



Ensham

R E S O U R C E S

Compliance Report

**Ensham Life of Mine Extension Project
EPBC 2020/8669**

30 June 2025 – 30 June 2026

Contents

1.0	Document Details	3
1.1	Document status and review.....	3
2.0	Introduction	4
3.0	Purpose of this Report.....	4
4.0	Description of Activities.....	4
5.0	Definitions	5
6.0	EPBC Approval Conditions and Compliance Table	6
7.0	Correcting non-compliances	25
8.0	New Environmental Risks.....	26
9.0	Schedule of Plans	27
10.0	Declaration of accuracy	28
11.0	Appendices	29
	Appendix A - Confirmation of Receival.....	29
	Appendix B - Groundwater Dependent Ecosystem Monitoring and Management Plan (GDEMMP).....	30
	Appendix C - EIMP.06.00.06 Subsidence Management Plan (SMP).....	31
	Appendix D - Notification of Commencement of the Action	32
	Appendix E - Review of plan against conditions of approval and other relevant regulatory matters (SMP).	33
	Appendix F - Upload of Compliance Report to Website.	34
	Appendix G - EPBC 2020/8669 Ensham Life of Mine Extension Project Correspondence.....	35
	Appendix H – Notification of Management Plan Approval (GDEMMP).....	36
	Appendix I – Notification of Non-Compliance to the Department 26 June 2026	37
	Appendix J – Initial Notification of Non-Compliance Memorandum 26 June 2026.....	38
	Appendix K – Investigation of Non-Compliance 24 June 2024.....	39

Table of Tables

Table 1 – Document Authorisation.....	3
Table 2 – Project Description.....	4
Table 3 - Compliance Definitions.....	5
Table 4 - EPBC Approval Conditions and Compliance Table	6




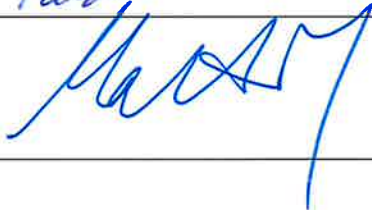
1.0 Document Details

Document Title: Compliance Report: Ensham Life of Mine Extension Project – EPBC 2020/8669 – 2025/2026

File Name: Compliance Report - 2025.2026 - Ensham Life of Mine Extension Project, Queensland (EPBC 2020.8669)

1.1 Document status and review

Table 1 – Document Authorisation

Edition	Comments	Author/s	Authorised by	Date
REV_A	Construction of Draft document	Alana Connolly		01/07/26
REV_A	Review of Draft document	Ben Hooper		01/07/26
REV_A	Review of Draft document	Peter Liston		1/7/26
REV_A	Final document	Matthew Lumb		1/7/26

2.0 Introduction

Ensham Mine is located about 40 kilometres east of Emerald, near the township of Comet in Central Queensland. Ensham Mine is both a surface open cut and underground mining operation. The open cut operations are currently in care and maintenance undergoing rehabilitation works in areas where mining is no longer viable. The underground mine utilises bord and pillar mining method to win coal. Coal quality mined is thermal coal from the coalesced Aries and Castor seams. Ensham originally commenced operations as an open cut coal mine in 1993, now operating the underground mine producing approximately 5 million tonnes per annum, Ensham's coal is railed to the Port of Gladstone and sold to various domestic and international customers.

3.0 Purpose of this Report

In accordance with Condition 26 of EPBC Act Approval 2020/8669, the approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the minister. This compliance report has been prepared in accordance with the *Annual Compliance Report Guidelines*, Commonwealth of Australia 2014 – as required by EPBC 2020/8669 Condition 27.

4.0 Description of Activities

Table 2 – Project Description

Item	Description
EPBC Number	EPBC 2020/8669
Project Name	Ensham Life of Mine Extension Project
Approval Holder and ACN	Thungela Resources Australia Pty Ltd CAN 665 159 759 and Sungela Pty Limited ACN 665 234 739
Approved Action	To extend the operation of the underground board and pillar working of Ensham Mine and to decommission the coal mine, located approximately 35 km east of Emerald in Queensland.
Location of the Project	Emerald, Queensland.
Report Author	See Declaration of Accuracy (Section 10.0).
Reporting Period	30 June 2025 to 30 June 2026
Date of Report	1 July 2026

5.0 Definitions

Table 1 provides details of the status of compliance with the conditions of the EPBC Act approval notice (EPBC 2020/8669). The following designations have been used to record findings in this compliance report:

Table 3 - Compliance Definitions

Status	Description
Compliant	'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.
Non-compliant	A designation of 'non-compliance' should be given where the requirements of a condition or elements of a condition, including the implementation of management plans and other measures, have not been met.
Not applicable	A designation of 'not applicable' should be given where the requirements of a condition or elements of a condition fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.

These definitions are consistent with Section 3.7 of the Annual Compliance Report Guidelines.

6.0 EPBC Approval Conditions and Compliance Table

Table 4 - EPBC Approval Conditions and Compliance Table

Condition Number	Condition	Status	Evidence
Part A – Conditions specific to the Action			
Maximum Clearance Limits			
1	The approval holder must not clear outside of the project area .	Compliant	The approved action did not require nor undertake clearance outside of the project area.
2	The approval holder must not clear any habitat for protected matters .	Compliant	The approved action did not require, nor undertake clearance of any habitat for protected matters.
Groundwater Dependent Ecosystems (GDEs)			
3	To minimise harm to protected matters , within 12 months of the date of this approval, the approval holder must submit to the Department ¹ , for the Minister’s written approval, a GDE Monitoring and Management Plan	Compliant	The approval holder developed the Groundwater Dependant Ecosystem Monitoring and Management Plan (GDEMMP), dated May 2024.

¹ Department of Climate Change, Energy, the Environment and Water

	<p>(GDEMMP). The approval holder must implement the approved GDEMMP from when it is approved until the expiry date of this approval.</p>		<p>The GDEMMP was submitted to the minister on 27 June 2024.</p> <p>Revised version of the GDEMMP address the department comments was prepared.</p> <p>The GDEMMP was implemented upon receipt of the Ministers written approval, Notification of approval was provided to Ensham January 12, 2026.</p> <p>See Appendix H– Notification of Management Plan Approval (GDEMMP)</p>
<p style="text-align: center;">4</p>	<p>If the GDEMMP has not been approved by the Minister in writing within 15 months of this approval, and the Minister notifies the approval holder that the GDEMMP is not suitable for approval, the Minister may, at least two months after so notifying the approval holder, approve a version of the GDEMMP prepared or revised by the department. The approval holder must implement the GDEMMP as approved by the Minister in writing, from when it is approved until the expiry date of this approval.</p>	<p>Not applicable</p>	<p><i>Note only.</i></p>
<p style="text-align: center;">5</p>	<p>The outcome of implementing the GDEMMP must be that all GDEs potentially impacted by the Action are identified and any impacts are avoided, mitigated or residual impacts are offset in accordance with the Environmental Offsets Policy. The GDEMMP must be consistent with the Environmental Management Plan Guidelines and include the following to the satisfaction of the Minister:</p>	<p>Compliant</p>	<p>The Groundwater Dependant Ecosystem Monitoring and Management Plan was developed to be consistent with the Environmental Management Plan Guidelines.</p> <p>There is no indication there are aquatic or terrestrial GDE's within the project area.</p> <p>See Appendix B – Groundwater Dependant Ecosystem Monitoring and Management Plan (GDEMMP), Section 3.</p>

5 (a)	The details and results of a GDE field assessment of the project area.	Compliant	<p>Three seasonal flora surveys were conducted in 2019 and 2020.</p> <p>Details and results of these surveys are detailed in Appendix B, GDEMMP, Section 3.4.</p>
5 (b)	If any riparian vegetation or Brigalow on alluvial plains within the project area is found to not be groundwater dependent, the evidence used to draw this conclusion.	Compliant	<p>Riparian vegetation and Brigalow on alluvial plains in the project area is not found to be groundwater dependant.</p> <p>This conclusion and supporting evidence is summarised in Appendix B, GDEMMP, Section 3.5 and Section 3 (wholly), respectively.</p>
5 (c)	If any riparian vegetation or Brigalow on alluvial plains is determined likely to be groundwater dependent, a description and map/s to clearly define the location and boundaries of GDEs and where they include habitat for protected matters.	Not applicable	<p>No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant.</p> <p><i>No action required.</i></p>
5 (d)	If any riparian vegetation or Brigalow on alluvial plains is determined likely to be groundwater dependent, the proposed methodology and timing for the monitoring and detection of any impacts to GDEs as a result of the Action, including collecting baseline data and specifying associated:	Not applicable	<p>No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant.</p> <p><i>No action required.</i></p>
5 (d)i)	Trigger values that, if reached, the approval holder commits to investigate the cause of and take effective corrective actions to bring values below the trigger, and	Not applicable	<p>No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant.</p> <p><i>No action required.</i></p>

5 (d)ii)	Limits that, if exceeded, the approval holder commits to provide environmental offsets to compensate for likely residual impacts to GDEs as a result of the Action in accordance with condition 9.	Not applicable	No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant. <i>No action required.</i>
5 (e)	Details of the investigations and corrective actions that will be taken if trigger values are reached.	Not applicable	No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant. <i>No action required.</i>
6	If, at any time during the period for which the approval has effect, the approval holder detects that any trigger value specified in the approved GDEMMP has been reached or any limit specified in the approved GDEMMP exceeded, the approval holder must notify the department in writing within 10 business days of the detection.	Not applicable	No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant. <i>No action required.</i>
7	Within 14 business days of detecting the reaching or exceeding of a trigger value or limit that must be notified under condition 6, the approval holder must commence an investigation to determine if the reaching of a trigger value or exceedance of a limit is a result of the Action.	Not applicable	No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant. <i>No action required.</i>
8	The approval holder must, within 60 business days of a detection that must be notified under condition 6, complete and submit to the department a report of the investigation required under condition 7. Unless evidence can be provided, to the Minister's satisfaction, that the reaching of a trigger value is not attributable to the Action, the approval holder must implement the corrective actions in accordance with the commitments made in the approved GDEMMP to halt and prevent further harm to protected matters.	Not applicable	No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant. <i>No action required.</i>

9	<p>If a limit specified in the approved GDEMMP is exceeded the approval holder must, within 12 months from the detection of the exceedance, submit an Offset Management Plan to address residual harm to protected matters to the department for the Minister’s written approval. The Offset Management Plan must be consistent with the Environmental Management Plan Guidelines and the Environmental Offsets Policy and contain the information and commitments specified in Attachment 4. The approval holder must implement the approved Offset Management Plan from when it is approved by the Minister in writing until the expiry date of this approval.</p>	Not applicable	<p>No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant.</p> <p><i>No action required.</i></p>
10	<p>If an Offset Management Plan is required under condition 9 and an Offset Management Plan has not been approved by the Minister in writing within 4 months of its first submission to the department and the Minister notifies the approval holder that the Offset Management Plan is not suitable for approval, the Minister may, at least two months after so notifying the approval holder, approve a version of the Offset Management Plan prepared or revised by the department. The approval holder must implement the Offset Management Plan as approved by the Minister in writing.</p>	Not applicable	<p>No riparian vegetation or Brigalow on alluvial plains was found to be groundwater dependant.</p> <p><i>No action required.</i></p>

Subsidence Monitoring and Management Plan (SMMP)			
11	<p>To manage potential impacts on protected matters, the approval holder must, within 12 months of the date of this approval, submit to the department for the Minister's written approval a Subsidence Management and Monitoring Plan (SMMP) developed by a suitably qualified expert. The SMMP must reliably predict subsidence caused by the Action that may cause harm to protected matters arising from the Action. The SMMP must:</p>	Compliant	<p>To meet the requirements of this condition, the approval holder prepared the Subsidence Management Plan (SMP), dated 11 June 2024.</p> <p>The SMP was submitted to the Minister via email on 27 June 2024.</p> <p>See Appendix A – Confirmation of Receival.</p> <p>A revised version of the SMP addressing the Department's comments came back with additional actions March 2026.</p> <p>Ensham continue to develop the SMMP in line with the departments consolidated comments.</p> <p>The SMP will be implemented upon receipt of the Minister's written approval, in line with the condition requirements</p> <p>See Appendix E – Review of plan against conditions of approval and other relevant regulatory matters (SMP).</p>
11 (a)	<p>Specify trigger values that will provide early warning of potential subsidence that may cause harm to protected matters.</p>	Compliant	<p>A subsidence trigger value of 500 mm has been selected for Ensham Mine.</p> <p>The literature review identified that Brigalow has not been impacted by subsidence movements up to 3m.</p> <p>See Appendix C, EIMP.06.00.06 Subsidence Management Plan (SMP), Section 5.2.1.</p>

11 (b)	Specify a program and network of monitoring capable of prompt detection of any specified trigger value so as to prevent harm to protected matters.	Compliant	<p>A Brigalow monitoring program, including a pre-activity baseline condition assessment and Brigalow TEC subsidence impact monitoring, was developed.</p> <p>See Appendix C, SMP, Section 5.3.</p>
11 (c)	Specify procedures for prompt notification to the department and details of investigation that will be undertaken if monitoring detects a specified trigger value being reached or exceeded.	Compliant	<p>The notification, investigation and reporting procedure is outlined in the SMP.</p> <p>See Appendix C, SMP, Section 5.4.</p>
11 (d)	Specify corrective actions to be undertaken to stop the cause of the trigger value being reached or exceeded and bring values under the trigger level.	Compliant	<p>Specified in the SMP are corrective actions and management measures for:</p> <ul style="list-style-type: none"> Routine operations; Trigger exceedance, no TEC impacted; Trigger exceedance, TEC impacted; and Non-routine situations. <p>See Appendix C, SMP, Section 5.5.</p>
11 (e)	Specify procedures to determine the potential extent and severity of actual and potential harm to protected matters.	Compliant	<p>Monitoring methods and procedures used to identify impacts to the Brigalow TEC are described in the SMP.</p> <p>See Appendix C, SMP, Section 5.3.</p>
11 (f)	Specify procedures to promptly report to the department the findings of investigations into the cause of any trigger value being reached or exceeded and the extent of any harm of subsidence on protected matters.	Compliant	<p>The SMP addresses the process for notifying the Department upon exceedance of trigger thresholds and upon finalisation of any required investigations.</p> <p>See Appendix C, SMP, Section 5.4.1 & 5.4.2.</p>

11 (g)	Specify procedures to promptly remediate harm to protected matters where this can reliably be achieved.	Compliant	<p>Corrective actions are outlined in the SMP.</p> <p>See Appendix C, SMP, Section 5.5.</p>
11 (h)	Make firm, clear commitments and specify procedures and timeframes to provide an offset consistent with the Environmental Offsets Policy for any harm to protected matters which has resulted from or is likely to result from subsidence including submitting an Offset Management Plan for the Minister's written approval, which contains the information and commitments specified in Attachment 4.	Compliant	<p>Ensham has committed to developing an Offset Management Plan within 12 months of a trigger threshold exceedance caused by mining activities. The Offset Management Plan requirement is detailed further in the SMP.</p> <p>See Appendix C, SMP, Section 5.4.3.</p>
11 (i)	Specify control measures for routine operations to minimise likelihood of harm to protected matters.	Compliant	<p>The SMP details preventative actions to be incorporated into routine mining operations.</p> <p>See Appendix C, SMP, Section 5.5.1.</p>
11 (j)	Specify contingency plans and emergency procedures for non-routine situations.	Compliant	<p>The SMP details corrective actions to be taken during non-routine situations, inclusive of reporting.</p> <p>See Appendix C, SMP, Section 5.5.2.</p>

11 (k)	Specify procedures for periodic review of environmental performance and continual improvement.	Compliant	<p>The SMP is subject to review every 2 years at minimum, or as triggered by:</p> <p>Change to licence conditions and/or reporting requirements; Significant change to current mine plan/operations; or an investigation report recommendation.</p> <p>See Appendix C, SMP, Section 9</p>
12	If the SMMP has not been approved by the Minister in writing within 16 months of this approval decision, and the Minister notifies the approval holder that the SSMP is not suitable for approval, the Minister may, at least two months after so notifying the approval holder, approve a version of the SMMP prepared or revised by the department. The approval holder must implement the approved SMMP as approved by the Minister in writing from when it is approved until the expiry date of this approval.	Not applicable	<i>Note only.</i>
13	If an Offset Management Plan is required in accordance with the approved SMMP for any harm to protected matters which has resulted from, or is likely to result from, the Action but has not been approved by the Minister in writing within 4 months of when the submission of an Offset Management Plan is required in accordance with the approved SMMP, and the Minister notifies the approval holder that the Offset Management Plan is not suitable for approval, the Minister may, at least two months after so notifying the approval holder, approve a version of the Offset Management Plan prepared or revised by the department. The approval holder must implement the approved Offset Management Plan as approved by the Minister in writing, from when it is approved by the Minister in writing until the expiry date of this approval.	Not applicable	<p>The approval holder has not triggered the requirement to develop or submit an Offset Management Plan during the reporting period.</p> <p><i>Note only.</i></p>

Part B – Administrative conditions

Revision of Action Management Plans

14	The approval holder may, at any time, apply to the Minister for a variation to an action management plan approved by the Minister, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.	Not applicable	No managements plans were required to be varied or submitted during the reporting period.
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Submission and Publication of Plans

15	The approval holder must submit all plans required by these conditions electronically to the department.	Compliant	The GDEMMP required by Condition 3 and the SMP required by Condition 11 were submitted electronically to the department on 27 June 2024. See Appendix A– Confirmation of Receival.
16	Unless otherwise agreed to in writing by the Minister, the approval holder must publish each plan on the website within 15 business days of the date the plan is approved by the Minister in writing.	Non-Compliant	As a result of the acquisition of Ensham by Thungela in late 2023 (partially) and subsequent full acquisition in early 2025, Thungela has spent most of the previous 12 months integrating many of the Ensham systems into Thungela’s. One of these actions has been the migration of the information onto the Thungela public website.

			<p>Publication of the approved GDEMMP was required to be made publicly available on the website² by 3 February 2026 (see condition 16 of EPBC Approval 2020/8669), being 15 business days³ from the date of Ministerial approval on 12 January 2026. The GDEMMP was not made available until 23 June 2026, which was approximately 91 business days outside the required timeframe required under condition 16.</p> <p>The Approved GDEMMP was published to the website within the 2025-26 annual compliance reporting timeframe and remains publicly available.</p>
17	The approval holder must keep all published plans required by these conditions on the website until the expiry date of this approval.	Compliant	GDEMMP was published to the website and remains publicly available.
18	The approval holder is required to exclude or redact sensitive ecological data from plans published on the website or otherwise provided to a member of the public. If sensitive ecological data is excluded or redacted from a plan, the approval holder must notify the department in writing what exclusions and redactions have been made in the version published on the website.	Not applicable	<p>No sensitive data has been redacted from this report.</p> <p><i>Note only.</i></p>

² "Website" is defined in Part C of the EPBC 2020/8669 is defined as an "set of related webpages located under a single domain name attributed to the approval holder and available to the public". The Thungela website includes pages specific to Sungela and TRA which meet this description [Ensham mine | Thungela](#)

³ "Business Day" is defined in Part C of the EPBC 2020/8669 to exclude public holidays in Queensland. 26 January, 3 April, 6 April and 4 May 2026 were public holiday's in Queensland.

Notification of Date of Commencement of the Action			
19	The approval holder must notify the department electronically of the date of commencement of the Action, within 5 business days following commencement of the Action.	Compliant	The approved action commenced on 11 August 2023. The department was notified via email on 11 August 2023. See Appendix D– Notification of Commencement of the Action.
20	If the commencement of the Action does not occur within 5 years from the date of this approval, then the approval holder must not commence the Action without the prior written agreement of the Minister.	Not applicable	Commencement of the approved action occurred on 11 August 2023, 42 days from the date of the EPBC 2020/8669 approval was granted.
Compliance Records			
21	The approval holder must maintain accurate and complete compliance records	Compliant	All records relevant to this compliance report are stored within Ensham’s internal file network or online data management platform.
22	If the department makes a request in writing, the approval holder must provide electronic copies of compliance records to the department within the timeframe specified in the request. <small>Note: Compliance records may be subject to audit by the department, or by an independent auditor in accordance with section 458 of the EPBC Act, and/or be used to verify compliance with the conditions. Summaries of the results of an audit may be published on the department’s website or through the general media</small>	Not applicable	The department has not made a written request to the approval holder for provision of compliance records within the reporting period.

23	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the Guidelines for biological survey and mapped data, Commonwealth of Australia 2018.	Not applicable	No monitoring, surveys or mapping were undertaken during the reporting period. <i>Note only.</i>
24	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the Guide to providing maps and boundary data for EPBC Act projects, Commonwealth of Australia 2021, or as otherwise specified by the Minister in writing.	Not applicable	No monitoring, surveys or mapping were undertaken during the reporting period. <i>Note only.</i>
25	The approval holder must submit all monitoring data (including sensitive ecological data), surveys, maps, other spatial and metadata and all species occurrence record data (sightings and evidence of presence) electronically to the department in accordance with the requirements of the relevant plan.	Not applicable	No monitoring, surveys or mapping were undertaken during the reporting period. <i>Note only.</i>
Annual Compliance Reporting			
26	The approval holder must prepare a compliance report for each 12-month period following the date of this approval decision, or as otherwise agreed to in writing by the Minister.	Compliant	This Compliance Report dated 24 June 2026 has been prepared for the 2025/26 reporting period.
27	Each compliance report must be consistent with the Annual Compliance Report Guidelines, Commonwealth of Australia 2014.	Compliant	This Compliance Report has been developed in accordance with the Annual Compliance Report Guidelines, Commonwealth of Australia 2014.

28	Each compliance report must include:		
28 (a)	Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents.	Compliant	Refer to Section 6.0 of this report.
28 (b)	One or more shapefile showing all clearing of protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared.	Compliant	No clearing of protected matter or their habitat occurred within the reporting period. No shapefiles have been provided.
28 (c)	A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.	Compliant	Refer to Section 10.0 of this report.
29	The approval holder must:		
29 (a)	Publish each compliance report on the website within 60 business days following the end of the 12-month period for which that compliance report is required	Compliant	The 2023/2024 and 2024/2025 Annual Compliance Reports required under EPBC Approval 2020/8669 were published to the Holders' website within the required 60 business day timeframe. This 2025/2026 Compliance Report will be published to the Holders' website by 22 September 2026 (60 business days following 30 June 2026) ⁴ . Approval Holders Website - Ensham mine Thungela See Appendix F – Upload of Compliance Report to Website.

⁴ The following days are Queensland public holidays and are therefore excluded from the definition of "business days" in Part C of EPBC 2020/8669: 22 September 2026)

29 (b)	Notify the department electronically, within 5 business days of the date of publication that a compliance report has been published on the website.	Compliant	Notification to the department was made electronically, within 5 business days of the date of publication. See Appendix G – EPBC 2020/8669 Ensham Life of Mine Extension Project Correspondence.
29 (c)	Provide the weblink for the compliance report in the notification to the department	Compliant	Weblink for the published compliance report was provided with notification to the department. See Appendix G – EPBC 2020/8669 Ensham Life of Mine Extension Project Correspondence.
29 (d)	Keep all published compliance reports required by these conditions on the website until the expiry date of this approval	Compliant	This compliance report will be, as with all previous compliance reports, available on the approval holder’s website: Ensham mine Thungela
29 (e)	Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public	Not applicable	No sensitive data has been redacted from this report. <i>Note only.</i>
29 (f)	If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to the department within 5 business days of its publication on the website and notify the department in writing what exclusions and redactions have been made in the version published on the website. <small>Note: Compliance reports may be published on the department’s website.</small>	Not applicable	No sensitive data has been redacted from this report. <i>Note only.</i>

Reporting Non-Compliance			
30	<p>The approval holder must notify the department electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan.</p>	Non-Compliant	<p>Ensham Resources became aware of failure to publish GDEMMP 9 February 2026, 4 business days outside of conditional timeframe.</p> <p>Notification was provided to the department June 26, 2026.</p> <p>See Appendix I– Notification of Non-Compliance to the Department 26 June 2026.</p> <p>See Appendix J– Initial Notification of Non-Compliance Memorandum 26 June 2026</p>
31	<p>The approval holder must specify in the notification:</p>		
31 (a)	<p>Any condition or commitment made in a plan which has been or may have been breached.</p>	Compliant	<p>Part B, conditions 16, 30 and 32 were breached. The approved GDEMMP was not published to the website within the timeframe specified in condition 16. The Holders failed to notify the Department within the required timeframe specified in Condition 30. The Holders failed to provide the investigation report within the required timeframe specified in Condition 32. The notification provided on 26 June 2026 specifies the content required by Condition 31. See Appendix I – Notification of Non-Compliance to the Department 26 June 2026. See Appendix K – Investigation of Non-Compliance 26 June 2026.</p> <p>See Appendix K– Investigation of Non-Compliance 24 June 2024.</p>

31 (b)	A short description of the incident and/or potential non-compliance and/or actual non-compliance.	Compliant	See Appendix K– Investigation of Non-Compliance 24 June 2024
31 (c)	The location (including co-ordinates), date and time of the incident and/or potential non-compliance and/or actual non-compliance. Note: If the exact information cannot be provided, the approval holder must provide the best information available.	Compliant	See Appendix K– Investigation of Non-Compliance 24 June 2024
32	The approval holder must provide to the department in writing, within 12 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance, the details of that incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan. The approval holder must specify:	Non-Compliant	See Appendix K– Investigation of Non-Compliance 24 June 2024. The Holders became aware of the condition 16 non-compliance on 9 February 2026. The investigation report was therefore required to be provided to the Department by 25 February 2026 (12 business days from the date of awareness). The investigation report was not provided until 26 June 2026, approximately 81 business days outside the required timeframe under condition 32. The investigation report is provided with this compliance report. See Appendix K – Investigation of Non-Compliance 26 June 2026.
32 (a)	Any corrective action or investigation which the approval holder has already taken.	Non-Compliant	Not provided within the required 12 business day timeframe. Provided 26 June 2026. See Appendix K – Investigation of Non-Compliance 26 June 2026.
32 (b)	The potential impacts of the incident and/or non-compliance.	Non-Compliant	Not provided within the required 12 business day timeframe. Provided 26 June 2026. See Appendix K – Investigation of Non-Compliance 26 June 2026.

32 (c)	The method and timing of any corrective action that will be undertaken by the approval holder.	Non-Compliant	See Appendix K– Investigation of Non-Compliance 24 June 2024 Not provided within the required 12 business day timeframe. Provided 26 June 2026. See Appendix K – Investigation of Non-Compliance 26 June 2026.
Independent Audit			
33	The approval holder must ensure that an independent audit of compliance with the conditions is conducted for every five-year period following the commencement of the Action until this approval expires, unless otherwise specified in writing by the Minister.	Not applicable	<i>Note only.</i> The 5-year period for the independent audit is 11/08/2023 to 11/08/2028.
34	For each independent audit, the approval holder must:		
34 (a)	Provide the name and qualifications of the nominated independent auditor, the draft audit criteria, and proposed timeframe for submitting the audit report to the department prior to commencing the independent audit.	Not applicable	<i>Note only.</i>
34 (b)	Only commence the independent audit once the nominated independent auditor, audit criteria and timeframe for submitting the audit report have been approved in writing by the department.	Not applicable	<i>Note only.</i>
34 (c)	Submit the audit report to the department for approval within the timeframe specified and approved in writing by the department.	Not applicable	<i>Note only.</i>
34 (d)	Publish each audit report on the website within 15 business days of the date of the department’s approval of the audit report.	Not applicable	<i>Note only.</i>

34 (e)	Keep every audit report published on the website until this approval expires.	Not applicable	<i>Note only.</i>
35	Each audit report must report for the five-year period preceding that audit report.	Not applicable	<i>Note only.</i>
36	Each audit report must be completed to the satisfaction of the Minister and be consistent with the Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines, Commonwealth of Australia 2019.	Not applicable	<i>Note only.</i>
Completion of the Action			
37	The approval holder must notify the department electronically 60 business days prior to the expiry date of this approval, that the approval is due to expire.	Not applicable	<i>Note only.</i> Notification must be submitted by 1 November 2045.
38	Within 20 business days after the completion of the Action, and, in any event, before this approval expires, the approval holder must notify the department electronically of the date of completion of the Action and provide completion data. The approval holder must submit any spatial data that comprises completion data as a shapefile.	Not applicable	<i>Note only.</i>

7.0 Correcting non-compliances

Ensham has reported the non-compliances to have occurred during this reporting period. GDEMMP was approved by the minister Jan 2026. Per Part B, Condition 16, Ensham were required to publish the approved GDEMMP to the website within the conditional time frame. Ensham was unable to publish the GDEMMP to the website within the conditional time frame. Notification of this non-compliance was not provided to the department until after the conditional time frame.

The Holders have reported non-compliances with conditions 16, 30 and 32 occurring during this reporting period, arising from failure to publish the approved GDEMMP within the timeframe required by condition 16, and from failure to notify the Department and provide an investigation report within the timeframes required by conditions 30 and 32 respectively. Following requirements of Part B, conditions 30 to 32, the Holders notified the Department of all three non-compliances on 26 June 2026 and have provided an investigation report as Appendix K to this compliance report.

The approved GDEMMP was published to the Holders' website on 23 June 2026 and remains publicly available, correcting the non-compliance with condition 16.

The investigation determined that the failures resulted from a combination of: the failure absence of a Regulatory Compliance System; disruption to compliance management processes during the Thungela corporate integration; failure of website publication processes with offshore management of the Thungela website; failure of the protocol requiring prompt escalation of identified non-compliances to a legal function. The omissions were not the result of any deliberate act or intention to avoid regulatory obligations.

The following corrective actions have been or will be implemented, as detailed in the Investigation of Non-Compliance at Appendix K: (1) publication of the approved GDEMMP (completed 23 June 2026); (2) the review of the Regulatory Compliance System to ensure that EPBC compliance are allocated to responsible persons and milestone dates assigned for each condition; (3) the review of the Regulatory Compliance System to ensure a documented website publication process with defined responsible persons, internal response timeframes and a verification step confirming correct documents are published; (4) the review of the Regulatory Compliance System to ensure that it includes a non-compliance escalation protocol requiring immediate notification to the legal function and to the Department within the timeframes required by Condition 30; and (5) delivery of EPBC compliance awareness training to all relevant personnel. Actions 2 through 5 are targeted for completion within 30 to 45 days of 26 June 2026. A written update on implementation status will be provided to the Department within 30 days of 26 June 2026.

8.0 New Environmental Risks

No new environmental risks have been identified during this reporting period.

9.0 Schedule of Plans

The below Schedule of Plans outlines all documents in existence relevant to this approval.

Name	Purpose	Version	Dated	Comments
Groundwater Dependent Ecosystem Monitoring and Management Plan (GDEMMP)	Comply with Condition 5. Identify all GDE's potentially impacted by the Action and manage impacts where required.	RevC	30/05/2024	Submitted for ministerial approval on 27 June 2024 Approved Jan 2026.
EIMP.06.00.06 Subsidence Management Plan (SMP)	Comply with Condition 11. Detail subsidence likely caused by the Action and specify trigger values and actions to prevent or mitigate harm to protected matters.	V6	27/06/2024	Submitted for ministerial approval on 27 June 2024 – not yet approved.

10.0 Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed Ben Hooper

Full name *(printed)* Ben Hooper

Position *(printed)* Environmental Superintendent

Organisation *(printed)* Ensham Resources Pty Ltd.

ABN/ACN 23011048678.

Date 01, 07, 2026.

11.0 Appendices

Appendix A - Confirmation of Receipt

Tayla Carins

From: Post Approval <PostApproval@dcceew.gov.au>
Sent: Monday, 1 July 2024 9:07 AM
To: Tayla Carins
Subject: RE: EPBC 2020/8669 - Ensham Resources - Management Plan Submission [SEC=OFFICIAL]

Categories: INX_InForm

Warning: This email is from an external sender. Please exercise caution when opening links or downloading attachments.

Hi Tayla,

Thank you for the submission of the GDEMMP and SMP for EPBC 2020/8669.

I have forwarded the plans to the Director of the Water Resources Regulatory Support section Derek Yates, who should be in contact soon.

Regards, Max.

Max Stratton

Environment Impact Assessment Officer

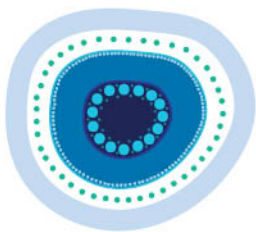
Nature Positive Regulation Division| Environment Assessments (Vic, Tas) and Post Approvals| Post Approvals Section

Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600 Australia, GPO Box 3090

Department of Climate Change, Energy, the Environment and Water

Contact: max.stratton@dcceew.gov.au

DCCEEW.gov.au | ABN 63 573 932 849



Acknowledgement of Country

Our department recognises the First Peoples of this nation and their ongoing connection to culture and country. We acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, present and emerging.

From: Tayla Carins <tayla.Carins@ensham.com.au>
Sent: Thursday, June 27, 2024 6:21 PM
To: EPBC Monitoring <epbcmonitoring@dcceew.gov.au>; Post Approval <PostApproval@dcceew.gov.au>
Cc: Dave Meyers <Dave.Meyers@ensham.com.au>
Subject: EPBC 2020/8669 - Ensham Resources - Management Plan Submission

You don't often get email from tayla.carins@ensham.com.au. [Learn why this is important](#)


Good Afternoon,

As required by EPBC 2020/8669, Ensham are required to submit two Monitoring and Management Plans within 12 months of approval, due 30 June 2024.




Ensham have prepared the following plans for the Ministers review and approval:

Condition 3 - Groundwater Dependent Ecosystem Management and Monitoring Plan

Condition 11 - Subsidence Monitoring and Management Plan

The above plans, covering letters and supporting documents are attached in the following  [link](#).

Can the department please confirm successful receipt of the 6 submitted documents?

 Name ▾	Modified ▾	Modified By ▾	File size ▾
 GDEMMP	About a minute...	Tayla Carins	2 items
 SMP	About a minute...	Tayla Carins	4 items

My contact details are below should you require any further information or assistance.

