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Tahmoor Coal Pty Ltd

2023 ANNUAL REVIEW AND ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

March 2024

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Document Control

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REVIEW TEAM:	Zina Ainsworth – Environment and Community Manager April Hudson - Approval Specialist Nick Le Baut – Project Manager – Environmental Projects
VERSION NUMBER:	**1.0**
COMMENTS:	**Final**

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Table 1-1 Title Block

Name of operation	Tahmoor Coal – SIMEC Mining
Name of operator	Tahmoor Coal Pty Ltd
Development consent / project approval #	DA 1975, DA 1979, DA 57/93, DA 67/98, DA 190/85, DA 162/76, SSD8445, EPBC 2017/8084
Name of holder of development consent / project approval	Tahmoor Coal Pty Ltd
Mining lease #	Tahmoor Coal Holdings - ML1376, ML1308, ML1539, ML1642 & CCL716 Bargo Coal Holdings - CCL747
Name of holder of mining leases	Tahmoor Coal Pty Ltd Bargo Collieries Pty Ltd
	This document has been prepared on behalf of Tahmoor Coal Pty Ltd and Bargo Collieries Pty Ltd. The following recitals pertain to documents for which Bargo Collieries is a signatory for any activities listed in clause 27 of the Mining Regulations (and relating to CCL747): A. Bargo Collieries Pty Ltd (Bargo Collieries) is the holder of Consolidated Coal Lease 747 (CCL 747). B. Mining in part of the approved Tahmoor South Coal Mine Project will take place within land covered by CCL 747 C. The development consent No. SSD8445 for the Tahmoor South Coal Mine Project was obtained by Tahmoor Coal Pty Ltd which is a related entity to Bargo Collieries. D. Subject to the terms of this Agreement and in accordance with s81(1)(a) of the Mining Act the Landholder consents to Bargo Collieries, its employees, agents (including Tahmoor Coal Pty Ltd and its employees) or Bargo Collieries' contractors to enter the Landholder's Land to undertake the proposed activity(ies) on the Landholder's Land. E. Bargo Collieries proposes to appoint Tahmoor Coal Pty Ltd as the mine operator pursuant to the relevant provisions of the Work Health and Safety (Mines and Petroleum sites) Act 2013 (WHS (M&P) Act) and the Work Health and Safety (Mines and Petroleum sites) Regulation 2022 (WHS(M&PS) Regulation.
Water licence #	WAL36442, WAL 25777, WAL43572, WAL43656, WAL44608. SWC839757 (Leased)
Name of holder of water licence	Tahmoor Coal Pty Ltd
RMP Start Date	02/07/2022
RMP End Date	19/10/2032
Annual Review start date	01/01/2023
Annual Review end date	31/12/2023
I, Zina Ainsworth, certify that this audit report is a true and accurate record of the compliance status of Tahmoor Coal Mine for the period 1 January 2023 and 31 December 2023 and that I am authorised to make this statement on behalf of Tahmoor Coal Pty Ltd. *Note.* *a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report*	

produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000. b) *The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*	
Name of authorised reporting officer	**Zina Ainsworth**
Title of authorised reporting officer	**Environment and Community Manager**
Signature of authorised reporting officer	
Date	*28/03/24*

2 Statement of Compliance

Table 2-1 outlines the statement of compliance with the relevant conditions for the reporting period.

Table 2-2 provides a statement of compliance for Tahmoor Coal for 2023.

Table 2-1 Statement of Compliance (2023)

Were all the conditions of the relevant approvals complied with?	Compliance
ML1376	Yes
ML1308	Yes
ML1539	Yes
ML1642	Yes
CCL716	Yes
CCL747	Yes
EPL 1389	Yes
WAL36442	Yes
WAL25777	Yes
WAL43572	Yes
WAL43656	Yes
WAL44608	Yes
SWC839757	Yes
DA 1975	Yes
DA 1979	Yes
DA 190/85	Yes
DA 57/93	Yes
DA 67/98	Yes
SSD 8445	Yes
EPBC 2017/8084	Yes

Table 2-2 Non-Compliance Summary (2023)

Relevant Approval	Condition #	Condition Description (summary)	Compliance status	Comment	Section addressed in Annual Review
		No non-compliances reported for the Reporting period			

3 Independent Audits

3.1 2023 Tri-ennial Independent Audit

During the reporting period, an Independent Environmental Audit was conducted in accordance with Conditions 50 and E15 of Development Consent DA 67/98 and SSD 8445 respectively. An Independent Environmental Audit has been completed by Epic Environmental assessing Tahmoor Coal's compliance with the aforementioned and historical development consents, EPL1389 and associated mining leases.

The below table outlines the findings / recommendations from Epic Environmental and the associated comments / actions from Tahmoor Coal.

Table 3-1 Independent Audit Findings with Comments from Tahmoor Coal.

Ref	Auditors Description of NC	Risk	Tahmoor Coal Comment/Action	Timing
Non-Compliance Recommendations				
EPL1389				
A3.1 - Information supplied to the EPA	NC1 – Activities have been undertaken generally in accordance with this EPL, with the exception of the non-compliances identified in M2.1 and M2.2 with regard to the frequency of monitoring: • air quality monitoring site PM10-1. An investigation confirmed that the disruption was as a result of a faulty powerline. Tahmoor actioned this incident immediately and installed a new power outlet and cable with appropriate weather protection.	Administrative	Tahmoor Coal actioned immediate repairs to rectify the power outage and get the monitoring unit back online as quickly as possible. No similar incidents have occurred since. No further action deemed necessary	N/A
M2.1 – Requirements to monitor concentration of pollutants discharged	NC2 – Activities have been undertaken generally in accordance with this EPL, with the exception of the non-compliances identified in M2.1 and M2.2 with regard to the frequency of monitoring: • air quality monitoring site PM10-1. An investigation confirmed that the disruption was as a result of a faulty powerline. Tahmoor actioned this incident immediately and installed a new power outlet and cable with appropriate weather protection.	Low	Tahmoor Coal actioned immediate repairs to rectify the power outage and get the monitoring unit back online as quickly as possible. No similar incidents have occurred since. No further action deemed necessary	N/A

Ref	Auditors Description of NC	Risk	Tahmoor Coal Comment/Action	Timing
M2.2 – Air Monitoring Requirements	NC3 – Activities have been undertaken generally in accordance with this EPL, with the exception of the non-compliances identified in M2.1 and M2.2 with regard to the frequency of monitoring: • air quality monitoring site PM10-1. An investigation confirmed that the disruption was as a result of a faulty powerline. Tahmoor actioned this incident immediately and installed a new power outlet and cable with appropriate weather protection.	Low	Tahmoor Coal actioned immediate repairs to rectify the power outage and get the monitoring unit back online as quickly as possible. No similar incidents have occurred since. No further action deemed necessary	N/A

All actions/Comments have been addressed for the 2023 Independent Environmental Audit, with no further actions required.

The next independent audit is due to be conducted by May 2026.

4 Introduction

4.1 Background

Tahmoor Coal Mine (Tahmoor Mine) is an underground coal mine located approximately 80 kilometres (km) south-west of Sydney between the towns of Tahmoor and Bargo, New South Wales (NSW). Tahmoor Coal, as the operator of Tahmoor Mine, is approved to extract up to 4 million tonnes of Run of Mine (ROM) coal per annum from the Bulli Coal Seam. Tahmoor Mine produces a primary hard coking coal product and a secondary higher ash coking coal product that are used predominantly for coke manufacture for steel production. Product coal is transported via rail to Port Kembla and Newcastle for Australian domestic customers and export customers.

Tahmoor Mine has been operated by Tahmoor Coal Pty Ltd (Tahmoor Coal) since the mine commenced in 1979 using bord and pillar mining methods, and via longwall mining methods since 1987. Tahmoor Coal is a wholly owned entity within the SIMEC Mining Division of the GFG Alliance group.

Tahmoor Coal has previously mined 37 longwalls to the north and west of the mine's current pit-top location. Tahmoor Coal is currently mining the Longwall South 2A (LW S2A) in the Tahmoor South Domain area located to the north of the Bargo township. This mining is undertaken in accordance with Development Consents and Extraction Plan Approval.

In April 2021, Tahmoor Coal received Development Application Approval (SSD 8445) for the extraction of up to 4 Mtpa of ROM coal, with a total of up to around 33 Mt of ROM coal proposed to be extracted over a 10-year period. Tahmoor Coal also received conditions of approval (EPBC 2017/8084) under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) in October 2021.

The Tahmoor South Domain is located south of the Bargo River and east of Remembrance Driveway and north-east of the township of Bargo. Longwall mining will be used to extract coal from the Bulli coal seam within the bounds of Consolidated Coal Lease (CCL) 716 and CCL 747. Twelve longwalls are proposed in this domain which are divided into a series of six northern (A series) and six southern (B series) longwalls. An Extraction Plan for the A series, Longwalls' South 1A to South 6A (LW S1A-S6A), was approved on 20 September 2022 and the first longwall (LW S1A) was completed in July 2023 and the second longwall (LW S2A) is currently being mined.

With regards to this Annual Review, the Department of Planning, Housing and Infrastructure (DPHI) and the Department of Regional NSW – Resources Regulator (Resources Regulator) approved that the Annual Review prepared under Condition 45 of Development Consent DA 67/98 can also fulfil the requirement of the Annual Environmental Management Report (AEMR). This was to reduce duplication of reported information to both Government authorities.

In addition, Mining Lease 1376 was varied on the 17th October 2022 and excludes the need to include a Rehabilitation Report as part of the Annual Review report as this was replaced with the reporting required for the Resources Regulator new rehabilitation reforms. The Commonwealth Department of Climate Change, Energy, the Environment and Water (Cwth DCCEEW) also confirmed on 16th June 2022 that the Annual Compliance Reports requirement will align with the due date of this report (31 March annually), and these reporting requirements will be covered off in this report.

Tahmoor Coal has recently been approved to align their reporting period for the Rehabilitation Reforms Annual Rehabilitation Report and Forward program with the AEMR reporting period in order to streamline reporting.

This Annual Review or Annual Environmental Management Report (AEMR) is for the reporting period of 1 January 2023 to 31 December 2023.

A plan of Tahmoor Mine showing the regional context, development consent boundary and mining lease boundaries is shown in **Figure 1**.

Contact information for Tahmoor Coal senior management and environment and community staff are listed in **Table 4-1** below.

Table 4-1 Tahmoor Coal Contacts

Name	Position held	Contact details
Tahmoor Coal Management		
Peter Vale	Executive General Manager Coal Operations	(02) 4640 0100
Clint Mason	Head of Tahmoor Coal Operations	(02) 46400150
Environment and Community Management Team		
Zina Ainsworth	Environment & Community Manager	(02) 4640 0100
Ross Barber	Project Manager Subsidence	(02) 4640 0028
Nick Le Baut	Environment Projects Manager	(02) 4640 0090
Thomas O'Brien	Environment Specialist	(02) 4640 0018
Natalie Brumby	Environmental Officer	(02) 4640 0048
April Hudson	Approvals Specialist	(02) 4640 0022
Amanda Bateman	Community Liaison Specialist	(02) 4640 0025
Amanda Fitzgerald	Environment & Community Officer	(02) 4640 0079

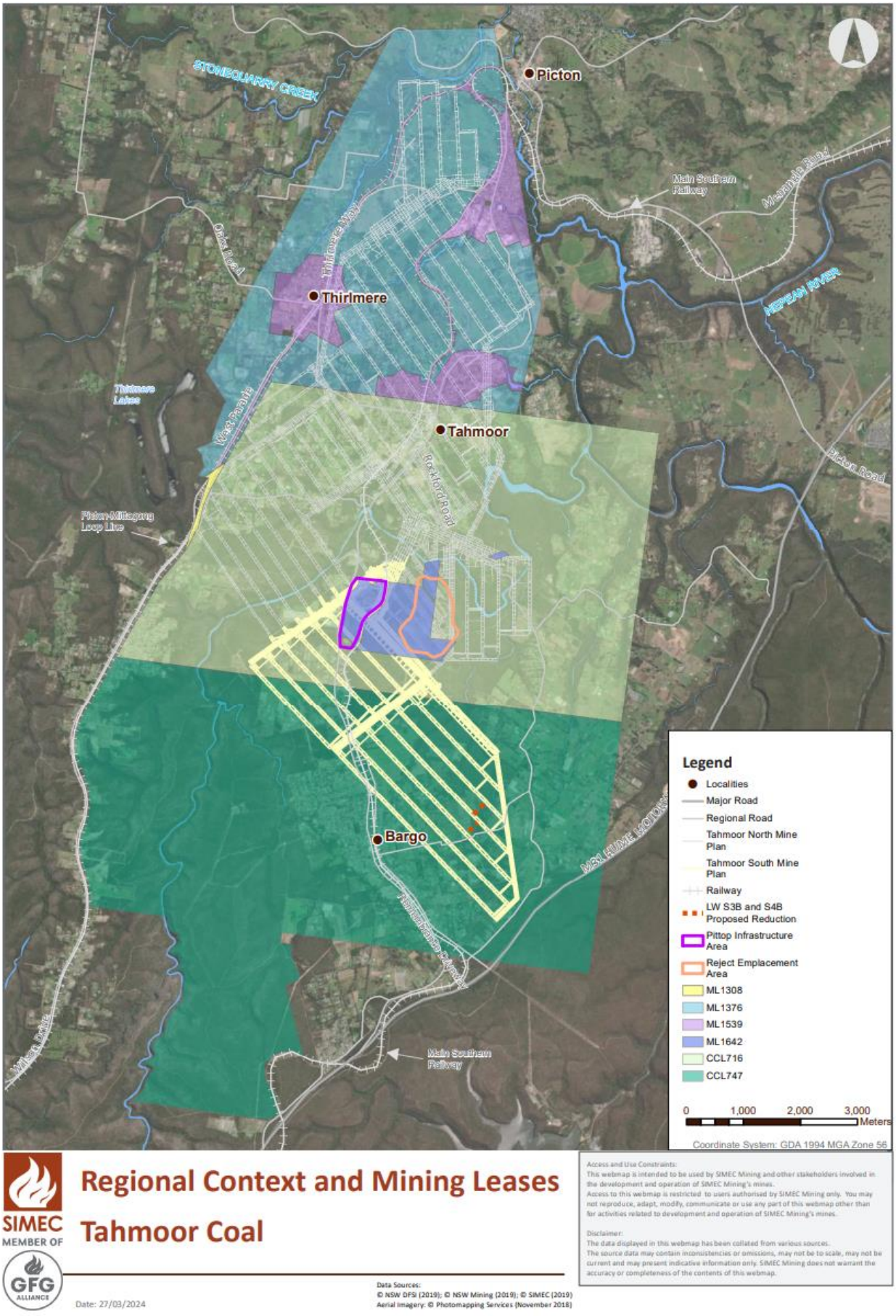

Figure 1 Mining Area and Tenure

5 Approvals

Development consents, mining tenures and environmental licences held by Tahmoor Coal Pty Ltd and Bargo Collieries Pty Ltd are outlined in **Table 5-1** below.

Table 5-1 Consents and Licences

Consent Number	Consent Description	Date Granted	Expiry Date
Development Consents			
DA 1975	Underground Mine	26/03/1975	No expiry
DA 162/76	Bargo Consent	21/04/1976	This Consent was surrended on 05/10/2022
DA 1979	Coal Preparation Plant Stockpiles and Refuse Emplacement Area	23/08/1979	No expiry
DA 1979 (Mod 1)	Modification for road haulage of trial coal shipments	16/09/1985	No expiry
DA 190/85	Surface Works for Gas Extraction	16/12/1985	No expiry
DA 1979 (Mod 2)	Modification for Upgrades for Longwall Mining	05/11/1986	No expiry
DA 1979 (Mod 3)	Modification for Road haulage in Wollondilly Shire and when rail unavailable	1988	No expiry
DA 1979 (Mod 4)	Modification for Road haulage to Corrimal and Coal Cliff Coke Works	13/12/1994	No expiry
DA 57/93	Tahmoor North Project	07/09/1994	No expiry
DA 57/93 (Mod 1)	Modification for heritage approval condition	07/06/2007	No expiry
DA 67/98	Tahmoor North Extension Project	25/02/1999	The approval for extraction of coal expires on 16/06/2024
DA 67/98 (Mod 1)	Modification for additional areas to be subsided	26/11/2006	As above
DA 67/98 (Mod 2)	Modification for Redbank Tunnel Subsidence Management	08/04/2012	As above
DA 67/98 (Mod 3)	Modification for Redbank Tunnel Rail Deviation – Subdivision of Land	25/11/2012	As above
DA 67/98 (Mod 4)	Modification for subsidence area update	15/10/2018	As above
DA 67/98 (Mod 5)	Modification for subsidence area update	03/11/2020	As above
SSD 8445	Tahmoor South Project	23/04/2021	Ten (10) years from commencement of second workings, ie 19 October 2032)
SSD 8445 (MOD 1)	Extension of time to commission Water Treatment Plant	19/07/2022	As above
SSD 8445 (MOD 2)	Underground brine disposal and transfer of mine water	13/06/2023	As above

Consent Number	Consent Description	Date Granted	Expiry Date
EPBC 2017/8084	Conditions of approval under the *Environment Protection and Biodiversity Conservation Act 1999*	01/10/2021	01/09/2061
Mining Tenure – Mining Leases & Exploration Authorisations			
Consolidated Coal Lease 716	Tahmoor Mining Lease	15/06/1990, renewed 16/08/2023	13/03/2042
Mining Lease 1376	Tahmoor North Mining Lease	28/08/1995, renewed 28/03/2023	28/08/2043
Mining Lease 1308	Mining Lease to west of CCL716	02/03/2014	02/03/2035
Mining Lease 1539	Tahmoor North Extension Mining Lease	16/06/2003	16/06/2024, renewal submitted for assessment
Mining Lease 1642	Pit-top and REA surface Mining Lease	27/08/2010	27/08/2031
Consolidated Coal Lease 747	Bargo Mining Leases	23/05/1990, renewed 21/11/2005	06/11/2025
Environmental Licences			
EPL 1389	Environmental Protection Licence– Licence variation 23rd August 2022.	01/05/1994, latest variation 23/8/2022	No expiry
WAL36442	Water Access Licence	06/12/2013	No expiry
WAL25777	Water Access Licence	27/10/2014	No expiry
WAL43572	Water Access Licence	08/9/2021	No expiry
WAL43656	Water Access Licence	01/8/2022	No expiry
WAL44608	Water Access Licence	08/2/2023	No expiry
SWC839757	Water Access Licence (Lease)	10/07/2023	1/7/2024
XSTR200005	Licence to store explosives	02/02/2017	02/02/2027

6 Operations Summary

6.1 Mining Operations

Mining activities during the reporting period have been conducted in accordance with the Rehabilitation Management Plan and Extraction Plan approvals.

Mining in the Tahmoor South domain commenced with the start of extraction for LW S1A on 18th October 2022 and was completed on the 4th of July 2023. The next longwall (LW S2A) commenced on the 2nd August 2023, with 1092.0m extracted as of the 30th December 2023 (see **Figure 2** for longwall location). An Extraction Plan for Longwalls South 1A to South 6A was approved on 20th September 2022.

No seismic or exploration activity has occurred during the reporting period.

Table 6-1 outlines a summary of operational performance at Tahmoor Mine.

Table 6-1 Operational Performance

Material	Approved Limit (Specify Source)	Previous Reporting Period (2022) (Actual)	This Reporting Period (2023) (Actual)	Next Reporting Period (2024) (Forecast)
ROM Feed Tonnes	3,000,000 until secondary extraction of Tahmoor South then 4,000,000 (SSD 8445)	2,324,202	2,733,692	2,815,931
Refuse Tonnes	-	853,000	1,141,264	1,325,723
Fine Refuse (Tailings) Tonnes	-	110,891	148,364	-
Waste rock/Overburden /Oversize Tonnes	Maximum of 200,000 tonnes of material transported to and from site each year (SSD 8445)	2,256	4,021	-
Saleable Product Tonnes	3,500,000 (EPL 1389)	1,554,298	1,672,504	1,729,229

6.2 Next Reporting Period

Table 6-2 outlines the proposed longwall sequencing for the continuation of mining in the Tahmoor South Domain. Secondary workings for the first longwall (LW S1A) has been completed and extraction of the next longwall (LW S2A) is being currently undertaken.

Appendix 11 outlines the planned longwall layout and planned longwall progress plot for the Tahmoor South longwalls.

Table 6-2 Tahmoor South Longwall Sequencing – Current Mining Domain

Longwall Block	Proposed Start	Proposed Completion (subject to change)
Tahmoor South – Longwall S1A	19/10/2022 (actual)	18/06/2023 (actual)
Tahmoor South – Longwall S2A	02/08/2023 (actual)	30/03/2024
Tahmoor South – Longwall S3A	26/04/2024	22/12/2024
Tahmoor South – Longwall S4A	25/01/2025	01/10/2025
Tahmoor South – Longwall S5A	01/11/2025	17/06/2026
Tahmoor South – Longwall S6A	18/07/2026	06/03/2027

Tahmoor Coal wrote to DPHI in July 2023, initiating the process of lodging a Modification to SSD8445 to seek an additional Longwall in the 'A series', ie.LWS7A. If approved, the longwall is planned to be extracted after LWS6A.

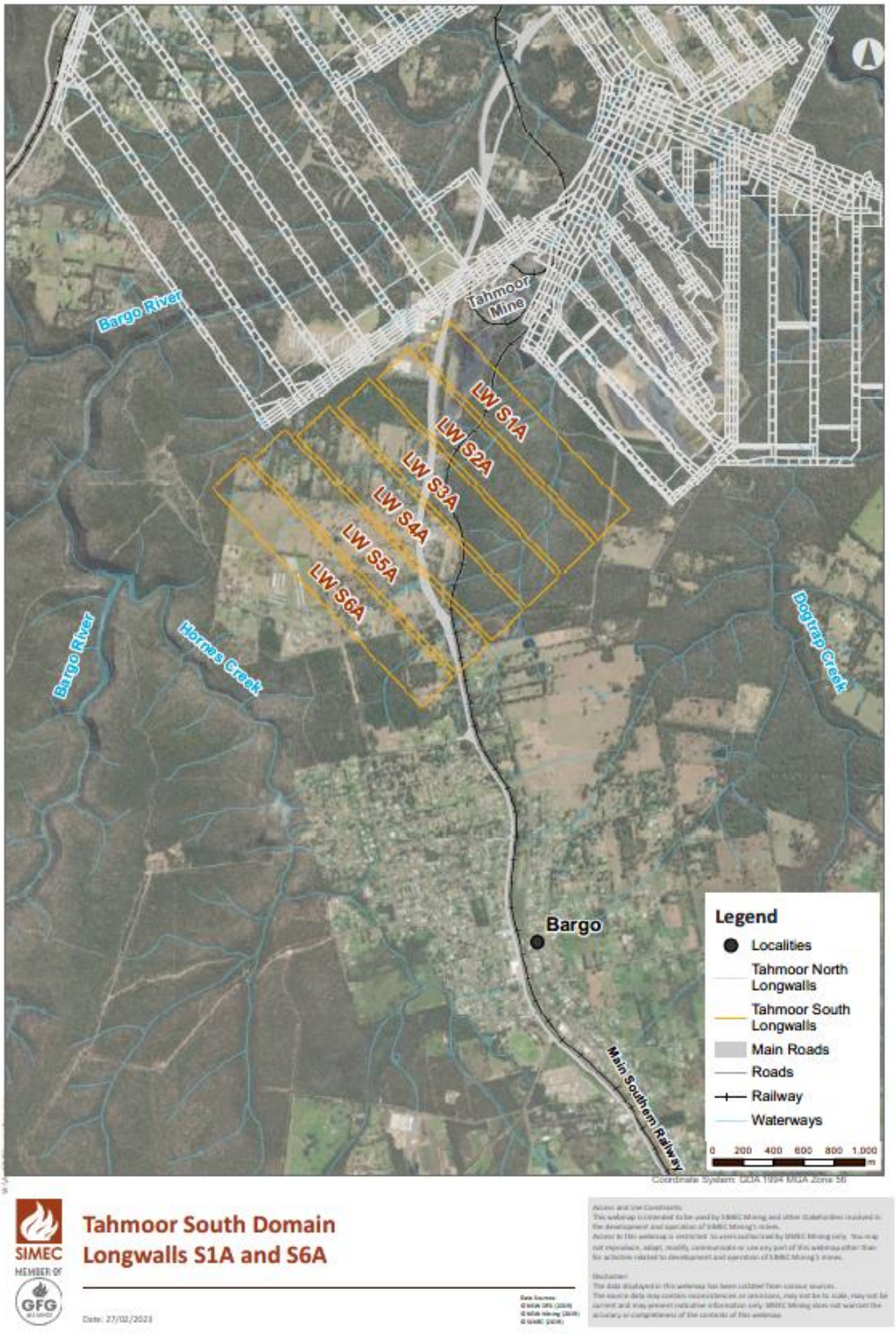

Figure 2 Tahmoor South Domain A-Series Longwalls

7 Actions Required from Previous 2022 Annual Review

As required under Schedule 2 Condition 52 of Development Consent DA 67/98 and Schedule 2 Condition E23 of the Development Consent SSD 8445, a copy of the 2022 Annual Review was made available on the Tahmoor Coal Website following submission on the 31st March 2023, and can be found at: Annual Environmental Management Reports - Tahmoor Colliery.

In accordance with Schedule 2 Condition 46 of the Development Consent DA 67/98 and Schedule 2 Condition E7 of Consent SSD8445, the related Management Plans were reviewed and updated where required within three months following the submission of the AEMR. Updates of these documents have been posted on the Tahmoor Coal Website.

No further actions were required from stakeholders for the 2022 Annual Review.

8 Environmental Performance

Environmental performance and implemented and/or proposed management activities at Tahmoor Mine is outlined in **Table 8-1** below. Further details regarding environmental performance is given in **Sections 9** to **18**.

Table 8-1 Environmental Performance

Aspect	Approval Criteria/EIS Prediction	Performance during the Reporting Period	Trend/key management implications	Implemented / proposed management actions
Noise	Maximum L10 reading of 45 dBA within 3 m of a residence Maximum L10 reading of 37 dBA at the REA	During the Q4 Noise Assessment Sound pressure level contributions reported for M5 exceeded the interim noise goal. This was caused by impact noise from a Transfer tower which was remediated at the time of the Assessment.	Noise levels were generally compliant throughout the reporting year.	Continue regular monitoring of noise levels and continue implementation of noise mitigation activities
Blasting	Tahmoor Coal does not conduct surface blasting activities			
Air quality	Maximum deposited dust annual average of 4 g/m^2/month (DA 67/98 MOD3)	Monitoring results all within approved criteria	Air quality levels within approved criteria	Continue regular monitoring of air quality levels
	Maximum total suspended particulate (TSP) matter annual average of 90 µg/m^3 (DA 67/98 MOD3)	Monitoring results all within approved criteria	Air quality levels within approved criteria	Continue regular monitoring of air quality levels
	Maximum particulate matter (PM10) annual average of 30 µg/m^3 (DA 67/98 MOD3)	Monitoring results all within approved criteria	Air quality levels within approved criteria	Continue regular monitoring of air quality levels

Aspect	Approval Criteria/EIS Prediction	Performance during the Reporting Period	Trend/key management implications	Implemented / proposed management actions
	Maximum particulate matter (PM10) 24-hour average of 50 µg/m^3 (DA 67/98 MOD3)	Monitoring results all within approved criteria	Air quality levels within approved criteria	Continue regular monitoring of air quality levels
	Maximum increase in deposited dust level over an annual period of 2 g/m^2/month (DA 67/98 MOD3)	Monitoring results all within approved criteria	Air quality levels within approved criteria	Continue regular monitoring of air quality levels
Biodiversity	-	Monitoring results all within approved criteria	N/A	Continue current management and monitoring activities
Heritage	Stonequarry Rockbar	Monitoring results all within approved criteria	Heritage compliant	No further monitoring required.
Water Quality	EPL 1389 Conditions	Monitoring results all within approved criteria	Water quality compliant with EPL	Construction of Water Treatment Plant completed December 2023. E2 Ecotoxicity Monitoring commenced Q4 2023. E3 Aquatic Health monitoring program continuing. Continue current management and monitoring activities.
Subsidence	Subsidence Management Plan and Extraction Plan approvals	Cracking on sandstone culverts at 88.400 km and 88.980 km (DPE notified 21/09/2021) resulted in an exceedance of subsidence performance indicator for 'other Aboriginal and heritage sites', which was defined as 'negligible subsidence impacts or environmental consequences'. A warning letter from DPE was received on 16 May 2022 regarding the breach against Section 4.2(1)(b) of the *Environmental Planning and Assessment Act 1979.* **Remediation works completed** May 2023.	Subsidence monitoring results generally within predictions	Continue current management and monitoring activities. Continue remediation works for Redbank and Myrtle Creek. Tahmoor Coal completed remediation to sandstone culverts at 88.400km and 88.980km in May 2023.

9 Operational Noise

9.1 Environmental Management

Tahmoor Coal is approved to operate Tahmoor Mine 365 days a year, 24 hours a day.

Tahmoor Mine and its associated facilities currently operate in accordance with noise criteria provided by the 1994 Development Consents. However, this criteria will be superseded by the noise criteria conditions provided with in the SSD 8445 following two (2) years from commencement of development works for Tahmoor South Domain (ie. 16 May 2024).

Current noise conditions are listed in Conditions 73 and 74 (DA 57/93 Tahmoor North development consent) as follows:

> *Condition 73: The noise level emanating from Tahmoor Mine and any associated facilities, including the Washery, stock pile area and rail loading facility, shall not exceed an L10 level of 45 dBA when measured within 3 m of any residence.*
>
> *Condition 74: The noise emanating from operations at the refuse emplacement site shall not exceed an L10 of 37 dBA or background +5 dBA whichever is the greater when measured within 3 m of any residence.*

The DA 57/93 consent conditions reference a distance of three (3) metres (m) from any residence that was constructed or approved prior to 1994.

Tahmoor Coal operates a real-time noise monitoring system which includes a Trigger Action Response Plan (TARP) and alarm system, linked back to the mine's 24-hour control room.

Attended due diligence monitoring and assessment is conducted quarterly during the reporting period as part of ongoing noise compliance.

9.2 Environmental Performance

Tahmoor Mine's real-time noise monitoring data and due diligence assessments continued to demonstrate compliance with the sites' development consent noise criteria, with all monitoring results satisfying the noise assessment goals for the mine pit-top, No.2 ventilation shaft and REA operational areas with one exception. During the Q4 Noise Assessment Sound pressure level contributions reported for assessment location M5 exceeded the interim noise goal. This was caused by impact noise from a Transfer tower which was remediated at the time of the Noise Assessment.

Appendix 1 outlines the positions of the quarterly noise monitoring assessment locations and **Appendix 2** contains a summary of noise monitoring completed from 2014 to 2023.

Tahmoor Coal received one (1) noise complaint in 2023 as listed below. Further information regarding the complaints and actions taken is given in **Section 20 Community**.

- One (1) complaint received in relation to noise & vibration.

9.3 Further Improvements

Tahmoor Coal will continue to operate and monitor the sites real-time noise monitoring network and alarm system, which includes a monitor at the mine pit-top facility (SX48) and one at a residence along Olive Lane (SX47) (refer to **Figure 3**). The site also hosts an additional portable

noise monitor which is utilised at times to investigate off site noise issues, SX25. This noise monitor is usually situated to the north of the stockpile area and is kept active and can be utilised as an additional onsite noise monitor however during 2023 the monitor has been located at an offsite property to monitor compliance with the Noise Assessment Criteria for SSD 8445 to take effect from16th May 2024.

As part of the Tahmoor South consent SSD 8445 and to comply with Condition B2, significant noise mitigation works are being investigated as to the most effective avenues to mitigate noise emissions from site.

Works that have been implemented for the Coal Handling Preparation Plant (CHPP) noise reduction, include the following:

1. Installation of acoustic cladding;
2. Installation of acoustic roller doors; and
3. Fitting of noise reduction material to windows.

Additional noise mitigation works that have been undertaken across site include the following:

1. Dozer sound suppression kits installed in June 2023;
2. Stockpile Extension for increased operation on the Eastern Side;
3. Refuse Haul Truck being fitted with new automatic transmission motor and upgraded sound kit;
4. 3C to 4C Transfer building doors; and
5. Double cladding of refuse bin.

Tahmoor Coal will continue to operate and monitor the sites noise levels in accordance with the approved Tahmoor South Noise Management Plan (TAH-HSEC-00372) which has been prepared to address the requirements of Condition B7 of the SSD 8445 development consent for Tahmoor South. The management plan provides a framework for Tahmoor Coal personnel to ensure that compliance is achieved with relevant internal and external regulatory requirements related to noise management at Tahmoor Mine. The plan ensures that noise impacts on the community are minimised and managed efficiently and effectively within a structured framework.

