwater levels measured during the 2024-2025 reporting period reported correlation with the increased rainfall measured. Year on year comparisons show a higher groundwater level, indicating good recharge from the higher rainfall experienced. This is contrasted with the decreasing water level experienced during the drier months of the 2023- 2024 period.

6.2 Water Quality

As per Table 2, a total of ten groundwater monitoring bore locations and one surface water location forms the groundwater and surface water related water quality monitoring program for the BORR Southern Section. Several monitoring program related aspects include:

- Monitoring bores MR_MW05 and BH27.1 have been decommissioned due to construction activities. MB14s and MB14d have replaced BH27.1.
- Monitoring bore MW09 has been replaced by MB11s and MB11d.
- BORR_MW07 has had restricted sampling since February 2022 due to the bore depth having limited saturated thickness restricting sample collection using the peristaltic sampling pump.
- BORR_MW8a has been subject to consistent tree root blockage. Like 2024, this bore was again cleared of roots in May 2025. This blockage may affect groundwater level readings as well as chemical analysis.
- BORR_MW12 has historically had limited access due to landowner restrictions.
- Samples from BORR_MW11 and MR_MW05 had elevated groundwater concentrations as a likely consequence of the adjacent quarry pit lakes forming a local hydraulic sink and therefore not likely representative of a project related change.

Groundwater quality data from available bores in the reporting period (2024-2025) are presented with baseline and historical data (2018-2021) in tabular and graphical formats in Appendix B. The time plots present analyte concentrations in context with Bunbury monthly rainfall totals.

To assess the water quality characteristics and potential change because of project construction related activities on the Black-striped minnow habitat, it is important to highlight and assess in context with local landuse changes. The Project area is in an area that has been extensively cleared and fertilised for grazing. In 2012, the DoW reported that waterways in the Leschenault Catchment regularly exceed ANZECC and ARMCANZ guidelines. The results presented herein are of a similar order of magnitude to the historical results presented by the DoW (2012). As a result, exceedances of the ANZECC and ARMCANZ guidelines are not linked to Project-related activities.

6.2.1 Surface Water Quality

Surface water quality was measured once at SW10 in August 2024 for this reporting period due to the monitoring location being dry during all other monitoring events. Summary of results are presented in Table 4. Prior to this, because of low rainfall, this location was not measured due to being dry during all monitoring events since July 2020. Surface water monitoring is also detailed separately within the *Annual Aquatic Fauna and Surface Water Report* (SLR Consulting, 2025).

6.2.1.1 Surface Water Physicochemical Parameters

Surface quality observation for Five Mile Brook, an area of known Black Striped Minnow habitat, during the 2024-2025 reporting period (Appendix C) included:

- The pH of 7.19 was slightly lower than the pre-construction historical pH range (7.33 and 7.57).
- Pre-construction groundwater electrical conductivity ranged up to 1,160 $\mu\text{S}/\text{cm}$. During the reporting period, salinity was measured at 358 $\mu\text{S}/\text{cm}$. The lower salinity is likely related to high rainfall events and time when the brook flow commenced.
- Prior to construction, bicarbonate concentrations (50 to 79 mg/L) were also high. During the August 2024 sampling period bicarbonate concentration was below laboratory limits (<1 mg/L).

A low EC (358 $\mu\text{S}/\text{cm}$) and neutral pH are indicative of rainwater. Nitrogen (3.4 mg/L) as well as Total Phosphorous (0.56 mg/L) were reported at similar concentrations to pre-construction samples.

6.2.2 Groundwater Quality

Groundwater samples were collected quarterly in August and November 2024, and February and May 2025. Table 4 presents a summary of groundwater quality results including pre-construction baseline with the current 2024-2025 reporting period.

Dissolved metals in groundwater are filtered prior to analysis to remove the particulate matter. In comparison, total metals are performed on surface water samples. To allow comparison with groundwater results, guideline “dissolved” values have been assumed and presented in tabular format highlighting exceedances in Appendix C.

Table 4 Groundwater and Surface Water Quality – Laboratory Summary Results

Parameter	ANZECC and AARMCANZ (2000) Freshwater Guidelines ¹ (mg/L)	Maximum during 2024/25 ¹ (mg/L)	2024/25 Exceedances	Pre-construction maximum (mg/L)		Pre-construction Exceedances
Aluminium	0.055	35.6 (BORR MW46)	BORR MW05; BORR MW06; BORR MW08a; BORR MW11; BORR MW46; SW10	0.052		SW10
Cadmium	0.002	40.2 (BORR_MW46)	BORR_MW04; BORR_MW05; BORR_MW06; BORR_MW08a; BORR_MB11s; BORR_MW10; BORR_MW11; BORR_MW46	0.00025		MR_MW05
Copper	0.0014	0.002 (SW10)	SW10	0.052		BORR_MW04, BORR_MW05, BORR_MW06, BORR_MW08a, BORR_MW09, BORR_MW10, BORR_MW11, BORR_MW46, MR_MW05
Nickel	0.011	0.075 (BORR_MW11)	BORR_MW06; BORR_MW11	0.041		BORR_MW04; BORR_MW05; BORR_MW09; BORR_MW11
Zinc	0.008	0.004 (BORR_MW11)	BORR_MW11	0.404		BORR_MW05
Nitrogen	1.5	35.6 (BORR_MW46)	BORR_MW08a, BORR_MW46	6.3		MR_MW05, BORR_MW05, BORR_MW06, BORR_MW08a, BORR_MW09, BORR_MW11
Phosphorus	0.06	27.4 (BORR_MW11)	BORR MW04; BORR_MW05, BORR_MW06, BORR_MW08a, BORR MW11s; BORR MW10 BORR_MW11, BORR_MW46	1.22		MR_MW05, BORR_MW04, BORR_MW05, BORR_MW06, BORR_MW08a, BORR_MW10, BORR_MW11, BORR_MW46

¹ Dissolved Metals guideline values assumed to allow assessment in context to groundwater

6.2.2.1 Groundwater Physicochemical Parameters

Based on the four discrete topographic zones groundwater quality observations for the 2024-2025 reporting period (Appendix C) included:

Eastern Agricultural Flats: CC Wetland UFI-931 and RE Wetland UFI-1117 – outside influence of the Gelorup quarry (BORR_MB11s, BORR_MW10): Lower elevations linked to Palusplain and shallow sediments overlaying Bunbury Basalt: *Areas of potential Black-stripe Minnow habitat*

- The pH range for this reporting period was found to be between 5.75 and 6.33 is lower than that of the pre-construction historical pH range of between 6.6 and 7.7.
- The groundwater salinity (measured as electrical conductivity (EC) ranged between 415 and 942 $\mu\text{S}/\text{cm}$, in range with the pre-construction values of between 168 and 779 $\mu\text{S}/\text{cm}$.
- Bicarbonate and alkalinity concentrations remained within historical ranges.

Quarry influence (BORR_MW11):

- The pH range in 2024-2025 of 6.59 -7.15 was slightly lower than the pre-construction historical pH range (7.2 and 7.9).
- Pre-construction groundwater electrical conductivity ranged up to 24,600 $\mu\text{S}/\text{cm}$. During the reporting period, salinity ranged between 1,045 and 15,664 $\mu\text{S}/\text{cm}$. The range in salinity reported during the reporting period is lower than that measured during pre-construction. This is likely due to monitoring event timing with high rainfall events and initial flushing the higher salt laden sediments from adjacent farmland areas.
- Prior to construction, bicarbonate 258 to 1,860 mg/L concentrations were also high. During the 2024-2025 period bicarbonate ranged between 140 and 1,650 mg/L. This is an increase from the previous reporting period and like the pre-construction levels.

Five Mile Brook: MU Wetland UFI-1163 (BORR_MW08a): Five Mile Brook area: *Areas of known Black Striped Minnow habitat*

- The pH range in 2024-2025 of between 6.48- 6.86 is only marginally lower than that of the pre-construction historical pH range of between 6.6 and 7.7.
- Groundwater electrical conductivity ranged between 564 and 807 $\mu\text{S}/\text{cm}$, is comparable with the pre-construction range of between 168 and 779 $\mu\text{S}/\text{cm}$.
- Bicarbonate and alkalinity concentrations remained within historical ranges.

West of Ridgeline: RE Wetland UFI-15493 and CC Wetland UFI-14478 (BORR_MW04, BORR_MW05, BORR_MW06, BORR_MW46): western flank of the ridgeline and towards the ocean: *Areas of potential Black Striped Minnow habitat*

- The pre-construction pH range was reported between 3.2 and 7.6. During this reporting period, the values range between 5.62 and 7.36, and are within the pre-construction range. The pH values in BORR_MW46 have remained slightly acidic (pH5.8 to pH6.6) and similar to 2019 records.
- Groundwater electrical conductivity ranged between 701 and 5,470 $\mu\text{S}/\text{cm}$, slightly higher than the pre-construction range of between 216 and 4,280 $\mu\text{S}/\text{cm}$. The slight increase may be explained by the increased rainfall following from a dry period.
- Bicarbonate and alkalinity concentrations remained within historical ranges.

6.2.2.2 Total Metals

Aluminium, Cadmium and Zinc exceeded reporting guidelines during the reporting period for any tested metals (Table 4). These observations were also exhibited during pre-construction baseline sampling and therefore indicate likely no change in water quality because of the Project activities. Overall metal concentrations are trending downwards. Possibly relating to the frequent pumping of bores decreasing their concentrations.

Exceedances are presented in Appendix C.

6.2.2.3 Nutrients

Concentrations of phosphorus (0.0 to 2.81 mg/L) were above the guidelines (0.06 mg/L) for the reporting period and, for BORR_MW46, slightly higher than the historic range (up to 1.22 mg/L) (**Appendix C**). The variability in concentration levels can likely be attributed to the variability is seasonal rainfall that results in first flush and inundation of widespread low-lying fertilised agricultural land.

A change in peak total nitrogen concentrations between a baseline maximum of 6.3 mg/L and the recent reporting period of 9.2 mg/L reported during the highly variably rainfall period (**Appendix C**).

6.2.2.4 Organic Chemicals

Petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes, organophosphorus and organochlorine pesticides, and glyphosate were not detected either pre-construction or during the 2024-2025 reporting period.

6.2.2.5 Surface Water and Groundwater Quality Summary

In context with the identified topographic zones, the following observations are apparent:

Eastern Agricultural Flats (BORR_MW9, MB11s, BORR_MW10) is aligned with CC Wetland UFI-931 and RE Wetland UFI-1117 and located outside influence of the Gelorup quarry. The Superficial Aquifer in this area is at lower elevations linked to palusplain and shallow sediments overlying Bunbury Basalt and has been linked with areas of potential Black-stripe minnow habitat. Groundwater quality measured during the 2024-2025 period trended towards the pre-construction ranges, likely a result of the increased rainfall which is closer to the amount experienced in the pre-construction phase.

Quarry influence (BORR_MW11) salinity fluctuated heavily with EC ranging 1045- 15664 $\mu\text{S}/\text{cm}$. Previous reporting period showed the well below the maximum pre-construction of 24,600 $\mu\text{S}/\text{cm}$. This large change in EC is often due to high rains after a dry period.

Five Mile Brook (SW10, BORR_MW08a) is aligned with MU Wetland UFI-1163 and an area known as Black Striped Minnow habitat. During the 2024-2025 reporting period the groundwater chemistry here remained consistent with long term trends. Surface water Nitrogen as well as Total Phosphorous are seen to exceed limits. However, rainfall and recharge are shown to have only a limited, short-term effect on some concentrations.

Residential Ridgeline (BORR_MW07) observations have been recently driven by groundwater levels in BORR_MW07 close to the base of the constructed bore. Due to the limited available saturation, no water quality samples could be collected during the 2024-25 monitoring period. It is however noted that this area is dominated as a topographic high ridgeline and therefore not within a suitable habitat for the Black Striped Minnow.

West of Ridgeline (BORR_MW4, BORR_MW05, BORR_MW06, and BORR_MW46) is associated with RE Wetland UFI-15493 and CC Wetland UFI-14478 on the western flank of the ridgeline and towards the ocean. This includes a potential Black Striped Minnow habitat area. The acidic values measured at BORR_MW46 in 2020 have reverted to neutral ranges. Outside BORR_MW46, groundwater quality characteristics remain within historical ranges with some minor fluctuations possibly caused by the low rainfall recharge and very low rainfall during the 2024-2025 period.

7 Quality Assurance/Quality Control

Laboratory QA/QC checks indicate results were within acceptable levels with all differences between the primary and duplicate within acceptable limits, except for phosphorus. This is considered to be acceptable as both primary and duplicate results are close to laboratory limit of reporting (LOR) and are low in concentrations (**Appendix C**).

Lab QA/QC was acceptable with all parameters within acceptable ranges except for:

- The laboratory measurements of pH were outside holding times on 22 Aug 2024, 14 Nov 2024, 14 Feb 2025, and 15 May 2025. However, the laboratory pH results were similar to the field pH results suggesting little had changed during sample handling and transportation.
- This is considered to be acceptable as results are like other events and all other total metals parameters, including relative percentage difference for field duplicates are acceptable.

In summary, the laboratory data is considered suitable for assessing water quality trends.

8 Monitoring Compliance

This monitoring review assesses the compliance with the Conditions 2-1(2) and Condition 2-3 of MS1191 and outlined in Section 2.2 and summarises the groundwater and surface water monitoring data for the 12-month reporting period from June 2024 to May 2025 in context with local baseline conditions. Monitoring compliance has been shaded and coded in accordance with Table 5.

Table 5 Summary of Monitoring Compliance Abbreviations

Abbreviation	Compliance Status	Comments
C	Compliant	More than 80% completed
PNC	Potentially non-compliant	60 to 80% completed
NC	Non-compliant	Less than 60% completed
D	Monitoring Bore Decommissioned/ Impacted	
NA	Monitoring location dry or no landowner access permitted	

Compliance of the scheduled monitoring for 2024-2025 reporting period is summarised in **Table 6**.

Table 6 Compliance of Monitoring in the Project Southern Section 2024-2025

Bore ID	2024-2025 Monitoring Bore Data Compliance								
	Monthly Static Water Level (m bgl; mAHD)	Quarterly Field TDS (mg/L)	Quarterly Field EC (mg/L)	Quarterly Field pH	Quarterly Laboratory Analysis				Notes
					Aug -24	Nov -24	Feb- 25	May -25	
Groundwater									
BORR_MW04	C	C	C	C	C	C	C	C	
BORR_MW05	C	C	C	C	C	C	C	C	
BORR_MW06	C	C	C	C	C	C	C	C	
BORR_MW07	C	NA	NA	NA	NA	NA	NA	NA	Minimal water in base of bore to allow sampling
BORR_MW08a	C	C	C	C	C	C	C	C	
BORR_MW09	D	D	D	D	D	D	D	D	Impacted by construction by September 2023
MB11s and MB11d	C	C	C	C	C	C	C	C	Replacement for BORR_MW09 water level monitoring
BORR_MW10	C	C	C	C	C	C	C	C	
BORR_MW11	C	C	C	C	C	C	C	NA	Dry (Mar, Apr, May)
BORR_MW12	D	D	D	D	D	D	D	D	Bore impacted by construction
BORR_MW46	C	C	C	C	C	C	C	NA	
MR_MW05	D	D	D	D	D	D	D	D	Bore impacted by construction
BH27.1	D	D	D	D	D	D	D	D	Bore impacted by construction
MB14s and MB14d	C	C	C	C	C	C	C	C	Replacement for BH27.1 water level monitoring
Surface Water									
SW10	-	NA	NA	NA	C	NA	NA	NA	Sampled when inundated.

9 Recommendations

Due to the Project nearing completion, and the reduction in construction related activities, groundwater related monitoring should continue to ensure compliance through the defects period.

10 Conclusions

Groundwater and surface water levels and quality have been monitored since 2019, prior to construction commencement and continued through the 2024 – 2025 reporting period. In context to construction related activities, key findings from monitoring during the 2024 to 2025 monitoring assessment include:

- Increased rainfall relative to 2023 – 2024 reporting have resulted in the return of surface water ponding in the southern areas that are known to form Black Striped Minnow habitat areas.
- Shallow water table levels continue to respond to varying degrees of seasonal rainfall recharge events.
- Groundwater levels linked to all geomorphic wetlands and TEC/PEC areas follow trends within or slightly higher than the historic ranges that are consistent with regional trends.
- The larger average seasonal groundwater level fluctuation in 2024 - 2025 can be attributed to the higher seasonal rainfall and resulting increased recharge to the Superficial Aquifer.
- Groundwater salinity remained fresh to slightly brackish with a spike in levels noted after high rainfall. BORR_MW11 showed a noticeable increase in EC following rain as it has in the past. This is likely due to a build-up of salts in the sediments being flushed out after rain.
- One surface water sample was collected for analysis with results summarised in 6.2.2.5.
- No Hydrocarbons were detected in groundwater during the 2024-2025 period.

Groundwater monitoring was completed in accordance with the outlined monitoring program. Replacement bores MB11 and MB14 are active and the results from these bores are presented within this report.

Based on the review, groundwater monitoring remains within historical ranges and no changes compared with baseline data as presented in *Bunbury Outer Ring Road, North, Central and Southern Section's Groundwater and Surface Water Monitoring 2019-2020* (SWGA, 2020) are attributed to the project.

It is concluded that Main Roads WA (MRWA) is compliant with Conditions 2-1(2), 2-3 and 2-4 of Ministerial Statement 1191 during the reporting period.

11 References

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- Southwest Gateway Alliance (SWGA) 2025, *Bunbury Outer Ring Road, IS Design Eco-1 Ecology Assessment*, unpublished report to Environmental Protection Authority, August 2024.

Appendix A

Bore Summary Details

App A - Monitoring Bore Construction Details

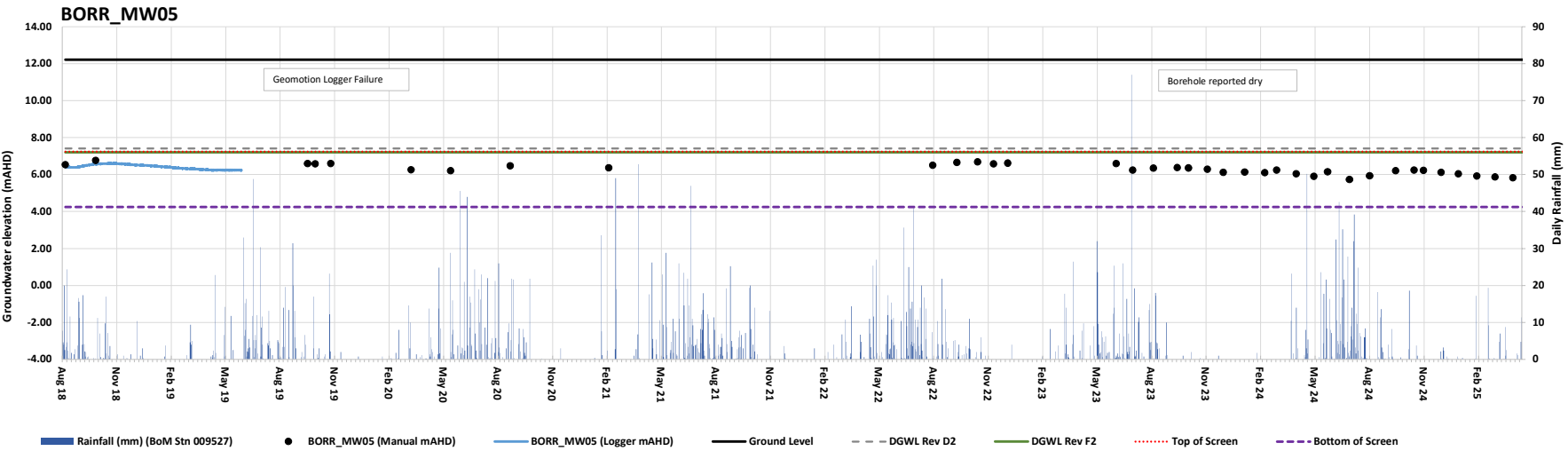
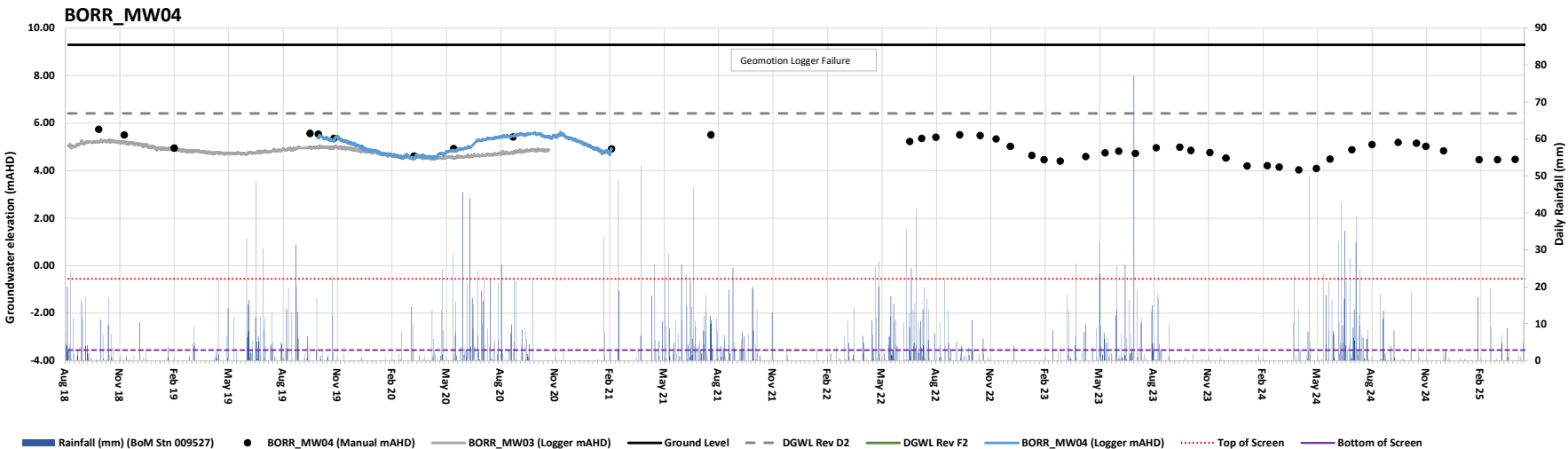
Bore_ID	River Locality	Location				Ground level (m AHD)	Top of Collar (m AHD)	Depth Driled	Casing Details	Screened Interval		Seasonal Low GWL (m bgl)	Seasonal Low GWL (m AHD)	DGWL (m AHD)	Comments
		Easting (PCG94)	Northing (PCG94)	Easting (MGA94, Z50)	Northing (MGA94, Z50)					From (m bgl)	To (m bgl)				
Groundwater															
BORR_MW04	South of Five Mile Brook	30,098	96,440	370,118	6,297,058	9.30	9.45	13	Nominal 50mm ID uPVC class 9 Casing	10	13	4.68	4.62	NA	-
BORR_MW05	South of Five Mile Brook	30,660	97,684	370,681	6,298,315	12.20	12.24	8		5	8	6	6.2	7.2	-
BORR_MW06	South of Five Mile Brook	31,097	98,436	371,109	6,299,072	11.60	11.62	8		5	8	5.76	5.84	6.92	-
BORR_MW07	South of Five Mile Brook	32,079	99,497	372,079	6,300,144	15.60	15.62	10.5		7.5	10.5	10.12	5.48	6.25	-
BORR_MW08a	South of Five Mile Brook	33,592	99,726	373,589	6,300,390	15.97	15.95	6		3	6	3.33	12.64	14.53	-
BORR_MW09	Preston Rv to Five Mile Brook	34,250	100,342	374,240	6,301,013	16.40	16.45	5.5		2.5	5.5	4.91	11.49	14.62	Decommissioned
BORR_MW10	Preston Rv to Five Mile Brook	34,870	101,074	374,851	6,301,752	19.30	19.35	4.4		0.5	4.4	2.27	17.03	18.97	-
BORR_MW11	Preston Rv to Five Mile Brook	35,310	101,916	375,282	6,302,599	20.80	20.80	4.4		0.5	4.4	3.89	16.91	20.8	-
BORR_MW12	Preston Rv to Five Mile Brook	35,899	103,498	375,853	6,304,187	19.60	19.63	4.5		1.5	4.5	3.46	16.14	18.96	Decommissioned
BORR_MW46	Five Mile Brook - West	33,939	104,427	373,883	6,305,094	7.10	7.03	6		3	6	4.74	2.36	4.07	-
MR_MW05	South of Five Mile Brook	35,337	101,506	375,313	6,302,189	20.54	20.63	-		-	-	-	-	19.64	Decommissioned
BH27.1	Five Mile Brook - West	31,413	98,949	371,426	6,299,584	12.30	12.30	9		6	9	-	-	6.74	Decommissioned
MB11s	South of Five Mile Brook	33,627	99,849	374,128	6,302,416	16.35	16.24	15.15		13.15	15.15	NA	NA	NA	Replacement for BORR_MW9
MB11d								60		42	60				
MB14s	Preston Rv to Five Mile Brook	31,552	99,007	371,558	6,299,648	14.83	14.85	14.55		7.55	14.55	NA	NA	NA	Replacement for BH27.1
MB14d								60.5		42.5	60.5				
Surface Water															
SW10	Five Mile Brook	33,341	99,834	373,337	6,300,496		NA	NA	NA	NA	NA	NA	NA	NA	Surface Water Sampling Location

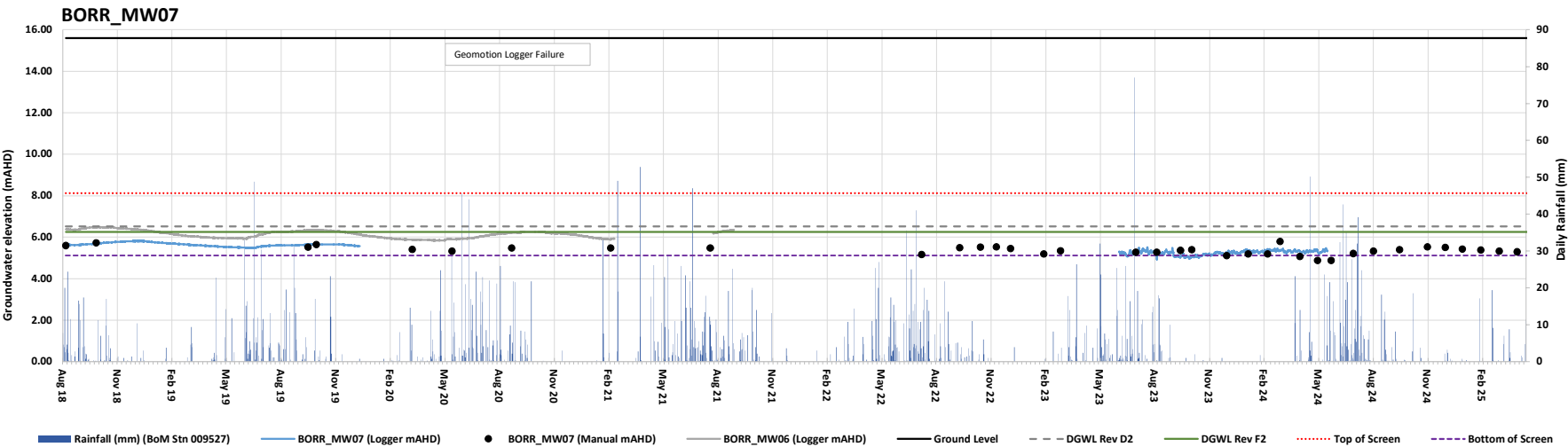
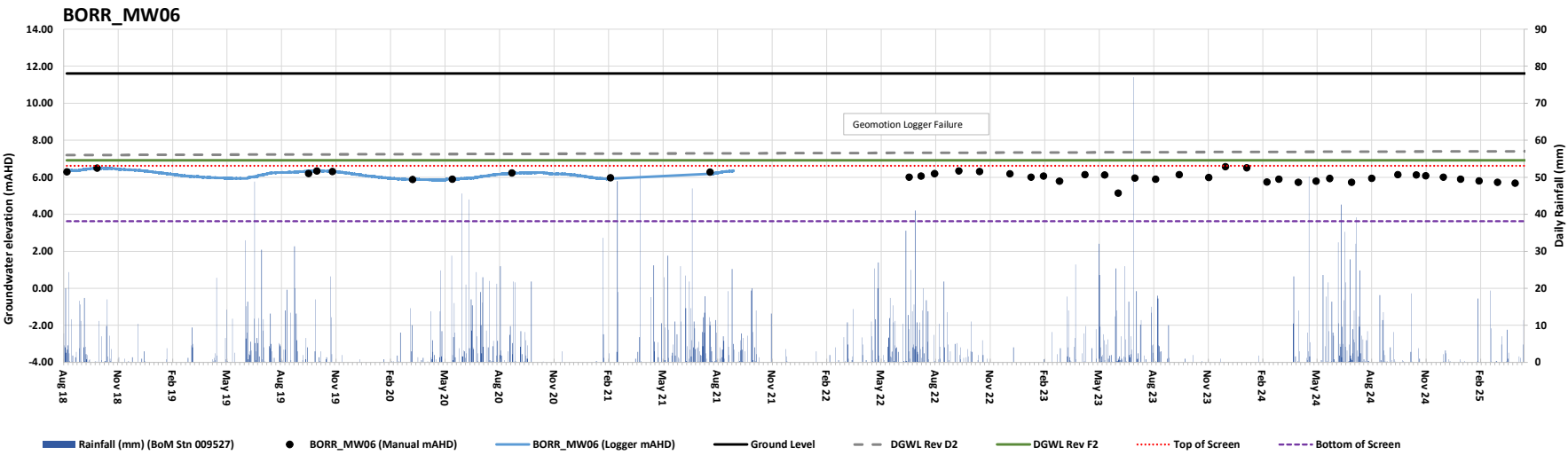
Appendix B

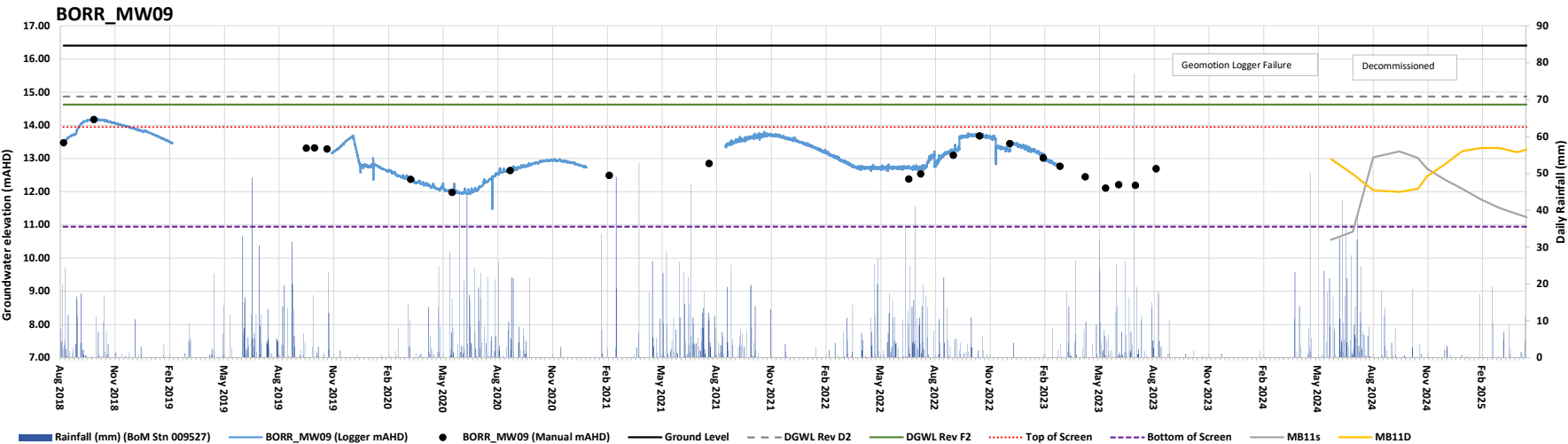
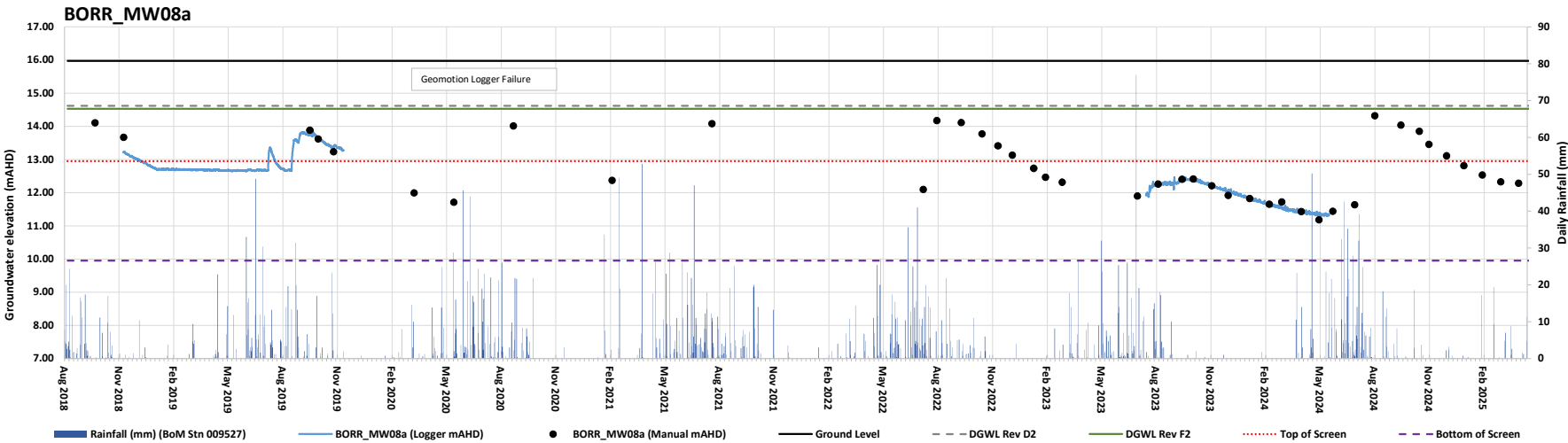
Groundwater Level Data

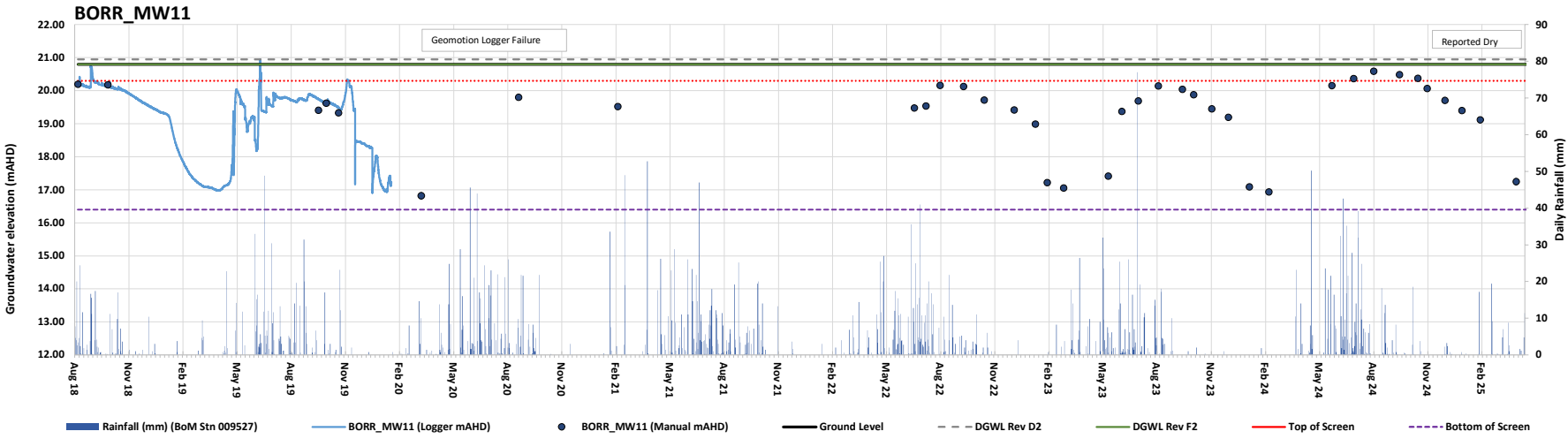
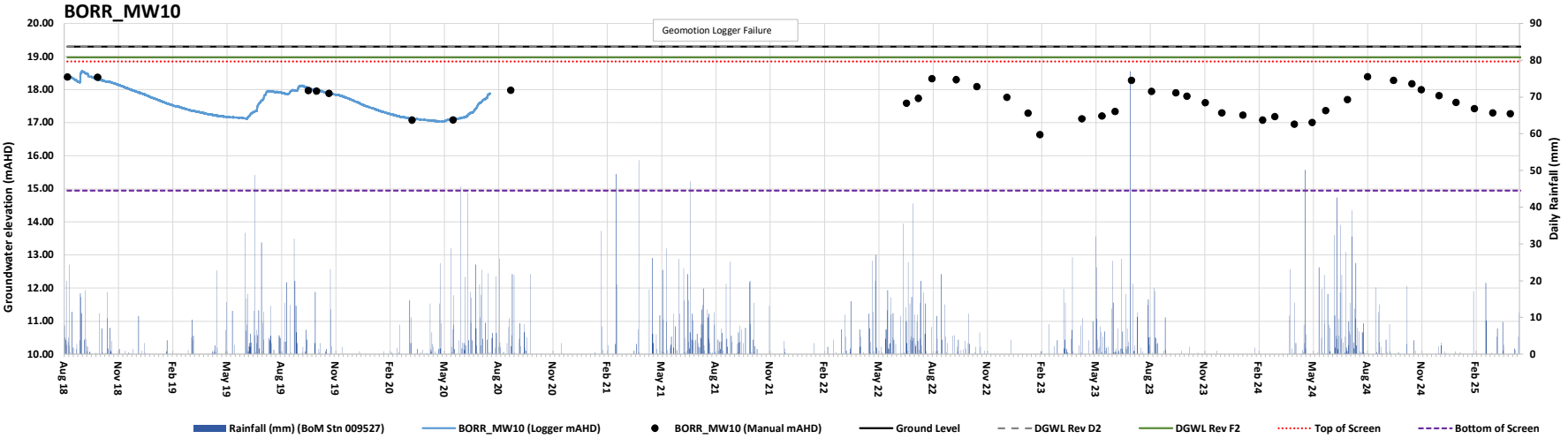
Appendix A - Groundwater Level Data

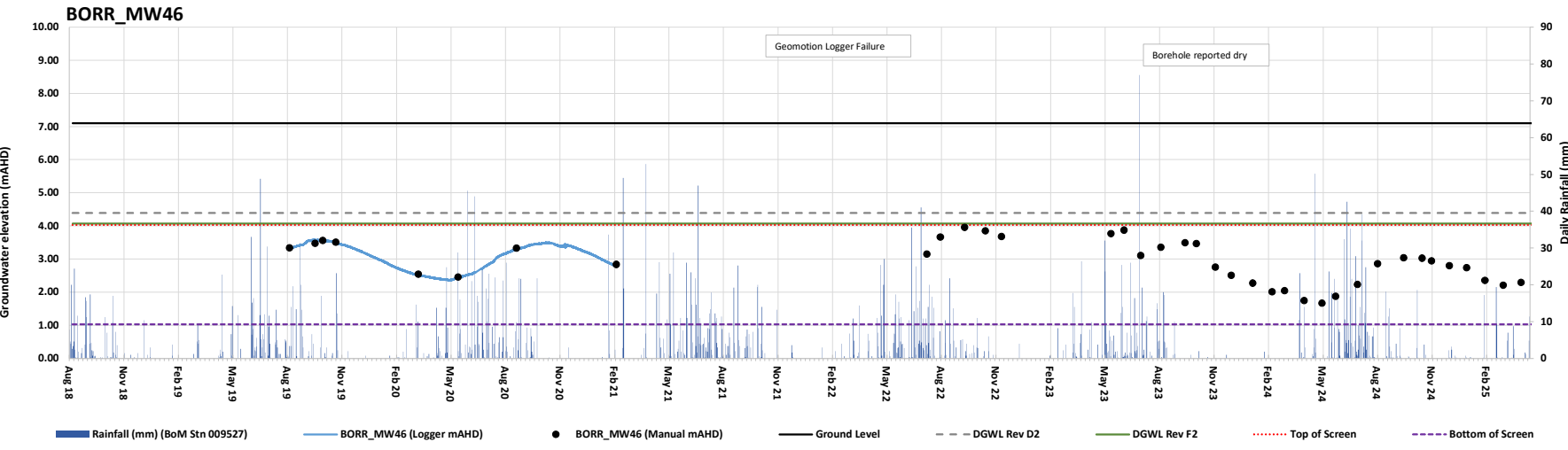
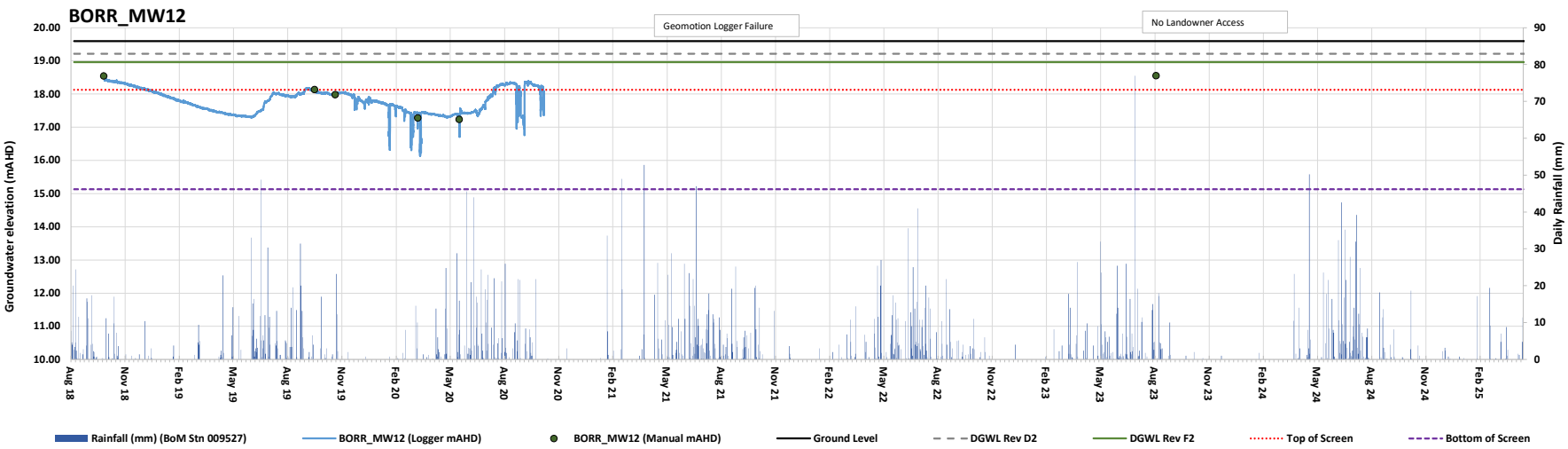
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Logger Type	#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A		#N/A			#N/A		#N/A	
Eastings	370117.70		370680.70		371109.40		372079.40		373588.50		374240.40		374128.00		374128.00		374851.40		375281.80		375852.60		373882.60		375313.50				371426.00		371558.00		
Northings	6297058.10		6298314.70		6299071.60		6300143.90		6300390.20		6301013.40		6302416.00		6302416.00		6301751.80		6302599.20		6304187.10		6305094.10		6302185.30				6299584.00		6299648.00		
Ref Point AHD	9.45		12.24		11.62		15.62		15.95		16.45		16.24		16.24		19.35		20.80		19.63		7.03		20.51				12.13		14.85		
Ground AHD	9.30		12.20		11.60		15.60		15.97		16.40		16.35		16.35		19.30		20.80		19.60		7.10		20.50				12.13		14.85		
Date	BORR_MW04 (mbrp)	BORR_MW04 (Manual mAHD)	BORR_MW05 (mbrp)	BORR_MW05 (Manual mAHD)	BORR_MW06 (mbrp)	BORR_MW06 (Manual mAHD)	BORR_MW07 (mbrp)	BORR_MW07 (Manual mAHD)	BORR_MW08a (mbrp)	BORR_MW08a (Manual mAHD)	BORR_MW09 (mbrp)	BORR_MW09 (Manual mAHD)	MB11s (mbrp)	MB11s (mAHD)	MB11D (mbrp)	MB11D (mAHD)	BORR_MW10 (mbrp)	BORR_MW10 (Manual mAHD)	BORR_MW11 (mbrp)	BORR_MW11 (Manual mAHD)	BORR_MW12 (mbrp)	BORR_MW12 (Manual mAHD)	BORR_MW46 (mbrp)	BORR_MW46 (Manual mAHD)	MR_MW05 (mbrp)	MR_MW05 (Manual mAHD)	BH27.1 (mbrp)	BH27.1 (Manual mAHD)	MB14s (mbrp)	MB14s (mAHD)	MB14D (mbrp)	MB14D (mAHD)	
26/7/2018				5.74	6.50	5.40	6.22	10.04	5.58		3.19	13.26					1.09	18.26	0.58	20.22						2.44	18.07						
6/8/2018				5.70	6.54	5.33	6.29	10.02	5.60		2.97	13.48					0.97	18.38	0.60	20.20													
7/8/2018																																	
21/9/2018									1.84	14.11																							
25/9/2018																					1.09	18.54											
26/9/2018	3.71	5.74	5.46	6.78	5.12	6.50	9.89	5.73			2.27	14.18					0.97	18.38	0.62	20.18													
8/11/2018	3.95	5.51							2.29	13.67																							
1/2/2019	4.49	4.96																															
14/2/2019																										2.10	18.41						
7/8/2019																																	
18/9/2019	3.88	5.57			5.41	6.21	10.10	5.52	2.07	13.88	3.14	13.31					1.38	17.98			1.50	18.13	3.69	3.34									
19/9/2019			5.65	6.59														1.39	19.41				3.56	3.47									
2/10/2019	3.91	5.54	5.65	6.59	5.28	6.34	9.97	5.65	2.33	13.62	3.13	13.32					1.39	17.96	1.18	19.62			3.47	3.56	2.20	18.31							
23/10/2019											3.16	13.29					1.46	17.89	1.47	19.33	1.65	17.98											
24/10/2019																								3.51									
28/10/2019	4.10	5.36	5.64	6.61	5.31	6.31			2.72	13.23																2.23	18.28						
12/3/2020	4.83	4.62	5.97	6.27	5.74	5.88	10.21	5.41	3.96	11.99	4.08	12.37					2.27	17.08	3.98	16.82	2.35	17.28	4.48	2.55									
18/5/2020	4.52	4.93	6.03	6.21	5.72	5.91	10.29	5.33	4.24	11.71												4.57	2.46										
21/5/2020											4.47	11.98					2.27	17.09			2.40	17.23			2.89	17.62							
24/8/2020																																	
25/8/2020																			1.00	19.80			3.70	3.33	2.50	18.01							
26/8/2020	4.03	5.42	5.76	6.48	5.38	6.24	10.14	5.48	1.94	14.01	3.81	12.64					1.37	17.98															
9/2/2021	4.53	4.92	5.87	6.37	5.65	5.97	10.12	5.48	3.58	12.37	3.96	12.49							1.28	19.52			4.19	2.84			6.13	6.00					
27/7/2021	3.94	5.51			5.34	6.28	10.20	5.48	1.87	14.08	3.60	12.85					1.19		0.82						2.28			6.08	6.05				
28/6/2022	4.22	5.23			5.61	6.01					4.07	12.38					1.76	17.59	1.32	19.48					2.42	18.09							
18/7/2022	4.09	5.36			5.56	6.06	10.46	5.16	3.86	12.09	3.91	12.54					1.61	17.74	1.26	19.54			3.88	3.15	2.32	18.19	6.17	5.96					
10/8/2022			5.73	6.51	5.42	6.20			1.78	14.17							1.02	18.33					3.36	3.67	2.27	18.24	6.24	5.89					
11/8/2022	4.04	5.41																	0.64	20.16													
11/9/2022											3.35	13.10																					
20/9/2022	3.94	5.51	5.58	6.66	5.27	6.35	10.13	5.49	1.84	14.11							1.05	18.30	0.67	20.13			3.07	3.96	0.99	19.52	6.33	5.80					
25/10/2022	3.97	5.48	5.55	6.69	5.30	6.32	10.10	5.52	2.18	13.77	2.77	13.68					1.26	18.09	1.08	19.72			3.18	3.85	2.33	18.18	6.39	5.74					
21/11/2022	4.11	5.34	5.66	6.58			10.09	5.53	2.54	13.41												3.35	3.68										
15/12/2022	4.43	5.02	5.61	6.63	5.43	6.19	10.17	5.45	2.82	13.13	3.00	13.45					1.58	17.77	1.38	19.42					1.84	18.67	6.36	5.77					
20/1/2023	4.81	4.64			5.61	6.01			3.22	12.73							2.06	17.29	1.81	18.99					2.49	18.02							
8/2/2023																									2.71	17.80							
9/2/2023							10.43	5.19	3.49	12.46	3.43	13.02					2.71	16.64	3.58	17.22													
10/2/2023	4.98	4.47			5.55	6.07																											
9/3/2023	5.05	4.40			5.83	5.79	10.27	5.35	3.64	12.31	3.68	12.77							3.74	17.06					2.45	18.06	6.02	6.11					
21/4/2023	4.85	4.60			5.48	6.14					4.00	12.45					2.23	17.12															
24/5/2023	4.70	4.75			5.50	6.12													3.39	17.41													
25/5/2023											4.34	12.11					2.15	17.20					3.26	3.77									
16/6/2023	4.63	4.82	5.64	6.60	6.47	5.15					4.23	12.22					2.01	17.34	1.43	19.37			3.16	3.88									
14/7/2023	4.72	4.73	6.00	6.24	5.65	5.97	10.35	5.27	4.05	11.90	4.26	12.19					1.07	18.28	1.11	19.69			3.92	3.11									
17/8/2023																	1.40	17.95	0.66	20.14	1.08	18.55	3.67	3.36									
18/8/2023	4.48	4.97	5.89	6.35	5.73	5.89	10.35	5.27	3.69	12.26	3.75	12.70																					
27/9/2023	4.46	4.99	5.86	6.38	5.48	6.14	10.26	5.36	3.55	12.40							1.45	17.90	0.76	20.04			3.54	3.49									
16/10/2023	4.60	4.86	5.88	6.36			10.22	5.40	3.54	12.41							1.55	17.81	0.92	19.88			3.57	3.47									
16/11/2023					5.64	5.99			3.74	12.21							1.75	17.61	1.35	19.45													
17/11/2023	4.68	4.77	5.95	6.29																			4.27	2.76									
14/12/2023	4.92	4.53	6.12	6.12	5.04	6.58	10.50	5.12	4.03	11.92							2.05	17.30	1.60	19.20			4.52	2.51									
19/1/2024	5.10	4.20	6.06	6.14	5.10	6.52	10.40	5.20	4.13	11.82							2.12	17.23	3.71	17.09			4.75	2.28									

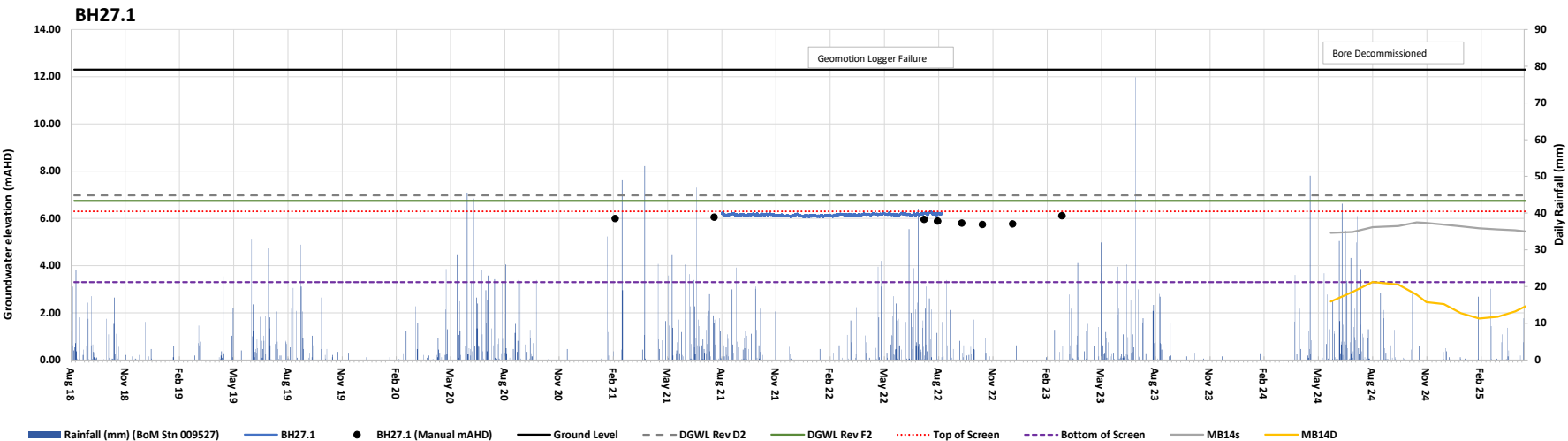
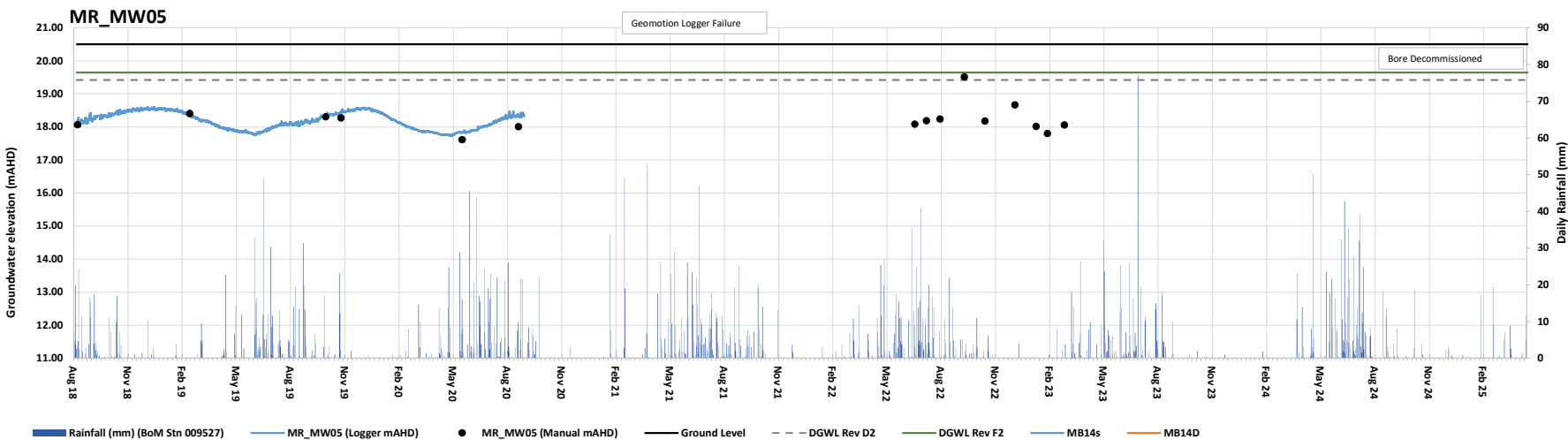


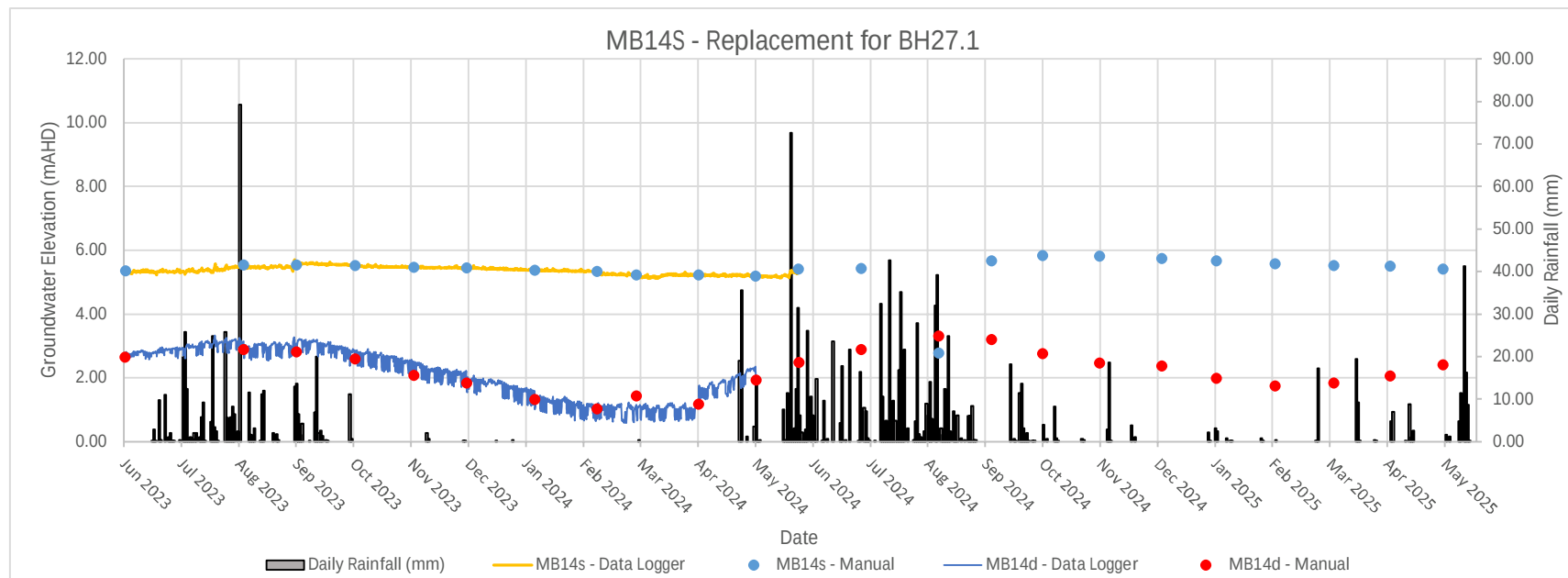
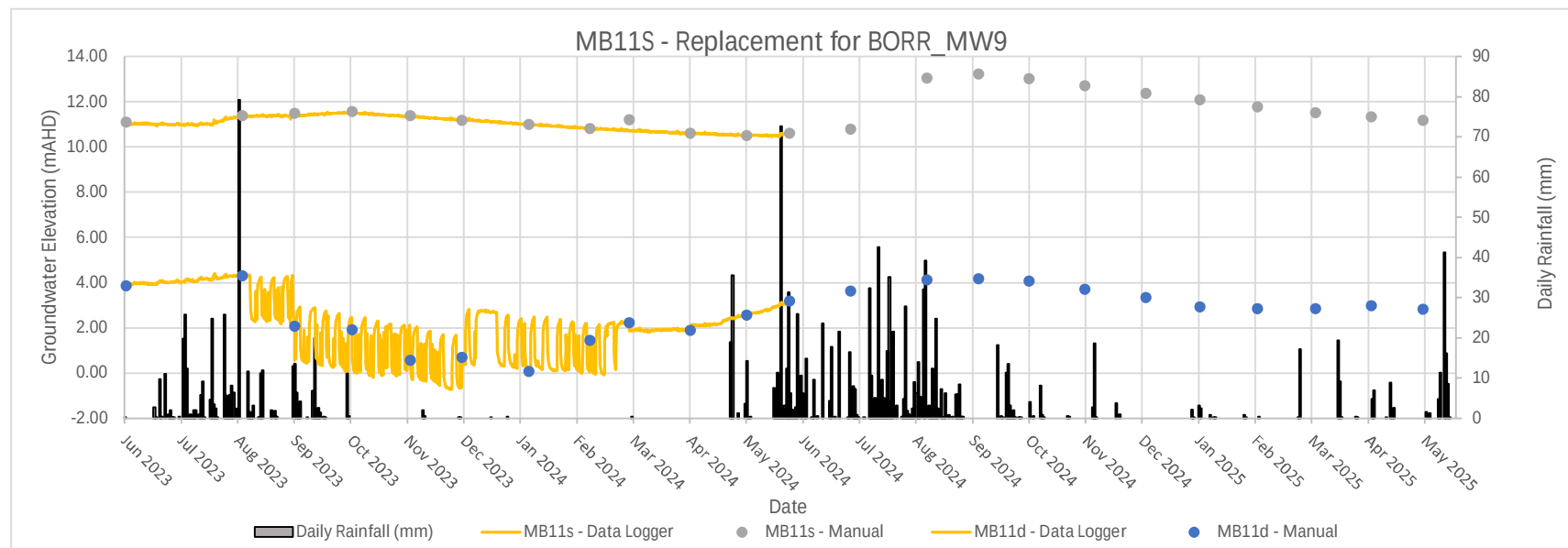












Appendix C

Groundwater Quality Data

Table C1

Table C2

Figure C1 - Concentrations of bicarbonate alkalinity, carbonate alkalinity and hydroxide alkalinity

Figure C2- Concentration of Total Alkalinity

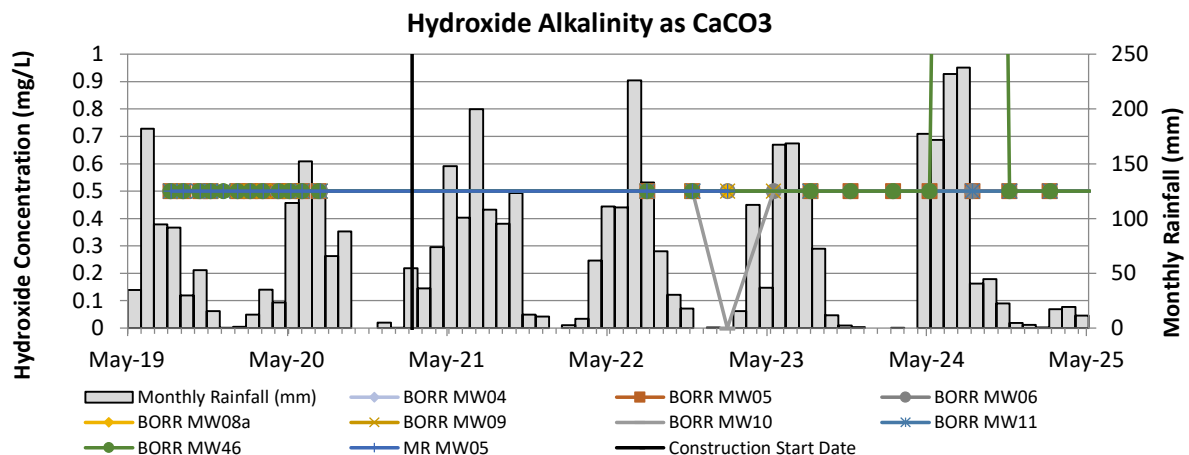
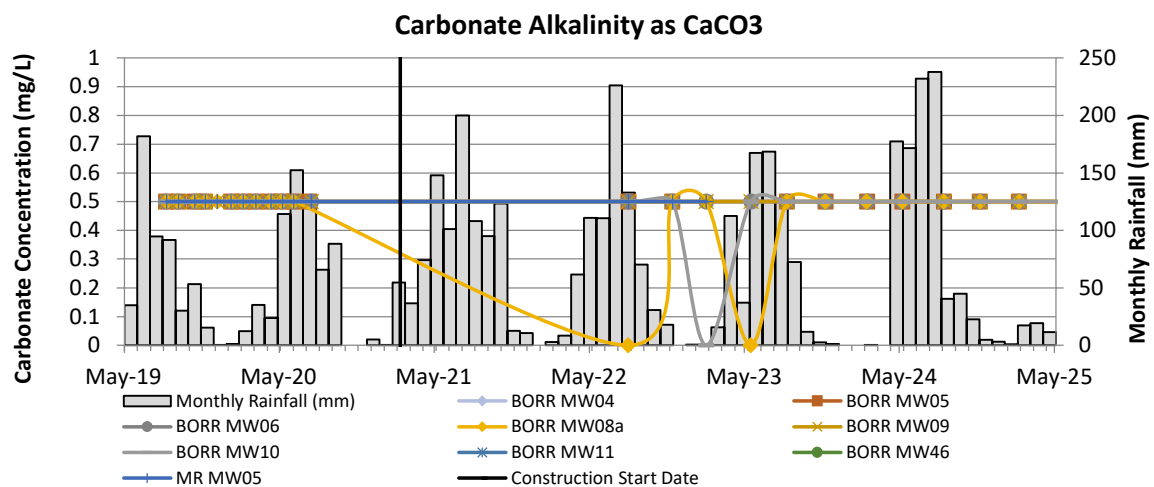
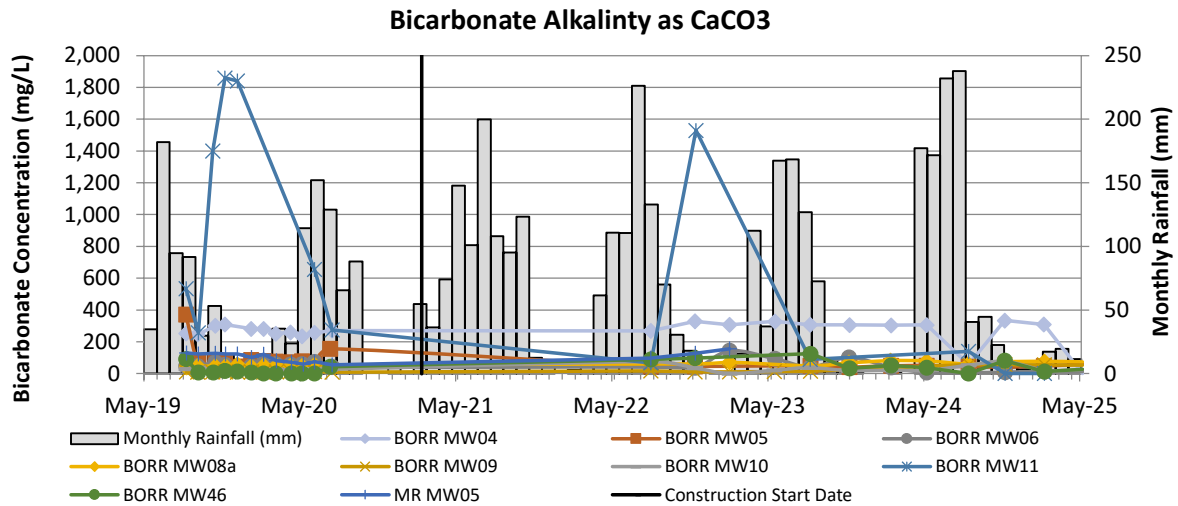
Figure C3 – Concentration of Arsenic, Cadmium and Copper

Figure C4 – Concentration of Lead and Zinc

Figure C5 – Concentration of Total Nitrogen and Phosphorus

Figure C6 – Concentration of TDS, EC and pH

Pesticides														
Parameter	Date	Seizone	Dichlorvos	Dimethoate	Ethion	Fenamiphos	Fenithion	Malathion	Monocrotophos	Parathion	Parathion-methyl	Permethrin-ethyl	Prothiofos	Glyphosate
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ANDETC and ANDETCANZ (2000) Freshwater 95% Guidelines		0.01		0.15				0.05		0.04				1200
BCRR.MW04	21/08/2019													
BCRR.MW04	18/09/2019													
BCRR.MW04	19/09/2019													
BCRR.MW04	20/11/2019													
BCRR.MW04	18/02/2020													
BCRR.MW04	18/03/2020													
BCRR.MW04	21/04/2020													
BCRR.MW04	18/05/2020													
BCRR.MW04	18/06/2020													
BCRR.MW04	27/07/2020													
BCRR.MW04	1/08/2020													
BCRR.MW04	21/11/2020													
BCRR.MW04	18/02/2021													
BCRR.MW04	17/03/2021													
BCRR.MW04	17/11/2021													
BCRR.MW04	22/02/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW04	19/03/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW04	21/05/2024													
BCRR.MW04	13/11/2024													
BCRR.MW04	13/02/2025													
BCRR.MW04	14/05/2025													
BCRR.MW05	21/08/2019													
BCRR.MW05	18/09/2019													
BCRR.MW05	20/10/2019													
BCRR.MW05	20/11/2019													
BCRR.MW05	20/01/2020													
BCRR.MW05	18/02/2020													
BCRR.MW05	18/03/2020													
BCRR.MW05	21/04/2020													
BCRR.MW05	18/05/2020													
BCRR.MW05	23/06/2020													
BCRR.MW05	14/09/2020													
BCRR.MW05 (dry)	3/02/2021													
BCRR.MW05 (dry)	25/05/2021													
BCRR.MW05	18/09/2021													
BCRR.MW05	17/11/2021													
BCRR.MW05	22/02/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW05	19/03/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW05	21/05/2024	-	-	-	-	-	-	-	-	-	-	-	-	-
BCRR.MW05	13/11/2024													
BCRR.MW05	13/02/2025													
BCRR.MW05	14/05/2025													
BCRR.MW06	21/08/2019													
BCRR.MW06	18/09/2019													
BCRR.MW06	20/10/2019													
BCRR.MW06	20/11/2019													
BCRR.MW06	20/01/2020													
BCRR.MW06	18/02/2020													
BCRR.MW06	18/03/2020													
BCRR.MW06	18/05/2020													
BCRR.MW06	27/07/2020													
BCRR.MW06	21/11/2020													
BCRR.MW06	18/09/2021													
BCRR.MW06	25/05/2021													
BCRR.MW06	18/09/2021													
BCRR.MW06	16/11/2021													
BCRR.MW06	16/11/2021	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW06	22/02/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW06	19/03/2024	-	-	-	-	-	-	-	-	-	-	-	-	-
BCRR.MW06	20/05/2024													
BCRR.MW06	14/11/2024													
BCRR.MW06	14/02/2025													
BCRR.MW06	14/05/2025													
BCRR.MW08a	22/08/2019													
BCRR.MW08a	18/09/2019													
BCRR.MW08a	20/10/2019													
BCRR.MW08a	21/11/2019													
BCRR.MW08a	19/12/2019													
BCRR.MW08a	20/01/2020													
BCRR.MW08a	18/02/2020													
BCRR.MW08a	18/03/2020													
BCRR.MW08a	21/04/2020													
BCRR.MW08a	18/05/2020													
BCRR.MW08a (biofixed)	18/06/2020													
BCRR.MW08a	21/11/2020													
BCRR.MW08a	18/09/2021													
BCRR.MW08a (biofixed)	25/05/2021													
BCRR.MW08a	18/09/2021													
BCRR.MW08a	16/11/2021													
BCRR.MW08a	21/02/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW08a	19/03/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW08a	14/11/2024	-	-	-	-	-	-	-	-	-	-	-	-	-
BCRR.MW08a	14/11/2024													
BCRR.MW08a	14/02/2025													
BCRR.MW08a	14/05/2025													
BCRR.MW09	22/08/2019													
BCRR.MW09	18/09/2019													
BCRR.MW09	20/10/2019													
BCRR.MW09	21/11/2019													
BCRR.MW09	19/12/2019													
BCRR.MW09	20/01/2020													
BCRR.MW09	18/02/2020													
BCRR.MW09	18/03/2020													
BCRR.MW09	21/04/2020													
BCRR.MW09	18/05/2020													
BCRR.MW09	27/07/2020													
BCRR.MW09	21/11/2020													
BCRR.MW09	18/09/2021													
BCRR.MW09	25/05/2021													
BCRR.MW09 (disturbed)	17/11/2021													
BCRR.MW09 (disturbed)	22/02/2024													
MB15a	22/08/2019	-	-	-	-	-	-	-	-	-	-	-	-	-
MB15a	18/09/2019													
MB15a	14/11/2024													
MB15a	14/02/2025													
BCRR.MW10	22/08/2019													
BCRR.MW10	18/09/2019													
BCRR.MW10	20/10/2019													
BCRR.MW10	21/11/2019													
BCRR.MW10	19/12/2019													
BCRR.MW10	20/01/2020													
BCRR.MW10	18/02/2020													
BCRR.MW10	18/03/2020													
BCRR.MW10	21/04/2020													
BCRR.MW10	18/05/2020													
BCRR.MW10	27/07/2020													
BCRR.MW10	19/09/2021													
BCRR.MW10	21/11/2020													
BCRR.MW10 (dry)	3/02/2021													
BCRR.MW10	25/05/2021													
BCRR.MW10	17/09/2021													
BCRR.MW10	16/11/2021													
BCRR.MW10	21/02/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW10	19/03/2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1	1	0.25	0.25	5
BCRR.MW10	14/11/2024	-	-	-	-	-	-	-	-	-	-	-	-	-
BCRR.MW10	14/11/2024													
BCRR.MW10	14/02/2025													
BCRR.MW10	14/05/2025													
BCRR.MW11	22/08/2019													
BCRR.MW11	18/09/2019													
BCRR.MW11	20/10/2019													
BCRR.MW11	21/11/2019													
BCRR.MW11	19/12/2019													
BCRR.MW11	18/02/2020													
BCRR.MW11	27/07/2020													
BCRR.MW11	19/09/2021													
BCRR.MW11	21/11/2020													



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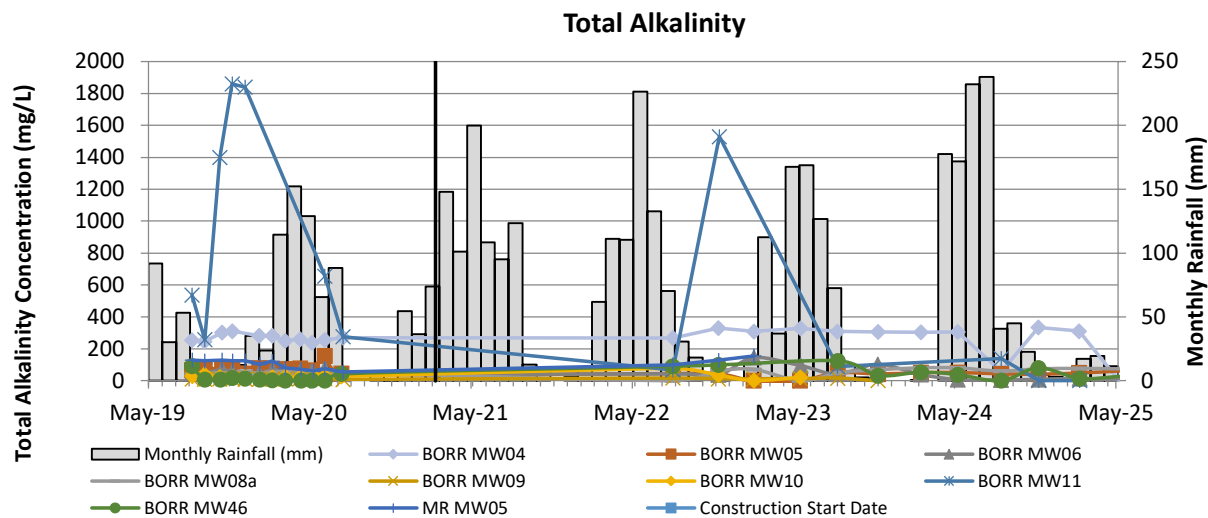


**Southern Section
 Groundwater Monitoring Review - to May
 2025**

**CONCENTRATION OF
 BICARBONATE ALKALINITY,
 CARBONATE ALKALINITY AND
 HYDROXIDE ALKALINITY**

Figure

5



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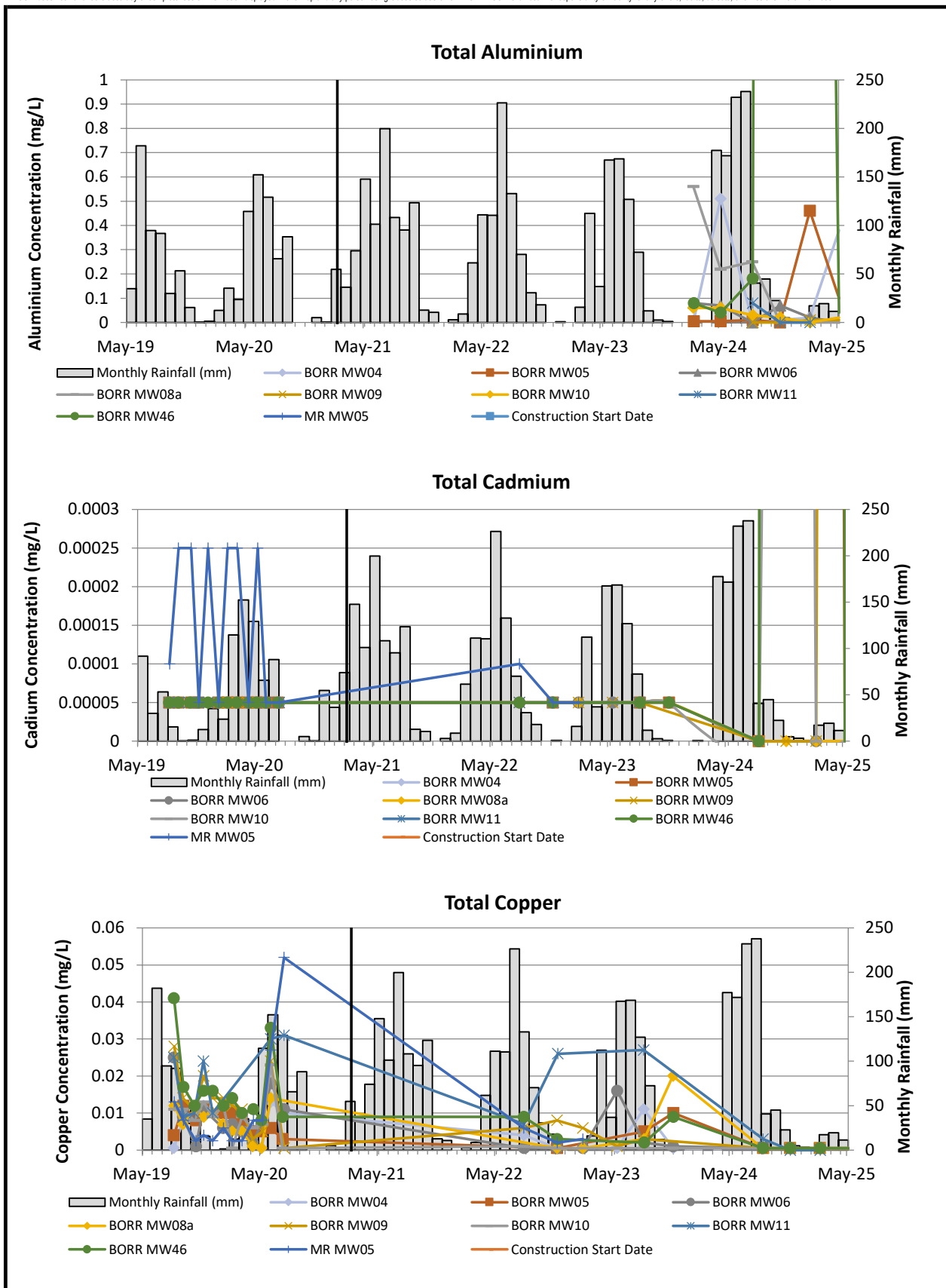


**Southern Section
 Groundwater Monitoring Review - to May
 2025**

**CONCENTRATION OF TOTAL
 ALKALINITY**

Figure

6



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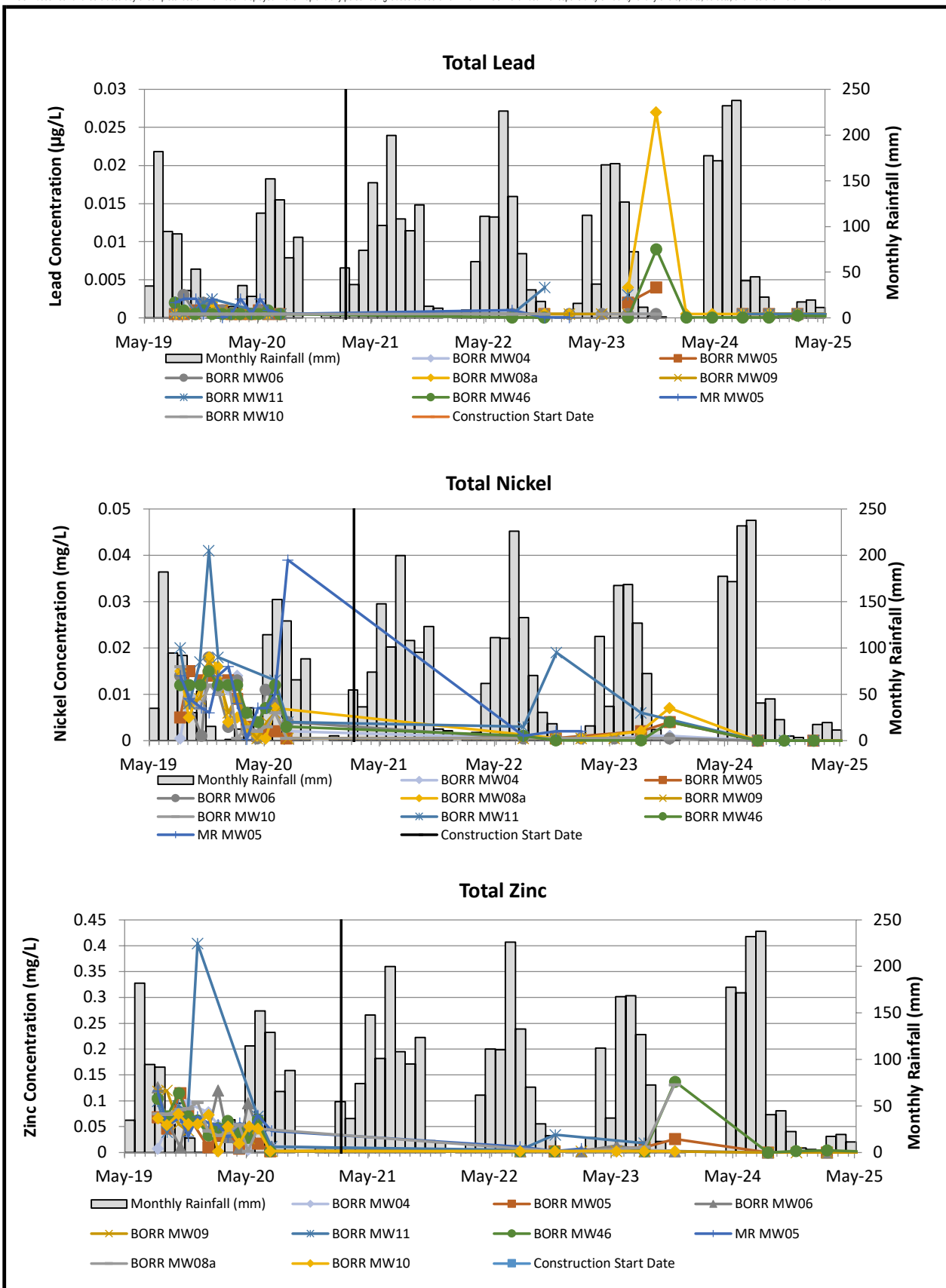


**Southern Section
 Groundwater Monitoring Review - to May
 2025**

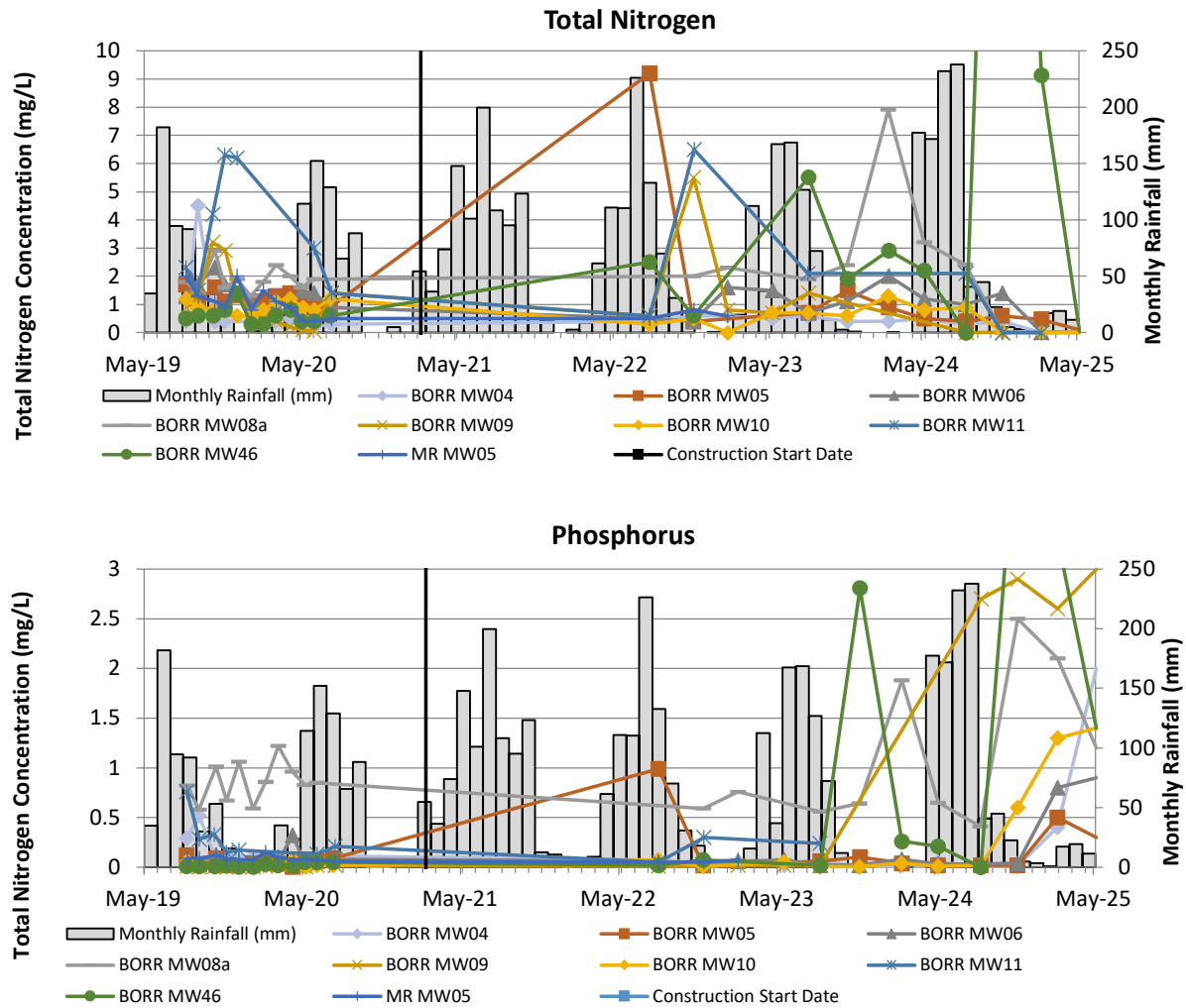
**CONCENTRATION OF
 ARSENIC, CADMIUM AND
 COPPER**

Figure

7



PROJECT ID: 60644386 CREATED BY: SB APPROVED BY: GRB LAST MODIFIED: 16/06/2025		Southern Section Groundwater Monitoring Review - to May 2025	
		CONCENTRATION OF LEAD AND ZINC	Figure 8



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 APPROVED BY GRB
 LAST MODIFIED 16/06/2025

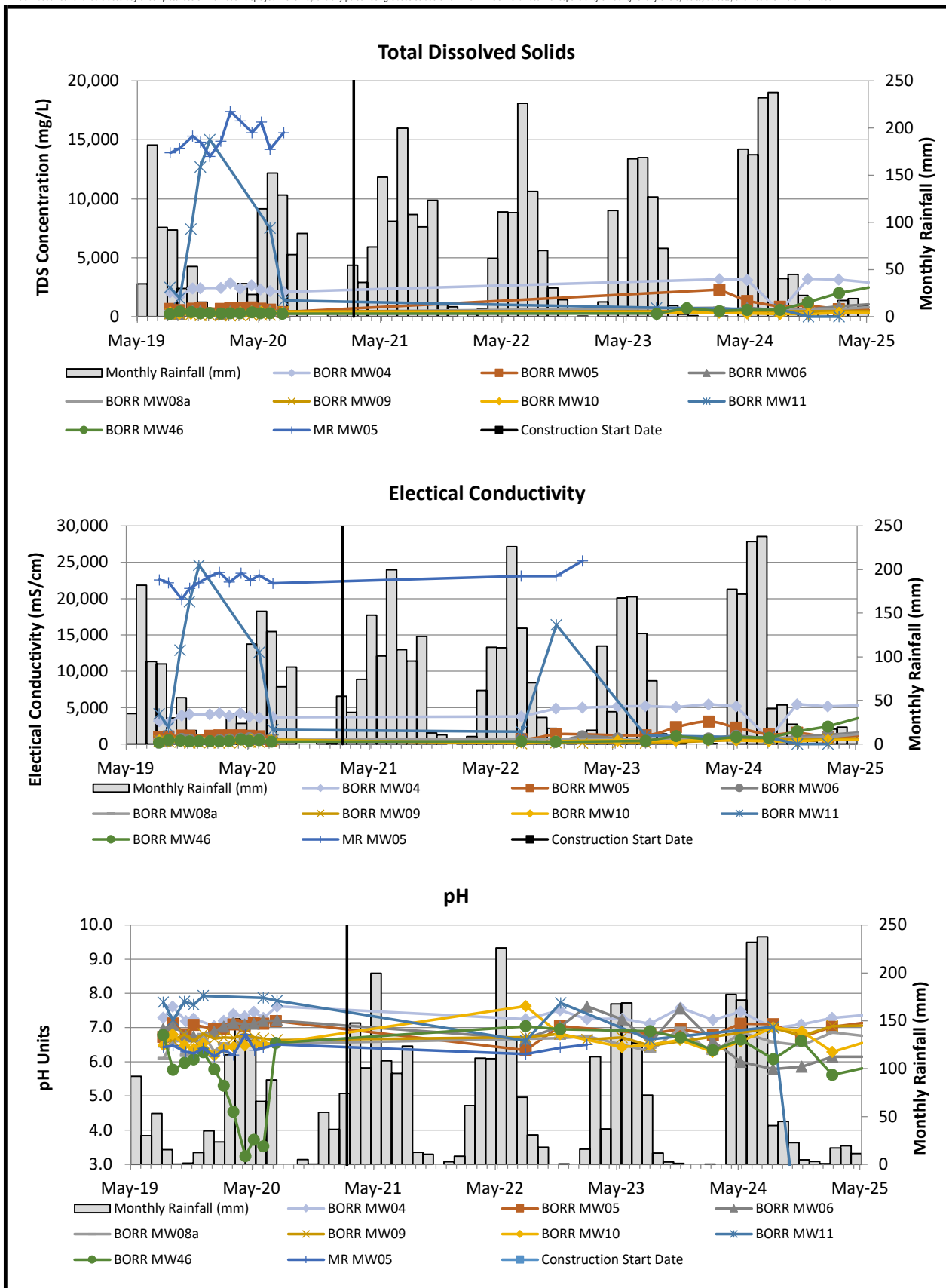


**Southern Section
 Groundwater Monitoring Review - to May
 2025**

**CONCENTRATION OF TOTAL
 NITROGEN AND
 PHOSPHORUS**

Figure

9



PROJECT ID 60644386
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**Southern Section
 Groundwater Monitoring Review - to May
 2025**

**CONCENTRATION OF TDS,
 EC and pH**

Figure

10

Appendix D

Laboratory Certificates



CERTIFICATE OF ANALYSIS

Work Order	: EP2502153	Page	: 1 of 28
Client	: AECOM AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: Hannah Ryan-Gadsden	Contact	: Natalie Duncan
Address	: LEVEL 15 58 Mounts Bay Road PERTH WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: 60644386 BORR Quarterly	Date Samples Received	: 14-Feb-2025 17:30
Order number	: 60644386	Date Analysis Commenced	: 15-Feb-2025
C-O-C number	: 79036	Issue Date	: 28-Feb-2025 20:42
Sampler	: Hannah Ryan-Gadsden		
Site	: BORR		
Quote number	: EP/675/21_V6		
No. of samples received	: 25		
No. of samples analysed	: 25		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
David Viner	SENIOR LAB TECH	Perth Organics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- ED041G (Turbidimetric Sulphate): LOR raised for sample 21 due to possible sample matrix interference.
EK071G (Reactive Phosphorus as P): LOR raised for sample 21 due to possible sample matrix interference.
- TDS by method EA-015 may bias high for sample #1, #18 and #21 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - dissolved iron, calcium, magnesium, potassium and sodium for sample #4, 7 and 8.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31_130225	MW25_130225	WQA01_130225	MW15_130225	MW11_130225
Sampling date / time				13-Feb-2025 09:46	13-Feb-2025 10:47	13-Feb-2025 10:52	13-Feb-2025 11:55	13-Feb-2025 13:22
Compound	CAS Number	LOR	Unit	EP2502153-001	EP2502153-002	EP2502153-003	EP2502153-004	EP2502153-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.34	6.09	6.10	6.49	7.64
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	380	4100	3940	1090	16300
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	355	2440	2430	655	10600
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	26	26	66	1650
Total Alkalinity as CaCO3	----	1	mg/L	4	26	26	66	1650
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	102	120	138	102	129
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	11	92	91	10	439
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	121	1290	1290	338	5020
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	6	23	22	14	145
Magnesium	7439-95-4	1	mg/L	6	82	82	16	383
Sodium	7440-23-5	1	mg/L	58	694	689	168	3140
Potassium	7440-09-7	1	mg/L	8	5	5	22	30
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	1.22	0.04	0.03	0.41	0.06
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	0.002	0.005
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	0.001	0.007
Copper	7440-50-8	0.001	mg/L	0.001	<0.001	<0.001	<0.001	0.003

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	MW31_130225	MW25_130225	WQA01_130225	MW15_130225	MW11_130225
Sampling date / time				13-Feb-2025 09:46	13-Feb-2025 10:47	13-Feb-2025 10:52	13-Feb-2025 11:55	13-Feb-2025 13:22
Compound	CAS Number	LOR	Unit	EP2502153-001	EP2502153-002	EP2502153-003	EP2502153-004	EP2502153-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.046	0.048	<0.001	0.002
Nickel	7440-02-0	0.001	mg/L	<0.001	0.017	0.017	<0.001	0.019
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	0.016	0.018	<0.005	0.007
Manganese	7439-96-5	0.001	mg/L	0.004	0.579	0.590	0.005	0.368
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	5.90	9.83	9.66	2.59	2.57
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.09	0.11	2.85	0.26
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.36	0.09	0.11	2.85	0.26
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.02	0.02	0.01	0.02	0.02
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.01	0.02	0.02
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	0.2	0.3	4.1	27.4
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.0	0.2	0.3	4.1	27.4
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.06	0.13	0.04	0.03	3.96
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.01	<0.01	0.08
EK085F: Dissolved Sulfide as S2-								
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	0.4	<0.1	<0.1	0.2	<0.1
EN055: Ionic Balance								



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31_130225	MW25_130225	WQA01_130225	MW15_130225	MW11_130225
Sampling date / time				13-Feb-2025 09:46	13-Feb-2025 10:47	13-Feb-2025 10:52	13-Feb-2025 11:55	13-Feb-2025 13:22
Compound	CAS Number	LOR	Unit	EP2502153-001	EP2502153-002	EP2502153-003	EP2502153-004	EP2502153-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	3.72	38.8	38.8	11.1	184
ø Total Cations	----	0.01	meq/L	----	----	----	10.0	----
ø Total Cations	----	0.01	meq/L	3.52	38.2	37.9	----	176
ø Ionic Balance	----	0.01	%	----	----	----	4.92	----
ø Ionic Balance	----	0.01	%	2.78	0.80	1.12	----	2.11
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	130
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	130
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	130
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW31_130225	MW25_130225	WQA01_130225	MW15_130225	MW11_130225
Sampling date / time					13-Feb-2025 09:46	13-Feb-2025 10:47	13-Feb-2025 10:52	13-Feb-2025 11:55	13-Feb-2025 13:22
Compound	CAS Number	LOR	Unit		EP2502153-001	EP2502153-002	EP2502153-003	EP2502153-004	EP2502153-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX		----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene		91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4		17060-07-0	2	%	96.5	99.7	101	96.1	98.9
Toluene-D8		2037-26-5	2	%	102	103	103	104	104
4-Bromofluorobenzene		460-00-4	2	%	102	102	103	102	102



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW10_130225	PB13_130225	MB14s_130225	MB14d_130225	MW05_130225
Sampling date / time				13-Feb-2025 13:57	13-Feb-2025 14:46	13-Feb-2025 15:26	13-Feb-2025 15:40	13-Feb-2025 16:00
Compound	CAS Number	LOR	Unit	EP2502153-006	EP2502153-007	EP2502153-008	EP2502153-009	EP2502153-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.46	6.94	4.26	7.67	7.02
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	512	742	1030	1300	1010
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	326	438	654	718	637
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	26	72	<1	----	48
Total Alkalinity as CaCO3	----	1	mg/L	26	72	<1	----	48
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	53	42	98	24	23
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	53	23	234	----	235
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	121	205	208	----	137
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	16	16	31	----	45
Magnesium	7439-95-4	1	mg/L	14	17	22	----	27
Sodium	7440-23-5	1	mg/L	60	99	128	----	107
Potassium	7440-09-7	1	mg/L	7	15	15	----	7
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.08	<0.01	1.09	<0.01	0.01
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.010	0.002	<0.001	<0.001

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW10_130225	PB13_130225	MB14s_130225	MB14d_130225	MW05_130225
Sampling date / time				13-Feb-2025 13:57	13-Feb-2025 14:46	13-Feb-2025 15:26	13-Feb-2025 15:40	13-Feb-2025 16:00	
Compound	CAS Number	LOR	Unit	EP2502153-006	EP2502153-007	EP2502153-008	EP2502153-009	EP2502153-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.004	<0.001	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.006	0.004	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.021	0.094	<0.005	<0.005	
Manganese	7439-96-5	0.001	mg/L	0.009	0.291	0.045	0.298	0.009	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Iron	7439-89-6	0.05	mg/L	1.78	10.6	6.30	<0.05	0.43	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.28	0.06	0.21	0.16	0.06	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.28	0.06	0.21	0.16	0.06	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	0.02	0.04	0.46	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	0.02	0.04	0.47	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	<0.1	2.0	0.3	0.5	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	<0.1	2.0	0.3	1.0	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.38	0.22	0.09	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.05	0.02	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	0.4	----	0.3	----	<0.1	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW10_130225	PB13_130225	MB14s_130225	MB14d_130225	MW05_130225
Sampling date / time				13-Feb-2025 13:57	13-Feb-2025 14:46	13-Feb-2025 15:26	13-Feb-2025 15:40	13-Feb-2025 16:00
Compound	CAS Number	LOR	Unit	EP2502153-006	EP2502153-007	EP2502153-008	EP2502153-009	EP2502153-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	5.04	7.70	10.7	----	9.72
ø Total Cations	----	0.01	meq/L	----	7.46	9.77	----	----
ø Total Cations	----	0.01	meq/L	4.74	----	----	----	9.30
ø Ionic Balance	----	0.01	%	----	1.62	4.73	----	----
ø Ionic Balance	----	0.01	%	3.03	----	----	----	2.18
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	<20	----	<20
C10 - C14 Fraction	----	50	µg/L	<50	----	<50	----	<50
C15 - C28 Fraction	----	100	µg/L	<100	----	<100	----	<100
C29 - C36 Fraction	----	50	µg/L	<50	----	<50	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	<20	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	<20	----	<20
>C10 - C16 Fraction	----	100	µg/L	<100	----	<100	----	<100
>C16 - C34 Fraction	----	100	µg/L	<100	----	<100	----	<100
>C34 - C40 Fraction	----	100	µg/L	<100	----	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	<100	----	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	<100	----	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	<1	----	<1
Toluene	108-88-3	2	µg/L	<2	----	<2	----	<2
Ethylbenzene	100-41-4	2	µg/L	<2	----	<2	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	<2	----	<2
ortho-Xylene	95-47-6	2	µg/L	<2	----	<2	----	<2
^ Total Xylenes	----	2	µg/L	<2	----	<2	----	<2



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW10_130225	PB13_130225	MB14s_130225	MB14d_130225	MW05_130225
Sampling date / time				13-Feb-2025 13:57	13-Feb-2025 14:46	13-Feb-2025 15:26	13-Feb-2025 15:40	13-Feb-2025 16:00
Compound	CAS Number	LOR	Unit	EP2502153-006	EP2502153-007	EP2502153-008	EP2502153-009	EP2502153-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
^ Sum of BTEX	----	1	µg/L	<1	----	<1	----	<1
Naphthalene	91-20-3	5	µg/L	<5	----	<5	----	<5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	97.6	----	98.9	----	95.2
Toluene-D8	2037-26-5	2	%	101	----	106	----	102
4-Bromofluorobenzene	460-00-4	2	%	100	----	102	----	104



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW06_130225	WQA03_130225	WQA04_130225	MW46_140225	MB11s_140225
Sampling date / time				13-Feb-2025 16:31	13-Feb-2025 16:39	13-Feb-2025 16:40	14-Feb-2025 07:57	14-Feb-2025 08:59
Compound	CAS Number	LOR	Unit	EP2502153-011	EP2502153-012	EP2502153-013	EP2502153-014	EP2502153-015
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.15	----	----	5.62	7.05
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1270	----	----	2400	698
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	880	----	----	2020	468
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	13	----	----	14	55
Total Alkalinity as CaCO3	----	1	mg/L	13	----	----	14	55
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	74	----	----	178	26
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	382	----	----	802	16
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	157	----	----	475	201
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	111	----	----	229	16
Magnesium	7439-95-4	1	mg/L	14	----	----	71	18
Sodium	7440-23-5	1	mg/L	112	----	----	238	87
Potassium	7440-09-7	1	mg/L	13	----	----	31	17
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.34	----	----	0.62	0.38
Arsenic	7440-38-2	0.001	mg/L	0.013	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0003	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.004	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	0.004	<0.001

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW06_130225	WQA03_130225	WQA04_130225	MW46_140225	MB11s_140225
Sampling date / time				13-Feb-2025 16:31	13-Feb-2025 16:39	13-Feb-2025 16:40	14-Feb-2025 07:57	14-Feb-2025 08:59	
Compound	CAS Number	LOR	Unit	EP2502153-011	EP2502153-012	EP2502153-013	EP2502153-014	EP2502153-015	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L	0.038	----	----	0.075	<0.001	
Nickel	7440-02-0	0.001	mg/L	0.045	<0.001	<0.001	0.045	0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.135	<0.005	
Manganese	7439-96-5	0.001	mg/L	0.079	----	----	0.161	0.016	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	0.02	<0.01	
Iron	7439-89-6	0.05	mg/L	16.8	----	----	0.56	0.17	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.41	----	----	0.08	0.80	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.41	----	----	0.08	0.80	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	0.06	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	----	----	9.07	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	----	----	9.13	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	----	----	3.3	2.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	----	----	12.4	2.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	----	----	0.24	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	<0.01	<0.01	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	----	----	<0.1	0.8	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW06_130225	WQA03_130225	WQA04_130225	MW46_140225	MB11s_140225
Sampling date / time				13-Feb-2025 16:31	13-Feb-2025 16:39	13-Feb-2025 16:40	14-Feb-2025 07:57	14-Feb-2025 08:59
Compound	CAS Number	LOR	Unit	EP2502153-011	EP2502153-012	EP2502153-013	EP2502153-014	EP2502153-015
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	12.6	----	----	30.4	7.10
ø Total Cations	----	0.01	meq/L	11.9	----	----	28.4	6.50
ø Ionic Balance	----	0.01	%	3.04	----	----	3.34	4.43
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW06_130225	WQA03_130225	WQA04_130225	MW46_140225	MB11s_140225
Sampling date / time					13-Feb-2025 16:31	13-Feb-2025 16:39	13-Feb-2025 16:40	14-Feb-2025 07:57	14-Feb-2025 08:59
Compound	CAS Number	LOR	Unit		EP2502153-011	EP2502153-012	EP2502153-013	EP2502153-014	EP2502153-015
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		97.4	97.2	99.4	100	97.5
Toluene-D8	2037-26-5	2	%		102	102	102	103	105
4-Bromofluorobenzene	460-00-4	2	%		108	107	99.4	109	100



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MB11d_140225	MW08a_140225	MW07_140225	MW04_140225	NC4_140225
Sampling date / time				14-Feb-2025 09:19	14-Feb-2025 09:23	14-Feb-2025 09:59	14-Feb-2025 10:37	14-Feb-2025 11:45
Compound	CAS Number	LOR	Unit	EP2502153-016	EP2502153-017	EP2502153-018	EP2502153-019	EP2502153-020
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.63	6.86	6.44	7.28	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	308	982	1230	5180	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	182	660	1000	3160	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	12	77	15	310	----
Total Alkalinity as CaCO3	----	1	mg/L	12	77	15	310	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	14	65	42	79	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	17	121	333	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	94	299	348	1380	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1	38	34	229	47
Magnesium	7439-95-4	1	mg/L	2	27	23	84	89
Sodium	7440-23-5	1	mg/L	53	111	187	771	408
Potassium	7440-09-7	1	mg/L	5	20	10	6	12
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.03	0.15	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MB11d_140225	MW08a_140225	MW07_140225	MW04_140225	NC4_140225
Sampling date / time				14-Feb-2025 09:19	14-Feb-2025 09:23	14-Feb-2025 09:59	14-Feb-2025 10:37	14-Feb-2025 11:45	
Compound	CAS Number	LOR	Unit	EP2502153-016	EP2502153-017	EP2502153-018	EP2502153-019	EP2502153-020	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.002	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.003	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.030	<0.005	0.026	<0.005	<0.005	
Manganese	7439-96-5	0.001	mg/L	0.035	0.126	0.040	0.176	0.828	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Iron	7439-89-6	0.05	mg/L	1.02	1.27	<0.05	3.66	0.20	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.72	0.01	0.24	----	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.03	0.72	<0.01	0.24	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.32	<0.01	0.66	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.32	<0.01	0.66	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	2.1	2.7	0.4	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	2.1	3.4	0.4	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.03	0.53	0.77	0.02	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.46	<0.01	<0.01	----	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	----	1.0	<0.1	<0.1	----	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MB11d_140225	MW08a_140225	MW07_140225	MW04_140225	NC4_140225
Sampling date / time				14-Feb-2025 09:19	14-Feb-2025 09:23	14-Feb-2025 09:59	14-Feb-2025 10:37	14-Feb-2025 11:45
Compound	CAS Number	LOR	Unit	EP2502153-016	EP2502153-017	EP2502153-018	EP2502153-019	EP2502153-020
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	2.89	10.3	12.6	52.0	----
ø Total Cations	----	0.01	meq/L	2.65	9.46	12.0	52.0	----
ø Ionic Balance	----	0.01	%	4.40	4.39	2.67	0.02	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	----	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	----	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	----	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L	----	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	----	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L	----	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	<100	<100	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	<1	<1	<1	----
Toluene	108-88-3	2	µg/L	----	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L	----	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	----	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L	----	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L	----	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L	----	<5	<5	<5	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MB11d_140225	MW08a_140225	MW07_140225	MW04_140225	NC4_140225
Sampling date / time					14-Feb-2025 09:19	14-Feb-2025 09:23	14-Feb-2025 09:59	14-Feb-2025 10:37	14-Feb-2025 11:45
Compound	CAS Number	LOR	Unit		EP2502153-016	EP2502153-017	EP2502153-018	EP2502153-019	EP2502153-020
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	97.4	97.4	98.2	----
Toluene-D8	2037-26-5	2	%		----	104	98.9	106	----
4-Bromofluorobenzene	460-00-4	2	%		----	100	100	105	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW27_140225	WQA05_140225	WQA06_140225	WQA07_140225	WQA08_140225
Sampling date / time				14-Feb-2025 12:21	14-Feb-2025 12:29	14-Feb-2025 12:31	14-Feb-2025 12:51	14-Feb-2025 12:52
Compound	CAS Number	LOR	Unit	EP2502153-021	EP2502153-022	EP2502153-023	EP2502153-024	EP2502153-025
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.52	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	147	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	249	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	10	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	10	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	57	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<25	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	47	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	4	----	----	----	----
Sodium	7440-23-5	1	mg/L	17	----	----	----	----
Potassium	7440-09-7	1	mg/L	2	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	1.17	<0.01	<0.01	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	0.005	<0.001	<0.001	----	----

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	MW27_140225	WQA05_140225	WQA06_140225	WQA07_140225	WQA08_140225
Sampling date / time				14-Feb-2025 12:21	14-Feb-2025 12:29	14-Feb-2025 12:31	14-Feb-2025 12:51	14-Feb-2025 12:52
Compound	CAS Number	LOR	Unit	EP2502153-021	EP2502153-022	EP2502153-023	EP2502153-024	EP2502153-025
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	0.007	<0.005	<0.005	----	----
Manganese	7439-96-5	0.001	mg/L	0.003	<0.001	<0.001	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Iron	7439-89-6	0.05	mg/L	2.05	<0.05	<0.05	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.90	----	----	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.90	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.02	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.1	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.1	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.09	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.02	----	----	----	----
EK085F: Dissolved Sulfide as S2-								
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	----	----	----	----
EN055: Ionic Balance								



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW27_140225	WQA05_140225	WQA06_140225	WQA07_140225	WQA08_140225
Sampling date / time				14-Feb-2025 12:21	14-Feb-2025 12:29	14-Feb-2025 12:31	14-Feb-2025 12:51	14-Feb-2025 12:52
Compound	CAS Number	LOR	Unit	EP2502153-021	EP2502153-022	EP2502153-023	EP2502153-024	EP2502153-025
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Anions	----	0.01	meq/L	1.52	----	----	----	----
Ø Total Cations	----	0.01	meq/L	1.41	----	----	----	----
Ø Ionic Balance	----	0.01	%	3.95	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW27_140225	WQA05_140225	WQA06_140225	WQA07_140225	WQA08_140225
Sampling date / time					14-Feb-2025 12:21	14-Feb-2025 12:29	14-Feb-2025 12:31	14-Feb-2025 12:51	14-Feb-2025 12:52
Compound	CAS Number	LOR	Unit		EP2502153-021	EP2502153-022	EP2502153-023	EP2502153-024	EP2502153-025
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		98.8	96.9	97.6	97.1	95.9
Toluene-D8	2037-26-5	2	%		102	102	102	100	100
4-Bromofluorobenzene	460-00-4	2	%		103	99.0	103	101	105



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				NC4_140225	----	----	----	----
Sampling date / time				14-Feb-2025 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2502153-020	-----	-----	-----	-----
Result				----	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.62	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	2760	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1840	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	18.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	76	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	76	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	7	----	----	----	----
ED040T: Total Major Anions								
Sulfate as SO4 2-	14808-79-8	1	mg/L	41	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	39	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	927	----	----	----	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	42	----	----	----	----
Magnesium	7439-95-4	1	mg/L	92	----	----	----	----
Sodium	7440-23-5	1	mg/L	417	----	----	----	----
Potassium	7440-09-7	1	mg/L	12	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.38	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				NC4_140225	----	----	----	----
Sampling date / time				14-Feb-2025 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2502153-020	-----	-----	-----	-----
Result				----	----	----	----	----
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	0.002	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	1.02	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Iron	7439-89-6	0.05	mg/L	2.78	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.04	----	----	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.04	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.4	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.07	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				NC4_140225	----	----	----	----
Sampling date / time				14-Feb-2025 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2502153-020	-----	-----	-----	-----
Result				----	----	----	----	----
EK085F: Dissolved Sulfide as S2-								
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	----	----	----	----
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	28.5	----	----	----	----
ø Total Cations	----	0.01	meq/L	27.7	----	----	----	----
ø Ionic Balance	----	0.01	%	1.34	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: **SURFACE WATER**
 (Matrix: **WATER**)

Sample ID

				NC4_140225	----	----	----	----
Sampling date / time				14-Feb-2025 11:45	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2502153-020	-----	-----	-----	-----
Result					----	----	----	----
EP068S: Organochlorine Pesticide Surrogate - Continued								
Dibromo-DDE	21655-73-2	0.5	%	59.4	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.5	%	61.0	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	98.3	----	----	----	----
Toluene-D8	2037-26-5	2	%	103	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	104	----	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	50	146
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	153
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EP204: Glyphosate and AMPA



CERTIFICATE OF ANALYSIS

Work Order	: EP2503364	Page	: 1 of 3
Client	: AECOM AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: Hannah Ryan-Gadsden	Contact	: Natalie Duncan
Address	: LEVEL 15 58 Mounts Bay Road PERTH WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: BORR quarterly	Date Samples Received	: 14-Feb-2025 17:30
Order number	: BORR Quarterly	Date Analysis Commenced	: 07-Mar-2025
C-O-C number	:	Issue Date	: 13-Mar-2025 13:55
Sampler	: Hannah Ryan-Gadsden		
Site	: BORR		
Quote number	: EP/675/21_V6		
No. of samples received	: 1		
No. of samples analysed	: 1		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- This workorder is a rebatch of EP2502153.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MB14d_130225	----	----	----	----
Sampling date / time					13-Feb-2025 15:40	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2503364-001	-----	-----	-----	-----
				Result	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	208	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	208	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	350	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	67	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	17	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	178	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	7	----	----	----	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	14.0	----	----	----	----	----
∅ Total Cations	----	0.01	meq/L	12.7	----	----	----	----	----
∅ Ionic Balance	----	0.01	%	5.19	----	----	----	----	----



CERTIFICATE OF ANALYSIS

Work Order : EP2507752
Client : AECOM AUSTRALIA PTY LTD
Contact : Stephen Baron
Address : LEVEL 15 58 Mounts Bay Road
PERTH WA, AUSTRALIA
Telephone : ----
Project : Borr 60644386
Order number : Borr 60644386
C-O-C number : 82776
Sampler : Stephen Baron
Site : Borr may 25
Quote number : EP/675/21_V7
No. of samples received : 17
No. of samples analysed : 17

Page : 1 of 20
Laboratory : Environmental Division Perth
Contact : Natalie Duncan
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : +61-8-9406 1301
Date Samples Received : 16-May-2025 15:40
Date Analysis Commenced : 16-May-2025
Issue Date : 23-May-2025 18:35



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
John Horwood	Organic Supervisor	Perth Organics, Wangara, WA
Niamh Carthew	Inorganic Chemist	Perth Inorganics, Wangara, WA
Stephanie Tilson	Instrument Chemist	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP204: Poor matrix spike recoveries due to matrix interferences.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EN055 PG (Ionic Balance) Sample #10 Total Cations was calculated using Iron, Aluminium, Calcium, Magnesium, Potassium and Sodium.
- ED041G (Turbidimetric Sulphate): LOR raised for sample #15 due to possible sample matrix interference.
- EG020, ED093: Metals and Cations results for samples EP2507752-012, -013, -014 and -017 have been confirmed by re-preparation and re-analysis.
- EK055G (Ammonia): Positive result for sample EP2507752-014 confirmed by re-analysis.
- It is recognised that Total Phosphorus (EK067G) is less than Reactive Phosphorus (EK071G) for sample #6. However, the difference is within experimental variation of the methods.
- TDS by method EA-015 may bias high for sample #15 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK055G-NH₄: In the absence of available field data (pH and temperature), ammonium was calculated using the lab standard values. Please scrutinise accordingly. NATA accreditation does not cover this service.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID				Mw05	Mw06	MW10	MW07	MW04
Sampling date / time				14-May-2025 11:44	14-May-2025 12:06	14-May-2025 12:42	14-May-2025 13:14	14-May-2025 13:39
Compound	CAS Number	LOR	Unit	EP2507752-001	EP2507752-002	EP2507752-003	EP2507752-004	EP2507752-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.14	6.15	6.55	6.61	7.36
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1130	1560	552	1800	5320
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	584	1040	327	1330	2910
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	60	12	25	22	301
Total Alkalinity as CaCO3	----	1	mg/L	60	12	25	22	301
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	11	86	43	25	40
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	173	460	61	255	357
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	222	171	98	435	1370
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	52	121	14	58	196
Magnesium	7439-95-4	1	mg/L	27	24	11	33	71
Sodium	7440-23-5	1	mg/L	121	118	55	225	715
Potassium	7440-09-7	1	mg/L	6	15	6	12	6
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.16	0.07	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.006	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	Mw05	Mw06	MW10	MW07	MW04
Sampling date / time				14-May-2025 11:44	14-May-2025 12:06	14-May-2025 12:42	14-May-2025 13:14	14-May-2025 13:39
Compound	CAS Number	LOR	Unit	EP2507752-001	EP2507752-002	EP2507752-003	EP2507752-004	EP2507752-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.023	<0.001	<0.001	0.001
Nickel	7440-02-0	0.001	mg/L	0.049	0.030	<0.001	0.003	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.012	<0.005
Manganese	7439-96-5	0.001	mg/L	0.010	0.133	0.008	0.035	0.172
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	0.26	32.0	0.66	<0.05	<0.05
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.22	0.32	<0.01	0.80
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.06	0.22	0.32	<0.01	0.79
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.10	<0.01	0.02	0.05	0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.10	<0.01	0.02	0.05	0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.9	1.4	1.7	2.0
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.4	0.9	1.4	1.8	2.0
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.03	0.49	0.38
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK085F: Dissolved Sulfide as S2-								
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	0.1	0.2	<0.1	<0.1
EN055: Ionic Balance								



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				Mw05	Mw06	MW10	MW07	MW04
Sampling date / time				14-May-2025 11:44	14-May-2025 12:06	14-May-2025 12:42	14-May-2025 13:14	14-May-2025 13:39
Compound	CAS Number	LOR	Unit	EP2507752-001	EP2507752-002	EP2507752-003	EP2507752-004	EP2507752-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	11.1	14.6	4.53	18.0	52.1
ø Total Cations	----	0.01	meq/L	10.2	13.5	4.15	15.7	46.9
ø Ionic Balance	----	0.01	%	3.89	3.94	4.42	6.87	5.27
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	Mw05	Mw06	MW10	MW07	MW04
Sampling date / time					14-May-2025 11:44	14-May-2025 12:06	14-May-2025 12:42	14-May-2025 13:14	14-May-2025 13:39
Compound	CAS Number	LOR	Unit		EP2507752-001	EP2507752-002	EP2507752-003	EP2507752-004	EP2507752-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		102	95.2	104	93.7	108
Toluene-D8	2037-26-5	2	%		97.4	93.2	94.2	96.1	93.5
4-Bromofluorobenzene	460-00-4	2	%		99.5	96.0	100	98.5	99.2



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID				MW08a	MB11S	MW46	MW15	MW14s
Sampling date / time				14-May-2025 14:15	14-May-2025 15:01	14-May-2025 16:26	15-May-2025 07:47	15-May-2025 09:29
Compound	CAS Number	LOR	Unit	EP2507752-006	EP2507752-007	EP2507752-008	EP2507752-009	EP2507752-010
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.76	7.06	5.81	6.73	4.37
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1370	754	3550	1300	1140
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	807	470	2490	810	718
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	74	54	26	109	<1
Total Alkalinity as CaCO3	----	1	mg/L	74	54	26	109	<1
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	32	9	47	30	56
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	43	16	1030	5	222
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	386	197	575	352	230
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	50	18	236	13	34
Magnesium	7439-95-4	1	mg/L	32	17	73	17	20
Sodium	7440-23-5	1	mg/L	140	87	334	187	127
Potassium	7440-09-7	1	mg/L	18	15	22	26	13
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.09	0.36	0.49	1.05	3.45
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0002	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.004	0.003	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.002	<0.001	0.032