Best regards,



Ensham
RESOURCES

Tayla (Grant) Carins
Environmental Superintendent

T: (07) 4987 3614

M: 0409 182 169

E: Tayla.Carins@ensham.com.au

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Appendix B - Groundwater Dependent Ecosystem Monitoring and Management Plan (GDEMMP)

Ensham Resources Pty Ltd

Groundwater Dependent Ecosystem Management and Monitoring Plan

Ensham Mine

May 2024



Question today Imagine tomorrow Create for the future

Groundwater Dependent Ecosystem Management and Monitoring Plan Ensham Mine




Ensham Resources Pty Ltd

WSP

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Rev	Date	Details
A	02/05/2024	Draft for client review and comment
B	30/05/2024	Final

	Name	Date	Signature
Prepared by:	Larissa Boundy	30/05/2024	
Reviewed by:	Rob Harrison	30/05/2024	
Approved by:	Rob Harrison	30/05/2024	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Table of contents

1	Introduction	1
1.1	Background.....	1
1.2	Study purpose	1
1.3	Areas of investigation	2
1.4	Study limitations.....	2
2	Environmental context.....	4
2.1	Climate.....	4
2.2	Geology	4
2.3	Hydrogeological setting.....	5
2.4	Receiving waters	5
2.5	Connectivity	5
2.6	Land use	5
2.7	Groundwater dependent ecosystems	6
3	Desktop findings	7
3.1	Literature review.....	7
3.2	Groundwater Monitoring and Management Plan Report (SLR, 2024)	7
3.2.1	Groundwater levels.....	8
3.2.2	Drawdown mapping.....	12
3.2.3	Groundwater quality.....	12
3.2.4	Aquifer connection.....	12
3.3	Zone 1: Groundwater Impact Assessment (SLR, 2022a) and Zones 2 and 3: Groundwater Impact Assessment (SLR, 2022b).....	1
3.3.1	Groundwater levels, flow, recharge and discharge.....	1
3.3.2	Groundwater water quality.....	5
3.3.3	Groundwater dependent ecosystems	6
3.3.4	Groundwater modelling predictions	6
3.3.5	Potential impacts	8
3.4	Flora Technical Report (AECOM, 2020).....	8
3.4.1	Regulated vegetation (regional ecosystems).....	8
3.4.2	Threatened ecological communities	9
3.4.3	Groundwater dependent ecosystems	9
3.5	Summary	11



4	Mitigation and management	13
4.1	Groundwater trigger levels	13
4.2	Data management and reporting	13
4.2.1	Groundwater level (SLR, 2022a and SLR, 2022b)	13
5	Conclusion	14
6	Limitations	15
	Bibliography	17

List of tables

Table 3.1	Alluvial monitoring bores for Ensham	7
Table 3.2	Electrical Conductivity summary statistics (SLR, 2022a and SLR, 2022b)	5
Table 3.3	Regional ecosystems field verified as occurring within the Project Footprint	9

List of figures

Figure 1.1	Study Area.....	3
Figure 2.1	Annual precipitation (1992–2024) divided between wet and dry season records from the Emerald Airport weather station (BoM, 2024)	4
Figure 3.1	Location of bores and derived GDE's.....	9
Figure 3.2	Hydrograph for Twin (bore 5), the upstream basal alluvium bore (SLR, 2024).....	10
Figure 3.3	Hydrograph of western, upstream Nogoia River alluvial bores (SLR, 2024).....	11
Figure 3.4	Hydrograph of eastern alluvial bores (SLR, 2024).....	12
Figure 3.5	Conceptual cross section through Nogoia River alluvium and Quaternary sediments (SLR, 2024).....	1
Figure 3.6	Hydrographs for upstream bores (SLR, 2022a).....	2
Figure 3.7	Hydrograph of bores near/in Zone 1 and 2 (SLR, 2022a).....	3
Figure 3.8	Hydrograph of the EC bores (SLR, 2022a).....	4
Figure 3.9	Conceptual cross section through the Nogoia River and quaternary sediments (SLR, 2022a and SLR, 2022b).....	5
Figure 3.10	Location of impacts to alluvium groundwater level	7
Figure 3.11	Recovery curve of EC11, an alluvial bore (SLR, 2022a)	8
Figure 3.12	Field verified regional ecosystems.....	10

1 Introduction

1.1 Background

Ensham Resources Pty Ltd (Ensham), has engaged suitably qualified ecologists to prepare this Groundwater Dependent Ecosystem Monitoring and Management Plan (GDEMMP) for Ensham Mine. The Ensham Mine is an open-cut and underground coal mine located approximately 35 kilometres east of Emerald, and it is proposed to extend underground operations into zones 1, 2 and 3 (Figure 1.1), which is the subject of an Environmental Authority Amendment application. The preparation of a GDEMMP and terrestrial Groundwater Dependent Ecosystem (GDE) monitoring methodology is in response to Condition 5 of the EPBC Approval (2020/8669) for the Ensham Life of Mine Extension (the Project).

Condition 5 of the EPBC Approval (2020/8669) outlines the following requirements for the GDEMMP and development and implementation of a potential terrestrial GDE monitoring program:

Condition 5:

The outcome of implementing the GDEMMP must be that all GDEs potentially impacted by the Action are identified and any impacts are avoided, mitigated or residual impacts are offset in accordance with the Environmental Offsets Policy. The GDEMMP must be consistent with the Environmental Management Plan Guidelines and include the following to the satisfaction of the Minister:

- a) the details and results of a GDE field assessment of the project area.*
- b) if any riparian vegetation or Brigalow on alluvial plains within the project area is found to not be groundwater dependent, the evidence used to draw this conclusion.*
- c) if any riparian vegetation or Brigalow on alluvial plains is determined likely to be groundwater dependent, a description and map/s to clearly define the location and boundaries of GDEs and where they include habitat for protected matters.*
- d) if any riparian vegetation or Brigalow on alluvial plains is determined likely to be groundwater dependent, the proposed methodology and timing for the monitoring and detection of any impacts to GDEs as a result of the Action, including collecting baseline data and specifying associated:
 - i) trigger values that, if reached, the approval holder commits to investigate the cause of and take effective corrective actions to bring values below the trigger, and*
 - ii) limits that, if exceeded, the approval holder commits to provide environmental offsets to compensate for likely residual impacts to GDEs as a result of the Action in accordance with condition 9.**
- e) details of the investigations and corrective actions that will be taken if trigger values are reached.*

1.2 Study purpose

The purpose of the GDEMMP is to:

- Identify field verified regional ecosystems that may be potential GDEs dependant on the subsurface presence of groundwater (subsurface GDEs), within the modelled areas of potential groundwater drawdown associated with mining operations.
- Evaluate the potential groundwater drawdown impacts to threatened ecological communities (TECs) (e.g. Brigalow) listed as Matters of National Environmental Significance (MNES) under the EPBC Act, which may be potential GDEs.

1.3 Areas of investigation

The primary area of interest for assessment was 2,737 ha of land within three zones into which underground operations expansion is proposed, or has commenced:

- Zone 1 (proposed)
 - Lot A AP7202
 - Lot 2 CP911010
 - Lot 8 TT345
 - Lot 7 TT309
 - Lot 6 TT309
- Zone 2 (approved and commenced)
 - Lot 31 CP864573
 - Lot 32 RP908643
- Zone 3 (approved, not yet commenced)
 - Lot 30 CP864574
 - Lot 33 RP864576

The areas of investigation and assessment discussed within this report for the Project, include:

- *Mine Expansion Area* – the extent of the expansion (zone 1, 2 and 3).
- *Study Area* – the extent of the Mine Expansion Area and additional areas within the Ensham mining leases where flora and hydrological surveys have been conducted.
- *Locality* – the extent of 20 km radius of the Study Area.

The areas of investigation are illustrated in Figure 1.1.

1.4 Study limitations

The GDE study and assessment presented herein has involved a desktop assessment only, which has relied on publicly available information and data and reports prepared by various consultancies for Ensham. It assumes these sources of information contain correct and scientifically robust analytical information and data, to enable the assessment of potential impacts upon GDEs, which may or may not result from modelled groundwater drawdown.

This study has also evaluated the influence of water releases from Fairbairn Dam for the purpose of crop irrigation that occurs on agricultural land associated with an alluvial floodplain, which is immediately adjacent to mining operations, and how the irrigated water recharges the shallow alluvial aquifer within the Quaternary aged alluvium.

Figure 1.1
Study Area

- Legend**
- Watercourse
 - Roads
 - Mine Expansion Area
 - Mining Lease
 - Land Parcels



Coordinate system: GDA 1984 MGA Zone 55
Scale ratio correct when printed at A3
1:80,000
Date: 18/04/2024

Data sources: DELWP, Geoscience Australia
Model Imagery: Esri/Air Imagery
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2 Environmental context

2.1 Climate

Ensham is in the Central Highlands region of Queensland in the Brigalow Belt bioregion, which is characterised by hot summers and mild winters. Meteorological data is available from the Emerald airport station (35264; BoM, 2024) from 1992 to 2024, which is approximately 35 km southwest of Ensham.

The Emerald region typically experiences short, intense rainfall events that occur primarily from November to April (the wet season), with comparatively less precipitation during the dry season (May to October) (BoM, 2024; refer Figure 2.1Error! Reference source not found.). Mean annual rainfall between 1992 and 2024 was 558 mm, average dry season rainfall was 159 mm and average wet season rainfall was 380 mm.

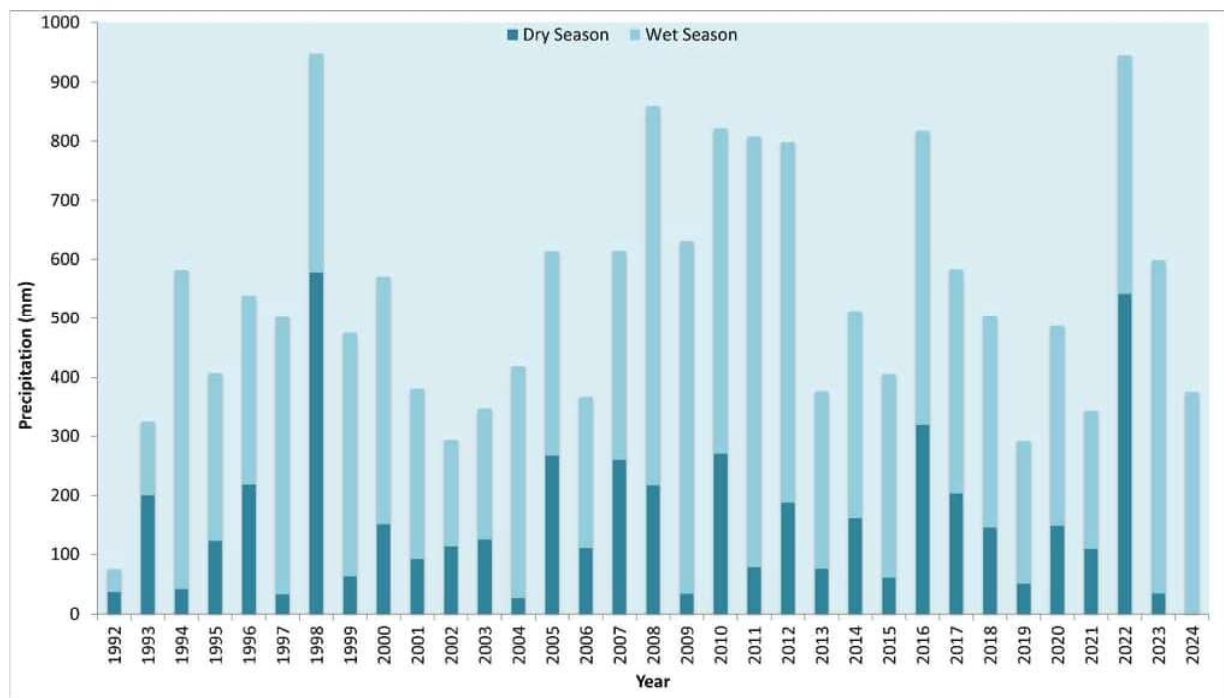


Figure 2.1 Annual precipitation (1992–2024) divided between wet and dry season records from the Emerald Airport weather station (BoM, 2024)

2.2 Geology

Geology features of the Study Area are described using the current Queensland Government online mapping resource (Queensland Globe, 2024).

The general landscape of Ensham is approximately 150 m above sea level (ASL) and characterised by gently undulating plains with some rocky hills with elevations up to 250 m. There are four separate surface geologies:

- The predominant surface geology in the Study Area is an alluvial flood plain with stratified units from the Quaternary, including clay, silt, sand and gravel.
- To the north of zone 1 and 2 there is stratified sedimentary rocks from the Eocene, with deeply weathered claystone, siltstone, sandstone, gravel, lignite, oil shale and interbedded basalt.

- There is a small section in the north-east corner of zone 2 with stratified ferricrete from the Tertiary which is characterised by duricrusted paleosols at the top of deep weathering profiles.
- In the centre of zone 1 and 2 there is a section of arenite-mudrock from the early/middle Triassic containing sandstones, mudstone and conglomerate.

2.3 Hydrogeological setting

There are two groundwater bearing units within the Study Area, the Quaternary aged alluvium, and the Permian aged Rangal Coal Measures, which are separated by a low permeability unit, the Rewan Group (SLR, 2024).

The Quaternary aged alluvium groundwater aquifer level is shallow (on average 13.8 m below ground level) and is comprised of sequences of less permeable clay, silt, and sand, underlain by more permeable sand and gravel (SLR, 2022a). It is likely the less permeable layers isolate the alluvium from the Nogoia River. The shallow alluvial aquifer is highly saline and unsuitable for stock watering and irrigation, which also indicates the aquifer is not connected to the Nogoia River, which has freshwater (discussed further in Section 3.2 and 3.3). The shallow alluvial aquifer has low water levels and may not be continuously saturated and rather form lenses of highly saline, stagnant water, as indicated by periodically dry bores.

2.4 Receiving waters

Watercourse features of the Study Area are described using the current Queensland Government online mapping resource (Queensland Globe, 2024).

The Nogoia River is a stream order 8 major watercourse that transects the Study Area, flowing from west to east, and continues south-east for approximately 20 km before its confluence with the Comet River to form the Mackenzie River. The Nogoia River briefly splits into two river channels within the Study Area before re-converging again into the one. The main channel flows the southern route. There are several ephemeral watercourses, including Mosquito Creek, stream order 4, which originates beyond the north-western boundary of zone 1 and flows into the Nogoia River in zone 1, and several small unnamed watercourses that drain to Mosquito Creek and the Nogoia River.

The Nogoia River is naturally ephemeral yet is anthropogenically managed for consistent low flow through releases from Fairbairn Dam, located ~60 km from the Study Area, for stock watering and agricultural crop irrigation.

2.5 Connectivity

Connectivity has been assessed using the Biodiversity Planning Assessment using Queensland Government online mapping resource (Queensland Spatial, 2024).

The Project Footprint contains 537.9 ha of state significant habitat and 164.8 ha of regionally significant habitat, which are predominantly along watercourses and represented by remnant vegetation. The watercourses and fringing vegetation provide habitat and a functional riparian wildlife corridor for the movement and dispersal of aquatic and terrestrial fauna species. It provides a safe refuge for and maintains genetic flow and diversity, which is particularly important for threatened fauna species. The waterway and transient fauna also enable the dispersal of flora seeds and pollen. The state and regionally significant habitats are connected to large tracts of state significant habitat that continues northward of the Project footprint.

2.6 Land use

Land use of the locality is described using the current Queensland Government online mapping resource (Queensland Globe, 2024).

The majority of the Study Area and the locality has been historically cleared for grazing and agricultural crop production, which has been occurring prior to the mine development and continues to currently occur.

2.7 Groundwater dependent ecosystems

Groundwater dependant ecosystems are defined as aquatic and terrestrial ecosystems reliant on groundwater for some, or all of their water requirements to survive, which can be influenced by variations in groundwater level and groundwater water quality. Groundwater dependant ecosystems are classified into three broad types (DESI, 2013):

- 1 Aquatic / surface expression GDEs: aquatic ecosystems dependent on the subsurface presence of groundwater.
- 2 Terrestrial GDEs: terrestrial ecosystems dependent on the subsurface expression of groundwater from shallow aquifers.
- 3 Subterranean GDEs: aquatic ecosystems within deeper aquifer and cave ecosystems.

Aquatic and terrestrial GDE's (low confidence) have been mapped within the Mine Expansion Area (Queensland Spatial, 2024).

Groundwater dependant ecosystems rely on groundwater presence to sustain their functionality and composition (Foster et al. 2005 and Murray et al. 2003). Alterations in groundwater levels can induce noticeable changes in GDEs, as evidenced through observable shifts in vegetation. These alterations include stunted or absent growth and dieback due to limited availability of water for transpiration and limit the effective recruitment of seedlings from adult trees.

Predicting the impacts of groundwater drawdown on vegetation communities is difficult as the critical groundwater depth threshold is unknown, as too the depth of roots of flora species that can be groundwater dependant (e.g. *Eucalyptus camaldulensis* and *E. tereticornis*). Ecological responses may exhibit either linear patterns, wherein a tree's health deteriorates proportionally with changes in groundwater depth, or threshold responses, where tree health remains relatively stable until groundwater depth plunges below the critical threshold (Kath et al., 2014).

The response to drawdown is likely contingent upon tree size, with younger trees possessing shallow roots exhibiting distinct requirements, thresholds, and responses compared to larger trees (Kath et al., 2014). Smaller trees typically have less interactions with groundwater and may not exhibit discernible responses to dewatering.

In regions characterised by highly intermittent watercourse flows, groundwater serves a vital water source for groundwater dependent species and vegetation. Consequently, the structure of riparian vegetation communities along ephemeral watercourses may be attributed to, or at least partly dependent upon, groundwater for long-term survival and persistence.

3 Desktop findings

3.1 Literature review

The following reports have been prepared for Ensham to support approval applications in relation to the Project and have been reviewed as part of the desktop assessment:

- Ensham Groundwater Monitoring – Groundwater Monitoring and Management Plan Report (SLR, 2024) (Appendix A)
- Ensham Life of Mine Extension Project – Zone 1: Groundwater Impact Assessment (SLR, 2022a) (Appendix B)
- Ensham Life of Mine Extension Project – Zones 2 and 3: Groundwater Impact Assessment (SLR, 2022b) (Appendix C)
- Ensham Life of Mine Extension Project: Flora Technical Report (AECOM, 2020) (Appendix D).

3.2 Groundwater Monitoring and Management Plan Report (SLR, 2024)

The Groundwater Monitoring and Management Plan (GMMP) was prepared to satisfy groundwater management conditions I14 and I15 from Environmental Authority (EA) EPML00732813 for Ensham Mine. A conceptual hydrological model described within the report represents the current understanding of the groundwater environment at Ensham Mine.

A progressive groundwater monitoring network has been progressively installed at Ensham since the 1990’s. The bore network comprises 39 bores located within Ensham and adjacent agricultural land, and they include alluvial, inactive, private landholder (agriculture), regional and residual void monitoring bores. As the potential GDE’s occur above the Quaternary aged alluvium (land zone 3, see section 3.4.1) associated with the Nogoia River floodplain, only the Nogoia River Alluvium bores have been interrogated by this GDE assessment (Table 3.1 and Figure 3.1).

Table 3.1 Alluvial monitoring bores for Ensham

Bore name	Longitude	Latitude	Within predicted groundwater drawdown impact zones for the relevant shallow alluvial aquifers
13020166	148.326758	-23.440642	No
13020169	148.451700	-23.439110	No
13020173	148.429450	-23.466970	No
EC01	148.468940	-23.475640	No
EC03	148.472130	-23.480240	No
EC07	148.478420	-23.487410	No
EC09A	148.482180	-23.489560	Yes
EC11	148.483800	-23.492360	Yes
EC13	148.483850	-23.496120	Yes
EC14	148.485420	-23.497210	Yes
EC24	148.46562	-23.45621	No

Bore name	Longitude	Latitude	Within predicted groundwater drawdown impact zones for the relevant shallow alluvial aquifers
EC25	148.50678	-23.48696	No
Field 5	148.50532	-23.51853	Yes
GW01	148.507470	-23.499080	Yes
RB7a	148.447320	-23.437070	No
Twin (Bore 5)	148.38392	-23.48989	No

3.2.1 Groundwater levels

The GMMP separates the Nogoia River alluvium bores into two categories:

- Western bores: 13020166, 13020169, 13020173, RB7a, and basal alluvium Twin (Bore 5). These are in the western section and are the most upstream monitoring points in the groundwater monitoring network. Water levels here range between 155 and 146 m AHD (Australian Height Datum).
- Eastern bores: EC01, EC03, EC07, EC09a, EC11, EC13, EC14, GW01, GW01, EC24, EC25, and Field 5. These are in the eastern section of the groundwater monitoring network, which is primarily within the central area of mining operations. Water levels here range between 145 and 136 m AHD.

On average, the alluvium groundwater level is 13.8 m below ground surface level.

Cumulative rainfall departure (CRD) reflects rainfall trends and is a parameter used to assess the nature of groundwater level changes. Positive gradients indicate wetter than normal climatic conditions, and conversely, negative gradients indicate drier than normal climatic conditions.

3.2.1.1 Western bores

One of the western groundwater monitoring bores, the Twin bore site, is approximately 7 km west of the mine and has the highest groundwater levels of the alluvial aquifer. Between 2006 and 2018 groundwater levels increased, regardless of climatic trends (Figure 3.2), which is theorised to be due to agricultural irrigation recharging the shallow alluvial aquifer. Since 2018 groundwater levels have been in line with general climatic trends and are trending towards baseline conditions, which may reflect a reduction of recharge related to decreased irrigation, more so than climatic rainfall variables.



Figure 3.2 Hydrograph for Twin (bore 5), the upstream basal alluvium bore (SLR, 2024)

Water level for the other western bores largely reflect climatic trends (Figure 3.3). The groundwater level at these bores has been relatively stable, with a strong correlation between groundwater levels and CRD, as demonstrated through increasing water levels in response to wetter than average climatic conditions over the 2022/2023 cusp, and subsequent decline as the wetter weather decreased.

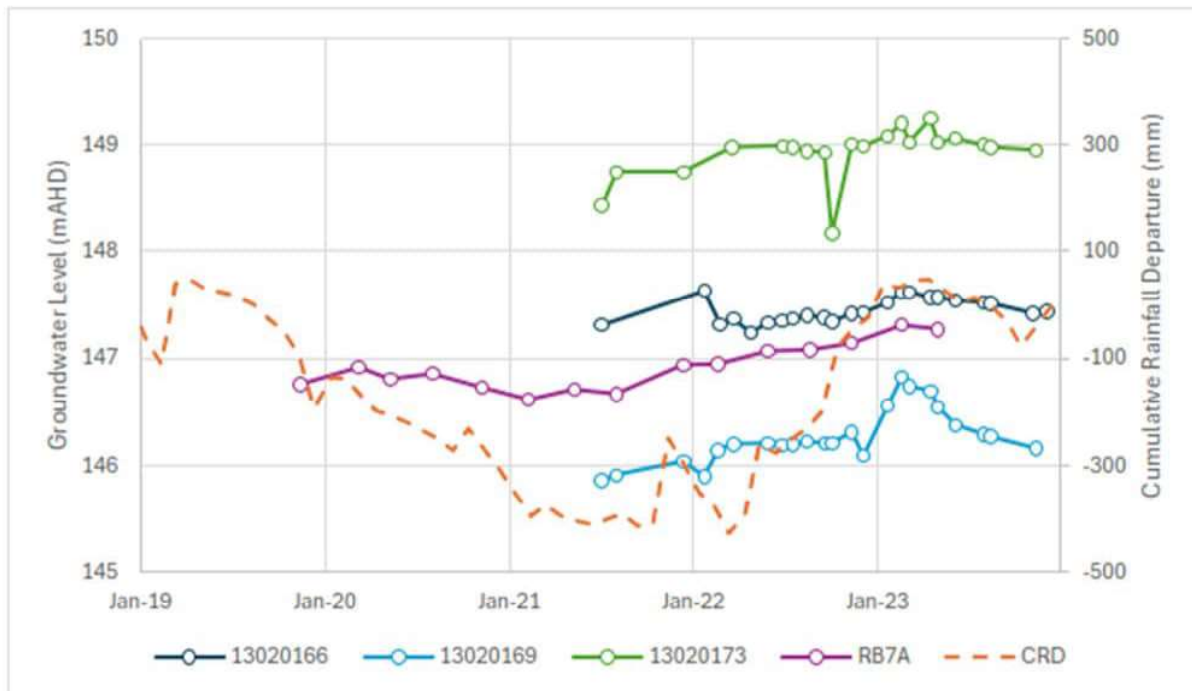


Figure 3.3 Hydrograph of western, upstream Nogoia River alluvial bores (SLR, 2024)

3.2.1.2 Eastern bores

In the eastern section of the alluvial monitoring network, the eastern monitoring bores are situated downstream and at lower elevations within the catchment area. These alluvial bores include the EC monitoring bore series, as well as the GW01 and Field 5 bore. The EC monitoring bore series is positioned near the Nogoia River and its anabranch, typically where the Rangal Coal measures sub-crops into the overlying alluvium. Meanwhile, the GW01 and Field 5 bores are situated further downstream, to the east of the sub-crop and current mining operations.

Hydrographs depicted in Figure 3.4 illustrate the water levels recorded in the eastern monitoring bores. Similar to the western boreholes, these downstream bores exhibit some sensitivity to climatic variations, with trends in CRD closely correlated with groundwater levels prior to 2011. However, most boreholes have remained relatively stable despite prolonged periods of drier-than-average conditions.

The potential impact of mining activities, if any, may have been obscured by a significant rainfall event at the onset of 2011, causing a sharp increase in water levels across the alluvium monitoring bore network. Subsequent monitoring efforts have revealed no discernible influence of mining extraction since then. Although water levels initially returned to near baseline levels following the flooding event, they continued to remain elevated despite the prevailing drier climatic conditions from 2014 to 2019. The persistent groundwater level during a prolonged dry period can likely be attributed to crop irrigation associated with agricultural land use.

The rising water levels within the EC monitoring bore series have been attributed to upstream irrigation, particularly in proximity to EC01 and EC03, with bores closest to the irrigation area experiencing the most substantial increase in water level over time. Monitoring bores farther from this recharge area demonstrate a greater response to climatic influences, particularly evident during the significant rainfall events of early 2022.

The lack of groundwater level decline amidst generally drier climatic conditions, coupled with the commencement and advancement of mining operations, indicates hydraulic disconnect or impediment between the Nogoia River Alluvium and the Rangal Coal Measures. Notably, no groundwater level drawdown attributable to mining activities has been observed in the alluvium. Instead, it is evident that increases to groundwater levels, which are inconsistent with CRD and

prevailing climatic conditions (rainfall) and modelled groundwater drawdown from mining operations, can be attributed to crop irrigation practices recharging the shallow alluvial aquifer.

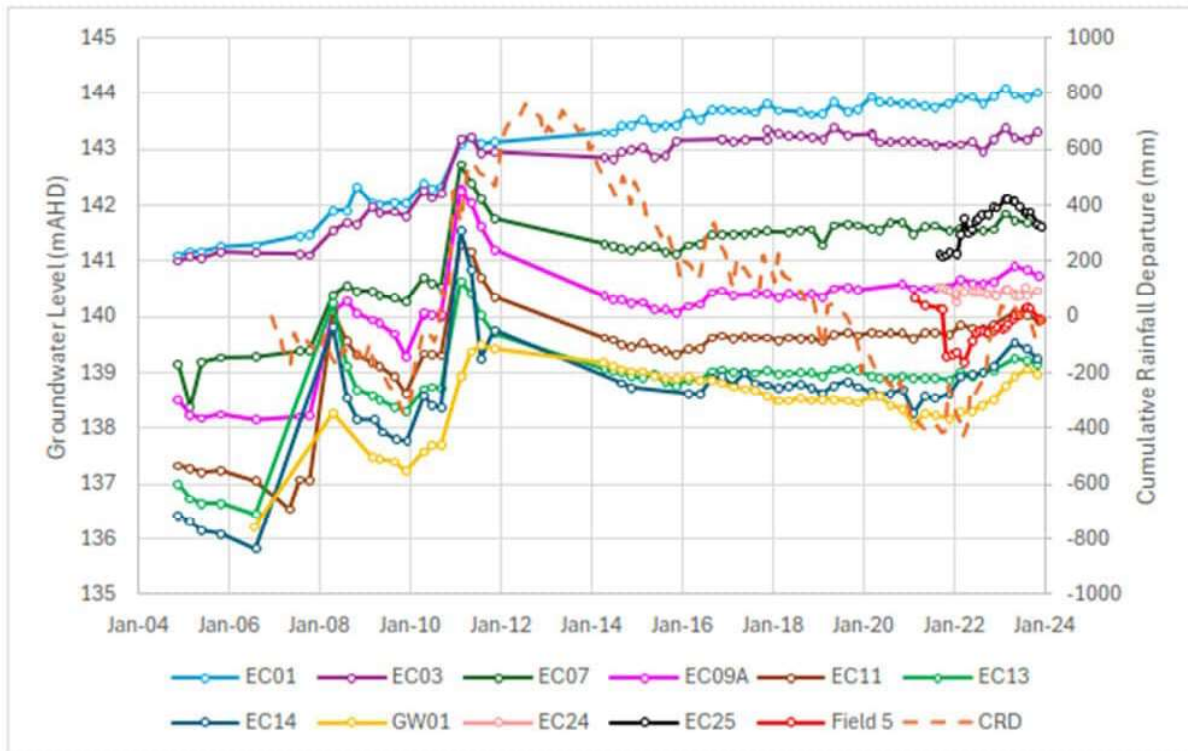


Figure 3.4 Hydrograph of eastern alluvial bores (SLR, 2024)

3.2.2 Drawdown mapping

No drawdown of groundwater has been observed in the alluvium.

3.2.3 Groundwater quality

The groundwater quality of the shallow alluvial aquifer is moderately to highly saline, with neutral to moderately alkaline pH and sodium-chloride water. The high rainfall and flooding events during 2011 resulted in increased salinity in the alluvial aquifer system due to the flushing of precipitated salts, which is now declining to baseline levels for most monitoring bores. However, at monitoring bore 13020166 there is a trend of increasing electrical conductivity, and as this is upstream of Ensham it can most likely be attributed to influences associated with agricultural crop irrigation.

Monitoring bores 13020169, GW01 and EC07 exhibit an upward trending pH, which is correlated with decreasing EC trends at these locations, likely due to calcite precipitation. These chemical trends are not considered related to mining operations as they are located upstream of mining and are likely to be due to both natural processes and influences beyond the Study Area.

Additional interaction with agricultural activities (irrigation) is evidenced by the substantial influx of high bicarbonate and low pH recharge originating from agricultural runoff and infiltration into the shallow alluvial aquifer, both within and outside the monitoring area.

3.2.4 Aquifer connection

The Nogoia River is partially isolated from the shallow alluvial aquifer, due to shallow silts and clays which divide the surface water areas from the basal gravel layers that comprise the lower areas of the groundwater aquifer. Groundwater

and surface water interactions may only occur during periods of intense irrigation, when the basal clay is absent, or the basal sands are exposed within the river. This is further supported by the differences in salinity and groundwater level observations, which specifically demonstrate no correlation between groundwater level and distance to the Nogoia River.

Figure 3.5 illustrates a conceptual cross section of the alluvium and underlying rock mass.

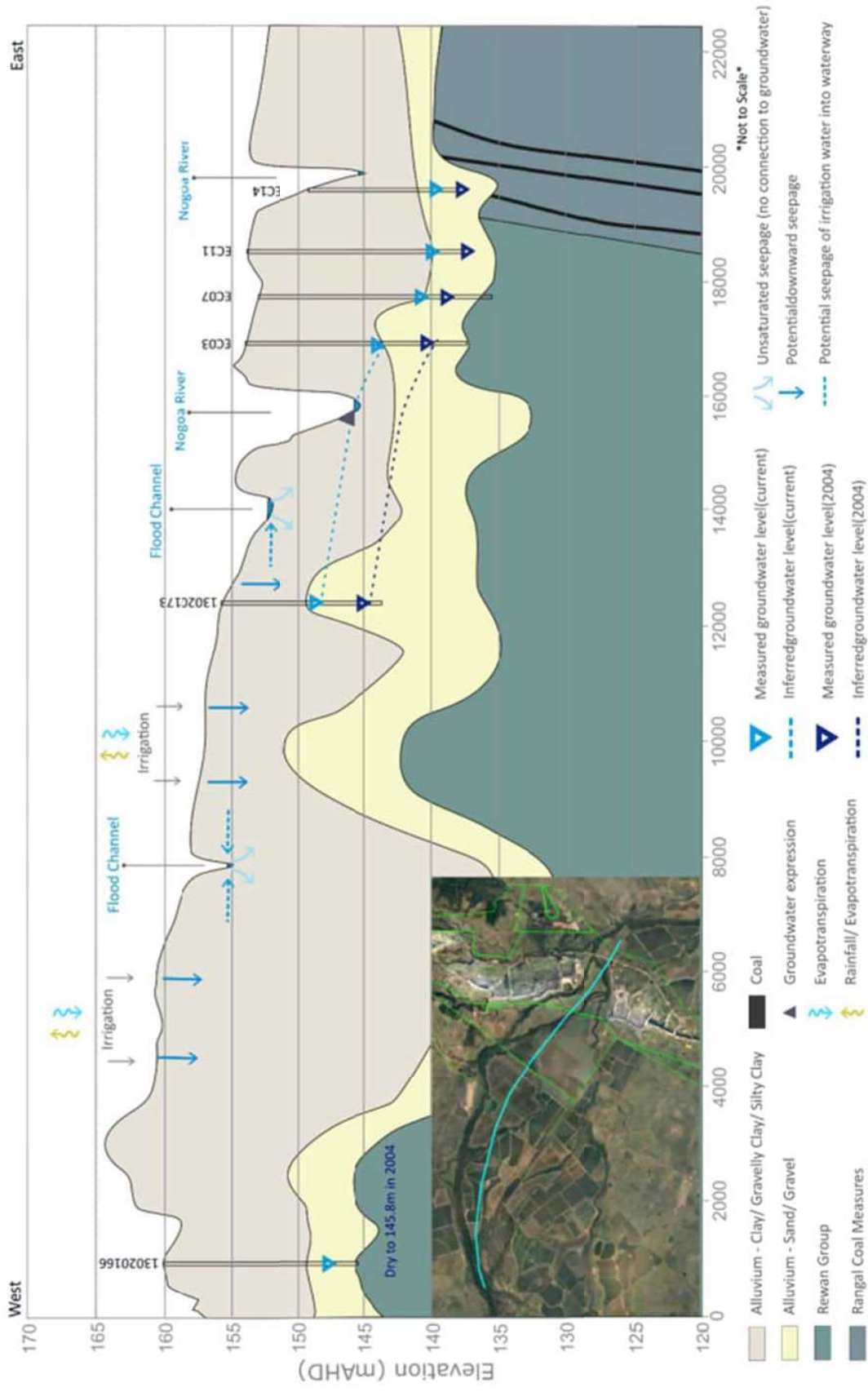


Figure 3.5 Conceptual cross section through Nogoia River alluvium and Quaternary sediments (SLR, 2024)

3.3 Zone 1: Groundwater Impact Assessment (SLR, 2022a) and Zones 2 and 3: Groundwater Impact Assessment (SLR, 2022b)

These two reports are essentially the same, as assessment of Zone 1 and Zone 2 utilise the same groundwater monitoring bores and were developed to assess potential impacts upon groundwater associated with the mine development (potential groundwater drawdown) and are thus combined herein.

3.3.1 *Groundwater levels, flow, recharge and discharge*

This section discussed the hydrogeological unit pertinent to the Project, describing groundwater hydrology (including groundwater occurrence, hydraulic gradients, recharge, and discharge), hydraulic characteristics, groundwater quality, and groundwater utilization and administration.

3.3.1.1 Upstream bores

This assessment incorporated analysis of monitoring bores upstream of the Study Area, operated by the Queensland Government. These bores were deemed to represent the natural interaction of the Nogoia River floodplain's alluvial aquifer and the Nogoia River, particularly prior to 2000 when there was an absence of agricultural and mining activities in the area.

The upstream bores exhibited a general disconnect to three flood events that happened prior to 2000, and the bore closest to the river, 13020163, remained dry for that period (Figure 3.6). The bore second closest to the river, 13020164 has only exhibited a response to flooding once, to the major flood in 2008 where the water level rose by approximately one metre. Monitoring for many bores ceased in 2008, with one more round occurring in 2018. During this period the water level at all bores had increased two metres, except for 13020164 which increased by four metres. These increases are likely due to agricultural irrigation commencing and continuing.