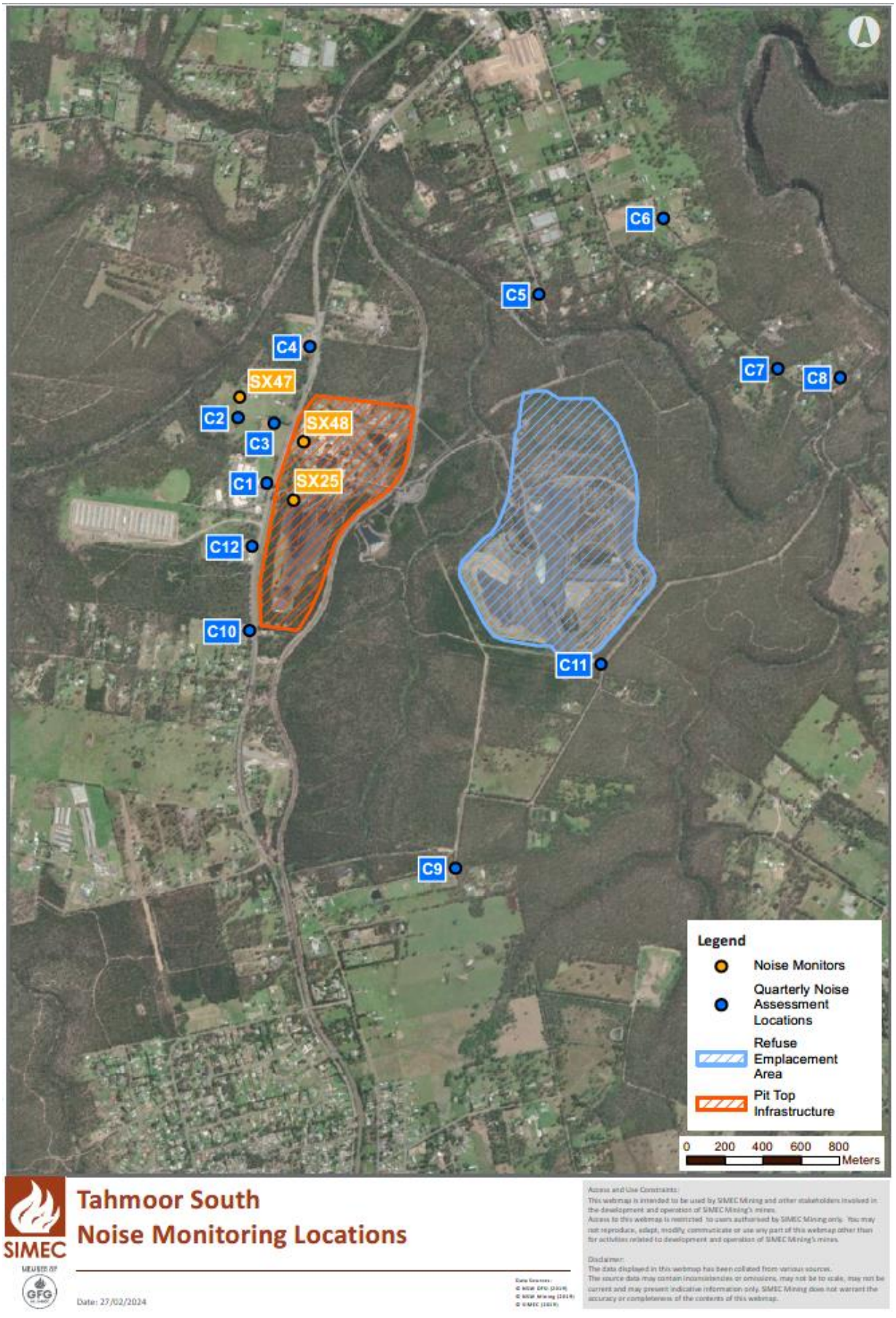

Figure 3 Locations of Noise Monitors and Noise Assessment Locations

10 Air Quality

10.1 Environmental Management

Tahmoor Coal manages air quality in accordance with the Air Quality and Greenhouse Gas Management Plan approved by DPHI (*TAH-HSEC-00379– Tahmoor South Air Quality & Greenhouse Gas Management Plan).*

A comprehensive system of controls is detailed for managing particulate matter on-site, including dust suppression sprays on the coal stockpiles (automatically triggered by pre-defined meteorological conditions), and visual triggers for operators and site personnel. Water carts are used at the REA and Pit-top hardstand areas to reduce wheel generated dust from mobile equipment. Unsealed access ways are controlled through the daily and additional on-call deployment of water carts to control dust. An organic dust suppressant 'Dustloc' is mixed into the water carts for additional effectiveness and an Early Warning Network (EWN) was implemented during the reporting period to create a daily awareness on site of potential dust enhancing conditions and influence work activities on site.

The site also utilised a chemical dust suppressant 'PetroTac' on highly trafficked areas to prevent wheel generated dust from mobile equipment during the reporting period. This suppressant was applied monthly to hardstand areas by a third-party contractor.

10.2 Environmental Performance

10.2.1 Depositional Dust

The annual average depositional dust monitoring results for the reporting period, expressed as insoluble solids (g/m^2/month), are compared against those from previous reporting periods and reviewed monthly. Monitoring results indicate that all recorded dust levels are monitored in accordance with Tahmoor Coal's Environmental Protection Licence (EPL) and within the annual average of 4 g/m^2/month as allowed by consent SSD 8445. Depositional dust results during the reporting period are outlined in **Table 10-1** and **Figure 4** and have remained comparatively similar when compared to results of the last reporting period. There were no occurrences of samples being contaminated by Insects, Polysaccharide Slime and/or Vegetation during the reporting period. Air quality monitoring site locations are shown in **Figure 9.**

Table 10-1 Depositional Dust Gauge Data

Month/Site	1	2	3	4	7	8	9	10	11	12
EPL Monitoring site	DDG1	DDG2	DDG3	DDG4	DDG7	DDG8				
Jan-23	1.1	0.6	1.7	1.7	0.3	1.7	0.2	2.7	0.7	1.9
Feb-23	0.5	0.3	2	2.1	0.6	1.1	0.8	3.9	0.7	1.5
Mar-23	0.8	0.7	1.7	0.6	0.3	0.9	0.7	1	0.7	1.2
Apr-23	0.9	0.7	0.8	1	0.7	0.9	0.3	1.7	0.2	0.8
May-23	0.5	0.5	0.5	0.5	0.2	0.4	0.1	0.7	0.6	0.6
Jun-23	1.0	0.4	0.9	0.7	0.6	1.0	0.3	0.8	0.7	3.7
Jul-23	0.6	0.1	0.4	0.6	0.2	2.3	0.1	1.1	1.2	0.5
Aug-23	1.5	1.9	0.8	0.5	0.3	1.4	0.2	1.2	3.2	0.4
Sep-23	0.5	0.9	0.8	0.7	0.3	0.7	0.3	1.0	0.9	0.8
Oct-23	0.9	0.8	0.9	1.7	2.1	1.1	0.5	2.9	2.7	1.6
Nov-23	0.5	0.7	0.6	1.8	0.7	1.1	1.0	1.8	0.8	2.2
Dec-23	0.4	0.6	0.8	2.1	0.3	1.4	1.2	1.5	0.8	1.0
Jan-23	1.1	0.6	1.7	1.7	0.3	1.7	0.2	2.7	0.7	1.9

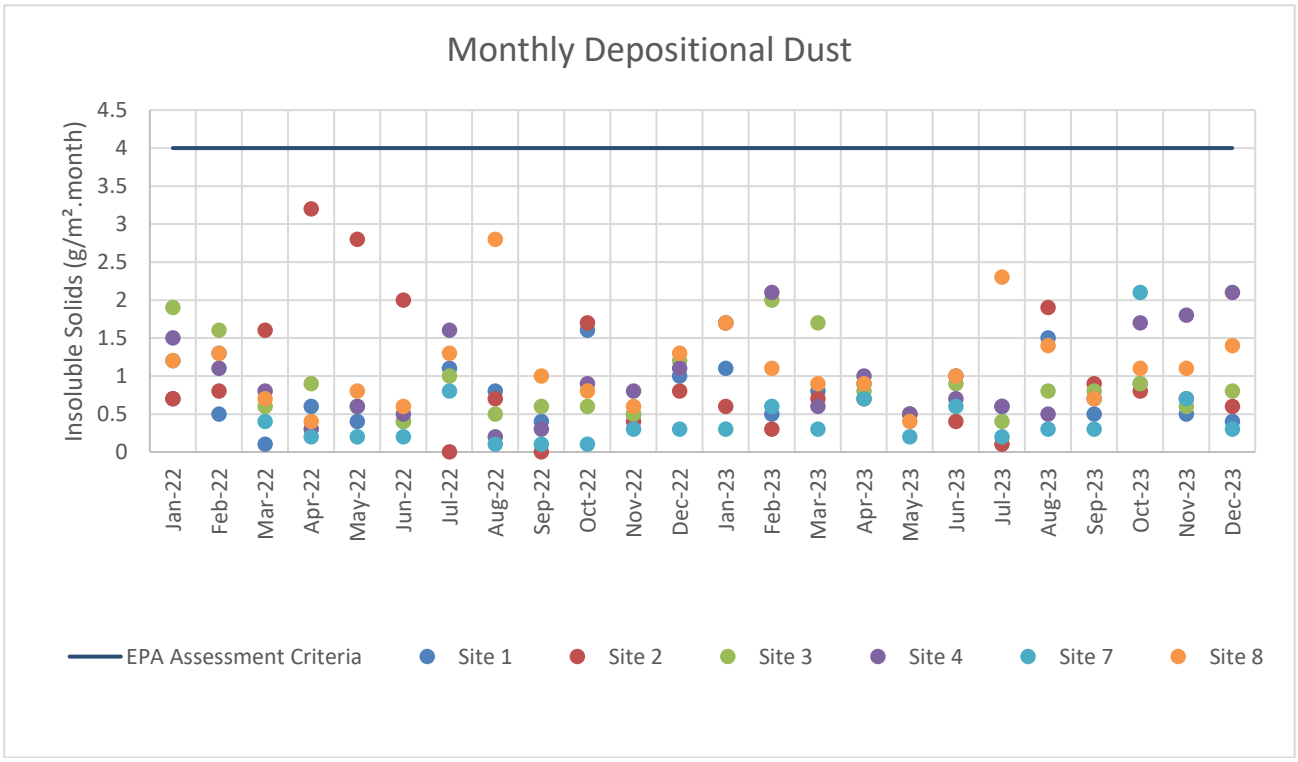

Figure 4: Comparison in pit-top Depositional Dust monitoring between the current monitoring period and previous reporting period.

Figure 4 illustrates all sites are in accordance with Tahmoor Coal's Environmental Protection Licence (EPL) and within the annual average of 4 g/m^2/month as allowed by consent SSD 8445. In general, all Depositional Dust monitoring site levels fluctuated on average between 0.5 to 1.7g/m^2/month with an annual average for all sites of 1.0 g/m^2/month for 2023. **Figure 5** illustrates the historical annual average of each site over the past 14 years.

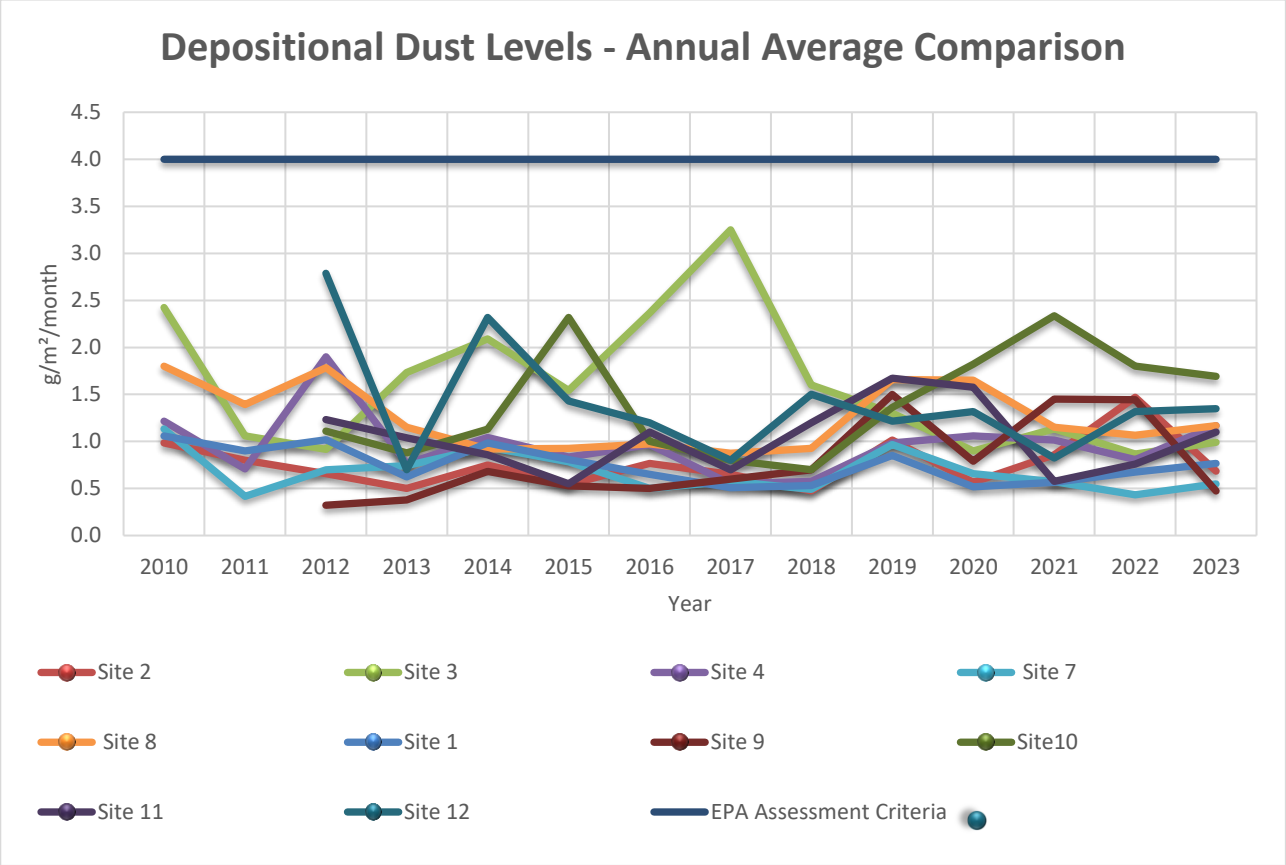

Figure 5 Depositional Dust Monitoring Annual Average Comparison

10.2.2 Continuous and Hi Vol Dust Monitoring

Figure 6 and **Figure 7** demonstrate the results of the particulate matter (PM_{10}) monitoring at Charlies Point Road and quarterly High Volume (Hi Vol) dust monitoring at Olive Lane and Hodgson Grove in Tahmoor. PM_{10} particles have a diameter of 10 micrometers or smaller and are found in dust and smoke as a common air pollutant. These monitoring sites have been established since August 2013, with a continuous TEOM (Tapered Element Oscillating Microbalance) dust monitor located at Tahmoor Coal's Charlies Point Road property.

During 2023, Hi vol results have remained low and well below our 24 hour maximum average level of 50 µg/m^3 (as shown in **Figure 6**).

As shown in **Figure 7**, bushfires and hazard reduction burns impacted on the air quality significantly during November and December 2019 causing a steep increase in the PM_{10} annual average. However, during 2020 levels considerably declined and returned to baseline levels during 2021. During 2023, PM_{10} results from our continuous TEOM dust monitor at Charlies Point Road have remained below development conditions (SSD 8445) maximum annual average of 25 µg/m^3. An increase of hazard reduction burns undertaken in the region were noted during this reporting period which could have influenced this year's average result shown in **Figure 6**.

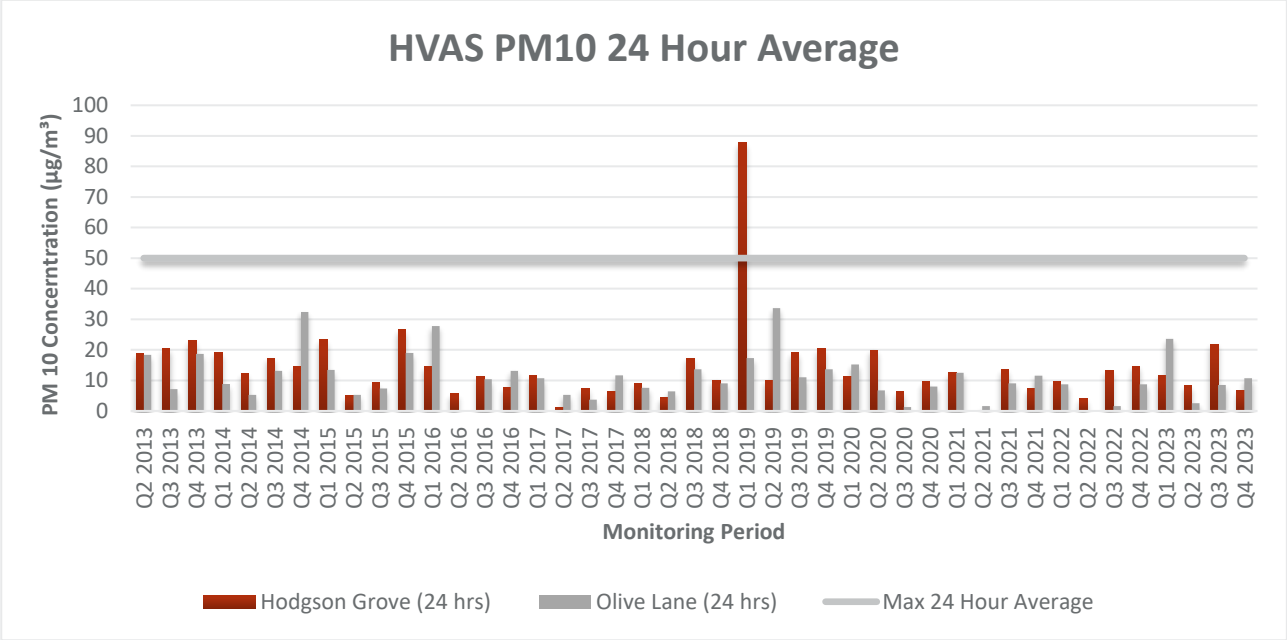

Figure 6 Air Quality monitoring results for PM10 from 24hr High Volume dust monitors located at Olive Lane and Hodgson Grove.

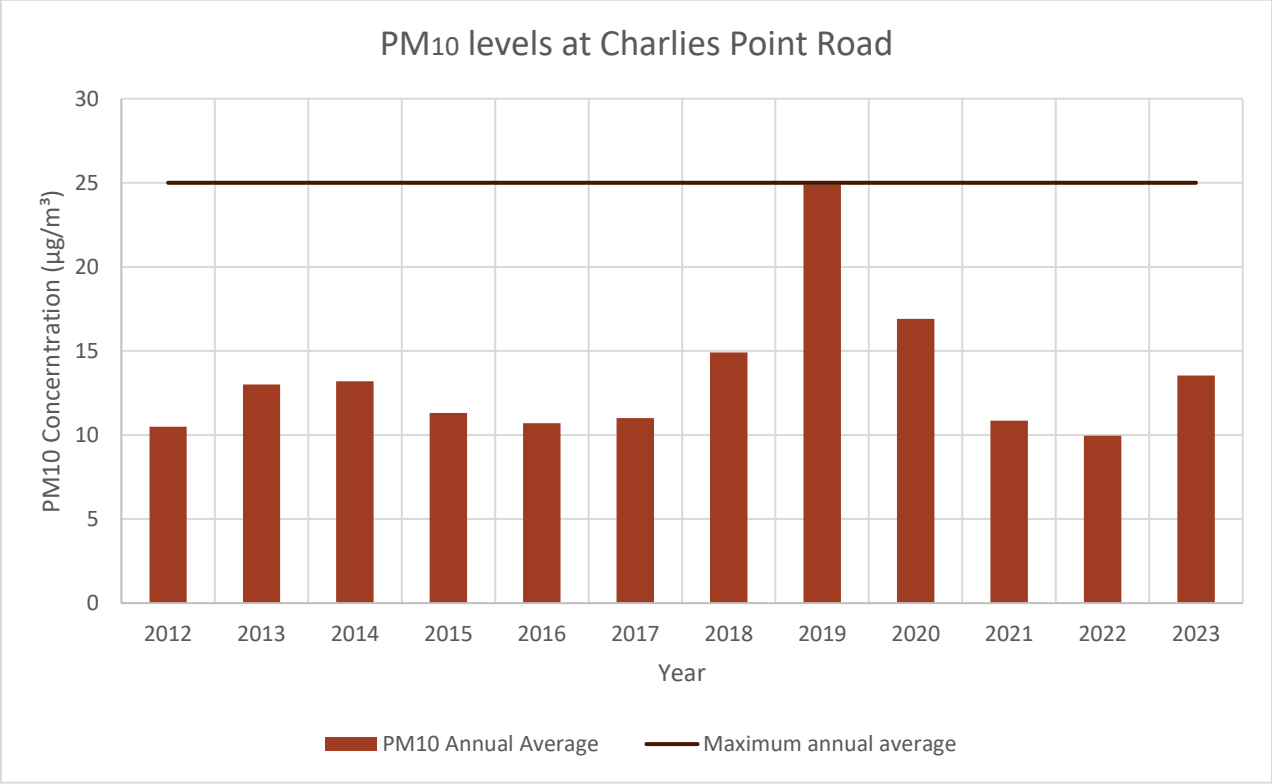

Figure 7 Continuous PM10 annual average results from our Charlies Point Road dust monitor.

10.2.3 Total Suspended Particulate

Total suspended particulate (TSP) refers to the totality of small solid matter released, documented and/or otherwise observed in the atmosphere. TSP is sampled every 6 days by a third-party contractor and sent to a laboratory for analysis. The TSP gauge is located on a mine owned property south of the REA with the TEOM monitoring station. The below data in **Table 10-2** was captured for the reporting period and recorded an average annual concentration of **17.10** µg/m^3, this has increased from the previous reporting period average of 10.49 µg/m^3 for 2022 but is within previous baseline results (refer to **Figure 8**) (and within the 90 µg/m^3 annual average as stated in Condition 37, DA 67/98).

Table 10-2 Total Suspended Particulates recorded for 2023.

2023	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Jan	9.5	15.5	14.8	10	25.7	**
Feb	17.5	15.8	23.5	19.8	19.2	**
Mar	28.3	22.6	32.9	8.3	9.9	**
Apr	12.8	9.3	12.5	9.3	6.5	**
May	15.6	17.7	9.9	20.9	7.2	**
June	11.2	12.7	10.2	20.9	2.2	**
July	6.2	2.8	20.8	9.4	11	**
Aug	30.2	20.9	8.2	11.4	14.4	**
Sept	7.8	9.8	35.3	37.5	23.2	**
Oct	46.3	9.5	8	21.9	*	**
Nov	41.8	74	3.2	17.4	0.1	**
Dec	9.7	32.4	31.0	42.1	10.5	19.2

*Power failure occurred for unit

** 6th sample not required in this month

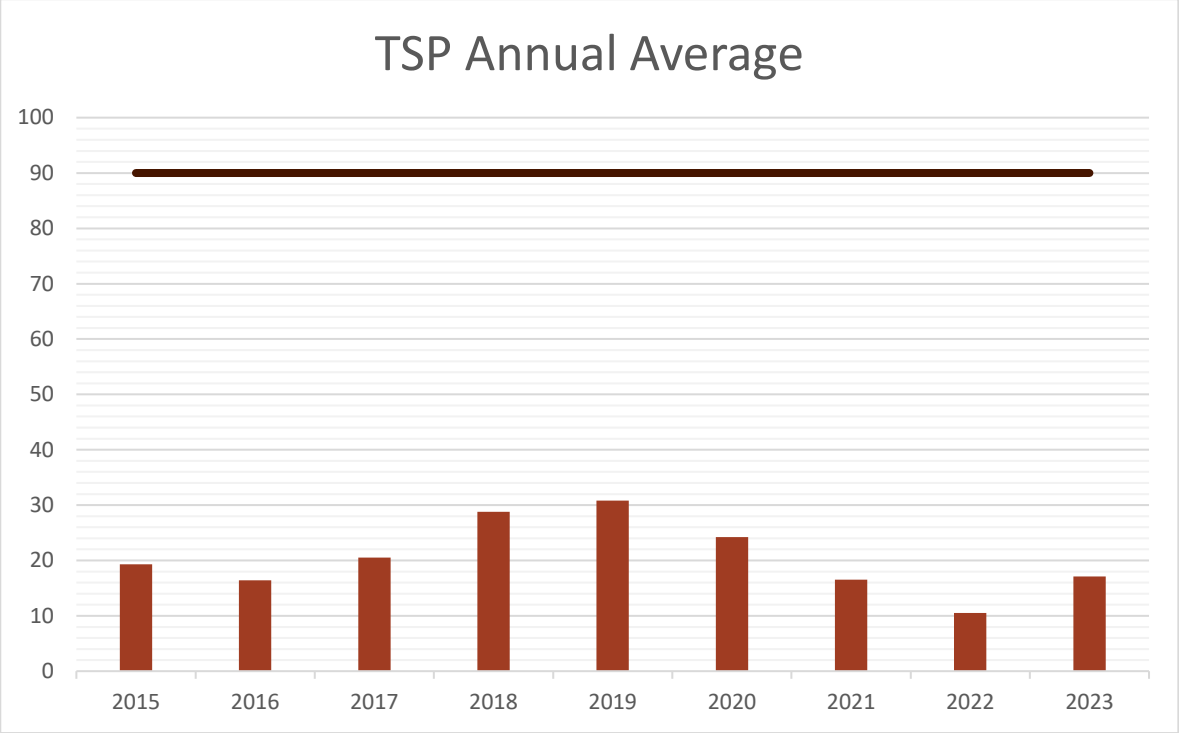

Figure 8 Total Suspended Particulates Annual Average

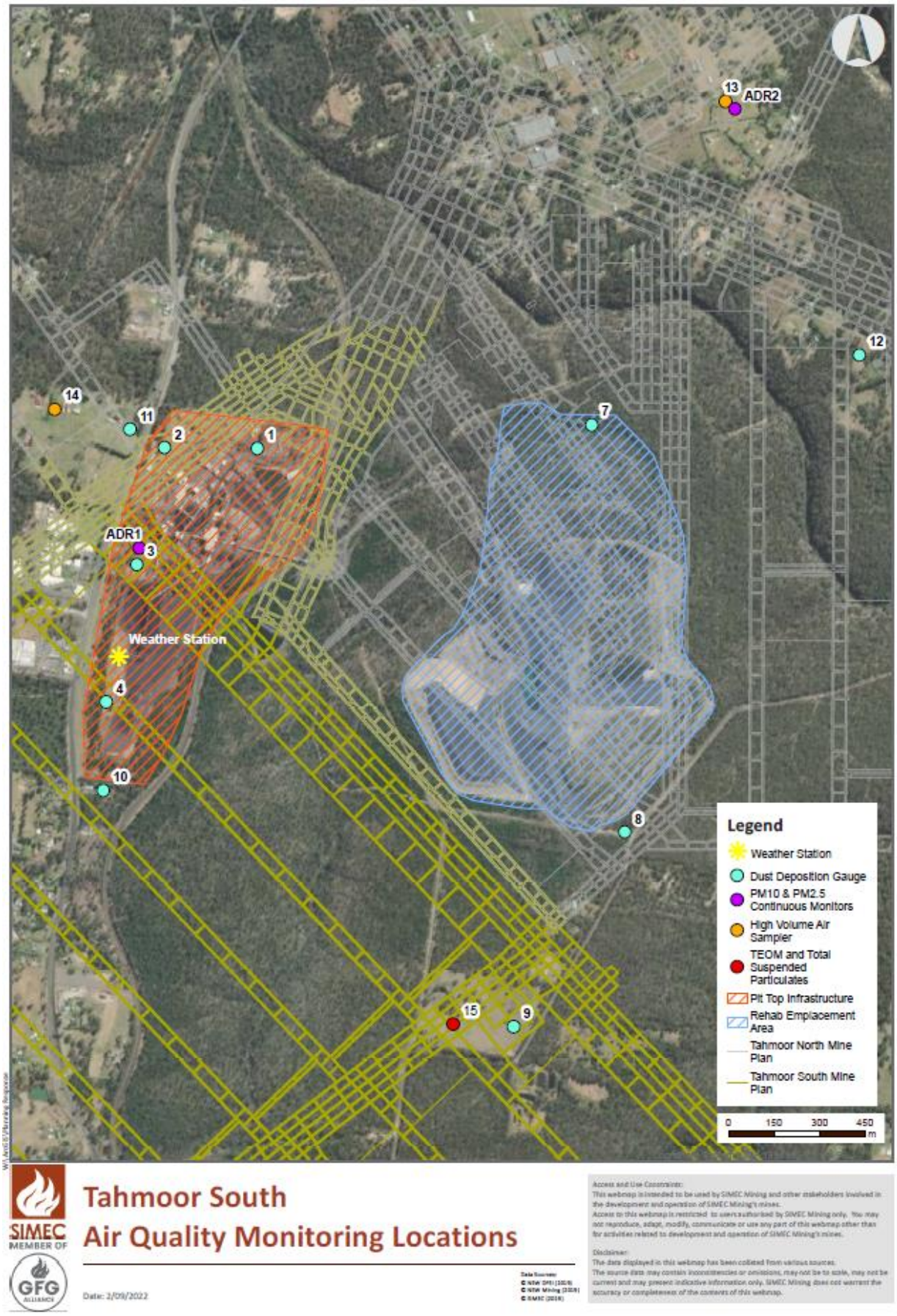

Figure 9 Air Quality monitoring locations

10.2.4 Greenhouse Gas Emissions

Greenhouse gas emissions (GHG) are recorded every six (6) months and reported every twelve (12) months in the National Greenhouse and Energy Reporting (NGERS) scheme as a requirement under the National Greenhouse and Energy Reporting Act 2007 (NGER Act). NGER provides information about GHG emissions, energy production and energy consumption.

Carbon Dioxide Emissions (CO2-e) for the Financial Year 2023 and previous years are shown in **Table 10-3** below, as well as further explanation of the data.

Table 10-3 Annual Greenhouse Gas Emissions for Financial Year

Year	Scope 1 (Mt CO2-e)	Scope 2 (Mt CO2-e)	Total Scope 1+2 (Mt CO2-e)	Explanation for results
FY16	1.643	0.085	1.727	Finished Longwall LW29 and commenced LW 30. A 78 day changeout between longwalls occurred versus a budget of 28 days. The cause of delays included 12 days lost due to surface dam subsidence risk management.
FY17	1.625	0.085	1.710	-
FY18	1.396	0.082	1.478	Decrease in emissions with use of more accurate gas composition (SICK Analyser) on Shaft 2 Ventilation Air Methane (VAM) emissions. In Dec 17 there was a Pit bottom roof fall which delayed mining for 12 days.
FY19	1.260	0.083	1.343	Decrease in Greenhouse emissions driven by plant outage for 10 weeks at Tahmoor due to Number 3 shaft safety incident (shaft winder), however 4 weeks of this period was a Longwall changeover, so the additional impact was 6 weeks. The Net Energy Consumed increased in main due to a higher ratio of CH4 to CO2 in mine gas flaring at Tahmoor due to longwall gas geology.
FY20	1.239	0.088	1.326	In H1 FY20 – Reduction in normal VAM emissions Sept-Nov 19 due to a longwall non-production period, due to extended LW changeout (discontinuity). Ramp up of longwall production within the new, more highly CH4 rich Domain has been significantly slower than forecast. Dec 19 - Bushfire site power outage.
FY21	1.124	0.079	1.222	Approx. 110,000 t CO2-e Scope 1 reduction due to decreases in VAM emissions primarily driven by • Increase in gas drainage plant capacity and post-drainage capture efficiency (PDCE) with waste gas sent to EDL and flares. • 2 x LW non-production periods in Nov 20 and Jun 21 relating to LW changeout. • Partial extraction in a virgin LW environment (ie. 1st LW in new domain i.e. Western Domain)
FY22	0.964	0.091	1.055	Main data variances identified when compared to the previous corresponding period are a reduction in normal free-vented emissions. These reductions are believed to be contributed to by: 1. Significant reduction in CH4 VAM (15-20%). Equivalent CO2 VAM. CH4 VAM reduced 16.4% from FY21 (the methane component of VAM was 873,040 tCO_2e in FY21 and 729,570 tCO_2e in FY22) 2. In general, trend towards increases in carbon dioxide fugitive emissions when compared to FY21 (note – emissions of carbon dioxide, not carbon dioxide equivalent emissions): • CO2 vented increased 192.4% from FY21 (303 tonnes in FY21 to 886 tonnes in FY22) • CO2 sent to EDL increased 114.2% from FY21 (6,131 tonnes in FY21 to 13,135 tonnes in FY22)

				• CO2 sent to flare increased 65.8% from FY21 (10,126 tonnes in FY21 to 16,786 tonnes in FY22) 3. Composition of methane and carbon dioxide as expected due to the above variation has shifted: • CO2: total mass in total mass of gas generated from the mine during the year before capture and storage (measured per NGERs requirement) has increased 10.6% from FY21 (140,262 tCO_2e in FY21, 155,088 tCO_2e in FY22) • CH4: total mass in total mass of gas generated from the mine during the year before capture and storage (measured per NGERs requirement) has decreased 11.59% from FY21 (1,623,825 tCO_2e in FY21, 1,435,567 tCO_2e in FY22) 4. VAM reductions due to reduced LW SGE and improved post-drainage capture efficiency (PDCE). 5. 2 x extended LW non-production periods in Jul-Aug 21 and Mar-Apr 22 relating to Longwall relocation. Combined non-production timeframe marginally exceeds that of previous period.
FY23	0.992	0.079	1.072	Main data variances identified when compared to the previous corresponding period are discussed below: • A marginal overall increase VAM gas (~6% total gas). This included an 8% reduction in CH4 VAM and a corresponding increase % in CO2 VAM. It is believed that this is contributed to by: ○ a 7% increase in ROM production output; ○ the partial sealing of Tahmoor North workings, the decommissioning of the Tahmoor North booster fans in late September and early October 2022 – an area of the mine with higher CH4 gas make – this marginally lowered the shaft CH4 composition; and ○ a subsequent transition to a CO2 dominant LW operating environment from mid Oct 22 • A 30% increase in total gas capture through the Gas Drainage Plant (16kt combined CH4 and CO2 gas), driven primarily by a 50% increase in CO2 capture. Of the gas captured year on year, the additional gas was distributed between flaring (6kt), cogen (4kt) and free-venting (6kt). ○ Free-venting at the Gas Drainage Plant increased 400-500% due to elevated O2, low CH4 and associated operational constraints relating to Cogen (EDL) operability, and flare configuration/capacity. ○ The additional CO2 flared is a function of the increased CO2 capture in the Gas Drainage Plant and the proportional distribution of gas to flares. Of the additional 16kt through the Gas Drainage plant, 6kt reported to the Flares (~40% compared to historical figure of ~60%, and also noting the Cogen % distribution was lower than normal and free-venting significantly higher (as explained above) • The increase in gas capture through the gas drainage plant may have otherwise emitted through VAM.