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW08a	MB11S	MW46	MW15	MW14s
Sampling date / time				14-May-2025 14:15	14-May-2025 15:01	14-May-2025 16:26	15-May-2025 07:47	15-May-2025 09:29	
Compound	CAS Number	LOR	Unit	EP2507752-006	EP2507752-007	EP2507752-008	EP2507752-009	EP2507752-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.063	<0.001	0.006	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.040	<0.001	0.008	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.091	0.065	<0.005	0.239	
Manganese	7439-96-5	0.001	mg/L	0.142	0.015	0.125	0.006	0.039	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Iron	7439-89-6	0.05	mg/L	1.54	0.11	1.09	3.79	7.05	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.59	0.64	0.01	4.47	0.14	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.59	0.64	<0.01	4.46	0.14	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	0.04	0.02	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.02	0.04	0.02	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	3.0	1.4	7.2	1.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.2	3.0	1.4	7.2	1.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.10	0.03	0.02	0.04	0.14	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.12	<0.01	<0.01	<0.01	<0.01	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	1.0	1.8	<0.1	0.2	<0.1	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW08a	MB11S	MW46	MW15	MW14s
Sampling date / time				14-May-2025 14:15	14-May-2025 15:01	14-May-2025 16:26	15-May-2025 07:47	15-May-2025 09:29
Compound	CAS Number	LOR	Unit	EP2507752-006	EP2507752-007	EP2507752-008	EP2507752-009	EP2507752-010
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	13.3	6.97	38.2	12.2	11.1
ø Total Cations	----	0.01	meq/L	----	----	----	----	9.96
ø Total Cations	----	0.01	meq/L	11.7	6.46	32.9	10.8	----
ø Ionic Balance	----	0.01	%	----	----	----	----	5.45
ø Ionic Balance	----	0.01	%	6.35	3.75	7.47	5.92	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW08a	MB11S	MW46	MW15	MW14s
Sampling date / time					14-May-2025 14:15	14-May-2025 15:01	14-May-2025 16:26	15-May-2025 07:47	15-May-2025 09:29
Compound	CAS Number	LOR	Unit		EP2507752-006	EP2507752-007	EP2507752-008	EP2507752-009	EP2507752-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX		-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene		91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4		17060-07-0	2	%	95.6	102	115	103	107
Toluene-D8		2037-26-5	2	%	92.4	101	95.2	97.7	93.9
4-Bromofluorobenzene		460-00-4	2	%	104	102	99.4	97.5	95.9



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				NC4	MW25	WQA02	WQA01	MW27
Sampling date / time				15-May-2025 10:24	15-May-2025 11:38	15-May-2025 11:40	15-May-2025 11:42	15-May-2025 12:39
Compound	CAS Number	LOR	Unit	EP2507752-011	EP2507752-012	EP2507752-013	EP2507752-014	EP2507752-015
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.32	6.75	6.34	----	6.61
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	3260	2870	4400	----	152
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	1690	1420	2310	----	247
EA045: Turbidity								
Turbidity	----	0.1	NTU	11.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	48	61	35	----	30
Total Alkalinity as CaCO3	----	1	mg/L	48	61	35	----	30
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	5	34	82	----	51
ED040T: Total Major Anions								
Sulfate as SO4 2-	14808-79-8	1	mg/L	72	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	67	76	----	<20
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	980	844	1310	----	24
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	48	22	22	----	2
Magnesium	7439-95-4	1	mg/L	85	60	73	----	6
Sodium	7440-23-5	1	mg/L	404	582	666	----	18
Potassium	7440-09-7	1	mg/L	6	5	5	----	2
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	50	----	----	----	----
Magnesium	7439-95-4	1	mg/L	88	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				NC4	MW25	WQA02	WQA01	MW27
Sampling date / time				15-May-2025 10:24	15-May-2025 11:38	15-May-2025 11:40	15-May-2025 11:42	15-May-2025 12:39
Compound	CAS Number	LOR	Unit	EP2507752-011	EP2507752-012	EP2507752-013	EP2507752-014	EP2507752-015
				Result	Result	Result	Result	Result
ED093T: Total Major Cations - Continued								
Sodium	7440-23-5	1	mg/L	418	----	----	----	----
Potassium	7440-09-7	1	mg/L	6	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.02	0.02	<0.01	0.82
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.003	0.002
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.037	0.045	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.014	0.016	0.032	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	0.014	0.016	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	0.265	0.488	0.584	0.005	0.006
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	<0.05	8.95	12.8	0.13	2.66
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.50	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	0.002	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.678	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	NC4	MW25	WQA02	WQA01	MW27
Sampling date / time					15-May-2025 10:24	15-May-2025 11:38	15-May-2025 11:40	15-May-2025 11:42	15-May-2025 12:39
Compound	CAS Number	LOR	Unit	EP2507752-011	EP2507752-012	EP2507752-013	EP2507752-014	EP2507752-015	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Iron	7439-89-6	0.05	mg/L	1.15	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.65	0.08	0.01	0.89	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.03	0.65	0.08	----	0.89	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.06	0.01	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.06	0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	1.5	0.3	<0.1	2.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	1.6	0.3	<0.1	2.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.04	0.46	0.06	<0.01	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	<0.01	----	<0.01	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	2.0	0.2	<0.1	0.2	
EK085M: Sulfide as S2-									
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	29.9	26.4	39.2	----	1.28	
∅ Total Cations	----	0.01	meq/L	27.1	31.5	36.2	----	1.43	
∅ Ionic Balance	----	0.01	%	4.90	8.73	4.02	----	5.60	
EP068B: Organophosphorus Pesticides (OP)									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				NC4	MW25	WQA02	WQA01	MW27
Sampling date / time				15-May-2025 10:24	15-May-2025 11:38	15-May-2025 11:40	15-May-2025 11:42	15-May-2025 12:39
Compound	CAS Number	LOR	Unit	EP2507752-011	EP2507752-012	EP2507752-013	EP2507752-014	EP2507752-015
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				NC4	MW25	WQA02	WQA01	MW27
Sampling date / time				15-May-2025 10:24	15-May-2025 11:38	15-May-2025 11:40	15-May-2025 11:42	15-May-2025 12:39
Compound	CAS Number	LOR	Unit	EP2507752-011	EP2507752-012	EP2507752-013	EP2507752-014	EP2507752-015
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP204: Glyphosate and AMPA								
Glyphosate	1071-83-6	10	µg/L	<10	----	----	----	----
AMPA	1066-51-9	10	µg/L	<10	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.5	%	65.1	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.5	%	57.4	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	103	102	99.2	106	96.8
Toluene-D8	2037-26-5	2	%	95.7	95.9	99.1	102	97.3
4-Bromofluorobenzene	460-00-4	2	%	98.9	99.1	97.6	98.3	99.7



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31	Wqa04	----	----	----
Sampling date / time				15-May-2025 13:06	15-May-2025 14:31	----	----	----
Compound	CAS Number	LOR	Unit	EP2507752-016	EP2507752-017	-----	-----	-----
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.78	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	730	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	423	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	24	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	193	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	9	----	----	----	----
Magnesium	7439-95-4	1	mg/L	14	----	----	----	----
Sodium	7440-23-5	1	mg/L	83	----	----	----	----
Potassium	7440-09-7	1	mg/L	8	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.26	<0.01	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW31	Wqa04	----	----	----
Sampling date / time				15-May-2025 13:06	15-May-2025 14:31	----	----	----	
Compound	CAS Number	LOR	Unit	EP2507752-016	EP2507752-017	-----	-----	-----	
				Result	Result	-----	-----	-----	
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.121	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.015	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Iron	7439-89-6	0.05	mg/L	3.29	<0.05	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.86	<0.01	----	----	----	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.86	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	<0.1	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	<0.1	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	<0.01	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----	
EK085F: Dissolved Sulfide as S2-									
Dissolved Sulfide as S2-	18496-25-8	0.1	mg/L	0.8	<0.1	----	----	----	
EN055: Ionic Balance									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31	Wqa04	----	----	----
Sampling date / time				15-May-2025 13:06	15-May-2025 14:31	----	----	----
Compound	CAS Number	LOR	Unit	EP2507752-016	EP2507752-017	-----	-----	-----
				Result	Result	----	----	----
EN055: Ionic Balance - Continued								
ø Total Anions	----	0.01	meq/L	5.44	----	----	----	----
ø Total Cations	----	0.01	meq/L	5.42	----	----	----	----
ø Ionic Balance	----	0.01	%	0.26	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW31	Wqa04	----	----	----
Sampling date / time					15-May-2025 13:06	15-May-2025 14:31	----	----	----
Compound	CAS Number	LOR	Unit		EP2507752-016	EP2507752-017	-----	-----	-----
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		100	104	----	----	----
Toluene-D8	2037-26-5	2	%		96.2	97.1	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		101	96.2	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	50	146
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	153
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EP204: Glyphosate and AMPA



CERTIFICATE OF ANALYSIS

Work Order	: EP2412000	Page	: 1 of 20
Client	: AECOM AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: SOPHIE JOHNSTONE	Contact	: Natalie Duncan
Address	: LEVEL 15 58 Mounts Bay Road PERTH WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 0478 926 928	Telephone	: +61-8-9406 1301
Project	: BORR - quarterly monitoring	Date Samples Received	: 22-Aug-2024 17:00
Order number	: 60644386	Date Analysis Commenced	: 22-Aug-2024
C-O-C number	: 70730	Issue Date	: 05-Sep-2024 17:16
Sampler	: SOPHIE JOHNSTONE		
Site	: Bunbury Outer Ring Road		
Quote number	: EP/675/21_V6		
No. of samples received	: 19		
No. of samples analysed	: 19		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- It is recognised that total phosphorus (EK067G) is less than reactive phosphorus (EK071G) for sample #3. However, the difference is within experimental variation of the methods.
- EG020 and ED093: It is recognised that total Ni and Ca concentrations are less than dissolved for samples EP2412000 -016. However, the difference is within experimental variation of the methods.
- ED041G (Turbidimetric Sulphate): LOR raised for sample 1 and 6 due to possible sample matrix interference.
- TDS by method EA-015 may bias high for sample #1 and 6 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK055G-NH₄: In the absence of available field data (pH and temperature), ammonium was calculated using the lab standard values. Please scrutinise accordingly. NATA accreditation does not cover this service.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31	MW25	MW25B	WQA01	MW08a
Sampling date / time				31-Jul-2024 10:22	20-Aug-2024 11:06	20-Aug-2024 11:11	20-Aug-2024 11:13	20-Aug-2024 14:33
Compound	CAS Number	LOR	Unit	EP2412000-001	EP2412000-002	EP2412000-003	EP2412000-004	EP2412000-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.74	6.20	6.57	6.16	6.58
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	427	4160	1090	4150	817
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	353	2400	604	2380	546
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	48	34	14	34	60
Total Alkalinity as CaCO3	----	1	mg/L	48	34	14	34	60
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	24	76	10	72	41
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<50	74	19	74	36
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	94	1180	325	1150	220
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.19	0.16	0.02	0.15	0.28
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.19	0.16	0.02	0.15	0.28
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.26	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.26	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.8	0.3	0.3	0.4	2.4



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW31	MW25	MW25B	WQA01	MW08a
Sampling date / time					31-Jul-2024 10:22	20-Aug-2024 11:06	20-Aug-2024 11:11	20-Aug-2024 11:13	20-Aug-2024 14:33
Compound	CAS Number	LOR	Unit		EP2412000-001	EP2412000-002	EP2412000-003	EP2412000-004	EP2412000-005
					Result	Result	Result	Result	Result
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		3.8	0.3	0.6	0.4	2.4
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.07	0.04	0.08	0.04	0.41
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.02	0.02	0.09	0.03	0.39
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		3.61	35.5	9.84	34.7	8.15
ø Total Cations	----	0.01	meq/L		4.30	37.1	9.19	35.9	7.54
ø Ionic Balance	----	0.01	%		8.76	2.21	3.44	1.82	3.91



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID				MW06	WQA02	MW15	MW11	MW10
Sampling date / time				20-Aug-2024 15:31	20-Aug-2024 15:33	21-Aug-2024 09:41	21-Aug-2024 10:35	21-Aug-2024 10:58
Compound	CAS Number	LOR	Unit	EP2412000-007	EP2412000-008	EP2412000-010	EP2412000-011	EP2412000-012
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.79	5.88	6.73	7.02	7.01
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	764	766	1050	902	383
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	526	529	618	632	236
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	4	59	140	53
Total Alkalinity as CaCO3	----	1	mg/L	4	4	59	140	53
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	52	53	38	37	13
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	249	245	20	41	31
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	99	95	288	209	70
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.25	0.25	3.72	0.08	0.14
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.25	0.25	3.71	0.08	0.14
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.31	0.31	0.04	<0.01	0.10
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.31	0.31	0.04	<0.01	0.10
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.6	4.6	2.1	0.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW06	WQA02	MW15	MW11	MW10
Sampling date / time				20-Aug-2024 15:31	20-Aug-2024 15:33	21-Aug-2024 09:41	21-Aug-2024 10:35	21-Aug-2024 10:58
Compound	CAS Number	LOR	Unit	EP2412000-007	EP2412000-008	EP2412000-010	EP2412000-011	EP2412000-012
				Result	Result	Result	Result	Result
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	0.9	4.6	2.1	0.9
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	<0.01	0.50	0.02
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.31	<0.01
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	8.06	7.86	9.72	9.55	3.68
∅ Total Cations	----	0.01	meq/L	7.67	7.59	----	----	----
∅ Total Cations	----	0.01	meq/L	----	----	9.42	8.57	3.30
∅ Ionic Balance	----	0.01	%	2.49	1.75	----	----	----
∅ Ionic Balance	----	0.01	%	----	----	1.58	5.40	5.35



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID				MW04	MW05	MW46	MB11s	----
Sampling date / time				21-Aug-2024 12:03	21-Aug-2024 12:42	21-Aug-2024 15:25	22-Aug-2024 08:26	----
Compound	CAS Number	LOR	Unit	EP2412000-013	EP2412000-014	EP2412000-015	EP2412000-017	-----
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.43	7.10	6.08	6.99	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	4660	1330	860	701	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	2840	850	590	450	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	291	43	12	57	----
Total Alkalinity as CaCO3	----	1	mg/L	291	43	12	57	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	32	12	43	17	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	309	366	277	<50	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	1170	214	68	189	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.17	0.08	0.17	0.70	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.17	0.08	0.17	0.70	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.02	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	14.4	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	14.4	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.4	2.1	2.7	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW04	MW05	MW46	MB11s	----
Sampling date / time					21-Aug-2024 12:03	21-Aug-2024 12:42	21-Aug-2024 15:25	22-Aug-2024 08:26	----
Compound	CAS Number	LOR	Unit		EP2412000-013	EP2412000-014	EP2412000-015	EP2412000-017	-----
					Result	Result	Result	Result	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		0.3	0.4	16.5	2.7	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.01	0.02	0.03	0.03	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.01	0.02	<0.01	<0.01	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		45.2	14.5	7.92	6.47	----
ø Total Cations	----	0.01	meq/L		44.5	13.3	8.08	6.43	----
ø Ionic Balance	----	0.01	%		0.83	4.37	0.95	0.31	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				MW31	MW25	MW25B	WQA01	MW08a
Sampling date / time				31-Jul-2024 10:22	20-Aug-2024 11:06	20-Aug-2024 11:11	20-Aug-2024 11:13	20-Aug-2024 14:33
Compound	CAS Number	LOR	Unit	EP2412000-001	EP2412000-002	EP2412000-003	EP2412000-004	EP2412000-005
				Result	Result	Result	Result	Result
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	15	24	13	24	25
Magnesium	7439-95-4	1	mg/L	9	80	25	78	22
Sodium	7440-23-5	1	mg/L	60	672	149	649	96
Potassium	7440-09-7	1	mg/L	8	4	<1	4	12
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.42	0.02	<0.01	0.02	0.25
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	0.002	0.006
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	<0.001	0.002
Copper	7440-50-8	0.001	mg/L	0.002	<0.001	0.002	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.041	<0.001	0.041	<0.001
Nickel	7440-02-0	0.001	mg/L	0.001	0.014	<0.001	0.014	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	0.166	0.005	0.013	0.006	<0.005
Manganese	7439-96-5	0.001	mg/L	0.009	0.576	0.015	0.565	0.063
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	0.19	10.8	<0.05	10.8	4.86



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				SW10	MW06	WQA02	NC4	MW15
Sampling date / time				20-Aug-2024 14:38	20-Aug-2024 15:31	20-Aug-2024 15:33	21-Aug-2024 14:42	21-Aug-2024 09:41
Compound	CAS Number	LOR	Unit	EP2412000-006	EP2412000-007	EP2412000-008	EP2412000-009	EP2412000-010
				Result	Result	Result	Result	Result
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	17	72	72	16	15
Magnesium	7439-95-4	1	mg/L	8	9	9	16	19
Sodium	7440-23-5	1	mg/L	40	49	48	78	151
Potassium	7440-09-7	1	mg/L	7	10	10	5	21
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.15	0.23	0.23	0.02	0.40
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001
Copper	7440-50-8	0.001	mg/L	0.001	<0.001	<0.001	0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.021	0.022	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.001	0.018	0.020	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	0.010	<0.005	0.006	<0.005
Manganese	7439-96-5	0.001	mg/L	0.017	0.086	0.081	0.061	0.005
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	1.37	17.6	17.0	0.58	3.82



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				MW11	MW10	MW04	MW05	MW46
Sampling date / time				21-Aug-2024 10:35	21-Aug-2024 10:58	21-Aug-2024 12:03	21-Aug-2024 12:42	21-Aug-2024 15:25
Compound	CAS Number	LOR	Unit	EP2412000-011	EP2412000-012	EP2412000-013	EP2412000-014	EP2412000-015
				Result	Result	Result	Result	Result
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	22	23	191	63	63
Magnesium	7439-95-4	1	mg/L	26	7	73	43	19
Sodium	7440-23-5	1	mg/L	119	34	663	148	71
Potassium	7440-09-7	1	mg/L	6	4	5	7	11
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.08	0.03	<0.01	0.01	0.18
Arsenic	7440-38-2	0.001	mg/L	0.003	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L	0.002	<0.001	0.001	<0.001	0.012
Nickel	7440-02-0	0.001	mg/L	0.005	<0.001	<0.001	<0.001	0.006
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	<0.005	<0.005	0.037
Manganese	7439-96-5	0.001	mg/L	0.079	0.005	0.160	0.015	0.076
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	20.4	0.09	0.07	0.73	0.91



Analytical Results

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	WQA03	MB11s	WQA04	WQA05	----
Sampling date / time					21-Aug-2024 14:44	22-Aug-2024 08:26	20-Aug-2024 17:53	21-Aug-2024 16:57	----
Compound	CAS Number	LOR	Unit		EP2412000-016	EP2412000-017	EP2412000-018	EP2412000-019	-----
					Result	Result	Result	Result	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		----	----	5.53	5.50	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	----	<1	<1	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		----	----	<10	<10	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	----	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	----	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	----	<1	<1	----
Total Alkalinity as CaCO3	----	1	mg/L		----	----	<1	<1	----
ED038A: Acidity									
Acidity as CaCO3	----	1	mg/L		----	----	2	2	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	<1	<1	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	----	<1	<1	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		17	16	<1	<1	----
Magnesium	7439-95-4	1	mg/L		16	18	<1	<1	----
Sodium	7440-23-5	1	mg/L		79	86	<1	<1	----
Potassium	7440-09-7	1	mg/L		5	16	<1	<1	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.02	0.38	<0.01	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		0.002	<0.001	<0.001	<0.001	----



Analytical Results

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	WQA03	MB11s	WQA04	WQA05	----
Sampling date / time					21-Aug-2024 14:44	22-Aug-2024 08:26	20-Aug-2024 17:53	21-Aug-2024 16:57	----
Compound	CAS Number	LOR	Unit		EP2412000-016	EP2412000-017	EP2412000-018	EP2412000-019	-----
					Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		0.012	<0.005	<0.005	<0.005	----
Manganese	7439-96-5	0.001	mg/L		0.056	0.015	<0.001	<0.001	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Iron	7439-89-6	0.05	mg/L		0.62	0.11	<0.05	<0.05	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	<0.01	<0.01	----
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L		----	----	<0.01	<0.01	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	<0.01	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	<0.01	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	<0.1	<0.1	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
Total Nitrogen as N	----	0.1	mg/L		----	----	<0.1	<0.1	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	<0.01	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	----	<0.01	<0.01	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		----	----	<0.01	<0.01	----
∅ Total Cations	----	0.01	meq/L		----	----	<0.01	<0.01	----



Analytical Results

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	WQA03	MB11s	WQA04	WQA05	----
Sampling date / time					21-Aug-2024 14:44	22-Aug-2024 08:26	20-Aug-2024 17:53	21-Aug-2024 16:57	----
Compound	CAS Number	LOR	Unit		EP2412000-016	EP2412000-017	EP2412000-018	EP2412000-019	-----
					Result	Result	Result	Result	----
EN055: Ionic Balance - Continued									
Ø Ionic Balance	----	0.01	%		----	----	<0.01	<0.01	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID				SW10	NC4	WQA03	----	----
Sampling date / time				20-Aug-2024 14:38	21-Aug-2024 14:42	21-Aug-2024 14:44	----	----
Compound	CAS Number	LOR	Unit	EP2412000-006	EP2412000-009	EP2412000-016	-----	-----
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.19	7.57	7.61	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	358	634	641	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	296	374	382	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	5.3	21.0	13.0	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	44	62	62	----	----
Total Alkalinity as CaCO3	----	1	mg/L	44	62	62	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	6	3	5	----	----
ED040T: Total Major Anions								
Sulfate as SO4 2-	14808-79-8	1	mg/L	16	24	24	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<30	25	23	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	76	148	157	----	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	21	17	16	----	----
Magnesium	7439-95-4	1	mg/L	9	18	17	----	----
Sodium	7440-23-5	1	mg/L	44	83	80	----	----
Potassium	7440-09-7	1	mg/L	8	5	5	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.27	0.97	0.84	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				SW10	NC4	WQA03	----	----
Sampling date / time				20-Aug-2024 14:38	21-Aug-2024 14:42	21-Aug-2024 14:44	----	----
Compound	CAS Number	LOR	Unit	EP2412000-006	EP2412000-009	EP2412000-016	-----	-----
				Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.001	----	----
Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.002	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.001	0.001	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	0.011	0.014	0.019	----	----
Manganese	7439-96-5	0.001	mg/L	0.028	0.089	0.086	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Iron	7439-89-6	0.05	mg/L	2.26	2.68	2.48	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.11	0.55	0.57	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.11	0.54	0.56	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.05	0.05	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.02	0.53	0.53	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.58	0.58	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.4	2.0	2.1	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
[^] Total Nitrogen as N	----	0.1	mg/L	3.4	2.6	2.7	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.72	0.15	0.16	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.56	0.06	0.06	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				SW10	NC4	WQA03	----	----
Sampling date / time				20-Aug-2024 14:38	21-Aug-2024 14:42	21-Aug-2024 14:44	----	----
Compound	CAS Number	LOR	Unit	EP2412000-006	EP2412000-009	EP2412000-016	-----	-----
				Result	Result	Result	----	----
EK085M: Sulfide as S2-								
Sulfide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	3.02	5.93	6.15	----	----
∅ Total Cations	----	0.01	meq/L	3.42	5.64	5.73	----	----
∅ Ionic Balance	----	0.01	%	6.24	2.58	3.51	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID				SW10	NC4	WQA03	----	----
Sampling date / time				20-Aug-2024 14:38	21-Aug-2024 14:42	21-Aug-2024 14:44	----	----
Compound	CAS Number	LOR	Unit	EP2412000-006	EP2412000-009	EP2412000-016	-----	-----
				Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP204: Glyphosate and AMPA								
Glyphosate	1071-83-6	10	µg/L	<10	<10	<10	----	----
AMPA	1066-51-9	10	µg/L	<10	<10	<10	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.5	%	59.7	80.6	62.1	----	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	SW10	NC4	WQA03	----	----
Sampling date / time					20-Aug-2024 14:38	21-Aug-2024 14:42	21-Aug-2024 14:44	----	----
Compound	CAS Number	LOR	Unit		EP2412000-006	EP2412000-009	EP2412000-016	-----	-----
					Result	Result	Result	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		48.1	54.5	51.2	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		93.7	96.3	98.4	----	----
Toluene-D8	2037-26-5	2	%		94.5	93.6	95.2	----	----
4-Bromofluorobenzene	460-00-4	2	%		104	102	102	----	----



Surrogate Control Limits

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	50	146
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	153
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EP204: Glyphosate and AMPA



CERTIFICATE OF ANALYSIS

Work Order	: EP2417026	Page	: 1 of 17
Client	: AECOM AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: Hannah Ryan-Gadsden	Contact	: Natalie Duncan
Address	: LEVEL 15 58 Mounts Bay Road PERTH WA, AUSTRALIA	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: BORR quarterly	Date Samples Received	: 15-Nov-2024 17:10
Order number	: BORR Quarterly	Date Analysis Commenced	: 15-Nov-2024
C-O-C number	: 75451	Issue Date	: 27-Nov-2024 23:07
Sampler	: Hannah Ryan-Gadsden		
Site	: BORR Quarterly Nov		
Quote number	: EP/675/21_V6		
No. of samples received	: 19		
No. of samples analysed	: 19		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
John Horwood	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H⁺ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EK071G (Reactive Phosphorus): LOR raised for sample #8 due to possible sample matrix interference.
- EK055G (Ammonia as N), EK055G-NH₄ (Ammonium as N): LOR for sample EP2417026-015 raised due to possible sample matrix interference.
- EK057G (Nitrite as N), EK058G (Nitrate as N): LOR raised for sample #15 due to possible sample matrix interference.
- TDS by method EA-015 may bias high for sample #1, 8 and 13 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK055G-NH₄: In the absence of available field data (pH and temperature), ammonium was calculated using the lab standard values. Please scrutinise accordingly. NATA accreditation does not cover this service.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31_131124	MW25_131124	WQA01_131124	MW15_131124	MW04_131124
Sampling date / time				13-Nov-2024 11:09	13-Nov-2024 12:24	13-Nov-2024 12:22	13-Nov-2024 13:46	13-Nov-2024 16:06
Compound	CAS Number	LOR	Unit	EP2417026-001	EP2417026-002	EP2417026-003	EP2417026-005	EP2417026-006
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.27	5.99	5.97	6.27	7.09
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	298	4210	4160	1110	5470
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	277	2410	2430	667	3210
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	33	33	40	334
Total Alkalinity as CaCO3	----	1	mg/L	4	33	33	40	334
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	58	103	99	56	89
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	83	83	14	396
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	83	1290	1290	271	1450
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	5	22	22	18	222
Magnesium	7439-95-4	1	mg/L	5	82	81	15	85
Sodium	7440-23-5	1	mg/L	46	699	692	142	827
Potassium	7440-09-7	1	mg/L	5	5	4	22	5
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.72	0.01	<0.01	0.28	<0.01
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW31_131124	MW25_131124	WQA01_131124	MW15_131124	MW04_131124
Sampling date / time				13-Nov-2024 11:09	13-Nov-2024 12:24	13-Nov-2024 12:22	13-Nov-2024 13:46	13-Nov-2024 16:06
Compound	CAS Number	LOR	Unit	EP2417026-001	EP2417026-002	EP2417026-003	EP2417026-005	EP2417026-006
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.043	0.042	<0.001	0.002
Nickel	7440-02-0	0.001	mg/L	0.001	0.016	0.015	<0.001	0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	0.002	0.573	0.562	0.003	0.181
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	5.12	12.3	12.2	2.71	<0.05
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.14	0.11	0.13	1.78	0.27
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.14	0.11	0.13	1.78	0.27
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	0.2	0.2	3.1	0.4
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.0	0.2	0.2	3.1	0.4
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.08	0.03	<0.01	0.08	0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	2.61	38.8	38.8	8.74	55.8
ø Total Cations	----	0.01	meq/L	2.79	38.4	38.0	8.87	54.2



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW31_131124	MW25_131124	WQA01_131124	MW15_131124	MW04_131124
Sampling date / time					13-Nov-2024 11:09	13-Nov-2024 12:24	13-Nov-2024 12:22	13-Nov-2024 13:46	13-Nov-2024 16:06
Compound	CAS Number	LOR	Unit		EP2417026-001	EP2417026-002	EP2417026-003	EP2417026-005	EP2417026-006
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Ø Ionic Balance	-----	0.01	%		3.36	0.52	1.06	0.78	1.50



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW05_131124	MW27_141124	MW06_141124	WQA03_141124	MB11S_141124
Sampling date / time				13-Nov-2024 16:42	14-Nov-2024 09:31	14-Nov-2024 10:32	14-Nov-2024 10:34	14-Nov-2024 11:28
Compound	CAS Number	LOR	Unit	EP2417026-007	EP2417026-008	EP2417026-009	EP2417026-010	EP2417026-011
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.72	4.26	5.86	5.91	6.76
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1540	539	998	984	719
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	970	583	624	659	458
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	41	<1	9	10	55
Total Alkalinity as CaCO3	----	1	mg/L	41	<1	9	10	55
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	24	95	48	49	22
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	398	<20	251	263	22
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	265	150	167	173	199
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	72	3	94	95	15
Magnesium	7439-95-4	1	mg/L	48	12	16	16	18
Sodium	7440-23-5	1	mg/L	179	80	89	88	89
Potassium	7440-09-7	1	mg/L	7	1	12	12	16
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	3.51	0.07	0.09	0.39
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.008	0.008	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.004	<0.001	<0.001	<0.001



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW05_131124	MW27_141124	MW06_141124	WQA03_141124	MB11S_141124
Sampling date / time				13-Nov-2024 16:42	14-Nov-2024 09:31	14-Nov-2024 10:32	14-Nov-2024 10:34	14-Nov-2024 11:28
Compound	CAS Number	LOR	Unit	EP2417026-007	EP2417026-008	EP2417026-009	EP2417026-010	EP2417026-011
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.001	0.020	0.020	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.014	0.014	0.001
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese	7439-96-5	0.001	mg/L	0.010	0.013	0.087	0.086	0.015
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L	0.64	7.88	17.3	16.0	0.17
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.07	0.24	0.24	0.67
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.06	0.07	0.24	0.24	0.67
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.06	0.02	0.54	0.56	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.02	0.54	0.56	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	3.8	0.9	0.8	2.9
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.6	3.8	1.4	1.4	2.9
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.02	0.08	0.04	0.02	0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.02	<0.01	<0.01	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	16.6	4.23	10.1	10.6	7.17
ø Total Cations	----	0.01	meq/L	15.5	4.64	10.2	10.2	6.51



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW05_131124	MW27_141124	MW06_141124	WQA03_141124	MB11S_141124
Sampling date / time					13-Nov-2024 16:42	14-Nov-2024 09:31	14-Nov-2024 10:32	14-Nov-2024 10:34	14-Nov-2024 11:28
Compound	CAS Number	LOR	Unit		EP2417026-007	EP2417026-008	EP2417026-009	EP2417026-010	EP2417026-011
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Ø Ionic Balance	-----	0.01	%		3.34	4.64	0.34	1.75	4.82



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW08A_141124	MW07_141124	MW10_141124	MW11_141124	MW46_141124
Sampling date / time				14-Nov-2024 12:00	14-Nov-2024 12:43	14-Nov-2024 13:04	14-Nov-2024 13:29	14-Nov-2024 14:19
Compound	CAS Number	LOR	Unit	EP2417026-012	EP2417026-013	EP2417026-014	EP2417026-015	EP2417026-016
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.48	6.21	6.89	7.00	6.61
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	830	731	391	1450	1750
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	566	588	229	1120	1220
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	74	15	77	447	81
Total Alkalinity as CaCO3	----	1	mg/L	74	15	77	447	81
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	55	30	23	137	51
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	40	44	35	7	343
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	229	170	52	283	272
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	25	23	27	46	81
Magnesium	7439-95-4	1	mg/L	26	16	7	53	55
Sodium	7440-23-5	1	mg/L	97	81	38	196	198
Potassium	7440-09-7	1	mg/L	13	9	4	6	23
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.20	<0.01	0.01	0.02	0.14
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	<0.001	0.002	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.006
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.003



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW08A_141124	MW07_141124	MW10_141124	MW11_141124	MW46_141124
Sampling date / time				14-Nov-2024 12:00	14-Nov-2024 12:43	14-Nov-2024 13:04	14-Nov-2024 13:29	14-Nov-2024 14:19
Compound	CAS Number	LOR	Unit	EP2417026-012	EP2417026-013	EP2417026-014	EP2417026-015	EP2417026-016
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.013
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	0.004	0.009
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.006	0.016
Manganese	7439-96-5	0.001	mg/L	0.060	0.028	0.006	0.254	0.032
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.06
Iron	7439-89-6	0.05	mg/L	2.08	<0.05	0.16	40.0	0.19
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.54	0.01	0.18	<0.10	0.04
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	0.54	<0.01	0.18	<0.10	0.04
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.01	<0.02	0.03
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.38	0.02	<0.02	35.6
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.38	0.03	<0.01	35.6
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.5	1.6	0.6	3.6	4.6
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.5	2.0	0.6	3.6	40.2
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.58	0.44	<0.01	0.39	0.20
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.48	<0.01	<0.01	0.18	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	8.77	6.01	3.73	17.0	16.4
ø Total Cations	----	0.01	meq/L	7.94	6.22	3.68	15.3	17.8



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MW08A_141124	MW07_141124	MW10_141124	MW11_141124	MW46_141124
Sampling date / time					14-Nov-2024 12:00	14-Nov-2024 12:43	14-Nov-2024 13:04	14-Nov-2024 13:29	14-Nov-2024 14:19
Compound	CAS Number	LOR	Unit		EP2417026-012	EP2417026-013	EP2417026-014	EP2417026-015	EP2417026-016
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Ø Ionic Balance	-----	0.01	%		4.98	1.69	0.75	5.32	3.91



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MB14S_131124	WQA02_131124	WQA04_141124	----	----
Sampling date / time				13-Nov-2024 15:20	13-Nov-2024 00:01	14-Nov-2024 00:01	----	----
Compound	CAS Number	LOR	Unit	EP2417026-017	EP2417026-018	EP2417026-019	-----	-----
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.06	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	832	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	532	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	92	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	162	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	172	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	12	----	----	----	----
Magnesium	7439-95-4	1	mg/L	11	----	----	----	----
Sodium	7440-23-5	1	mg/L	111	----	----	----	----
Potassium	7440-09-7	1	mg/L	11	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	11.3	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	0.008	<0.001	<0.001	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MB14S_131124	WQA02_131124	WQA04_141124	----	----
Sampling date / time				13-Nov-2024 15:20	13-Nov-2024 00:01	14-Nov-2024 00:01	----	----
Compound	CAS Number	LOR	Unit	EP2417026-017	EP2417026-018	EP2417026-019	-----	-----
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	0.010	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.013	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	0.017	<0.005	<0.005	----	----
Manganese	7439-96-5	0.001	mg/L	0.022	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Iron	7439-89-6	0.05	mg/L	2.02	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	----	----
EK055G-NH4: Ammonium as N by DA								
Ammonium as N	14798-03-9_N	0.01	mg/L	<0.01	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.2	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.2	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.21	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	8.22	----	----	----	----
ø Total Cations	----	0.01	meq/L	7.98	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	MB14S_131124	WQA02_131124	WQA04_141124	----	----
				Sampling date / time	13-Nov-2024 15:20	13-Nov-2024 00:01	14-Nov-2024 00:01	----	----
Compound	CAS Number	LOR	Unit		EP2417026-017	EP2417026-018	EP2417026-019	-----	-----
					Result	Result	Result	----	----
EN055: Ionic Balance - Continued									
Ø Ionic Balance	----	0.01	%		1.51	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				NC4_131124	----	----	----	----
Sampling date / time				13-Nov-2024 12:59	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2417026-004	-----	-----	-----	-----
				Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				NC4_131124	----	----	----	----
Sampling date / time				13-Nov-2024 12:59	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2417026-004	-----	-----	-----	-----
Result				----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP204: Glyphosate and AMPA								
Glyphosate	1071-83-6	10	µg/L	<10	----	----	----	----
AMPA	1066-51-9	10	µg/L	<10	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.5	%	56.1	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.5	%	53.9	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	105	----	----	----	----
Toluene-D8	2037-26-5	2	%	94.3	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	93.7	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	50	146
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27	153
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EP204: Glyphosate and AMPA

Appendix E

Field Sheets

2025 APR MONTHLY

Project Name:		BORR		Project Location:		Bunbury		PM Name:		Gary Brophy	
Project Number:		60644386		Client:		SWGA		Fieldwork Staff Name:		Z-HRG SB	
Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.											
Field Data											
Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)	
MW31	16/04/25	09:20	-	-	3.262	-	-	-	-		
MW15		09:35	-	-	2.151	-	-	-	-		
MW14d		09:50	-	-	12.807	-	-	-	-		
MW14s		09:53	-	-	9.352	-	-	-	-		
MW04		10:02	-	-	4.975	-	-	-	-	Ants	
MW05		10:13	-	-	5.545	-	-	-	-	Roots on dipper	
MW06		10:24	-	-	5.594	-	-	-	-	Road open - 70km/h.	
MW4b		10:38	-	-	4.808	-	-	-	-	Water in gate	
MW11		11:06	-	-	3.550	-	-	-	-	Water in gate	
MW10		11:15	-	-	2.028	-	-	-	-		
MW07		11:30	-	-	10.323	-	-	-	-	Road closed, under construction	
MW08a		11:45	-	-	6.2691	-	-	-	-	Water in gate	
MW15		11:49	-	-	4.914	-	-	-	-		
MW1d		11:51	-	-	13.189	-	-	-	-		
MW25		12:17	-	-	8.374	-	-	-	-		
MW25b		12:19	-	-	Dry	-	-	-	-		
MW27		13:00	-	-	2.043	-	-	-	-	Podlock fully fenced, had to walk	
1A		13:33	-	-	7.258	-	-	-	-	Roots on dipper. Picking pile. Logger	
10		13:40	-	-	18.076	-	-	-	-	Logger down pad.	
13/12		13:58	-	-	17.350/25.692	-	-	-	-	Loggers	
Measurement Equipment											
Make & Model:	Heron Dipper.T			Supplier:	CK Enviro						
Serial No.:	11DM230803046			Calibration Report Provided?							
Notes/Comments (PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquid; (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing											
Approval and Distribution											
Distribution: Project Central File											
Fieldwork Staff Signature 16/04/25 Date Project Manager Signature Date											

Received: 11 April 2017
 Editor: Mark A. Little, University of Cambridge, United Kingdom
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FQM - NAPL and Groundwater Level Gauging Record

2025 Mar Monthly

Project Name:		BORR		Project Location:		Bunbury		PM Name:		G.Brophy	
Project Number:		60644386		Client:		SWGA		Fieldwork Staff Name:		HRG SA	
Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.											
Field Data											
Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)	
MW31	17/03/25	0925			3.065						
MW15		0940			2.084						
MB14S		0955			9.321						
MB14d		0955			13.029						
MW04		1000			4.965						
MW05		1010			5.750						
MW06		1015			5.547						
MW46		1025			4.886						
MW11		1035			Dry						
MW10		1045			2.000					70 Km/h - reduced from 90 Km/h	
MW07		1050			10.290						
MB11S		1100			4.722						
MB11d		1100			13.315						
MW8A		1125			3.646						
MW25B		1150			Dry			2.600		out 2.600m bgl	
MW25A		1150			8.190						
MW27		1205			2.374						
1A		1240			Dry						
10		1248			17.928			7.27		Logger removed 12:38 possible blocked by roots	
13		1255			18.281					Logger removed 12:47	
12		13:01			25.619					Logger removed 12:54 / 12:59	
Notes/Comments											
(PID) - photo ionisation detector, (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquids, (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing											
header at MW8a causing delay											
Measurement Equipment											
Make & Model:	Heron digger-T		Supplier:	GK Environmental							
Serial No.:	11D M211148 HB		Calibration Report Provided?	3							
Approval and Distribution											
Distribution: Project Central File				Fieldwork Staff Signature				Date			
				17/03/25				Date			
				Project Manager Signature				Date			

Q4AN(EV)-414-FM1

MAY 2025

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		Bore ID: MW04	
Client: SWGA		Project Location:		Sample Date: 14.5.2025	
Groundwater Sampling				Well Development or Well Sampling Event? (circle)	
Date of GW Level: 4.7.89		Bore Radius (mm):		Hydrasleeve Size:	
Depth to GW (m-pvc): 4.789		Screen Interval (m):		Hydrasleeve Type:	
Bore Depth (m-pvc): 13.25		Casing Radius (mm):		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Hydrasleeve in Parameters	
Calculated bore volume (L):		Key Type (if applicable):		Sampling Start Time:	
Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	

Water Quality Parameters							Odour, Colour, Turbidity	
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or µg/L)	E.C. (mS/cm or µS/cm)	pH		Redox (mV)
13:41				2.82	5143	6.55	-89.7	15.9
14:3				1.97	5145	6.56	-91.3	18.9
14:5				1.36	5148	6.56	-93.8	18.7
14:7				0.93	5152	6.57	-75.1	18.9
14:9				0.91	5153	6.58	-77.4	18.9
15:1				0.95	5157	6.58	-99.3	18.9

Acceptable Parameter Range:				Bottles Collected				QA/QC Information		Field Comments
				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				

Fieldwork Staff Signature		Date: 14.5.25		Approval and Distribution	
Project Manager Signature		Date:		Checker Name and Signature	
		Distribution: Project Central File		Date:	

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		PM Name:		Bore ID: M1W05	
Client: SWGA		Project Location: Ruabru		Fieldwork Staff: SS + JF		Sample Date: 14.5.2025	
General Bore Information				Parameter Info.		Sampling Method	
Date of GW Level: 14.5.2025		Bore Radius (mm):		F1 Decontaminated		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.723 (601)		Screen Interval (m):		F1 Dedicated		Hydrasleeve Type:	
Bore Depth (m-pvc): 11		Casing Radius (mm):		F1 Disposable		F1 Baller	
Depth to Product (m-pvc):		Cover Type (gate/stick up): Gate		F1 Other (specify):		F1 Hydrasleeve	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Peristaltic Pump	
Key Type (if applicable):		Retrieved		F1 Other (specify):		F1 Waterra	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or $\mu\text{g/L}$)	E.C. (mS/cm or $\mu\text{S/cm}$)	pH	Redox (mV)
11:03			30	11.28	1012	6.7	-105.6
11:07			36	0.92	1055	6.65	-101.1
11:11				0.71	1045	6.65	-95.5
11:15				0.57	1072	6.65	-95.6
11:15				0.52	1088	6.58	-94.7
11:17				0.51	1095	6.56	-94.4
							21.7
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV
Analyses Sampled for:				Bottles Collected		QA/QC Information	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		1	x 60 mL Ferrous	2	x 60 mL metals (HNO ₃)
		x 40 mL Vial (H ₂ SO ₄)		2	x 100 mL Amber		x 250 mL Plastic
							1 x 500mL
Approval and Distribution							
Fieldwork Staff Signature		Date: 14.5		Checker Name and Signature		Date:	
Project Manager Signature		Date:		Distribution: Project Central File			
Bore volume calculation, bore condition, fate of tubing, redox correction etc.							

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644396		Bore ID: MW06					
Client: SWGA		Project Location: Sunbury		Sample Date: 14.5.25					
Date of GW Level: 14.5		Bore Radius (mm):		Well Development or Well Sampling Event? (circle)					
Depth to GW (m-pvc): 5.626		Screen Interval (m):		Monitoring sequence followed (number in order):					
Bore Depth (m-pvc):		Casing Radius (mm):		Gauging					
Depth to Product (m-pvc):		Cover Type (gate/stick up):		Hydrasleeve in					
Product Thickness (m):		Bore Locked (YES/NO):		Hydrasleeve out					
Key Type (if applicable):		Parameter method: F1 Downhole		Parameters					
Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		Total purged volume (L):					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or $\mu\text{mol/L}$)	E.C. (mS/cm or $\mu\text{S/cm}$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:00			30	0.49	2096	7	-167	21.4	
12:02				0.51	2107	7	-158	21.8	
12:04				0.48	2109	7	-159	21.8	clear, odourless
12:06				0.38	2117	7	-157	21.8	
12:08				0.35	2106	6.93	-152	21.8	
Acceptable Parameter Range:									
± 10%									
± 3%									
± 0.05									
± 10 mV									
± 0.2 °C									
± 10% turbidity (if using a turbidity meter)									
Field Comments									
Bore volume calculation, bore condition, fate of tubing, redox correction etc.									
Analysis Sampled for:									
Bottles Collected									
CAIQC Information									
Field Filtered:									
Unfiltered:									
x 40 mL Vial (HCl)									
x 40 mL Vial (H ₂ SO ₄)									
x 60 mL Ferrous									
x 100 mL Amber									
x 250 mL Plastic									
x 500 mL									
Approval and Distribution									
Fieldwork Staff Signature									
Date									
Checker Name and Signature									
Date									
Project Manager Signature									
Date									
Distribution: Project Central File									

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		Bore ID: MW08																																																													
Client: SWGA		Project Location: Burnbury		Sample Date: 14.5.2025																																																													
Date of GW Level: 14.5.2025		Bore Radius (mm):		Hydrasleeve Size:																																																													
Depth to GW (m-pvc): 4.120		Screen Interval (m):		Hydrasleeve Type:																																																													
Bore Depth (m-pvc):		Casing Radius (mm):		Sampling Depth (m-pvc):																																																													
Depth to Product (m-pvc):		Cover Type (gate/stick up):		Sampling Depth Install time:																																																													
Product Thickness (m):		Bore Locked (YES/NO):		Hydrasleeve Install time:																																																													
Key Type (if applicable):		Parameter method: F1 Downhole		Sampling Start Time:																																																													
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		Parameters																																																													
		# purge volumes removed:		Total purged volume (L):																																																													
<table border="1"> <thead> <tr> <th rowspan="2">Time</th> <th rowspan="2">Cumulative Vol. Removed (L)</th> <th rowspan="2">SWL (m-pvc)</th> <th rowspan="2">Pump Rate</th> <th colspan="4">Water Quality Parameters</th> <th rowspan="2">Odour, Colour, Turbidity</th> </tr> <tr> <th>DO (ppm or mg/L)</th> <th>E.C. (mS/cm or uS/cm)</th> <th>pH</th> <th>Redox (mV)</th> <th>Temp °C</th> </tr> </thead> <tbody> <tr> <td>14:14</td> <td></td> <td></td> <td></td> <td>0.81</td> <td>1433</td> <td>5.93</td> <td>-44.1</td> <td>20.5</td> <td rowspan="5">Purity. Odourless</td> </tr> <tr> <td>14:16</td> <td></td> <td></td> <td></td> <td>0.35</td> <td>1389</td> <td>5.92</td> <td>-51.1</td> <td>20.7</td> </tr> <tr> <td>14:18</td> <td></td> <td></td> <td></td> <td>0.34</td> <td>1373</td> <td>5.90</td> <td>-60.7</td> <td>20.7</td> </tr> <tr> <td>14:20</td> <td></td> <td></td> <td></td> <td>0.27</td> <td>1354</td> <td>5.9</td> <td>-61.3</td> <td>20.7</td> </tr> <tr> <td>14:22</td> <td></td> <td></td> <td></td> <td>0.23</td> <td>1342</td> <td>5.88</td> <td>-73.4</td> <td>20.7</td> </tr> </tbody> </table>						Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	Water Quality Parameters				Odour, Colour, Turbidity	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C	14:14				0.81	1433	5.93	-44.1	20.5	Purity. Odourless	14:16				0.35	1389	5.92	-51.1	20.7	14:18				0.34	1373	5.90	-60.7	20.7	14:20				0.27	1354	5.9	-61.3	20.7	14:22				0.23	1342	5.88	-73.4	20.7
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	Water Quality Parameters						Odour, Colour, Turbidity																																																							
				DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C																																																									
14:14				0.81	1433	5.93	-44.1	20.5	Purity. Odourless																																																								
14:16				0.35	1389	5.92	-51.1	20.7																																																									
14:18				0.34	1373	5.90	-60.7	20.7																																																									
14:20				0.27	1354	5.9	-61.3	20.7																																																									
14:22				0.23	1342	5.88	-73.4	20.7																																																									
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		Bore ID: MW10					
Client: SWGA		Project Location:		Sample Date: 14.5.2025					
General Bore Information Date of GW Level: 14.5.25 Depth to GW (m-pvc): 2.445 Bore Depth (m-pvc): 3.9 Depth to Product (m-pvc): Product Thickness (m): Key Type (if applicable):				Parameter Info. Chem Kit Serial No.: Chem Kit Model: YSI Pro Corrected Redox: Y / O (The correction to apply is probe dependent) Parameter method: F1 Downhole Retrieved					
Decontamination F1 Decontaminated F1 Dedicated F1 Disposable F1 Other (Specify)				Sampling Equipment Low Flow Pump rate: Intake depth: F1 Hydrasleeve F1 Bailor F1 Peristaltic Pump F1 Waterra F1 Other (Specify)					
Well Development or Well Sampling Event? (circle) Monitoring sequence followed (number in order): Hydrasleeve in Hydrasleeve out Parameters									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		Total purged volume (L):					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1239			30%	2.16	791	5.94	16.5	21.9	Clear, odourless
1241				0.56	645	5.91	7.7	22	
1243				0.54	691	5.92	7.5	22	
1245				0.4	675	5.87	0.1	22	
1247				0.26	653	5.86	-2.2	21.9	
1249				0.27	643	5.86	-5.3	22	
				0.23	667	5.85	-7.2	22	
				0.19	650	5.86	-7.5	22	
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for: Unfiltered: x 40 mL Vial (HCl) x 40 mL Vial (H₂SO₄)		Bottles Collected 1 x 60 mL Ferrous 2 x 100 mL Amber 1 x 250 mL Plastic 1 x 500 mL		QA/QC Information Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
Approval and Distribution Fieldwork Staff Signature: 14/5/25 Project Manager Signature: Date: 14/5/25 Checker Name and Signature: Date:									

Q44AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc

Q44AN(EV)-405-FM1

MB11D - 12/11/1984
13-335

Q4AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc

Q44AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

Q4AN(EV)-405-FM1

QAAN(EV)-405-FM1
FCM - Groundwater Sampling and Purging Record (QAAN(EV)-405-FM1)
Revision 2, July 12, 2016

Q44AN(EV)-405-FM1

± 10% turbidity (if using a turbidity meter)

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FGM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

Q4AN(EV)-414-FM1
FQM - NAPL and Groundwater Level Gauging Record (Q4AN(EV)-414-FM1)

Q4AN(EV)-405-FM1

Grass very overgrown

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 0 11/14/2012

Q4AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

[illegible]

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		PM Name: Gary Brophy		Bore ID: MW08A	
Client: SWGA		Project Location: Bunbury, WA		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
General Bore Information				Sampling Method		Hydrasleeve Info	
Date of GW Level: 14/11/24	Bore Radius (mm): 150	Chem Kit Serial No.: 210101747	Decontamination: ☒ Decontaminated	Low Flow Pump rate: 30	Hydrasleeve Size: 30	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.514	Screen Interval (m):	Chem Kit Model: VS1020	Dedicated	Intake depth: 3.0	Hydrasleeve Type:	1 Gauging	
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y / N	Disposable	☐ Bailor	Sampling Depth (m-pvc):	1 Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/tick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole		☐ Other (specify)	Sampling Start Time:	Hydrasleeve out	
Key Type (if applicable): A160		Retrieved				2 Parameters	
Calculated bore volume (L):		# purge volumes removed:		Total purged volume (L):			
Includes/ excludes bore annulus (circle)							

Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:52	0.5	2.521	30	7.01	842	7.59	-139.1	21.1	
11:54	1.0			6.39	822	6.01	-150.3	20.7	
11:56	1.5			0.16	817	5.99	-157.7	20.5	
11:58	2.0			0.08	843	5.96	-162.4	20.3	
12:00	2.5			0.07	856	5.94	-165.6	20.3	
12:02	3.0			0.07	862	5.94	-168.8	20.4	Light brown, clear, sulfurous odour
← STABILISED →									

Acceptable Parameter Range:				QA/QC Information			
Analytes Sampled for:		Bottles Collected		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber				
			x 60 mL Plastic				
			x 60 mL				
Approval and Distribution				Flooded gatic			
Fieldwork Staff Signature: Date: 14/11/24				Logger taken out at 11:50am			
Project Manager Signature: _____ Date: _____				Checker Name and Signature: Date: 14/11/24			
Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR		Project Number: 60644386		PM Name: Gary Brophy		Bore ID: MW16	
Client: SWGA		Project Location: Bunbury, WA		Fieldwork Staff: SA/HR		Sample Date: 14/11/24	
General Bore Information				Sampling Method: Hydrasleeve info.			
Date of GW Level: 14/11/24	Bore Radius (mm): 150	Chem Kit Serial No.: 21010799	Decontamination: ☒ Low Flow Pump rate: 30	Hydrasleeve Size: 30		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.302	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated	Hydrasleeve Type: 2.0		1 Gauging	
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y / N	☒ Disposable	Sampling Depth (m-pvc):		1 Gauging	
Depth to Product (m-pvc):	Cover Type (click up):	(The correction to apply is probe dependent)	☒ Other (specify)	Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☒ Downhole		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable): Alko	☒ Retrieved				Parameters	
Calculated bore volume (L):		# purge volumes removed:		Total purged volume (L):			
Includes/ excludes bore annulus (circle)							

Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu S/cm$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:02	0.5	1.309	30	0.98	494	6.26	-129.7	19.9	
13:04	1.0			0.18	471	6.27	-110.7	19.7	
13:06	1.5			0.10	494	6.28	-113.1	19.6	
13:08	2.0			0.07	456	6.37	-100.0	19.4	
13:10	2.5			0.08	432	6.36	-87.9	19.6	
13:12	3.0			0.08	415	6.33	-79.6	19.6	Light brown, clear, no odour
					STABILISED				

Acceptable Parameter Range:				QA/QC Information			
Analyses Sampled for:		Bottles Collected		± 10%		± 3%	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 300 mL Plastic			
	All			1 x 60 mL			
Field Comments: Bore volume calculation, bore condition, fate of tubing, redox correction etc.							

Approval and Distribution		Date	
Fieldwork Staff Signature: <i>Ab. Raza</i>	14/11/24	Checker Name and Signature: <i>[Signature]</i>	14/11/24
Project Manager Signature: _____	Date: _____	Distribution: Project Central File	

Q4AN(EV)-405-FM1

Project Name:		BORR	Project Number:		60644386	PM Name:		Gary Brophy	Bore ID:		MW11
Client:		SWGA	Project Location:		Bunbury, WA	Fieldwork Staff:		SA/HR	Sample Date:		14/11/24
Well Development or Well Sampling Event? (circle)											
Monitoring sequence followed (number in order):											
Hydrasleeve Info.											
Hydrasleeve Size:											
Hydrasleeve Type:											
Sampling Depth (m-pvc):											
Gauging											
Hydrasleeve in											
Sampling Start Time:											
Parameters											
Total purged volume (L):											
Water Quality Parameters											
Includes/excludes bore annulus (circle)											
# purge volumes removed:											
Chem Kit Serial No.: 7101019A											
Decontaminated											
Dedicated											
Disposable											
Other (specify)											
Parameter method: F Downhole											
Retrieved											
Key Type (if applicable) Athen											
Calculated bore volume (L):											
Time											
Cumulative Vol. Removed (L)											
SWL (m-pvc)											
Pump Rate											
DO (ppm or µg/L)											
E.C. (mS/cm or µS/cm)											
pH											
Redox (mV)											
Temp °C											
Odour, Colour, Turbidity											
Brown, slightly turbid, no odour											
± 10% turbidity (if using a turbidity meter)											
Field Comments											
Bore volume calculation, bore condition, fate of tubing, redox correction etc.											
Flooded gatic											
Approval and Distribution											
Analyses Sampled for:											
Acceptable Parameter Range:											
Bottles Collected											
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x 60 mL Plastic											
x 60 mL											
Signature											
Date											
Checker Name and Signature											
Distribution: Project Central File											

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 0 11.14.02 0045

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)

Q4AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		BORR		Project Number:		60644386		PM Name:		Gary Brophy		Bore ID:		MW31																																																																																																																						
Client:		SWGA		Project Location:		Bunbury, WA		Fieldwork Staff:		SA/HR		Sample Date:		13/11/24																																																																																																																						
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Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 0 11.14.00 0042

Project Name: BORR		Project Number: 60644366		PM Name: Gary Brophy		Bore ID: MB115	
Client: SWGA		Project Location: Bunbury, WA		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
General Bore Information				Well Development or Well Sampling Event? (circle)			
Date of GW Level: 14/11/24		Bore Radius (mm): 4		PM Name: Gary Brophy		Bore ID: MB115	
Depth to GW (m-pvc): 3.543		Screen Interval (m):		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Bore Depth (m-pvc):		Casing Radius (mm): 50		PM Name: Gary Brophy		Bore ID: MB115	
Depth to Product (m-pvc):		Cover Type (gatic/sick up):		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Product Thickness (m):		Bore Locked (YES/NO):		PM Name: Gary Brophy		Bore ID: MB115	
Key Type (if applicable):		Parameter method: Downhole		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Retrieved		Parameter method: Downhole		PM Name: Gary Brophy		Bore ID: MB115	
Calculated bore volume (L):		# purge volumes removed:		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Includes/ excludes bore annulus (circle)		Total purged volume (L):		PM Name: Gary Brophy		Bore ID: MB115	
Monitoring sequence followed (number in order):		Monitoring sequence followed (number in order):		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Hydrasleeve Size:		Hydrasleeve Type:		PM Name: Gary Brophy		Bore ID: MB115	
Hydrasleeve Depth (m-pvc):		Sampling Depth (m-pvc):		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Hydrasleeve Install time:		Hydrasleeve Start Time:		PM Name: Gary Brophy		Bore ID: MB115	
Parameters		Parameters		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Sampling Method:		Sampling Method:		PM Name: Gary Brophy		Bore ID: MB115	
Low Flow Pump rate:		Intake depth:		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Intake depth:		Intake depth:		PM Name: Gary Brophy		Bore ID: MB115	
Bailer		Bailer		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Peristaltic Pump		Peristaltic Pump		PM Name: Gary Brophy		Bore ID: MB115	
Other (specify)		Other (specify)		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Total purged volume (L):		Total purged volume (L):		PM Name: Gary Brophy		Bore ID: MB115	
Odour, Colour, Turbidity		Odour, Colour, Turbidity		Fieldwork Staff: SAHR		Sample Date: 14/11/24	
Bore volume calculation, bore condition, rate of tubing, redox correction etc.		Bore volume calculation, bore condition, rate of tubing, redox correction etc.		PM Name: Gary Brophy		Bore ID: MB115	
Logger taken out 11:20am 14/11		Logger taken out 11:20am 14/11		Fieldwork Staff: SAHR		Sample Date: 14/11/24	

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 0 11.14.00 0045

Q4AN(EV)-405-FM1

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

FQM - Sample QAQC Tracking Sheet

Project Name:	BORR	Project Number:	60644386
Project Location:	Bunbury, WA	Client:	SWGA
PM Name:	Gary Brophy	Fieldwork Staff:	SA/HR

QAQC ID	Primary Sample ID	Sample Type	Batch Number
WQAP01-131124	MW25	Duplicate	
WQAP02-131124	Off IP	Rinseate	
WQAP03-141124	MW06	Duplicate	
WQAP04-141124	Off IP	Rinseate	

QAQC Project Requirements			
QAQC	Required	Frequency	Method Used
Field Duplicates	☐ Yes ☐ No	☐ 1 in 10 ☐ 1 in 20	
Field Triplicates	☐ Yes ☐ No	☐ 1 in 10 ☐ 1 in 20	
Rinseate Blanks	☐ Yes ☐ No	☐ 1 per matrix/equipment/day	
Field Blanks	☐ Yes ☐ No	☐ 1 per day	
Trip Blanks	☐ Yes ☐ No	☐ 1 per ice chest	
Trip Spikes	☐ Yes ☐ No	☐ 1 per ice chest	

Approval and Distribution			
Fieldwork Staff Signature		Project Manager Signature	
Date		Date	
Distribution: Project Central File			

Project Name:		BORR - Monthly Monitoring		Project Location:		Bunbury		PM Name:		G Brophy	
Project Number:		60644386		Client:		SWGGA		Fieldwork Staff Name:		S. Johnstone	

Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.

Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)
MN81	14/10/24	8:37	-	2.034	-	-	-	-	-	
MN27		9:00	-	6.804	-	-	-	-	-	
MN25		9:05	-	6.801	-	-	-	-	-	
MN25b		9:07	-	1.347	-	-	-	-	-	
MN15		9:30	-	1.131	-	-	-	-	-	
MN46		9:48	-	4.071	-	-	-	-	-	
MN11		10:02	-	0.426	-	-	-	-	-	
MN10		10:10	-	1.126	-	-	-	-	-	
MN08a		10:30	-	2.118	-	-	-	-	-	
UB15		10:40	-	3.225	-	-	-	-	-	
UB14D		10:45	-	12.091	-	-	-	-	-	
MN04		11:00	-	4.295	-	-	-	-	-	
MN05		11:10	-	5.367	-	-	-	-	-	
MN06		11:15	-	5.149	-	-	-	-	-	
UB14S		12:00	-	9.021	-	-	-	-	-	
UB14D		12:05	-	2.102	-	-	-	-	-	
UB14		13:05	-	6.639	-	-	-	-	-	
UB10		13:37	-	17.433	-	-	-	-	-	
Bore B		13:49	-	18.083	-	-	-	-	-	
Bore A		14:00	-	15.50	-	-	-	-	-	

Notes/Comments: (PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquid; (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing

MN27 = 10.145

QDAN(EV) 414.1 M1

QDAN(EV) 414.1 M1

	BODM monthly monitoring		0.8
	SWPCA		M

[illegible]

Notes/Comments

312439	Solinst 122	Yes	Airmet
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Customer: Project Control File

Project Control Signature

17/09/24
Date

Project Manager Signature

Date

Q4AN(EV)-414-FM1
FQM - NAPL and Groundwater Level Gauging Record (Q4AN(EV)-414-FM1)
Revision 1 May 2, 2016

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: mlv 76			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 20/08/24			
Well Development or Well Sampling Event? (circle)									
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 20/08/24		Bore Radius (mm):		Chem Kit Serial No.: 20m07517		☒ Decontaminated			
Depth to GW (m-pvc): 4.237		Screen Interval (m):		Chem Kit Model: 451 Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gait/stick up):		(The correction to apply is probe dependent)		☒ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☒ Downhole		☒ Other (specify)			
		Key Type (if applicable): Allen		☒ Retrieved					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
15:22	0.5	4.237	30	3.60	970	5.27	121.6	18.9	
15:24	1.0			0.46	971	5.22	146.9	19.2	
15:26	1.5			0.36	968	5.21	158.9	19.3	
15:28	2.0			0.30	959	5.20	164.9	19.3	
15:30	2.5			0.26	950	5.21	167.6	19.4	
15:32	3.0			0.24	935	5.24	164.0	19.4	Clear, colourless, no odour
				← STABILISED →					
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	All	x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 50 mL Plastic			
		x 125 mL 70		x 10 mL nutrients					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: LAN31	
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 20/08/24	
Well Development or Well Sampling Event? (circle)							

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 20/08/24	Bore Radius (mm):	Chem Kit Serial No.: 20m102597	☒ Decontaminated	☒ Low Flow Pump rate: 30%	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 1.156	Screen Interval (m):	Chem Kit Model: V51 Pro	☒ Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 6.01	Casing Radius (mm):	Corrected Redox: Y / (N)	☒ Disposable	☐ Bailer	☐ Hydrasleeve	Sampling Depth (m-pvc): 1	Gauging		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump	☐ Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO): NO	Parameter method: ☐ Downhole		☐ Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable): VEM	☒ Retrieved					2 Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			

Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:27	0.5	1.159	30	1.77	479.2	5.99	81.6	16.4	
10:29	1.0			0.41	449.0	5.97	43.0	16.2	
10:31	1.5			0.15	441.2	5.96	12.0	16.1	
10:33	2.0			0.11	439.5	5.96	9.1	16.1	
10:35	2.5			0.08	439.2	5.98	-21.4	16.1	
10:37	3.0			0.10	440.5	6.00	-26.9	16.1	
10:39	3.5	↓	↓	0.08	439.8	6.01	-30.8	16.2	Brown, clear, no odour
				F STABILISED →					
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									

Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc. Concrete surrounding gatic is cracked & fragmented		
✓	All	2 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic			
		1 x 60 mL nutrient	1 x 125 mL Zn				

Approval and Distribution			
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 20/08/24	
Project Manager Signature: _____		Date: _____	
Distribution: Project Central File		Checker Name and Signature: <i>[Signature]</i>	

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW25			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 20/08/24			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 20/08/24		Bore Radius (mm):		Chem Kit Serial No.: 20m10231		☒ Decontaminated			
Depth to GW (m-pvc): 6.368		Screen Interval (m):		Chem Kit Model: YSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gatic stick up):		(The correction to apply is probe dependent)		☒ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☒ Downhole		☒ Peristaltic Pump ☒ Waterra			
		Key Type (if applicable): Allen		☒ Retrieved		☒ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:07	0.5	6.561	30	1.87	4034	5.46	-29.1	19.1	
11:09	1.0	6.667		0.68	4162	5.48	-69.5	19.3	
11:11	1.5	6.730		0.38	4193	5.50	-83.7	19.4	
11:13	2.0	6.773		0.25	4223	5.47	-90.2	19.4	
11:15	2.5	6.804		0.19	4230	5.46	-95.4	19.4	
11:17	3.0	6.822		0.15	4236	5.45	-100.1	19.4	Clear, colourless, slight sulfur odour
				← STABILISED →					
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 60 mL Ferrous x 60 mL metals (HNO ₃) x 40 mL Vial (H ₂ SO ₄) x 100 mL Amber x 250 mL Plastic 2 x 60 mL nutrients 2 x 125 mL Zn				WQA01 - Dup		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature: <i>Jo. Brophy</i>		Date: 20/08/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/08/24			
Project Manager Signature:		Date:		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW25B			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 20/08/24			
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 20/08/24	Bore Radius (mm):	Chem Kit Serial No.: 20m161977	☒ Decontaminated	Low Flow Pump rate: 30		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 0.764	Screen Interval (m):	Chem Kit Model: YSi Pro	☒ Dedicated	Intake depth: 1.3m		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	☒ Disposable	☒ Bailer	☐ Hydrasleeve	Sampling Depth (m-pvc):	1 Gauging		
Depth to Product (m-pvc):	Cover Type (galv stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump	☐ Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole	☒ Retrieved	☐ Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable): Allen						2 Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or uS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:33	0.5	0.941	30	2.83	2245	5.65	75.7	17.8	
11:35	1.0	1.075		0.97	1955	5.63	78.4	17.6	
11:37	1.5	1.260		1.91	1809	5.76	80.8	17.3	
11:39	2.0	1.340		2.80	1624	5.90	79.6	17.1	
11:41	2.5	-		3.60	1442	6.02	82.7	17.1	
11:43	3.0	1.545		3.77	1333	6.05	86.2	17.0	
11:45	3.5	1.657		3.82	1225	6.06	89.9	17.0	
11:47	4.0	1.750		4.33	1111	6.08	89.9	16.9	
11:49	4.5	1.80		4.30	1018	6.11	94.9	16.9	Clear, colourless, no odour
← STABILISED →									
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 60 mL Ferrous x 100 mL Amber x 60 mL metal (HNO ₃) x 250 mL Plastic x 175 mL Zn					Bore volume calculation, bore condition, fate of tubing, redox correction etc. Surface water infiltration due to rain.		
Approval and Distribution									
Fieldwork Staff Signature: <i>N. Rye</i>		Date: 20/08/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/08/24			
Project Manager Signature:		Date:		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: 21/03/24			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 21/03/24			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 21/03/24	Bore Radius (mm):	Chem Kit Serial No.: 20102517	☒ Decontaminated	☒ Low Flow Pump rate: 30%	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 1.008	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated	Intake depth: 1.5m	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / (N)	☒ Disposable	☐ Bailer ☐ Hydrasleeve	Sampling Depth (m-pvc):	1 Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump ☐ Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved	☐ Other (specify)	☐ Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable): Allen					2 Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
9:38	0.5	1.012	30	6.12	1203	5.91	40.9	18.1	
9:40	1.0			2.14	1192	5.90	-41.8	18.2	
9:42	1.5			0.65	1174	5.90	-64.4	18.2	
9:44	2.0			0.67	1175	5.91	-73.6	18.2	
9:46	2.5			0.50	1165	5.91	-78.9	18.2	
9:48	3.0	↓	↓	0.48	1157	5.92	-82.0	18.2	light brown, clear. sulfur odour
← STABILISED →									
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 60 mL Ferrous x 60 mL metals (HNO ₃) 2 x 40 mL Vial (H ₂ SO ₄) 1 x 100 mL Amber 1 x 250 mL Plastic 1 x 60 mL redox 1 x 125 mL Zn					Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
Approval and Distribution									
Fieldwork Staff Signature: <i>Ab. R...</i>		Date: 21/03/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/03/24			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW11			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 21/06/24			
General Bore Information				Parameter Info.		Well Development or Well Sampling Event? (circle)			
Date of GW Level: 21/06/24		Bore Radius (mm):		Chem Kit Serial No.: 101401507		Decontamination			
Depth to GW (m-pvc): < 0.21		Screen Interval (m):		Chem Kit Model: YSI Pro		Sampling Method			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		Hydrasleeve info.			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		Monitoring sequence followed (number in order):			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☐ Downhole ☒ Retrieved		Hydrasleeve Size:			
Key Type (if applicable): Allen						Hydrasleeve Type:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Sampling Depth (m-pvc):			
						Hydrasleeve Install time:			
						Sampling Start Time:			
						Parameters			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:34	0.5	-	30	5.29	1342	6.55	-30.7	17.7	
10:36	1.0	-		0.29	1161	6.59	-90.0	17.9	
10:38	1.5	-		0.10	1084	6.59	-108.9	17.8	
10:40	2.0	-		0.06	1065	6.59	-119.9	17.7	
10:42	2.5	-		0.09	1051	6.59	-125.9	17.7	
10:44	3.0	-		0.04	1045	6.59	-131.0	17.6	Brown, clear, organic odour, suspended sediments
← STABILISED →									
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:							Bore volume calculation, bore condition, fate of tubing, redox correction etc. Surface water infiltration	
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name:		BORR Quarterly GME	Project Number:		60644386	PM Name:		G.Brophy	Bore ID:		M011S
Client:		SWGA	Project Location:		Bunbury	Fieldwork Staff:		S.J/H.R-G	Sample Date:		27/09/24
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	27/09/24	Bore Radius (mm):		Chem Kit Serial No.:	ZOMW1547	☒ Decontaminated	☒ Low Flow Pump rate:	30 %	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	3.120	Screen Interval (m):		Chem Kit Model:	XI Pro	☒ Dedicated	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox:	Y / N	☒ Disposable	☐ Bailor	☐ Hydrasleeve	Sampling Depth (m-pvc):	1 Gauging	
Depth to Product (m-pvc):		Cover Type:	(stick up)	(The correction to apply is probe dependent)		☐ Other (specify)	☒ Peristaltic Pump	☐ Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method:		☐ Downhole	☐ Other (specify)		Sampling Start Time:	Hydrasleeve out	
		Key Type (if applicable):				☒ Retrieved				2 Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)			# purge volumes removed:	Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:37	0.5	3.148	30%	3.30	713	6.33	-158.7	17.6	Brown, clear, SULFIDIC odour		
8:39	1.0			0.39	717	6.29	-187.7	17.9			
8:41	1.5			0.16	720	6.27	-204.7	18.0			
8:43	2.0			0.10	716	6.27	-215.6	18.1			
8:45	2.5			0.08	715	6.27	-223.5	18.0			
8:47	3.0			0.08	713	6.27	-230.2	18.0			
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
/	AII	x 40 mL Vial (H ₂ SO ₄)		x 40 mL Amber	1	x 250 mL Plastic					
		1 x 125 mL Zn		2 x 60 mL nutrients							
		1 x 60 mL nutrients									
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW10			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J.H.R-G		Sample Date: 21/08/24			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 21/08/24		Bore Radius (mm):		Chem Kit Serial No.: 20M10257		☒ Decontaminated			
Depth to GW (m-pvc): 0.910		Screen Interval (m):		Chem Kit Model: Y61 Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent)		☐ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☐ Downhole		☒ Other (specify)			
		Key Type (if applicable): Allen		☒ Retrieved					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Sampling Method									
Intake depth:		Hydrasleeve Size:		Monitoring sequence followed (number in order):					
☒ Low Flow Pump rate: 30%		Hydrasleeve Type:		1 Gauging					
☒ Bailer		☒ Hydrasleeve		2 Gauging					
☒ Peristaltic Pump		☒ Waterra		Hydrasleeve install time:		Hydrasleeve in			
☐ Other (specify)				Sampling Start Time:		Hydrasleeve out			
						2 Parameters			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:01	0.5	0.915	30	3.72	639	6.25	-52.6	17.7	
11:03	1.0			0.96	587	6.21	-53.7	17.7	
11:05	1.5			0.91	508	6.20	-31.3	17.6	
11:07	2.0			0.83	478	6.20	-41.9	17.5	
11:09	2.5			0.87	465	6.20	-47.1	17.5	
11:11	3.0	↓	↓	1.04	431	6.20	-38.2	17.5	Clear, colourless, no odour
			←	STABILISED		→			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) 2 x 40 mL Vial (H ₂ SO ₄) 1 x 100 mL Amber 1 x 250 mL Plastic				x 60 mL Ferrous x 60 mL metals (HNO ₃) x 100 mL Plastic		Extra amber lab QA/QC Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature: <i>16-Rm</i>		Date: 21/08/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/08/24			
Project Manager Signature:		Date:		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW08a			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S./H.R-G		Sample Date: 20/08/24			
General Bore Information				Decontamination		Sampling Method			
Date of GW Level: 20/08/24		Bore Radius (mm):		Chem Kit Serial No.: 20M102597		Hydrasleeve Info.			
Depth to GW (m-pvc): 1.648		Screen Interval (m):		Chem Kit Model: YSI Pro		Monitoring sequence followed (number in order):			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		Gauging			
Depth to Product (m-pvc):		Cover Type (cable stick up):		(The correction to apply is probe dependent)		Hydrasleeve Type:			
Product Thickness (mm):		Bore Locked (YES/NO): Allent		Parameter method: Downhole		Sampling Depth (m-pvc):			
		Key Type (if applicable): Key		Retrieved		Hydrasleeve Install time:			
						Sampling Start Time:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
14:33	0.5	1.657	30	1.09	949	5.87	-163.5	18.6	
14:35	1.0			0.19	945	5.85	-179.0	18.7	
14:37	1.5			0.17	928	5.86	-184.4	18.8	
14:39	2.0			0.12	911	5.87	-189.3	18.8	
14:41	2.5			0.10	905	5.88	-193.9	18.9	
14:43	3.0			0.08	893	5.89	-197.5	18.9	light brown, clear, sulfur odour
← STABILISED →									
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:							Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	All	x 40 mL Vial (HCl) x 60 mL Ferrous x 60 mL metals (HNO ₃) 2 x 40 mL Vial (H ₂ SO ₄) 1 x 100 mL Amber x 250 mL Plastic 1 x 250 mL Zn 1 x 250 mL H ₂ O ₂							
Approval and Distribution									
Fieldwork Staff Signature: <i>T.G.</i>		Date: 20/08/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/08/24			
Project Manager Signature:		Date:		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: UN06			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 20/08/24			
Well Development of Well Sampling Event (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 20/08/24	Bore Radius (mm):	Chem Kit Serial No.: 01012597	☒ Decontaminated	Low Flow Pump rate: 30%		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 5.335	Screen Interval (m):	Chem Kit Model: 451015	☒ Dedicated	Intake depth:		Hydrasleeve Type:	1 Gauging		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	☒ Disposable	☒ Bailer ☒ Hydrasleeve		Sampling Depth (m-pvc):	Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gath/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:	Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO): Alien	Parameter method: ☒ Downhole	☐ Other (specify)		Sampling Start Time:		2 Parameters		
Key Type (if applicable): Key		☒ Retrieved							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
15:34	0.5	5.339	30	4.55	1098	6.94	-41.8	19.9	
15:36	1.0			1.58	1169	7.12	-115.0	20.4	
15:38	1.5			0.77	1199	7.05	-136.2	20.4	
15:40	2.0			0.66	1190	6.86	-143.1	20.5	
15:42	2.5			0.51	1127	6.58	-140.2	20.5	
15:44	3.0			0.43	1007	6.21	-130.0	20.5	
15:46	3.5			0.37	924	5.96	-113.6	20.5	
15:48	4.0			0.35	879	5.83	-110.6	20.5	
15:50	4.5			0.34	854	5.79	-105.6	20.4	Clear, colourless, no Sulfur odour
				STABILISED →					
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 60 mL Ferrous 4 x 60 mL metals (HNO ₃) 4 x 40 mL Vial (H ₂ SO ₄) 2 x 100 mL Amber 2 x 50 mL Plastic 2 x 60 mL 100ppm H ₂ S 2 x 15 mL Zn				WQAO2 - Dup		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature		Date: 20/08/24		Checker Name and Signature		Date: 22/08/24			
Project Manager Signature		Date:		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW05			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 21/08/24			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 21/08/24		Bore Radius (mm):		Chem Kit Serial No.: 20M10251		☒ Decontaminated			
Depth to GW (m-pvc): 5.678		Screen Interval (m):		Chem Kit Model: VSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		☒ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☒ Downhole		☒ Peristaltic Pump			
		Key Type (if applicable): Allen		☒ Retrieved		☒ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:38	0.5	5.680	30	5.58	1269	6.45	-93.5	19.7	
12:40	1.0	5.683		0.34	1283	6.35	-112.8	20.6	
12:42	1.5	5.685		0.16	1356	6.30	-111.5	20.6	
12:44	2.0			0.10	1411	6.28	-109.5	20.5	
12:46	2.5			0.09	1437	6.27	-109.0	20.5	
12:48	3.0			0.10	1435	6.27	-109.5	20.5	Clear, colourless, very sulphurous odour
4				STABILISED					
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 60 mL Ferrous x 100 mL Amber x 60 mL metals (HNO ₃) x 500 mL Plastic x 60 mL nutrients x 125 mL Tr				Extra amber 100% QA/QC		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature		21/08/24		Date		Checker Name and Signature		22/08/24	
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly GME		Project Number: 60644386		PM Name: G.Brophy		Bore ID: MW04			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: S.J/H.R-G		Sample Date: 21/08/24			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 21/08/24	Bore Radius (mm):	Chem Kit Serial No.: 20M102597	☒ Decontaminated	☒ Low Flow Pump rate: 30 l/min		Hydrasleeve Size:			
Depth to GW (m-pvc): 4.348	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / (N)	☒ Disposable	☒ Bailer ☒ Hydrasleeve		Sampling Depth (m-pvc): 1			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☒ Downhole	☐ Other (specify)	☒ Other (specify)		Sampling Start Time:			
	Key Type (if applicable): Allen	☒ Retrieved				Monitoring sequence followed (number in order): 2 Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:01	0.5	4.405	30	0.33	4761	6.55	52.4	18.6	
12:03	1.0	4.412		0.21	4761	6.56	48.9	18.7	
12:05	1.5	4.415		0.11	4782	6.56	45.7	18.7	
12:07	2.0			0.10	4790	6.56	43.7	18.7	
12:09	2.5			0.09	4794	6.57	42.3	18.7	
12:11	3.0			0.08	4794	6.57	40.2	18.7	Clear, colourless, no odour
				STABILISED					
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) x 60 mL Ferrous x 60 mL metals (HNO ₃) 2 x 40 mL Vial (H ₂ SO ₄) x 100 mL Amber x 250 mL Plastic 1 x 125 mL Zn 1 x 60 mL nutrient				extra amber lab QAQC		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature: <i>16. Rupp</i>		Date: 21/08/24		Checker Name and Signature: <i>[Signature]</i>		Date: 22/08/24			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

[illegible]

FQM - NAPL and Groundwater Level Gauging Record

Q4AN(EV)-414-FM1

Project Name:	BORR - Monthly Monitoring	Project Location:	Bunbury	PM Name:	G.Brophy					
Project Number:	60644386	Client:	SWGA	Fieldwork Staff Name:	HRG SA					
Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.										
Field Data										
Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)
MW31	16/12/24	9:27	-	-	2.382	-	-	-	-	
MW25	16/12/24	9:39	-	-	7.078	-	-	-	-	
MW25b	"	9:41	-	-	Dry	-	-	2:60	-	at 2.60 m
MW27	"	9:57	-	-	2.037	-	-	-	-	
MW15	"	10:20	-	-	1.485	-	-	-	-	
MW46	"	10:40	-	-	4.297	-	-	-	-	
MW11	"	11:00	-	-	1.095	-	-	-	-	
MW10	"	11:11	-	-	1.483	-	-	-	-	
MB115	"	11:47	-	-	3.880	-	-	-	-	Logger removed at 11:45
MB114d	"	11:50	-	-	12.833	-	-	-	-	Logger removed at 11:48
MW08a	"	11:33	-	-	2.864	-	-	-	-	Logger removed at 11:31
MW07	"	12:46	-	-	10.115	-	-	-	-	Logger removed 12:45
MB14S	"	12:20	-	-	9.115	-	-	-	-	Logger removed at 14:19
MB14d	"	12:18	-	-	12.490	-	-	-	-	Logger removed at 14:16
MW06	"	12:21	-	-	5.267	-	-	-	-	
MW05	"	12:15	-	-	5.494	-	-	-	-	
MW04	"	12:08	-	-	4.608	-	-	-	-	
1A	"	3:38	-	-	6.955	-	-	-	-	Logger removed at 15:37
1D	"	3:47	-	-	17.584	-	-	-	-	Logger removed at 15:46
DB 15	"	3:55	-	-	13.121	-	-	-	-	Logger removed at 15:53
DB 12	"	5:01	-	-	25.444	-	-	-	-	Logger removed at 16:00
Measurement Equipment						Notes/Comments				
Make & Model:	Geotech	Supplier:	UK Enviro	(PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquids; (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing						
Serial No.:	8724	Calibration Report Provided?								

Approval and Distribution

 Fieldwork Staff Signature		16/12/24 Date		 Project Manager Signature		Date	
Distribution: Project Central File							

Q4AN(EV)-414-FM1
FQM - NAPL and Groundwater Level Gauging Record (Q4AN(EV)-414-FM1)
Revision 1 May 2, 2016

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW04			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/23			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 14/02/25	Bore Radius (mm): 150	Chem Kit Serial No.: 19L102400	☒ Decontaminated		☒ Low Flow Pump rate: 30%		Hydrasleeve Size:		
Depth to GW (m-pvc): 4.983	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated		Intake depth: 5.5		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y ☒ N	☒ Disposable		☐ Bailer ☐ Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole			☐ Other (specify)		Sampling Start Time:		
	Key Type (if applicable): Allen	☒ Retrieved					Monitoring sequence followed (number in order):		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):		1 Gauging		
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:37	0.5	5.093	30	0.71	5064	6.35	-60.7	19.3	
10:39	1.0	5.097	30	0.21	5035	6.39	-69.7	19.1	
10:41	1.5	5.097	30	0.15	5036	6.40	-73.8	19.1	
10:43	2.0	5.097	30	0.11	5023	6.40	-77.7	19.1	
10:45	2.5			0.09	5023	6.41	-80.0	19.1	
10:47	3.0			0.08	5025	6.41	-82.5	19.1	Odourless, Light brown, slightly turbid
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Amber		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	AN	2 x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
				1 x 125 mL		1 x 500 mL			
Approval and Distribution									
Fieldwork Staff Signature		Date: 14/02/25		Checker Name and Signature		Date: 14/02/25			
Project Manager Signature		Date:		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: mw 05			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25	Bore Radius (mm): 150	Chem Kit Serial No.: 19L102400	☒ Decontaminated		Sampling Method: ☒ Low Flow Pump rate: 30%		Hydrasleeve Info. Monitoring sequence followed (number in order): 1 Gauging 2 Parameters		
Depth to GW (m-pvc): 5.688	Screen Interval (m):	Chem Kit Model: 151 Pro	☐ Dedicated		Intake depth:				
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y / N	☒ Disposable		☐ Bailer ☐ Hydrasleeve				
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump ☐ Waterra				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved			☐ Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
16:01	0.5	5.696	30	1.75	1103	6.34	-166	22.5	
16:03	1.0	5.696	30	0.66	1215	6.26	-156.7	22.0	
16:05	1.5	5.696	30	0.44	1236	6.25	-156	22.0	
16:07	2.0		30	0.31	1237	6.24	-156.3	22.0	
16:09	2.5		30	0.26	1238	6.24	-156.3	21.9	
16:11	3.0		30	0.22	1236	6.24	-156.5	21.9	Odourless, Colourless, clear.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	1	x 60 mL Borewater	1	x 60 mL metals (HNO ₃)	Extra Amber for 196	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	ALL	2	x 40 mL Vial (H ₂ SO ₄)	2	x 100 mL Amber	x 250 mL Plastic			
			1x125ml		1x500ml				
Approval and Distribution									
Fieldwork Staff Signature		13/02/25		Date		14/02/25		Date	
Project Manager Signature		Date		Checker Name and Signature		Date			
Distribution: Project Central File									

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW06			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25	Bore Radius (mm):	Chem Kit Serial No.: 19L102400	☒ Decontaminated		Low Flow Pump rate: 30%		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 5.475	Screen Interval (m):	Chem Kit Model: YSR0	☒ Dedicated		Intake depth:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / 10	☒ Disposable		☐ Bailer ☐ Hydrasleeve		Hydrasleeve Size:		
Depth to Product (m-pvc):	Cover Type (grip/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Type:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved			☐ Other (specify)		Sampling Depth (m-pvc): 1		
	Key Type (if applicable): Allen						Hydrasleeve Install time:		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):		Sampling Start Time:		
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
16:31	0.5	5.481	30	1.37	2091	6.7	-117	22	
16:33	1.0	5.481	30	0.24	2110	6.8	-164.4	21.7	
16:35	1.5	5.481	30	0.10	2072	6.41	-167.3	21.7	
16:37	2.0		30	0.07	1793	6.81	-146.2	21.7	
16:39	2.5		30	0.05	1690	5.62	-135.6	21.7	
16:41	3.0		30	0.09	1624	5.52	-128.9	21.7	
16:43	3.5		30	0.10	1581	5.47	-124.6	21.7	Odourless, colourless, clear.
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	1	x 60 mL Ferrous	1	x 60 mL metals (HNO ₃)	Extra Amber for lab	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	Au	2 x 40 mL Vial (H ₂ SO ₄)	2	x 100 mL Amber		x 250 mL Plastic			
				1 x 125 mL		1 x 500 mL			
Approval and Distribution									
Fieldwork Staff Signature		13/02/25 Date		16 Rye Checker Name and Signature		13/02/25 Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW07	
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/25	
General Bore Information				Parameter Info.		Decontamination	
Date of GW Level: 14/02/25	Bore Radius (mm): 150	Chem Kit Serial No.: 194102400	☒ Decontaminated		☒ Low Flow Pump rate: ~		Hydrasleeve Size: ~
Depth to GW (m-pvc): 10.244	Screen Interval (m): ~	Chem Kit Model: ISI Pro	☒ Dedicated		Intake depth: ~		Hydrasleeve Type: ~
Bore Depth (m-pvc): ~	Casing Radius (mm): 50	Corrected Redox: Y / N	☒ Disposable		☒ Bailer		Sampling Depth (m-pvc): 1
Depth to Product (m-pvc): ~	Cover Type (gatic/stick up): ~	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump		Hydrasleeve Install time: ~
Product Thickness (m): ~	Bore Locked (YES/NO): ~	Parameter method: ☐ Downhole	☒ Retrieved		☒ Waterra		Sampling Start Time: ~
Key Type (if applicable): Allen							
Calculated bore volume (L): ~		Includes/ excludes bore annulus (circle)		# purge volumes removed: ~		Total purged volume (L): ~	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
10:21	-	-	-	1.81	1467	5.77	-32.42
Temp °C							
Odour, Colour, Turbidity							
Odourless, Grey, Turbid							
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)							
Analyses Sampled for:		Bottles Collected			QA/QC Information		Field Comments
Field Filtered: ~	Unfiltered: AU	x 40 mL Vial (HCl)	x 60 mL Vial (HNO ₃)	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			Roots at ~10.5m
							Roots cleared
Approval and Distribution							
Fieldwork Staff Signature		Date: 14/02/25		Checker Name and Signature		Date: 14/02/25	
Project Manager Signature		Date		Distribution: Project Central File			

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW08a			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 14/02/25	Bore Radius (mm): 150	Chem Kit Serial No.: 19L102400	☒ Decontaminated		☒ Low Flow Pump rate: 30%		Hydrasleeve Size:		
Depth to GW (m-pvc): 3443	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y NO	☒ Disposable		☐ Bailer ☐ Hydrasleeve		Sampling Depth (m-pvc): 1		
Depth to Product (m-pvc):	Cover Type (gaiter/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved			☐ Other (specify)		Sampling Start Time:		
	Key Type (if applicable): Open						2 Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
09:26	0.5	3.445	30	0.30	1200	5.95	-181.2	21.8	
09:28	1.0	3.463	30	0.11	1191	5.95	-191.2	21.1	
09:30	1.5	3.456	30	0.06	1189	5.95	-195.0	20.9	
09:32	2.0	3.456	30	0.05	1200	5.94	-195.7	21.0	
09:34	2.5	3.456	30	0.04	1225	5.93	-197.7	20.8	
09:36	3.0	3.456	30	0.03	1217	5.93	-195.9	20.9	light brown, clear, organic colour
Stabilised									
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		1	x 60 mL Amber	1	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		2 x 40 mL Vial (H ₂ SO ₄)		2	x 100 mL Amber		x 250 mL Plastic		
						1	x 500 mL		
Approval and Distribution									
Fieldwork Staff Signature		14/02/25		16-Bp		14/02/25			
		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW10			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
Well Development or Well Sampling Event? (circle)									
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25		Bore Radius (mm): 150		Chem Kit Serial No.: 194102400		☒ Decontaminated			
Depth to GW (m-pvc): 1.873		Screen Interval (m):		Chem Kit Model: YSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm): 50		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/tick up):		(The correction to apply is probe dependent)		☐ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☐ Downhole		☒ Peristaltic Pump ☐ Waterra			
		Key Type (if applicable): Allen		☒ Retrieved		☐ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:56	0.5	1.884	25	0.4	1220	5.97	-172.6	22.7	
13:58	1.0	1.888	25	0.1	1019	5.87	-158.6	22.8	
14:00	1.5	1.885	25	0.07	890	5.80	-138.1	23.0	
14:02	2.0	1.885	25	0.05	813	5.75	-151.8	23.1	
14:04	2.5	↓	25	0.05	790	5.76	-158.3	23.2	Odourless, slightly yellow, clear
14:06	3.0	↓	25	0.05	764	5.75	-163.4	23.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl) 1 x 40 mL Vial (H ₂ SO ₄) 2 x 60 mL Ferrous 1 x 100 mL Amber 2 x 60 mL metals (HNO ₃) 1 x 250 mL Plastic 1 1 x 125 mL 1 x 500 mL				Extra Amber for ab.		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
Approval and Distribution									
Fieldwork Staff Signature		Date: 13/02/25		Checker Name and Signature: 76. Ky		Date: 14/02/25			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW11			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25		Bore Radius (mm): 150		Chem Kit Serial No.: 196102400		☒ Decontaminated			
Depth to GW (m-pvc): 1.678		Screen Interval (m):		Chem Kit Model: YSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm): 50		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		☐ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☒ Downhole		☒ Peristaltic Pump ☐ Waterra			
		Key Type (if applicable): Allen		☒ Retrieved		☐ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:20	0.5	2.290	30	0.58	15482	7.08	-93	21.3	
13:22	1.0	2.600	25	0.38	15554	7.12	-96.1	21.5	
13:24	1.5	2.839	20	0.35	15549	7.13	-93.5	21.7	
13:26	2.0	3.109	20	0.32	15620	7.14	-88.7	21.8	
13:28	2.5	3.304	20	0.33	15653	7.15	-84.2	21.8	
13:30	3.0	3.497	20	0.27	15664	7.15	-84.1	21.9	No Odour, Brown, slightly turbid
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		1	x 60 mL Ferrous	1	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		2 x 40 mL Vial (H ₂ SO ₄)		2	x 100 mL Amber		x 250 mL Plastic	Well ran out of water during sampling Only able to fill 1x vial and partially filled 60ml sulphuric	
				1 x 125mL	1 x 500mL				
Approval and Distribution									
Fieldwork Staff Signature		13/02/25		Date		14/02/25		Date	
				Checker Name and Signature					
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW15			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25		Bore Radius (mm): 150		Chem Kit Serial No.: 19410240		☒ Decontaminated			
Depth to GW (m-pvc): 1.918		Screen Interval (m):		Chem Kit Model: YS1050		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm): 50		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gauge/stick up):		(The correction to apply is probe dependent)		☐ Other (specify)			
Product Thickness (m):		Bore Locker (YES/NO):		Parameter method: ☐ Downhole		☒ Peristaltic Pump ☐ Waterra			
		Key Type (if applicable): ALAN		☒ Retrieved		☐ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:54	0.5	1.920	30	0.26	1670	5.92	-171.7	24.1	
11:56	1.0	1.928	30	0.16	1596	5.87	-174.2	24.3	
11:58	1.5	1.928	30	0.12	1543	5.83	-175.6	24.5	
12:00	2.0	1.925	30	0.08	1474	5.78	-176.2	24.6	
12:02	2.5	1.925	30	0.07	1431	5.76	-175.6	24.6	
12:04	3.0	"	30	0.07	1353	5.75	-173.9	24.7	Odourless, Brown, Clear
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)	Extraneous Amber for lab QA/QC		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
	ALL	2 x 40 mL Vial (H ₂ SO ₄)	2 x 100 mL Amber	x 250 mL Plastic					
			1 x 125 mL	1 x 500 mL					
Approval and Distribution									
Fieldwork Staff Signature		Date: 13/02/25		Checker Name and Signature: G. Brophy		Date: 14/02/25			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW 25			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 13/02/25		Bore Radius (mm): 150		Chem Kit Serial No.: 190102400		☒ Decontaminated			
Depth to GW (m-pvc): 7.671		Screen Interval (m):		Chem Kit Model: YSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm): 50		Corrected Redox: Y / ☒ N		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (catic stick up):		(The correction to apply is probe dependent)		☐ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☐ Downhole		☒ Retrieved			
		Key Type (if applicable): Allen							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Sampling Method									
Intake depth:		Hydrasleeve Size:		Monitoring sequence followed (number in order):					
Low Flow Pump rate: 30 l		Hydrasleeve Type:		Gauging					
☒ Bailer		☐ Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in			
☒ Peristaltic Pump		☐ Waterra		Hydrasleeve install time:		Hydrasleeve out			
☐ Other (specify)				Sampling Start Time:		Parameters			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:48	0.5	7.419	30	0.22	3283	5.83	-185.2	19.9	
10:50	1.0	7.549	30	0.15	3292	5.76	-187	19.8	
10:52	1.5	7.610	30	0.12	3564	5.61	-167.6	19.7	
10:54	2.0	7.650	30	0.10	3746	5.47	-156	19.7	
10:56	2.5	7.630	25	0.09	3872	5.40	-149	19.9	
10:58	3.0	7.616	25	0.08	4041	5.29	-140.2	19.9	
11:00	3.5	7.619	28	0.08	4063	5.26	-138.3	19.9	
11:02	4.0	7.619	28	0.08	4064	5.26	-136.9	19.9	Odourless, Colourless, clear
Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ ± 0.05 ± 10 mV ± 0.2 °C $\pm 10\%$ turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	2	x 60 mL LowpH	4	x 60 mL metals (HNO ₃)	WQA01 - Dup	Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	All	x 40 mL Vial (H ₂ SO ₄)	3	x 100 mL Amber		x 250 mL Plastic	WQA02 - Trip		
			2	x 25 mL	3	x 500 mL			
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW 27	
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/25	
General Bore Information				Parameter Info.		Decontamination	
Date of GW Level: 14/02/25	Bore Radius (mm): 150	Chem Kit Serial No.: 9L102400	☒ Decontaminated		☐ Low Flow Pump rate: 30		Hydrasleeve Size:
Depth to GW (m-pvc): 2.278	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated		Intake depth: 3.0		Hydrasleeve Type:
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y ☒ N	☒ Disposable		☐ Bailer ☐ Hydrasleeve		Sampling Depth (m-pvc): 1
Depth to Product (m-pvc):	Cover Type (gati/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)		☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved			☐ Other (specify)		Sampling Start Time:
	Key Type (if applicable): Allen						☒ Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):	
Water Quality Parameters							
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)
12:18	0.5	2.294	30	0.41	525	5.77	-178.3
12:20	1.0	2.290	30	0.12	333.5	5.65	-154.7
12:22	1.5	2.280	30	0.11	320.6	5.60	-144.4
12:24	2.0	2.300	30	0.16	303.0	5.41	-122.3
12:26	2.5	2.305	30	0.07	289.6	5.34	-111.1
12:31	3.0	2.307	30	0.06	288.0	5.34	-111.3
Organic odour, brown, clear							
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)							
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)	WQA05 - Rinsate		Bore volume calculation, bore condition, fate of tubing, redox correction etc. Pumping stopped at 12:25 due to tubing not long enough
☒	All	2 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	x 250 mL Plastic	WQA06 - FB		
		1 x 125 mL	1 x 500 mL				
Approval and Distribution							
Fieldwork Staff Signature		Date		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File			

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW31			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 13/02/25			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 13/02/24	Bore Radius (mm):	Chem Kit Serial No.: 79402400	☒ Decontaminated	☒ Low Flow Pump rate: 30%		Hydrasleeve Size:			
Depth to GW (m-pvc): 2.845	Screen Interval (m):	Chem Kit Model: YS1 Pro	☒ Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	☒ Disposable	☐ Bailer ☐ Hydrasleeve		Sampling Depth (m-pvc):			
Depth to Product (m-pvc):	Cover Type (gall/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump ☐ Waterra		Hydrasleeve Install time:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole ☒ Retrieved	☐ Other (specify)		Sampling Start Time:		Monitoring sequence followed (number in order):		
Key Type (if applicable): Alien		Parameters							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
9:42	0.5	2.875	30	0.15	498	5.14	-162.8	20.6	
9:45	1	2.873		0.11	498.8	5.14	-158.9	20.6	
9:47	1.5	2.876		0.08	502.4	5.13	-155.9	20.6	
9:49	2.0	2.874		0.07	522.4	5.13	-155.4	20.6	
9:51	2.5	2.875		0.06	533.1	5.13	-155.4	20.6	
9:53	3.0	"		0.06	543.5	5.13	-155.8	20.6	Brown, clear, organic odour
← STABILISED →									
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	1	x 60 mL Ferrous	1	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	All	x 40 mL Vial (H ₂ SO ₄)	1	x 100 mL Amber		x 250 mL Plastic			
			1	x 125 mL		x 500 mL			
Approval and Distribution									
Fieldwork Staff Signature		13/02/25		Date		14/02/25		Date	
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MW46			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/25			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 14/02/25	Bore Radius (mm): 150	Chem Kit Serial No.:	☒ Decontaminated	☒ Low Flow Pump rate: 30%		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 4.739	Screen Interval (m):	Chem Kit Model: YSI Pro	☒ Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm): 50	Corrected Redox: Y (N)	☒ Disposable	☐ Bailer	☐ Hydrasleeve	Sampling Depth (m-pvc):	1 Gauging		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	☐ Other (specify)	☒ Peristaltic Pump	☐ Waterra	Hydrasleeve install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: ☐ Downhole		☐ Other (specify)		Sampling start time:	Hydrasleeve out		
	Key Type (if applicable):	☒ Retrieved					2 Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
08:07	0.5	4.725	30	1.1	2953	5.02	107.1	20.7	
08:09	1.0	4.719	30	0.61	3011	4.95	130.8	20.2	
08:11	1.5	4.731	30	0.93	3162	4.86	130.4	20.9	
08:13	2.0	4.718	30	0.91	3202	4.85	126.4	20.5	
08:15	2.5	4.738	30	0.46	3217	4.88	111.6	20.9	
08:19	3.0	4.739	30	0.31	3195	4.86	106.9	20.9	
08:21	3.5	4.739	30	0.28	3107	4.89	104.5	20.9	Organic odour, Brown, turbid
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Eucous	x 60 mL metals (HNO ₃)	Extra Amber for lab		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
	ALL	2 x 40 mL Vial (H ₂ SO ₄)	2 x 100 mL Amber	x 250 mL Plastic					
		1 x 125 mL	1 x 500 mL						
Approval and Distribution									
Fieldwork Staff Signature		Date: 14/02/25		Checker Name and Signature: G. Brophy		Date: 14/02/25		Cleared roots @ 4.7m Stopped pumping at 08:15 to adjust tubing	
Project Manager Signature		Date:		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: BORR Quarterly		Project Number: 60644386		PM Name: G. Brophy		Bore ID: MALLS			
Client: SWGA		Project Location: Bunbury		Fieldwork Staff: HRG SA		Sample Date: 14/02/25			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 14/02/25		Bore Radius (mm):		Chem Kit Serial No.: AL102400		☒ Decontaminated			
Depth to GW (m-pvc): 4.468		Screen Interval (m):		Chem Kit Model: YSI Pro		☒ Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm): 50		Corrected Redox: Y / (N)		☒ Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		☒ Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: ☒ Downhole		☒ Peristaltic Pump ☒ Waterra			
		Key Type (if applicable):		☒ Retrieved		☒ Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:51	0.5	4.478	30	1.00	1007	6.33	-186.7	20.2	
8:53	1.0			0.17	968	6.30	-197.6	19.8	
8:55	1.5			0.11	952	6.29	-199.8	19.8	
8:57	2.0			0.06	943	6.29	-202.9	19.7	
8:59	2.5			0.06	941	6.29	-203.2	19.7	
9:01	30			0.04	942	6.28	-205.0	19.8	Clear, brown, organic odour
				STABILISED					
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
	All	2 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 50 mL Plastic			
				1 x 50 mL Plastic		1 x 60 mL Plastic			
Approval and Distribution									
Fieldwork Staff Signature: <i>G. Brophy</i>		Date: 14/02/25		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FGM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
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FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
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Q4AN(EV)-405-FM1
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)
Revision 2 July 12, 2016

Q4AN(EV)-011-FM1

QAQC Information	
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QA/QC Project Requirements

Approval and Distribution	
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Date _____

Date _____

Q4AN(EV)-011-FM1
FQM - Sample QAQC Tracking Sheet (Q4AN(EV)-011-FM1)
Revision 1 May 2, 2016

Project Name:	BORR	Project Location:	Bunbury, WA	PM Name:	Gary Brophy					
Project Number:	60644386	Client:	SWGA	Fieldwork Staff Name:	SAHR					
Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.										
Field Data										
Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)
MW31	14/01/25	9:20	-	-	2.601	-	-	-	-	60km/h approx 12m from road, busy
MW25		9:32	-	-	7.557	-	-	-	-	40km/h road closed, approx 3m from road
MW25b		9:34	-	-	DRY	-	-	2.60m	-	"
MW27		9:47	-	-	2.145	-	-	-	-	Inside fenced paddock
MW15		10:12	-	-	1.715	-	-	-	-	Pull off rest stop, approx 3m from parking area
MW46		10:30	-	-	4.358	-	-	4.358	-	80km/h, construction road to pull in to, approx 30m off road
MW11		10:43	-	-	1.401	-	-	-	-	90km/h approx 2.5m from road, quiet road
MW10		10:50	-	-	1.691	-	-	-	-	Closed road, approx 2.5m from road, quiet.
MW08a		13:15	-	-	3.159	-	-	-	-	70km/h, logger removed 13:13, approx 13m off road, quiet
MW11s		13:03	-	-	4.152	-	-	-	-	" , logger removed 13:02, approx 15m off road, quiet
MW11d		13:09	-	-	13.225	-	-	-	-	" , logger removed 13:07, approx 18m off road, quiet
MW07		11:03	-	-	10.187	-	-	-	-	70km/h, approx 8m off road, logger removed 11:03
MW14s		12:37	-	-	9.190	-	-	-	-	logger removed 12:37, Enter from 110km/h, concrete barriers in place
MW14d		12:34	-	-	12.868	-	-	-	-	logger removed 12:35 "
MW06		11:37	-	-	5.378	-	-	-	-	Closed road, next to 110km/h, concrete barriers in place
MW05		11:29	-	-	5.581	-	-	-	-	70km/h, approx 5m off road, quiet
MW04		11:22	-	-	Requires	traffic control	-	-	-	Approx 9m off road, 110km/h
1A		14:04	-	-	7.113	-	-	-	-	logger removed 14:02
1D		14:11	-	-	17.707	-	-	-	-	Logger removed 14:10
13	12	14:18	-	-	18.164	-	-	-	-	Logger removed 14:17/14:23
Measurement Equipment						Notes/Comments				
Make & Model:	Heron Dipper-T	Supplier:	CK Enviro	(PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquids; (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing						
Serial No.:	112006095FR	Calibration Report Provided?		MW11, after sharp turn with 30km/h slowdown signage. MW08a, plastic barriers						
Approval and Distribution										
Fieldwork Staff Signature			14/01/25		Project Manager Signature			Date		
Distribution: Project Central File										

FQM - NAPL and Groundwater Level Gauging Record

Project Name:		BORR - Monthly Monitoring		Project Location:		Bunbury		PM Name:		G.Brophy	
Project Number:		60644386		Client:		SWGA		Fieldwork Staff Name:		HRG SM	
Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.											
Field Data											
Well ID	Date (dd/mm/yy)	Time (24hr:mm)	PID Reading (ppm)	Depth to LNAPL (mBTOC)	Depth to Groundwater (mBTOC)	LNAPL Thickness (m)	Depth to DNAPL (mBTOC)	Total Well Depth (mBTOC)	DNAPL Thickness (m)	Comments (well condition, odour, NAPL colour and viscosity)	
MW31	10/07/24	13:26	-	-	3.115	-	-	-	-		
MW25	↓	13:43	-	-	dry 8.112	-	-	-	-		
MW25B		13:47	-	-	dry	-	-	2.58	-		
MW15		14:28	-	-	1.751	-	-	-	-		
MW13		14:37	-	-	10.21	-	-	-	-		
MW11	11/07/24	8:47	-	-	0.431	-	-	-	-	Flooded, no gas	
MW10	↓	9:20	-	-	1.598	-	-	-	-	Flooded	
MW07		9:46	-	-	10.405	-	-	-	-	No cap	
MW04		10:37	-	-	4.564	-	-	-	-		
MW05		10:44	-	-	5.882	-	-	-	-		
MW11d		11:12	-	-	12.533	-	-	-	-	No cap	
MW11s		11:15	-	-	5.443	-	-	-	-		
MW08A		11:30	-	-	4.338	-	-	-	-		
MW14S		12:03	-	-	9.418	-	-	-	-		
MW14d		12:08	-	-	11.971	-	-	-	-		
MW06		12:50	-	-	5.546	-	-	-	-		
MW46	↓	13:05	-	-	4.865	-	-	-	-		
Measurement Equipment						Notes/Comments					
Make & Model:		Supplier:		CK Enviro		(PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquids; (DNAPL) - dense light non-aqueous phase liquid; (mBTOC) - metres below top of casing MW06 - presence of gas MW27 - flooded padlock					
Serial No.:		Calibration Report Provided?		Yes							
Approval and Distribution											
Fieldwork Staff Signature: <u>16. R. R.</u> Date: <u>11/07/24</u> Project Manager Signature: _____ Date: _____											
Distribution: Project Central File											

Appendix F

Calibration Records



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20M102597

Cable length: 1m 23A100621

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
	Condition	✓	Good, clean
	pH millivolts for pH7 calibration range 0 mV ± 50 mV	✓	
	pH 4 mV range + 165 to + 180 from 7 buffer mV value	✓	170.20 mV
	pH slope	✓	55 to 60 mV/pH, ideal 59mV 57.74
	Response time < 90 seconds	✓	
	Calibrated and conforms to manufacturer's specifications	✓	
ORP			
	Condition	✓	Good, clean
	Response time < 90 seconds	✓	
	within ± 80mV of reference Zobell Reading	✓	
	Calibrated and conforms to manufacturer's specifications	✓	variance range ± 20mV 5 mV
Conductivity			
	Condition	✓	Good, clean
	Temperature	✓	°C
	Conductivity cell constant 5.0 ± 1.0 in GLP file	✓	
	Clean sensor reads less than 3 uS/cm in dry air	✓	
	Calibrated and conforms to manufacturer's specifications	✓	µS/cm
Dissolved Oxygen			
	Condition	✓	Good, clean
	DO sensor in use	✓	Galvanic
	1.25 mil PE membrane (yellow membrane):	✓	swapped DO sensor from 19L102401
	DO Sensor Value	✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
	Calibrated and conforms to manufacturer's specifications	✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (21H100010)	Check Temp NATA	Room Temp	16.1	0	°C	NA	16.1	°C
pH (23K)	pH 7.00	398528	7.01	-6.70	mV	7.04	7.01	pH
pH (23K)	pH 4.00	401033	4.00	163.50	mV	4	4.00	pH
Conductivity (21H100010)	2764 µS/cm at 25°C	24/0602	2764	GLP	5.18	2689	2764	µS/cm
ORP (21J)	Zobell A & B	23/3006	249	249	mV	239.9	243.6	mV
Zero DO (21G100131)	NaSO3 in distilled water	10175	0.0	NA	NA	-0.4	0.0	%
100% DO (21G100131)	100% Air Saturation	Air	100.0	4.5	uA	101.3	100.0	%

Calibration Report

Multi-Parameter Water Quality Instrument

Customer: [REDACTED]

Contact: [REDACTED]

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20B120527

Cable length: 1m (18K100836)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
Connections	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Cable	Condition	✓	Good, clean
Display	Operation	✓	Clean, no tears
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	170.00 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV
Response time < 90 seconds		✓	57.1
Calibrated and conforms to manufacturer's specifications		✓	
DO			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mV of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV
Conductivity			0 mV
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Before	After	Units
Temperature (20D100817)	Check Temp NATA	Room Temp	21.9	-0.2	°C	NA	21.7	°C
pH (24J)	pH 7.00	398528	7.01	-20.80	mV	7.04	7.01	pH
pH (24J)	pH 4.00	401033	4.00	149.20	mV	4.1	4.00	pH
Conductivity (20D100817)	2764 µS/cm at 25°C	25/2001	2764	GLP	5.08	2779	2764	µS/cm
ORP (200124SEN506102)	Zobell A & B	24/1807	236	236	mV	235.6	236.3	mV
Zero DO (20H100658)	NaSO3 in distilled water	10175	0.0	NA	NA	0.4	0.0	%
100% DO (20H100658)	100% Air Saturation	Air	100.0	6.45	uA	106.8	100.0	%

Calibrated by: Gaurav Kanwar

Calibration Date: 29-Apr-25

Next Due: 26-Oct-25



South West Gateway Alliance
Suite 3, 3 Craig Street, Burswood
Western Australia 6100



Report

Annual Aquatic Fauna and Surface Water Report (SLR Consulting, 2025)



BORR (Southern Section) Ministerial Statement 1191

Annual Aquatic Fauna Report

South West Gateway Alliance

2 Dryandra Court, Picton, WA, 6230

Prepared by:

SLR Consulting Australia Pty Ltd

SLR Project No.: 675.073198.00001

30 June 2025

Revision: 02

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
02	26 June 2025	A.I.	A.H.	M.T.
02	27 June 2025	A.H.	A.G.	
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with South West Gateway Alliance (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



Executive Summary

Main Roads Western Australia (Main Roads) is constructing a 27-kilometre highway, the Bunbury Outer Ring Road (BORR), that links Forrest Highway to Bussell Highway. The Project area is located approximately 200 km south of Perth and occurs within the City of Bunbury and Shires of Capel, Dardanup and Harvey. The BORR is separated into the BORR (Northern and Central) and BORR (Southern) Sections. The BORR (Southern Section) includes 11 kilometres (km) of dual carriageway connecting the South-Western Highway to Bussell Highway.

The Commissioner of Main Roads Western Australia (Main Roads) has been granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the WA *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS1191) which was issued on 31 May 2022 (Minister for Environment, 2022) and includes;

Condition 2-1(2)

No project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions

Condition 2-3

The proponent shall continue to undertake monitoring of hydrological regime and water quality during and post-construction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 2-1(2) have been met.

Condition 2-4

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:

- (1) outline the monitoring that was undertaken during the implementation of the proposal;*
- (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1(2) were achieved;*
- (3) report whether that the outcomes in condition 2-1(2) were achieved; and*
- (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 2-1(2).*

To address potential impacts to BSM habitats that are within or adjoining the development envelope, there has been pre-disturbance monitoring of hydrological regimes and baseline conditions, and monitoring of these elements during construction, to meet the objective that there are no project-attributable impacts to the hydrological regime and water quality of potential BSM habitats.

To date, there have been no attributable impacts to the hydrological regime and water quality of any BSM or UFI wetland sites associated with construction activities related to the Proposal. Data collection at monitoring sites will continue to monitor construction activities that could influence water quality, habitat and BSM populations.

BSM population sampling has been ongoing during 2025 and will continue into post-construction. Post-construction monitoring will include all existing minnow survey locations. Both the current BSM habitats, and UFI wetlands, will continue to be monitored for water quality and potential changes, in relation to construction activities within the Proposal area.



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Appendices

Appendix A Historical Water Quality Data

Appendix B Site Photos

B.1 Black-stripe Minnow Sites



Acronyms and Abbreviations

ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand
ANZG	Australia and New Zealand Guidelines
BC	Biodiversity Conservation
BORR	Bunbury Outer Ring Road
BSM	Black-stripe Minnow
CCW	Conservation Category Wetlands
CFM	Carter's Freshwater Mussel (<i>Westralunio carteri</i>)
CPUE	Catch Per Unit Effort
DBCA	Department of Biodiversity, Conservation and Attractions
DGV	Default Guideline Values
DO	Dissolved Oxygen
DPIRD	Department of Primary Industries and Regional Development
EC	Electrical Conductivity
EPBC	Environmental Protection and Biodiversity Conservation
EXEM	Exemption
IPT	Integrated Project Team
IUCN	International Union for Conservation of Nature
MNES FMP	Matters of National Environmental Significance Fauna Management Plan
MUW	Multiple Use Wetland
NATA	National Association of Testing Authorities
NTU	Nephelometric Turbidity Units
REW	Resource Enhancement Wetland
SCP	Swan Coastal Plain
SL	Standard Length
SWGA	South West Gateway Alliance
UFI	Unique Feature Identifier
UWA	University of Western Australia
WRM	Wetland Research & Management



1.0 Introduction

1.1 Overview and Scope

1.1.1 State Approval – Ministerial Statement 1191

The Commissioner of Main Roads Western Australia (Main Roads) has also been conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the WA *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (EPA Report 1714, October 2021), the EPA noted in relation to Inland Waters, the potential for direct and indirect impacts to hydrological regimes and water quality in adjacent Conservation Category Wetlands (CCWs), Resource Enhancement Wetlands (REWs), the Five Mile Brook and BSM habitats.

To address these impacts, under Condition 2 of MS1191, the EPA required pre-disturbance monitoring of hydrological regimes and baseline conditions, and monitoring of these elements during and post-construction, with reporting requirements, to meet the objective that there are no project-attributable impacts to the hydrological regime and water quality of 'conservation' category and 'resource enhanced' wetlands, Five Mile Brook, or BSM habitat. MS1191, therefore, includes the following conditions in relation to Inland Waters:

Condition 2-1(2)

No project attributable impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions:

- (a) *Five Mile Brook (incorporating Multiple Use Wetland UFI-1163 and Conservation Category Wetland UFI-931);*
- (b) *Conservation Category Wetland (UFI-14478);*
- (c) *Resource Enhancement Wetlands (UFI-1117 and UFI-15493) and;*
- (d) *Black-stripe minnow (*Galaxiella nigrostriata*) habitats defined and mapped in the proponent's Action Management Plan Conservation Significant Fauna (Revision 2 August 2021) that are within or adjoins the development envelope, except for the black-stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).*

Condition 2-3

The proponent shall continue to undertake monitoring of hydrological regime and water quality during and post-construction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 2-1(2) have been met.

Condition 2-4

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:



- (1) *outline the monitoring that was undertaken during the implementation of the proposal;*
- (2) *outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 2-1(2) were achieved;*
- (3) *report whether that the outcomes in condition 2-1(2) were achieved; and*
- (4) *outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 2-1(2).*



1.2 Background

The Commissioner of Main Roads Western Australia (Main Roads) is constructing the Bunbury Outer Ring Road (BORR). The BORR is a planned Controlled Access Highway linking the Forrest and Bussell Highways and will provide a high standard route for access to the Bunbury Port, improved road user safety, and will facilitate proposed development to the east of the City of Bunbury. The completed BORR will also provide an effective bypass of Bunbury for inter-regional traffic. Project development of the BORR was conducted through the BORR Integrated Project Team (IPT), composed of Main Roads, GHD and BG&E. The project is now in the construction phase, conducted through the South West Gateway Alliance (SWGA), comprising Acciona, NRW Contracting, MACA Civil, AECOM and Aurecon, together with Main Roads.

The Proposal passes through or is adjacent to a number of waterbodies. As part of the approval process, it was necessary to document the ecological values of these ecosystems and determine if they support any aquatic fauna species of conservation significance. Based on field surveys undertaken by WRM in 2018 – 2020, some of these wetlands were found to support one State, Federally and internationally listed species:

Black-stripe minnow (*Galaxiella nigrostriata*); Endangered (EPBC Act 1999), Endangered (BC Act 2016, Schedule 2 of the Wildlife Conservation Specially Protected Fauna Notice 2018), Endangered (IUCN Redlist 2022).

In August-October 2022 surveys were conducted on nine additional wetlands within the southern investigation area (WRM 2022), and one of these wetlands were added to the monitoring regime for the Proposal (BSM-S-PI-3).

SLR Consulting (previously Wetland Research and Management) has been contracted since 2018, to monitor and report on the presence of BSM and BSM habitat in the BORR southern alignment on behalf of Main Roads, and the South West Gateway Alliance (SWGA).

1.3 Objectives

To ensure that wetland habitat conditions (including both BSM and UFI listed habitats) are not impacted by construction of the Proposal, and measures are implemented to avoid, mitigate and manage impacts of the Proposal during clearing, construction and operation.

In doing so, this report aims to review potential impacts to the hydrological regime and water quality of the following values when compared to preconstruction baseline conditions:

- (a) Five Mile Brook (incorporating Multiple Use Wetland UFI-1163 and Conservation Category Wetland UFI-931);
- (b) Conservation Category Wetland (UFI-14478);
- (c) Resource Enhancement Wetlands (UFI-1117 and UFI-15493) and;
- (d) black-stripe minnow (*Galaxiella nigrostriata*) habitats defined and mapped in the proponent's Action Management Plan Conservation Significant Fauna (Revision 2 August 2021) that are within or adjoins the development envelope, except for the black-stripe minnow habitats permitted to be cleared in condition 4-1(1)(e).

As a result of the occurrences of BSM within the southern investigation area, it is necessary to monitor the potential effects of the Proposal on potential populations. The monitoring includes:



- quarterly water quality monitoring including in situ parameters (pH, oxygen-reduction potential, dissolved oxygen, electrical conductivity, turbidity and temperature) and laboratory analysis of total suspended solids, hydrocarbons and colour,
- quarterly photopoint monitoring from a permanent stake,
- detailed habitat characteristics including mineral substrate and aquatic habitat composition,
- targeted BSM population survey.

Construction commenced in the Proposal area in August 2022 and works in proximity to Five Mile Brook; BSM-S-PI-2 (Table 1, Figure 1), have occurred during the reporting period, therefore, data will be compared between pre and post disturbance.



2.0 Species of Conservation Significance

Aquatic ecosystems in the south-west of the state support a diverse range of taxa with different local, regional, national, and international distributions, and therefore taxa vary in their conservation status depending upon their distribution and evolutionary origins. To assess the conservation significance of aquatic fauna recorded a range of sources were referenced, including:

- Nationally threatened Fauna listed under the EPBC Act 1999,
- Threatened and Priority Fauna in Western Australia under the BC Act 2016 (as listed on the Department of Biodiversity, Conservation and Attractions Threatened and Priority Fauna List (DBCA 2024)),
- Threatened Fauna under the IUCN Redlist of Threatened Species (IUCN 2024), and
- Conservation status of Australian Fishes List (Australian Society for Fish Biology 2016).

One species of conservation significance was specifically targeted during the sampling; the black-stripe minnow. Information on each species is outlined below.