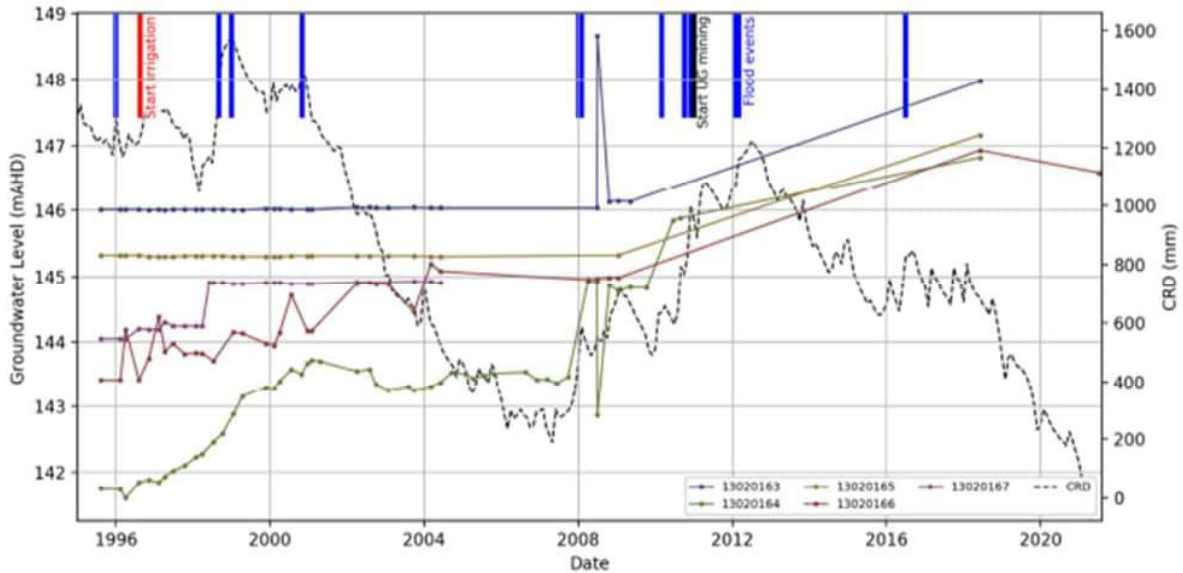


Figure 3.6 Hydrographs for upstream bores (SLR, 2022a)

3.3.1.2 Zone 1 and 2 bores

The monitoring bore closest to the river, 13020169, did not exhibit a response to periods of high rainfall, in 1996, 1998 and 1999 (Figure 3.7). There was a minor response observed from the 2008 flood event, with water level rising by approximately 0.5 m. However, this response aligns with the overall upward trend witnessed across all monitoring boreholes.

This trend commenced around 2000, coinciding with a period of severe drought and an absence of flood events, as indicated by rainfall monitoring data. Since 1996, water levels in these bores have risen by approximately five to six meters, exceeding those recorded in upstream boreholes by up to four meters. Groundwater measurements taken from 2021 onwards in accessible monitoring bores indicate a sustained and continually upward trend. With no other identified sources that could have influenced groundwater during this period, it was concluded that irrigation activities were responsible for the increased water levels in the shallow alluvial aquifer associated with the Nogoia River's alluvium deposits.

An additional observation is that groundwater levels tend to be higher farther away from the Nogoia River, suggesting a gradient towards the river. Typically, if the river were the primary source of groundwater, groundwater levels would be expected to be higher closer to the river.

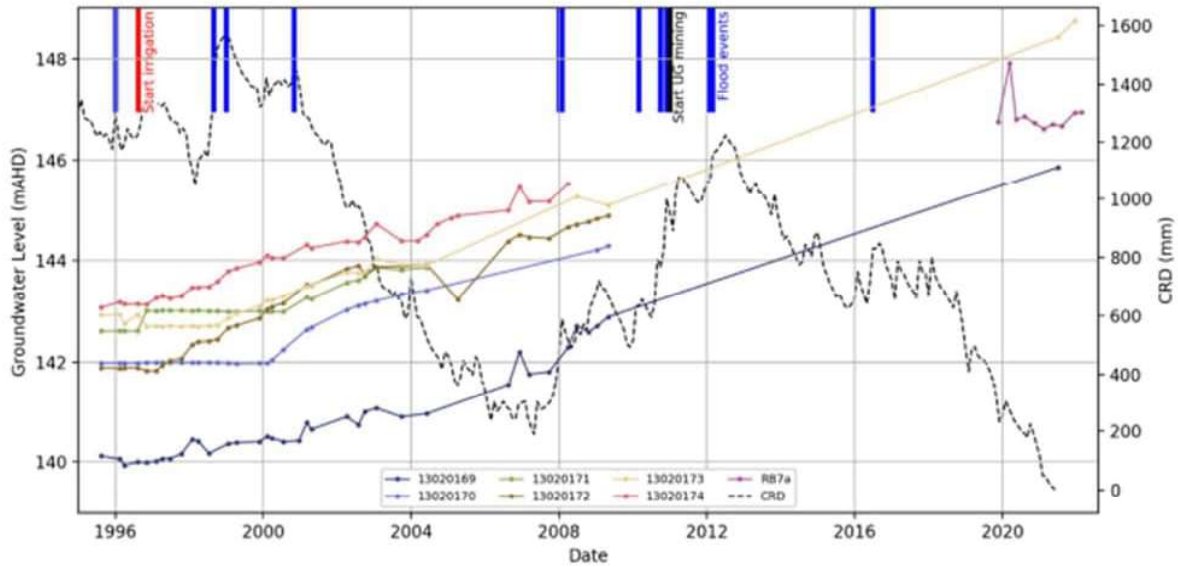


Figure 3.7 Hydrograph of bores near/in Zone 1 and 2 (SLR, 2022a)

3.3.1.3 EC monitoring bore series

The EC monitoring bore series is situated within the Nogoia River alluvium, near or within the sub-crop of the Rangal Coal measures. Unlike the bores discussed above, the EC monitoring bore series exhibit a distinct response to flooding and climate conditions (Figure 3.8). Specifically, bores EC07 to EC14 respond to flooding in the Nogoia River and/or rainfall, as evidenced by the CRD data. Over time, water levels in these bores show a decreasing trend, which contrasts with the constantly increasing trend observed in bores EC01 and EC03. Bores EC01 and EC03, which are closest to the irrigation area, do not display a decrease in water levels over time. It has been interpreted that the upstream rise in alluvial groundwater levels has moved towards EC01 and EC03, indicating that agricultural irrigation influences the groundwater levels within the shallow alluvial aquifer, via recharging the aquifer with water releases from Fairbairn Dam.

No EC monitoring bores showed a response to the commencement of underground mining, whereby groundwater drawdown from mining could be evidenced.

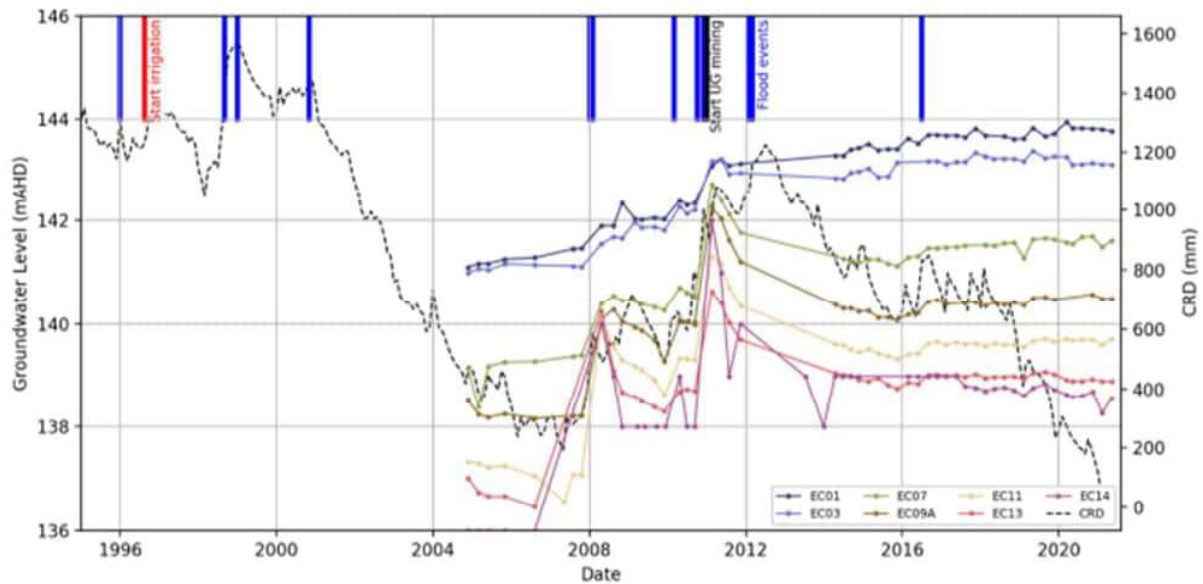


Figure 3.8 Hydrograph of the EC bores (SLR, 2022a)

3.3.1.4 Groundwater flow

There is limited hydraulic connection between the coal seam groundwater and the shallow alluvial aquifer associated with the Nogoia River's alluvium, with the Rewan Group acting as a flow barrier.

Groundwater movement within the alluvial deposits conforms to the topographical slopes, generally flowing from the northwest to the southeast across the Study Area. The flow direction of groundwater within the alluvium mirrors the course of the Nogoia River, trending from northwest to southeast. The shallow alluvial aquifer may not be consistently saturated and the contours offer the most accurate representation. However, there is a possibility of disconnected zones and stagnant lenses within the groundwater system, as indicated by dry monitoring bores.

3.3.1.5 Interaction with surface water

The saturated water level of the alluvium is approximately 140 m AHD, and the riverbed is approximately 147 m AHD. The groundwater level of the alluvium is, on average, 13.8 m below ground level. There have been numerous investigations, which have conceptualised the groundwater interaction with surface water. All investigations have concluded there is limited, and potentially no, interaction between the two water features (groundwater and surface water) (Figure 3.9).

There are silts and clays at the upper part of the alluvium with poor permeability and the groundwater occurrence in the alluvium is highly variable, with some bores documented as being repeatedly dry. If the alluvium was connected to the river, the water quality parameters should be expected to be similar. However, when the alluvial monitoring bores started to refill after extended dry periods, the water was saline whilst the Nogoia River is fresh.

Additionally, the bores further away from Nogoia River tend to have higher groundwater levels, which is contradictory of what would be expected if there was hydraulic connectivity, whereby groundwater levels would be higher closer to the river and the river would naturally lose stream. It is conceptualised, the alluvium during the wet season is recharged primarily through irrigation, with limited amounts of downward seepage from rainfall.

The most likely explanation for the steady long-term increase in groundwater levels is agricultural irrigation of water releases from Fairbairn Dam upstream of Zone 1. In July 2019 it was clearly determined that groundwater was flowing into the river, and again was most likely due to irrigation upstream of the Study Area increasing the standing water level of the alluvium.

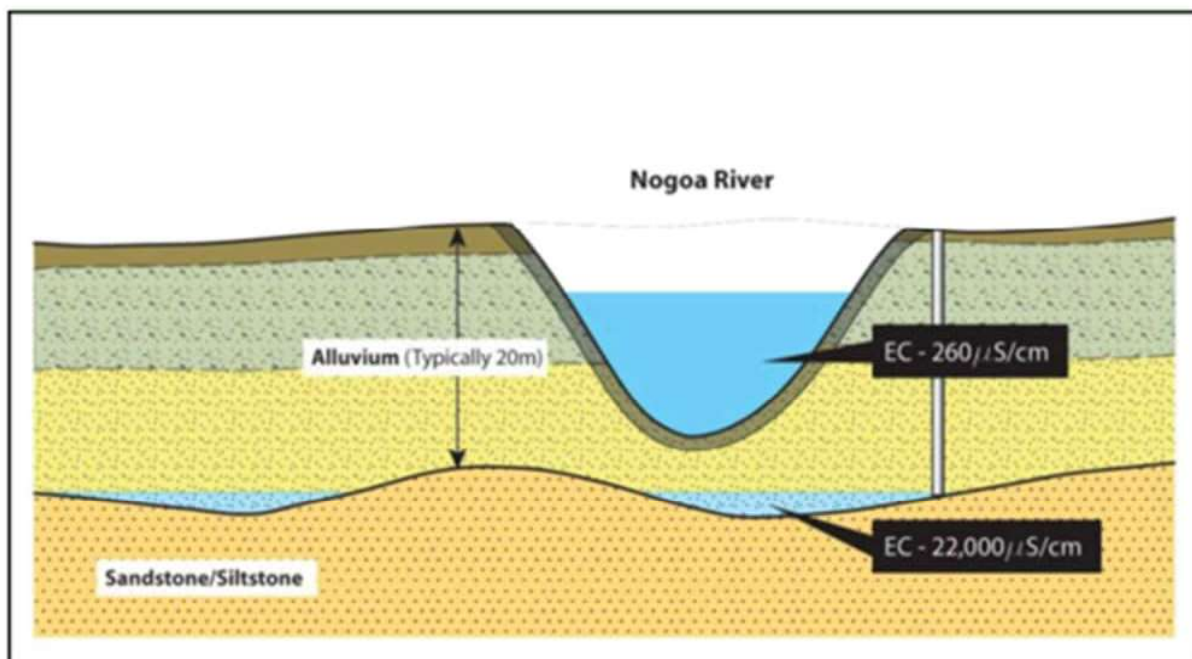


Figure 3.9 Conceptual cross section through the Nogoia River and quaternary sediments (SLR, 2022a and SLR, 2022b)

3.3.2 Groundwater water quality

Electrical conductivity (EC) is a measurement of salinity levels in water, and the water within the alluvium is highly saline, as demonstrated by over 350 monitoring observations (Table 3.2). Historical data indicates that high electrical conductivity (EC) in the alluvium is natural, as EC was high prior to the commencement of mining (late 1990s and early 2000s). It is likely that the alluvium is highly saline due to slow infiltration recharge from rainfall and evapotranspiration, and the evidential lack of influx from the Nogoia River.

Table 3.2 Electrical Conductivity summary statistics (SLR, 2022a and SLR, 2022b)

Parameter	Number of observations	20th percentile (µS/cm)	Median (µS/cm)	80th percentile (µS/cm)
Field EC	353	3,208	11,590	20,040
EC Lab	668	2,124	6,150	19,360

After a main recharge event in late 2010 the EC at bores had begun to increase, with varying times of onset. At the furthest upstream bore from the mine (where EC data is available, EC07), salinity began increasing in 2013, and at EC13, which is downstream of the mine, EC began increasing around 2016. The trend of increase beginning upstream then downstream indicates the increase is not mining related.

The 80th percentile value for EC for EC01, EC03, EC05, EC07, EC09A, EC11 and EC13 is above the 80th percentile of water quality objectives for electrical conductivity for the region (15,495 µS/cm), which indicate groundwater from the alluvium at these bores is not suitable for aquatic ecosystems. Groundwater quality parameters support the conclusion that the Nogoia River is separated from the alluvium, as demonstrated through high salinity within the alluvium in contrast to the freshwater in the river.

3.3.3 *Groundwater dependent ecosystems*

The ecological survey (AECOM, 2020) identified three Regional Ecosystems within the terrestrial GDE mapping, though there was a lack of wetland flora indicator species, evidence of water stress and high availability of preferential freshwater surface flows, which confirmed it is unlikely these communities rely on groundwater to persist.

Within a 10 km radius of the Survey Area, there are no identified aquatic GDE seeps with known or high confidence, nor are there any subterranean GDE seeps. The primary channel of the Nogoia River and its anabranches are categorised as low confidence aquatic GDE seeps. Aquatic and terrestrial GDE seeps denote ecosystems dependent on surface water closely linked with groundwater. As detailed previously, there is documented evidence that there is no hydraulic connectivity between the alluvium and the Nogoia River.

There are no potential GDE's mapped in Zone 3.

3.3.4 *Groundwater modelling predictions*

The groundwater model primarily presents its predictions as incremental impacts, meaning it compares the results of three cases, a Null run (no mining post January 2022), current underground operations (ending mining in 2028) and modelling of the proposed mine expansion (ending mining in 2037).

The model is likely an overestimation, as the model does not account for active management measures to reduce inflows after mining has passed through an area, thus predicting larger drawdown, resulting in a conservative impact assessment.

Lower inflows are expected when mining remains in an area for a longer period of time and can be higher when going into new areas, as no previous dewatering has occurred. Mine dewatering, both directly and indirectly through induced flow, leads to a reduction in water levels in the surrounding groundwater units.

The scope of the area impacted by modelled mine dewatering, resulting in decreased water levels, is contingent upon the hydraulic characteristics of the aquifers / aquitards. In a confined aquifer, this area is termed the zone of depressurisation, whereas in an unconfined aquifer, it is referred to as the zone of drawdown within the water table. The most significant depressurisation and drawdown of groundwater levels occur at the coal-face of the mine workings, gradually diminishing with distance from the mine.

Predictive groundwater modelling demonstrates the rate of inflow for the proposed mine expansion is similar to existing operations, and the incremental alluvial flux is negligible, with no evidential predicted reduction in baseflow in the Nogoia River.

There is a predicted maximum incremental groundwater drawdown of 1 m in the target coal seams associated with the Project at end of mining, which is expected to extend up to 15 km west. The drawdown resulting from mine dewatering is not causing wide-spread drawdown in the alluvium, as there is limited hydraulic connection between the alluvium groundwater and the Rangal Coal measures.

The model shows a downward trend of recharge in the alluvium south-west of the Mine Expansion Area (Figure 3.10) from 2030, due to reduction in loss from the alluvium into the lower strata, with a maximum decrease of 0.5 ML/day in 2036 before recovery commences. The long-term average alluvial extraction, calculated using annual climate inputs, is approximately 0.9 ML/day for the Project. In contrast, the null model (where there is no change) indicates a slightly lower extraction rate of around 0.8 ML/day, resulting in a difference of 0.1 ML/day between the two, which is considered negligible and of no tangible significance to the groundwater aquifer.

The Nogoia River alluvium is predicted to fully recover post-mining.

3.3.5 Potential impacts

The 0.5 m contour of the Project's incremental maximum drawdown intersects parts of the low confidence aquatic and terrestrial GDEs outside of the Mine Development Area yet being within the mining lease (south-west of Zone 2, see Figure 3.1).

Due to the conservative approach in drawdown calculations, the model predicts an incremental drawdown curve. However, upon reviewing hydrographs within the drawdown contour, it becomes evident the groundwater system will not experience additional drawdown due to the Project. For instance, in the hydrograph example for EC11 in Figure 3.11, the maximum incremental drawdown (the maximum difference between the light blue and dark blue lines) is around 1 m, as predicted to occur in 2070 (noting that mining is proposed to conclude in 2037 and that drawdown continues post-works).

In terms of the three scenarios (graphical lines for Null run, Existing operations, and Project), water level predictions remain consistent up to 2038. Subsequently, the water level for the Null run indicates a faster recovery, resulting in a difference between water levels resembling drawdown, although in real terms, the water levels are gradually increasing. Groundwater availability in the alluvium increases across all scenarios, indicating no actual additional drawdown forecasted from mining, and all scenarios ultimately recover to the same final levels. Thus, impacts on any potential low confidence GDE's are negligible as the drawdowns in the shallow alluvial aquifer are a typical delay in groundwater recovery and not a reduction in water levels.

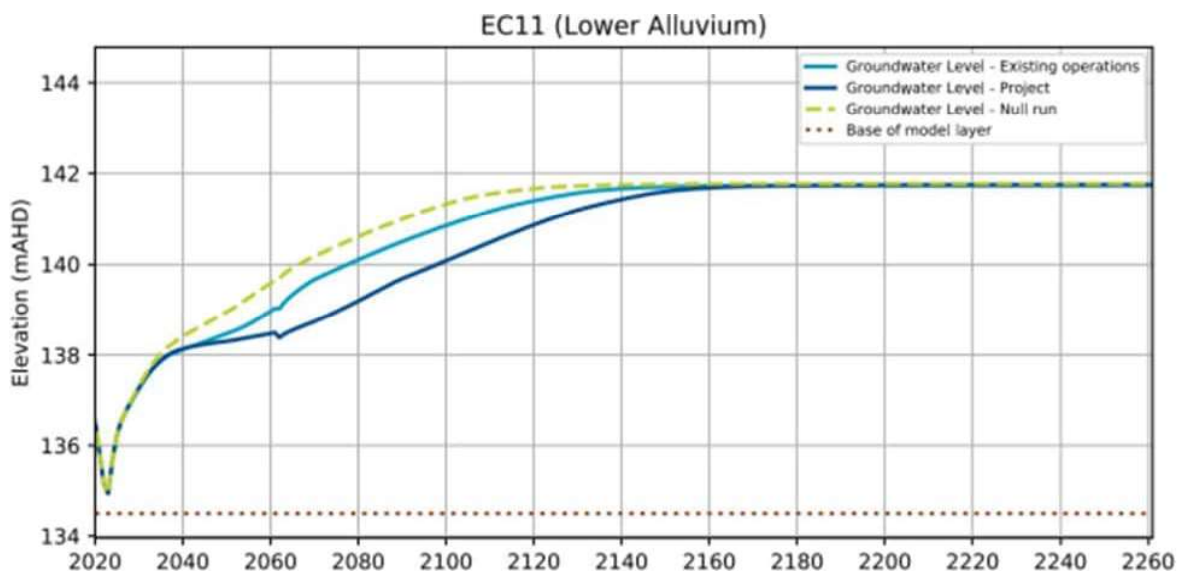


Figure 3.11 Recovery curve of EC11, an alluvial bore (SLR, 2022a)

3.4 Flora Technical Report (AECOM, 2020)

Three seasonal flora surveys were conducted in zones 1, 2 and 3 in May 2019, October 2019 and January 2020. The surveys consisted of field verification (ground truthing) the presence and extent of regulated vegetation (regional ecosystems), EPBC Act listed threatened ecological communities (TEC's), GDE's and threatened flora habitat.

3.4.1 Regulated vegetation (regional ecosystems)

Five regional ecosystems have been field verified as occupying 450.2 ha within the Mine Expansion Area (Table 3.3 and Figure 3.12). The remaining 1,774.6 ha is non-remnant woodland and pastures, agricultural land, mine rehabilitation and regrowth vegetation. The vegetation outside of the Mine Expansion Area, though within the Ensham mining lease, was not field verified as part of the AECOM survey and report.

Table 3.3 Regional ecosystems field verified as occurring within the Project Footprint

RE	Regional ecosystem description	VM Act Status	Area (ha)
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	63.7
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains	Of concern	169.4
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	52.3
11.7.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> and <i>Eucalyptus thozetiana</i> or <i>E. microcarpa</i> woodland on lower scarp slopes on Cainozoic lateritic duricrust	Least concern	127.7
11.7.2	<i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Least concern	37.1
Total regulated vegetation			450.2
Non-remnant			1,774.6
Total Project area			2,224.8

3.4.2 Threatened ecological communities

The Brigalow (*Acacia harpophylla*) dominant and co-dominant TEC (Brigalow TEC) has been field verified as occurring within the Mine Expansion Area. The Brigalow TEC is analogous with RE 11.3.1, although the listing advice requires the vegetation meets key diagnostic criteria and condition thresholds to be considered the TEC. The primary criteria and thresholds are that the patch is 0.5 ha or larger, and exotic perennial vegetation does not exceed 50% of the patch. Within the Mine Expansion Area, 72% of RE 11.3.1 met the Brigalow TEC key diagnostics.

3.4.3 Groundwater dependent ecosystems

3.4.3.1 Vegetation with potential to be terrestrial GDE's

The field verified regional ecosystems (RE) that occur within the Mine Expansion Area, which have been state mapped as low-confidence derived GDE's, include:

- RE 11.3.1: *Acacia harpophylla* open forest on alluvial plains
- RE 11.3.3: *Eucalyptus coolabah* woodland on alluvial plains, and
- RE 11.3.25: *E. camaldulensis* woodland fringing drainage lines.

The *Acacia harpophylla* (Brigalow) forest is located along an unnamed watercourse within zone 1 and in small linear strips along the Nogoia River. It is comprised of remnant and high-value regrowth with a canopy range from 6 m to 7 m, with some emergent *Acacia harpophylla* (Brigalow) and *Eucalyptus coolabah* (Coolabah) reaching up to 14 m. *Terminalia oblongata* (Yellowwood) and *Lysiphyllum carronii* (Red bauhinia) are common in the canopy. Due to extensive historical clearing in the surrounding areas this community was in poor / moderate condition.

The remnant *Eucalyptus coolabah* (Coolabah) woodland is located along the Nogoia River, Mosquito Creek and a southern unnamed tributary. The canopy reaches 21 m and is generally mid-dense, though during the post-dry season surveys the condition of the canopy foliage was reduced, indicating water stress.

The remnant *Eucalyptus camaldulensis* (River red gum) woodland within the potential GDE mapping is located along the Nogoia River, fringing stream banks adjacent to where the channel typically held water during the surveys. The canopy reaches 22 m and *Casuarina cunninghamiana* (River she-oak) and *Eucalyptus coolabah* (Coolabah) are common. The community had good growth and coverage and was determined to be in good condition.

3.4.3.2 Wetland indicator species

Seven wetland indicator species were recorded, which can indicate, though does not confirm, groundwater dependence, including:

- *Casuarina cunninghamiana* (River she-oak)
- *Marsilea hirsuta* (Nardoo)
- *Eucalyptus camaldulensis* (River red gum)
- *Melaleuca trichostachya* (Flax-leaf paperbark)
- *Ischaemum australe* (Large bluegrass)
- *Duma florulenta* (Lignum), and
- *Eremophila bignoniiflora* (Dogwood).

Most of the wetland indicator species occurred within RE 11.3.25, with *Eucalyptus camaldulensis* (River red gum) the most common species. *Duma florulenta* (Lignum) and *Marsilea hirsuta* (Nardoo) were recorded within RE 11.3.3, and no wetland indicator species were recorded within RE 11.3.1.

3.4.3.3 Likelihood of GDE's within the Mine Development Area

Acacia harpophylla (Brigalow) has a shallow horizontal root system concentrated in the upper soil profile, enabling the species to draw resources from a substantial, shallow area around the plant, and is thus highly unlikely to be dependent on access to groundwater for long-term survival.

Eucalyptus coolabah (Coolabah) exhibited signs of water stress during the surveys that occurred post-dry season, indicating that the community is not accessing permanent groundwater. Additionally, the alluvium groundwater has a higher saline content and thin, discontinuous saturation zones, which limit the use and reliance of flora upon any potential GDE present.

The *Eucalyptus camaldulensis* (River red gum) woodlands were dominated by wetland indicator species and were in good condition. *Eucalyptus camaldulensis* (River red gum) is a common species along Australian watercourses that can develop vertical roots to depths greater than 10 m and is not tolerant of long-term drought or salinity. Whilst *Eucalyptus camaldulensis* (River red gum) has the ability to access and utilise groundwater, the alluvium groundwater within the Study Area is not suitable due to the high salinity content and thin, discontinuous saturation zones. It is likely the health of the community is attributed to the Nogoia River which has permanent water due to water releases from Fairbairn Dam for irrigation, which reduces the need and reliance upon permanent groundwater.

It should be noted the only the regional ecosystems within the Mine Expansion Area were field verified by AECOM, and the area of drawdown that intersects derived GDE's is outside of the Mine Expansion Area, although within the mining lease (Figure 3.12). The state mapping indicates that the regional ecosystems within the potential drawdown area are the same, though would need to be field verified if monitoring is undertaken, to confirm regional ecosystem presence and extent.

3.5 Summary

The combination of groundwater data and flora surveys determine that there are no aquatic or terrestrial GDE's within the Study Area and Mine Development Area.

There is evidence that the shallow alluvial aquifer within the Nogoia River alluvium is not connected to the Nogoia River, via highly differential saline levels and a groundwater gradient that is higher further away from the river, instead of lower gradient. This separation is due to shallow silts and clays which divide the surface water areas from the basal gravel layers that comprise the lower areas of the aquifer. The Nogoia River is a freshwater river that has permanent flow, which is anthropogenically controlled via releases from Fairbairn Dam.

The shallow alluvial aquifer within the Nogoia River alluvium has low groundwater levels that are not continuously saturated and rather form lenses of highly saline, stagnant water, as indicated by periodically dry groundwater monitoring

bores. When the bores recharge following periods of being dry, the water was saline, which could be attributed to a combination of naturally saline groundwater and possibly recharge from irrigation. If the shallow alluvial aquifer and river were connected, it would be expected the bores would not dry whilst there was flow in the river and water chemistry would be similar; thus, there is no recharge of the alluvium from the river.

The hydraulic disconnect results in no dilution of the highly saline water within the shallow alluvial aquifer, which is so saline that it is unsuitable for stock watering and irrigation. Seven bores are above the 80th percentile of water quality objectives for electrical conductivity for the region (15,495 $\mu\text{S}/\text{cm}$). These bores (EC01, EC03, EC07, EC05, EC09A, EC11 and EC13) are either within 200 m of the incremental maximum drawdown of the alluvium or within it. Aquatic and terrestrial GDE seeps denote ecosystems that depend on surface water closely linked with groundwater. As detailed, there is evidence that there is no hydraulic connectivity between the shallow alluvial aquifer and Nogoia River.

There is evidence that irrigation above the Study Area is increasing the water level of the shallow alluvial aquifer and altered chemistry. There has been a substantial influx of high bicarbonate and low pH recharge originating from agricultural runoff and infiltration of irrigated water. Monitoring bores closest to the irrigation area have been steadily increasing, regardless of climatic conditions. There is potential for increasing, highly saline groundwater to have negative impacts on the flora communities, if it gets closer to the ground surface and encroaches on root zones, and on the aquatic community, if it starts to seep into the Nogoia River.

There are no known GDE's within a 10km radius, only low-confidence derived GDE's. Aquatic GDE's require groundwater present at the surface, and as the groundwater level is, on average, 13.8 m below ground level, this is not possible. The flora present within the Mine Expansion Area does not indicate any reliance on subsurface groundwater (terrestrial GDE's), regardless of whether that groundwater is suitable.

Acacia harpophylla (Brigalow; dominant species of RE 11.3.1 and Brigalow TEC), which has a shallow, lateral root system that is concentrated in the upper soil profile and is a shallow-rooted species (Johnson et al. 2016). Brigalow's shallow rooting habitat is evident through the tendency of mature trees to fall because of disturbance to the upper soil profile, which exposes the lateral root system with little evidence of deeper sinking roots. It is therefore unlikely this vegetation community is reliant on the groundwater, which is on average 13.8 m below ground level, discontinuous and highly saline.

Eucalyptus coolabah (Coolabah; dominant species of RE 11.3.3) is a species that can utilise groundwater and is tolerant of slightly saline sites (2,000-4,000 $\mu\text{S}/\text{cm}$; Government of Western Australia, 2023). However, surrounding and within the areas mapped as derived GDE's, which also intersect the incremental maximum drawdown of the shallow alluvial aquifer, the salinity of the groundwater exceeds 15,495 $\mu\text{S}/\text{cm}$. Additionally, during the flora surveys conducted post-dry season, there was signs of water stress among the *Eucalyptus coolabah* canopy, further indicating this vegetation community is not interacting with the groundwater present in the alluvium.

Eucalyptus camaldulensis (River red gum; dominant species of RE 11.3.25) is a species that can utilise groundwater and is tolerant of moderately saline sites (4,000-8,000 $\mu\text{S}/\text{cm}$; Government of Western Australia, 2023). However, surrounding and within the areas mapped as derived GDE's, which also intersect the incremental maximum groundwater drawdown of the alluvium, the salinity of the groundwater exceeds 15,495 $\mu\text{S}/\text{cm}$.

In summary, it is therefore likely the vegetation communities along the Nogoia River would access the high availability of preferred, permanent freshwater surface flows from the river and regulated water releases from Fairbairn Dam and would show signs of poor health, and likely senesce, if there was interaction with the highly saline groundwater within the alluvium.

Regardless, if there were GDE's present, the groundwater model for the mine expansion determined that the inflow and incremental alluvial flux predicted changes, are negligible and there is no predicted reduction of baseflow in the Nogoia River. The predicted reduction in loss from the alluvium into the lower strata reaches an incremental maximum drawdown of 0.5 m, which is temporary and was determined to be a negligible reduction. Additionally, the alluvium is separated from the Rangal Coal Measures groundwater unit, and thus drawdown in the coal seam aquifer would also not affect any present GDE's.

4 Mitigation and management

Ensham's existing EA requires monitoring of groundwater, as summarised below. There are no GDE's present, therefore additional mitigation or management is not required, and no further actions are proposed.

4.1 Groundwater trigger levels

Drawdown trigger levels have been established within the GMMP (SLR, 2024) to provide an early warning of potential impacts. If a drawdown trigger level is exceeded, Ensham will conduct an investigation into the potential for environmental harm. If the investigation indicates potential for environmental harm, a suitably qualified person will develop an action plan to mitigate the potential harm.

4.2 Data management and reporting

4.2.1 Groundwater level (SLR, 2022a and SLR, 2022b)

In accordance with the current EA the following will apply:

- The groundwater monitoring at all bores will be conducted on a quarterly basis or as defined in the EA.
- Data will be stored within the existing consolidated groundwater database.
- Quality assurance and quality control procedures, such as field sampling procedures and the use of NATA accredited laboratories, will continue to be in place to assess the accuracy of data entered into the database.

In accordance with the current EA, findings from the quarterly monitoring events will continue to be documented:

- The quarterly review will include identification of any groundwater quality trigger exceedances.
- Where a trigger exceedance is identified, the regulator will be notified within 28 days and an investigation into the potential for environmental harm will be completed. The groundwater database and factual quarterly documentation will be available for provision to the regulator upon request.
- Each year an annual review of groundwater level and water quality trends will be conducted by a suitably qualified person and provided to the regulator. The review will assess the change in groundwater level and quality over the year, compared to historical trends and impact assessment predictions. The annual review will discuss any groundwater trigger exceedances or where trends show potential for environmental harm.

5 Conclusion

There is no indication there are aquatic or terrestrial GDE's within the Study Area. It has been demonstrated there is no hydrological connectivity between the Nogoia River, Nogoia River alluvium and the coal seam groundwater. The Nogoia River alluvium is not consistently saturated and rather forms lenses of stagnant, highly saline water.

The vegetation along the Nogoia River is slightly to moderately tolerant of saline water. However, the salinity within the groundwater in the area of drawdown impact significantly exceeds the known tolerant range of dominant species. It is likely that the vegetation is accessing the permanent, freshwater of the Nogoia River, more so than water from the shallow alluvial aquifer and would show signs of poor health if the vegetation was interacting with the highly saline groundwater.

Regardless, if there were GDE's present within the Study Area, the modelled 0.5m incremental maximum drawdown of the shallow alluvial aquifer is temporary and determined to be a negligible impact.

Ensham currently monitors groundwater as per the existing EA requirements, and as there are no GDE's present additional mitigation or management is not required.

6 Limitations

This Report has been prepared by WSP on behalf of Ensham and in accordance with WSP's proposal and agreement with Ensham.

Even though attention has been paid to desktop and field-based identification of project risks, this Report is not able to comprehensively account for unknown risks not captured by this Report.

PERMITTED PURPOSE

This report has been prepared by WSP on behalf of Ensham for the purpose described in the contractual agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (Permitted Purpose).

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The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to Ensham.

Except as otherwise stated in the Report and to the extent that statements, opinions, facts, conclusion and/or recommendations in the Report are based in whole or in part on information provided by Ensham and other parties identified in the Report, the management recommendations are based on assumptions by WSP of the reliability, adequacy, accuracy and completeness of available information and guidelines and have not been verified. WSP accepts no responsibility for the information used.