10.2.5 Tahmoor South Project specific reporting

In accordance with Condition B19 (d) of the consent SSD 8445, the below **Table 10-4** and **10-5** demonstrates the reporting of annual and 3-year rolling average GHG emissions for the Tahmoor South Project.

Table 10-4 Calculated Scope 1 and 2 GHG Emissions

Project Year	Scope 1 GHGE (t CO2-e) (flaring and power generation occurring)	Scope 2 GHGE (t CO2-e)	Total Scope 1+ Scope 2 GHGE (t CO2-e)	Comments
1 (2021)	97,571	9,106	106,678	-
2 (2022)	432,000	38,993	470,994	
3 (Jan-June 2023)	541,178	40,528	581,706	H2 FY23 Data only (Jan-June 2023) H1 FY24 data (July-Dec 2023) will be published in NGER for FY24.
Total	1,070,749	88,627	1,159,378	

Three (3) years of data has not yet been recorded to determine the 3-year rolling average. The emissions have not exceeded the predicted Scope 1 and 2 emissions as detailed in Appendix 9 of SSD8445 and given below in Table 10.5.

Table 10-5 Predicted Scope 1 and 2 GHG Emissions (Appendix 9 from SSD 8445 consent)

Project Year	Scope 1 GHGE (t CO2-e) (flaring and power generation occurring)	Scope 2 GHGE (t CO2-e)	Total Scope 1+ Scope 2 GHGE (t CO2-e)
1 (2021)	230,041	14,764	244,805
2 (2022)	1,003,246	64,389	1,067,635
3 (2023)	1,636,849	105,054	1,741,903
4 (2024)	2,054,557	131,863	2,186,420
5 (2025)	1,843,089	118,291	1,961,380
6 (2026)	2,065,327	132,555	2,197,882
7 (2027)	2,070,977	132,917	2,203,894
8 (2028)	2,301,721	147,727	2,449,448
9 (2029)	1,859,357	119,335	1,978,692
10 (2030)	2,016,949	129,450	2,146,399
11 (2031)	1,761,824	113,076	1,874,900
12 (2032)	466,314	29,928	496,242
Total	19,310,249	1,239,350	20,549,599
Annual Average	1,609,187	103,279	1,712,466

10.2.6 EIS Commitments

Condition A2 (g) of the Consent states that the development may only be carried out generally in accordance with the Tahmoor South EIS. The relevant Tahmoor South EIS documents include:

a) Tahmoor South Project Environmental Impact Statement (EIS), Volumes 1 and 7, dated January 2019;
b) Tahmoor South Project Amendment Report (PAR), including Appendices A to R and response to submissions, dated February 2020;
c) Tahmoor South Project Second Amendment Report, Appendices A to O and response to submissions, dated August 2020;
d) Additional information responses dated 14 September 2020, 23 October 2020 and 4 November 2020;
e) Submission to the Independent Planning Commission (IPC) February 2021.

Tahmoor South EIS commitments relevant to the Tahmoor South Air Quality Greenhouse Gas Management Plan are outlined in **Table 6** below.

Table 6 EIS Commitments

Instrument	Reference	Commitment	Where Addressed
Air Quality			
EIS/ RTS	AQ-1	**Potential impact:** Impacts of construction of the Project on air quality sensitive receptors **Management and mitigation measures:** Develop and implement an Air Quality Management Plan for inclusion in the CEMP. The Air Quality Management Plan would include management and mitigation measures to minimise dust generation.	The Tahmoor South Air Quality Greenhouse Gas Management Plan is utilised to manage construction and ongoing operation of Tahmoor Coal.

RTS	AQ-2	**Potential impact:** Impacts of construction of the Project on air quality sensitive receptors **Management and mitigation measures:** Consult nearest residents to the proposed ventilation shaft sites during detailed design.	Construction of new ventilation sites not to be undertakenat this point.
RTS	AQ- 6	**Potential impact:** Impacts of the operation of the Project on air quality sensitive receptors **Management and mitigation measures:** Installation and monitoring of additional real-time PM10 monitors to target the most sensitive receptors likely to be affected by dust.	Two new PM10 and PM2.5 dust monitors installed in locations according to condition B18 (f)(i) of Consent SSD 8445.
Greenhouse Gas			
EIS/ RTS	GHG-3	**Potential impact:** Generation of GHG from operation of the Project **Management and mitigation measure:** Monitor the upcast ventilation shaft sites to enable accurate measurements of ventilation emissions. Monitoring to be reported within the Annual Review.	Emissions monitoring is reported above in **Section** Error! Reference source n ot found..**2.4**
EIS/ RTS	GHG-4	**Potential impact:** Generation of GHG from operation of the Project **Management and mitigation measure:** Prepare an Energy Savings Action Plan in accordance with the NSW Energy Administration Amendment (Water and Energy Savings) Act, 2005 and the Guidelines for Energy Savings Action Plans (DEUS, 2005). The plan will include standards to minimise energy use and GHG emissions from the Project's operations.	Management and mitigation measures undertaken in accordance with Table 13 of the AQGHGMP. Completed in association with Condition B19 (a) of Consent SSD8445.
EIS/ RTS	GHG-5	**Potential impact:** Generation of GHG from operation of the Project **Management and mitigation measure:** Ensuring maintenance, calibration and record keeping is undertaken on the main ventilation shafts and fans to enable GHG emission calculations. Maintaining records for monthly electricity use and monthly ROM coal production to allow calculation of greenhouse gas emissions. Monitoring to be reported annually within the Annual Review.	Emissions monitoring is reported above in **Section** Error! Reference source n ot found..**2.4** Maintenance, calibration and record keeping is undertaken in accordance with operating requirements to maintain equipment efficiency and reliability.
EIS/ RTS	EHR-1	**Potential impact:** Potential impact of diesel emissions on the health of individuals **Management and mitigation measures:** Undertake monitoring programs and regular maintenance and servicing of diesel vehicles on site to reduce risks to the exposed community.	Management and mitigation measures undertaken in accordance with Table 13 of the AQGHGMP. Diesel vehicles on site serviced according to service program and Work Order system.
PAR	NA	In relation to Scope 3 emissions, Tahmoor Coal's current end customers include: 1. Australian consumers of metallurgical coking coal (notably the two steelmakers in Australia: BlueScope and OneSteel Manufacturing, which is an affiliated company of Tahmoor Coal); 2. Consumers of metallurgical coking coal located in Germany, Japan, India, United Kingdom and Netherlands; and 3. End customers in other locations from time to time. Tahmoor Coal's current end customer base is located in countries that are signatories to the Paris Agreement within the United Nations Framework Convention on Climate Change. Tahmoor Coal would continue to manage the reduction of the Scope 3 emissions from the Amended Project to the greatest extent possible by continuing to sell its coal to customers with end users located in countries that are parties to the Paris Agreement, or countries with equivalent domestic policies for reducing greenhouse gas emissions.	Refer to Section **Error! R eference source not found.** of the AQGHGMP for further information.

Submission to IPC	2(a)	To support the CN30 program, and to support the objectives of the NSW Climate Change Policy Framework, Tahmoor Coal will continue to investigate opportunities for the reduction of Scope 1 and Scope 2 emissions from this Project as part of an Energy Savings Action Plan (or 'Air Quality and Greenhouse Gas Management Plan'). Tahmoor Coal is willing to make specific references to carbon neutrality commitments in any standalone Statement of Commitments.	Refer to Table 13 of the AQGHGMP for further information.
Submission to IPC	2(b)	Tahmoor Coal is willing to accept a Recommended Condition identical to conditions B32, B34, B35 and B36 'Management of Scope 3 Greenhouse Gas Emissions' of Part B 'Specific Environmental Conditions' of the United Wambo Open Cut Coal Mine (SSD 7142) Approval granted by the IPC on the 29 August 2019, relating to the preparation of an Export Management Plan, as described in 4.6.1.	Noted

10.3 Further Improvements

Tahmoor Coal will continue to operate and monitor the sites dust and air quality levels in accordance with the approved Tahmoor South Air Quality and Greenhouse Gas Management Plan (TAH-HSEC-00379) reviewed annually following the submission of this AEMR.

Tahmoor Coal continue to utilise the two (2) photometers installed during 2022 to analyse particulate matter for 2.5µm and 10µm in real-time equipped with alarms triggered by the approved Air Quality Trigger Action Response Plan for Tahmoor Coal.

Tahmoor Coal also continue to utilise the 24/7 remote access to real-time monitoring for PM10 data from the TEOM (Tapered Element Oscillating Microbalance) monitor at Charlie Point Road which was upgraded during the previous reporting period.

Tahmoor Coal will continue to implement control strategies identified in Tahmoor Mine's Air Quality and Greenhouse Gas Management Plan (TAH-HSEC-00379) and continue to identify areas for improvement over the next reporting period.

11 Erosion and Sediment Control

11.1 Environmental Management

Tahmoor Coal has developed a Water Management Plan (TAH-HSEC-00369) and site Erosion & Sediment Control Plan (TAH-HSEC-00374), prepared generally in accordance with the requirements of *Managing Urban Stormwater* (OEH, 2008), including *Volume 2E Mines and Quarries* (2008) (also known as 'the Blue Book') and have both been approved by DPHI (formerly Department of Planning and Environment) in accordance with the Tahmoor South Consent (SSD 8445) conditions.

A number of drive-in sumps are positioned around pit-top to capture and hold sediment laden water. A network of drains across pit-top direct runoff waters into our settling dams, which allow the capture and settling of sediment laden waters prior to discharge via Tahmoor Coal's Licence Discharge Point 1 (LDP1).

The unsealed equipment storage area between dams M1, M2, M3 and M4 is treated regularly with a dust suppressant to seal the roadways and reduce wind blown dust activity. The sealing agent is also useful in reducing sediment mobilisation during stormwater runoff.

Continued use of flocculent in surface water dams enables a reduction in turbidity and an increased settling of mobilised particles during rain events. Flocculent dosing rates are adjusted depending on Turbidity readings from the real-time Turbidity monitor situated on Dam M3 and connected to Tahmoor Coal's Citect software system. This system is linked to alarms and SMS notifications based on the related Trigger Action Response Plan levels.

11.2 Environmental Performance

Dust gauge and water quality sampling are carried out monthly by third party licenced contractors while continuous water and continuous dust data is accessed remotely via telemetry by the environmental team onsite as required. The continuous dust monitors are connected to a telemetry service which issue alarms based on trigger levels reached in accordance with Tahmoor Coal's Air Quality TARP. Results obtained during the reporting period reflect Tahmoor Coal has operated within maximum levels as required by Environmental Protection Licence 1389 (EPL 1389) and that the current dust suppression activities are sufficient in continued dust control for site.

11.3 Further Improvements

Tahmoor Coal will continue to implement control strategies identified in Tahmoor Coal's Water Management Plan (TAH-HSEC-00369) and the site's Erosion & Sediment Control Plan (TAH-HSEC-00374) which incorporate site-wide erosion and sediment controls and their effective implementation.

12 Waste Management

12.1 Environmental Management

Tahmoor Mine's waste management system currently operates in accordance with the developed Waste Management Plan (TAH-HCEC-00106). This plan aids in ensuring waste streams generated at Tahmoor Mine are minimised and managed effectively and that all waste is collected, disposed of and tracked in accordance with regulatory requirements and in a way that does not compromise the health or safety of our personnel or impact the environment. This Waste Management Plan applies to all waste generated or stored at Tahmoor Coal and is part of the Tahmoor Coal's Environmental Management System (EMS).

In accordance with Consent SSD 8445 condition B48(e), Tahmoor Coal monitors and reports annually on the effectiveness of the waste minimisation and management measures undertaken onsite and included in this section.

According to the Waste Classification Guidelines Part 1: Classifying Waste (EPA 2014), waste is classified using six classes:

- Special waste;
- Liquid waste;
- Hazardous waste;
- Restricted solid waste;
- General solid waste (putrescible); and
- General solid waste (non-putrescible).

These classes are documented with their corresponding waste stream in Appendix A of the Waste Management Plan (TAH-HSEC-00106).

Tahmoor Coal recognises the importance of segregating the six groups of waste so they can be treated separately. Various bins are placed across the site to assist with waste segregation, refer to **Figure 11** for their locations at Tahmoor Mine. Waste produced on site is placed in the appropriate bin and if no bin fits the description of that waste, it is placed in a bunded area and covered in case of a rainfall event for correct disposal in consultation with an appropriate waste disposal contractor.

All wastes that have the potential to cause environmental harm (e.g. hazardous waste) are placed in secure areas on site. Adequate containment (bunding) is provided to minimise the potential for spillage or leaching which could affect surface water quality or cause soil contamination. Bunded areas are constructed and operated generally in accordance with the EPA's Technical Guideline "Bunding and Spill Management" and Australian Standard (1940-2004) "The Storage and Handling of Flammable and Combustible Liquids". Particular waste streams, such as waste oil, are also managed to provide that they are safe from likely ignition sources to minimise the risk of fire. All bins and waste storage areas are clearly identified, designed to meet the storage requirements, and maintained to contain any spillages.

12.2 Environmental Performance

During the reporting period waste generated on site has been managed in accordance with Tahmoor Mine's Waste Management Plan with the table below quantifying the waste generated during 2023. Main trends from the data show General Waste has reduced from the previous reporting period and recyclables have increased, with Paper and Cardboard waste showing a downward trend over the past 3 reporting periods (refer to **Table 12-1** below).

Table 12-1 Waste Streams for Tahmoor Coal

Waste Stream	2021	2022	2023
General Waste (tonnes)	1104.95	1226.43	1108.07
Paper and Cardboard (tonnes)	19.59	14.7	11.78
Comingled Recyclables (tonnes)	-	0.06	0.17
Metal Recycling (tonnes)		539.03	368.73
Oil Filters (units)	1507	742	900
Oil Drums empty 20L (units)	4578	4628	8898
Diesel Particulate Filters (tonnes)	60.19	55.84	15.3

12.2.1 Onsite Sewage Management

Tahmoor Coal operates a *Smith & Loveless* Sewage Treatment Plant (STP) onsite, illustrated in **Figure 10** below and utilises two (2) maturation treatment ponds to treat its effluent waters. Water Quality samples have continued to be taken to further understand the water quality and potential improvements potentially affecting the new Water Treatment Plant. During the reporting period both maturation ponds were cleaned/dredged out, this had an immediate improvement on E-coli and Enteroccoci levels, recording a dramatic decrease to previous baseline levels.

Figure 10: Smith & Loveless Sewage Treatment Plant (STP) onsite

12.2.2 Coal Washery Refuse (CWR)

During 2022, Tahmoor Coal's CWR obtained certified compliance with the EPA Coal Washery Rejects Order and Exemption 2014. The use of CWR is controlled by the NSW State Government Environmental Planning Authority (EPA), under the Protection of the Environment Operations (Waste) Regulation 2014.

This has provided Tahmoor Coal the opportunity to utilise it's CWR for potential offsite purposes including but not limited to general construction fill, construction of public facilities (such as playing fields, tennis courts, golf courses and general landscaping), road construction usually as embankment fill, or subgrade for unsealed road surfacing. Further uses include topdressing, haul roads, drainage blankets, capping (e.g. tailings dams prior to application of topsoil layer), retaining wall backfill, cattle tracks and earthwall dams.

Due to the relatively consistent nature of the coal seam and surrounding geology; and the coal washing process (i.e. crusher and sieve sizing), the CWR material characteristics are consistent over time.

During 2023, there was no off-site use of Tahmoor Coal's CWR product to report.

Any offsite use of Tahmoor Coal's CWR will be reported in the AEMR in accordance with Consent SSD 8445 condition B61.

12.3 Further Improvements

Tahmoor Coal will continue to implement control strategies identified in Tahmoor Mine's Waste Management Plan (TAH-HSEC-00106) and continue to identify areas for improvement over the next reporting period.

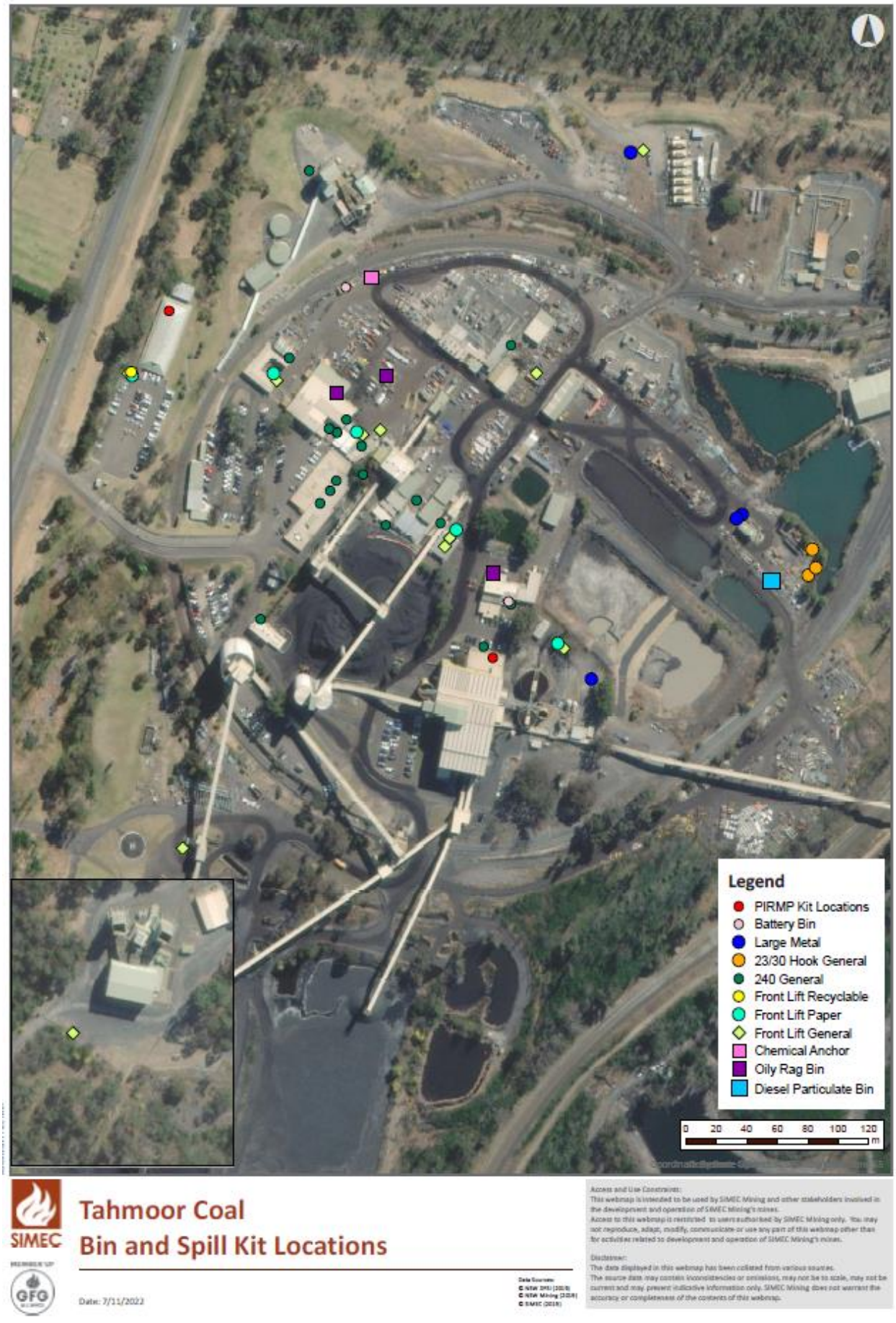

Figure 11 Bin and Spill Kit Locations

13 Contaminated Land

13.1 Environmental Management

A Stage 1 Preliminary Contamination Investigation was completed by GHD in 2017 and actions from the findings have been closed out, including removal of former underground storage tanks (USTs) and remediation works around the waste oil tanks and diesel above ground storage tanks (ASTs).

Groundwater monitoring around the UST area is ongoing as part of the quarterly water quality sampling and monitoring program for pit-top groundwater.

13.2 Environmental Performance

A Hazardous Building Material audit and inspection was undertaken by GHD in 2018.

The audit focused on:

- Asbestos containing materials (ACM);
- Lead based paint systems;
- Lead Dust;
- Synthetic Mineral Fibre (SMF);
- Polychlorinated Biphenyls (PCBs) in light fittings; and
- Ozone depleting substances (ODS).

The Hazardous Materials Audit identified several actions that were completed during 2019 and there remains one outstanding action as outlined in **Table 13-1** below.

Table 13-1 Hazardous Building Material Audit Actions

Action	Proposed Completion Date
Remove vinyl floor tiles from 5 offices and replace with new tiles	Complete
Labelling of all asbestos	Complete
Seal or encapsulate the eaves of BU001 which were found to contain asbestos	Works delayed – to be addressed in the future.
Remove dust on upper surface of ceiling panels in muster area	Complete
Remove dust in Washery HV switch room SR 105 and SR106- low level lead contamination	Complete
Remove dust from No3 Switch room SR103 – high lead on top of st169	Complete

There were no reportable incidents related to contaminated land during the reporting period.

13.3 Further Improvements

Tahmoor Coal will continue to monitor potential areas of contaminated lands across the site and have one (1) action to complete from the 2018 Hazardous Building Materials Audit (refer to **Table 13-1**).

14 Subsidence

14.1 Environmental Management

14.1.1 Western Domain

The LW W3-W4 Subsidence Monitoring Program was implemented to monitor subsidence impacts within the Study Area. The Subsidence Monitoring Program included seventeen (17) Global Navigation Satellite System (GNSS) units measuring absolute horizontal and vertical positions in real time installed directly above and adjacent to LW W3-W4. Nine GNSS units have been removed from privately owned properties in July 2023.

LW W4 extraction was completed on 13 September 2022.

All subsidence related impacts are managed in accordance with the LW W3-W4 Extraction Plan approval. It is noted that the post-mining monitoring period for the Western Domain has now finished, and no further remediation or monitoring is required in accordance with this Extraction Plan.

14.1.2 Tahmoor South Domain

The LW S1A-S6A Subsidence Monitoring Program was implemented with the commencement of LW S1A secondary extraction on the 18th October 2022 to monitor subsidence impacts within the Study Area. The Subsidence Monitoring Program includes twenty-eight (28) GNSS units measuring absolute horizontal and vertical positions in real time installed directly above and adjacent to LW S1A-S6A. The extraction of LW S1A was completed on the 18th June 2023 and mining of LW S2A commenced on the 2nd of August 2023. By the end of this reporting period (31 December 2023), 1092.0m of LW S2A had been extracted.

All subsidence related impacts are managed in accordance with the Tahmoor South LW S1A-S6A Extraction Plan approval.

A weekly review of the subsidence survey results was completed by Tahmoor Coal and MSEC during the extraction period.

14.2 Environmental Performance

14.2.1 Western Domain

14.2.1.1 Review of Environmental Monitoring

A detailed review of subsidence monitoring data and impacts is provided in the Tahmoor Coal Six Monthly Subsidence Impact Reports. These reports fulfil the reporting requirement of the Extraction Plans approved for LW S1A-S6A, and cover the period from 1st January 2023 – 31st December 2023. These requirements are outlined in Section 7.1 of the LW S1A-S6A Extraction Plan, which are derived from Section 6 of the DPIE *Draft Guidelines for the Preparation of Extraction Plans V5* (DPE, 2015). These reports provide the Secretary of DPHI with a summary of subsidence and environmental monitoring results, subsidence impacts and management actions

undertaken during the reporting period. The following Reports are found in the Appendix to this AEMR:

Appendix 14 – Western Domain Six Monthly Subsidence Impact Report 8; and
Appendix 15 – Western Domain Six Monthly Subsidence Impact Report 9.

14.2.1.2 Subsidence Monitoring

Subsidence monitoring has been completed during the reporting period in accordance with the approved Tahmoor Coal LW W3-W4 Extraction Plan, specifically as summarised in the LW W3-W4 Subsidence Monitoring Programs. On completion of a Longwall, the active subsidence zone is resurveyed, and comparative analysis of predicted and actual subsidence forecasts are reported in the 6 Monthly Subsidence Impact Reports.

The maximum observed vertical subsidence relating to the extraction of LW W4 was 897 mm recorded along the LW W1-W4 crossline survey and was less than predicted.

Notable environmental monitoring observations during the reporting period are discussed in the following sections for Biodiversity, Aboriginal Cultural Heritage, Historical Heritage, Built Features monitoring, Public Safety, Surfacewater, Groundwater, and Landscape Features.

14.2.1.3 TARP Triggers

There were seven (7) environmental aspects that were associated with Trigger Action Response Plans (TARPs) triggers. All triggers have been reviewed by the Environmental Response Group / Structural Response Group / specialists to determine if any further action is required. These TARP triggers included the following:

- **Pool Water Level TARP**:
    - During the first half of the year, Level 2 and 3 triggers occurred due to pool water level reduction at monitoring site CB and monitoring site CE on Cedar Creek. During the periods of water level decline the water level remained above the previously recorded minimum and did not decline atypically. No further actions are required;
    - During the second half of the year, a Level 2 was triggered due to pool water level reduction at monitoring site CB on Cedar Creek. During the periods of water level decline the water level did not decline atypically and occurred during a period of generally below average rainfall. No further actions are required;
- **Natural Drainage Behaviour TARP:**
    - During the calendar year, Level 3 was triggered due to laminar fracturing at SR17 Rockbar from November 2021 onwards, and fracturing at SR20 Rockbar from August 2022 onwards. A Level 3 TARP trigger was associated for both locations as the rockbar fracturing was formed during mining (was not present during baseline inspections), and there was no reduction in pool water level, drainage or overland connected flow (taking into account climatic conditions and observations during the baseline monitoring period). No further actions are required;
- **Surface Water Quality TARP:**
    - During the first half of the year, a Level 2 was triggered due to elevated dissolved aluminium at various pools throughout the reporting period. These elevated aluminium concentrations were attributed to prevailing climatic conditions. No further actions are required;
    - During the second half of the year, a Level 2 was triggered due to elevated dissolved aluminium at monitoring site SD in December 2023, and elevated pH at

monitoring sites SC and SD in December 2023. These elevated results were attributed to prevailing climatic conditions and an increase in algae growth, respectively. No further actions are required;

- **Groundwater Bore Level TARP:**
  - At the end of the calendar year, a Level 2 remained triggered for water level at P12C and P16C, however a trend in groundwater recovery was evident. No further actions are required;
- **Shallow Groundwater Pressures TARP:**
  - During the calendar year, Level 2 was triggered however a trend in groundwater recovery was evident. This trigger resolved in December 2023. No further actions are required;
- **Deep Groundwater Pressures TARP:**
  - During the calendar year, Level 2 was triggered. However, this trigger was resolved in August 2023. No further actions are required;
- **Groundwater Quality TARP:**
  - During the calendar year, Level 2 was triggered. No further actions are required.

There were no subsidence reporting notifications for LW W4 during 2023.

14.2.2 Tahmoor South Domain

14.2.2.1 Review of Environmental Monitoring

A detailed review of subsidence monitoring data and impacts is provided in the Tahmoor Coal Six Monthly Subsidence Impact Reports. These reports fulfil the reporting requirement of the Extraction Plans approved for LW S1A-S6A, and cover the period from 1st January 2023 – 31st December 2023. These requirements are outlined in Section 7.1 of the LW S1A-S6A Extraction Plan, which are derived from Section 6 of the DPIE *Draft Guidelines for the Preparation of Extraction Plans V5* (DPE, 2015). These reports provide the Secretary of DPHI with a summary of subsidence and environmental monitoring results, subsidence impacts and management actions undertaken during the reporting period. The following Reports are found in the Appendix to this AEMR:

Appendix 16 – Tahmoor South Six Monthly Subsidence Impact Report 2; and
Appendix 17 – Tahmoor South Six Monthly Subsidence Impact Report 3.

14.2.2.2 Subsidence Monitoring

Subsidence monitoring has been completed during the reporting period in accordance with the approved Tahmoor South S1A-S6A Extraction Plan, specifically as summarised in the LW S1A-S6A Subsidence Monitoring Programs. On completion of a Longwall, the active subsidence zone is resurveyed, and comparative analysis of predicted and actual subsidence forecasts are reported in the 6 Monthly Subsidence Impact Reports.

A maximum of 841 mm of vertical subsidence relating to the extraction of LW S2A was recorded at GNSS S06 during the calendar year. Subsidence is currently developing within the predictions.

Notable environmental monitoring observations during the reporting period are discussed in the following Sections for Biodiversity, Aboriginal Cultural Heritage, Historical Heritage, Built Features monitoring, Public Safety, Surfacewater, Groundwater, Flooding and Landscape Features.