2.1 Black-stripe Minnow

The black-stripe minnow (*Galaxiella nigrostriata*; Plate 1) is currently listed as Endangered nationally (EPBC Act 1999) and at a state level in Western Australia (Biodiversity Conservation Act 2016, April 2024 list), as well as Endangered at an international level (IUCN Red List of Threatened Species 2024). The black-stripe minnow is capable of aestivating (burrowing) into soils to survive drying habitat and therefore can inhabit wetlands that dry over summer, appearing in pools within hours following first rains (Morgan *et al.* 2011). Interestingly, it does not have any specific anatomical or physiological adaptations to aid aestivation and is assumed to survive either within moist soils or within crayfish burrows that contain water through dry periods. It appears that most individuals only live for one year, dying shortly after spawning (Morgan *et al.* 2011).

BSM inhabit tannin stained, vegetated, ephemeral wetlands of approximately 300 mm deep with a pH range of 3 - 8 (Morgan and Gill 2000, Galeotti *et al.* 2008). Other than these general observations, and anecdotal information, little is known about the preferred physio-chemical water properties of their habitats, with no correlations found between physio-chemical variables measured in wetlands across the south-west (Galeotti 2013). However, individual populations appear to be sensitive to sudden, localised changes in water quality variables (Knott *et al.* 2002). Little is known about the salinity tolerances for the black-stripe minnow, although the authors have previously recorded them in wetlands with salinity levels above 3330 $\mu\text{S}/\text{cm}$.

The black-stripe minnow is endemic to south-western Australia and rare throughout its distribution. Its main distribution lies within the Warren sub-region, where numerous populations are found between Albany and Augusta. However, there are isolated populations on the Swan Coastal Plain, including Lake Chandala (near Gingin), Melaleuca Park (north of Perth), and wetlands within the Kemerton Nature Reserve (north of Bunbury) (Morgan *et al.* 1998, Allen *et al.* 2002). A survey by WRM (now part of SLR) in October 2018 within the BORR southern alternate investigation area also recorded a population of black-stripe minnow in Gelorup (WRM 2019a). It is thought that the populations on the Swan Coastal Plain are remnants of a once wider distribution (Morgan *et al.* 1998), suggesting that the loss of habitat caused by urban and rural development during the previous hundred years has had a



significant impact on the extent of this species. As such, their biggest threat is loss of suitable habitat through urbanisation and rural development.



Plate 1. Black-stripe Minnow (*G. nigrostriata*), photo SLR Consulting ©.



3.0 Methodology

3.1 Licenses, Standards and Guidelines

This study was conducted under DPIRD Fisheries Licence EXEM 251057222 (*Instruments of Exemption to the Fish Resources Management Act 1994* for Scientific Research Purposes). As a condition of this licence, taxa lists and reports are required to be submitted to DPIRD. The study was also conducted under DBCA Fauna Taking (Biological Assessment) Licence BA27000105-3. As a condition of this licence, a fauna return including taxa lists and locations, is required upon project completion.

Water quality for physio-chemical parameters and nutrients have been compared against ANZECC/ARMCANZ (2000) freshwater guideline values for the protection of slightly/moderately disturbed wetland ecosystems in the south west of Western Australia as these are the most recent locally specific guidelines. It is noted that the ANZECC and ARMCANZ (2000) are now referred to as Australia and New Zealand Guidelines (ANZG) (2018) and came into effect on 4 September 2018 (ANZG, 2018). Preliminary review of these guidelines has identified that new default guideline values are not yet provided for SW WA. For the purposes of this wetland study, ANZECC and ARMCANZ (2000) criteria have been adopted until these values are updated. Results have also been compared to historical data from the pre-development monitoring program (BORR IPT 2020, SWGA 2021).

3.2 Sites and Sampling Design

Three sites were included in initial the monitoring program for BSM, including one reference site and two potential impact sites (Table 1; Figure 1). The reference site was established for the purposes of providing comparative BSM population trend data and seasonal water quality changes, including water depth. An additional potential impact site (BSM-S-PI-3) was added after wetland studies in August-October 2022 (WRM 2022).

All UFI listed sites to be monitored as per Ministerial Conditions 2-1(2) and their current status (including the current presence/absence of BSM) are outlined in Table 2.

Field surveys conducted for the Proposal (WRM 2020), inclusive of long term monitoring of BSM sites have been ongoing since 2020, with the exception of BSM-S-PI-3, which was added in 2022. Monitoring sites outlined in Table 1 include two sites within the Development Envelope (BSM-S-PI-1 and BSM-S-PI-2), one site downstream of the Development Envelope (BSM-S-PI-3), and a reference site (BSM-S-R-1) (Figure 1).

3.3 Habitat

Details of aquatic mineral substrate and in-stream habitat characteristics were made at each black-stripe minnow site during each sampling event. Habitat characteristics recorded included percent cover by inorganic sediment, submerged macrophyte, floating macrophyte, emergent macrophyte, algae, large woody debris, detritus, roots and trailing vegetation. Details of substrate composition were also recorded and included percent cover by bedrock, boulders, cobbles, pebbles, gravel, sand, silt and clay.



Table 1. Summary of all sampling locations for black-stripe minnows (wetlands) within and adjacent to the southern investigation area. GPS points relate to photopoint locations.

Southern targeted wetlands: Black-stripe minnow				
Site name	Easting	Northing	Site type	Previous name code
BSM-S-R-1	373503	6298065	Reference	WRM Site 3 (2018 – alternate alignment)
BSM-S-PI-1	373329	6300480	Potential impact	Five Mile Brook – additional sample site
BSM-S-PI-2	373608	6300320	Potential impact	WRM South 8 (2019)
BSM-S-PI-3	373836	6301723	Potential Impact	UFI-931, downstream Five Mile Brook

Table 2. Summary of UFI sites in the southern alignment, and the current monitoring status, as per the ministerial reporting requirements. CCW = Conservation Category Wetland, MUW = Multiple-Use Wetland, REW = Resource Enhancement Wetland.

UFI	Wetland Type	Surface Water Location ID	BSM (presence)	Comments
UFI-931	CCW	BSM-S-PI-1	Y	BSM found during annual monitoring in 2021. Monitoring will continue throughout the development of the project.
UFI-1163	MUW	BSM-S-PI-2	Y	BSM found during annual monitoring in 2021. Monitoring will continue throughout the development of the project.
UFI-1163	MUW	BSM-S-PI-3	Y	Downstream site of BSM-S-PI-2. BSM found during annual monitoring in 2022. Monitoring will continue throughout the development of the project.
UFI-1117	REW	UFI-1117	N	Low levels of water holding during 2022 annual surveys. Topography also unsuited for wetland. Follow up surveys observed no BSM populations. No further follow up BSM surveys required.
UFI-14478	CCW	UFI-14478	N	Initial surveys during May 2022 indicate healthy, wetland habitats that had recently dried due to seasonality. Follow up surveys observed no BSM populations. No further follow up BSM surveys required.
UFI-15493	REW	UFI-15493	N	Initial surveys during May 2022 indicate healthy, wetland habitats that had recently dried due to seasonality. Follow up surveys observed no BSM populations. No further follow up BSM surveys required.



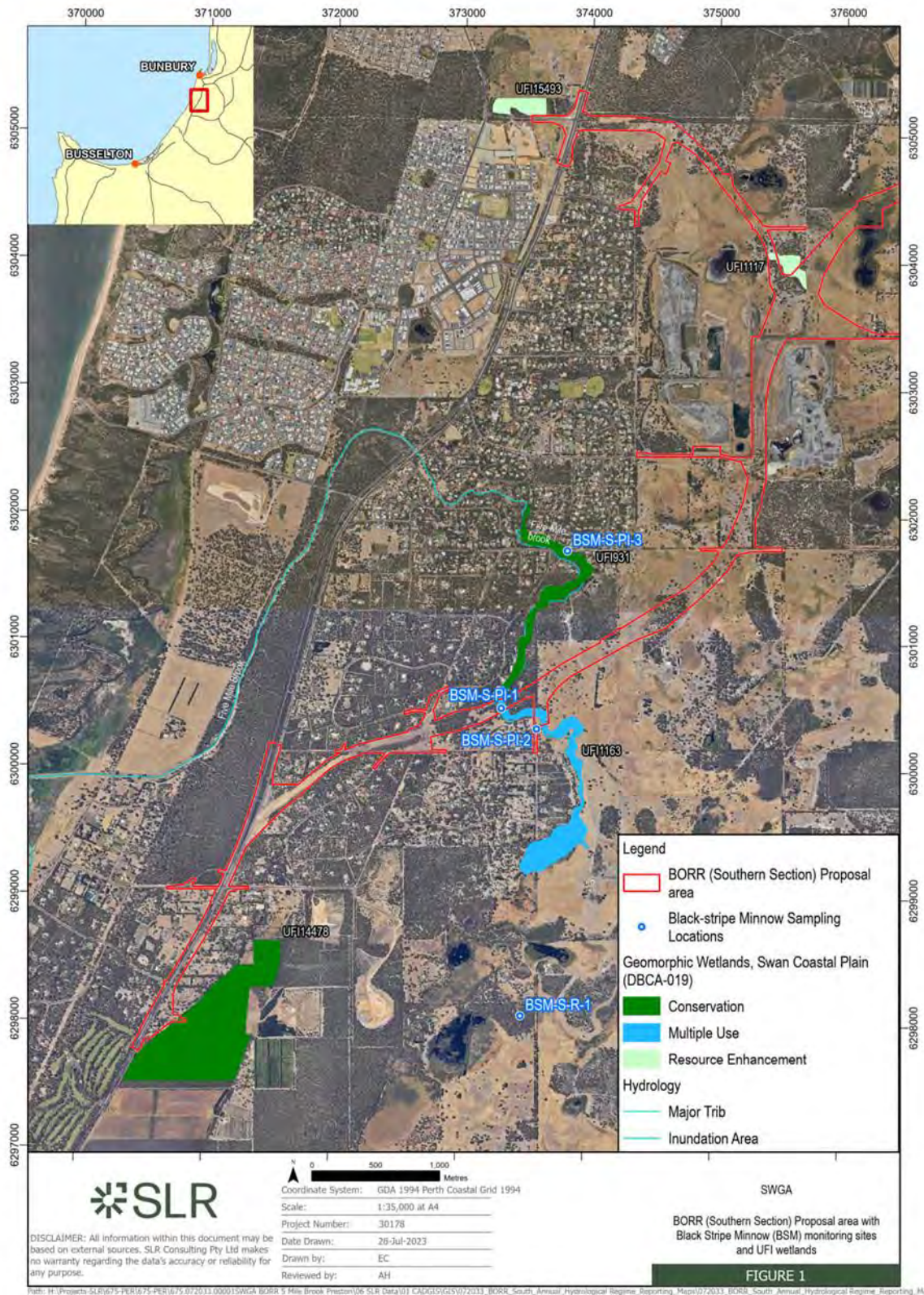


Figure 1. BORR (Southern Section) Proposal Area with Black-Stripe Minnow (BSM) and UFI wetlands (conservation, multiple use and resource enhancement) areas overlaid.



3.4 Surface Water Sampling

During each quarterly monitoring event, *in situ* water quality data were recorded at each site, if it held water, using portable field meters at a depth of approximately 10 cm below the water surface. Variables recorded included pH, oxygen-reduction potential, DO (% and mg/L), EC ($\mu\text{S}/\text{cm}$), turbidity (NTU) and water temperature ($^{\circ}\text{C}$).

Undisturbed water samples were also collected quarterly from each site, if it held water, for laboratory analysis of colour, total suspended solids, and total recoverable hydrocarbons. All samples were collected from a depth of approximately 15 cm below the water surface. All water samples were kept cool in an esky while in the field and were refrigerated as soon as possible for subsequent transport to the laboratory. All laboratory analyses were conducted by the ChemCentre, Bentley, WA (a NATA accredited laboratory).

Total Recoverable Hydrocarbons (TRH) indicate the presence of polar organic compounds which are often prevalent in inorganic substances such as petroleum and diesels. If identified in a sample, a silica gel cleanup (SGC) will be conducted, which acts to absorb non-hydrocarbon polar organics during the sample extraction process. The remaining TRH after the cleanup will indicate the presence of any petroleum polar hydrocarbons, and their molecular range (F2 >C10-C16 = gasoline/petrol, F3 > C16-C34 = gas oil/diesel). Currently ANZG Default Guideline Values (DGVs) for freshwater systems are predominantly limited to F1 hydrocarbons, with no DGVs for oil or petroleum hydrocarbons (ANZG 2018).

Photopoints were set up at each site during the 2020 monitoring. Photopoints were marked permanently with a stake and their locations recorded using a handheld GPS. Photos were taken from the top of the stake (or similar where stakes were not permitted). Photopoints were revisited on every sampling occasion to note general changes in water level and habitat.

Historical water quality data is provided in **Appendix A**.

3.5 Black-stripe Minnow sampling

BSM were targeted using six double wing fyke nets comprising a double 10 m leader/wing (4 - 6 mm mesh, 1 m drop) and a 5 m hoop, and one single wing fyke net comprising a 5.5 m leader/wing (4 - 6 mm mesh, 0.8 m drop) and a 3 m hoop were set overnight at each site. Net set and pick up times were recorded. Exclusion screens were placed on the opening on each net, to keep out water rats and/or turtles. A floating fauna platform was placed at the cod-end (closest to the bank) of each fyke net to provide an air space for freshwater turtles / water rats if caught (i.e. broke through exclusion screen).

Annual sampling for populations of black-stripe minnow used a standardised catch per unit effort (CPUE) approach to provide abundance data on minnows at each site, to allow comparisons of numbers and population structure over time. CPUE was calculated by dividing 24 (hours) by the number of hours fished (net set time), then multiplying by the raw abundance of fish per net. This gave the abundance of fish per net caught within a 24-hour time period. CPUE was then expressed as abundance per site, allowing for yearly data comparisons to be made.



4.0 Results and Discussion

4.1 Rainfall

Total annual rainfall data for study period May 2024 to 2025 is presented in Figure 2 (data for Bunbury – 009965, obtained from BOM 04 June 2025). Total annual rainfall in 2024 (932.2 mm) was above mean annual rainfall (727.7 mm) for the Bunbury area. Total annual rainfall per survey year is summarised in Table 3, with rainfall results for 2025 inclusive of January to May. Rainfall for the months preceding the annual fauna survey (May through August 2024) represented above average measurements, compared to mean rainfall for the area (Figure 2). Subsequently, annual BSM surveys were conducted during October 2024 due to the above average rainfalls observed May – August 2024.

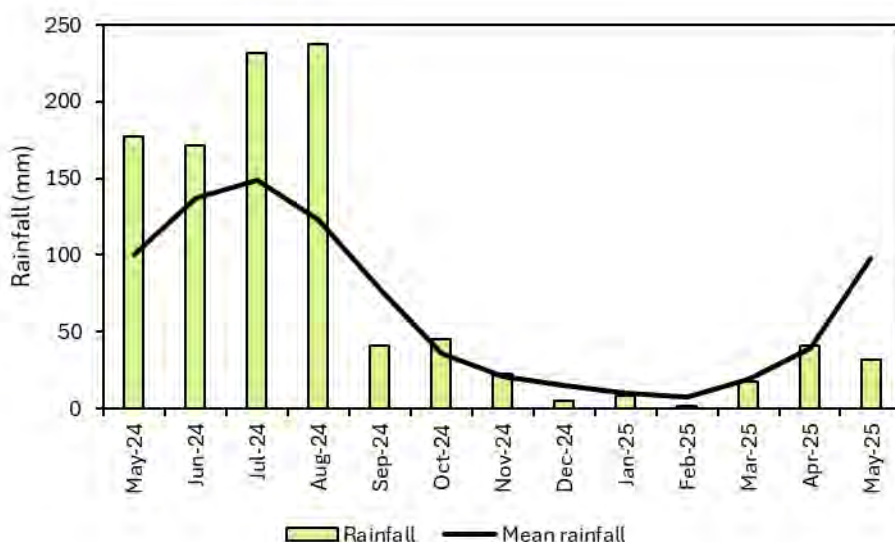


Figure 2. Monthly rainfall for the study period with mean rainfall overlaid (1995 – present).

Table 3. Annual total rainfall (mm) for Bunbury (009965).

Year	Total Rainfall (mm)
2025	99.8*
2024	932.2
2023	716.4
2022	772.2
2021	963.8
2020	626.8*

* incomplete dataset (results are Jan – May 2025).



4.2 Habitat

Confirmed BSM sites within and adjacent to the Proposal area have a diversity of aquatic habitat types including large woody debris, emergent macrophyte, submerged macrophyte, trailing vegetation, floating macrophyte and detritus (Table 4). Differences of in-stream habitat types between sites as part of this sampling period are visualised in Figure 3. It should be noted that sites BSM-S-PI-1 and BSM-S-PI-3 were dry on both Q1 and Q2 monitoring periods during 2025 sampling.

Table 4. Average percentage of different habitat types of black-stripe minnow sites sampled 2020 – 2025. Note: data from 2025 is inclusive of Q1 (January) and Q2 (May) monitoring only.

Location ID	Year	Mineral substrate	Emergent vegetation	Submerged vegetation	Floating vegetation	Algal cover	Detritus	Trailing vegetation	Large woody debris	Other
BSM-S-R-1	2020	32.5	7.5	10	12.5	0	15	10	12.5	0
	2021	23.75	6.25	7.5	25	0.75	9.25	14.5	13	0
	2022	27.4	3.8	2.5	33.9	0	3.8	8.8	20	0
	2023	49.3	1.7	3.7	18.3	1.7	4.0	16.3	5.0	0
	2024	33.3	1.7	0.7	38.3	0.0	2.3	11.0	12.7	0
	2025	34.4	0.6	0.2	36.1	0.0	3.1	13.7	11.9	0
BSM-S-PI-1	2020	20	40	5	0	0	20	5	10	0
	2021	50	10	10	2.5	0	10	12.5	5	0
	2022	77.5	5	0	0	0	10	5	2.5	0
	2023	DRY								
	2024	80	0	0	0	0	10	5	5	0
	2025	DRY								
BSM-S-PI-2	2020	40	2.5	5	0	0	5	42.5	5	0
	2021	45	5	17.5	7.5	0	6.5	6	12.5	0
	2022	90	0	0	0	0	5	2.5	2.5	0
	2023	93.3	0.0	0.0	0.0	0.0	2.8	2.5	0.3	1.3
	2024	100	0	0	0	0	0	0	0	0
	2025	92.0	0.0	0.0	0.8	0.0	3.3	1.7	2.2	0
BSM-S-PI-3*	2022	55	0	2	3	0	5	30	5	0
	2023	20	0	0	2.5	2.5	45	15	15	0
	2024	27.5	0	0	30	0	10	2.5	10	20
	2025	DRY								

* Site only recorded from Q3 2022



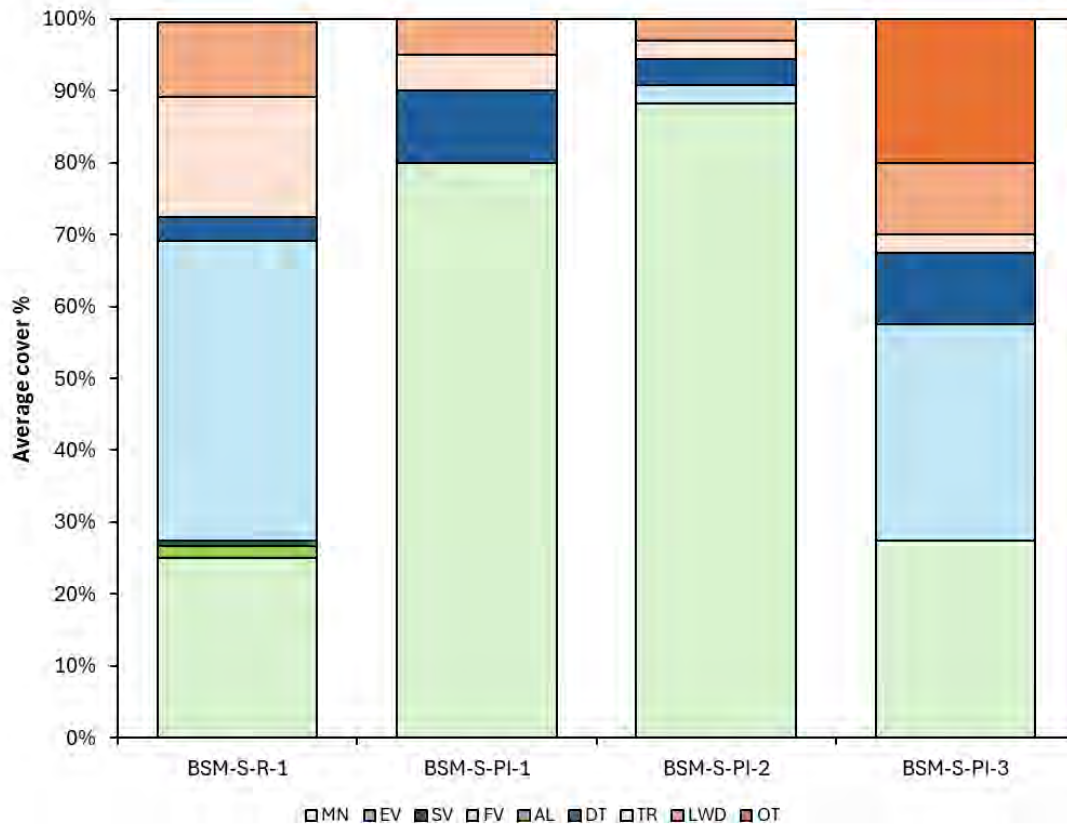


Figure 3. Composition of group-averaged in-stream habitats across site as visually estimated in 2024-25 sampling period (note: no water holding at BSM-S-PI-1 as part of current monitoring period). Habitat types as follows: MN= mineral substrate, EV = emergent vegetation, SV = submerged vegetation, FV = floating vegetation, AL = algal cover, DT = detritus, TR = trailing vegetation, LWD = large woody debris, OT = other.

Changes to habitat due to ongoing construction activities were observed at upper Five Mile Brook (BSM-S-PI-1 and BSM-S-PI-2) during the survey period. Works at BSM-S-PI-1 included the installation of a temporary access in the immediate receiving area downstream of the sampling location (Plate 2) and the construction of a bridge structure, with additional erosion control measures including sediment fences and geo-fabric to protect BSM habitat. By the end of Q2 monitoring in 2025, all construction works impacting the habitat of BSM-S-PI-1 are expected to be completed.





Plate 2. Differences in sampling habitat and the development of construction at BSM-S-PI-1. Top Left: BSM-S-PI-1 in Q2 2023. Top Right: BSM-S-PI-1 in Q2 2024. Bottom Left: BSM-S-PI-1 in Q2 2025.

The installation of large box-culverts downstream of the BSM-S-PI-2 was also observed during this sampling period. Clearing works commenced directly after Q2 monitoring in 2023, with the completed installation of the culverts in Q2 2024 (Plate 3). With this in mind, there are not expected to be any further impacts on habitat at BSM-S-PI-2 as part of construction activities for the BORR.

There have been no documented changes in habitat due to erosion (such as bank scaling or alteration) through natural causes, via photopoint analysis, for the duration of the monitoring project for any other locations (BSM-S-PI-3 or BSM-S-R-1).





Plate 3. Ongoing construction works at BSM-S-PI-2 from photopoint monitoring locations. Top Left: BSM-S-PI-2 during Q2 monitoring 2023. Top Right: BSM-S-PI-2 in Q2 2024. Bottom Left: BSM-S-PI-2 in Q2 2025.



4.3 Surface Water

4.3.1 Depth

Surface water volume varied throughout the current monitoring period (Table 5). BSM-S-PI-2 has held water into Q2 of 2025 and BSM-S-R-1 held water up to Q1 of 2025, whereas all sampling sites held water in Q3 monitoring, 2024. BSM-S-PI-1 has not held water since Q3 2024 and BSM-S-PI-3 has not held water since Q4 2024. Water depth was estimated at sites with larger 'pool' areas, at times when they held water (BSM-S-R-1 and BSM-S-PI-2). These pool areas are likely to act as refugia for BSM at times when water is scarce (Summer).

Table 5. Maximum water depth (m) at each BSM monitoring site in the sampling period.

Site	2024		2025	
	Q3	Q4	Q1	Q2
BSM-S-R-1	1.5	1.6	1.0	DRY
BSM-S-PI-1	0.6	DRY	DRY	DRY
BSM-S-PI-2	1.5	1.5	1.5	0.5
BSM-S-PI-3	1.1	0.8	DRY	DRY

4.3.2 BSM Monitoring Sites

Four sites inhabited by black-stripe minnow in the Proposal Area and surrounding area; including one reference (BSM-S-R-1) and three potential impact sites (BSM-S-PI-1, BSM-S-PI-2 and BSM-S-PI-3), are part of the scope of routine quarterly water quality monitoring. All sites have been routinely monitored since May 2020, with the exception of BSM-S-PI-3, which was added to the sampling design in Q3, 2022 (see **Appendix B**).

In situ water quality within the BSM sites during 2024 - 2025 monitoring was characterised by slightly acidic to slightly basic pH (6.59 – 9.2), very low to very high dissolved oxygen levels (3.6 – 181.1%), and cool to moderate temperatures (16.4 – 32.6 °C) (Table 6). EC values ranged from 539.9 to 1650 µS/cm at sites throughout sampling. Turbidity readings were in range of ANZG (2018) guidelines at all sites in 2024 - 2025 (10 – 100 NTU), except for BSM-S-PI-2 which was at 127.6 in Q2 of 2025 (Table 6).

pH was lower than the trigger value guidelines (ANZG 2018) for the protection of slightly/moderately disturbed wetland ecosystems in the southwest of W.A. (pH 6.01 – 6.59) at BSM-S-R-1 during all sampling occasions. BSM-S-PI-2 and BSM-S-PI-3 had values outside the trigger value guidelines on one occasion during the sampling period (Q4= 9.2, Q1= 6.75). Exceedances of pH values were however still within the known pH range for BSM (as low as 4.5; Allen *et al.* 2002).

Dissolved oxygen (DO%) concentrations were below the trigger value of 90% at all sites on all sampling occasions, with the exception of BSM-S-PI-2, which exceeded the upper trigger value in sampling periods Q4, Q1 and Q2 (Table 6).

BSM-S-R-1 and BSM-S-PI-2 had EC values that were above the ANZG (2018) trigger value range for slightly disturbed wetlands in the southwest of Western Australia (1558-1650 µS/cm) during Q1 and Q2 2025 sampling (Table 6). All other EC values at all sites on all other occasions were within trigger value range (539.9 - 1272 µS/cm).



Table 6. *In-situ* water quality results from BSM southern sites sampled in 2024- 2025, with ANZECC/ARMCANZ (2000) water quality trigger values (values in exceedance of trigger values are highlighted in orange).

Site	Date	Temp (°C)	Cond (µs/cm)	pH (H+)	Redox (mV)	Turbidity (NTU)	DO (%)	DO (mg/L)
ANZG guidelines – wetlands			300-1500	7-8.5		10-100	90-120	
BSM-S-R-1	01-10-2024	19	621.7	6.59	28.1	28.04	39.4	3.51
	19-11-2024	22.7	1272	6.91	1	9.29	44.3	3.13
	04-02-2025	25.7	1650	6.01	5.9	33.79	41.4	3.43
	05-05-2025	DRY						
BSM-S-PI-1	01-10-2024	16.5	682.3	7.29	-13.4	41.9	29.4	2.3
	19-11-2024	DRY						
	04-02-2025	DRY						
	06-05-2025	DRY						
BSM-S-PI-2	30-09-2024	24.1	539.9	6.82	13.3	13.46	48.9	2.93
	18-11-2024	29	882	8.05	-67.3	31.13	158.5	9.19
	04-02-2025	32.6	1271	8.3	-81.1	17.96	134.4	9.78
	05-05-2025	21.9	1558	9.2	-129.6	127.6	181.1	17.65
BSM-S-PI-3	02-10-2024	16.4	626.5	6.75	16.2	10.05	19.1	1.93
	18-11-2024	21.1	875	7.39	-31.4	20.69	3.6	0.4
	04-02-2025	DRY						
	05-05-2025	DRY						



Fully-factorial ANOVAs to determine significant differences in surface water quality parameters are outlined in Table 7. There was a significant difference in DO% between sites ($df = 3$, $F = 6.92$, $p = <0.01$), pH between sites ($df = 3$, $F = 5.71$, $p = <0.01$), and turbidity between time (pre and post construction) ($df = 2$, $F = 0.1$, $p = 0.047$) for all surface water data analysed as part of the southern monitoring program. However, there were no significant differences in the interaction between site and time for any parameters (EC; $p = 0.8$, DO%; $p = 0.4$, pH; $p = 0.4$, turbidity; $p = 0.9$, colour; $p = 0.08$) across all monitoring data, indicating that significant differences between sites, and over time, were site specific, and not project attributable. It should however be noted that data for site BSM-S-PI-3 for the interaction between site and time was omitted, due to their being no available pre-monitoring data for this site (as the site was only introduced as part of Q3 monitoring, 2022).

Total suspended solids (TSS) ranged from 3 mg/L at BSM-S-R-1 in Q3, 2024 to 220 mg/L at BSM-S-PI-2 in Q2 2025 (Table 8). The highest TSS reading for 2024 - 2025 sampling coincided with the highest turbidity, at BSM-S-PI-2 in Q2 2025. Colour ranged from 180 TCU at BSM-S-PI-2 in Q2 2025, to 810 at BSM-S-PI-3 in Q3 2024 (Table 8).

Total recoverable hydrocarbons were recorded at all sites on at least one occasion in 2024-2025 (Table 8). After gel-silica clean up, F2 hydrocarbons ($>C_{10}-C_{16}$; gasoline/petrol) were still detectable at BSM-S-PI-2 and BSM-S-PI-3, and F3 hydrocarbons ($>C_{16}-C_{34}$; gas oil/diesel) were detectable at BSM-S-R-1 and BSM-S-PI-2 (Table 8). F4 hydrocarbons ($C_{34}-C_{40}$) were detectable after gel-silica clean up at BSM-S-PI-2 during Q2 of 2025.

Currently, ANZG Default Guideline Values (DGVs) for freshwater systems are predominantly limited to F1 hydrocarbons, with no DGVs for oil or petroleum hydrocarbons (ANZG 2018). Some sources present in TRH measurements include polar compounds from natural organic matter (NOM), which can be comprised of tannins (CRC Care 2018), which may explain the presence of TRH at some sites.

Previous results from water quality sampling can be found in Appendix A.



Table 7. Tukey post-hoc tests for significant differences in site for pH, Turbidity, DO%, EC and Colour at BSM sites. Groups joined by a common line are not significantly different. Groups are arranged in order of total abundance ascending value, left-to-right, with means indicated in brackets.

Variable	Source	df	F	p-value	Tukey's Post-hoc			
In-situ EC	Site	3	2.61	0.07	BSM-S-PI-1 (655)	BSM-S-PI-3 (677)	BSM-S-PI-2 (1200)	BSM-S-R-1 (1462)
	Time (pre/post)	2	0.21	0.81	Pre (1136.4)	Post (1173.2)		
In-situ DO%	Site	3	6.92	<0.01	BSM-S-PI-3 (20.6)	BSM-S-R-1 (43.8)	BSM-S-PI-1 (60.8)	BSM-S-PI-2 (81.8)
	Time (pre/post)	2	1.03	0.37	Pre (51.7)	Post (59.8)		
In-situ pH	Site	3	5.71	<0.01	BSM-S-R-1 (6.7)	BSM-S-PI-3 (6.9)	BSM-S-PI-1 (7.2)	BSM-S-PI-2 (7.6)
	Time (pre/post)	2	0.88	0.42	Pre (7.0)	Post (7.2)		
In-situ Turb	Site	3	1.26	0.30	BSM-S-PI-3 (9.94)	BSM-S-PI-1 (10.95)	BSM-S-R-1 (11.20)	BSM-S-PI-2 (29.10)
	Time (pre/post)	2	0.10	0.04	Pre (7.8)	Post (25.5)		
Colour	Site	3	2.81	0.05	BSM-S-PI-2 (509)	BSM-S-R-1 (601)	BSM-S-PI-1 (712)	BSM-S-PI-3 (717)
	Time (pre/post)	2	2.78	0.08	Post (585.7)	Pre (616.7)		

*Time p-value calculated without BSM-S-PI-3



Table 8. Laboratory analysed water quality results from southern black-stripe minnow sites sampled in 2024-2025 (F: fraction number, C: carbon number range). Values in orange identify presence of TRH.

Site	Date	Colour	TSS	Total N	Total P	TRH				
		TCU	mg/L	mg/L	mg/L	F1: C6-C10 µg/L	F2: >C10-C16 µg/L	F3: >C16-C34 µg/L	F4: >C34-C40 µg/L	Total TRH µg/L
ANZG guidelines – wetlands				1.5	0.06	>25	>25	>100	>100	>250
BSM-S-R-1	01-10-2024	760	200	9.3	1.3	<25	32	270	<100	300
	19-11-2024	530	3	4.5	0.36	<25	34	250	<100	280
	04-02-2025	470	24	6.1	0.66	<25	<25	450	<100	450
	05-05-2025	DRY								
BSM-S-PI-1	01-10-2024	710	23	5.1	1.2	<25	<25	190	<100	<250
	19-11-2024	DRY								
	04-02-2025	DRY								
	06-05-2025	DRY								
BSM-S-PI-2	30-09-2024	750	7	4.7	0.87	<25	<25	160	<100	<250
	18-11-2024	580	54	7.8	1.9	<25	37	380	<100	420
	04-02-2025	290	13	4.8	0.4	<25	27	310	<100	330
	05-05-2025	180	220	28	2.7	<25	210	4900	280	5400
BSM-S-PI-3	02-10-2024	810	12	5.2	1.1	<25	<25	200	<100	<250
	18-11-2024	690	49	4.3	0.58	<25	55	250	<100	310
	04-02-2025	DRY								
	05-05-2025	DRY								
TRH (after silica gel clean-up)										
							F2: >C10-C16 µg/L	F3: >C16-C34 µg/L	F4: >C34-C40 µg/L	
BSM-S-R-1	01-10-2024						25	110	<100	
	19-11-2024						<25	<100	<100	
	04-02-2025						<25	210	<100	
BSM-S-PI-1	01-10-2024						<25	<100	<100	
BSM-S-PI-2	30-09-2024						<25	<100	<100	
	18-11-2024						<25	150	<100	
	04-02-2025						<25	<100	<100	
	05-05-2025						110	3600	260	
BSM-S-PI-3	02-10-2024						<25	<100	<100	
	18-11-2024						32	<100	<100	



4.3.3 UFI Wetland Monitoring Sites

Conservation Category and Resource Enhancement Wetlands UFI-14478, UFI-1117 and UFI-15493 were only holding water during one or two sampling events, remaining dry for most of the year (Table 9). *In situ* water quality within these sites was characterised by slightly-acidic to slightly-basic pH, very low to low dissolved oxygen levels, and fresh to slightly-brackish electrical conductivities (Table 9).

Table 9. *In-situ* water quality results from UFI wetland sites in the southern alignment. Exceedances of DGVs are highlighted in orange.

Site	Date	Temp (°C)	Cond (µs/cm)	pH (H+)	Redox (mV)	Turbidity (NTU)	DO (%)	DO (mg/L)
ANZECC/ARMCANZ guidelines – wetlands			300-1500	7-8.5		10-100	90 - 120	
UFI-1117	02-10-2024	22.4	518.4	7.61	-28.3	31.84	82	7.18
	19-11-2024	29	440.4	6.41	30	47.74	95.1	5.98
	29-01-2024	DRY						
	13-05-2024	DRY						
UFI-14478	01-10-2024	20.2	442.3	6.91	7.9	19.71	9.6	0.97
	18-11-2024	21.5	755.5	7.4	-23.6	6.96	33.6	2.05
	29-01-2024	DRY						
	13-05-2024	DRY						
UFI-15493	01-10-2024	23.5	765	7.45	-23.7	13.8	48	3.86
	18-11-2024	DRY						
	29-01-2024	DRY						
	13-05-2024	DRY						

Total recoverable hydrocarbons were recorded at both UFI-1117 and UFI-14478 during Q4 2024 sampling (Table 10). Silica gel clean-up did not identify any remaining TRH, there trace amounts of TRH were most likely from organic sources. Total nitrogen (TN) and Total phosphorus exceeded ANZG (2018) guidelines for wetlands in SW Australia at all sites on all occasions (Table 10). The exceedances are likely due to historical land use for farming in these wetlands. Sample analysis was not available during Q3 2024.



Table 10. Laboratory analysed water quality results from UFI wetland sites in the southern alignment. Note: guidelines in grey are for TN and TP are based on ANZG (2018) guidelines for south-western wetlands, while guidelines for TRH are above detectable limits. Exceedances of DGVs are highlighted in orange.

Location ID		Date	Colour (TCU)	TSS (mg/L)	TN (mg/L)	TP (mg/L)	F1 (µg/L)	F2 (µg/L)	TRH		Total TRH (µg/L)
				1.5	0.06	>25	>25	>100	>100	>250	
UFI-1117	02-10-2024	NO SAMPLE									
	19-11-2024	-	59	2.8	0.17	<25	89	320	<100	410	
	04-02-2025	DRY									
	05-05-2025	DRY									
UFI-14478	01-10-2024	NO SAMPLE									
	18-11-2024	-	4	3.7	0.22	<25	53	250	<100	300	
	04-02-2025	DRY									
	05-05-2025	DRY									
UFI-15493	01-10-2024	NO SAMPLE									
	18-11-2024	DRY									
	04-02-2025	DRY									
	05-05-2025	DRY									



4.4 Annual Black-stripe Minnow Population Sampling

A total of 5 individual BSM were recorded at site BSM-S-R-1 during the 2024 annual survey. This is a decrease from the 112 total individuals caught in 2023 (2020 – 1 individual, 2021 – 98 individuals, 2022 – 33 individuals). All individuals caught were displaying breeding colours (i.e. two distinctive lateral black stripes bordering a narrow band of orange). There was a significant difference in abundance between sites during 2024 sampling ($p < 0.05$, Table 11).

Table 11. ANOVA results for differences in fish abundance (per net) between sites for all annual data, with Tukey's post-hoc tests. Groups joined by a common line are not significantly different. Groups are arranged in order of total abundance descending value, left-to-right, with means indicated in brackets.

Source	df	F	p	Tukey's post-hoc test			
Average abundance (per net)	3	6.25	<0.05	BSM-S-R-1 0.71	BSM-S-PI-1 0.00	BSM-S-PI-2 0.00	BSM-S-PI-3 0.00

Catch per unit effort was only recorded at one location in the southern alignment during 2024, BSM-S-R-1 (CPUE = 5.87 individuals, Figure 4). There were no BSM recorded at site BSM-S-PI-1, BSM-S-PI-2 or BSM-S-PI-3. Size classes of BSM observed during the 2024 annual sampling ranged between the 26 – 30mm size classes (Figure 5).

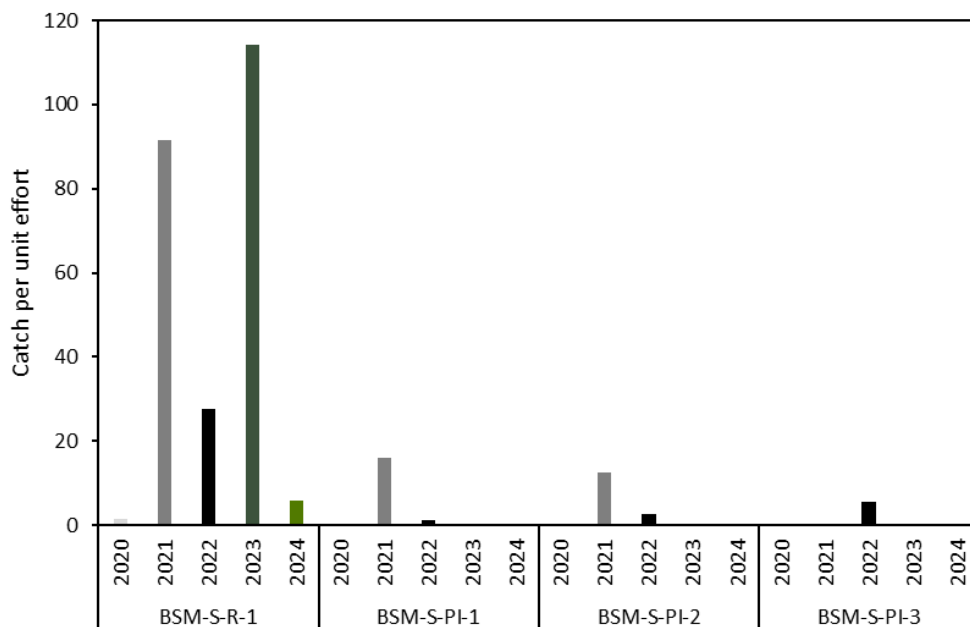


Figure 4. Calculated Catch Per Unit Effort (CPUE) data from 2020 – 2024 for BSM within the southern alignment.



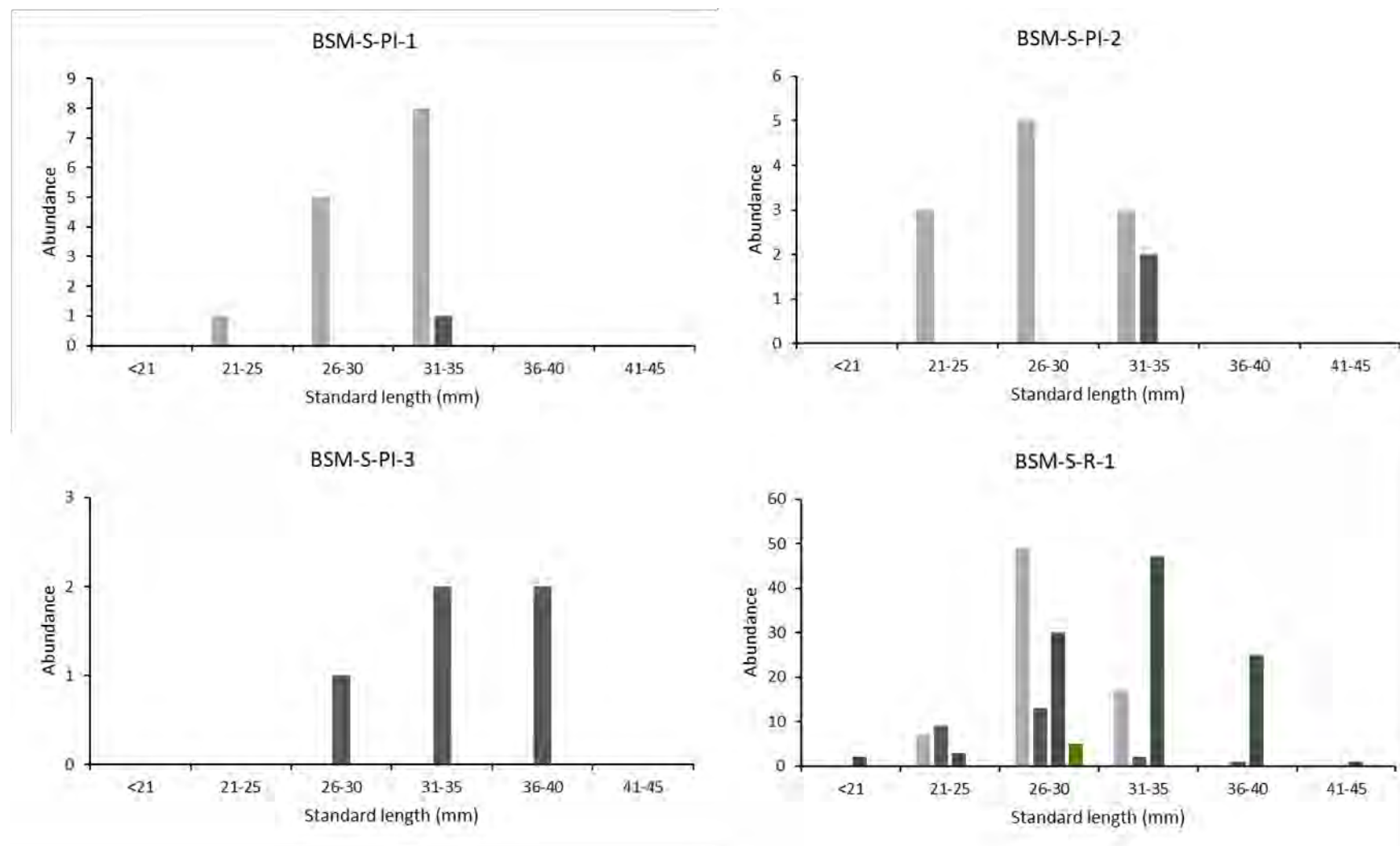


Figure 5. Standard length (mm) frequency graphs of black-stripe minnows at all sites in the southern alignment 2020-2024.



There was a significant difference between average abundance of BSM per net, between years of annual catch data (Table 12). Catch numbers were significantly higher in 2023, comparative to other years, however this does not factor into site specific differences (reference v potential impact, pre v post). Statistical analysis of pre and post construction presence and absence of minnows was not conducted on this occasion, due to the small sample size of 'post-construction' data, as well as the ongoing absence of BSM within Five Mile Brook since 2022.

Table 12. ANOVA results for differences in fish abundance (per net) between years for all annual data, with Tukey's post-hoc tests. Groups joined by a common line are not significantly different. Groups are arranged in order of total abundance descending value, left-to-right, with means indicated in brackets.

Source	df	F	p	Tukey's post-hoc test				
Average abundance (per net)	4	14.49	<0.05	2023	2021	2022	2024	2020
				(9)	(5.4)	(1.32)	(0.18)	(0.05)



5.0 Summary and Conclusions

There have been no attributable impacts to the hydrological regime and water quality of any BSM habitat associated with construction of the Proposal. Differences in surface water quality detected for both sites (impact and reference) and over time (pre and post construction) are deemed to be site specific and seasonal, as there are currently no differences between both site and time in the southern alignment.

High turbidity and TSS in BSM-S-PI-2 during Q2 monitoring in 2025 is likely due to a reduction in water depth at the site during sampling. Prior studies have shown similar patterns, with the exposure of sediments to surface water, and the air, to likely be the cause of these increases. This was also apparent in Total Recoverable Hydrocarbon (TRH) analysis at the same site, for the same monitoring period, = (F3 = 3600µg/L). Prior surveys have also observed higher detectable levels of TRH within this monitoring site (1100 µg/L - Q1 sampling 2024), likely also due to water level drawdown occurs over the warmer summer months.

While there were no BSM found within the potential impact sites within the Five Mile Brook in the southern alignment during this reporting period, it is noted that historical water levels throughout the area are heavily dependent on higher rainfall events. Some sites that have previously observed populations of minnows had been dry for over 12 months, prior to the 2024 annual BSM survey. Catch numbers within the reference site in the southern alignment (BSM-S-R-1) were also much lower than prior sampling years, indicating that the absence of minnows has potentially been impacted from seasonality and recent low rainfalls (over the past 2 years). Additionally, it is important to note that the design and construction of culverts (smaller total length) and bridge infrastructure (overpass design) along Five Mile Brook is more conducive to the re-habitation of BSM after construction activities, due to lesser ground disturbance within sites. Therefore, construction activities most likely have not contributed to the decline in BSM populations within Five Mile Brook. Populations of BSM in five Mile Brook will however need to be closely monitored annually, to ensure that minnows return to these areas, based on pre-construction (2022) data.

It is recommended that all current BSM monitoring sites are retained, including both the reference (BSM-S-R-1) and downstream monitoring site (BSM-S-PI-3), to monitor the health of populations of minnow's post-construction.



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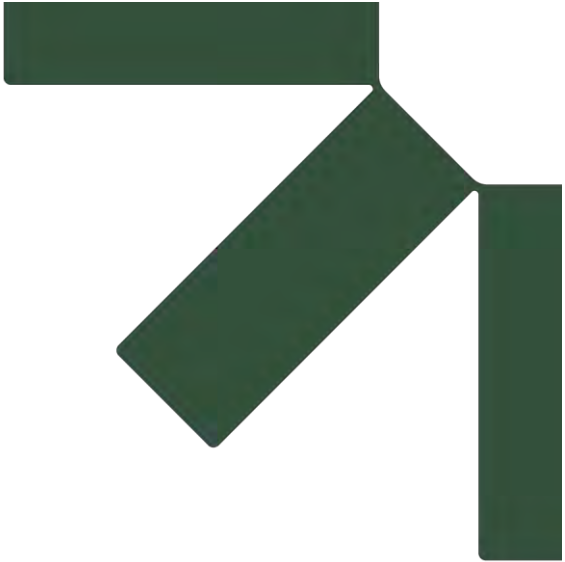


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Appendix A Historical Water Quality Data

Table A1. Historical *In-situ* water quality results from BSM sites in the southern alignment. Exceedances of DGVS in orange.

Site	Date	Temp (°C)	Cond (µS/cm)	pH (H+)	Redox (mV)	Turbidity (NTU)	DO %	DO (mg/L)
ANZECC/ARMCANZ guidelines – wetlands			300-1500	7-8.5		10-100	90 - 120	
BSM-S-R-1	29-05-2020	Not sampled						
	07-08-2020	13.1	820	7.15	-19.8	4.9	72.1	7.88
	28-10-2020	18.8	1056	6.71	18.8	4.86	31	2.2
	28-01-2021	16.4	2610	7.26	8.5	10.64	31.4	9.91
	25-05-2021	11	2810	5.58	7.96	2.76	48.7	5.56
	27-08-2021	8.2	619.6	7.82	-40.2	2.13	48.4	5.68
	13-10-2021	11.5	742.7	6.89	10.1	3.25	55.5	5.97
	31-01-2022	21.1	1360	6.75	27.5	8.96	5	0.51
	01-06-2022	8.5	1947	5.02	118.1	6.8	54.4	6.12
	15-08-2022	12.6	613.5	6.45	25.4	11.59	30.2	3.27
	06-10-2022	14.2	676	7.03	6.3	3.71	61.7	6.17
	31-01-2023	21.7	1519	7.22	-6.8	26.78	26.2	2.83
	15-05-2023	DRY						
	18-09-2023	17.1	1352	6.82	3.2	8.18	61.9	5.12
	21-11-2023	19.3	1880	7.75	-44.3	8.43	37.1	3.34
	29-01-2024	23.2	3300	6.27	22.2	16.32	56.5	3.72
	13-05-2024	DRY						
	01-10-2024	19	621.7	6.59	28.1	28.04	39.4	3.51
	19-11-2024	22.7	1272	6.91	1	9.29	44.3	3.13
	04-02-2025	25.7	1650	6.01	5.9	33.79	41.4	3.43
	05-05-2025	DRY						
BSM-S-PI-1	29-05-2020	DRY						
	07-08-2020	14.1	837	7.24	-24.9	1.52	72.2	7.55
	28-10-2020	DRY						
	28-01-2021	DRY						
	25-05-2021	DRY						
	27-08-2021	10.2	520.9	7.36	-14.7	6.61	63.5	7.09
	14-10-2021	13.9	778.9	7.12	-1.5	5.95	83	8.34
	31-01-2022	DRY						
	01-06-2022	DRY						
	15-08-2022	14.4	492.9	6.79	14	5.34	54.8	4.4
	05-10-2022	19.7	596.3	7.3	-1.6	3.98	55	5
	31-01-2023	DRY						
	15-05-2023	DRY						
	18-09-2023	DRY						
	21-11-2023	DRY						



	29-01-2024	DRY						
	13-05-2024	DRY						
	01-10-2024	16.5	682.3	7.29	-13.4	41.9	29.4	2.3
	19-11-2024	DRY						
	04-02-2025	DRY						
	06-05-2025	DRY						
BSM-S-PI-2	29-05-2020	DRY						
	08-08-2020	11	846	7.41	-34.8	3.55	76.9	8.47
	28-10-2020	20.5	1125	6.96	5.3	26.57	34.4	3.35
	28-01-2021	DRY						
	25-05-2021	DRY						
	27-08-2021	10.1	528.1	7.74	-36	6.78	55	6.78
	14-10-2021	16.6	716.1	7.31	-13.5	4.87	83.5	8.43
	31-01-2022	DRY						
	01-06-2022	DRY						
	15-08-2022	15.7	505.6	6.8	13	5.89	53.4	5.24
	05-10-2022	21.5	607	7.11	0.4	3.81	63	5.65
	31-01-2023	25.7	1087	8.04	-55.2	12.71	114.3	8.94
	15-05-2023	16.6	1600	7.33	-24.6	6.42	21.8	1.73
	21-09-2023	19	1090	7.41	-28.8	2.78	61.3	5.67
	20-11-2023	32.6	1379	7.92	-55.9	12.9	109.2	6.13
	29-01-2024	33.5	4270	7.65	-47.9	160.1	31.2	6.2
	13-05-2024	DRY						
	30-09-2024	24.1	539.9	6.82	13.3	13.46	48.9	2.93
	18-11-2024	29	882	8.05	-67.3	31.13	158.5	9.19
	04-02-2025	32.6	1271	8.3	-81.1	17.96	134.4	9.78
	05-05-2025	21.9	1558	9.2	-129.6	127.6	181.1	17.65
BSM-S-PI-3	17-08-2022	14.1	524.4	7.17	-10.7	6.61	40.3	4.17
	15-09-2022	18.5	508	6.63	20.9	4.6	25.5	2.39
	12-10-2022	12.7	760.9	7.3	7.6	5.69	20.8	2.22
	31-01-2023	DRY						
	15-05-2023	DRY						
	18-09-2023	15.2	765.2	6.14	36.6	11.97	14.3	1.49
	20-11-2023	DRY						
	29-01-2024	DRY						
	13-05-2024	DRY						
	02-10-2024	16.4	626.5	6.75	16.2	10.05	19.1	1.93
	18-11-2024	21.1	875	7.39	-31.4	20.69	3.6	0.4
	04-02-2025	DRY						
	05-05-2025	DRY						



Table A2. Historical laboratory analysed water quality results for BSM sites in the southern alignment. Note: guidelines in grey are for TN and TP are based on ANZG (2018) guidelines for south-western wetlands, while guidelines for TRH are above detectable limits. Exceedances of DGVs are highlighted in orange.

Location ID	Date	Colour (TCU)	TSS (mg/L)	TN	TP	TRH				
						F1 (µg/L)	F2 (µg/L)	F3 (µg/L)	F4 (µg/L)	Total TRH (µg/L)
BSM-S-R-1	29-05-2020	Not sampled								
	07-08-2020	700	17			<25	<25	<100	<100	<250
	28-10-2020	790	130			<25	110	650	100	860
	28-01-2021	520	9			<25	48	340	<100	<250
	25-05-2021	200	1			<25	<25	140	<100	<250
	27-08-2021	670	3			<25	<25	<100	<100	<250
	13-10-2021	560	6			<25	400	130	<100	530
	31-01-2022	740	18			<25	<25	180	<100	<250
	01-06-2022	390	16			<25	<25	180	<100	<250
	15-08-2022	750	5			<25	<25	<100	<100	<250
	11-11-2022	640	N/A			<25	<25	<100	<100	<250
	31-01-2023	790	61			<25	<25	260	<100	260
	15-05-2023	DRY								
	18-09-2023	470	3	3.3	0.45	<25	46	120	<100	<250
	21-11-2023	480	5	4.9	0.53	<25	<25	170	<100	<250
	29-01-2024	750	53	12	1.3	<25	46	820	<100	860
	13-05-2024	DRY								
	01-10-2024	760	200	9.3	1.3	<25	32	270	<100	300
19-11-2024	530	3	4.5	0.36	<25	34	250	<100	280	
04-02-2025	470	24	6.1	0.66	<25	<25	450	<100	450	
05-05-2025	DRY									
BSM-S-PI-1	29-05-2020	DRY								
	07-08-2020	640	1			<25	<25	<100	<100	<250
	28-10-2020	DRY								
	28-01-2021	DRY								
	25-05-2021	DRY								
	27-08-2021	650	4			<25	<25	<100	<100	<250
	14-10-2021	560	4			<25	<25	130	<100	<250
	31-01-2022	DRY								
	01-06-2022	DRY								
	15-08-2022	720	1			<25	<25	<100	<100	<250
	09-11-2022	990	N/A			<25	<25	200	<100	<250
	31-01-2023	DRY								
	15-05-2023	DRY								



	18-09-2023	DRY								
	21-11-2023	DRY								
	29-01-2024	DRY								
	13-05-2024	DRY								
	01-10-2024	710	23	5.1	1.2	<25	<25	190	<100	<250
	19-11-2024	DRY								
	04-02-2025	DRY								
	06-05-2025	DRY								
BSM-S-PI-2	29-05-2020	DRY								
	08-08-2020	640	1			<25	<25	<100	<100	<250
	28-10-2020	800	22			<25	<25	140	<100	<250
	28-01-2021	DRY								
	25-05-2021	DRY								
	27-08-2021	650	7			No sample taken				
	14-10-2021	590	3			<25	48	120	<100	<250
	31-01-2022	DRY								
	01-06-2022	DRY								
	15-08-2022	720	3			<25	<25	<100	<100	<250
	09-11-2022	870	N/A			<25	<25	240	<100	<250
	31-01-2023	380	18			<25	<25	310	<100	310
	15-05-2023	180	15			<25	26	340	<100	360
	21-09-2023	450	2	3.2	0.57	<25	58	140	<100	<250
	20-11-2023	310	15	4.1	0.88	<25	<25	220	<100	<250
	29-01-2024	250	190	23	3.1	<25	200	2100	370	2700
	13-05-2024	DRY								
	30-09-2024	750	7	4.7	0.87	<25	<25	160	<100	<250
	18-11-2024	580	54	7.8	1.9	<25	37	380	<100	420
	04-02-2025	290	13	4.8	0.4	<25	27	310	<100	330
	05-05-2025	180	220	28	2.7	<25	210	4900	280	5400
BSM-S-PI-3	17-08-2022	710	4			<25	<25	<100	<100	<250
	15-09-2022	660	46			<25	<25	<100	<100	<250
	12-10-2022	760	5			<25	140	<100	<100	<250
	31-01-2023	DRY								
	15-05-2023	DRY								
	18-09-2023	670	27	2.5	0.2	<25	110	150	<100	260
	20-11-2023	DRY								
	29-01-2024	DRY								
	13-05-2024	DRY								
	02-10-2024	810	12	5.2	1.1	<25	<25	200	<100	<250
	18-11-2024	690	49	4.3	0.58	<25	55	250	<100	310
	04-02-2025	DRY								



	05-05-2025	DRY
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Table A3. Historical TRH Gel silica clean-up of BSM sites in the southern alignment.
Detectable TRH amounts are highlighted in orange.

Location ID	Date	TRH (after silica gel clean-up)		
		F2: >C10-C16 (µg/L)	F3: >C16-C34 (µg/L)	F4: >C34-C40 (µg/L)
BSM-S-R-1	31-01-2022	<25	<100	<100
	01-06-2022	<25	<100	<100
	31-01-2023	<25	<100	<100
	18-09-2023	<25	<100	<100
	21-11-2023	<25	<100	<100
	29-01-2024	31	460	<100
	19-11-2024	<25	<100	<100
	21-09-2024	<25	<100	<100
	04-02-2025	<25	210	<100
BSM-S-PI-1	09-11-2022	<25	<100	<100
	01-10-2024	<25	<100	<100
BSM-S-PI-2	09-11-2022	<25	<100	<100
	31-01-2023	<25	<100	<100
	15-05-2023	<25	<100	<100
	21-09-2023	<25	<100	<100
	20-11-2023	<25	<100	<100
	29-01-2024	130	1100	400
	30-09-2024	<25	<100	<100
	18-11-2024	<25	150	<100
	04-02-2025	<25	<100	<100
	05-05-2025	110	3600	260
BSM-S-PI-3	12-10-2022	37	<100	<100
	18-09-2023	93	<100	<100
	02-10-2024	<25	<100	<100
	18-11-2024	32	<100	<100



Table A4. Historical *In-situ* water quality results from UFI sites in the southern alignment. Exceedances of DGVs are highlighted in orange.

Site	Date	Temp (°C)	Cond (µs/cm)	pH (H+)	Redox (mV)	Turbidity (NTU)	DO (%)	DO (mg/L)
ANZECC/ARMCANZ guidelines – wetlands			300-1500	7-8.5		10-100	90 - 120	
UFI-1117	17-08-2022	7.6	458	5.42	8.7	5.29	41	5.35
	15-09-2022	24	744.5	4.77	139.4	1.9	27.4	2.27
	11-10-2022	22.1	1175	5.77	79.8	6.68	27	2.32
	22-09-2023	19	676.3	6.64	14.5	43.85	15.5	1.66
	21-11-2023	22.4	1375	8.09	-66.8	41.03	22.7	1.97
	02-10-2024	22.4	518.4	7.61	-28.3	31.84	82	7.18
	19-11-2024	29	440.4	6.41	30	47.74	95.1	5.98
UFI-14478	17-08-2022	14.9	2904	6.3	40.4	1.91	24.8	1.53
	15-09-2022	19.2	1521	6.81	10.4	3.8	25.5	2.18
	11-10-2022	15.9	1700	6.96	9.8	1.01	27.4	1.01
	20-09-2023	16.2	742	6.96	-8.1	3.38	5.3	0.47
	01-10-2024	20.2	442.3	6.91	7.9	19.71	9.6	0.97
	18-11-2024	21.5	755.5	7.4	-23.6	6.96	33.6	2.05
UFI-15493	16-08-2022	16.3	483	6.71	17.6	0.55	17	1.75
	16-09-2022	14.5	619.5	7.33	-17.1	2.99	9.6	0.82
	10-10-2022	20.7	792.8	7.57	-26.9	1.75	42.6	3.87
	20-09-2023	17	568.8	7.44	-32.4	1.86	36.1	3.43
	01-10-2024	23.5	765	7.45	-23.7	13.8	48	3.86



Table A5. Historical laboratory analysed water quality results for UFI sites in the southern alignment. Note: guidelines in grey are for TN and TP are based on ANZG (2018) guidelines for south-western wetlands, while guidelines for TRH are above detectable limits. Exceedances of DGVs are highlighted in orange.

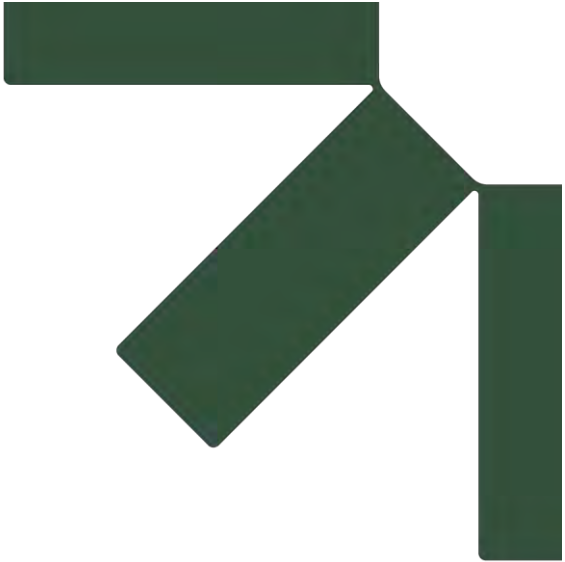
Locati on ID	Date	Colour (TCU)	TSS (mg/L)	TN (mg/L)	TP (mg/L)	TRH				
						F1 (µg/L)	F2 (µg/L)	F3 (µg/L)	F4 (µg/L)	Total TRH (µg/L)
				1.5	0.06	>25	>25	>100	>100	>250
UFI-1117	18-08-2022	1700	3	-	-	<25	<25	110	<100	<250
	15-09-2022	2800	4	-	-	<25	<25	190	<100	<250
	11-10-2022	5300	16	-	-	<25	62	340	<100	400
	22-09-2023	2200	10	4.1	0.11	<25	<25	160	<100	<250
	21-11-2023	-	14	2.6	0.045	<25	<25	<100	<100	<250
	02-10-2024	430	52	3.4	0.25	<25	63	370	<100	430
	19-11-2024	-	59	2.8	0.17	<25	89	320	<100	410
UFI-14478	17-08-2022	340	4	-	-	<25	<25	<100	<100	<250
	15-09-2022	710	1	-	-	<25	<25	<100	<100	<250
	12-10-2022	810	2	-	-	<25	63	110	<100	<250
	20-09-2023	-	8	6.1	0.029	<25	59	<100	<100	<250
	01-10-2024	650	16	4.5	0.41	<25	26	220	<100	<250
	18-11-2024	-	4	3.7	0.22	<25	53	250	<100	300
UFI-15493	16-08-2022	160	6	-	-	<25	<25	<100	<100	<250
	16-09-2022	220	3	-	-	<25	50	<100	<100	<250
	12-10-2022	120	2	-	-	<25	<25	<100	<100	<250
	20-09-2023	-	0.5	0.7	0.069	<25	<25	<100	<100	<250
	01-10-2024	120	6	1	0.077	<25	57	330	<100	390



**Table A6. Historical TRH Gel silica clean-up of UFI sites in the southern alignment.
Detectable TRH amounts are highlighted in orange.**

Location ID	Date	TRH (after silica gel clean-up)		
		F2: >C10-C16 (µg/L)	F3: >C16-C34 (µg/L)	F4: >C34-C40 (µg/L)
UFI-1117	18-08-2022	<25	<100	<100
	15-09-2022	<25	<100	<100
	11-10-2022	<25	<100	<100
	22-09-2023	<25	<100	<100
	02-10-2024	38	130	<100
	19-11-2024	61	<100	<100
UFI-14478	12-10-2022	<25	<100	<100
	20-09-2023	<25	<100	<100
	18-11-2024	37	<100	<100
UFI-15493	16-09-2022	42	<100	<100
	01-10-2024	39	140	<100





Appendix B Site Photos

B.1 Black-stripe Minnow Sites

BSM-S-R-1



Q2 Monitoring



Q3 Monitoring



Q1 Monitoring



Q2 Monitoring



BSM-S-PI-1



Q3 Monitoring



Q4 Monitoring



Q1 Monitoring



Q2 Monitoring



BSM-S-PI-2



Q3 Monitoring



Q4 Monitoring



Q1 Monitoring



Q2 Monitoring



BSM-S-PI-3



Q3 Monitoring



Q4 Monitoring



Q1 Monitoring



Q2 Monitoring



UFI-14478



Q3 Monitoring



Q4 Monitoring



Q3 Monitoring



Q4 Monitoring



UFI-7216 (1117)



Q3 Monitoring



Q4 Monitoring



Q1 Monitoring



Q2 Monitoring



UFI-15493



Q3 Monitoring



Q4 Monitoring



Q1 Monitoring



Q2 Monitoring





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Appendix K

M3.4 Environmental Performance Report - Flora and Vegetation (PEC)

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191: M3-4

Environmental Performance Report

Flora and Vegetation (2024 - 2025)

Priority Ecological Communities

Main Roads WA

Revision 0

28-Aug-25



Document control record

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Document control						
Report title		Ministerial Statement 1191 M2-4 Environmental Performance Report – PEC				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	27-Jul-25	SWGA Review	D.B. & C.S.	A.G.		A.M.
B	18-Aug-25	SWGA Review	A.G.	E.R.		A.M.
C	18-Aug-25	Main Roads Review	A.G.	Main Roads		M.S.
0	28-Aug-25	Issued	A.G.	Main Roads		M.S.
Current revision		0				

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Report

Environmental Performance Report - Priority Ecological Communities (EcoEdge, 2025)

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- Figure 2. Distribution of Banksia Woodlands TEC/PEC, Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC in proximity to the Proposal area
- Figure 3. Distribution of Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC adjacent to the Development Envelope
- Figure 4. Overview of monitoring location for Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC
- Figure 5. Ground disturbance and clearing extents during the reporting period in relation to TEC/PEC vegetation

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Table 1. Clearing metrics during the reporting period

1 Introduction

1.1 Proposal

Main Roads Western Australia (Main Roads) is constructing a 27-kilometre highway, the Bunbury Outer Ring Road (BORR), that links Forrest Highway to Bussell Highway.

The BORR Southern Section (the Proposal) includes 11 kilometres (km) of dual carriageway connecting the South-Western Highway to Bussell Highway (

Figure 1). The Proposal area is located approximately 200 km south of Perth and occurs within the City of Bunbury and Shire of Capel.

1.2 Overview and Scope

The Commissioner of Main Roads has been granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (Environmental Protection Authority (EPA) Report 1714, October 2021), the EPA noted that in relation to Flora and Vegetation, the following Priority Ecological Communities (PECs) (Priority 3) were identified in the development envelope (Figure 2):

- Banksia woodlands of the Swan Coastal Plain (referred to as the Banksia Woodlands TEC/PEC)
- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain (referred to as the Tuart Woodlands TEC/PEC)
- Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands (FCT 25) (referred to as the Tuart-Peppermint Woodlands PEC).

Two of these communities are listed as Threatened Ecological Communities (TECs) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are considered Matters of National Environmental Significance for the Commonwealth assessment. The Banksia Woodlands is listed as Endangered, and the Tuart Woodlands is listed as Critically Endangered.

The proposal has the potential to directly impact these communities through clearing, and potential indirect impacts which include the introduction/spread of weeds and disease (including dieback *Phytophthora cinnamomi*) and altered hydrological regimes.

To address these impacts, the EPA recommended Condition 3. Ministerial Statement 1191, therefore, includes the following conditions in relation to Flora and Vegetation:

Condition 3-1

The proponent shall implement the proposal to achieve the following environmental outcomes:

(1) clear no more than:

- 23.4 ha of vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (Banksia Woodlands);*
- 4.4 ha of vegetation representative of the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands); and*
- 4.5 ha of vegetation representative of the Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC.*

- (2) ensure there are no project attributable indirect impacts, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands within twenty (20) metres outside the development envelope (defined in Figure 2a and Figure 2b) and within the clearing exclusion areas (defined in Figure 1).

Condition 3-2

Prior to ground-disturbing activities, the proponent shall undertake monitoring of the values listed in condition 3-1(2) and submit a report about the preconstruction baseline conditions to the CEO.

Condition 3-3

The proponent shall continue to undertake monitoring during and postconstruction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 3-1(2) has been met.

2 Environmental Performance Report

2.1 Purpose and Objective

The purpose of this Environmental Performance Report (EPR) is to address the compliance of the BORR Southern Section with condition 3-4 set out in MS 1191.

Condition 3-4 of MS 1191 requires an annual environmental performance report to be submitted to the Chief Executive Officer (CEO) of the EPA as part of the Compliance Assessment Report (CAR).

Condition 3-4

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:

- (1) outline the monitoring that was undertaken during the implementation of the proposal;*
- (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 3-1(2) were achieved;*
- (3) report whether that the outcomes in condition 3-1(1) and 3-1(2) were achieved; and*
- (4) outline any management actions undertaken during the implementation of the proposal to meet the outcomes in condition 3-1(1) and 3-1(2).*

This EPR has been produced in accordance with condition M3-4 and incorporates a 12-month audit period from 31 May 2024 to 31 May 2025. This is the third EPR for M3-4 to be submitted under MS 1191.

The report prepared by EcoEdge (2025) is attached.

2.2 Priority Ecological Communities

The areas of Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC adjacent to the Development Envelope are indicated in Figure 3, noting the Tuart-Peppermint Woodlands PEC largely overlaps the Tuart Woodlands TEC/PEC.

The monitoring locations of Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC adjacent to the development are indicated in Figure 4.

2.3 Clearing metrics in relation to Flora and Vegetation (PEC) during the reporting period

Construction of the Proposal commenced on 1 August 2022.

Clearing and disturbance of Priority Ecological Community (PEC) during the reporting period is summarised in Table 1 and Figure 5.

Table 1. Clearing metrics during the reporting period.

Environmental Aspect	Area / quantity specified in Ministerial Statement 1191	Area / quantity cleared during the 2022 - 2023 reporting period	Area / quantity cleared during this 2023 – 2024 reporting period	Area / quantity cleared during this 2024 – 2025 reporting period	Total area / quantity cleared
Vegetation representative of the Banksia Woodlands of the Swan Coastal Plain Priority Ecological Community (PEC) (Banksia Woodlands)	23.4 ha	11.49 ha	6.16 ha	0.05 ha	17.70 ha
Vegetation representative of the Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain PEC (Tuart Woodlands)	4.4 ha	2.06 ha	1.42 ha	0 ha	3.48 ha
Vegetation representative of the Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> – <i>Agonis flexuosa</i> Woodlands PEC (Tuart-Peppermint Woodlands), overlapping the Tuart Woodlands PEC	4.5ha	2.15 ha	1.42 ha	0 ha	3.58 ha

...

Figure 1. Proposal area (Proposal area as shown in Ministerial Statement 1191)

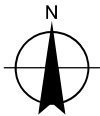
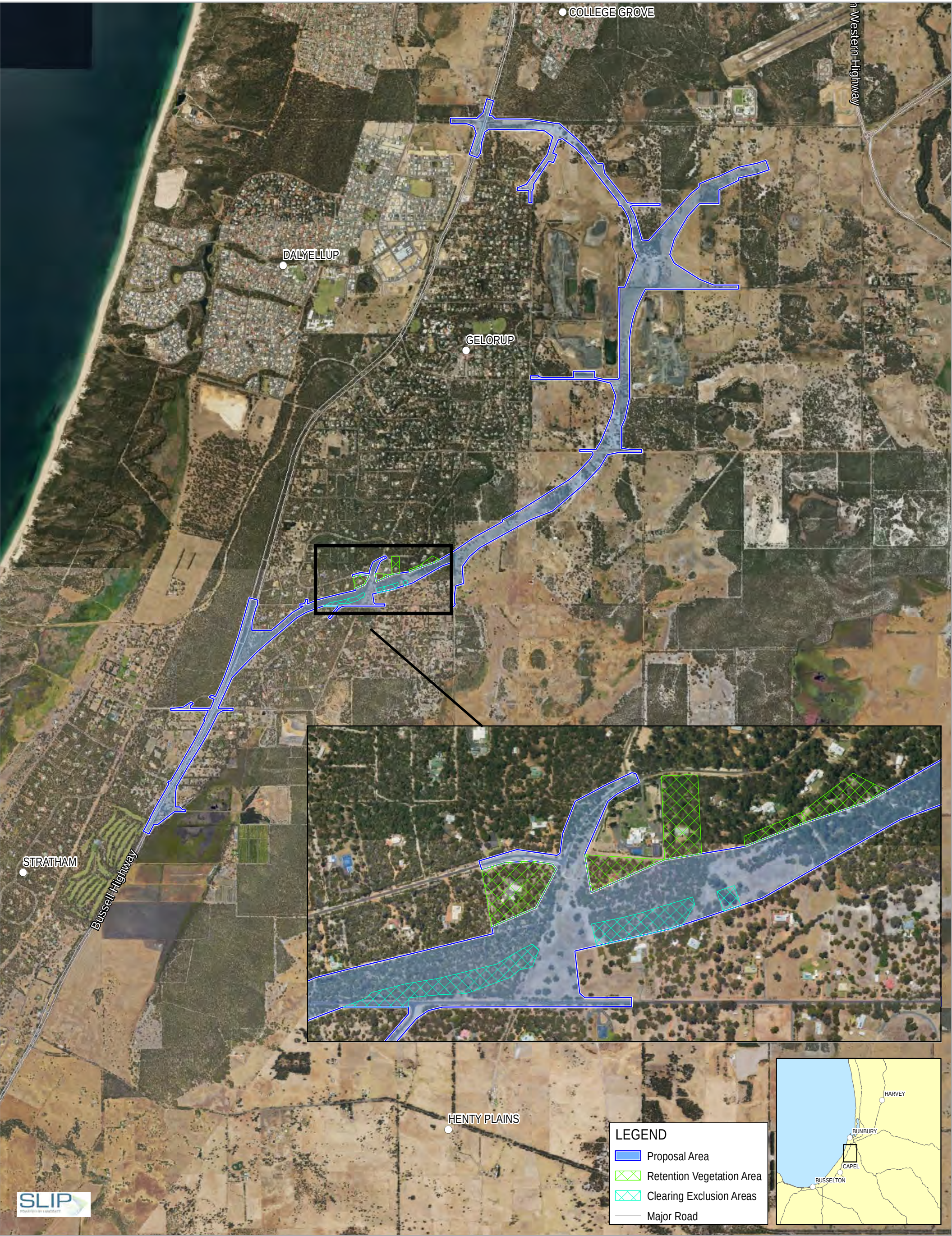


FIGURE 1

Figure 2. Distribution of Banksia Woodlands TEC/PEC, Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC in proximity to the Proposal area

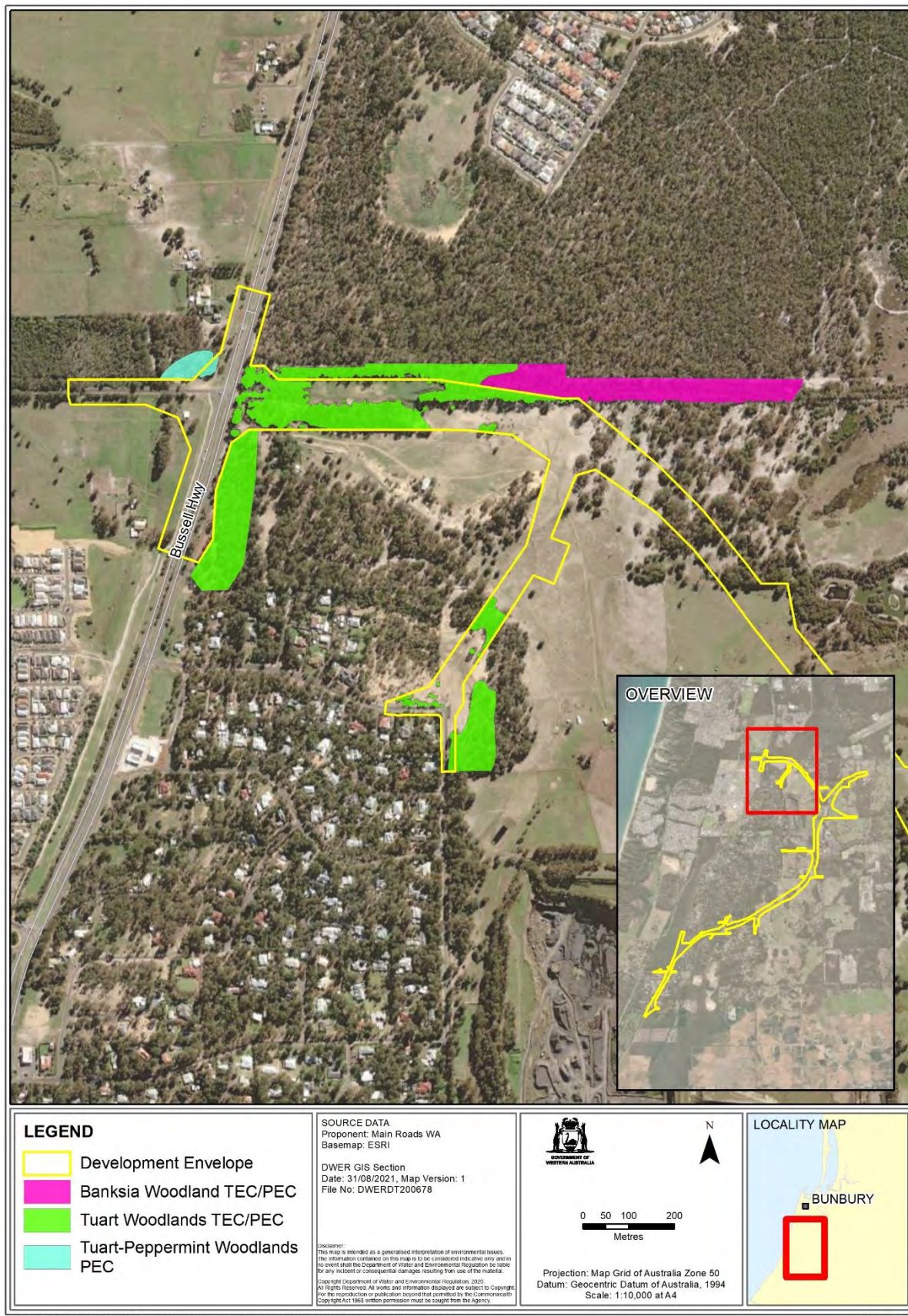


Figure 2a Distribution of Banksia Woodlands TEC/PEC, Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC in proximity to the Proposal area.

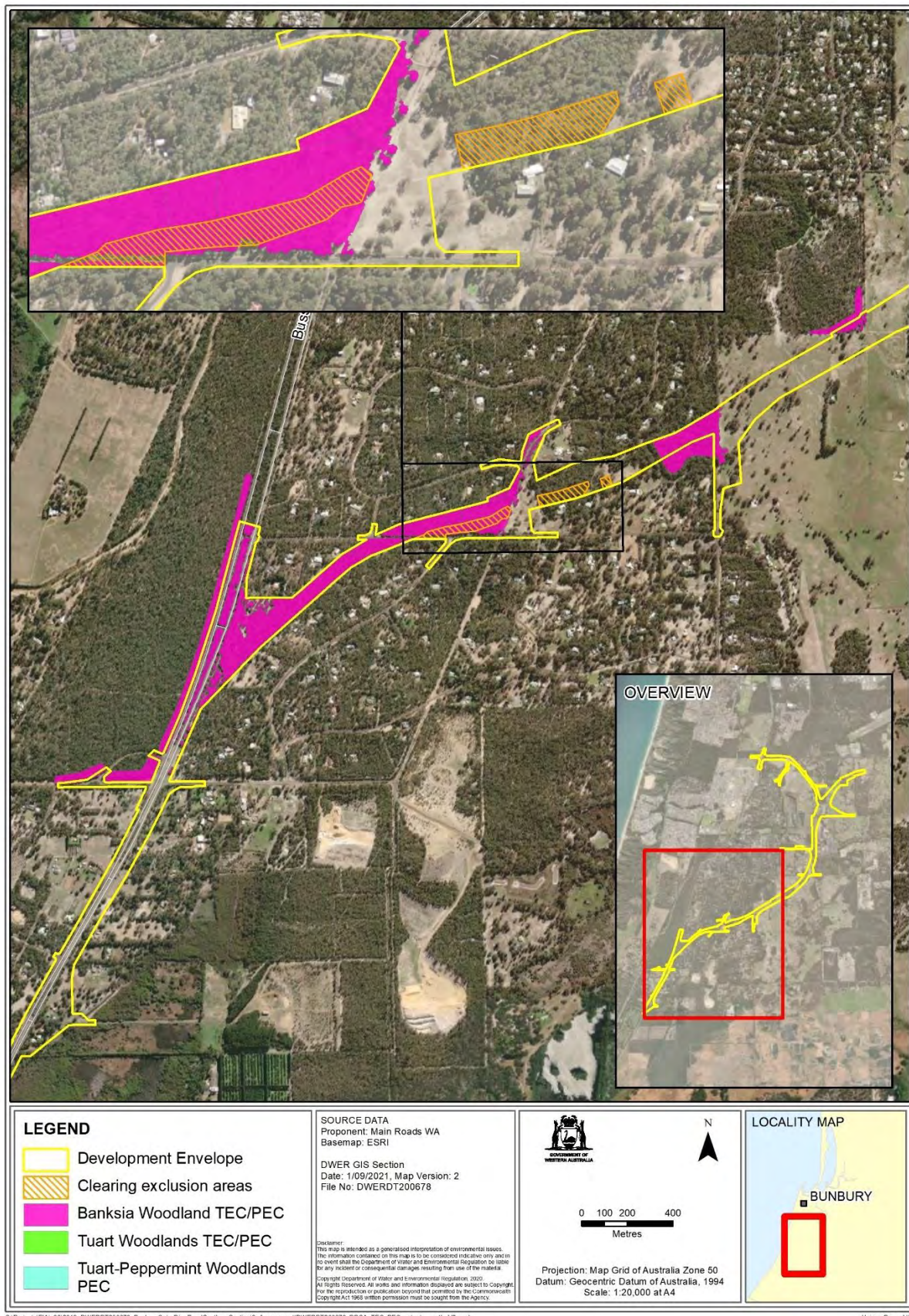
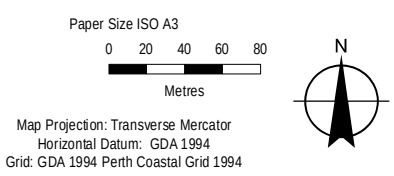
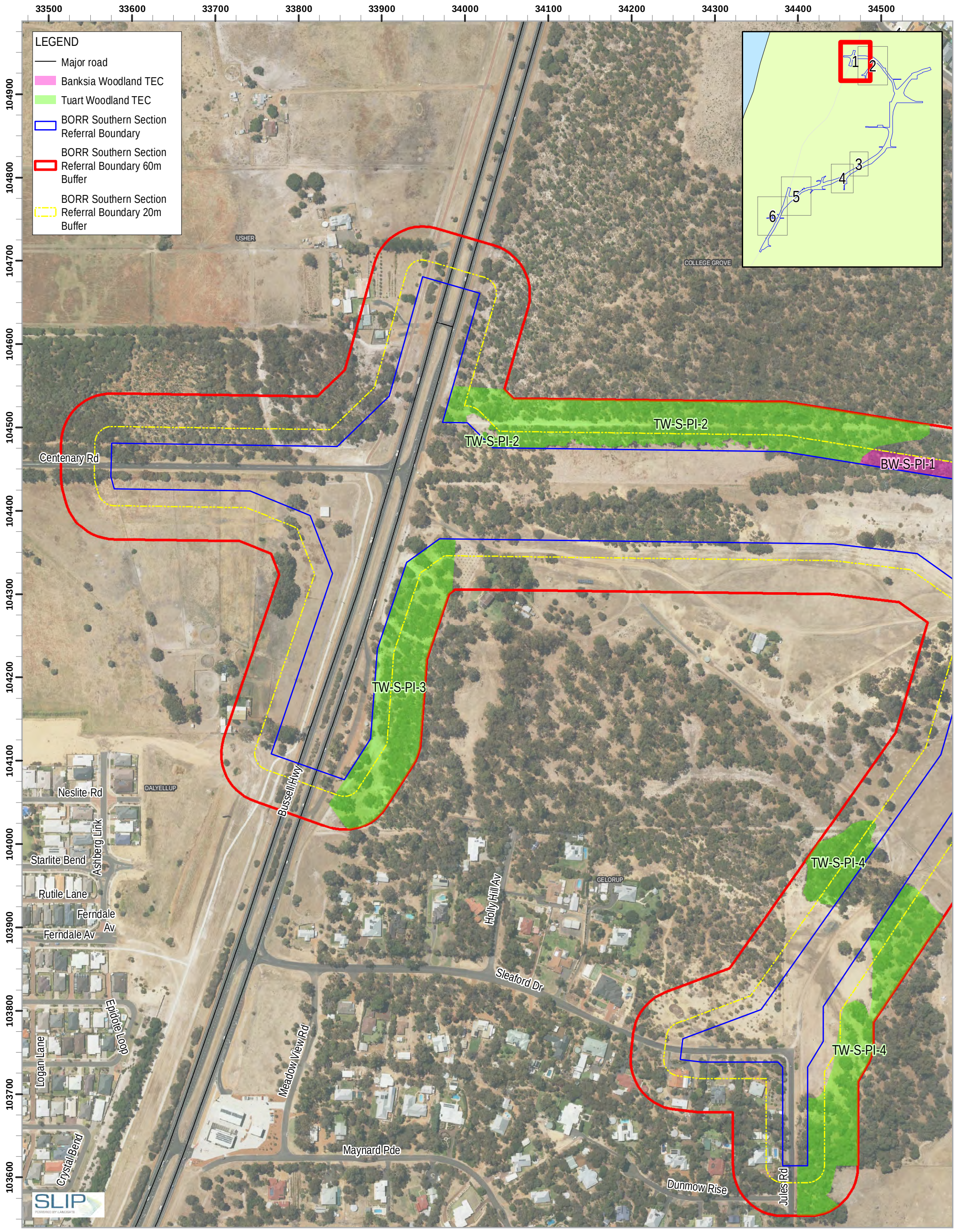


Figure 2b Distribution of Banksia Woodlands TEC/PEC, Tuart Woodlands TEC/PEC and Tuart-Peppermint Woodlands PEC in proximity to the Proposal area.

Figure 3. Distribution of Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC adjacent to the Development Envelope

Note: A 60 m buffer to the Development Envelope is included for Tuart Woodlands TEC/PEC in this figure in relation to monitoring requirements under Commonwealth Approval Notice EPBC 2019/8543.

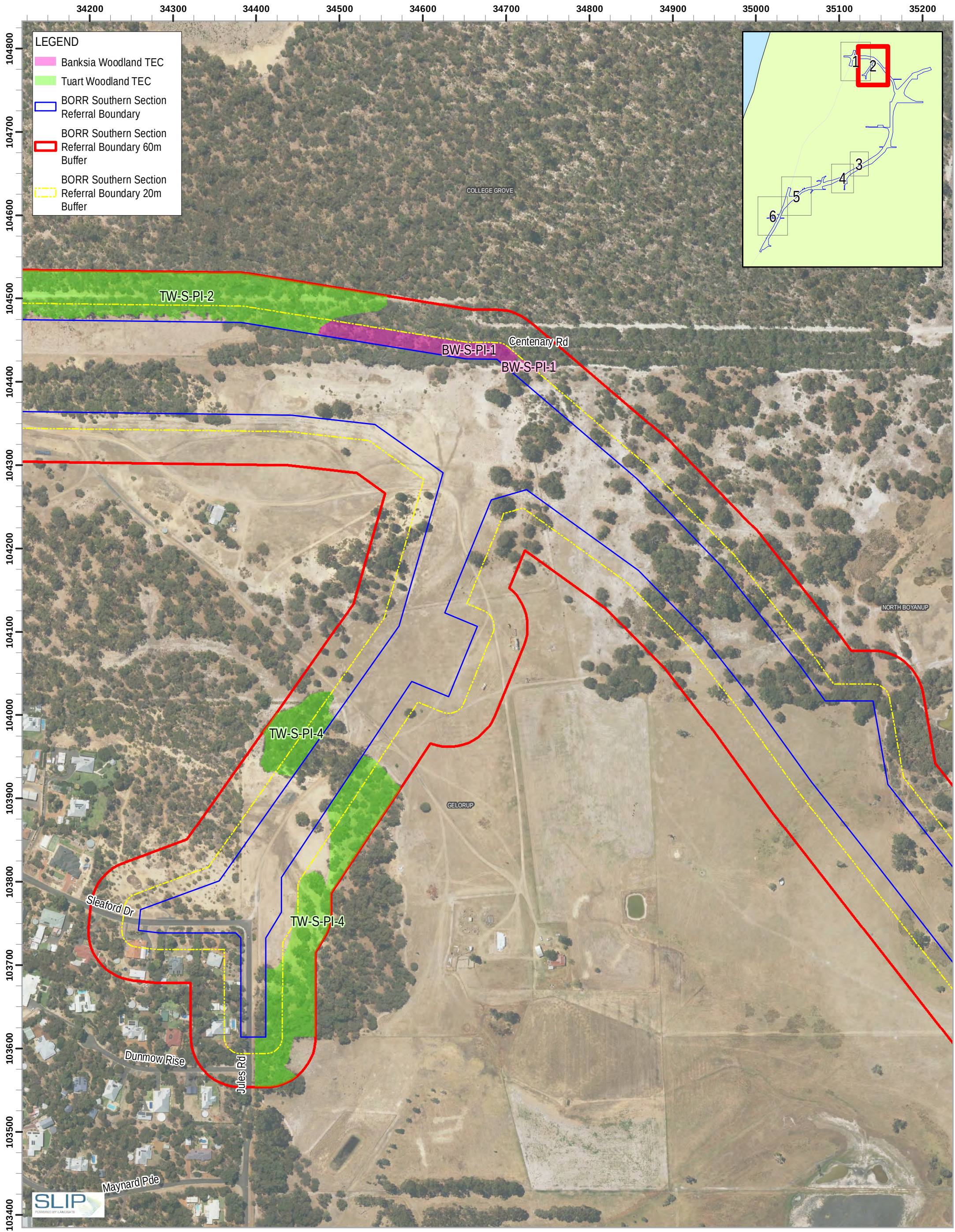


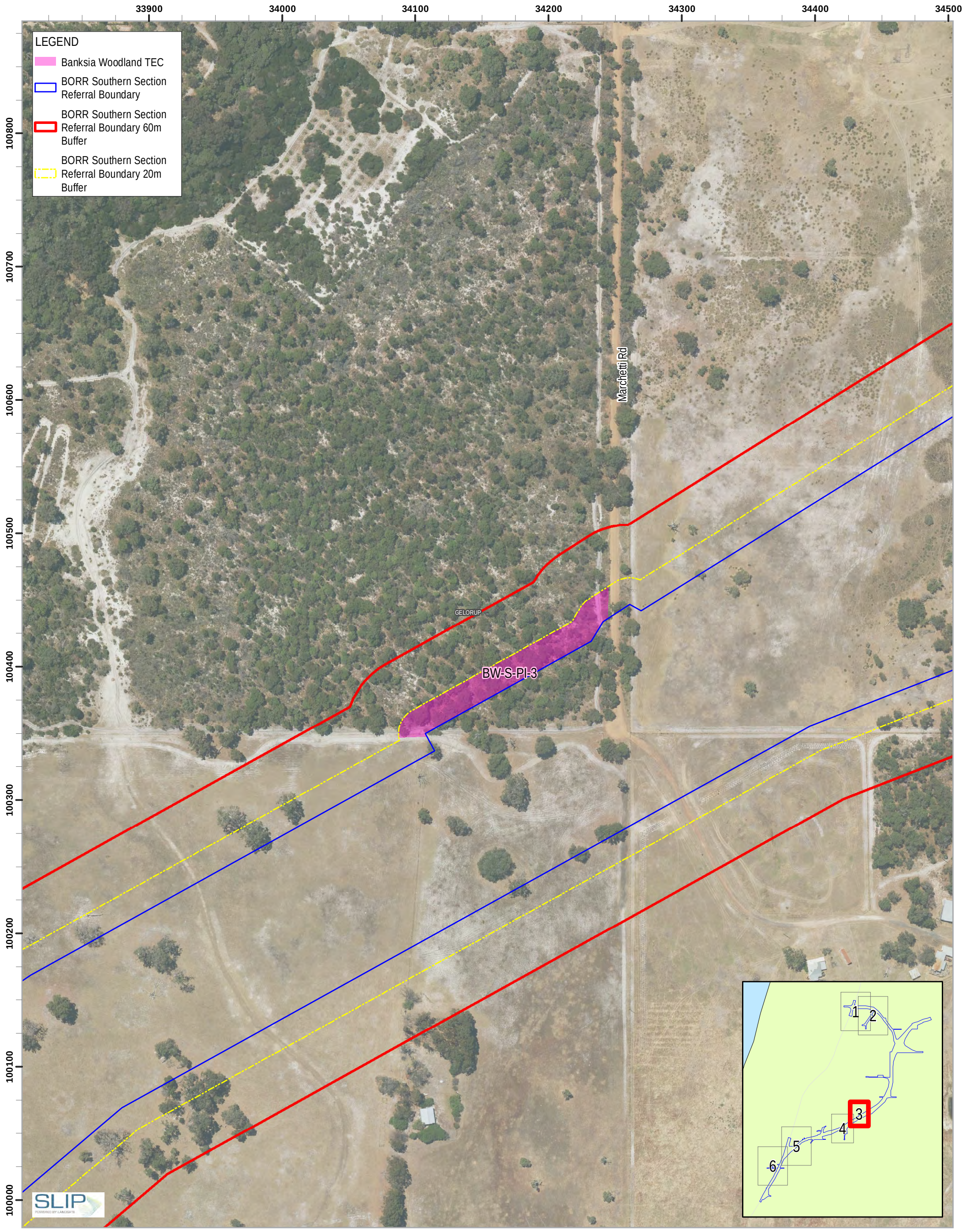
Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

TEC/PEC adjacent to the
Proposal Area

Project No. 61-37041
Revision No. 6
Date 30/06/2022

Page 1 of 6
FIGURE 3





Paper Size ISO A3
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994

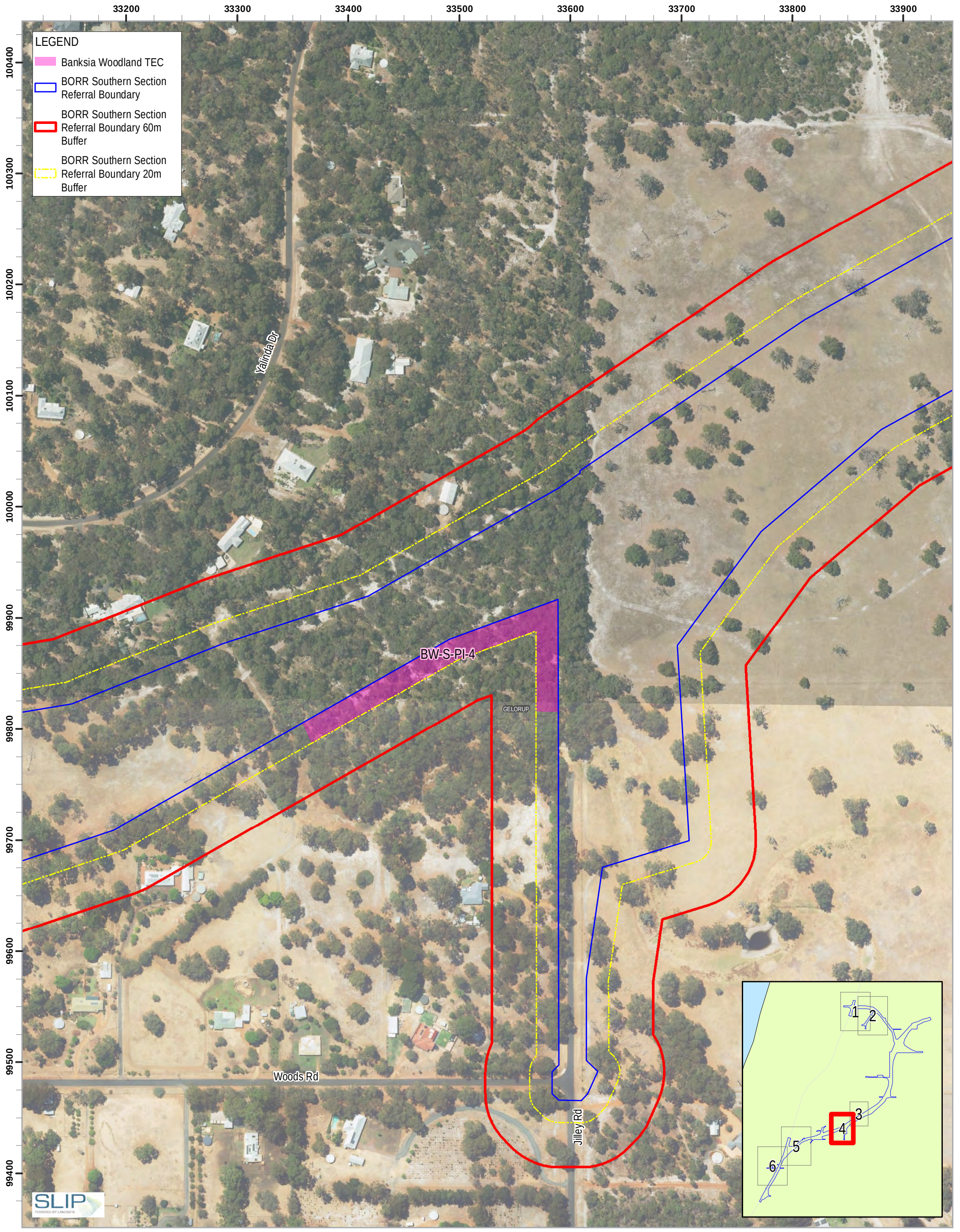


Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

TEC/PEC adjacent to the
Proposal Area

Project No. 61-37041
Revision No. 6
Date 30/06/2022

Page 3 of 6
FIGURE 3



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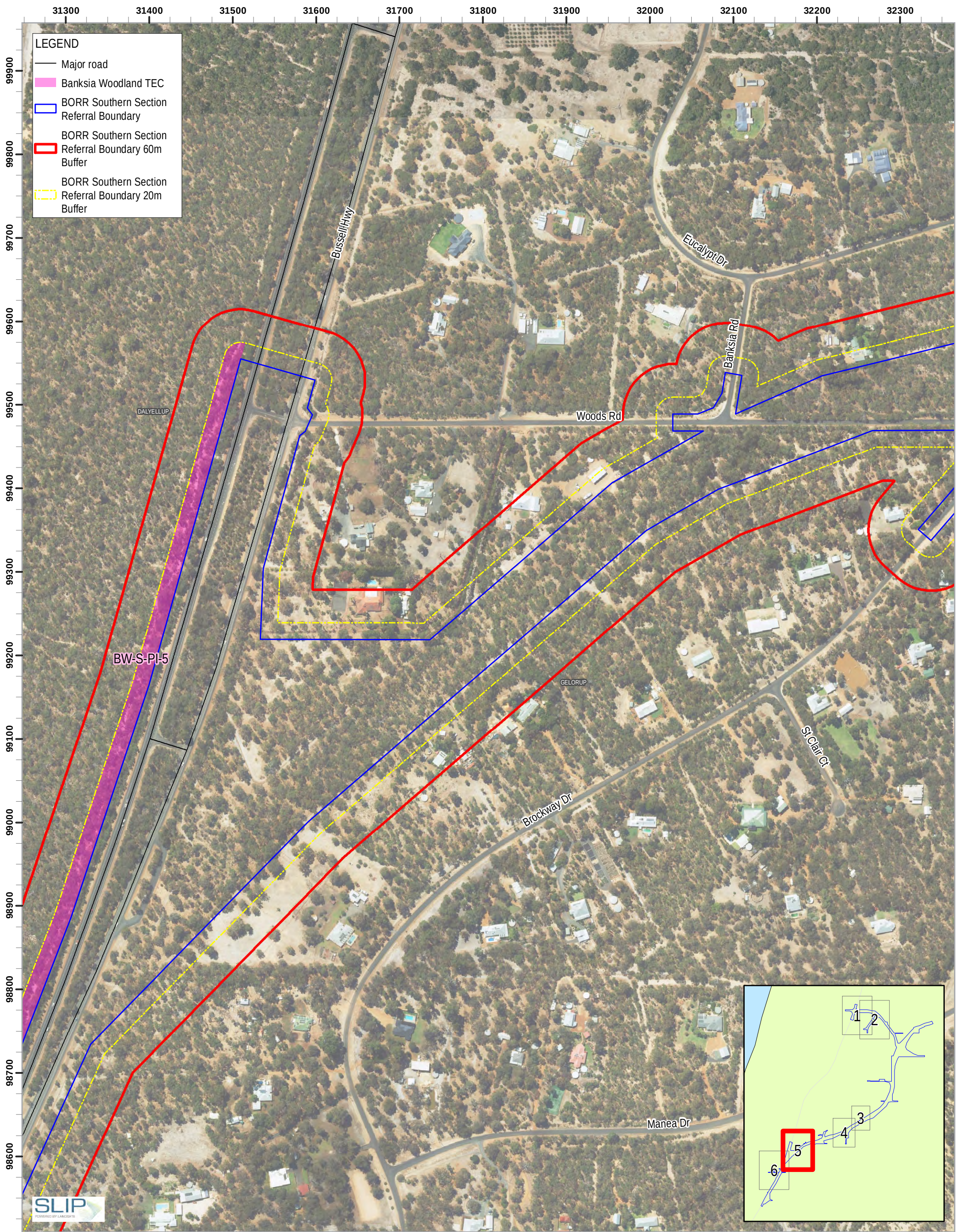


Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

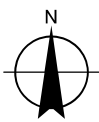
TEC/PEC adjacent to the Proposal Area

Project No. 61-37041
Revision No. 6
Date 30/06/2022

Page 4 of 6
FIGURE 3



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Grid: GDA 1994 Perth Coastal Grid 1994



Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

TEC/PEC adjacent to the
Proposal Area

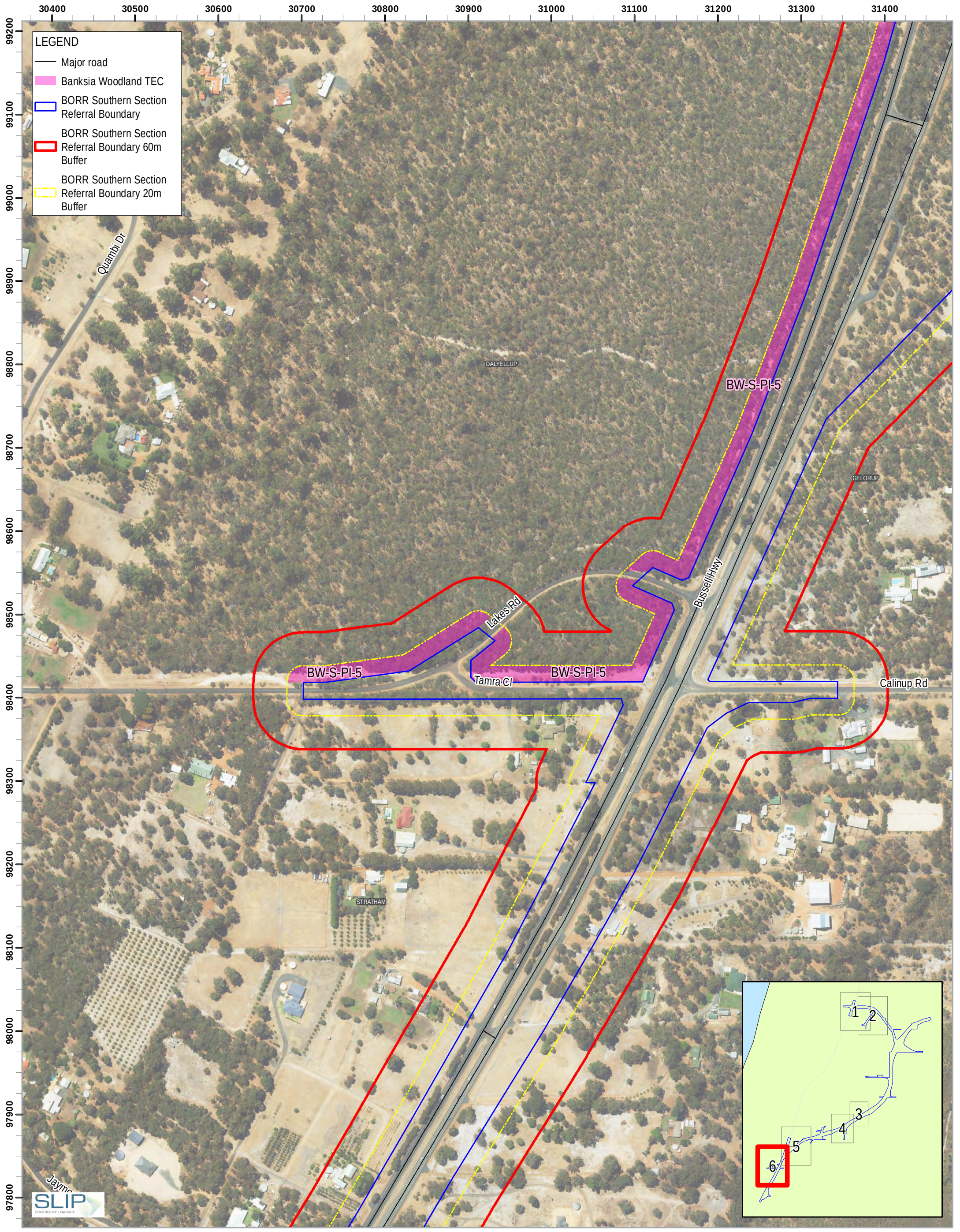
Project No. 61-37041
Revision No. 6
Date 30/06/2022

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FIGURE 3

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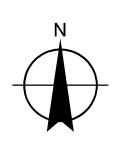
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LEGEND

- Major road
- Banksia Woodland TEC
- BORR Southern Section Referral Boundary
- BORR Southern Section Referral Boundary 60m Buffer
- BORR Southern Section Referral Boundary 20m Buffer

Paper Size ISO A3
0 20 40 60 80
Metres



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 Perth Coastal Grid 1994



Main Roads Western Australia
Bunbury Outer Ring Road Southern Section

TEC/PEC adjacent to the Proposal Area

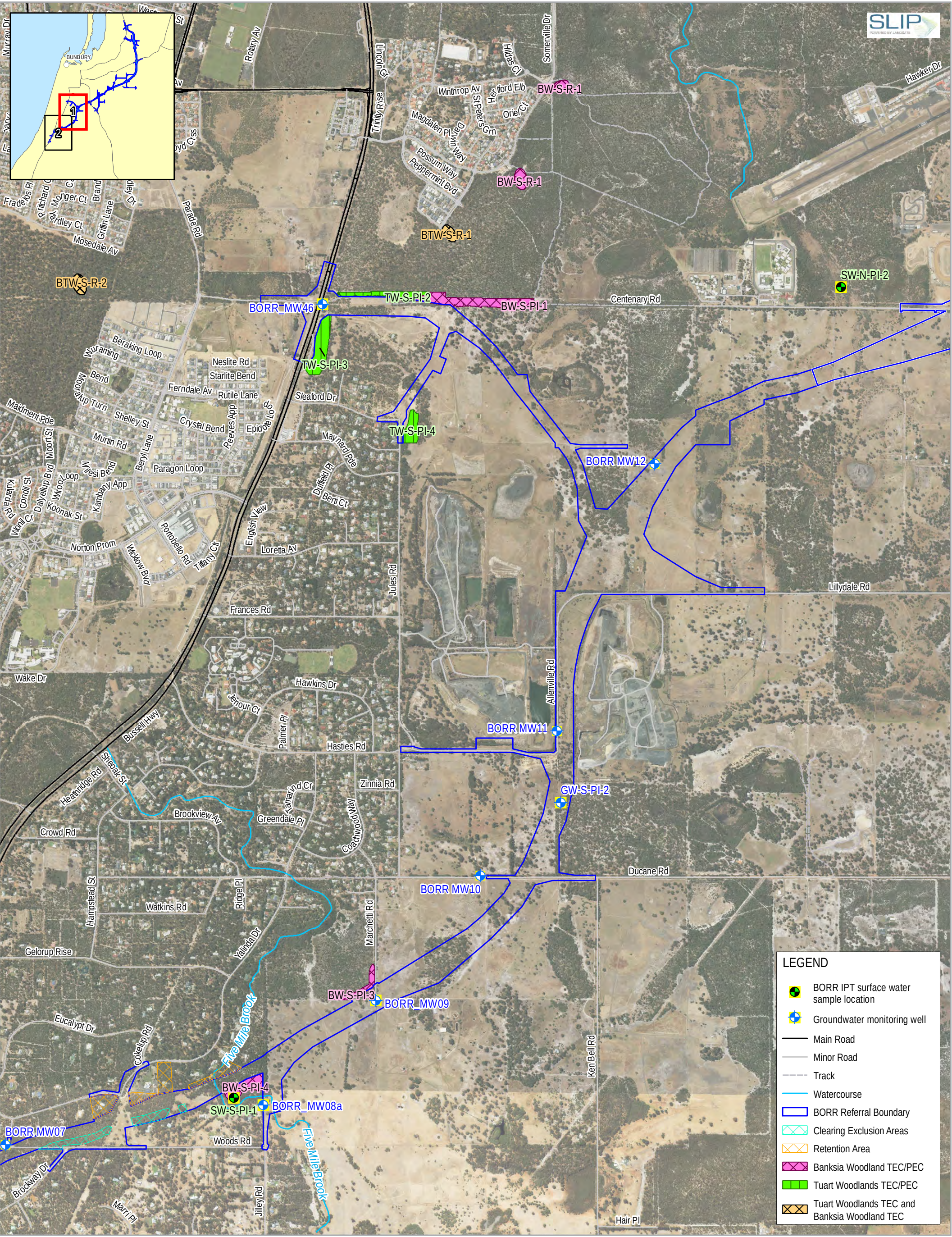
Project No. 61-37041
Revision No. 6
Date 30/06/2022

Page 6 of 6
FIGURE 3

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Figure 4. Overview of monitoring location for Banksia Woodlands TEC/PEC and Tuart Woodlands TEC/PEC



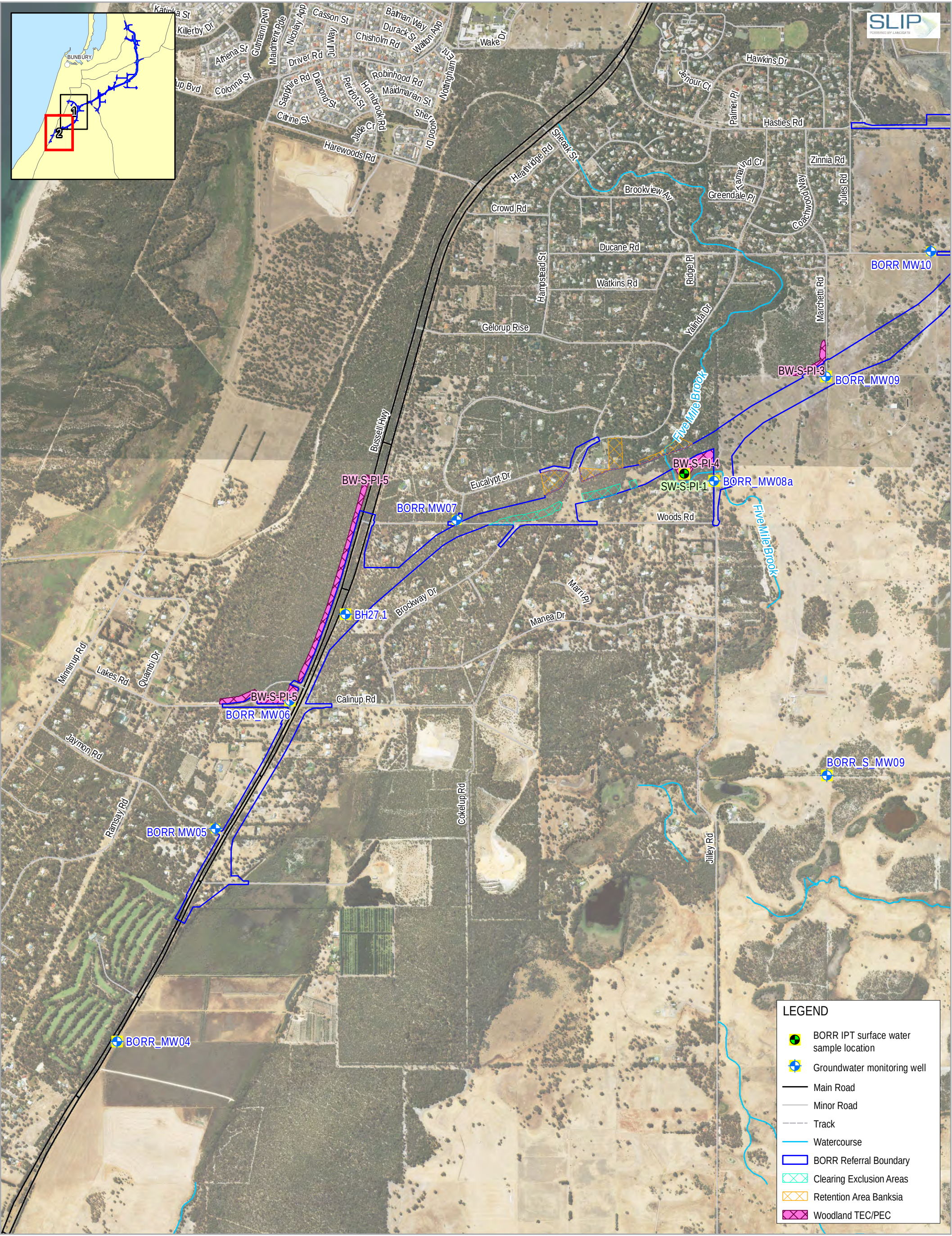
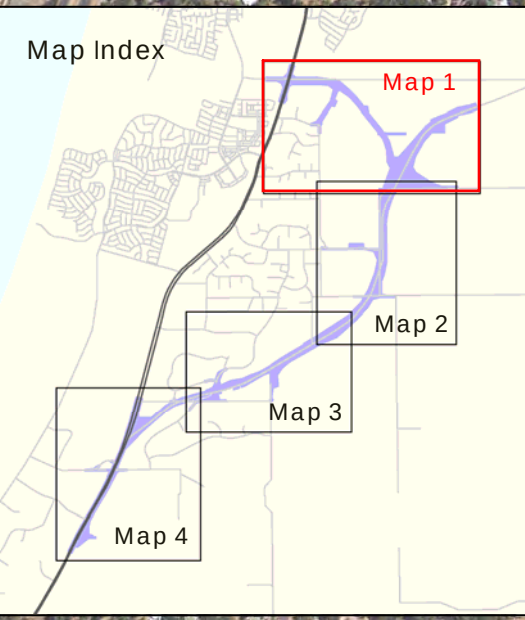
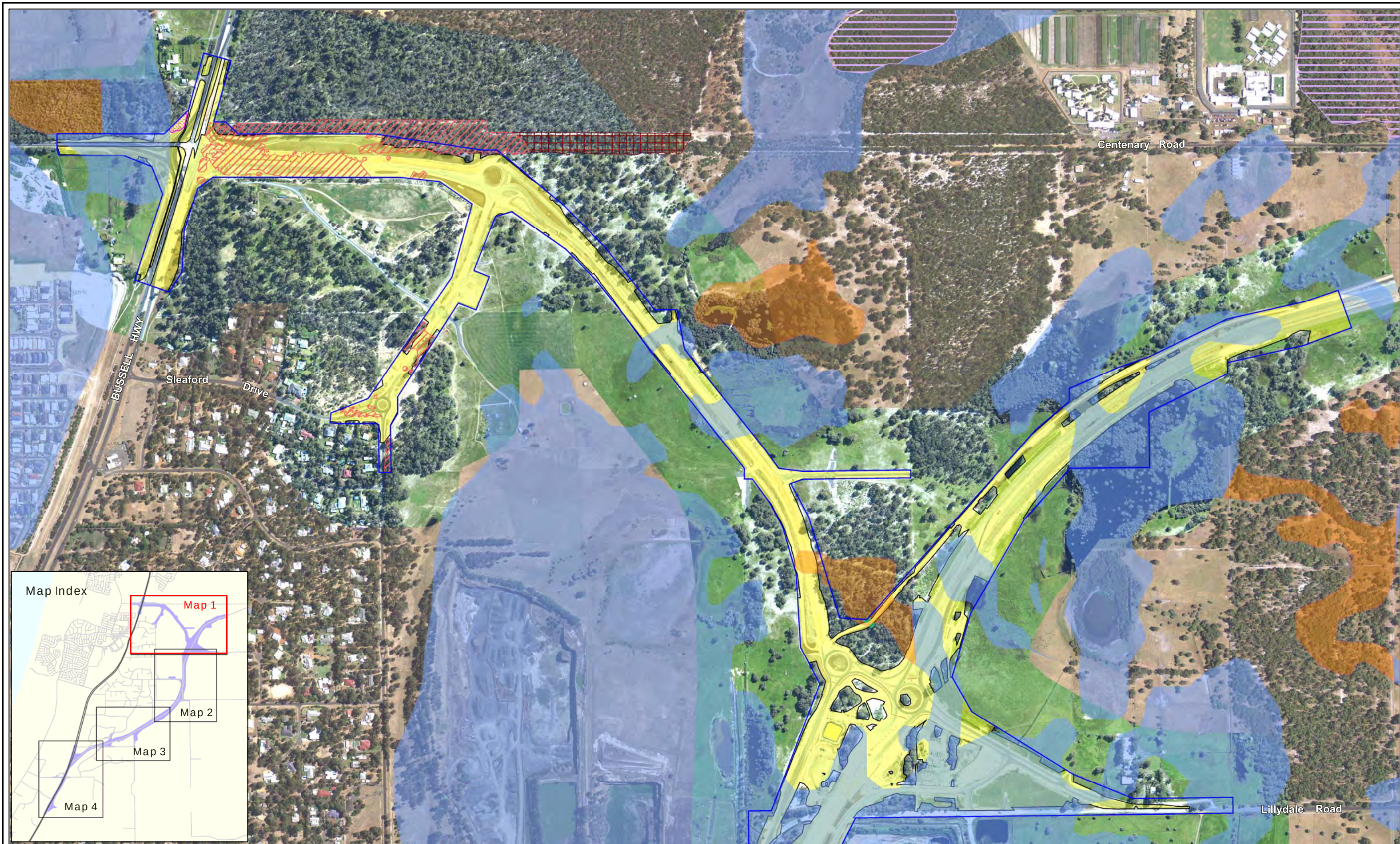


Figure 5. Ground disturbance and clearing extents during the reporting period in relation to TEC/PEC vegetation



Location Map

KARRATHA
W A
PERTH
KALGOORLIE
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC
- Tuart Woodland TEC/PEC
- Tuart-Peppermint Woodland PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands
- Resource Enhancement Wetlands

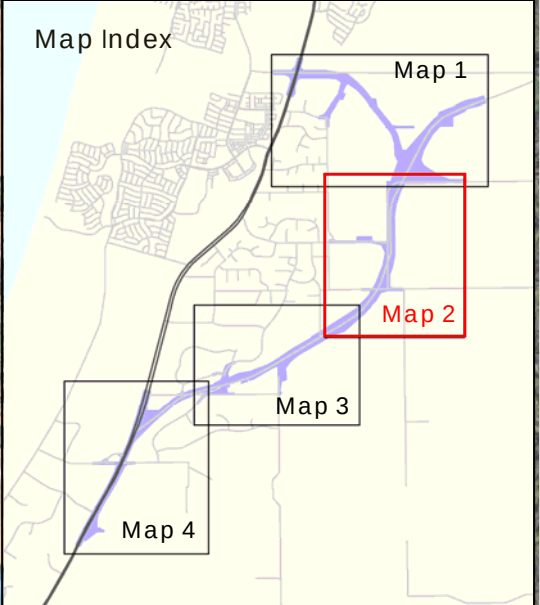
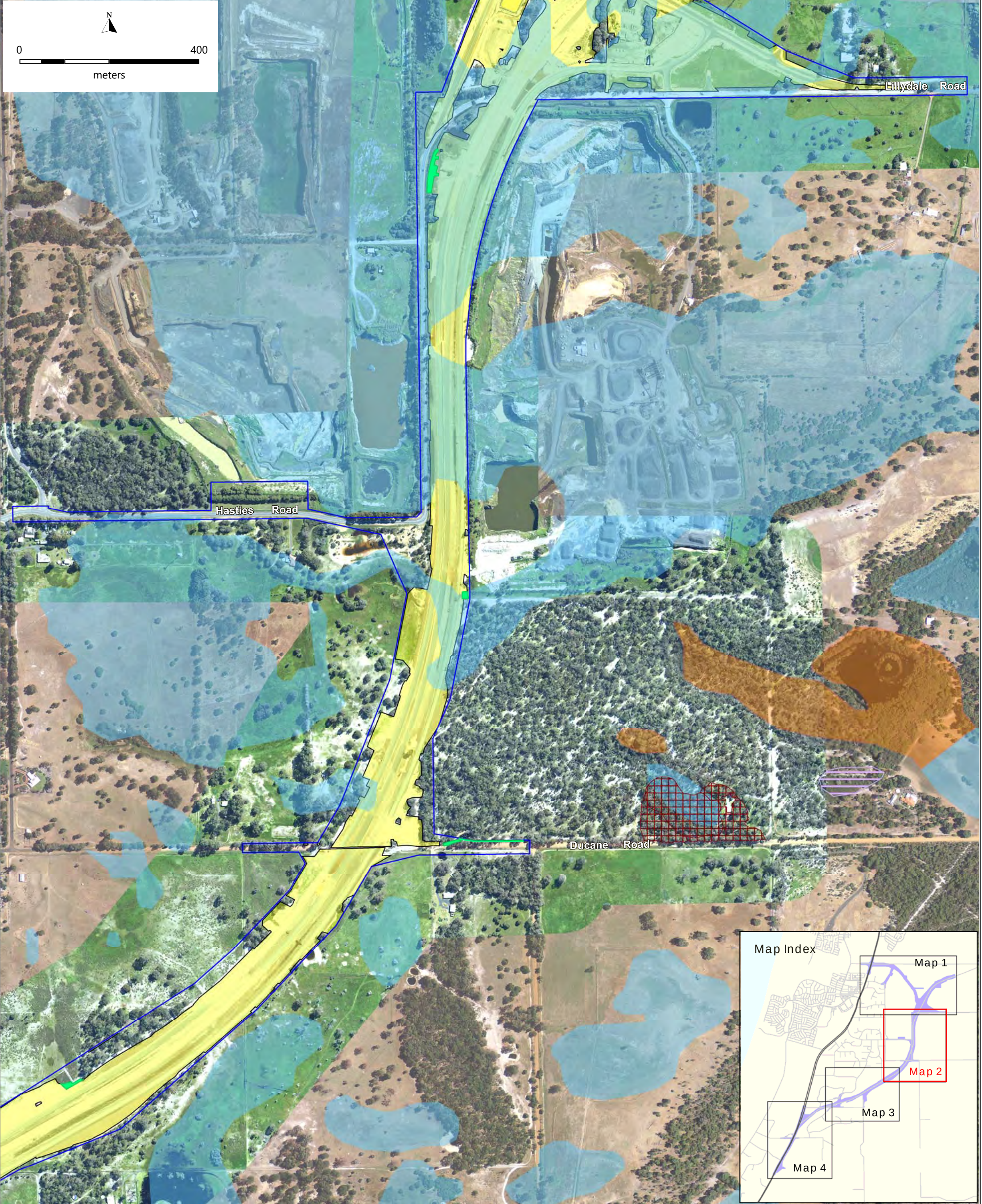
0 300 meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 1

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:8,2500 @ A3

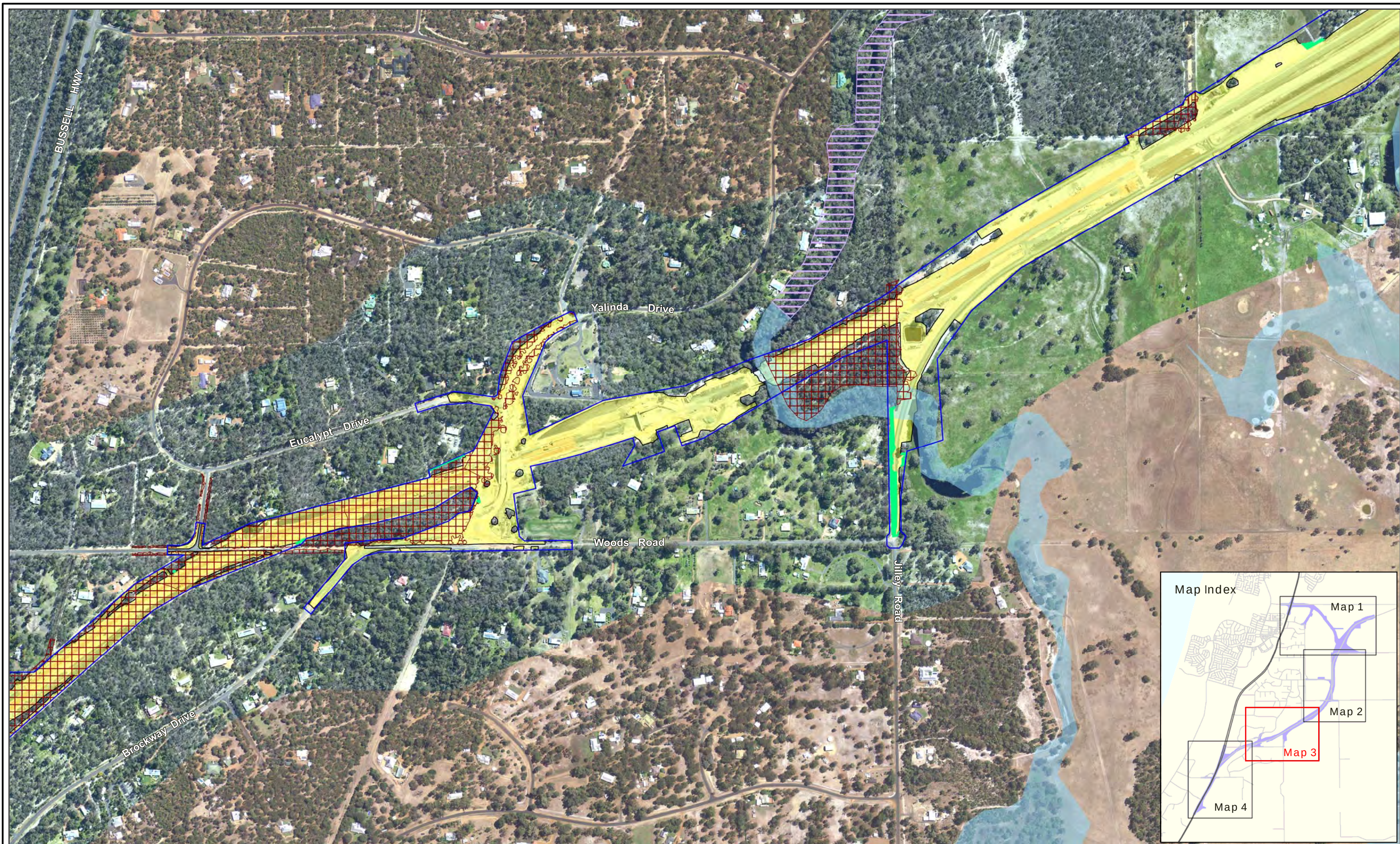


- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
- BORR South Imagery September 2024

- TEC PEC**
- Banksia Woodland TEC/PEC
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)**
- Conservation Category Wetlands
 - Resource Enhancement Wetlands
 - Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands
Map 2





Location Map

KARRATHA
W A
KALGOORLIE
PERTH
Map Area

LEGEND

- Proposal approval boundary (MS1191)
- Ground disturbance and clearing extents 2022 - 2023
- Ground disturbance and clearing extents 2024 - 2025

TEC PEC

- Banksia Woodland TEC/PEC

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation Category Wetlands
- Multiple Use Wetlands

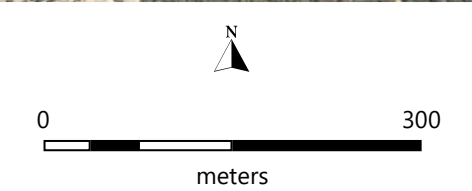
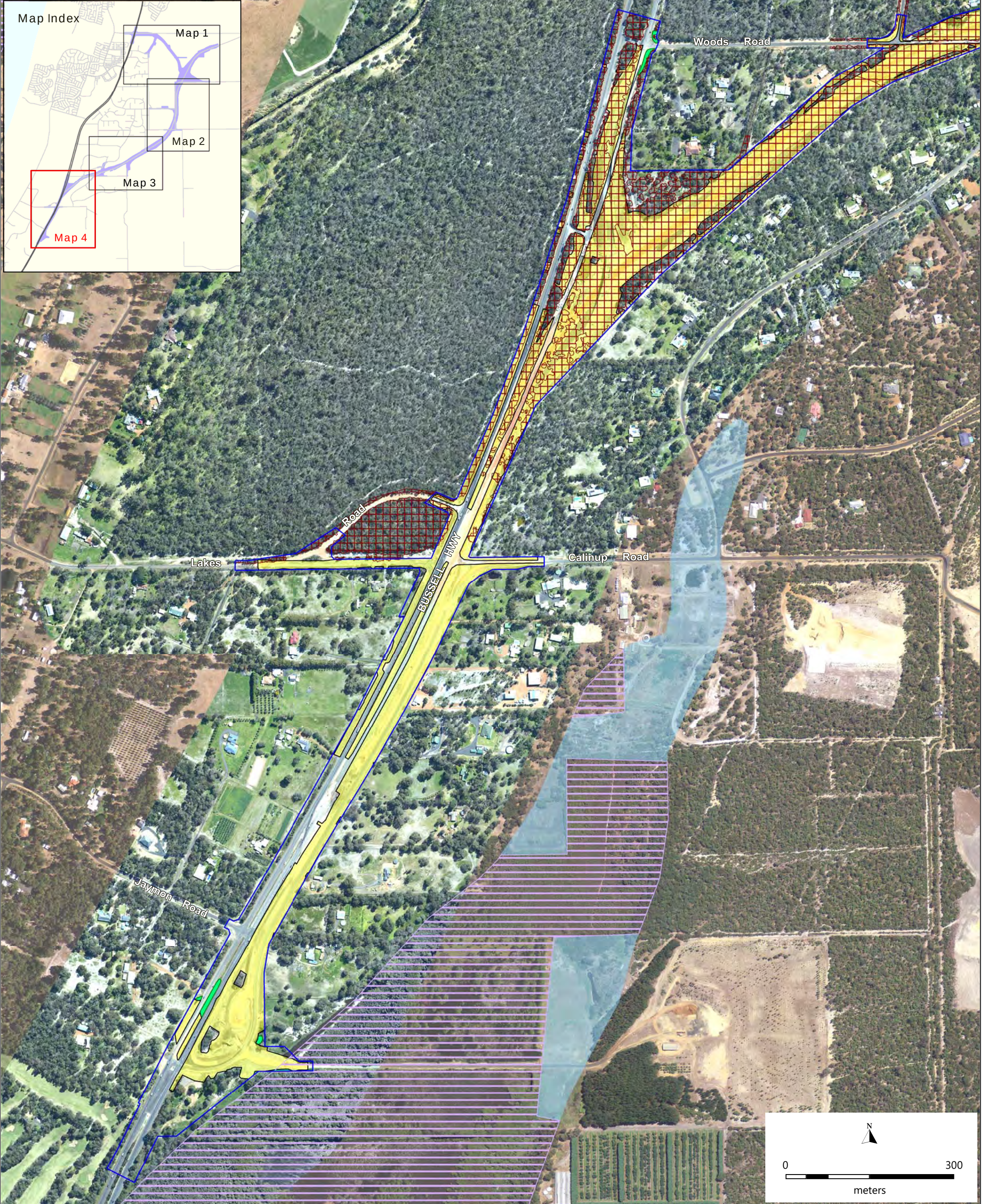
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meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands - Map 3

Biota Environmental Sciences

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised: Projection: MGA Z50 (GDA94) Scale: 1:7,250 @ A3



- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025

- TEC PEC**
- Banksia Woodland TEC/PEC
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)**
- Conservation Category Wetlands
 - Multiple Use Wetlands

Ground Disturbance and Clearing Extents in Relation to TEC PEC and Geomorphic Wetlands
Map 4



BORR South Imagery September 2024

Report

Environmental Performance Report - Priority Ecological Communities (EcoEdge, 2025)

**Bunbury Outer Ring Road
Southern Section**

**Threatened and Priority Ecological Communities
Annual Monitoring Report
31 May 2024 – 31 May 2025**



Prepared for
Main Roads Western Australia
2025



PO Box 9179, Picton WA 6229

0484 771 825 | enquiries@ecoedge.com.au

Version	Origin	Review	Review date	Release approval	Issue date
Rev A	CS	DB	31/7/2025	Ecoedge	4/8/2025
Rev B	CS	DB		Ecoedge	
Rev 0	CS & DB	AG	12/08/2025	Ecoedge	18/8/2025

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Statement of Limitations

Reliance on Data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

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The report has been prepared for the benefit of the Client and for no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

1 Introduction

The third annual Threatened and Priority Ecological Community (TEC PEC) monitoring report is prepared in view of conditions stipulated under approvals issued by both the Western Australian State Minister for the Environment and the Commonwealth Environment Minister for the Bunbury Outer Ring Road (BORR) Southern Section Project. These conditions relate to the protection and mitigation of impacts to Threatened Ecological Communities protected under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Threatened and Priority Ecological Communities protected under the *State Environmental Protection Act 1986* (EP Act).