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Bibliography

AECOM, 2020 '*Ensham Life of Mine Extension Project: Flora Technical Report*'. Prepared August 2020, Job No.: 60603371

Coaldrake, J.E., 1967. "*Depth of ploughing in relation to depth of suckering and soil type in the control of root suckers of brigalow (Acacia harpophylla)*". Australian Journal of Experimental Agriculture 7, 523-527

Bureau of Meteorology (BoM), 2024. '*Climate Data Online*'. Retrieved from <http://www.bom.gov.au/climate/data/>

Commonwealth of Australia, 2013. '*Vegetation Assessment Guide*'. Retrieved from <http://www.nrm.gov.au/system/files/resources/600d1b92-c1ca-436e-8f83-23e7f15ca892/files/vegetation-assessment-guide.pdf>

Department of Environment, Science and Innovation (DESI), 2013, '*Groundwater dependent ecosystem – system types*'. Retrieved from <https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/systems/>

Dillon, P., Kumar, A., Kookana, R., Leijes, R., Reed, D., Parsons, S., & Ingleton, G., 2009. '*Managed aquifer recharge - Risks to groundwater dependent ecosystems - A review*'. Water for a Healthy Country Flagship Report to Land & Water Australia, 2009.

Eyre, T.J., Kelly, A.L., Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J., 2015. '*BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2*'. Queensland Herbarium, Department of Science, Information Technology and Innovation.

Foster, S., Koundouri, P., Tuinhof, A., Kemper, K., Nanni, M., & Gardufio, H., 2005. '*Groundwater dependent ecosystems: The challenge of balanced assessment and adequate conservation*'. Washington, USA: The World Bank.

Government of Western Australia, 2023. '*Salinity tolerance of plants for agriculture and revegetation in Western Australia*'. Retrieved from <https://www.agric.wa.gov.au/soil-salinity/salinity-tolerance-plants-agriculture-and-revegetation-western-australia>

Johnson, R., McDonald, W., Fensham, R., McAlpine, C., & Lawes, M., 2016. '*Changes over 46 years in plant community structure in a cleared brigalow (Acacia harpophylla) forest*'. Austral Ecology, 41(6), 644-656.

Kath J., Reardon-Smith K., Le Brocque A.F., Dyer F.J., Dafny E., Fritz L., Batterham M., 2014. '*Groundwater decline and tree change in floodplain landscapes: Identifying non-linear threshold responses in canopy condition*'. *Global Ecology and Conservation* 2: 148-160.

Munakata, K., Nonaka, T., Ogaya, N., & Kanamori, M., 2010. '*Practical application for estimating the crown density of conifers using LiDAR data*'. In Proceedings of the International Society for Photogrammetry and Remote Sensing Technical Commission VIII Symposium, Kyoto, Japan.

Murray, B.R., Zeppel, M.J.B., Hose, G.C., & Eamus, D., 2003. '*Groundwater-dependent ecosystems in Australia: It's more than just water for rivers*'. EBSCO Publishing.

Neldner, V. J., Niehus R.E., Wilson B.A., McDonald W.J.F., Ford A.J., and Accad A., 2019. '*The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 4.0*'. Queensland Herbarium, Department of Environment and Science.

Queensland Globe, 2024. '*Queensland Globe*'. Retrieved from <https://qldglobe.information.qld.gov.au/>

QSpatial, 2024. '*QSpatial*'. Retrieved from <https://www.business.qld.gov.au/running-business/support-assistance/mapping-data-imagery/data/qspatial>

SLR, 2022a, '*Ensham Life of Mine Extension Project – Zone 1: Groundwater Impact Assessment*'. Prepared October 2022, SLR Project No.: 620.30872.00400-R01

SLR, 2022b, '*Ensham Life of Mine Extension Project – Zones 2 and 3: Groundwater Impact Assessment*'. Prepared March 2022, SLR Project No.: 620.30686.00400-R01

SLR, 2024, '*Ensham Groundwater Monitoring – Groundwater Monitoring and Management Plan Report*'. Prepared February 2024, SLR Project No.: 620.040784.00001

Appendix C - EIMP.06.00.06 Subsidence Management Plan (SMP)



Ensham
 R E S O U R C E S

EIMP.06.00.06

SUBSIDENCE MANAGEMENT PLAN

ENVIRONMENTAL IMPACT MANAGEMENT PLAN
 (EIMP)

APPROVAL

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Revision	7			

Contents

1.	Introduction	6
1.1	Scope	6
2.	Ensham Mine Overview	8
2.1	Mining Activities.....	8
2.2	Topography and Drainage.....	8
2.3	Soils	10
2.3.1	Vertosols	10
2.3.2	Dermosols	11
2.3.3	Rudosols.....	12
2.3.4	Kandosols	13
2.4	Geology	16
2.5	Groundwater Regime.....	17
2.6	Land Use.....	17
2.7	Brigalow Threatened Ecological Community	19
3.	Predicted Subsidence.....	20
3.1	Introduction	20
3.2	Pillar Design.....	20
3.3	Compression Analysis	21
3.4	Predicted Subsidence.....	22
3.5	Surface and Subsurface Cracking.....	22
3.6	Subsidence Impacts	22
4.	Subsidence Monitoring	23
4.1	LIDAR Monitoring.....	23
4.2	Real Time Monitoring	23
4.3	Monitoring Surveys.....	25
4.3.1	500 Series Stations.....	25
4.3.2	114 Panel Stations.....	29
4.3.3	Old mined out areas – 404 and 201 Panels	31
4.3.4	Non-Mined areas – WM07 and 706 Panels	33

4.3.5	Summary	35
4.4	Underground Surveying	35
4.5	Surface Inspections	35
4.6	Compliance	36
4.6.1	PRCP applies to all UG mining areas	36
4.6.2	RIDA applies to Zones 2 and 3.....	36
4.6.1	EPBC 2020/8669 applies to Zones 1, 2 and 3.....	37
4.7	Monitoring Schedule and Trigger Levels.....	39
4.7.1	Subsidence Trigger Levels	40
4.8	Subsidence Management Measures.....	40
4.9	Emergency Procedures	42
5.	Potential Impacts on Brigalow TEC	43
5.1	Introduction	43
5.2	Potential Impacts	43
5.2.1	Subsidence trigger value to monitor for a significant impact to Brigalow TEC	43
5.3	Brigalow Monitoring	43
5.3.1	Pre-activity condition assessment	44
5.3.2	Brigalow TEC subsidence impact Monitoring	44
5.3.3	Monitoring site locations	45
5.3.4	Brigalow TEC monitoring assessment methods.....	46
5.3.5	Brigalow Trigger threshold levels to trigger an investigation	47
5.4	Complying with EPBC Approval.....	49
5.4.1	Notifying the Department of Climate Change, Energy, the Environment and Water	50
5.4.2	Investigating and reporting.....	50
5.4.3	When an Offset management Plan will be required	50
5.5	Brigalow TEC corrective action and management measures	51
5.5.1	Corrective Actions for routine operations	51
5.5.2	Corrective Actions for Non-routine Situation	52
6.	Legal Compliance and References	53
7.	Terms and Abbreviations.....	53

7.1	Abbreviation and Description	53
8.	Document Preparation	54
9.	Review History	54
10.	Roles and Responsibilities.....	55
11.	References	56

Figures

Figure 1-1	Existing Operations and Proposed Mining Plan For Zones 1, 2 And 3.....	7
Figure 2-1	Surface Topography and drainage.....	9
Figure 2-2	Vertosol used for grazing.....	10
Figure 2-3	Vertosol used for cropping	11
Figure 2-4	Dermosol.....	12
Figure 2-5	Rudosol	13
Figure 2-6	Kandosol	14
Figure 2-7	Soil Units	15
Figure 2-8	Conceptual Hydrogeological Model Cross Section (EIS Submission, 2021).....	17
Figure 2-9	Land Uses at Ensham Mine (2021).	18
Figure 2-10	Brigalow TEC areas and monitoring locations	19
Figure 3-1	Maximum Mining Height for a FoS of 1.6.....	21
Figure 4-1	Fixed Monitoring Station 114_2	24
Figure 4-2	Location of Remote Subsidence Monitoring – Ensham Underground Area.	25
Figure 4-3	Monitoring Data – 502_3 Station.	26
Figure 4-4	Monitoring Station 502_3.....	26
Figure 4-5	Monitoring Data – 503_1 Station	27
Figure 4-6	Monitoring Data – 502_1 Station.	28
Figure 4-7	Monitoring Data –502_2 Station.	28
Figure 4-8	Monitoring Data – 114_1 Panel Station.	29
Figure 4-9	Monitoring Station 114_1 Panel.....	30
Figure 4-10	Monitoring Data – 114_2 Panel Station.	31
Figure 4-11:	MONITORING DATA – 201_1 PANEL STATION.	32
Figure 4-12:	MONITORING DATA – 404 PANEL STATION.	33

Figure 4-13: MONITORING DATA – 404 PANEL STATION. 34

Figure 4-14: MONITORING DATA – 706 PANEL STATION. 34

Figure 4-15 Groundwater Monitoring Bores. 38

Figure 4-16 Paint Marks to Control the Thickness of Floor Coal Mined. 42

Figure 5-1 Process to determine monitoring Brigalow TEC..... 44

Figure 5-2 Conceptualized Flowchart of the Notification Process..... 49

Tables

Table 2-1 Stratigraphy..... 16

Table 4-1 Monitoring Schedule for Subsidence..... 39

Table 5-1 Location of Monitoring Sites..... 45

Table 5-2 Monitoring purpose and Schedule for Brigalow TEC..... 46

Table 5-3 Trigger threshold levels for each monitoring assessment method to trigger an investigation
..... 48

Table 6-1 References. 53

Table 7-1 Terms 53

Table 9-1 Review History. 54

1. INTRODUCTION

Ensham Mine (EM) is an opencut and underground bord and pillar coal mine located approximately 35 km east of Emerald along the Nogoa River in Central Queensland.

Ensham currently undertakes underground mining using continuous miner operations, whilst utilizing the existing access and supporting infrastructure located within the current Mining Leases. The open cut portion of the mine is transiting from mining to rehabilitation. Mining extracts a portion of the combined Aries/Castor seam plies, typically leaving the higher ash, uppermost plies in the roof of the underground roadways.

Ensham is required to manage potential impacts of subsidence from underground mining activities in accordance with conditions within the following approvals:

- Regional Interests Development Approval (RIDA RPI22/002 Ensham – Life of Mine Extension Zones 2 and 3)
- Progressive Rehabilitation Closure Plan schedule PRCP_EMPL00732813_V4 (and future revisions)
- Environmental Protection and Biodiversity Conservation Approval (EPBC 2020/8669 - Zones 1, 2 & 3)

1.1 SCOPE

This Plan addresses the monitoring and management of subsidence impacts from Ensham's underground mining operation. This includes the triggers for investigation of potential subsidence impacts, specifications for LIDAR, guidance on inspections and photographic monitoring, groundwater monitoring, as well as mitigation and management measures.

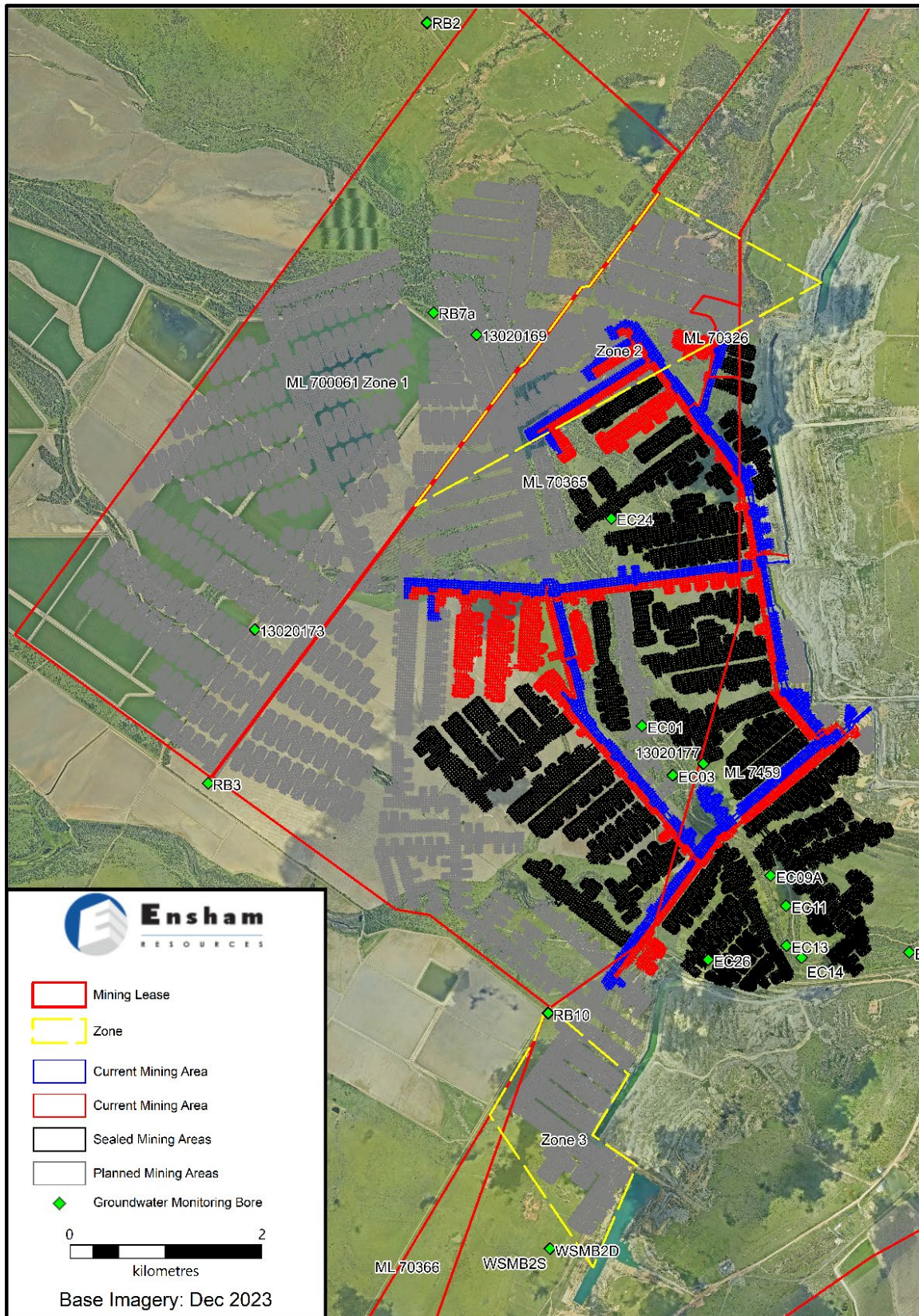


FIGURE 1-1 EXISTING OPERATIONS AND PROPOSED MINING PLAN FOR ZONES 1, 2 AND 3.

2. ENSHAM MINE OVERVIEW

2.1 MINING ACTIVITIES

The Ensham underground mine has been operating since 2011. The mine will continue to produce around 4.5 million tonnes per annum (Mtpa) of thermal coal with the addition of Zone 1 to the existing operation.

Coal from the underground mine is mined by five production units and transferred to the surface via the Ramp 4 drift conveyor.

2.2 TOPOGRAPHY AND DRAINAGE

The terrain in the Ensham area is generally low-lying, and the few hills within the area are capped by a hard layer formed on the surface known as duricrusts (Figure 2-1). The main drainage of the area is via the Nogoia River, which flows in an easterly and south-easterly direction through the Ensham mining leases before joining the Comet River to form the Mackenzie River near the town of Comet.

In the Ensham area, the elevation of the Nogoia River banks average 150 metres above Australian Height Datum. The Nogoia River is used for irrigation, drinking water and stock water supply, with flow maintained by releases from Fairbairn Dam, located south of Emerald. Due to the supply of water from the Fairbairn Dam to downstream users, the Nogoia River flows essentially all year round. The anabranch however is ephemeral and flows generally following a significant rain event.

The low-lying area includes floodplains and riparian zones along the Nogoia River and an anabranch, which runs to the north of the Nogoia River.

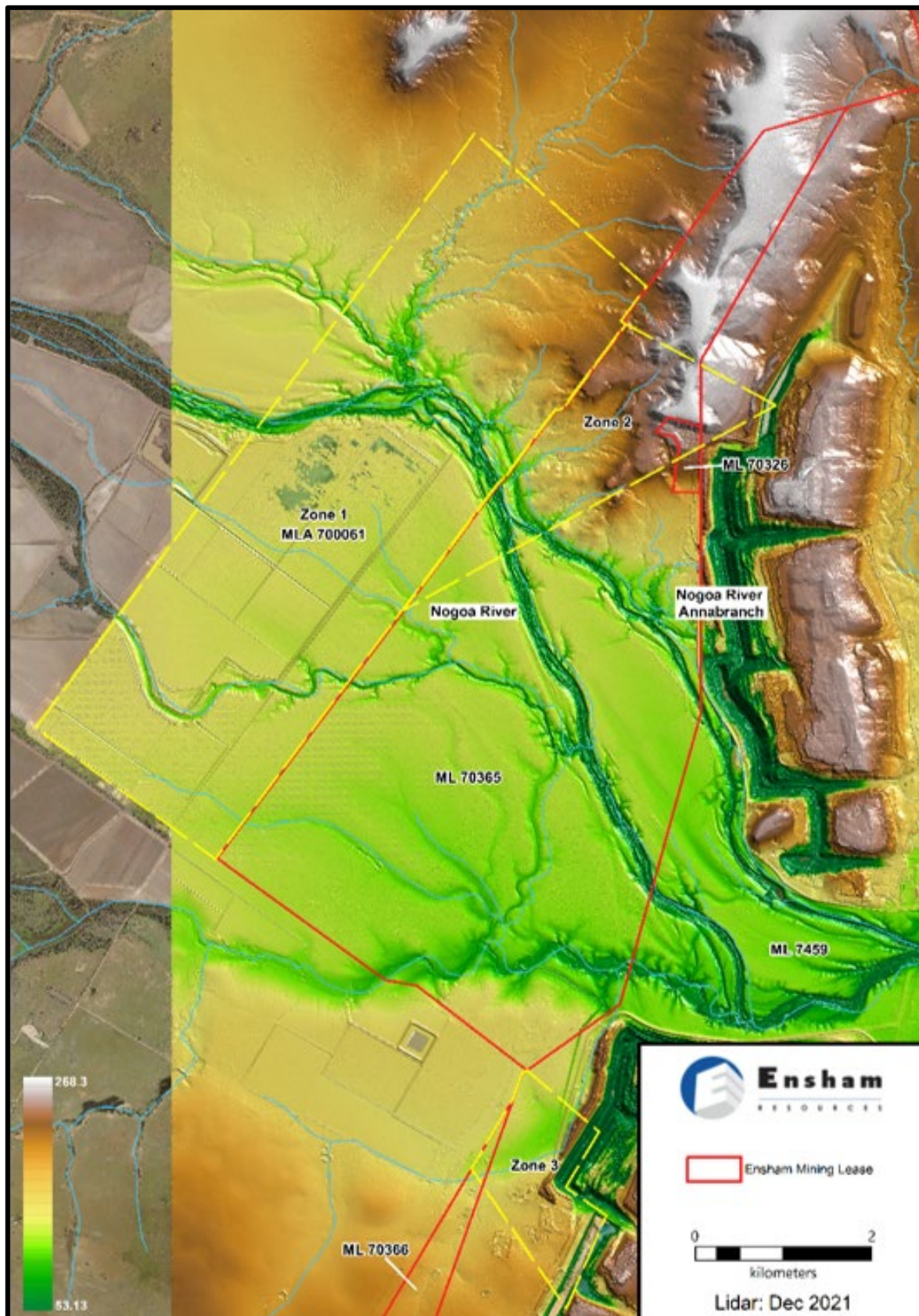


FIGURE 2-1 SURFACE TOPOGRAPHY AND DRAINAGE

2.3 SOILS

Soils in the areas above zones 1, 2 and 3 have been identified and are presented in Figure 2-1. The different soil types are known to not display a uniform reaction to climatic influences. The Vertosol is known to shrink and swell with varying moisture, which manifests as significant variation of surface elevation relative to Australian Height Datum.

The amount of natural movement of the soil surface exceeds the maximum predicted and measured subsidence movement. For this reason, RTK GPS monitors buried into the ground have been used to measure ground movement as opposed to the soil movement.

2.3.1 VERTOSOLS

These are soils with the following characteristics:

- A clay field texture or 35% or more clay throughout the solum except for a thin, surface crusty horizons 0.03 m or less thick,
- When dry, this soil exhibits cracking occasionally. These cracks are at least 5 mm wide and extend upward to the surface or to the base of any plough layer, peaty horizon, self-mulching horizon, or thin, surface crusty horizon, and
- Slickensides and/or lenticular peds occur at some depth in the solum.

The Vertosols generally consist of greyish brown medium clay A horizons (topsoil) with moderate structure, overlying a medium to medium-heavy clay B2 horizon with strong angular blocky structure. The topsoil showed strongly alkaline, non-sodic and low saline properties. The B2 horizon generally showed strongly alkaline, sodic and high saline properties.



FIGURE 2-2 VERTOSOL USED FOR GRAZING



FIGURE 2-3 VERTOSOL USED FOR CROPPING

2.3.2 DERMOSOLS

These are soils other than Vertosols, Hydrosols and Calcarosols which:

- Have B2 horizons with a structure more developed than weak throughout the major part of the horizon, and
- Do not have clear or abrupt textural B horizons.

The Dermosols generally consist of very dark brown to very dark greyish brown light clay to medium clay A horizons (topsoil) with weak to moderate structure, overlying a light medium clay to medium clay B2 horizon with moderate to strong angular to sub angular blocky structure. The topsoil and subsoils showed variable pH, sodicity, and salinity properties.



FIGURE 2-4 DERMOSOL

2.3.3 RUDOSOLS

Rudosols are other soils with negligible (rudimentary), if any, pedologic organisation apart from the minimal development of an A1 horizon or the presence of less than 10% of B horizon material. There is little or no texture or colour change with depth.

The Rudosols generally consisted of sandy clay loam A horizons (topsoil) with weak structure, overlying a sandy clay loam to clayey sand B2 horizon with weak sub angular blocky structure. The topsoil showed strongly acidic, non-sodic and very low saline properties. Similarly, the B2 horizon showed strongly acidic, non-sodic and very low saline properties.



FIGURE 2-5 RUDOSOL

2.3.4 KANDOSOLS

Kandosols are soils other than Hydrosols which lack a clear or abrupt texture contrast between the A horizon and a B horizon, with the major part of the B2 horizon consisting of a massive or weak pedality grade and a maximum clay content which exceeds 15%.

The Kandosols on site generally consisted of brown to black clayey sand to light medium clay A horizons (topsoil) with weak to strong structure, overlying a sandy clay loam to medium clay B2 horizon with weak to strong angular to sub angular blocky structure. The topsoil showed very strongly acidic, non-sodic and very low saline properties, similarly, the B2 horizon generally showed very strongly acidic, non-sodic and very low saline properties.



FIGURE 2-6 KANDOSOL

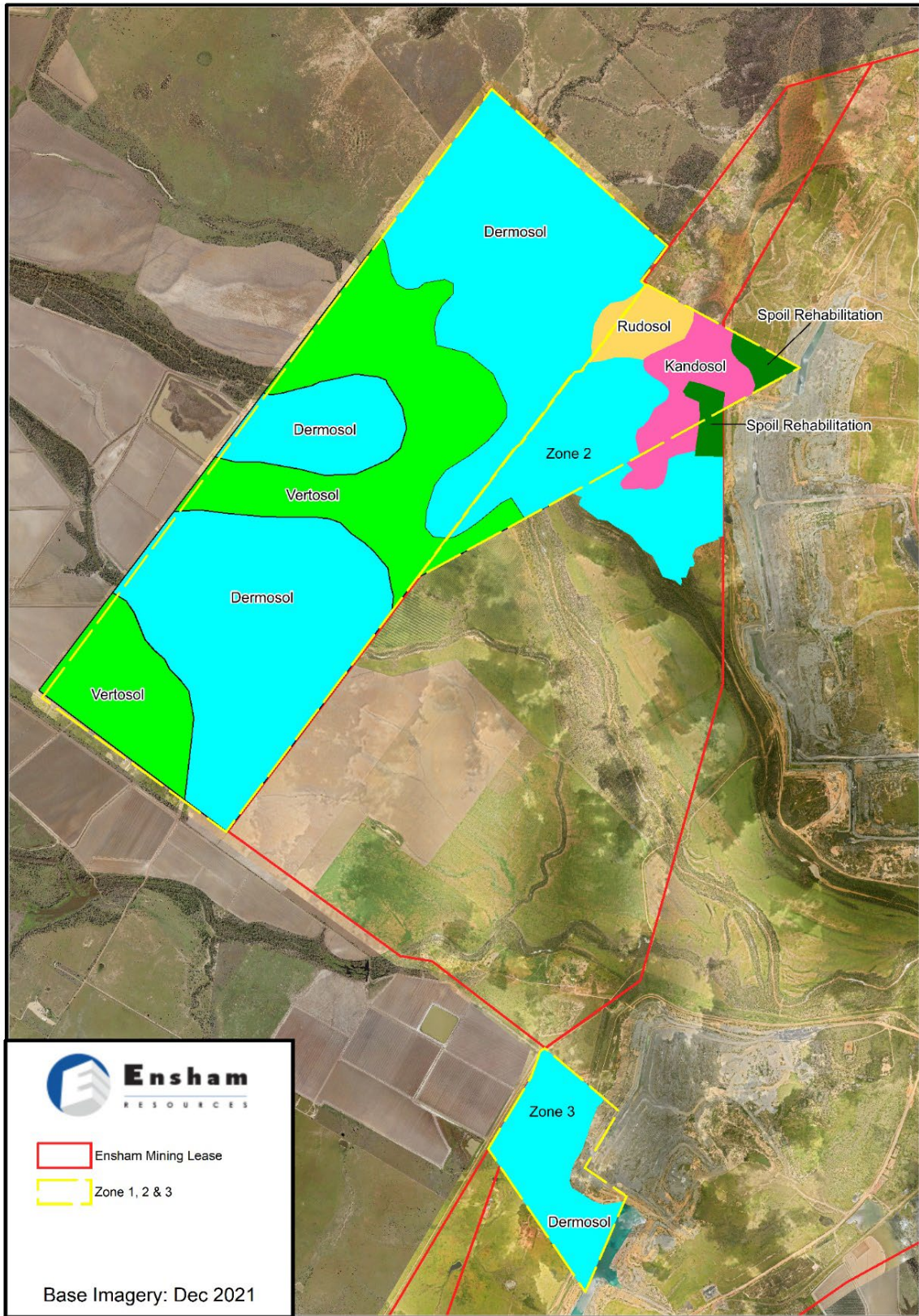


FIGURE 2-7 SOIL UNITS

2.4 GEOLOGY

Ensham mine is located in the western part of the Bowen Basin, which is one of five major foreland sedimentary basins formed along the eastern side of Australia during the Permian period. The Bowen Basin is the largest productive coal basin in Australia and stretches from Townsville to south of the Queensland-New South Wales border, in a north to south direction.

Table 2-1 provides a summary of the stratigraphic sequence in the Ensham area. This comprises unconsolidated Quaternary aged sediments, unconformably overlying consolidated Tertiary and Permian sediments.

TABLE 2-1 STRATIGRAPHY

Age	Unit	Maximum thickness ¹ (m)	Description
Quaternary	-	25	Alluvium - silt, clay, sand and gravel
Tertiary	-	ND	Duricrusted palaeosols at the top of deep weathering profiles, including ferricrete and silcrete; duricrusted old land surfaces
	Emerald Formation	50	Fluviatile and lacustrine claystone and siltstone, quartzose sandstone, pebbly sandstone, gravel, lignite, oil shale, interbedded basalt; all deeply weathered in outcrop
	Basalt	ND	Tertiary volcanics (basalt) mapped as being present over 10 km west of the site
Triassic	Rewan Group	200	Lithic sandstone, pebbly lithic sandstone, green to reddish brown mudstone and minor volcanolithic pebble conglomerate (at base); deposited in a fluvial-lacustrine environment.
Permian	Rangal Coal Measures	125	Feldspathic and lithic sandstone, carbonaceous mudstone, siltstone, tuff and coal seams. Coal seams include the Aries, Castor, Pollux and Orion seams. The main economic seams at Ensham are the Aries 2 and Castor seams.
	Burngrove Formation	200	Sandstones, siltstones and mudstones, and banded coal seams frequently interbedded with tuff and tuffaceous mudstones - coal seams include the Virgo and Leo seams.
	Fair Hill Formation	150	Lithic and feldspathic labile sandstone, siltstone, mudstone and conglomerate
	Macmillan Formation	100	Lithic and feldspathic sublabe mudstone, siltstone and sandstone

¹ Approximate maximum thickness based on available exploration holes and/or relevant literature
 ND: not defined, not enough data available

The Permian and Triassic strata form regular layered fluvio-deltaic sedimentary sequences, while the Quaternary sediments are more complex and irregular. The coal seams mined at Ensham Mine are found within the Rangal Coal Measures, which is the uppermost Permian unit of the portion of the Bowen Basin.

The Rewan Group aquitard overlies the Rangal Coal Measures and separates the Nogo River and associated floodplain alluvium from the underground workings. Each are discussed in more detail in (Table 2-1).

The underground mine surface geology is dominated by the Nogoa River alluvium, with the Tertiary sediments mapped to the south and the north.

2.5 GROUNDWATER REGIME

The principal groundwater bearing formations in the Ensham area are associated with the Permian coal seams. The Triassic Rewan Group siltstones and sandstones are considered a regional scale aquitard. A conceptual hydrogeological model is shown in Figure 2-8.

Alluvial deposits are associated with the Nogoa River and its anabranch (Figure 2-8). The Quaternary aged alluvium comprises shallow sequences of clay, silty sand and sand, underlain by discontinuous basal sands and gravel. A comprehensive network of bores listed in the EA are located in the alluvium to monitor any impact of mining on the alluvial aquifers.

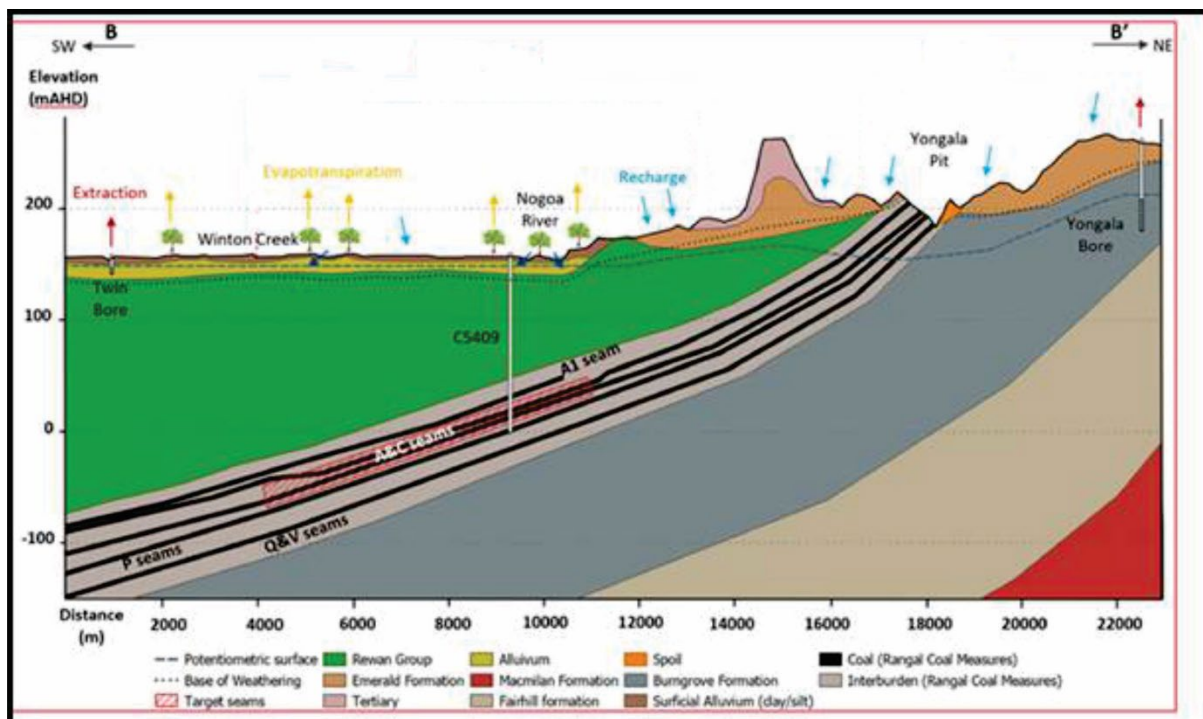


FIGURE 2-8 CONCEPTUAL HYDROGEOLOGICAL MODEL CROSS SECTION (EIS SUBMISSION, 2021).

2.6 LAND USE

Ensham mine is located within a rural setting, typical of the Central Queensland region, within the rural margins between a range of central township nodes. The largest nearby townships include Emerald, which is located approximately 35 km south-west, and Blackwater which is located 49 km south-east. The small township of Comet is located approximately 18 km south-east of the mine site.

The predominant land uses within the wider region include cropping, grazing and resource activities (Figure 2-9). The existing land uses include resource activities, cropping, grazing land and waterways with fringing riparian vegetation.

Adhering to the Cultural Heritage Management Plans, preservation areas have been established with the respective traditional owners’ groups at Ensham in areas where significant amounts of culturally significant artefact materials has been located, (refer Figure 2-9). The two preservation areas are located above underground workings, both areas have been mined under, are fenced and are subject to periodic inspection.

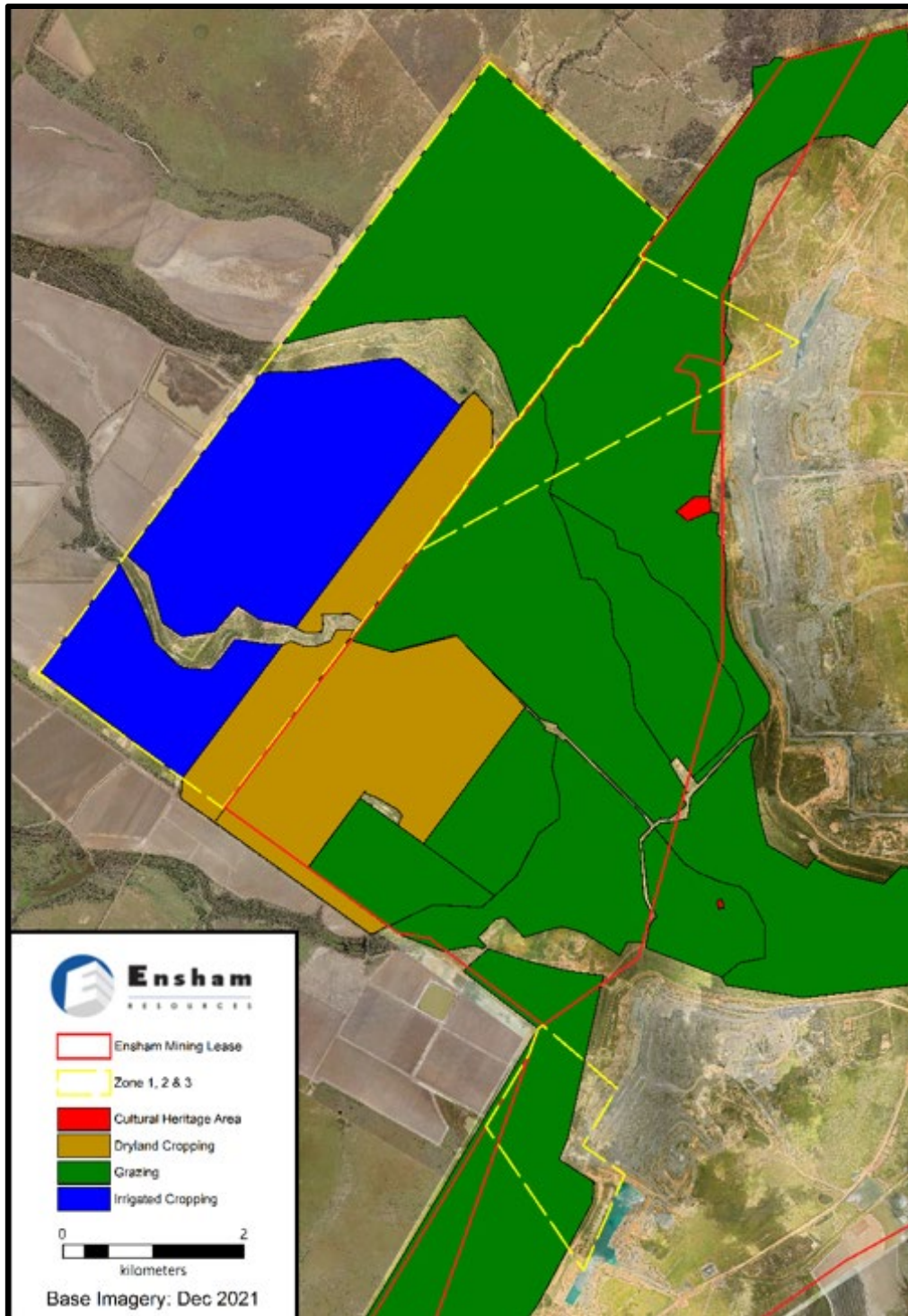


FIGURE 2-9 LAND USES AT ENSHAM MINE (2021).