14.2.2.3 Subsidence Event Notifications

Notifications of subsidence events to Government agencies is required in accordance with the Tahmoor South LW S1A-S6A Extraction Plan, and TARPs under the relevant Infrastructure and Environmental Management Plans. During the reporting period, there were thirteen (13) TARP triggers notified to the departments relating to Surface water, Groundwater, Physical Features and Natural Behaviour and Infrastructure. The TARP triggers are summarised below:

- Surface Water Quality TARP (WMP1):
    - During the first half of the year, a Level 1 triggered due to elevated EC, dissolved iron and dissolved zinc concentrations at pool TT7 from March to June 2023;
    - During the second half of the year, elevated concentrations of analytes at various sites resulted in Level 1, 2 and 3 triggers. This included a Level 2 TARP trigger in dissolved zinc and iron and a Level 3 TARP trigger for electrical conductivity, both triggers occurring during July and August 2023 at monitoring site TT7.
    - These elevated concentrations were attributed to prevailing evapoconcentration of salinity due to period of below average rainfall and water level decline, and interaction of underflow with subsurface geology and re-emergence of underflow as surface flow. No further actions other than ongoing monitoring is required;
- Surface Water Level TARP (WMP3):
    - During the first half of the year, reduction in pool water level resulted in Level 1 triggers at monitoring sites TT2-QLa and TT9-QLa occurred, which was attributed to the prevailing climatic conditions and unrelated to mining effects associated with LW S1A. However, reduction in pool water level at monitoring sites TT3-QLa, TT12QLa and TT13-QLa resulted in Level 3 triggers. These Level 3 triggers were attributed to mining induced fracturing and prevailing climatic conditions;
    - During the second half of the year, reduction in pool water level at various sites resulted in Level 1, 2 and 3 triggers. This included Level 3 TARP triggers at monitoring sites TT2, TT3, TT7, TT12 and TT13. Observations of water level decline at these monitoring sites were confirmed to be associated with direct or indirect mining impacts, in addition to influence from prevailing climatic conditions.
    - A site visit to the sites of the Level 3 TARP triggers was offered to DPIE (now DPHI) and NRAR, and a site visit with representatives from National Trust and the Australian Wildlife Sanctuary was undertaken on 22 November 2023. A WCAMP will be prepared (if required) and implemented following the cessation of subsidence movements associated with Tahmoor South mining;
- Physical Features and Natural Behaviour TARP (WMP5):
    - During the first half of the year, Level 1 was trigger at pool TT2 due to visually observed anomalous change in water level occurred during the reporting period, which was attributed to prevailing climatic conditions and unrelated to mining effects associated with LW S1A. Level 2 TARP triggers occurred at pools TT3, TT7 and TT11, and Level 3 TARP triggers occurred at pools TT12 and TT13. The Level 2 and 3 TARP triggers were attributed to mining induced fracturing, prevailing climatic conditions, and resulting reduction in baseflow conditions and negligible surface water flow;
    - During the second half of the year, reduction in pool water level, increased iron staining and the development of new or existing fractures resulted in Level 1, 2 and 3 triggers. This included Level 3 TARP triggers at monitoring sites TT2, TT3, TT11, TT12 and TT13. Changes to physical features and natural behaviour of these pools

and reaches were confirmed to be associated with direct or indirect mining impacts, in addition to influence from prevailing climatic conditions;
    - A site visit to the sites of the Level 3 TARP triggers was offered to DPIE (now DPHI) and NRAR, and a site visit with representatives from National Trust and the Australian Wildlife Sanctuary was undertaken on 22 November 2023. A WCAMP will be prepared (if required) and implemented following the cessation of subsidence movements associated with Tahmoor South mining;
- Groundwater Level TARP (WMP8):
    - During the first half of the year, Level 1 was triggered at P55C and P56C due to groundwater level reduction for a period of 6 months. For both bores, groundwater depressurisation could be due to ongoing mining effect. However, at P55C, the relative stability of this water level cannot definitely be attributed to extraction activities and further monitoring is required to better understand the trends. No further actions other than ongoing monitoring is required;
    - During the second half of the year, Level 1 triggered at P51B, P53A, P53B, P55B and GW104659, and Level 2 triggered at P53C, P55C and P56C due to groundwater level reduction. Groundwater level decline at P53 and P56 nested bores could be due to ongoing mining effect. However, at the remaining locations, it cannot definitely be attributed to extraction activities. No further actions other than ongoing monitoring is required;
- Groundwater Quality TARP (WMP11):
    - During the first half of the year, Level 1 triggered at numerous monitoring sites for barium, strontium and manganese. It was determined that extraction of LW S1A was unlikely to be influencing water quality during the reporting period, and elevated analytes were likely representative of natural fluctuations in water quality. A revision of the trigger levels of dissolved metals is recommended to be completed after a full 12-month period of monitoring data has been completed;
- Groundwater – Surface Water Interaction TARP (WMP12):
    - During the first half of the year, a review of groundwater – surface water interaction between P55C (Level 1 triggered for TARP WMP8) and associated surface water monitoring site TT1-QRLa did not find any apparent correlation between the two sites. No further actions other than ongoing monitoring is required;
    - During the second half of the year, a review of groundwater – surface water interaction between P53 nested bores (Level 1 and 2 triggered for TARP WMP8) and associated surface water monitoring site TT13-QRLa did not find any apparent correlation between the two sites. No further actions other than ongoing monitoring is required;
- Aquatic Habitat and Macroinvertebrate Indicators TARP (BMP1):
    - During Spring 2023 monitoring season, Level 1 triggered at aquatic ecology monitoring sites TTH16 and TTHt7 due to reduced aquatic pool habitats (dry pools) compared to baseline observations for two consecutive sampling occasions. These monitoring sites correlate to surface water monitoring sites where reduction of water levels is related to both mining-induced impacts in combination with prevailing dry weather conditions. No further actions other than ongoing monitoring is required;
- Historical Heritage TARP (HMP2):

    - During the calendar year, Level 1 triggered for detectable environmental consequences observed at Tahmoor Mine Site, specifically relating to cracks observed in the 6C tunnel on site. A review of the cracks by a qualified archaeologist noted that they were minor and, if required, could be repaired in a manner that preserves the heritage value of the mine. No further actions other than ongoing monitoring is required;
- Main Southern Rail TARP:
    - During the calendar year, a blue trigger was observed due to poor track geometry at 98.8 km as a result of mining-induced movements. Multiple resurfacing of the track was completed, which resolved the trigger. No further actions other than ongoing monitoring is required;
- Various Infrastructure TARPs:
    - Triggers due to non-conventional subsidence movements and bump on Remembrance Drive. Meetings with all infrastructure owners was completed during the calendar year, and actions from these meetings are being implemented;
- Tahmoor Mine Site TARP:
    - During the calendar year, a blue trigger was observed due to closure on the rail loop and cracking in the 6C Tunnel, as a result of mining. An inspection by a structural engineer of the 6C Tunnel noted no immediate concerns. Assessment of the strain on the rail loop will be completed after LW S2A mining. Ongoing monitoring is required;
- Bargo Petroleum - 3030 Remembrance Drive TARP:
    - During the first half of the year, a blue trigger was observed due to failure of fuel balance tank at an above ground diesel tank. This trigger is being investigated internally, and no mining-related impacts were observed at the property; and
- Australian Wildlife Sanctuary TARP:
    - During the second half of the year, a Level 4 trigger was observed relating to pool water level reduction and fracturing in Wirrimbirra Creek. This trigger is largely managed by the Water Management Plan TARPs. Notification of this trigger was provided to AWS in October 2023, and a site inspection with National Trust and AWS staff of Wirrimbirra Creek was conducted in November 2023. No further actions other than ongoing monitoring is required.

During the reporting period, there were no exceedances of environmental performance measures or indicators, as adopted from Condition C1 and Condition C5 of SSD 8445.

14.2.3 Further Improvements

Tahmoor Coal committed to the installation of a pre-mining and post-mining height of fracture (HoF) hole as stated in accordance with the LW W1–W2 and LW W3-W4 Water Management Plans, to be located over LW W2 and associated headings. The pre-mining HoF hole was completed before the commencement of LW W1 extraction and the post-mining HoF hole was completed following the completion of LW W4.

In accordance with the Tahmoor South LW S1A-S6A Water Management Plan, pre-mining HoF holes were completed in the vicinity of LW S1A and LW S4A. Post-mining HoF holes will be completed above LW S1A and LW S4A following the completion of the majority of mining subsidence. Further pre and post mining HoF holes are planned for the B-series upon approval of the future LW S1B-S6B Extraction Plan.

14.3 Biodiversity

14.3.1 Tahmoor Mine Site

Tahmoor Coal undertakes ecological assessments and due diligence vegetation assessments prior to undertaking activities likely to require vegetation clearing as documented in our approved Biodiversity Management Plan (TAH-HSEC-00378). Several threatened plant species have previously been identified on the surface mining lease areas, including *Grevillea parviflora* and *Persoonia bargoensis,* which have been identified at the REA, near the No.2 Shaft area, and along Charlies Point Road. *Grevillea parviflora* is listed as vulnerable on both the *Biodiversity Conservation Act 2016* (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). *Persoonia bargoensis* is listed as endangered under the Biodiversity Conservation Act and vulnerable under the EPBC Act.

14.3.2 Tahmoor North Domain

Mining related subsidence in Myrtle and Redbank Creek had resulted in reduced pool holding capacity. Water flow in affected pools was diverted through the subsurface via cracks and fissures in the bedrock, this resulted in a reduced pool holding capacity in impacted pools.

Remediation of Myrtle Creek and Redbank Creek is currently underway in accordance with the approved Corrective Action Management Plan by the Resources Regulator and in consultation with a variety of stakeholders. The remediation process consists of drilling a series of boreholes and injecting an expanding hydrophobic polyurethane grout material. This creates a “curtain wall” or subsurface dam wall across the creek bed to a depth where the fracture network has been detected, which seals the fractures and helps redirecting the stream flow back to the surface. This remediation technique is also used in combination with a grid pattern grouting process that acts as a liner to improve the water retention capability of the pool.

The grout material has also been used successfully for creek rehabilitation in Sydney Catchment Authority areas as it has minimal ecotoxicological effects and has proven to be highly effective in remediating subsurface fractures. To assess the remediation effectiveness, aquatic ecology monitoring is undertaken biannually in Autumn and Spring with specific reference to the recovery of stream health in pools that have been rehabilitated.

Monitoring was conducted using the Australian River Assessment System (AUSRIVAS) method, aquatic habitat assessment, quantitative macroinvertebrate survey and physiochemical water quality results in autumn and spring of 2019 before remediation commenced, and during autumn and spring of 2020, 2021, 2022 and 2023. Sites unaffected by subsidence are also monitored for aquatic health in the creek systems and act as a baseline for comparison.

14.3.2.1 Myrtle Creek

Remediation works at Myrtle Creek were carried out between October 2019 and August 2022. Before remediation the pools were either dry, retaining water below capacity, or holding water temporarily before rapidly declining. Since completion of the remediation works all pools have retained water during monitoring surveys, with the exception of Pool 14 in autumn 2023 and spring 2023. As of spring 2023, Pools 10, 11, 18 and 20 have been observed to retain water on at least four consecutive sampling occasions. Pool 12a has held water on three consecutive sampling occasions (refer to **Figure 12** for pool locations).

Autumn and Spring monitoring for Myrtle Creek reflected an overall generally consistent water quality result across monitoring sites compared with previous monitoring results, with the exception of elevated alkalinity reading at Pool 30 (non-impacted site) and continued dry conditions at Pool 14. The lower dissolved oxygen levels in Spring 2023 results, are likely indicative of lower rainfall and subsequent lower water flow.

During the Autumn 2023 survey, AUSRIVAS results recorded Band B, C or D scores for all monitoring pools, with Pool 30 recording Band B and Pools 10, 11, 12a and 18 recording a Band C while Pool 14 was dry. In comparison in Spring, Pools 10, 11, 18 and 20 recorded a Band C and Pools 12a recorded a Band D; Pool 30 was classed as 'Outside the Experience of the Model (OEM)'.

Low scores were recorded across all monitoring sites except Pool 30, indicating the domination of pollution tolerant macroinvertebrates and presence of few pollution sensitive taxa. This is common in low-flow, pool-edge habitats in the area.

The low biological monitoring results in spring 2023 likely reflect the mostly bedrock dominated habitats within the remediated pools and reduced pool water levels in this period, resulting in a commensurate lack of habitat complexity. It is noted that lower than average rainfall was recorded between autumn and spring 2023, resulting in somewhat reduced water levels along Myrtle Creek generally. The observations of limited microhabitat establishment among the rehabilitated pools (including between autumn 2023 and spring 2023), lower pool levels and impoverished macroinvertebrate assemblages may suggest more limited aquatic habitat permanence when compared to Pool 30.

Niche (2022) identified that the water holding and biological results in 2022 may have been higher than they otherwise would have been, due to the significantly above average rainfall conditions in that year. This does appear to be a factor, with Pool 14 recorded as dry in autumn and spring 2023, and with a general reduction in stream health index results occurring across the remediated pools generally in 2023 when compared to 2022.

It has been recommended biannual monitoring of remediated pools to determine if remediated habitat is sustained in the long term for up to two years after work has been completed. Water holding capacity has been demonstrated at Pools 10, 11, 18 and 20 for four or more consecutive sampling occasions, with ecological recovery levels ranging between 'good' and 'limited'. It is likely that the significant rainfall (and increased water availability) in 2022 contributed to improved recovery levels in previous sampling occasions (Niche 2022), that have not been sustained into 2023 where there has been a transition to lower rainfall conditions.

Further monitoring would assist in determining whether levels of recovery continue to improve and indicate the relative importance of prevailing conditions on stream health within the remediated pools.

Figure 12 Myrtle Creek Aquatic Ecology Monitoring Sites

14.3.2.2 Redbank Creek

The results in autumn 2023 indicated a decline in conditions for a number of parameters when compared to the 2022 sampling season. This is explained by the intermittent nature of Redbank Creek under nominal conditions, with the consistently high rainfall levels across 2022 likely to have temporarily ameliorated local water quality conditions.

During the Autumn 2023 survey, AUSRIVAS results recorded a Band B for Pool RR26, Pools RB5, RB6, RB19, RR30, RB33 (non-impacted site) scoring a Band C and with Pool R11 not holding water at the time of the survey. The biological results show that remediated Pools RB5, RB6, RR19, RR26 and RR30 have been able to retain some pool habitat and provide an aquatic environment supporting macroinvertebrate communities (refer to **Figure 13** for pool locations).

During the Spring 2023 Survey, Pools RR26 RR30 and RB33 scored in a Band C. Overall, there appears to be a decrease in AUSRIVAS scores in comparison to the spring 2022 sampling occasion, but results are broadly consistent with those scores previously recorded as part of the monitoring program. It is likely that the sustained high rainfall levels throughout 2022 resulted in somewhat increased biological scores, with the transition to lower rainfall levels in 2023, a relative decline in biological scores may be expected.

The number of taxa recorded in spring 2023 across the monitoring sites were low (less than 10 taxa per sites). These scores are low in comparison to previous monitoring seasons, but are within the range of results that have been recorded in the past. None of the sites recorded any EPT taxa or sensitive families of the orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddis flies). The pools do not generally record high numbers of EPT taxa, and there have been occasions where the sites have not recorded any EPT taxa in the past. This is common in low-flow, pool-edge habitats in the area.

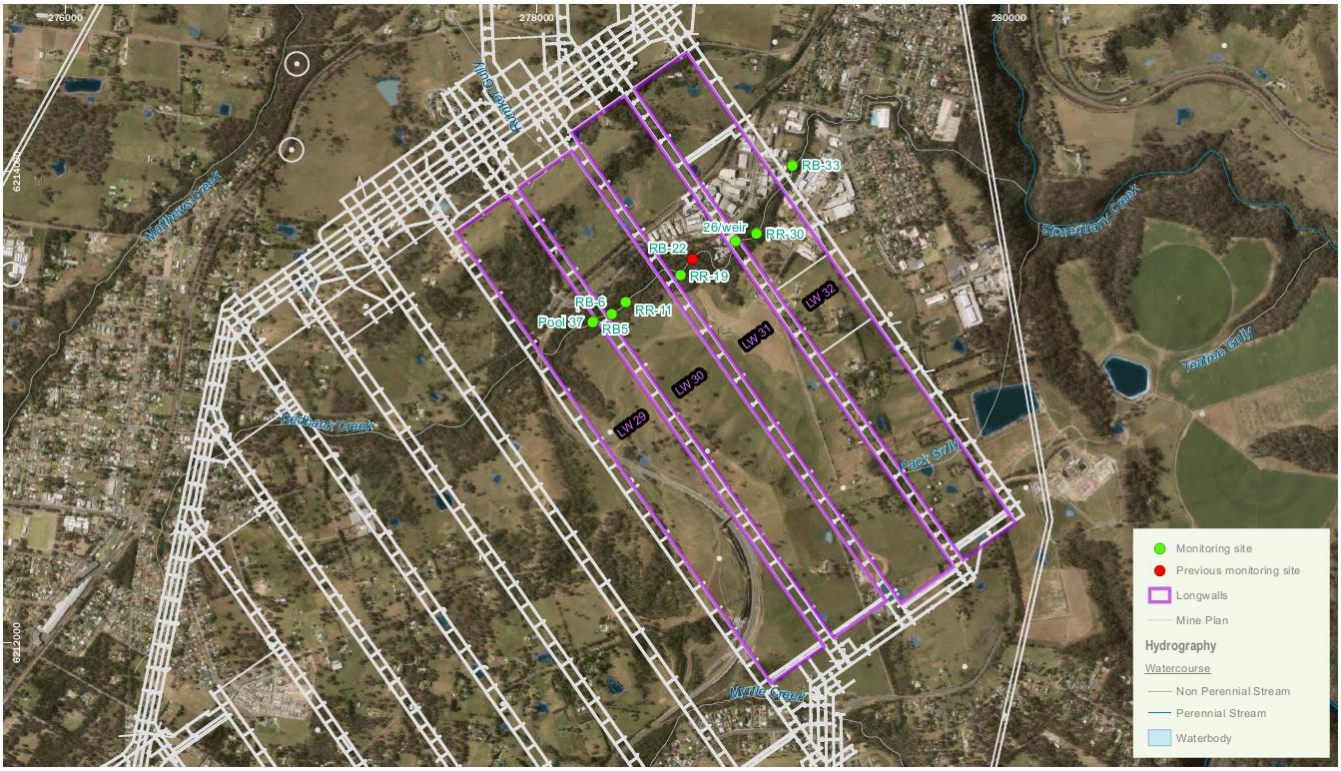

Figure 13 Redbank Creek Aquatic Ecology Monitoring sites

14.3.3 Western Domain

Baseline terrestrial and aquatic ecology studies have previously been conducted within waterway catchments in the Western Domain in Stonequarry Creek, Matthews Creek and Cedar Creek prior to the extraction of Longwall West 1 (LW W1). Visual inspections have been conducted monthly during periods of active subsidence of these creek systems for any impacts to pool level, drainage behaviour and flow. Terrestrial and aquatic monitoring of these waterway catchments have continued to be monitored and assessed following the completion of mining in the Western Domain, with monitoring finalised in Autumn 2023.

Aquatic Ecology and Terrestrial monitoring has been conducted biannually on 12 occasions across control and impact monitoring sites in Stonequarry Creek, Matthews Creek and Cedar Creek (November 2017, April 2018, November 2018, May 2019, October 2019, March 2020, September 2020, April 2021, September 2021, March 2022, September 2022 and April 2023) (refer to **Figures 13 and 14**). These occasions included baseline data since before mining commenced in the area, during active mining and post-mining monitoring with the final Autumn 2023 monitoring.

14.3.3.1 Aquatic Ecology Monitoring

Aquatic Ecology Monitoring is conducted using the Australian River Assessment System (AUSRIVAS), Riparian Channel and Environment (RCE) inventory, AUSRIVAS macroinvertebrate sampling, quantitative benthic macroinvertebrate monitoring program and Water quality sampling.

During Autumn 2023 monitoring results showed continued habitat availability since the previous survey, despite a transition from consistently above average rainfall in 2022 to below average levels in autumn 2023. Water quality was reasonably good across all sites in autumn 2023 with

water quality readings largely within or approaching guideline values. AUSRIVAS OE50 scores and associated Bands were generally lower than in the previous (spring 2022) season. However, these scores are within the typical range of results recorded throughout the program. The lower scores are likely driven by the reduced stream flows in autumn 2023 in comparison to recent monitoring seasons, and the limited aquatic habitat establishment following the transition from an extended period of above average flows to low flows.

The quantitative macroinvertebrate analysis identified significant differences in the macroinvertebrate assemblages that were primarily driven by temporal change. In particular, between 2022 and 2023, where there has been a marked transition from consistently elevated flows to more nominal conditions that will have resulted in fluxes in aquatic habitat conditions. A reduction in average macroinvertebrate densities and taxonomic diversity has been recorded in the 'after' period across the majority of impact and control monitoring sites for the autumn surveys. This suggests that while variable at the site scale, the prevailing environmental conditions are driving these trends.

In consideration of all data, the aquatic biodiversity TARP remains within Level 1 according to the relevant TARP for the monitoring period. This monitoring period concluded the post-mining monitoring requirements for aquatic ecology in the Western Domain.

14.3.3.2 Terrestrial Monitoring

A Before, After, Control, Impact (BACI) monitoring program was designed to identify ecological change within the Study Area as a result of mine subsidence by permitting comparisons between control and impact areas before and after subsidence. The monitoring was required for three years prior to the commencement of mining and continued throughout active mining. Mining in the Western Domain was completed in August 2022, with the Spring 2022 monitoring considered the commencement of post-mining monitoring for the study area.

Nine sites (including four impact sites and five control sites) were monitored (refer to **Figure 14** for monitoring site locations). Riparian vegetation monitoring involved floristic surveys within established vegetation monitoring plots at each site. Amphibian monitoring included spotlighting, call provocation, listening for diagnostic amphibian calls and tadpole surveys along established transects and were targeted at two threatened amphibian species: the Giant Burrowing Frog (*Heleioporus australiacus)* and the Red-crowned Toadlet (*Pseudophryne australis).*

Riparian Vegetation Monitoring

River-flat Eucalypt Forest, which is listed as an Endangered Ecological Community under the Biodiversity Conservation Act, was recorded at two (2) control sites along Stonequarry Creek.

For Autumn 2023, 'impact' sites had a slightly lower mean flora species richness than 'control' sites. Control sites also had higher percentage vegetation cover than impact sites. This is inconsistent with Autumn 2022 findings, as previously flora species richness was higher at impact sites, when compared with control sites.

Statistical analyses identified a significant difference between vegetation cover for 'After' data between control and impact sites, specifically, Autumn 2021, Autumn 2022, and Autumn 2023. Given that there were noticeable reductions in vegetation cover across control Sites 6, 7 and 9, as well as impact Sites 3, 4 and 5, impacts cannot be attributed to mining.

Based on stream morphology, persistent rainfall during the La Niña climatic period, and other associated factors, these sites appeared to be heavily affected by the recent (March 2022) flooding event (e.g., destabilisation of the embankments, loss of riparian vegetation and large

accumulation of flood debris). Continuation of monitoring is recommended to observe the recovery of vegetation cover with time, at impact and control sites post-natural disaster event.

No thresholds in the Trigger Action Response Plan from the LW W3-W4 Biodiversity Management Plan have been triggered, and therefore, no remedial management actions are required. This monitoring period concluded the post-mining monitoring requirements for riparian vegetation in the Western Domain.

Amphibian Monitoring

During Autumn 2023, Amphibian detection rates were variable between Before and After monitoring for most sites. In Autumn 2023, the most widespread amphibian species was the Common Eastern Froglet (*Crinia signifera),* which was detected at all but two of the sites. Stony Creek Frog (*Litoria lesueuri)* was detected at three of the nine sites (two of which being impact sites) and was the most abundant amphibian species (refer to **Figure 15** for monitoring site locations). The greatest number of amphibians detected were at Site 11 (impact) with 81 Common Eastern Froglet individuals recorded.

For all Autumn data, there was a significant difference in amphibian assemblages at the control sites and impact sites, and a significant difference in amphibian assemblages Before and After. However, there was no significant BACI interaction for amphibian assemblages. Inspection of the data suggests a high degree of similarity between the control sites before and after, whereas the after-impact data has a lower degree of variability than the before data. While amphibian richness was reduced in the after data, abundances were observed to have increased. Given that no significant BACI interaction was detected and that amphibian numbers are greater in the after period (albeit with lower species richness), this does not suggest an indication of mining impact.

The four amphibian species detected represent an otherwise normal assemblage of common species that may be expected to be present in the Study Area under the current climatic conditions.

Amphibian detection rates fluctuated between monitoring events for most sites, likely due to the highly variable weather and climatic conditions experienced across all monitoring events.

The targeted threatened amphibian species were not detected during the survey and appear not to be present in the Study Area, at least not in numbers that can be detected by the current monitoring program. While the Study Area contains superficially suitable habitat, it is possible that the species would no longer be able to survive in the area due to the impact of the multiple flooding events that have occurred over the past four years, including a major flooding event that preceded the Autumn 2022 surveys. Predation pressures from two introduced predators: the Eastern Gambusia and the Freshwater Crayfish (Cherax destructor), both of which were detected at all sites, may also be impacting on the suitability of the habitat for these threatened frogs.

No thresholds in the Trigger Action Response Plan from the LW W3-4 Biodiversity Management Plan have been triggered, and therefore, no remedial management actions are required. This monitoring period concluded the post-mining monitoring requirements for amphibians in the Western Domain.

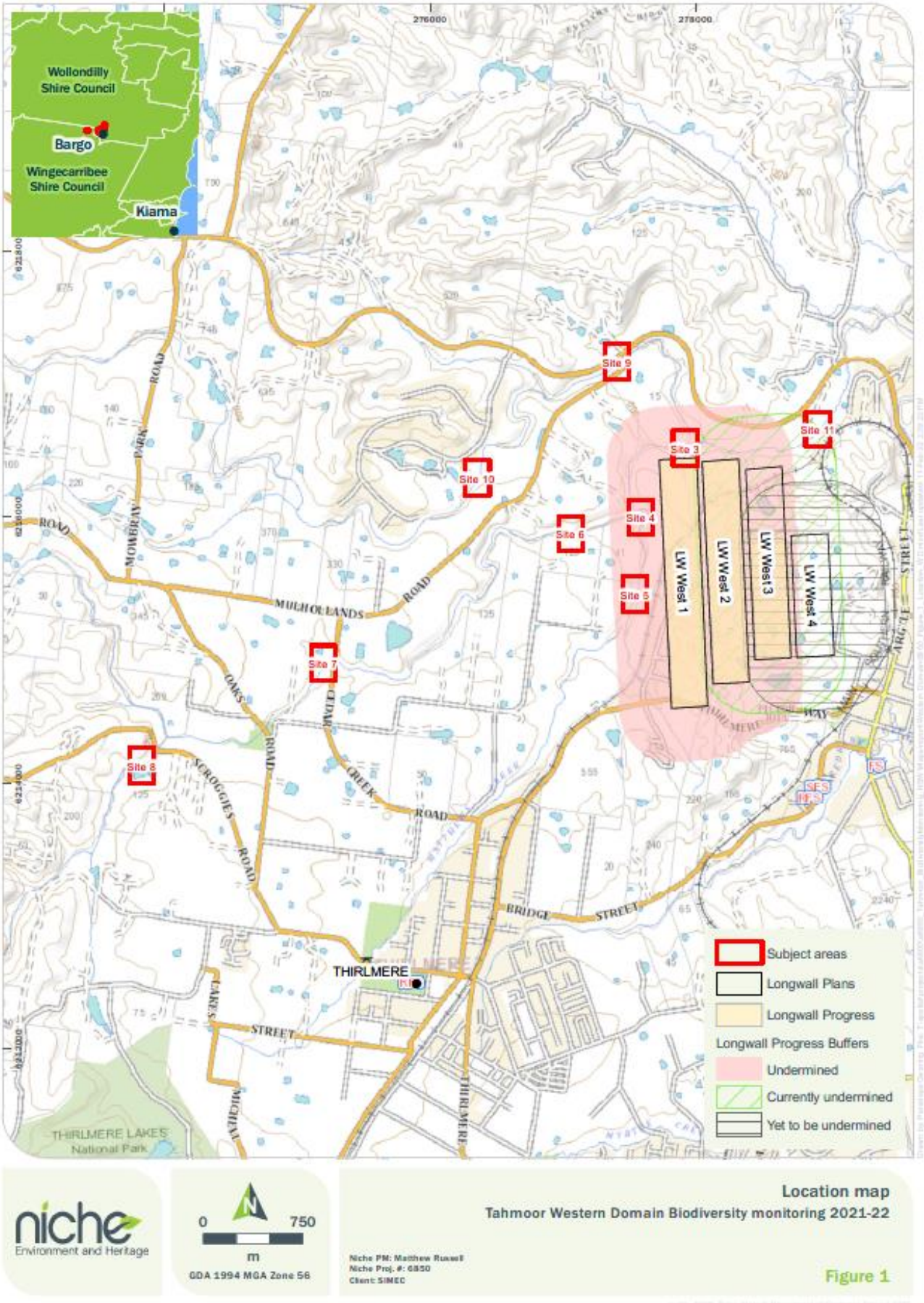

Figure 14 Western Domain Terrestrial Ecology Monitoring Locations

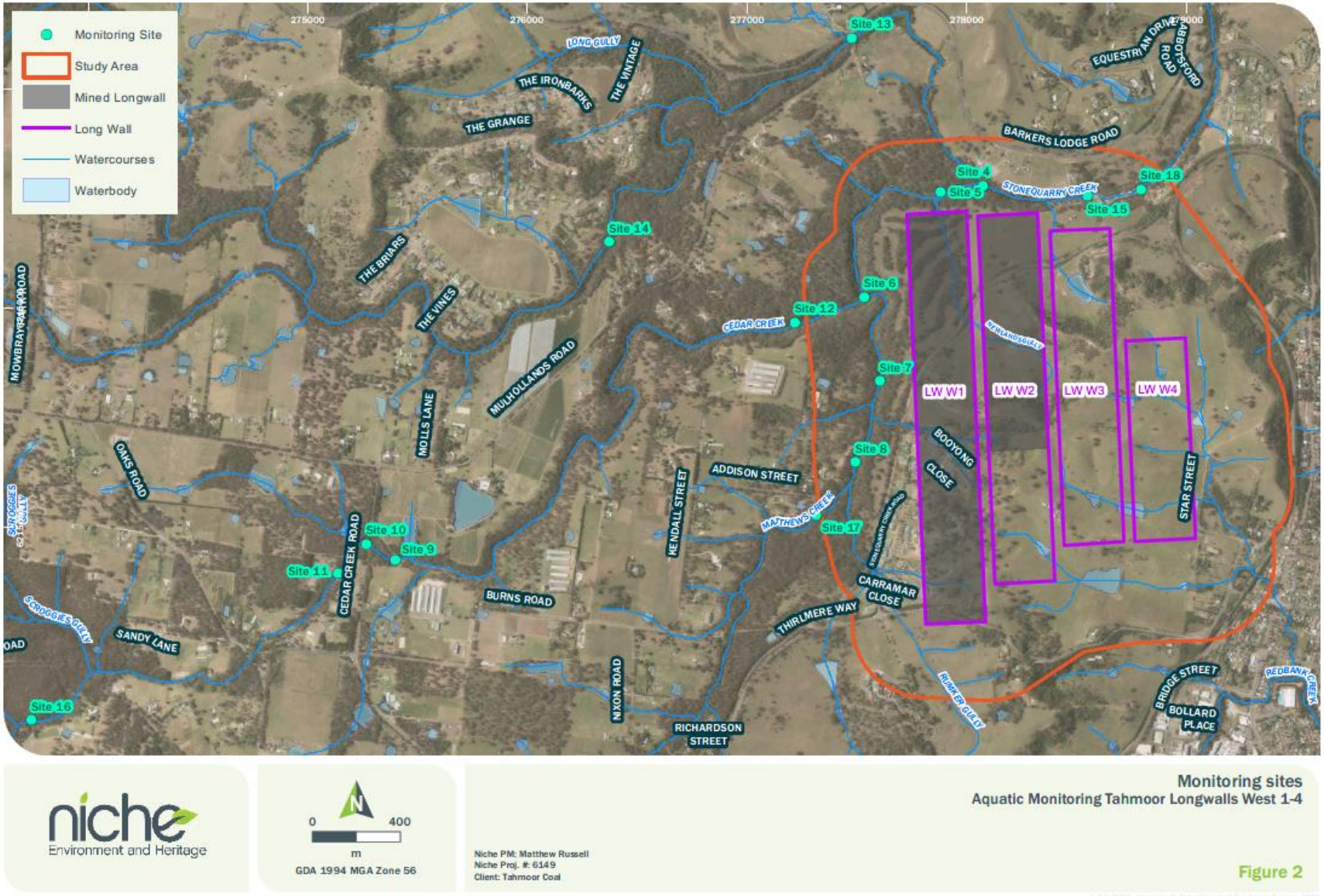

Figure 154. Western Domain Aquatic Ecology Monitoring Locations

SIMEC

14.3.4 Tahmoor South Domain

Terrestrial and aquatic monitoring is currently conducted in the Tahmoor South Domain as a requirement of the LW S1A-S6A Biodiversity Management Plan (BMP). The BMP identifies the monitoring and management measures for aquatic and terrestrial biodiversity that are required to be implemented to demonstrate that the relevant performance measures are achieved for various sites in Teatree Hollow Creek, Bargo River, Dogtrap Creek and Hornes Creek. The BMP focuses on aquatic and terrestrial biodiversity, with particular focus on threatened species, populations and their habitats, and Endangered Ecological Communities (EECs) and water dependent ecosystems.

Baseline monitoring results of pre-mining conditions have been completed over a 3 year period previous to LW S1A commencement for Tahmoor South Longwalls, which has focused on riparian vegetation, watercourses, and amphibian monitoring, as these areas were previously determined to be more susceptible to impacts from subsidence.

During 2023, Baseline Monitoring has commenced for the B-series Extraction Plan preparation, with the establishment of four future impact sites (referred to as “B-series” monitoring sites), along Dog Trap Creek during the Spring 2023 biodiversity monitoring program. The four terrestrial monitoring sites (comprised of riparian vegetation and amphibian monitoring locations), were established along Dog Trap Creek to collect baseline data to inform the “B-Series” Extraction Plan to be prepared for the future longwalls proposed in the locality.

14.3.4.1 Aquatic Ecology Monitoring

Autumn 2023

Monitoring was conducted at sites using standard (Australian River Assessment System (AUSRIVAS)) methods and quantitative benthic macroinvertebrate surveys. Physiochemical water quality sampling is also completed at aquatic monitoring sites to provide context for the assessment of biological data. Refer to **Figure 16** for Aquatic monitoring sites for Tahmoor South.

Autumn 2023 results showed a return to flow conditions being more typically in line with baseflow levels than in recent seasons (2022) that have seen elevated flows and significant rainfall. This was reflected in the observations of low flows, limited organic debris and lower pool levels across the monitoring sites (other than Sites 13, 16 and 17).

Observations of mining induced changes to aquatic habitats were observed at Impact Sites 13, 16 and 17 (loss of pool water and flocculant), but not at Site 12. The water quality readings collected at Impact Site 12 (upstream of observed areas of mining induced change) along Tea Tree Hollow are comparable to baseline data, and also to that of the control sites.

The opportunistic water quality readings collected at supplementary Impact monitoring sites (downstream of areas of mining induced change) are suggestive of impaired water quality conditions, with elevated electrical conductivity levels, and low dissolved oxygen and pH levels.

Supplementary AUSRIVAS samples (collected downstream of areas of mining induced change) indicate that these mining induced changes do not appear to have translated into acute impacts to macroinvertebrate assemblages immediately downstream, as these sites recorded biological scores comparable to baseline data, and also to the control sites in autumn 2023.

The levels of variation observed in macroinvertebrate density and abundance among the Control sites in autumn 2023 are suggestive of the fluxes in aquatic habitats associated with this transition from elevated flows to more low flow conditions.All impact monitoring sites align with a ‘Normal’ BMP1 aquatic habitat and macroinvertebrate indicators (stream health) TARP (Trigger Action

Response Plan) level in autumn 2023, as the reduction in aquatic pool habitat observed at Sites 13, 16 and 17 have not occurred over two consecutive sampling occasions.