These communities include¹:

- Banksia woodlands of the Swan Coastal Plain, listed as both a TEC (Commonwealth (Cth)) and Priority 3 PEC (State) (Banksia woodlands TEC PEC)
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain, listed as both a TEC (Cth) and Priority 3 PEC (State) (Tuart woodlands TEC PEC²).
- Southern Swan Coastal Plain *Eucalyptus gomphocephala* - *Agonis flexuosa* woodlands (floristic community type 25)³

The conditions relevant to this TEC PEC monitoring report are presented below.

EPBC Approval 2019/8543

Approval date: 29 June 2022

Relevant conditions:

- ‘4. The approval holder must not cause a reduction in habitat quality within the clearing exclusion areas.
- 5. For the protection of listed threatened species and communities, the approval holder must not cause a reduction in habitat quality, for:
 - a. any Banksia Woodland TEC within 20 metres of the proposal area.
 - b. any Tuart Woodlands and Forests TEC within 60 metres of the proposal area.’

¹ An additional state and Commonwealth protected TEC, the Herb Rich Shrublands in Claypans (Floristic Community Type (FCT) 08 TEC, part of the Federally protected Claypans of the Swan Coastal Plain TEC (Claypan TEC) was also monitored. This community is NOT subject to any environmental approvals associated with the proposal, but for precautionary reasons was included in the TEC PEC monitoring program submitted as part of the referral documentation submitted for State approval in 2020 (BORR Team 2020). The monitoring program states that:

‘No Claypan TEC occurrences will be impacted by the Proposal however one occurrence, situated approximately 500 m at its nearest from the Proposal Area is being included in the monitoring plan to enable the detection of any indirect impacts resulting from Proposal implementation.’

² Tuart woodland and Banksia woodlands co-occur in the Project Area and are referred to as Banksia Tuart Woodlands in this report.

³ Can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC or the Critically Endangered Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain EPBC Act listed TEC.

Condition 12 required a Vegetation Management Plan (VMP) to be prepared that established the environmental management actions to manage, monitor and mitigate direct and potential indirect impacts on the TECs. It also required the identification of the baseline habitat quality of the areas of TEC to be protected.

Condition 28 requires the approval holder to prepare a compliance report for each 12 months following the commencement date of the action.

State Approval Ministerial Statement (MS) 1191.

Approval date: 31 May 2022

Relevant conditions:

3-1(2) 'The proponent shall implement the proposal to achieve the following environmental outcome: (2) ensure there are no project attributable indirect impacts, when compared to preconstruction baseline conditions, to Banksia Woodlands, Tuart Woodlands and Tuart-Peppermint Woodlands within twenty (20) metres outside the development envelope (defined in Figure 2a and Figure 2b) and within the clearing exclusion areas (defined in Figure 1) (Minister for Environment 2022).'

3-3 The proponent shall continue to undertake monitoring during and post-construction until the CEO is satisfied that the proponent has demonstrated the outcomes in condition 3-1(2) have been met.

3-4 The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:

- (1)** outline the monitoring that was undertaken during the implementation of the proposal;
- (2)** outline the results of the monitoring undertaken to report whether the environmental outcomes specified in condition 3-1(2) were achieved;
- (3)** report whether the outcomes in conditions 3-1(1) and 3-1(2) were achieved; and
- (4)** outline any management actions undertaken during the implementation of the proposal to meet the outcomes in conditions 3-1(1) and 3-1(2).

Condition **12-1** requires the first compliance assessment report to be submitted within 15 months of the date of issue of the approval, which is 31 August 2023.

This TEC PEC monitoring report is submitted in respect of condition 12-1 of State approval MS 1191 for the period 31 May 2024 to 31 May 2025. It compares the results of parameters monitored since the construction of the BORR Southern Project area commenced in August 2022 with baseline levels established by Ecoedge between October 2019 and July 2022 (Ecoedge 2023).

2 Methods

There are two components to the monitoring program: vegetation monitoring and drainage monitoring.

The vegetation monitoring program focuses on monitoring changes in the status of vegetation at reference sites and potential impact sites, such as its condition, species composition, vegetation structure and plant stress. Vegetation monitoring is carried out biannually in autumn and spring.

The drainage monitoring focuses on impacts of drainage and changes in hydrology on vegetation, specifically impacts from erosion, inundation/flooding and drying effects. Drainage monitoring is carried out quarterly in summer, autumn, winter and spring.

Data is collected from all TEC PEC sites that have the potential to be impacted by the project, due to their close proximity to the project and TEC PEC reference sites that are unlikely to be impacted due to their distance away from the project.

2.1 Location of monitoring sites

There are nine potential impact and five reference monitoring sites within the BORR Southern project area (**Table 1**). The location of these sites is shown in **Figure 1** and individual sites shown in **Appendix 1**.

Table 1. Current site name and location within the Southern project area.

No	Site Name	Location
Potential Impact Sites		
1	BW-S-PI-1	South of Centenary Road, east of Bussell Hwy
2	BW-S-PI-3	East of Yalinda Drive, west of Marchetti Road
3	BW-S-PI-4	Jilley Road north of Woods Road. Photopoints established along the BORR boundary
4	BW-S-PI-5	West of Bussell Hwy
5	BW-S-PI-8	Woods Road, Gelorup
6	CP-S-PI-1	Manea Park, middle claypan, south of CP-NS-R-2
7	TW-S-PI-2	Road reserve on the north side of Centenary Road east of Bussell Hwy, and extending into the adjacent reserve to the north
8	TW-S-PI-3	Bussell Hwy southbound, south of Centenary Road (adjacent to the parking bay)
9	TW-S-PI-4	Jules Road near Sleaford Drive
Reference sites		
10	BW-S-R-1	Manea Park (R 32963)
11	BTW-S-R-1	Manea Park, corner of Lakeside and Melaleuca Drive
12	BTW-S-R-2	North-side of Centenary Rd east of Bussell Hwy
13	CP-NS-R-1	Waterloo Nature Reserve (R46108)
14	CP-NS-R-2	Manea Park (R16044)

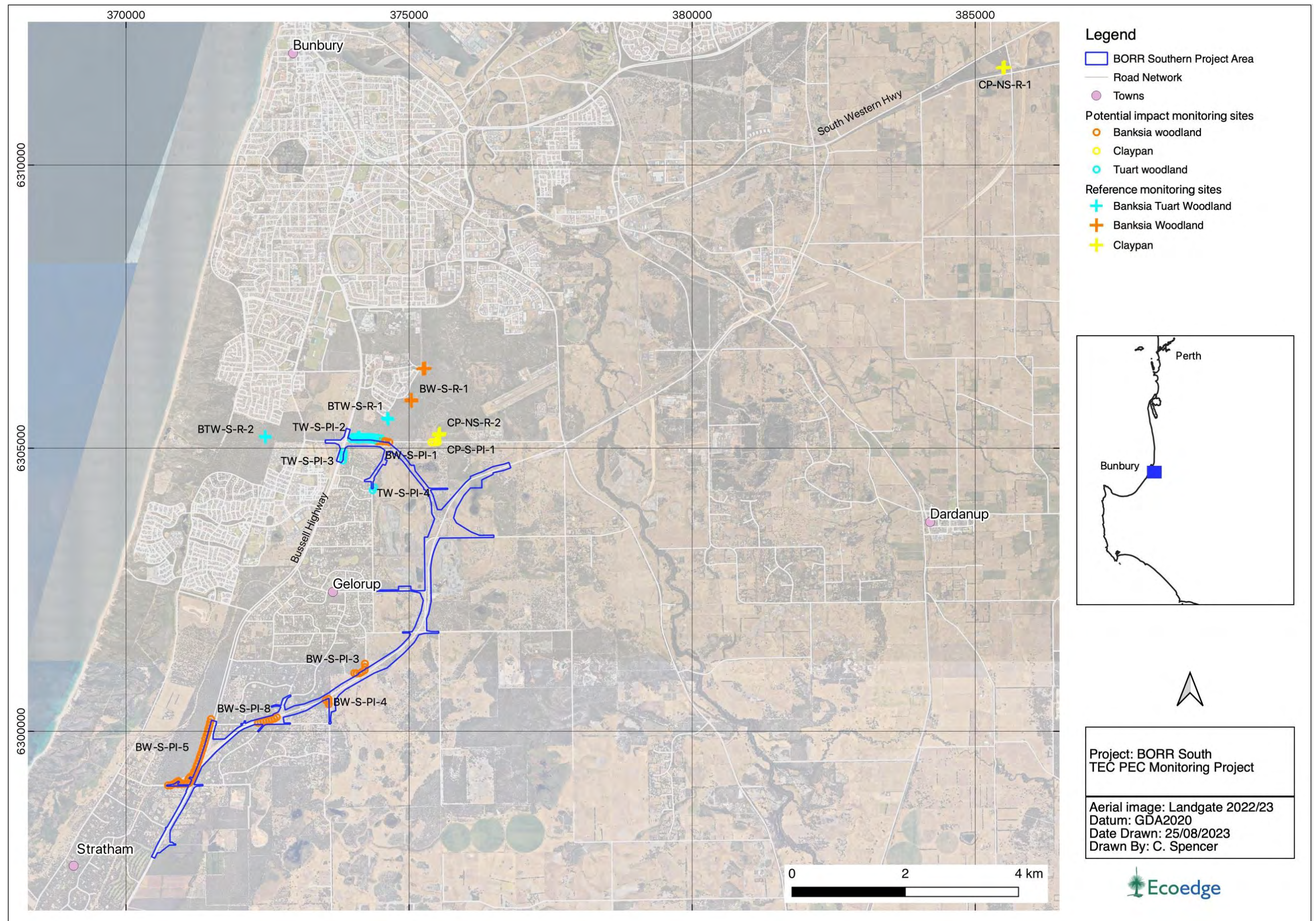


Figure 1. Location of potential impact and reference sites within the BORR Southern vegetation monitoring program.

2.2 Site nomenclature

The naming convention for vegetation monitoring points is as follows:

- Which vegetation TEC PEC type (**BW** = Banksia Woodlands, **BTW** = Banksia Tuart Woodlands, **CP** = Claypan, **TW**= Tuart Woodland)
- Whether it's in the **N**orth or **S**outh (Northern & Central or South referral areas, or **NS** for both)
- Whether it's a **P**otential **I**mpact site, or a **R**eference site.
- Whether it was a transect **T** or boundary photopoint **P** and a
- Site number if more than one site monitored in the TEC PEC.

For example, TW-S-PI-2_P01 is a potential impact Tuart Woodlands TEC site in the Southern referral area.

The naming convention for drainage monitoring points is as follows:

Example monitoring point: BTW-S-R-1_E1(a21)

BTW-S-R-1 - site name

D - drying, **E** - erosion, **I** - inundation

1 - chronological number of particular issue recorded at site.

(**a** - autumn, **w** - winter, **sp** = spring, **su** - summer) – the season first recorded.

21 -2021, the year it was first recorded.

2.3 Timing and frequency of survey

The boundary photopoint vegetation monitoring program is carried out biannually in autumn and spring. Transect vegetation monitoring is carried out annually in spring, except for the claypan transects, which are carried out twice a year⁴, once in mid-spring and once in late spring, and mid to late November. This is in order to maximise the identification of herbaceous annuals, which progressively germinate following the steady subsidence of claypan water levels as the weather warms up. Drainage monitoring is conducted quarterly to account for any seasonal variations.

An overview of the aspects of the monitoring program is presented in **Table 2**, and the timing of monitoring rounds conducted to date is presented in **Table 3**.

⁴ Claypans were originally to be monitored twice once in late winter and once in spring, but observations showed that they were too inundated to be meaningfully monitored in winter. Instead, the second monitoring round was scheduled for late spring.

Table 2. Annual monitoring program overview.

Monitoring type	Activity	Sites	Frequency	Timing
Vegetation	Transects	BW-S-PI-1, BW-S-PI-5, TW-S-PI-2, CP-S-PI-1, BW-S-R-1, BTW-S-R-1, BTW-S-R-2, CP-NS-R-1, CP-NS-R-2	Annually	Spring
Vegetation	Transects	Claypan TEC	Bi-annually	Dependent on rainfall, but typically October and mid to late November.
Vegetation	Photopoints	Boundary points	Bi-annually	Spring and autumn
Drainage	Visual inspection	All sites	Quarterly	Spring, summer, autumn and winter

Table 3. Monitoring dates of monitoring rounds.

Year	Season	Drainage	Boundary photopoint	Transect/ quadrat assessment (spring only)
2019	Spring / summer	Not started	19 November to 3 December	
2020	Summer	Not started	N/A	
2020	Autumn	29-30 April	20-26 May	N/A
2020	Winter	28 – 31 July	N/A	4 August
2020	Spring	9 October – 28 October		
2021	Summer	10-12 February	N/A	
2021	Autumn	31 May	No monitoring	N/A
2021	Winter	7 September	N/A	N/A
2021	Spring	13 October	13 October	8 September - 14 October
2022	Summer	22 February	1 December	N/A
2022	Autumn	25 May	25 & 26 May	N/A
2022	Winter	20 June	20 June	N/A
2022	Spring	17 October – 20 October	17 October – 20 October	22 September – 21 November 2022

Year	Season	Drainage		Boundary photopoint	Transect/ quadrat assessment (spring only)
2023	Summer	17 February 2023	N/A	N/A	
2023	Autumn	26 May 2023		22 – 26 May	N/A
2023	Winter	24 August 2023		N/A	N/A
2023	Spring	7 November 2023		29 September to 14 October	9 October – 27 November
2024	Summer	16 February 2024		N/A	N/A
2024	Autumn	25 May 2024		23 May to 27 May	N/A
2024	Winter	22 August 2024		N/A	N/A
2024	Spring	31 October 2024		25-31 October	8 October – 5 December
2025	Summer	20 February 2025		N/A	N/A
2025	Autumn	22- 23 May 2025		22-23 May 2025	N/A

2.4 Transects and Quadrats

Monitoring transects of 30 m in length were established within both potential impact and reference sites⁵. The ends of each transect were marked with a steel peg, which will be left in place until the end of the monitoring program (noting that the stakes were removed from all roadside sites). Along each transect, 2 x 2 m quadrats were established at 10 m intervals, the first at 0 m and the last at 30 m. Each quadrat (marked at the corners with wooden stakes hammered into the ground) was placed alternately, left and right of the transect line. A total of four quadrats were established per transect. At most sites, only one transect was established. A photopoint was established at either end of the transect, and a photo was taken of each quadrat. The layout of a transect is shown in **Figure 2**.

⁵ Transects were not installed in potential impact sites located on private property, or where access was restricted.

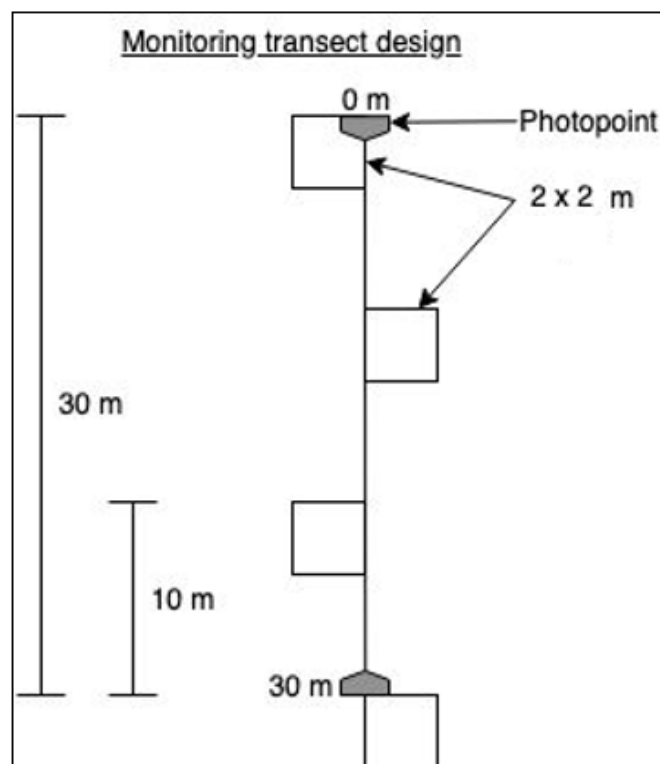


Figure 2. Layout plan for a transect.

To the extent practicable, the locations of transects at reference sites were placed in vegetation that was similar to Potential Impact sites for the Banksia and Tuart Woodlands and Claypan TEC.

The following parameters were recorded for each quadrat: Information on dominant plant species present, species cover, and plant stress within the transect quadrats. Data was recorded using various methods including Fulcrum application (<https://www.fulcrumapp.com/>), Excel spreadsheets and/or paper-based data collection sheets.

The parameters that are to be analysed for each quadrat are: species diversity, species composition, level of plant stress, weed species, plant deaths, vegetation health and ground characteristics. Changes in these parameters within the quadrats, along these transects, are compared between data collected at Reference and Potential Impact sites and between data collected at the same site over time.

The physical characteristics recorded for each quadrat include:

- Species composition: species identified in each quadrat.
- Vegetation cover⁶ assessed using the scale presented in **Table 4**.

⁶ Vegetation cover scale: Vegetation cover at non-transect monitoring sites is recorded using the National Vegetation Information Vegetation System NVIS scale instead of the Domin-Krajina scale as agreed to previously by the BORR Team. The reason for this is that it is more easily applied than the Domin-Krajina scale in non-quadrat estimates of cover and abundance.

- Stress of perennial shrubs and trees: assessed using the scale⁷ presented in
- **Table 5.**
- Evidence of obvious plant pests and diseases, such as Phytophthora dieback, Marri Canker and scale.
- Bare ground: assessed using the same scale as the vascular plant cover, from 1 equalling no bare ground to 10, which equalled 100% bare ground.
- Leaf litter: recorded as a % coverage of the quadrat.

Table 4. Cover scores for vascular plants within transect quadrats (BORR Team 2019).

Cover score	Description
1	Seldom found species with insignificant cover
2	Very scattered individuals of a species with less than 1% cover
3	Scattered individuals of a species with 1-5% cover
4	Any number of individuals of a species with 5-10% cover
5	Any number of individuals of a species with 10-25% cover
6	Any number of individuals of a species with 25-33% cover
7	Any number of individuals of a species with 33-50% cover
8	Any number of individuals of a species with 50-75% cover
9	Any number of individuals of a species with greater than 75 % but less than 100%
10	Any number of individuals of a species with complete cover (100%) in the stand

⁷ The vegetation health / plant stress monitoring scale used for assessing plant stress in transects and at boundary photopoint from 2020 was updated from the initial round of baseline survey to include a wider range of plant stress indicators (BORR Team 11 August 2020).

Table 5. Plant stress scale for shrubs and trees within transect quadrats.

Plant Stress Level	Description
5	Plant with >81 % of the original canopy present; healthy overall; little or no leaf yellowing. No evidence of wilting of foliage. Plants not stressed.
4	Plant with 61-80% of the original canopy present; occasional dead branches (< 20 % of canopy); small patches of leaf yellowing. Plant leaves may show signs of wilting at periphery. Plants potentially stressed.
3	Plant with 41-60 % of the original canopy present; some smaller dead branches evident (21-40 % of canopy); moderate amount of leaf yellowing (21-40 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf periphery. Plants exhibiting symptoms of stress.
2	Plant with 21-40 % of original canopy present; some main branches dead (50 – 80 % of canopy; abundant leaf yellowing (> 41 % of canopy). Plant leaves may show signs of wilting with noticeable curling of leaf. Plants exhibiting signs of stress.
1	Plant with <20 % of original canopy; most main branches dead; remaining leaves mostly dying off. Plant leaves may show signs of wilting with noticeable curling of leaf (approaching closure). Plants clearly stressed.

2.5 Boundary photopoints

Boundary photopoints are located at approximately 50 m intervals along the boundary of monitoring sites and the BORR project area (not around the perimeter of monitoring sites). The monitoring boundary for each site is 20 m from the photopoint. That is, 10 m on either side of the observer (photopoint) and 20 m into the vegetation being monitored. It is considered that this area can be reasonably observed from a photopoint and will incorporate most elements required to be assessed at the monitoring point, e.g. all vegetation structural layers – upper, middle and understorey elements.

Boundary photographs are taken at right angles to the boundary towards the TEC or PEC occurrence using the phone/tablet app Photomon (Northern Agricultural Catchments Council 2014). With the use of the Photomon application, the exact location and direction can be guaranteed, due to the fact that the photos have a ghosting feature from a 'guide' photo taken previously.

Photopoints are also situated at each end of transects (transect photopoints), with the vegetation 10 m on either side of the transect being assessed.

An index of photographs taken during all monitoring rounds is provided in **Appendix 2**.

The full set of comparative data collected since monitoring commenced for the key variables recorded at the boundary photopoint sites and transect end points is presented in **Appendix 3**.

At each photopoint, the following information was collected:

- The location is determined using a handheld GPS unit.
- A photograph (using the Photomon app) taken looking into the TEC/PEC or along the length of the transect.
- A description of the vegetation (including dominant tree, shrub, grass, sedge and herbaceous species), weed cover percentage, vegetation condition, evidence of erosion, flooding, pathogens, rubbish and grazing impacts.
- Major weed species and their percentage cover (except at transect photopoints⁸).
- Percentage cover of natives (autumn 2020 onwards) this value was assessed as a single, composite value in the autumn 2020 monitoring round. Prior to this, native cover was assessed as part of the assessment of vegetation structure⁹.
- Record the stress of the trees (dominant shrubs, in the absence of trees) within the 20 x 20 m assessment area using the revised stress scale presented in **Table 5**.

Variables of species/cover, disease, disturbance, etc., are recorded using Fulcrum.

Vegetation condition is assessed against the method of the EPA (2016) (**Appendix 4**).

Assessment of vegetation structure is based on the Keighery (1994) structural classification, which is similar to that of the foliage cover of the National Vegetation Information System (NVIS) structural classification system (NVIS 2017).

The percentage cover of native and weed vegetation cover at non-transect monitoring sites is recorded using the National NVIS (2017) canopy cover scales.

The impact of *Phytophthora* dieback and Marri canker was recorded as part of standard vegetation monitoring undertaken at all monitoring locations. Four scales of impact were recorded:

1. Low impact: 1-2 plants
2. Medium impact: active front visible, some death
3. Heavy impact: active front visible, numerous deaths
4. Old impact site: vegetation structure altered.

⁸ This information was not collected at photopoints associated with transects because it was collected for the transect quadrats.

⁹ The method of assessment for native vegetation cover was not stipulated in the original scope for the project, just that it should be assessed as a percentage.

2.6 Transect and photopoint monitoring site summary

Transects were established at three potential impact Banksia sites (BW-S-PI-1, BW-S-PI-5, BW-S-PI-8), one potential impact Tuart site (TW-S-PI-2) and one potential impact Claypan site (CP-S-PI-1). The remaining potential impact sites are monitored via photopoints only. All reference sites have transects and photopoints. A breakdown of the number and type of transects and/or photopoints within each monitoring site is provided **Table 6**.

Table 6. Breakdown of monitoring points at each site.

Number	Site	Number boundary monitoring sites	Number of transects (number of photopoints in brackets)
Potential impact sites			
1	BW-S-PI-1	5	1 (2)
2	BW-S-PI-3	7	-
3	BW-S-PI-4	4	-
4	BW-S-PI-5	34	1 (2)
5	BW-S-PI-8	8	1 (2)
6	TW-S-PI-2	20	1(2)
7	TW-S-PI-3	4	-
8	TW-S-PI-4	3	-
9	CP-S-PI-1	3	1 (2)
	Total	88	5(10)
Reference sites			
1	BW-S-R-1		2 (4)
2	BTW-S-R-1		1 (2)
3	BTW-S-R-2		1 (2)
4	CP-NS-R-1 ¹⁰		1 (2)
5	CP-NS-R-2		1 (2)
	Total		6(12)
	Grand Total	88	11(22)

¹⁰ The CP-NS-R-1 and CP-NS-R-2 sites serve as Reference Sites for both the BORR Northern & Central Section and BORR Southern Section due to the limited number of suitable Claypan TEC occurrences within reasonable proximity to the referral area.

2.7 Drainage monitoring

Drainage monitoring was first undertaken in autumn 2020. Drainage monitoring is carried out quarterly (each season).

Drainage monitoring is conducted via a foot traverse along the length of potential impact site boundaries and along the transects within Reference sites. Three drainage disturbance variables are measured: flooding/inundation, erosion, and non-seasonal drying effects (**Table 7**). If drainage disturbance is noticed, the location of this point is recorded using a hand-held GPS, and a photograph and description of the disturbance are taken. Where a disturbance is considered to have impacted vegetation, a plant stress assessment is conducted using the scale shown in

Table 5. This scale was used to describe non-seasonal drying effects, i.e., those that would not normally be expected during the particular season.

The drainage monitoring information recorded has been based on the visual assessment field sheet created by the BORR IPT and provided in **Appendix 5**. This information is currently collected using the in-field app, Fulcrum.

Table 7. Descriptions of the three disturbance variables recorded during drainage monitoring.

Disturbance Variable	Description
Flooding/Inundation	Flooding or inundation of vegetation resulting from run-off from a roadway
Erosion	Erosion, primarily caused by water that has resulted from runoff from a roadway
Drying effects	Drying off (yellowing and/or death) of vegetation that may have been caused by changes in hydrology caused by roadway construction. (Potentially as a result of new <i>Phytophthora</i> disease infection, but not including normal seasonal leaf drop in summer and early autumn).

The triggers for investigation with regard to ‘drainage disturbance impacts’ are:

- If TEC vegetation is inundated or flooded for 24 hours as a result of project activities.
- Evidence of new erosion in monitored TEC vegetation.
- TEC vegetation health declined relative to reference sites.

2.8 Comparative analysis

Comparative analysis of data occurs on two bases: between different monitoring rounds for the same sites, and between Potential Impact and Reference sites of the same community type. The analysis considers changes with regard to absolute number (e.g., number of species) and category score (e.g., cover or stress rating)

While it is not considered likely that statistical analysis will be required to detect changes reaching either specified trigger or threshold levels (BORR Team 2020, Main Roads 2022), where warranted, a paired t-test or repeated measures ANOVA may be used, noting that, due to differences in some vegetation characteristics between Potential Impact and Reference sites, and the relatively low number of sites, the tests would have a low "power" to detect a fundamental difference between the two means.

A change is potentially significant and worthy of further investigation when there is a negative variation in the result for any measured variable, in particular for dominant vegetation structure, vegetation condition, weed cover, native diversity and cover at anyone monitoring point. For example, a change worthy of investigation may include:

- Vegetation structure: A Banksia Low Woodland changing to a Banksia Open Low Woodland
- Vegetation condition: Good condition vegetation changing to Degraded condition vegetation
- Weed cover: <2% weed cover changing to 2-10% weed cover
- Native cover: 30-70% native cover changing to 10-30% native cover and
- Plant Stress: trees / largest shrubs within the survey area changing by one grade point, for example, from a 5 to a 4.

These changes are compared against reference sites of the same vegetation type, or data from previous rounds at the same site, to determine whether the change is the result of project-attributable impacts, or other, more regional-scale impacts, such as drought.

Where possible, site averages have been determined using field data. This was possible for three of the measured variables, weed cover, native cover and plant stress. For these parameters, the mid-point of the category range was used as the representative value as shown in **Table 8**, **Table 9** and **Table 10**. Vegetation condition could not be averaged because its determination is not based on a numerical assessment.

Where appropriate, the results of comparisons are shown in graphs that have bars showing the 20% threshold, which, if exceeded, presents a potential reportable decline.

Table 8. Mid-point category score for weed cover.

Weed cover	Category score mid-point %
<2%	1
2-10%	4
11-30%	20
31-70%	50
>70%	85

Table 9. Mid-point category score for native cover.

Native cover	Category score mid-point %
<2%	1
2-10%	4
11-30%	20
31-70%	50
>70%	85

Table 10. Mid-point category score for plant stress.

Plant stress	Category score mid-point %
>81%	90
61-80%	70
41-60%	50
21-40%	30
<20%	10

2.9 Reportable decline

The Vegetation Monitoring Plan (BORR Team 2020) submitted as part of the State environmental approval defines a change or decline considered to be a reportable decline as ‘where monitoring shows a 20% decline in the species composition and/or health/stress attributes of the TEC / PEC potential impact sites against the change at reference sites’.

The process for determining whether a reportable decline has occurred is outlined chronologically in the following steps:

1. Determine whether a significant change/decline has occurred
2. If yes, determine whether the significant change/decline is project attributable
3. If yes, then a reportable decline has occurred.

It is understood for the monitoring that the reportable declines are to be relative to baseline levels across a site or data from reference sites. The baseline levels for this project, reported in Ecoedge (2023), are based on TEC PEC monitoring data collected from spring 2019 to winter 2022 before the commencement of the project, which commenced in August 2022.

3 Personnel

The TEC PEC monitoring for the period May 31, 2024, to May 31 2025, was conducted by Colin Spencer, lead botanist (flora permit FB62000169), Ben Eckermann, botanist (flora permit FB62000262), and Debbie Brace, botanist (flora permit FB62000504).

4 Limitations

Limitations with regard to this reporting period are addressed in **Table 11**.

Table 11. Limitations of the field monitoring with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Proportion of flora identified	Minor	The spring transect monitoring was carried out from 8 October to 12 December 2024, which covers the optimum time for identification of flora within the Bunbury region.
Climatic and seasonal effects	Minor	Above average rainfall was experienced for the Bunbury Weather Station (No. 9965) for the 2024 May to September wet season, followed by about average rain for the balance of the monitoring period. This meant that spring flowering in general and germination of annuals were good, especially in the claypans. It also allowed a level of recovery for vegetation subject to high levels of water stress in the preceding summer and autumn drought.
Availability of contextual information	Not a constraint	Data and reports from numerous studies conducted on Swan Coastal Plain vegetation are available to provide context for the monitoring program.
Completeness of the survey	Not a constraint	All monitoring sites were accessible and able to be easily assessed.
Skill and knowledge of the botanists	Minor	The lead botanist has ten years' experience in undertaking botanical surveys and over 20 years' experience in vegetation management on the Swan Coastal Plain.
Consistency of monitoring personnel	Minor	The lead botanist has participated in all vegetation monitoring episodes since the project commenced in spring 2019 and has ensured consistency in assessment of monitored parameters, including vegetation condition, plant stress and weed cover. However, it is acknowledged that some variation in assessment values due to the interpretation of field conditions between observers may occur.
Disturbance (fire, grazing, clearing etc.)	Minor	At the time of survey, no sites were impacted/disturbed, such that they could not be meaningfully surveyed.
Collection and storage of data	Minor	Data was collected and stored using various applications on electronic devices and pen/paper notebooks. A coordinated approach is required, so data does not get lost or corrupted.

5 Results

5.1 Weather

Rainfall and temperature statistics for the 2019 – 2024 survey period, as compared to the 1995-2024 average for the Bunbury Weather Station (No.9965), are shown in **Figure 3** and, and Error! Reference source not found.. This information provides context to observed changes or trends in vegetation that may arise from variations in weather, for example, from prolonged, unseasonal drought impacts reducing plant germination and increasing plant stress.

The statistics show that the mean temperature for the period between 2020 – 2024 was higher than the mean temperature measured between 1995 and 2024 (BOM 2024a) for four of the five monitoring years, with a range of -0.2 – 1.3 degrees. 2024 was the warmest monitoring year, followed by 2023 and then 2019. The average temperatures from February until May 31 for 2024 were the highest recorded since monitoring commenced and coincided with the driest summer to mid-autumn monitoring period, **Figure 4**, and Error! Reference source not found..

The ‘wet season’ (May to September) rainfall for Bunbury in 2024 was above average **Figure 5**, however, this was in strong contrast to the lowest on record rainfall for Bunbury the 9 months from August 2023 to May 2024 reported by the Bureau of Meteorology (BOM 2024b) **Figure 6**. The low rainfall and elevated temperatures also resulted in Bunbury experiencing, in April 2024, the lowest soil moisture on record (based on all years since 1911) (BOM 2024c) **Figure 7** and increased in 2025 (**Figure 8**). The above-average rain experienced in the balance of 2024 was, however, sufficient to ease the extent of soil moisture deficiencies experienced earlier in the year (BOM 2024b). About average rainfall continued to June 2025.

The above-average rains provided respite to the drought-affected vegetation, with the flowering of native vegetation appearing normal and severely affected vegetation slowly recovering with epicormic regrowth evident on many trees.

Table 12. Rainfall and temperature statistics for 2019 till autumn 2025 for the Bunbury weather station No. 9965 (BOM 2023).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan – Dec
Rainfall Totals													
2019	10.6	0	21.2	16.2	34.8	182	94.6	91.8	30	53.2	15.4	0.2	550
2020	1.2	12.4	35.2	23.6	114.4	152.2	129	65.6	88.2	23	3	5	652.8
2021	0.2	54.6	36.4	74.0	147.8	101.0	199.8	108.2	95.2	123.4	12.6	10.6	963.8
2022	0	2.8	8.6	61.6	111	110.4	226.2	132.8	70.2	30.6	18	0	772.2
2023	0.6	0	15.8	112	37	167.4	168.6	126.8	72.4	11.8	2.6	1	716.4
2024	0	0	0.4	0	177.4	171.8	232	237.8	40.6	44.8	22.6	4.8	932.2
2025	31.4	30.2	30.4	24.8	22.4	19.1							
1995 - 2024	0	8.2	19.1	39.7	100	137	149.2	122.7	78.1	35.9	20.7	14.9	725.5
Temperature Averages													
2019	28.6	29.9	28.2	23.9	20.6	18.8	17.9	18.9	19.9	21.2	26.1	30.4	23.7

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan – Dec
2020	28.9	30.6	27.7	24.2	20.1	19.6	18.1	17.6	19.4	22.6	22.6	29.3	23.4
2021	31.5	28.5	27.4	24.2	20.8	18.0	17.2	17.9	19.1	19.4	23.7	28.2	23
2022	31.7	31.4	28	24.2	20.9	18.1	17.7	17.2	19.3	19.9	24.1	28	23.4
2023	30.9	29.9	27.7	22.3	20.7	16.4	17.1	18.2	20.2	24	28.6	29.8	23.8
2024	30.7	32.8	28.9	26.7	23.2	18.8	18.1	18	20.2	22.3	24.6	29.8	24.5
2025													
1995 - 2024	30	30.1	27.8	24.2	21	18.5	17.4	17.7	18.8	21.2	24.6	27.7	23.2

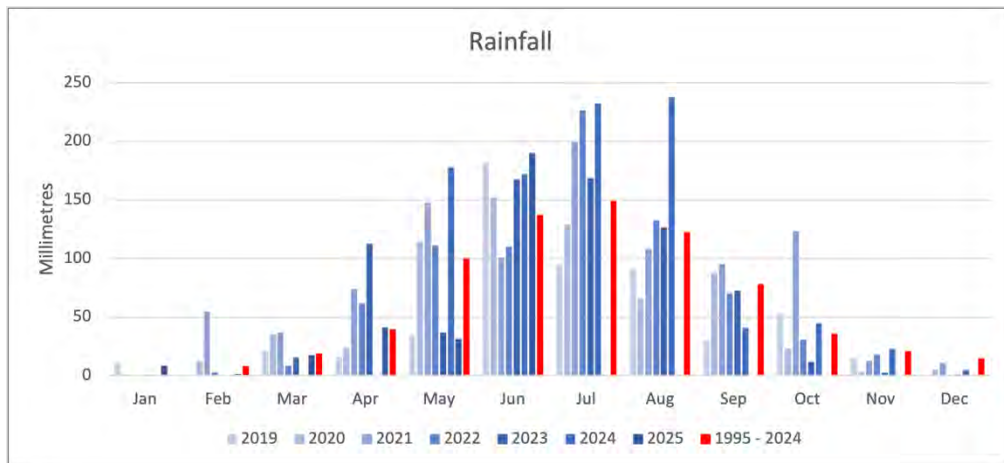


Figure 3. Long term mean and 2019 to 2024 mean rainfall for Bunbury Rain station 9965 (BOM 2024a).

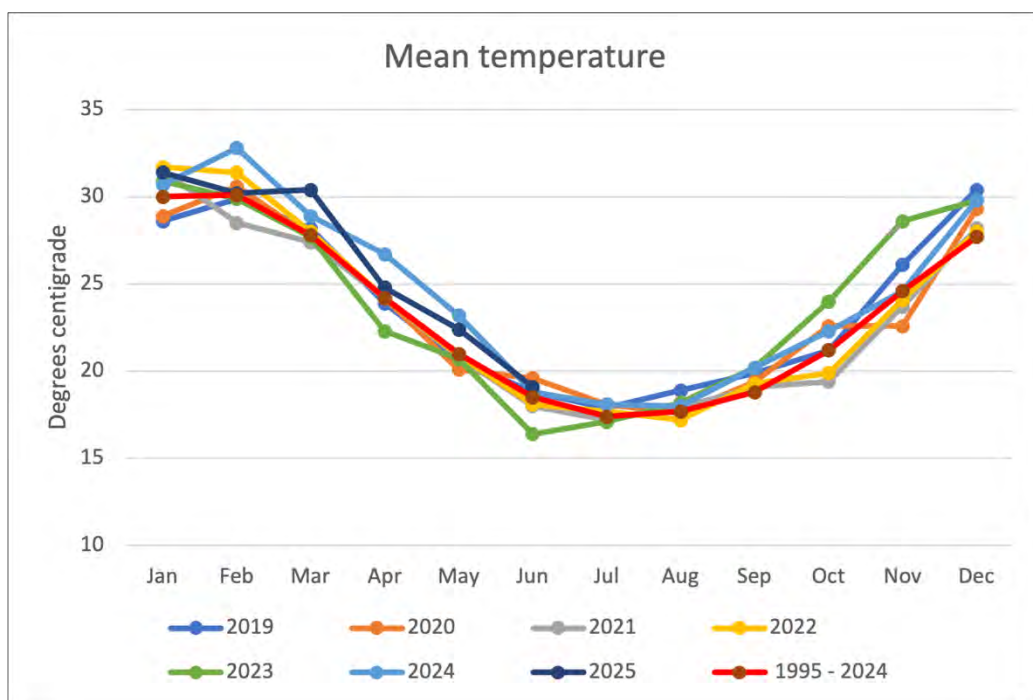


Figure 4. Long term mean and 2019 to Autumn 2025 mean temperature for Bunbury Rain station 9965 (BOM 2025).

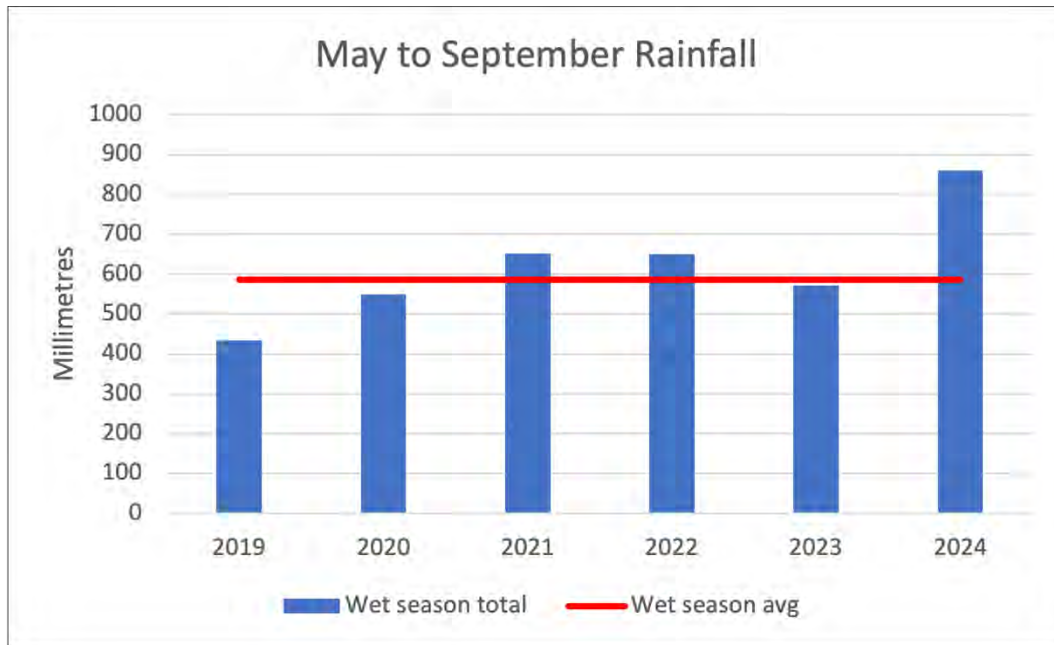


Figure 5. Long term and 2019 to 2024 mean wet season (May to September) rainfall for Bunbury weather station 9965 BOM (BOM 2025).

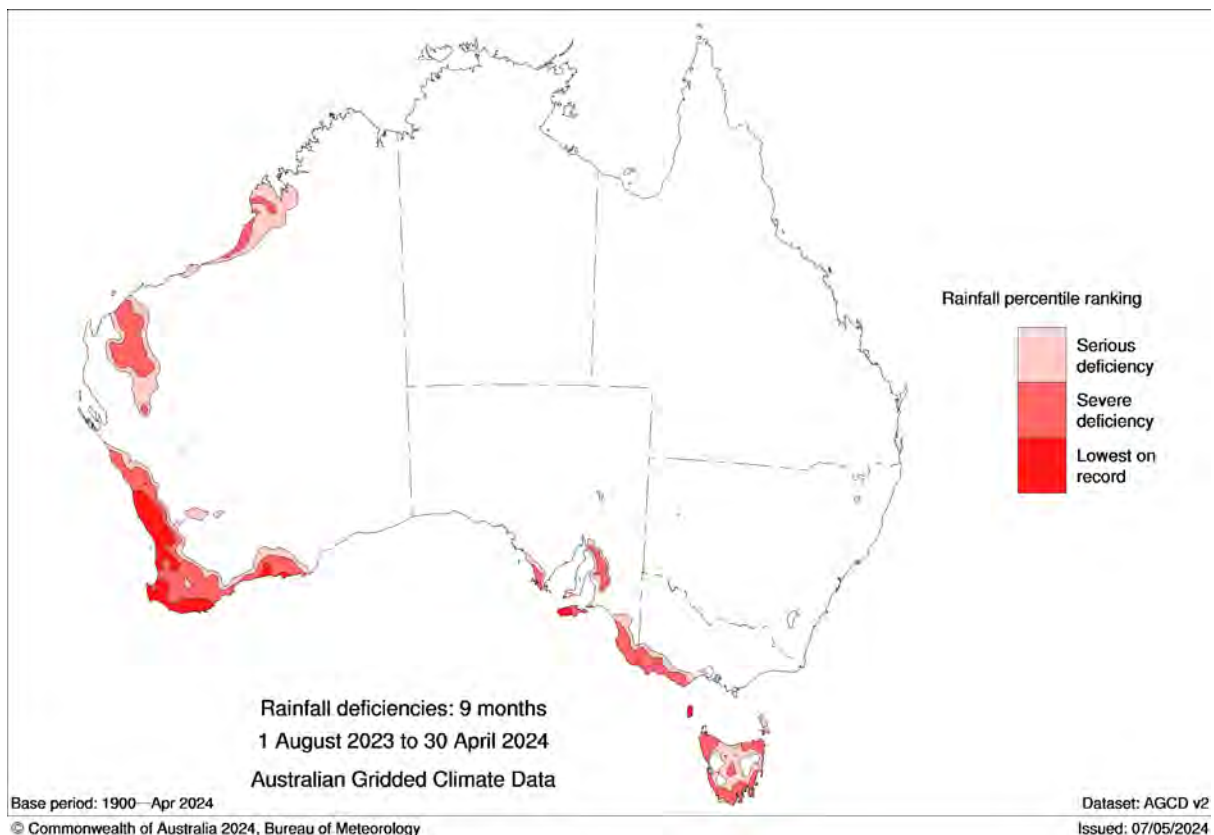


Figure 6. Rainfall deficiencies: 9 months 1 August 2023 to 30 April 2024. (BOM 2024a, used with permission – Creative Commons, CC- BY).

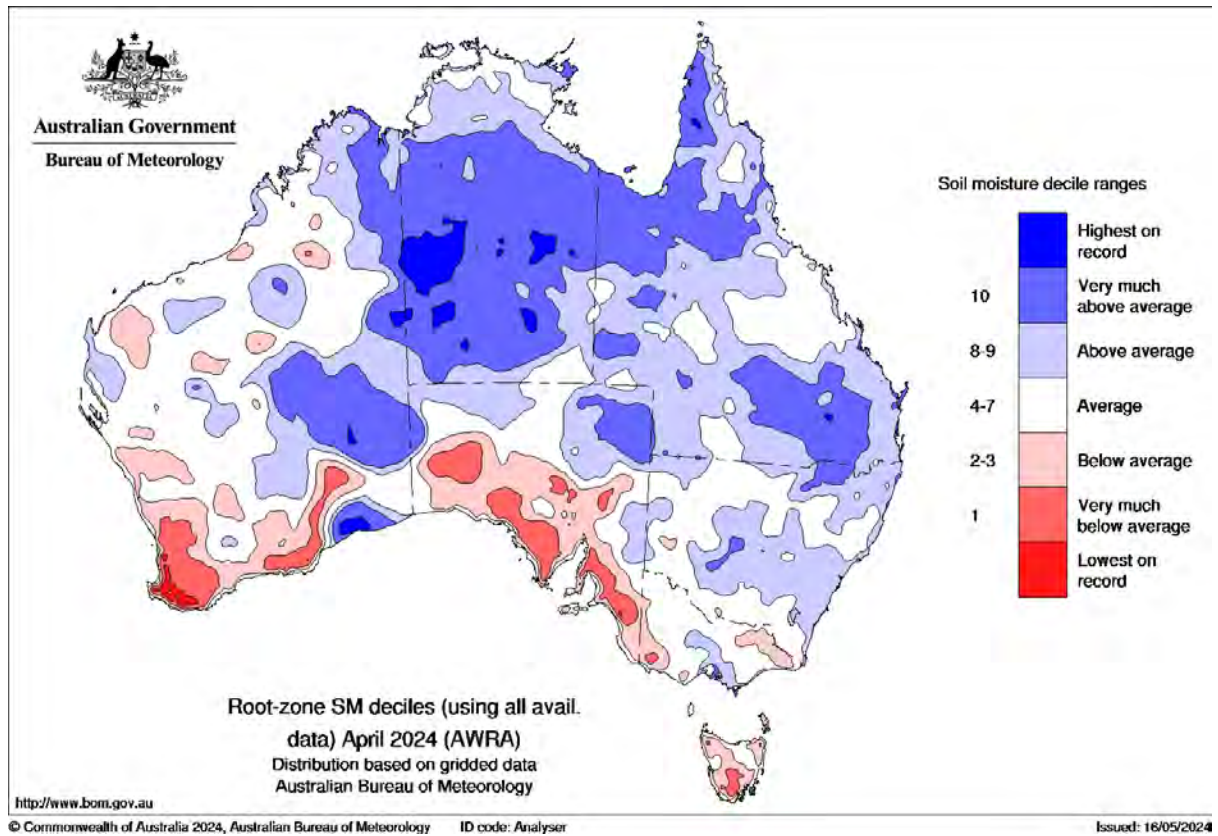


Figure 7. Root zone soil moisture for April 2024 (BOM 2024b, used with permission – Creative Commons, CC- BY).

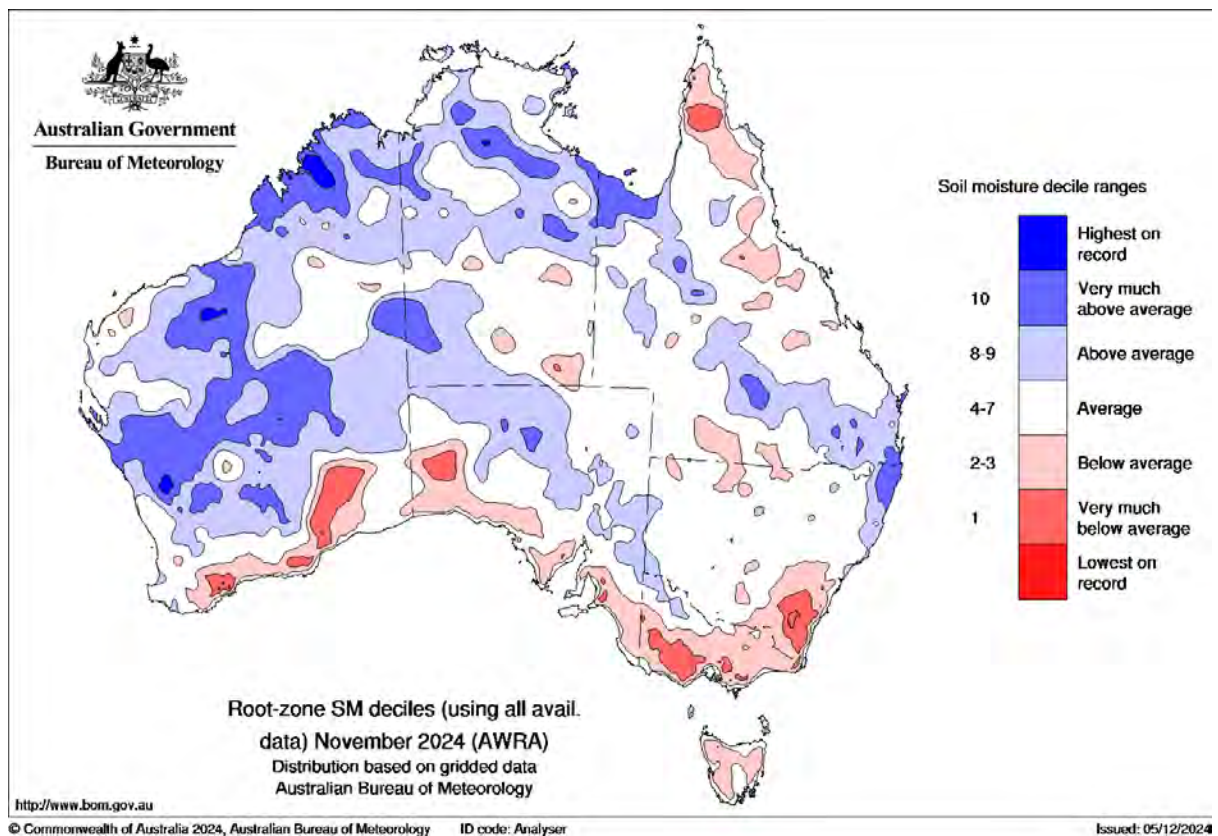


Figure 8. Root zone soil moisture for Nov 2024 (BOM 2024c, used with permission – Creative Commons, CC- BY).

5.2 Potential impact and reference site vegetation descriptions

A description of the modal vegetation for each monitoring site based on dominant vegetation identified within each structural layer is presented in **Table 13**. These descriptions are based on an assessment of vegetation at each photopoint across the monitoring site. A total of six Banksia Woodlands, two Banksia Tuart Woodlands, three clay pans and three Tuart Woodland sites were monitored.

Table 13. Vegetation descriptions for current monitoring sites

Site Name	Vegetation description Autumn 2023
BW-S-PI-1	<i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> Open Woodland over <i>Banksia attenuata</i> , <i>Agonis flexuosa</i> , <i>Xylomelum occidentale</i> , <i>Banksia grandis</i> Low Open Woodland over <i>Kunzea glabrescens</i> Tall Open Shrubland over <i>Jacksonia sternbergiana</i> , <i>Acacia extensa</i> , <i>Stirlingia latifolia brunonis</i> Open Shrubland over <i>Xanthorrhoea brunonis</i> , <i>Hibbertia hypericoides</i> and <i>Macrozamia riedlei</i> Low Open Shrubland over <i>Lomandra micrantha</i> , <i>Phlebocarya ciliata</i> Very Open Herbland and <i>*Ehrharta calycina</i> , <i>*Briza maxima</i> Very Open Grassland and <i>Lepidosperma squamatum</i> and <i>Hypolaena exsulca</i> Very Open Sedgeland.
BW-S-PI-3	<i>Eucalyptus marginata</i> Open Woodland over <i>Banksia attenuata</i> <i>Banksia ilicifolia</i> , <i>Xylomelum occidentale</i> Low Open Woodland over <i>Kunzea glabrescens</i> Tall Open Shrubland over <i>Macrozamia riedlei</i> , <i>Stirlingia latifolia</i> Open Shrubland over <i>Hibbertia hypericoides</i> , <i>Melaleuca thymoides</i> , <i>Acacia pulchella</i> Low Shrubland over <i>Phlebocarya ciliata</i> <i>Dasypogon bromeliifolius</i> Very Open Herbland over <i>Lepidosperma pubisquameum</i> Very Open Sedgeland and <i>*Ehrharta calycina</i> Very Open Grassland.
BW-S-PI-4	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> Woodland <i>Corymbia calophylla</i> , <i>Banksia attenuata</i> , <i>Banksia grandis</i> , <i>Xylomelum occidentale</i> Low Open Woodland <i>Kunzea glabrescens</i> , <i>Persoonia longifolia</i> Tall Open Shrubland over <i>Hibbertia hypericoides</i> , <i>Acacia pulchella</i> , <i>Dasypogon bromeliifolius</i> , <i>Opercularia hispidula</i> Low Shrubland <i>Phlebocarya ciliata</i> , <i>Lomandra micrantha</i> Open Herbland <i>Lepidosperma squamatum</i> , <i>Lyginia imberbis</i> , <i>Lepidosperma pubisquameum</i> Open Sedgeland
BW-S-PI-5	<i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> Open Woodland over <i>Banksia attenuata</i> , <i>Xylomelum occidentale</i> , <i>Banksia grandis</i> Low Open Forest over <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea brunonis</i> and <i>Macrozamia riedlei</i> Low shrubland over <i>Phlebocarya ciliata</i> , <i>Conostylis aculeata</i> , <i>Burchardia congesta</i> , <i>Orthrosanthus laxus</i> Very Open Herbland <i>*Ehrharta calycina</i> , <i>*Briza maxima</i> Very Open Grassland and <i>Lepidosperma squamatum</i> , <i>Lepidosperma pubisquameum</i> and <i>Hypolaena exsulca</i> Very Open Sedgeland.
BW-S-PI-8	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> Open Woodland over <i>Agonis flexuosa</i> , <i>Banksia attenuata</i> , <i>Banksia grandis</i> and <i>Xylomelum occidentale</i> Low Open Forest over <i>Spyridium globulosum</i> , <i>Jacksonia horrida</i> , <i>Acacia cochlearis</i> , <i>*Acacia iteaphylla</i> Open Shrubland over <i>Hibbertia hypericoides</i> , <i>Macrozamia riedlei</i> , <i>Xanthorrhoea brunonis</i> , <i>Phyllanthus calycinus</i> and <i>Styphelia racemulosa</i> Low Shrubland to Open Low Heath over <i>Dichopogon capillipes</i> , <i>Lagenophora huegelii</i> , <i>Lomandra micrantha</i> , <i>Orthrosanthus laxus</i> and <i>*Hypochaeris glabra</i> Open Herbland over <i>*Briza maxima</i> , <i>*Ehrharta calycina</i> Open Grass land and <i>Morelotia octandra</i> and <i>Lepidosperma squamatum</i> Very Open Sedgeland.
BTW-S-R-1	<i>Eucalyptus gomphocephala</i> , <i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> Open Woodland over <i>Banksia attenuata</i> , <i>Xylomelum occidentale</i> Low Woodland over <i>Macrozamia riedlei</i> , <i>Xanthorrhoea brunonis</i> Open Shrubland over <i>Hibbertia hypericoides</i> , <i>Phyllanthus calycinus</i> Low Shrubland over <i>Lomandra caespitosa</i> , <i>*Ursinia anthemoides</i> Open Herbland over <i>*Briza maxima</i> Very Open Herbland.
BTW-S-R-2	<i>Eucalyptus gomphocephala</i> Open Woodland over <i>Agonis flexuosa</i> , <i>Banksia grandis</i> Low Woodland over <i>Spyridium globulosum</i> Tall Open Shrubland over <i>Macrozamia riedlei</i> Open Shrubland over <i>Hibbertia hypericoides</i> Very Open Shrubland over <i>Orthrosanthus laxus</i> , <i>Phlebocarya ciliata</i> Open Herbland, <i>Morelotia octandra</i> , <i>Lepidosperma squamatum</i> Very Open Sedgeland and <i>*Briza maxima</i> Very Open Grassland.

Site Name	Vegetation description Autumn 2023
BW-S-R-1	<i>Eucalyptus marginata</i> Open Woodland over <i>Banksia attenuata</i> , <i>Eucalyptus marginata</i> Low Woodland over <i>Kunzea glabrescens</i> Tall Shrubland over <i>Hibbertia hypericoides</i> , <i>Calytrix flavescens</i> , <i>Gompholobium tomentosum</i> , <i>Bossiaea eriocarpa</i> Low Shrubland over <i>Lepidosperma squamatum</i> Very Open Sedgeland.
CP-S-PI-1	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> Open Woodland over <i>Banksia attenuata</i> , <i>Banksia grandis</i> , <i>Banksia ilicifolia</i> Low Open Woodland over <i>Macrozamia riedlei</i> Open Shrubland over <i>Macrozamia riedlei</i> , <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea brunonis</i> Low Shrubland over <i>Lomandra micrantha</i> , <i>Conostylis aculeata</i> , <i>Burchardia congesta</i> Very Open Herbland over <i>Lepidosperma squamatum</i> Very Open Sedgeland and <i>*Briza maxima</i> , <i>*Ehrharta calycina</i> Open Grassland.
CP-NS-R-1	<i>Corymbia calophylla</i> , <i>Eucalyptus rudis</i> Open Woodland over <i>Melaleuca raphiophylla</i> , <i>Acacia saligna</i> Low Open Woodland over <i>Viminaria juncea</i> Tall Shrubland over <i>Xanthorrhoea preissii</i> , <i>Hakea varia</i> Shrubland over <i>Hakea varia</i> , <i>Grevillea bipinnatifida</i> , <i>Hypocalymma angustifolia</i> Low Open Shrubland over <i>*Babiana angustifolia</i> Open Herbland over <i>Mesomelaena tetragona</i> , <i>Morelotia octandra</i> , <i>Cyathochaeta avenacea</i> Open Sedgeland.
CP-NS-R-2	<i>Melaleuca viminea</i> Tall Shrubland over <i>Blennospora doliiformis</i> , <i>Centrolepis aristatus</i> , <i>*Bartsia viscosa</i> Herbland.
TW-S-PI-2	<i>Eucalyptus gomphocephala</i> Open Woodland over <i>Banksia attenuata</i> , <i>Agonis flexuosa</i> , <i>Xylomelum occidentale</i> Low Woodland over <i>Spyridium globulosum</i> Tall Open Shrubland over <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea brunonis</i> and <i>Macrozamia riedlei</i> Low Shrubland over <i>Orthrosanthus laxus</i> , <i>Dichopogon capillipes</i> , <i>*Ursinia anthemoides</i> Very Open Herbland and <i>*Briza maxima</i> , <i>*Avena barbata</i> , <i>*Ehrharta calycina</i> Open Grassland and <i>Lepidosperma squamatum</i> Very Open Sedgeland.
TW-S-PI-3	<i>Eucalyptus gomphocephala</i> , <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> Woodland over <i>Agonis flexuosa</i> and <i>Banksia attenuata</i> Low Woodland over <i>Jacksonia furcellata</i> and <i>Daviesia divaricata</i> Open Shrubland over <i>Xanthorrhoea brunonis</i> and <i>Macrozamia riedlei</i> Very Open Shrubland over <i>Lomandra micrantha</i> , <i>Conostylis aculeata</i> var. <i>preissii</i> Very Open Herbland and <i>Ehrharta calycina</i> Open Grassland.
TW-S-PI-4	<i>Eucalyptus gomphocephala</i> , <i>Eucalyptus marginata</i> Woodland over <i>Agonis flexuosa</i> , <i>Banksia attenuata</i> , <i>Banksia grandis</i> Low Woodland over <i>Xanthorrhoea brunonis</i> Very Open Shrubland <i>Lomandra suaveolens</i> , <i>Lomandra micrantha</i> , <i>Conostylis aculeata</i> var. <i>preissii</i> , <i>*Anagallis sp.</i> , <i>Oxalis pes-caprae</i> Open Herbland <i>Briza maxima</i> <i>Ehrharta calycina</i> Open Grassland.

* Denotes introduced species.

5.2.1 Comparison of potential impact and reference site transect monitoring sites

Representative data for the key variables (diversity of natives, including orchids, diversity and cover of weeds and shrub and trees stress) monitored at each transect monitoring site for the 2019 to 2024 spring monitoring periods is presented in **Table 14**. Graphs showing the comparative trends in this data between potential impact sites and reference sites for each TEC PEC type is presented below, **Figure 9** for Banksia woodland sites, **Figure 10** for Claypan sites, **Figure 11** for Banksia Tuart woodland sites and **Figure 12** showing average stress for all TEC/ PEC sites monitored.

The trends are discussed for each TEC PEC, and an assessment is made with regard to the need to make a reportable decline and project attributable indirect impacts.

Twenty percent standard error bars are shown on each graph for the 2021 survey season in order to provide a baseline reference point. This point is 'imperfect' as some monitoring was completed in autumn and winter 2022 prior to the commencement of the project in August 2022, but it serves as a conservative point from which to make visual comparisons.

Table 14. Representative data for the six key variables for Potential Impact and Reference sites in the BORR South project area.

Site Name	Year	Total taxa	Natives	Orchids	Weeds	Maximum weed cover	Average large shrub & tree stress
BW-S-PI-1_T1	2019	21	17	0	4	3	4.67
	2020	29	23	1	6	6	4.50
	2021	31	23	1	8	6	3.67
	2022	36	28	1	8	5	5.00
	2023	36	26	2	9	5	5.00
	2024	39	28	1	11	6	5.00
BW-S-PI-5_T1	2019	22	20	0	2	3	4.88
	2020	40	36	1	4	8	4.83
	2021	35	31	2	4	5	4.71
	2022	36	32	3	4	5	4.38
	2023	37	32	3	5	5	4.75
	2024	47	40	4	7	7	4.4
BW-S-PI-8_T1	2022	51	44	3	7	4	4.92
	2023	48	41	2	7	4	4.94
	2024	60	52	3	8	4	4.3
BW-S-R-1_T1	2019	58	54	0	4	4	4.86
	2020	30	28	3	2	2	5.00
	2021	26	23	3	3	1	4.71
	2022	35	30	3	5	2	4.89
	2023	42	36	2	6	3	4.88
	2024	48	41	2	7	3	4.83
BW-S-R-1_T2	2020	31	30	5	1	4	5.00
	2021	31	30	5	1	3	4.44
	2022	30	28	4	2	2	4.58

Site Name	Year	Total taxa	Natives	Orchids	Weeds	Maximum weed cover	Average large shrub & tree stress
	2023	34	31	4	2	3	4.48
	2024	40	38	4	2	5	4.67
BTW-S-R-1_T1	2020	41	35	0	6	7	4.78
	2021	42	35	2	7	6	4.67
	2022	50	44	3	6	6	4.55
	2023	51	43	2	8	6	4.84
	2024	54	43	2	11	6	4.54
BTW-S-R-2_T1	2020	34	28	1	6	5	3.50
	2021	44	32	3	12	6	4.33
	2022	42	32	4	10	5	3.80
	2023	43	32	4	11	5	3.67
	2024	44	31	3	13	5	3.83
TW-S-PI-2_T1	2019	25	21	0	4	8	5.00
	2020	38	25	13	0	5	4.67
	2021	42	28	14	2	5	4.71
	2022	47	33	14	3	5	4.71
	2023	40	24	16	2	6	4.67
	2024	56	37	2	19	6	4.8
CP-S-PI-1_T1	2019	37	24	0	13	4	
	2020	35	14	0	21	9	
	2021	46	27	0	19	5	
	2022	52	33	0	19	5	
	2023	52	30	0	22	5	
	2024	51	27	1	24	7	
CP-NS-R-1_T1	2019	21	17	0	4	4	4.81
	2020	36	28	0	8	4	3.56
	2021	36	26	0	10	5	4.83
	2022	33	23	0	10	6	4.86
	2023	32	23	1	9	6	4.50
	2024	40	27	1	13	7	4.33
CP-NS-R-2_T1	2020	34	22	1	12	5	
	2021	19	11	0	8	5	5.00
	2022	31	21	1	10	4	4.50 ¹¹
	2023	40	22	0	18	5	
	2024	46	25	0	21	6	5.00

¹¹ Note these stress scores were for the presence of *Melaleuca lateritia* and *Hibbertia vaginata* seedlings which were not recorded in the 2023 monitoring round.

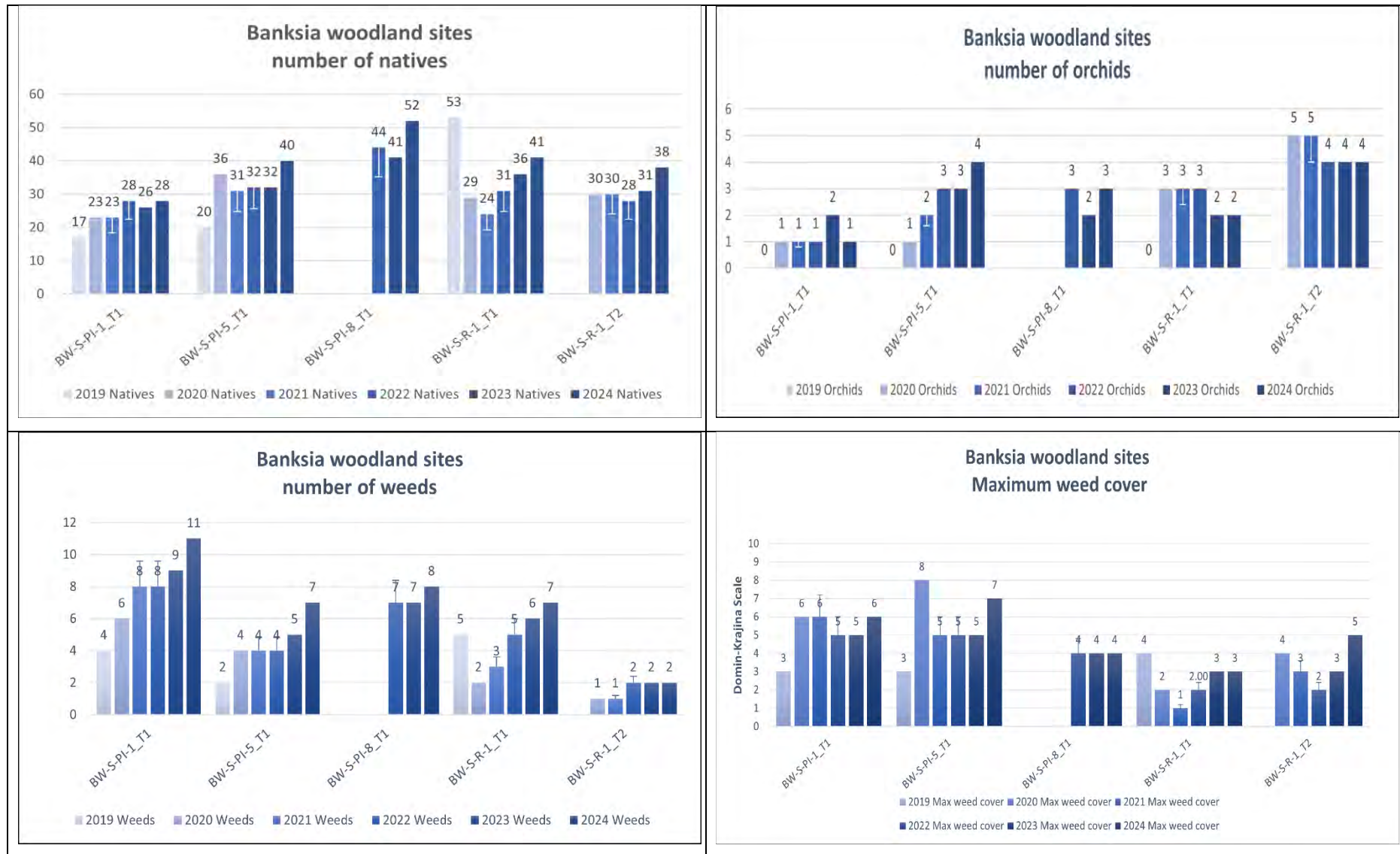


Figure 9. Banksia woodland transect graphs showing comparative data for potential impact sites and reference sites for weeds, native species and orchids.

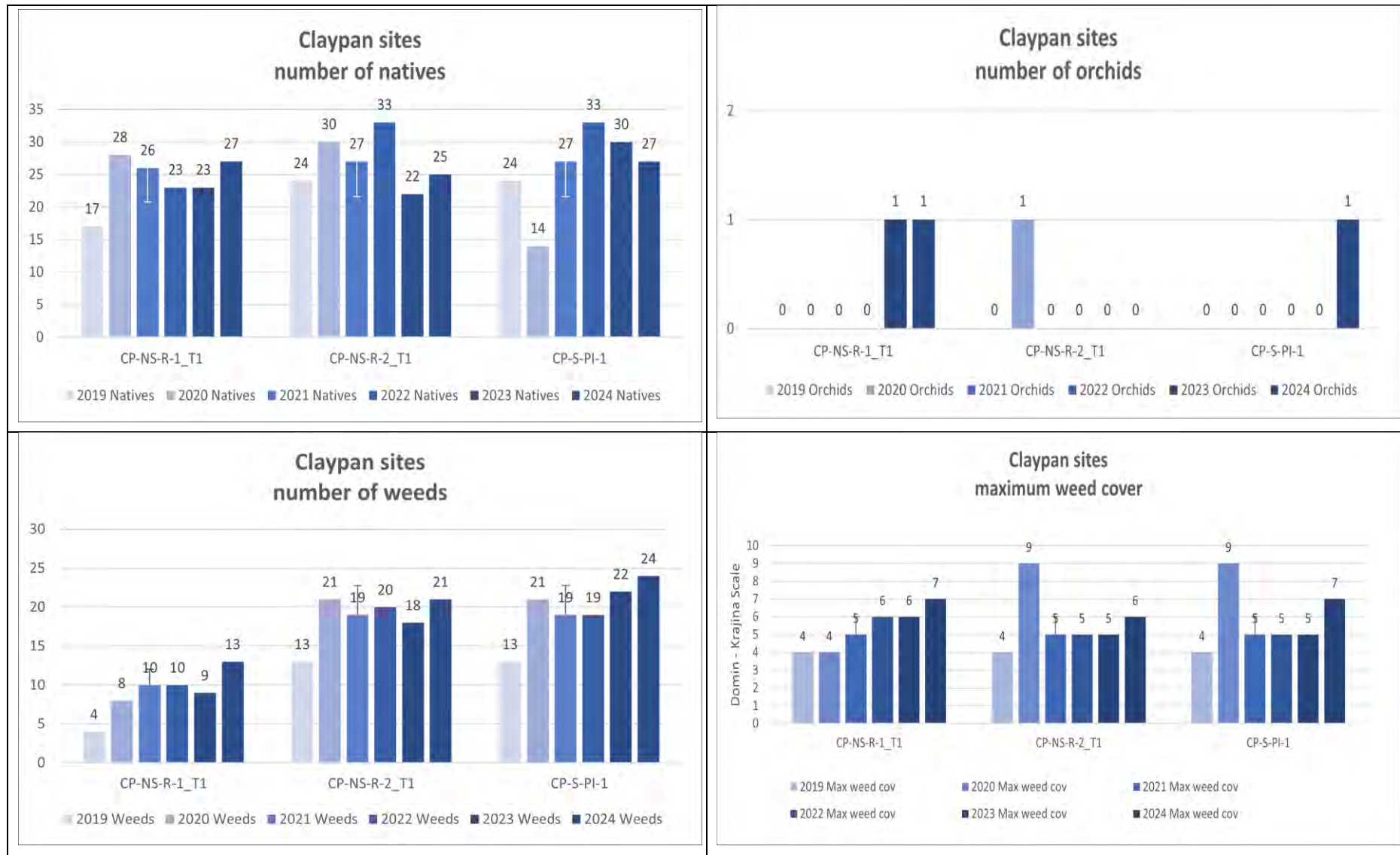


Figure 10. Claypan transect graphs showing comparative data for potential impact sites and reference sites for weeds, native species and orchids.

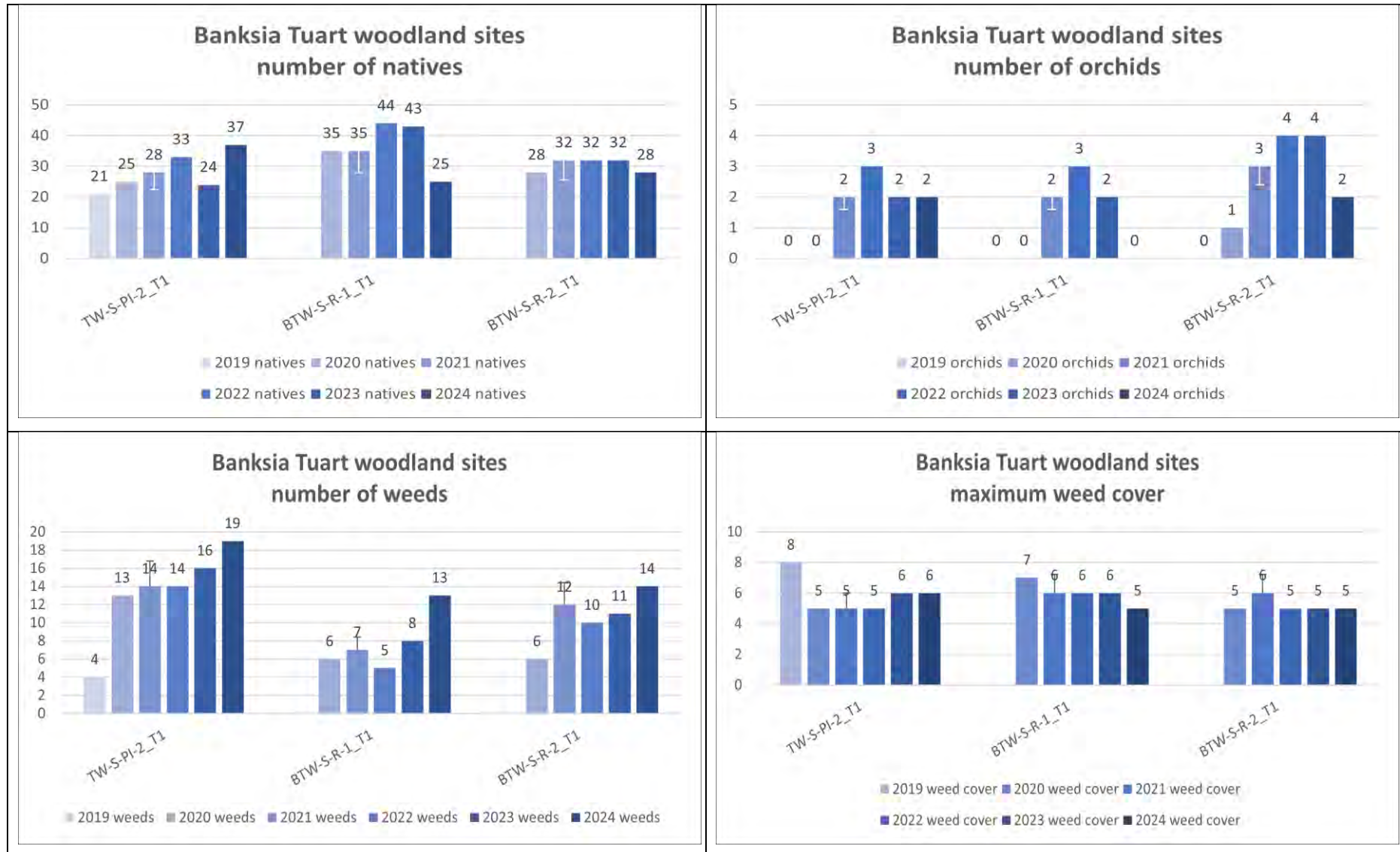


Figure 11. Banksia Tuart woodland transect graphs showing comparative data for potential impact sites and reference sites for weeds, native species and orchids.

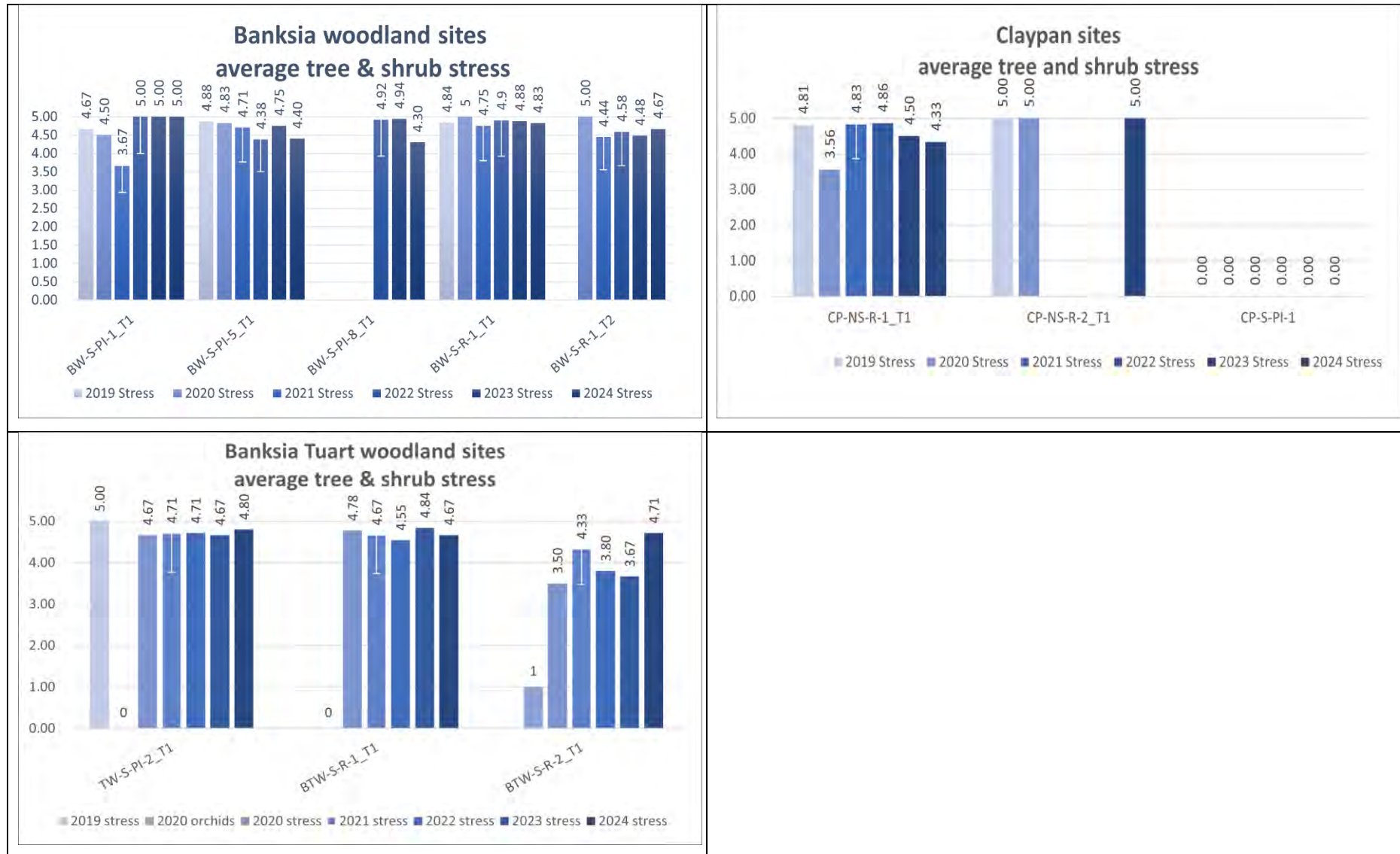


Figure 12. Graphs showing comparative data for potential impact sites and reference sites for average tree and shrub stress in Banksia woodland, Claypan and Banksia Tuart woodland TEC PEC sites.

5.2.2 Weed diversity and cover

Banksia woodlands

Weed diversity has increased at all three Banksia woodland potential impact sites by up to three species relative to the spring 2021 baseline levels. Weeds also increased at both reference sites, with an increase of four species at BW-S-R-1_T1. Maximum weed cover increased for two of the potential impact sites from 10 – 25% to 25 – 33% and was stable at 5– 10% for BW-S-PI-8_T1 relative to baseline conditions. Weed cover also increased at the reference sites, but the weed loads at the reference sites were overall lower than at the potential impact sites. The increases in weed cover were observed in most weed species within the quadrats.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to weeds for Banksia woodland potential impact TEC sites, because the increases were experienced in both potential impact and reference sites and were of a comparable magnitude. Furthermore, the increase in weed diversity is attributed to colonisation of weeds from immediately adjacent bushland and not from the nearby BORR project area.

Claypans

The levels of weed diversity increased by five species at the one claypan potential impact site CP-S-PI-1_T1 relative to baseline levels, with an increase in maximum weed cover from 10 – 25% to 33 – 50 %. Increases in diversity were also experienced at both reference sites, by three species at CP-NS-R-1_T1 and two species at CP-NS-R-2_T1. A similar increase in maximum weed cover was recorded at the reference site CP-NS-R-1_T1 (**Figure 10**).

The increases in weed cover at the reference and potential impact sites were attributed to different weeds, *Cotula coronopifolia* and *Anthoxanthum odoratum* at CP-S-PI-1 and *Babiana angustifolia* and *Vulpia bromoides* at CP-NS-R-1_T1.

Project attributable indirect impacts and/or reportable decline: There are no project attributable indirect impacts regarding weeds for Claypan potential impact sites CP-S-PI-1_T1 because the increases were experienced in both potential impact and reference sites and were of a comparable magnitude.

Tuart woodlands

The levels of weed diversity within the single Tuart woodland potential impact site TW-S-PI-2_T1 increased by five species compared with baseline levels. Both reference sites also increased in weed diversity, with BTW-S-R-1_T1 experiencing the largest increase of six species. Maximum weed cover increased from 10-25% to 25-30% at TW-S-PI-2_T1 in 2023 due to increases in small annual grasses. This increase was not experienced at the reference sites, which both decreased in maximum weed cover. The variation is attributed to variable germination in small annual weeds.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to weed diversity, as the increase at TW-S-PI-2 was

comparable to the reference site BTW-S-R-1_T1. It is also considered that these increases are attributed to increases in existing annually renewed weeds present within and adjacent to the site rather than from BORR-related activities, which are located approximately 50 m from the monitoring transect.

5.2.3 Native diversity

Banksia woodlands

The diversity within the three Banksia woodland potential impact sites has overall increased at all three potential impact sites relative to baseline levels, with the largest increase generally occurring in the 2024 monitoring period. This pattern was reflected in the reference sites. The overall increasing trend comprised small fluctuations (minor increases and decreases) in the diversity. The fluctuations are attributed to variations in the diversity of small annual herbs, in particular species of the *Isolepis*, *Centrolepis* and *Hydrocotyle* and annually renewed geophytes such as orchids and droseras together with new seedlings which are more prevalent in higher rainfall years such as 2024. For interest, a list of species recorded in 2024 but not in 2023 is presented for BW-S-PI-8 and BW-S-PI-5. It is suggested that the increase in species could also be attributed to the increase in space created by the widespread dieback of some understorey shrub species, such as *Hibbertia hypericoides* and *Styphelia racemulosa*, coupled with above-average rainfall.

BW-S-PI-5: *Asteridea pulverulenta*, *Caladenia flava*, *Drosera erythrorhiza*, *Drosera pallida*, *Homalosciadium homalocarpum*, *Hydrocotyle callicarpa*, *Kennedia prostrata* and *Thysanotus arbuscula*

BW-S-PI-8: *Austrostipa compressa*, *Caladenia flava*, *Centrolepis drummondiana*, *Drosera pallida*, *Gompholobium tomentosum*, *Ficinia marginata*, *Luzula meridionalis*, *Opercularia apiciflora* and *Tricoryne elatior*

Noting that the 53 species recorded in 2019 for BW-S-R-1_T1 appear to be an anomaly, most likely due to a recording error, with levels between 30 and 40 species better reflecting the site's diversity.

There has been no decrease in orchid diversity at the Banksia woodland potential impact sites. They steadily increased at BW-S-PI-5 from two to four species yet fluctuated at BW-S-PI-1_T1 and BW-S-PI-8_T1 returning to baseline levels in 2024. In contrast orchid diversity dropped by one species for both the reference sites.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to native diversity for the Banksia woodland potential impact sites as all sites have increased in diversity from baseline monitoring levels.

Claypans

The diversity of natives in Potential Impact site CP-S-PI-1_T1 has returned to baseline levels after increased levels of diversity recorded in 2022 and 2023. This is generally similar to CP-NS-R-2 which also experienced an increase in diversity followed by a decrease. In contrast CP-

NS-R-1 decreased in species diversity before increasing to above base line levels in 2024. The variations, both positive and negative, can be attributed to the variable germination in annual herbs within the claypans, some of which had low cover/abundance scores of 1 (seldom found species with insignificant cover) or 2 (very scattered individuals of a species with less than 1% cover). This means that they are vulnerable to changes within the local environment.

2024 saw the first occurrence of an orchid (*Eriochilus dilatatus* – leaf only) within the potential impact site since monitoring commenced.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to native diversity for the Claypan potential impact sites because there was no decrease in native diversity, including orchid diversity, compared to baseline levels.

Tuart woodlands

The diversity of natives in the one Tuart woodland potential impact transect site TW-S-PI-2_T1 has increased in diversity relative to baseline levels from 28 to 37 species. This is in contrast to 2023, when diversity levels were lower than the baseline levels recorded.

Similar magnitude fluctuations were also observed in reference site BTW-S-R-1_T1, which is like TW-S-PI-2_T1 in that it has a range of micro-habitats, including open areas and large logs conducive to colonisation of annually regenerating species, including orchids. These species include *Caladenia flava*, *Centrolepis drummondiana*, *Chamaescilla corymbosa*, *Crassula colorata*, *Drosera stolonifera*, *Ficinia marginata* and *Millotia myosotidifolia*.

By contrast, levels of native diversity at the reference site BW-S-R-2_T1 were generally more consistent with baseline levels. BTW-S-R-2_T1 has an overall denser understorey with fewer open areas conducive for the colonisation of small annual herbs. Hence, the fluctuation in diversity and number of annual herbs is less likely than for either BTW-S-R_T1 and TW-S-PI-2_T1.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to native diversity for the single Tuart woodland potential impact site as the diversity of native species within the site has increased relative to baseline levels.

5.2.4 Shrub and tree stress

Banksia woodlands

Relatively minor increases in stress (less than 20%) were observed at two of the potential impact monitoring transects relative to baseline levels, at BW-S-PI-5 and BW-S-PI-8. These increases were recorded in 2024 and generally reflect the poor condition of the low shrub *Hibbertia hypericoides* following the record summer and autumn drought experienced in 2023/2024.

Stress levels remained relatively stable for the two reference sites BW-S-R-1_T1 and BW-S-R-1_T2 with most species, including *Hibbertia hypericoides* recording the maximum health of 5.

Project attributable indirect impacts and or reportable decline: At the time of monitoring in spring 2024 there are no project attributable indirect impacts with regards to plant stress for the Banksia woodland potential impact sites because increases in stress were less than 20.

Claypans

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to stress in trees or shrubs for the monitored Claypan Potential Impact site CP-S-PI-1 because there are no trees or shrubs within the monitoring quadrats. All plants are annual or semi-perennial herbs that die or die back soon after the end of the rainy season.

Tuart woodlands¹²

The average stress level within the single potential impact monitoring site TW-S-PI-2_T1 has remained generally stable since 2020. This is comparable to stress levels within the reference site BTW-S-R-1_T1, which have also been generally stable since 2020. By contrast, overall stress levels were reduced at reference site BTW-S-R-1_T2 relative to baseline levels. The stress at this site is mostly due to the poor condition of *Macrozamia riedlei*. A substantive improvement in the condition of one of the plants resulted in the overall reduction in stress at this site in 2024. This is perhaps due to the 28% above average rainfall in 2024, see section 5.1.

Project attributable indirect impacts and/or reportable decline: There are no project attributable indirect impacts regarding plant stress for the monitored Tuart woodland potential impact site TW-S-PI-2_T1 because stress levels have remained practically stable relative to baseline levels.

5.2.5 Plant deaths

Plant deaths for all perennial shrubs and trees have been recorded within potential impact and reference site transects since monitoring commenced in 2019 with deaths recorded for the first time in 2024. These were observed in the low shrub *Hibbertia hypericoides* in four quadrats within the two sites BW-S-PI-5 and BW-S-PI-8. Widespread stress in *Hibbertia hypericoides* was observed outside of the monitoring quadrats at these sites and the primary cause of reported stress in the transects at these sites. These deaths are attributed to the record summer and autumn drought experienced in 2024.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts with regards to the death of *Hibbertia hypericoides* within monitoring sites BW-S-PI-5 and BW-S-PI-8. These deaths are attributed to the record summer and autumn drought experienced in 2024.

¹² The Tuart potential impact transect sites are compared with Banksia Tuart woodland transect reference sites due to the absence of transect reference sites within just Tuart woodland.

5.3 Comparison of biannual photopoints

5.3.1 Vegetation structure

There were no significant changes in dominant species or vegetation structure at any of the 108 photopoints monitored between autumn 2025 and the commencement of monitoring in spring 2019. This means that there was no change in the overall vegetation descriptions for the monitoring sites.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts and therefore any potentially reportable declines with regards to vegetation structure at any of the monitored TEC and PEC community types relative to baseline levels.

5.3.2 Vegetation condition

There were five changes in vegetation condition out of the 125 monitoring points between the 2019 and 2025 monitoring rounds for all monitored Banksia woodland, Claypan and Tuart woodland PEC/TEC occurrences. These were all recorded in the Banksia woodland community at four sites, BW-S-PI-1 (T1W), BW-S-PI-3 (P05), BW-S-PI-4 (P02) and BW-S-PI-5 (P04 and P09) (**Table 15**).

The comparative data for vegetation condition recorded at the boundary photopoint sites are presented in **Appendix 3**.

Table 15. Monitoring points with changed vegetation condition.

Monitoring point	Season	Condition change	Reason
BW-S-PI-1 (T1W),	Spring 2024	VG - G	Weeds have increased, and some understory plants are dead, notably <i>Phlebocarya ciliata</i> , due to drought impacts altering the diversity of the site.
BW-S-PI-3 (P05)	Autumn 2024	Ex - Vg	Declined from Ex to Vg because the canopy structure is significantly altered with most trees (<i>Banksia attenuata</i> and Jarrah trees dead) / very stressed from a combination of drought, fire, phytophthora dieback(?), borer and cockatoo damage.
BW-S-PI-4 (P02)	Spring 2022	Ex - Vg	Establishment of <i>Acacia longifolia</i> observed in autumn 22, aggressively competing with mid and understorey native species.
BW-S-PI-5 (P04)	Spring 2022	Ex - Vg	Spread and increase of weeds, in particular <i>Briza maxima</i> .
BW-S-PI-5 (P09).	Autumn 2025	G - D	Spread and increase of weeds, in particular grass weeds

The greatest potential for a downgrading of vegetation condition is within marginally Excellent condition monitoring points due to the invasion of aggressive weeds and the modification of vegetation structure, which can be caused by a range of factors such as repeated fire, phytophthora dieback and grazing.

Project attributable indirect impacts and or reportable decline:

The decline in vegetation condition at all five photopoints is not attributable to BORR project activities. The reasons are due to a combination of increased weed loads from weed infestations already present at the site and due to reductions in native diversity due to plant death caused by the record-breaking 2024 autumn drought, historic fire, phytophthora dieback, borer and cockatoo damage.

5.3.3 Weed cover

Weeds cover increased at nine of the 14 sites actively monitored¹³ during the baseline monitoring period, spring 2019 to Autumn 2022 (**Table 16**). The increases affected all vegetation types, Banksia woodland, Tuart woodland and Claypans, and were evident in potential impact and reference sites. This increase is likely due to the increases in annual rainfall and compounding increases in weed seed set over the monitoring period.

Post baseline monitoring shows that weed cover has continued to increase, with cover increasing at 28 of the 110 monitoring points: three Banksia woodland potential impact sites, BW-S-PI-1, BW-S-PI-4 and BW-S-PI-5, one Banksia Tuart Woodland reference site BTW-S-R-2, one Tuart woodland potential impact site TW-S-PI-2 and one claypan reference site CP-NS-R-2. Thirteen of these increases occurred in the 22/23 monitoring period, seven increased in the 23/24 monitoring period and eight in the 24/25 monitoring period. These increases are shown in **Table 17**.

A full set of comparative results for weed cover is available in **Appendix 3**.

Table 16. Number of monitoring points with a change (increase) in weed during the baseline monitoring period per monitoring site.

Site type	Site	Number of points with a change in weed cover*
Potential impact sites	BW-S-PI-1	6 (7)
	BW-S-PI-3	5 (7)
	BW-S-PI-4	3 (4)
	BW-S-PI-5	12 (37)
	BW-S-PI-8	First monitored in winter 2022
	CP-S-PI-1	2 (5)
	TW-S-PI-2	6 (11) an additional 11 sites were added in winter 2022
	TW-S-PI-3	0 (4)

¹³ BW-S-PI-8 was only monitored for the first time in Winter 2022, as this is in the clearing exclusion zone.

	TW-S-PI-4	1 (3)
Reference sites	BW-S-R-1	0 (4)
	BTW-S-R-1	2 (2)
	BTW-S-R-2	2 (2)
	CP-NS-R-1	1 (2)
	CP-NS-R-2	1 (2)

* The number in the brackets is the total number of monitoring points at a monitoring site.

Table 17. Site with increased weed cover recorded post the baseline monitoring period. *Figures in bold type mark the first increase in weed cover.

No	Monitoring point	Baseline	Post baseline					
		Autumn / Winter 2022	Spring 2022	Autumn 2023	Spring 2023	Autumn 2024	Spring 2024	Autumn 2025
1	BTW-S-R-2_T1N	10-30%	10-30%	10-30%	10-30%	10-30%	30-70%	30-70%
2	BTW-S-R-2_T1s	10-30%	10-30%	10-30%	30-70%	30-70%	30-70%	30-70%
3	BW-S-PI-1_P01	10-30%	10-30%	10-30%	10-30%	10-30%	30-70%	30-70%
4	BW-S-PI-1_T1W	10-30%	10-30%	10-30%	10-30%	10-30%	30-70%	30-70%
5	BW-S-PI-4_P01	2-10%	30-70%*	30-70%	30-70%	30-70%	30-70%	30-70%
6	BW-S-PI-5_P01	<2%	2-10%	2-10%	2-10%	2-10%	2-10%	2-10%
7	BW-S-PI-5_P02	30-70%	>70%	>70%	>70%	>70%	>70%	>70%
8	BW-S-PI-5_P04	<2%	10-30%	10-30%	10-30%	10-30%	10-30%	10-30%
9	BW-S-PI-5_P05	2-10%	2-10%	2-10%	10-30%	10-30%	10-30%	10-30%
10	BW-S-PI-5_P06	30-70%	>70%	>70%	>70%	>70%	>70%	>70%
11	BW-S-PI-5_P07	30-70%	>70%	>70%	>70%	>70%	>70%	>70%
12	BW-S-PI-5_P08	30-70%	>70%	>70%	>70%	>70%	>70%	>70%
13	BW-S-PI-5_P09	10-30%	10-30%	10-30%	10-30%	10-30%	30-70%	30-70%
14	BW-S-PI-5_P10	10-30%	10-30%	10-30%	30-70%	30-70%	30-70%	30-70%
15	BW-S-PI-5_P14	<2%	2-10%	2-10%	2-10%	2-10%	2-10%	2-10%
16	BW-S-PI-5_P15	10-30%	30-70%	30-70%	30-70%	30-70%	30-70%	30-70%
17	BW-S-PI-5_P25	<2%	<2%	<2%	2-10%	2-10%	2-10%	2-10%
18	BW-S-PI-5_P26	2-10%	2-10%	2-10%	10-30%	10-30%	10-30%	10-30%
19	BW-S-PI-5_P30	2%	2%	2%	2-10%	2-10%	2-10%	2-10%
20	BW-S-PI-5_P31	2%	2%	2%	2-10%	2-10%	2-10%	2-10%
21	CP-NS-R-2_T1N	10-30%	10-30%	10-30%	30-70%	30-70%	30-70%	
22	TW-S-PI-1_P02	2%	2%	2%	2%	2-10%	2-10%	2-10%
23	TW-S-PI-2_P03	10-30%	30-70%	30-70%	30-70%	30-70%	30-70%	30-70%
24	TW-S-PI-2_P05	10-30%	>70%	>70%	>70%	>70%	>70%	>70%
25	TW-S-PI-2_P14	30-70%	30-70%	30-70%	30-70%	30-70%	>70%	>70%
26	TW-S-PI-3_P04	30-70%	30-70%	30-70%	30-70%	30-70%	30-70%	>70%
27	TW-S-PI-3_P01	30-70%	30-70%	30-70%	30-70%	30-70%	30-70%	>70%
28	TW-S-PI-3_P04	30-70%	30-70%	30-70%	30-70%	30-70%	30-70%	>70%

Banksia woodlands

There was an increase in the average weed cover at three banksia woodland monitoring potential impact sites since construction commenced in 2022 (**Figure 13**). These increases occurred at BW-S-PI-1, BW-S-PI-4, BW-S-PI-5 and were generally of a similar magnitude to one reference site, BTW-S-R-2 (**Figure 13**). Photographs of the increase in weed from spring 2022 to spring 2024 are shown in **Plate 1**. The increases in average cover at the monitoring sites reflect the increases in weed cover at individual monitoring points within these sites, as shown in **Table 17**. All of these increases relate to the presence of invasive grasses already present at the site. In respect of the other sites, BW-S-PI-3 remained steady with regards to weeds, and BW-S-PI-8 experienced a decrease in weeds. No increases were recorded for two of the three reference sites (BW-S-R-1 and BTW-S-R-1) as these sites were largely weed-free.

Project attributable indirect impacts and or reportable decline: The increases in weed cover at these sites are not regarded as being attributable to the project and instead are attributable to weeds already within and directly adjacent to the monitoring points and are comparable to the increase observed for the reference site BTW-S-R-2.

Noting that no construction work, including clearing activities, had commenced in proximity to BW-S-PI_4 at the time of the observed increase of weeds at this site. Ongoing observations of the project activities adjacent to BW-S-PI-1 and BW-S-PI-5 show them to be relatively free of weeds and highly unlikely to be the cause of the increase.

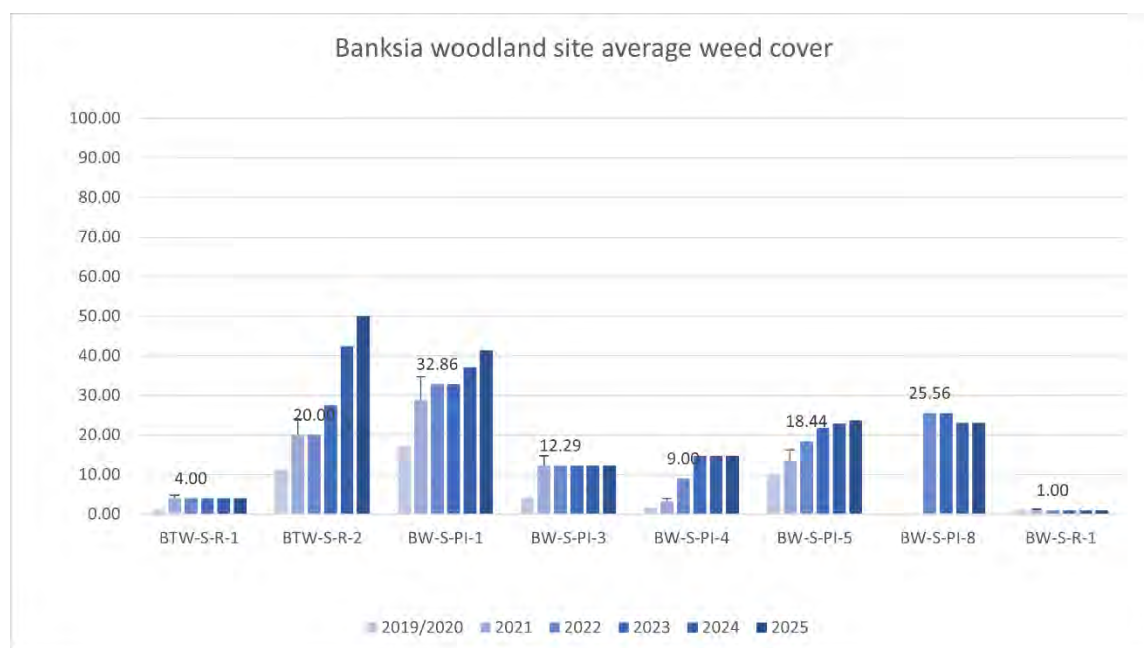


Figure 13. Change in average weed cover for Banksia woodland, potential impact and reference sites.



Spring 2022



Spring 2024

Plate 1. Increase in weed cover from spring 2022 to spring 2024, for BTW-S-R-2.

Claypans

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts nor reportable declines with regards to weed cover for the potential impact claypan site CP-S-PI-1, because there was no increase in weed cover relative to baseline levels (**Figure 14**).

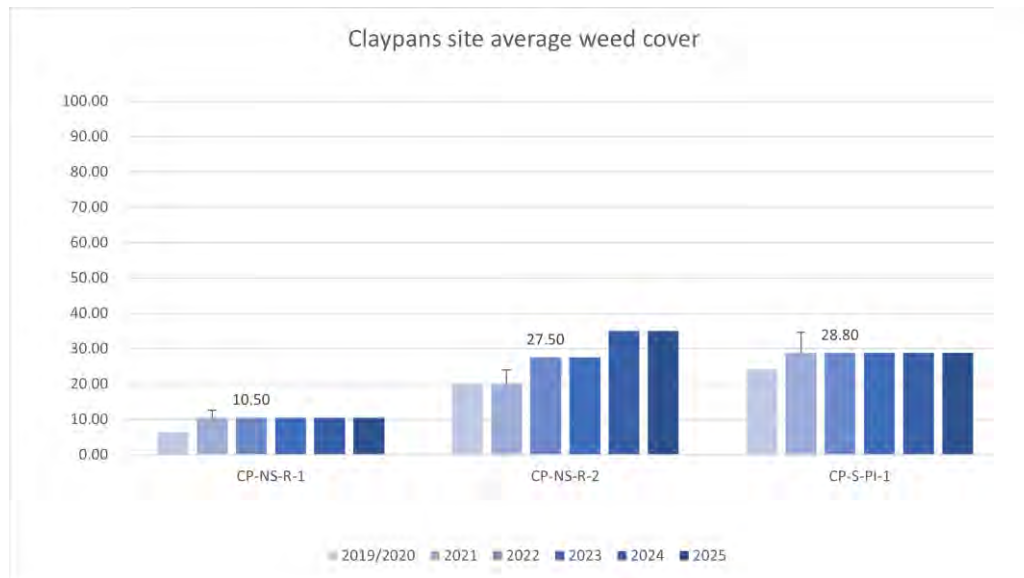


Figure 14. Change in average weed cover for claypans, potential impact and reference sites.

Tuart woodlands

There was an increase in weed cover at two Tuart woodland potential impact sites TW-S-PI-2 and TW-S-PI-3. The average increase at TW-S-PI-2 was relatively minor (~5%) attributed to increases at three out of the 19 site monitoring points TW-S-PI-2_P03, TW-S-PI-2_P05 and TW-S-PI-2_P14, where weed loads increased from 30 – 70 % to > 70%. The average increase at TW-S-PI-3 was much more notable (20%) because the increase from 30 – 70 % to > 70% occurred at half (2) of the total (4) monitoring sites.

The increases in weed cover at both these sites are not regarded as being attributable to the project. Instead, these are attributable to weeds already within and directly adjacent to the monitoring points. Similar to the Banksia woodland sites, the increases relate to increases in invasive grasses already present at the site, such as *Bromus diandrus*, *Briza maxima* and *Ehrharta* sp.

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts with regard to weed cover at Tuart woodlands potential impact sites because the increases in weed cover at both these sites are not regarded as being attributable to the project. Instead, these are attributable to natural increases in mostly grass weeds, such as *Bromus diandrus*, *Briza maxima* and *Ehrharta* already within and directly adjacent to the monitoring points.

Ongoing observations of the cleared area adjacent to TW-S-PI-2 show it to be relatively free of weeds and highly unlikely to be the cause of increase (**Figure 15**).