2.7 BRIGALOW THREATENED ECOLOGICAL COMMUNITY

Within the mining leases and approval areas, the Brigalow (*Acacia harpophylla* dominated and co-dominated) threatened ecological community (Brigalow TEC) occurs. Brigalow TEC at the mine site is analogous with regional ecosystem (RE) 11.3.1 *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains. It occurs as remnant and high value regrowth.

Across the Project area, there is a total of 63.66 ha Brigalow TEC occurring, with 46.1 ha in Zone 1. A total of 23.5 ha is located directly above the planned underground mining expansion area (Figure 2-10).

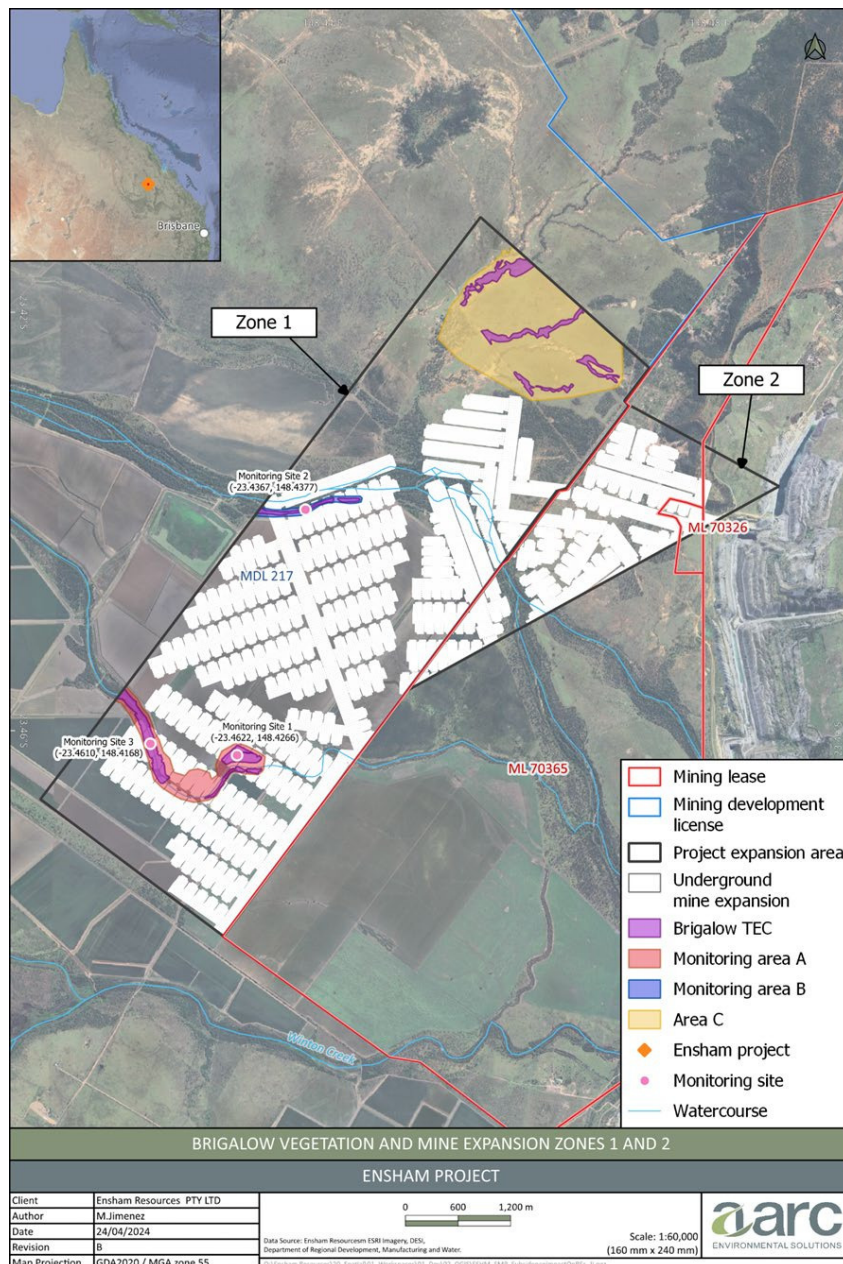


FIGURE 2-10 BRIGALOW TEC AREAS AND MONITORING LOCATIONS

3. PREDICTED SUBSIDENCE

3.1 INTRODUCTION

The bord and pillar mining layout at Ensham is specifically designed to prevent caving of the roof or collapse of the pillars. The long-term stability of the underground workings has been assessed using the design Factor of Safety (FoS), pillar dimensions (width to height ratio) and stability of the overburden.

Any subsidence that does occur will be due to strata compression. This typically results in low levels of surface lowering and minimal associated surface effects due to the associated low tilts, curvatures and strains.

The underground workings are designed where practical to avoid geological structures such as faults that may be associated with poorer mining conditions. This mining methodology minimises any potential impacts that geological structures may have on the subsidence behaviour. Seismic surveying is used to identify these structures prior to mining, allowing the optimization of the underground workings. For every panel that is mined, a hazard panel plan is produced that collates the available geological information such as:

- Location of geological structures.
- Depth of cover.
- Seam thickness.
- Seam levels.
- Roof strength.

Furthermore, the maximum excavation heights to maintain the required minimum FoS, in both the roadways and bell outs, are detailed on the Permit to Mine (PTM) for each mining area. The final roadway and pillar profiles are surveyed to confirm compliance with the design excavation heights. These checks are carried out by the Geotechnical Engineer and reported in the monthly geotechnical inspection report.

3.2 PILLAR DESIGN

The stability of the coal pillars in the Ensham underground mine are assessed using the industry accepted University of New South Wales Pillar Design Procedure to determine the design FoS as follows (Galvin et al, 1998):

$$\text{FoS} = \text{Strength of Pillar} / \text{Load on Pillar}$$

The strength and load carried by the pillars in the Ensham Area are calculated using the UNSW Pillar Design Power Strength Formulae and tributary area loading methodology respectively.

A minimum design FoS of 1.6 has been applied to ensure the long-term stability of the underground workings below the flood plain (Figure 3-1 Maximum Mining Height for a FoS of 1.6.). Where pillars are located below the flood plain, a conservative temporary flood depth of 4 m equating to an effective increase in depth of cover of 2.1 m should be applied to the load calculations in Figure 3-1.

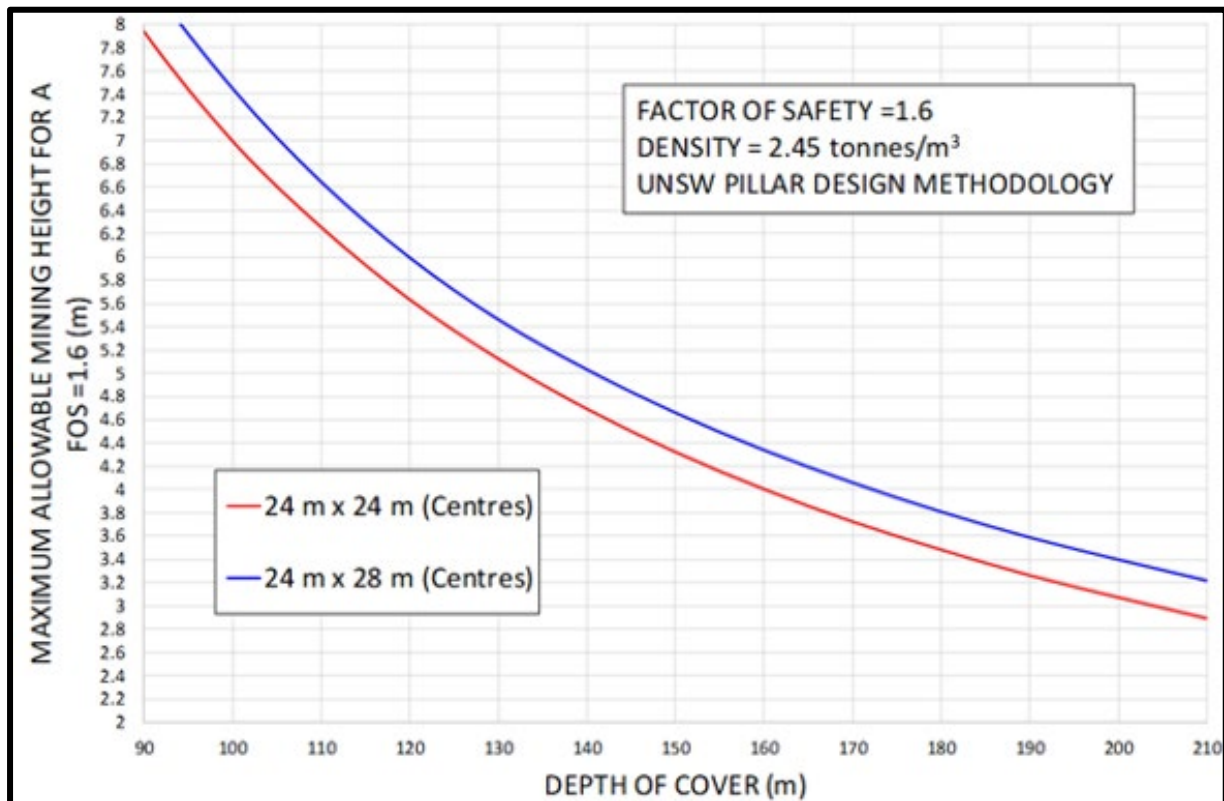


FIGURE 3-1 MAXIMUM MINING HEIGHT FOR A FOS OF 1.6.

The long-term stability of the pillars (in excess of 200 years) has been confirmed by three separate industry recognized geotechnical consultants who have peer reviewed the subsidence assessment for the extension mining area. Below the Nogoia River channel and anabranh, a FoS of 2.11 will be adopted for mining, equating to a probability of pillar failure of 1 in 1 million. Similarly, a conservative temporary flood depth of 16 m in the channel and anabranh equates to an effective 7.5 m increase in the depth of cover and will be taken into account when undertaking pillar design.

The barrier pillars between panels and sub-panels are also designed to ensure FoS values greater than 2.11, equating to a probability of failure of 1 in 1 million.

3.3 COMPRESSION ANALYSIS

The deformation induced at the surface by bord and pillar mining due to strata compression can be estimated analytically by calculating the combined pillar, roof and floor compression using modulus values as follows.

The pillar compression is then calculated as follows using the methodology of Poulos and Davis (1974) for analysing rigid footings:

$$\text{Compression}_{\text{pillar}} = (\sigma_c * h)/E$$

Where:

σ_c = Vertical stress change (MPa)

h = Pillar height (m)

E = Young's modulus of coal pillars (MPa)

The compression of the roof and floor is calculated as follows:

$$\text{Compression}_{\text{roof or floor}} = I_P * (\sigma_c * w/2) / E$$

Where:

σ_c = Vertical stress change (MPa)

I_P = Influence Factor (for a rigid footing) = 1.4

w = Pillar width (m)

E = Young's modulus of roof or floor (MPa)

The change in vertical stress on the pillars can be estimated as:

$$\sigma_c = \text{Tributary Area Stress} - \text{Virgin Stress}$$

3.4 PREDICTED SUBSIDENCE

LIDAR has been used to determine the existence of any subsidence over previously mined areas, with no trends or evidence of subsidence being observed. Subsidence predictions for future mining areas indicate levels less than 35 mm in Zones 2 and 3, and typically less than 40mm in Zone 1, which is less than the accuracy of LIDAR and less than natural ground movement of up to 50 mm according to the Commonwealth of Australia (2014 and 2015).

In 2021, more accurate RTK (Real Time Kinematic) - GPS monitoring (with an accuracy of + /- 5mm) above mined out bord and pillar panels at Ensham has confirmed the low levels of surface subsidence as discussed in Section 4.2. It is considered that the lower accuracy (± 50 mm) LIDAR surveys will still be applicable in assessing the possibility of pillar collapses or squeezes that may have occurred in previously mined out areas.

3.5 SURFACE AND SUBSURFACE CRACKING

No surface or sub-surface cracking relating to underground mining has been observed in the Ensham underground mined area since underground bord and pillar mining began in 2011.

3.6 SUBSIDENCE IMPACTS

Underground mining at Ensham considers potential impacts to the following aspects:

- Groundwater.
- Surface water - Nogoa and Anabranck and other creeks and flood plain.
- Flora and fauna.
- Surface infrastructure (mining).
- Agricultural infrastructure including laser levelled irrigation paddocks.

- Cultural Heritage.

The expected low levels of subsidence are unlikely to result in the formation of significant depressions in the surface topography where ponding of the surface drainage may occur. This subsidence is anticipated to form in a consistent and uniform manner, without significant undulations, as a result of elastic compression of the strata i.e. compression due to the additional load on the pillars after the coal is extracted.

Furthermore, based on mining experience at shallow depths of cover in the current Ensham underground workings, as well as experience at other mining operations around the world, the risk of sinkhole subsidence occurring in Zones 1 and Zones 2 and 3, where the depth of cover is greater than 120 m and 75 m respectively, is considered to be without known precedent.

4. SUBSIDENCE MONITORING

Subsidence monitoring at Ensham comprises:

- LIDAR (+/- 50 mm accuracy).
- Photographic monitoring at designated points
- Real Time Kinematic (RTK)-GPS monitoring (+/- 5 mm accuracy).
- General surface inspections if monitoring indicates exceedance of one or more subsidence trigger levels.

4.1 LIDAR MONITORING

LIDAR provides representation of surface elevation. The points derived during a LIDAR survey are classified according to the type of surface that was reflected, where “ground” points are selected to represent ground surface. Therefore, LIDAR requires a proportion of the ground surface to be visible in order to present a ground surface elevation. Generally, LIDAR provides vertical accuracy of +/- 0.05m. The LIDAR is referenced to a common Australian Datum which are aligned to permanent survey markers. LIDAR metadata is maintained by Ensham in Australian Geodetic Datum 1984 (AGD84).

LIDAR data was collected over the underground mine initially in 2009, then on an annual basis since 2016, including areas where bord and pillar has been or will be carried out. LIDAR is collected at or about year end, each year and done so in accordance with (but not limited to) ISO 19115 as a minimum. No discernible surface movement due to subsidence has been able to be detected to date by LIDAR.

4.2 REAL TIME MONITORING

Based on LIDAR monitoring to date and more recently, fixed monitoring RTK (Real Time Kinematic) GPS stations, any ground movements resulting from bord and pillar mining are shown to be less than natural soil movement. Mitigation measures have therefore not been necessary to date for the bord and pillar mined areas.

Fixed monitor GPS stations were installed in 2021 and provide a much higher level of accuracy of +/- 5 mm than LIDAR (Figure 4-1). These stations are installed 1.5-2 m into the ground surface to be able to better determine ground movement and minimise the impact of surface soil movement.



FIGURE 4-1 FIXED MONITORING STATION 114_2

Ensham has now installed nine of these remote GPS monitoring stations above 114, 500 Mains, 502, 503, WM07, 706, and the older mined out areas 201 and 404 Panels in the current underground area (as shown in Figure 4-2). Five of the monitoring stations started recording data in mid-April 2021, one in July 2021 and the other three in September 2023. By August 2024, development mining (primary workings) and second workings had been completed under all except WM07 and 706 Panel stations (Figure 4-2). In September 2023 RTK stations were setup above old workings mined out in previous years (201 Panel 2014, 404 Panel 2019).

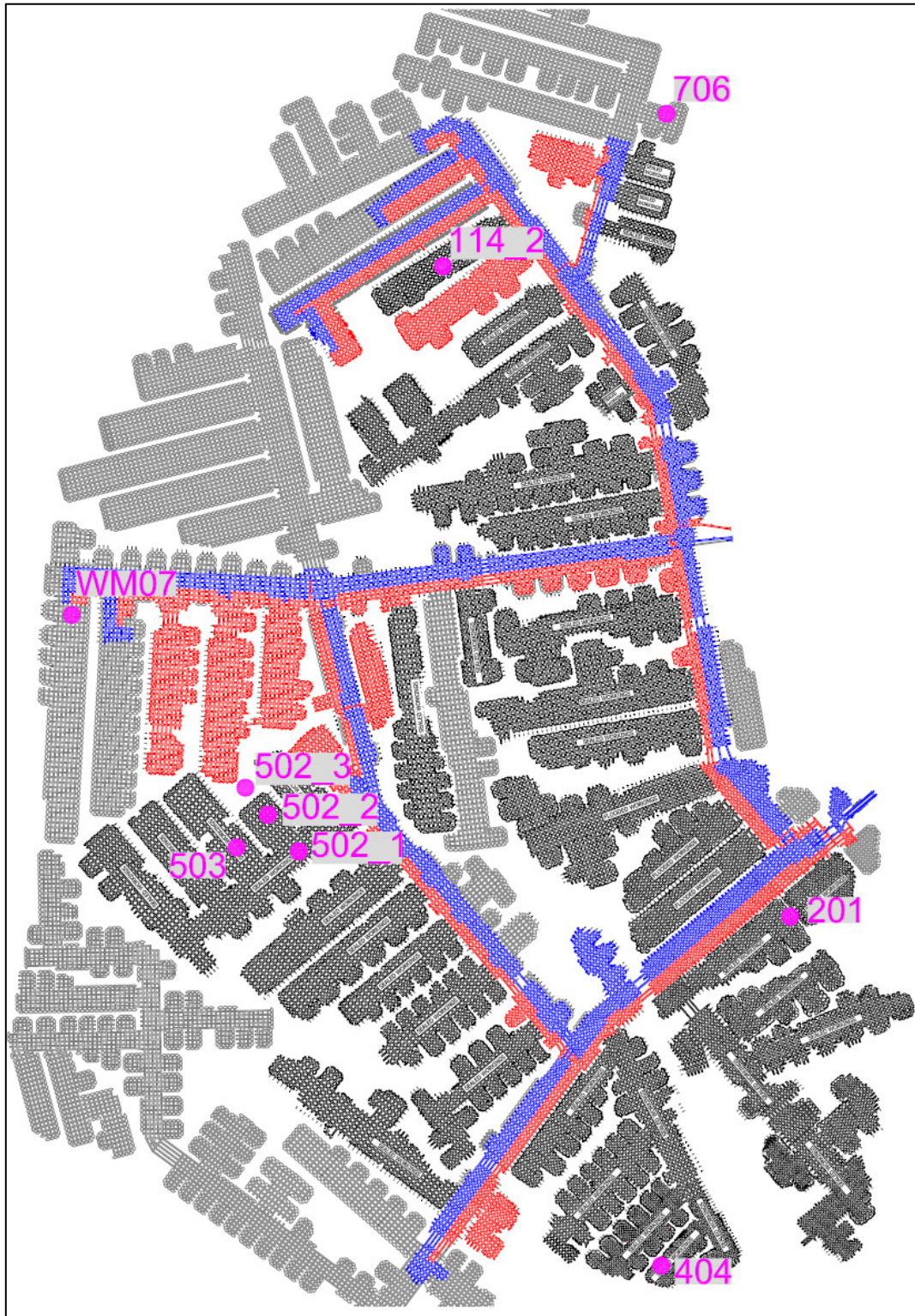


FIGURE 4-2 LOCATION OF REMOTE SUBSIDENCE MONITORING – ENSHAM UNDERGROUND AREA.

4.3 MONITORING SURVEYS

4.3.1 500 SERIES STATIONS

In the 500 Series Panel area, no mining has been carried out below station 502_3. The 14-day moving average curve indicates any vertical movement is less than the survey error of ± 5 mm (Figure 4-3). Also of note, the rainfall events since April 2021 do not appear to have significantly affected the vertical movement measured by this station (Figure 4-3). These stations are all located on vertosol soils. Please note the change in data precision from January 2023 is due to improved GPS processing data scripts introduced.

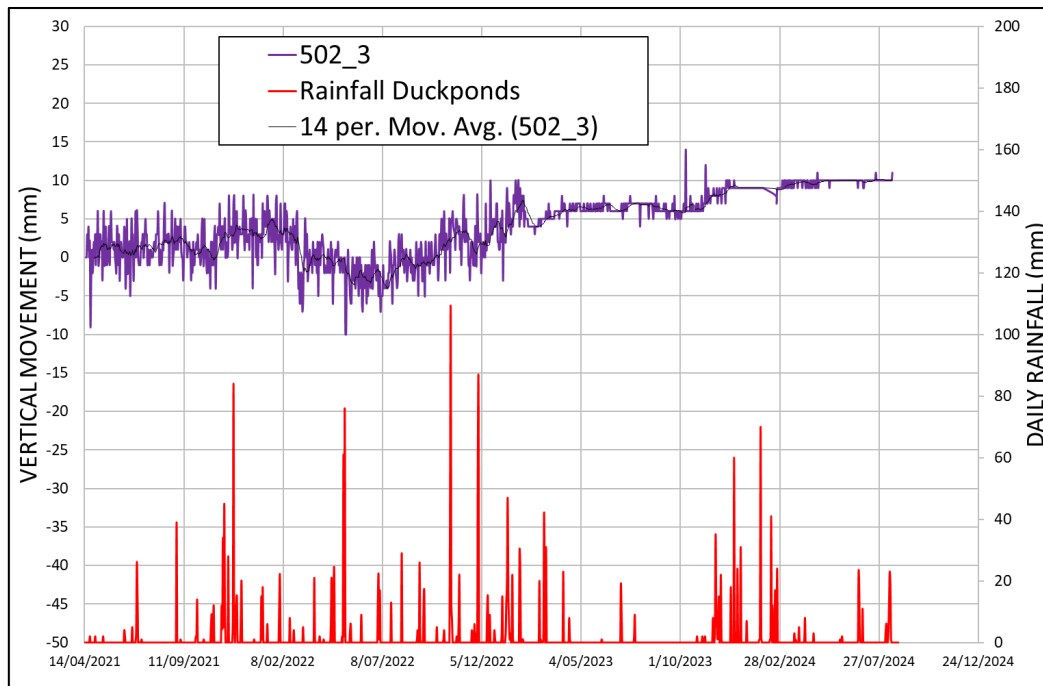


FIGURE 4-3 MONITORING DATA – 502_3 STATION.



FIGURE 4-4 MONITORING STATION 502_3

Similar observations are evident in station 503_1, where secondary extraction was carried out below this station in November 2022 (Figure 4-5). Any movement associated with mining below this station appears to be less than the survey error of ± 5 mm (Figure 4-5).

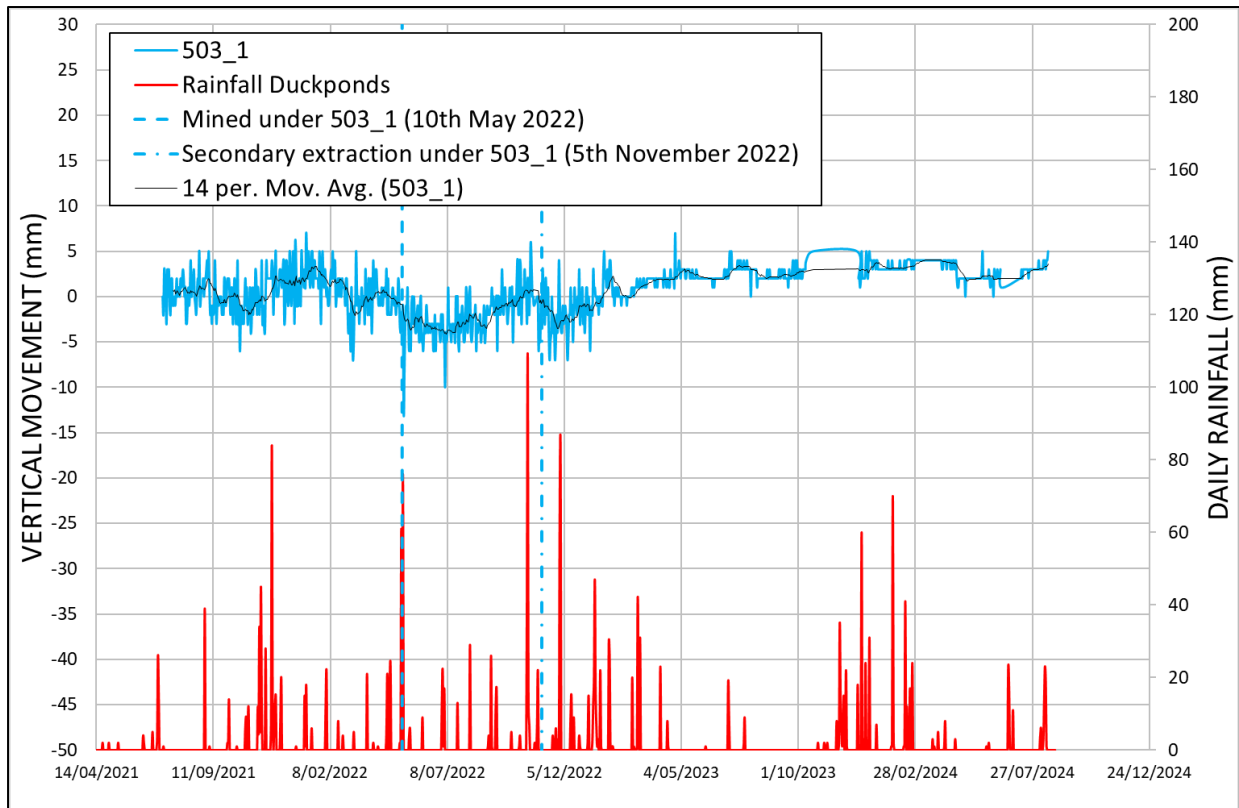


FIGURE 4-5 MONITORING DATA – 503_1 STATION

Development (primary workings) was carried out in the 500 Mains below station 502_1 in late May 2021. This mining appears to have been associated with approximately 5 mm of movement that occurred over a timeframe of a month (Figure 4-6). This timing is as anticipated based on the approximate 2 to 3 weeks required to mine the entire width of the panel below the survey station.

The reserve recovery in the 500 Mains below station 502_1 is 38.5%, at 195 m depth of cover. The FoS of the 500 Mains pillars for a 3.5 m mining height in this area is 1.90, equivalent to a probability of failure of 1 in 90,000.

502 Panel developed under station 502_2 in late August 2021, extracting coal to around 3.3 m high. Similar subsidence behaviour to 502_1 was noted on the 502_2 station (Figure 4-7). Secondary workings of an additional 1 m of floor coal were completed under this station by late September 2021, with no additional vertical movement measured (Figure 4-7). This is consistent with the methodology of the strata compression analysis, which predicts a small amount of increased settlement (less than 2 mm) at the surface due to the increase in pillar height. Similarly, rainfall events do not appear to be significantly affecting the vertical movement measurements in this area.

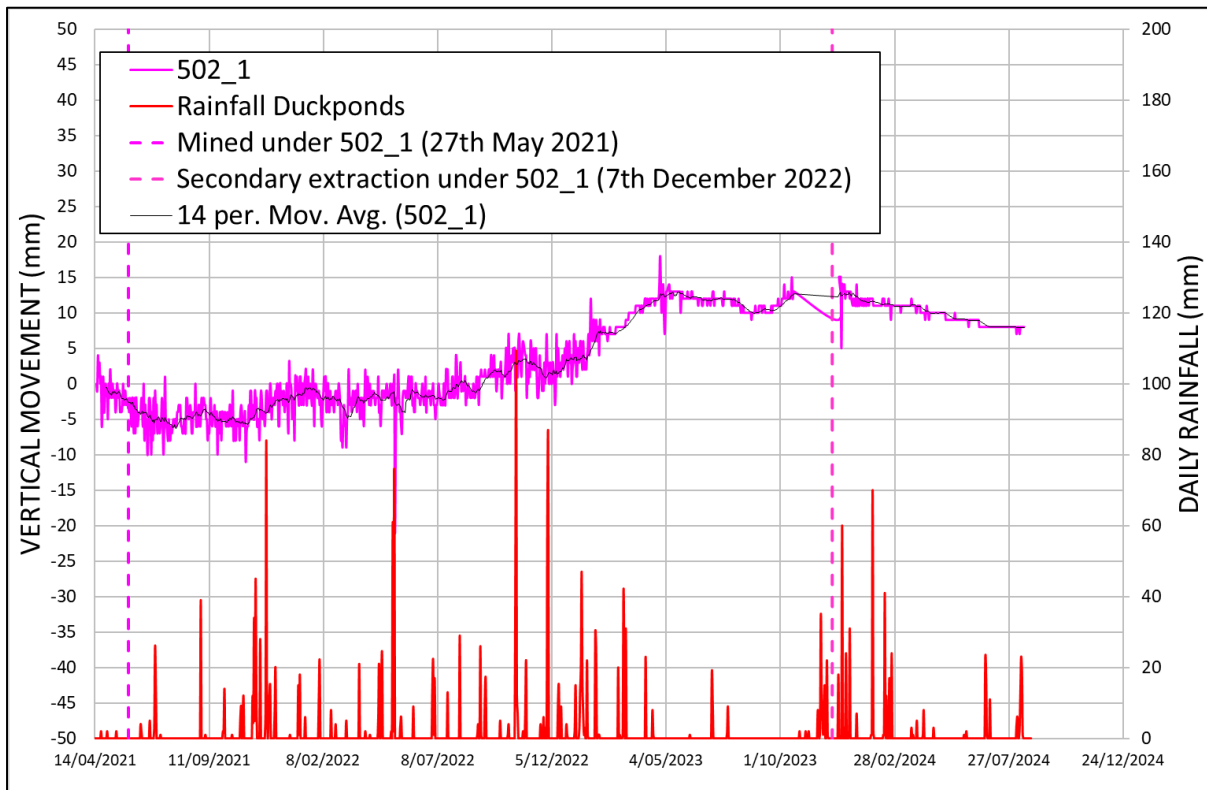


FIGURE 4-6 MONITORING DATA – 502_1 STATION.

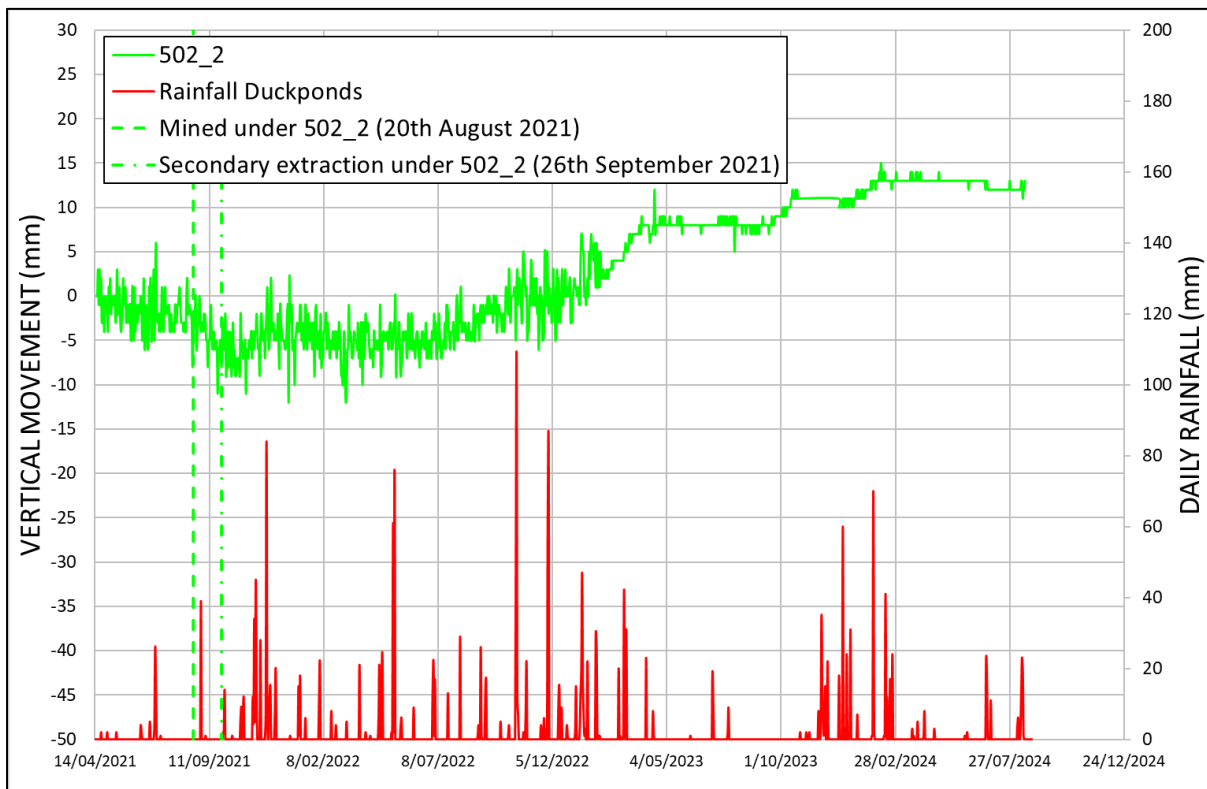


FIGURE 4-7 MONITORING DATA – 502_2 STATION.

4.3.2 114 PANEL STATIONS

Mining of development roadways (primary workings) at 3.3 m high was carried out below survey stations 114_1 and 114_2 in mid-August and mid-September 2021 respectively (Figure 4-8 and Figure 4-10). Secondary extraction was completed below these stations in December 2021 and January 2022 respectively.

Prior to mining under station 114_1 (Figure 4-9), a greater amount of scatter in the data was evident (Figure 4-8). This station also appears more susceptible to changes during rainfall events, such as those in in November 2021 and May 2022, which can be attributed to the type of material in which the station is anchored. It is located higher up the slope on Kandosol soil. This RTK station was relocated to another location and is no longer monitored.

The data from station 114_2 appears less affected by rainfall and indicates around a two-week period for the maximum 8 mm of subsidence to occur (Figure 4-10). Station 114_2 is located further down the slope on Dermosol soil.