Spring 2023

During the Spring 2023 monitoring, observations of potentially mining-induced changes (bedrock cracking and flocculant) were observed along sections of Tea Tree Hollow, with sites 13, 16 and 17 dry in autumn 2023. Level 1 triggered at aquatic ecology monitoring sites TTH16 and TTHt7 due to reduced aquatic pool habitats (dry pools) compared to baseline observations for two consecutive sampling occasions. These monitoring sites correlate to surface water monitoring sites where reduction of water levels is related to both mining induced impacts in combination with prevailing dry weather conditions. No further actions other than ongoing monitoring is required. All other sites held water, except new site TTH9. While conditions were generally drier and rainfall more sporadic in spring 2023 than in 2022, the spring 2023 surveys were preceded by a number of rain events.

Water quality conditions in spring 2023 were generally comparable between the impact and control monitoring sites and were comparable to pre-mining results. No indicators of highly acute water quality issues were identified.

The low scores in general reflect the dominance of pollution tolerant macroinvertebrates and presence of few pollution sensitive taxa. This is common in low flow pool edge habitat in the locality. The sites (where samples could be collected) recorded generally lower stream health index results than in recent (2022) seasons. However, these scores are within the typical range of results recorded throughout the program, with this overall trajectory also observed at the control sites. These trends are likely driven by the reduced stream flows in 2023 in comparison to the elevated flows in 2022, primarily driven by reduced rainfall.

The stream health results in the Tea Tree Hollow stream network are generally somewhat lower than in the control sites in spring 2023. This may be driven by the more intermittent nature of this stream system than Hornes Creek, although at the site level (e.g. dry sites TTH16 and TTH17) mining induced effects may also be operating. A relatively dry winter followed by more consistent spring rainfall likely has resulted in samples that have been taken from newly replenished or recently flushed pools where macroinvertebrate presence may not be fully established.

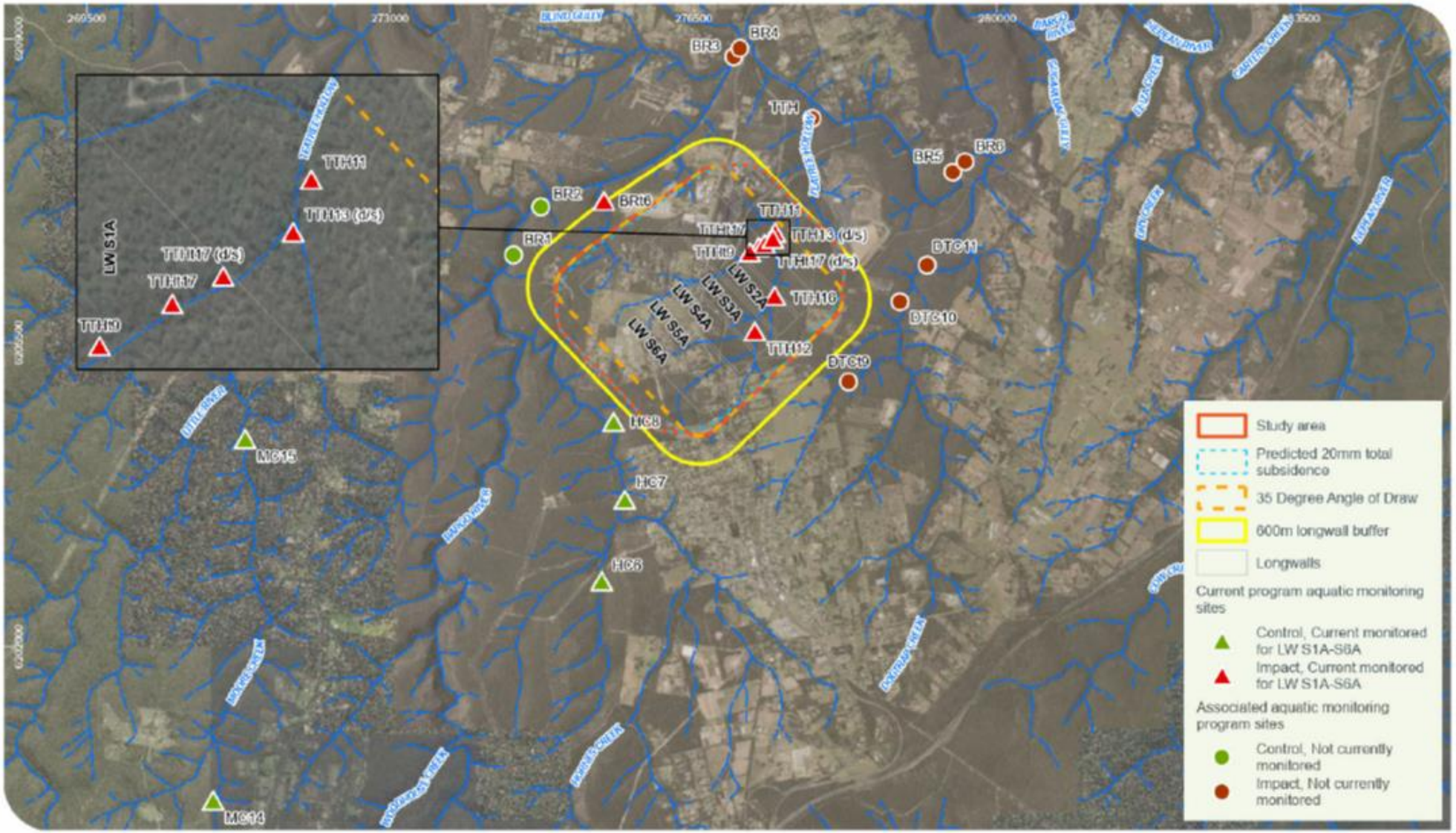

Figure 16 Tahmoor South Aquatic Ecology Monitoring (A-series)

14.3.4.2 Terrestrial Monitoring

A Before, After, Control, Impact (BACI) monitoring program was designed to identify ecological change within the Study Area because of mine subsidence by permitting comparisons of population trends between control and impact areas before and after the impact. The aim of the BACI monitoring program is to collect data that will enable comparison of environmental variables pre- and post-mining in Tahmoor South via the collection of empirical data, mapping, and establishment of a photographic record for the sites. Refer to **Figure 17** for Terrestrial monitoring sites for Tahmoor South.

Two years of baseline biodiversity monitoring was completed in Autumn 2022 and the mining of Tahmoor South commenced 18 October 2022. This report presents the findings of riparian vegetation, Threatened Ecological Community (TEC), and threatened flora and fauna (amphibian) monitoring.

Six monitoring sites were established in Spring 2020 for both riparian and amphibian monitoring (12 monitoring sites in total) (referred to as the Tahmoor South "A-Series Sites"), including three impact and three control Sites. Riparian vegetation monitoring involved establishing vegetation monitoring plots within each site for repeat survey. Amphibian monitoring targeted two threatened frog species (Giant Burrowing Frog [*Heleioporus australiacus,* Vulnerable, NSW *Biodiversity Conservation Act* 2016 (BC Act) and Commonwealth *Environmental Protection Biodiversity Conservation Act* 1999 (EPBC Act) and Red-crowned Toadlet [*Pseudophryne australis,* Vulnerable, BC Act]) and included spotlighting, call provocation, listening for diagnostic frog calls and tadpole identification along established transects.

In Spring 2023, three additional riparian and amphibian monitoring sites (two control and one impact site) were established along Teatree Hollow Creek (impact Site 9) and within a tributary of the Bargo River (control Site 8) and Hornes Creek (control Site 7).

In addition to the new A-Series sites, four future impacts sites were established on Dog Trap Creek in Spring 2023, for both riparian and amphibian monitoring (referred to as "B-Series sites").

Riparian Vegetation Monitoring

There was a significant effect of Control-Impact and Before-After for vegetation cover across Spring sampling events, as well as a significant BACI interaction. Despite this, baseline Vegetation Integrity (VI) scores have increased between spring sampling seasons across all sites, which indicates an overall improvement in vegetation condition across impact and control sites.

According to the Fire Extent Severity Mapping (FESM) (DPE 2022), all riparian sites were burnt in the 2019/2020 bushfires (prior to the commencement of monitoring) and were within a 'Moderate' to 'Extreme' severity burnt class, where all stratum layers were severely burnt to canopy height. Many species and communities will take years to recover, particularly those not adapted to fire or impacted by prolonged drought or other threatening processes. As monitoring continues, the residual impacts of fire are becoming less evident.

Dominant species in terms of percent cover for Autumn 2023 in the riparian plots include *Eucalyptus piperita, Pteridium esculentum* (particularly dominant at control Site 4) and Black Wattle (*Acacia mearnsii)* (particularly dominant at impact Site 3). Most dominant exotic species included Panic Veldtgrass (*Ehrharta erecta),* Common Thornapple (*Datura stramonium),* Blackberry (*Rubus fruticosus* sp. agg.) and Trad (*Tradescantia fluminensis).* During the Autumn 2023 monitoring there was a substantial increase in native species richness at control sites whereas native species richness at impact sites decreased only slightly.

Dominant species in terms of percent cover for Spring 2023 riparian plots include *Pteridium esculentum* (particularly dominant at control Site 4), *Eucalyptus piperita, Cynodon dactylon* (particularly at impact Site 2), *Acacia terminalis* (particularly dominant at impact Site 9), *Melaleuca linariifolia, Eucalyptus punctata* and *Acacia longifolia.* Most dominant exotic species included *Solanum sisymbriifolium, Anagallis arvensis, Cyperus eragrostis* and *Modiola caroliniana.*

Across all sampling seasons, native species richness at riparian control sites has decreased overall since monitoring commenced in Spring 2020, however it increased in Autumn and Spring 2023. Native species richness at impact sites has remained relatively stable throughout monitoring and there was a substantial increase in Spring 2023.

Threatened Flora Monitoring

The threatened flora monitoring was established in September 2022, and the baseline number of threatened individuals at each site was recorded within a fixed 10 x 10 m plot (prior to the commencement of mining) at each monitoring site. Three rounds of monitoring have occurred after the commencement of mining (Spring 2022, Autumn 2023 and Spring 2023).

The six plots were designed to monitor a subset of individuals of the following species, Brown Pomaderris (*Pomaderris brunnea),* Bargo Geebung (*Persoonia bargoensis),* and small-flowered Grevillea (*Grevillea parviflora* subsp. *parviflora).* The highest number of individuals was identified at impact Sites TF3 and TF6 (mean count of 187.75 of Small-flowered Grevillea), followed by impact Site TF1 (mean count of 169.5 of Brown Pomaderris), and impact Site TF5 (mean count of 133.75 of Brown Pomaderris).

Overall, the number of threatened flora individuals across impact and control sites is considered stable, with minor fluxes in the number of individuals across sampling seasons. Monitoring is to be undertaken annually (spring only) due to the flowering season of Brown Pomaderris, Bargo Geebung, and small-flowered Grevillea being in Spring (DPE 2022).

Amphibian Monitoring

In Autumn 2023, the most widespread amphibian species was the Common Eastern Froglet (*Crinia signifera),* which was detected at all but two of the sites. Stony Creek Frog (*Litoria lesueuri)* was detected at three of the nine sites (two of which being impact sites) and was the most abundant amphibian species. The greatest number of amphibians detected were at Site 11 (impact) with 81 Common Eastern Froglet individuals recorded.

The Spring 2023 round of monitoring included the establishment of two additional amphibian control sites on Hornes Creek and a Bargo River Tributary, and an additional impact site along Teatree Hollow Creek. There was a significant effect of Control-Impact on frog detections for all data and Spring data (meaning, frog numbers are higher control sites, when compared to impact sites). Despite this, there were no significant BACI interactions for frog detections across sampling seasons.

Frog detection rates were variable across Spring monitoring events. The species driving this variation was the Common Eastern Froglet (*Crinia signifera).* At the time of Spring 2023 monitoring, there were consecutive months of substantially below average monthly rainfall totals leading up to November, followed by higher-than-average monthly rainfall in November and December.

A total of eight frog species were detected across the Spring 2023 monitoring event, with five species detected across impact sites and eight species across control sites. This represents an increased level of species detection that was observed across both control and impact monitoring sites in comparison to the Spring 2022 surveys. It is the highest number of species detected in

total and at control sites since Spring 2020, and the highest number of species detected at impact sites since Spring 2021.

The targeted threatened frog species appears to not be present in the Study Area. While the Study Area contains superficially suitable habitat, it is possible that these species would no longer be able to survive in the area due to number of factors such as:

- Absence of suitable non-breeding habitat for Giant Burrowing Frog at most monitoring sites post-fire (due to heavy weed encroachment and erosion). Leaf litter has now shown to increase substantially in the past year but is unlikely to support Giant Burrowing Frog habitat.
- Increased urban encroachment resulting in habitat removal, altered hydrological flows, water quality and nutrient loads.
- Potential predation pressures from two introduced predators: Eastern Gambusia (*Gambusia holbrooki)* and the Yabby (*Cherax destructor),* both of which were detected at all sites.

No thresholds in relevant TARPs from the Biodiversity Management Plan have been triggered for amphibians and riparian vegetation, therefore, no remedial management actions are required. It is recommended that annual monitoring continue in Spring and Autumn of 2024. This will allow comparison between impact and control sites, Before and After mining impacts, and to allow for temporal changes to be assessed as the project progresses while increasing the power of the statistical analyses.

14.3.5 Further Improvements

Ecological survey assessments will continue to be undertaken as required to manage compliance and assess potential impact across all Tahmoor Coal's mining domains and in accordance with the Tahmoor North Domain program, the LW S1A-S6A Biodiversity Management Plan, and preparation for the Tahmoor South B series longwalls.

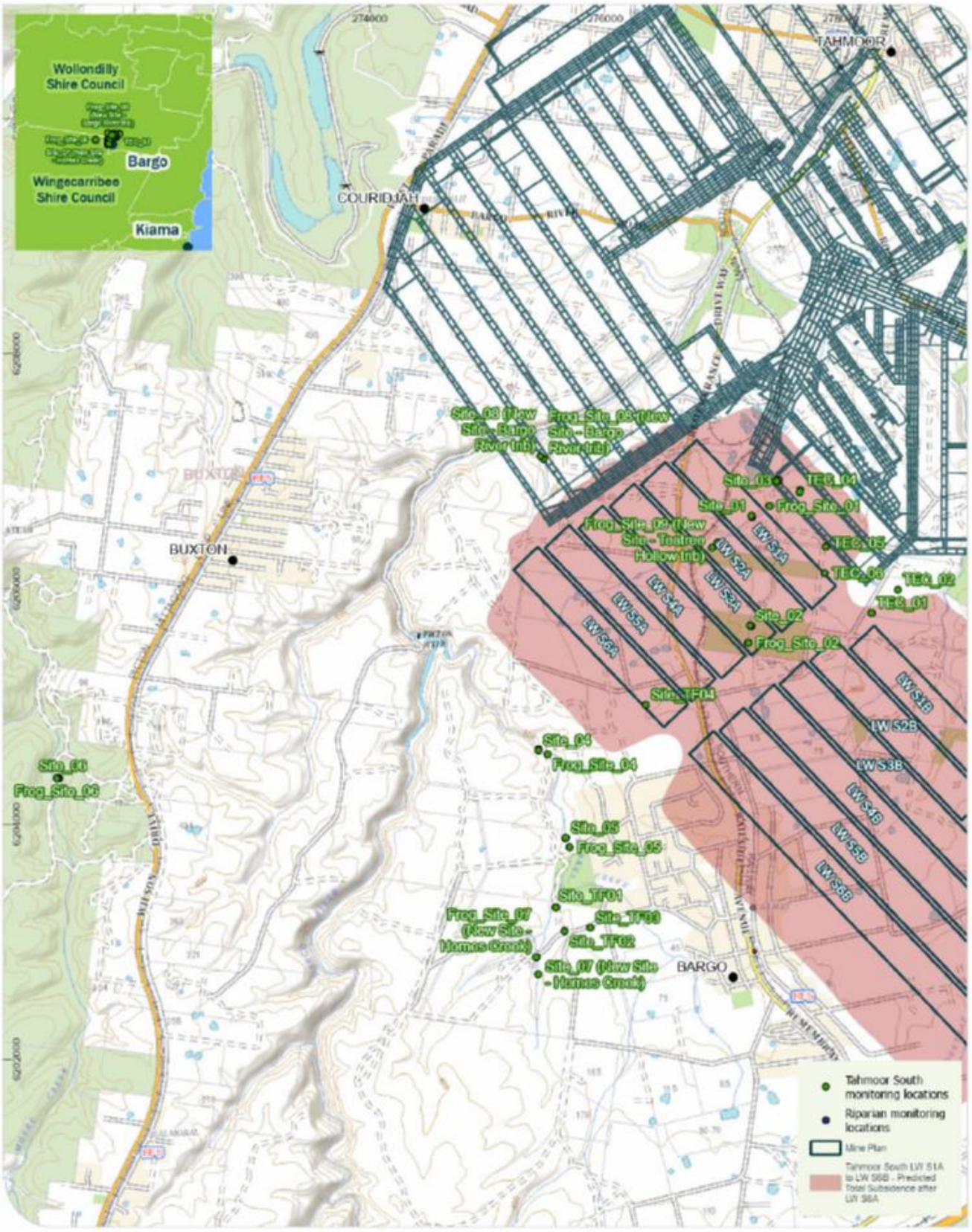

Figure 17 Tahmoor South Terrestrial Monitoring Sites (A-series)

14.4 Aboriginal Cultural Heritage

14.4.1 Western Domain

Monitoring requirements as per the LW W3-W4 Heritage Management Plan were completed in the previous reporting period. No remediation or further monitoring is required in the Western Domain.

14.4.2 Tahmoor South Domain

For the Tahmoor South mining area, an Extraction Plan for LW S1A- S6A was developed and approved by DPHI in 2022 with an accompanying Heritage Management Plan (HMP) identifying 3 Aboriginal sites recorded in the A-series study area, comprising 2 artefact sites and a rockshelter with art and artefacts (Teatree Hollow 2013.1 (#52-2-4471)). The HMP has been developed to provide direction on the management of Aboriginal cultural materials that may interact with the proposed development activities.

One of the requirements as part of the HMP was the proactive investigation of a documented rockshelter, Teatree Hollow 2013.1 (AHIMS #52-2-4471), situated on the eastern bank of Teatree Hollow Creek. While the site was considered of very low risk of being adversely affected by the undermining of the locale, discussions with Heritage NSW and the registered Aboriginal parties sought to obtain some archaeological information from the site prior to the development activities should harm and/or destruction ultimately result. An archival recording of the site was completed during the previous reporting period, which fulfilled the requirement to collect additional archaeological information prior to potential impacts from mining.

In accordance with the Aboriginal heritage monitoring program as set out in the LW S1A-S6A HMP, an inspection was undertaken by qualified Aboriginal cultural consultants on the 10th July 2023 following the end of extraction of LW S1A. Outcomes of the inspection revealed the rockshelter condition appeared in a similar condition to when previously visited by these personnel as part of archaeological excavations in November 2022. The site inspection did not identify any observable impacts such as cracks, exfoliation, or collapse, as a result of subsidence or other activities. Further, the floor of the rockshelter showed no evidence of recent rockfall or other moved material that may suggest collapse or movement has occurred. As no subsidence related impacts were observed, no additional management strategies are required.

14.4.3 Further Improvements

Aboriginal cultural due diligence assessments will continue to be undertaken by qualified Aboriginal cultural consultants as required to identify items of significance and propose mitigation measures to ensure compliance with statutory requirements across all mining domains. In addition, the Tahmoor South Aboriginal heritage monitoring program will continue to be implemented in accordance with the LW S1A-S6A Heritage Management Plan. Tahmoor Coal aims to maintain valued working relationships with local Registered Aboriginal Parties (RAPS) throughout the mining process.

14.5 Historical Heritage

14.5.1 Western Domain

Historical heritage sites associated with LW W3–W4 are managed through the provisions of the LW W3–W4 Heritage Management Plan (HMP). The HMP required that historical brick and sandstone culverts within the Study Area (**Figure 18**) be subject to monitoring at the completion of each longwall.

During the reporting period for Western Domain, surveys were undertaken during 1st Jan 2023 to 30th June 2023 with no issues related to mining identified during visual inspections for Mittagong Loop line, Main Southern Railway and local roads. Monitoring of historical heritage items was not required following June 2023, in accordance with the HMP.

14.5.1.1 Railway Culvert

There are six culverts on the Picton Mittagong Loop Line (Loop Line) and two culverts on the Main Southern Railway (MSR) within the project area for LW W1-W4 which required monitoring.

During the previous reporting period (2022), there was one (1) exceedance of environmental performance measures or indicators, as adopted from DA 67/98 Modification 5 or the LW W1-W2 Extraction Plan Approval conditions. Cracking on sandstone culverts at 88.400 km and 88.980 km resulted in an exceedance of subsidence performance indicator for 'other Aboriginal and heritage sites', which was defined as 'negligible subsidence impacts or environmental consequences'. Tahmoor Coal notified DPE and Heritage NSW of the trigger via the NSW Major Projects Planning Portal on 21 September 2021. A site visit with DPE was completed on 12 April 2022. A warning letter from DPE was received on 16 May 2022 regarding the breach against Section 4.2(1)(b) of the *Environmental Planning and Assessment Act 1979.*

During this reporting period, Tahmoor Coal completed remediation of the two sandstone culverts in May 2023 in accordance with the proposed rehabilitation methodology and as prescribed in the TfNSW Structures Repair Standard TMC302. The repair work included crack epoxy injection, bed joint reinforcement, stone voussoir pinning, stone voussoir reattachment with epoxy, and repointing. The texture and coloring of the repair work was noted to generally match the surrounding sandstone masonry. A site inspection of the culverts with Transport Heritage NSW was completed on 2 May 2023, and a letter was received from Transport Heritage NSW after the site inspection stating they were satisfied with the repairs completed. DPE were notified of this completion on 19 May 2023 and a site inspection of the culverts with DPE was undertaken on 6 June 2023. Correspondence was received from DPE on 23 June 2023 acknowledging the works have been undertaken.

The four other Loop Line culverts and two MSR culverts in the LW W3– W4 Study Area require no further management strategies or monitoring.

14.5.1.2 Victoria Bridge

During the reporting period, regular surveys were conducted at the Victoria Bridge over Stonequarry Creek after the mining of LW W4. Very small and gradual closure was observed across Stonequary Creek.

Visual inspections did not identify any impacts associated with mine subsidence but the gap between the deck and the eastern abutment was observed to continue to close. The gap between

the deck and the eastern abutment was reinstated on 24 January 2023. The gap has gradually reduced over time to 19 mm. Rates of change are reducing to be very low levels and very gradual ongoing residual vertical subsidence have been observed.

No other impacts to historical heritage for Western Domain were observed during this reporting period.

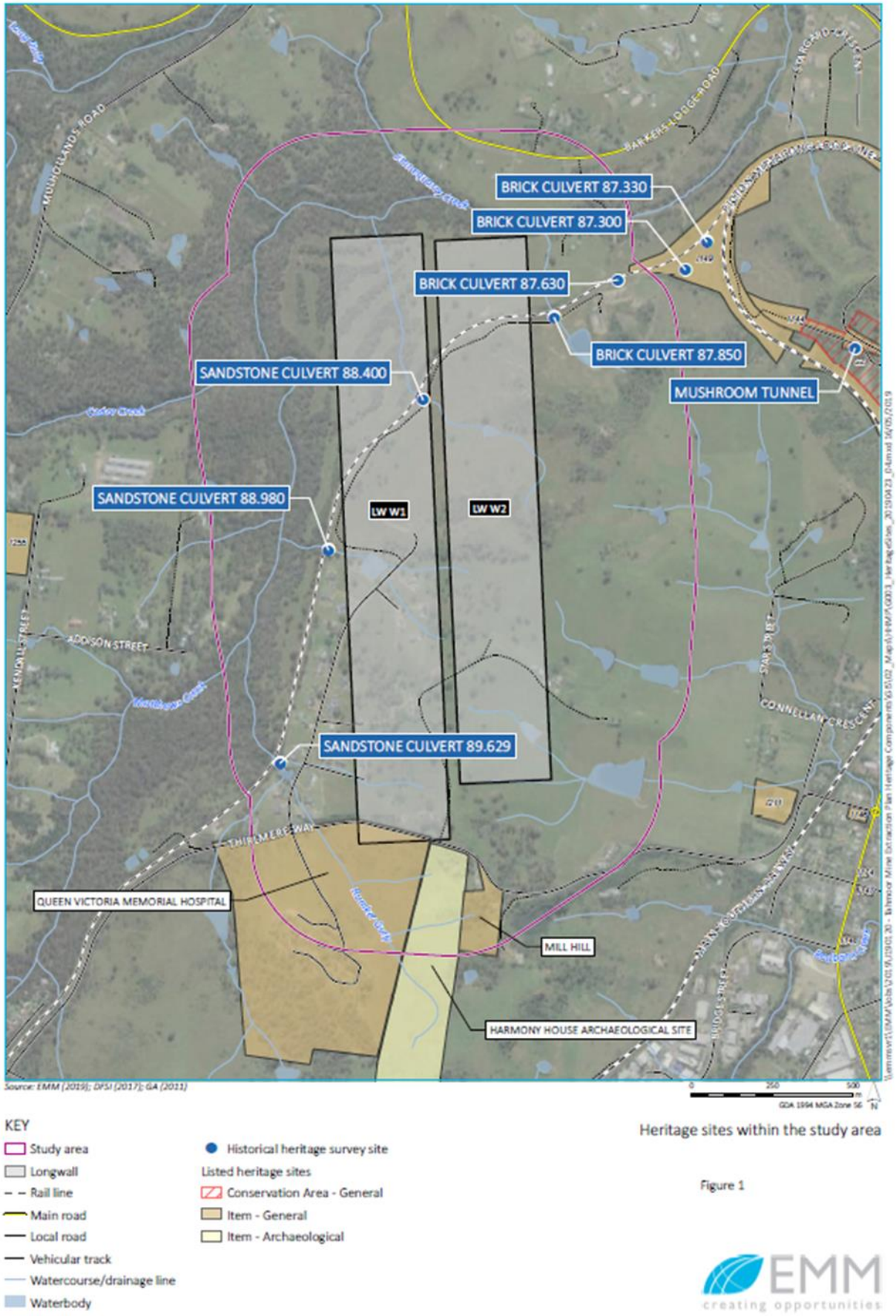

Figure 18 Locations of Sandstone culvets remediated at 88.400km and at 88.980km.

14.5.2 Tahmoor South Domain

The LW S1A-S6A Heritage Management Plan (HMP) for the Tahmoor South Domain has been developed which identifes the monitoring and management measures for historical heritage items within the Extraction Plan Study Area that are required to be implemented to demonstrate that the relevant performance measures are achieved. The HMP focused on Aboriginal and historical heritage items listed on heritage databases, and Aboriginal and historical heritage items identified in the Study Area during site investigations.

Within the Study Area one heritage item, Wirrimbirra Sanctuary (now known as the Australian Wildlife Sanctuary) is of State heritage significance and is listed on the State Heritage Register for its historical heritage values, research potential, rarity and associative values (refer to **Figure 19**). Wirrimbirra Sanctuary is also listed on the National Trust Register and the Wollondilly Local Environment Plan (WLEP) (2011). A site-specific management plan for the Sanctuary was developed as a stand-alone document. The *Australian Wildlife Sanctuary Management Plan* includes a Statement of Heritage Impact (EMM, 2020) that was prepared in consultation with the National Trust and NSW Heritage Council.

Wirrimbirra Sanctuary and Bargo Cemetery are the two registered items of local heritage significance (WLEP 2011) within the Study Area and there are three additional items of local heritage significance that are outside the Study Area but may be subject to far field movement, (i.e. Picton Weir, Bargo Railway Bridge North (known as the Wellers Road Overbridge) and Bargo Railway Viaduct). Bargo Railway Bridge North is also listed on the CRN S170 Register.

Two unregistered heritage sites were identified by Niche (2020): the Great Southern Road in Bargo (c.1820) and Tahmoor Colliery (c.1972) (also known as the Tahmoor Mine site). Approximately 550 m of the Great Southern Road at its northern end are located within the Study Area. The road has had many subsequent upgrades and parts of the original road are no longer in use. Tahmoor Colliery was identified in the *Macarthur Heritage Study* (1986) as Item #509 but is not listed on any of the heritage registers.

During the reporting period, two cracks were observed at the Tahmoor Mine site within the 6C tunnel and vent shaft interface. The site continued to be monitored with weekly inspections. On 6th June 2023, four (4) additional cracks were observed. An additional crack was observed on the 27th June 2023. The site continues to be monitored with weekly inspections. As the Tahmoor Mine site (Tahmoor Colliery) has been identified as a heritage site as part of the HMP, impacts to this item must be managed under the relevant Trigger Action Response Plan (TARP). According to the TARP, this impact is deemed to be a Level 1 trigger:

- *Historical heritage site monitoring indicates potential detectable environmental consequences with negligible impacts to the heritage value of the heritage site.*

This trigger required that a qualified archaeologist or heritage architect be consulted in order to determine whether impacts to heritage sites have occurred, which was completed during the reporting period. A review of hairline cracks in the 6C Tunnel were considered to be minor and, if required, could be repaired in a manner that preserves the heritage value of the mine. In addition, the Tahmoor Mine Site is a working site and minor impacts such as hairline cracks are unlikely to affect its heritage values.

During the reporting period, no other impacts to historical heritage items were reported in relation to LW S1A and LW S2A mining. Monitoring and management measures are detailed within the Extraction Plans and assessment of monitoring results reviewed in the two (2) Six Monthly

Reports: Tahmoor South Six Monthly Report 2 and Tahmoor South Six Monthly Report 3 (**Appendix 16** and **Appendix 17** respectively).

14.5.3 Further Improvements

Historical heritage due diligence assessments will continue to be undertaken by qualified consultants as required to identify items of significance and propose mitigation measures to ensure compliance with statutory requirements across all mining domains. In addition, the Tahmoor South Domain historical heritage monitoring program will continue to be implemented in accordance with the LW S1A-S6A Heritage Management Plan.

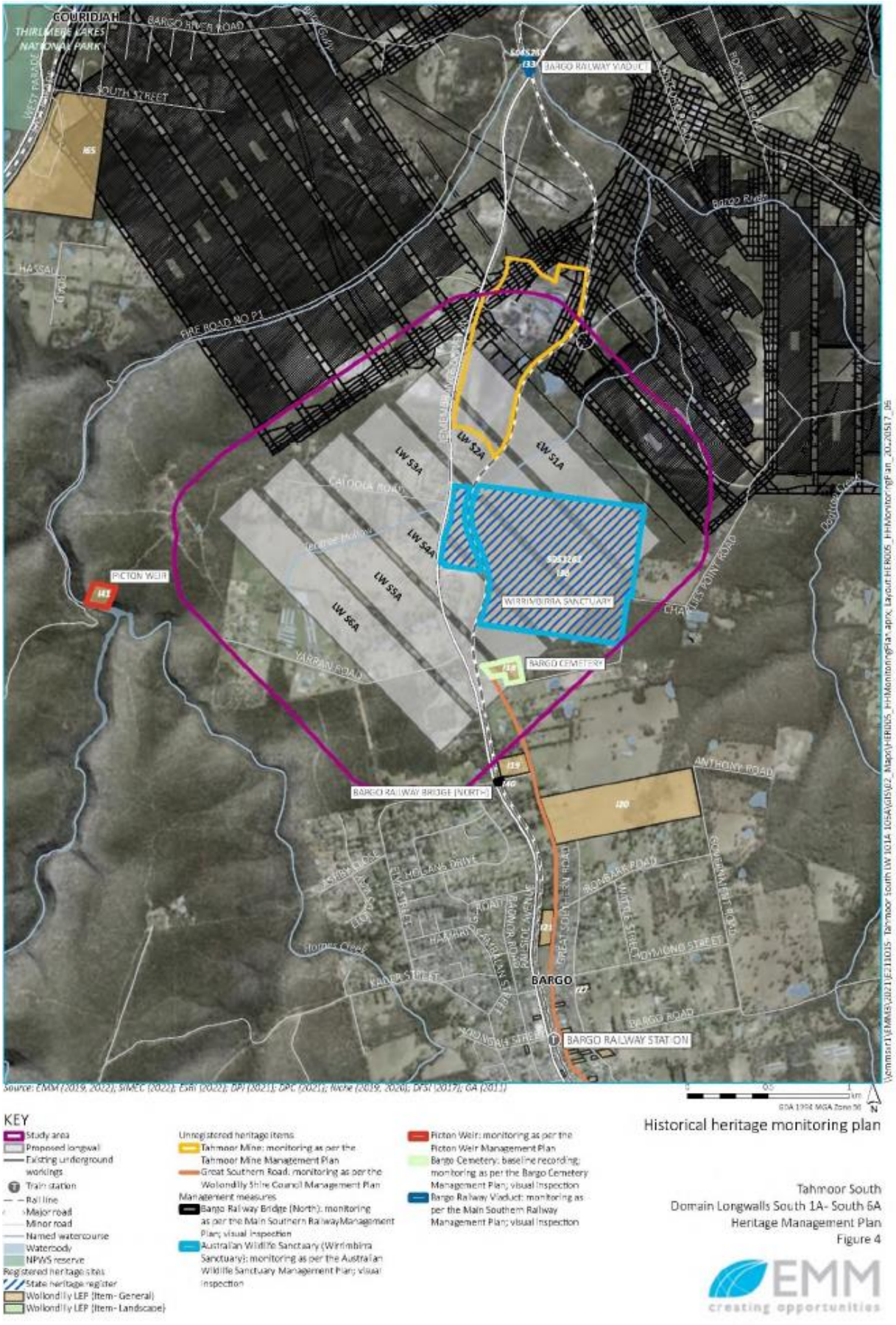

Figure 19 Historical heritage sites identified within the Tahmoor South Study Area.