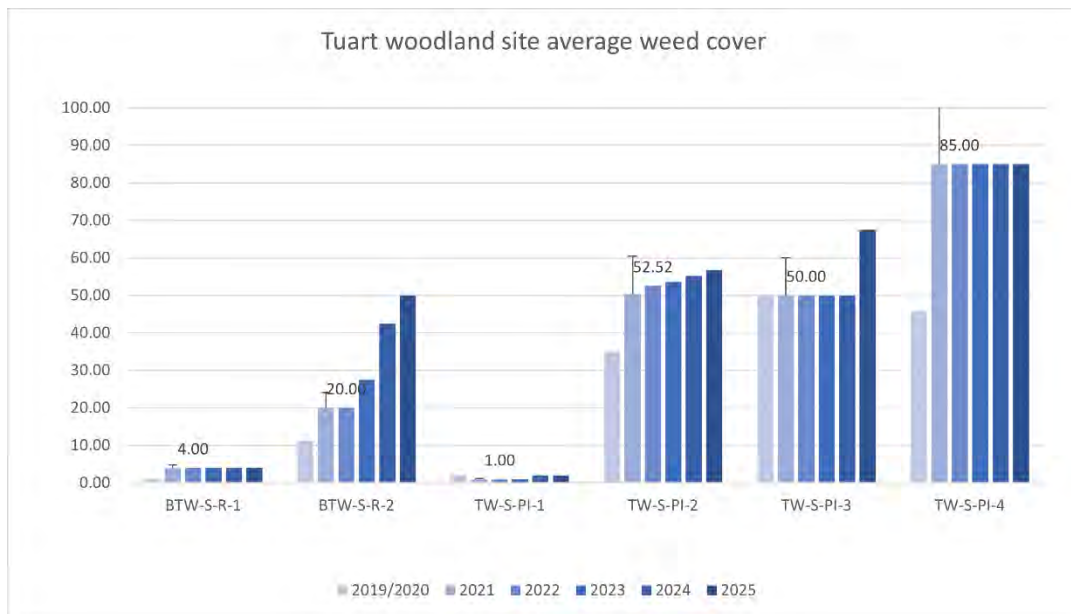


Figure 15. Change in average weed cover for Tuart woodland potential impact and reference sites.



Plate 2. Cleared areas adjacent to TW-S-PI-2 are relatively free of weeds in autumn 2024 and spring 2024

5.4 Native cover

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts or reportable declines with regard to native cover for any potential impact sites.

There was no change in the percentage cover of native plants between the 2019 and 2023 monitoring rounds for all monitored sites within the Banksia woodland, Claypan and Tuart woodland PEC/TEC occurrences and for all other monitored vegetation types (**Figure 16** and **Figure 17**). The observed increase in average native cover at TW-S-PI-2 is due to the 11 additional monitoring points installed on the site in winter of 2022 and not due to an actual increase in native cover.

The comparative data for native cover recorded at the boundary photopoint sites are presented in **Appendix 3**.

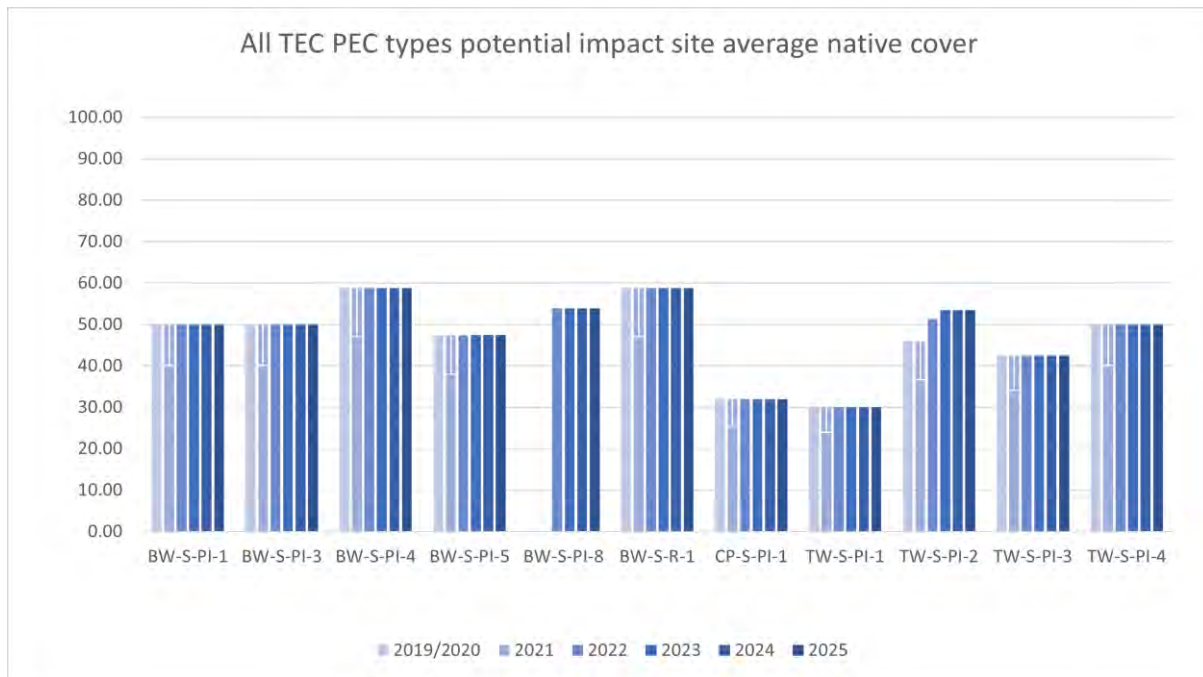


Figure 16. Average native cover of all potential impact sites.

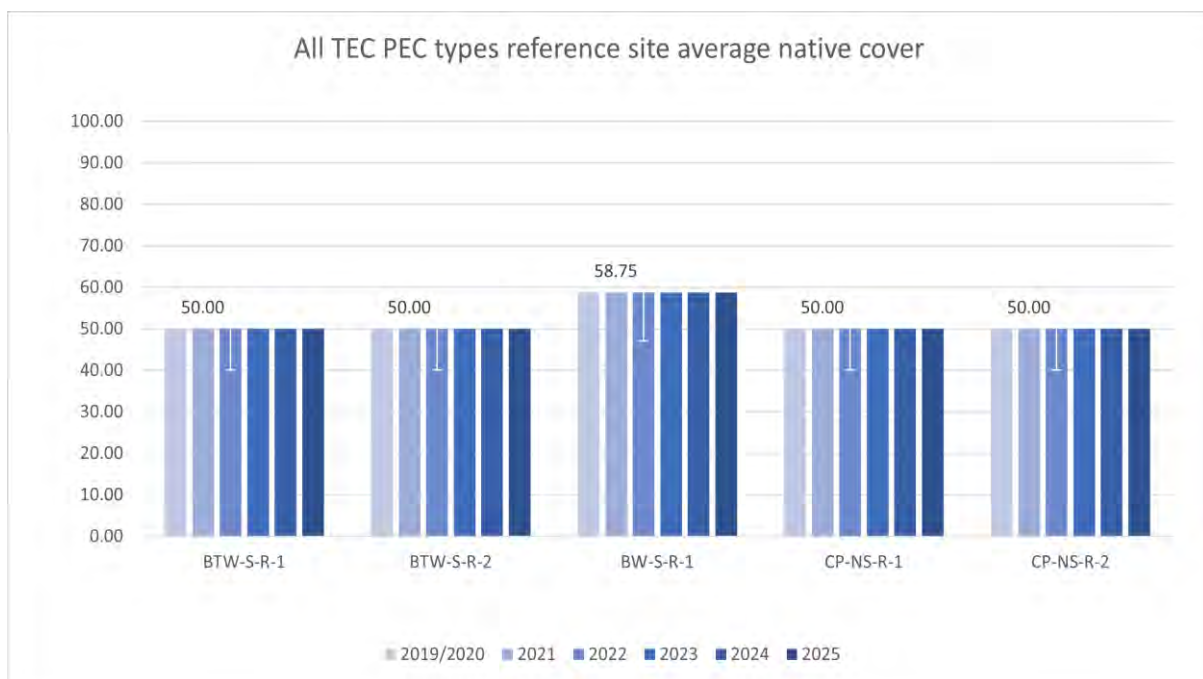


Figure 17. Average native cover of all reference sites.

5.4.1 Plant stress

The plant stress of the dominant trees/shrubs within a 20 m x 20 m area of all 88 boundary photopoints and 22 transect end points have been recorded since spring 2020. A comparison of the monitoring point data obtained since the project commenced in August 2022 and baseline data is summarised below. The full results showing the comparison of plant stress are provided in tables in **Appendix 3**.

Banksia Woodlands

Average stress increased at four potential impact Banksia / Banksia Tuart woodland sites (BW-S-PI-1, BW-S-PI-3, BW-S-PI-4 and BW-S-PI-8) and one reference site (BW-S-R-1) relative to 2021/2022 baseline levels; however, only one of these sites, BW-S-PI-8, recorded an average increase in stress greater than 20%. Two sites remained stable (BTW-S-R-1, BTW-S-R-2), and one site increased in health from spring 2021 levels, BW-S-PI-5. These patterns in stress can be seen in **Figure 18**.

Further analysis was undertaken to investigate increases in stress at specific monitoring points where an increase was recorded within the Potential impact sites. This occurred at BW-S-PI-1, BW-S-PI-3, BW-S-PI-4 and BW-S-PI-5. These increases were assessed individually to determine trends, scale of increase and the potential cause of increase, in particular whether they could be attributed to the BORR project.

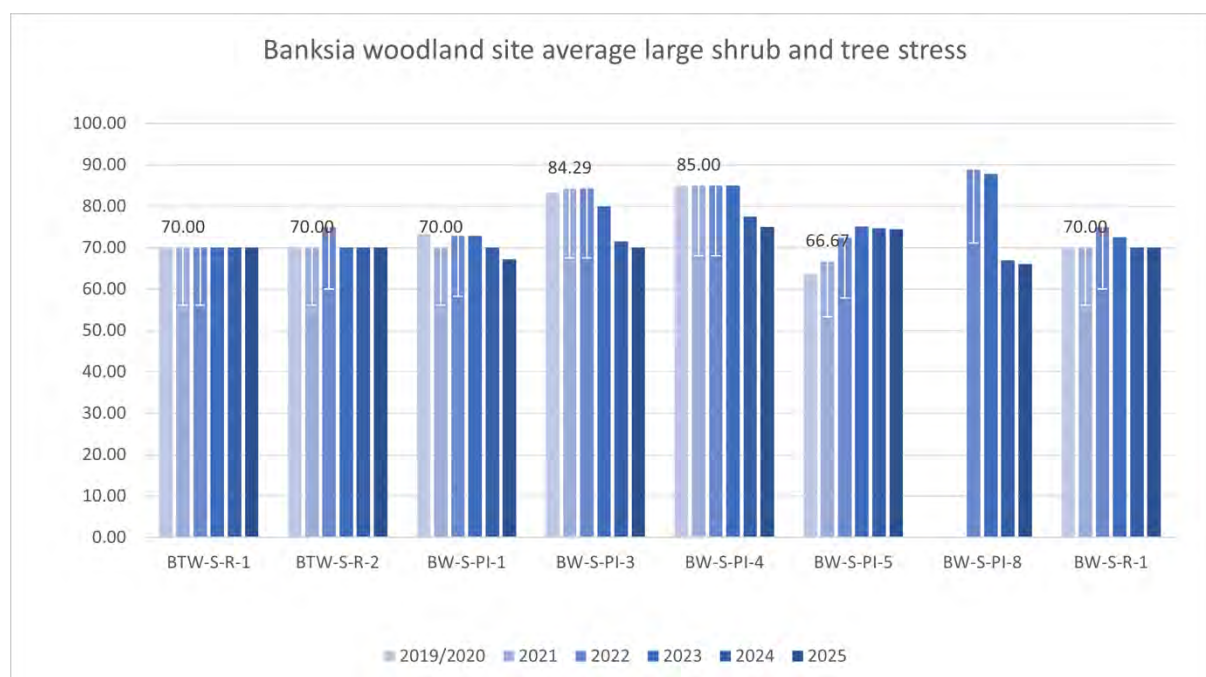


Figure 18. Change in average large shrub and tree stress for Banksia woodland, potential impact and reference sites.

BW-S-PI-1

Stress levels were observed to increase in two of the seven sites, BW-S-PI-1_P03 and BW-S-PI-1_T1W, whilst the other sites remained stable (**Figure 20**). Both increases occurred in the 2024-2025 monitoring period. The increase in stress for both these sites is associated with the impacts of the autumn 2024 drought, with almost all *Banksia attenuata* and *B. grandis* saplings dead. *Corymbia calophylla* and *Xylomelum occidentale* trees were also very stressed. These impacts were also observed to be scattered throughout the surrounding vegetation. The effects of stress at BW-S-PI-1_P03 are shown in **Plate 4**.

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts and therefore reportable declines associated with the potential impact site BW-S-PI-1. The increases in stress at the two monitoring points are attributable to the impacts of autumn 2024 drought conditions, as discussed above.

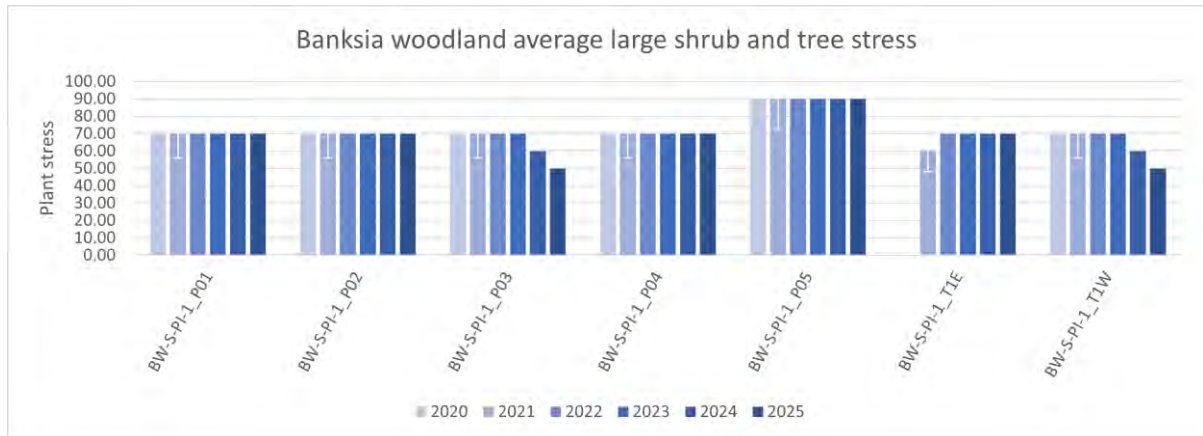


Figure 19. Change in average large shrub and tree stress for Banksia woodland potential impact site BW-S-PI-1.



Spring 2022



Spring 2024

Plate 3. BW-S-PI-1_P03 plant stress in spring 2024 compared to spring 2022.

BW-S-PI-3

Stress levels were observed to increase in four of the seven sites P01, P05, P06 and P07, whilst the other sites remained stable (**Figure 20**).

The increase in stress at BW-S-PI-3_P01, first observed in autumn 2024, is attributed to a reduction in the health of Marri trees at the site due to the impacts of the autumn 2024 drought. Up to this point, the health of vegetation at this monitoring point had been relatively healthy.

The increase at BW-S-PI-3_P06 is unlikely to be attributable to the project because no project activities had commenced in proximity to the site at the time of recording in autumn 2023 and because this monitoring point is observed to be impacted by an infestation of *Phytophthora dieback*, which is the cause of stress at the site.

The increase in stress for P05, P06 and P07 is likely due to the ongoing impacts of *Phytophthora dieback* observed prior to project activities (see section 5.6). The impacts of the autumn drought were generally evident but not uniform across the whole site and likely exacerbated the stress at P07. The most drought-affected species across the site were *Banksia grandis* and Jarrah trees, mostly saplings.

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts and therefore reportable declines associated with the potential impact site BW-S-PI-3. The increases in stress at three of the four sites are attributable to ongoing impacts of *Phytophthora dieback* observed prior to project activities, which are likely to have been exacerbated by the autumn 2024 drought

conditions, as discussed above. And for the fourth site the impacts are due to impacts autumn 2024 drought.

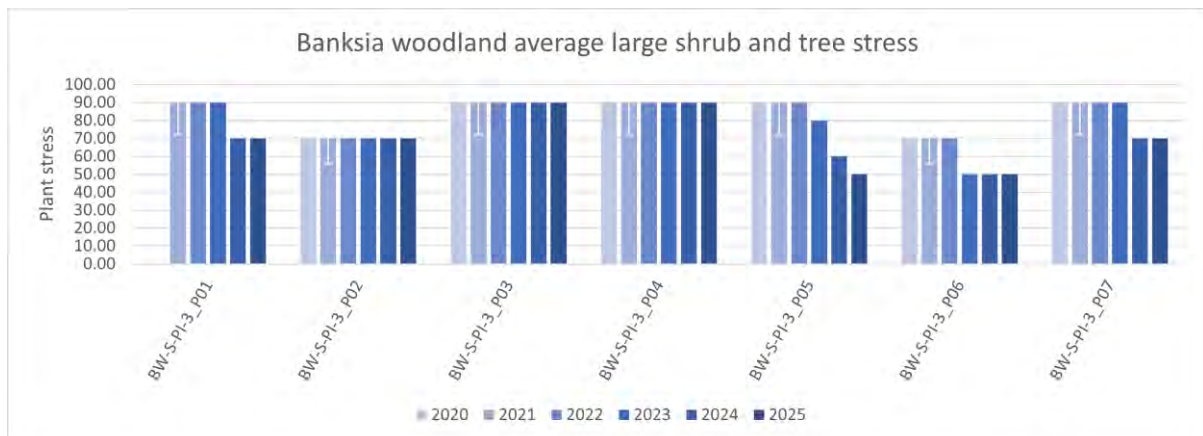


Figure 20. Change in average large shrub and tree stress for Banksia woodland potential impact site BW-S-PI-3.

BW-S-PI-4

The stress levels increased at two of the four monitoring points at this site, at BW-S-PI-4_P01 and BW-S-PI-4_P03, in 2024 (**Figure 21**).

The stress at BW-S-PI-4_P01 was primarily due to the native fungal pathogen *Quambalaria coyrecup* in the *Corymbia calophylla* recorded at the site. These impacts were recorded prior to the start of BORR activities near the site.

Whereas the increase in stress at BW-S-PI-4_P03 was due to the record autumn drought conditions of 2024, which were evident but not uniform across the entire site. Some species were more affected than others, including young Jarrah trees, *Xylomelum occidentale* and interestingly, the weed species *Acacia longifolia longifolia* (**Error! Reference source not found**).

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts and therefore reportable declines associated with the potential impact site BW-S-PI-4. The increase in stress at BW-S-PI-4_P01 is attributable to Marri canker (*Quambalaria coyrecup*), which was pre-existing at the site, and the increase at BW-S-PI-P03 is due to the impacts of the record-breaking autumn 2024 drought.

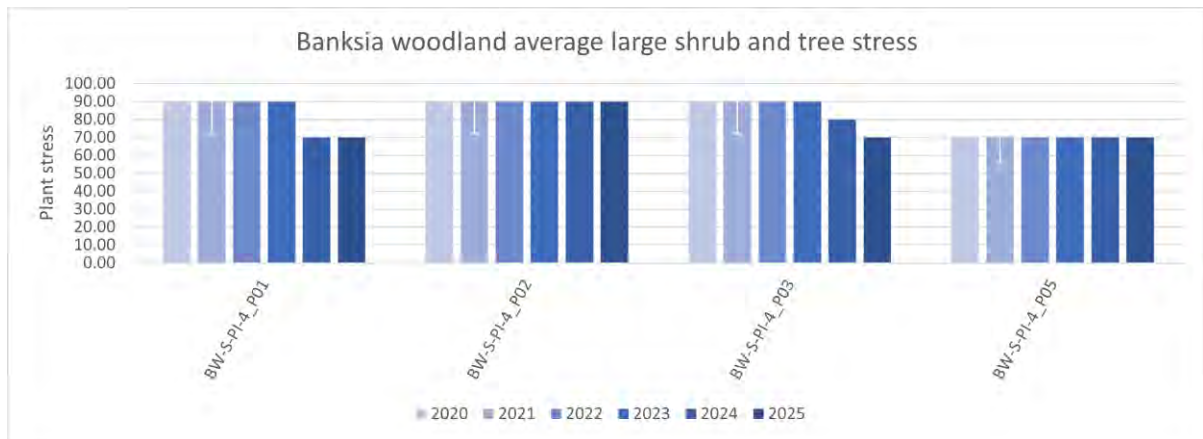


Figure 21. Change in average large shrub and tree stress for Banksia woodland potential impact site BW-S-PI-4.



Plate 4. Dead *Acacia longifolia* trees within BW-S-PI-4.

BW-S-PI-5

BW-S-PI-5 has 35 monitoring points. Stress levels in trees and large shrubs have remained stable at 16 of these sites, reduced at 18 and increased at one site at BW-S-PI-5_P04 since monitoring commenced in 2019. Two sites, BW-S-PI-5_P34 and BW-S-PI-5_TN1 have fluctuated but not increased in stress relative to baseline levels.

The apparent absence of stress does not mean that the site has been without stress with the observed residual impacts of the record summer/autumn 2024 drought evident in 2025 with

scattered, or patchy impacts across most of the site (**Plate 5** and **Plate 6**). It is just that the scattered nature of impacts and monitoring of large shrubs and trees meant that only two sites, BW-S-PI-5_P34 and BW-S-PI-5_TN1 recorded stress impact due to the 2024 autumn drought. The impact observed at the monitoring points and across the broader site was limited mainly to certain species, such as *Banksia grandis*, *Banksia attenuata*, *Eucalyptus marginata* (mostly saplings), the small shrub *Hibbertia hypericoides* and the forb *Caesia micrantha*.



Plate 5. Drought affected *Hibbertia hypericoides* located near BW-S-PI-5_P23, autumn 2024.



Plate 6. Drought affected *Phlebocarya ciliata* located near BW-S-PI-5_P33, autumn 2025



Plate 7. The grey shrubs in the understorey are stressed *Hibbertia hypericoides* near BW-S-PI-5_P16, autumn 2025



Plate 8. Shows an essentially healthy understorey including *Hibbertia hypericoides* near BW-S-PI-5_P25 autumn 2025.

The scale of impact did not increase beyond that observed in the previous 2023/2024 monitoring round, with only one site at BW-S-PI-5_T1N (**Figure 22**) recording an increase in stress in the 2024/25 monitoring period. The reduction in stress and overall stability at the site is attributed to the recuperation of stressed trees and large shrubs with persistent average and above average rains (2024) , which followed both the drier and warmer than average 2019 monitoring period and the record summer and autumn 2024 drought (**Figure 3**).

It was also clear that the BORR was not an obvious cause of the manifested stress observed across the site, as much of the vegetation directly adjacent to the BORR was observed to be in a generally healthy condition.



Plate 9. Healthy, unstressed vegetation adjacent to the cleared edge along Bussell Highway east of BW-S-PI-5_P014, autumn 24.

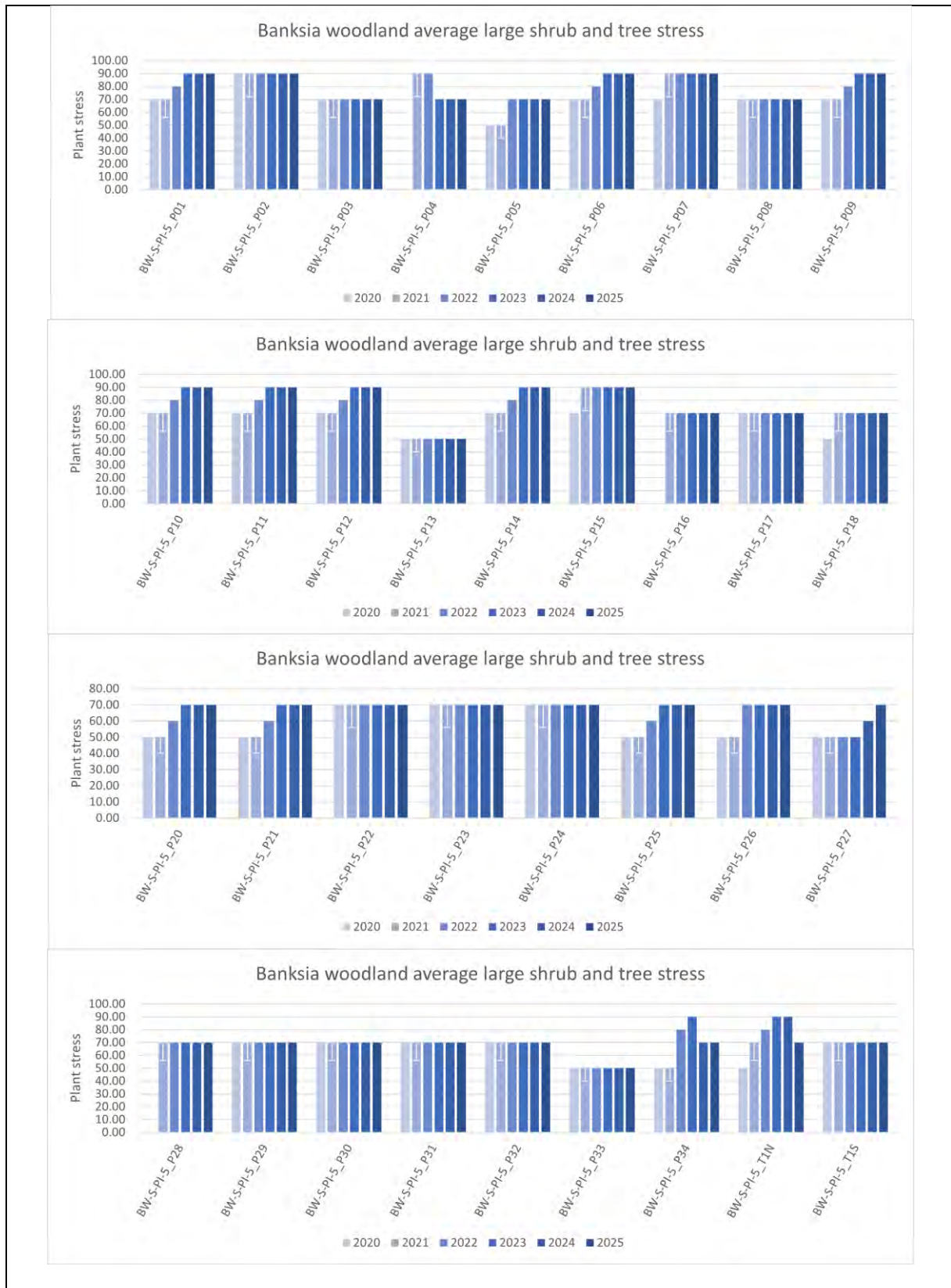


Figure 22. Change in average large shrub and tree stress for Banksia woodland potential impact site BW-S-PI-5.

Project attributable indirect impacts and or reportable decline: There are no project attributable indirect impacts and therefore reportable declines associated with the potential impact site BW-S-PI-5. The increase in stress recorded at one monitoring point at the site relative to baseline levels occurred in Jarrah and Banksia trees in autumn 2023 at BW-S-PI-5_P04, which is situated on Lakes Road. These increases at this site are attributed to local factors, as there were no project activities in proximity to this site at the time. Furthermore, these increases in stress are of a similar magnitude reported for the Banksia woodland monitoring site BW-S-R-1_T2S.

The impacts of stress observed across the broader area of BW-S-PI-5 are attributed to the record-breaking autumn 2024 drought reported in the previous monitoring round and not to BORR-related activities, as there is no clear pattern of stress at the site that would indicate it was the cause.



Plate 10. Highly stressed Jarrah sapling tunnelled out by Jarrah wood borer, which has been predated by forest red-tail-cockatoos, autumn 2024.

BW-S-PI-8

Widespread effects of the severe autumn 2024 drought are reported in the previous monitoring report¹⁴ were still evident across most of the site, with stress and death evident in much of the canopy, with *Agonis flexuosa* and *Banksia attenuata* trees most affected. There was concern that the impacts of the drought would continue and result in worsening impacts at the site; however, the above-average rainfall that followed the drought appears to have limited further impact, with only site BW-S-PI-8_P05 recording an increase in stress in 2025 relative to 2024 (**Figure 23**). The increase in stress is due to the ongoing observed stress in the *Agonis flexuosa* trees at the point.

There does not appear to be any developing pattern of stress that can be attributed to the batters created for the BORR immediately adjacent to this site. This is because of the ongoing patchiness of manifested stress with a mix of stressed and unstressed vegetation across the entire site, including vegetation immediately adjacent to the batters, which was relatively unstressed see **Plate 10** compared to highly stressed vegetation further from the batters (**Plate 11**).

As reported in 2024, it is possible that the increased manifestation of drought impacts at this site relative to others, which remained relatively stable, could be linked to topography and aspect, being north facing and near the top of the landscape (**Figure 24**). This means the site would drain faster and earlier in the season than lower, flatter sites such as BW-S-PI-5, BW-S-PI-3, BW-S-PI-4, which generally experienced lower levels of manifested stress, and therefore have less moisture available for plant growth. The only other site with a similar scale of impacts was the Tuart woodland potential impact site TW-S-PI-2, which also has relatively similar topography **Figure 29**.

Previous monitoring in 2022 had identified potential project-related stress at monitoring point BW-S-PI-8_P01, which could be attributed to the project because this point was in the closest proximity to the boundary of the cleared area. Stress increased at this site in 2022 while all the other points remained stable at a 5 rating. The plant stress for this point is related to reductions in the health of large marri and jarrah trees present at the site. The 2023 report considered it unlikely that the stress was project-related because increases in stress independent of the clearing activities were commonly observed in Jarrah and Marri trees in intact vegetation, such as that evidenced at transect BW-S-R_T1E and the drainage monitoring points BW-S-PI-3_D1 (w20), BW-S-PI-5_D1 (w20) and BW-S-R-1_D1(w20) refer to **Table 15**. No further increases in stress were recorded for this point.

¹⁴ BW-S-PI-8 was the most drought affected monitoring site in the BORR Southern Referral area (**Figure 23**) with nine of the ten sites recording an increase in stress in the autumn 2024 monitoring round.

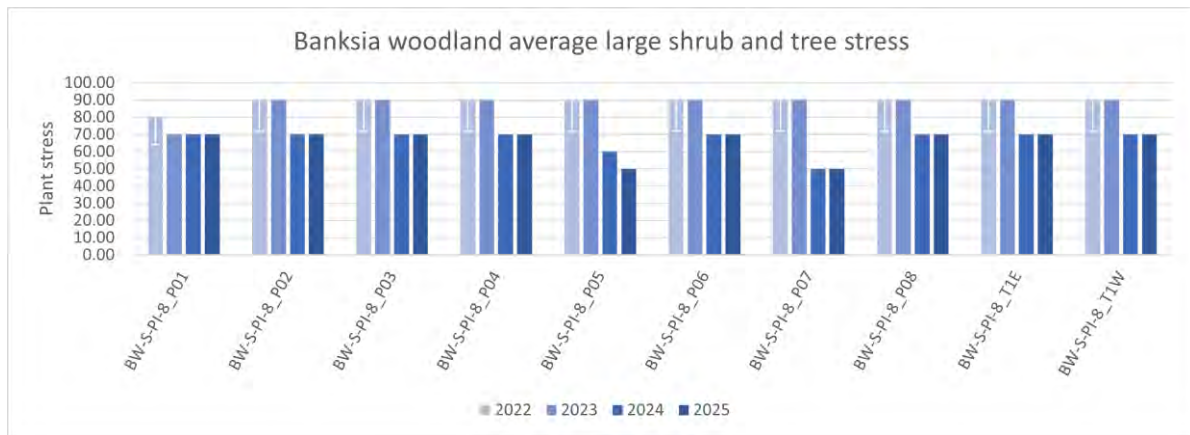


Figure 23. Large shrub and tree stress at BW-S-PI-8.



Plate 11. Healthy vegetation taken from north of BW-S-PI-8_P07 showing generally healthy vegetation adjacent to the batter spring 2024



Plate 12. Stressed and dead *Agonis flexuosa* and *Banksia attenuata* near BW-S-PI-8_P06 and P07 autumn 2024. Showing signs of recovery spring 2024.

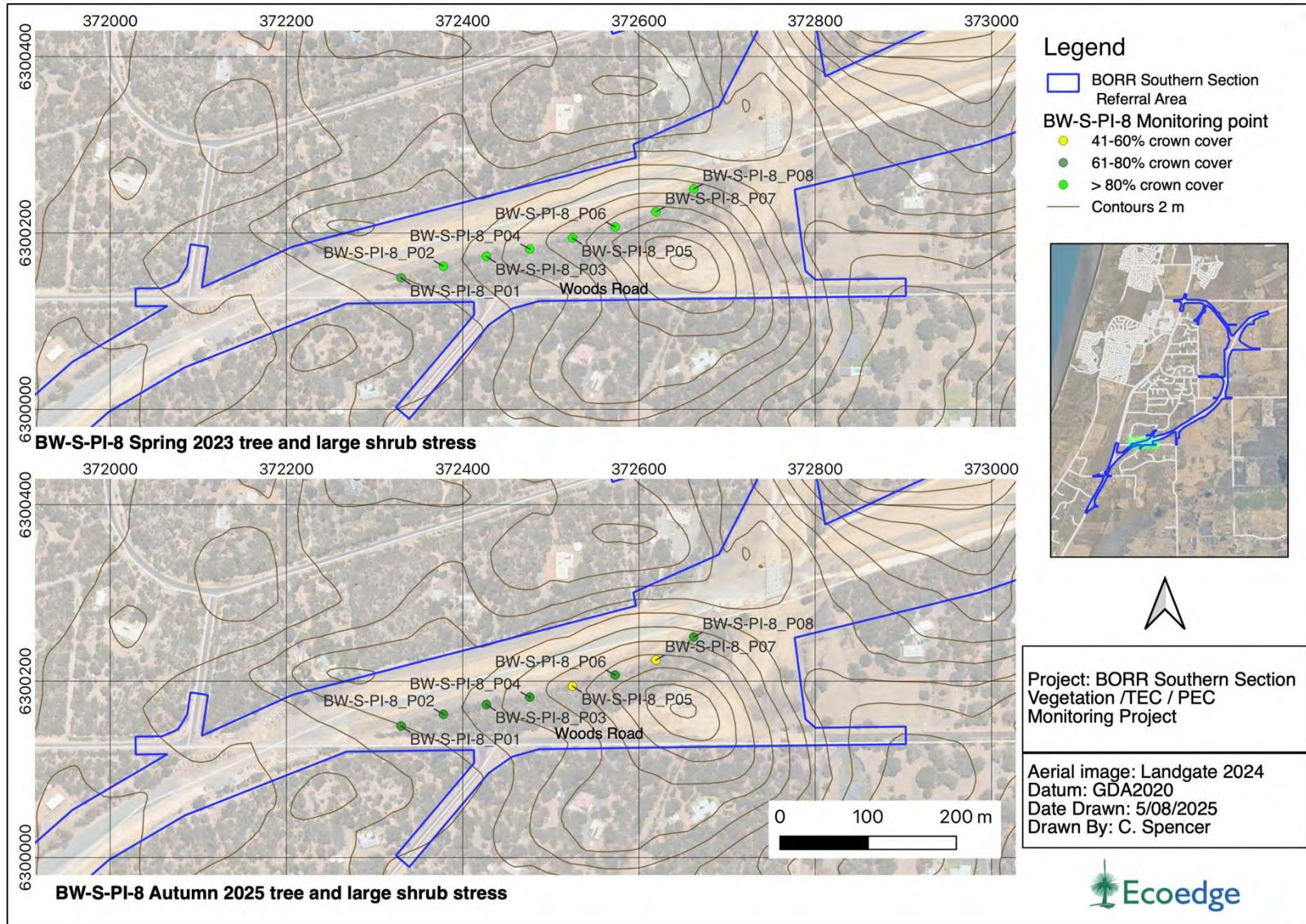


Figure 24. Location of stress-affected monitoring points at BW-S-PI-8 near the top of the local landscape.



Plate 13. BW-S-PI-8_P01 autumn 24 and spring 24. Note that the Banksia in the foreground had to be removed for the installation of the sound wall.

BW-S-R-1

Stress levels have, on the whole, declined at the two transect-based reference monitoring points BW-S-R-1_T1 and BW-S-R-1_T2 within this Banksia woodland reference site BW-S-R-1 (**Figure 25**). The decline and generally lower health at BW-S-R-1_T1 is attributed to the ongoing impacts of *Phytophthora* dieback. Whereas the decrease in stress at BW-S-R-1_T2 appears related more to variations in seasonal rainfall rather than *Phytophthora*. This site occurs on relatively alkaline Spearwood soils, which can retard or limit the impacts of the pathogen.

BW-S-R-1_T2 is likely to behave similarly to other Banksia woodland sites on Spearwood soils such as BW-S-PI-4, BW-S-PI-5 and BW-S-PI-8.

BW-S-R-1_T1 is likely to behave similarly to other Banksia woodland sites on Bassendean soils, such as BW-S-PI-1 and BW-S-PI-3.

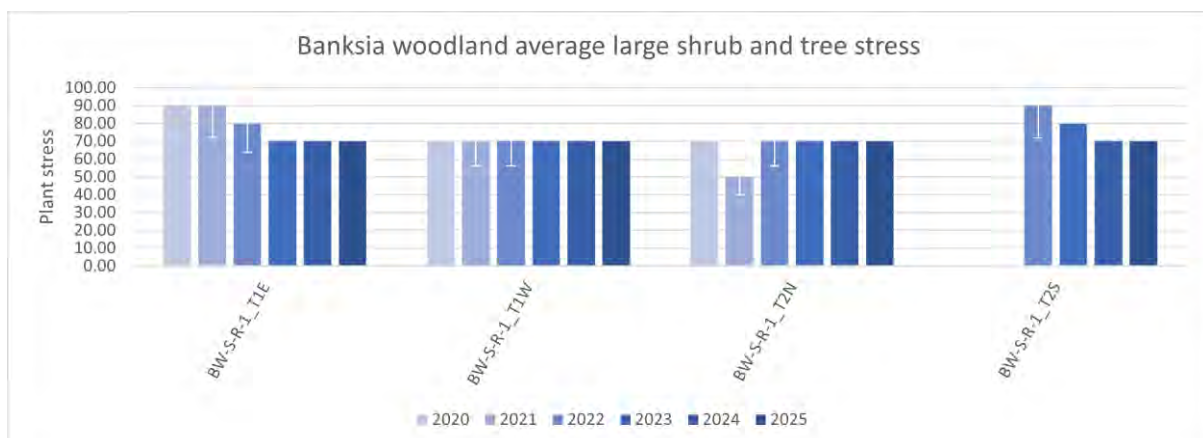


Figure 25. Large shrub and tree stress at BW-S-R-1.

Tuart woodland

Average stress increased at three of the four Tuart woodland potential impact sites (TW-S-PI-1, TW-S-PI-2 and TW-S-PI-3) relative to baseline levels, with largest increase in stress occurring at TW-S-PI-2. The other potential impact site TW-S-PI-4, and the two reference sites BTW-S-R-1 and BTW-S-R-2 remained stable. The average stress for each site is shown in **Figure 26**. Further analysis was undertaken to investigate increases in stress at specific monitoring points where an increase in stress was recorded within the Potential impact sites. This occurred at TW-S-PI-2 and TW-S-PI-3.

The graphs of sites with stable and reduced stress are shown in **Appendix 6**.

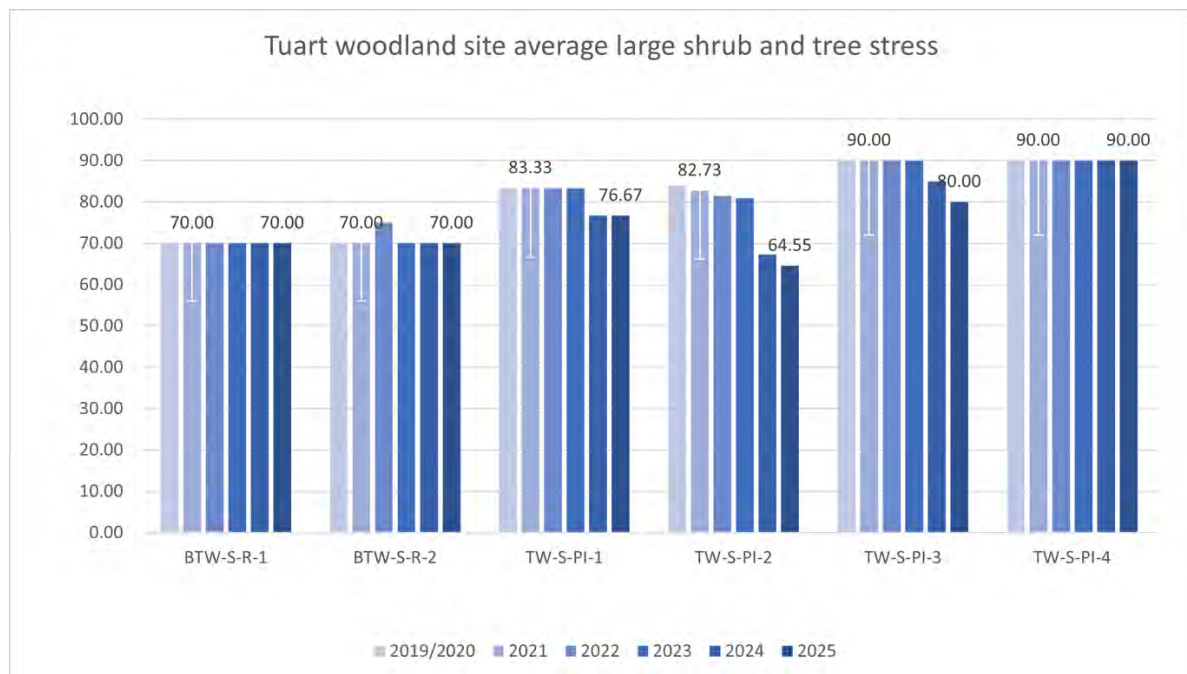


Figure 26. Change in average large shrub and tree stress for Tuart woodland, potential impact and reference sites.

TW-S-PI-1

The increase in average stress for this monitoring site is attributed to an increase in stress observed at one of the three monitoring points, TW-S-PI-1_P03 (**Figure 27**). This stress was first observed in autumn 2024 and later in spring 2024, with observed stress in *Acacia saligna* and *Agonis flexuosa* trees. Subsequent monitoring in autumn 2025 showed similar levels of stress in the *Acacia* and *Agonis* but with additional stress in *Marri* and *Tuart*.

Project attributable indirect impacts and or reportable decline:

The stress in the trees at TW-S-PI-1_P03 is attributed to the impacts of the autumn 2024 drought rather than the BORR Project. The timing of the onset of stress correlates with the drought and reflects similar observations of stressed vegetation due to the drought observed well away from the BORR. Additionally, there is no clear pattern of stress within the vegetation that would link it to the BORR, as the other two monitoring points at the site, which are closer to BORR, recorded no increase in stress.

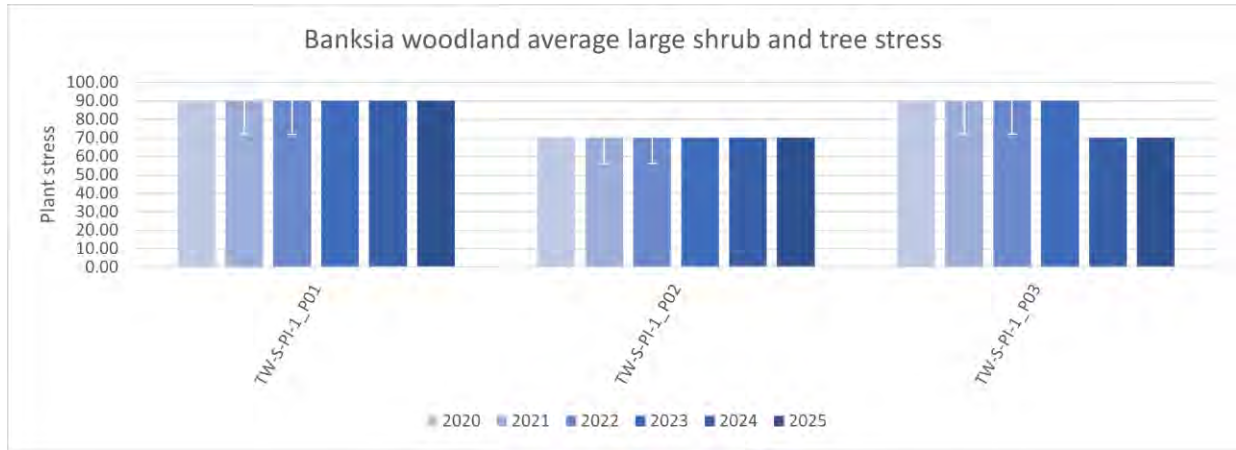


Figure 27. Change in average large shrub and tree stress for Tuart woodland potential impact site TW-S-PI-1.



Spring 2022



Spring 2024

Plate 14. Comparison of stress at site TW-S-PI-3_ P01, between spring 2022 and 2024.

TW-S-PI-2

The widespread effects of the autumn 2024 drought are reported in the 2023 / 2024 report¹⁵ were still evident across the site with patches of stressed and almost dead *Agonis flexuosa*, *Banksia attenuata*, *Banksia grandis*, *Xylomelum occidentale* and *Eucalyptus marginata* trees scattered across the site. Stress was also evident in the common small shrub *Hibbertia hypericoides*, and to a lesser extent *Styphelia racemulosa*, as shown in **Plate 15**.



Plate 15. Patches of stressed vegetation looking north from TW-S-PI-2, the dead / stressed low shrub is *Hibbertia hypericoides*.

Further increases in stress were recorded in autumn 2025 at five of the 13 sites impacted in the 2023-2024 monitoring round. Like BW-S-PI-8, there does not appear to be any developing pattern of stress that can be attributed to the batters created for the BORR immediately adjacent to this site. This is because of the ongoing patchiness of manifested stress with a mix of stressed and unstressed vegetation across the entire site, including vegetation immediately adjacent to the batters, which was relatively unstressed compared to highly stressed vegetation further from the batters, see **Plate 16** to **Plate 18**. As observed in the 23/24 report, if the batters did affect vegetation stress (**Plate 19**), it is expected that impacts from the batters would be experienced more substantially adjacent to it and then taper off with distance. This 'gradual deterioration' away from the BORR has not been observed since the project's commencement in 2022. The absence of this pattern is shown with three of the four points with increased stress at the site observed at monitoring points furthest away from the BORR at points TW-S-PI-2_P12, P13, and P16 (**Figure 28**).

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts and therefore no reportable declines associated with the potential impact site TW-S-PI-2. The significant increases in stress at the site in autumn 2024 and autumn 2025 are all attributable to the record drought (BOM 2024a and BOM 2024b), as discussed above.

¹⁵ Increases at stress levels have been recorded at 14 of the 22 monitoring points since construction commenced in August 2022. Thirteen of these were recorded during the autumn 2024 monitoring period corresponding with the record drought (BOM 2024) and soil dryness (BOM 2024) levels. This is one of the most stress affected monitoring sites, with only BW-S-PI-8 being more stressed.

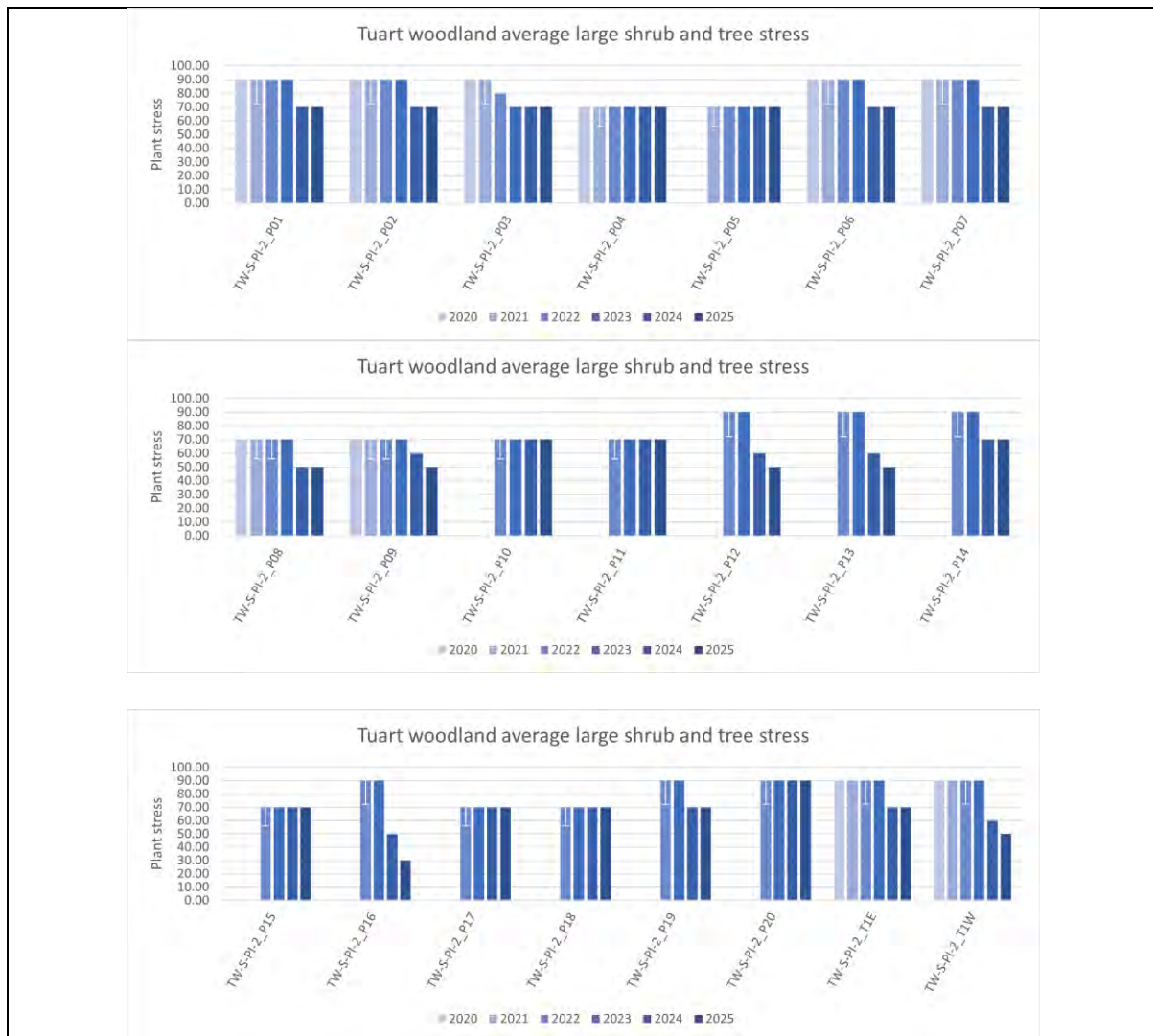


Figure 28. Change in average large shrub and tree stress for Tuart woodland potential impact and reference sites.

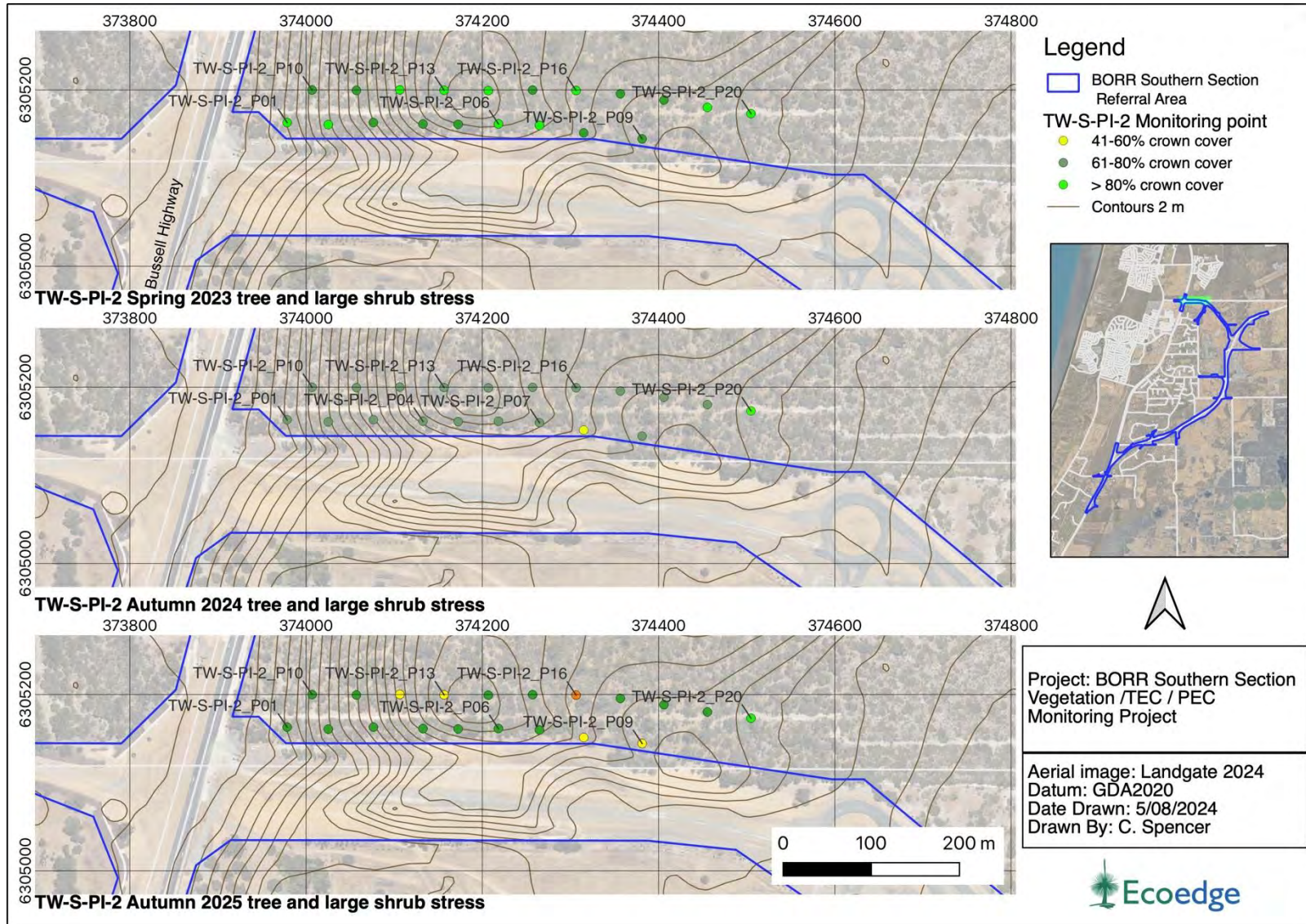


Figure 29. Chronology of stress-affected monitoring points at TW-S-PI-2



Plate 16. Panoramic view looking east towards TW-S-PI-2 showing patchy, stressed vegetation extending north well beyond the TW-S-PI-2 monitoring area, autumn 2024.



Plate 17. Panoramic view from near monitoring point TW-S-PI-2_P04 showing healthy vegetation to the south on the old batter adjacent to BORR with stressed vegetation to the north, further from the BORR, spring 2024.



Plate 18. Location of steep cutting adjacent to TW-S-PI-2_P07.



Plate 19. Relatively unstressed vegetation adjacent to TW-S-PI-2_P07 autumn 2024 and spring 2024.

TW-S-PI-3

Stress levels in the trees and large shrubs have reduced at two sites relative to baseline levels. The first observed increase in stress occurred at TW-S-PI-3_ P02 in the Autumn 2024 monitoring round (**Figure 30**). This was due to observed stress in *Agonis flexuosa* and the medium shrub *Jacksonia furcellata*. This was attributed to the record autumn 2024 stress due to the absence of a pattern of stress linking it to BORR activities. For example, the BORR project works are close to this site at TW-S-PI-3_ P01, but this site remained relatively unstressed.

An increase in stress was also observed at TW-S-PI-3_ P03 for the first time in Autumn 2025 due to increases in stress of Jarrah and *Agonis flexuosa*. The increase is also not attributed to the BORR, as the layby was closed in the previous spring with site restoration works. Again, the monitoring point closest to BORR works TW-S-PI-3_ P01, remained relatively unstressed (**Plate 20**).

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts and therefore reportable declines associated with the potential impact site TW-S-PI-3, as discussed above.

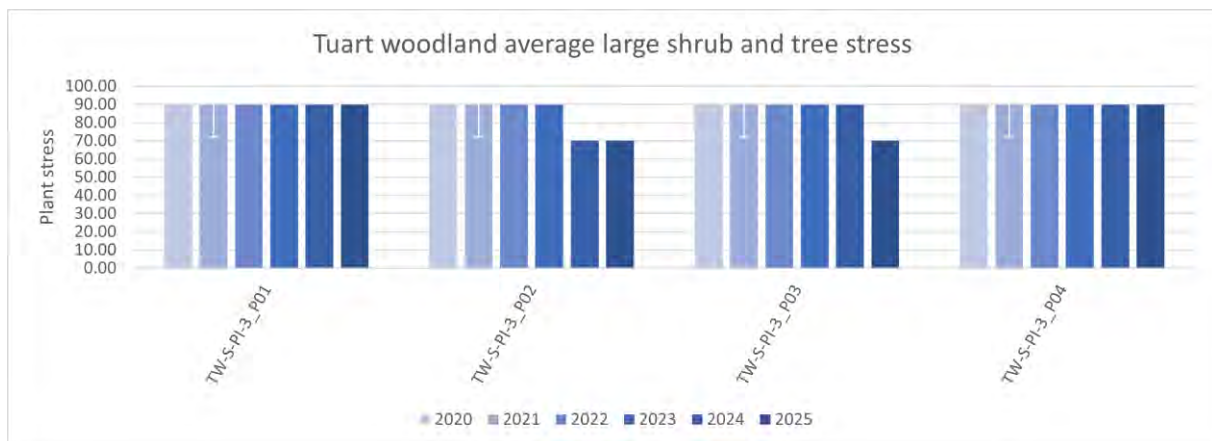


Figure 30. Change in average large shrub and tree stress for Tuart woodland potential impact site TW-S-PI-3.



Plate 20. Vegetation adjacent to works near TW-S-PI-3_P01 autumn 2024

Claypans

Average tree and shrub stress at monitored claypan sites has only decreased at one of the reference sites, CP-NS-R-1, since monitoring commenced in 2019. This occurred in autumn 2024. The stress levels at the other reference site CP-NS-R-1_T2 and the potential impact site CP-S-PI-1 have remained stable (**Figure 31**). **Figure 32** to **Figure 34** show the trends in tree and shrub stress for all monitored claypan sites.

Project attributable indirect impacts and or reportable decline:

There are no project attributable indirect impacts with regard to plant stress for the potential impact claypan site CP-S-PI-1, because there was no increase in plant stress recorded for this site relative to baseline levels.

These sites are lower in the landscape with soils with a high clay fraction. The canopy, which mainly comprises medium-sized shrubs dominated by *Melaleuca viminea* appeared resilient to the autumn drought stresses and the lower storey is dominated by annual herbs, which are mostly naturally dormant during summer and autumn.

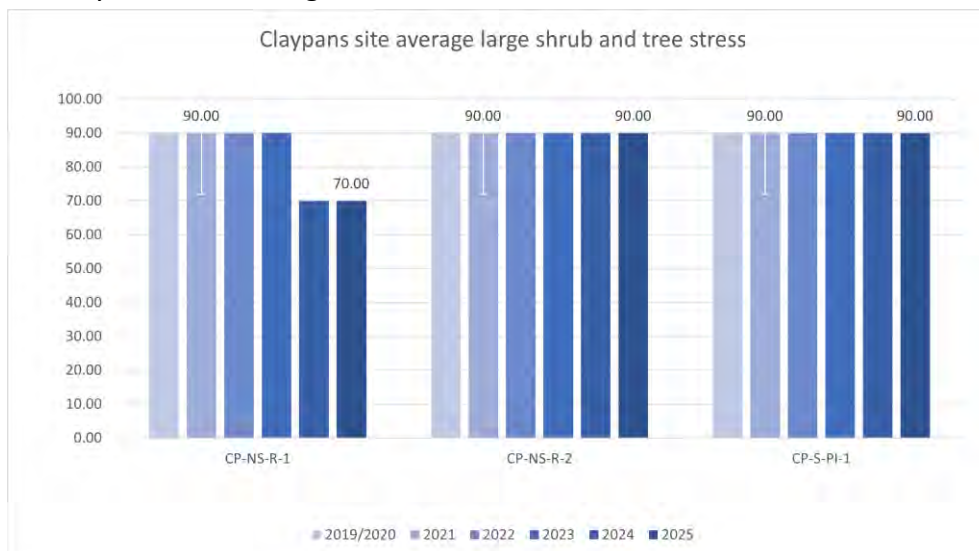


Figure 31. Change in average large shrub and tree stress for claypan potential impact and reference sites.

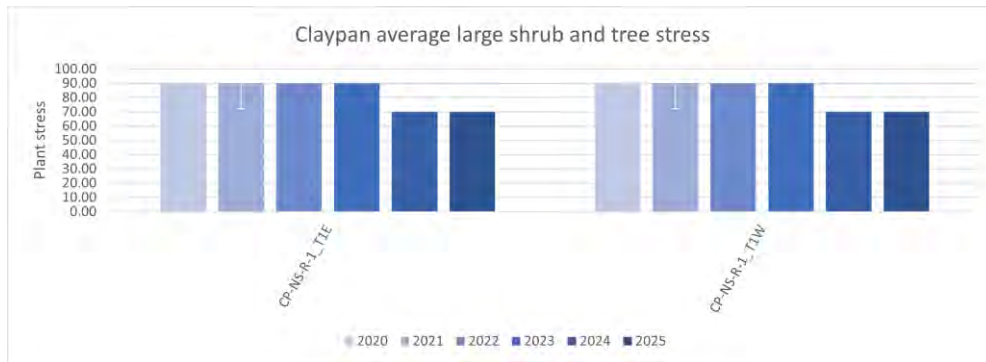


Figure 32. Change in average large shrub and tree stress for reference site CP-NS-R-1.

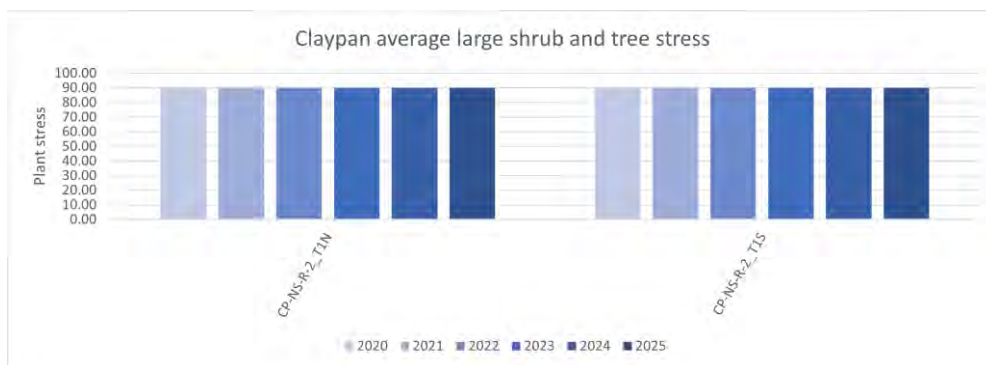


Figure 33. Change in average large shrub and tree stress for potential impact site CP-NS-R-2.



Figure 34. Change in average large shrub and tree stress for Tuart woodland potential impact site CP-S-PI-1.

5.5 Drainage Monitoring

Drainage monitoring targeted at abnormal erosion, flooding and drying effects is conducted four times a year at each of the monitoring sites, once in each season. The results of these monitoring rounds are summarised since the baseline monitoring commenced until autumn (May) 2025 (**Table 18**).

5.5.1 Inundation effects on TEC PEC

Project attributable indirect impacts and or reportable decline:

There has been no TEC PEC vegetation abnormally inundated or flooded for 24 hours as a result of the project activities since monitoring commenced. Consequently, there have been no project attributable indirect flooding or inundation impacts, when compared to preconstruction baseline conditions, to the Banksia woodland, Tuart woodland or Claypan TEC PEC.

5.5.2 Erosion effects on TEC PEC

Project attributable indirect impacts and or reportable decline:

There have been no occurrences of abnormal erosion recorded at any of the TEC PEC monitoring sites since monitoring commenced. Consequently, there have been no project attributable indirect erosion impacts or reportable declines regarding erosion effects when compared to preconstruction baseline conditions for the Banksia woodland, Tuart woodland or Claypan TEC PEC.

5.5.3 Drying effects on TEC PEC

Abnormal impacts as a result of drying were observed in seven of the 14 monitoring sites in autumn 2024. Three Banksia woodland potential impact sites and one Banksia woodland reference site and two Tuart woodland potential impact sites, and one reference site. No potential impact or reference claypan sites showed signs of stress due to drying effects. A summary of the impacts at these sites is provided in **Table 18**. There was no new drying recorded since autumn 2024.

Within the Banksia woodlands, the species most affected were *Banksia grandis*, *Banksia attenuata*, *Eucalyptus marginata* and *Agonis flexuosa*. In the Tuart woodlands, *A. flexuosa* and *E. marginata* showed signs of drying effects, and there was localised drying of low shrubs such as *Hibbertia hypericoides*, *Orthrosanthus laxus* and *Styphelia racemulosa* (**Table 19** and **Figure 35**). Some of the dead and very stressed trees, mostly Jarrah, were impacted by wood borer and predation of the wood borer by black white-tail and forest red-tail cockatoos stripping the bark. Some images of this are provided in **Plate 21**

The drying impacts were observed to be patchy and irregularly distributed across the monitored communities. The two most affected monitoring sites were BW-S-PI-8 (with about 30-70% of the site affected) and TW-S-PI-2 (10-30% of the site affected). The other monitored sites were about 2-10 % affected. The increased impact relative to the other sites is suggested to be related to the elevated position and steeper slopes of these sites, as discussed in **Section 5.4.1**.

Monitoring in spring 2024 and autumn 2025 showed that the impacts of the drought were not ongoing, as there was no observed increase in stress for almost all of the points impacted in 2024. By May 2025, all of five potential impact and two reference sites showed signs of recovery, notably epicormic growth from the tree trunks. There was one site (TW_S-PI-2_D1 (w20 a24) that still showed signs of drying; however, there were no new signs of tree death from stress, since the extremely dry summer/autumn of 2024 (**Plate 22** and **Plate 23**).

This recovery is attributed to the onset of above-average rainfall for the rain season of 2024, which resulted in average to above-average soil moisture in the Bunbury region (BOM 2024c)

Project attributable indirect impacts and or reportable decline:

Most of these observed abnormal drying effects were recorded in the driest autumn on record, autumn 2024 (BOM 2024a and 2024b). So, whilst the observed impacts of drying were significant and ‘abnormal’, they are most logically attributed to the effects of the record dry summer and autumn of 2024 and not to the BORR project. These abnormal drying effects were recorded at reference sites as well as potential impact sites and extended well beyond what may be regarded as a reasonable potential impact area that could be associated with the BORR project. Opportunistic observations of drying effects in Banksia and Tuart woodlands were noticed from Perth to Busselton and east to Donnybrook, reflecting the distribution of mapped record deficiencies in rainfall and soil moisture for these areas (BOM 2024a and BOM 2024b). These abnormal drying impacts all coincided with this phenomenon and were not experienced in any of the prior monitoring rounds.

The drying effects observed within the three Banksia woodland and two Tuart woodland potential impact sites are attributed to the record deficiencies in rainfall and soil moisture experienced across parts of the southwest of WA, including the Bunbury region (BOM 2020a and BOM 2024b).

The potential that the BORR Project has exacerbated the impacts of the drought was reviewed; however, the irregular pattern of observed drying impacts due to the record autumn 2024 makes any potential positive link attributing to exacerbating drying effects due to the Project very challenging. The absence of any pattern of adverse drying effects post-construction and before autumn 2024 indicates that any impacts from BORR, if present, have not been significant.

Table 18. Summary of drainage monitoring sites and points for the Southern Project Area.

Number	Site Name	Drainage site _Effect (season year)	Issues in previous rounds	2022 Autumn	2022 Winter	2022 Spring	2023 Summer	2023 Autumn	Winter 2023	Spring 2023	Summer 2024	Autumn 2024
Date					26/05/ 2022	19/10/20 22	17/02/20 23	26/05/ 2023	24/08/ 2023	7/11/ 2023	16/02/ 2024	25/05/2024
Potential impact sites												
1	BW-S-PI-1	-	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	Drying effects
2	BW-S-PI-3	BW-S-PI- 3_D1 (w20)	Thinning of canopies in Marri	No issue canopy normal	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues
3	BW-S-PI-4	BW-S-PI- 4_D1 (w20)	Yellowing of leaves	No issue	No issues	New growth after winter rain	No issues	No issues	No issues	No issues	No issues	Drying effects
4	BW-S-PI-5	BW-S-PI- 5_D1 (w20)	<i>Eucalyptus marginata</i> , <i>Eucalyptus gomphocephala</i>	Drying effects on marri and jarrah	No issue in winter	Less stressed after rain	No issues	No issues	No issues	No issues	No issues	No issues
5	BW-S-PI-8	-	-	-	-	New site	No issue	No issues	No issues	No issues	No issues	Drying effects
6	CP-S-PI-1	-	No issue	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues
7	TW-S-PI-2	TW_S-PI- 2_D1 (w20)	Tuart thinning canopy	New tip growth. Looking healthier	No issues	No issues	No issues	No issues	No issues	No issues	No issues	Drying effects
8	TW-S-PI-3	-	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	Drying effects

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Number	Site Name	Drainage site _Effect (season year)	Issues in previous rounds	2022 Autumn	2022 Winter	2022 Spring	2023 Summer	2023 Autumn	Winter 2023	Spring 2023	Summer 2024	Autumn 2024
9	TW-S-PI-4	-	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues
Reference sites												
1	BW-S-R-1	BW-S-R- 1_D1 (w20)	Drought-affected site, thinning canopies in Jarrah and Banksia attenuata	No issues	No issues	Recovere d after winter - no issues	No issues	No issues	No issues	No issues	No issues	No issues
2	BTW-S-R-1	BTW-S-R- 1_D1 (a24)	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	Drying effects
3	BTW-S-R-2	BTW-S-R- 2_D1 (a24)	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	Drying effects
4	CP-NS-R-1	CP-NS-R- 1_D1(w20)	Evidence of yellowing of <i>X.p</i> Leaves across site - unknown cause - water table is high at site	No issue - autumn 2022, all leaves of <i>X.p</i> green.	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues
5	CP-NS-R-2	-	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues	No issues

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Number	Site Name	Drainage site _ Effect (season year)	2024 Winter	2024 Spring	2024/25 Summer	2025 Autumn
			29/8/2024	31/10/2024	20/2/2025	23/5/2025
Potential impact sites						
1	BW-S-PI-1	-	No issue	No issue	No issue	No issue
2	BW-S-PI-3	BW-S-PI-3_ D1 (w20)	No issue	No issue	No issue	No issue
3	BW-S-PI-4	BW-S-PI-4_ D1 (w20)	No issue	No issue	No issue	No issue
4	BW-S-PI-5	BW-S-PI-5_ D1 (w20)	No issue	No issue	No issue	No issue
5	BW-S-PI-8	-	No issue	No issue	No issue	No issue
6	CP-S-PI-1	-	No issue	No issue	No issue	No issue
7	TW-S-PI-2	TW_S-PI-2_ D1 (w20 a24)	Ongoing drying effects	Recovery Epicormic growth	Stable	Stable
8	TW-S-PI-3	-	No issue	No issue	No issue	No issue
9	TW-S-PI-4	-	No issue	No issue	No issue	No issue
Reference sites						
1	BW-S-R-1	BW-S-R-1_ D1 (w20)	No issue	No issue	No issue	No issue
2	BTW-S-R-1	BTW-S-R-1_ D1 (a24)	No issue	No issue	No issue	No issue

Number	Site Name	Drainage site _ Effect (season year)	2024 Winter	2024 Spring	2024/25 Summer	2025 Autumn
3	BTW-S-R-2	BTW-S-R-2_ D1 (a24)	No issue	No issue	No issue	No issue
4	CP-NS-R-1	CP-NS-R-1_ D1(w20)	No issue	No issue	No issue	No issue
5	CP-NS-R-2	-	No issue	No issue	No issue	No issue

The site report for 2025 autumn is provided in **Appendix 7**, (TW-S-PI-2).

Table 19. Sites that have drying effects as of autumn 2024.

#	Site	Site name	Affected species	General comments	latitude	longitude	Estimated level of impact.	Photo
	Potential impact sites							
1	BW-S-PI-1	BW-S-PI-1_D1 (a24)	<i>Banksia grandis</i> , <i>Banksia attenuata</i>	Regularly scattered <i>Banksia</i> death, approximately 50% dead of banksia species only	-33.38588156	115.6516445	2-10%	
3	BW-S-PI-4	BW-S-PI-4_D1(w20)	<i>Eucalyptus marginata</i>	Wood borer and Bark stripping by cockatoos affecting some <i>E. marginata</i>	-33.42666702	115.639844	2-10%	
4	BW-S-PI-8	BW-S-PI-8	<i>Agonis flexuosa</i>	Stressed <i>A. flexuosa</i>	-33.4300577	115.629749	30-70%	

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#	Site	Site name	Affected species	General comments	latitude	longitude	Estimated level of impact.	Photo	
									
5	BW-S-PI-8	BW-S-PI-8_D1 (su22)	<i>Agonis flexuosa</i>	Stressed <i>flexuosa</i> A.	-33.43058108	115.6277186	30-70%		

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#	Site	Site name	Affected species	General comments	latitude	longitude	Estimated level of impact.	Photo
7	TW-S-PI-2	TW-S-PI-2_D1 (su 22)	Shrubs	Localise drying low shrubs – <i>Hibbertia hypericoides</i> , <i>Orthrosanthus laxus</i> and <i>Styphelia racemulosa</i>	-33.38544358	115.6461724	10-30%	
	TW-S-PI-2	TW-S-PI-2_D1 (a24)	<i>Agonis flexuosa</i>	Patches of dead <i>A. flexuosa</i> . Tuart alive	-33.38515578	115.6469832	10-30%	

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#	Site	Site name	Affected species	General comments	latitude	longitude	Estimated level of impact.	Photo
	TW-S-PI-2	TW-S-PI-2_D1 (a24)	<i>Eucalyptus marginata</i>	Cockatoo damage to <i>E. marginata</i>	-33.3847155	115.6447531	10-30%	
	Reference sties							
11	BTW-S-R-1	BTW-S-R-1_D1 (a24)	<i>Banksia attenuata</i>	Understory shrubs showing signs of drought stress	-33.38218656	115.6519813	2-10%	

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#	Site	Site name	Affected species	General comments	latitude	longitude	Estimated level of impact.	Photo
12	BTW-S-R-2	BTW-S-R-2_D1 (w20)	<i>Agonis flexuosa</i>		-33.38482406	115.628727	2-10%	

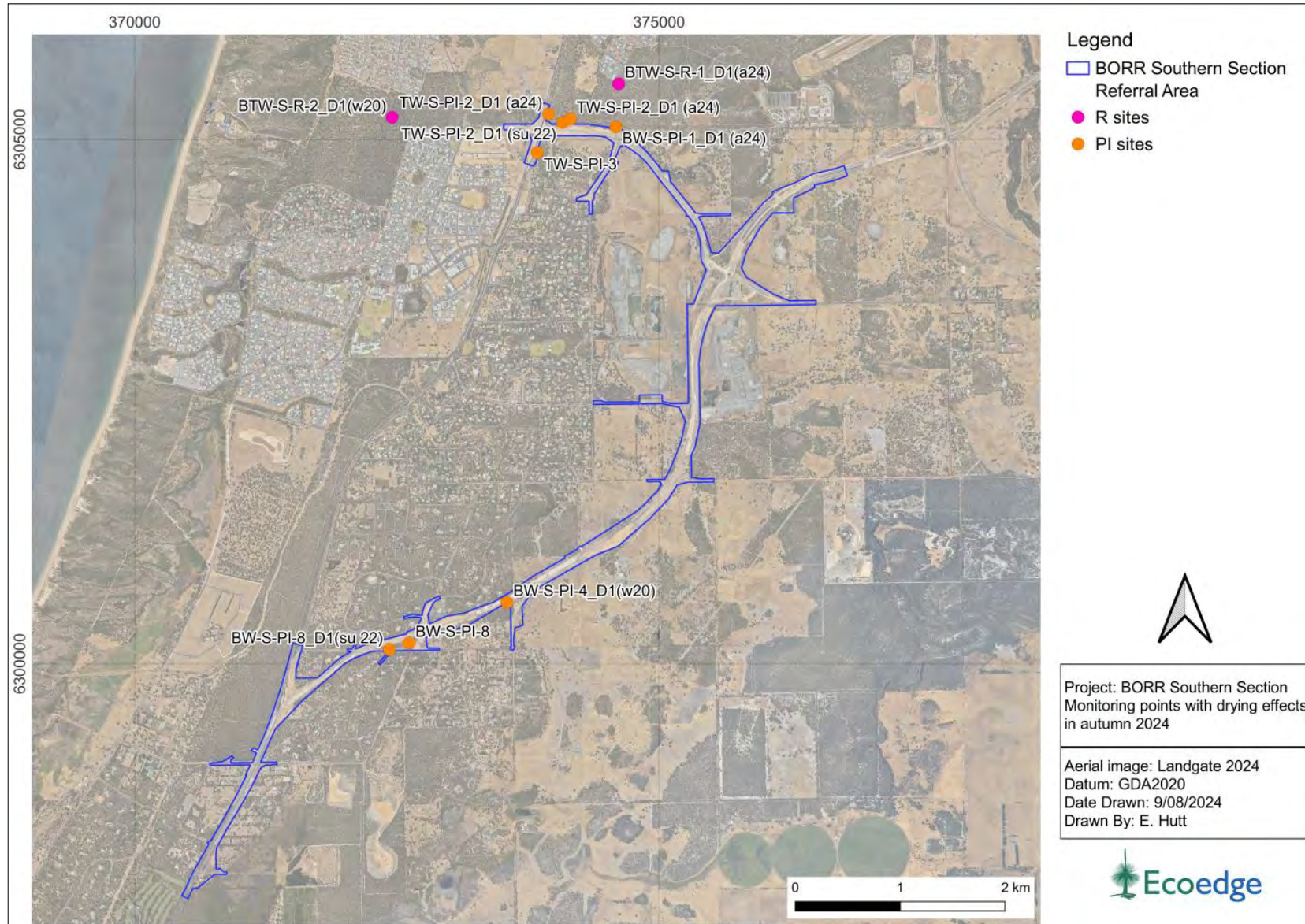


Figure 35. Monitoring points that have shown drying effects in autumn 2024.



Plate 21. Photos of stressed *E. marginata* trees at TW-S-PI-2 due to wood borer and native cockatoos.



Plate 22. Ongoing drying effects from autumn 2024, with trees showing signs of recovery with epicormic growth.



Epicormic growth in spring 2024.



Plate 23. Epicormic growth and recovery in autumn 2025.

5.6 Phytophthora Dieback

Phytophthora cinnamomi is a microscopic, soil borne plant pathogen which impacts about 40% of native vegetation in the Southwest of WA. Impacts on vegetation from *Phytophthora cinnamomi*, referred to as Phytophthora dieback, may appear similar in appearance to impacts of drying but Phytophthora dieback can usually be distinguished from drying and other plant stressors by its rapid impact on Phytophthora sensitive plants, normally occurring at the end of the summer and dry period.

Impact from Phytophthora dieback was assessed as part of standard vegetation monitoring undertaken at all monitoring locations with four scales of impact being recorded:

1. Low impact: 1-2 plants
2. Medium impact: active front visible, some death
3. Heavy impact: active front visible, lots of death
4. Old impact site: vegetation structure altered.

Ten monitoring points were recorded with Phytophthora dieback during the baseline monitoring period. These impacts were mostly recorded in Banksia Woodland, with relatively little observed impact within the Banksia/Tuart Woodland and no evidence recorded in the Claypan sites. This is not unusual as the Banksia/Tuart Woodland, which typically occurs on more alkaline soils which is not favoured by *Phytophthora cinnamomi*.

There was no change in the number of photopoints recorded to have symptoms of Phytophthora dieback relative to baseline monitoring levels. A breakdown of impacts from Phytophthora dieback at each monitoring site is provided in **Table 20**.

Table 20. Breakdown of observed impacts of Phytophthora dieback per monitoring sites in autumn 2025, relative to Autumn 2022 baseline levels.

Site	Aut 22	Aut 25	Aut 22	Aut 25	Aut 22	Aut 25	Aut 22	Aut 25	Aut 22	Aut 25	Total Photopoints
	Low	Low	Medium	Medium	Heavy	Heavy	Old*	Old*	Site total	Site total	
Potential impact sites											
BW-S-PI-1	-	-	-	-	-	-	-	-	0	0	5
BW-S-PI-3	-	-	-	-	-	-	4	4	4	4	7
BW-S-PI-4	1	1	-	-	-	-	-	-	1	1	4
BW-S-PI-5	1	1	2	2	-	-	-	-	3	3	34
BW-S-PI-8	-	-	-	-	-	-	-	-	0	0	8
CP-S-PI-1	-	-	-	-	-	-	-	-	0	0	3
TW-S-PI-2	-	-	-	-	-	-	-	-	0	0	20
TW-S-PI-3	-	-	-	-	-	-	-	-	0	0	4
TW-S-PI-4	-	-	-	-	-	-	-	-	0	0	3
Reference sites											
BW-S-R-1	-	-	2	2	-	-	-	-	2	2	4
BTW-S-R-1	-	-	-	-	-	-	-	-	0	0	2
BTW-S-R-2	-	-	-	-	-	-	-	-	0	0	2
CP-NS-R-1	-	-	-	-	-	-	-	-	0	0	2
CP-NS-R-2	-	-	-	-	-	-	-	-	0	0	2
Totals	2	2	4	4	0	0	4	4	10	10	100

* The site is devoid of *P. cinnamomi*-susceptible species and therefore, *P. cinnamomi* is not perceived to be actively causing death.

6 Conclusion

This 2025 TEC PEC annual monitoring report compares results from the preconstruction baseline monitoring undertaken between spring of 2019 and summer of 2020 with all subsequent monitoring rounds completed before the end of this reporting period on May 31, 2025.

The results of this monitoring shows that there were no Project attributable indirect impacts or reportable declines associated with any of the monitored occurrences of Banksia Woodland TEC PEC, Claypan TEC or Tuart Woodland TEC PEC for any of the monitored variables, including: weed diversity or cover, native diversity or cover, plant stress, erosion, inundation, or drying since baseline monitoring commenced in spring of 2019.

The widespread effects of the record-breaking driest summer and autumn of 2024 were still evident across most of the monitoring sites. The concerns that the impacts of the drought would continue and result in worsening impacts at the site did not eventuate, as the above-average rainfall that followed the drought appeared to have limited further impact, with only a few of the monitored points recording increases in stress.

The manifestation of stress within the vegetation continued to be non-uniform or 'patchy', with some parts and particular species affected far more than others. Nor did there appear to be any developing pattern of stress that could be reasonably attributed to the BORR project. Such a pattern would highly likely show impacts that generally tapered with distance from the project. This pattern of 'gradual deterioration' away from the BORR was not observed in this monitoring round and has not been evident at any of the monitoring sites since the project's commencement in 2022.

7 References

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- BORR Team (2020). TEC Vegetation Monitoring Program, Appendix I. Updated Environmental Referral Supporting Document and Additional Information REV 2.
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- Keighery, B. (1994). *Bushland Plant Survey, A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.).
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NVIS Technical Working Group (2017) *Australian Vegetation Attribute Manual: National Vegetation Information System, Version 7.0*. Department of the Environment and Energy, Canberra. Prep by Bolton, M.P., deLacey, C. and Bossard, K.B. (Eds).

Appendices

Appendix 3 Location of current boundary and transect photopoints, with current and baseline vegetation condition, percentage cover for weeds and native plants at site, baseline 2022 and 2025.

Maps are arranged in order from north to south of their location within the BORR southern section referral area.

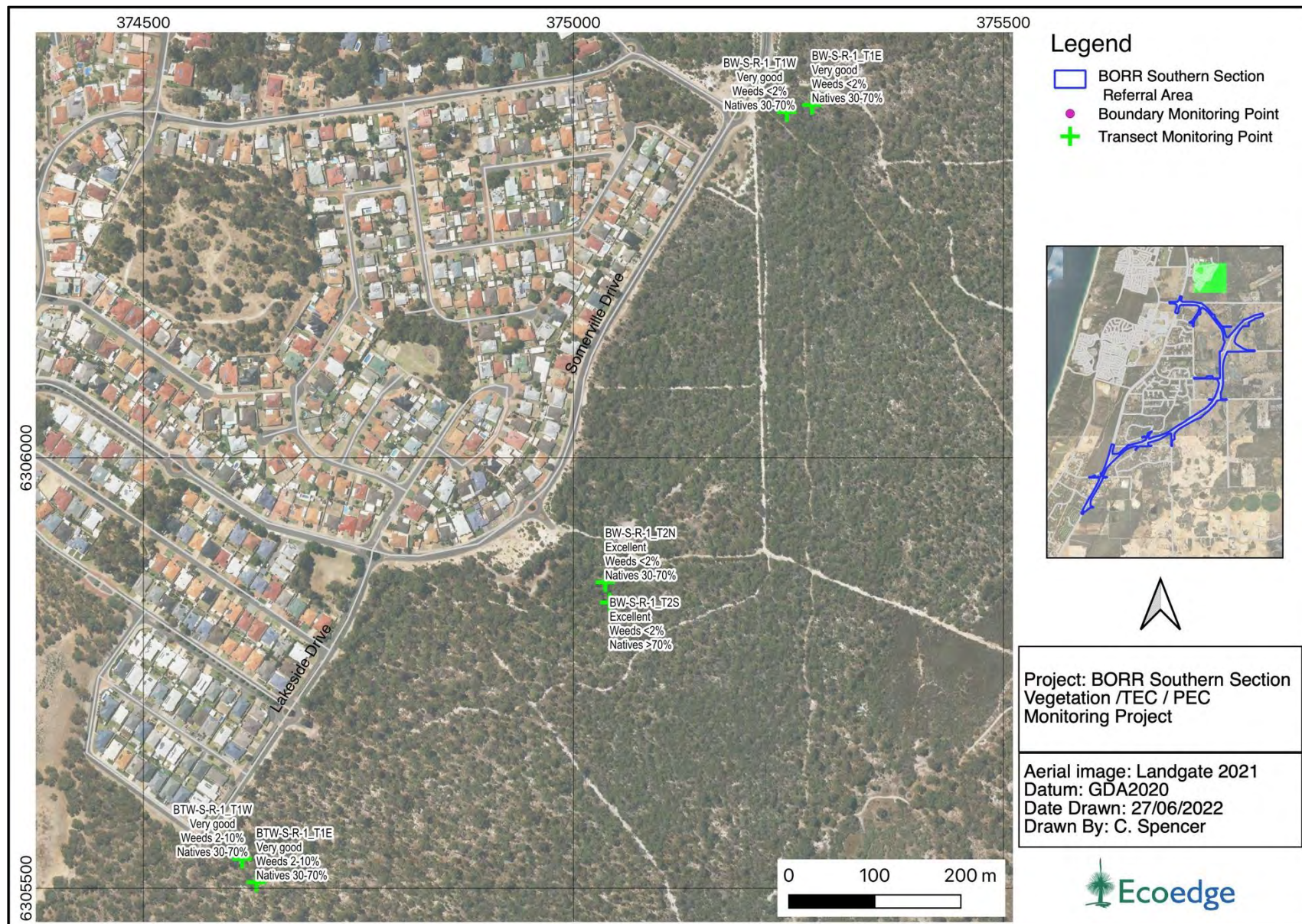


Figure 1. Baseline reference site BW-S-R-1 and BTW-S-R-1 vegetation condition, weed and native cover.

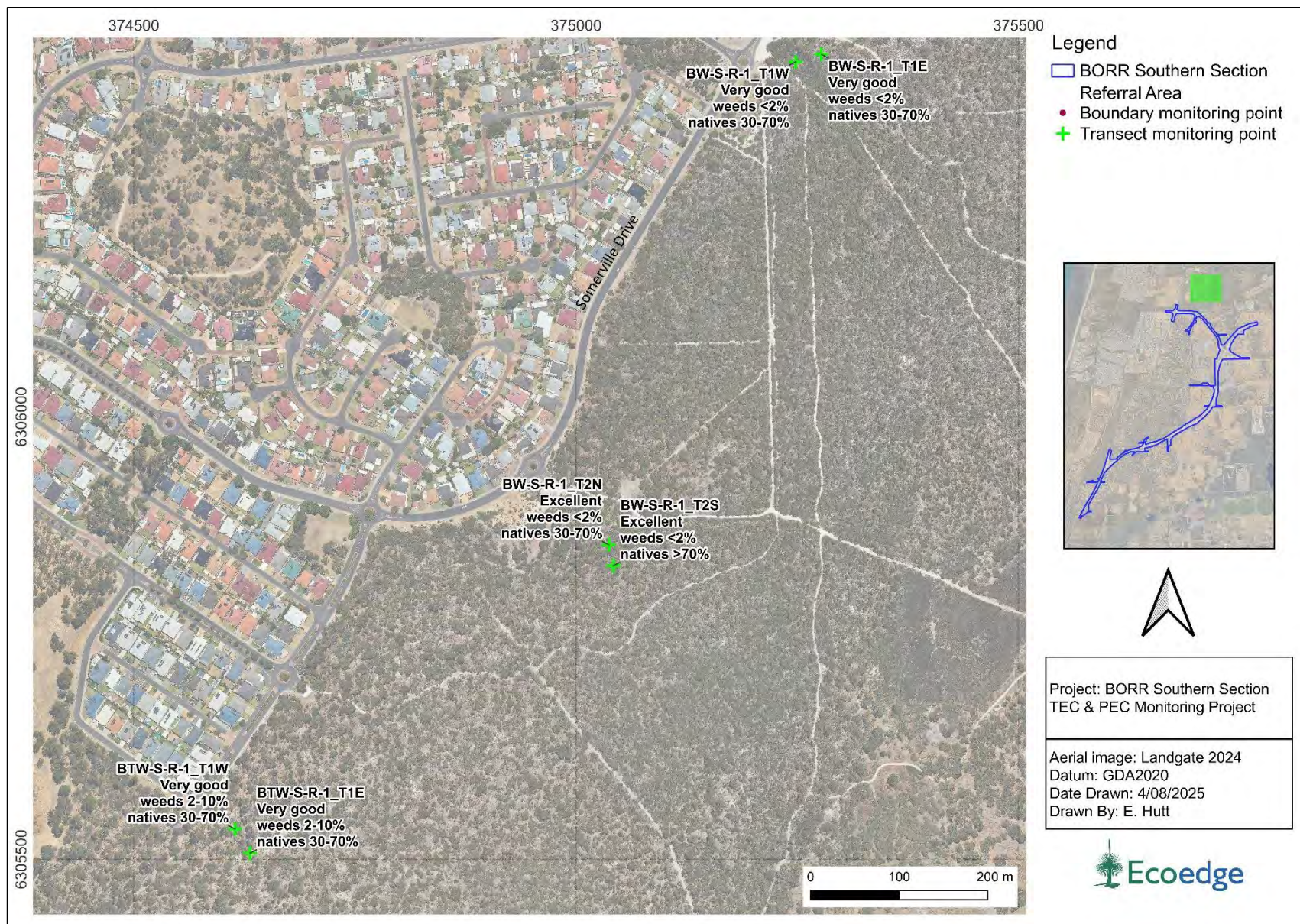


Figure 2. 2025 reference site BW-S-R-1 and BTW-S-R-1 vegetation condition, weed and native cover.

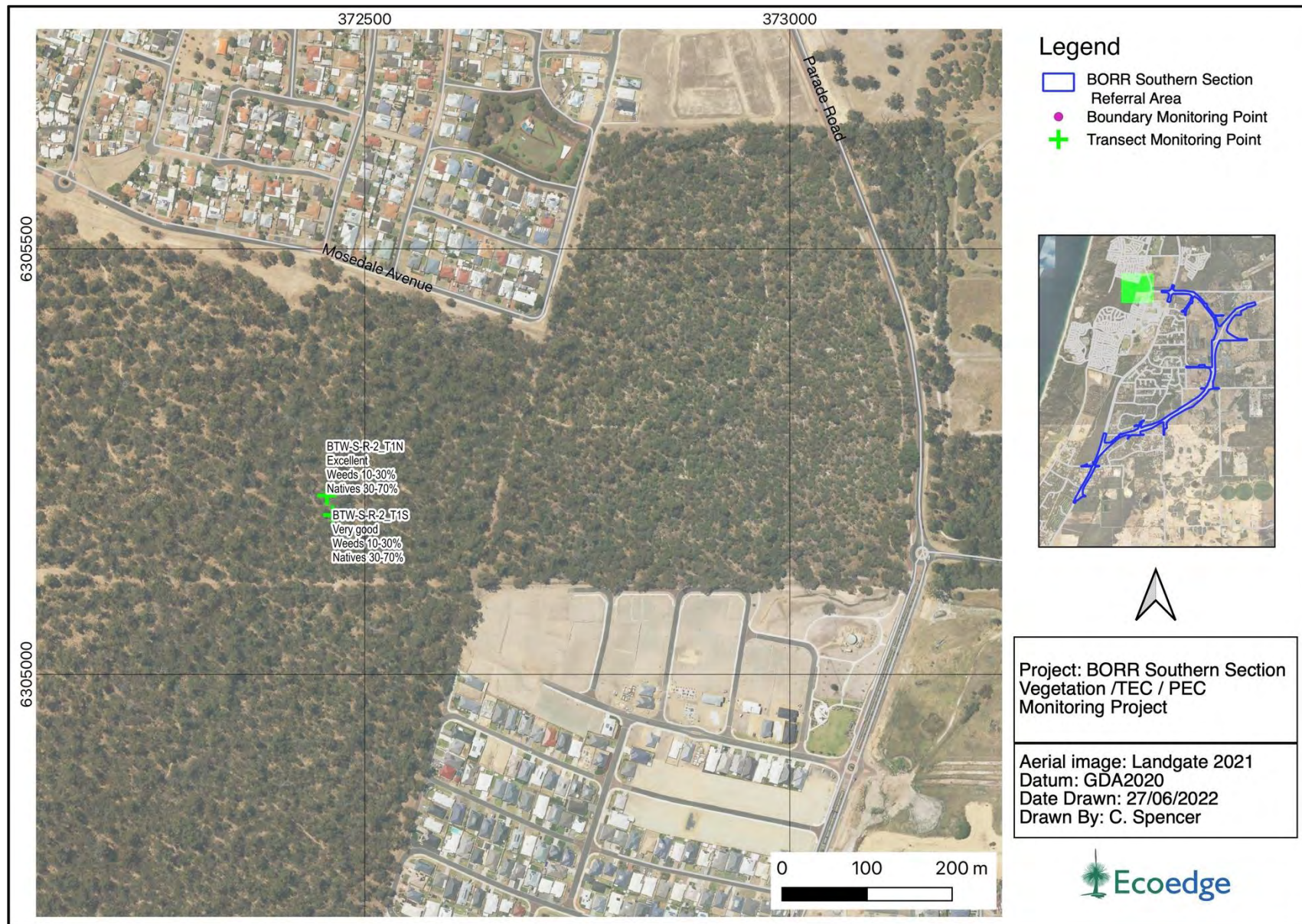


Figure 3. Baseline reference site BTW-S-R-2 vegetation condition, weed and native cover.

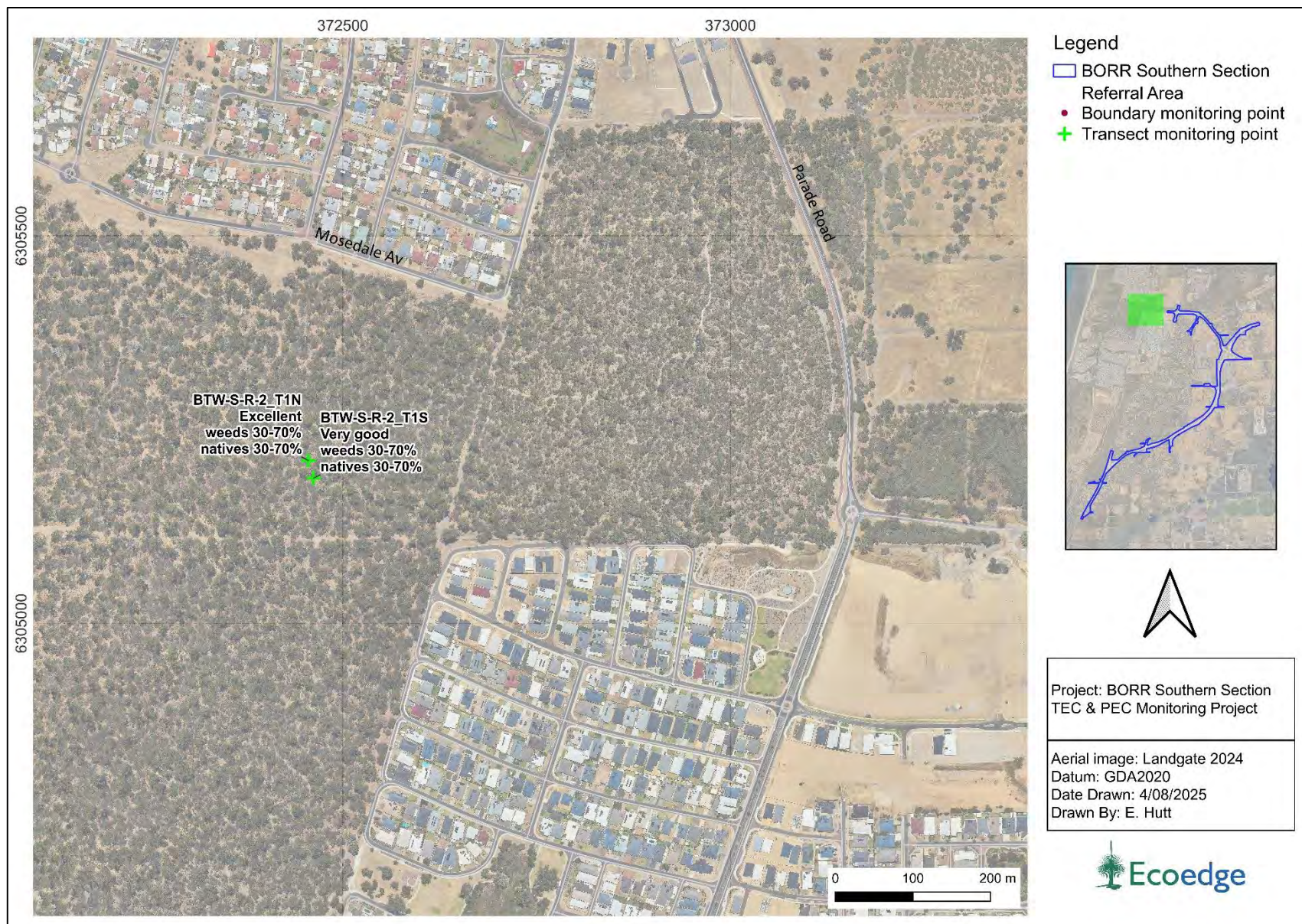


Figure 4. 2025 reference site BTW-S-R-2 vegetation condition, weed and native cover.

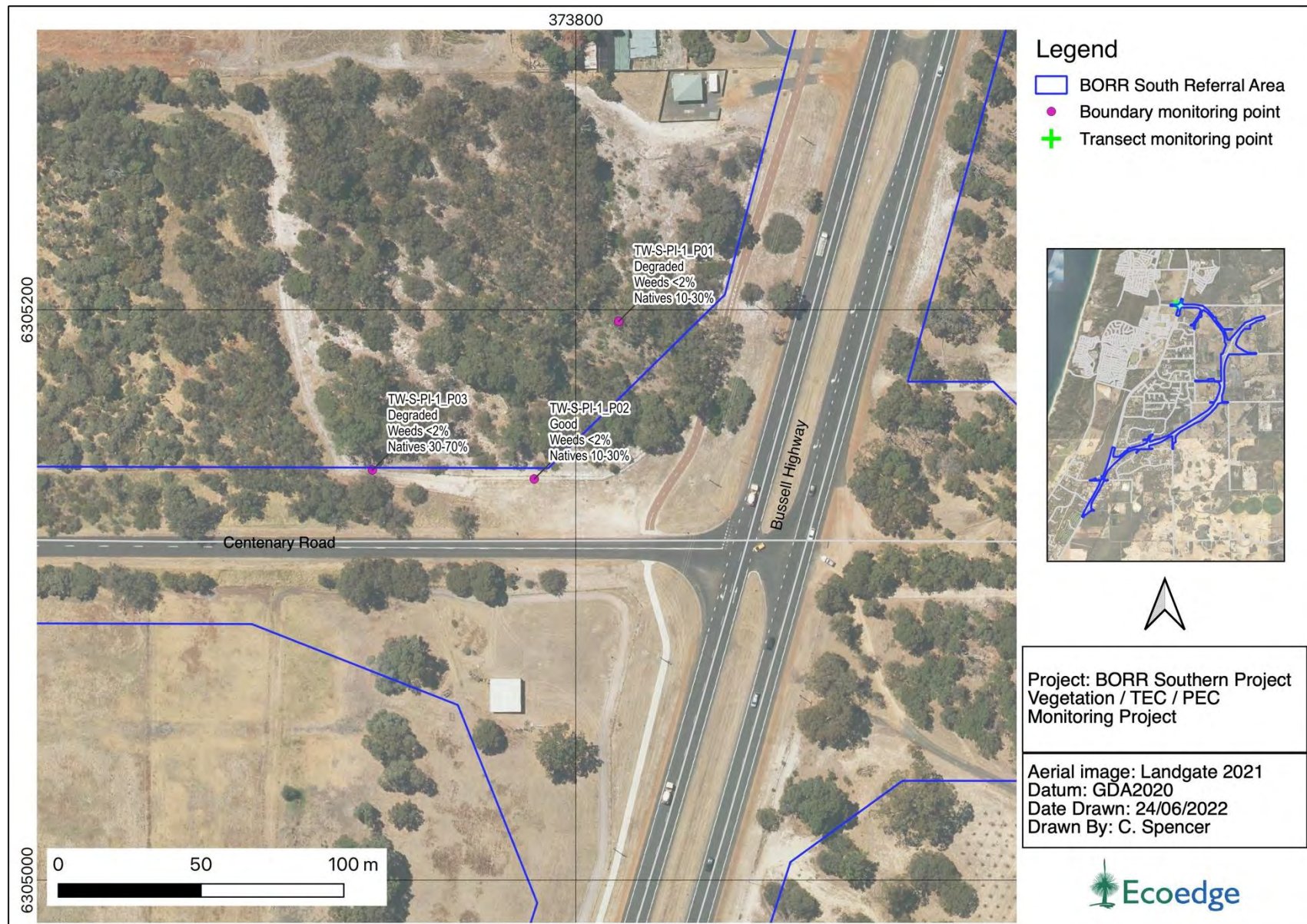


Figure 5. Baseline potential impact site TW-S-PI-1 vegetation condition, weed and native cover.



Figure 6. 2025 potential impact site TW-S-PI-1 vegetation condition, weed and native cover.

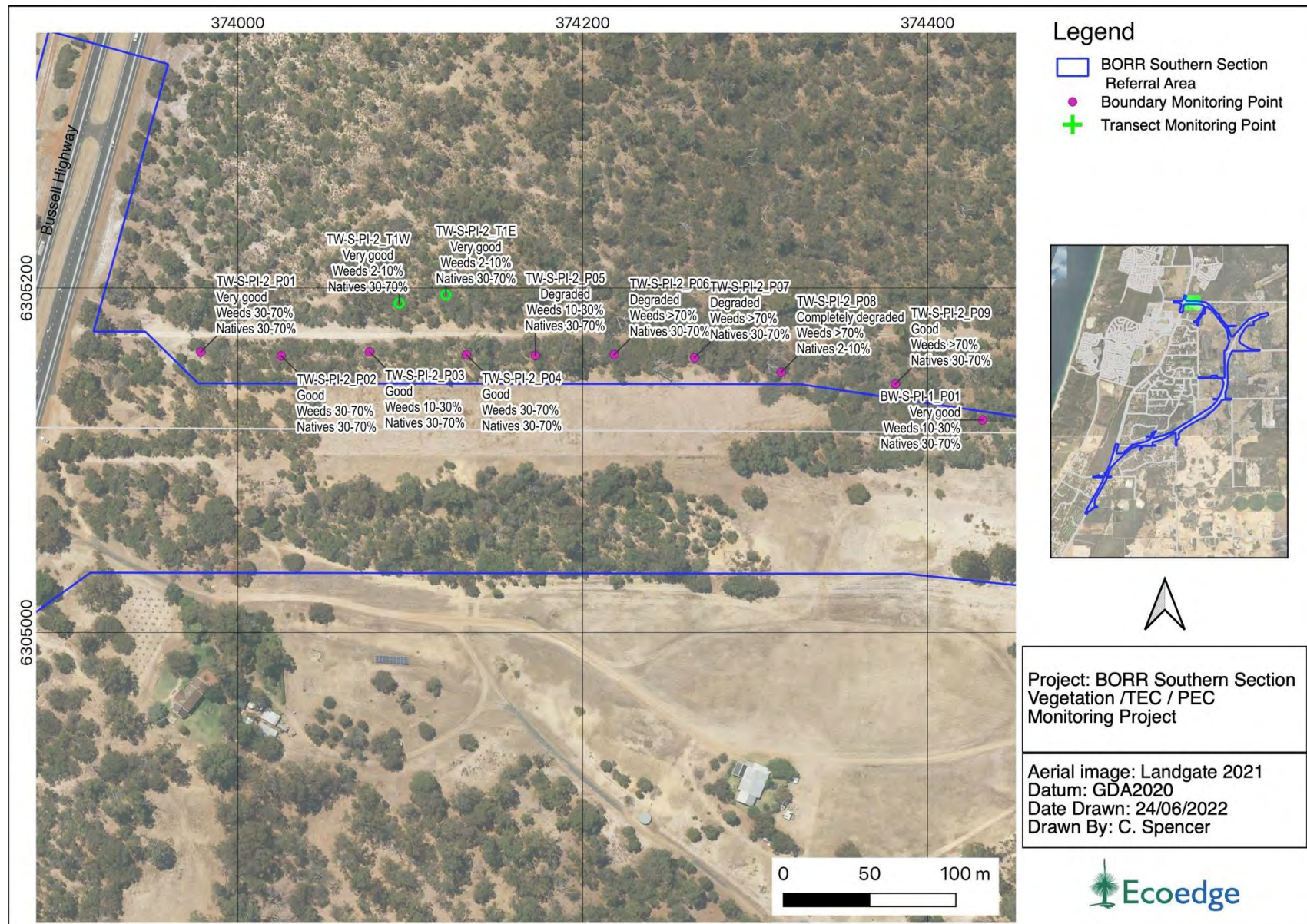


Figure 7. Baseline potential impact site TW-S-PI-2 vegetation condition, weed and native cover.

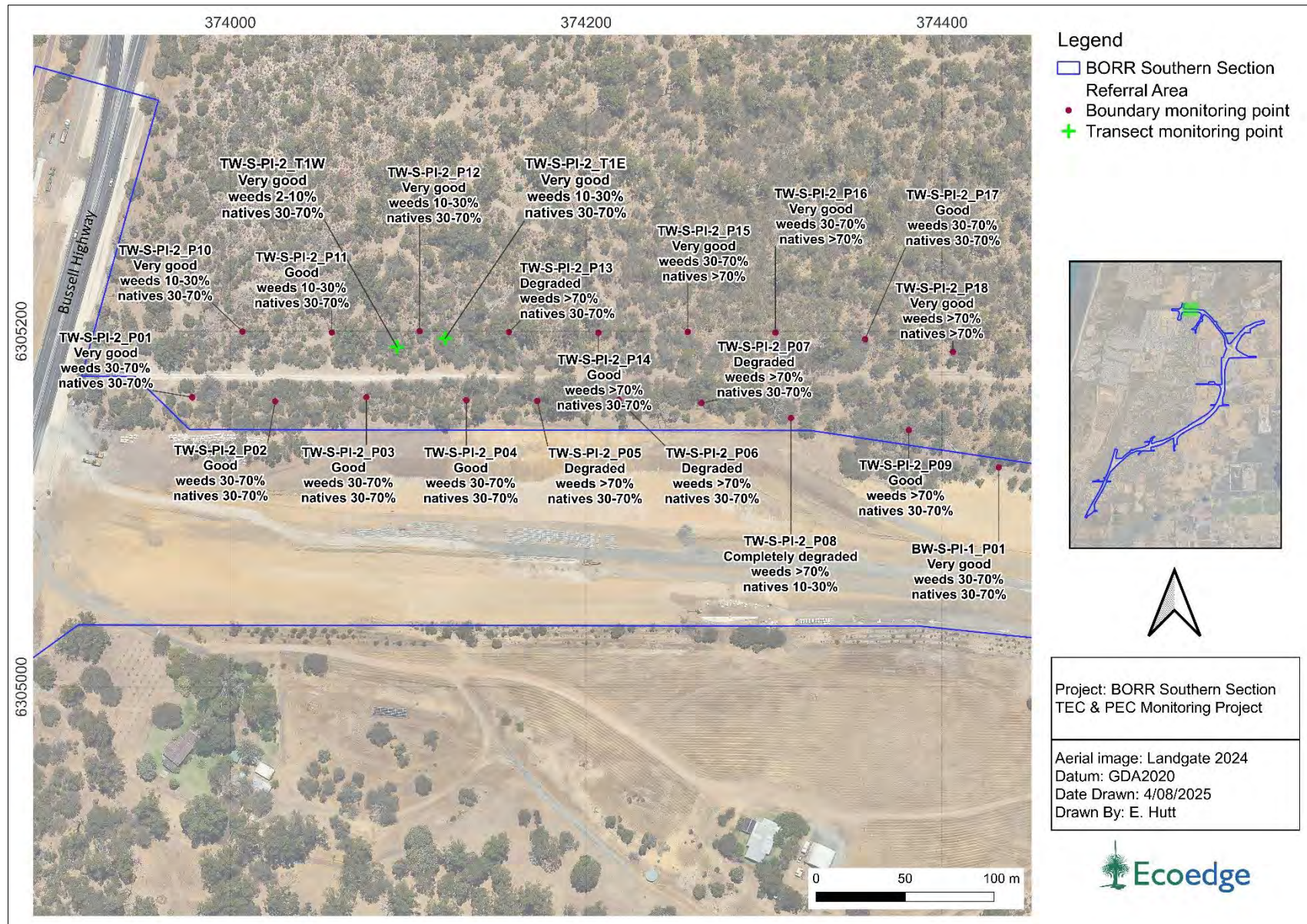


Figure 8. 2025 potential impact site TW-S-PI-2 vegetation condition, weed and native cover.

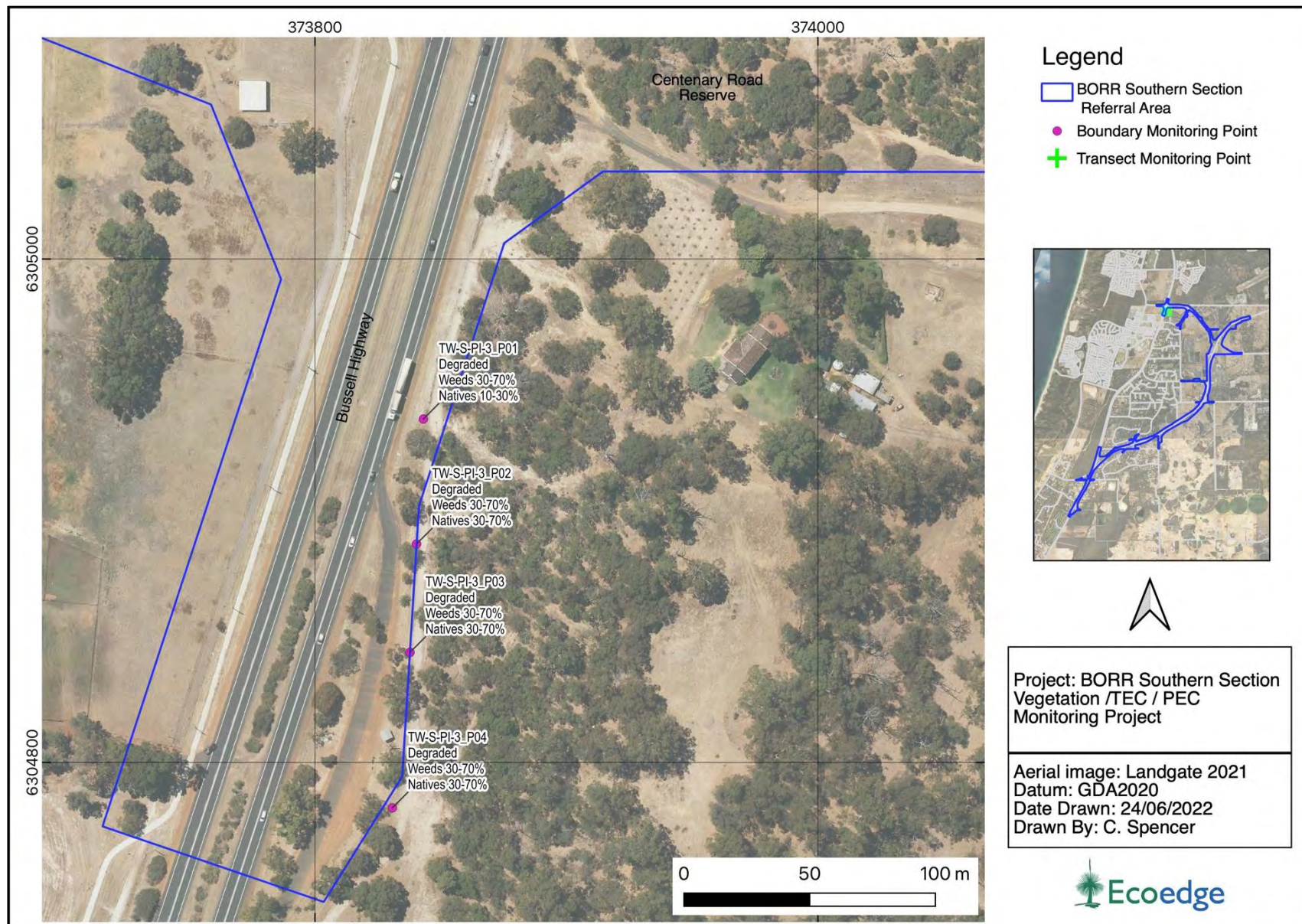
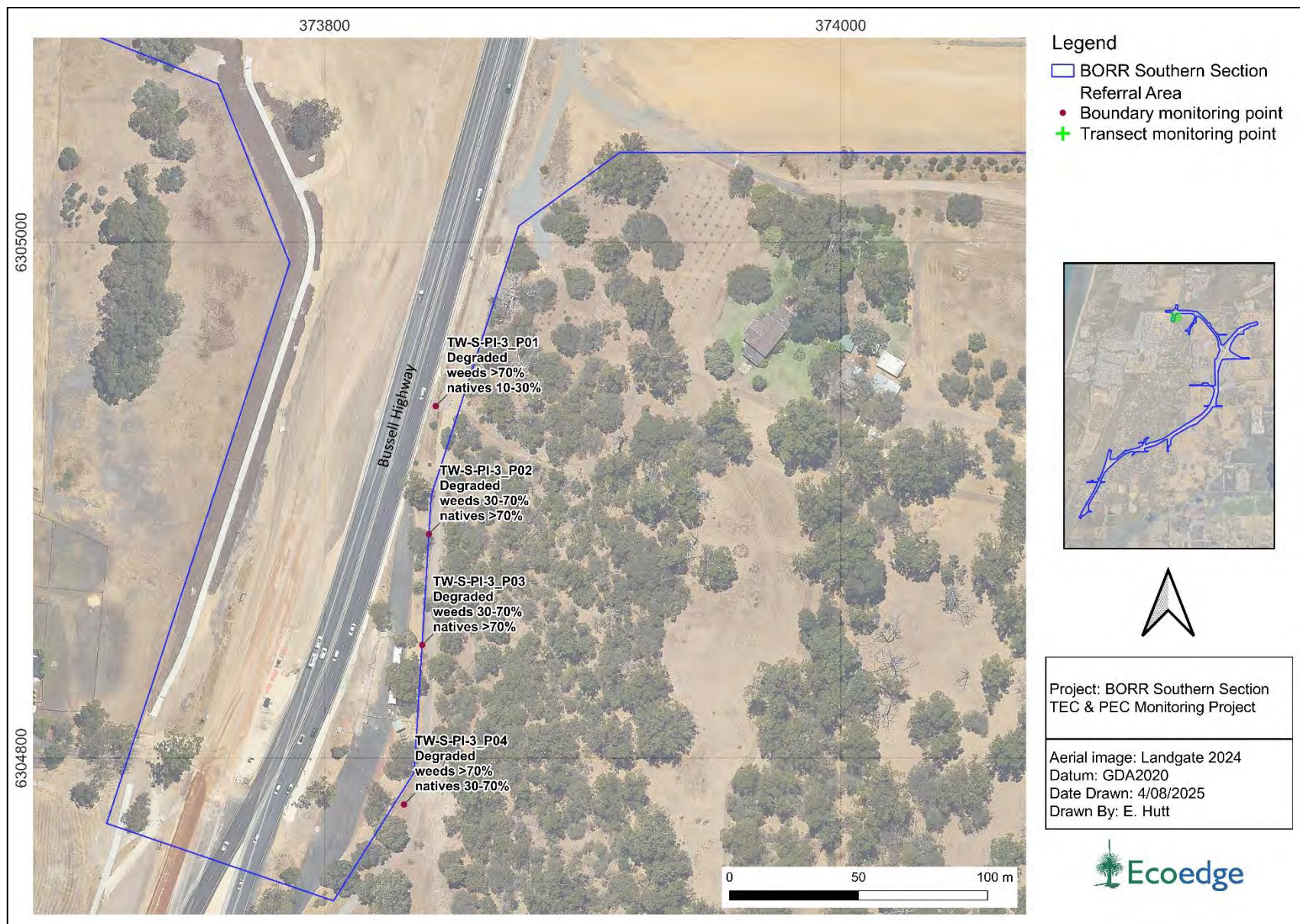


Figure 9. Baseline potential impact site TW-S-PI-3 vegetation condition, weed and native cover.