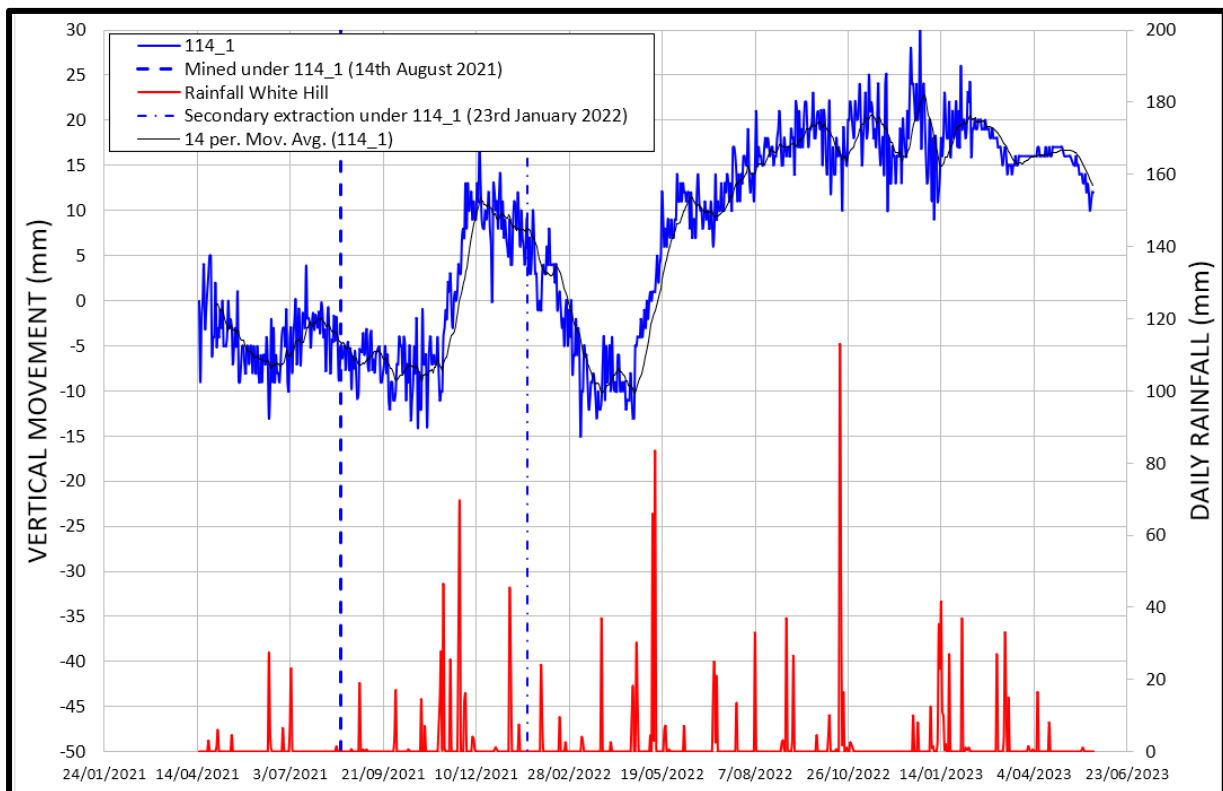


FIGURE 4-8 MONITORING DATA – 114_1 PANEL STATION.



FIGURE 4-9 MONITORING STATION 114_1 PANEL.

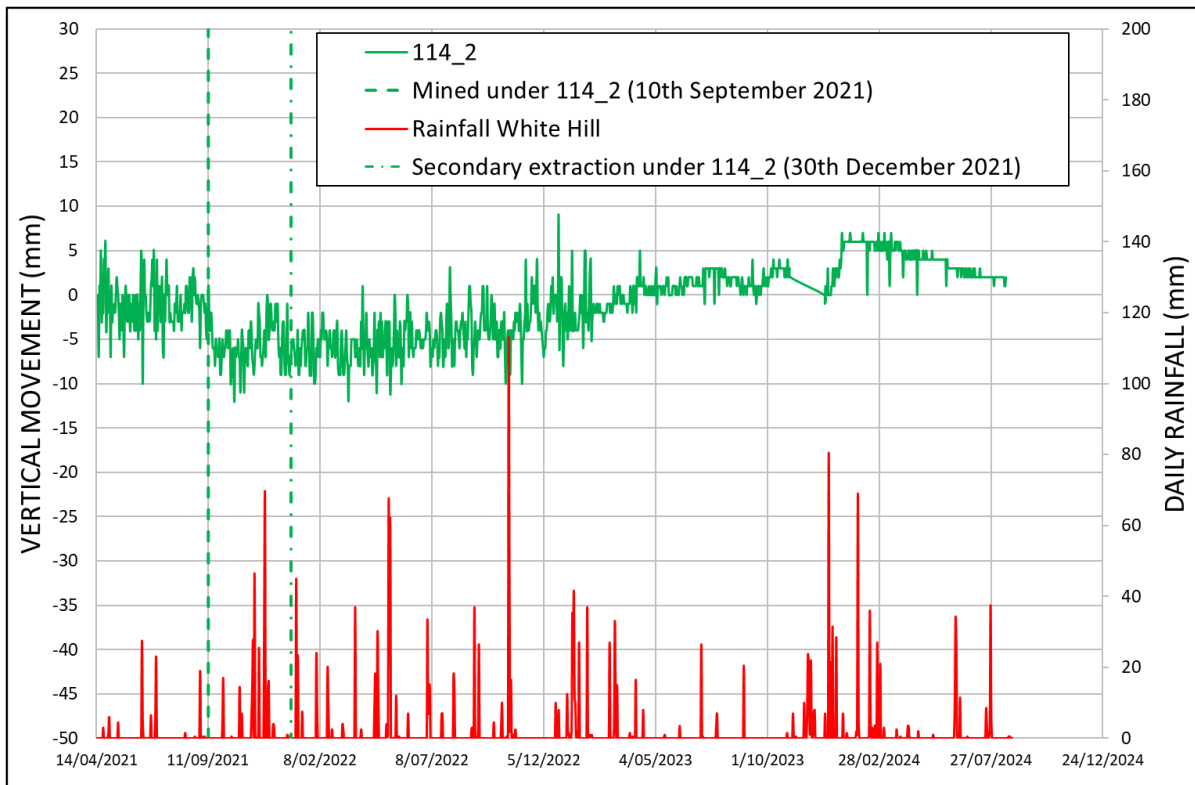


FIGURE 4-10 MONITORING DATA – 114_2 PANEL STATION.

4.3.3 OLD MINED OUT AREAS – 404 AND 201 PANELS

Mining of 201 Panel commenced in January 2014, moving to secondary extraction in April 2014 and completed in early June 2014. The 201 Panel is located adjacent to the Open Cut (OC) highwall from pit C and off ramp 3. A RTK station was setup over 201 Panel in September 2023 to monitor the long-term stability of the older workings, Figure 4-11 shows a relatively stable variation with some noise associated around rainfall.

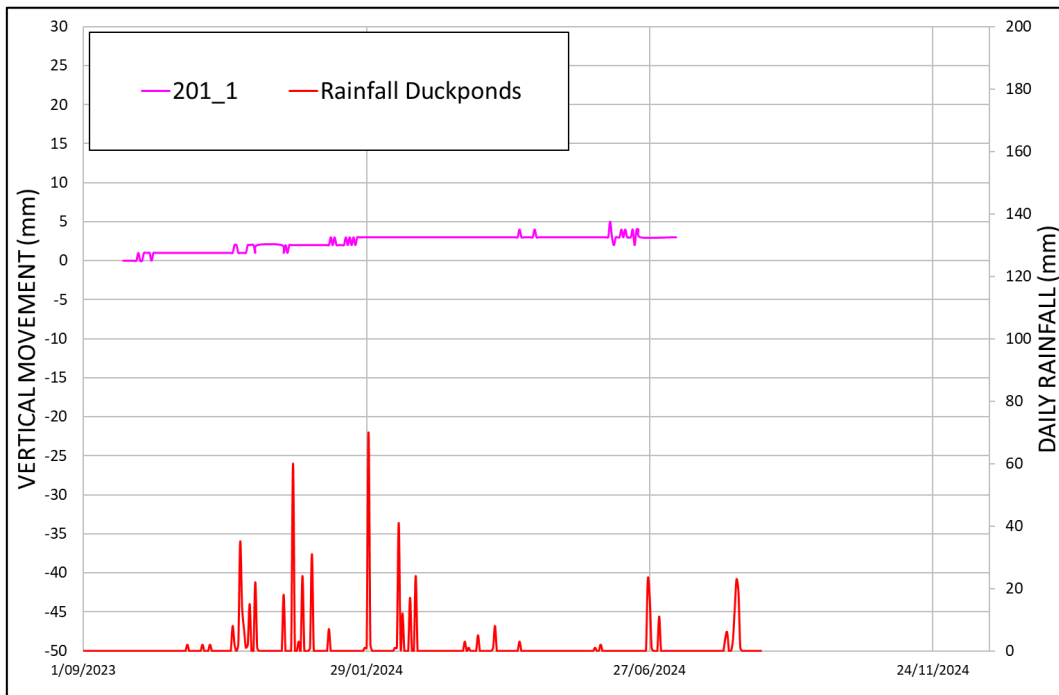


FIGURE 4-11: MONITORING DATA – 201_1 PANEL STATION.

Mining of 404 Panel commenced in August 2018, primary mining was completed early October 2018, and secondary extraction commenced March 2019 and finished in early May 2019. The 404 Panel is located adjacent to the Open Cut (OC) highwall from pit B and off ramp 3. A RTK station was setup over 201 Panel in September 2023 to monitor the long-term stability of the older workings, Figure 4-12 shows more variation with some noise associated around rainfall. The data is consistent with natural variation across the soils.

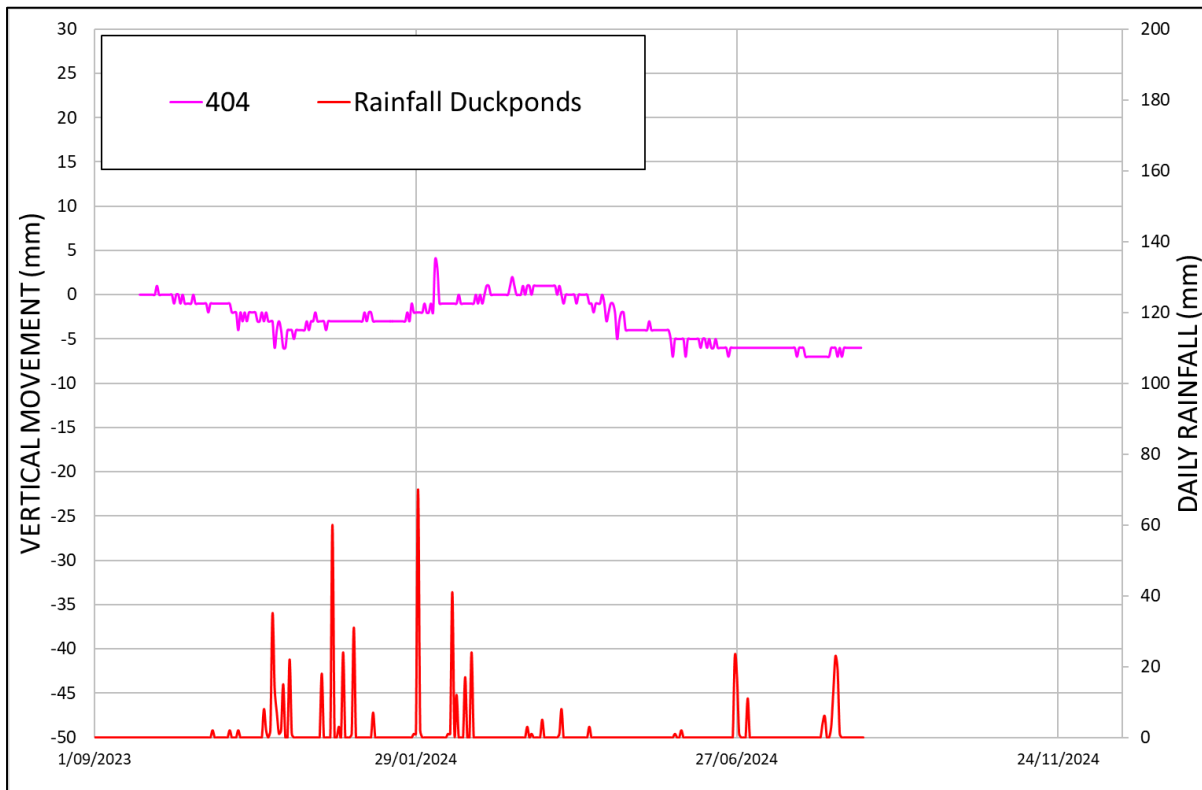


FIGURE 4-12: MONITORING DATA – 404 PANEL STATION.

4.3.4 NON-MINED AREAS – WM07 AND 706 PANELS

Mining has not been conducted within the areas of these two RTK monitors, the WM07 monitor has had mining conducted within 80 m of the location in June 2024, and the 706 Panel RTK station is located ~ 270 m from underground workings. Figure 4-13 and Figure 4-14 show movement in these two non-mining areas with variations with rainfall and more indicative of natural ground swells within the soils than mining induced changes.

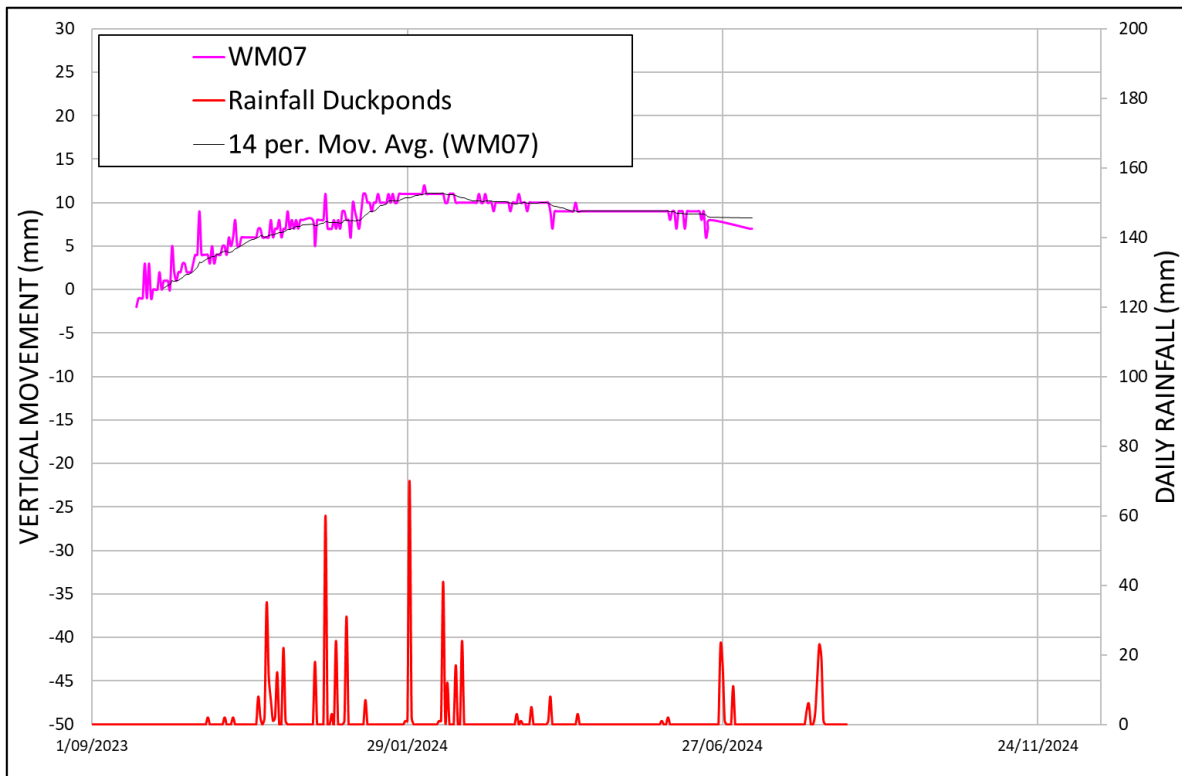


FIGURE 4-13: MONITORING DATA – 404 PANEL STATION.

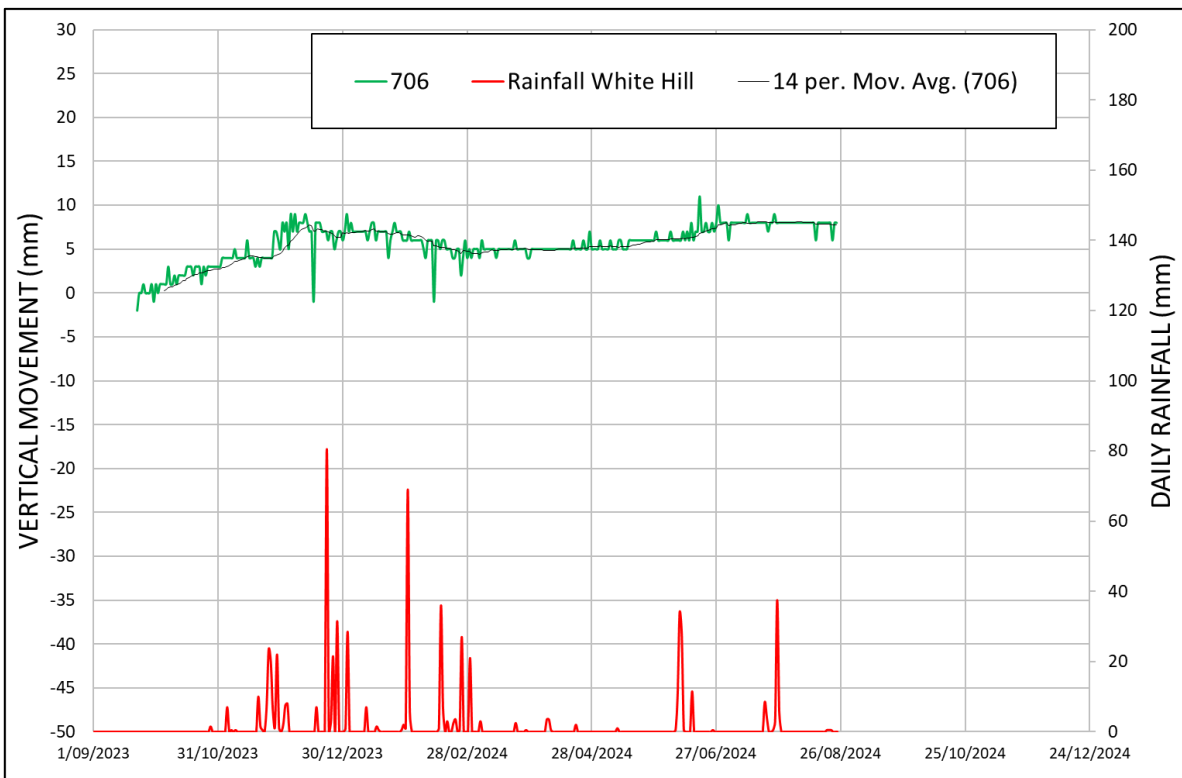


FIGURE 4-14: MONITORING DATA – 706 PANEL STATION.

4.3.5 SUMMARY

By August 2024, more than three years of higher accuracy (± 5 mm) monitoring survey data has been collected over the Ensham underground workings. This data indicates that underground mining has been associated with surface movements less than 10 mm, which is within the accuracy of the survey monitoring and validates the subsidence predictions.

It is anticipated that prior to mining in Zones 1 more data of the natural surface movement will allow interpretation to determine any subsidence movement component. This data will be reviewed in conjunction with rainfall records and the location of underground mining, to provide some guidance on the proportion of movement due to both mining induced subsidence and the seasonal variation in ground levels due to changes in moisture content.

Nine monitoring stations are installed within the mining footprint, both planned and mined. Some of the stations will be used as a control and will be located within an area which will not be subject to mining as discussed in Section 4.2. Additional monitoring stations are planned to be installed in Zone 1.

LIDAR surveys will still be required to assess surface movements over larger areas and verification with compliance conditions.

This monitoring (LIDAR and RTK) should confirm the subsidence predictions and any significant changes in subsidence will trigger a review of the relevant impact assessments and associated mitigation and management measures, as discussed further in Section 4.9.

This review will also provide additional calibration data for any future subsidence predictions and assessments of subsidence effects.

A subsidence monitoring report will be produced as required for compliance and monitoring of subsidence impacts and will be continued until rehabilitation milestones are achieved.

4.4 UNDERGROUND SURVEYING

As well as the surface monitoring, underground surveying of the completed mined roadways and pillar dimensions is carried out. The FoS and width: height ratio of the as-mined pillars can be calculated and checked against the design values.

These values can be referenced when reviewing the subsidence predictions.

4.5 SURFACE INSPECTIONS

Detailed surface inspections will be carried out on areas that have been identified through LIDAR or fixed GPS monitoring as having triggered an investigation as discussed in Section 4.8.

Any underground crossings under the Nogoia River within Zones 1 and 2 will be subject to an annual inspection of the bed and banks adjacent to the crossing to identify any visible subsidence as a result of mining operations that may impede on fish passage.

4.6 COMPLIANCE

4.6.1 PRCP APPLIES TO ALL UG MINING AREAS

The PRCP requires that:

- The extent and frequency of surface cracking and ponding of the mined land is comparable to the unmined land.
- Drainage features within the subsided areas is comparable with the pre-mining drainage features of the land as confirmed by a LIDAR Survey.

Photographic monitoring within mined panels and adjacent unmined areas will be used to confirm that cracking and ponding is comparable between the two areas as proof towards achievement of PRCP Schedule Milestone RM12.

Annually a drainage map will be produced from LIDAR over mined areas and compared to pre-mine drainage to confirm no change to drainage features, as proof towards achievement of PRCP Schedule Milestone RM12.

4.6.2 RIDA APPLIES TO ZONES 2 AND 3

The RIDA requires that:

- LIDAR is based on common geodetic datum.
- LIDAR metadata must be collected to any relevant Australian Standard.
- LIDAR data must be captured at the same time each year.
- Levels of subsidence must not exceed:
 - 100 mm of vertical subsidence.
 - A tilt of less than 5mm/m measured over 20 metres.
- An Erosion and Sediment Control Plan is developed and implemented.
- Photographs of flare sites – date and GPS stamped of:
 - Pre-disturbance site conditions.
 - Post-restoration site conditions.
- A report is lodged within 3 months of removal of bore casing.

Annually the LIDAR surface for Zones 2 & 3 will be collected (in accordance with Section 4.1) and compared with the LIDAR surface from the previous year with the threshold set at 100mm. Any areas where the surface has greater than 100mm difference will be investigated to determine if it could be related to underground mining activities or is natural or agricultural processes. If the subsidence is less than 100mm then the tilt must be within acceptable criteria.

Strategies and actions outlined within the Erosion and Sediment Control Plan will be carried out at the flare locations. This will also include photographic records.

Photographic monitoring points within Zones 2 & 3 will be established and recorded over the duration of mining activities to detect and record any changes due to mining activities over time. The photographs are to be date and GPS stamped.

4.6.1 EPBC 2020/8669 APPLIES TO ZONES 1, 2 AND 3

The EPBC approval requires:

- This SMP must reliability predict subsidence that may cause harm to protected matters i.e. Brigalow.
- Subsidence levels must not exceed 500mm compared to pre-mining levels.

This is detailed more in Section 5.

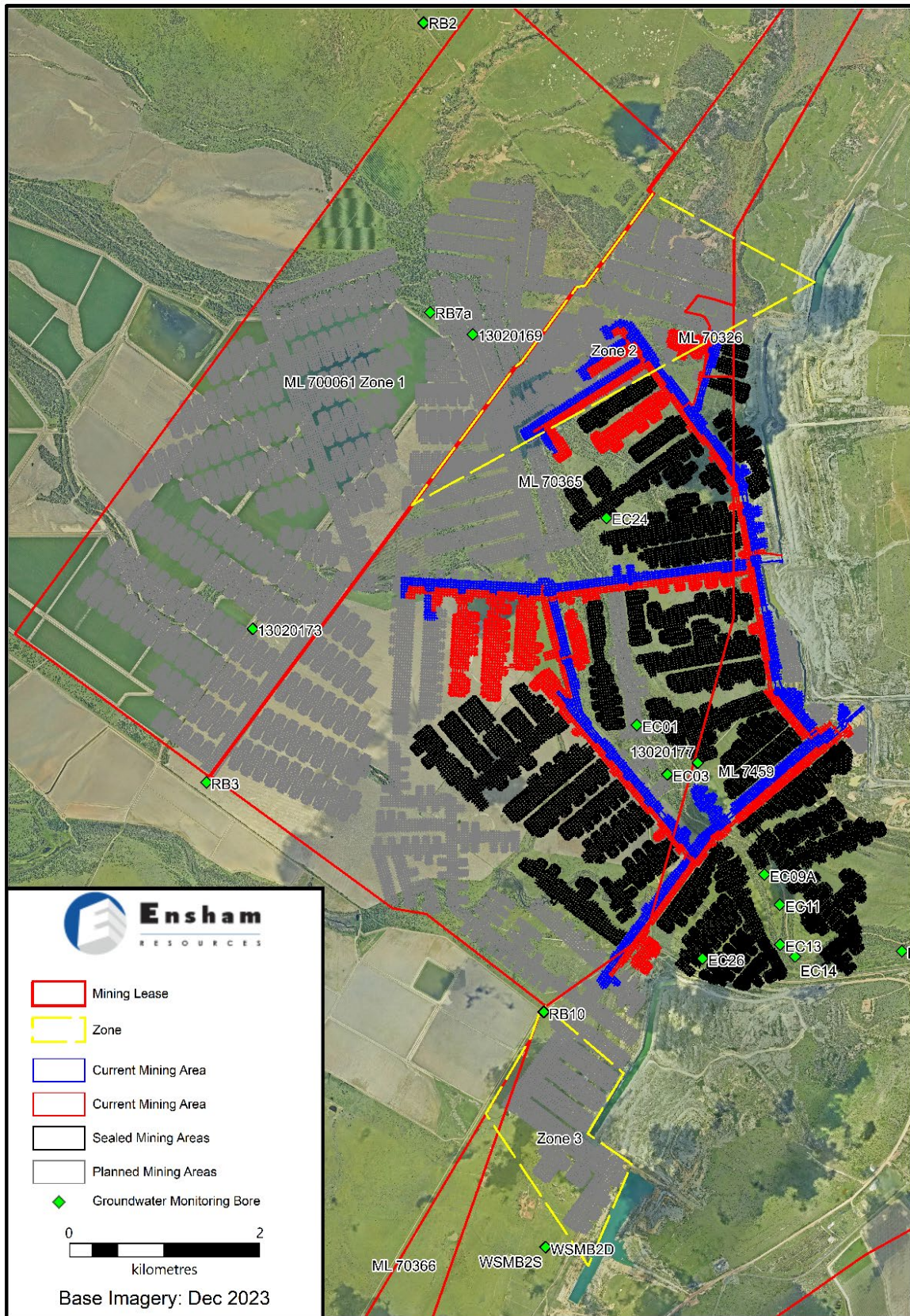


FIGURE 4-15 GROUNDWATER MONITORING BORES.

4.7 MONITORING SCHEDULE AND TRIGGER LEVELS

The monitoring schedule for the various aspects detailed in this SMP are summarized in Table 4-1. This schedule also includes the frequency and responsible department. Trigger levels based on various approvals for Zones 1, 2 and 3 have also been specified to initiate a review. The Fixed GPS trigger is slightly higher in Zone 1 compared to Zones 2 and 3 due to the increased depth of cover.

TABLE 4-1 MONITORING SCHEDULE FOR SUBSIDENCE.

Monitoring/ Survey	Who by	How often	Trigger Levels – Zone 1	RIDA Trigger Levels – Zones 2 and 3	EPBC Trigger Levels – Zones 1, 2 & 3
LIDAR	Technical Services/Survey	Annual	>100 mm movement when LIDAR surfaces are compared on an annual basis	>100 mm movement when LIDAR surfaces are compared on an annual basis	500mm
Fixed GPS	Technical Services/Survey	Real Time	40 mm	35 mm	500mm
Surface Surveying	Technical Services/Survey	As per land compensation agreements	As per land compensation agreements	As per land compensation agreements	As per land compensation agreements
Underground Surveying	Survey	Daily	As per Strata Control Management Plan	As per Strata Control Management Plan	As per Strata Control Management Plan
Surface Inspections	Environmental	Annual or if investigation is triggered	Surface inspections will be instigated from LIDAR results. Water ponding, new gully erosion or changes to Nogoia Riverbed and banks (that may indicate an impact to fish passage) not	Surface inspections will be instigated from LIDAR results. Water ponding, new gully erosion or changes to Nogoia Riverbed and banks (that may indicate an impact to fish passage) not attributed to natural processes at	As required when the subsidence trigger is reached.

			attributed to natural processes at locations where underground mining has occurred	locations where underground mining has occurred	
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4.7.1 SUBSIDENCE TRIGGER LEVELS

Based upon the accuracy of LIDAR (+/-50 mm) and the natural soil variation of 50 mm (Commonwealth of Australia, 2014 and 2015), a LIDAR trigger level of 100 mm lower than the previous annual LIDAR surface survey is considered a realistic value for cracking clay soils and other soils located on slopes to investigate.

Similarly, a 35 mm variation in the more accurate fixed pole RTK-GPS ground monitoring is considered a valid trigger level based on the initial monitoring over 114, 500 Mains, and 502 Panels (Figure 4-3 to Figure 4-10), which is based on the magnitude of the predicted subsidence as per the Subsidence Report for the Ensham Life of Mine Extension – Zones 2 and 3, February 2022, and the Subsidence Report for the Ensham Life of Mine Extension – Zone 1, June 2022.

4.8 SUBSIDENCE MANAGEMENT MEASURES

Due to the low-level subsidence effects measured and observed as a result of bord and pillar mining at Ensham, remedial management measures are presently not required unless a significant deviation in the level of subsidence is identified from future monitoring. The subsidence monitoring results detailed in Section 4.3, confirm the surface movements due to mining of less than 10 mm. This level of movement requires no remediation in view of the natural soil variation, which may exceed 50 mm (Commonwealth of Australia, 2014 and 2015).

Any significant detection of subsidence (i.e. where the level of subsidence exceeds the trigger levels) will trigger a review of underground mining activities as detailed in Section 4.8. Depending on the land use and risk involved in the activity, different mitigation measures may be required:

- Grazing – rip to eliminate risk to stock.
- Dry land cropping – plough out if effecting crop yield.
- Irrigated cropping – re-level to ensure continued drainage.
- Brigalow TEC – offsets.

Where surface levels indicate a difference in elevation greater than the trigger levels in Table 4-1 an investigation will be undertaken by Ensham. Where the RIDA trigger levels are exceeded, the investigation undertaken must identify if the subsidence is likely a result of mining activities. If the investigation supports that the elevation change is associated with mining, then a detailed investigation will be completed by a suitably qualified person and, where warranted, an investigation

report will be prepared and submitted to the Administering Authority and to the landowner/land occupier. The investigation will nominate the necessary rehabilitation (which may include monitoring and management of soil erosion) to be undertaken if necessary. Land will be rehabilitated in accordance with the approved PRCP and the current Environmental Authority.

If subsidence monitoring identifies a potential impact to fish passage within the Nogoia River as a result of mining activities, then rehabilitation and restoration works would be undertaken. The trigger levels based on monitoring, surveying and inspection are detailed in Table 4-1. These trigger levels would be reviewed annually (or following an investigation) to ensure that there are no impacts to fish passage in the Nogoia River. Furthermore, the stability of the underground workings is checked by regular inspections. In the current underground workings, the thickness of floor coal is controlled during the mining process by spray painting the rib side to ensure the mined thickness does not exceed the amount specified on the sequence plan and Permit to Mine document (Figure 4-16).

The actions to be taken after exceedance of the EPBC trigger are detailed in Section 5.

Ensham's existing design, processes and monitoring target management of subsidence by prevention. In regard to long-term stability, after mining is completed and the workings are flooded with groundwater, the buoyancy effect of the groundwater will reduce the vertical load on the pillars by up to 40%. For a pillar below the Nogoia River anabranh, designed with a FoS of 2.11, at 140 m depth of cover, reducing the vertical load on the pillar by a conservative 25%, to account for any potential strength loss in the coal and surrounding strata, increases the FoS to 2.82. This FoS has a probability of failure in excess of 1 in 10,000,000. As well as the factor of safety approach, the long-term life expectancy of pillars can be estimated using empirical studies from South Africa. Using this methodology, the pillars are calculated to be stable well in excess of 200 years.

Furthermore, as detailed in Section 3.1, underground surveying of the completed mined roadways, bell outs and pillars is carried out. The FoS and width: height ratio of the as-mined pillars can be calculated and checked against the design values. These checks are carried out by the Geotechnical Engineer and reported in the monthly geotechnical inspection report. Experience to date has shown that there have been no exceedances of the planned mining heights in the secondary workings' panels at Ensham.

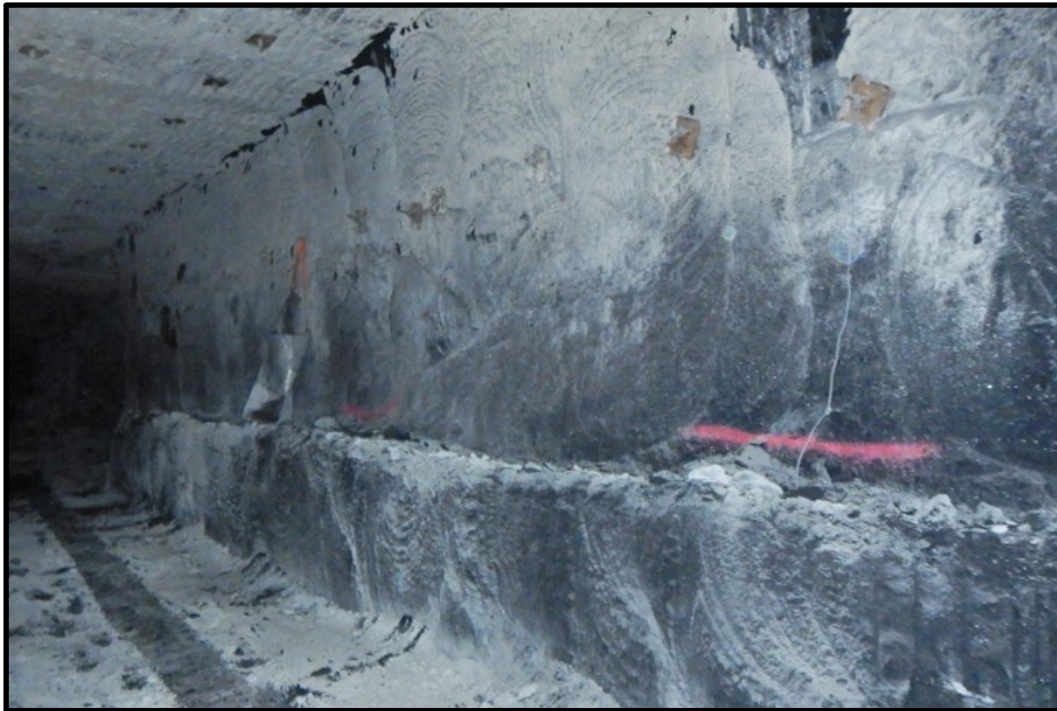


FIGURE 4-16 PAINT MARKS TO CONTROL THE THICKNESS OF FLOOR COAL MINED.

Underground mining is proposed beneath the Nogoia River main channel, with mining only to occur at FoS of 2.11 (Figure 1-1). Surface inspections for impacts from subsidence on the Nogoia River will be completed. Some underground mining is planned under the Nogoia River anabranch in Zone 2; however, this channel only holds water at times of flooding and therefore provides limited fish passage compared to the Nogoia River main channel.