14.6 Built Features Monitoring

14.6.1 Western Domain

The LW W3-W4 Built Features Management Plan and associated sub-plans were prepared to manage the potential environmental consequences of LW W3-W4 extraction on built features in accordance with Condition 13H(vii)(b) of DA 67/98.

During January to June 2023, the LW W3-W4 Subsidence Monitoring Program has been implemented to monitor subsidence impacts on infrastructure owned by Endeavour Energy (electrical infrastructure), Sydney Water (potable water infrastructure and sewer infrastructure), Bradcorp (sewer infrastructure), Jemena (gas infrastructure), Wollondilly Shire Council (roads, bridges and culverts), Telstra (telecommunications infrastructure), NBN (telecommunications infrastructure), ARTC (rail infrastructure), Transport Heritage NSW (rail infrastructure), Weatherboard House (historical building) and private property owners.

A post-mining report for this reporting period was completed and noted that monitoring of local roads, built structures, Picton Mittagong Loop Line, heritage-listed Weatherboard House, gas infrastructure, electrical infrastructure, telecommunications infrastructure, potable water infrastructure and sewer infrastructure was not completed during July to December 2023, in accordance with the LW W3-W4 Built Features Management Plan and associated sub-plans.

Monitoring of the Main Southern Railway and the Victoria Bridge were completed during the reporting period.

Further details of impacts to Built Structures from LW W4 are found in the Western Domain Six Monthly Subsidence Impact Report 8 and Western Domain Six Monthly Subsidence Impact Report 9 (1st January 2023 – 31st December 2023), **Appendix 14** and **Appendix 15** respectively.

14.6.1.1 Main Southern Railway

Regular surveys were conducted along the Main Southern Railway during and after the mining of LW W4. All results were within survey tolerance during mining, and visual inspections did not identify any issues associated with mine subsidence. During January to June 2023, horizontal movements had been observed along the Main Southern Rail and at the Thirlmere Way Underbridge and Connellan Crescent Overbridge. All results were within survey tolerance during mining, and visual inspections did not identify any issues associated with mine subsidence.

14.6.1.2 Transport NSW Infrastructure

Regular surveys were conducted at the Victoria Bridge over Stonequarry Creek during and after the mining of LW W4. Very small and gradual closure was observed across Stonequarry Creek. Visual inspections did not identify any impacts associated with mine subsidence.

TfNSW agreed to continue surveys on a monthly period, unless adverse changes are observed. Automated, continuous monitoring of GNSS units and laser distance meters continue to monitor continuously. Rates of change showed a reduction to very low levels During the reporting period, rates of change have reduced to very low levels, and very gradual ongoing residual vertical subsidence have been observed.

As triggers are not forecast to be exceeded due to residual subsidence, surveys and reporting periods were reduced to quarterly intervals as of May 2023.

14.6.2 Tahmoor South

The LW S1A-S6A Built Features Management Plan and associated sub-plans were prepared to manage the potential environmental consequences of LW S1A-S6A extraction on built features in accordance with Condition C8 of SSD 8445.

During this reporting period, the LW S1A-S6A Subsidence Monitoring Program was implemented to monitor subsidence impacts on infrastructure owned by Wollondilly Shire Council (roads, bridges and culverts), ARTC (rail infrastructure), Sydney Water (potable water infrastructure and sewer infrastructure), Endeavour Energy (electrical infrastructure), Jemena (gas infrastructure), Telstra (telecommunications infrastructure), NBN (telecommunications infrastructure), TPG (telecommunications infrastructure) and private property owners.

A weekly review of the subsidence survey results during the reporting period has been completed during mining of LW S1A. In addition, weekly reports are prepared for specific built features including the Main Southern Railway, Tahmoor Mine Site, 3030 Remembrance Driveway (Petrol Station), MKD Machinery, Tahmoor Garden Centre, Wollondilly Anglican College, and Australian Wildlife Sanctuary.

14.6.2.1 Main Southern Railway

Weekly surveys have been conducted on the Main Southern Railway during LW S1A and LW S2A. Rates of change have reduced to very low levels. During the reporting period, poor track geometry at 98.8 km was noted 15 April 2023 to have occurred. The cause of this change was confirmed to be due to mining-induced movements. Resurfacing on 3 June 2023 was noted to have improved track condition on both tracks. Additional deterioration has also occurred since maintenance work at the Down Main at 98.824 km and Up Main at 98.807 km. Further local resurfacing was completed in August and September, resulting in improved track geometry.

During the reporting period, there were no adverse impacts were observed on bridges or the Viaduct. In addition, the Main Southern Railway was maintained in a safe and serviceable conditions during mining of LW S1A and LW S2A.

14.6.2.2 Local Roads and Bridges

Monthly and weekly surveys have been conducted on local roads and bridges during LW S1A and LW S2A in accordance with the Wollondilly Shire Council Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan, Telstra Management Plan, NBN Management Plan and TPG Management Plan. Observations have been reported in the weekly Subsidence Monitoring Reports

On 22 May 2023 along the Remembrance Drive, non-conventional subsidence movements were initially measured at Pegs R46 to R48 on Remembrance Drive, accompanied by a bump in the observed subsidence profile at Peg R47. Compression strain was measured to have increased between Pegs R47 and R48 on 29 May 2023. A focused visual inspection was conducted on 31 May, which identified a small compression bump in the southbound lane of Remembrance Drive between Pegs R47 and R48. The location of the bump observed on 31 May is shown in **Figure 20**. The bump intersects with a number of utility services, including Jemena's gas main, Sydney Water's potable water main and sewer main, and optical fibre and copper telecommunication cables.

Monthly surveys during the early stages of mining of LW S2A measured ongoing residual subsidence and compressive strain developing between Pegs R47 and R48 up to 2.0 mm/m. Trench excavation works were conducted in mid-December 2023 to relieve stresses in the Jemena

gas pipe, and Peg R48 was damaged during this work and could not be surveyed on 28 December 2023. In anticipation of peg disturbances, Tahmoor Coal installed backup pegs (Peg R46B to R49B) immediately adjacent to the original pegs and an initial survey was conducted on 6 November 2023. On 28 December 2023, very minor changes (within survey tolerance) were observed at the backup pegs.

An increase in compressive strain was observed in December 2023, with very minor changes in vertical misalignment.

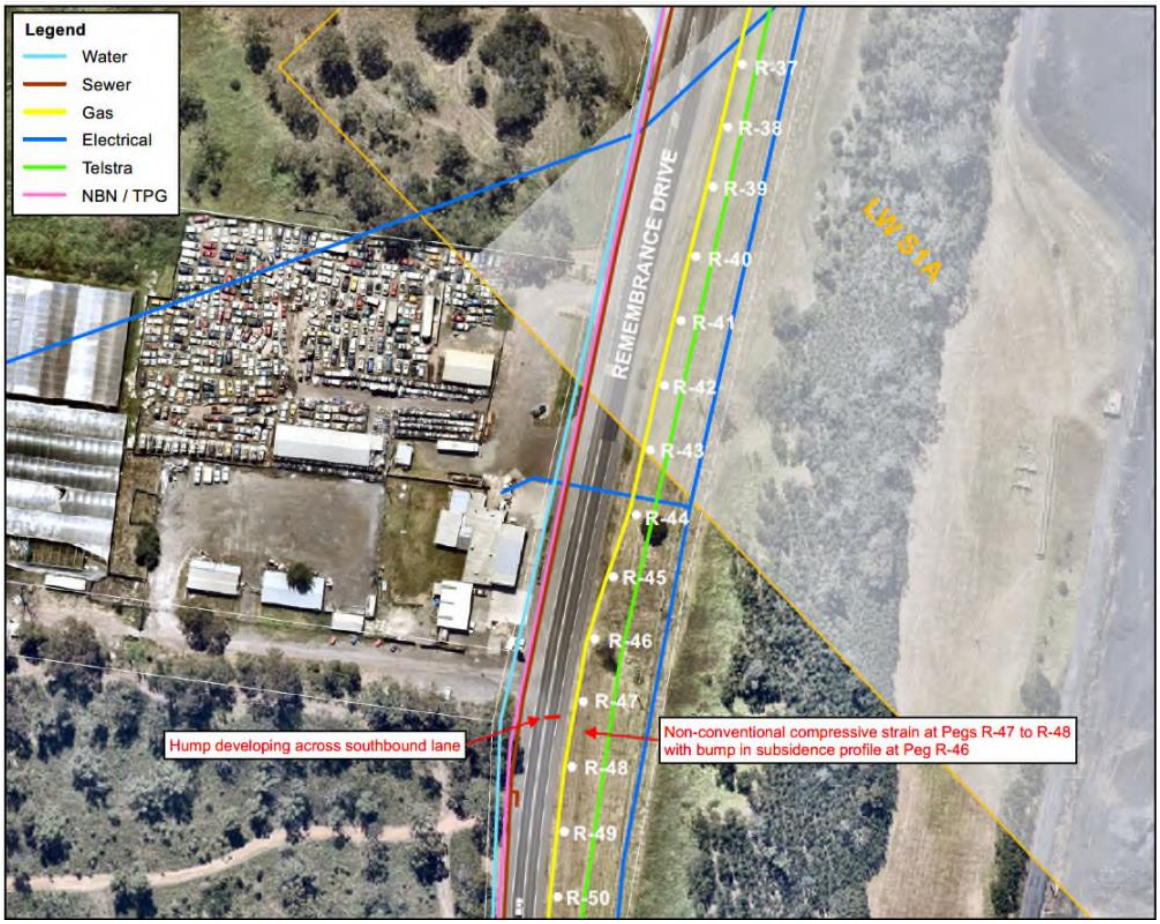

Figure 20 Location of non-conventional compressive strain, bump and hump on Remembrance Drive.

With regards to other roads, monthly ground surveys have been conducted along Charlies Point Road, with very minor changes observed on 27 November 2023. A visual inspection of Charlies Point Road on 4 December 2023 found no issues. Ground surveys and visual inspections have ceased as Charlies Point Road is beyond the zone of active subsidence. Surveys of Rockford Road Bridge and Arina Road Bridge were conducted on 25 July and 18 December 2023, and found no issues.

14.6.2.3 Potable Water Infrastructure

Monthly and weekly surveys have been conducted on local roads and bridges during LW S1A and LW S2A in accordance with the Wollondilly Shire Council Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan, Telstra Management Plan, NBN Management Plan and TPG Management Plan. Observations have

been reported in the weekly Subsidence Monitoring Reports. No impacts to Sydney Water potable water infrastructure was observed during the reporting period.

14.6.2.4 Sewer Infrastructure

Monthly and weekly surveys have been conducted on local roads and bridges during LW S1A and LW S2A in accordance with the Wollondilly Shire Council Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan, Telstra Management Plan, NBN Management Plan and TPG Management Plan. Observations have been reported in the weekly Subsidence Monitoring Reports. No impacts to Sydney Water sewer infrastructure was observed during the reporting period.

14.6.2.5 Gas Infrastructure

Monthly and weekly surveys have been conducted on local roads and bridges during LW S1A and LW S2A in accordance with the Wollondilly Shire Council Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan, Telstra Management Plan, NBN Management Plan and TPG Management Plan. Observations have been reported in the weekly Subsidence Monitoring Reports. No impacts to Jemena gas infrastructure was observed during the reporting period.

14.6.2.6 Electrical Infrastructure

Ground surveys of critical power poles are conducted when Endeavour Energy electrical poles are within the active subsidence zone. The latest survey was on 18 December 2023. Observations have been reported in the weekly Subsidence Monitoring Reports. Observations on Remembrance Drive not adversely affect Endeavour Energy infrastructure during the reporting period. No impacts to Endeavour Energy electrical infrastructure was observed during the reporting period.

14.6.2.7 Telecommunications Infrastructure

Monthly and weekly surveys have been conducted on local roads and bridges during LW S1A and LW S2A in accordance with the Wollondilly Shire Council Management Plan, Jemena Management Plan, Sydney Water Potable Water Management Plan, Sydney Water Sewer Management Plan, Telstra Management Plan, NBN Management Plan and TPG Management Plan. Observations have been reported in the weekly Subsidence Monitoring Reports.

On 27 December, a minor loss was detected by Optical Time Domain Reflectometer (OTDR) at the location of the bump and high compressive strain on Remembrance Drive. The cable was retested on 29 December 2023 and 1 January 2024, which found minor changes since 27 December 2023. An increase in loss was observed on 4 and 8 January 2023. The cause of the loss could be related to the gas pipe trench excavation or heavy construction vehicles travelling over the cable, or saturation of soils from recent rainfall events.

14.6.2.8 Built Structures (General)

Monthly and weekly surveys are conducted at farm structures (farm buildings, sheds, tanks, fences) and residential structures (houses, swimming pools, associated residential structures, fences, pavement) during active subsidence as required. During the reporting period, no impacts were observed at farm structures as a result of LW S1A and LW S2A extraction.

14.6.2.9 Wollondilly Anglican College

Weekly Subsidence Status Reports have been prepared for the Wollondilly Anglican College, which summarise monitoring and inspection results for the Remembrance Driveway, monitoring lines between College buildings, structures, fence lines, dams, and sensitive equipment. During the reporting period, there were no triggers under the Wollondilly Anglican College Management Plan. One gate at the Wollondilly Anglican College has jammed and has been repaired.

14.6.2.10 Tahmoor Mine Site

Monthly and weekly surveys were conducted at the Tahmoor Mine Site during LW S1A and LW S2A in accordance with the Tahmoor Mine Site Management Plan. Weekly Subsidence Status Reports have been prepared for the Tahmoor Mine site, which summarise monitoring and inspection results for general mine site monitoring, the stockpile area (including conveyor 5C and reclaim tunnel conveyor 6C), overhead conveyors, drift, winder, rail loop, mine site structures, overhead crane and monorails, shaft No. 3, dams, embankments and site services, and the refuse emplacement area.

During the reporting period 11 mm of closure between Pegs BL600 and BL700 of the rail loop was initially observed on the 15 May 2023; and cracks observed at two locations at 6C Tunnel and vent shaft interface initially observed on 29 May 2023. The number of cracks grew to seven (7) by the end of the monitoring period, all of them being less than 1 mm in width. A structural engineer inspected the cracks in the 6C Tunnel on 30 May 2023 and reported no immediate concerns. The mine site remained safe and serviceable during LW S1A and LW S2A extraction.

14.6.2.11 Australian Wildlife Sanctuary

Weekly Subsidence Status Reports have been prepared for the Australian Wildlife Sanctuary, which summarises monitoring and inspection results from relevant GNSS units, ground survey (Tahmoor Mine Boundary line (V line)), survey and visual inspections of Main Southern Railway, local streets, structures; and natural features observations. During the reporting period, there were no triggers under the Australian Wildlife Sanctuary Management Plan and no impacts were observed to built structures at this property.

14.6.2.12 Bargo Petroleum

Weekly Subsidence Status Reports have been prepared for the Bargo Petroleum (3030 Remembrance Drive), which summarise monitoring and inspection results from survey and visual inspections on Remembrance Driveway and structures, fuel balance monitoring and pressure testing of fuel tanks and fuel lines, hydrocarbon testing and visual inspections of groundwater, and alignment survey of vehicle hoists.

During the reporting period, an above-ground diesel tank failed a fuel balance test, resulting in further investigation. The cause of the tank failure was determined to be unlikely related to mining as surveys around the tank measured very small ground strains that were close to survey tolerance.

14.6.2.13 Inghams Farms

During the reporting period, there were no triggers under the Inghams Bargo Chicken Breeder Production Complex Management Plan and no impacts were observed at this property. The Inghams Bargo Turkey Breeder Production Complex is not located within the active subsidence zone of LW S1A and LW S2A.

14.6.2.14 Tahmoor Garden Centre

Weekly Subsidence Status Reports have been prepared for the Tahmoor Garden Centre, which summarise monitoring and inspection results from the Remembrance Drive, structures, and outdoor storage racks. During the reporting period, there were no triggers under the Tahmoor Garden Centre Management Plan and no impacts were observed at this property.

14.6.2.15 Other Built Structures

The following built structures were located outside the active subsidence zone of LWS1A and LW S2A:

- Picton Weir;
- Bargo Cemetery;
- MKD Machinery;
- Bargo Valley Produce;
- Canine Country Club; and
- Pamak Hobbies.

Further details of impacts to Built Structures from LW S1A and LW S2A are found in the Tahmoor South Six Monthly Subsidence Impact Report 2 and Tahmoor South Six Monthly Subsidence Impact Report 3 (1st January 2023 – 31st December 2023), **Appendix 16** and **Appendix 17** respectively.

14.7 Public Safety

14.7.1 Western Domain

The LW W3-W4 Public Safety Management Plan were prepared to manage the potential consequences as a result of LW W3-W4 extraction on public safety within the Study Area in accordance with Condition 13H(vii)(g) of DA 67/98.

Management requirements for public safety are covered in the Built Features Management Plan and the Land Management Plan. Monitoring of steep slopes and other landscape features has been conducted for the reporting period in accordance with the LW W3-W4 Land Management Plan. In addition, monitoring of infrastructure items has also been conducted for the reporting period in accordance with the LW W3-W4 Built Features Management Plan.

No subsidence impacts were identified during the reporting period that were considered to pose a risk to public safety.

14.7.2 Tahmoor South

The LW S1A-S6A Public Safety Management Plan was prepared to manage the potential consequences as a result of LW S1A-S6A extraction on public safety within the Study Area in accordance with Condition C8 of SSD 8445.

Management requirements for public safety are covered in the Built Features Management Plan and the Land Management Plan. Monitoring of cliffs, natural steep slopes and other landscape features has been conducted for the reporting period in accordance with the LW S1A-S6A Land Management Plan. In addition, monitoring of built features has been conducted for the reporting period in accordance with the LW S1A-S6A Built Features Management Plan. No subsidence impacts were identified during the reporting period that were considered to pose a risk to public safety.

14.8 Surface Water

In accordance with monitoring requirements of the Western Domain LW W3-W4 Water Management Plan and the Tahmoor South LW S1A-S6A Water Management Plan, Trigger Action Response Plans (TARPs) have been developed to class degrees of impact based on monitoring data and are reviewed monthly to track progression. Flow, pool level, surface water quality and visual creek inspection monitoring for natural drainage behaviour are monitored and reviewed in accordance with the relevant Water Management Plan. Review and interpretation of monitoring data, assessment against performance measures and performance indicators for surface water and groundwater, and any recommendations in relation to ongoing monitoring or corrective actions was undertaken during the reporting period.

During the reporting period the following TARP levels were triggered with further details given below and in the Tahmoor Coal Six Monthly Subsidence Impact Reports; Western Domain Report 8 & 9, and Tahmoor South Reports 2 & 3 (**Appendix 14, Appendix 15, Appendix 16 and 17** respectively):

14.8.1 Western Domain

During the post-mining phase monthly monitoring data is reviewed and reported for Flow, pool water level and surface water quality are monitored for Stonequarry Creek, Cedar Creek and Matthews Creek. Visual Inspections and reporting was conducted quarterly for creek monitoring for natural drainage behaviour.

As discussed in the Surface Water Review (Appendix B to the Western Domain 6 monthly Subsidence Impact Report 9), on the basis of results that indicate impacts from prevailing climatic conditions and the completion of 15 months of post-mining monitoring, monitoring at surface water monitoring sites ceased in December 2023. This report will be the final monitoring report for Western Domain.

14.8.1.1 Surface Water Quality

To date, there has been negligible evidence of an influence of mining LW W1-W4 on surface water quality in Matthews Creek, Cedar Creek or Stonequarry Creek. The water quality characteristics of monitoring sites following commencement of mining LW W1-W4 have been largely consistent with baseline conditions and/or consistent with reference site conditions.

During January and February 2023, isolated occurrences of elevated dissolved aluminium were recorded at some monitoring sites on Cedar Creek (monitoring site CG) and Stonequarry Creek (monitoring sites SC2 and SD). Elevated concentrations of dissolved aluminium were also recorded at associated reference sites and, as such, the elevated concentrations are considered to be catchment wide and related to the prevailing climatic conditions. The dissolved aluminium concentrations recorded at all sites declined to the limit of detection in March 2023.

During December 2023, isolated occurrences of elevated pH levels were recorded at monitoring sites SC and SD in Stonequarry Creek. From photographs of monitoring site SD taken on 8 December 2023, it is indicated that the presence of extensive algae growth has likely contributed to an increase in pH at these sites.

Also, during December 2023, an isolated occurrence of elevated dissolved aluminium was recorded at monitoring site SD in Stonequarry Creek. This measurement was only slightly elevated (0.08 mg/L) above the site specific trigger value, and it was noted that similar or greater elevations had

been recorded at several sites historically. As such, the slightly elevated dissolved aluminium concentration at monitoring site SD was considered to be related to the prevailing climatic conditions and to the contribution of flow from Cedar Creek to Stonequarry Creek containing elevated concentrations of dissolved aluminium.

TARP Triggers

The following TARP triggers occurred during the reporting period for surface water quality:

- **Level 2** triggered at monitoring site SC2 and CG due to elevated Aluminium concentrations between January and February 2023. SD was triggered due to elevated Aluminium concentrations in February 2023; and
- **Level 2** triggered at monitoring site CD on Cedar Creek due to elevated dissolved aluminium in December 2023, and elevated pH at monitoring sites SC and SD in December 2023. These elevated results were attributed to prevailing climatic conditions and an increase in algae growth, respectively.

Actions in response to TARP triggers

The following actions have been completed in response to the Level 2 TARP triggers during this reporting period:

- Continue monitoring as per monitoring program - monthly monitoring is ongoing during the monitoring period;
- Continue monthly review of data including analysis of water quality trend along creek (upstream to downstream) to identify spatial changes – completed on a quarterly basis during the post-mining stage; and
- Convene Tahmoor Coal Environmental Response Group to review response – completed following the reporting of this data, including discussions of these TARP triggers. There were no actions regarding this TARP trigger.

Noting that surface water quality triggers recorded during the reporting period were not considered to be associated with mining impacts, no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan is no longer required.

14.8.1.2 Pool Water Level

With the exception of monitoring site CB and CE in Cedar Creek, water levels at monitoring sites on Matthews Creek, Stonequarry Creek, and Cedar Creek remained above minimum baseline levels and/or were consistent with baseline conditions during the reporting period. Monitoring site SE in Stonequarry Creek had occurrences in the reporting period where the water level was at or marginally below the baseline minimum.

During January to June 2023, except following high rainfall periods, the water level at monitoring site CB (pool CR14) was recorded below the CTF level and below the baseline minimum for the majority of the review period. The water level declined by a maximum of 0.53 m below the baseline minimum in March 2023 although was recorded at the CTF level in late May to June 2023. The decline in water level recorded intermittently at monitoring site CB during this period is considered a result of below average rainfall conditions, a reduction in streamflow contribution from upstream sites (including upstream reference sites) and complex groundwater-surface interactions occurring in the vicinity of monitoring site CB which may be exacerbated by the mobilisation of fractures which is considered to have occurred during mining of LW W1-W4.

A Level 4 TARP significance was originally triggered in relation to surface water level decline for the period 19 to 29 January 2021 at monitoring site CB (pool CR14) in Cedar Creek. Whilst not visible on the surface, it is likely that mining induced subsidence had mobilised existing fractures resulting in changes in the water level recession rate of this pool. In addition, it was considered likely that mining induced groundwater drawdown had resulted in the surface water system in the vicinity of pool CR14 transitioning from a gaining stream (baseflow discharge from the groundwater stream to the stream) to a weakly gaining or losing stream (surface water recharge to the groundwater system).

Between 1 July to 19 December 2023, a Level 2 TARP trigger intermittently applied at monitoring site CB (pool CR14). When comparing the monitoring data directly to the TARP level description, it is noted that a Level 3 may apply for this period. However, the water level decline recorded at monitoring site CB during the above mentioned periods are considered negligible and related to a catchment-wide reduction in surface flow due to below average rainfall conditions. As such, a Level 2 trigger has been equated for these periods.

From 13 February to 4 April 2023, the water level recorded at monitoring site CE (pool CR25) declined slightly below the baseline minimum (maximum of 0.07 m below the baseline minimum). The water level then rose from early May and was trending around the baseline minimum for the remainder of the review period. The period of slight water level decline recorded at monitoring site CE was consistent with the period of water level decline recorded at monitoring site CB. As such, it is considered that the water level decline recorded at monitoring site CE was related to a decline in surface flow from upstream monitoring site CB in combination with below average rainfall conditions.

Tahmoor Coal have been providing quarterly (3-monthly) monitoring reports for surface water and groundwater as per the request by DPE (now DPHI) on 22 December 2023. These reports include a review and interpretation of monitoring data, assessment against performance measures and performance indicators for surface water and groundwater, and any recommendations in relation to ongoing monitoring or corrective actions.

TARP Triggers

The following TARP triggers occurred during the reporting period for pool water level:

- **Level 3** then **Level 2** triggered at monitoring site CB on Cedar Creek due to pool water level reduction during the reporting period. During the periods of water level decline the water level did not decline atypically, and occurred during a period of generally below average rainfall. No further actions are required; and
- **Level 2** triggered at monitoring site CE on Cedar Creek due to pool water level reduction between 13 February and 4 April 2023.

Actions in response to TARP triggers

The following actions have been completed in response to the Level 2 TARP triggers during this reporting period:

- Continue monitoring as per monitoring program - monthly monitoring was ongoing during the reporting period;
- Continue monthly review of data – quarterly result analysis and reporting was completed in accordance with the post-mining monitoring program;
- Review relevant surface water level, groundwater level and streamflow data to assess comparative trends – completed as part of this report for monitoring site CB, which

suggested that gaining conditions (groundwater contribution to the surface water system) were occurring during this time period in the vicinity of monitoring site CB (pool CR14);

- Review manual water level measures for additional monitoring sites to identify potential spatial trends in water level decline – completed as part of this report which suggested that the decline in water level at monitoring site CB was contributed to by a decline in water level at upstream reference sites Cedar US and CC1A; and
- Convene Tahmoor Coal Environmental Response Group to review response – completed and included a discussion of these TARP triggers. There were no actions regarding these TARP triggers.

Noting that water level decline recorded at site CB during the reporting period was not considered to be associated with mining impacts, no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan has now been completed.

14.8.1.3 Natural Drainage Behaviour

Visual and photographic surveys for subsidence impacts on creeks have been completed quarterly for all monitoring pools on Stonequarry Creek, Cedar Creek and Matthews Creek in the post-mining monitoring period. The purpose of these surveys is to note whether change has occurred to pool level, drainage or overland flow, and to assist in determining if any change can be attributed to mining impacts. Surveys are carried out to identify rock bar and/or stream base cracking, gas release, or increased iron precipitation.

A summary of creek observations for the reporting period is provided below:

- Surficial fracturing of the controlling rockbar at Pool SR17 and a rockbar at Pool SR20 have been noted, and have not changed since the previous reporting period;
- There were no additional surface fracturing or cracking noted in the waterways during the reporting period;
- No reduction in pool water level, flow or connective overland flow was observed in the waterways during the reporting period;
- Iron hydroxide precipitation was observed to have reduced in Cedar Creek in February 2023, and are no longer present in Matthew Creek in February 2023; and
- No gas release was noted in the waterways during the reporting period.

The surficial fracturing of the controlling rockbar at Pool SR17 was first noted following the visual inspection on 17 November 2021. The fractures occurred in thinly bedded, laminated sandstone and were likely in response to mining related differential compression in combination with the presence of existing delamination in the rockbar surface formed by natural weathering processes. This surficial fracturing had been noted to be stable during the reporting period.

The surficial fracturing of a rockbar at Pool SR20 was noted following the inspection on 18 August 2022. Two fractures were noted and it was confirmed that one crack was the development of an existing (premining) joint / discontinuity, while the other was first observed during mining of LW W4. The fractures had been noted to be stable during the reporting period. Further discussion of surficial fracturing and related TARP triggers is provided in Western Domain 6-monthly Impact Report 8 (**Appendix 10**).

TARP Triggers

The following TARP triggers occurred during the reporting period for natural drainage behaviour:

- **Level 3** triggered at site SR17 Rockbar from November 2021 onwards, and fracturing at SR20 Rockbar from August 2022 onwards. A Level 3 TARP trigger was associated for both locations as the rockbar fracturing was formed during mining (was not present during baseline inspections), and there was no reduction in pool water level, drainage or overland connected flow (taking into account climatic conditions and observations during the baseline monitoring period). No further actions are required.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

- Continue monitoring as per monitoring program - quarterly monitoring was ongoing during the reporting period;
- Continue review of data – completed on a quarterly basis during the reporting period (following completion of quarterly monitoring, as required by the LW W3-W4 Water Management Plan);
- Convene Tahmoor Coal Environmental Response Group to undertake an investigation to assess if the change in behaviour is related to LW W3-W4 mining effects, other catchment changes or the prevailing climate;
- Response as defined by Environmental Response Group – there were no actions regarding this TARP trigger; and
- Consider increasing inspection and review of data frequency to fortnightly for sites where Level 3 has been reached - an increase in the frequency of visual inspections and review of data in relation to rockbar physical features, natural drainage behaviour and pool water level is not considered to be required at this stage.

Noting that fracturing at Rockbar SR17 and Rockbar SR20 are stable and have not resulted in decline in water level of their respective pools, no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan has now been completed.

14.8.2 Tahmoor South Domain

Flow, pool water level, surface water quality and creek condition was monitored and reviewed on a monthly basis for Teatree Hollow, Teatree Hollow tributary ('Wirrimbirra Creek'), Bargo River, and Bargo River Tributary, as well as a fortnightly basis for impacted sites. Continuous surface water level data and manual monthly water level measurements have been recorded at seven monitoring sites on Teatree Hollow (and tributary) and six monitoring sites on Bargo River (and tributary).

Streamflow recorded from TT-F1 in Teatree Hollow indicate that streamflow is intermittent, with extended periods of no flow recorded prior to the commencement of mining of LW S1A. During July to November 2023, no flow was recorded at the TT-F1 streamflow site, indicating below average rainfall conditions. The rate of streamflow decline recorded during the review period is considered consistent with that recorded from April to November 2021, prior to the commencement of mining of LW S1A and consistent with the rate of rainfall decline recorded during these periods.

From late November 2023 to the end of the review period, flow events occurred in response to above average rainfall. Following this period of above average rainfall, pool water level in the majority of pools rose in response. With the exception of TT3 and TT12, all pools recovered to levels above the cease to flow level at the end of the review period.

A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP1, WMP3 and WMP5 via letter dated 10 November 2023. A site visit was also offered to National Trust and Australian Wildlife Sanctuary, and took place on 22 November 2023.

14.8.2.1 Surface Water Quality TARP (WMP1)

TARP Triggers

The following TARP triggers occurred during the reporting period for surface water quality:

- **Level 1** triggered at monitoring site TT12-QLa due to elevated Electrical Conductivity level for 3 consecutive months December 2022 to February 2023. During the baseline monitoring period, similarly elevated EC values were recorded at TT7-QRLa which suggests that elevated EC values likely occurred historically at TT12-QLa. Given that only EC was elevated at TT12-QLa and the EC values were within the range of historical values recorded at sites in the Teatree Hollow catchment, it is considered that the elevated EC values recorded at TT12-QLa were likely due to the prevailing climatic conditions and unrelated to mining influences.
- **Level 1** triggered at monitoring site TT2-QLa due to elevated dissolved Aluminium in November 2023 during four consecutive months from September to December 2023. Between September and November 2023, similar elevated dissolved aluminium concentrations were not recorded at the upstream reference site (TT1-QLa). It was considered that the elevated dissolved aluminium concentrations recorded at pool TT2 reflected the low volume of stagnant, ponded water present in the pool at the time of sampling. As such, it is considered that the aluminium concentrations recorded are reflective of a drying phase for pool TT2 rather than typical flow conditions.
- **Level 1** triggered at monitoring site TT7 due to elevated dissolved Nickel concentrations during August 2023. Elevated dissolved Iron and dissolved Zinc were also reported between April and June 2023, and elevated Electrical Conductivity was reported between March to June 2023. Dissolved Nickel SSGV was exceeded for three consecutive months from June to August 2023, resulting in a Level 1 TARP trigger. Similar elevated dissolved Nickel concentrations were not recorded at the upstream reference site (TT1-QLa) during the corresponding periods. The elevated dissolved metal concentrations recorded at pool TT7 from June to August 2023 are considered related to the interaction of underflow with subsurface geology and re-emergence of elevated dissolved iron underflow as surface flow in the vicinity of pool TT7.
- **Level 2** triggered for monitoring site TT7 due to elevated levels of dissolved Zinc and dissolved Iron between July and August 2023. Dissolved iron and zinc SSGVs were exceeded for five consecutive months from April to August 2023, resulting in a Level 2 TARP trigger. Similar elevated dissolved iron and dissolved zinc concentrations were not recorded at the upstream reference site (TT1-QLa) during the corresponding periods. The elevated dissolved metal concentrations recorded at pool TT7 from April to August 2023 are considered related to the interaction of underflow with subsurface geology and re-emergence of elevated dissolved iron and dissolved zinc underflow as surface flow in the vicinity of pool TT7.
- **Level 2** triggered at monitoring site TT7-QRLa and TT13-QLa due to elevated dissolved aluminium concentrations for 5 consecutive months between October 2022 to February 2023 . The same was recorded at the reference site (TT1-QRLa) in October 2022 although was not recorded at the reference site in the months which followed. The SSGV (Site Specific

Guideline Values) exceedances occurred following above average rainfall in October 2022, prior to the commencement of mining of LW S1A. In October 2022, prior to the commencement of mining of LW S1A, historically elevated dissolved aluminium concentrations were recorded at all sites. From November 2022 to February 2023, the dissolved aluminium concentrations recorded at sites in the Teatree Hollow catchment were consistent with that recorded at sites in the Dogtrap Creek catchment (located outside of the influence of mining activities). Based on the above, it is considered that the elevated dissolved aluminium concentrations are related to the prevailing climatic conditions and indicative of natural variability rather than a mining related influence.