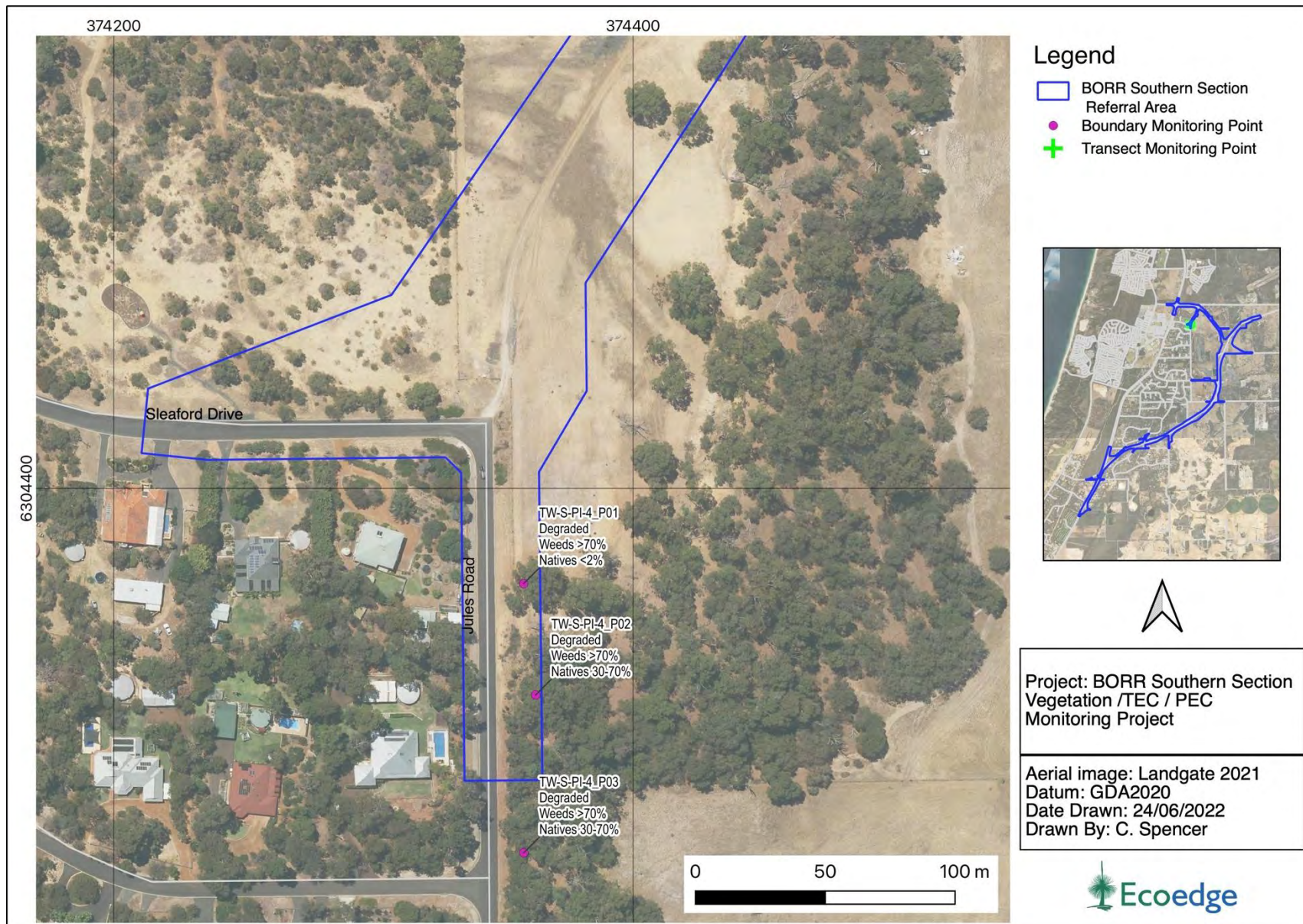


Figure 11. Baseline potential impact site TW-S-PI-4 vegetation condition, weed and native cover.

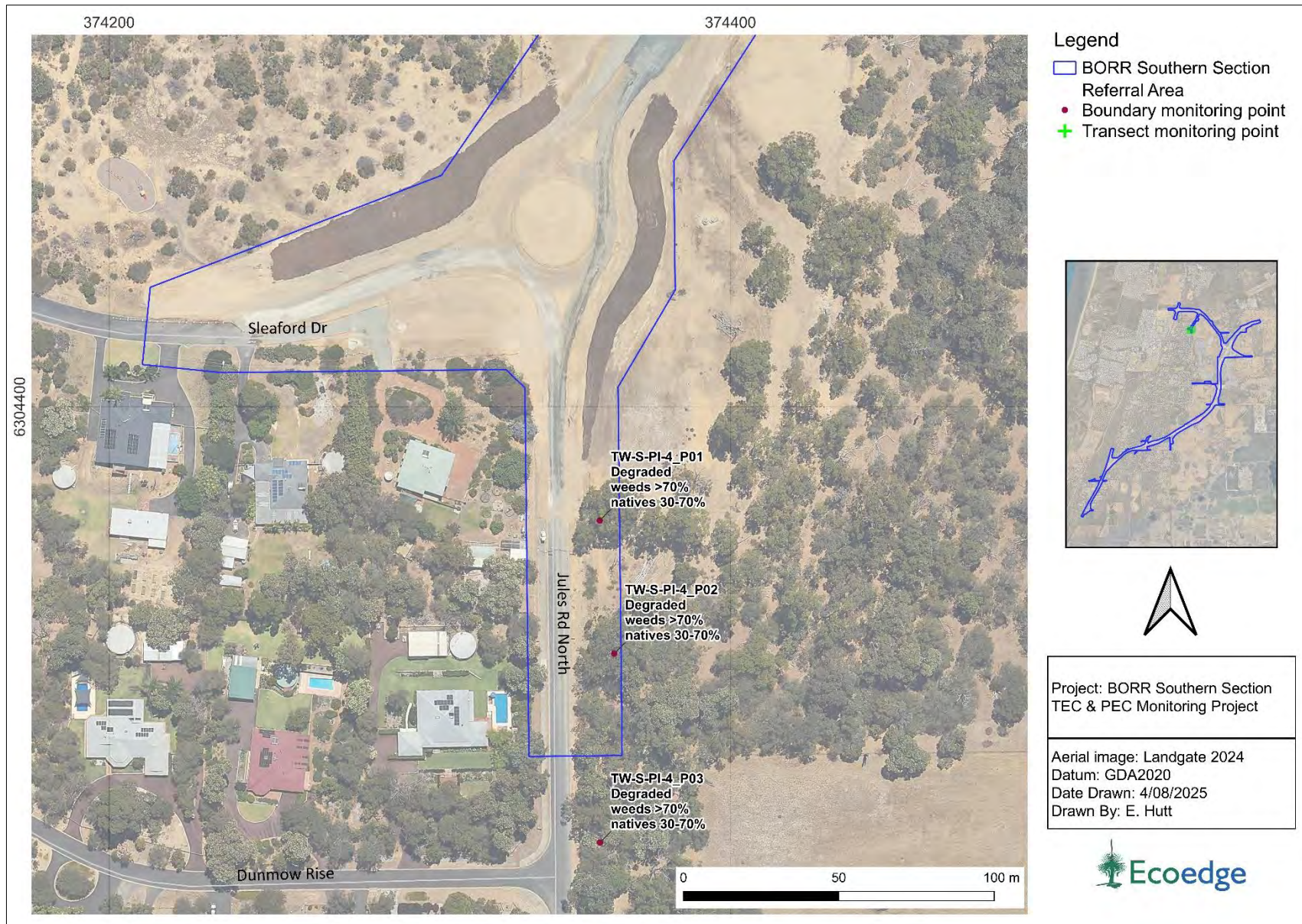


Figure 12. 2025 potential impact site TW-S-PI-4 vegetation condition, weed and native cover.

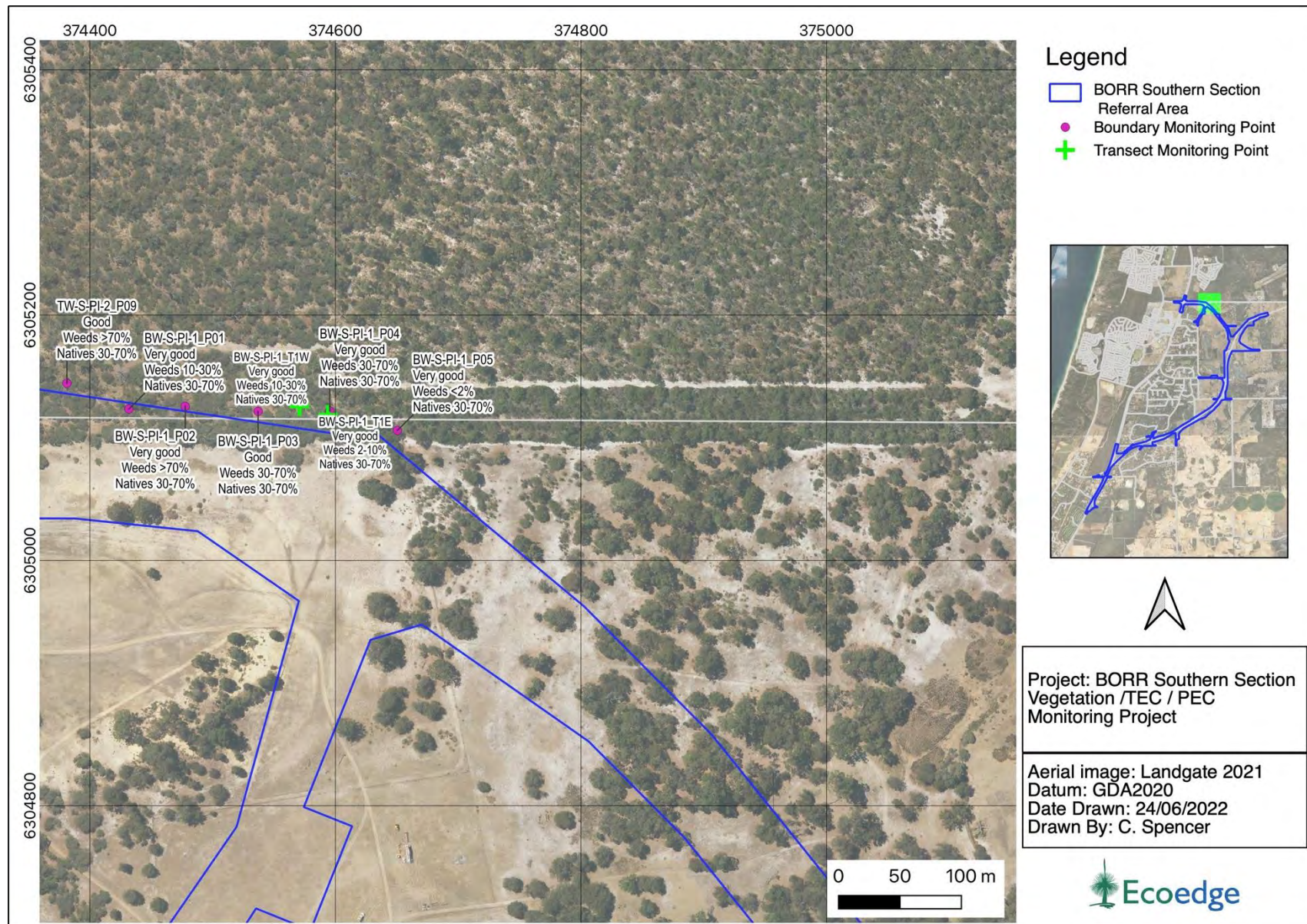


Figure 13. Baseline potential impact site BW-S-PI-1 vegetation condition, weed and native cover.

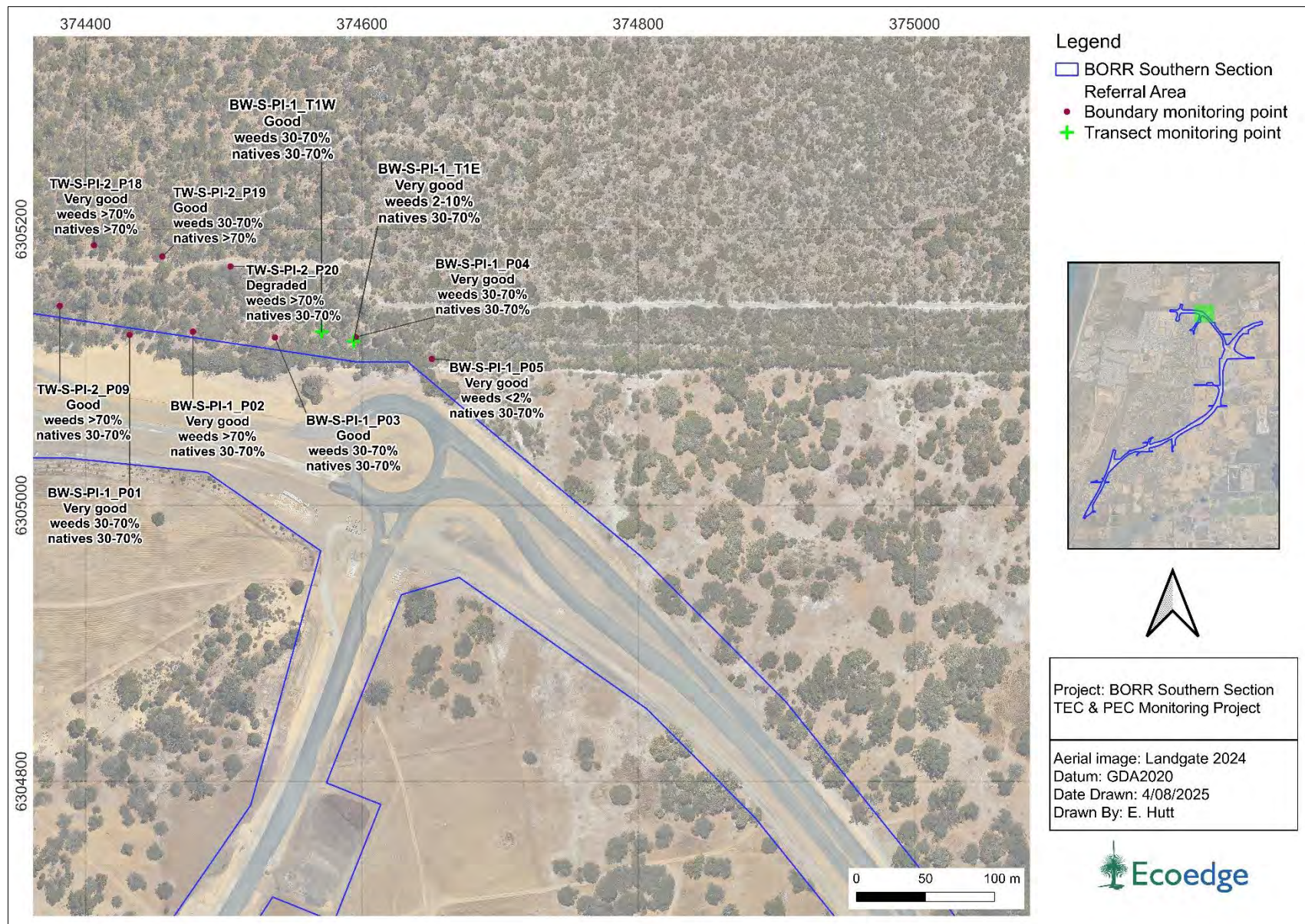


Figure 14. 2025 potential impact site BW-S-PI-1 vegetation condition, weed and native cover.

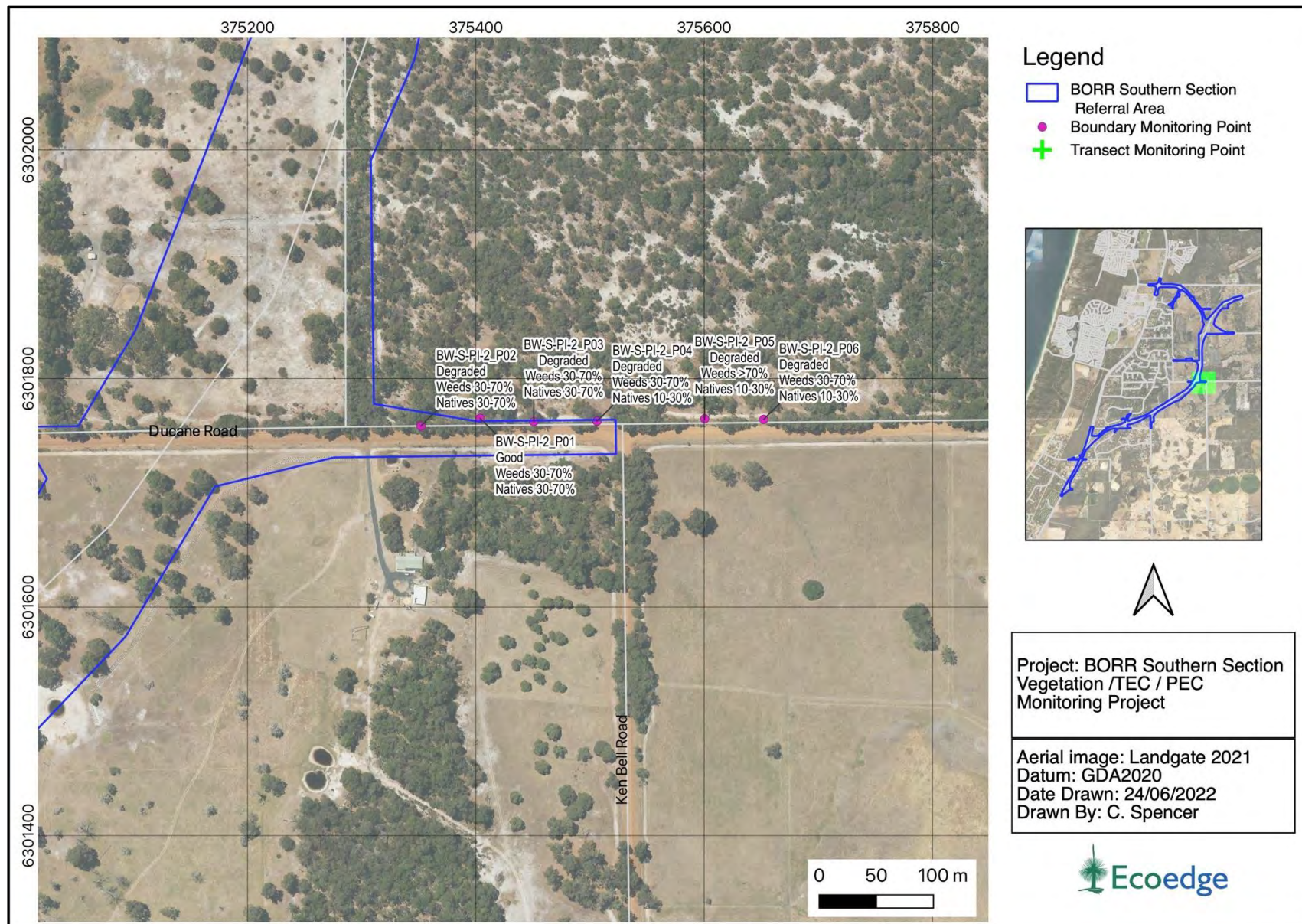


Figure 15. Baseline potential impact site BW-S-PI-2 vegetation condition, weed and native cover.

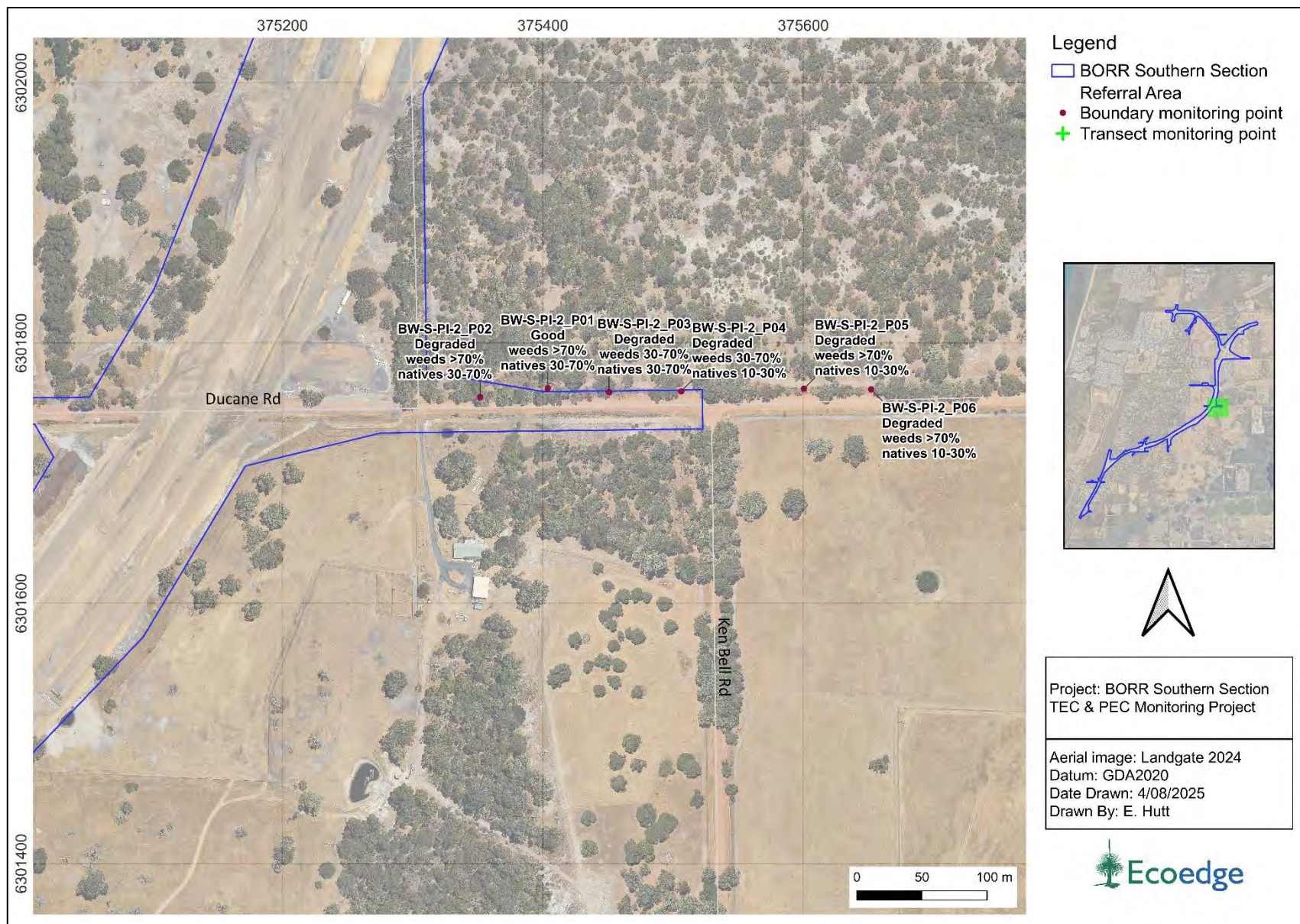


Figure 16. 2025 potential impact site BW-S-PI-2 vegetation condition, weed and native cover.

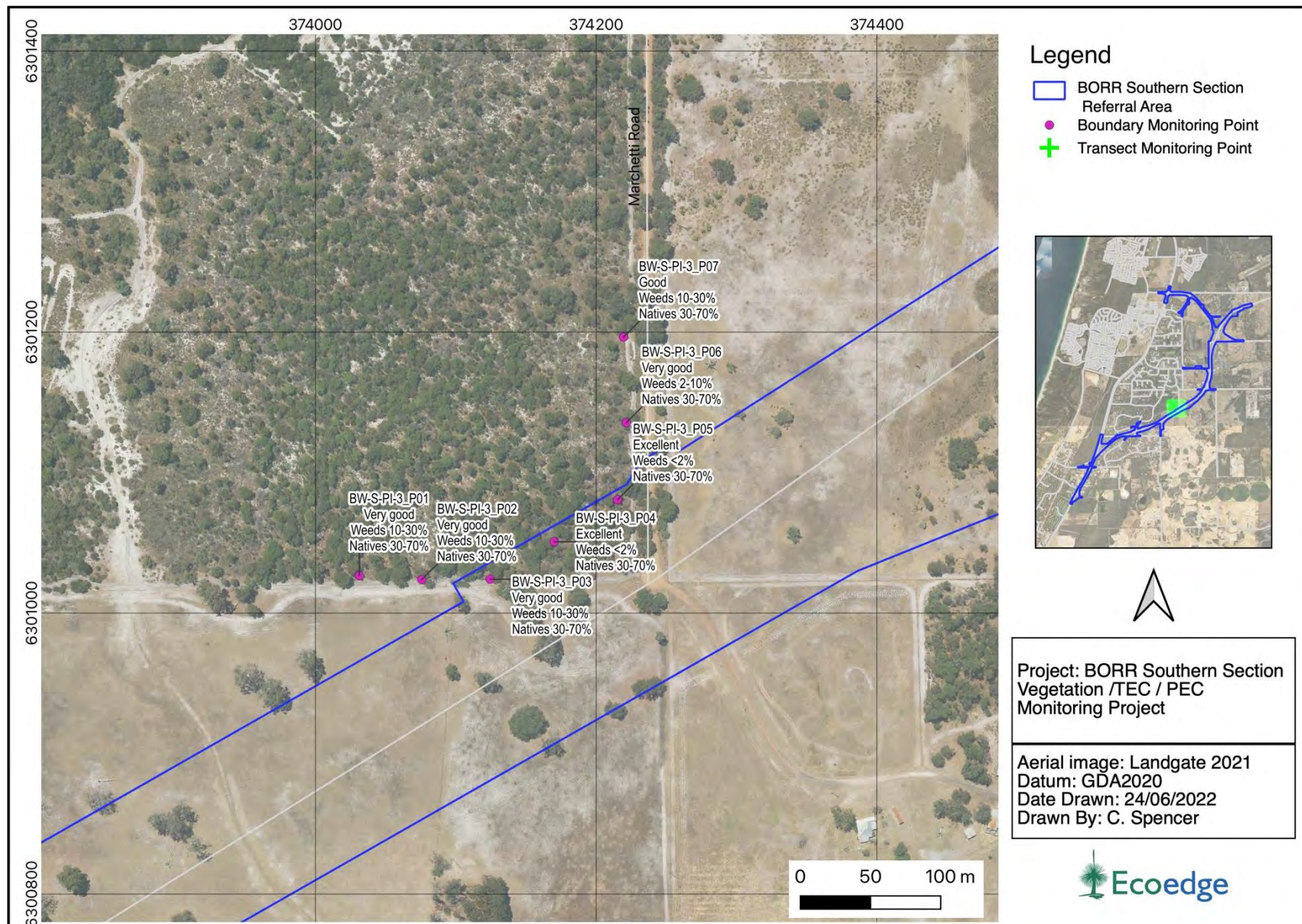


Figure 17. Baseline potential impact site BW-S-PI-3 vegetation condition, weed and native cover.

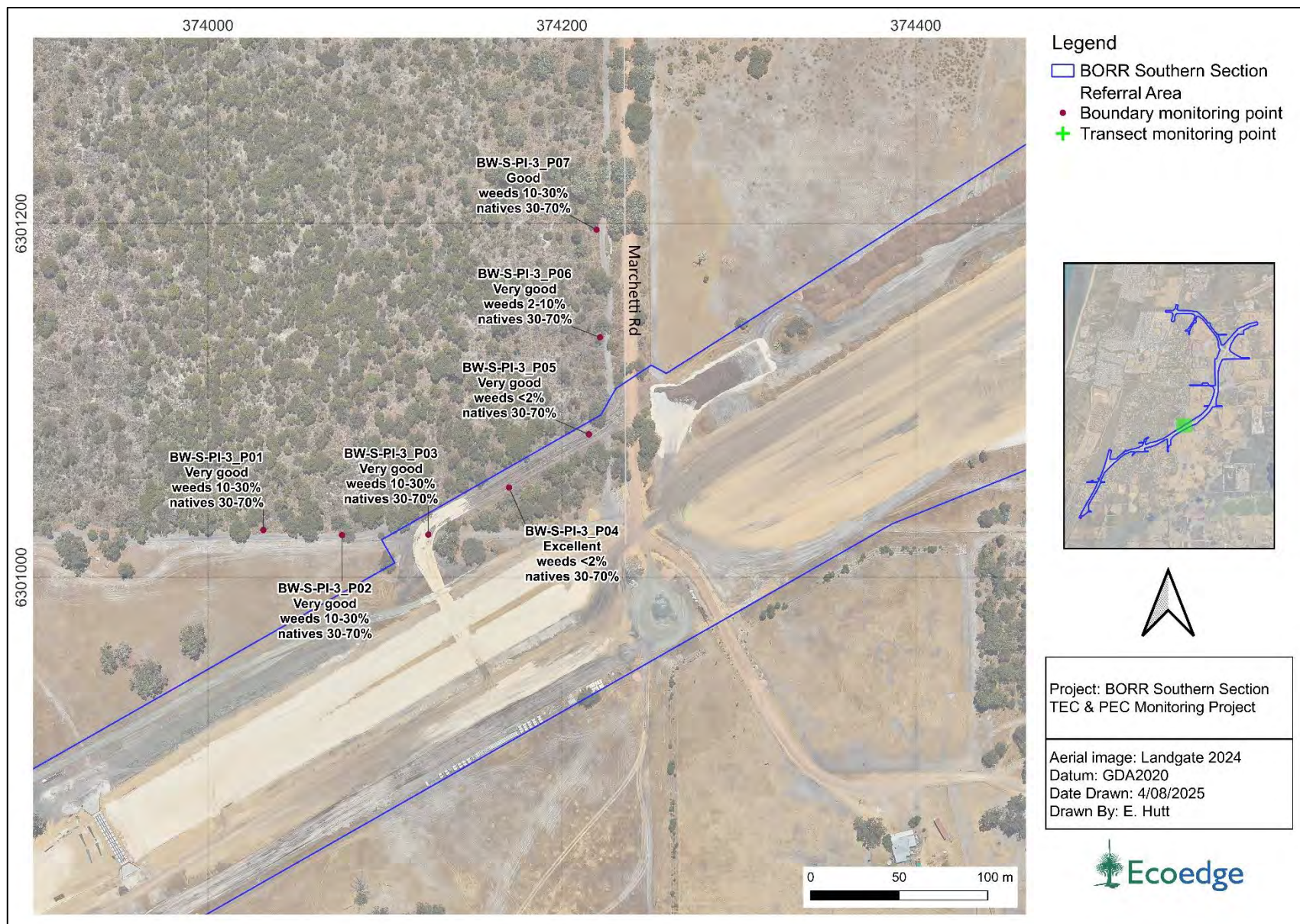


Figure 18. 2025 potential impact site BW-S-PI-3 vegetation condition, weed and native cover.

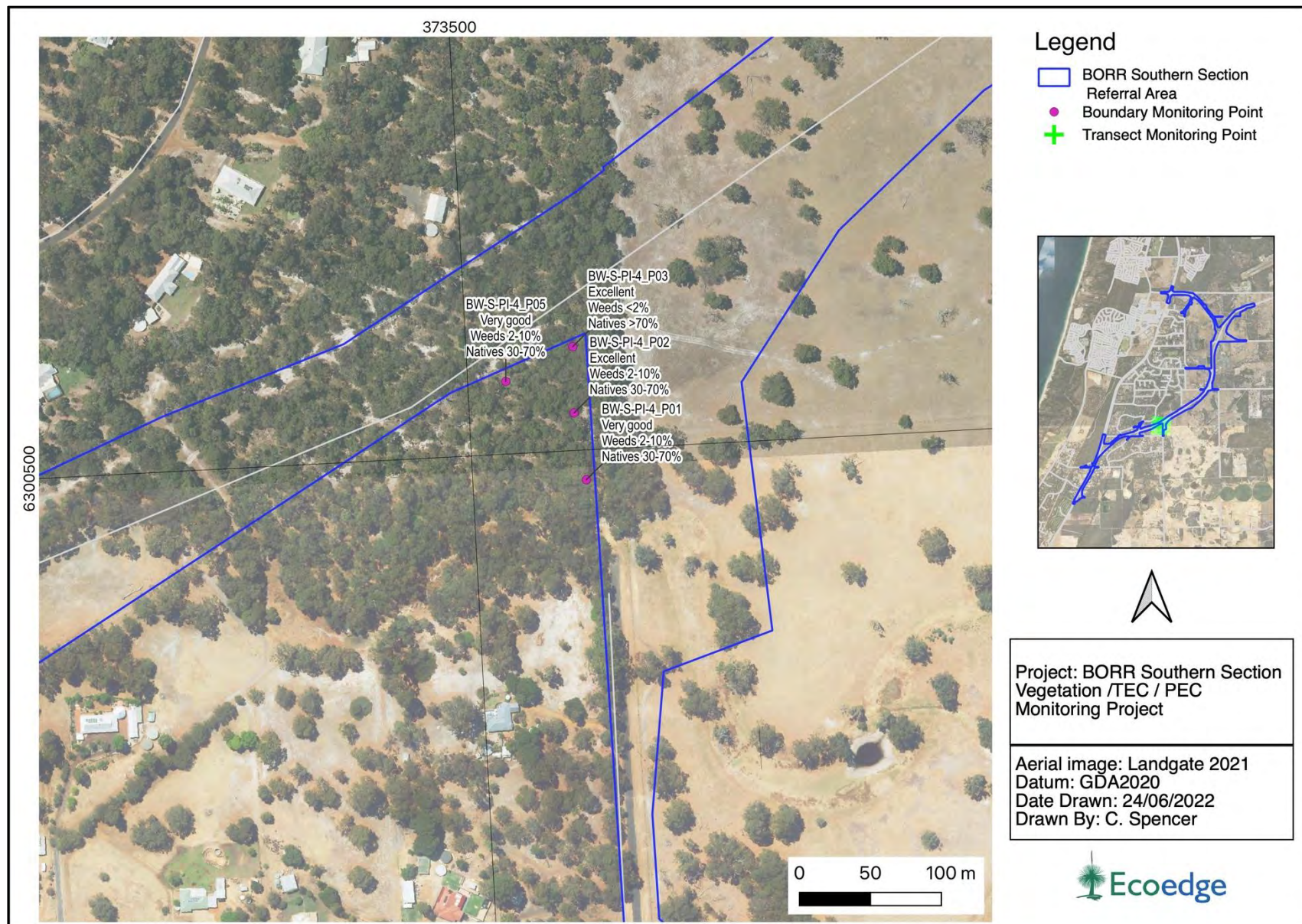


Figure 19. Baseline potential impact site BW-S-PI-4 vegetation condition, weed and native cover.

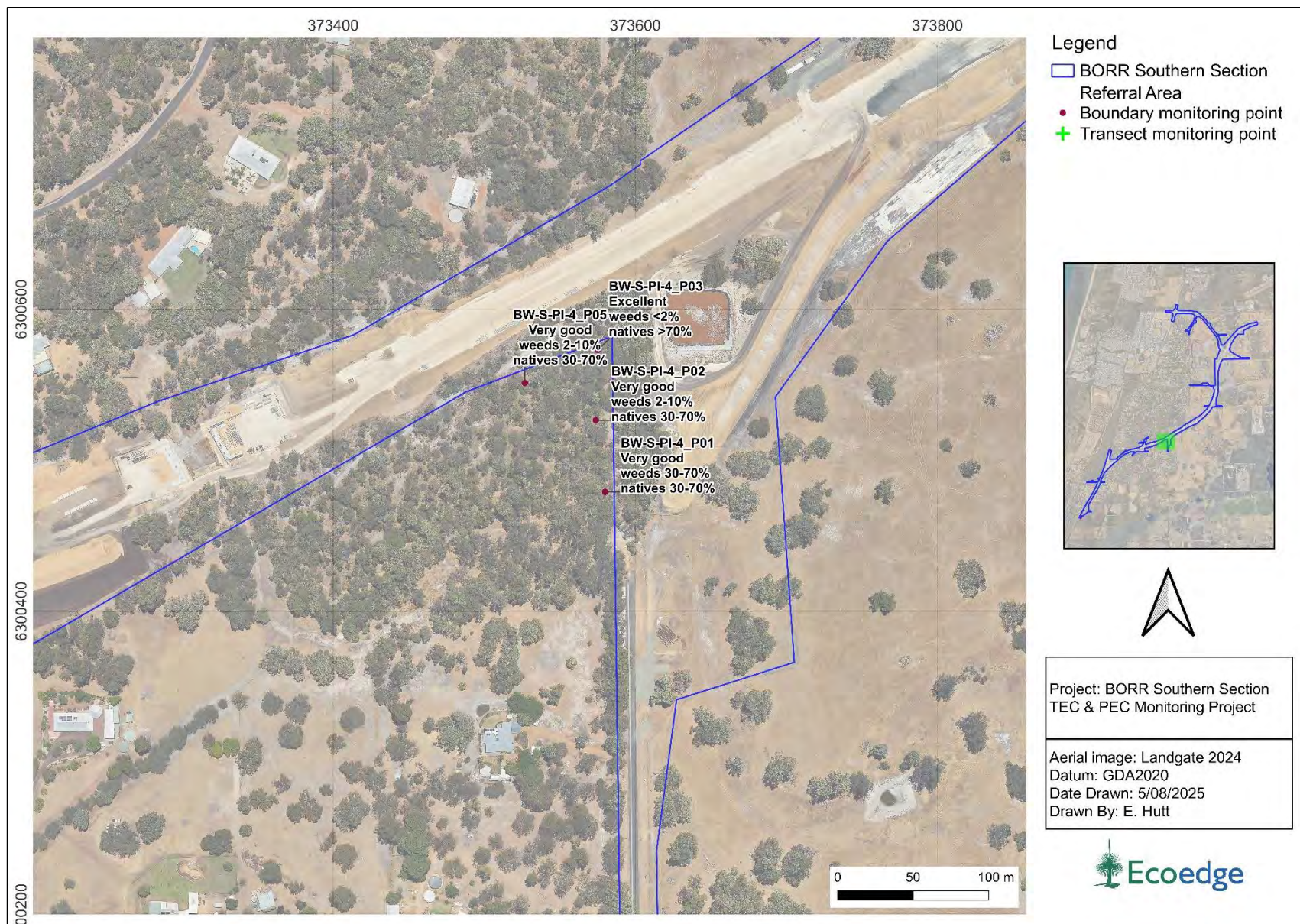


Figure 20. 2025 potential impact site BW-S-PI-4 vegetation condition, weed and native cover.

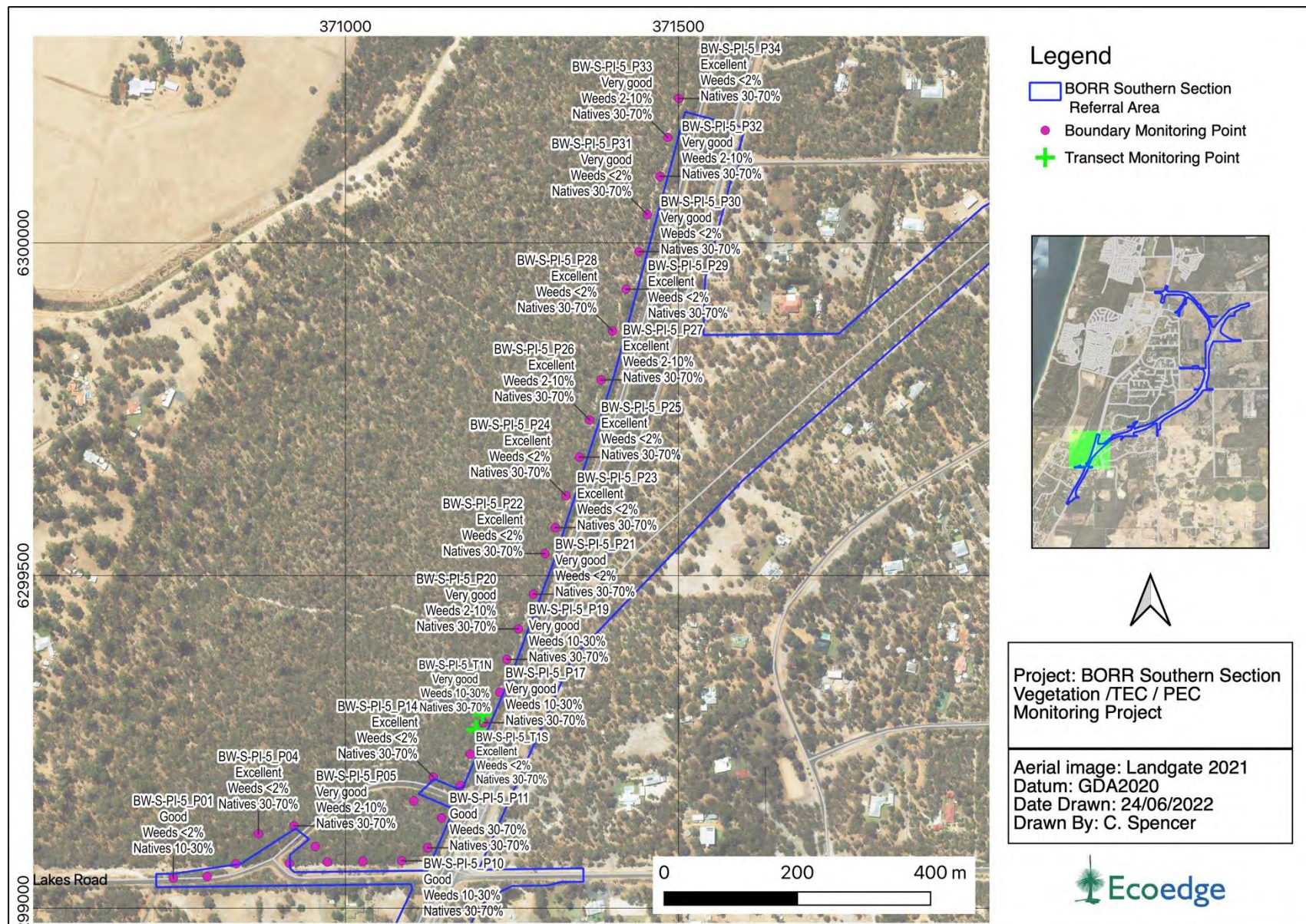


Figure 21. Baseline potential impact site BW-S-PI-5 vegetation condition, weed and native cover.

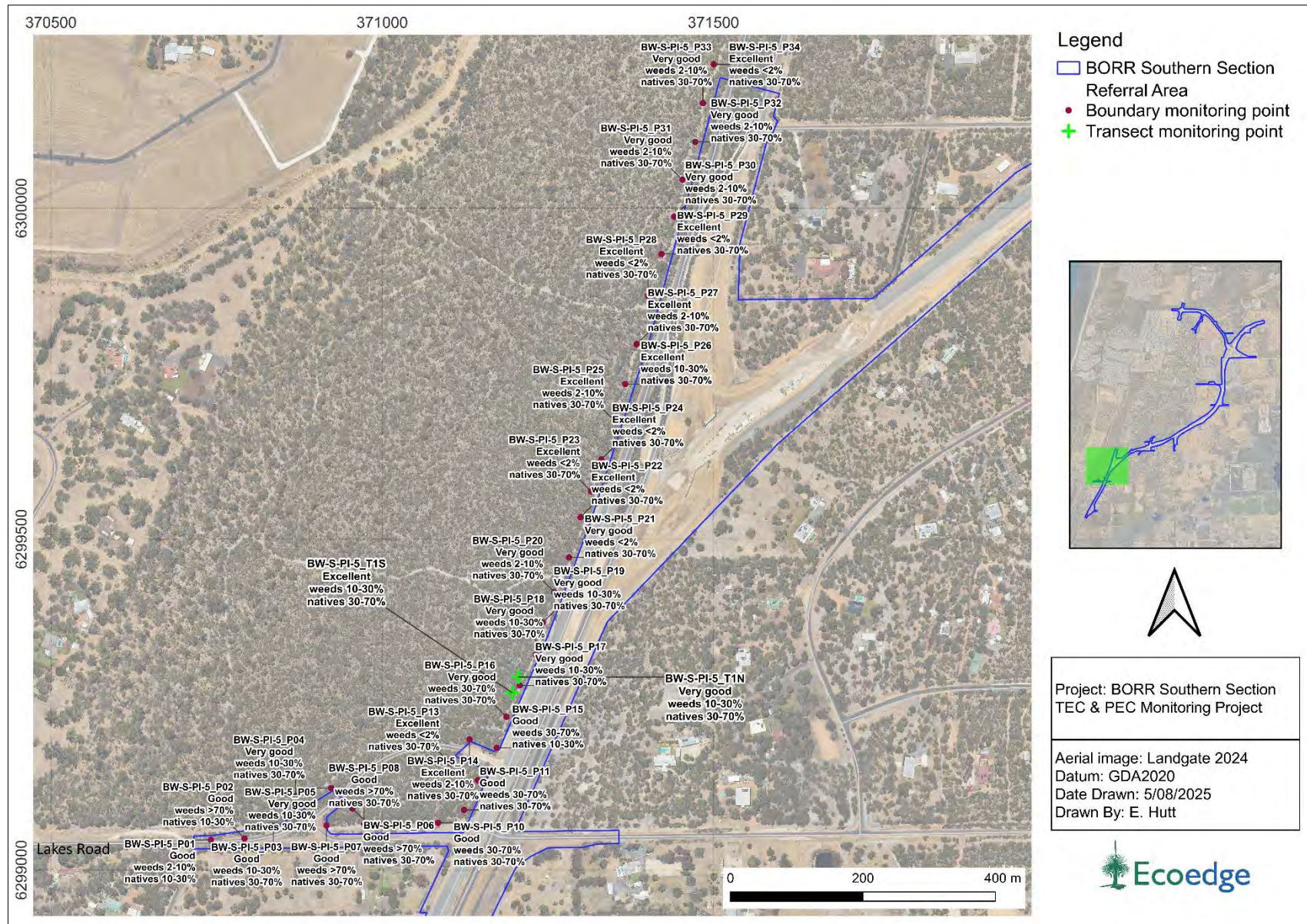


Figure 22. 2025 potential impact site BW-S-PI-5 vegetation condition, weed and native cover.

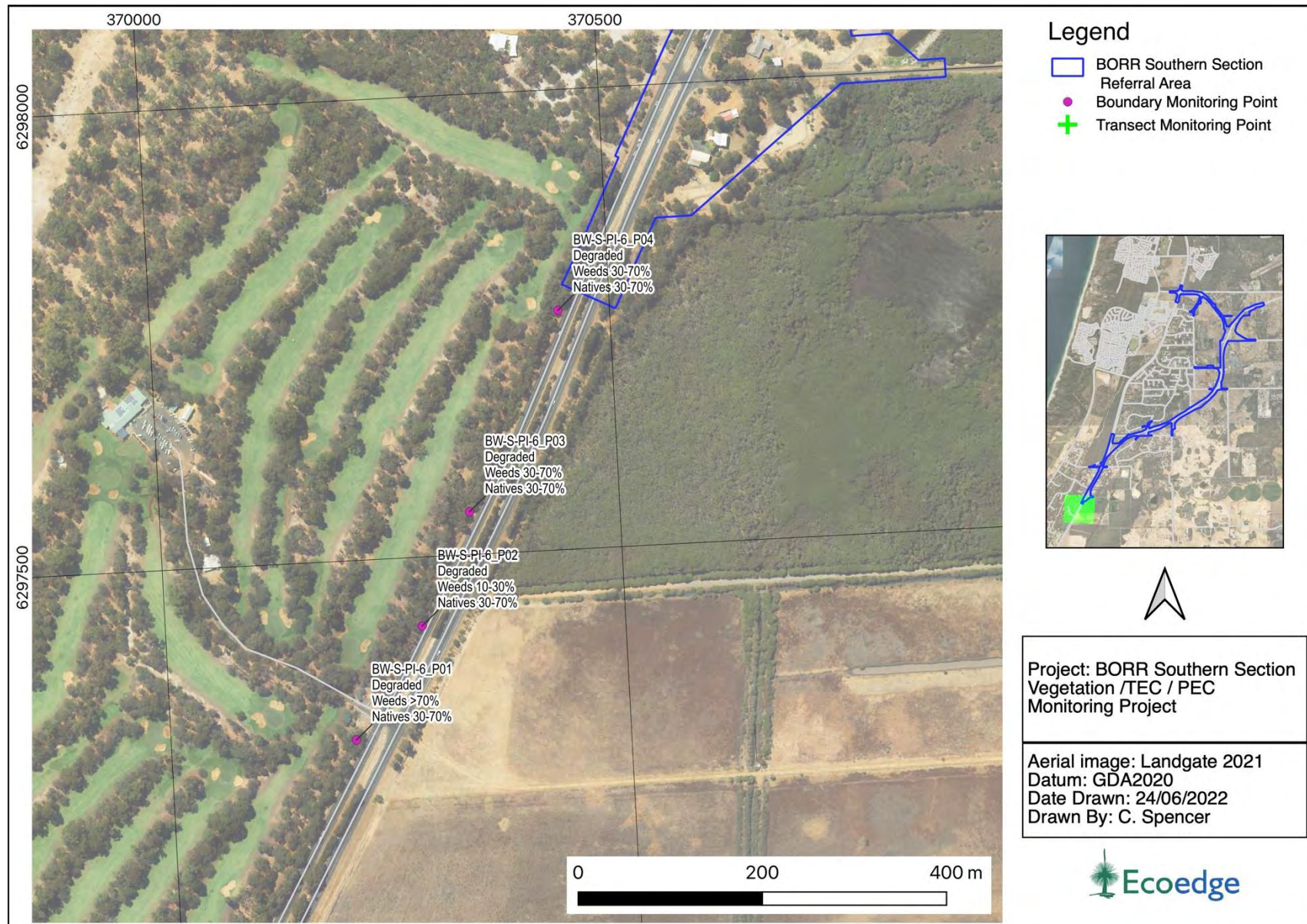


Figure 23. Baseline potential impact site BW-S-PI-6 vegetation condition, weed and native cover.

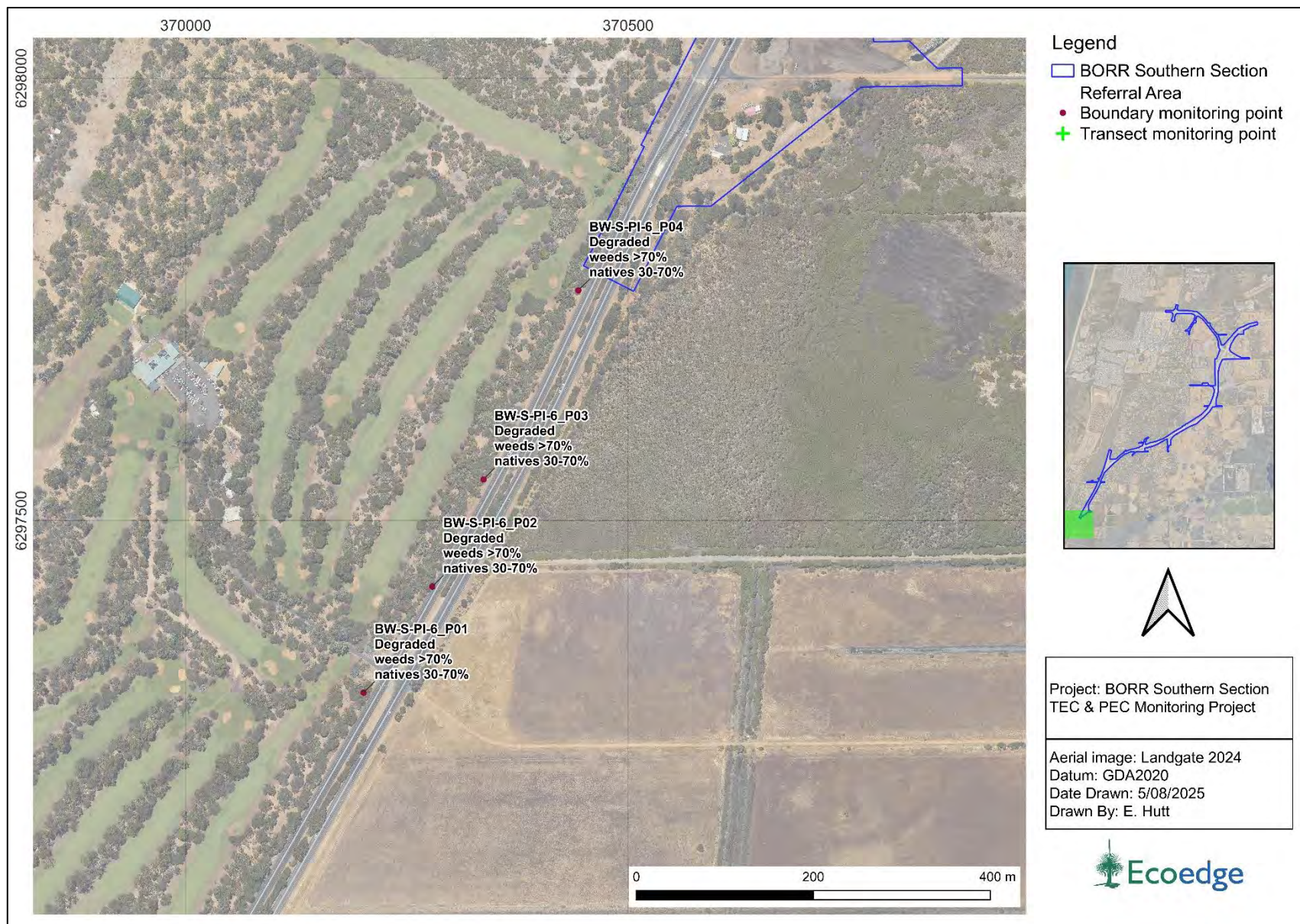


Figure 24. 2025 potential impact site BW-S-PI-6 vegetation condition, weed and native cover.

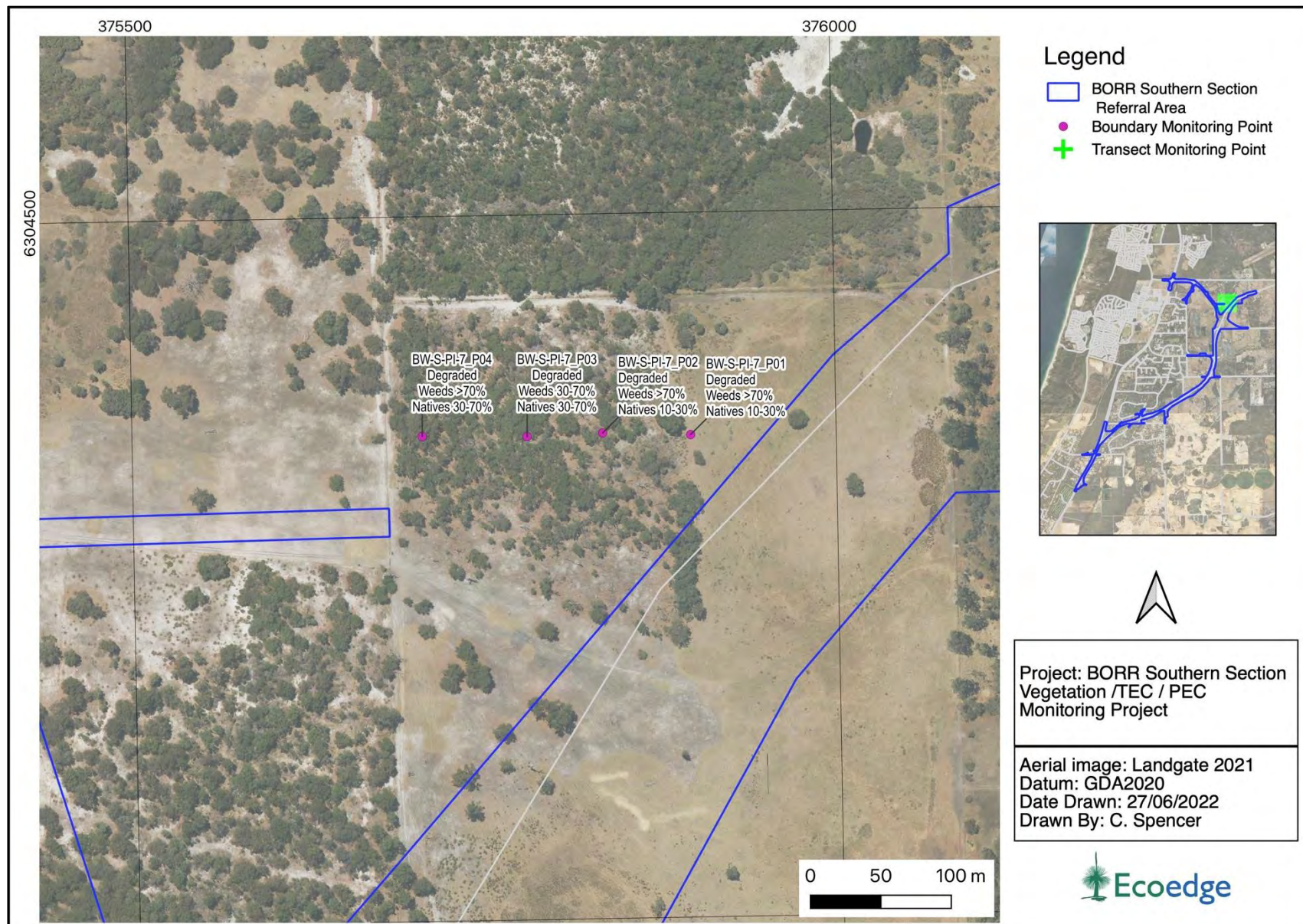
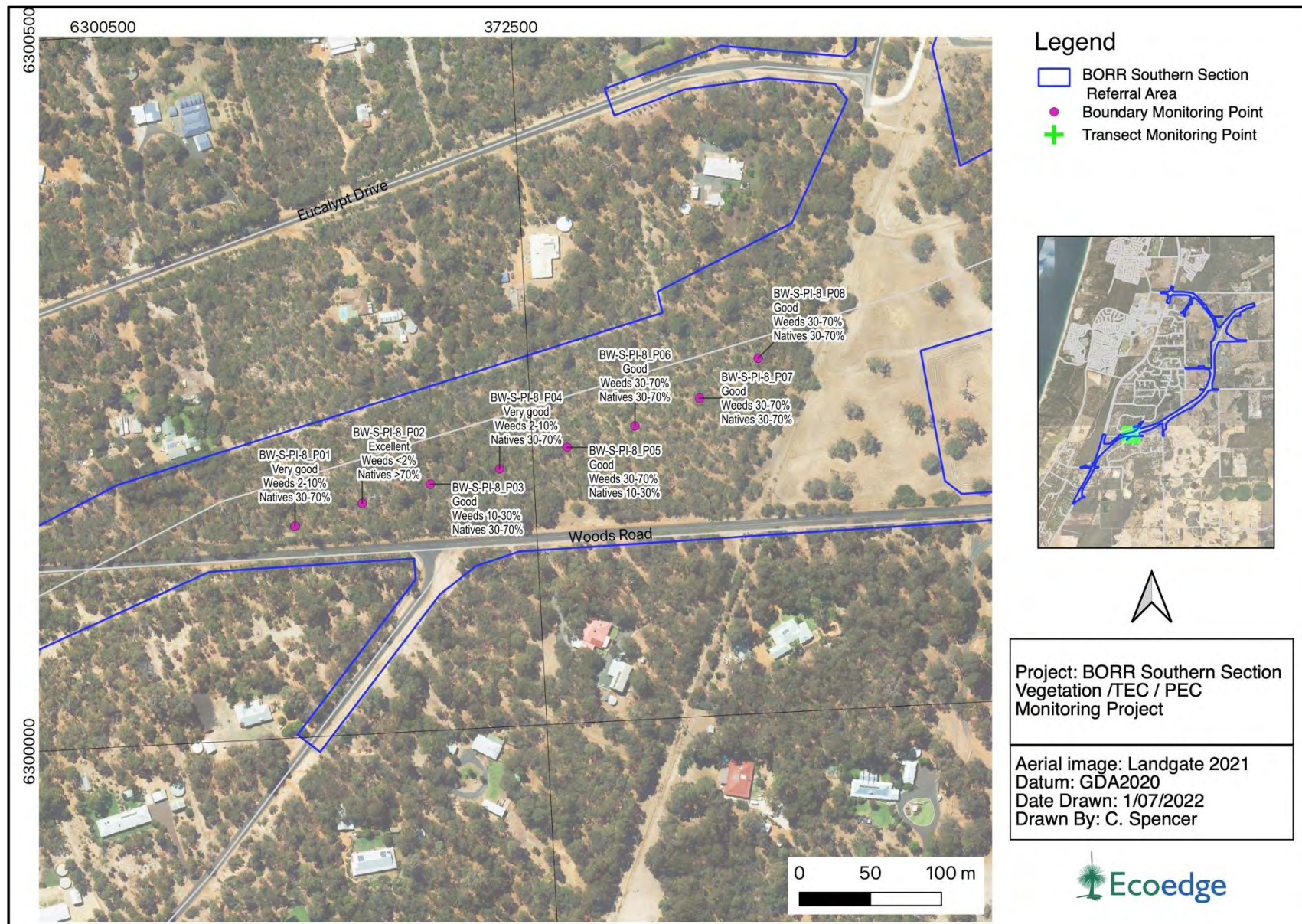


Figure 25. Baseline potential impact site BW-S-PI-7 vegetation condition, weed and native cover. **Note** data is only current to Spring 2019 due to site access issues.



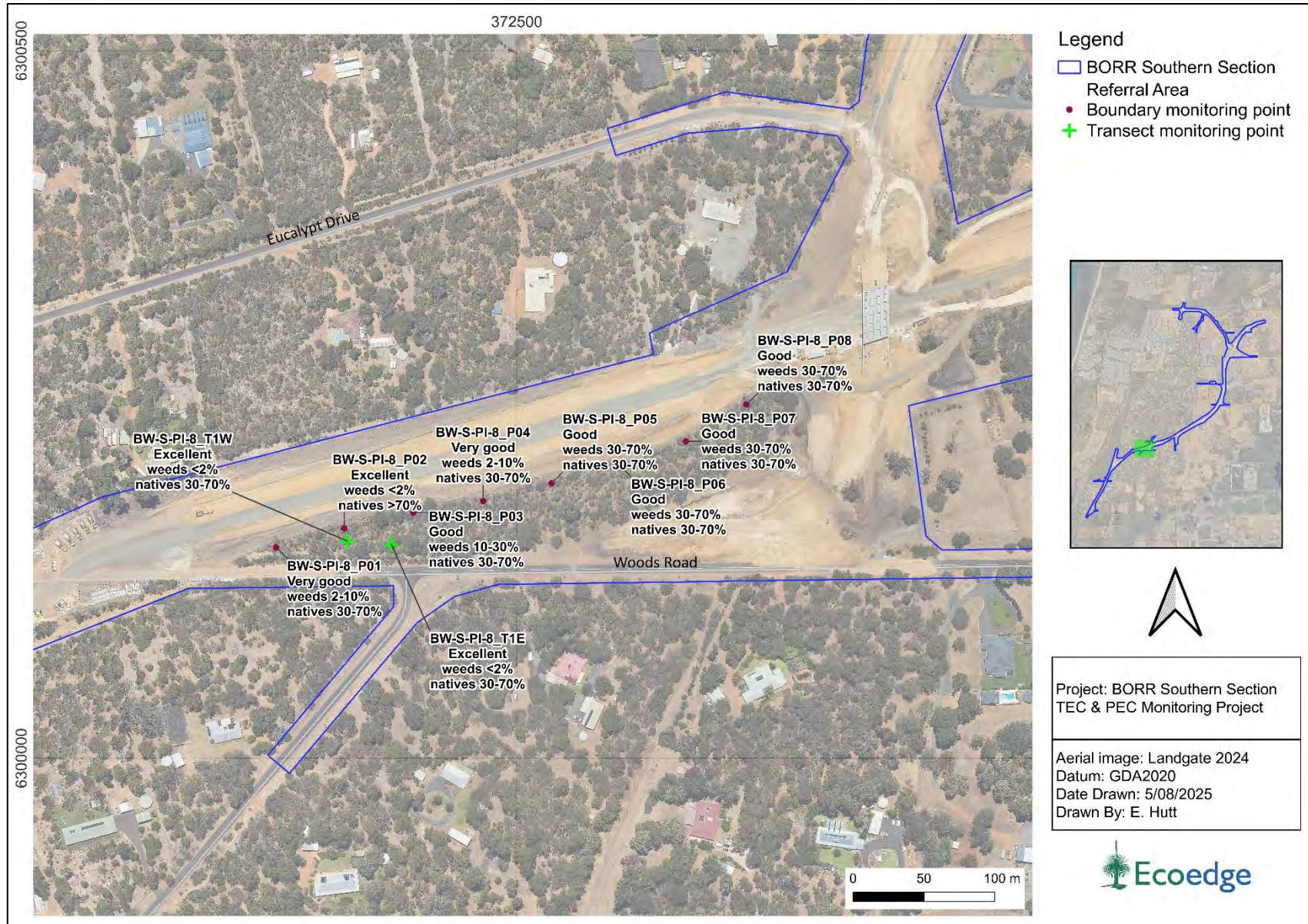


Figure 27. 2025 potential impact site BW-S-PI-8 vegetation condition, weed and native cover

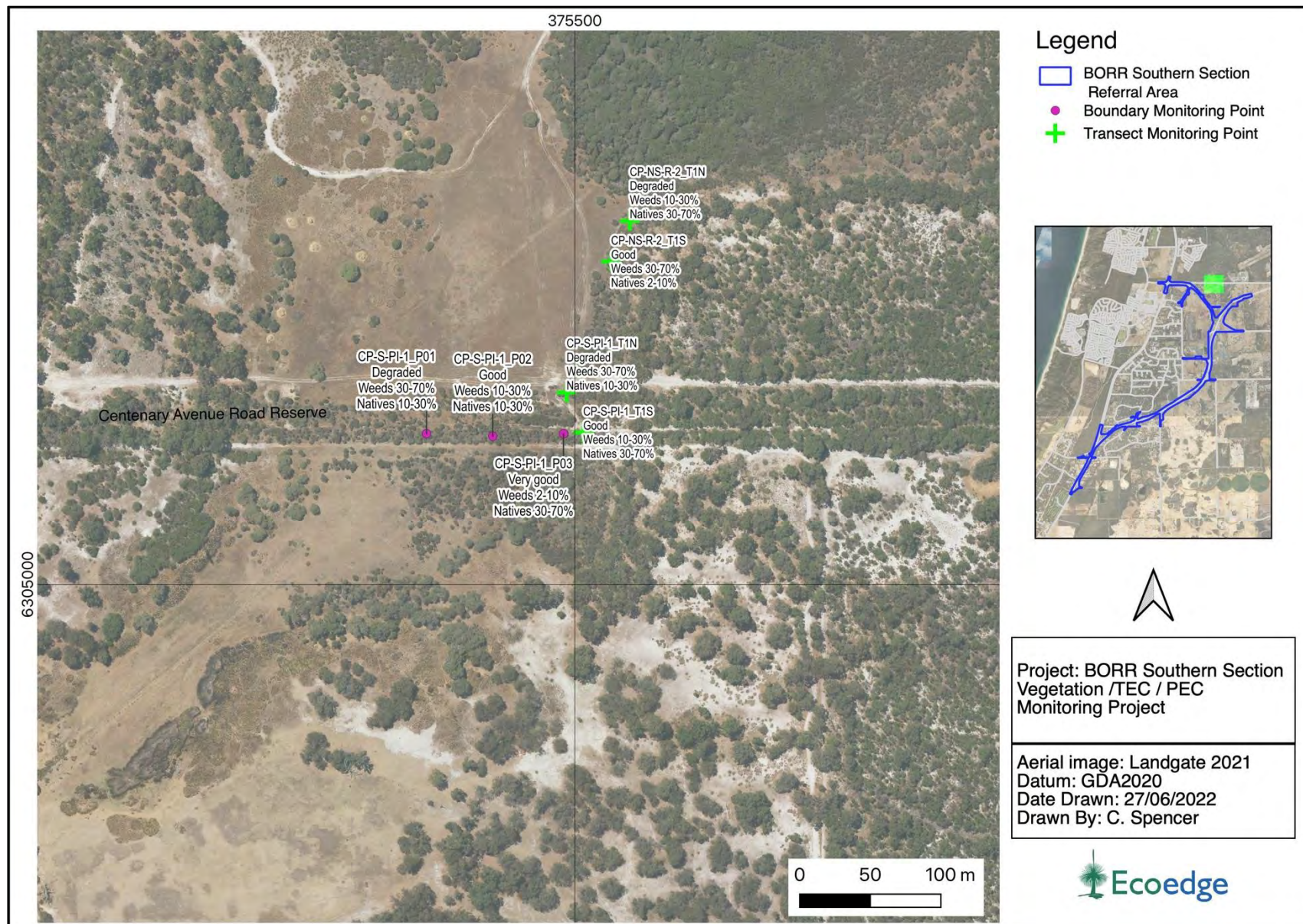


Figure 28. Baseline potential impact sites CP-S-PI-1 and reference site CP-NS-R-2 vegetation condition, weed and native cover.

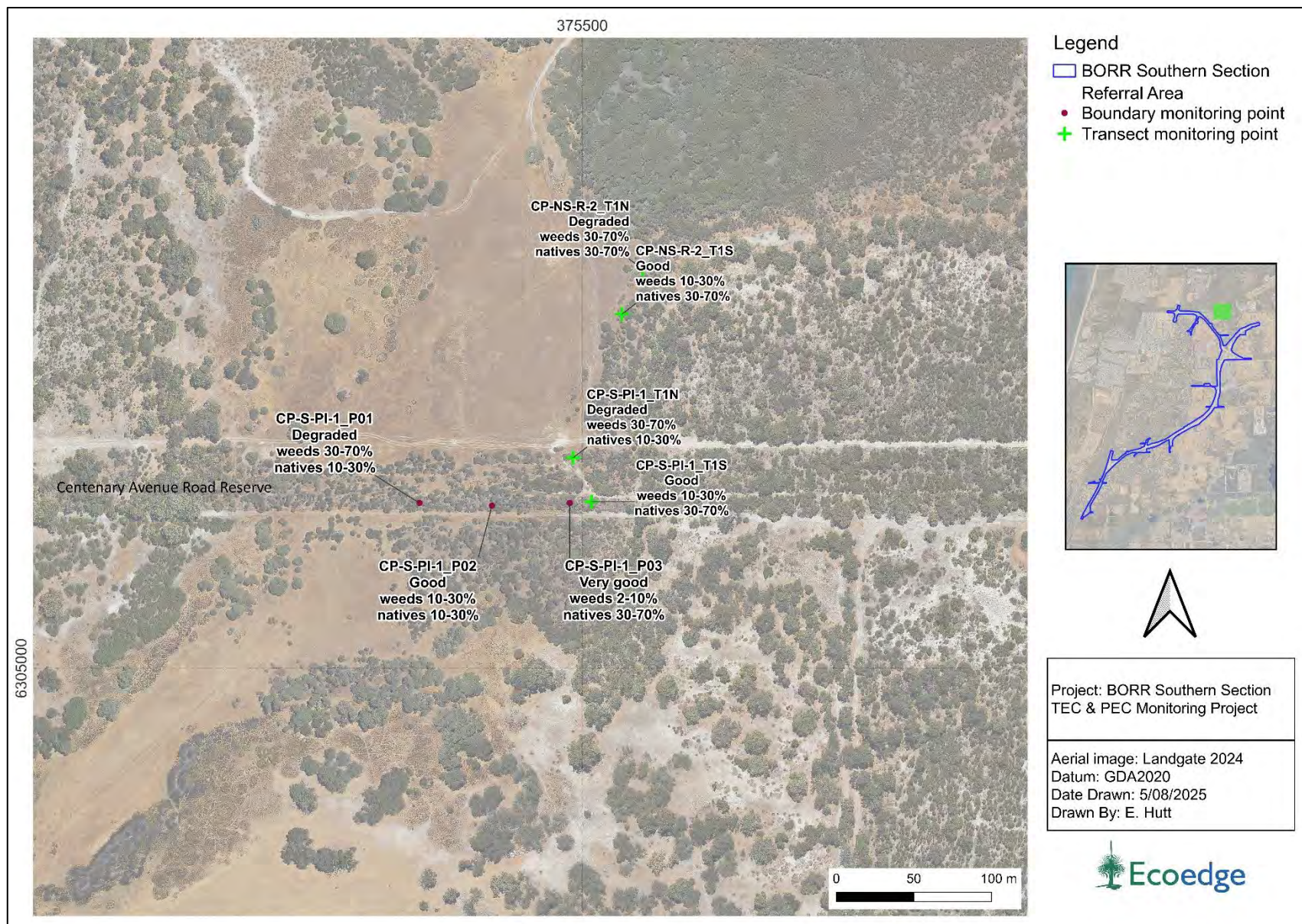


Figure 29. 2025 potential impact site CP-S-PI-1 and reference site CP-NS-R-2 vegetation condition, weed and native cover.

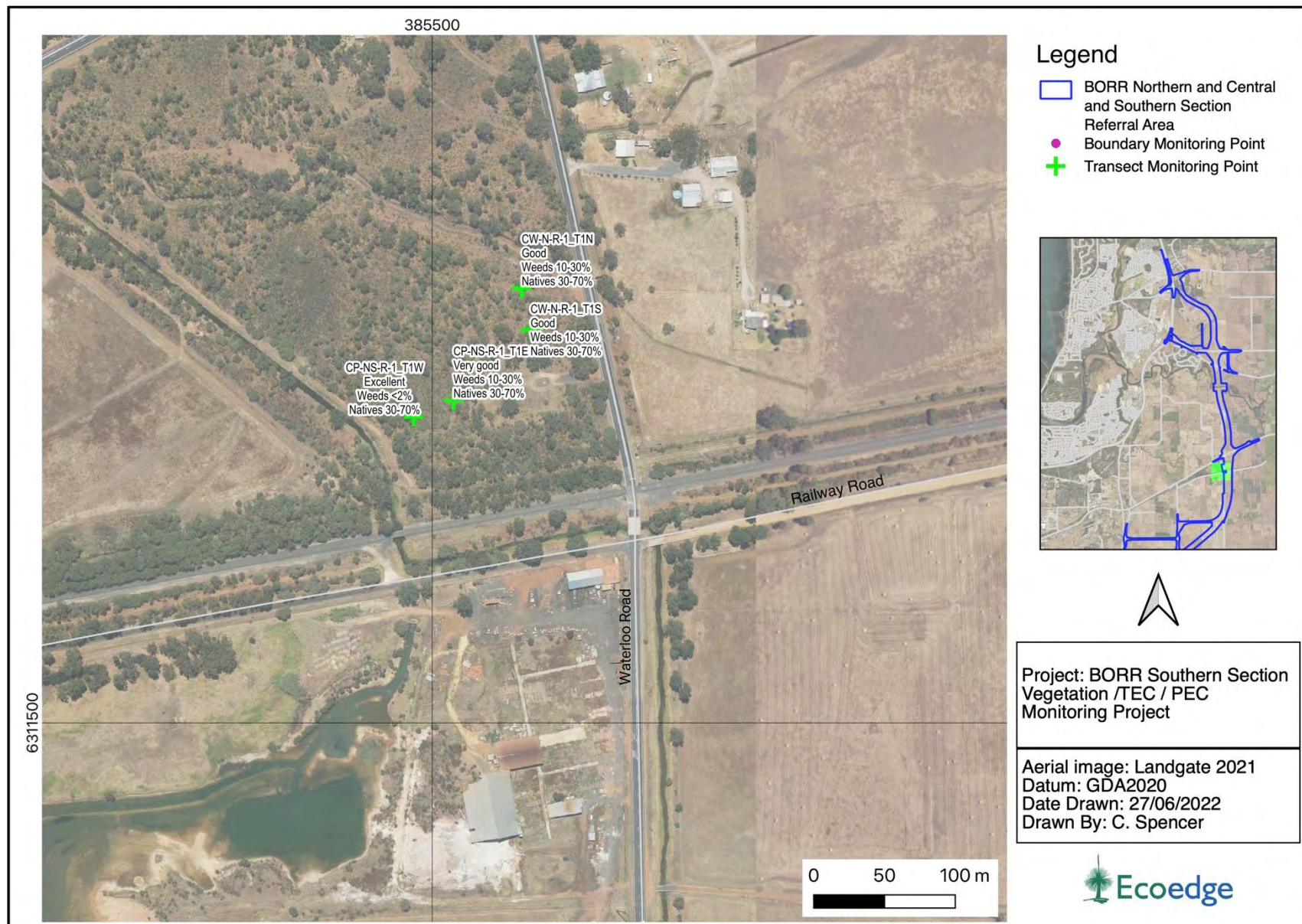


Figure 30. Baseline reference site CP-NS-R-1 vegetation condition, weed and native cover.

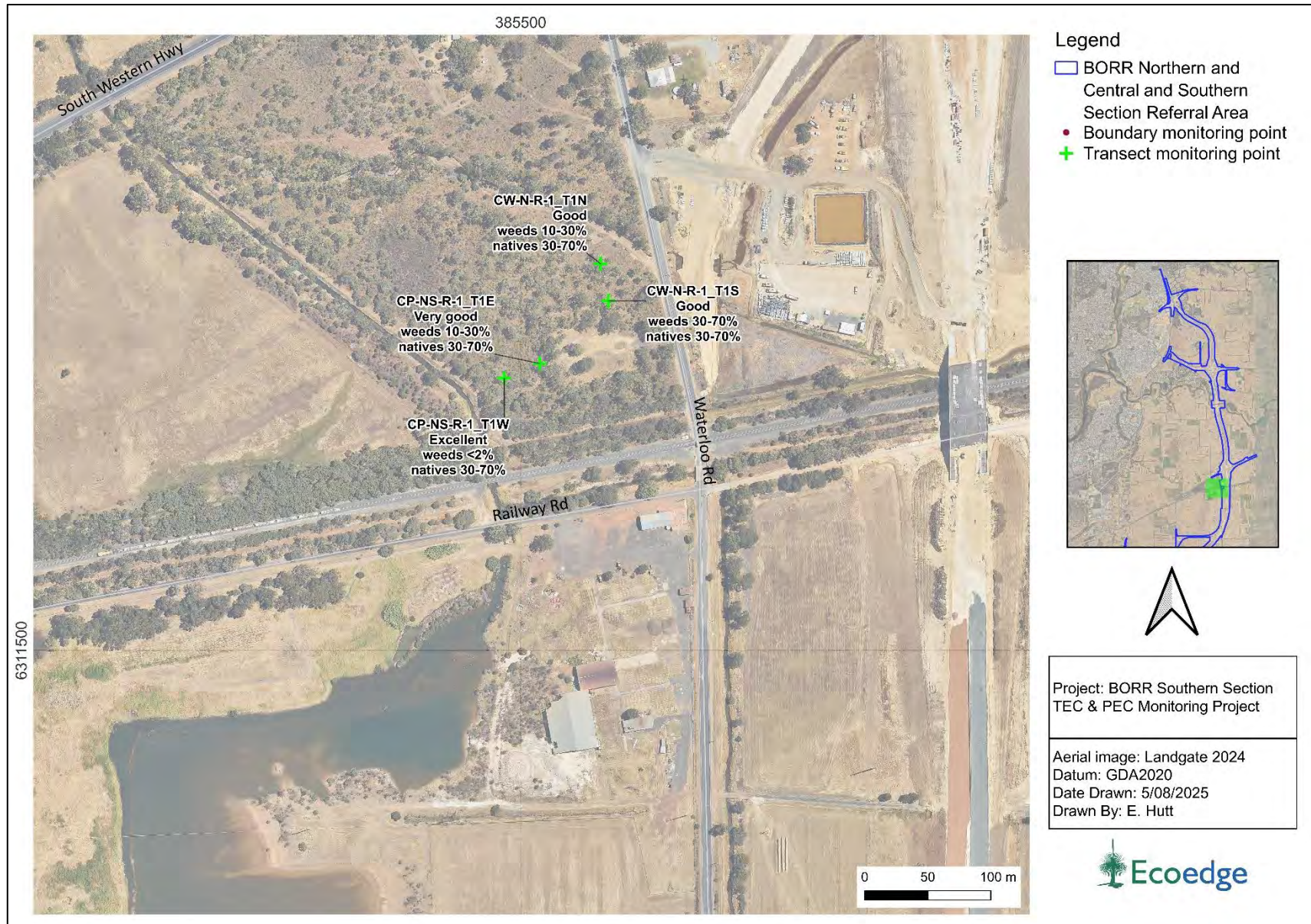


Figure 31. 2025 reference site CP-NS-R-1 vegetation condition, weed and native cover.

Appendix 2. Index to all photographs taken during the monitoring survey.

Name [Site]	Photo ID	Latitude [Site]	Longitude [Site]	Photo date and time
BTW-S-I-3_T1E	5dd37c427f1cccf0cb000013	-33.3858393	115.6516662	May 23, 2025 13:28
BTW-S-I-3_T1W	5dd37e2f7f1cccf0cb000017	-33.3857365	115.6514139	May 23, 2025 13:29
BTW-S-I-5_P01	5dd7578b7f1ccc82ad000046	-33.4012035	115.6749654	November 22, 2019 11:35
BTW-S-I-6_P01	5dd740be7f1ccc82ad000026	-33.4161131	115.6592936	May 30, 2025 08:43
BTW-S-I-6_P02	5dd742647f1ccc82ad00002a	-33.4161588	115.6595102	May 30, 2025 08:42
BTW-S-I-6_P03	5dd743937f1ccc82ad00002e	-33.4162611	115.6603852	May 30, 2025 08:46
BTW-S-I-6_P04	5dd744997f1ccc82ad000032	-33.4162714	115.6610338	May 30, 2025 08:47
BTW-S-I-6_P05	5dd7469f7f1ccc82ad000036	-33.4162598	115.662019	May 30, 2025 08:35
BTW-S-I-6_P06	5dd747f87f1ccc82ad00003a	-33.416307	115.6625752	May 30, 2025 08:36
BTW-S-R-2_T1N	5dd726507f1ccc82ad000022	-33.3848005	115.6287575	May 30, 2025 08:55
BTW-S-R-2_T1S	5dd62fee7f1ccc82ad00001e	-33.3851131	115.6286841	May 30, 2025 09:03
BW-S-PI-1_P01	5dd5fd5d7f1ccc236a000018	-33.3858932	115.6498828	May 23, 2025 13:46
BW-S-PI-1_P02	5dd5ff357f1ccc236a00001c	-33.3858199	115.6503764	May 23, 2025 13:43
BW-S-PI-1_P03	5dd600437f1ccc236a000020	-33.3857995	115.6510326	May 23, 2025 13:39
BW-S-PI-1_P04	5dd601657f1ccc236a000024	-33.3859093	115.6516872	May 23, 2025 13:27
BW-S-PI-1_P05	5dd602267f1ccc236a000028	-33.3860766	115.652174	May 23, 2025 13:25
BW-S-PI-2_P01	5ecca7c87f1ccc3cd1000010	-33.4276185	115.6401493	May 30, 2025 09:00
BW-S-PI-2_P02	5ecc9cfe7f1cccce9400000a	-33.4272550	115.6401015	May 30, 2025 09:02
BW-S-PI-2_P03	5ecc95e27f1cccb399000044	-33.4268483	115.6401301	May 30, 2025 09:03
BW-S-PI-2_P05	5ecc99467f1ccc21a1000005	-33.4268697	115.6396042	May 30, 2025 09:06
BW-S-PI-3_P01	5dd61f447f1ccc82ad000002	-33.4226741	115.6450023	May 30, 2025 10:07
BW-S-PI-3_P02	5dd6203f7f1ccc82ad000006	-33.4226731	115.6455322	May 30, 2025 10:05
BW-S-PI-3_P03	5dd621337f1ccc82ad00000a	-33.4227269	115.6460349	May 30, 2025 09:59
BW-S-PI-3_P04	5dd622407f1ccc82ad00000e	-33.4225602	115.646502	May 30, 2025 09:57
BW-S-PI-3_P05	5dd6233e7f1ccc82ad000012	-33.422316	115.6470271	May 30, 2025 09:55
BW-S-PI-3_P06	5dd624287f1ccc82ad000016	-33.4216707	115.6470518	May 30, 2025 10:12
BW-S-PI-3_P07	5dd625277f1ccc82ad00001a	-33.4212879	115.6470898	May 30, 2025 10:14
BW-S-PI-5_P01	5dd497a37f1ccc6080000005	-33.4403155	115.6092812	May 23, 2025 11:26
BW-S-PI-5_P02	5dd498de7f1ccc6080000009	-33.4402387	115.6099411	May 23, 2025 11:18
BW-S-PI-5_P03	5dd499837f1ccc608000000d	-33.4400637	115.6103677	May 23, 2025 11:16
BW-S-PI-5_P04	5f225e017f1ccc2172000008	-33.4395975	115.6108167	May 23, 2025 11:13
BW-S-PI-5_P05	5f2261257f1ccc217200000c	-33.4394283	115.6113988	May 23, 2025 11:07
BW-S-PI-5_P06	5f22671c7f1ccc2172000011	-33.4397539	115.6117089	May 23, 2025 11:09
BW-S-PI-5_P07	5dd49b8e7f1ccc6080000012	-33.4400094	115.6112618	May 23, 2025 11:05
BW-S-PI-5_P08	5dd49c547f1ccc6080000016	-33.4399534	115.6117959	May 23, 2025 10:58
BW-S-PI-5_P09	5dd49daf7f1ccc608000001a	-33.4400469	115.6125537	May 23, 2025 10:55
BW-S-PI-5_P10	5dd49f2b7f1ccc608000001e	-33.4400371	115.6131205	May 23, 2025 10:53
BW-S-PI-5_P11	5dd4a03c7f1ccc6080000022	-33.4397621	115.613363	May 23, 2025 10:51
BW-S-PI-5_P12	5dd4a1147f1ccc6080000026	-33.4395357	115.6139467	May 23, 2025 10:49
BW-S-PI-5_P13	5f226b497f1ccc2172000019	-33.4392007	115.6133654	May 23, 2025 10:47
BW-S-PI-5_P14	5f226d5e7f1cccaf9b000002	-33.4388954	115.6136528	May 23, 2025 10:44
BW-S-PI-5_P15	5dd4a2177f1ccc608000002a	-33.4390552	115.6141635	May 23, 2025 10:42
BW-S-PI-5_P16	5dd4a40a7f1ccc0978000002	-33.4381435	115.6143935	May 23, 2025 10:27

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BW-S-PI-5_P18	5dd4a5fb7f1ccc097800000a	-33.4373637	115.6148172	May 23, 2025 10:22
BW-S-PI-5_P19	5dd4aa2d7f1ccca2bf000002	-33.4368847	115.6148976	May 23, 2025 10:20
BW-S-PI-5_P20	5dd4aad67f1ccca2bf000006	-33.4364571	115.6152007	May 23, 2025 10:14
BW-S-PI-5_P21	5dd4abce7f1ccca2bf00000a	-33.4359254	115.6153474	May 23, 2025 10:10
BW-S-PI-5_P22	5dd4ad1b7f1ccc3da8000002	-33.4355875	115.6156514	May 23, 2025 10:07
BW-S-PI-5_P23	5dd4ade27f1ccc3da8000006	-33.4351053	115.6157648	May 23, 2025 10:05
BW-S-PI-5_P24	5dd4aeb97f1ccc3da800000a	-33.4346058	115.6160213	May 23, 2025 10:00
BW-S-PI-5_P25	5dd4af6d7f1ccc3da800000e	-33.4340331	115.6162208	May 23, 2025 09:58
BW-S-PI-5_P26	5dd4b03c7f1ccc7137000002	-33.4336439	115.6162346	May 23, 2025 09:55
BW-S-PI-5_P27	5dd4b5cd7f1ccc7137000006	-33.4324012	115.6167063	May 23, 2025 09:48
BW-S-PI-5_P28	5dd4c7647f1ccc713700000a	-33.4317055	115.6169872	May 23, 2025 09:45
BW-S-PI-5_P29	5dd4c84e7f1ccc713700000e	-33.4312614	115.6172137	May 23, 2025 09:41
BW-S-PI-5_P30	5dd4cca97f1ccc7137000012	-33.4306416	115.6173231	May 23, 2025 09:39
BW-S-PI-5_P31	5dd4cd887f1ccc7137000016	-33.4302755	115.6175042	May 23, 2025 09:33
BW-S-PI-5_P32	5dd4d0a07f1ccc713700001a	-33.4297671	115.6176874	May 23, 2025 09:27
BW-S-PI-5_T1N	5dd4e5457f1ccc12cb000002	-33.4381292	115.6144303	May 23, 2025 10:25
BW-S-PI-5_T1S	5dd4e7137f1ccc12cb000006	-33.4383257	115.614306	May 23, 2025 10:31
BW-S-PI-6_P01	5ec764f27f1ccca8e400001a	-33.4547108	115.6041219	May 23, 2025 11:50
BW-S-PI-6_P02	5ec766207f1ccca8e400001e	-33.453729	115.6048411	May 23, 2025 11:53
BW-S-PI-6_P03	5ec767417f1ccca8e4000022	-33.4517653	115.6060602	May 23, 2025 11:58
BW-S-PI-6_P04	5ec76fe07f1ccc4a93000002	-33.4558396	115.6033989	May 23, 2025 11:46
BW-S-PI-8_p01	62afd78d4be8e47fc6d9d196	-33.4304361	115.6266668	May 30, 2025 09:17
BW-S-PI-8_p02	62afd5804be8e47fc6d9d192	-33.4303681	115.6271793	May 30, 2025 09:20
BW-S-PI-8_p03	62afd46d4be8e47fc5af10ea	-33.4302893	115.6277484	May 30, 2025 09:25
BW-S-PI-8_p04	62afd32e4be8e47fc5af10e7	-33.4301872	115.6282257	May 30, 2025 09:27
BW-S-PI-8_p05	62afd1b14be8e47fc6d9d18c	-33.4300714	115.6287699	May 30, 2025 09:30
BW-S-PI-8_p06	62afd04e4be8e47fc6d9d188	-33.4299418	115.6293096	May 30, 2025 09:31
BW-S-PI-8_p07	62afcb324be8e47fc5af10df	-33.4295119	115.6302364	May 30, 2025 09:34
BW-S-PI-8_p08	62afce164be8e47fc5af10e3	-33.4297421	115.6297448	May 30, 2025 09:33
BW-s-pi-8_T1E	6350d4cc4be8e47fc6d9d7c9	-33.4303044	115.6274848	May 30, 2025 09:24
BW-s-pi-8_T1w	6350d9784be8e47fc6d9d7cd	-33.4303976	115.6272319	May 30, 2025 09:21
BW-S-R-1_T1E	5dd778b87f1ccc82ad00005a	-33.3743006	115.6592384	May 29, 2025 15:24
BW-S-R-1_T1W	5dd779697f1ccc82ad00005e	-33.3743638	115.6589942	May 29, 2025 15:25
BW-S-R-1_T2N	5de5a00c7f1ccc501400001c	-33.3792152	115.6566059	May 29, 2025 15:32
BW-S-R-1_T2S	5de5a05a7f1ccc5014000020	-33.3795493	115.6566127	May 29, 2025 15:33
BW-S-R-1_T3E	5de5b4d17f1ccc5014000030	-33.3823649	115.6521701	May 29, 2025 15:45
BW-S-R-1_T3W	5de5b58a7f1ccc5014000034	-33.3822052	115.6520015	May 29, 2025 15:44
CP-NS-R-1_T1E	5ec47b757f1ccc1e33000002	-33.3275144	115.7697476	May 29, 2025 13:38
CP-NS-R-1_T1W	5ec47be57f1ccc1e33000005	-33.3275767	115.7695486	May 29, 2025 13:35
CP-NS-R-2_T1N	5ec4d1de7f1ccc25c5000029	-33.3858477	115.661357	May 23, 2025 12:56
CP-NS-R-2_T1S	5ec4d13b7f1ccc25c5000026	-33.3861279	115.6613561	May 23, 2025 12:57
CP-NS-R-2_T2N	5f6e8f887f1cccf40a000002	-33.3848678	115.6618369	May 23, 2025 13:12
CP-NS-R-2_T2S	5f6e8fe67f1cccf40a000006	-33.3850267	115.6617319	May 23, 2025 13:10
CP-S-PI-1_P01	5dd38ea47f1ccc483e000005	-33.3861547	115.6603239	May 23, 2025 13:02
CP-S-PI-1_P02	5dd3900c7f1ccc483e00000e	-33.3861386	115.6607547	May 23, 2025 13:00
CP-S-PI-1_P03	5dd391a47f1ccc84c7000003	-33.3862765	115.6611953	May 23, 2025 12:58

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TW-S-3_P03	5eccafee7f1ccc361400002b	-33.3882961	115.6435389	May 30, 2025 10:53
TW-S-PI-1_P01	5dd5d9377f1ccc71ee000005	-33.3850522	115.6433727	May 30, 2025 11:03
TW-S-PI-1_P02	5dd5da2e7f1ccc71ee00000c	-33.3856479	115.6430364	May 30, 2025 11:05
TW-S-PI-1_P03	5dd5dbe87f1cccb5ef000005	-33.3855386	115.642477	May 30, 2025 11:07
TW-s-pi-2_11	634f93684be8e47fc5af16fc	-33.3850611	115.6459322	May 23, 2025 14:54
TW-s-pi-2_12	634f95724be8e47fc5af1703	-33.3850262	115.6463898	May 23, 2025 14:57
TW-s-pi-2_12	665010f64be8e4051cbf85f3	-33.3850948	115.6469407	May 24, 2024 12:00
TW-s-pi-2_13	634f98174be8e47fc5af1708	-33.38510359	115.6469343	May 23, 2025 15:03
TW-s-pi-2_14	634f99e74be8e47fc6d9d751	-33.38512872	115.6475099	May 23, 2025 15:07
TW-s-pi-2_15	634f9baa4be8e47fc5af170b	-33.38508928	115.6480337	May 23, 2025 15:08
TW-s-pi-2_16	634f9ffd4be8e47fc5af1710	-33.38503536	115.6485608	May 23, 2025 15:11
TW-s-pi-2_17	651674ee4be8e4051cbf7946	-33.38510047	115.6490172	May 23, 2025 15:15
TW-s-pi-2_18	6516761a4be8e4051da93fbd	-33.38522225	115.6494441	May 23, 2025 15:18
TW-s-pi-2_19	634fa2fa4be8e47fc5af1718	-33.38539612	115.6501371	May 23, 2025 15:23
TW-s-pi-2_20	634fa4304be8e47fc5af171c	-33.38531558	115.6506432	May 23, 2025 15:26
TW-S-PI-2_P1	5f235cc67f1cccaf9b000006	-33.38546676	115.6451456	May 23, 2025 14:29
TW-s-pi-2_p10	634f90004be8e47fc5af16f8	-33.38514689	115.6454169	May 23, 2025 14:48
TW-S-PI-2_P2	5f235e5e7f1cccaf9b00000a	-33.3854663	115.645611	May 23, 2025 14:25
TW-S-PI-2_P3	5f235fce7f1cccaf9b00000e	-33.3854694	115.6461629	May 23, 2025 14:21
TW-S-PI-2_P4	5f2361407f1cccaf9b000012	-33.38546454	115.646679	May 23, 2025 14:18
TW-S-PI-2_P5	5f2363857f1cccaf9b00001c	-33.3854422	115.6471593	May 23, 2025 14:13
TW-S-PI-2_P6	5f23659a7f1cccaf9b000024	-33.38550133	115.6477226	May 23, 2025 14:06
TW-S-PI-2_P7	5f2366c47f1cccaf9b000031	-33.38549802	115.6481921	May 23, 2025 14:02
TW-S-PI-2_P8	5f2368fa7f1cccaf9b000035	-33.38555804	115.6487332	May 23, 2025 13:55
TW-S-PI-2_P9	5f236d9b7f1cccec9d000005	-33.38566449	115.6494547	May 23, 2025 13:52
TW-S-PI-2_T1E	5dd36dc97f1cccf0cb00000f	-33.3851229	115.6465552	May 23, 2025 14:59
TW-S-PI-2_T1W	5dd356de7f1cccf0cb00000b	-33.3852271	115.646394	May 23, 2025 14:56
TW-S-PI-3_P01	5eccad987f1ccc361400001d	-33.3874218	115.643608	May 30, 2025 10:50
TW-S-PI-3_P02	5eccaf077f1ccc3614000027	-33.3879024	115.6435372	May 30, 2025 10:51
TW-S-PI-3_P04	5eccb1317f1ccc361400002f	-33.3888317	115.6434452	May 30, 2025 10:54
TW-S-PI-4_P01	5ecc88f77f1ccc23d5000001	-33.3931737	115.6492214	May 30, 2025 10:39
TW-S-PI-4_P01a	628dde394be8e47fc5af0fb9	-33.39266575	115.6490952	May 30, 2025 10:38
TW-S-PI-4_P02	5f8d24747f1cccc75a000010	-33.393619	115.6490432	May 30, 2025 10:40

Appendix 9. Boundary photopoint and transect end point comparative data for vegetation condition, crown extent density, weed cover and native cover from spring / summer 2019 to autumn 2024.

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BTW-S-R-1_T1E	12/3/2019	Very good				
BTW-S-R-1_T1E	5/22/2020	Very good		<2%	30-70%	
BTW-S-R-1_T1E	10/26/2020	Very good	4	<2%	30-70%	
BTW-S-R-1_T1E	10/12/2021	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	5/25/2022	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	10/13/2022	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	5/22/2023	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	10/10/2023	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	5/24/2024	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	10/8/2024	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1E	23/5/2025	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	12/3/2019	Very good				
BTW-S-R-1_T1W	5/22/2020	Very good		<2%	30-70%	
BTW-S-R-1_T1W	10/26/2020	Very good	4	<2%	30-70%	
BTW-S-R-1_T1W	10/12/2021	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	5/25/2022	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	10/13/2022	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	5/22/2023	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	10/10/2023	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	5/24/2024	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	10/8/2024	Very good	4	2-10%	30-70%	
BTW-S-R-1_T1W	23/5/2025	Very good	4	2-10%	30-70%	
BTW-S-R-2_T1N	11/22/2019	Excellent				
BTW-S-R-2_T1N	5/22/2020	Excellent		<2%	30-70%	
BTW-S-R-2_T1N	10/26/2020	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	10/20/2021	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	5/26/2022	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	10/19/2022	Excellent	5	10-30%	30-70%	
BTW-S-R-2_T1N	5/25/2023	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	10/14/2023	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	5/27/2024	Excellent	4	10-30%	30-70%	
BTW-S-R-2_T1N	10/8/2024	Excellent	4	30-70%	30-70%	
BTW-S-R-2_T1N	23/5/2025	Excellent	4	30-70%	30-70%	
BTW-S-R-2_T1S	11/22/2019	Very good				
BTW-S-R-2_T1S	5/22/2020	Very good		2-10%	30-70%	
BTW-S-R-2_T1S	10/26/2020	Very good	4	10-30%	30-70%	
BTW-S-R-2_T1S	10/20/2021	Very good	4	10-30%	30-70%	
BTW-S-R-2_T1S	5/26/2022	Very good	4	10-30%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BTW-S-R-2_T1S	10/19/2022	Very good	4	10-30%	30-70%	
BTW-S-R-2_T1S	5/25/2023	Very good	4	10-30%	30-70%	
BTW-S-R-2_T1S	10/14/2023	Very good	4	30-70%	30-70%	
BTW-S-R-2_T1S	5/27/2024	Very good	4	30-70%	30-70%	
BTW-S-R-2_T1S	10/8/2024	Very good	4	30-70%	30-70%	
BTW-S-R-2_T1S	23/5/2025	Very good	4	30-70%	30-70%	
BW-S-PI-1_P01	21/11/2019	Very good		2-10%		
BW-S-PI-1_P01	26/05/2020	Very good		2-10%	30-70%	
BW-S-PI-1_P01	28/10/2020	Very Good	4	10-30%	30-70%	The large Marri in the background is almost dead. ,
BW-S-PI-1_P01	14/10/2021	Very Good	4	10-30%	30-70%	
BW-S-PI-1_P01	26/05/2022	Very good	4	10-30%	30-70%	
BW-S-PI-1_P01	19/10/2022	Very good	4	10-30%	30-70%	
BW-S-PI-1_P01	25/05/2023	Very good	4	10-30%	30-70%	
BW-S-PI-1_P01	29/09/2023	Very good	4	10-30%	30-70%	Large marris in the background very stressed. P2522 2523,
BW-S-PI-1_P01	24/05/2024	Very good	4	10-30%	30-70%	Large marris in the background very stressed. P2522 2523, almost dead. 2024 Dead jarrah sapling in foreground from drought? Dead banksia scattered in background. Site adjacent to Borr clearing, note trees healthy in this space. Pic 159,
BW-S-PI-1_P01	11/10/2024	Very good	4	30-70%	30-70%	2024 Dead jarrah sapling in foreground from drought? Dead banksia scattered in background. Site adjacent to Borr clearing, note trees healthy in this space. Pic 159. 24Sp veg 4 same adjacent BORR, pic 1793,
BW-S-PI-1_P01	23/05/2025	Very good	4	30-70%	30-70%	2024 Dead jarrah sapling in foreground from drought? Dead banksia scattered in background. Site adjacent to Borr clearing, note trees healthy in this space. Pic 159. 24Sp veg 4 same adjacent BORR, pic 1793,Dead As saplings, but also lots new saplings.
BW-S-PI-1_P02	21/11/2019	Very good		2-10%		
BW-S-PI-1_P02	26/05/2020	Very good		2-10%	30-70%	
BW-S-PI-1_P02	28/10/2020	Very Good	4	>70%	30-70%	Some jarrah trees very thin, others not.,
BW-S-PI-1_P02	14/10/2021	Very Good	4	>70%	30-70%	
BW-S-PI-1_P02	26/05/2022	Very good	4	>70%	30-70%	Marri crowns thinning ,
BW-S-PI-1_P02	19/10/2022	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, ,
BW-S-PI-1_P02	25/05/2023	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, ,
BW-S-PI-1_P02	29/09/2023	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, / dead ,
BW-S-PI-1_P02	24/05/2024	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, / dead. 2024 scattered Xylomelon occidentale very stressed, Banksia also dead / stressed but less dense on vegetation. ,
BW-S-PI-1_P02	11/10/2024	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, / dead. 2024 scattered Xylomelon occidentale very stressed, Banksia also dead / stressed but less dense on vegetation. 24Sp veg all about 4. Similar to veg adjacent BORR pic 1790.,
BW-S-PI-1_P02	23/05/2025	Very good	4	>70%	30-70%	Marri crowns thinning , small jarrah tree almost dead, / dead. 2024 scattered Xylomelon occidentale very stressed, Banksia also dead / stressed but less dense on vegetation. 24Sp veg all about 4. Similar to veg adjacent BORR pic 1790.,A25 jarrah still stressed. Cc also. Adjacent Borr side veg ok.
BW-S-PI-1_P03	21/11/2019	Good		<2%		
BW-S-PI-1_P03	26/05/2020	Good		<2%	30-70%	
BW-S-PI-1_P03	28/10/2020	Good	4	30-70%	30-70%	Half trees thin half ok,
BW-S-PI-1_P03	14/10/2021	Good	4	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-1_P03	26/05/2022	Good	4	30-70%	30-70%	
BW-S-PI-1_P03	19/10/2022	Good	4	30-70%	30-70%	Acacia iteaphylla invading,
BW-S-PI-1_P03	25/05/2023	Good	4	30-70%	30-70%	Acacia iteaphylla invading,
BW-S-PI-1_P03	29/09/2023	Good	4	30-70%	30-70%	Acacia iteaphylla invading,
BW-S-PI-1_P03	24/05/2024	Good	4	30-70%	30-70%	dead banksias mostly saplings and young trees are scattered throughout the surrounding vegetation. Pic 158,
BW-S-PI-1_P03	11/10/2024	Good	3	30-70%	30-70%	dead banksias mostly saplings and young trees are scattered throughout the surrounding vegetation. Pic 158. 24sp almost all Bg, Ba dead. Cc Xo 3. Site stressed. Pic 1783.,
BW-S-PI-1_P03	23/05/2025	Good	3	30-70%	30-70%	dead banksias mostly saplings and young trees are scattered throughout the surrounding vegetation. Pic 158. 24sp almost all Bg, Ba dead. Cc Xo 3. Site stressed. Pic 1783.,A25 per previous comments. A iteaphylla growing. O vaginata showing signs of stress.
BW-S-PI-1_P04	21/11/2019	Very good		<2%		
BW-S-PI-1_P04	26/05/2020	Very good		<2%	30-70%	
BW-S-PI-1_P04	28/10/2020	Very good	4	30-70%	30-70%	
BW-S-PI-1_P04	14/10/2021	Very good	4	30-70%	30-70%	
BW-S-PI-1_P04	26/05/2022	Very good	4	30-70%	30-70%	Autumn survey doesn't show weeds,
BW-S-PI-1_P04	19/10/2022	Very good	4	30-70%	30-70%	Autumn survey doesn't show weeds,
BW-S-PI-1_P04	25/05/2023	Very good	4	30-70%	30-70%	Recently cleared hard up against monitoring boundary. P686,
BW-S-PI-1_P04	29/09/2023	Very good	4	30-70%	30-70%	Autumn site was incorrect, too close to the boundary ,
BW-S-PI-1_P04	24/05/2024	Very good	4	30-70%	30-70%	Some scattered deaths of Banksia, mostly Banksia grandis saplings with some b attenuata trees. Impact appears localised? Low in landscape.pic 155. Not related to Borr.,
BW-S-PI-1_P04	11/10/2024	Very good	4	30-70%	30-70%	24sp local veg 4. Background BaBg dead pic 1784. Area adjacent BORR, veg 5 pic 1785, 1786 lower slope. Pic 1787 up.,
BW-S-PI-1_P04	23/05/2025	Very good	4	30-70%	30-70%	24sp local veg 4. Background BaBg dead pic 1784. Area adjacent BORR, veg 5 pic 1785, 1786 lower slope. Pic 1787 up.,25A local veg 4
BW-S-PI-1_P05	21/11/2019	Very good		<2%		
BW-S-PI-1_P05	26/05/2020	Very good		<2%	30-70%	
BW-S-PI-1_P05	28/10/2020	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	14/10/2021	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	26/05/2022	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	19/10/2022	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	25/05/2023	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	29/09/2023	Very good	5	<2%	30-70%	
BW-S-PI-1_P05	24/05/2024	Very good	5	<2%	30-70%	Vegetation appears healthy, no drying effects apparent. ,
BW-S-PI-1_P05	11/10/2024	Very good	5	<2%	30-70%	Vegetation appears healthy, no drying effects apparent. 24sp site appears healthy. Low in landscape.,
BW-S-PI-1_P05	23/05/2025	Very good	5	<2%	30-70%	Vegetation appears healthy, no drying effects apparent. 24sp site appears healthy. Low in landscape.,A25 site is stable.
BW-S-PI-1_T1E	11/19/2019	Very good				
BW-S-PI-1_T1E	5/26/2020	Very good		<2%	30-70%	
BW-S-PI-1_T1E	2/8/2021	Very good	3	<2%	30-70%	
BW-S-PI-1_T1E	10/14/2021	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	5/26/2022	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	10/13/2022	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	5/25/2023	Very good	4	2-10%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-1_T1E	10/10/2023	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	5/24/2024	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	10/9/2024	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1E	23/5/2025	Very good	4	2-10%	30-70%	,A25 site is stable. New new stress observed.
BW-S-PI-1_T1W	11/19/2019	Very good				
BW-S-PI-1_T1W	5/26/2020	Very good		<2%	30-70%	
BW-S-PI-1_T1W	10/26/2020	Very good	4	2-10%	30-70%	
BW-S-PI-1_T1W	10/14/2021	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	5/26/2022	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	10/13/2022	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	5/25/2023	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	10/10/2023	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	5/24/2024	Very good	4	10-30%	30-70%	
BW-S-PI-1_T1W	10/9/2024	Very good	3	30-70%	30-70%	
BW-S-PI-1_T1W	23/5/2025	Good	3	30-70%	30-70%	,Site is now good. Weeds have increased, and some understory plants dead, Phlebocarya ciliata. decaying altering the structure of site.
BW-S-PI-2_P01	22/11/2019	Good		10-30%		Possible historical grazing,
BW-S-PI-2_P01	20/05/2020	Good		10-30%	30-70%	Possible historical grazing,
BW-S-PI-2_P01	28/10/2020	Good	4	30-70%	30-70%	Possible historical grazing,
BW-S-PI-2_P01	13/10/2021	Good	4	30-70%	30-70%	
BW-S-PI-2_P01	25/05/2022	Good	4	30-70%	30-70%	Marri blight still impacting trees,
BW-S-PI-2_P01	17/10/2022	Good	4	30-70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. ,
BW-S-PI-2_P01	24/05/2023	Good	4	30-70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. ,
BW-S-PI-2_P01	30/09/2023	Good	4	>70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. ,
BW-S-PI-2_P01	27/05/2024	Good	4	>70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. 2024 per 2023 about 75%,
BW-S-PI-2_P01	15/11/2024	Good	4	>70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. 2024 per 2023 about 75%. 24Sp blight affected cc thin.,
BW-S-PI-2_P01	19/05/2025	Good	4	>70%	30-70%	Marri blight still impacting trees, trees continue to thin. Weeds increasing. Could be called degraded. 2024 per 2023 about 75%. 24Sp blight affected cc thin.,
BW-S-PI-2_P02	22/11/2019	Degraded		30-70%		
BW-S-PI-2_P02	20/05/2020	Degraded		30-70%	30-70%	
BW-S-PI-2_P02	28/10/2020	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	13/10/2021	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	25/05/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	17/10/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	24/05/2023	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P02	30/09/2023	Degraded	5	>70%	30-70%	Weed cover has increased. Mostly Briza and avena,
BW-S-PI-2_P02	27/05/2024	Degraded	5	>70%	30-70%	Weed cover has increased. Mostly Briza and avena,2024, tree canopy reasonably healthy, about 80%,
BW-S-PI-2_P02	15/11/2024	Degraded	5	>70%	30-70%	Weed cover has increased. Mostly Briza and avena,2024, tree canopy reasonably healthy, about 80%. 24Sp most trees healthy, those with blight more stressed.,
BW-S-PI-2_P02	18/05/2025	Degraded	5	>70%	30-70%	Weed cover has increased. Mostly Briza and avena,2024, tree canopy reasonably healthy, about 80%. 24Sp most trees healthy, those with blight more stressed.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-2_P03	22/11/2019	Degraded		10-30%		
BW-S-PI-2_P03	20/05/2020	Degraded		10-30%	30-70%	
BW-S-PI-2_P03	28/10/2020	Degraded	5	10-30%	30-70%	
BW-S-PI-2_P03	13/10/2021	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P03	25/05/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-2_P03	17/10/2022	Degraded	5	30-70%	30-70%	Weed cover across the site has increased. A Banksia ilicifolia is dead, 1,year, within monitoring site. ,
BW-S-PI-2_P03	24/05/2023	Degraded	5	30-70%	30-70%	Weed cover across the site has increased. A Banksia ilicifolia is dead, 1,year, within monitoring site. ,
BW-S-PI-2_P03	30/09/2023	Degraded	4	30-70%	30-70%	Weed cover across the site has increased. A Banksia ilicifolia is dead, 1,year, within monitoring site. Large jarrah tree in site is stressed, hence decrease in stress score. ,
BW-S-PI-2_P03	27/05/2024	Degraded	4	30-70%	30-70%	Weed cover across the site has increased. A Banksia ilicifolia is dead, 1,year, within monitoring site. Large jarrah tree in site is stressed, hence decrease in stress score. 2024, all jarrah trees are stressed overall site about 60% canopy ,
BW-S-PI-2_P03	15/11/2024	Degraded	4	30-70%	30-70%	2024, all jarrah trees are stressed overall site about 60% canopy. 24Sp per 24au.,
BW-S-PI-2_P03	23/05/2025	Degraded	4	30-70%	30-70%	2024, all jarrah trees are stressed overall site about 60% canopy. 24Sp per 24au.,
BW-S-PI-2_P04	22/11/2019	Degraded		30-70%		Historically cleared grazed,
BW-S-PI-2_P04	20/05/2020	Degraded		30-70%	10-30%	Historically cleared grazed,
BW-S-PI-2_P04	28/10/2020	Degraded	5	30-70%	10-30%	Historically cleared grazed,
BW-S-PI-2_P04	13/10/2021	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P04	25/05/2022	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P04	17/10/2022	Degraded	5	30-70%	10-30%	Large Jarrah beyond site is very stressed. ,
BW-S-PI-2_P04	24/05/2023	Degraded	5	30-70%	10-30%	Large Jarrah beyond site is very stressed. Appears stable. ,
BW-S-PI-2_P04	30/09/2023	Degraded	5	30-70%	10-30%	Large Jarrah beyond site is very stressed. Appears stable. / per autumn monitoring round.,
BW-S-PI-2_P04	27/05/2024	Degraded	4	30-70%	10-30%	Large Jarrah beyond site is very stressed. Appears stable. / per autumn monitoring round.2024 blight affected trees have lost many of their leaves. A longifolia dead. Overall trees thin about 60%,
BW-S-PI-2_P04	15/11/2024	Degraded	4	30-70%	10-30%	Large Jarrah beyond site is very stressed. Appears stable. / per autumn monitoring round.2024 blight affected trees have lost many of their leaves. A longifolia dead. Overall trees thin about 60%. 24sp blight affected cc still 60% other trees ok.,
BW-S-PI-2_P04	23/05/2025	Degraded	4	30-70%	10-30%	Large Jarrah beyond site is very stressed. Appears stable. / per autumn monitoring round.2024 blight affected trees have lost many of their leaves. A longifolia dead. Overall trees thin about 60%. 24sp blight affected cc still 60% other trees ok.,
BW-S-PI-2_P05	22/11/2019	Degraded		30-70%		Historically cleared grazed ,
BW-S-PI-2_P05	20/05/2020	Degraded		30-70%	10-30%	Historically cleared grazed,
BW-S-PI-2_P05	28/10/2020	Degraded	5	>70%	10-30%	Large jarrah is stressed, but other trees are ok,
BW-S-PI-2_P05	13/10/2021	Degraded	5	>70%	10-30%	
BW-S-PI-2_P05	25/05/2022	Degraded	5	>70%	10-30%	Old clearing site. Veg currently healthy.,
BW-S-PI-2_P05	17/10/2022	Degraded	5	>70%	10-30%	Old clearing site. Most Veg currently healthy, but Large jarrah is in decline, has been stressed since monitoring started. ,
BW-S-PI-2_P05	24/05/2023	Degraded	5	>70%	10-30%	Old clearing site. Most Veg currently healthy, but Large jarrah is in decline, has been stressed since monitoring started. Tree stressed but stable.,
BW-S-PI-2_P05	30/09/2023	Degraded	5	>70%	10-30%	Old clearing site. Most Veg currently healthy, but Large jarrah is in decline, has been stressed since monitoring started. Tree stressed but stable. / as per autumn round ,
BW-S-PI-2_P05	27/05/2024	Degraded	4	>70%	10-30%	2024 large jarrah very stressed, overall trees ok but about 75 % canopy. Understory ok,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-2_P05	15/11/2024	Degraded	4	>70%	10-30%	2024 large jarrah very stressed, overall trees ok but about 75 % canopy. Understory ok. 24Sp large Em has recovered a bit to 4. Em saplings thin.,
BW-S-PI-2_P05	23/05/2025	Degraded	4	>70%	10-30%	2024 large jarrah very stressed, overall trees ok but about 75 % canopy. Understory ok. 24Sp large Em has recovered a bit to 4. Em saplings thin.,
BW-S-PI-2_P06	22/11/2019	Degraded		30-70%		
BW-S-PI-2_P06	20/05/2020	Degraded		30-70%	10-30%	
BW-S-PI-2_P06	9/09/2020	Degraded		30-70%	10-30%	
BW-S-PI-2_P06	13/10/2021	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P06	25/05/2022	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P06	17/10/2022	Degraded	5	30-70%	10-30%	
BW-S-PI-2_P06	24/05/2023	Degraded	5	>70%	10-30%	Weed cover has increased across mostly cleared site.,
BW-S-PI-2_P06	30/09/2023	Degraded	5	>70%	10-30%	Weed cover has increased across mostly cleared site.,
BW-S-PI-2_P06	27/05/2024	Degraded	4	>70%	10-30%	Weed cover has increased across mostly cleared site. 2024 tree canopy has thinned across all sp to about 70%,
BW-S-PI-2_P06	15/11/2024	Degraded	4	>70%	10-30%	Weed cover has increased across mostly cleared site. 2024 tree canopy has thinned across all sp to about 70%. 24Sp site stable.,
BW-S-PI-2_P06	23/05/2025	Degraded	4	>70%	10-30%	Weed cover has increased across mostly cleared site. 2024 tree canopy has thinned across all sp to about 70%. 24Sp site stable.,
BW-S-PI-3_P01	21/11/2019	Very good		<2%		
BW-S-PI-3_P01	20/05/2020	Very good		<2%	30-70%	
BW-S-PI-3_P01	9/09/2020	Very good		<2%	30-70%	
BW-S-PI-3_P01	13/10/2021	Very good	5	10-30%	30-70%	Exotic grasses have increased, B maxima. ,
BW-S-PI-3_P01	25/05/2022	Very good	5	10-30%	30-70%	Exotic grasses have increased, B maxima. ,
BW-S-PI-3_P01	17/10/2022	Very good	5	10-30%	30-70%	Exotic grasses have increased, B maxima. ,
BW-S-PI-3_P01	24/05/2023	Very good	5	10-30%	30-70%	Exotic grasses have increased, B maxima. ,
BW-S-PI-3_P01	30/09/2023	Very good	5	10-30%	30-70%	Exotic grasses have increased, B maxima. ,
BW-S-PI-3_P01	27/05/2024	Very good		10-30%	30-70%	Exotic grasses have increased, B maxima. Tree canopy has thinned to about 75 %. No deaths , understory ok,
BW-S-PI-3_P01	15/11/2024	Very good	4	10-30%	30-70%	Exotic grasses have increased, B maxima. Tree canopy has thinned to about 75 %. No deaths , understory ok. 24Sp weed cover has decreased? Bmax absent? Tree stress at 75%,
BW-S-PI-3_P01	23/05/2025	Very good	4	10-30%	30-70%	Exotic grasses have increased, B maxima. Tree canopy has thinned to about 75 %. No deaths , understory ok. 24Sp weed cover has decreased? Bmax absent? Tree stress at 75%,
BW-S-PI-3_P02	21/11/2019	Very good		<2%		Possible historically cleared? Of trees,
BW-S-PI-3_P02	20/05/2020	Very good		<2%	30-70%	Possible historically cleared? Of trees,
BW-S-PI-3_P02	28/10/2020	Very good	4	2-10%	30-70%	Possible historically cleared? Of trees,
BW-S-PI-3_P02	13/10/2021	Very good	4	10-30%	30-70%	Note flat weed and grasses have increased ,
BW-S-PI-3_P02	25/05/2022	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin.,
BW-S-PI-3_P02	17/10/2022	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin.,
BW-S-PI-3_P02	24/05/2023	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin.,
BW-S-PI-3_P02	30/09/2023	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin. Per previous monitoring round. ,
BW-S-PI-3_P02	27/05/2024	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin. Per previous monitoring round. 2024 stable, perhaps more loss of leaves on jarrah trees .,
BW-S-PI-3_P02	15/11/2024	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin. Per previous monitoring round. 2024 stable, perhaps more loss of leaves on jarrah trees .24 Sp site is stable.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-3_P02	23/05/2025	Very good	4	10-30%	30-70%	Trees appear healthy, but crowns are still thin. Per previous monitoring round. 2024 stable, perhaps more loss of leaves on jarrah trees .24 Sp site is stable.,
BW-S-PI-3_P03	21/11/2019	Very good		<2%		
BW-S-PI-3_P03	20/05/2020	Very good		<2%	30-70%	
BW-S-PI-3_P03	28/10/2020	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	13/10/2021	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	25/05/2022	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	17/10/2022	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	24/05/2023	Very good	5	10-30%	30-70%	
BW-S-PI-3_P03	30/09/2023	Very good	5	10-30%	30-70%	Weeds are increasing but still 10-30%. Crowns of marri and jarrah are thinning, still 5,
BW-S-PI-3_P03	27/05/2024	Very good	5	10-30%	30-70%	Weeds are increasing but still 10-30%. Crowns of marri and jarrah are thinning, still 5. 2024 site stable, jarrah trees in background stressed most appear affected by borer . Pic 212,213. Understory ok.,
BW-S-PI-3_P03	15/11/2024	Very good	5	10-30%	30-70%	Weeds are increasing but still 10-30%. Crowns of marri and jarrah are thinning, still 5. 2024 site stable, jarrah trees in background stressed most appear affected by borer . Pic 212,213. Understory ok.24Sp per previous monitoring round.,
BW-S-PI-3_P03	23/05/2025	Very good	5	10-30%	30-70%	Weeds are increasing but still 10-30%. Crowns of marri and jarrah are thinning, still 5. 2024 site stable, jarrah trees in background stressed most appear affected by borer . Pic 212,213. Understory ok.24Sp per previous monitoring round.,
BW-S-PI-3_P04	21/11/2019	Excellent		<2%		
BW-S-PI-3_P04	20/05/2020	Excellent		<2%	30-70%	
BW-S-PI-3_P04	28/10/2020	Excellent	5	<2%	30-70%	
BW-S-PI-3_P04	13/10/2021	Excellent	5	<2%	30-70%	
BW-S-PI-3_P04	25/05/2022	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. ,
BW-S-PI-3_P04	17/10/2022	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. ,
BW-S-PI-3_P04	24/05/2023	Excellent	5	<2%	30-70%	Dead Kunzea has fallen in previous storms. ,
BW-S-PI-3_P04	30/09/2023	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. ,
BW-S-PI-3_P04	27/05/2024	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. Site appears stable and healthy, perhaps not affected by dieback, evidence of previous burn. ,
BW-S-PI-3_P04	15/11/2024	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. Site appears stable and healthy, perhaps not affected by dieback, evidence of previous burn. 24Sp site stable, need to check dieback mapping. Pic 2926,
BW-S-PI-3_P04	23/05/2025	Excellent	5	<2%	30-70%	Dead kunzea has fallen in previous storms. Site appears stable and healthy, perhaps not affected by dieback, evidence of previous burn. 24Sp site stable, need to check dieback mapping. Pic 2926,
BW-S-PI-3_P05	21/11/2019	Excellent		<2%		
BW-S-PI-3_P05	20/05/2020	Excellent		<2%	30-70%	
BW-S-PI-3_P05	28/10/2020	Excellent	5	<2%	30-70%	
BW-S-PI-3_P05	13/10/2021	Excellent	5	<2%	30-70%	
BW-S-PI-3_P05	25/05/2022	Excellent	5	<2%	30-70%	Trees have died due to fire/ dieback ,
BW-S-PI-3_P05	17/10/2022	Excellent	5	<2%	30-70%	Trees have died due to fire/ dieback. Remaining trees are healthy and have the 5 health rating. ,
BW-S-PI-3_P05	24/05/2023	Excellent	5	<2%	30-70%	Trees have died due to fire/ dieback. Remaining trees are healthy and have the 5 health rating. ,
BW-S-PI-3_P05	30/09/2023	Excellent	4	<2%	30-70%	Trees have died due to fire/ dieback. Remaining trees are healthy and have the 5 health rating. Banksia and Jarrah trees in background are stressed.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-3_P05	27/05/2024	Very good	4	<2%	30-70%	2024 Ba and Em trees are now very stressed site is about 50% canopy. Borer damage pic 2014Understory veg ok. Perhaps fire and drought. VG because structure clears altered with most trees dead / very stressed. Check dieback mapping.,
BW-S-PI-3_P05	15/11/2024	Very good	3	<2%	30-70%	Check dieback mapping. 24 Sp Ba & Bi dead, Em stressed, 3 rating. Understory ok. ,
BW-S-PI-3_P05	23/05/2025	Very good	3	<2%	30-70%	Check dieback mapping. 24 Sp Ba & Bi dead, Em stressed, 3 rating. Understory ok. ,
BW-S-PI-3_P06	21/11/2019	Very good		<2%		
BW-S-PI-3_P06	20/05/2020	Very good		<2%	30-70%	
BW-S-PI-3_P06	28/10/2020	Very good	4	2-10%	30-70%	Jarrah is thin,
BW-S-PI-3_P06	13/10/2021	Very good	4	2-10%	30-70%	
BW-S-PI-3_P06	25/05/2022	Very good	4	2-10%	30-70%	Fire impacts are between 1-10 years,
BW-S-PI-3_P06	17/10/2022	Very good	4	2-10%	30-70%	Fire impacts are between 1-10 years, regrowth evident. ,
BW-S-PI-3_P06	24/05/2023	Very good	3	2-10%	30-70%	Fire impacts are between 1-10 years, regrowth evident. Canopy of jarrah trees is very thin. Dieback appears active with recent death of Macrozamia ,
BW-S-PI-3_P06	30/09/2023	Very good	3	2-10%	30-70%	Fire impacts are between 1-10 years, regrowth evident. Canopy of jarrah trees is very thin. Dieback appears active with recent death of Macrozamia. Site appears stable no recent decline.,
BW-S-PI-3_P06	27/05/2024	Very good	3	2-10%	30-70%	2024 further decline in trees with one medium sized jarrah recently dead. Understory stressed mostly Phlebocarya ciliata Dasypogon isome dead. Pic 211.Macrozamia in foreground very stressed , drought or pc.,
BW-S-PI-3_P06	15/11/2024	Very good	3	2-10%	30-70%	24Sp Em very stressed, hence 3 rating. Pc stressed from aut drought, pic 2925. ,
BW-S-PI-3_P06	23/05/2025	Very good	3	2-10%	30-70%	24Sp Em very stressed, hence 3 rating. Pc stressed from aut drought, pic 2925. ,
BW-S-PI-3_P07	21/11/2019	Good		2-10%		
BW-S-PI-3_P07	20/05/2020	Good		2-10%	30-70%	
BW-S-PI-3_P07	28/10/2020	Good	5	10-30%	30-70%	
BW-S-PI-3_P07	13/10/2021	Good	5	10-30%	30-70%	
BW-S-PI-3_P07	25/05/2022	Good	5	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire,
BW-S-PI-3_P07	17/10/2022	Good	5	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating.,
BW-S-PI-3_P07	24/05/2023	Good	5	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating.,
BW-S-PI-3_P07	30/09/2023	Good	5	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating.,
BW-S-PI-3_P07	27/05/2024	Good	4	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating. Trees are stressed most at about 75% canopy, jarrah tree recently half dead.,
BW-S-PI-3_P07	31/10/2024	Good	4	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating. Trees are stressed most at about 75% canopy, jarrah tree recently half dead.2024sp veg looking healthy ,
BW-S-PI-3_P07	23/05/2025	Good	4	10-30%	30-70%	Site has lost much of its canopy and mid story species, due to dieback and perhaps fire, hence its good condition rating. Trees are stressed most at about 75% canopy, jarrah tree recently half dead.2024sp veg looking healthy ,
BW-S-PI-4_P01	26/05/2020	Very good		<2%	30-70%	
BW-S-PI-4_P01	28/10/2020	Very good	5	2-10%	30-70%	
BW-S-PI-4_P01	13/10/2021	Very good	5	2-10%	30-70%	
BW-S-PI-4_P01	25/05/2022	Very good	5	2-10%	30-70%	Acacia longifolia also present ,
BW-S-PI-4_P01	17/10/2022	Very good	5	30-70%	30-70%	Acacia longifolia also present , marri blight is still active, weeds increasing.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-4_P01	26/05/2023	Very good	5	30-70%	30-70%	Acacia longifolia also present , marri blight is still active, weeds increasing.,
BW-S-PI-4_P01	29/09/2023	Very good	5	30-70%	30-70%	Acacia longifolia also present , marri blight is still active, weeds increasing.,
BW-S-PI-4_P01	27/05/2024	Very good	4	30-70%	30-70%	2024 marri blight slow but active. Trees stressed 75% canopy all species. Some jarrah affected by wood borer, out side monitoring area. Some Acacia longifolia dead. Drought or control?,
BW-S-PI-4_P01	14/11/2024	Very good	4	30-70%	30-70%	24 Sp veg appears healthy 4. Blight affected trees ok. 1 Em dead, from drought. ,
BW-S-PI-4_P01	21/05/2025	Very good	4	30-70%	30-70%	24 Sp veg appears healthy 4. Blight affected trees ok. 1 Em dead, from drought. ,
BW-S-PI-4_P02	26/05/2020	Excellent		<2%	30-70%	
BW-S-PI-4_P02	28/10/2020	Excellent	5	2-10%	30-70%	
BW-S-PI-4_P02	13/10/2021	Excellent	5	2-10%	30-70%	
BW-S-PI-4_P02	25/05/2022	Excellent	5	2-10%	30-70%	Note Acacia longifolia becoming established. ,
BW-S-PI-4_P02	17/10/2022	Very good	5	2-10%	30-70%	Note Acacia longifolia becoming established. Presence of more aggressive weeds lowering veg condition ,
BW-S-PI-4_P02	26/05/2023	Very good	5	2-10%	30-70%	Note Acacia longifolia becoming established. Presence of more aggressive weeds lowering veg condition ,
BW-S-PI-4_P02	29/09/2023	Very good	5	2-10%	30-70%	Note Acacia longifolia becoming established. Presence of more aggressive weeds lowering veg condition . Large marri in the background (out of monitoring area recently dead p2521,
BW-S-PI-4_P02	27/05/2024	Very good	5	2-10%	30-70%	Some stress in canopy but still above 80%. Some scattered stressed / dead Acacia longifolia in background. Pic 207, 208,
BW-S-PI-4_P02	14/11/2024	Very good	5	2-10%	30-70%	Some stress in canopy but still above 80%. Some scattered stressed / dead Acacia longifolia in background. Pic 207, 208. 24 Sp site appears healthy 5. One blight affected marri in back ground stressed 3. Pic 2910.,
BW-S-PI-4_P02	23/05/2025	Very good	5	2-10%	30-70%	Some stress in canopy but still above 80%. Some scattered stressed / dead Acacia longifolia in background. Pic 207, 208. 24 Sp site appears healthy 5. One blight affected marri in back ground stressed 3. Pic 2910.,
BW-S-PI-4_P03	26/05/2020	Excellent		<2%	>70%	
BW-S-PI-4_P03	28/10/2020	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	13/10/2021	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	25/05/2022	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	17/10/2022	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	26/05/2023	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	29/09/2023	Excellent	5	<2%	>70%	
BW-S-PI-4_P03	27/05/2024	Excellent	5	<2%	>70%	2024 site appears stable.,
BW-S-PI-4_P03	14/11/2024	Excellent	4	<2%	>70%	2024 site appears stable. 24 Sp some increase in stress, trees have about 75 % foliage. Em in sw 3. ,
BW-S-PI-4_P03	23/05/2025	Excellent	4	<2%	>70%	2024 site appears stable. 24 Sp some increase in stress, trees have about 75 % foliage. Em in sw 3. ,
BW-S-PI-4_P04	26/05/2020	Excellent		<2%	30-70%	
BW-S-PI-4_P05	26/05/2020	Very good		<2%	30-70%	
BW-S-PI-4_P05	28/10/2020	Very good	4	<2%	30-70%	
BW-S-PI-4_P05	13/10/2021	Very good	4	2-10%	30-70%	Briza has increased at the site ,
BW-S-PI-4_P05	25/05/2022	Very good	4	2-10%	30-70%	Crowns in large marri and jarrah are thin,
BW-S-PI-4_P05	17/10/2022	Very good	4	2-10%	30-70%	Crowns in large marri and jarrah are thin,
BW-S-PI-4_P05	26/05/2023	Very good	4	2-10%	30-70%	Crowns in large marri and jarrah are thin,
BW-S-PI-4_P05	29/09/2023	Very good	4	2-10%	30-70%	Crowns in large marri and jarrah are thin,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-4_P05	27/05/2024	Very good	4	2-10%	30-70%	Crowns in large marri and jarrah are thin. 2024 per 2023 + young Persoonia longifolia dead in site, scattered Acacia longifolia dead in background due to drought/ control?pic 209 isolated young jarrah stressed/ dead , Xylomelon stressed Understory ok, ,
BW-S-PI-4_P05	14/11/2024	Very good	4	2-10%	30-70%	24Sp site healthy, remaining veg healthy but saplings are thin Xo healthy. Blight affected trees are stressed. ,
BW-S-PI-4_P05	22/05/2025	Very good	4	2-10%	30-70%	24Sp site healthy, remaining veg healthy but saplings are thin Xo healthy. Blight affected trees are stressed. ,
BW-S-PI-5_P01	20/11/2019	Good		<2%		
BW-S-PI-5_P01	22/05/2020	Good		<2%	10-30%	
BW-S-PI-5_P01	23/10/2020	Good	4	<2%	10-30%	
BW-S-PI-5_P01	14/10/2021	Good	4	<2%	10-30%	
BW-S-PI-5_P01	25/05/2022	Good	4	<2%	10-30%	New Acacia iteaphylla infestation ,
BW-S-PI-5_P01	20/10/2022	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation ,
BW-S-PI-5_P01	25/05/2023	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation ,
BW-S-PI-5_P01	29/09/2023	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation, Peppi litter suppressing weeds ,
BW-S-PI-5_P01	24/05/2024	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation, Peppi litter suppressing weeds, 2024 per 2023.,
BW-S-PI-5_P01	15/11/2024	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation, Peppi litter suppressing weeds, 2024 per 2023. 24 Sp site stable.,
BW-S-PI-5_P01	23/05/2025	Good	5	2-10%	10-30%	New Acacia iteaphylla infestation, Peppi litter suppressing weeds, 2024 per 2023. 24 Sp site stable.,25 A site stable.
BW-S-PI-5_P02	20/11/2019	Good		<2%		
BW-S-PI-5_P02	22/05/2020	Good		<2%	10-30%	
BW-S-PI-5_P02	23/10/2020	Good	5	2-10%	10-30%	
BW-S-PI-5_P02	14/10/2021	Good	5	10-30%	10-30%	Increase in exotic grasses ,
BW-S-PI-5_P02	25/05/2022	Good	5	30-70%	10-30%	Increase in exotic grasses ,
BW-S-PI-5_P02	20/10/2022	Good	5	>70%	10-30%	Increase in exotic grasses ,
BW-S-PI-5_P02	25/05/2023	Good	5	>70%	10-30%	Increase in exotic grasses ,
BW-S-PI-5_P02	29/09/2023	Good	5	>70%	10-30%	Increase in exotic grasses ,
BW-S-PI-5_P02	24/05/2024	Good	5	>70%	10-30%	Increase in exotic grasses. 2024 per 2023.,
BW-S-PI-5_P02	15/11/2024	Good	5	>70%	10-30%	Increase in exotic grasses. 2024 per 2023. 24Sp site stable.,
BW-S-PI-5_P02	23/05/2025	Good	5	>70%	10-30%	Increase in exotic grasses. 2024 per 2023. 24Sp site stable.,Site is stable, weeds appear to be suppressed by leaf litter.
BW-S-PI-5_P03	20/11/2019	Very good		<2%		
BW-S-PI-5_P03	22/05/2020	Very good		<2%	30-70%	
BW-S-PI-5_P03	23/10/2020	Very good	4	10-30%	30-70%	
BW-S-PI-5_P03	14/10/2021	Very good	4	10-30%	30-70%	
BW-S-PI-5_P03	25/05/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_P03	20/10/2022	Very good	4	10-30%	30-70%	Veg structure and diversity intact,
BW-S-PI-5_P03	25/05/2023	Very good	4	10-30%	30-70%	Veg structure and diversity intact,
BW-S-PI-5_P03	29/09/2023	Very good	4	10-30%	30-70%	Veg structure and diversity intact, but weeds increasing ,
BW-S-PI-5_P03	24/05/2024	Very good	4	10-30%	30-70%	Veg structure and diversity intact, but weeds increasing. Recent deaths in stressed small marri most likely due to borer, pic 191.,
BW-S-PI-5_P03	15/11/2024	Very good	4	10-30%	30-70%	Veg structure and diversity intact, but weeds increasing. Recent deaths in stressed small marri most likely due to borer, pic 191. 24Sp site stable.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P03	23/05/2025	Good	4	10-30%	30-70%	Veg structure and diversity intact, but weeds increasing. Recent deaths in stressed small marri most likely due to borer, pic 191. 24Sp site stable.,25A weed cover has increased such that it is no longer Vg. Understory is thin too
BW-S-PI-5_P04	30/07/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P04	9/09/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P04	14/10/2021	Excellent	5	<2%	30-70%	Increase in native herbs,
BW-S-PI-5_P04	25/05/2022	Excellent	5	<2%	30-70%	Increase in native herbs,
BW-S-PI-5_P04	20/10/2022	Very good	5	10-30%	30-70%	Site has a high concentration of Briza maxima ,
BW-S-PI-5_P04	25/05/2023	Very good	4	10-30%	30-70%	Site has a high concentration of Briza maxima , crowns of jarrah and banksia are thin.,
BW-S-PI-5_P04	29/09/2023	Very good	4	10-30%	30-70%	Site has a high concentration of Briza maxima , crowns of jarrah and banksia are thin.,
BW-S-PI-5_P04	24/05/2024	Very good	4	10-30%	30-70%	Site has a high concentration of Briza maxima , crowns of jarrah and banksia are thin. 2024 canopy thin but overall healthy. One large b grandis dead.,
BW-S-PI-5_P04	15/11/2024	Very good	4	10-30%	30-70%	Site has a high concentration of Briza maxima , crowns of jarrah and banksia are thin. 2024 canopy thin but overall healthy. One large b grandis dead. 24 sp site stable.,
BW-S-PI-5_P04	23/05/2025	Very good	4	10-30%	30-70%	Site has a high concentration of Briza maxima , crowns of jarrah and banksia are thin. 2024 canopy thin but overall healthy. One large b grandis dead. 24 sp site stable.,25A site is stable.
BW-S-PI-5_P05	30/07/2020	Very good		2-10%	30-70%	
BW-S-PI-5_P05	23/10/2020	Very good	3	2-10%	30-70%	
BW-S-PI-5_P05	14/10/2021	Very good	3	2-10%	30-70%	
BW-S-PI-5_P05	25/05/2022	Very good	4	2-10%	30-70%	Crowns are reasonably healthy ,
BW-S-PI-5_P05	20/10/2022	Very good	4	2-10%	30-70%	Crowns are reasonably healthy ,
BW-S-PI-5_P05	25/05/2023	Very good	4	2-10%	30-70%	Crowns are reasonably healthy ,
BW-S-PI-5_P05	29/09/2023	Very good	4	10-30%	30-70%	Crowns are reasonably healthy, weeds have increased ,
BW-S-PI-5_P05	24/05/2024	Very good	4	10-30%	30-70%	Crowns are reasonably healthy, weeds have increased, 2024 canopy healthy, some stress in Hh.,
BW-S-PI-5_P05	15/11/2024	Very good	4	10-30%	30-70%	Crowns are reasonably healthy, weeds have increased, 2024 canopy healthy, some stress in Hh. 24Sp site stable, but large em cc in background stressed.,
BW-S-PI-5_P05	23/05/2025	Very good	4	10-30%	30-70%	Crowns are reasonably healthy, weeds have increased, 2024 canopy healthy, some stress in Hh. 24Sp site stable, but large em cc in background stressed.,A25 site stable.
BW-S-PI-5_P06	30/07/2020	Good		30-70%	30-70%	
BW-S-PI-5_P06	23/10/2020	Good	4	30-70%	30-70%	
BW-S-PI-5_P06	14/10/2021	Good	4	30-70%	30-70%	
BW-S-PI-5_P06	25/05/2022	Good	4	30-70%	30-70%	
BW-S-PI-5_P06	20/10/2022	Good	5	>70%	30-70%	
BW-S-PI-5_P06	25/05/2023	Good	5	>70%	30-70%	
BW-S-PI-5_P06	29/09/2023	Good	5	>70%	30-70%	
BW-S-PI-5_P06	24/05/2024	Good	5	>70%	30-70%	Site appears healthy ,
BW-S-PI-5_P06	15/11/2024	Good	5	>70%	30-70%	Site appears healthy. 24Sp site stable.,
BW-S-PI-5_P06	23/05/2025	Good	5	>70%	30-70%	Site appears healthy. 24Sp site stable.,Site is overall Good, part is degraded .
BW-S-PI-5_P07	20/11/2019	Good		30-70%		Adjacent power line ,
BW-S-PI-5_P07	22/05/2020	Good		30-70%		Adjacent power line,
BW-S-PI-5_P07	23/10/2020	Good	4	30-70%	30-70%	Adjacent power line,
BW-S-PI-5_P07	14/10/2021	Good	5	30-70%	30-70%	Tree health is really good ,
BW-S-PI-5_P07	25/05/2022	Good	5	30-70%	30-70%	Tree health is really good ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P07	20/10/2022	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pescaprae increasing, along with Briza maxima ,
BW-S-PI-5_P07	25/05/2023	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pes-caprae increasing, along with Briza maxima ,
BW-S-PI-5_P07	29/09/2023	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pescaprae increasing, along with Briza maxima ,
BW-S-PI-5_P07	24/05/2024	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pescaprae increasing, along with Briza maxima. 2024 canopy health good, butt One b grandis sapling dead.,
BW-S-PI-5_P07	15/11/2024	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pescaprae increasing, along with Briza maxima. 2024 canopy health good, butt One b grandis sapling dead. 24Sp site stable.,
BW-S-PI-5_P07	23/05/2025	Good	5	>70%	30-70%	Tree health is really good , Oxalis glabra and O. Pescaprae increasing, along with Briza maxima. 2024 canopy health good, butt One b grandis sapling dead. 24Sp site stable.,A25 site is stable.
BW-S-PI-5_P08	20/11/2019	Good		2-10%		
BW-S-PI-5_P08	22/05/2020	Good		2-10%	30-70%	
BW-S-PI-5_P08	23/10/2020	Good	4	10-30%	30-70%	
BW-S-PI-5_P08	14/10/2021	Good	4	30-70%	30-70%	Understory shrubs Ap, and M thy very reduced ,
BW-S-PI-5_P08	25/05/2022	Good	4	30-70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. ,
BW-S-PI-5_P08	20/10/2022	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. ,
BW-S-PI-5_P08	25/05/2023	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. Dipogon appears to have been controlled.,
BW-S-PI-5_P08	29/09/2023	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. Dipogon appears to have been controlled.,
BW-S-PI-5_P08	24/05/2024	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. Dipogon appears to have been controlled. 2024 per 2023.,
BW-S-PI-5_P08	15/11/2024	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. Dipogon appears to have been controlled. 2024 per 2023. 24Sp stress stable, but weeds increasing, site bordering degraded.,
BW-S-PI-5_P08	23/05/2025	Good	4	>70%	30-70%	Dipogon lignosus infestation, Oxalis pes-caprae spreading also. Briza maxima very dense. Locally good. Dipogon appears to have been controlled. 2024 per 2023. 24Sp stress stable, but weeds increasing, site bordering degraded.,Site is good and stable.
BW-S-PI-5_P09	20/11/2019	Good		2-10%		
BW-S-PI-5_P09	22/05/2020	Good		2-10%	30-70%	
BW-S-PI-5_P09	23/10/2020	Good	4	10-30%	30-70%	
BW-S-PI-5_P09	14/10/2021	Good	4	30-70%	30-70%	Weeds have increased ,
BW-S-PI-5_P09	25/05/2022	Good	4	30-70%	30-70%	Weeds have increased ,
BW-S-PI-5_P09	20/10/2022	Good	5	30-70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, ,
BW-S-PI-5_P09	25/05/2023	Good	5	30-70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, ,
BW-S-PI-5_P09	29/09/2023	Good	5	30-70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, bridal creeper, prickly pear,
BW-S-PI-5_P09	24/05/2024	Good	5	30-70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, bridal creeper, prickly pear. 2024 per 2023.,
BW-S-PI-5_P09	15/11/2024	Good	5	>70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, bridal creeper, prickly pear. 2024 per 2023. 24Sp weed cover has increased. Site stress is stable.,
BW-S-PI-5_P09	23/05/2025	Degraded	5	>70%	30-70%	Weeds have increased , site is bordering degraded, basic veg structure across portion of the site is intact, bridal creeper, prickly pear. 2024 per 2023. 24Sp weed cover has increased. Site stress is stable.,A25 weed cover has increased, now degraded. Understory largely absent.