4.9 EMERGENCY PROCEDURES

A principal hazard management plan, PHMP (UG PHMP.09.17.01 Precautions Against Inrush Principal Hazard Management Plan) defines the requirements for the effective control of the risks associated with Inrush and the principal hazard of inundation due to water, gas, or material that flows, in the underground workings of Ensham Coal Mine. It applies to all aspects, activities and personnel associated with underground coal mining at Ensham Resources Pty Ltd. The objective is to identify areas where inrush or inundation could occur, and to prevent such occurrences. It also provides for the requirements of the Coal Mining Safety and Health Regulation 2017 (CMSHR) Sections 292, 293, 294, 295. The management plan is underpinned by Risk Assessment (RA.BT014 Inrush into underground workings) and Trigger Action Response Plan, TARP (UG TARP.09.17.01-01 Potential for Inrush Underground TARP).

Non-routine situations such as an incident or natural disaster that has the potential to impact Brigalow vegetation is discussed in Section 5.5.2.

5. POTENTIAL IMPACTS ON BRIGALOW TEC

5.1 INTRODUCTION

The mining activities are approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), with approval requirements to manage the impact of subsidence on Brigalow Threatened Ecological Community (Brigalow TEC). This plan includes requirements to address the condition requirements of EPBC 2020/8669 approval, being to develop a subsidence monitoring and management plan. The risk of Brigalow TEC being impacted by subsidence attributed to the Project is low (likelihood is rare, with minor environmental consequences). This is due to the limited subsidence depths expected. The main requirements to manage the subsidence impact associated with mining activities on Brigalow TEC will be:

- Monitoring to demonstrate no significant impacts on Brigalow have occurred despite Project subsidence levels; and
- Implementing correction actions to be taken if nominated trigger values are achieved.

5.2 POTENTIAL IMPACTS

The risk of Brigalow TEC experiencing a significant impact from the Project subsidence is low. This is based on studies investigating subsidence impacts on Brigalow and other vegetation in the brigalow belt of Queensland. No significant impacts have been observed, despite the subsidence levels being greater than 3 m (BHP 2023a, 2023b; Eco Logical Australia 2015). In the Project, the potential impact on Brigalow TEC, if any, would be in the area along the Nogoia River and a patch in the southwest corner of Zone 1. The two locations are described as area A and B in Figure 2-10.

5.2.1 SUBSIDENCE TRIGGER VALUE TO MONITOR FOR A SIGNIFICANT IMPACT TO BRIGALOW TEC

Studies from the literature review have indicated that Brigalow has not been impacted by subsidence movements of up to 3 m, with similar findings from studies assessing subsidence movements of between 2.4 and 2.9 m. As a highly conservative measure, it is proposed that a subsidence trigger value of 500 mm is selected for Ensham mine. This depth substantially exceeds the predicted subsidence depth for the Project and is significantly lower than the depth addressed in related studies that did not result in any impact to Brigalow.

The trigger value is considered appropriate to differentiate between normal ground movement, whilst capturing any potential impact from subsidence. As no impacts have been recorded where 3 m of subsidence has occurred, 500mm is considered appropriate to identify potential impacts from the Project subsidence on Brigalow TEC.

5.3 BRIGALOW MONITORING

Brigalow vegetation monitoring is proposed to consist of monitoring for two different purposes: pre-activity condition/baseline assessment; and Brigalow TEC impact monitoring when the subsidence is exceeded (Sections 5.3.1 and 5.3.2). The timing for each monitoring purpose is outlined in Figure 5-1.

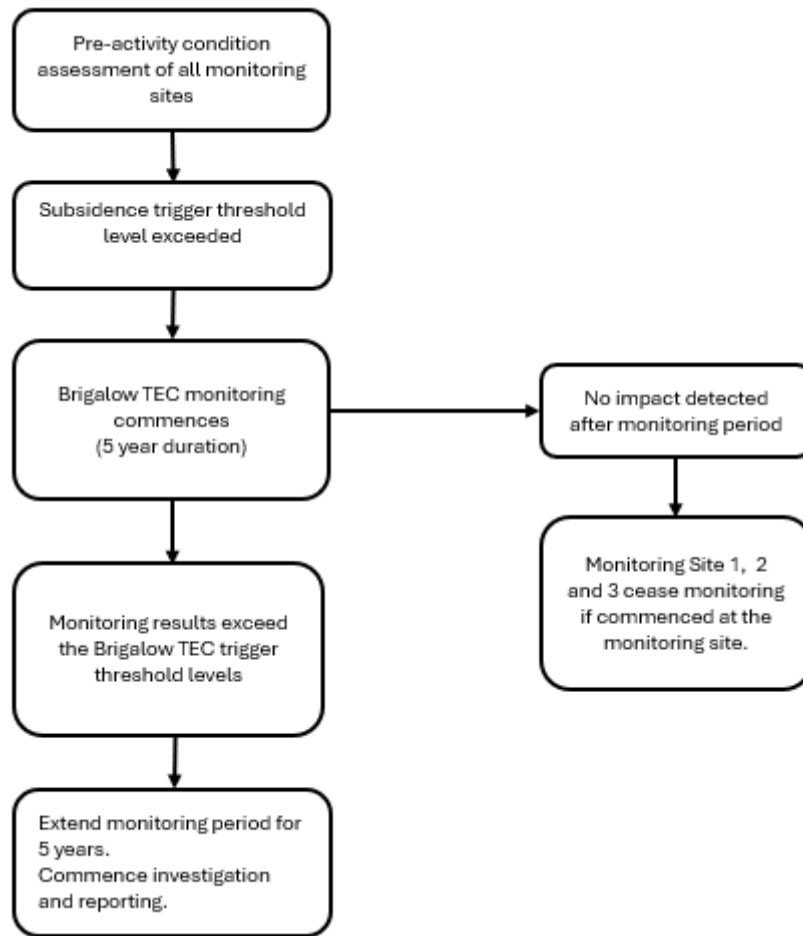


FIGURE 5-1 PROCESS TO DETERMINE MONITORING BRIGALOW TEC

5.3.1 PRE-ACTIVITY CONDITION ASSESSMENT

In the pre-activity condition assessment, three monitoring sites are proposed to be established to assess the condition of the Brigalow TEC using BioCondition and photo monitoring methods as the pre-mining/subsidence baseline (Figure 2-10). One round of measurements is proposed to be undertaken before mining commences at each monitoring site. The proposed monitoring sites are provided in Table 5-1.

5.3.2 BRIGALOW TEC SUBSIDENCE IMPACT MONITORING

The measured subsidence records may indicate a deviation, or an increased level of subsidence, from the level of subsidence predicted. Subsidence will be detected using the existing methods outlined in Section 4.1 and 4.2 of the SMMP. The existing measures in the SMMP will also be used to identify the level of subsidence that has occurred.

After underground mining activities have commenced, it is proposed that the monitoring sites, set up in the pre-activity condition assessment (Section 5.3.1) will be used for monitoring purposes if the trigger value for subsidence (Section 5.2.1) is exceeded during operations.

Brigalow TEC monitoring at the monitoring sites will only be undertaken after subsidence has been detected at a specific location.

Health of the Brigalow TEC is proposed to be verified by:

- annual photographic monitoring; and
- BioCondition monitoring conducted every two years; and
- the use Normalised Difference Vegetation Index (NDVI) assessment.

The methods are further described in Section 5.3.

With the proposed mining schedule, monitoring would be undertaken at monitoring sites 1 and 2, before monitoring site 3. Monitoring assessment methods are proposed to be undertaken, as stated in Table 5-2.

When the measured subsidence exceeds the trigger value without the Brigalow threshold triggers being exceeded, the process described in Section 5.5.1.1, will be undertaken.

If a decline in Brigalow vegetation condition is detected, the notification process and investigation process will be triggered. The process is described in Section 5.4.1 and 5.4.2. Monitoring under this scenario is proposed to be undertaken for a duration of a further five years if a significant impact on Brigalow TEC from subsidence is confirmed by ecologists. The confirmation would require evidence and an evaluation report.

5.3.3 MONITORING SITE LOCATIONS

The Brigalow TEC occurs in two distinct linear shaped areas above the proposed underground mining; monitoring area A is approximately 19.8 ha; and monitoring area B is a smaller area of 3.7 ha. Three monitoring sites have been selected to ensure adequate monitoring in the two areas (Table 5-1). Proposed locations may be adjusted based on local conditions such as accessibility.

TABLE 5-1 LOCATION OF MONITORING SITES

Monitoring Site	Latitude (GDA 94)	Longitude (GDA 94)	Pre-activity indicative year to be undertaken, or prior to nominated date	Brigalow TEC subsidence impact monitoring
Monitoring Site 1 (Area A)	-23.4622	148.4266	2030	TBD, if subsidence monitoring during operations exceeds trigger level.
Monitoring Site 2 (Area B)	-23.4367	148.4377	2030	TBD, if subsidence monitoring during operations exceeds trigger level.
Monitoring Site 3 (Area A)	-23.4610	148.4168	2030	TBD, if subsidence monitoring during operations exceeds trigger level.

Monitoring site 1 in monitoring area A was selected because it is the location of the site used in previous Brigalow assessment studies; existing data can be used for background information and there will be similar data parameters used to continue monitoring the site; and it appears to be within the polygon avoiding edge effects.

Two new monitoring sites are to be established. Site 2 in monitoring area B, and site 3 in monitoring area A (Table 5-1). These two sites have been selected because of the occurrence of Brigalow TEC within the area of potential subsidence; to be less exposed to edge effects; and the proposed scheduled mining in that area. Monitoring may be undertaken at the four separate patches (four monitoring sites) in Area C, if the mine plan is revised and potential subsidence may result in that area.

5.3.4 BRIGALOW TEC MONITORING ASSESSMENT METHODS

Brigalow monitoring at Ensham mine will use Queensland industry established qualitative and quantitative vegetation methods:

- Photographic monitoring at monitoring sites;
- BioCondition at monitoring sites; and
- Remote sensing using the Normalised Difference Vegetation Index (NDVI).

The proposed indicative monitoring schedule is provided in Table 5-2. Each method is described in the sections following. A review of the methods and the schedule for monitoring will occur as the monitoring results are analysed. Monitoring results and data records will be stored in electronic format by the mine. They will be used for annual reporting as required.

The frequency, purpose, accountable role, and benchmarks to be measured are provided in Table 5-3.

TABLE 5-2 MONITORING PURPOSE AND SCHEDULE FOR BRIGALOW TEC

Monitoring/ Assessment method	Monitoring stage	Role responsible for monitoring	Frequency	Benchmarks being monitored for
Photographic Monitoring	Pre-activity condition assessment Brigalow TEC subsidence impact monitoring	Environmental Advisor	Pre-activity condition assessment, then annually.	Mortality of multiple tree and shrub individuals at monitoring site.
BioCondition Assessment	Pre-activity condition assessment Brigalow TEC subsidence impact monitoring	Consultant Ecologist	Pre-activity condition assessment, then every 2 years.	Biocondition Score decline by 10; and 'Tree Canopy Cover' aspect declined by 5 from initial assessment.
NDVI	Exceeded trigger value monitoring.	Spatial specialist	As required based on trigger value of photographic or BioCondition monitoring, or if	Median NDVI value fails to maintain a value greater than the first quartile of the reference site for at least 85% for any sample event.

	May be used to validate site monitoring results.		trigger threshold value exceeded.	
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5.3.4.1 PHOTOGRAPHIC MONITORING

Photographic monitoring will adopt the method described in the Guide to photo monitoring of ecological restoration projects (NSW Office of Environment and Heritage 2018) and be undertaken annually. Photographic monitoring is recommended as it is a rapid method and provides a relatively direct way to measure changes in vegetation and provides on ground evidence of vegetation condition (NSW Office of Environment and Heritage 2018).

An annual monitoring frequency for five years is proposed for photographic monitoring if the subsidence trigger level is exceeded, as subsidence impacts on Brigalow condition are not expected to be immediately noticeable.

5.3.4.2 BIOCONDITION ASSESSMENT

Biocondition assessment is recommended as it can quantitatively measure vegetation composition, structure and function (Eyre et al. 2015). Combined with photographic monitoring, the methods provide detailed information on vegetation condition that are complementary when used at different frequencies, and they diversify the data collected. Both photographic and Biocondition field-based methods are proposed to be used to measure and monitor vegetation. They are considered suitable to provide reliable records for vegetation condition and evaluate vegetation changes through time.

Biocondition assessment is proposed to be the primary assessment method to quantitatively measure vegetation condition. It will be undertaken according to the BioCondition Assessment Manual (Eyre et al. 2015). The assessment will be conducted twice within the five-year period if the subsidence trigger threshold is exceeded.

5.3.4.3 NORMALISED DIFFERENCE VEGETATION INDEX (NDVI)

Normalised Difference Vegetation Index (NDVI) is recommended as a method to measure change throughout the entire TEC area. Based on vegetation colour, it is a commonly used vegetation imaging system to provide insights into vegetation condition for a broader vegetation area (Eco Logical Australia 2015).

Non-impacted Brigalow TEC in area C can be used as a reference area to provide a comparative baseline for the other areas above the mining area (Brigalow TEC in area A and B). By comparing the NDVI collected from each monitoring area with reference area C, Brigalow TEC with a median NDVI value 15% less than the first quartile of the reference site at any sample event throughout the year will trigger a field verification assessment.

5.3.5 BRIGALOW TRIGGER THRESHOLD LEVELS TO TRIGGER AN INVESTIGATION

If the subsidence trigger level is reached (>500mm), and monitored thresholds for photographic monitoring, NDVI and BioCondition assessments have been exceeded (Table 5-3), an investigation will be required (Section 5.4.1). Further justification for each threshold is also provided.

TABLE 5-3 TRIGGER THRESHOLD LEVELS FOR EACH MONITORING ASSESSMENT METHOD TO TRIGGER AN INVESTIGATION

Assessment method	Threshold to trigger additional requirements
BioCondition assessment	Total score declines by 10, and ‘Tree Canopy Cover’ score declines by 5.
Photographic monitoring	Photographic monitoring detects mortality of multiple trees and shrubs.
NDVI	Median NDVI value fails to maintain a value greater than the first quartile of the reference site for at least 85% for any sample event.

The total BioCondition score provides an overview of the vegetation, including grasses and shrubs. A decline by 10 indicates an overall condition decline in the vegetation. The ‘Tree Canopy Cover’ is one of the aspects in BioCondition that characterises stand productivity, distribution and abundance of biomass of the tree component (McElhinny 2002). A change in both total score and tree canopy cover will identify a decline in the Brigalow TEC condition.

At any particular location, it is acknowledged that individual plants will naturally senesce over time. The trigger for photographic monitoring at the site will be when mortality of multiple individual trees and shrubs are observed at the monitoring site.

Brigalow TEC productivity can be measured using NDVI, and if there is a significant decrease in the median NDVI value, it can indicate a change in TEC condition.

5.4 COMPLYING WITH EPBC APPROVAL

This section outlines the requirements for notifying investigating and reporting, to address the EPBC approval. The diagram (Figure 5-2) identifies when each will be required, and the following sections provide further detail.

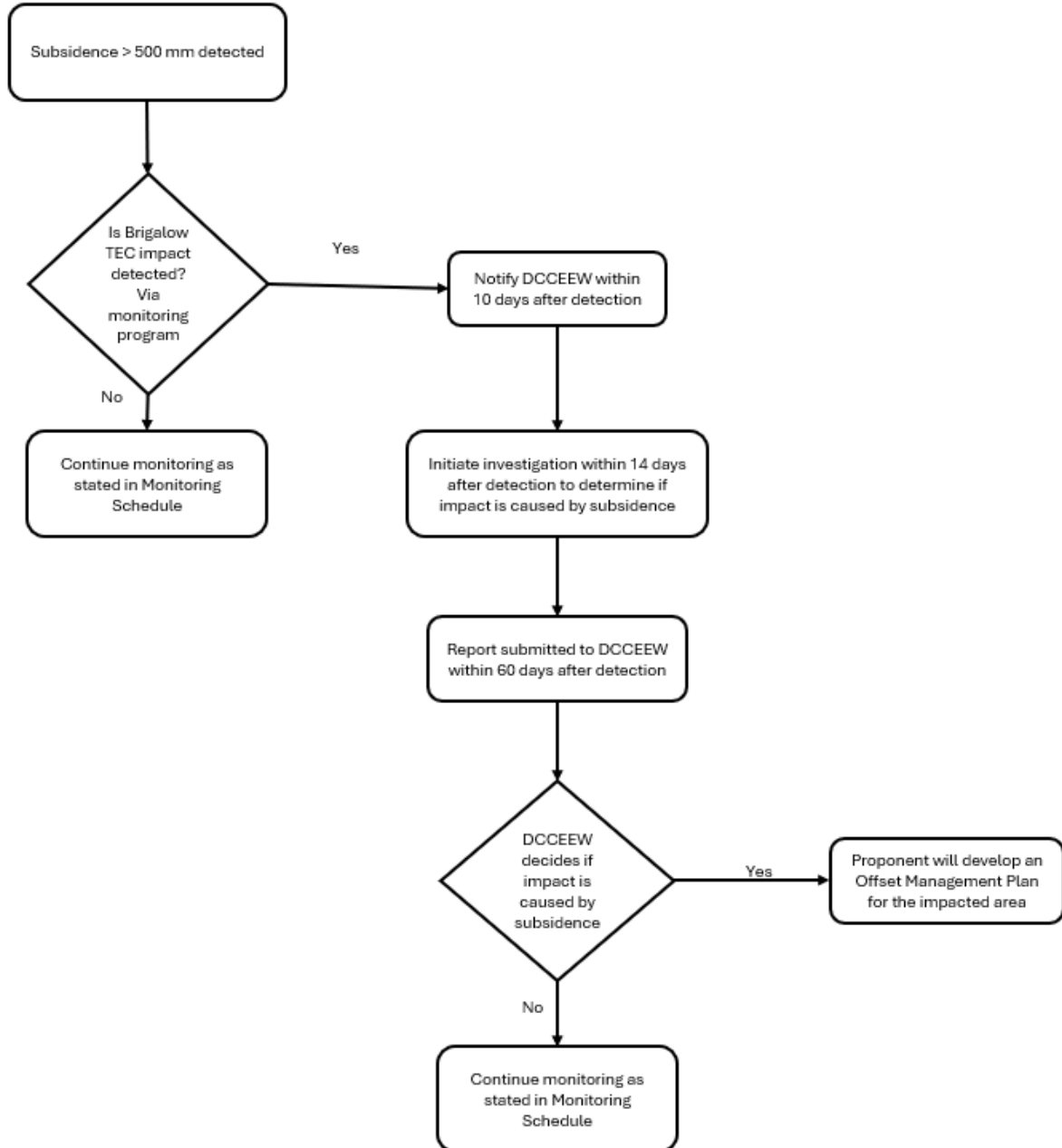


FIGURE 5-2 CONCEPTUALIZED FLOWCHART OF THE NOTIFICATION PROCESS

5.4.1 NOTIFYING THE DEPARTMENT OF CLIMATE CHANGE, ENERGY, THE ENVIRONMENT AND WATER

If the subsidence threshold is exceeded, and an impact to Brigalow TEC is detected, a process to notify the relevant Australian Government Department is required. The detection may be approximately 6-12 months after the subsidence occurs, and within the five-year monitoring period.

When the trigger values for photographic monitoring, BioCondition or NDVI are also exceeded (Table 5-3), the process to notify the Department according to the EPBC approval is to be implemented.

The approval holder must notify the Department of Climate Change, Energy, the Environment and Water (DCCEEW) of any potential non-compliance or actual non-compliance. The approval holder must notify electronically within two business days of a potential non-compliance (Condition 30). They must also notify in writing within 12 business days of the detection (Condition 32 of the approval), of an exceedance of the trigger values in Table 5-3.

5.4.2 INVESTIGATING AND REPORTING

The Environmental section will notify the Area Supervisor to ensure they are made aware of the impacted area. The impacted Brigalow vegetation will be demarcated, by fencing as required, or by using GPS coordinates for the impacted area collected in the field.

An investigation, aligned with the Ensham Resources SOP for incident notification, investigation and reporting (IMS.SOP.14.00.01), is to be commenced by ecologist(s) within 14 business days of detection, to determine if the reaching of the trigger value or exceedance of the limit is a result of the approved activity. The investigation and reporting process in the SOP will facilitate data collection and analysis to identify the cause of the trigger exceedance. All supporting documentation, including past data collected from photographic monitoring, NDVI and Biocondition assessments (including the photos), and reports will be attached to the investigation report. An NDVI assessment, combined with Biocondition and photographic assessments will be used to determine the extent and severity of the actual harm to the Brigalow TEC. All primary information shall be recorded by the Supervisor responsible for the incident. The Investigation Report will be completed by ecologist(s) and reviewed by a Supervisor.

The investigation report, highlighting the magnitude of impact, area of impact and potential cause of impact, must be submitted to the DCCEEW within 60 business days of the detection.

If the trigger value is reached by virtue of subsidence from the underground mining activities, the corrective actions stated in the Section 5.5 will be undertaken to halt and prevent further harm to protected matters.

5.4.3 WHEN AN OFFSET MANAGEMENT PLAN WILL BE REQUIRED

After an exceedance of the trigger thresholds has been detected, and it can be confirmed by an Ecologist working with relevant specialists, that the exceedance has been caused by subsidence; an Offset Management Plan will be required. The Offset Management Plan will be required to be

developed within 12 months. It must be consistent with the Environmental Management Plan Guidelines and the Environmental Offsets Policy to address residual harm to protected matters. Once developed, it must be submitted to DCCEEW for the Minister's written approval.

5.5 BRIGALOW TEC CORRECTIVE ACTION AND MANAGEMENT MEASURES

5.5.1 CORRECTIVE ACTIONS FOR ROUTINE OPERATIONS

Due to the low-level subsidence effects measured and expected as a result of the bord and pillar mining operation at Ensham, remedial management measures are presently not required unless there is a significant deviation in the level of subsidence that would be detected during the monitoring program. It is also unlikely that any corrective action could be implemented to minimise an impact to Brigalow, once subsidence has occurred.

To avoid harm to the Brigalow TEC, the following will be integrated into the mining operation:

- vehicle tracks through the TEC area will be avoided;
- as per EPBC 2020/8669 condition 2, environmental officers will ensure no other mine related development is located in the Brigalow TEC; and
- weed management will be implemented on the mine site throughout the active mining operation period.

There are no identified remedial actions that are practical or feasible, in the short term, to improve the condition of Brigalow, should mortality or an impact be detected as a result of subsidence.

Any significant detection of subsidence change will trigger a review of underground mining activities, and this is described in section 4.8.

5.5.1.1 SUBSIDENCE LEVEL IS EXCEEDED WITH NO IMPACT TO BRIGALOW TEC DETECTED

If the subsidence level has exceeded the predicted expectations, but the assessments for Brigalow TEC in Section 5.3.2 do not indicate the community has been impacted (Table 5-3); monitoring requirements will cease after the 5 year period.

5.5.1.2 BRIGALOW SPECIFIC TRIGGER VALUE EXCEEDED

The corrective actions when trigger value(s) are exceeded, as stated in Table 5-3 is detected includes:

- demarcating or mapping, as appropriate, the impacted Brigalow vegetation area so that the location of the area can be communicated to mine staff;
- preparing and implementing a site-specific weed management plan;
- continuing monitoring as stated in Table 5-2, for TEC regrowth improvement during restoration process; and
- increasing Biocondition assessments to an annual frequency.

In addition, an Offset Management Plan will be developed, to comply with the information and commitments specified in Attachment 4 of the EPBC approval.

5.5.2 CORRECTIVE ACTIONS FOR NON-ROUTINE SITUATION

A non-routine situation for Brigalow vegetation is considered to be an incident or natural disasters that has caused decline in Brigalow TEC condition and caused the trigger values to be exceeded.

In case of an incident, the SOP for Incident Notification, Investigation and Reporting and actions will be implemented.

In the case of natural disasters, such as flood, the actions stated in Section 5.4.1 will be implemented. A report with details of the related natural disaster and its impacts to Brigalow TEC will be included in the annual compliance reporting submission to the DCCEEW.

6. LEGAL COMPLIANCE AND REFERENCES

TABLE 6-1 REFERENCES.

<p>Legislation/Recognized Standards</p>	<ul style="list-style-type: none"> • Regional Interests Development Approval (RIDA) RPI22/002 • Environmental Authority EPML00732813. • Environmental Protection Biodiversity Conservation Act 1999. • Water Act 2000.
<p>Reports</p>	<p>Commonwealth of Australia (2014). Subsidence from coal mining activities, background review, prepared by Sinclair Knight Merz Pty Ltd for the Department of the Environment, Commonwealth of Australia, Canberra.</p> <p>Commonwealth of Australia (2015). Management and monitoring of subsidence induced by longwall coal mining activity, prepared by Jacobs Group (Australia) for the Department of the Environment, Commonwealth of Australia, Canberra.</p>

7. TERMS AND ABBREVIATIONS

7.1 ABBREVIATION AND DESCRIPTION

TABLE 7-1 TERMS

<p>Abbreviation</p>	<p>Description</p>
<p>EA</p>	<p>Environmental Authority</p>
<p>EPBC Act</p>	<p><i>Environment Protection and Biodiversity Protection Act 1999</i> (Commonwealth).</p>
<p>GM</p>	<p>General Manager</p>
<p>GPS</p>	<p>Global Positioning System</p>
<p>HSE</p>	<p>Health, Safety and Environment</p>
<p>LIDAR</p>	<p>Light Detection And Ranging</p>
<p>NDVI</p>	<p>Normalised Difference Vegetation Index</p>
<p>PHMP</p>	<p>Principal Hazard Management Plan</p>

Abbreviation	Description
RTK	Real Time Kinematic
SSE	Site Senior Executive
TARP	Trigger Action Response Plan
TEC	Threatened Ecological Community

8. DOCUMENT PREPARATION

This SMP has been prepared by Gordon Geotechniques Pty Ltd (GGPL), in conjunction with Ensham technical and environmental personnel. The SMP has been updated based on the Subsidence Report prepared for Zone 1 by Gordon Geotechniques in June 2022. The SMP has been updated based on Flora Technical Report (AECOM 2020) by AARC Environmental Solutions in April 2024.

9. REVIEW HISTORY

This Subsidence Monitoring Plan will be subject to review every 2 years or under the following conditions due to:

- Change to licence conditions and/or reporting requirements.
- Significant change to current mine plan/operations.
- An investigation report recommendation.

TABLE 9-1 REVIEW HISTORY.

Date of review	Revision Number	Trigger for review	New revision Number
8/2/2022	1	Requirement of EIS assessment report and EA Amendment – Zones 2 and 3 subsidence technical report	2
17/6/22	2	Addition of Zone 1	3
20/9/2022	3	Update as result of requirements from PRCP and RIDA	4
2/6/2023	4	RIDA application for Zone 1, Updated monitoring	5

		Update monitoring results	
25/06/2024	5	Inclusion of EPBC Brigalow Triggers and Monitoring Trigger Levels & Monitoring Section restructured to identify applicability to various approvals	6
28/08/2024	6	General document review. Update monitoring charts.	7

10. ROLES AND RESPONSIBILITIES

Survey Section

- Carry out monitoring – fixed monitor and LIDAR.
- Prepare monitoring data.
- Ensure compliance of the dimensions of the underground pillars and roadways.

Environmental Section

- Surface inspections.
- Monitor creeks/rivers/groundwater.
- Prepare subsidence monitoring report.
- Monitor Brigalow population.
- Prepare Brigalow monitoring report.
- Review LIDAR and NDVI data.
- Liaise with landowners.

Technical Services Section

- Underground inspections.
- Plan subsidence monitoring requirements.
- Review and reconcile subsidence monitoring data.
- Facilitate review if trigger levels are exceeded.
- Liaise with landowners.

11. REFERENCES

AECOM 2020, 'Ensham Life of Mine Extension Project - Flora Technical Report', accessed from <<https://idemitsu.com.au/mining/wp-content/uploads/2021/04/Appendix-C-1-Terrestrial-Ecology-Flora.pdf>>.

BHP 2023a, 'Saraji East Mining Lease Project Environmental Impact Statement: Chapter 6 Terrestrial Ecology', accessed March 20, 2024, from <https://www.bhp.com/-/media/bhp/regulatory-information-media/coal/bma/saraji-east/saraji-east-mining-lease-project-eis-2023/semlp_eis_ch_06_terrestrial-ecology.pdf>.

BHP 2023b, 'Saraji East Mining Lease Project Environmental Impact Statement: Appendix K-2 Subsidence Management Plan', accessed March 20, 2024, from <<https://www.bhp.com/-/media/project/bhp1ip/bhp-com-en/documents/sustainability/environment/regulatory-information/bma-saraji-east/appendix-k-2-subsidence-management-plan.pdf>>.

Butler, DW (2007) Recovery plan for the "Brigalow (Acacia harpophylla dominant and co-dominant" endangered ecological community (draft of 1 May 2007). Report to the Department of the Environment and Water Resources, Canberra. Queensland National Parks and Wildlife Service, Brisbane.

Commonwealth of Australia (2014). Subsidence from coal mining activities, background review, prepared by Sinclair Knight Merz Pty Ltd for the Department of the Environment, Commonwealth of Australia, Canberra.

Commonwealth of Australia (2015). Management and monitoring of subsidence induced by longwall coal mining activity, prepared by Jacobs Group (Australia) for the Department of the Environment, Commonwealth of Australia, Canberra.

Department of the Environment 2013, 'Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community', Canberra: Department of the Environment, accessed from <<http://www.environment.gov.au/biodiversity/threatened/communities/pubs/028-conservation-advice.pdf>>.

Eco Logical Australia 2015, 'Impact of Mine Subsidence on Threatened Ecological Communities. Prepared for The Australian Coal Association Research Program.'

Eyre, TJ, Kelly, AL, Neldner, VJ, Wilson, BA, Ferguson, DJ, Laidlaw, MJ & Franks, AJ 2015, BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2., Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane, accessed from <https://www.qld.gov.au/__data/assets/pdf_file/0029/68726/biocondition-assessment-manual.pdf>.

Gordon Geotechniques 2020, Subsidence Report For The Ensham Life Of Mine Extension Project.

Hinchliffe, D, Matthew, P, Pillai-McGarry, U, So, H and Mulligan, D. 2003. Effect of longwall mine subsidence on plant production on cropping land, ACARP Project C8018, Australian Coal Association Research Program.

Johnson, R & Purdie, R 1997, 'The impact of clearing on brigalow communities and consequences for conservation. In P Hale and D Lamb (eds)', Conservation outside nature reserves, Centre for Conservation Biology, The University of Queensland, Brisbane, pp. 359–63.

NSW Office of Environment and Heritage 2017, The NSW State Vegetation Type Map: Methodology for a regional-scale map of NSW plant community types, NSW Office of Environment and Heritage, Sydney, Australia, accessed from

<<https://www.environment.nsw.gov.au/resources/vegetation/nsw-state-vegetation-type-map-methodology-170134.pdf>>.

NSW Office of Environment and Heritage 2018, Guide to photo monitoring of ecological restoration projects funded by the NSW Environmental Trust, NSW Office of Environment and Heritage, Sydney NSW, accessed from <<https://www.environment.nsw.gov.au/resources/grants/180068-Ecological-Monitoring-Guide.pdf#:~:text=Photo%20monitoring%20is%20a%20quick%20and%20relatively%20easy,aim%20of%20visually%20showing%20improvement%20in%20vegetation%20condition.>>

>.

McElhinny, C 2002, 'Forest and Woodland Structure as an Index of Biodiversity: A Review.

Commissioned by NSW NPWS', Department of Forestry, Australian National University, accessed from <https://www.environment.nsw.gov.au/resources/nature/BioMetric_Structure_as_index.pdf>.

Threatened Species Scientific Committee (TSSC) 2013, 'Commonwealth Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community', Canberra.

Trotter, T & Frazier, PS. 2009. Monitoring the effect of longwall mining on agricultural environments - interim report, Australian Coal Association Research Program, viewed 1 August 2009

<<http://www.acarp.com.au/abstracts.aspx?repld=C15013>>.

Appendix D - Notification of Commencement of the Action



Ensham
R E S O U R C E S



ENSHAM
RESOURCES
PTY LIMITED

ABN 23 011 048 678

As Operator of the
Ensham Coal Project

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The Ensham Coal Project
is a joint venture of the
following companies which
are liable severally in the
following proportions:

Bligh Coal Limited
ABN 20 010 186 393
47.5%

Idemitsu Australia
Resources Pty Ltd
ABN 45 010 236 272
37.5%

Bowen Investment
(Australia) Pty Ltd
ABN 12 002 806 831
15.0%

Damien O'Connor

11th August 2023

Assistant Director

Queensland North Assessments Section
Nature Positive Regulation Division
Ngunnawal Country,
John Gorton Building,
King Edward Terrace,
Parkes ACT 2600
Department of Climate Change, Energy, the Environment and Water

Ensham Mine - Our ref: EPBC 2020/8669

Hi Damien,

Thank you very much for your letter dated 30th June 2023

In relation to Notification of Approval : **Ensham Life of Mine Extension Project, Queensland (EPBC ref 2020/8669)**

In accordance with Item (19) **NOTIFICATION OF DATE OF COMMENCEMENT OF THE ACTION**

We would like to advise the action has commenced **11th August 2023**.

As required by the approval conditions 3 and 11 we will submit for approval:

A GDE Monitoring and Management Plan (GDEMMP)

A Subsidence Management and Monitoring Plan (SMMP)

Within the date of the approval being 30th June 2023

Yours,

A.D.Mifflin
General Manager and SSE
Ensham Mine

Appendix E - Review of plan against conditions of approval and other relevant regulatory matters (SMP).



EPBC Ref: 2020/8669.

Review of plan against conditions of approval and other relevant regulatory matters

Ensham Life of Mine Extension, 35 Km East of Emerald, Queensland.

Approval holder	Bligh Coal Limited, Idemitsu Australia Pty Ltd, Bowen Investment (Australia) Pty Ltd
Name of document under review	Subsidence Management Plan Revision 7 (SMMP) (EIMP.06.00.06 SUBSIDENCE MANAGEMENT PLAN Rev 7 dated 29 Aug 2024)
Reviewing officers	Jean Foerster/ Derek Yates
Date issued to approval holder	31 January 2025

From the conditions of approval, the GDEMMP must be consistent with the department's Environmental Management Plan Guidelines (EMP Guidelines). Similarly, the SMMP must be consistent with the EMP Guidelines as it is an environment management document. Link to [EMP guidelines](#).

- Action 1.** Ensure any resubmission or future plan has updated version numbering and revision date information.
- Action 2.** Include a declaration of accuracy (e.g. as per p8 of the EMP guidelines)
- Action 3.** Provide a Conditions of approval reference table to demonstrate how the plan addresses condition requirements and refer to information or commitments made in the plan to address all condition requirements (e.g. as per Appendix B of the EMP guidelines).

The SMMP must be drafted so that all relevant conditions of EPBC approval ref. 2020/8669 are included in the document *verbatim*.

- Action 4.** Confirm in the plan that relevant statutory documents have been considered including priority management actions, conservation actions and recovery objectives outlined in these documents. Refer to the Greater Glider Conservation Advice and the National Recovery Plan for the Australian Painted Snipe or provide information explaining why these plans have not been considered.