- **Level 3** triggered for monitoring site TT7 for Electrical Conductivity during July and August 2023. At TT7, the electrical conductivity SSGV was exceeded for six consecutive months from March to August 2023 (inclusive), equating to a Level 3 trigger. Similar elevated EC values were not recorded at the upstream reference site (TT1-QLa) during the corresponding period. The elevated EC values recorded during March to August 2023 are considered related to evapo-concentration of salinity during periods of below average rainfall and water level decline and the Interaction of underflow with subsurface geology and re-emergence of elevated EC underflow as surface flow in the vicinity of pool TT7.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

Level 1, 2 and 3 TARP Triggers:

- Continue monitoring as per monitoring program - monthly monitoring is ongoing according to the monitoring program;
- Continue monthly review of data and Water Quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions– completed on a monthly basis during the reporting period;
- Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment. Convene Tahmoor Coal Environmental Response Group to review response – completed following the reporting of this data, including discussions of these TARP triggers;
- Reasonable and feasible options for remediation were considered where relevant. With respect to the water quality trigger recorded at TT7-QLa and TT2-QLa during the review period of 1 July to 31 December 2023, there are limited feasible corrective management actions (CMAs) that could be implemented prior to the cessation of subsidence movements associated with mining of LW S1A-S6A. Presently, there is negligible indication of a material impact to the water quality of Teatree Hollow, given that there has been negligible surface flow reporting to the downstream reach of Teatree Hollow since February 2023 with limited potential for transport of elevated EC, dissolved aluminium, iron, zinc and nickel. Accordingly, it is considered that water quality effects are limited to pool TT7 and TT2 with negligible indication of material environmental harm to Teatree Hollow. Therefore, no CMAs are not considered reasonable or feasible at this stage;
- TARP triggers during the reporting period were notified to DPE (now DPHI) and NRAR on 16 August 2023 and 10 November 2023. Tahmoor Colliery Community Consultative Committee

was advised of water quality triggers on 7 September 2023 and 7 December 2023.. Future meetings will include further notification of additional TARP triggers;

- Report TARP triggers and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review;

Level 2 and 3 TARP Triggers:

- Increased monitoring and review of data frequency was considered. For all four elevated qualities, the causation was determined to be due to interaction of underflow with surface geology and re-emergence of elevated dissolved iron underflow as surface flow in the vicinity of pools TT2 and TT7. In addition, evapo-concentration of salinity during period of below average rainfall and water level decline was also noted to contribute to elevated EC values at pool TT7. Increased monitoring was not undertaken during the reporting period;
- The LW S1A-S6A Water Management Plan was reviewed and proposed amendments to the plan were submitted to DPE (now DPHI) on 5 July 2023 for approval. Following the submission of this report, another round of review and (if required) update will be completed for the LW S1A-S6A Water Management Plan, and any amendments submitted to DPHI for approval; and

Level 3 TARP Triggers:

- A site visit was offered to DPIE and NRAR in relation to Level 3 TARP triggers of TARPs WMP1, WMP3 and WMP5 via letter dated 10 November 2023. A site visit was also offered to National Trust and Australian Wildlife Sanctuary, and took place on 22 November 2023. In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP (if required) will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.

14.8.2.2 Stream Water Quality for other Water courses (Bargo River and Hornes Creek) (WMP2)

No triggers under this TARP were activated during this reporting period.

14.8.2.3 Pool Water Level for all Water courses within the Subsidence Area TARP (WMP3)

TARP Triggers

The following TARP triggers occurred during the reporting period for surface water quality:

- **Level 1** triggered at monitoring site TT9 due to a decline below the trigger level on 24 February to 3 March 2023 and below the level sensor from 4 to 14 March 2023. The same was not recorded at the reference site(s). Level 1 triggered again October to November 2023 due to water level decline to a historical minimum from mid-October to late November 2023, although did not decline below the sensor level. Further actions will be undertaken in accordance with the TARP.
- **Level 1** triggered at monitoring site TT12 due to a decline below the sensor level on 18 February and was visually observed as dry on 1 and 15 March 2023. The same was not recorded at the reference site TT1-QRLa; however, a decline in water level was recorded at pool TT9 which is located upstream of pool TT12. Level 3 TARP triggered from July to

November 2023 due to water level remaining below the sensor level or the pool was dry for the majority of the review period, except for brief intervals during and following rainfall events.

- **Level 3** triggered at monitoring site TT13 during July to November 2023 due to water level recording below the sensor level or the pool was dry from July to mid-November 2023.
- **Level 3** triggered at monitoring site TT2 during August to November 2023 due to pool water level recorded below the cease to flow level from late April to the end of June and between July to 23 October 2023, and below the sensor level or dry from 24 October to late November 2023.
- **Level 3** triggered at monitoring site TT7 in November 2023 due to water level recorded below the cease to flow and the baseline minimum from September to October 2023, and the pool was reported to be dry in November 2023.
- **Level 3** triggered at monitoring site TT3 due to decline in water level below the level sensor between 7 February to 14 March 2023. As such, an atypical decline in water level for greater than one month has been recorded. The same has not occurred at the reference site (TT1-QRLa). A preliminary recession analysis was conducted which indicated that the water level recession rate recorded in January and February 2023 was slightly greater than that of the baseline period. On 8 February 2023, BES (2023a)1 visually identified flow diversion and cracking upstream of pool TT3. Pool TT3 was reported as dry, however, no mining induced fractures were observed in the base of the pool. The diverted flow was observed as re-emerging downstream of TT3. Based on the above, the increased rate of water level recession recorded at pool TT3 is considered to be related to a decline in surface water flow reporting to pool TT3 due to mine induced cracking occurring upstream of pool TT3. In accordance with the TARP, download and assessment of water level data recorded at TT3-QLa has been increased to weekly (real time telemetry data). A detailed investigation will also be undertaken in accordance with the TARP. A Level 3 TARP was also triggered during July to November 2023 due to the pool water level recording below the sensor level or the pool was dry, except for brief periods during and following rainfall events. Water level monitoring will continue in accordance with the LW S1A-S6A Water Management Plan.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

Level 1, 2 and 3 TARP Triggers:

- Continue monitoring as per monitoring program – monthly (or more frequent) monitoring is ongoing according to the monitoring program;
- Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed with consideration to climatic conditions;
- Streamflow data recorded at TT-F1 was reviewed and streamflow reduction assessment conducted. The streamflow assessment indicated that streamflow trends recorded at monitoring site TT-F1 in Teatree Hollow have been consistent with rainfall trends for the duration of the review period;
- Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment.

Level 2 and 3 TARP Triggers:

- Monitoring and review of data frequency was increased to fortnightly at sites TT2, TT3, TT12 and TT13;
- Water level trends for all sites in Teatree Hollow and Teatree Hollow tributary were reviewed to identify special changes with consideration to climatic conditions;
- The LW S1A-S6A Water Management Plan was reviewed and proposed amendments to the plan were submitted to DPE (now DPHI) on 5 July 2023 for approval. Following the submission of this report, another round of review and (if required) update will be completed for the LW S1A-S6A Water Management Plan, and any amendments submitted to DPHI for approval;

Level 3 TARP Triggers:

- Monitoring and review of data frequency was increased to fortnightly at sites TT2-QLa, TT3-QLa, TT12-QLa and TT13-QLa; and
- A detailed investigation was undertaken to assess if the change in behaviour at is related to mining effects. Direct and indirect impacts from mining have been confirmed at the pools in question, as summarised in Tahmoor South 6 monthly Impact Report 3 (**Appendix 17**).

14.8.2.4 Pool Water Level for other water courses (Bargo River and Hornes Creek) TARP (WMP4)

During this reporting period, there have been no triggers under this TARP.

14.8.2.5 Physical Features and Natural Behaviour of Watercourses within the Subsidence Area TARP (WMP5)

Visual and photographic surveys for subsidence impacts on creeks have been completed monthly for monitoring pools and reaches in Teatree Hollow and Teatree Hollow tributary within the active subsidence zone of LW S1A and LW S2A. An increase in frequency to fortnightly has been completed for mining impacted pools.

The purpose of these surveys is to note whether change has occurred to pool level, drainage or overland flow, and to assist in determining if any change can be attributed to mining impacts. Surveys are carried out to identify rock bar and/or stream base cracking, changes in overland connected flow, gas release, turbidity or increased iron precipitation.

Similarly to pool water level, it was noted that following above average rainfall in late November 2023, pool water level in the majority of pools rose in response. With the exception of TT3, overland connective flow was observed at pools, particularly trickle flow over the hydraulic controls.

TARP Triggers

The following TARP triggers occurred during the reporting period for creek condition:

- **Level 2** triggered at monitoring site TT10 during August to November 2023. The pool was observed as dry from July to mid-September 2023, and minor ponding was observed in the pool in September, October and November 2023. No fractures have been observed and no surface flow was observed in the upstream reach of the minor tributary from July to November 2023. In addition, no surface flow was present in the upstream reach of Teatree Hollow tributary in late October and November 2023. It is considered that the decline in surface flow in the upper headwaters of Teatree Hollow tributary was related to the prevailing climatic conditions and unrelated to mining effects;

- **Level 2** triggered at monitoring site TT15 between September to November 2023. The pool was observed as dry in July, August, October and November 2023; and moderate turbidity was noted in December 2023. No fractures have been observed and no surface flow was observed in the upstream reach of the minor tributary from July to November 2023. In addition, no surface flow was present in the upstream reach of Teatree Hollow tributary in late October and November 2023. It is considered that the decline in surface flow in the upper headwaters of Teatree Hollow tributary was related to the prevailing climatic conditions and unrelated to mining effects;
- **Level 3** triggered at monitoring site TT2 from September to December 2023. A notable decline in water level was observed from May to November 2023. Two fractures on the immediate upstream boundary of TT2 were observed in July 2023 and an increase in fracture size was reported from September 2023 onwards. Low to moderate turbidity was observed during the reporting period. Although below average rainfall conditions occurred from July to November 2023 and surface flow ceased in the upper headwaters of Teatree Hollow tributary, the water level decline recorded at pool TT2 is considered atypical and inconsistent with historical conditions. In addition, widening of the fracture observed immediately upstream of pool TT2 indicates that mining related effects have occurred at this site. As such, it is considered that the water level decline recorded at pool TT2 during the review period is related to mining effects in combination with the prevailing climatic conditions;
- **Level 3** triggered at monitoring site TT3 from August to December 2023. The pool was observed as dry majority of the inspections between February and June and from July to November 2023. Pooled water was observed in December 2023 with no overland connective flow. Although below average rainfall conditions occurred from July to November 2023 and surface flow ceased in the reach of Teatree Hollow tributary downstream of pool TT1, the water level decline recorded at pool TT3 is considered atypical and inconsistent with historical conditions and indicate that mining related effects have occurred in the vicinity of Pool TT3;
- **Level 3** triggered at monitoring site TT7 from March to November 2023. A decline in water level was observed from July to October, and the pool was reported as dry in November 2023. Iron staining was observed on exposed bedrock at the upstream extent of the pool during the reporting period. It is considered that the decline in water level at pool TT7 is predominately related to the prevailing climatic conditions. However, mine induced fracturing has occurred upstream of pool TT7 which has likely resulted in a change in surface flow behaviour in the vicinity of pool TT7;
- **Level 3** triggered at monitoring site TT11 from August to December 2023. The pool was observed as dry majority of the inspections between February to early December 2023. Additional fractures and an increase in the size of an existing fracture was observed during the reporting period. Minor gas bubbling was observed in the centre of the pool in late December 2023. Although below average rainfall conditions occurred from July to November 2023 and surface flow ceased in the reach of Teatree Hollow tributary downstream of pool TT1, the water level decline recorded at pool TT3 is considered atypical and inconsistent with historical conditions. Additional fracturing and widening of existing fractures at pool TT11, in addition to the observation of minor gas bubbling, indicate that mining related effects have occurred in the vicinity of pool TT11;

- **Level 3** triggered at monitoring site TT12 from July to December 2023. The pool was observed as dry from March to November 2023. An increase in the extent of fracturing upstream and downstream of the pool was observed during the reporting period. Iron staining was observed, consistent with that observed in the previous reporting period. Moderate to high turbidity was observed in December 2023. It is considered that the water level behaviour at pool TT3 recorded during the review period is atypical and inconsistent with historical conditions. During the review period, an increase in the extent of fracturing upstream and downstream of pool TT12 was recorded. As such, the change in water level behaviour at pool TT12 is considered related to mining induced fracturing in combination with the prevailing climatic conditions.; and
- **Level 3** triggered at monitoring site TT13 from July to November 2023**.** The pool was observed as dry from March to November 2023 with minimal water observed during May 2023. Moderate turbidity was observed in December 2023. Although below average rainfall conditions occurred from July to November 2023 and surface flow ceased in the reach of Teatree Hollow tributary downstream of pool TT1, the water level decline recorded at pool TT13 is considered atypical in comparison to baseline conditions. The decline in water level recorded during the review period is considered related to the cessation of surface water flow in Teatree Hollow tributary due to mining induced fracturing upstream of pool TT11 in combination with the prevailing climatic conditions.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

Level 1, 2 and 3 TARP Triggers:

- Monthly (or more frequent) monitoring and review of data is ongoing according to the monitoring program;
- Visual changes along watercourse were reviewed to observe any spatial changes with consideration to climatic conditions;
- Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment;

Level 2 and 3 TARP Triggers:

- Monitoring and review of data frequency was increased to fortnightly at pools TT2, TT3, TT7, TT11, TT12 and TT13, as well as relevant reference sites (pools TT1 and TT9). Changes at TT10 and TT15 were not confirmed to be related to mining effects;
- A detailed investigation was undertaken to assess if the change in behaviour at is related to mining effects (refer Section 6 of **Appendix B**). Direct and indirect impacts from mining have been confirmed at the pools in question;
- The LW S1A-S6A Water Management Plan was reviewed and proposed amendments to the plan were submitted to DPE (now DPHI) on 5 July 2023 for approval. Following the submission of this report, another round of review and (if required) update will be completed for the LW S1A-S6A Water Management Plan, and any amendments submitted to DPHI for approval; and

- Monitoring and review of data frequency was increased to fortnightly at pools TT2, TT3, TT7, TT11, TT12 and TT13, as well as relevant reference sites (pools TT1 and TT9). Changes at TT10 and TT15 were not confirmed to be related to mining effects.

14.8.2.6 Physical Features and Natural Behaviour of Pools for other Watercourses (Bargo River and Hornes Creek) TARP (WMP6)

During this reporting period, there have been no triggers under this TARP.

14.8.2.7 Channel Stability, Sedimentation and Erosion TARP (WMP7)

Visual and photographic surveys for subsidence impacts on creeks have been completed monthly for morphology and channel stability monitoring site in Teatree Hollow and Teatree Hollow tributary within the active subsidence zone of LW S1A, with the exception of headwater sites which are completed on an annual basis.

The purpose of these surveys is to note whether change has occurred to channel stability, erosion and sedimentation, and to assist in determining if any change can be attributed to mining impacts. Surveys are carried out to identify any visual changes in knickpoint development and channel morphology. In addition, annual visual inspections are conducted at headwater sites to characterise erosion and sedimentation.

During this reporting period, channel morphology site CM7 and knickpoint sites K71, K73, K78 and K79 were located within the active subsidence zone of LW S1A.

During this reporting period, visual inspections were largely noted to be comparable to those observed in baseline visual inspection records for September 2022 (headwater sites) and October 2022 (channel morphology sites and knickpoints). No evidence of increased erosion or sedimentation in comparison to baseline conditions, with the exception of the following:

- CM3: In November 2023, CM3 was reported to be disturbed by earthworks conducted at the railway corridor;
- CM7: Fracturing was observed at CM7 in July 2023, however the extent of fracturing was not observed to change during the reporting period.

During this reporting period, there have been no triggers under this TARP.

14.8.3 Further Improvements

14.8.3.1 Tahmoor South Domain

In accordance with C12 of SSD 8445 and as detailed in the WMP, a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. The WCAMP will be prepared in consultation with relevant government agencies, as defined in the WMP. The WCAMP (if required) will be prepared and implemented at the cessation of subsidence movements associated with Tahmoor South mining.

Proposed amendments to the LW S1A-S6A Water Management Plan were submitted to DPE (now DPHI) on 5 July 2023. Tahmoor Coal and DPHI are in currently in consultation regarding the changes to the WMP. Following the submission of this report, another round of review and (if required) update will be completed for the LW S1A-S6A Water Management Plan, and any amendments submitted to DPHI for approval.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next Six Monthly Subsidence Impact Assessment report, to be provided to DPHI by 30 September 2024.

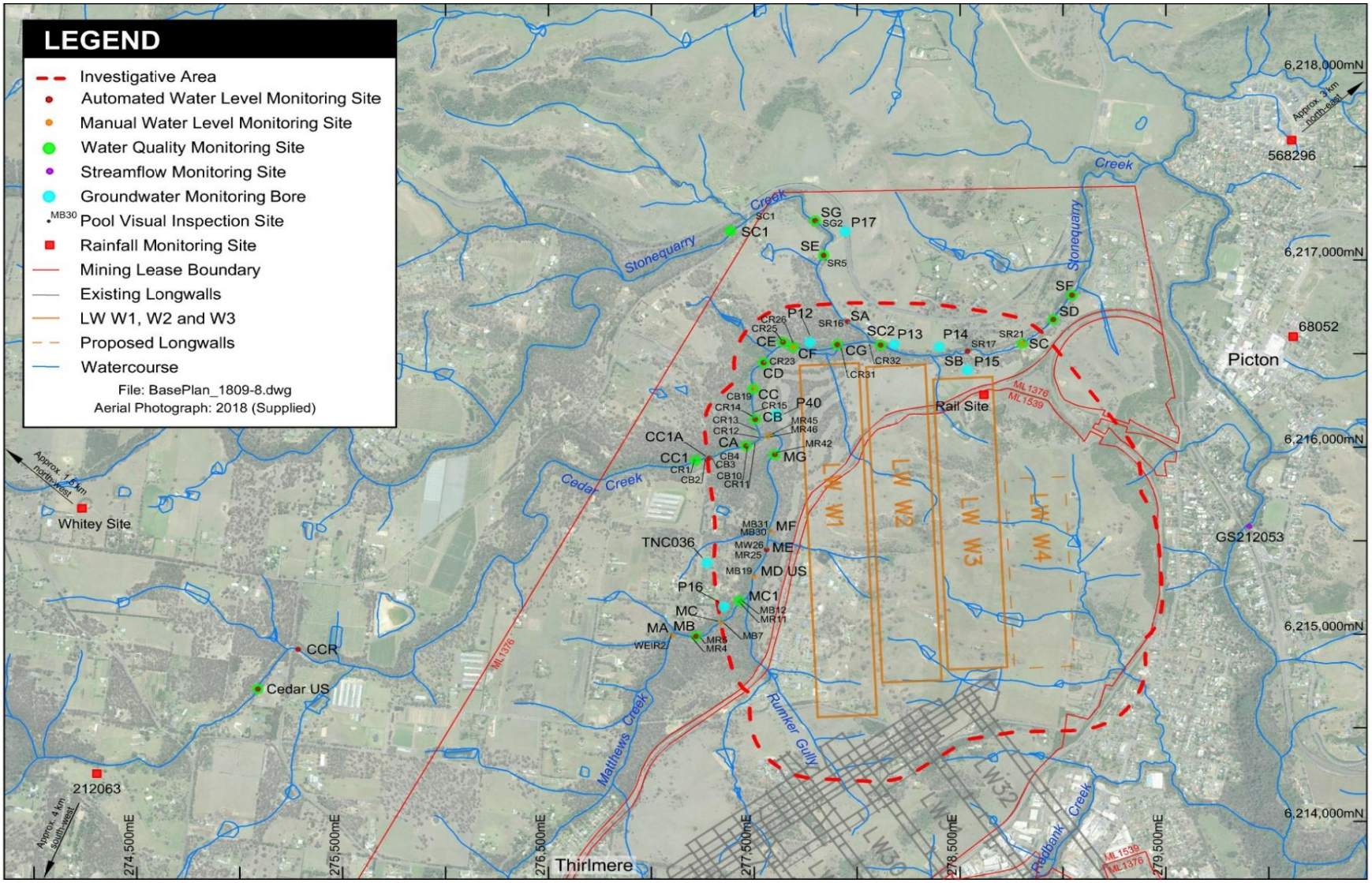

Figure 21 LW W3-W4 Surface Water Monitoring Locations

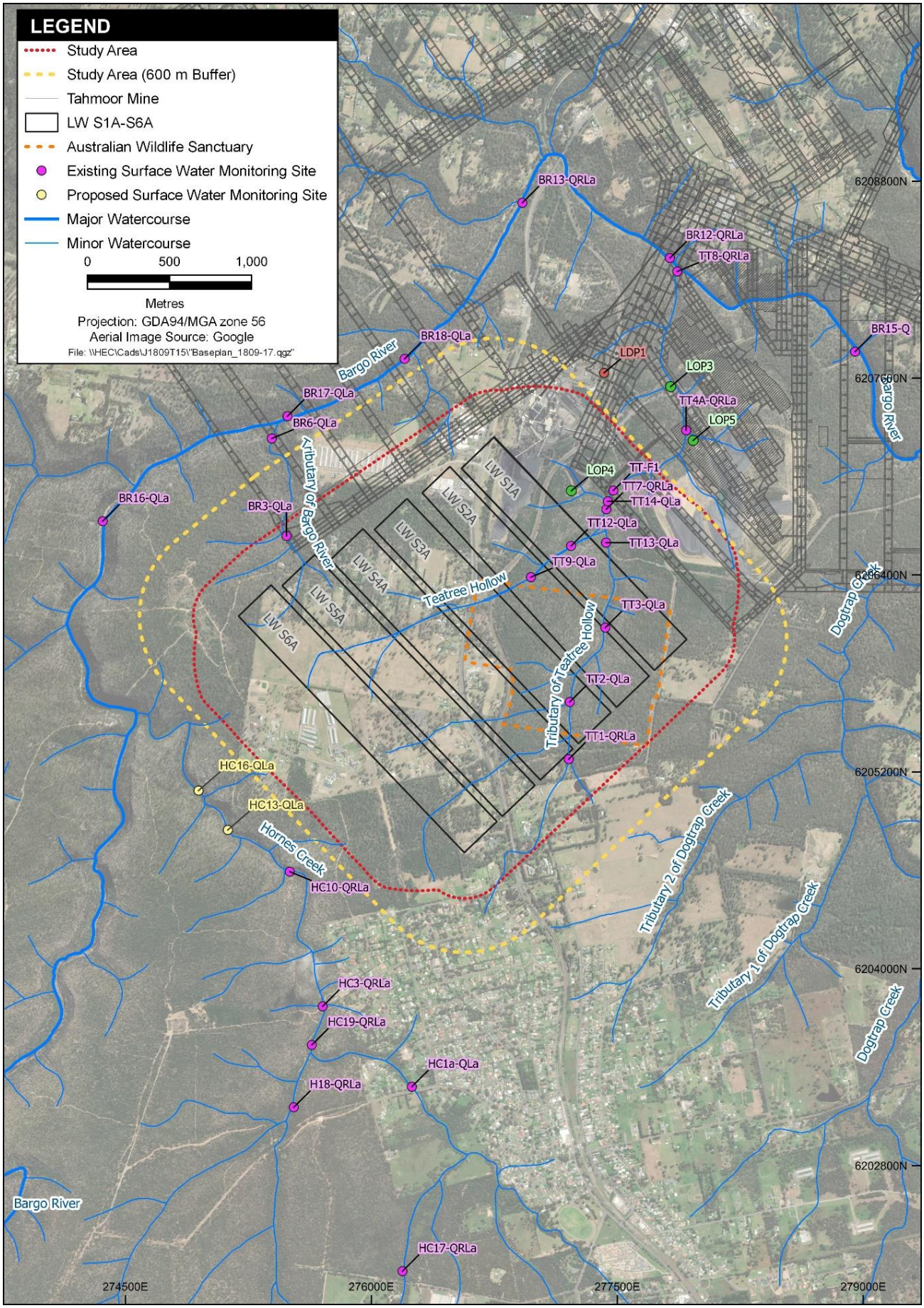

Figure 22 LW S1A-S6A Surface Water Monitoring Sites Specific to LW S1A-S6A

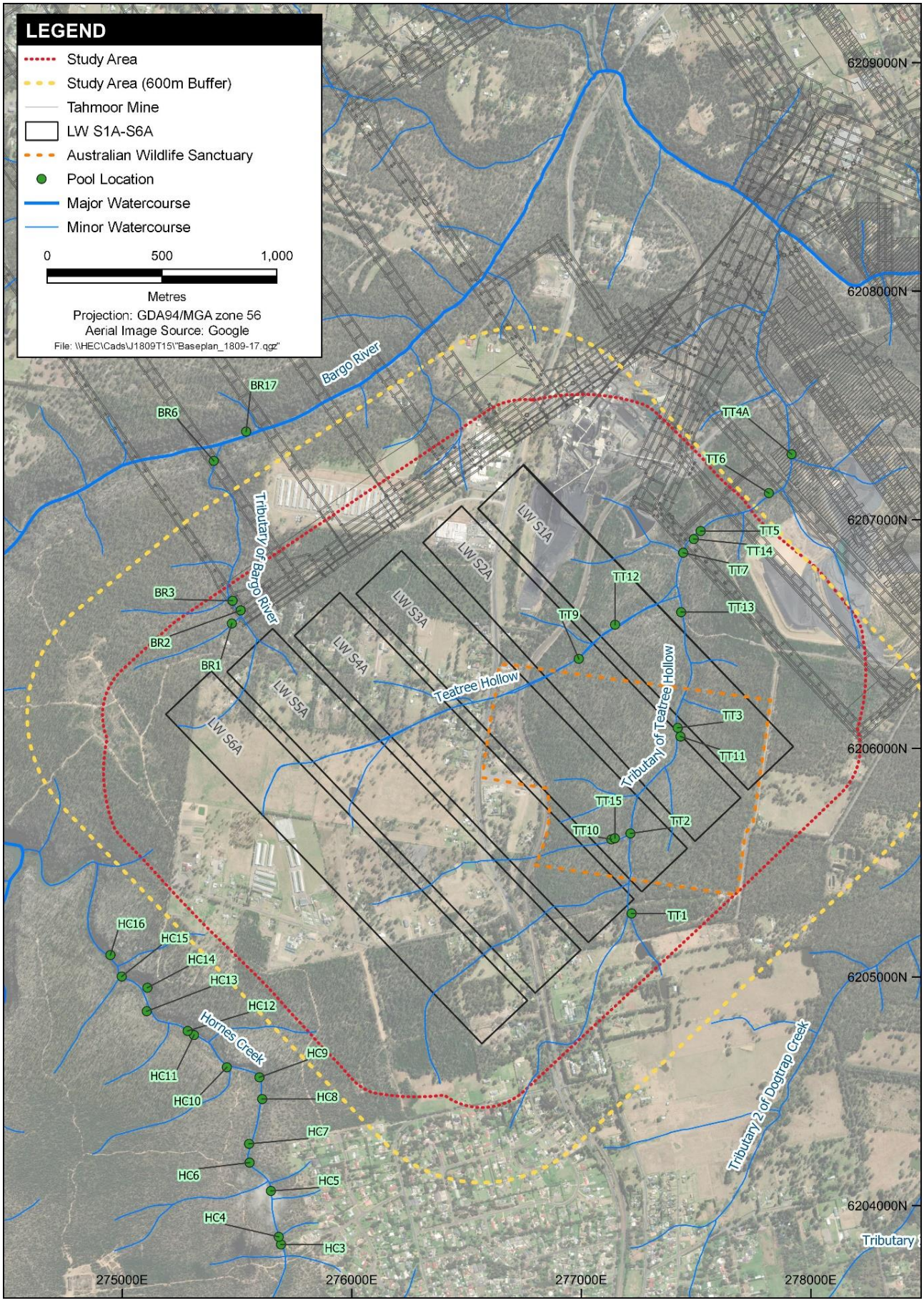

Figure 23 LW S1A-LWS6A Pool Visual Inspection Sites

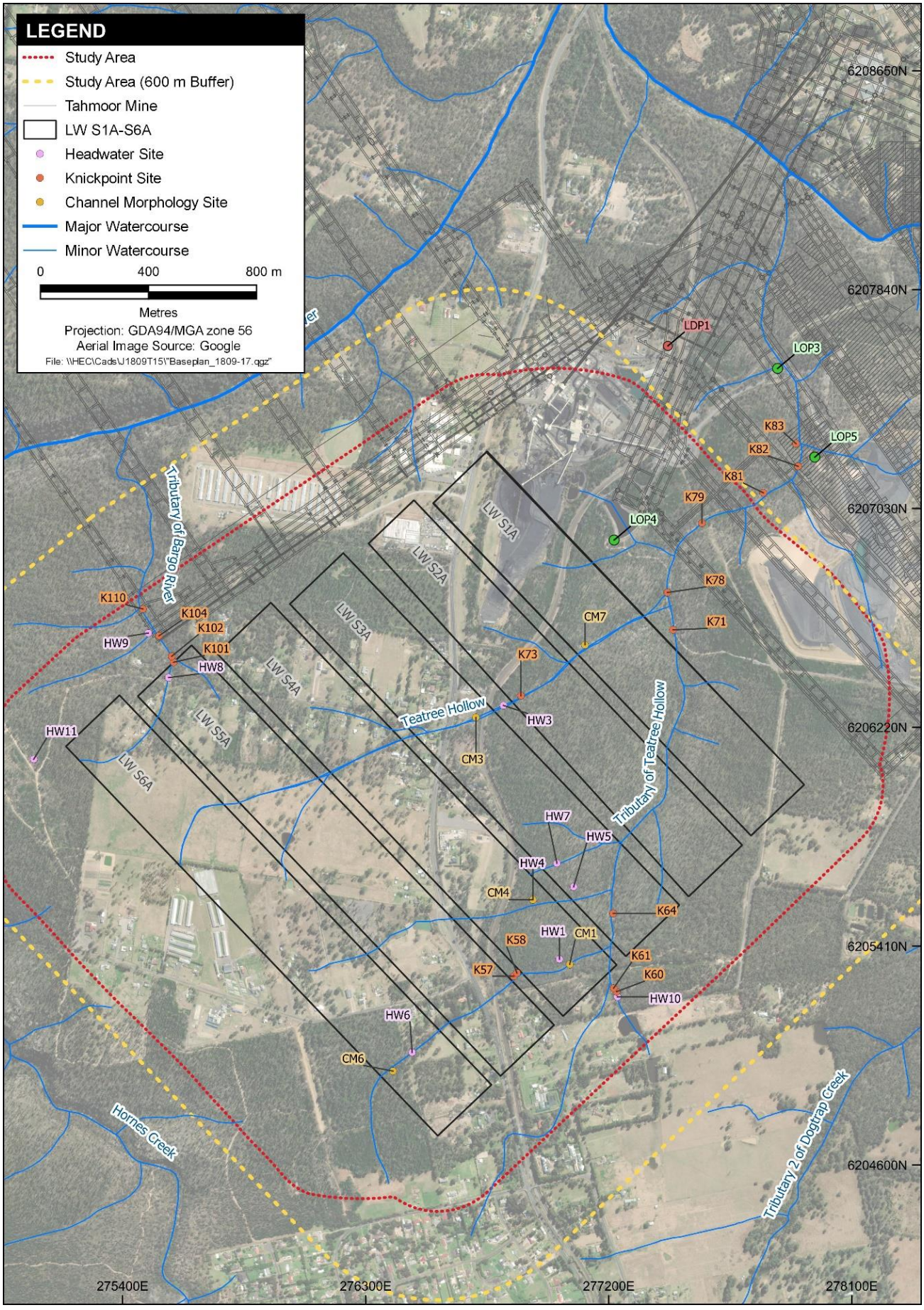

Figure 24 LW S1A-S6A Morphology and Channel Stability Monitoring Sites

14.9 Groundwater

During the reporting period (1st January 2023 - 31st December 2023), the following TARP levels were triggered with further details explained in the Western Domain Six Monthly Subsidence Impact Report 8 and 9, and Tahmoor South Six Monthly Subsidence Impact Report 2 and 3 (**Appendix 14**, **Appendix 15, Appendix 16 and Appendix 17** respectively). Locations of boreholes monitored are shown in **Figure 25**.