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P10	20/11/2019	Good		<2%		Geraldton wax along power line ,
BW-S-PI-5_P10	22/05/2020	Good		<2%	30-70%	Geraldton wax along power line,
BW-S-PI-5_P10	23/10/2020	Good	4	2-10%	30-70%	Geraldton wax along power line,
BW-S-PI-5_P10	14/10/2021	Good	4	2-10%	30-70%	Rubbish has been cleaned up,
BW-S-PI-5_P10	25/05/2022	Good	4	10-30%	30-70%	Weed cover increased at site. Near access track. ,
BW-S-PI-5_P10	20/10/2022	Good	5	10-30%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing.,
BW-S-PI-5_P10	25/05/2023	Good	5	10-30%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing.,
BW-S-PI-5_P10	29/09/2023	Good	5	30-70%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing. Some jarrah and Banksia trees cut down.,
BW-S-PI-5_P10	24/05/2024	Good	5	30-70%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing. Some jarrah and Banksia trees cut down. 2024 canopy is healthy.,
BW-S-PI-5_P10	15/11/2024	Good	5	30-70%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing. Some jarrah and Banksia trees cut down. 2024 canopy is healthy. 24 Sp site is stable.,
BW-S-PI-5_P10	23/05/2025	Good	5	30-70%	30-70%	Weed cover increased at site. Near access track. This site is bordering degraded. Basic structure is present but weeds are increasing. Some jarrah and Banksia trees cut down. 2024 canopy is healthy. 24 Sp site is stable.,25A site is stable.
BW-S-PI-5_P11	20/11/2019	Good		30-70%		
BW-S-PI-5_P11	22/05/2020	Good		30-70%	30-70%	
BW-S-PI-5_P11	23/10/2020	Good	4	30-70%	30-70%	
BW-S-PI-5_P11	14/10/2021	Good	4	30-70%	30-70%	Rubbish cleaned up,
BW-S-PI-5_P11	25/05/2022	Good	4	30-70%	30-70%	
BW-S-PI-5_P11	20/10/2022	Good	5	30-70%	30-70%	
BW-S-PI-5_P11	25/05/2023	Good	5	30-70%	30-70%	
BW-S-PI-5_P11	29/09/2023	Good	5	30-70%	30-70%	
BW-S-PI-5_P11	24/05/2024	Good	5	30-70%	30-70%	Vegetation appears healthy ,
BW-S-PI-5_P11	15/11/2024	Good	5	30-70%	30-70%	Vegetation appears healthy. 24Sp site stable.,
BW-S-PI-5_P11	23/05/2025	Good	5	30-70%	30-70%	Vegetation appears healthy. 24Sp site stable.,Per previous assessment
BW-S-PI-5_P12	20/11/2019	Good		2-10%		
BW-S-PI-5_P12	22/05/2020	Good		2-10%	30-70%	
BW-S-PI-5_P12	23/10/2020	Good	4	2-10%	30-70%	
BW-S-PI-5_P12	14/10/2021	Good	4	2-10%	30-70%	Litter cleaned up,
BW-S-PI-5_P12	25/05/2022	Good	4	2-10%	30-70%	
BW-S-PI-5_P12	20/10/2022	Good	5	2-10%	30-70%	Canopy crown is healthy ,
BW-S-PI-5_P12	25/05/2023	Good	5	2-10%	30-70%	Canopy crown is healthy ,
BW-S-PI-5_P12	29/09/2023	Good	5	2-10%	30-70%	Canopy crown is healthy ,
BW-S-PI-5_P12	24/05/2024	Good	5	2-10%	30-70%	Canopy crown is healthy, 2024 vegetation appears healthy. The absence of annual weeds makes the site look suitable for a very good condition rating.,
BW-S-PI-5_P12	15/11/2024	Good	5	2-10%	30-70%	Canopy crown is healthy, 2024 vegetation appears healthy. The absence of annual weeds makes the site look suitable for a very good condition rating. 24Sp site stable.,
BW-S-PI-5_P12	23/05/2025	Good	5	2-10%	30-70%	Canopy crown is healthy, 2024 vegetation appears healthy. The absence of annual weeds makes the site look suitable for a very good condition rating. 24Sp site stable.,Per previous assessment

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P13	30/07/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P13	23/10/2020	Excellent	3	<2%	30-70%	
BW-S-PI-5_P13	14/10/2021	Excellent	3	<2%	30-70%	
BW-S-PI-5_P13	25/05/2022	Excellent	3	<2%	30-70%	Crowns of most trees are thin ,
BW-S-PI-5_P13	20/10/2022	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good ,
BW-S-PI-5_P13	25/05/2023	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good ,
BW-S-PI-5_P13	29/09/2023	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good ,
BW-S-PI-5_P13	24/05/2024	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good . Large jarrah tree is stressed, branches impacted by borer. Pic 190.,
BW-S-PI-5_P13	15/11/2024	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good . Large jarrah tree is stressed, branches impacted by borer. Pic 190. 24Sp jarrah trees are still stressed with 3, almost dead, but ba appears healthy. ,
BW-S-PI-5_P13	23/05/2025	Excellent	3	<2%	30-70%	Crowns of most trees are thin , locally excellent, but broadly very good . Large jarrah tree is stressed, branches impacted by borer. Pic 190. 24Sp jarrah trees are still stressed with 3, almost dead, but ba appears healthy. ,Per Sp 24. Understory healthy.
BW-S-PI-5_P14	30/07/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P14	23/10/2020	Excellent	4	<2%	30-70%	
BW-S-PI-5_P14	14/10/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_P14	25/05/2022	Excellent	4	<2%	30-70%	
BW-S-PI-5_P14	20/10/2022	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing ,
BW-S-PI-5_P14	25/05/2023	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing ,
BW-S-PI-5_P14	29/09/2023	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing ,
BW-S-PI-5_P14	24/05/2024	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing. 2024 site looks healthy when few weeds present. Canopy healthy.,
BW-S-PI-5_P14	15/11/2024	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing. 2024 site looks healthy when few weeds present. Canopy healthy. 24 Sp site stable.,
BW-S-PI-5_P14	23/05/2025	Excellent	5	2-10%	30-70%	Veg condition locally maybe excellent, but broadly it is only very good. Briza maxima is increasing. 2024 site looks healthy when few weeds present. Canopy healthy. 24 Sp site stable.,Site is stable. Weed load is low, perhaps delayed.
BW-S-PI-5_P15	20/11/2019	Good		10-30%		Note this site 10 of Russell ,
BW-S-PI-5_P15	22/05/2020	Good		10-30%	10-30%	Note this site 10 of Russell,
BW-S-PI-5_P15	23/10/2020	Good	4	10-30%	10-30%	Note this site 10 of Russell,
BW-S-PI-5_P15	14/10/2021	Good	5	10-30%	10-30%	
BW-S-PI-5_P15	25/05/2022	Good	5	10-30%	10-30%	Rubbish dumped at gate ,
BW-S-PI-5_P15	20/10/2022	Good	5	30-70%	10-30%	Rubbish dumped at gate , weed cover has increased substantially. ,
BW-S-PI-5_P15	25/05/2023	Good	5	30-70%	10-30%	Close to recently cleared areas.,
BW-S-PI-5_P15	29/09/2023	Good	5	30-70%	10-30%	Close to recently cleared areas. P2517 few weeds in cleared area ,
BW-S-PI-5_P15	24/05/2024	Good	5	30-70%	10-30%	Close to recently cleared areas. P2517 few weeds in cleared area . 2024 per 2023.,
BW-S-PI-5_P15	15/11/2024	Good	5	30-70%	10-30%	Close to recently cleared areas. P2517 few weeds in cleared area . 2024 per 2023. 24 Sp site stable.,
BW-S-PI-5_P15	23/05/2025	Good	5	30-70%	10-30%	Close to recently cleared areas. P2517 few weeds in cleared area . 2024 per 2023. 24 Sp site stable.,Site stable, close to works.
BW-S-PI-5_P16	20/11/2019	Very good		30-70%		

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P16	22/05/2020	Very good				
BW-S-PI-5_P16	9/09/2020	Very good		30-70%	30-70%	
BW-S-PI-5_P16	14/10/2021	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established ,
BW-S-PI-5_P16	25/05/2022	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established ,
BW-S-PI-5_P16	20/10/2022	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing.,
BW-S-PI-5_P16	25/05/2023	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing. Crowns look reasonably healthy.,
BW-S-PI-5_P16	29/09/2023	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing. Crowns look reasonably healthy.,
BW-S-PI-5_P16	24/05/2024	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing. Crowns look reasonably healthy. per 2023, 1-2 banksia grandis saplings dead in background. Surrounding veg ok.,
BW-S-PI-5_P16	15/11/2024	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing. Crowns look reasonably healthy. per 2023, 1-2 banksia grandis saplings dead in background. Surrounding veg ok. 24 sp stable. ,
BW-S-PI-5_P16	23/05/2025	Very good	4	30-70%	30-70%	No photo mon point for this fulcrum point. New photo mon point established, Weed cover increasing. Crowns look reasonably healthy. per 2023, 1-2 banksia grandis saplings dead in background. Surrounding veg ok. 24 sp stable. ,Site is healthy , stable, jarrah to south almost dead.
BW-S-PI-5_P17	20/11/2019	Very good		10-30%		
BW-S-PI-5_P17	22/05/2020	Very good		10-30%	30-70%	
BW-S-PI-5_P17	23/10/2020	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	14/10/2021	Very good	4	,10-30%	30-70%	
BW-S-PI-5_P17	25/05/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	20/10/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	25/05/2023	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	29/09/2023	Very good	4	10-30%	30-70%	
BW-S-PI-5_P17	24/05/2024	Very good	4	10-30%	30-70%	Site appears stable , but most Hh very stressed.,
BW-S-PI-5_P17	15/11/2024	Very good	4	10-30%	30-70%	Site appears stable , but most Hh very stressed. 24Sp trees and shrubs 4. Hh 3 from drought.,
BW-S-PI-5_P17	23/05/2025	Very good	4	10-30%	30-70%	Site appears stable , but most Hh very stressed. 24Sp trees and shrubs 4. Hh 3 from drought.,
BW-S-PI-5_P18	20/11/2019	Very good		10-30%		
BW-S-PI-5_P18	22/05/2020	Very good		10-30%	30-70%	Drought effects in Jarrah,
BW-S-PI-5_P18	23/10/2020	Very good	3	10-30%	30-70%	Drought effects in Jarrah,
BW-S-PI-5_P18	14/10/2021	Very good	4	10-30%	30-70%	
BW-S-PI-5_P18	25/05/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_P18	20/10/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_P18	25/05/2023	Very good	4	10-30%	30-70%	Large Marri very stressed.,
BW-S-PI-5_P18	29/09/2023	Very good	4	10-30%	30-70%	"Large Marri very stressed. Has recovered somewhat but still very stressed.
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BW-S-PI-5_P18	24/05/2024	Very good	4	10-30%	30-70%	"Large Marri very stressed. Has recovered somewhat but still very stressed. 2024 per 2023, 1-2 scattered b grandis and jarrah sapling dead in background
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Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P18	15/11/2024	Very good	4	10-30%	30-70%	Large Marri very stressed. Has recovered somewhat but still very stressed. 2024 per 2023, 1-2 scattered b grandis and jarrah sapling dead in background. 24Sp Trees and shrubs 4, Hh stress wide spread almost all 3. Pic 2922. ,
BW-S-PI-5_P18	23/05/2025	Very good	4	10-30%	30-70%	Large Marri very stressed. Has recovered somewhat but still very stressed. 2024 per 2023, 1-2 scattered b grandis and jarrah sapling dead in background. 24Sp Trees and shrubs 4, Hh stress wide spread almost all 3. Pic 2922. ,Large Marri appears dead. Other canopy 60%. Hh about 60% relictual stress
BW-S-PI-5_P19	20/11/2019	Very good		2-10%		
BW-S-PI-5_P19	22/05/2020	Very good		2-10%	30-70%	Drought effects in Jarrah,
BW-S-PI-5_P19	23/10/2020	Very good	3	10-30%	30-70%	Drought effects in Jarrah,
BW-S-PI-5_P19	14/10/2021	Very good	3	10-30%	30-70%	
BW-S-PI-5_P19	25/05/2022	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok,
BW-S-PI-5_P19	20/10/2022	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok,
BW-S-PI-5_P19	25/05/2023	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok,
BW-S-PI-5_P19	29/09/2023	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok,
BW-S-PI-5_P19	24/05/2024	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok, per 2023 sight looks ok, no dead canopy. Some stressed Hh.,
BW-S-PI-5_P19	15/11/2024	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok, per 2023 sight looks ok, no dead canopy. Some stressed Hh. 24Sp site is stable, close to BORR.pic 2922,
BW-S-PI-5_P19	23/05/2025	Very good	4	10-30%	30-70%	Tree crowns look ok, 4 score ok, per 2023 sight looks ok, no dead canopy. Some stressed Hh. 24Sp site is stable, close to BORR.pic 2922,Canopy 4, Hh about 60%. Dead Banksia has fallen across the site.
BW-S-PI-5_P20	20/11/2019	Very good		2-10%		
BW-S-PI-5_P20	22/05/2020	Very good		2-10%	30-70%	
BW-S-PI-5_P20	23/10/2020	Very good	3	2-10%	30-70%	
BW-S-PI-5_P20	14/10/2021	Very good	3	2-10%	30-70%	
BW-S-PI-5_P20	25/05/2022	Very good	3	2-10%	30-70%	
BW-S-PI-5_P20	20/10/2022	Very good	4	2-10%	30-70%	Canopy health has improved ,
BW-S-PI-5_P20	25/05/2023	Very good	4	2-10%	30-70%	Canopy health has improved , still a 4 rating ,
BW-S-PI-5_P20	29/09/2023	Very good	4	2-10%	30-70%	Canopy health has improved , still a 4 rating ,
BW-S-PI-5_P20	24/05/2024	Very good	4	2-10%	30-70%	Canopy health has improved , still a 4 rating . 2024 per 2023. Site appears largely unstressed. Adjacent borr works no weeds pic 187 and healthy vegetation.,
BW-S-PI-5_P20	15/11/2024	Very good	4	2-10%	30-70%	Canopy health has improved , still a 4 rating . 2024 per 2023. Site appears largely unstressed. Adjacent borr works no weeds pic 187 and healthy vegetation. 24 Sp. Site stable. ,
BW-S-PI-5_P20	23/05/2025	Very good	4	2-10%	30-70%	Canopy health has improved , still a 4 rating . 2024 per 2023. Site appears largely unstressed. Adjacent borr works no weeds pic 187 and healthy vegetation. 24 Sp. Site stable. ,Overall site is healthy
BW-S-PI-5_P21	20/11/2019	Very good		<2%		
BW-S-PI-5_P21	22/05/2020	Very good		<2%	30-70%	
BW-S-PI-5_P21	23/10/2020	Very good	3	<2%	30-70%	
BW-S-PI-5_P21	14/10/2021	Very good	3	<2%	30-70%	
BW-S-PI-5_P21	25/05/2022	Very good	3	<2%	30-70%	Crowns are thin ,
BW-S-PI-5_P21	20/10/2022	Very good	4	<2%	30-70%	Canopy health has improved ,
BW-S-PI-5_P21	25/05/2023	Very good	4	<2%	30-70%	Canopy health has improved ,
BW-S-PI-5_P21	29/09/2023	Very good	4	<2%	30-70%	Canopy health has improved ,
BW-S-PI-5_P21	24/05/2024	Very good	4	<2%	30-70%	Canopy health has improved , 2024 stable , jarrah sapling dead in background, surrounding veg ok, borer?,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P21	15/11/2024	Very good	4	<2%	30-70%	Canopy health has improved , 2024 stable , jarrah sapling dead in background, surrounding veg ok, borer? 24 Sp site healthy, but Banksia branch fallen into site. Hh 3.,
BW-S-PI-5_P21	23/05/2025	Very good	4	<2%	30-70%	Canopy health has improved , 2024 stable , jarrah sapling dead in background, surrounding veg ok, borer? 24 Sp site healthy, but Banksia branch fallen into site. Hh 3.,Canopy 4, understory good . Delayed on set of grass weeds.
BW-S-PI-5_P22	20/11/2019	Excellent		<2%		
BW-S-PI-5_P22	22/05/2020	Excellent		<2%	30-70%	Jarrah drought effects,
BW-S-PI-5_P22	23/10/2020	Excellent	4	<2%	30-70%	Jarrah drought effects,
BW-S-PI-5_P22	14/10/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_P22	25/05/2022	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Jarrah stressed ,
BW-S-PI-5_P22	20/10/2022	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Jarrah stressed ,
BW-S-PI-5_P22	25/05/2023	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Small Jarrah saplings stressed ,
BW-S-PI-5_P22	29/09/2023	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Small Jarrah saplings stressed, large jarrah almost dead.,
BW-S-PI-5_P22	24/05/2024	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Small Jarrah saplings stressed, large jarrah almost dead. 2024 per 2023,
BW-S-PI-5_P22	15/11/2024	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Small Jarrah saplings stressed, large jarrah almost dead. 2024 per 2023. 24Sp site still 4. Large Em with some epicormic growth. Hh a 3.,
BW-S-PI-5_P22	23/05/2025	Excellent	4	<2%	30-70%	Banksia crowns look healthy. Small Jarrah saplings stressed, large jarrah almost dead. 2024 per 2023. 24Sp site still 4. Large Em with some epicormic growth. Hh a 3.,Site is healthy over all
BW-S-PI-5_P23	20/11/2019	Excellent		<2%		
BW-S-PI-5_P23	22/05/2020	Excellent		<2%	30-70%	Jarrah drought effects,
BW-S-PI-5_P23	23/10/2020	Excellent	4	<2%	30-70%	Jarrah drought effects,
BW-S-PI-5_P23	14/10/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	25/05/2022	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	20/10/2022	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	25/05/2023	Excellent	4	<2%	30-70%	
BW-S-PI-5_P23	29/09/2023	Excellent	4	<2%	30-70%	Site is healthy ,
BW-S-PI-5_P23	24/05/2024	Excellent	4	<2%	30-70%	Site is healthy, 1-2 stressed kunzea in background, lots Hh stressed / dead pic 186,
BW-S-PI-5_P23	15/11/2024	Excellent	4	<2%	30-70%	Site is healthy, 1-2 stressed kunzea in background, lots Hh stressed / dead pic 186. 24 Sp overall site shrubs trees 4, but Ba thin. Hh with Relictual drought stress, 4,
BW-S-PI-5_P23	23/05/2025	Excellent	4	<2%	30-70%	Site is healthy, 1-2 stressed kunzea in background, lots Hh stressed / dead pic 186. 24 Sp overall site shrubs trees 4, but Ba thin. Hh with Relictual drought stress, 4,Hh about 60 % cover. Some Styphelia dead.
BW-S-PI-5_P24	20/11/2019	Excellent		<2%		
BW-S-PI-5_P24	22/05/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P24	23/10/2020	Excellent	4	<2%	30-70%	
BW-S-PI-5_P24	14/10/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_P24	25/05/2022	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin,
BW-S-PI-5_P24	20/10/2022	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin,
BW-S-PI-5_P24	25/05/2023	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin,
BW-S-PI-5_P24	29/09/2023	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin,
BW-S-PI-5_P24	24/05/2024	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin. 2024 site is ok but Hh still stressed.,
BW-S-PI-5_P24	15/11/2024	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin. 2024 site is ok but Hh still stressed. 24Sp site healthy.,
BW-S-PI-5_P24	23/05/2025	Excellent	4	<2%	30-70%	Canopies of large marri and jarrah trees are thin. 2024 site is ok but Hh still stressed. 24Sp site healthy.,Site ok

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P25	20/11/2019	Excellent		<2%		
BW-S-PI-5_P25	22/05/2020	Excellent		<2%	30-70%	Was incorrectly labeled P21,
BW-S-PI-5_P25	23/10/2020	Excellent	3	<2%	30-70%	Was incorrectly labeled P21,
BW-S-PI-5_P25	14/10/2021	Excellent	3	<2%	30-70%	
BW-S-PI-5_P25	25/05/2022	Excellent	3	<2%	30-70%	Jarrah trees very stressed with thinning crowns ,
BW-S-PI-5_P25	20/10/2022	Excellent	4	<2%	30-70%	Jarrah trees have improved in condition. ,
BW-S-PI-5_P25	25/05/2023	Excellent	4	<2%	30-70%	Jarrah trees have improved in condition. ,
BW-S-PI-5_P25	29/09/2023	Excellent	4	2-10%	30-70%	Jarrah and Banksia trees are stressed. May go down to 3.,
BW-S-PI-5_P25	24/05/2024	Excellent	4	2-10%	30-70%	Jarrah and Banksia trees are stressed. May go down to 3. Two banksia dead, but jarrah ok. Rest of site ok,
BW-S-PI-5_P25	15/11/2024	Excellent	4	2-10%	30-70%	Jarrah and Banksia trees are stressed. May go down to 3. Two banksia dead, but jarrah ok. Rest of site ok. 24Sp site recovered well after drought. Pic 2920,
BW-S-PI-5_P25	23/05/2025	Excellent	4	2-10%	30-70%	Jarrah and Banksia trees are stressed. May go down to 3. Two banksia dead, but jarrah ok. Rest of site ok. 24Sp site recovered well after drought. Pic 2920,Site is ok
BW-S-PI-5_P26	20/11/2019	Excellent		<2%		
BW-S-PI-5_P26	22/05/2020	Excellent		<2%	30-70%	Possible storm damage in past: Incorrectly labeled P22,
BW-S-PI-5_P26	23/10/2020	Excellent	3	2-10%	30-70%	Possible storm damage in past: Incorrectly labeled P22,
BW-S-PI-5_P26	14/10/2021	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P26	25/05/2022	Excellent	4	2-10%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. ,
BW-S-PI-5_P26	20/10/2022	Excellent	4	2-10%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. ,
BW-S-PI-5_P26	25/05/2023	Excellent	4	2-10%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. Trees still at 4 rating,
BW-S-PI-5_P26	29/09/2023	Excellent	4	10-30%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. Trees still at 4 rating,
BW-S-PI-5_P26	24/05/2024	Excellent	4	10-30%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. Trees still at 4 rating. 2024 per 23 assessment. Site relatively healthy.,
BW-S-PI-5_P26	15/11/2024	Excellent	4	10-30%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. Trees still at 4 rating. 2024 per 23 assessment. Site relatively healthy. 24Sp site healthy, overall low stress.,
BW-S-PI-5_P26	23/05/2025	Excellent	4	10-30%	30-70%	Tree crowns look healthy, some older Banksia dead and have lost all their leaves. Increased rating based on overall quality of tree health. Trees still at 4 rating. 2024 per 23 assessment. Site relatively healthy. 24Sp site healthy, overall low stress.,Per 24Sp.
BW-S-PI-5_P27	20/11/2019	Excellent		<2%		Possible storm damage in past,
BW-S-PI-5_P27	22/05/2020	Excellent		<2%	30-70%	Incorrectly labeled 0P23,
BW-S-PI-5_P27	23/10/2020	Excellent	3	2-10%	30-70%	Incorrectly labeled 0P23,
BW-S-PI-5_P27	14/10/2021	Excellent	3	2-10%	30-70%	
BW-S-PI-5_P27	25/05/2022	Excellent	3	2-10%	30-70%	Note large marri jarrah tree crowns are very thin hence 3 rating.,
BW-S-PI-5_P27	20/10/2022	Excellent	3	2-10%	30-70%	Note large marri jarrah tree crowns are very thin hence 3 rating.,
BW-S-PI-5_P27	25/05/2023	Excellent	3	2-10%	30-70%	Note large marri jarrah tree crowns are very thin hence 3 rating.,
BW-S-PI-5_P27	29/09/2023	Excellent	3	2-10%	30-70%	Note large marri jarrah tree crowns are very thin hence 3 rating.,
BW-S-PI-5_P27	24/05/2024	Excellent	3	2-10%	30-70%	Note large marri jarrah tree crowns are very thin hence 3 rating. Some scattered b grandis saplings and kunzea glabrescens dead in background due to drought. Other Banksia ok pic 185. Hh stressed ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P27	15/11/2024	Excellent	4	2-10%	30-70%	Hh stressed. 24Sp site has recovered. Relictual stress in Hh and Pc. Lots of fallen banksia.,
BW-S-PI-5_P27	23/05/2025	Excellent	4	2-10%	30-70%	Hh stressed. 24Sp site has recovered. Relictual stress in Hh and Pc. Lots of fallen banksia.,Per 24Sp
BW-S-PI-5_P28	20/11/2019	Excellent		<2%		
BW-S-PI-5_P28	25/06/2020	Excellent		<2%		
BW-S-PI-5_P28	9/09/2020	Excellent		<2%		
BW-S-PI-5_P28	14/10/2021	Excellent	4	<2%	30-70%	No data was present for this point. Point was established. Point does not align with photo mon Point for old photocode number,
BW-S-PI-5_P28	25/05/2022	Excellent	4	<2%	30-70%	No data was present for this point. Point was established. Point does not align with photo mon Point for old photocode number, Photomon no 26a. Banksia canopies look healthy. Other tree crowns are thinning. ,
BW-S-PI-5_P28	20/10/2022	Excellent	4	<2%	30-70%	No data was present for this point. Point was established. Point does not align with photo mon Point for old photocode number, Photomon no 26a. Banksia canopies look healthy. Other tree crowns are thinning. ,
BW-S-PI-5_P28	25/05/2023	Excellent	4	<2%	30-70%	Banksia healthy. Marri showing continued stress, hence 4 rating.,
BW-S-PI-5_P28	29/09/2023	Excellent	4	<2%	30-70%	Banksia healthy. Marri showing continued stress, hence 4 rating. Weeds are increasing mostly bmax,
BW-S-PI-5_P28	24/05/2024	Excellent	4	<2%	30-70%	Banksia healthy. Marri showing continued stress, hence 4 rating. Weeds are increasing mostly bmax. Site relatively healthy. One dead banksia grandis sapling. Due to drought.,
BW-S-PI-5_P28	15/11/2024	Excellent	4	<2%	30-70%	Banksia healthy. Marri showing continued stress, hence 4 rating. Weeds are increasing mostly bmax. Site relatively healthy. One dead banksia grandis sapling. Due to drought. 24Sp Site is healthy most veg recovered.,
BW-S-PI-5_P28	23/05/2025	Excellent	4	<2%	30-70%	Banksia healthy. Marri showing continued stress, hence 4 rating. Weeds are increasing mostly bmax. Site relatively healthy. One dead banksia grandis sapling. Due to drought. 24Sp Site is healthy most veg recovered.,Site is per Sp24, but weeds are increasing especially freesia. So now Bg
BW-S-PI-5_P29	20/11/2019	Excellent		<2%		
BW-S-PI-5_P29	22/05/2020	Excellent		<2%	30-70%	Note recent death of Banksia attenuata due to die back,
BW-S-PI-5_P29	23/10/2020	Excellent	4	<2%	30-70%	Note recent death of two Banksia attenuata due to die back,
BW-S-PI-5_P29	14/10/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_P29	25/05/2022	Excellent	4	<2%	30-70%	Canopies of large trees are thin,
BW-S-PI-5_P29	20/10/2022	Excellent	4	<2%	30-70%	Canopies of large trees are thin, recent death of Banksia sapling may indicate active pc front. Xanthorrhoea brunonis fronds yellowing. ,
BW-S-PI-5_P29	25/05/2023	Excellent	4	<2%	30-70%	Canopies of large trees are thin, recent death of Banksia sapling may indicate active pc front. Xanthorrhoea brunonis fronds yellowing. Xanthorrhoea still alive, ,
BW-S-PI-5_P29	29/09/2023	Excellent	4	<2%	30-70%	Canopies of large trees are thin, recent death of Banksia sapling may indicate active pc front. Xanthorrhoea brunonis fronds yellowing. Xanthorrhoea still alive, / healthy ,
BW-S-PI-5_P29	24/05/2024	Excellent	4	<2%	30-70%	Canopies of large trees are thin, recent death of Banksia sapling may indicate active pc front. 2024 Xb ok. Further death of some scattered Banksia grandis saplings in and near site. Jarrah tree dead due to wood borer. hh stressed but site looks ok.,
BW-S-PI-5_P29	15/11/2024	Excellent	4	<2%	30-70%	24Sp site overall 4. Relictual stress with dead foliage in Hh and Pc. ,
BW-S-PI-5_P29	23/05/2025	Excellent	4	<2%	30-70%	24Sp site overall 4. Relictual stress with dead foliage in Hh and Pc. ,Per 24Sp
BW-S-PI-5_P30	20/11/2019	Very good		<2%		
BW-S-PI-5_P30	22/05/2020	Very good		<2%	30-70%	
BW-S-PI-5_P30	23/10/2020	Very good	4	<2%	30-70%	
BW-S-PI-5_P30	14/10/2021	Very good	4	<2%	30-70%	
BW-S-PI-5_P30	25/05/2022	Very good	4	<2%	30-70%	Dead Banksia trees have fallen. ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P30	20/10/2022	Very good	4	<2%	30-70%	Dead Banksia trees have fallen. ,
BW-S-PI-5_P30	25/05/2023	Very good	4	<2%	30-70%	Dead Banksia trees have fallen. Dieback does not appear to be very active, no recent death.,
BW-S-PI-5_P30	29/09/2023	Very good	4	2-10%	30-70%	Dead Banksia trees have fallen. Dieback does not appear to be very active, no recent death. Weeds have increased near track ,
BW-S-PI-5_P30	24/05/2024	Very good	4	2-10%	30-70%	Dead Banksia trees have fallen. Dieback does not appear to be very active, no recent death. Weeds have increased near track. Dead Persoonia longifolia in background. All Hh very stressed. ,
BW-S-PI-5_P30	15/11/2024	Very good	4	2-10%	30-70%	Dead Banksia trees have fallen. Dieback does not appear to be very active, no recent death. Weeds have increased near track. Dead Persoonia longifolia in background. All Hh very stressed. 24Sp existing trees ok, recovering from drought ,
BW-S-PI-5_P30	23/05/2025	Very good	4	2-10%	30-70%	Dead Banksia trees have fallen. Dieback does not appear to be very active, no recent death. Weeds have increased near track. Dead Persoonia longifolia in background. All Hh very stressed. 24Sp existing trees ok, recovering from drought ,Tree canopy ok, Hh stressed. Other forbs stressed,
BW-S-PI-5_P31	20/11/2019	Very good		2-10%		
BW-S-PI-5_P31	22/05/2020	Very good		<2%	30-70%	Weeds not evident at this time,
BW-S-PI-5_P31	23/10/2020	Very good	4	<2%	30-70%	Weeds not evident at this time,
BW-S-PI-5_P31	14/10/2021	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	25/05/2022	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	20/10/2022	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	25/05/2023	Very good	4	<2%	30-70%	
BW-S-PI-5_P31	29/09/2023	Very good	4	2-10%	30-70%	Weed cover increased ,
BW-S-PI-5_P31	24/05/2024	Very good	4	2-10%	30-70%	Weed cover increased, no annual weeds, too dry. Some occasional scattered dead jarrah saplings due to wood borer. Pic 184,
BW-S-PI-5_P31	15/11/2024	Very good	4	2-10%	30-70%	Weed cover increased, no annual weeds, too dry. Some occasional scattered dead jarrah saplings due to wood borer. Pic 184. 24 sp trees 4 . Hh, Pc 3 recovering from drought.,
BW-S-PI-5_P31	23/05/2025	Very good	4	2-10%	30-70%	Weed cover increased, no annual weeds, too dry. Some occasional scattered dead jarrah saplings due to wood borer. Pic 184. 24 sp trees 4 . Hh, Pc 3 recovering from drought.,Hh approximately 60%. Phlebocarya also stressed.
BW-S-PI-5_P32	20/11/2019	Very good		2-10%		
BW-S-PI-5_P32	22/05/2020	Very good		<2%	30-70%	Access issues previously reported have passed,
BW-S-PI-5_P32	23/10/2020	Very good	4	2-10%	30-70%	Access issues previously reported have passed,
BW-S-PI-5_P32	14/10/2021	Very good	4	2-10%	30-70%	
BW-S-PI-5_P32	25/05/2022	Very good	4	2-10%	30-70%	Tree crowns look healthy. Old trees have died and what remains is good ,
BW-S-PI-5_P32	20/10/2022	Very good	4	2-10%	30-70%	Tree crowns look healthy. Old trees have died and what remains is good ,
BW-S-PI-5_P32	25/05/2023	Very good	4	2-10%	30-70%	Tree crowns look healthy. Old trees have died and what remains is good ,
BW-S-PI-5_P32	29/09/2023	Very good	4	2-10%	30-70%	Tree crowns look healthy. Old trees have died and what remains is good ,
BW-S-PI-5_P32	24/05/2024	Very good	4	2-10%	30-70%	Tree crowns look healthy. Old trees have died and what remains is good. Some scattered jarrah saplings and Banksia grandis dead, jarrah affected by wood borer pic 183. Hh stressed.,
BW-S-PI-5_P32	15/11/2024	Very good	4	2-10%	30-70%	24Sp Hh recovering but about 3 stress. Phlebocarya ciliata also stressed. Trees 4.,
BW-S-PI-5_P32	23/05/2025	Very good	4	2-10%	30-70%	24Sp Hh recovering but about 3 stress. Phlebocarya ciliata also stressed. Trees 4.,Per 24Sp.
BW-S-PI-5_P33	20/11/2019	Very good		2-10%		
BW-S-PI-5_P33	22/05/2020	Very good		<2%	30-70%	Autumn view presents less weeds,
BW-S-PI-5_P33	23/10/2020	Very good	3	2-10%	30-70%	Autumn view presents less weeds,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_P33	14/10/2021	Very good	3	2-10%	30-70%	
BW-S-PI-5_P33	25/05/2022	Very good	3	2-10%	30-70%	
BW-S-PI-5_P33	20/10/2022	Very good	3	2-10%	30-70%	
BW-S-PI-5_P33	25/05/2023	Very good	3	2-10%	30-70%	
BW-S-PI-5_P33	29/09/2023	Very good	3	2-10%	30-70%	Trees don't look stressed, but foliage missing on old stressed trees.,
BW-S-PI-5_P33	24/05/2024	Very good	3	2-10%	30-70%	Some scattered dead jarrah saplings young trees in background. Pic 181 most Hibbertia hypercoides is very stressed almost dead pic 182,
BW-S-PI-5_P33	15/11/2024	Very good	3	2-10%	30-70%	Some scattered dead jarrah saplings young trees in background. Pic 181 most Hibbertia hypercoides is very stressed almost dead pic 182. 24Sp Em saplings dead from cockies and drought. Hh is about 60% dead, Phlebocarya ciliata also dead. Pic 2917.,
BW-S-PI-5_P33	23/05/2025	Very good	3	2-10%	30-70%	Some scattered dead jarrah saplings young trees in background. Pic 181 most Hibbertia hypercoides is very stressed almost dead pic 182. 24Sp Em saplings dead from cockies and drought. Hh is about 60% dead, Phlebocarya ciliata also dead. Pic 2917.,Hh about 60%, Sty rac also dead. Stressed jarrah
BW-S-PI-5_P34	20/11/2019	Very good		2-10%		
BW-S-PI-5_P34	22/05/2020	Excellent		<2%	30-70%	
BW-S-PI-5_P34	23/10/2020	Excellent	3	<2%	30-70%	
BW-S-PI-5_P34	14/10/2021	Excellent	3	<2%	30-70%	
BW-S-PI-5_P34	25/05/2022	Excellent	4	<2%	30-70%	Tree crowns look healthy , increased health from 3 to 5,
BW-S-PI-5_P34	20/10/2022	Excellent	5	<2%	30-70%	Tree crowns look healthy , increased health from 3 to 5, Briza maxima is increasing in the area west of monitoring area. Substantial increases in the monitoring area will result in a lowering of veg condition. ,
BW-S-PI-5_P34	25/05/2023	Excellent	5	<2%	30-70%	Tree crowns look healthy , increased health from 3 to 5, Briza maxima is increasing in the area west of monitoring area. Substantial increases in the monitoring area will result in a lowering of veg condition. ,
BW-S-PI-5_P34	29/09/2023	Excellent	5	<2%	30-70%	Tree crowns look healthy , increased health from 3 to 5, Briza maxima is increasing in the area west of monitoring area. Substantial increases in the monitoring area will result in a lowering of veg condition. Weeds stable.,
BW-S-PI-5_P34	24/05/2024	Excellent	4	<2%	30-70%	Some scattered dead very stressed banksia and jarrah trees in background.,
BW-S-PI-5_P34	15/11/2024	Excellent	4	<2%	30-70%	Some scattered dead very stressed banksia and jarrah trees in background. 24Sp site stress low has recovered well. AUTmn stressed Hh is recovering but thin with dead branches. Pic 2916, 2917. No,
BW-S-PI-5_P34	23/05/2025	Excellent	4	<2%	30-70%	Some scattered dead very stressed banksia and jarrah trees in background. 24Sp site stress low has recovered well. AUTmn stressed Hh is recovering but thin with dead branches. Pic 2916, 2917. No,Styphelia rac dead, Hh about 60%. Canopy ok.
BW-S-PI-5_T1N	11/20/2019	Very good				
BW-S-PI-5_T1N	5/22/2020	Very good		<2%	30-70%	
BW-S-PI-5_T1N	10/14/2020	Very good	3	30-70%	30-70%	
BW-S-PI-5_T1N	10/14/2021	Very good	4	10-30%	30-70%	
BW-S-PI-5_T1N	5/25/2022	Very good	4	10-30%	30-70%	
BW-S-PI-5_T1N	10/17/2022	Very good	5	10-30%	30-70%	
BW-S-PI-5_T1N	5/26/2023	Very good	5	10-30%	30-70%	
BW-S-PI-5_T1N	10/13/2023	Very good	5	10-30%	30-70%	
BW-S-PI-5_T1N	5/24/2024	Very good	5	10-30%	30-70%	
BW-S-PI-5_T1N	10/11/2024	Very good	5	10-30%	30-70%	
BW-S-PI-5_T1N	23/5/2025	Very good	4	10-30%	30-70%	,Canopy is now 4 with stress in Cc and Em. Understory similar to 24 sp.

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-5_T1S	11/20/2019	Very good				
BW-S-PI-5_T1S	5/22/2020	Excellent		<2%	30-70%	
BW-S-PI-5_T1S	10/14/2020	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	10/14/2021	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	5/25/2022	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	10/17/2022	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	5/26/2023	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	10/13/2023	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	5/24/2024	Excellent	4	<2%	30-70%	
BW-S-PI-5_T1S	10/11/2024	Excellent	4	10-30%	30-70%	
BW-S-PI-5_T1S	23/5/2025	Excellent	4	10-30%	30-70%	,Hh 3, Pc 3. Weed cover has to increased so the site is only marginally excellent.
BW-S-PI-6_P01	22/05/2020	Degraded		>70%	30-70%	
BW-S-PI-6_P01	23/10/2020	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	15/10/2021	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	25/05/2022	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	17/10/2022	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	26/05/2023	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	29/09/2023	Degraded	4	>70%	30-70%	
BW-S-PI-6_P01	24/05/2024	Degraded	4	>70%	30-70%	Large jarrah in background almost dead.,
BW-S-PI-6_P01	7/11/2024	Degraded	4	>70%	30-70%	Large jarrah in background almost dead. 2024 sp stable no change ,
BW-S-PI-6_P01	23/05/2025	Degraded	4	>70%	30-70%	Large jarrah in background almost dead. 2024 sp stable no change ,A24 site stable.
BW-S-PI-6_P02	22/05/2020	Degraded		10-30%	30-70%	
BW-S-PI-6_P02	23/10/2020	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P02	15/10/2021	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P02	25/05/2022	Degraded	4	10-30%	30-70%	
BW-S-PI-6_P02	17/10/2022	Degraded	5	30-70%	30-70%	Weeds increasing significantly ,
BW-S-PI-6_P02	26/05/2023	Degraded	5	>70%	30-70%	Weeds increasing significantly ,
BW-S-PI-6_P02	29/09/2023	Degraded	5	>70%	30-70%	Weeds increasing significantly, dead banksia branches falling ,
BW-S-PI-6_P02	24/05/2024	Degraded	5	>70%	30-70%	Weeds increasing significantly, dead banksia branches falling, stressed jarrah in background. All other trees healthy.,
BW-S-PI-6_P02	7/11/2024	Degraded	5	>70%	30-70%	Weeds increasing significantly, dead banksia branches falling, stressed jarrah in background. All other trees healthy. 2024sp no change ,
BW-S-PI-6_P02	23/05/2025	Degraded	5	>70%	30-70%	Weeds increasing significantly, dead banksia branches falling, stressed jarrah in background. All other trees healthy. 2024sp no change ,A25 stable no change.
BW-S-PI-6_P03	22/05/2020	Degraded		30-70%	30-70%	
BW-S-PI-6_P03	23/10/2020	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	15/10/2021	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	25/05/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	17/10/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P03	26/05/2023	Degraded	5	>70%	30-70%	Almost all weeds in understory ,
BW-S-PI-6_P03	29/09/2023	Degraded	5	>70%	30-70%	Almost all weeds in understory ,
BW-S-PI-6_P03	24/05/2024	Degraded	5	>70%	30-70%	Almost all weeds in understory , 2024 old banksia has large dead branch, one jarrh sapling recently dead, othe Canopy healthy .,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-6_P03	7/11/2024	Degraded	5	>70%	30-70%	Almost all weeds in understory , 2024 old banksia has large dead branch, one jarrah sapling recently dead, othe Canopy healthy . 3024 sp no change. stable ,
BW-S-PI-6_P03	23/05/2025	Degraded	4	>70%	30-70%	Almost all weeds in understory , 2024 old banksia has large dead branch, one jarrah sapling recently dead, othe Canopy healthy . 3024 sp no change. stable ,A25 canopy has thinned especially in cc
BW-S-PI-6_P04	22/05/2020	Degraded		30-70%	30-70%	Marri drought effects,
BW-S-PI-6_P04	23/10/2020	Degraded	4	30-70%	30-70%	Marri drought effects,
BW-S-PI-6_P04	15/10/2021	Degraded	4	30-70%	30-70%	
BW-S-PI-6_P04	25/05/2022	Degraded	4	30-70%	30-70%	
BW-S-PI-6_P04	17/10/2022	Degraded	5	30-70%	30-70%	
BW-S-PI-6_P04	26/05/2023	Degraded	5	>70%	30-70%	
BW-S-PI-6_P04	29/09/2023	Degraded	5	>70%	30-70%	
BW-S-PI-6_P04	24/05/2024	Degraded	5	>70%	30-70%	Site is stable,
BW-S-PI-6_P04	7/11/2024	Degraded	5	>70%	30-70%	Site is stable. 2024 sp no change ,
BW-S-PI-6_P04	23/05/2025	Degraded	5	>70%	30-70%	Site is stable. 2024 sp no change ,A25 site is stable.
BW-S-PI-8_P01	20/06/2022	Very good	5	2-10%	30-70%	
BW-S-PI-8_P01	20/10/2022	Very good	4	2-10%	30-70%	Large marri and jarrah trees are stressed ,
BW-S-PI-8_P01	26/05/2023	Very good	4	2-10%	30-70%	Large marri and jarrah trees are stressed , still stressed. Cleared within 10m of site.,
BW-S-PI-8_P01	29/09/2023	Very good	4	2-10%	30-70%	Large marri and jarrah trees are stressed , still stressed. Cleared within 10m of site. P2518 stressed jarrah and marri trees. P2519 cleared edge weed free. ,
BW-S-PI-8_P01	25/05/2024	Very good	4	2-10%	30-70%	Large marri and jarrah trees are stressed , still stressed. Cleared within 10m of site. P2518 stressed jarrah and marri trees. P2519 cleared edge weed free. 2024 per 2023. Close to works. Pic 195,
BW-S-PI-8_P01	14/11/2024	Very good	4	2-10%	30-70%	Pic 195. 24Sp site per previous assessment, but Ba in east of site at risk due to excavation for wall, pic 2808. ,
BW-S-PI-8_P01	23/05/2025	Very good	4	2-10%	30-70%	Pic 195. 24Sp site per previous assessment, but Ba in east of site at risk due to excavation for wall, pic 2808. ,
BW-S-PI-8_P02	20/06/2022	Excellent	5	<2%	>70%	
BW-S-PI-8_P02	20/10/2022	Excellent	5	<2%	>70%	
BW-S-PI-8_P02	26/05/2023	Excellent	5	<2%	>70%	Site looks healthy ,
BW-S-PI-8_P02	29/09/2023	Excellent	5	<2%	>70%	Site looks healthy / one jarrah sapling about 3m from cleared edge is almost dead P2520. All other trees healthy. P3086,
BW-S-PI-8_P02	25/05/2024	Excellent	4	<2%	>70%	Site looks healthy / one jarrah sapling about 3m from cleared edge is almost dead P2520. All other trees healthy. P3086. 2024 jarrah dead. Large Banksia attenuata dead, with another in background dead due to drought. Hh stressed- ,
BW-S-PI-8_P02	14/11/2024	Excellent	4	<2%	>70%	24 Sp veg healthy. Ba saplings healthy. Af not common here, most stressed trees. Hh healthy but showing old signs of drought stress. Pic 2907.,
BW-S-PI-8_P02	23/05/2025	Excellent	4	<2%	>70%	24 Sp veg healthy. Ba saplings healthy. Af not common here, most stressed trees. Hh healthy but showing old signs of drought stress. Pic 2907.,
BW-S-PI-8_P03	20/06/2022	Good	5	10-30%	30-70%	Site has been disturbed, towards road edge it is good, but condition improves away from road,
BW-S-PI-8_P03	20/10/2022	Good	5	10-30%	30-70%	Site has been disturbed, towards road edge it is good, but condition improves away from referral area.,
BW-S-PI-8_P03	26/05/2023	Good	5	10-30%	30-70%	Site has been disturbed, towards road edge it is good, but condition improves towards the project area.,
BW-S-PI-8_P03	13/10/2023	Good	5	10-30%	30-70%	Site has been disturbed, towards road edge it is good, but condition improves towards the project area./ site stable,
BW-S-PI-8_P03	25/05/2024	Good	4	10-30%	30-70%	Site has been disturbed, towards road edge it is good, but condition improves towards the project area./ site stable. 2024 annual weeds absent. Large agonis, and Ba dead in site. Scattered Agonis in background also dead due to drought. Pic 196.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-8_P03	14/11/2024	Good	4	10-30%	30-70%	24Sp scattered Af not dead, stressed 2-3 with epi growth pic 2905. Unstory healthy 5. Veg adj BOrr healthy. Pic 2906.,
BW-S-PI-8_P03	23/05/2025	Good	4	10-30%	30-70%	24Sp scattered Af not dead, stressed 2-3 with epi growth pic 2905. Unstory healthy 5. Veg adj BOrr healthy. Pic 2906.,
BW-S-PI-8_P04	20/06/2022	Very good	5	2-10%	30-70%	
BW-S-PI-8_P04	20/10/2022	Very good	5	2-10%	30-70%	
BW-S-PI-8_P04	26/05/2023	Very good	5	2-10%	30-70%	
BW-S-PI-8_P04	13/10/2023	Very good	5	2-10%	30-70%	Site looks healthy ,
BW-S-PI-8_P04	25/05/2024	Very good	4	2-10%	30-70%	2024 trees look stressed with 75% of canopy. Young jarrah and Banksia attenuata dead but Note vegetation adjacent to borrr ok. Pic 197, 198,
BW-S-PI-8_P04	25/10/2024	Very good	4	2-10%	30-70%	2024 so trees look stressed with 75% of canopy. Young jarrah and Banksia attenuata dead but Note vegetation adjacent to borrr ok. Pic 197, 198. 24Sp most site 4 some scattered af 2-3. Underst 5.,
BW-S-PI-8_P04	23/05/2025	Very good	4	2-10%	30-70%	2024 so trees look stressed with 75% of canopy. Young jarrah and Banksia attenuata dead but Note vegetation adjacent to borrr ok. Pic 197, 198. 24Sp most site 4 some scattered af 2-3. Underst 5.,
BW-S-PI-8_P05	20/06/2022	Good	5	30-70%	10-30%	
BW-S-PI-8_P05	20/10/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P05	26/05/2023	Good	5	30-70%	30-70%	
BW-S-PI-8_P05	13/10/2023	Good	5	30-70%	30-70%	Site looks healthy. Adjacent veg similar P3095,3096,
BW-S-PI-8_P05	25/05/2024	Good	4	30-70%	30-70%	Site looks healthy. Adjacent veg similar P3095,3096. 2024 3 dead banksia. Several very stressed/ dead agonis on site . This death and stress pattern is repeated to south behind monitoring site. Under story stressed but ok.pic 199. About 50% canopy.,
BW-S-PI-8_P05	14/11/2024	Good	3	30-70%	30-70%	24Sp Af still very stressed, 3 some epi growth. Repeated in background. Ust ok,
BW-S-PI-8_P05	23/05/2025	Good	3	30-70%	30-70%	24Sp Af still very stressed, 3 some epi growth. Repeated in background. Ust ok,
BW-S-PI-8_P06	20/06/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P06	20/10/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P06	26/05/2023	Good	5	30-70%	30-70%	
BW-S-PI-8_P06	13/10/2023	Good	5	30-70%	30-70%	Peppi tree to west adjacent clearing healthy. P3097,
BW-S-PI-8_P06	25/05/2024	Good	4	30-70%	30-70%	Peppi tree to west adjacent clearing healthy. P3097 2024 2 mature batt dead, 3-4 agonis very stressed / dead. Due to drought. Hh stressed but ok. Note vegetation adjacent to borrr cutting ok - Pic 200. ,
BW-S-PI-8_P06	14/11/2024	Good	4	30-70%	30-70%	Note vegetation adjacent to borrr cutting ok - Pic 200. 24Sp 3-4 Af still stressed, some epicormic growth. Pic 2900. Hh ok 5 2904, parts dead, but most recovered . Af in background still stressed. Pic 2901. 2903,
BW-S-PI-8_P06	23/05/2025	Good	4	30-70%	30-70%	Note vegetation adjacent to borrr cutting ok - Pic 200. 24Sp 3-4 Af still stressed, some epicormic growth. Pic 2900. Hh ok 5 2904, parts dead, but most recovered . Af in background still stressed. Pic 2901. 2903,
BW-S-PI-8_P07	20/06/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P07	20/10/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P07	26/05/2023	Good	5	30-70%	30-70%	
BW-S-PI-8_P07	13/10/2023	Good	5	30-70%	30-70%	Jarrah tree sapling just east of cleared area stressed. P3098. All other trees ok. Cutting at this side deep.p3099. Else ok,
BW-S-PI-8_P07	25/05/2024	Good	3	30-70%	30-70%	. Else ok. 2024 - Most trees agonis and Banksia attenuata very stressed/ dead within 20 - 30 m of monitoring point. Pic 201 204. Understory stressed but ok. Highest point, pic c205 perhaps very dry. ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-PI-8_P07	14/11/2024	Good	3	30-70%	30-70%	24Sp most Af in 20-30 m still very stressed, but with some epicormic growth, 2 stress rating. Pic 2893. Other trees em ba and after 3 rating. Understory healthy. Locally Uniform pattern of stress both in and adjacent road. Pic 2896. Healthy veg 2899.,
BW-S-PI-8_P07	23/05/2025	Good	3	30-70%	30-70%	24Sp most Af in 20-30 m still very stressed, but with some epicormic growth, 2 stress rating. Pic 2893. Other trees em ba and after 3 rating. Understory healthy. Locally Uniform pattern of stress both in and adjacent road. Pic 2896. Healthy veg 2899.,
BW-S-PI-8_P08	20/06/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P08	20/10/2022	Good	5	30-70%	30-70%	
BW-S-PI-8_P08	26/05/2023	Good	5	30-70%	30-70%	
BW-S-PI-8_P08	13/10/2023	Good	5	30-70%	30-70%	Site looks healthy, no stress in trees or shrubs,
BW-S-PI-8_P08	25/05/2024	Good	4	30-70%	30-70%	Site looks healthy, no stress in trees or shrubs. 2024 8-10 Adonis saplings dead, 1 small B grandis dead in site. Scattered dead/stressed ag and ba in background. Understory stressed but ok. Vegetation adjacent to cutting ok pic 206.,
BW-S-PI-8_P08	14/11/2024	Good	4	30-70%	30-70%	24Sp ,Äüdead,Äü Most Af saplings now have epicormic growth. Pic 2891. Understorey healthy 5. Veg adjacent cutting ok, pic 2893.,
BW-S-PI-8_P08	23/05/2025	Good	4	30-70%	30-70%	24Sp ,Äüdead,Äü Most Af saplings now have epicormic growth. Pic 2891. Understorey healthy 5. Veg adjacent cutting ok, pic 2893.,
BW-S-PI-8_T1E	10/20/2022	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1E	5/26/2023	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1E	10/13/2023	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1E	5/25/2024	Excellent	4	<2%	30-70%	
BW-S-PI-8_T1E	10/11/2024	Excellent	4	<2%	30-70%	
BW-S-PI-8_T1E	23/5/2025	Excellent	4	<2%	30-70%	
BW-S-PI-8_T1W	10/20/2022	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1W	5/26/2023	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1W	10/13/2023	Excellent	5	<2%	30-70%	
BW-S-PI-8_T1W	5/25/2024	Excellent	4	<2%	30-70%	
BW-S-PI-8_T1W	10/11/2024	Excellent	4	<2%	30-70%	
BW-S-PI-8_T1W	23/5/2025	Excellent	4	<2%	30-70%	
BW-S-R-1_T1E	11/22/2019	Very good				
BW-S-R-1_T1E	5/22/2020	Very good		<2%	30-70%	
BW-S-R-1_T1E	10/22/2020	Very good	5	<2%	30-70%	
BW-S-R-1_T1E	10/12/2021	Very good	5	<2%	30-70%	
BW-S-R-1_T1E	5/26/2022	Very good	4	<2%	30-70%	
BW-S-R-1_T1E	10/13/2022	Very good	5	<2%	30-70%	
BW-S-R-1_T1E	5/22/2023	Very good	4	<2%	30-70%	
BW-S-R-1_T1E	10/10/2023	Very good	4	<2%	30-70%	
BW-S-R-1_T1E	5/24/2024	Very good	4	<2%	30-70%	
BW-S-R-1_T1E	10/8/2024	Very good	4	<2%	30-70%	
BW-S-R-1_T1E	23/5/2025	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	11/22/2019	Excellent				
BW-S-R-1_T1W	5/22/2020	Very good		<2%	30-70%	
BW-S-R-1_T1W	10/22/2020	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	10/12/2021	Very good	4	<2%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
BW-S-R-1_T1W	5/26/2022	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	10/13/2022	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	5/22/2023	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	10/10/2023	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	5/24/2024	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	10/8/2024	Very good	4	<2%	30-70%	
BW-S-R-1_T1W	23/5/2025	Very good	4	<2%	30-70%	
BW-S-R-1_T2N	12/3/2019	Excellent				
BW-S-R-1_T2N	5/22/2020	Excellent		<2%	30-70%	
BW-S-R-1_T2N	10/22/2020	Excellent	3	<2%	30-70%	
BW-S-R-1_T2N	10/12/2021	Excellent	3	<2%	30-70%	
BW-S-R-1_T2N	5/26/2022	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	10/13/2022	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	5/22/2023	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	10/10/2023	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	5/24/2024	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	10/8/2024	Excellent	4	<2%	30-70%	
BW-S-R-1_T2N	23/5/2025	Excellent	4	<2%	30-70%	
BW-S-R-1_T2S	12/3/2019	Excellent				
BW-S-R-1_T2S	5/22/2020	Excellent		<2%	>70%	
BW-S-R-1_T2S	10/22/2020	Excellent		<2%	>70%	
BW-S-R-1_T2S	10/12/2021	Excellent		<2%	>70%	
BW-S-R-1_T2S	5/26/2022	Excellent	4	<2%	>70%	
BW-S-R-1_T2S	10/13/2022	Excellent	5	<2%	>70%	
BW-S-R-1_T2S	5/22/2023	Excellent	5	<2%	>70%	
BW-S-R-1_T2S	10/10/2023	Excellent	4	<2%	>70%	
BW-S-R-1_T2S	5/24/2024	Excellent	4	<2%	>70%	
BW-S-R-1_T2S	10/8/2024	Excellent	4	<2%	>70%	
BW-S-R-1_T2S	23/5/2025	Excellent	4	<2%	>70%	
CP-NS-R-1_T1E	6/11/2019	Very good				
CP-NS-R-1_T1E	5/20/2020	Very good		2-10%		
CP-NS-R-1_T1E	10/12/2020	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	11/9/2021	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	5/24/2022	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	9/28/2022	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	5/24/2023	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	10/11/2023	Very good	5	10-30%	30-70%	
CP-NS-R-1_T1E	5/23/2024	Very good	4	10-30%	30-70%	
CP-NS-R-1_T1E	10/10/2024	Very good	4	10-30%	30-70%	
CP-NS-R-1_T1E	5/29/2025	Very good	4	10-30%	30-70%	,A25 cc thin. Vj 20% dead.
CP-NS-R-1_T1W	11/6/2019	Excellent				
CP-NS-R-1_T1W	5/20/2020	Excellent		<2%	30-70%	
CP-NS-R-1_T1W	10/12/2020	Excellent	5	<2%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
CP-NS-R-1_T1W	11/9/2021	Excellent	5	<2%	30-70%	
CP-NS-R-1_T1W	5/24/2022	Excellent	5	<2%	30-70%	
CP-NS-R-1_T1W	9/28/2022	Excellent	5	<2%	30-70%	
CP-NS-R-1_T1W	5/24/2023	Excellent	5	<2%	30-70%	
CP-NS-R-1_T1W	10/11/2023	Excellent	5	<2%	30-70%	
CP-NS-R-1_T1W	5/23/2024	Excellent	4	<2%	30-70%	
CP-NS-R-1_T1W	10/10/2024	Excellent	4	<2%	30-70%	
CP-NS-R-1_T1W	5/29/2025	Excellent	4	<2%	30-70%	,A25 Hp 50% else per S24
CP-NS-R-2_T1N	9/26/2020	Degraded	5	10-30%	30-70%	
CP-NS-R-2_T1N	5/26/2022	Degraded	5	10-30%	30-70%	
CP-NS-R-2_T1N	5/25/2023	Degraded	5	10-30%	30-70%	
CP-NS-R-2_T1N	10/12/2023	Degraded	5	30-70%	30-70%	
CP-NS-R-2_T1N	5/24/2024	Degraded	5	30-70%	30-70%	
CP-NS-R-2_T1N	9/10/2024	Degraded	5	30-70%	30-70%	
CP-NS-R-2_T1N	5/23/2025	Degraded	5	30-70%	30-70%	,A site is dry but stable.
CP-NS-R-2_T1S	10/20/2020	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	10/15/2021	Good	5			
CP-NS-R-2_T1S	5/26/2022	Good	5	30-70%	2-10%	
CP-NS-R-2_T1S	9/29/2022	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	5/25/2023	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	10/12/2023	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	5/24/2024	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	9/10/2024	Good	5	10-30%	30-70%	
CP-NS-R-2_T1S	5/23/2025	Good	5	10-30%	30-70%	,A25 site is dry but appears stable.
CP-NS-R-2_T1N	10/15/2021	Degraded	5	10-30%	30-70%	
CP-NS-R-2_T1N	9/26/2022	Degraded	5	10-30%	30-70%	
CP-S-PI-1_P01	15/10/2021	Degraded	5	30-70%	10-30%	Sheep foot plugs in clay,
CP-S-PI-1_P01	26/05/2022	Degraded	5	30-70%	10-30%	Fire track inundated, as expected in clay pan after rain,
CP-S-PI-1_P01	19/10/2022	Degraded	5	30-70%	10-30%	Fire track inundated, as expected in clay pan after rain,
CP-S-PI-1_P01	25/05/2023	Degraded	5	30-70%	10-30%	Fire track slightly inundated. Dry autumn ,
CP-S-PI-1_P01	29/09/2023	Degraded	5	30-70%	10-30%	Fire track slightly inundated. Dry autumn ,
CP-S-PI-1_P01	24/05/2024	Degraded	5	30-70%	10-30%	Vegetation appears healthy, even after the dry summer.,
CP-S-PI-1_P01	9/10/2024	Degraded	5	30-70%	10-30%	Vegetation appears healthy, even after the dry summer. 2024 sp healthy inundated ,
CP-S-PI-1_P01	23/05/2025	Degraded	5	30-70%	10-30%	Vegetation appears healthy, even after the dry summer. 2024 sp healthy inundated ,A25 site stable.
CP-S-PI-1_P02	15/10/2021	Good	5	10-30%	10-30%	
CP-S-PI-1_P02	26/05/2022	Good	5	10-30%	10-30%	No native annuals germinated yet,
CP-S-PI-1_P02	19/10/2022	Good	5	10-30%	10-30%	Track inundated as expected for this time of year. ,
CP-S-PI-1_P02	25/05/2023	Good	5	10-30%	10-30%	Track dry,
CP-S-PI-1_P02	29/09/2023	Good	5	10-30%	10-30%	Track inundated ,
CP-S-PI-1_P02	24/05/2024	Good	5	10-30%	10-30%	Shrubs appear healthy.,
CP-S-PI-1_P02	9/10/2024	Good	5	10-30%	10-30%	Shrubs appear healthy. 24 site inundated.,
CP-S-PI-1_P02	23/05/2025	Good	5	10-30%	10-30%	Shrubs appear healthy. 24 site inundated.,25A site is stable
CP-S-PI-1_P03	20/05/2020	Very good		2-10%	30-70%	Adjacent to fire access track,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
CP-S-PI-1_P03	15/10/2021	Very good	5	2-10%	30-70%	
CP-S-PI-1_P03	26/05/2022	Very good	5	2-10%	30-70%	
CP-S-PI-1_P03	19/10/2022	Very good	5	2-10%	30-70%	
CP-S-PI-1_P03	25/05/2023	Very good	5	2-10%	30-70%	Dry autumn, no water.,
CP-S-PI-1_P03	29/09/2023	Very good	5	2-10%	30-70%	Damp lots of herbs,
CP-S-PI-1_P03	24/05/2024	Very good	5	2-10%	30-70%	Site appears healthy and stable. ,
CP-S-PI-1_P03	9/10/2024	Very good	5	2-10%	30-70%	Site appears healthy and stable. 2024 very healthy.,
CP-S-PI-1_P03	23/05/2025	Very good	5	2-10%	30-70%	Site appears healthy and stable. 2024 very healthy.,Site is very dry, but appears stable.
CP-S-PI-1_T1N	11/5/2019	Degraded				
CP-S-PI-1_T1N	5/20/2020	Degraded		30-70%	10-30%	
CP-S-PI-1_T1N	10/20/2020	Degraded		30-70%	10-30%	
CP-S-PI-1_T1N	10/15/2021	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	5/26/2022	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	9/29/2022	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	5/25/2023	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	10/12/2023	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	9/10/2024	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1N	5/23/2025	Degraded	5	30-70%	10-30%	,A25 site stable
CP-S-PI-1_T1N	24/5/2024	Degraded	5	30-70%	10-30%	
CP-S-PI-1_T1S	11/5/2019	Good				
CP-S-PI-1_T1S	5/20/2020	Good		10-30%	30-70%	
CP-S-PI-1_T1S	10/20/2020	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	10/15/2021	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	5/26/2022	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	9/29/2022	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	5/25/2023	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	10/12/2023	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	9/10/2024	Good	5	10-30%	30-70%	
CP-S-PI-1_T1S	5/23/2025	Good	5	10-30%	30-70%	,A site stable
CP-S-PI-1_T1S	24/5/2024	Good	5	10-30%	30-70%	
CPS-S-PI-1_P01	28/10/2020	Degraded	5	30-70%	10-30%	10 Cm inundated fire break ,
CPS-S-PI-1_P02	28/10/2020	Good	5	10-30%	10-30%	Site fully inundated, 20x20m. 10cm,
CPS-S-PI-1_P03	28/10/2020	Very good	5	2-10%	30-70%	Adjacent to fire access track,
CP-S-PI-1_P01	19/11/2019	Degraded		10-30%		
CP-S-PI-1_P01	20/05/2020	Degraded		10-30%	10-30%	
CP-S-PI-1_P02	19/11/2019	Good		2-10%		Farm,
CP-S-PI-1_P02	20/05/2020	Good		2-10%	10-30%	Farm,
CP-S-PI-1_P03	19/11/2019	Very good		2-10%		
TW-S-PI-1_P01	21/11/2019	Degraded		<2%		Previously cleared for farming, reveg site,
TW-S-PI-1_P01	26/05/2020	Degraded		<2%	10-30%	Previously cleared for farming, reveg site,
TW-S-PI-1_P01	28/10/2020	Degraded	5	<2%	10-30%	Previously cleared for farming, reveg site,
TW-S-PI-1_P01	14/10/2021	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress,
TW-S-PI-1_P01	26/05/2022	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-1_P01	19/10/2022	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress,
TW-S-PI-1_P01	25/05/2023	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress,
TW-S-PI-1_P01	29/09/2023	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress, note weeds from the verge have started to spread into the area, and need to be controlled ,
TW-S-PI-1_P01	24/05/2024	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress, note weeds from the verge have started to spread into the area, and need to be controlled . 2024 canopy health is good. Some melaleuca thymoides shrubs are recently dead.,
TW-S-PI-1_P01	7/11/2024	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress, note weeds from the verge have started to spread into the area, and need to be controlled . 2024 canopy health is good. Some melaleuca thymoides shrubs are recently dead. 2024 sp no change stable ,
TW-S-PI-1_P01	23/05/2025	Degraded	5	<2%	10-30%	Historic farm but very good reveg in progress, note weeds from the verge have started to spread into the area, and need to be controlled . 2024 canopy health is good. Some melaleuca thymoides shrubs are recently dead. 2024 sp no change stable ,A25 site is stable
TW-S-PI-1_P02	21/11/2019	Good		<2%		
TW-S-PI-1_P02	26/05/2020	Good		<2%	10-30%	Historically cleared and farmed. Now a revegetation site.,
TW-S-PI-1_P02	28/10/2020	Good	4	<2%	10-30%	Historically cleared and farmed. Now a revegetation site.,
TW-S-PI-1_P02	14/10/2021	Good	4	<2%	10-30%	Very good revegetation,
TW-S-PI-1_P02	26/05/2022	Good	4	<2%	10-30%	Very good revegetation,
TW-S-PI-1_P02	19/10/2022	Good	4	<2%	10-30%	Very good revegetation,
TW-S-PI-1_P02	25/05/2023	Good	4	<2%	10-30%	Very good revegetation, note stress in tuart trees,!but this appears stable.,
TW-S-PI-1_P02	29/09/2023	Good	4	<2%	10-30%	Very good revegetation, note stress in tuart trees,!but this appears stable.,
TW-S-PI-1_P02	24/05/2024	Good	4	2-10%	10-30%	Very good revegetation, note stress in tuart trees,!but this appears stable. 2024 many of the agonis are stressed / dead in adjacent to site. ,
TW-S-PI-1_P02	7/11/2024	Good	4	2-10%	10-30%	Very good revegetation, note stress in tuart trees,!but this appears stable. 2024 many of the agonis are stressed / dead in adjacent to site. 2024 sp same no change. Some Agonis coming back. ,
TW-S-PI-1_P02	23/05/2025	Good	4	2-10%	10-30%	Very good revegetation, note stress in tuart trees,!but this appears stable. 2024 many of the agonis are stressed / dead in adjacent to site. 2024 sp same no change. Some Agonis coming back. ,A25 some fresh stress in Af. Most relictual. Site about 50% canopy cover.
TW-S-PI-1_P03	21/11/2019	Degraded		2-10%		
TW-S-PI-1_P03	26/05/2020	Degraded		2-10%	30-70%	
TW-S-PI-1_P03	28/10/2020	Degraded	5	2-10%	30-70%	
TW-S-PI-1_P03	15/10/2021	Degraded	5	<2%	30-70%	Reveg site. Weed control is being undertaken ,
TW-S-PI-1_P03	26/05/2022	Degraded	5	<2%	30-70%	Reveg site. Weed control is being undertaken ,
TW-S-PI-1_P03	19/10/2022	Degraded	5	<2%	30-70%	Reveg site. Weed control is being undertaken ,
TW-S-PI-1_P03	25/05/2023	Degraded	5	<2%	30-70%	Reveg site. Weed control is being undertaken ,
TW-S-PI-1_P03	29/09/2023	Degraded	5	<2%	30-70%	Reveg site. Weed control is being undertaken, rabbit proof fence has been damaged as part of project works,
TW-S-PI-1_P03	24/05/2024	Degraded	4	<2%	30-70%	Reveg site. Weed control is being undertaken, rabbit proof fence has been damaged as part of project works. Many of agonis, Acacia saligna at site are very stressed / or dead in the site . This stress is evident throughout site.pic 192,
TW-S-PI-1_P03	7/11/2024	Degraded	4	<2%	30-70%	Many of agonis, Acacia saligna at site are very stressed / or dead in the site . This stress is evident throughout site.pic 192. 2024 sp stressed plants are looking alive (just). Tuarts stable ,
TW-S-PI-1_P03	23/05/2025	Degraded	4	<2%	30-70%	Many of agonis, Acacia saligna at site are very stressed / or dead in the site . This stress is evident throughout site.pic 192. 2024 sp stressed plants are looking alive (just). Tuarts stable ,A25 Tuart and Cc stressed some 20-30%. Close to 3 for site. Relictual stress in Acacia evident some dead.

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P01	31/07/2020	Very good		10-30%	30-70%	
TW-S-PI-2_P01	28/10/2020	Very good	5	30-70%	30-70%	Site is in the border of being good ,
TW-S-PI-2_P01	14/10/2021	Very good	5	30-70%	30-70%	
TW-S-PI-2_P01	26/05/2022	Very good	5	30-70%	30-70%	
TW-S-PI-2_P01	19/10/2022	Very good	5	30-70%	30-70%	Weeds are invading the condition of the site is declining ,
TW-S-PI-2_P01	25/05/2023	Very good	5	30-70%	30-70%	Weeds are invading the condition of the site is declining. Autumn dry no annual weeds. ,
TW-S-PI-2_P01	29/09/2023	Very good	5	30-70%	30-70%	Weeds are invading the condition of the site is declining. Autumn dry no annual weeds. Briza maxima, Ursinia invading ,
TW-S-PI-2_P01	24/05/2024	Very good	4	30-70%	30-70%	Scattered stressed agonis, most hibbertia hypericoides dead / stressed in site. Pic 168,
TW-S-PI-2_P01	11/10/2024	Very good	4	30-70%	30-70%	Scattered stressed agonis, most hibbertia hypericoides dead / stressed in site. Pic 168. 24Sp Af Hh 3, else 4. Pic 1808.,
TW-S-PI-2_P01	23/05/2025	Very good	4	30-70%	30-70%	Scattered stressed agonis, most hibbertia hypericoides dead / stressed in site. Pic 168. 24Sp Af Hh 3, else 4. Pic 1808.,A2. Hh 75% stressed. Dav div also stressed. Loss of structure & weeds makes site close to Good.
TW-S-PI-2_P02	31/07/2020	Good		10-30%	30-70%	
TW-S-PI-2_P02	28/10/2020	Good	5	30-70%	30-70%	Weed cover increased significantly ,
TW-S-PI-2_P02	14/10/2021	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	26/05/2022	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	19/10/2022	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	25/05/2023	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	29/09/2023	Good	5	30-70%	30-70%	
TW-S-PI-2_P02	24/05/2024	Good	4	30-70%	30-70%	Scattered dead/ stressed Banksia, agonis and Xylomelon. ,
TW-S-PI-2_P02	11/10/2024	Good	4	30-70%	30-70%	Scattered dead/ stressed Banksia, agonis and Xylomelon. 24Sp most veg 4,
TW-S-PI-2_P02	23/05/2025	Good	4	30-70%	30-70%	Scattered dead/ stressed Banksia, agonis and Xylomelon. 24Sp most veg 4,A25. Site per 24Sp.
TW-S-PI-2_P03	31/07/2020	Good		10-30%	30-70%	
TW-S-PI-2_P03	28/10/2020	Good	5	10-30%	30-70%	
TW-S-PI-2_P03	14/10/2021	Good	5	10-30%	30-70%	
TW-S-PI-2_P03	26/05/2022	Good	5	10-30%	30-70%	Peppermint, Banksia and Spyridium crowns thin, hence 4 rating,
TW-S-PI-2_P03	19/10/2022	Good	4	30-70%	30-70%	Peppermint, Banksia and Spyridium crowns thin, hence 4 rating,
TW-S-PI-2_P03	25/05/2023	Good	4	30-70%	30-70%	Peppermint, Banksia and Spyridium crowns thin, hence 4 rating,
TW-S-PI-2_P03	29/09/2023	Good	4	30-70%	30-70%	Peppermint, Banksia and Spyridium crowns thin, hence 4 rating/ 2 Spyridium dead, possibly old age,
TW-S-PI-2_P03	24/05/2024	Good	4	30-70%	30-70%	2024 3 Spyridium dead and 2 very stressed. Several Young melaleuca thymoides also dead in site. This appears localised and maybe exacerbated by drought. Pic 167.,
TW-S-PI-2_P03	11/10/2024	Good	4	30-70%	30-70%	2024 3 Spyridium dead and 2 very stressed. Several Young melaleuca thymoides also dead in site. This appears localised and maybe exacerbated by drought. Pic 167. 24Sp, ~10 Sg dead., 1x Mth dead, Hh 4. Adjacent BORR ok pic 1806.Las pet 5 1807.,
TW-S-PI-2_P03	23/05/2025	Good	4	30-70%	30-70%	2024 3 Spyridium dead and 2 very stressed. Several Young melaleuca thymoides also dead in site. This appears localised and maybe exacerbated by drought. Pic 167. 24Sp, ~10 Sg dead., 1x Mth dead, Hh 4. Adjacent BORR ok pic 1806.Las pet 5 1807.,Stressed Sg almost all dead. Some residual stress in Af. Adjacent borr side veg ok. One large Ba fresh dead. Las pet ok.
TW-S-PI-2_P04	31/07/2020	Good		10-30%	30-70%	
TW-S-PI-2_P04	28/10/2020	Good	4	30-70%	30-70%	Banksia and agonis have some thinning of the canopy.,
TW-S-PI-2_P04	14/10/2021	Good	4	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P04	26/05/2022	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	19/10/2022	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	25/05/2023	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	29/09/2023	Good	4	30-70%	30-70%	
TW-S-PI-2_P04	24/05/2024	Good	4	30-70%	30-70%	Scattered dead/ very stressed agonis. Some dead and healthy Agonis adjacent to borr pic 166.,
TW-S-PI-2_P04	11/10/2024	Good	4	30-70%	30-70%	Scattered dead/ very stressed agonis. Some dead and healthy Agonis adjacent to borr pic 166. Site healthy even adjacent to Borr pic 1803.,
TW-S-PI-2_P04	23/05/2025	Good	4	30-70%	30-70%	Scattered dead/ very stressed agonis. Some dead and healthy Agonis adjacent to borr pic 166. Site healthy even adjacent to Borr pic 1803.,A25 no new stress evident. Some relictual stress esp in Af. Dead Ba.
TW-S-PI-2_P05	31/07/2020	Degraded		10-30%	30-70%	
TW-S-PI-2_P05	9/09/2020	Degraded		10-30%	30-70%	
TW-S-PI-2_P05	14/10/2021	Degraded	4	10-30%	30-70%	
TW-S-PI-2_P05	26/05/2022	Degraded	4	10-30%	30-70%	
TW-S-PI-2_P05	19/10/2022	Degraded	4	>70%	30-70%	
TW-S-PI-2_P05	25/05/2023	Degraded	4	>70%	30-70%	
TW-S-PI-2_P05	29/09/2023	Degraded	4	>70%	30-70%	
TW-S-PI-2_P05	24/05/2024	Degraded	4	>70%	30-70%	Scattered dead/ stressed agonis in vegetation. This is similar adjacent to Borr, pic 165,
TW-S-PI-2_P05	11/10/2024	Degraded	4	>70%	30-70%	Scattered dead/ stressed agonis in vegetation. This is similar adjacent to Borr, pic 165, 24Sp per 24 aut. Pic 1801.,
TW-S-PI-2_P05	23/05/2025	Degraded	4	>70%	30-70%	Scattered dead/ stressed agonis in vegetation. This is similar adjacent to Borr, pic 165, 24Sp per 24 aut. Pic 1801.,A25 site is dry, some relictual stress evident . Grass weeds not all fully germinated. Could be rated as good.
TW-S-PI-2_P06	31/07/2020	Degraded		10-30%	30-70%	
TW-S-PI-2_P06	28/10/2020	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	14/10/2021	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	26/05/2022	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	19/10/2022	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	25/05/2023	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	29/09/2023	Degraded	5	>70%	30-70%	
TW-S-PI-2_P06	24/05/2024	Degraded	4	>70%	30-70%	Scattered patchy dead/ stressed agonis in vegetation in Manea park. Note vegetation adjacent to Borr is healthy at this point. Pic 164,
TW-S-PI-2_P06	11/10/2024	Degraded	4	>70%	30-70%	Scattered patchy dead/ stressed agonis in vegetation in Manea park. Note vegetation adjacent to Borr is healthy at this point. Pic 164, 24Sp veg mostly 4 . Adjacent BORR healthy pic 1800.,
TW-S-PI-2_P06	23/05/2025	Degraded	4	>70%	30-70%	Scattered patchy dead/ stressed agonis in vegetation in Manea park. Note vegetation adjacent to Borr is healthy at this point. Pic 164, 24Sp veg mostly 4 . Adjacent BORR healthy pic 1800.,A25 per Sp25
TW-S-PI-2_P07	31/07/2020	Degraded		10-30%	30-70%	
TW-S-PI-2_P07	28/10/2020	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	14/10/2021	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	26/05/2022	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	19/10/2022	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	25/05/2023	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	29/09/2023	Degraded	5	>70%	30-70%	
TW-S-PI-2_P07	24/05/2024	Degraded	4	>70%	30-70%	Very stressed Agonis scattered in vegetation. Note adjacent to Borr clearing pic 162, 163. Affect is consistent away from borr. ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P07	11/10/2024	Degraded	4	>70%	30-70%	Very stressed Agonis scattered in vegetation. Note adjacent to Borr clearing pic 162, 163. Affect is consistent away from borr. 24Sp trans veg 5. Adjacent some deathsAf. Pic -1799,
TW-S-PI-2_P07	23/05/2025	Degraded	4	>70%	30-70%	Very stressed Agonis scattered in vegetation. Note adjacent to Borr clearing pic 162, 163. Affect is consistent away from borr. 24Sp trans veg 5. Adjacent some deathsAf. Pic -1799,A25 af 3-4 in monitoring area. Adjacent dead per 24. Large Eg in ma still healthy.
TW-S-PI-2_P08	31/07/2020	Completely degraded		>70%	2-10%	
TW-S-PI-2_P08	28/10/2020	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P08	14/10/2021	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P08	26/05/2022	Completely degraded	4	>70%	2-10%	
TW-S-PI-2_P08	19/10/2022	Completely degraded	4	>70%	10-30%	Small tuart tree is very stressed,
TW-S-PI-2_P08	25/05/2023	Completely degraded	4	>70%	10-30%	Small tuart tree is very stressed, still stressed. ,
TW-S-PI-2_P08	29/09/2023	Completely degraded	4	>70%	10-30%	Small jarrah tree is very stressed, still stressed. / still stressed ,
TW-S-PI-2_P08	24/05/2024	Completely degraded	3	>70%	10-30%	Small jarrah tree is very stressed, still stressed. / still stressed. 2024 dead. Most Agonis is very stressed in the site 2 rating. Pic 160, 161.,
TW-S-PI-2_P08	11/10/2024	Completely degraded	3	>70%	10-30%	Small jarrah tree is very stressed, still stressed. / still stressed. 2024 dead. Most Agonis is very stressed in the site 2 rating. Pic 160, 161. 24 sp af 3/4 part recovery.pic 1797. Double gee.,
TW-S-PI-2_P08	23/05/2025	Completely degraded	3	>70%	10-30%	Small jarrah tree is very stressed, still stressed. / still stressed. 2024 dead. Most Agonis is very stressed in the site 2 rating. Pic 160, 161. 24 sp af 3/4 part recovery.pic 1797. Double gee.,A25, af 2-3 rating Residual stress.
TW-S-PI-2_P09	31/07/2020	Good		10-30%	30-70%	
TW-S-PI-2_P09	28/10/2020	Good	4	>70%	30-70%	
TW-S-PI-2_P09	14/10/2021	Good	4	>70%	30-70%	
TW-S-PI-2_P09	26/05/2022	Good	4	>70%	30-70%	
TW-S-PI-2_P09	19/10/2022	Good	4	>70%	30-70%	
TW-S-PI-2_P09	25/05/2023	Good	4	>70%	30-70%	
TW-S-PI-2_P09	29/09/2023	Good	4	>70%	30-70%	
TW-S-PI-2_P09	24/05/2024	Good	4	>70%	30-70%	Recent dead banksia saplings young trees in site and background. Dead jarrah sapling in back of site.,
TW-S-PI-2_P09	11/10/2024	Good	3	>70%	30-70%	Recent dead banksia saplings young trees in site and background. Dead jarrah sapling in back of site. 24sp dead Af, Ba, Em sapling other trees 4.pic 1796.,
TW-S-PI-2_P09	23/05/2025	Good	3	>70%	30-70%	Recent dead banksia saplings young trees in site and background. Dead jarrah sapling in back of site. 24sp dead Af, Ba, Em sapling other trees 4.pic 1796.,A25, now new stress in canopy, but Relictual stress evident in shrubs eg sty rac, 30%
TW-S-PI-2_P10	31/07/2020	Good		10-30%	30-70%	
TW-S-PI-2_P10	19/10/2022		4	10-30%	30-70%	Possible impacts from pc. But old impact site. ,
TW-S-PI-2_P10	25/05/2023		4	10-30%	30-70%	Possible impacts from pc. But old impact site. ,
TW-S-PI-2_P10	29/09/2023	Very good	4	10-30%	30-70%	Possible impacts from pc. But old impact site. ,
TW-S-PI-2_P10	24/05/2024	Very good	4	10-30%	30-70%	Possible impacts from pc. But old impact site. Some scattered stressed banksia and Xylomelon. . Lots of Hibbertia hypericoides and Orthrosanthus laxus abnormal stressed dead in due to drought. ,
TW-S-PI-2_P10	11/10/2024	Very good	4	10-30%	30-70%	Possible impacts from pc. But old impact site. Some scattered stressed banksia and Xylomelon. . Lots of Hibbertia hypericoides and Orthrosanthus laxus abnormal stressed dead in due to drought. 24Sp Hh all 4. Other trees 4, Ol 5,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P10	23/05/2025	Very good	4	10-30%	30-70%	Possible impacts from pc. But old impact site. Some scattered stressed banksia and Xylomelon, . Lots of Hibbertia hypericoides and Orthrosanthus laxus abnormal stressed dead in due to drought. 24Sp Hh all 4. Other trees 4, Ol 5,A25 Hh 60% residual stress evident.
TW-S-PI-2_P11	19/10/2022	Good	4	10-30%	30-70%	
TW-S-PI-2_P11	25/05/2023	Good	4	10-30%	30-70%	
TW-S-PI-2_P11	29/09/2023	Good	4	10-30%	30-70%	
TW-S-PI-2_P11	24/05/2024	Good	4	10-30%	30-70%	Trees mostly healthy. Hibbertia hypericoides very stressed.
TW-S-PI-2_P11	11/10/2024	Good	4	10-30%	30-70%	Trees mostly healthy. Hibbertia hypericoides very stressed. 24Sp Hh 4 else healthy.,
TW-S-PI-2_P11	23/05/2025	Good	4	10-30%	30-70%	Trees mostly healthy. Hibbertia hypericoides very stressed. 24Sp Hh 4 else healthy.,25A Em saplings stressed. Hh 40%
TW-S-PI-2_P12	19/10/2022	Very good	5	10-30%	30-70%	
TW-S-PI-2_P12	25/05/2023	Very good	5	10-30%	30-70%	
TW-S-PI-2_P12	29/09/2023	Very good	5	10-30%	30-70%	
TW-S-PI-2_P12	24/05/2024	Very good	4	10-30%	30-70%	Scattered very stressed dead banksia and agonis mostly upslope from monitoring point. Pic 169. Almost all Lots Hibbertia hypericoides very stressed. Pic 170.Tuart ok.,
TW-S-PI-2_P12	11/10/2024	Very good	3	10-30%	30-70%	Scattered very stressed dead banksia and agonis mostly upslope from monitoring point. Pic 169. Almost all Lots Hibbertia hypericoides very stressed. Pic 170.Tuart ok. 24sp 4 x ba dead. Hh 20 - 40% pic 1774.,
TW-S-PI-2_P12	23/05/2025	Very good	3	10-30%	30-70%	Scattered very stressed dead banksia and agonis mostly upslope from monitoring point. Pic 169. Almost all Lots Hibbertia hypericoides very stressed. Pic 170.Tuart ok. 24sp 4 x ba dead. Hh 20 - 40% pic 1774.,A25 residual stress evident. Other trees plz
TW-S-PI-2_P13	19/10/2022	Degraded	5	>70%	30-70%	Veg structure impacted , low scope for regeneration ,
TW-S-PI-2_P13	25/05/2023	Degraded	5	>70%	30-70%	Veg structure impacted , low scope for regeneration ,
TW-S-PI-2_P13	29/09/2023	Degraded	5	>70%	30-70%	Veg structure impacted , low scope for regeneration ,
TW-S-PI-2_P13	24/05/2024	Degraded	4	>70%	30-70%	Veg structure impacted , low scope for regeneration. Almost all Agonis dead or very stressed to north pic 171. but to south ok pic 172.,
TW-S-PI-2_P13	11/10/2024	Degraded	3	>70%	30-70%	Veg structure impacted , low scope for regeneration. Almost all Agonis dead or very stressed to north pic 171. but to south ok pic 172. 24sp Af 10-20%. Eg ok.pic 1776.,
TW-S-PI-2_P13	23/05/2025	Degraded	3	>70%	30-70%	Veg structure impacted , low scope for regeneration. Almost all Agonis dead or very stressed to north pic 171. but to south ok pic 172. 24sp Af 10-20%. Eg ok.pic 1776.,Per 24 sp
TW-S-PI-2_P14	19/10/2022	Good	5	30-70%	30-70%	
TW-S-PI-2_P14	25/05/2023	Good	5	30-70%	30-70%	
TW-S-PI-2_P14	29/09/2023	Good	5	30-70%	30-70%	
TW-S-PI-2_P14	24/05/2024	Good	4	30-70%	30-70%	Most agonis, hibbertia hyp very stressed in site. Tuart ok.,
TW-S-PI-2_P14	11/10/2024	Good	4	>70%	30-70%	Most agonis, hibbertia hyp very stressed in site. Tuart ok. 24sp weeds^. Af 3-4, Eg 4. Hh 4, Lasiopetalum 2. Pic 1778.,
TW-S-PI-2_P14	23/05/2025	Good	4	>70%	30-70%	Most agonis, hibbertia hyp very stressed in site. Tuart ok. 24sp weeds^. Af 3-4, Eg 4. Hh 4, Lasiopetalum 2. Pic 1778.,No new stress evident just relictual stress
TW-S-PI-2_P15	19/10/2022	Very good	4	30-70%	>70%	Weeds are small, competing with smaller herbs. ,
TW-S-PI-2_P15	25/05/2023	Very good	4	30-70%	>70%	Few autumn weeds.,
TW-S-PI-2_P15	29/09/2023	Very good	4	30-70%	>70%	Few autumn weeds./ lots of spring annual weeds ,
TW-S-PI-2_P15	24/05/2024	Very good	4	30-70%	>70%	Few autumn weeds./ lots of spring annual weeds 2024 no autumn weeds, some agonis and hibbertia stressed on site. Relatively ok.,
TW-S-PI-2_P15	11/10/2024	Very good	4	30-70%	>70%	Few autumn weeds./ lots of spring annual weeds 2024 no autumn weeds, some agonis and hibbertia stressed on site. Relatively ok. 24 Trees 4 , Hh 4, Sty rac dead pic 1779.,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P15	23/05/2025	Very good	4	30-70%	>70%	Few autumn weeds./ lots of spring annual weeds 2024 no autumn weeds, some agonis and hibbertia stressed on site. Relatively ok. 24 Trees 4 , Hh 4, Sty rac dead pic 1779.,A25 Hh 70 Af 50 . Fresh Ba death. Relictual stress.
TW-S-PI-2_P16	19/10/2022	Very good	5	30-70%	>70%	
TW-S-PI-2_P16	25/05/2023	Very good	5	30-70%	>70%	All Macrozamia riedlei plants are stressed with outer leaves dead.,
TW-S-PI-2_P16	29/09/2023	Very good	5	30-70%	>70%	All Macrozamia reidleii plants are stressed with outer leaves dead/ this a natural part of their growth cycle.,
TW-S-PI-2_P16	24/05/2024	Very good	4	30-70%	>70%	All Macrozamia reidleii plants are stressed with outer leaves dead/ this a natural part of their cycle 2024 Macrozamia healthy. Most 75% of agonis dead / stressed. Most Styphelia propinqua and hibbertia hyp dead stressed.pic 173,
TW-S-PI-2_P16	11/10/2024	Very good	2	30-70%	>70%	2024 Macrozamia healthy. Most 75% of agonis dead / stressed. Most Styphelia propinqua and hibbertia hyp dead stressed.pic 17. 24sp all Af 2 pic 1780, Hh and Sty rac 3-4, ,
TW-S-PI-2_P16	23/05/2025	Very good	2	30-70%	>70%	2024 Macrozamia healthy. Most 75% of agonis dead / stressed. Most Styphelia propinqua and hibbertia hyp dead stressed.pic 17. 24sp all Af 2 pic 1780, Hh and Sty rac 3-4, ,A25 Af with epicormic growth still 2. Other shrubs per Sp24
TW-S-PI-2_P17	19/10/2022	Good	4	30-70%	30-70%	
TW-S-PI-2_P17	25/05/2023	Good	4	30-70%	30-70%	Outer leaves of Macrozamia dead, but plants look healthy ,
TW-S-PI-2_P17	29/09/2023	Good	4	30-70%	30-70%	Outer leaves of Macrozamia dead, but plants look healthy. Lots of Ursinia invading the site.,
TW-S-PI-2_P17	24/05/2024	Good	4	30-70%	30-70%	Some scattered stressed agonis. Priority listed lasiopetalum stressed but surviving. Pic 174,
TW-S-PI-2_P17	11/10/2024	Good	4	30-70%	30-70%	Some scattered stressed agonis. Priority listed lasiopetalum stressed but surviving. Pic 174. 24sp Af 4, Las pet ok 4 pic 1781.,
TW-S-PI-2_P17	23/05/2025	Good	4	30-70%	30-70%	Some scattered stressed agonis. Priority listed lasiopetalum stressed but surviving. Pic 174. 24sp Af 4, Las pet ok 4 pic 1781.,A25 stress 4 . Eg in background fresh dead?
TW-S-PI-2_P18	19/10/2022	Very good	4	30-70%	>70%	
TW-S-PI-2_P18	25/05/2023	Very good	4	30-70%	>70%	
TW-S-PI-2_P18	29/09/2023	Very good	4	30-70%	>70%	
TW-S-PI-2_P18	24/05/2024	Very good	4	30-70%	>70%	Some scattered stressed Banksia attenuata in background. Large marri tree has died suddenly due to wood borer, cockie predation and drought stress pic 176, 177, 178,
TW-S-PI-2_P18	11/10/2024	Very good	4	>70%	>70%	Some scattered stressed Banksia attenuata in background. Large marri tree has died suddenly due to wood borer, cockie predation and drought stress pic 176, 177, 178. 24sp trees and shrubs 4. Scattered dead sty rac. Dead marri pic 1782,
TW-S-PI-2_P18	23/05/2025	Very good	4	>70%	>70%	Some scattered stressed Banksia attenuata in background. Large marri tree has died suddenly due to wood borer, cockie predation and drought stress pic 176, 177, 178. 24sp trees and shrubs 4. Scattered dead sty rac. Dead marri pic 1782,A24 relictual stress evident. Af coppicing but about 50%
TW-S-PI-2_P19	19/10/2022	Good	5	30-70%	30-70%	Dieing Agonis flexuosa north of site,
TW-S-PI-2_P19	25/05/2023	Good	5	30-70%	30-70%	Dying Agonis flexuosa north of site, half is dead. ,
TW-S-PI-2_P19	29/09/2023	Good	5	30-70%	30-70%	Dieing Agonis flexuosa north of site, half is dead. Still dead ,
TW-S-PI-2_P19	24/05/2024	Good	4	30-70%	30-70%	Dieing Agonis flexuosa north of site, half is dead. Still dead. Scattered stressed agonis in site and background .,
TW-S-PI-2_P19	11/10/2024	Good	4	30-70%	>70%	Dieing Agonis flexuosa north of site, half is dead. Still dead. Scattered stressed agonis in site and background . 24sp Af 4. Site ok.,
TW-S-PI-2_P19	23/05/2025	Good	4	30-70%	>70%	Dieing Agonis flexuosa north of site, half is dead. Still dead. Scattered stressed agonis in site and background . 24sp Af 4. Site ok.,A25 per Sp24
TW-S-PI-2_P20	19/10/2022	Degraded	5	>70%	30-70%	
TW-S-PI-2_P20	25/05/2023	Degraded	5	>70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-2_P20	29/09/2023	Degraded	5	>70%	30-70%	Three large tuarts on the background are dead. Large Marri to the east is very stressed. P2524,
TW-S-PI-2_P20	24/05/2024	Degraded	5	>70%	30-70%	Three large tuarts on the background are dead. Large Marri to the east is very stressed. P2524 and is now dead pic 180. A few scattered dead banksia attenuata in background vegetation. Site relatively ok.,
TW-S-PI-2_P20	11/10/2024	Degraded	5	>70%	30-70%	Three large tuarts on the background are dead. Large Marri to the east is very stressed. P2524 and is now dead pic 180. A few scattered dead banksia attenuata in background vegetation. Site relatively ok. 24sp local veg 5.,
TW-S-PI-2_P20	23/05/2025	Degraded	5	>70%	30-70%	Three large tuarts on the background are dead. Large Marri to the east is very stressed. P2524 and is now dead pic 180. A few scattered dead banksia attenuata in background vegetation. Site relatively ok. 24sp local veg 5.,A25 per Sp24
TW-S-PI-2_T1E	11/19/2019	Very good				
TW-S-PI-2_T1E	5/26/2020	Very good		<2%	30-70%	
TW-S-PI-2_T1E	10/26/2020	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1E	10/14/2021	Very good	5	10-30%	30-70%	
TW-S-PI-2_T1E	5/26/2022	Very good	5	10-30%	30-70%	
TW-S-PI-2_T1E	10/19/2022	Very good	5	10-30%	30-70%	
TW-S-PI-2_T1E	5/25/2023	Very good	5	10-30%	30-70%	
TW-S-PI-2_T1E	10/10/2023	Very good	5	10-30%	30-70%	
TW-S-PI-2_T1E	5/24/2024	Very good	4	10-30%	30-70%	
TW-S-PI-2_T1E	10/11/2024	Very good	4	10-30%	30-70%	
TW-S-PI-2_T1E	23/5/2025	Very good	4	10-30%	30-70%	,a25 per Sp25
TW-S-PI-2_T1W	11/19/2019	Good				
TW-S-PI-2_T1W	5/26/2020	Very good		<2%	30-70%	
TW-S-PI-2_T1W	10/26/2020	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	10/14/2021	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	5/26/2022	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	10/19/2022	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	5/25/2023	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	10/10/2023	Very good	5	2-10%	30-70%	
TW-S-PI-2_T1W	5/24/2024	Very good	4	2-10%	30-70%	
TW-S-PI-2_T1W	10/11/2024	Very good	3	2-10%	30-70%	
TW-S-PI-2_T1W	23/5/2025	Very good	3	2-10%	30-70%	,A25 per Sp24, maybe some recovery in Ba. Af in foreground almost dead.
TW-S-PI-3_P01	26/05/2020	Degraded		30-70%	10-30%	
TW-S-PI-3_P01	28/10/2020	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	14/10/2021	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	26/05/2022	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	19/10/2022	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	22/05/2023	Degraded	5	30-70%	10-30%	A new fence is being constructed on opposite side of the fire access track. ,
TW-S-PI-3_P01	29/09/2023	Degraded	5	30-70%	10-30%	A new fence is being constructed on opposite side of the fire access track. Access track is disturbed as part of borrh works,
TW-S-PI-3_P01	25/05/2024	Degraded	5	30-70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.,
TW-S-PI-3_P01	25/10/2024	Degraded	5	30-70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.2024 sp no litter stable - stopping bay shut ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-3_P01	23/05/2025	Degraded	5	>70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.2024 sp no litter stable - stopping bay shut ,A25 per sp24
TW-S-PI-3_P02	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P02	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	29/09/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	25/05/2024	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. ,
TW-S-PI-3_P02	25/10/2024	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. 2024 sp Agonis still alive 50% health. Stable ,
TW-S-PI-3_P02	23/05/2025	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. 2024 sp Agonis still alive 50% health. Stable ,A25 stable.
TW-S-PI-3_P03	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P03	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	29/09/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	25/05/2024	Degraded	5	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.,
TW-S-PI-3_P03	25/10/2024	Degraded	5	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.2024 sp stable and healthy. Picnic bay shut ,
TW-S-PI-3_P03	23/05/2025	Degraded	4	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.2024 sp stable and healthy. Picnic bay shut ,A25 Af & Em have reduced canopy Af 60%, Em 75. Weeds increased.
TW-S-PI-3_P04	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P04	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	29/09/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	25/05/2024	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	25/10/2024	Degraded	5	30-70%	30-70%	2024 so stable and healthy. BORR building material still on site ,
TW-S-PI-3_P04	23/05/2025	Degraded	5	>70%	30-70%	2024 so stable and healthy. BORR building material still on site ,A25 site is stable.
TW-S-PI-4_P01	26/05/2020	Degraded		30-70%	30-70%	Historical grazing,
TW-S-PI-4_P01	19/10/2020	Degraded	5	>70%	30-70%	Historical grazing,
TW-S-PI-4_P01	13/10/2021	Degraded	5	>70%	<2%	Farmland ,
TW-S-PI-4_P01	25/05/2022	Degraded	5	>70%	<2%	Farmland ,
TW-S-PI-4_P01	19/10/2022	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	22/05/2023	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	29/09/2023	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	25/05/2024	Degraded	5	>70%	30-70%	Farmland ,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-4_P01	31/10/2024	Degraded	5	>70%	30-70%	Farmland 2024sp stable no change ,
TW-S-PI-4_P01	23/05/2025	Degraded	5	>70%	30-70%	Farmland 2024sp stable no change ,A25 appears grazing has gone, so weed cover from grass has increased.
TW-S-PI-4_P02	26/05/2020	Degraded		2-10%	30-70%	Historic clearing,
TW-S-PI-4_P02	9/09/2020	Degraded		2-10%	30-70%	Historic clearing,
TW-S-PI-4_P02	13/10/2021	Degraded	5	>70%	30-70%	Farm site.,
TW-S-PI-4_P02	25/05/2022	Degraded	5	>70%	30-70%	Farm site. Photomon needs updating ,
TW-S-PI-4_P02	19/10/2022	Degraded	5	>70%	30-70%	Farm site. Photomon needs updating , updated with new guide photo ,
TW-S-PI-4_P02	22/05/2023	Degraded	5	>70%	30-70%	Fire access track recently graded,
TW-S-PI-4_P02	29/09/2023	Degraded	5	>70%	30-70%	
TW-S-PI-4_P02	25/05/2024	Degraded	5	>70%	30-70%	Site stable, Tuart healthy,
TW-S-PI-4_P02	31/10/2024	Degraded	5	>70%	30-70%	Site stable, Tuart healthy 2024sp stable no change ,
TW-S-PI-4_P02	20/05/2025	Degraded	5	>70%	30-70%	Site stable, Tuart healthy 2024sp stable no change ,A25 stable
TW-S-PI-4_P03	19/10/2020	Degraded	5	>70%	30-70%	Historically cleared,
TW-S-PI-4_P03	13/10/2021	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	25/05/2022	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	19/10/2022	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	22/05/2023	Degraded	5	>70%	30-70%	Note Dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	29/09/2023	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	25/05/2024	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok.,
TW-S-PI-4_P03	31/10/2024	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok. 2024 sp no stress stable ,
TW-S-PI-4_P03	23/05/2025	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok. 2024 sp no stress stable ,A25 site is stable
TW-S-PI-3_P01	26/05/2020	Degraded		30-70%	10-30%	
TW-S-PI-3_P01	28/10/2020	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	14/10/2021	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	26/05/2022	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	19/10/2022	Degraded	5	30-70%	10-30%	
TW-S-PI-3_P01	22/05/2023	Degraded	5	30-70%	10-30%	A new fence is being constructed on opposite side of the fire access track. ,
TW-S-PI-3_P01	29/09/2023	Degraded	5	30-70%	10-30%	A new fence is being constructed on opposite side of the fire access track. Access track is disturbed as part of borr works,
TW-S-PI-3_P01	25/05/2024	Degraded	5	30-70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.,
TW-S-PI-3_P01	25/10/2024	Degraded	5	30-70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.2024 sp no litter stable - stopping bay shut ,
TW-S-PI-3_P01	23/05/2025	Degraded	5	>70%	10-30%	Trees have thinned but still retain greater than 80% foliage. Note Borr works close to site pic 194.2024 sp no litter stable - stopping bay shut ,A25 per sp24
TW-S-PI-3_P02	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P02	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P02	29/09/2023	Degraded	5	30-70%	30-70%	

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-3_P02	25/05/2024	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. ,
TW-S-PI-3_P02	25/10/2024	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. 2024 sp Agonis still alive 50% health. Stable ,
TW-S-PI-3_P02	23/05/2025	Degraded	4	30-70%	30-70%	Jacksonia furcellata stressed, Agonis tree very stressed in the background. 2024 sp Agonis still alive 50% health. Stable ,A25 stable.
TW-S-PI-3_P03	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P03	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	29/09/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P03	25/05/2024	Degraded	5	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.,
TW-S-PI-3_P03	25/10/2024	Degraded	5	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.2024 sp stable and healthy. Picnic bay shut ,
TW-S-PI-3_P03	23/05/2025	Degraded	4	30-70%	30-70%	Jacksonia furcellata has died possibly due to drought.2024 sp stable and healthy. Picnic bay shut ,A25 Af & Em have reduced canopy Af 60%, Em 75. Weeds increased.
TW-S-PI-3_P04	26/05/2020	Degraded		30-70%	30-70%	
TW-S-PI-3_P04	28/10/2020	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	14/10/2021	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	26/05/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	19/10/2022	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	22/05/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	29/09/2023	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	25/05/2024	Degraded	5	30-70%	30-70%	
TW-S-PI-3_P04	25/10/2024	Degraded	5	30-70%	30-70%	2024 so stable and healthy. BORR building material still on site ,
TW-S-PI-3_P04	23/05/2025	Degraded	5	>70%	30-70%	2024 so stable and healthy. BORR building material still on site ,A25 site is stable.
TW-S-PI-4_P01	26/05/2020	Degraded		30-70%	30-70%	Historical grazing,
TW-S-PI-4_P01	19/10/2020	Degraded	5	>70%	30-70%	Historical grazing,
TW-S-PI-4_P01	13/10/2021	Degraded	5	>70%	<2%	Farmland ,
TW-S-PI-4_P01	25/05/2022	Degraded	5	>70%	<2%	Farmland ,
TW-S-PI-4_P01	19/10/2022	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	22/05/2023	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	29/09/2023	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	25/05/2024	Degraded	5	>70%	30-70%	Farmland ,
TW-S-PI-4_P01	31/10/2024	Degraded	5	>70%	30-70%	Farmland 2024sp stable no change ,
TW-S-PI-4_P01	23/05/2025	Degraded	5	>70%	30-70%	Farmland 2024sp stable no change ,A25 appears grazing has gone, so weed cover from grass has increased.
TW-S-PI-4_P02	26/05/2020	Degraded		2-10%	30-70%	Historic clearing,
TW-S-PI-4_P02	9/09/2020	Degraded		2-10%	30-70%	Historic clearing,
TW-S-PI-4_P02	13/10/2021	Degraded	5	>70%	30-70%	Farm site.,
TW-S-PI-4_P02	25/05/2022	Degraded	5	>70%	30-70%	Farm site. Photomon needs updating ,
TW-S-PI-4_P02	19/10/2022	Degraded	5	>70%	30-70%	Farm site. Photomon needs updating , updated with new guide photo ,
TW-S-PI-4_P02	22/05/2023	Degraded	5	>70%	30-70%	Fire access track recently graded,

Current photocode	date	condition	Crown extent density	Weed cover	Native cover	Comments
TW-S-PI-4_P02	29/09/2023	Degraded	5	>70%	30-70%	
TW-S-PI-4_P02	25/05/2024	Degraded	5	>70%	30-70%	Site stable, Tuart healthy,
TW-S-PI-4_P02	31/10/2024	Degraded	5	>70%	30-70%	Site stable, Tuart healthy 2024sp stable no change ,
TW-S-PI-4_P02	20/05/2025	Degraded	5	>70%	30-70%	Site stable, Tuart healthy 2024sp stable no change ,A25 stable
TW-S-PI-4_P03	19/10/2020	Degraded	5	>70%	30-70%	Historically cleared,
TW-S-PI-4_P03	13/10/2021	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	25/05/2022	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	19/10/2022	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	22/05/2023	Degraded	5	>70%	30-70%	Note Dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	29/09/2023	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory ,
TW-S-PI-4_P03	25/05/2024	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok.,
TW-S-PI-4_P03	31/10/2024	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok. 2024 sp no stress stable ,
TW-S-PI-4_P03	23/05/2025	Degraded	5	>70%	30-70%	Note dichopogon capillipes is common in understory , some stress in the Jarrah at south of site. Overall ok. 2024 sp no stress stable ,A25 site is stable

Appendix 5. Vegetation condition scale (EPA, 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
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.