Condition or other relevant requirement	Departmental review or evaluation	Approval holder response to comments or issues
<p>Condition 11</p> <p>To manage potential impacts on protected matters, the approval holder must, within 12 months of the date of this approval, submit to the department for the Minister’s written approval a Subsidence Management and Monitoring Plan (SMMP) developed by a suitably qualified expert. The SMMP must reliably predict subsidence caused by the Action that may cause harm to protected matters arising from the Action. The SMMP must:</p>	<p>Not addressed</p> <p>The SMMP notes ‘potential impacts to the following aspects:’ (p 22)</p> <ul style="list-style-type: none"> • Groundwater. • Surface water - Nogoia and Anabranh and other creeks and flood plain. • Flora and fauna. • Surface infrastructure (mining). • Agricultural infrastructure including laser levelled irrigation paddocks. • Cultural Heritage. <p>which relate to the approval controlling provisions (Listed threatened species and communities and impact on water resources).</p> <p>However, the SMMP only deals with potential impacts to ‘Brigalow’ (S 4.6.1 and S 5).</p> <p>Condition 11 stipulates management of potential ‘impacts on protected matters’.</p> <p>Action 5. Provide information demonstrating how the SMMP is (in accordance with condition 11) managing impacts on ALL protected matters or provide evidence and/ or references to demonstrate that other protected matters were not found within the project area or will not be subject to potential impacts.</p> <p>Action 6. Provide information (supplementary to that in</p>	

	<p>SMMP S8) demonstrating the qualifications and/ or experience of authors/ contributing authors of the SMMP.</p>	
<p>Condition 11 a) specify trigger values that will provide early warning of potential subsidence that may cause harm to protected matters</p>	<p>Partially addressed</p> <p>SMMP page 37: <i>'This SMP must reliability predict subsidence that may cause harm to protected matters i.e. Brigalow.'</i></p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 4.7 MONITORING SCHEDULE AND TRIGGER LEVELS</u></p> <p>Provides trigger values with adequate supporting information (subject to the proviso above and action 5).</p> <p><u>SMMP Section 4.6.1 EPBC 2020/8669 APPLIES TO ZONES 1, 2 AND 3</u></p> <p>States: <i>'The EPBC approval requires:</i></p> <ul style="list-style-type: none"> • <i>This SMP must reliability predict subsidence that may cause harm to protected matters i.e. Brigalow.</i> • <i>Subsidence levels must not exceed 500mm compared to pre-mining levels.'</i> <p>As noted above, it is stated that the SMMP considers potential impacts to a list of environmental aspects (P 22). The statement above refers only to 'Brigalow'. Protected matters could include but are not limited to 'Brigalow'.</p> <p>Action 7. Correct the statement above (in accordance with</p>	

	<p>action 5), to demonstrate how the SMMP is managing impacts on ALL protected matters, or provide evidence and/or references to demonstrate that other protected matters were not found within the project area or will not be subject to potential impacts.</p> <p>The statement above and Table 4-1 state that the EPBC approval includes a subsidence trigger level of '<500mm'. A subsidence trigger value of <500 mm is NOT mentioned in the 2020/8669 EPBC Act approval</p> <p>Action 8. Correct the statement above and Table 4-1.</p>	
<p>Condition 11 b) specify a program and network of monitoring capable of prompt detection of any specified trigger value so as to prevent harm to protected matters.</p>	<p>Partially addressed</p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 4.7 MONITORING SCHEDULE AND TRIGGER LEVELS</u> and <u>SMMP Section 5. POTENTIAL IMPACTS ON BRIGALOW TEC</u></p> <p>Action 9. Provide trigger values (4.7), impact monitoring (5.3.2) monitoring locations (5.3.3) monitoring methods (5.3.4.2 Biocondition assessment [recommended, as it can quantitatively measure vegetation composition, structure and function], 5.3.4.3 Normalised Difference Vegetation Index [recommended as a method to measure change throughout the entire TEC area]) with appropriate supporting data, subject to the action 5 requirement.</p>	
<p>Condition 11c) specify procedures for prompt notification to the department</p>	<p>Partially addressed</p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p>	

<p>and details of investigation that will be undertaken if monitoring detects a specified trigger value being reached or exceeded.</p>	<p><u>SMMP Section 5.4.1 NOTIFYING THE DEPARTMENT OF CLIMATE CHANGE, ENERGY, THE ENVIRONMENT AND WATER</u></p> <p>Provides appropriate reporting and trigger response actions subject to the action 5 requirement and the following actions: Action 10. Edit section Figure 5-2 and section 5.4.1 to include notification to the department if a trigger value is reached or exceeded in accordance with the condition.</p>	
<p>Condition 11d) specify corrective actions to be undertaken to stop the cause of the trigger value being reached or exceeded and bring values under the trigger level.</p>	<p>Not addressed</p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 5.5 BRIGALOW TEC CORRECTIVE ACTION AND MANAGEMENT MEASURES</u></p> <p>Notes response actions (increased monitoring, biocondition assessments) to trigger exceedances to confirm impact, states: <i>'There are no identified remedial actions that are practical or feasible, in the short term, to improve the condition of Brigalow, should mortality or an impact be detected as a result of subsidence.'</i></p> <p>Response actions therefore include an Offset Management Plan Action 11. Provide supporting data or references for the statement above.</p> <p>Action 12. Explain how the actions listed in Section 5.5.1.2 BRIGALOW SPECIFIC TRIGGER VALUE EXCEEDED will 'stop the cause of the trigger value being reached or exceeded and bring values under the trigger level' as required by the condition.</p>	
<p>Condition 11e)</p>	<p>Partially addressed</p>	

<p>specify procedures to determine the potential extent and severity of actual and potential harm to protected matters</p>	<p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 5.4.2 INVESTIGATING AND REPORTING</u></p> <p>Provides appropriate information to address this condition subject to the action 5 requirement.</p>	
<p>Condition 11f) specify procedures to promptly report to the department the findings of investigations into the cause of any trigger value being reached or exceeded and the extent of any harm of subsidence on protected matters.</p>	<p><u>Partially addressed</u></p> <p><u>SMMP Section 5.4.1 NOTIFYING THE DEPARTMENT OF CLIMATE CHANGE, ENERGY, THE ENVIRONMENT AND WATER</u></p> <p>This section contains procedures to address the condition subject to the following action: Action 13. Correct text in S 5.4.1 (and any other similar occurrences) to address the condition of ‘any trigger value being reached or exceeded, not just exceeded.</p>	
<p>Condition 11g) specify procedures to promptly remediate harm to protected matters where this can reliably be achieved.</p>	<p><u>Partially addressed</u></p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 5.5 BRIGALOW TEC CORRECTIVE ACTION AND MANAGEMENT MEASURES</u></p> <p>states: <i>‘There are no identified remedial actions that are practical or feasible, in the short term, to improve the condition of Brigalow, should mortality or an impact be detected as a result of subsidence.’</i> Response actions therefore include an Offset Management Plan</p>	

	Action 14. Provide supporting data or references for the statement above.	
<p>Condition 11h)</p> <p>make firm, clear commitments and specify procedures and timeframes to provide an offset consistent with the Environmental Offsets Policy for any harm to protected matters which has resulted from, or is likely to result from subsidence including submitting an Offset Management Plan for the Minister’s written approval, which contains the information and commitments specified in Attachment 4.</p>	<p>Partially addressed</p> <p><u>SMMP Section 5.4.3 WHEN AN OFFSET MANAGEMENT PLAN WILL BE REQUIRED</u></p> <p>Provides appropriate commitments to address the condition subject to the following action:</p> <p>Action 15. To address the condition a commitment must be made provide the information and commitments specified in (approval) Attachment 4 in the offset management plan.</p>	
<p>Condition 11i)</p> <p>specify control measures for routine operations to minimise likelihood of harm to protected matters.</p>	<p>Partially addressed</p> <p>This condition is not addressed unless condition 11, including action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 5. POTENTIAL IMPACTS ON BRIGALOW TEC</u></p> <p>Provides appropriate information to address the condition, subject to the action 5 requirement.</p>	
<p>Condition 11j)</p>	<p>Partially addressed</p> <p>This condition is not addressed unless condition 11, including</p>	

<p>specify contingency plans and emergency procedures for non-routine situations.</p>	<p>action 5 is satisfactorily addressed to include all protected matters</p> <p><u>SMMP Section 5.5.2 CORRECTIVE ACTIONS FOR NON-ROUTINE SITUATION</u></p> <p>Provides appropriate information to address the condition, subject to the action 5 requirement.</p>	
<p>Condition 11k) specify procedures for periodic review of environmental performance and continual improvement.</p>	<p><u>SMMP Section 9. REVIEW HISTORY</u></p> <p>Provides appropriate information to address the condition.</p>	

Appendix F - Upload of Compliance Report to Website.

Documents

Access our extensive library of downloadable documents by clicking the button below.

Downloads	
Notification of approval: Ensham life of mine extension project, Queensland (EPBC ref 2020/8669)	Download pdf
Groundwater Dependent Ecosystem Management and Monitoring Plan	Download pdf
Approval of Groundwater Dependent Ecosystem Management and Monitoring Plan for Ensham Life of Mine Extension Project EPBC 2020/8669	Download pdf
SIMP.07.00.01 Ensham life of mine extension project	Download pdf
Purchase order terms and conditions	Download pdf
Compliance Report: Ensham Life of Mine Extension Project EPBC 2020/8669 – 2024/2025	Download pdf
Compliance Report: Ensham Life of Mine Extension Project – EPBC 2020/8669 – 2023/2024	Download pdf
Social Impact Management Report: Ensham Life of Mine Extension Project SIMP - 2024	Download pdf

Appendix G - EPBC 2020/8669 Ensham Life of Mine Extension Project
Correspondence.

From: [Tayla Carins](#)
To: [Post Approval](#)
Cc: [Yates, Derek](#)
Subject: EPBC 2020/6889 Ensham Life of Mine Extension Project
Date: Friday, 30 August 2024 8:10:00 AM
Attachments: [image001.png](#)

Good Morning,

In accordance with Condition 29 of EPBC Approval 2020/6889, Ensham Resources are required to prepare and publish a Compliance Report for the 2023/24 reporting period.

This Compliance Report has been completed and uploaded to the website on 29/08/2024.

Please accept this written notification of publication.

The report can be found at this [link: https://www.sungela.com/documents/](https://www.sungela.com/documents/)

I note the following:

- The report has been prepared consistent with the 2014 guideline.
- As no clearing of protected matters is approved nor undertaken in the reporting period, no shapefiles have been provided.
- No sensitive data has been redacted from this report.

Please do not hesitate to contact me should you have any questions or concerns.

My details are below.

Best regards,



Tayla (Grant) Carins
Environmental Superintendent

T: (07) 4987 3614

M: 0409 182 169

E: Tayla.Carins@ensham.com.au

Appendix H – Notification of Management Plan Approval (GDEMMP)

From: [Derek YATES](#)
To: [Ben Hooper](#)
Cc: [Cath COONEY](#)
Subject: RE: Ensham GDEMMP and SMMP assessment for EPBC Ref 2020/8669 feedback [SEC=OFFICIAL]
Date: Monday, 12 January 2026 2:01:43 PM
Attachments: [image001.png](#)
[image002.png](#)
[image005.png](#)
[2020-8669_2025-12-16 GDEMMP decision letter.pdf](#)

Warning: This email is from an external sender. Please exercise caution when opening links or downloading attachments.



OFFICIAL

Hi Ben,

Thank you for your submission of the Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP), in accordance with condition 3 of the above project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Please find attached a decision letter from the delegate approving the GDEMMP.

Thank you for your patience and assistance with this process.

Dr Derek Yates


Assistant director


Post Approvals (QLD) Section

Environment Assessments (Vic/Tas) and Post Approvals Branch, Environment Regulation Division,

Department of Climate Change, Energy, the Environment and Water

 Ngunnawal Country, John Gorton Building, King Edward Terrace, Parkes ACT 2600

 derek.yates@dcceew.gov.au

 (02) 5162 1751

OFFICIAL

From: Ben Hooper <ben.hooper@ensham.com.au>
Sent: Monday, 5 January 2026 12:30 PM
To: Derek YATES <Derek.Yates@dcceew.gov.au>
Cc: Cath COONEY <Cath.Cooney@dcceew.gov.au>
Subject: Ensham GDEMMP and SMMP assessment for EPBC Ref 2020/8669 feedback [SEC=OFFICIAL]

Hi Derek,

Hope the New Year finds you well? I am just following up again to see if there has been any progress with the GDEMMP and also the Ensham Subsidence Monitoring and Management Plan dated and signed the 02nd October 2025 (SSMP) assessment, I know you said it was getting a decision brief from the delegate for the GDEMMP but I thought I would also ask about the SSMP as well too



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC 2020/8669

Mr Ben Hooper
Environmental Superintendent
Ensham Resources
E: Ben.Hooper@ensham.com.au

Approval of Groundwater Dependent Ecosystem Management and Monitoring Plan for Ensham Life of Mine Extension Project

Dear Mr Hooper

Thank you for your email dated 5 August 2025 to the Department of Climate Change, Energy, the Environment and Water (the department), seeking approval of the Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP), in accordance with condition 3 of the above project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Officers of the department have advised me on the GDEMMP and the requirements of the conditions of the approval for this project. On this basis, and as a delegate of the Minister for the Environment and Water (the Minister), I have decided to approve the Groundwater Dependent Ecosystem Management and Monitoring Plan Rev C dated 28 July 2025.

Now this plan has been approved, it must be implemented. The approved plan must also be published in accordance with your conditions of approval.

As you are aware, the department has an active monitoring program which includes monitoring inspections, desk top document reviews and audits. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval so that they can be made available to the department on request. Should you require any further information please contact Derek Yates by email to PostApproval@dcceew.gov.au or telephone +61 2 5162 1751.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Rachel Short'.

Rachel Short
Branch Head
Environment Assessments (Vic and Tas) and Post Approvals Branch
Environment Regulation Division

16 December 2025

Appendix I – Notification of Non-Compliance to the Department 26 June
2026

From: [Alana Connolly](mailto:Alana.Connolly)
To: ["environment.compliance@dcceew.gov.au"](mailto:environment.compliance@dcceew.gov.au)
Cc: [Peter Liston](#); [Peter Burge](#)
Bcc: [Ben Hooper](#)
Subject: EPBC 2020/8669 - Reporting Non-Compliance - Ensham Life of Mine Extension Project
Date: Friday, 26 June 2026 3:36:00 PM
Attachments: [EPBC2020.8669 Notification of Non-Compliance 2026-06-26.pdf](#)
[EPBC2020.8669 Investigation of Non-Compliance 2026-06-26.pdf](#)
[Thungela Resources Structure - O4-2025.pdf](#)
[TRA Corporate Structure - 21 Jan 2026.pdf](#)

Dear Compliance Team,

This email serves as a notification of non-compliance under EPBC 2020/8669 for the Ensham Life of Mine Extension Project.

This notification is submitted in accordance with the conditions of the approval and is intended to inform the department of an identified instance of non-compliance concerning Part B – Conditions 16, 30 & 32.

The attached documentation includes:

- Notification of Non-Compliance
- Investigation of Non-Compliance
- Supporting Documentation: Corporate Structures of the Thungela Group (included in the Investigation).

The approval holder has taken action following identification of the matter and remains committed to meeting obligations under the approval.

Should the department require any clarification or additional information regarding this notification, please do not hesitate to contact myself.

Kind regards,

Alana Connolly

Environmental Coordinator

Ensham Resources Pty Ltd

PO Box 1565, Emerald QLD 4720

M – (+61) 400 003 771

T – (07) 4987 3637

E – alana.connolly@ensham.com.au



Appendix J – Initial Notification of Non-Compliance Memorandum 26 June
2026



ENSHAM
RESOURCES
PTY LIMITED

ABN 23 011 048 678

As Operator of the
Ensham Coal Project

Duckponds Road
Emerald QLD 4720
Australia

PO Box 1565
Emerald QLD 4720
Australia

Telephone:
+61 7 4987 3601

Website:
www.ensham.com.au

Department of Climate Change, Energy, the Environment and Water
Environment Compliance Branch Division
GPO Box 309, Canberra, ACT, 2601
environment.compliance@dcceew.gov.au

RE: Notification of Non-Compliance - Ensham Life of Mine Extension Project, pursuant to Condition 30 of EPBC Approval 2020/8669

26/06/2026

This notification is given by Ensham Resources Pty Ltd (**Ensham Resources**) on behalf of the holders of EPBC Approval 2020/8669 (**EPBC 2020/8669**) being Thungela Resources Australia Pty Ltd and Sungela Pty Ltd (the **Holders**). In all matters related to the EPBC Approval, Ensham Resources, which is a wholly owned subsidiary of the Holders, and operator of the Ensham mine, acts on behalf of the Holders. All terms used in this notification which are not defined in it, shall have the meaning given to them in the EPBC 2020/8669 if any.

On January 12, 2026, Ensham received notification of the approval by the Minister of the Groundwater Dependent Ecosystem Monitoring and Management Plan (**GDEMMP**) submitted by Ensham Resources on behalf of the Holders.

In accordance with condition 16 of EPBC 2020/8669, the Holders were required to publish the GDEMMP on their website within 15 business days¹ of the date of approval (i.e., in this case by 3 February 2026) This did not occur as required.

Ensham Resources and the Holders became aware of the Holders' non-compliance with condition 16 of EPBC 2020/8669 (Part B – Submission and Publication of Plans), on 9 February, 2026.

Pursuant to condition 30 of EPBC 2020/8669, the Holders were required to inform the department of their breach of condition 16 within two business days of becoming aware of the non-compliance (i.e., in this case by 11 February 2026). This did not occur as required.

Pursuant to condition 32 of EPBC 2020/8669, the Holders were required to provide to the department, details of the incidents of non-compliance referred to above and the details of:

- any corrective action or investigation which the Holders has already undertaken;
- the potential impacts of the non-compliance; and
- the method and timing of any corrective action that will be undertaken by the holder.

Conditions of EPBC 2020/8669 breached

¹ "Business Day" is defined in Part C of the EPBC 2020/8669 to exclude public holidays in Queensland. 26 January 2026 was a public holiday in Queensland.



This is notification given by Ensham Resources on behalf of the Holders, of breaches by the Holders of:

- condition 16 of EPBC 2020/8669, as referred to above;
- condition 30 of EPBC 2020/8669, as referred to above; and
- condition 32 of EPBC 2020/8669, as referred to above.

On behalf of the Holders, Ensham Resources has undertaken an investigation [in accordance with Conditions 32].

The results of this investigation are set out in the "Investigation and Proposed Corrective Action" which accompanies this Notification of Non-compliance.

Appendix K – Investigation of Non-Compliance 24 June 2024



ENSHAM
RESOURCES
PTY LIMITED

ABN 23 011 048 678

As Operator of the
Ensham Coal Project

Duckponds Road
Emerald QLD 4720
Australia

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Website:
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Department of Climate Change, Energy, the Environment and Water
Environment Compliance Branch Division
GPO Box 309, Canberra, ACT, 2601
environment.compliance@dcceew.gov.au

26/06/2026

RE: Investigation and Proposed Corrective Action - Ensham Life of Mine Extension Project, EPBC Approval 2020/8669

1. Purpose

This document constitutes the investigation report required under condition 32 of EPBC Approval 2020/8669 (**EPBC 2020/8669**). It is provided by Ensham Resources Pty Ltd ACN 011 048 678 (**Ensham Resources**) on behalf of the holders of EPBC 2020/8669 being Thungela Resources Australia Pty Ltd ACN 665 159 759 and Sungela Pty Ltd ACN 665 234 739 (the **Holders**). It should be read together with the Notification of Non-Compliance dated 26 June 2026.

This document sets out: the factual background to, and the timeline of, the non-compliance events; the findings of the investigation into the causes of those events; the potential impacts of each non-compliance event; and the corrective actions that the Holders will implement to prevent recurrence.

2. Conditions Breached

Three separate conditions of EPBC 2020/8669 were breached. Each is addressed in this report.

Condition	Obligation	Nature of Breach
condition 16	Publication of approved plans within 15 business days of Ministerial approval	The GDEMMP, approved by the Minister on 12 January 2026, was not published on the Holders' website by the required date of 3 February 2026. It was not published until 24 June 2026.
condition 30	Notification to the Department ¹ of non-compliance within 2 business days of becoming aware	The Holders became aware of the condition 16 non-compliance on 9 February 2026. Notification to the Department was therefore required by 11 February 2026. It was

¹ Department of Climate Change, Energy, the Environment and Water



condition 32	Provision of investigation details to the Department within 12 business days of becoming aware	not given until 26 June 2026. The Holders became aware of the condition 16 non-compliance on 9 February 2026. This investigation report was therefore required by 25 February 2026. It was not provided until 26 June 2026.
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3. Background

3.1 Corporate Ownership Changes

Prior to 31 August 2023, the majority 85% interest in the assets of the Ensham mine (which included the issued share capital of Ensham Resources)(the **Ensham Mine**), was held by Idemitsu Australia Pty Ltd ACN 010 236 272 (**Idemitsu**) and Bligh Coal Limited ACN 010 186 393 (**Bligh**). The remaining 15% interest in the Ensham Mine, was held by Bowen Investment (Australia) Pty Ltd ACN 002 806 831 (**Bowen**). On 31 August 2023 Idemitsu and Bligh sold their interests in the Ensham Mine to Sungela Holdings Pty Ltd ACN 665 229 336 (**Sungela**), a company owned 75% by Thungela Resources Australia Pty Ltd ACN 665 159 759 (**TRA**), 12.5% by Mayfair Corporations Group Pty Ltd ACN 665 216 210 (**Mayfair**) and 12.5% by Audley Energy Limited (Registration number 1407007) (**Audley**).

In February 2025, TRA acquired the remaining 15% interest in the Ensham Mine from Bowen. As a result of that acquisition, TRA's parent, Thungela Resources Ltd (a company incorporated in South Africa) (**Thungela**) commenced the full integration of Ensham's operational systems, governance frameworks, records, and digital presence into Thungela's corporate systems. See **attached two (2)** diagrams showing the corporate structure of the Thungela group of companies, and the place of each of the Holders (being TRA and Sungela), and Ensham in it

One material consequence of this integration was the closure of the Sungela's website, on which EPBC-related compliance documents had previously been published. All of the information on Sungela's website was to be put on Thungela's website. Thungela's website is managed from Thungela's IT team in South Africa.

3.2 The GDEMMP Approval

On 12 January 2026, the Department notified Ensham Resources that the Minister had approved the Groundwater Dependent Ecosystem Monitoring and Management Plan (**GDEMMP**) submitted by Ensham Resources on behalf of the Holders pursuant to condition 3 of EPBC 2020/8669.



Under condition 16 of EPBC 2020/8669, the Holders were required to publish the approved GDEMMP on their website within 15 business days² of the date of Ministerial approval. The applicable deadline was 3 February 2026, excluding Queensland public holidays as defined in EPBC 2020/8669 (including Australia Day on 26 January 2026).

4. Timeline of Events

Date	Event
12 January 2026	Department notifies Ensham Resources of Ministerial approval of the GDEMMP.
3 February 2026	Under condition 16 the last date for publication of the GDEMMP on the website ³ was 3 February 2026 ⁴ . The GDEMMP was not published on the website by this date.
9 February 2026	Ensham Resources identifies that the GDEMMP has not been published and requests Thungela to upload the GDEMMP to the Thungela website.
11 February 2026	Having become aware of the condition 16 non-compliance on 9 February 2026, the Holders were obliged pursuant to condition 30 to notify the department of the non-compliance by 11 February 2026. No notification was provided to the Department by this date.
25 February 2026	Having become aware of the condition 16 non-compliance on 9 February 2026, the Holders were obliged pursuant to provide to the Department that information provided for under condition 32 (the Investigation Report). No Investigation Report was provided to the department by this date.
2 March 2026	GDEMMP remains unpublished. Ensham Resources escalates the request through the site HR function (which had previously managed the Sungela website), which in turn escalates to the Thungela HR Manager.
11 May 2026	Ensham Resources realises that the GDEMMP has still not been published and makes a further request to Thungela.
8 June 2026	GDEMMP remains unpublished. Ensham Resources escalates to the Ensham Technical Services Manager to assist with achieving publication.
10 June 2026	Confirmation received from Thungela that a document had been uploaded. The document uploaded was subsequently identified as being incorrect.
23 June 2026	Ensham Resources realises that the wrong document was uploaded on 11 June 2026. Ensham Resources requests the Ensham SSE Personal Assistant to escalate to Thungela's communications team for upload of the correct

² "Business Day" is defined in Part C of the EPBC 2020/8669 to exclude public holidays in Queensland. 26 January 2026 was a public holiday in Queensland.

³ "Website" is defined in Part C of the EPBC 2020/8669 is defined as an "set of related webpages located under a single domain name attributed to the approval holder and available to the public". The Thungela website includes pages specific to Sungela and TRA which meet this description [Ensham mine / Thungela](#)

⁴ Supra 1.



	GDEMMP. The correct GDEMMP is published on the Holders' website.
26 June 2026	Notification of Non-Compliance provided to the Department, together with this investigation report, pursuant to conditions 30 and 32 of EPBC 2020/8669.

5. Initial Investigation Findings

5.1 Condition 16 Non-Compliance

The investigation which has just been completed (the **Initial Investigation**) identified the following contributing causes of the failure to publish the GDEMMP within the required 15 business day period:

a) Failure of a formal compliance obligation tracking system for EPBC conditions

The compliance system that is in place to identify, calendar, and monitor conditions under EPBC 2020/8669 (the **Regulatory Compliance System**) failed to log the obligation under condition 16 at the time the GDEMMP was approved. The Regulatory Compliance System did not sign responsibility for monitoring the publication deadline was not assigned to a specific individual with authority to ensure timely execution, as it was supposed to. This failure of the Regulatory Compliance System in this regard is the subject of a more thorough on-going investigation being carried out the inhouse legal function (the **Ongoing Investigation**). Once the Ongoing Investigation has been completed, necessary amendments to the Regulatory Compliance System will be made to ensure that this does not occur again.

b) Disruption caused by corporate transition

The Thungela corporate integration, including the migration of compliance documentation from the Sungela website to the Thungela website, was underway at the time of the GDEMMP approval. The integration had created significant operational and administrative workload. As a result, compliance obligations that were not directly connected to safety-critical or production-critical activities did not receive adequate attention during this period. In addition, there has been a lack of coordination between various functions at site, the Brisbane corporate office and Thungela's operations in South Africa. This is also the subject of the Ongoing Investigation into the lack of coordination between the various layers of management.

c) Website management located offshore and poorly integrated

The Thungela website is managed from South Africa, whereas the information relevant to EPBC 2020/8669 was previously on the Ensham Resources' website which was under the control of Ensham Resources. Ensham Resources' personnel had no direct access to, or control over, the Thungela website or the migration of information on the Ensham Resources' website to the Thungela website. Requests for publication required escalation through multiple internal pathways (and in some cases not through the internal escalation pathways that they should have been). As noted above this issue is the subject of the Ongoing Investigation.



d) Wrong document initially uploaded

The Ministerial notification letter was mistakenly uploaded on 11 June 2026 following escalation, rather than the GDEMMP. The Regulatory Compliance System again failed to verify that the correct document had been uploaded. As noted above this is the subject of the Ongoing Investigation.

5.2 Condition 30 Non-Compliance

The investigation identified the following contributing causes of the failure to notify the Department within 2 business days of becoming aware of the condition 16 non-compliance:

a) Absence of awareness of the Condition 30 notification obligation

When Ensham Resources identified the condition 16 non-compliance on 9 February 2026, the most immediate concern was to seek to remedy the breach by uploading the document. The Regulatory Compliance System did not also identify the obligation to notify the Department in accordance with condition 30. As noted above the Regulatory Compliance System will be amended following completion of the Ongoing Investigation.

b) No escalation protocol to legal or compliance function

The Regulatory Compliance System was intended to escalate identified instances of non-compliance with EPBC 2020/8669 conditions immediately escalated to the legal. The reason why it did not do so in this particular set of circumstances is the subject of the Ongoing Investigation.

5.3 Condition 32 Non-Compliance

The failure to provide an investigation report to the Department within 12 business days is a direct consequence of the condition 30 failure described at section 5.2 above. Because neither Ensham Resources nor the Holders notified the Department of the non-compliance within the required timeframe, no steps were taken to conduct, or provide the results of, an investigation within the timeframe required by condition 32. The root causes identified at section 5.2 therefore apply equally to the condition 32 non-compliance.

6. Potential Impacts

6.1 Environmental Impacts

The GDEMMP, as approved by the Minister, concludes that there are no groundwater dependent ecosystems (**GDEs**) identified within the project area. Accordingly, the failure to publish the GDEMMP on the website within the required timeframe **did not give rise to any actual environmental harm or any failure to monitor or manage environmental risks associated with the Action.**

6.2 Regulatory and Transparency Impacts



The failure to publish the GDEMMP in accordance with condition 16 meant that the document was not publicly available for a period of approximately five months. During this period, members of the public and interested parties were unable to access the GDEMMP from the Holders' website, contrary to the transparency objectives of conditions 16 and 17. **Ensham Resources is not aware of any specific requests for access to the GDEMMP that were made and could not be fulfilled during this period.**

The failure to notify the Department under conditions 30 and 32 within the required timeframes deprived the Department of the ability to be kept apprised of the condition 16 non-compliance on the timeframes required by EPBC 2020/8669.

7. Corrective Actions

The following corrective actions have been or will be implemented. Ensham Resources will provide the Department with a written update on the implementation status of all outstanding corrective actions within 30 days of the date of this report.

#	Action	Detail	Target Date
1	Publication of GDEMMP	The approved GDEMMP has been published on the Holders' website at https://www.thungela.com/ensham-mine . The correct document was confirmed published on 24 June 2026.	Completed 24 June 2026
2	Review and amendment of the Regulatory Compliance System	The Regulatory Compliance System is being reviewed to ensure that it includes a dedicated compliance obligations register for all EPBC 2020/8669 conditions, with responsible persons, milestone dates, and verification requirements assigned for each condition.	To be completed 27 July 2026
3	Defined website publication process and responsible persons	The Regulatory Compliance System is being reviewed to ensure that it includes a documented process for the publication of EPBC-related documents to the Thungela website. This process will identify the specific Thungela personnel responsible for publication, set internal response timeframes, and include a verification step confirming the correct document has been published.	To be completed 27 July 2026
4	Non-compliance escalation protocol	The Regulatory Compliance System is being reviewed to ensure that it includes a documented protocol which requires all identified instances of non-	To be completed 27 July 2026



compliance with EPBC 2020/8669 conditions to be immediately notified to the TRA legal function, and, through it, to the Department within the timeframes required by condition 30. The protocol will be reviewed to ensure that includes a specific requirement to conduct an initial investigation and prepare an investigation report within the timeframes required by condition 32, and where appropriate more thorough investigation which may not be completed within the timeframes required by condition 32.

5	EPBC compliance awareness training	Training on the notification and reporting obligations under Conditions 16, 30, and 32 of EPBC 2020/8669 will be delivered to all personnel with responsibilities for EPBC compliance, including relevant site, technical, and corporate personnel.	To be completed 10 August 2026
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8. Conclusion

The investigation has established that the failures giving rise to the non-compliances with conditions 16, 30, and 32 of EPBC 2020/8669 resulted from a combination of: the failure of the Regulatory Compliance System; disruption to compliance management processes during the Thungela corporate integration; inadequate website publication processes and offshore management; and the absence of a protocol requiring prompt escalation of identified non-compliances to a legal function.

The Holders are committed to implementing the corrective actions described in section 7 above and to maintaining the level of EPBC compliance required by EPBC 2020/8669.

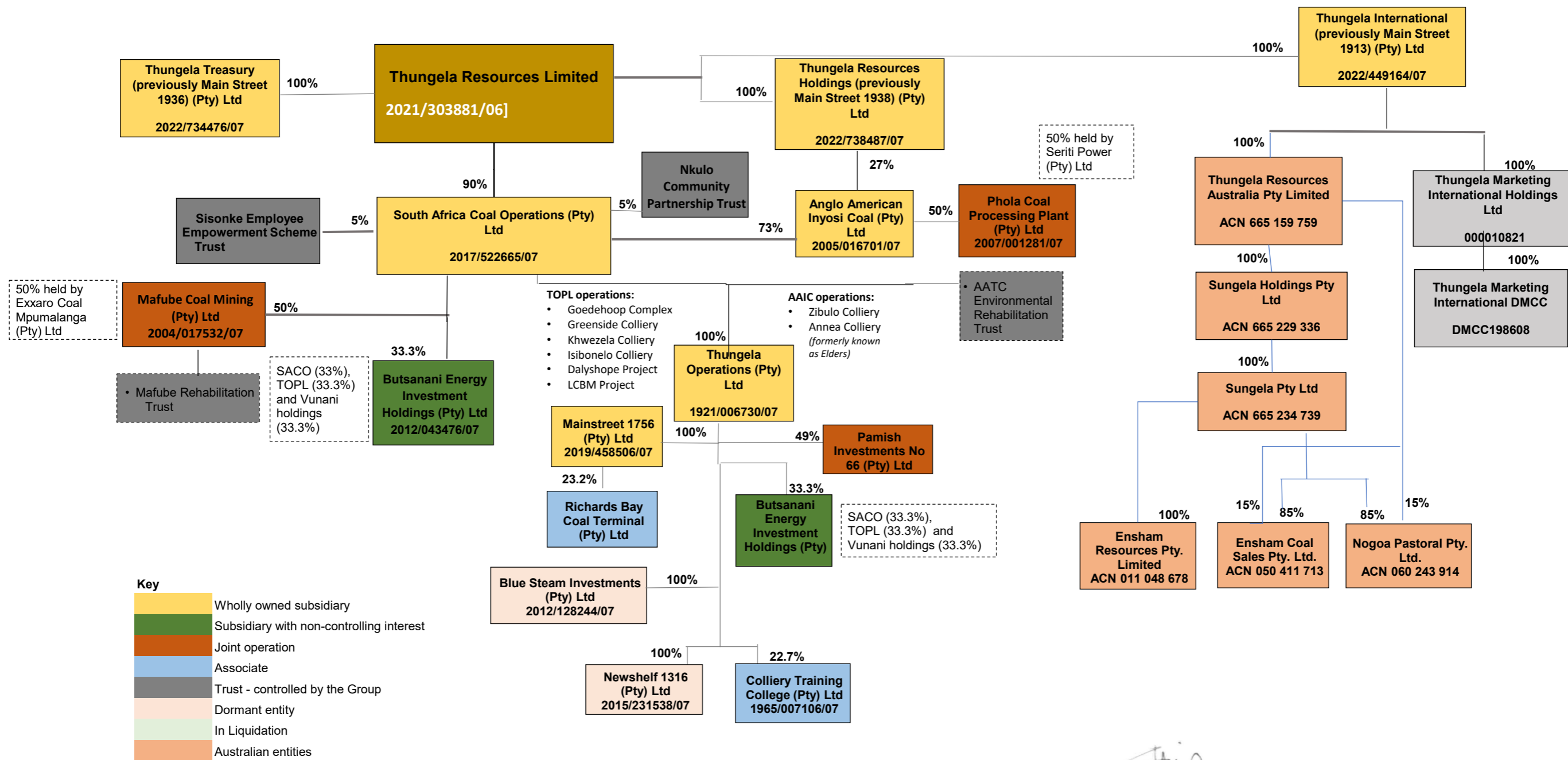
The Holders and Ensham Resources remain available to provide the Department with any further information required.

Signed on behalf of Ensham Resources Pty Ltd

Alana Connolly
Environmental Coordinator
Ensham Resources Pty Ltd
Date: 26 June 2026



THUNGELA RESOURCES LIMITED ORGANISATIONAL STRUCTURE - Q4 2025



Tovi Ellis
 Tovi Ellis
 Company Secretary
 15 October 2025

CORPORATE STRUCTURE