Appendix 6. Recording sheet template – developed into Fulcrum app for data collection.

BORR Drainage Monitoring Program. Quarterly visual inspection Sheet -

Site name	Date	Field personnel

Flooding/inundation

If flooding/inundation is present, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC that is flooded/inundated.

Considering the degree of impact (or lack of impact), make a recommendation for when the subsequent assessment should occur (quarterly as is the standard or within a shorter timeframe)

Standing water present (Y/N)	
Estimated area of standing water (m ²)	
% of TEC / PEC occurrence impacted by standing water	
TEC/PEC vegetation affected (Y/N) If yes, describe effect.	
List main species affected	
Photograph and waypoint taken (Y)	
Plant health assessment conducted (Y/N)	

Erosion

If TEC/PEC vegetation is impacted by active erosion, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC suspected to be impacted.

Active erosion present (Y/N)	
Estimated area of active erosion (m ²)	
Photograph and waypoint taken (Y)	
TEC/PEC vegetation affected (Y/N) If yes, describe effect. Complete plant health assessment if required.	
Plant health assessment conducted (Y/N)	

Drying

If a drying effect is suspected, complete a plant health assessment using the scale included below. The plant health assessment should be conducted over the portion of the TEC/PEC suspected to be impacted.

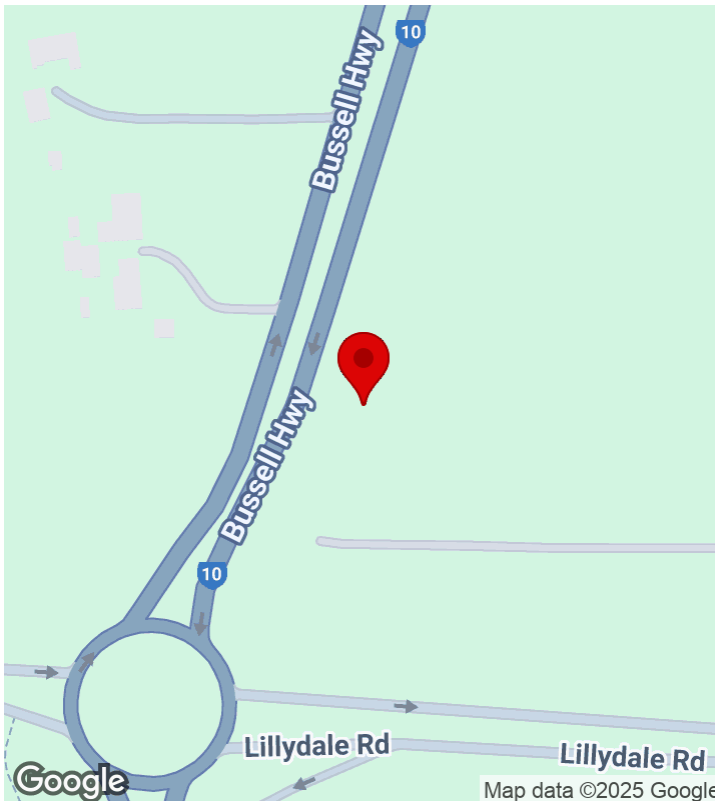
Considering the degree of impact (or lack of impact), make a recommendation for when the subsequent assessment should occur (quarterly as is the standard or within a shorter timeframe)

Drying effect present or suspected (Y/N)	
% of TEC / PEC occurrence impacted	
Describe effect	
List main species affected	
Photograph and waypoint taken (Y)	
Plant health assessment conducted (Y/N)	

BORR Drainage monitoring autumn 2025_23052025

TW-S-PI-2_D1 (a24)

5/23/2025, 6:32:02 AM UTC



CREATED

8/22/2024, 9:22:23 AM UTC

by Debbie Brace

UPDATED

5/23/2025, 6:32:02 AM UTC

by Debbie Brace

LOCATION

-33.384715, 115.644753

Site name	TW-S-PI-2
Point name	TW-S-PI-2_D1 (a24)
Recorder	Debbie Brace
Date	May 23, 2025
Issue Y/N	No
Issue	Drying effects, Existing not new
Cause of erosion	
Type of erosion	
Extent of erosion	
Cause of Inundation	
Extent of inundation	
Percentage Extent of TEC PEC affected	1-10% western edge only
Species affected	
Plant health assessment	

Photos

Photo direction	
General comments	Stable (no worse) 24/25 su . same au 25. Epicormic growth
Estimated level of impact	2-10%



South West Gateway Alliance
Suite 3, 3 Craig Street, Burswood
Western Australia 6100



Appendix L

M4.7 Environmental Performance Report - Black Cockatoos

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191: M4-7

Environmental Performance Report

Black Cockatoo Artificial Hollows

(2024 - 2025)

Main Roads WA

Revision 0

28-Aug-25



Document control record

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Document control						
Report title		Ministerial Statement 1191 M4-7 Environmental Performance Report – BC AH				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	27-Jun-25	SWGA Review	A.G.			A.M.
B	12-Aug-25	SWGA Review	A.G.			A.M.
C	27-Aug-25	Main Roads Review	A.G.	Main Roads		M.S.
0	28-Aug-25	Issued	A.G.	Main Roads		M.S.
Current revision		0				

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2.2	Clearing metrics in relation to Black cockatoos during the reporting period	7

Report

Environmental Performance Report (Australia Black Cockatoo Specialists, 2024)

Figures

Figure 1. Ground disturbance and clearing extents during the reporting period in relation to Black Cockatoo habitat and habitat trees.

Tables

Table 1. Ground disturbance and clearing in relation to Terrestrial Fauna (Black Cockatoo foraging habitat and trees) during the reporting period (May 2024 – 2025).

1 Introduction

1.1 Background

The Commissioner of Main Roads Western Australia (MRWA) has been granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (EPA Report 1714, October 2021), the EPA noted that in relation to Terrestrial Fauna, the key values likely to be impacted by the proposal are the local and regional population levels of conservation significant terrestrial fauna. The residual impacts to these values are predominately from clearing of breeding and foraging habitat, habitat fragmentation and changes to hydrological regimes of aquatic habitat.

1.2 Overview and Scope

In relation to the potential for direct and indirect impacts to Terrestrial Fauna, the EPA recommended a number of conditions including Condition 4, and Ministerial Statement 1191, therefore, includes the following conditions in relation to Terrestrial Fauna, specifically the following fauna taxa:

- Carnaby's Cockatoo *Calyptorhynchus latirostris*
- Baudin's Cockatoo *Calyptorhynchus baudinii*
- Forest Red-tailed Black Cockatoo *Calyptorhynchus banksia naso*

To address the impacts, the EPA recommended Condition 4. Ministerial Statement 1191, therefore, includes the following conditions in relation to Terrestrial Fauna:

Condition 4-1

The proponent shall implement the proposal to achieve the following environmental outcomes:

- (1) *clear no more than:*
 - (a) *60.9 ha of habitat for western ringtail possum;*
 - (b) *60.9 ha of black cockatoo foraging and breeding habitat;*
 - (c) *1088 black cockatoo potential nesting trees, and 11 trees with suitable hollows;*
 - (d) *39.2 ha of habitat for south-western brush-tailed phascogale; and*
 - (e) *5.5 ha of habitat for black-stripe minnow.*

Condition 4-2

Prior to ground-disturbing activities the proponent shall undertake the following actions:

- (1) *within seven (7) days prior to clearing, using a qualified and licensed terrestrial fauna spotter with experience in surveying for black cockatoos, inspect all potential nesting trees hollows within the development envelope to determine if any hollows are being used for nesting by black cockatoos;*
- (2) *if any hollows are in use by black cockatoos, the proponent shall not disturb or clear the nesting tree, or vegetation within a ten (10) metre radius of the nesting tree, until after the cockatoos have naturally completed nesting (young have fledged and dispersed) and an appropriately qualified terrestrial fauna spotter has verified that the hollow(s) are no longer being used by black cockatoos; and*
- (3) *within seven (7) days prior to clearing (or if staged, prior to each stage) implement pre-clearance protocols to minimise impacts to terrestrial fauna.*

Condition 4-3

During the construction of the proposal the proponent shall:

- (1) *ensure the presence of appropriately qualified fauna spotters during clearing activities;*
- (2) *not clear or cause any project attributable indirect impacts to the clearing exclusion areas as defined in Figure 1; and*
- (3) *ensure foraging species for black cockatoos are not planted within ten (10) metres of the road.*

Condition 4-4

The proponent must install one artificial black cockatoo nesting hollow for each suitable hollow that cannot be avoided in the 11 trees with suitable hollows identified in condition 4-1(1)(c).

Condition 4-5

Each artificial black cockatoo nesting hollow required by condition 4-4 must be installed prior to commencement of the next black cockatoo breeding season following clearing.

Condition 4-6

The artificial black cockatoo nest hollow(s) required by condition 4-4 of must:

- (1) be installed at the locations identified by DBCA within property locations as set out and described in Table 1 of condition 9-2.*
- (2) be designed and placed in accordance with the specifications details in How to design and place artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline; and*
- (3) be monitored and maintained in accordance with the specifications detailed in How to monitor and maintain artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline, for a period of at least ten (10) years.*

2 Environmental Performance Report

2.1 Purpose and scope

The purpose of this Environmental Performance Report (EPR) is to address the compliance of the Bunbury Outer Ring Road (BORR) Southern Section (the Proposal) with condition 4-7 set out in Ministerial Statement 1191 (MS 1191).

Condition 4-7 of MS 1191 requires an annual environmental performance report to be submitted to the Chief Executive Officer (CEO) of the Environmental Protection Authority (EPA) as part of the Compliance Assessment Report (CAR).

Condition 4-7

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, for a period of at least ten (10) years, that shall:

- (1) outline the monitoring and maintenance that was undertaken in accordance with the specifications detailed in How to Monitor and maintain artificial hollows for Carnaby's cockatoo (DPAW Fauna Notes 2015), or any subsequent DBCA revision of this guideline;*
- (2) outline the results of the monitoring and maintenance undertaken.*

This EPR has been produced in accordance with condition M4-7 and incorporates a 12-month audit period from 31 May 2023 to 31 May 2024. This is the first EPR for M4-7 to be submitted under Ministerial Statement 1191.

A monitoring report was prepared by Australian Black Cockatoo Specialists (2024) for the three artificial nesting hollows located at the nearby Ducane offset site (refer attached Report).

2.2 Clearing metrics in relation to Black cockatoos during the reporting period

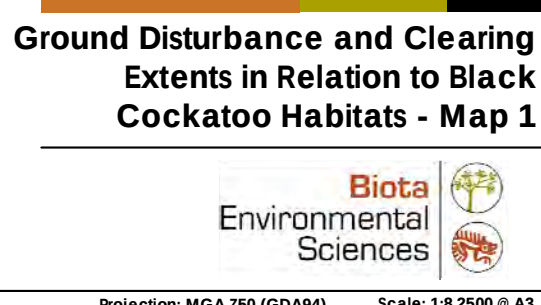
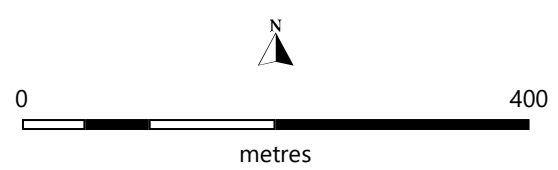
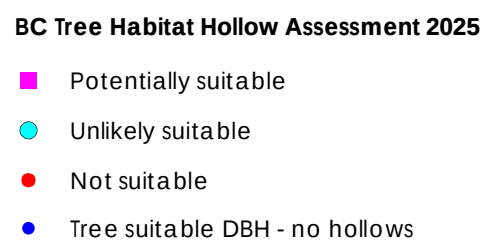
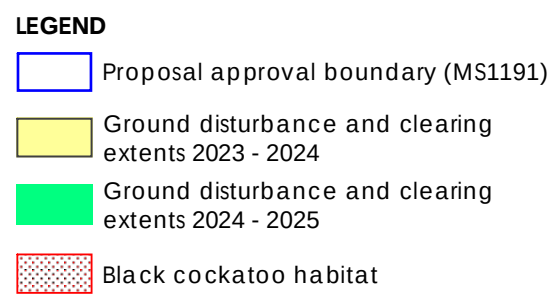
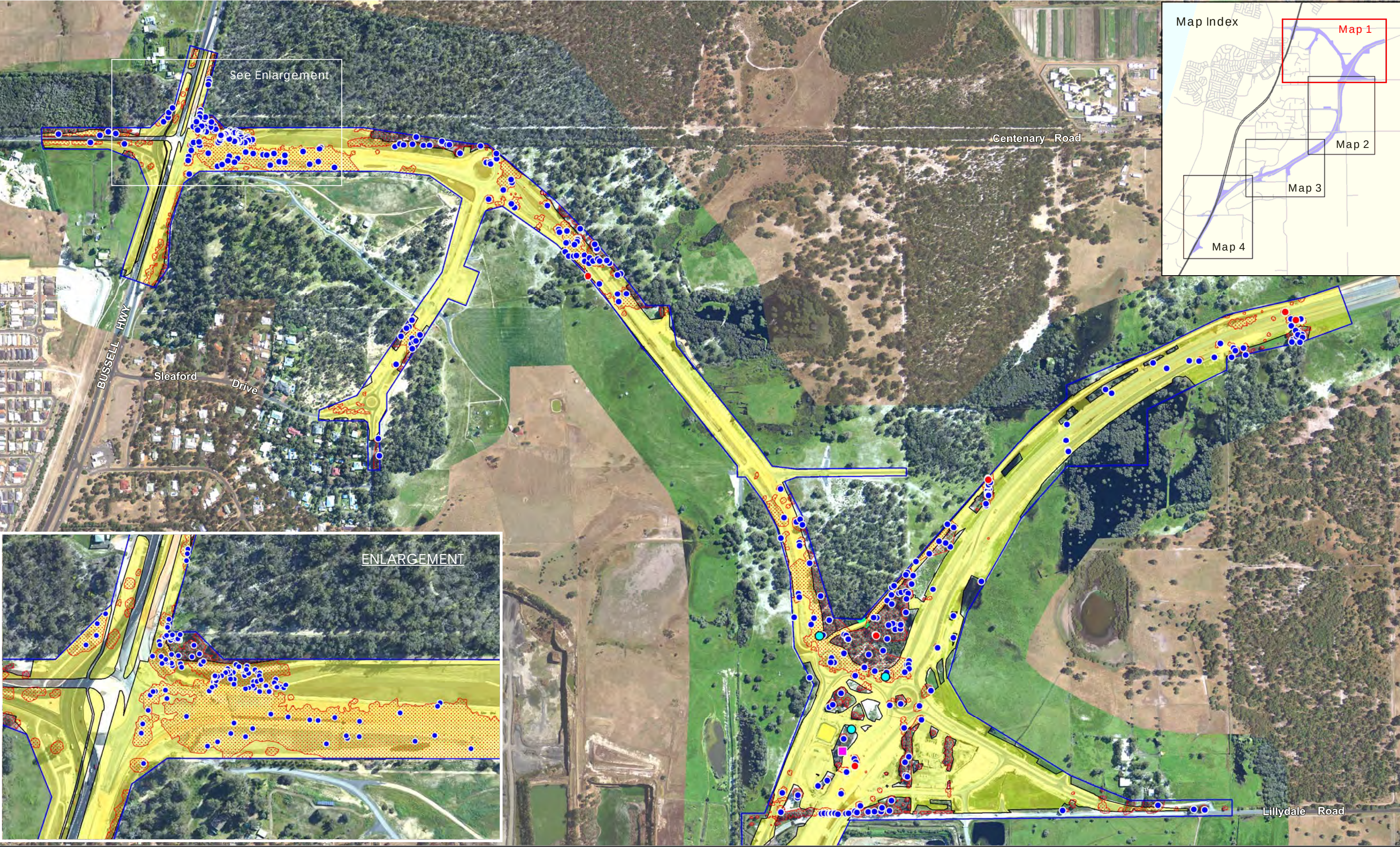
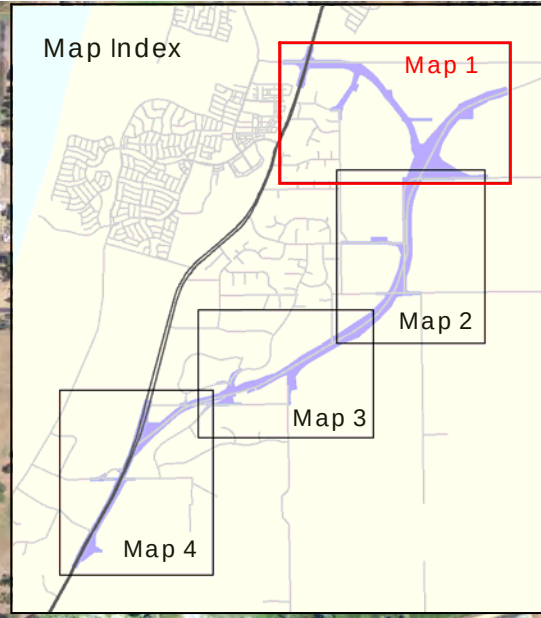
Construction of the Proposal (BORR Southern Section) commenced on 1 August 2022.

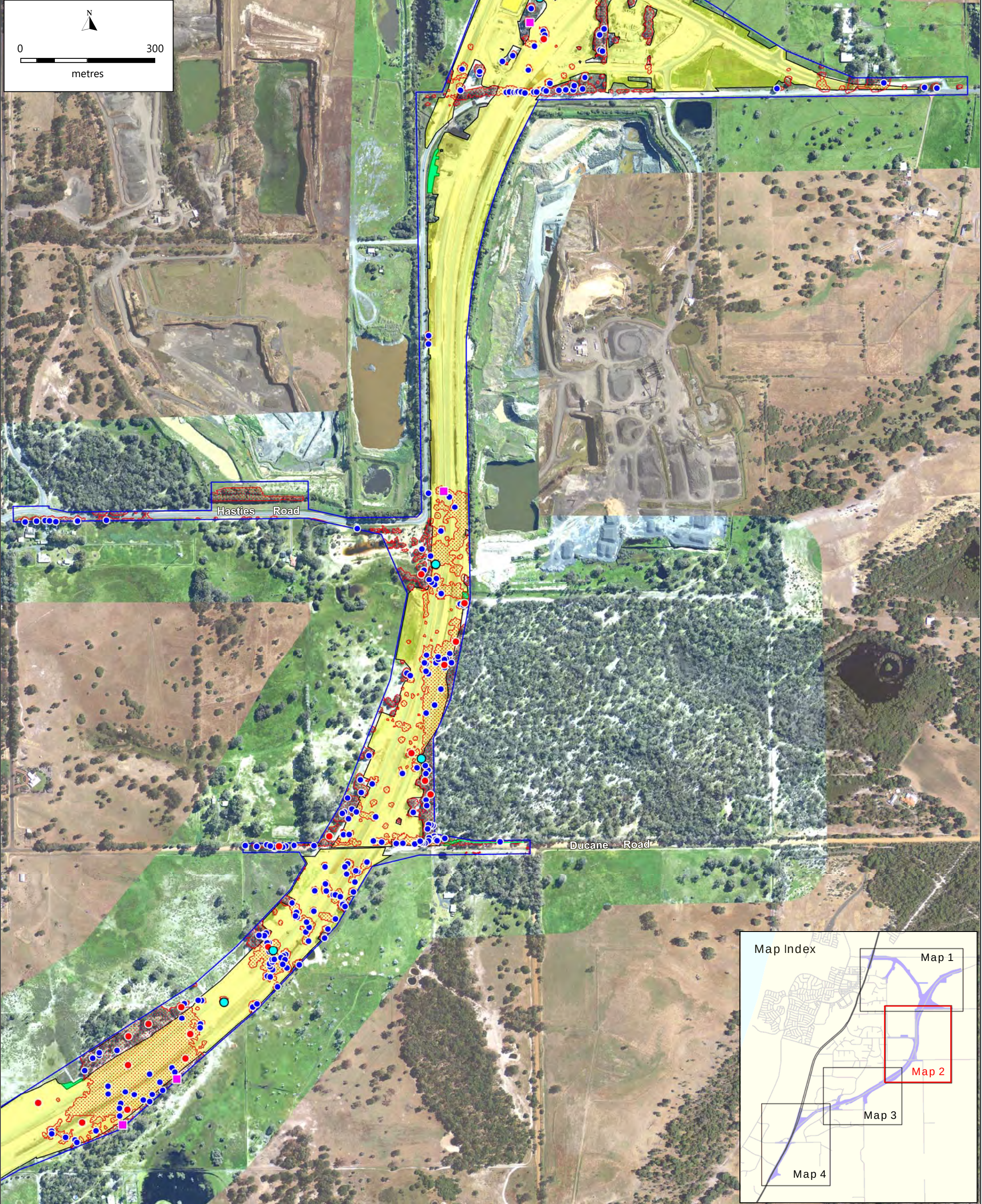
Clearing and disturbance in relation to Terrestrial Fauna, specifically Black Cockatoo habitat during the reporting period is summarised in **Table 1** and **Figure 1**.

Table 1. Ground disturbance and clearing in relation to Terrestrial Fauna (Black Cockatoo foraging habitat and trees) during the reporting period (May 2024 – 2025).

Environmental Aspect	Area specified in Ministerial Statement 1191	Area / quantity cleared during 2022 2023 reporting period	Area / quantity cleared during this 2023 2024 reporting period	Area / quantity cleared during this 2024 2025 reporting period	Total area / quantity cleared
Black Cockatoo Habitat	60.9 ha	24.39 ha	17.94 ha	0.19 ha	42.52 ha
No more than 1088 trees with a diameter at breast height of >500mm	1088	397	305 trees	0	702 trees
No more than 11 trees with suitable nest hollows	11	3	0 trees	0	3 trees

Figure 1. Ground disturbance and clearing extents during the reporting period in relation to Black Cockatoo habitat and habitat trees.



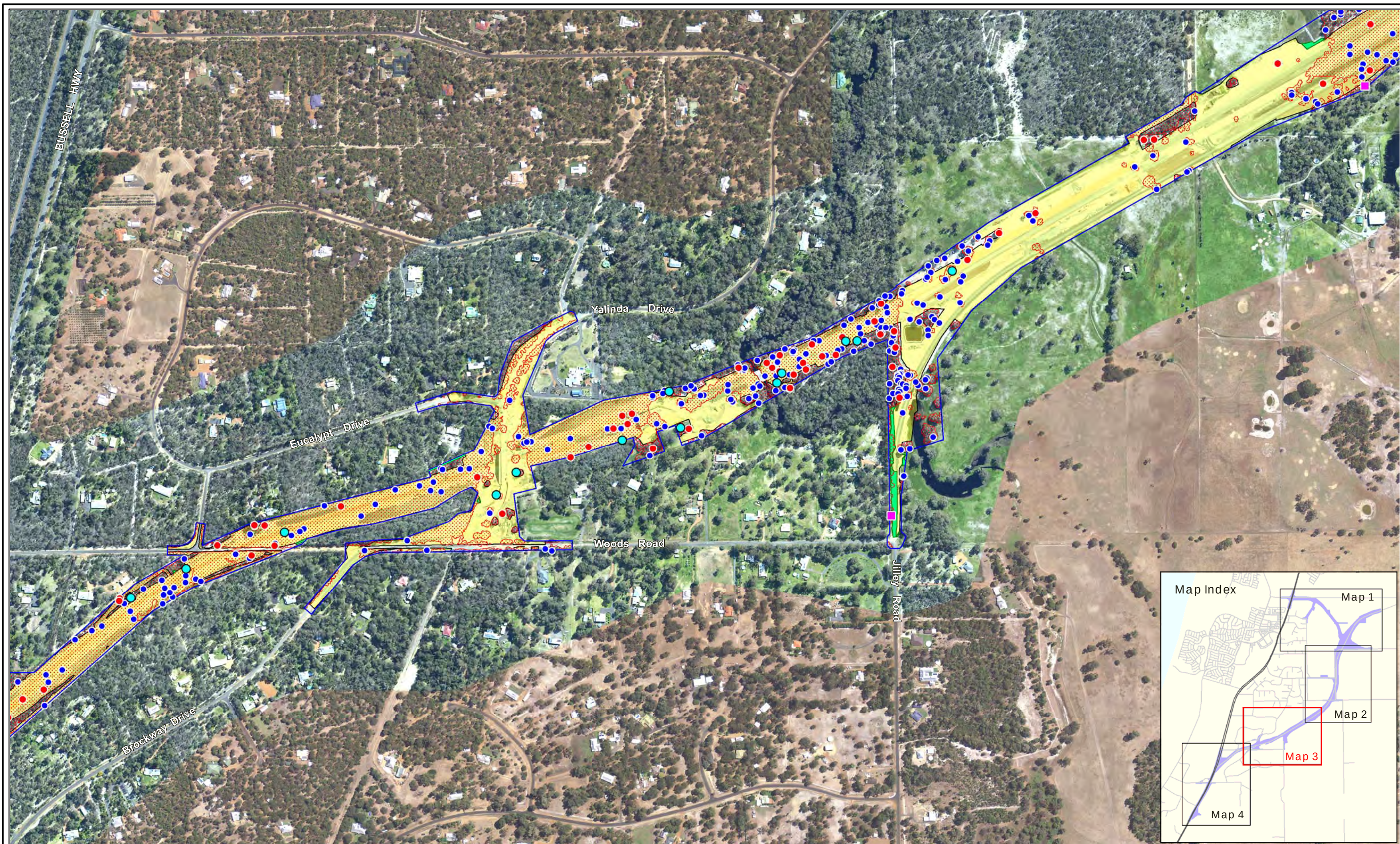


- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black cockatoo habitat

- BC Tree Habitat Hollow Assessment 2025**
- Potentially suitable
 - Unlikely suitable
 - Not suitable
 - Tree suitable DBH - no hollows
- BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat
Map 2





Location Map



LEGEND

- Environmental Boundary (MS 1191)
- Ground disturbance and clearing extents 2022 - 2024
- Ground disturbance and clearing extents 2024 - 2025
- Black cockatoo habitat

BC Tree Habitat Hollow Assessment 2025

- Potentially suitable
- Unlikely suitable
- Not suitable
- Tree suitable DBH - no hollows

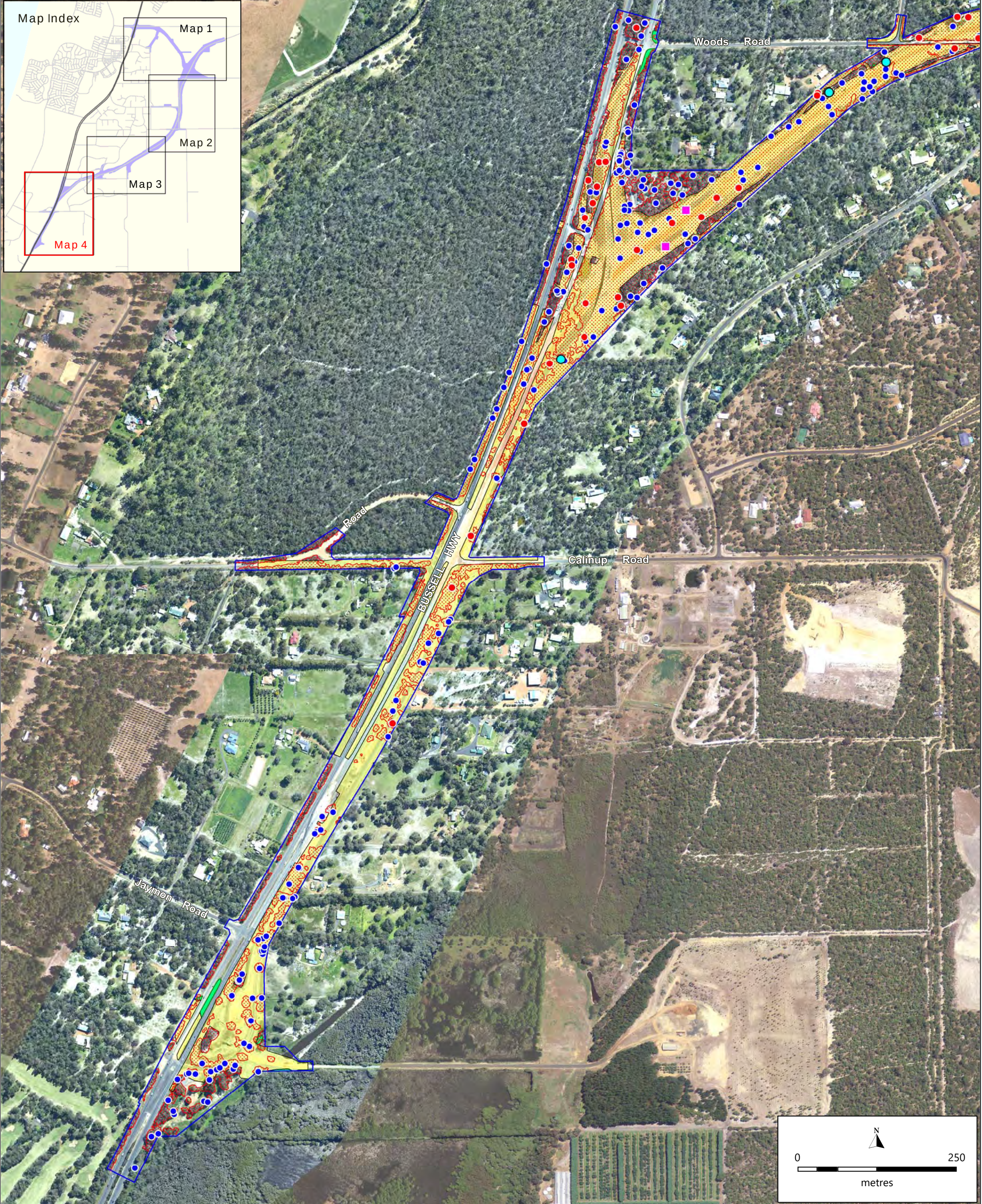


0 400
meters

BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat - Map 3





- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Black cockatoo habitat

- BC Tree Habitat Hollow Assessment 2025**
- Potentially suitable
 - Unlikely suitable
 - Not suitable
 - Trees suitable DBH - no hollows

Ground Disturbance and Clearing Extents in Relation to Black Cockatoo Habitat
Map 4

Report

Environmental Performance Report (Australia Black Cockatoo Specialists, 2024)



Australian Black Cockatoo Specialists

Report: Second nesting survey of 55 artificial hollows BORR Offset

Main Roads
Western Australia

14 December 2024





Australian Black Cockatoo Specialists

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• RECOMMENDED REPAIRS.....	2
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• APPENDIX 1, 2 AND 3-5 ATTACHED SEPERATELY	6

All images source: Rick Dawson

INTRODUCTION

Australian Black Cockatoo Specialists (ABCS) are pleased to submit this report to the Department of Main Roads Western Australia (MRWA) regarding the inspection/nesting survey of 55 Artificial hollows (ANH) and six natural hollows in Ducane, Badgebup, Kwobrup, Elphin Reserves and Highbury State Forest between Monday 9th and Wednesday 11th December 2024.

INSPECTION METHOD

The objective of the survey was to establish if there has been Black Cockatoo 'prospecting' and/or nesting activity. The scope of this project included:

- undertaking a close visual inspection of all ANH's via camera pole and or ladder, any activity detected was then photographed.
- Inspect tree, fixings and hollow condition.
- Any Black Cockatoo nestlings older than 21days, will be photographed, leg banded, measured, weighed, aged (this will give us the date egg laid) and DNA taken, under licences from DPAW.
- Details of any use including non-target species was recorded.

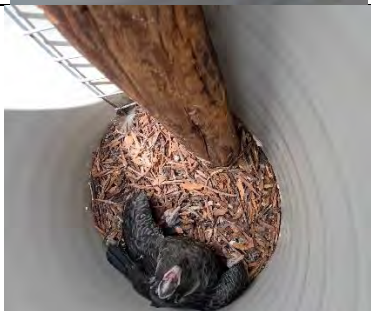
All 55 ANH's were inspected in accordance with protocols used by CSIRO and the Department of Biodiversity, Conservation and Attractions. The inside and above each artificial hollow were viewed using a pole camera and photographs taken of any Chewing detected, nesting activity or obstructions. A photograph was also taken from the ground using a 500mm lens of the sacrificial posting detailing any Chewing or signs of prospecting. Details of observations were recorded and are attached at Appendix 2 and 3.

RESULTS

I am very pleased to advise that the following hollows 13 hollows have had nesting attempts by Carnaby's in breeding season 2024/25:

• <u>BADGEBUP RESERVE</u>	
• BY03: One 79-day old female Carnaby's nestling, Still in nest will fledge any day Chewing on post.	
• BY04: One Carnaby's egg in November Survey, however, no egg in December - <u>FAILED</u> Chewing on post.	

• BY15: One 51-day old nestling, Chewing on post.	
• Repair one (Badgebup): Carnaby's nestling <u>fledged</u>. Chewing on hollow walls.	
<u>KWOBRUP RESERVE</u> • BY18: One 49-day old male Carnaby's nestling, Chewing on post.	
• BY20: One 35-day old male Carnaby's nestling, Chewing on post.	
• BY22: One 20-day old male Carnaby's nestling, Chewing on post.	

• Repair 2 (Kwobrup): Carnaby's nestling <u>fledged</u>. Chewing on hollow walls.	
<u>Elphin Reserve</u>	
• BY31: 77-day old Nestling still present, will fledge any day. Chewing on post.	
• BY34: Carnaby's Nestling has <u>fledged</u>. Chewing on post.	
• BY32: Two nestlings found dead in the first survey -no further use by CC.	
• BY35: Male Carnabys, 50 days old, Chewing on post.	

• Repair 3 (Elphin): Carnaby's Nestling has <u>fledged</u>	
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The Ducane ANHs continue to show no evidence of use by black cockatoos. However, D01 contains Galah feathers at the base. The absence of cobwebs inside the four ANHs, which typically accumulate over years without use, suggests that animals have entered these hollows at some point.

Chewing by black cockatoos was observed in 31 of the 51 ANHs surveyed across Badgebup, Kwobrup, Elphin reserves and Highbury State Forest. This chewing activity indicates that most of these hollows have been inspected by female cockatoos. A scoring system from 0 to 10 was used to rate the extent of chewing, with '0' indicating no chewing detected, see Appendix 1 and 2 for details.

Carnaby's Cockatoos were heard calling in Badgebup, Kwobrup and Elphin Reserves. A group of seven Forest Redtails were photographed feeding on Marri in the Northwest Corner of Ducane. No black cockatoos were seen or heard at Highbury State Forest.

There has been a total of 13 nesting attempts in the 55 hollows. Of note is that there have been no second nesting attempts from the end of October. This can be attributed to the drought earlier this year.

REPAIRS

At this time, no repairs are recommended prior to the start of next year's breeding season:

- During the survey, no hollows were found to require woodchips or post replacements. While posts typically need replacement following each breeding event, the use of Wandoo posts has significantly reduced chewing damage by more than 70%.
- All 55 trees are in good condition, and there is no need to relocate any hollows at this stage.
- The fixings and hollows are in excellent condition.

RECOMMENDATIONS

- No repairs are necessary at this stage, as the artificial nesting hollows (ANHs) were installed this year.
- Surveys for the following year should be conducted in **October and December 2024** to ensure comprehensive data collection from all nestlings, thereby providing critical insights into the health of the birds utilizing this area.

CONCLUSIONS

These impressive results, achieved in a relatively short period, emphasize the critical shortage of suitable nesting hollows in the wheatbelt region. The success of 13 nesting attempts, resulting in the fledging of 11 nestlings this season, represents a significant contribution to the conservation of Black Cockatoos in the area. Furthermore, it is highly probable that the number of nesting attempts will increase in subsequent years as the artificial nesting hollows (ANHs) continue to be utilized.

No Black Cockatoo activity was detected in Highbury State Forest during this survey, which is unsurprising given that the hollows there were only installed on 30 October 2024. Observations

suggest that no new breeding activity has occurred in the eastern and northern wheatbelt regions since early November.

I would like to express my sincere gratitude to Main Roads Western Australia (MRWA) and the Department of Biodiversity, Conservation and Attractions (DBCA) for their invaluable support in facilitating the installation of ANHs and the restoration of natural hollows within these reserves. Your commitment is making a measurable and positive impact on the conservation of Black Cockatoos.

CONTACT INFORMATION

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Rick Dawson
Director
Australian Black Cockatoo Specialist
14 November 2024

Appendix 1: DETAILS OF ANH OBSERVATIONS

Appendix 2: DETAILS OF PROCESSED NESTLINGS

Appendix 3: PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH D01 TO BY15. (Attached separately)

Appendix4: PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH BY16 TO Repair 3 Elphin. (Attached separately)

Appendix4: PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH BY37 TO ANH51 (Attached separately)

APPENDIX 1 –DETAILS OF ANH OBSERVATIONS

Hollow#	Comments	Chipping 0-10	Wood Chips Lts	Tree condition	Fixings	Recommend repairs
<u>DUCANE</u>						
D01	No signs of nesting or inspection by Black Cockatoos. Galah feathers in base	0	Nil	Good	Good	Nil
D02	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
D03	No signs of nesting or inspection by Black Cockatoos. Cobwebs at entry	0	Nil	Good	Good	Nil
D04	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
<u>BADGEBUP</u>						
BY01	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil
BY02	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY03	One 79-day old female Carnaby's nestling, Still in nest will fledge any day Chewing on post.	3	Nil	Good	Good	Nil
BY04	No sign of CC egg from October 24 survey. CC breast feathers on base.- <u>Failed</u>	3	Nil	Good	Good	Nil
BY05	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil
BY06	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY07	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

BY08	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY09	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY10	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY11	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY12	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY13	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY14	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY15	One Male CC nestling 51 days old	3	Nil	Good	Good	Nil
<u>KWOBRUP</u>						
BY16	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil
BY17	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY18	One Male CC nestling 49-days old. Chewing on post	3	Nil	Good	Good	Nil
BY19	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
BY20	One Female CC nestling 35 days old. Chewing on post	3	Nil	Good	Good	Nil

BY21	Chewing on post no signs of Breeding	1	Nil	Good	Good	Nil
BY22	One CC nestling 20-days old. Chewing on post	3	Nil	Good	Good	Nil
BY23	Minor chewing on post, no signs of Breeding	1	Nil	Good	Good	Nil
BY24	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY25	Chewing on post, no signs of Breeding	3	Nil	Good	Good	Nil
BY26	Minor chewing on post, no signs of Breeding	1	Nil	Good	Good	Nil
BY27	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY28	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY29	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY30	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
ELPHIN						
BY31	80-day old Nestling still present, will fledge any day.	3	Nil	Good	Good	Nil
BY32	Two nestlings found dead in the first survey in October -no further use by CC since then	3	Nil	Good	Good	Nil

BY33	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil
BY34	Carnaby's Nestling Fledged	3	Nil	Good	Good	Nil
BY35	Male Carnabys,50 days old CC, Chewing on post	3	Nil	Good	Good	Nil
BY36	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil
<u>HIGHBURY SF</u>						
BY37	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY38	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY39	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY40	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY41	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY42	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY42	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY44	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY45	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

BY46	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY47	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY48	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY49	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY50	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil
BY51	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

NATURALS REPAIRED

Hollow#	Comments	Chipping 0-10	Wood Chips Lts	Tree condition	Fixings	Recommend repairs
Badgebup 01	Carnaby's Nestling Fledged	2	Nil	Good	N/A	Nil
Kwobrup 02	Carnaby's Nestling Fledged	5	Nil	Good	N/A	Nil
Kwobrup 03	No signs of nesting or inspection by Black Cockatoos. Cobwebs in hollow	0	80	Good	N/A	NIL
Elphin 01	Chewing in hollow no signs of Breeding	2	Nil	Good	N/A	Nil
Elphin 02	Corellas have fledged	2	Nil	Good	N/A	Nil
Elphin 03	Nestling has fledged	3	0	Good	N/A	Nil

APPENDIX 2. DETAILS OF PROCESSED NESTLINGS IN SEASON 2024

Date	Nest No	Sex	Band No	FLW	Actual weight	Age days	DNA	Comments
01/11/24	BY03	F	320-02432	155	600	39	5F	NIL
01/11/24	Repair01 Badgebup	M	320-02433	255	630	55	3F	NIL
01/11/24	Repair02 Kwobrup	F	320-02434	220	610	50	4F	NIL
02/11/24	BY31	F	320-02435	134	500	37	4F	NIL
02/11/24	BY34	M	320-02436	174	580	43	4F	NIL
02/11/24	Repair03 Elphin	M	320-02437	227	570	51	4F	NIL
9/12/24	BY35	M	320-02256	232	600	52	3F	NIL
10/12/24	BY15	M	320-02240	230	610	51	3F	NIL
10/12/24	BY18	M	320-02257	215	650	49	3F	NIL
10/12/24	BY20	F	320-02258	124	600	35	3F	NIL
10/12/24	BY22	M	320-02259	55	310	20	3F	NIL

APPENDIX 3 PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH D01 TO BY15 – Attached separately.

APPENDIX 4 PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH BY16 TO REPAIR 3 ELPHIN– Attached separately.

APPENDIX 5 PHOTOGRAPHS AND OBSERVATION DETAILS OF ANH BY37 TO ANH51 (HIGHBURY)– Attached separately

Artificial Hollow D01



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
D01	No signs of nesting or inspection by Black Cockatoos. Galah feathers in base.	0	Nil	Good	Good	Nil

Artificial Hollow D02



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
D02	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow D03



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
D03	No signs of nesting or inspection by Black Cockatoos. Cobwebs at entry	0	Nil	Good	Good	Nil

Artificial Hollow D04



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
D04	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY01



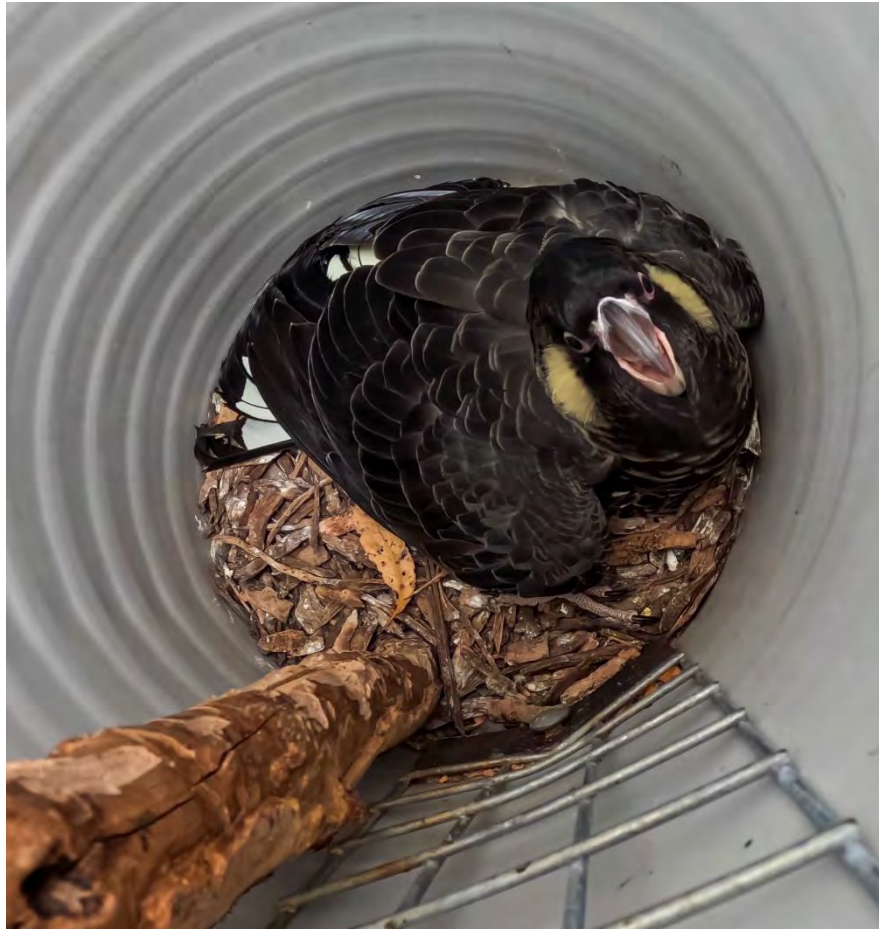
Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY01	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil

Artificial Hollow BY02



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY02	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY03



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY03	One 79-day old female Carnaby's nestling, Still in nest will fledge any day Chewing on post.	3	Nil	Good	Good	Nil

Artificial Hollow BY04



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY04	No sign of CC egg from October 24 survey. CC breast feathers on base.- <u>Failed</u>	3	Nil	Good	Good	Nil

Artificial Hollow BY05



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY05	Chewing on post no signs of Breeding. Faeces in bottom of hollow	3	Nil	Good	Good	Nil

Artificial Hollow BY06



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY06	Minor chewing on post, no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY07



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY07	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY08



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY08	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY09



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY09	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY10



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY10	Chewing on post no signs of Breeding	1	Nil	Good	Good	Nil

Artificial Hollow BY11



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY11	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY12



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY12	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY13



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY13	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY14



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY14	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY15



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY15	One 9-day old Carnaby's nestling. Chewing on post	3	Nil	Good	Good	Nil

Artificial Hollow BY16



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY16	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil

Artificial Hollow BY17



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY17	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY18



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY18	One Male CC nestling 49-days old. Chewing on post	3	Nil	Good	Good	Nil

Artificial Hollow BY19



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY19	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Artificial Hollow BY20



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY20	One Female CC nestling 35 days old. Chewing on post	3	Nil	Good	Good	Nil

Artificial Hollow BY21



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY21	Chewing on post no signs of Breeding	1	Nil	Good	Good	Nil

Artificial Hollow BY22



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY22	One CC nestling 20-days old. Chewing on post	3	Nil	Good	Good	Nil

Artificial Hollow BY23



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY23	Minor chewing on post, no signs of Breeding	1	Nil	Good	Good	Nil

Artificial Hollow BY24



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY24	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY25



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY25	Chewing on post, no signs of Breeding	3	Nil	Good	Good	Nil

Artificial Hollow BY26



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY26	Minor chewing on post, no signs of Breeding	1	Nil	Good	Good	Nil

Artificial Hollow BY27



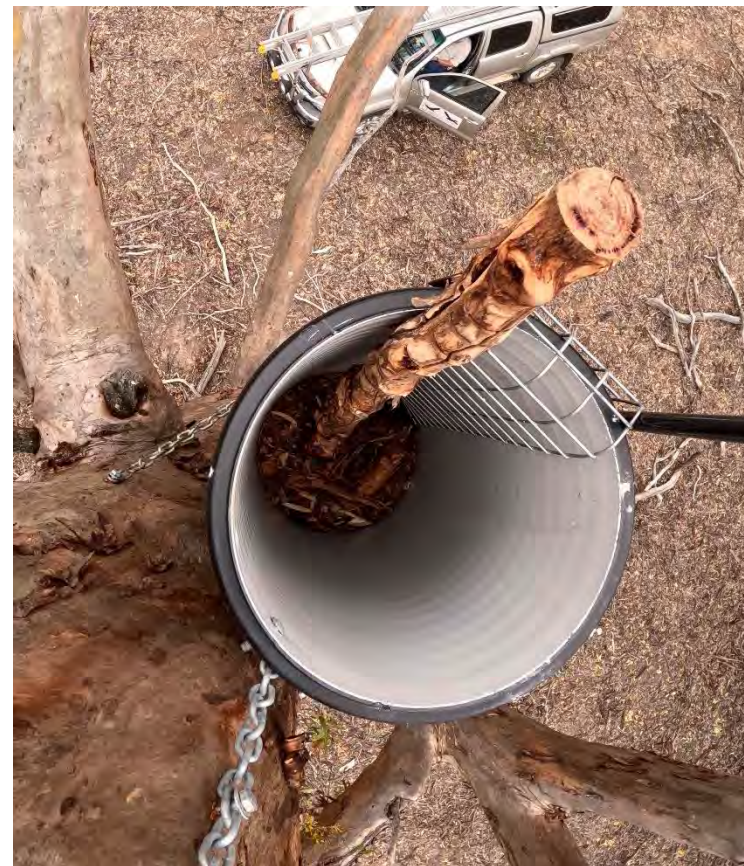
Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY27	Minor chewing on post, no signs of Breeding	1	Nil	Good	Good	Nil

Artificial Hollow BY28



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY28	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY29



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY29	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY30



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY30	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY31



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY31	80-day old Nestling still present, will fledge any day.	3	Nil	Good	Good	Nil

Artificial Hollow BY32



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY32	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil

Artificial Hollow BY33



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY33	Chewing on post no signs of Breeding	3	Nil	Good	Good	Nil

Artificial Hollow BY34



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY34	Nestling Fledged	3	Nil	Good	Good	Nil

Artificial Hollow BY35



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY35	Male Carnabys,50 days old CC, Chewing on post	3	Nil	Good	Good	Nil

Artificial Hollow BY36



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY36	Chewing on post no signs of Breeding	2	Nil	Good	Good	Nil

Natural Hollow Repair One (Badgebup



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Badgebup 01	Carnaby's Nestling Fledged	2	Nil	Good	N/A	Nil

Natural Hollow Repair Two (Kwobrup)



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Kwobrup 02	Carnaby's Nestling Fledged	5	Nil	Good	N/A	Nil

Natural Hollow Repair Three (Kwobrup)



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Kwobrup 03	No signs of nesting or inspection by Black Cockatoos. Cobwebs in hollow	0	NIL	Good	N/A	NIL

Natural Hollow Repair One (Elphin)



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Elphin 01	Chewing in hollow no signs of Breeding	2	Nil	Good	N/A	Nil

Natural Hollow Repair Two (Elphin)



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Elphin 02	Corellas have fledged	2	Nil	Good	N/A	Nil

Natural Hollow Repair Three (Elphin)



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
Elphin 03	CC Nestling has fledged.	3	0	Good	N/A	Nil

Artificial Hollow BY37



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY37	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY38



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY38	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY39



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY39	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY40



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY40	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY41



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY41	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY42



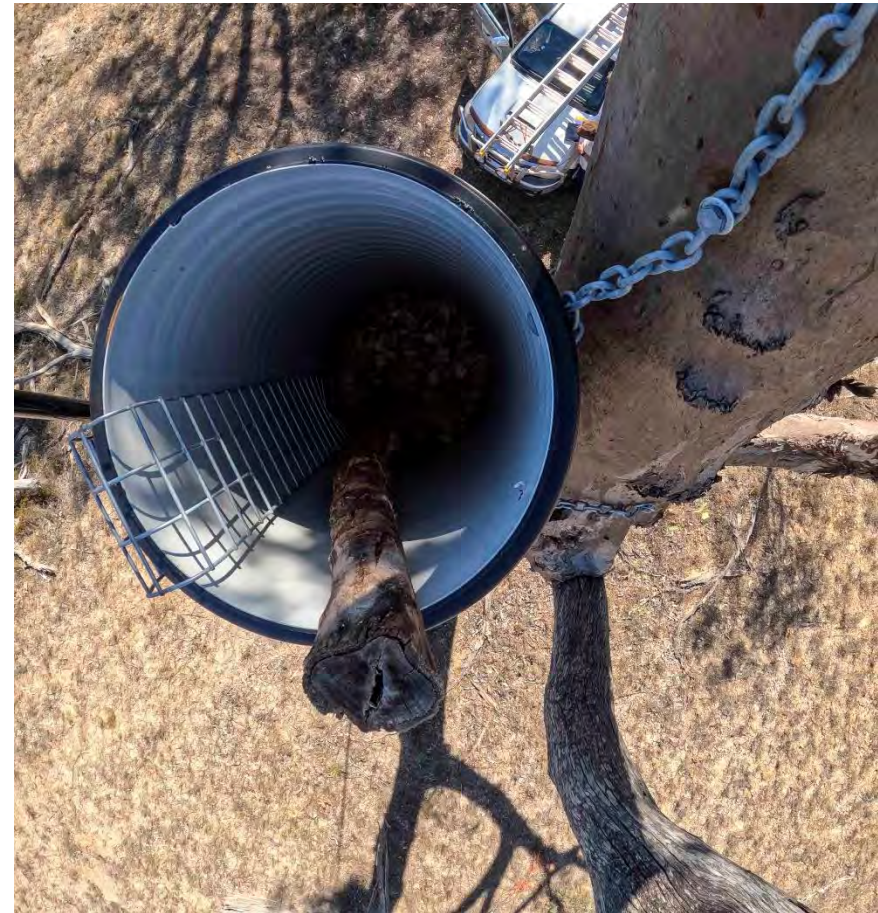
Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY42	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY43



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY43	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY44



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY44	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY45



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY45	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY46



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY46	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY47



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY47	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY48



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY48	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY49



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY49	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY50



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY50	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil

Artificial Hollow BY51



Hollow No	Comments	Chipping score 0-10	Wood Chips	Tree condition	Fixings and Hollow condition	Recommended repairs
BY49	No signs of nesting or inspection by Black Cockatoos	0	Nil	Good	Good	Nil



South West Gateway Alliance
Suite 3, 3 Craig Street, Burswood
Western Australia 6100



Appendix M

M5.3 Environmental Performance Report – Construction Fauna Management Plan

Bunbury Outer Ring Road

Southern Section

Ministerial Statement 1191: M5-3

Environmental Performance Report

Construction Fauna Management Plan

(2024 - 2025)

Main Roads WA

Revision 0

28-Aug-25



Document control record

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Document control						
Report title		Ministerial Statement 1191 M5-3 Environmental Performance Report – CFMP				
Client		Main Roads WA				
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	23-Jul-25	SWGA Review	A.G.			A.M.
B	19-Aug-25	SWGA Final	A.G.	E.R.		A.M.
C	27-Aug-25	Main Roads Review	A.G.	Main Roads		M.S.
0	28-Aug-25	Issued	A.G.	Main Roads		M.S.
Current revision		0				

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1 Introduction

1.1 Background

The Commissioner of Main Roads Western Australia (MRWA) has been granted conditional approval for the Bunbury Outer Ring Road Southern Section (the Proposal) under Part IV Division 2 (section 45) of the *Environmental Protection Act 1986* by the Minister for Environment. The Proposal is subject to the implementation conditions of Ministerial Statement 1191 (MS 1191) which was issued on 31 May 2022 (Minister for Environment, 2022).

In their Report and Recommendations in relation to the Proposal (EPA Report 1714, October 2021), the EPA noted that in relation to Terrestrial Fauna, the key values likely to be impacted by the proposal are the local and regional population levels of conservation significant terrestrial fauna. The residual impacts to these values are predominately from clearing of breeding and foraging habitat, habitat fragmentation and changes to hydrological regimes of aquatic habitat.

1.2 MS 1191 Condition 5

In relation to the potential for direct and indirect impacts to Terrestrial Fauna, the EPA recommended a number of conditions including Condition 5, and Ministerial Statement 1191, therefore, includes the following conditions in relation to Terrestrial Fauna:

Condition 5-1

The proponent shall implement the proposal to achieve the following environmental objective:

- (1) *during construction, minimise and manage project attributable adverse impacts to conservation significant terrestrial fauna including western ringtail possum and south-western brush-tailed phascogale.*

Condition 5-2

The proponent shall prepare a Construction Fauna Management Plan and submit to the CEO prior to ground-disturbing activities. This Plan shall:

- (1) *specify the passive relocation management actions to be implemented prior to and during clearing;*
- (2) *define the low-risk clearing timeframe for western ringtail possum applicable to Category 1 Clearing Areas and append supplementary survey evidence to justify the chosen timeframe;*
- (3) *specify monitoring that:*
 - (a) *includes a baseline survey to be undertaken within thirty (30) days prior to clearing (or if staged, prior to each clearing stage) to confirm presence/absence and number of western ringtail possum and south-western brush-tailed phascogale individuals within the development envelope and at receival sites. The baseline survey shall be prepared and undertaken on advice of DBCA during the preparation of the Construction Fauna Management Plan;*
 - (b) *records whether threatened or priority fauna is encountered during clearing, and reports to the CEO and DBCA within thirty (30) days after clearing (or each clearing stage) on the number of individuals relocated in accordance with any requirements of the lawful authority obtained under the Biodiversity Conservation Act 2016;*
 - (c) *evaluates the suitability, adequacy and effectiveness of passive relocation management actions at reducing impacts to western ringtail possum individuals displaced by clearing from Category 1 Clearing Areas defined in Figure 3;*
 - (d) *evaluates impacts to residential western ringtail possum individuals at receival sites; and*
 - (e) *uses monitoring methods including, but not limited to, radio telemetry with robust sample sizes (the minimum number of tagged animals to be determined in consultation with DBCA).*
- (4) *identify and spatially define the study area(s) and reference sites proposed for monitoring and evaluation and provide rationale for the location of the sites;*
- (5) *specify management actions; management targets; monitoring locations, methodologies, indicators and timing; and actions and investigations in the event of a failure to meet a management target to demonstrate that the objective in condition 5-1 will be met; and*
- (6) *be prepared in consultation with the DBCA and in accordance with any requirements of a lawful authority obtained under the Biodiversity Conservation Act 2016.*

2 Environmental Performance Report

2.1 Purpose and scope

This Environmental Performance Report (EPR) addresses the compliance of the Bunbury Outer Ring Road (BORR) Southern Section (the Proposal) with Condition 5-3 set out in Ministerial Statement 1191 (MS 1191).

Condition 5-3 of MS 1191 requires an annual environmental performance report to be submitted to the Chief Executive Officer (CEO) of the Environmental Protection Authority (EPA) as part of the Compliance Assessment Report (CAR).

Condition 5-3

The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:

- (1) outline the monitoring that was undertaken during the implementation of the Construction Faun Management Plan required in condition 5-2;*
- (2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 5-1(1) were achieved;*
- (3) report whether that the outcomes in condition 5-1(1) were achieved; and*
- (4) outline any management actions undertaken during the implementation of the Construction Fauna Management Plan required in condition 5-2 to meet the objective in condition 5-1(1).*

An Environmental Performance Report (EPR) has been prepared to address Conditions 5-1(1), 5-2 and 5-3 of MS 1191 during the reporting period (refer attached report prepared by Biota Environmental Sciences, August 2025).

This EPR incorporates a 12-month audit period from 31 May 2024 to 30 May 2025. This is the third EPR associated with Condition 5-3 to be submitted under Ministerial Statement 1191.

2.2 Compliance with MS 1191 Conditions 5-1, 5-2 and 5-3

Compliance with Conditions 5-1, 5-2 and 5-3 is addressed in Table 1.

Table 1. Compliance status with regard to MS 1191 Conditions 5-1, 5-2 and 5-3.

MS 1191 Condition	Condition	Status	Evidence / Compliance
5-1	<i>The proponent shall implement the proposal to achieve the following environmental objective:</i> <i>(1) during construction, minimise and manage project attributable adverse impacts to conservation significant terrestrial fauna including western ringtail possum and south-western brush-tailed phascogale.</i>	Compliant	This CAR.
5-2	<i>The proponent shall prepare a Construction Fauna Management Plan and submit to the CEO prior to ground-disturbing activities. This Plan shall:</i> <i>(1) specify the passive relocation management actions to be implemented prior to and during clearing;</i> <i>(2) define the low-risk clearing timeframe for western ringtail possum applicable to Category 1 Clearing Areas and append supplementary survey evidence to justify the chosen timeframe;</i> <i>(3) specify monitoring that:</i> <i>(a) includes a baseline survey to be undertaken within thirty (30) days prior to clearing (or if staged, prior to each clearing stage) to confirm presence/absence and number of western ringtail possum and south-western brush-tailed phascogale individuals within the development envelope and at receival sites. The baseline survey shall be prepared and undertaken on advice of DBCA during the preparation of the Construction Fauna Management Plan;</i>	Compliant	Construction Fauna Management Plan (approved 22 July 2022).

MS 1191 Condition	Condition	Status	Evidence / Compliance
	(b) records whether threatened or priority fauna is encountered during clearing, and reports to the CEO and DBCA within thirty (30) days after clearing (or each clearing stage) on the number of individuals relocated in accordance with any requirements of the lawful authority obtained under the Biodiversity Conservation Act 2016; (c) evaluates the suitability, adequacy and effectiveness of passive relocation management actions at reducing impacts to western ringtail possum individuals displaced by clearing from Category 1 Clearing Areas defined in Figure 3; (d) evaluates impacts to residential western ringtail possum individuals at receival sites; and (e) uses monitoring methods including, but not limited to, radio telemetry with robust sample sizes (the minimum number of tagged animals to be determined in consultation with DBCA). (4) identify and spatially define the study area(s) and reference sites proposed for monitoring and evaluation and provide rationale for the location of the sites; (5) specify management actions; management targets; monitoring locations, methodologies, indicators and timing; and actions and investigations in the event of a failure to meet a management target to demonstrate that the objective in condition 5-1 will be met; and (6) be prepared in consultation with the DBCA and in accordance with any requirements of a lawful authority obtained under the Biodiversity Conservation Act 2016.		

MS 1191 Condition	Condition	Status	Evidence / Compliance
5.3 (1)	<i>The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:</i> <i>(1) outline the monitoring that was undertaken during the implementation of the Construction Fauna Management Plan required in condition 5-2</i>	Compliant	The Construction Fauna Management Plan identified the following monitoring: • Pre-clearing WRP and BTP surveys • Recording of conservation significant fauna encounters that occur during clearing • Post-clearing WRP and BTP surveys of the receival and reference sites as part of on-going bi-monthly surveys • Mark-resight study using PIT tags of WRP within the Development Envelope and receival sites • Telemetry study using GPS collars on up to fifty WRP and monitoring these animals for up to 3 months • A genetic relatedness study of WRP with a minimum of 20 and up to 50 a samples DNA sequenced. Please refer to this CAR. Please refer also to attached EPR report (Biota Environmental Science, 2025).
5.3 (2)	<i>The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:</i> <i>(2) outline the results of the monitoring undertaken to report whether that the environmental outcomes specified in condition 5-1(1) were achieved;</i>	Compliant	Please refer to this CAR. Please refer also to attached EPR report (Biota Environmental Science, 2025) with regard to the bi-monthly, telemetry and mark-resight surveys and genetic relatedness study.
5-3(3)	<i>The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:</i> <i>(3) report whether that the outcomes in condition 5-1(1) were achieved; and</i>	Compliant	The objectives of Condition 5-1 are that <i>during construction, minimise and manage project attributable adverse impacts to conservation significant terrestrial fauna including western ringtail possum and south-western brush-tailed phascogale.</i> Given the work undertaken to minimise and manage project attributable impacts, with one clearing related WRP mortality being recorded during the entire clearing program, it is considered that the management measures in place have achieved

MS 1191 Condition	Condition	Status	Evidence / Compliance
			the objective. Ongoing monitoring will continue to measure whether this objective is being achieved.
5-3(4)	<i>The proponent shall annually submit an Environmental Performance Report as part of the Compliance Assessment Report required by condition 12-6, that shall:</i> <i>(4) outline any management actions undertaken during the implementation of the Construction Fauna Management Plan required in condition 5-2 to meet the objective in condition 5-1(1)</i>	Compliant	Please refer to this CAR.

2.3 Clearing metrics in relation to Terrestrial Fauna during the reporting period

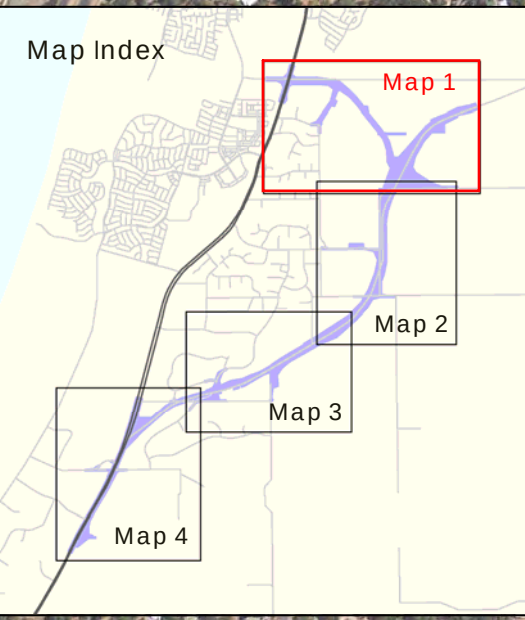
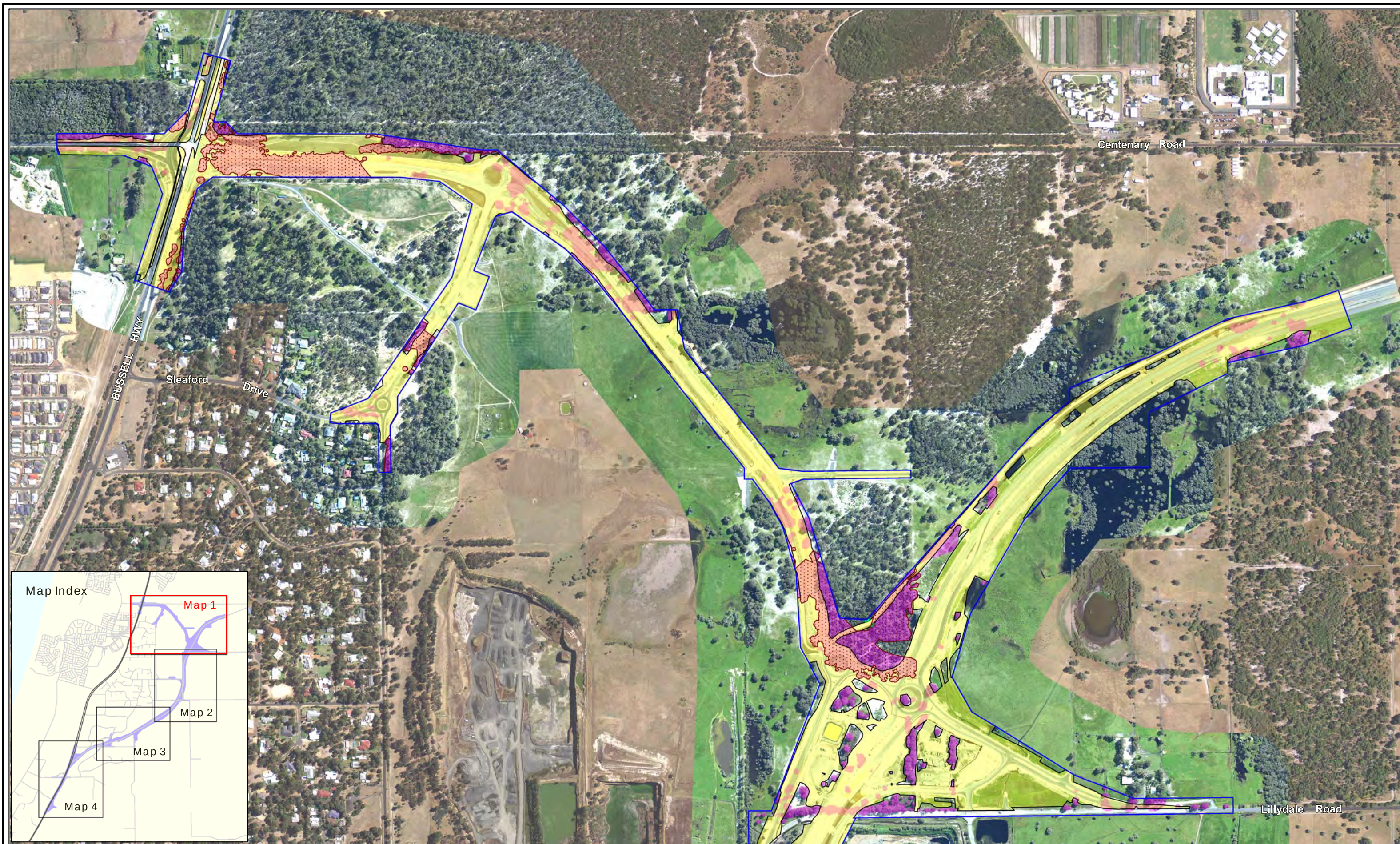
Construction of the Proposal (BORR Southern Section) commenced on 1 August 2022.

Clearing and disturbance in relation to Terrestrial Fauna, specifically Western ringtail possum (WRP) habitat and Brush-tailed phascogale (BPh) habitat during the reporting period is summarised in Table 1 and Figure 1.

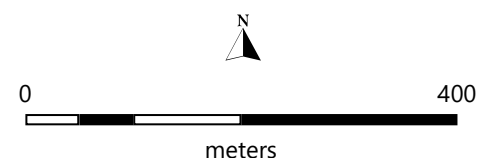
Table 2. Ground disturbance and clearing in relation to Terrestrial Fauna (Western ringtail possum habitat and South-western brush-tailed phascogale habitat) during the reporting period (May 2024 – May 2025).

Environmental Aspect	Area specified in Ministerial Statement 1191	Area cleared during the 2022 – 2023 reporting period	Area cleared during this 2023 – 2024 reporting period	Area cleared during this 2024 – 2025 reporting period	Total area / quantity cleared
Western ringtail possum habitat (WRP)	60.9 ha	24.39 ha	17.94 ha	0.19 ha	42.52 ha
Brush-tailed phascogale habitat (BPh)	39.2 ha	18.09 ha	11.72 ha	0.08 ha	29.89 ha

Figure 1. Ground disturbance and clearing extents during the reporting period in relation to Terrestrial Fauna (Western ringtail possum habitat and South-western brush-tailed phascogale habitat).

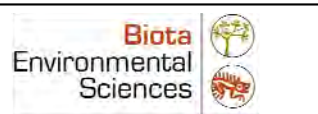


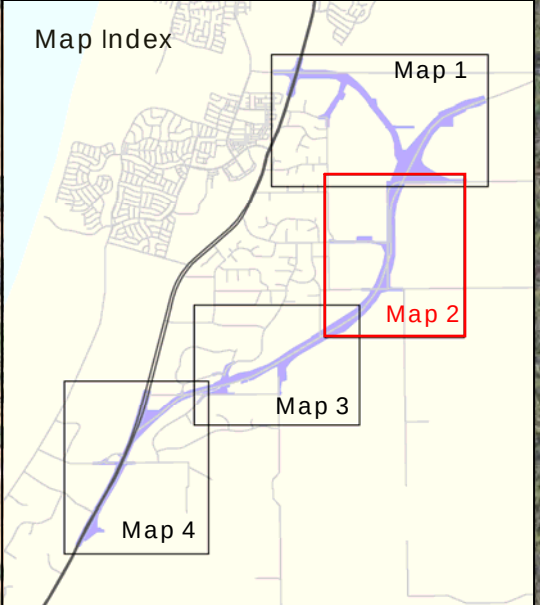
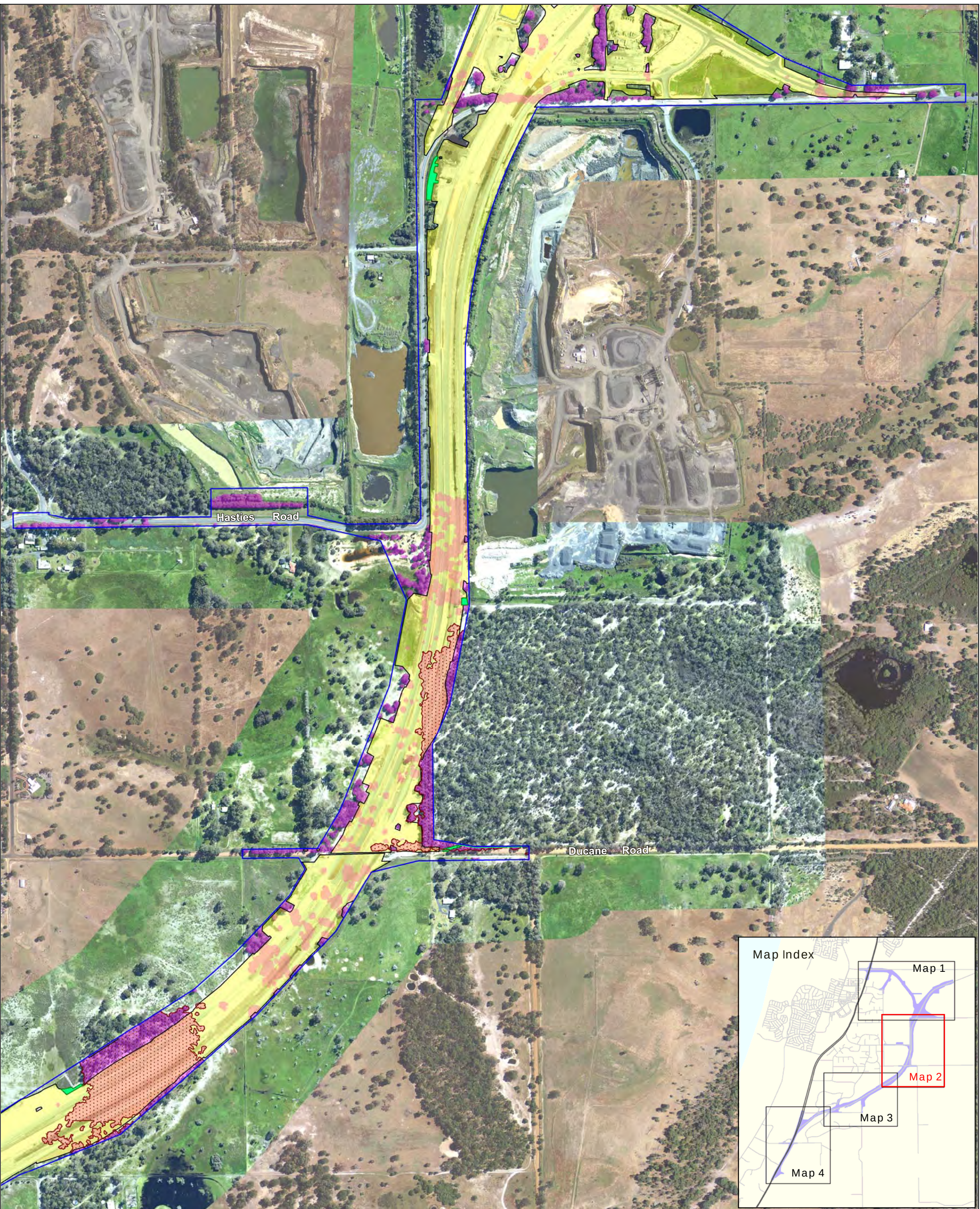
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Western Ringtail Possum habitat
 - Brush-tailed Phascogale habitat



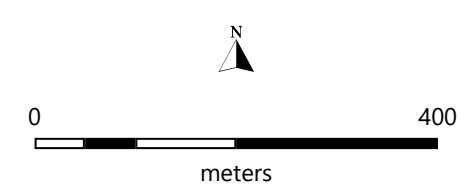
BORR South Imagery September 2024

Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat - Map 1





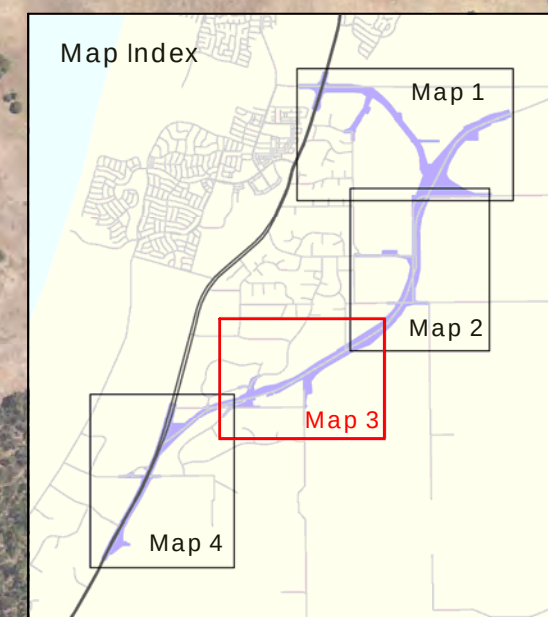
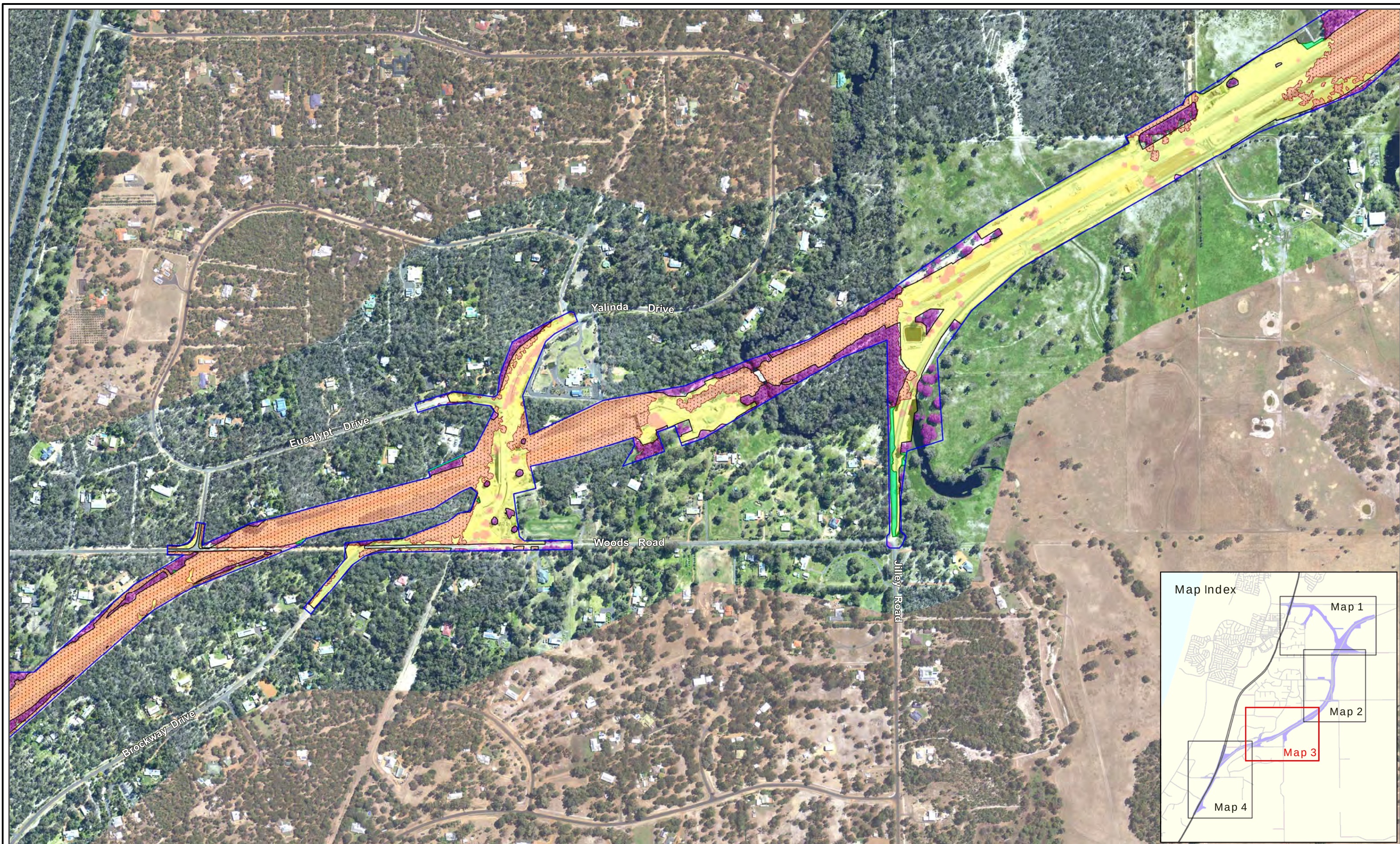
- LEGEND**
- Proposal approval boundary (MS1191)
 - Ground disturbance and clearing extents 2022 - 2024
 - Ground disturbance and clearing extents 2024 - 2025
 - Western Ringtail Possum habitat
 - Brush-tailed Phascogale habitat



Ground Disturbance and Clearing Extents in Relation to Western Ringtail Possum Habitat and South-western Brush-tailed Phascogale Habitat
Map 2

BORR South Imagery September 2024





Location Map

KARRATHA
W A
KALGOORLIE
PERTH
Map Area

LEGEND

 Proposal approval boundary (MS1191)	 Western Ringtail Possum habitat
 Ground disturbance and clearing extents 2022 - 2024	 Brush-tailed Phascogale habitat
 Ground disturbance and clearing extents 2024 - 2025	

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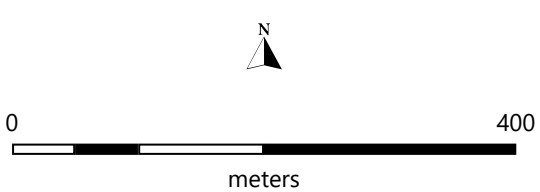
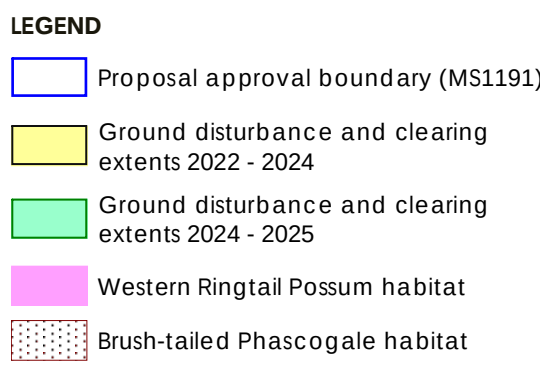
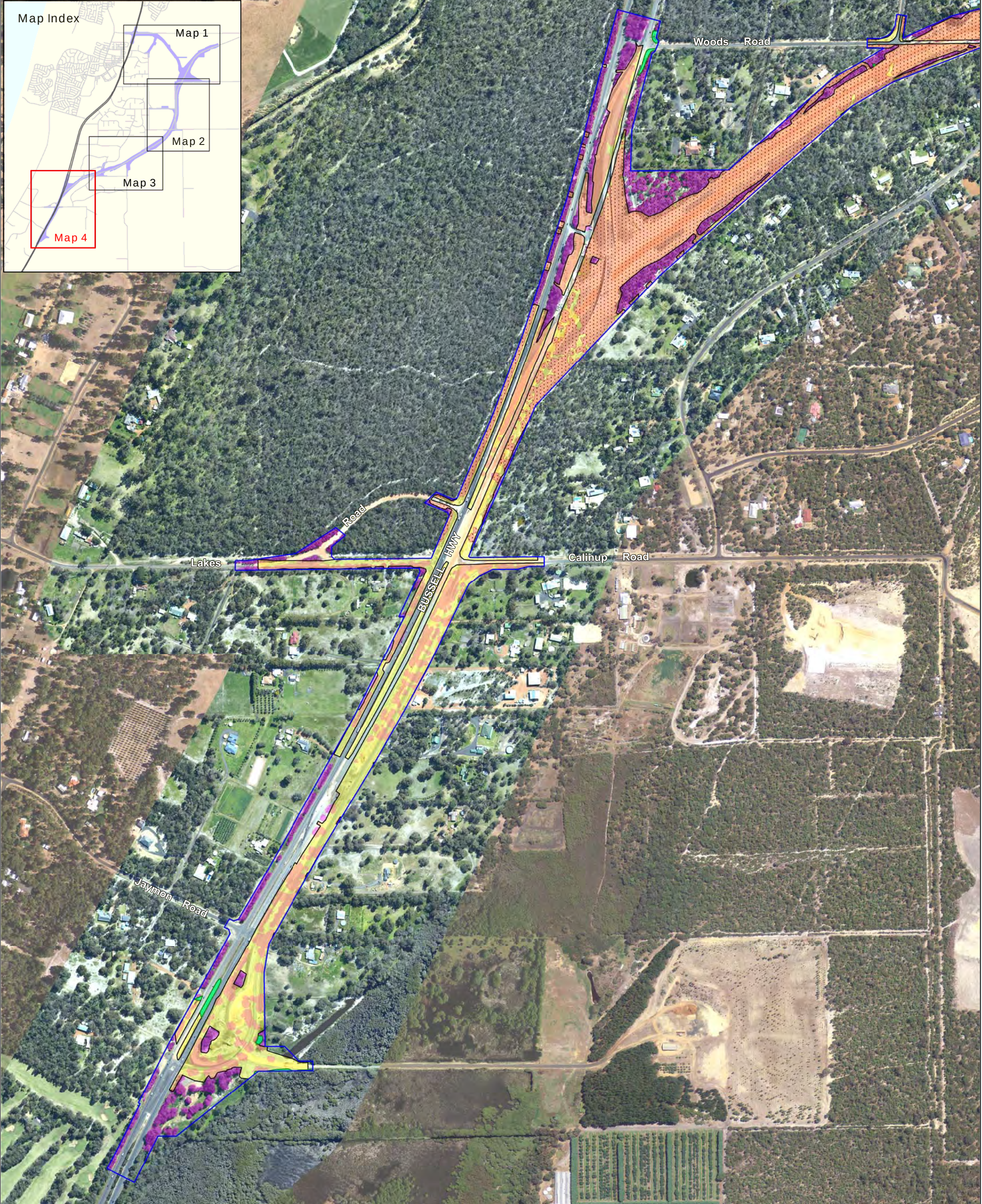
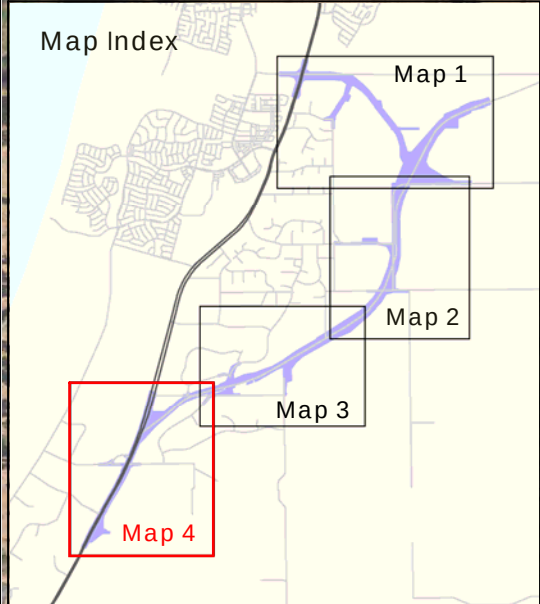
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BORR South Imagery September 2024

**Ground Disturbance and Clearing
Extents in Relation to Western Ringtail
Possum Habitat and South-western
Brush-tailed Phascogale Habitat - Map 3**

Author: Biota Drawn: P Sowers Job No.: 1855 Date: 23 Mar 2025 Revised:

Projection: MGA Z50 (GDA2020) Scale: 1:7,250 @ A3



BORR South Imagery September 2024

Ground Disturbance and Clearing
Extents in Relation to Western Ringtail
Possum Habitat and South-western
Brush-tailed Phascogale Habitat
Map 4



Report

Environmental Performance Report (Biota Environmental Sciences, 2025)

18 August 2025

Alex Gorman
Environment and Heritage
Planning and Technical Services Directorate
Main Roads Western Australia
Via Email

Biota
Environmental
Sciences



Dear Alex

Biota (n): The living creatures of an area; the flora and fauna together

Bunbury Outer Ring Road (Southern Section): Compliance Assessment Report (CAR) May 31 2024 to 31 May 2025.

Biota Environmental Sciences have contributed to several scopes of work related to the Bunbury Outer Ring Road (BORR) Southern Section, required under Ministerial Approval 1191. These scopes largely relate to Western Ringtail Possum (WRP) monitoring activities documented in the Construction Fauna Management Plan (CFMP) and Habitat Fragmentation Management Plan (HFMP). The scopes include bi-monthly surveys, telemetry studies, mark-resight studies, a genetic relatedness study and WRP habitat condition surveys.

Compliance Assessment Reporting (CAR) is a requirement for the BORR (Southern Section) under the Ministerial Approval 1191 with the current reporting period coinciding with the period 31st May 2024 to 31st May 2025.

This document reports on the aspects of WRP monitoring required under the CFMP that were undertaken by Biota Environmental Sciences.

The scope of works issued to Biota relevant to this reporting period, are specifically:

- Pre-clearing WRP and Brush-tailed Phascogale (BTP) survey of the Development Envelope, receival sites and reference sites (reported elsewhere);
- Post-clearing WRP and BTP surveys of the receival and reference sites as part of the on-going bi-monthly survey;
- Mark-resight study using PIT tags of WRP within the Development Envelope and receival sites;
- WRP habitat condition surveys via assessment of 3D aerial imagery.

Bi-monthly surveys

Bi-monthly (every two months) surveys have been completed throughout the reporting period (31 May 2024 – 31 May 2025) (Table 1) and have included habitat within the development envelop, the receiving habitat and Reserve 23,000 (the BORR S reference site). The bi-monthly surveys commenced in August 2019 and the almost five years of continuous data provide a robust baseline for population size and natural fluctuations within the survey footprint. Methods adopted for these surveys are provided in Appendix A. The count data from each bimonthly survey of the development envelop and adjacent receiving habitat are shown in Figure 1 and are divided into Patches with these delineated in Appendix Figure A1.

Effort, measured by the length of transects walked for each patch, was not always consistent across the surveys in this monitoring program. This inconsistency was partly due to variable access constraints on different parcels of land, including within the receiving habitat. For example, during the current reporting period, the landowner denied access to

survey Patches 1 to 4. There was only very selective and minimal clearing undertaken during the reporting period with most clearing essentially completed in 2023. As a result, there is relatively minimal variation between the bimonthly counts and any variation is largely attributable to seasonal / demographic changes.

Table 1. BORR South bi-monthly survey dates during current reporting period.

Phase	Survey Date
June 2024	7 th – 9 th , 11 th – 12 th , 19 th – 21 st and 24 th – 25 th June 2024
August 2024	19 th – 22 nd and 27 th – 28 ^h - August 2024
October 2024	7 th – 11 th and 22 nd – 23 rd October 2024
December 2024	10 th – 12 th and, 16 th – 18 th December 2024
February 2025	10 th – 13 th and, 19 th – 21 st February 2025
April 2025	7 th – 9 th , 23 rd – 24 th and 28 th – 30 th April 2025

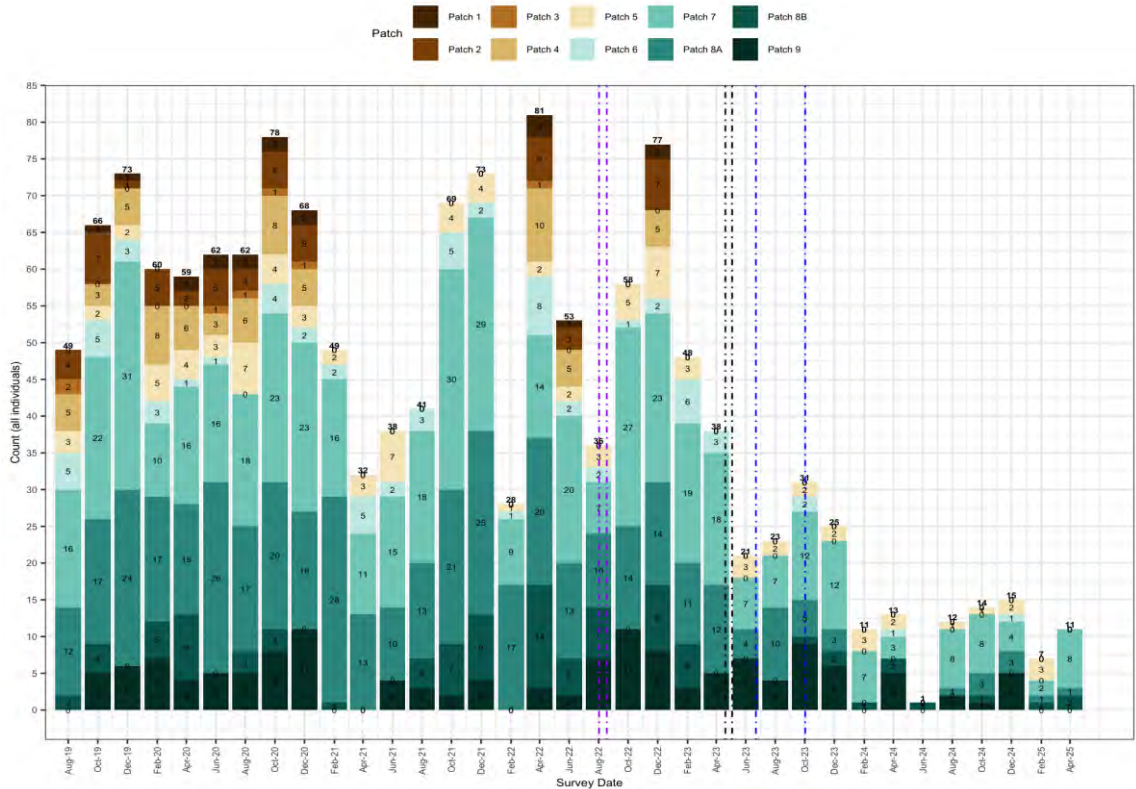


Figure 1. Results of counts of Western Ringtail Possums in the BORR South study area. Note effort is not always equivalent for each phase of the counts which would contribute to some of the variation between each phase. Purple hatched lines represent Stage 1 clearing, black and blue hashed lines represent Stage 2 clearing.

Considering the changing access permissions and the subsequent effect on the bi-monthly counts particularly within the receiving habitat, we suggest that the impact of clearing on WRP abundance within the receiving habitat is best understood by examining the results of the movement study (see below). Importantly, the reference site data also clearly shows the impact of the hot dry summer of 2023 /24 (which followed clearing) on WRP counts.

The BORR S reference site (Reserve 23,000) comprising 72 km of transects, is considered sufficiently large to provide a demographic snapshot of the entire monitoring period (commencing November 2019). Approximately 5 ha of Reserve 23,000 representing 3.4 % of the total area (146 ha) was burnt following a lightning strike on the 3/01/2023 and should be considered when interrogating the bi-monthly counts for this Reserve.

The seasonal peaks and troughs are broadly comparable across years (with the exception of the period post the summer of 2023/24 and including this current reporting timeframe).

The peaks are associated with the emergence of young from the pouch, typically evident in the October and December counts but with an occasional April peak (Figure 2). Troughs are evident in the winter counts (Figure 2). Against this background cycle, two climate features recur in the data. First, very hot summers drive post-breeding declines: the extremely hot, dry summer of 2023/24 (with prolonged runs of very hot days and little rain extending into autumn) coincided with the sharp drop in February 2024 and April 2024, and the loss was proportionally greatest among juveniles, nearly all young recorded in December were absent by February. The February estimate was lower than any of the preceding August counts, when the population is usually at its seasonal low, and the decline continued through April and into December (when young are typically seen with mothers), suppressing what is normally a seasonal high. Second, seasonal rainfall appears to buffer summer declines: the very wet conditions through 2021 supported a clear rebound by April 2022 that partially offset losses from the hot, dry 2021/22 summer; by contrast, the dry autumn and winter of 2023 preceded the 2023/24 crash. An atypical increase in counts was recorded in February 2025 that may represent immigration from adjoining watered properties (residential gardens, larger bush blocks and the golf course) rather than in-situ recruitment.

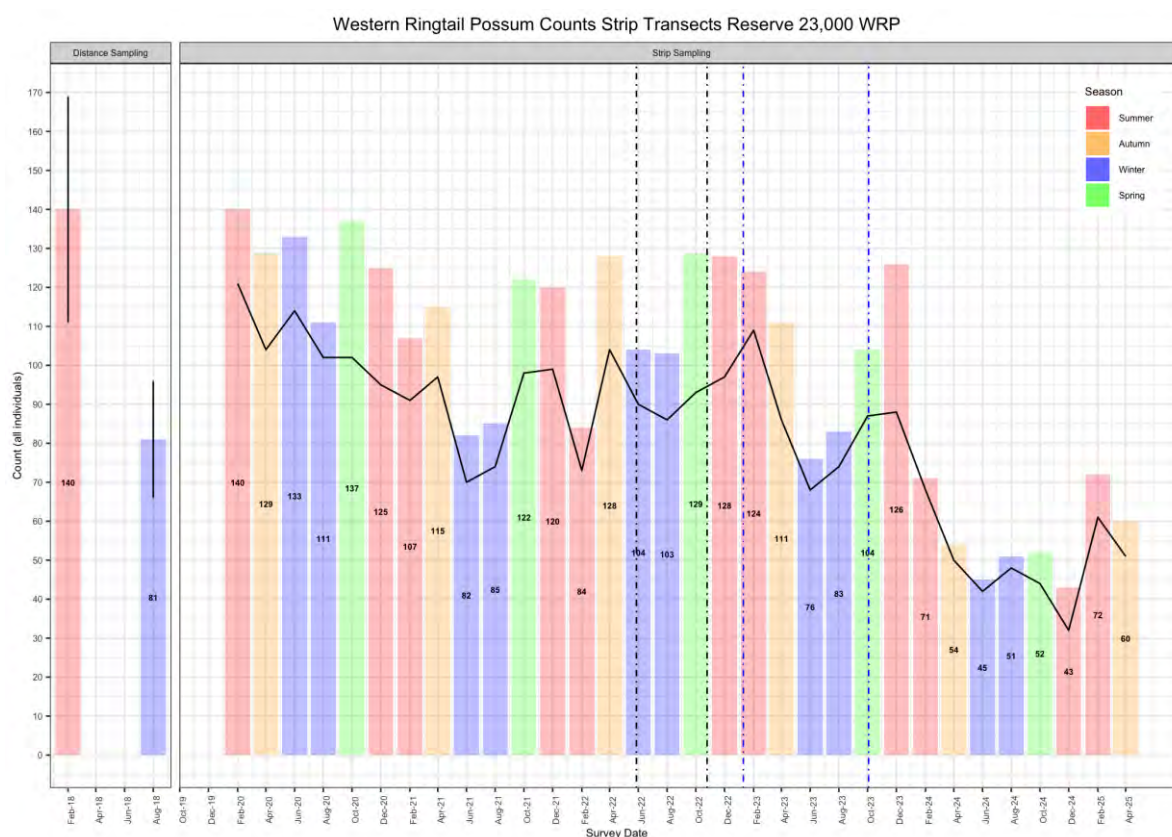


Figure 2. Results of counts of Western Ringtail Possums in Reserve 23,000 using distance sampling in the first panel (bars represent total number of individuals, black vertical bars are standard error estimates) and strip sampling in the second panel (bars represent total number of individuals, black line representing the total number of detections).

Mark-resight study

For the period up to December 2023, the transponder mark-recapture/resight study was largely superseded by the comprehensiveness of the GPS collaring study (see below). This is because the fate of collared animals (n=107) has been studied intensively before, during, and after clearing, both within the clearing area and in the receiving habitat (where access was permitted). We estimate that the total number of WRP captured represents approximately 90% of the individuals available for capture in the accessible parts of the receiving habitat and throughout the clearing footprint. Following the completion of the

telemetry study, the first round of captures for the mark-recapture study was proposed for August 2024. However, we note that the number of individuals within accessible areas of the Gelorup Corridor declined markedly following the prolonged hot, dry summer of 2023 / 24 (Figure 1), consistent with observations in the BORR S reference site (Figure 2) and as such no captures were attempted.

This meant that during the current reporting period there were no resighting's of previously marked individuals.

Telemetry (Movement) study

All modelling and analyses associated with the Telemetry study has been completed and a draft report is expected within the third quarter of 2025. A summary of findings is presented below and supported by Figure 3.

The collaring project was designed as a longitudinal study, where the home range of WRP individuals was modelled from GPS re-locations obtained prior to, during and after clearing.

Main objectives

- Estimate home range size for WRP before, during and after clearing in the Gelorup section of BORR South.
- Determine the extent to which shepherded WRP remain in modified home ranges or re-establish new home ranges within adjacent habitat.
- Determine the extent to which new home ranges overlap with pre-existing home ranges.
- Determine whether genetic relatedness influences the likelihood of WRP successfully sharing home ranges.
- Determine whether rope bridges, artificial water sources and dens can be used to shepherd WRP into adjacent home ranges before and during clearing.
- Determine whether artificial den sites, rope connections and water sources and dens continue to be utilised post-clearing, and whether they allow WRP to coexist at higher densities in the receiving habitat.

Methods

WRP were hand-captured using the hook-fitted pole techniques outlined in Jones *et al* (1994) and in accordance with animal ethics AEC NO. 21-1-05. Following capture, possums were weighed, sexed, scanned for microchips, and given a visual health assessment. All individuals were marked with a microchip if none was already present. Female's pouches were examined to determine their reproductive status, and the size of any pouch young. WRP which were visually healthy, weighed >900g, and not carrying large pouch young were fitted with Lotek® Litetrack-30 RF whip-antenna collars (Lotek, Havelock North, New Zealand), and then released at point of capture. Collars weighed 35g; no more than 3.9% of total body weight for any individual. Follow-up visual assessments were conducted the night post-release, and throughout the study.

GPS data was remotely downloaded from the collars throughout the study using a Lotek® PinPoint Commander unit (Lotek, Havelock North, New Zealand) attached to a three-prong Yagi antenna (Advanced Telemetry Solutions Australia, Gold Coast, Australia). This data was used to assess each individual's movement and check for signs of mortality progressively throughout the course of the clearing.

Findings

A total of 179 Western Ringtail Possums (WRP) were captured; 107 adults were fitted with Litetrack 30-RF GPS/VHF collars. At cessation of the surveys, a combined total of 155 (87%) were alive and 24 (13%) were deceased; two-thirds of deaths were fox predation/scavenging (8 DNA-confirmed). Mean collar duration was 196 days (range 14–428), and there was no evidence collars impeded female reproduction (72% breeding at first capture, 95% at second, 100% at third).

All modelled individuals exhibited range residency for at least one period (either pre- or post-clearing); OU-family models predominated. Pre-clearing, males held larger ranges than females (mean 1.74 ha vs 0.84 ha, 95% AKDE), with male ranges typically overlapping multiple females and female boundaries aligning with canopy gaps.

Stage 1 pre/post comparisons ($n = 41$; 24 ♀, 17 ♂) showed clear effects where the clearing corridor intersected home ranges. Among impacted animals, female mean range contracted from 0.995 ± 0.577 ha to 0.611 ± 0.281 ha; male mean range from 2.223 ± 0.970 ha to 1.596 ± 0.816 ha. In receiving (unimpacted) habitat, female ranges were stable (0.680 ± 0.226 to 0.712 ± 0.292 ha) and male ranges increased (1.269 ± 0.614 to 1.555 ± 0.818 ha).

Movement metrics were consistent with reduced home ranges in impacted animals: τ [position] shortened post-clearing and diffusion was lower or comparable (females lower; males modest declines), indicating more localised movement over shorter correlation times within reduced ranges. Among unimpacted animals, diffusion tended to decline across winter to spring, perhaps reflecting seasonal foraging shifts rather than disturbance.

Home-range fidelity mirrored habitat loss. For impacted females, pre/post home range overlap (Bhattacharyya's Affinity) averaged 0.67 ± 0.26 (range 0.21–0.92), reflecting the proportion of the pre-clearing range removed by the clearing. Unimpacted females typically maintained high fidelity, with individual overlaps commonly around 0.90–0.98 (e.g., $F_NR_33862 = 0.98$; $F_R_33338 = 0.97$; $F_R_32537 = 0.97$).

There was evidence of increased density in receiving habitat post clearing: resident ranges stayed in place but were overlapped more by home ranges of displaced animals post-clearing. For example, female F32537 sat on the clearing boundary yet her own range size and position were essentially unchanged (0.843 ha pre vs 0.816 ha post; pre/post overlap 97%), while the extent to which other females overlapped her increased after clearing, consistent with encroachment by displaced animals. Prior to clearing, female–female overlaps were generally low (only 29 pairs >10%), so the post-clearing encroachment into stable resident ranges represents a deviation from baseline.

Patterns in males were broadly similar: unimpacted males showed very high pre/post fidelity (most 0.83–0.98), with one outlier (M_R_33861) exhibiting a large post-clearing shift (overlap 0.17) interpreted as dispersal from the natal range of F_NR_33862.

Stage 2 (late Jan–early Oct 2023) comprised an April track-widening step in addition to the primary clearing; analyses were split into Pre-Track, Pre-Clearing and Post-Clearing. Fifty-seven WRP (35F, 22M) yielded 113 home-range estimates corresponding to the different clearing stages. Tracking duration and relocations decreased across stages (Figure 3) due to battery attrition such that comparatively few (relative to Stage 1) comparisons of pre- and post-clearing impacts were available. Baseline (Pre-Track) ranges again showed that on average males had larger home ranges than females (≈ 1.56 ha vs 0.78 ha). Where the widened track/bridgeworks intersected ranges, home-range area modestly contracted from Pre-Track to Pre-Clearing (e.g., females ~ 0.84 to 0.76 ha), with little change in home range size for those WRP unimpacted. From Pre-Clearing to Post-Clearing (primary clearing), paired comparisons (9F, 5M) mirrored Stage 1: impacted ranges contracted, and pre / post overlap declined, while unimpacted ranges remained broadly stable.

Operationally, daily radio-tracking of collared WRP identified diurnal roosts and enabled tailored clearing (staging works, targeted trapping, arborists working around animals, and canopy retention).



Figure 3. Summary of duration over which WRP were GPS collars during phases 1 (Bussell Highway to Yalinda Drive) and 2 (Yalinda Drive to Jilly Road) of clearing within the Gelorup corridor. Note that the current reporting period extends from May 31st 2024 to May 31st 2025 and the collaring study was completed in early October 2023.

WRP Habitat Condition Survey

Aerial 3D-imagery of the development envelope, receiving habitat and part of the BORR S reference site (Shire of Capel's Reserve 23,000) was captured prior to commencement of clearing (July 2022). Subsequently, the aerial survey was expanded to include the entirety of the BORR S reference site and flights undertaken in September 2024 and March 2025.

The following datasets have been captured:

- 25cm SpecTerra multispectral imagery (4-band) with co-registered 6 cm high resolution RGB imagery.
- Digital Surface Models (DSM) and Digital Terrain Models (DTM).
- Delineation and segmentation of canopy polygons with height, area and Plant Cell Density (PCD) / Normalised Difference Vegetation Index attributes.

All resultant data to date has been used to both document the utility of the captured parameters in relation to home range modelling undertaken in the Gelorup corridor and examine any changes in habitat quality as clearing progressed.

Yours sincerely,

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References

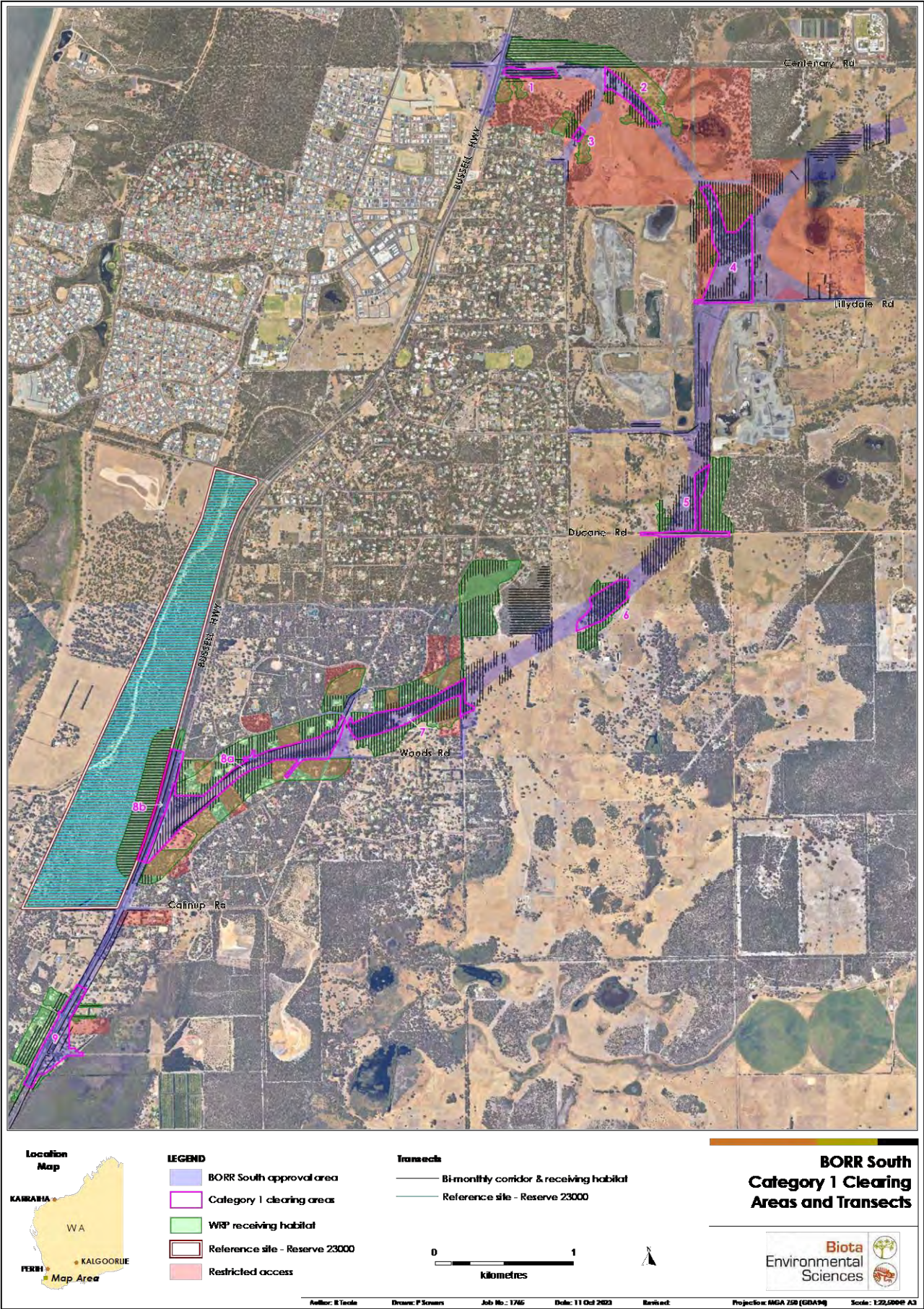
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Appendix A: Standard Western Ringtail Possum Survey Methods

To document WRP seasonal population variation and to guide management actions, censuses within the BORR South Study Area and the BORR South Referral Boundary have been undertaken at two-monthly (bimonthly) intervals since August 2019. Counts within the BORR South Reference Site (Reserve 23,000) commenced in early November 2019 and were then timed to match those undertaken in the BORR South Study Area (i.e., from December 2019 and then bimonthly). To simplify reporting, the BORR South Study Area and Referral Boundary have been divided into Patches.

A strip-sampling approach using 20 m wide strips, was adopted in each of the survey areas. This was preferred over using distance sampling for a number of reasons, mainly that many habitat remnants were too small to implement robust distance sampling. However, the width of the strip was guided by the detection function developed from the regional distance sampling program (based on thousands of detections) which indicated a probability of detection of 95% within 10 m either side of an observer (and even higher in the more open habitat characteristic of the BORR study sites). To obtain accurate and repeatable counts of the number of possums utilizing the BORR South Study Area and Referral Boundary, each section of habitat (including the Reserve 23000 Reference Site) was divided into 20 m strips.

These strips were pre-loaded onto map imagery and displayed on tablets (UniStrong UT 10) with a GPS accuracy typically to within 1.5 m. Each strip was surveyed by an appropriately experienced zoologist walking centrally through the strip at a slow steady pace (typically less than 1 km/hr), using a high-powered head torch (Led Lenser XEO 19R model) to detect animals. In open pasture with scattered trees, searching individual paddock trees was undertaken in favour of searching strips. In addition to the Western Ringtail Possum, observations of the Common Brushtail Possum and Brush-tailed Phascogale were also recorded.



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