14.9.1 Western Domain

The LW W3-W4 Water Management Plan was prepared to manage the potential environmental consequences of LW W3-W4 extraction on groundwater in accordance with Condition 13H(vii)(c) of DA 67/98. During this reporting period, the LW W3-W4 Water Management Plan was implemented to monitor:

- Shallow groundwater levels, quality and pressures, and deep groundwater levels / pressures – monthly monitoring data reviewed and reported on a quarterly basis during the post-mining phase, and
- Mine water intake – data for this reporting period reviewed and reported. The following sections summarise the observations made during the reporting period for each groundwater category.

14.9.1.1 Groundwater Bore Levels

A total of 17 open standpipe piezometers (OSPs) have been installed at six locations in the Western Domain – P12 to P17, and a number of private groundwater bores form part of the groundwater monitoring program for LW W3-W4. It is noted that Tahmoor Coal no longer has access to piezometers P13 and P17 due to land access constraints. The locations of these groundwater bores are illustrated in **Figure 22**.

During the reporting period, ongoing recovery of groundwater levels are being observed following the completion of mining in the Western Domain at monitoring bores P12, P14, P15, P16 and private bores. Groundwater level at P12C is still recovering from a maximum groundwater depressurisation of 11m in February 2021. Overall, groundwater levels have increased since the previous reporting period, and are approaching baseline levels. Groundwater level at P16C continue to remain relatively stable and slightly increased towards the end of the reporting period. It is expected that groundwater levels at this bore will continue to rise, noting that they have been doing so under below average rainfall conditions since May 2023.

TARP Triggers

The following TARP trigger occurred during the reporting period according to the Groundwater Bore Level TARP:

- Level 2 triggered at monitoring sites P12C during January to November 2023; P16B during January 2023 and P16C during January to November 2023, however a trend in groundwater recovery was evident. Groundwater bore level will continue to be monitored in accordance with the LW W3-W4 Water Management Plan, and Tahmoor Coal will continue to provide 3-monthly reports to DPHI for surface water and groundwater.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

- Continue monitoring program – monthly monitoring is ongoing during the reporting period;
- Ongoing review of water level data – result analysis and reporting has been completed on a quarterly basis during the post-mining stage;
- Review relevant surface water level, groundwater level and streamflow data to assess comparative trends; and
- Convene Tahmoor Coal Environmental Response Group to review response – completed on a monthly basis, including the discussion of any groundwater level TARP triggers. There were no actions regarding this TARP trigger.

In light of the demonstration of aquifer recovery to normal conditions or almost normal conditions (as is the case for P16C), no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan has now been completed.

14.9.1.2 Groundwater Pressures

VWP arrays have been installed at locations TNC36, TNC40, TNC43, P40, P41, WD01 and WD02 (refer to **Figure 22**). TNC043 was decommissioned due to terminated site access and has been removed from the TARP assessment from July 2022 onwards. WD01 was decommissioned in April 2023. VWP arrays have been installed in the newly completed WD02 site, however trigger levels for groundwater levels of each VWP pressure sensor are yet to be established.

LW W3 and LW W4 extraction had no significant effects on shallow and deep groundwater across the Western Domain throughout the reporting period. Groundwater elevations at P40 and P41 typically remained stable during the reporting period with the groundwater elevation in all sensors observed above the creek bed elevation.

During January to June 2023, observed drawdown at TNC036 (BGSS-412.5m) exceeded predicted (modelled) drawdown but was within 30 m of predicted (modelled) drawdown, however observed drawdown appeared to be trending closer to the predicted (modelled) drawdown. Groundwater levels at TNC036 steadily increased at most sensors during July to December 2023 with significant recovery observed in the deeper sensors in the Bulgo Sandstone aquifer. All deep sensors recovered to above modelled drawdown predictions during the reporting period.

Groundwater levels at TNC040 slightly declined during January to June 2023 however showed recovery of the aquifer to pre-mining conditions.

TARP Triggers

The following TARP trigger occurred during the reporting period according to the Shallow Groundwater Pressures TARP and Deep Groundwater Pressures TARP:

- Shallow Groundwater Pressures TARP – Level 2 triggered at monitoring site TNC36 during the reporting period (except December 2023), however a trend in groundwater recovery was evident. No further actions other than ongoing monitoring are required.
- Deep Groundwater Pressures TARP – Level 2 triggered at monitoring site TNC36 during January to July 2023 and returned to normal conditions. No further actions other than ongoing monitoring are required.

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

- Continue monitoring program - monitoring is ongoing according to the monitoring program;
- Ongoing review of water level data – result analysis and reporting has been completed on a quarterly basis during the post-mining stage;
- continue to evaluate groundwater levels against model predictions and the rate of depressurisation over time and closely monitor groundwater pressures levels against TARP trigger levels for the site and associated control sites as set out in the TARPs; and
- Convene Tahmoor Coal Environmental Response Group to review response – completed on a monthly basis, including the discussion of any groundwater level TARP triggers. There were no actions regarding this TARP trigger.

In light of the demonstration of aquifer recovery to normal conditions in the shallow sensors of TNC036, no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan has now been completed.

14.9.1.3 Groundwater Quality

A total of 17 open standpipe piezometers (OSPs) have been installed at six locations in the Western Domain – P12 to P17, and a number of private groundwater bores form part of the groundwater monitoring program for LW W3-W4. It is noted that Tahmoor Coal no longer has access to piezometers P13 and P17 due to land access constraints. The locations of these groundwater bores are illustrated in **Figure 22**.

Overall, improvement in groundwater quality is being observed across most of the shallow open standpipes within the monitoring network (where data was available).

During the reporting period, a number of short-term exceedances (less than three months) of normal pH and electrical conductivity (EC) levels were observed. These minor breaches of the trigger levels are in line with historical natural fluctuations and are unlikely to be attributable to mining. At P12A, pH levels were elevated during the full reporting period. pH levels at P12B and P12C remain within the lower and upper pH trigger levels. Therefore, the TARP trigger at P12A is likely to be localised and natural. The general trend in pH over time in P12A, P12B and P12C is consistent.

TARP Triggers

A number of elevated metal concentrations were noted during the review period, and these short-term increases (less than three months) were noted. These minor breaches of the trigger levels are in line with historical natural fluctuations and are unlikely to be attributable to mining. These are noted with an asterix (*) below.

The following TARP trigger occurred during the reporting period according to the Groundwater Quality TARP:

- **Level 2** triggered for monitoring site **P16B** due to elevated strontium concentrations during November 2022 to March 2023 and again between October to December 2023. Similarly to that observed at P15B, this increased concentration was attributed to a release of strontium from geological strata with increased rainfall in the area;
- **Level 2** triggered at monitoring site **P12A** for pH during January to August 2023, before decreasing to normal conditions in September 2023***;**

- **Level 2** triggered at monitoring site **P12B** for Cu during March 2023***;**
- **Level 2** triggered for monitoring site **P12C** for Fe during January, February, May and June 2023; EC in March; Mn in January to July; Cu in March and June; and Pb in June 2023***;**
- **Level 2** triggered at monitoring site **P14B** for pH during January and April 2023, EC in April, November and December; and Sr during June to August and again in October and December 2023***;**
- **Level 2** triggered at monitoring site **P15A** for Ni during January; Fe in February; Sr in February to March; Li in February, May and June; Sr in June and December 2023***;**
- **Level 2** triggered at monitoring site **P15B** for Sr during January to March, May to December 2023; Pb & Al during February 2023; EC in February, July, September and December. It has been observed in this area that strontium is released from geological strata with increased rainfall***;**
- **Level 2** triggered at monitoring site **P15C** for Al during January 2023; Fe during February, March and June; Sr during January, February, April, May and June; and As during January, February, May and June 2023***;**
- **Level 2** triggered at monitoring site **P15D** for Al during January 2023; Mn during February; Fe during February, May to December 2023. Fluctuations in dissolved iron concentrations observed during the reporting period appear consistent with observed concentrations during a similar time in mid to late 2022, and is in alignment with natural variation***;**
- **Level 2** triggered at monitoring site **P16A** for pH during January, April, June and October 2023, and Ni during January, February, April to July, October and December***;**
- **Level 2** triggered at monitoring site **P16C** for Zn during January 2023; EC in September; Sr in December 2023***;**
- **Level 2** triggered at monitoring site **GW105228** for Li during January and April 2023***;**
- **Level 2** triggered at monitoring site **GW104090** for Li during April 2023; Sr in July and October; EC & Ba during July 2023***;**
- **Level 2** triggered at monitoring site **GW105467** for Li during July 2023***;** and
- **Level 2** triggered at monitoring site **GW115860** for EC, Zn &Sr during July 2023***.**

Actions in response to TARP triggers

Noting that groundwater quality triggers recorded during the reporting period were not considered to be associated with mining impacts, no further monitoring is considered to be required and monitoring in accordance with the LW W3-W4 Water Management Plan has now been completed.

A number of bores have been selected for ongoing monitoring as part of requirements associated with other operations at Tahmoor Mine. These bores include P14 nested suite, P16 nested suite, WD02 and TNC040.

14.9.2 Tahmoor South

The LW S1A-S6A Water Management Plan was prepared to manage the potential environmental consequences of LW S1A-S6A extraction on groundwater in accordance with Condition C8 of SSD 8445.

During this reporting period, the LW S1A-S6A Water Management Plan has been implemented to monitor groundwater:

- Shallow groundwater levels, quality and pressures, and deep groundwater levels / pressures – monthly monitoring data reviewed and reported on a monthly basis; and
- Mine water intake – data for this reporting period reviewed and reported.

The following sections summarise the observations made during the reporting period for each groundwater category.

14.9.2.1 Groundwater Bore Levels

The Tahmoor South Monitoring Network comprises both open standpipes (OSP) and Vibrating Wire Piezometers (VWPs). The standpipe piezometers can be used for monitoring water levels manually or with an automated datalogger (installed in 10 sites to date), as well as for collection of water samples for groundwater quality monitoring purposes. The VWPs are grouted and therefore can only be used for monitoring groundwater pressures, but do allow for multiple instruments to be installed at different depths within a single borehole. The locations of groundwater monitoring bores are provided in **Figure 22**.

Shallow OSP Bores

Groundwater depressurisation has been observed in the deepest Open Standpipes at P53 (P53C), P55 (P55C) and P56 (P56C). Trends of groundwater elevation at Open Standpipes are described below:

- P53C has been declining since January 2023. Groundwater elevation at P53A and P53B has reduced significantly since April 2023 and stable since July 2023;
- P55C has reduced significantly in November 2022 and appear to be decreasing gradually since. Groundwater elevation at P55A is stable, however, at P55B is decreasing; and
- P56C has reduced in November 2022 and significantly again in April 2023, however, water levels have stabilised since June 2023. However, groundwater elevation at the shallower bores, P56A and P56B, are stable.

This groundwater depressurisation at P53 could be due to an ongoing mining effect (LWS1A and LWS2A progression). However, the shallower bores, groundwater levels at P55A and P56A&B are stable. Groundwater levels at P55B appear to be decreasing since April 2023. Additionally, given the relative stability of the water level in P55C since an initial decline in November 2022 and in P56C since April 2023 (i.e., no ongoing declining trend) this cannot definitively be attributed to extraction activities. Tahmoor Coal will continue to review the trends in this bore and the associated nested bores in coming months to better understand the trends (SLR, 2024).

At P51B, the groundwater elevation has fluctuated by approximately 2 m with an overall decreasing groundwater trend since January 2023. A review of the cumulative rainfall departure (CRD) indicates groundwater elevation is potentially reacting to rainfall in the area. Hence, it is uncertain whether groundwater depressurisation is a result of ongoing mining. It is potentially a combination of both factors influencing the groundwater levels (SLR, 2024).

At P56C, a steep decline in April/May 2023 correlates with the similar trend observed at P53, however these are located on opposite sides of LWS2A and there is no obvious link in timing to longwall progression. Since this point, there has been minor fluctuations both up and down, not a typical representative of groundwater depressurisation due to longwall mining. Tahmoor Coal will continue ongoing monitoring and analyse of this trend.

Numerous sites (P52 and REA4) are showing some consistent decline in water levels since approximately November 2022, however it is unconfirmed at this stage if these declines are related to mining impacts (SLR, 2024).

Private Bores

Fluctuations in groundwater levels across the suite of private bores monitored are observed, however this is no identifiable trend and no indication of impact from mining extraction activities

Shallow VWPs (<200m)

Shallow VWPs are showing variation in responses since commencement of extraction. TBC009 (HBSS – 30m) has experienced a small steady decline of approximately 2.5 m since November 2022, however the deeper sensors are remaining relatively stable. TBC018 is also showing approximately 3 m drawdown in the three shallowest sensors (70m, 117m, 164m), approximately 1.5 metres decline in the sensor at 179 m and has remained stable in the deepest sensor at 198 m. TBC027 is showing some small steady decline, ranging between 0.5 m to 2 m across all depth sensors, although there is no apparent relationship in the depressurisation incurred and the depth profile.

TBC032 is the closest VWP to current extraction activities and is showing depressurisation of up to 15 metres in the deepest sensor (200m). The shallower sensors are all showing some minor trends in depressurisation ranging between 1 and 7 metres. TBC034 remains stable and TBC039 has observed an increase in water level.

Deep VWPs (>200m)

The deep VWPs overall are showing some depressurisation but this is not consistent spatially or across depth profiles at individual sites.

TBC009 is showing maximum depressurisation of 15 m between December 2022 and December 2023 at sensor depth 357 m, however recovery was observed subsequently. Approximately 4 m of drawdown was observed in the sensors above and below (343 m and 391 m) between November 2022 and December 2023. TBC018 has observed steady drawdown to a maximum of 3.5 m since November 2022, with less drawdown followed by stabilisation and some recovery in the deeper sensors. TBC020 has shown fluctuation across all sensors, the lowest three sensors have observed no overall drawdown. The shallowest sensor (211m) observed total drawdown of approximately 7 metres between June 2023 and December 2023 however a 4 m recovery was observed subsequently, though fluctuated to a maximum of an overall 8.5 m drawdown.

TBC026 has shown significant fluctuations in water levels and with some overall drawdown occurring, but also an increase above baseline conditions in the deepest sensor (440m). TBC032 is the closest VWP to current extraction activities and has observed relatively steady drawdown over time, with the shallowest sensor showing the highest drawdown, which decreases with depth (220m sensor – 18 m drawdown, 237m sensor – 5.5 m drawdown, 294 metre sensor – 7 m drawdown). TBC039 is not showing any clear response to mining with water levels stable, increasing above baseline conditions or some drawdown and stabilisation.

TARP Triggers

The following TARP trigger occurred during the reporting period according to the Groundwater bore level TARP:

- Monitoring bore P51B: Reduction below Level 1 since May 2023, resulting in a trigger of the Level 1 TARP in October 2023;
- Monitoring bore P53A: Reduction below Level 1 since May 2023, resulting in a trigger of the Level 1 TARP in October 2023;
- Monitoring bore P53B: Reduction below Level 1 since April 2023, resulting in a trigger of the Level 1 TARP in September 2023;
- Monitoring bore P53C: Level 1 TARP trigger in October 2023 and Level 2 TARP trigger in December 2023;
- Monitoring bore P55B: Reduction below Level 1 since May 2023, resulting in a trigger of the Level 1 TARP in October 2023;
- Monitoring bore P55C: Level 1 TARP trigger since July 2023 and Level 2 TARP trigger in November 2023;
- Monitoring bore P56C: Level 1 TARP trigger since July 2023 and Level 2 TARP trigger in October 2023; and
- Private bore GW104659: Reduction below Level 1 since April 2023, resulting in a trigger of the Level 1 TARP in September 2023.

Further discussion of these triggers is provided in the Tahmoor South Subsidence Impact Report 3 (**Appendix 17**).

Actions in response to TARP triggers

The following actions have been completed in response to the TARP triggers during this reporting period:

- Monthly monitoring and review of data is ongoing according to the monitoring program;
- An investigation to assess cause of the water level decline at P51B, P53A, P53B, P53C, P55B, P55C, P56C and GW104659 was completed. Groundwater level decline at P53 and P56 could be due to ongoing mining effect. However, at the remaining locations, it cannot definitely be attributed to extraction activities.
- Investigation undertaken to determine if the decline will impact the long-term viability of the affected water supply works. Current drawdown associated with TARP trigger is localised. Consequently, there is no indication that regional aquifer drawdown is occurring of that any impact would be observed in existing water supply works.
- Relevant information was obtained from key specialists necessary to inform assessment
- Changes to the Water Management Plan will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next Six Monthly Subsidence Impact Assessment report, to be provided to DPHI by 30 September 2024.

14.9.2.2 Groundwater Quality

Groundwater quality has been monitored monthly in the OSPs (monitoring network and private bores) since the commencement of extraction. The Tahmoor South Groundwater Monitoring Network, and the locations of groundwater monitoring bores is provided in **Figure 22**.

The pH and EC across all bores show some level of fluctuation with no apparent trends across the full record. Metals across all bores have shown fluctuation over the reporting period and cannot be attributable to mining with sporadic spatial and depth profile distribution.

As part of this Six Monthly Report, groundwater quality triggers were redefined based on extended baseline data in order to capture natural fluctuations originally not captured due to short baseline. In light of the revised trigger levels, the defined groundwater quality trigger levels were breached for numerous parameters for more than three months. However, of these parameters, the analytes did not appear to be showing similar trends across multiple observation points. Consequently none of the analytes trigger the TARP triggers for TARP WMP11 during the reporting period.

14.9.2.3 Groundwater and Surface Water Interaction

Groundwater monitoring is undertaken within nearby vicinity of surface watering at multiple locations to assist with the review of groundwater – surface water interaction. Namely to assist with defining if surface flow changes identified are attributable to baseflow loss due to groundwater depressurisation resultant from mining activities. Further detail is provided in the Tahmoor South Subsidence Impact Report 3 (**Appendix 17**).

Numerous triggers of TARP WMP8 occurred during this reporting period. However, as only groundwater level changes at P53 could be due to ongoing mining effect, TARP WMP12 is initiated only for these nested bores. WMP12 pertains specifically to the monitoring of potential impacts on groundwater – surface water interactions. Assessment under this TARP is initiated if a TARP WMP8 trigger is confirmed to be related to mining effects.

TARP Triggers

All three nested bores at P53 triggered a TARP level for TARP WMP8:

- Monitoring bore P53A: Reduction below Level 1 since May 2023, resulting in a trigger of the Level 1 TARP in October 2023;
- Monitoring bore P53B: Reduction below Level 1 since April 2023, resulting in a trigger of the Level 1 TARP in September 2023; and
- Monitoring bore P53C: Level 1 TARP trigger in October 2023, and Level 2 TARP trigger in December 2023.

Monitoring bores P53A-C are associated with surface water monitoring site TT13-QRLa, and together they can be considered when reviewing the surface water – groundwater connectivity TARP (WMP12). TT13-QLa is located approximately 300 m west of the monitoring bores P53A-C in the Teatree Hollow tributary. Groundwater level at monitoring bore P53C was noted to exhibit groundwater depressurisation attributed to mining of LWS1A and LWS2A.

A comparison of groundwater level recorded at P53A (shallowest bore in the series) with water levels at TT13-QRLa inferred that negligible change in baseflow contributions to Teatree Hollow tributary in the vicinity of TT13-QRLa have occurred during the review period. Therefore, it was concluded that there was no apparent correlation at this point in time between the apparent decline in groundwater level at and the nearby surface water gauging station.

Actions in response to TARP triggers

The following actions have been completed in response to the Level 1 & 2 TARP triggers during this reporting period:

- Monthly monitoring and review of data is ongoing according to the monitoring program.
- An investigation to assess cause of the water level decline at P53 nested bores. TARP WMP12 has been initiated for P53 nested bores due to the assessment that groundwater level decline at P53 could be due to ongoing mining effect. The relevant surface water site is TT13-QRLa. Further detailed investigation into the site-specific groundwater surface water relationship indicated there is unlikely to be a direct relationship between groundwater drawdown and surface water changes; and
- Changes to the Water Management Plan will be made in accordance with the regulatory guidelines, provided as track changes to the Department for review.

The current monitoring program will continue in accordance with the LW S1A-S6A Water Management Plan. The next update will be provided as part of the next Six Monthly Subsidence Impact Assessment report, to be provided to DPHI by 30 September 2024.

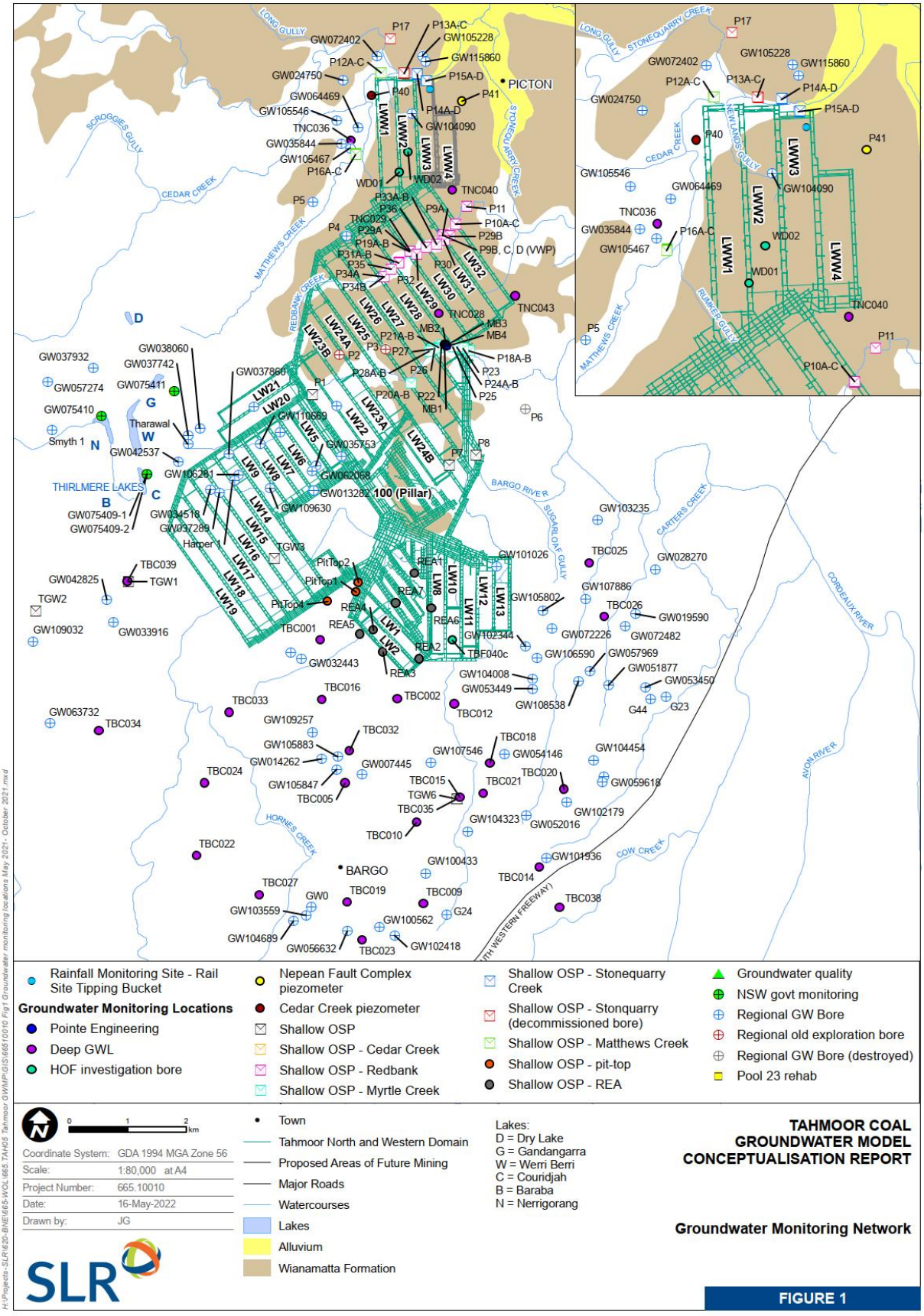

Figure 25Groundwater Monitoring Borehole network

14.10 Landscape Features

14.10.1 Western Domain

The LW W3-W4 Land Management Plan was prepared to manage the potential environmental consequences of LW W3-W4 extraction on natural steep slopes, dams, agricultural land, and land in general in accordance with Condition 13H(vii)(e) of DA 67/98.

During this reporting period, the LW W3-W4 Land Management Plan was implemented to monitor the following landscape features.

The post-mining monitoring period for LW W4 concluded during this reporting period, and no further monitoring is required.

14.10.1.1 Steep Slopes

Quarterly visual and photographic surveys for subsidence impacts on structures near steep slopes have been completed during the post-mining phase for features within the LW W3-W4 active subsidence zone. Structures located on Stonequarry Creek Road, Booyong Close, Attunga Close, Carramar Close, Thirlmere Way, Star Street, Connellan Crescent and the Water Treatment Plant were inspected. There were no signs of impacts or changes in the areas inspected that could be attributed to mine subsidence. Refer to **Figure 26** for monitoring sites.

14.10.1.2 Dams

Visual and photographic surveys for subsidence impacts on dams were completed on a quarterly basis during the post-mining phase for dams within the LW W3-W4 active subsidence zone. During the reporting period, there were no observable changes to farm dams that were considered to be due to mine subsidence. Refer to **Figure 27** for monitoring sites.

14.10.1.3 Agricultural Land

Visual and photographic surveys for subsidence impacts on agricultural land have been completed on a quarterly basis during the post-mining monitoring period. Inspections points were set up prior to the commencement of LW W3 mining to provide vantage of agricultural land within the LW W3-W4 Study Area. The purpose of the surveys is to note whether change has occurred to agricultural land, and to assist in determining if any change can be attributed to mining impacts.

Surveys noted the presence of erosion, condition of boundary and internal fencing components, paddock gate condition, out-building condition, paddock dam condition, presence of any surface slumping or cracking, and the presence of vegetation dieback. During the reporting period, it was noted that seasonal changes had affected vegetation growth, however there were no observable changes to agricultural land in comparison to pre-mining baseline data.

14.10.2 Tahmoor South Domain

The LW S1A-S6A Land Management Plan were prepared to manage the potential environmental consequences of LW S1A-S6A extraction on cliffs, natural steep slopes, dams, agricultural land, and land in general in accordance with Condition C8 of SSD 8445 for the Tahmoor South Domain.

During this reporting period, the S1A-S6A Land Management Plan was implemented to monitor the following landscape features.

14.10.2.1 Cliffs and Rock Outcrops

A visual inspection at the completion of mining by a geotechnical engineer will be undertaken for Cliff BC1 after the completion of LW S6A; Cliff BC2 after LW S3A, S4A, S5A and S6A. No visual inspections have been required during this reporting period required according to the LW S1A-S6A Land Management Plan. Refer to **Figure 28** for monitoring sites.

14.10.2.2 Steep Slopes

Monthly visual inspections and reporting by geotechnical engineers, visual and photographic surveys of natural steep slopes were completed monthly for features within the LW S1A and LW S2A active subsidence zone and quarterly outside the active subsidence zone.

With the exception of steep slope WC1, no visual observations or cracks, localised ground bulging, buckling or shearing was observed at natural steep slopes.

In October 2023, it was noted that movement (i.e. opening) of approximately 10 mm occurred between two sandstone boulders / blocks (i.e. not bedrock) near the 'Big Pool' in Wirrimbirra Creek at the steep slope WC1 since the September 2023 inspection. From a geotechnical viewpoint, the current movement/cracking at the location is not considered to be detrimental to the stability of the rocky outcrop or the water carrying capacity of the creek. No further movement was noted for the remainder of the reporting period.

14.10.2.3 Dams

During the reporting period, visual and photographic surveys for subsidence impacts on dams were completed on a weekly and monthly basis of dams within the LW S2A active subsidence zone. Visual inspections of dams located in the active subsidence zone did not identify any mining-related impacts during the reporting period. Visual inspections from July to November 2023 observed ongoing reduction of water level due to dryer weather. However, water levels in dams rose in response to rainfall events in November 2023. Refer to **Figure 29** for monitoring sites.

14.10.2.4 Agricultural Land

During the reporting period, visual and photographic surveys of agricultural land have been completed as part of inspections for local roads. Refer to Figure 29 for monitoring sites; and

A post-longwall visual inspection was completed on 4 July 2023 following the completion of LW S1A extraction. The report noted that ground surface features observed during the post-mining agricultural land monitoring were considered typical for the age, location, type of construction and climatic conditions present at the time of the inspection. There were no identified assets or land that were associated with potential hazards as a result of LW S1A extraction.

14.10.3 Further Improvements

Natural heritage surveys will continue to be undertaken as per operational and approval requirements to manage compliance and impacts. In addition, monoring of natural landscape features will continue to be monitored in accordance with the LW S1A-S6A Land Management Plan.

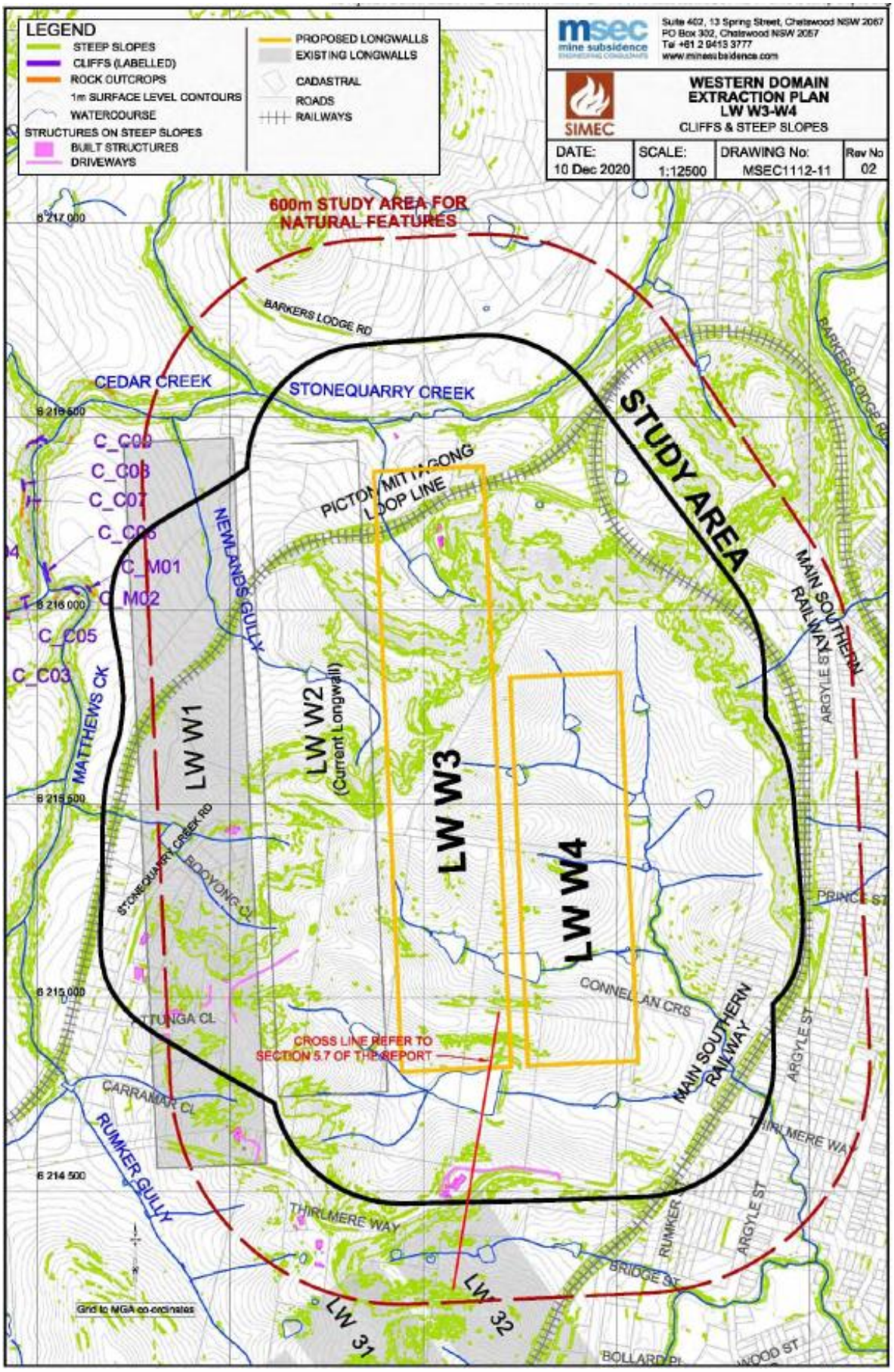

Figure 26 Steep slopes within the LW W3-W4 Study Area

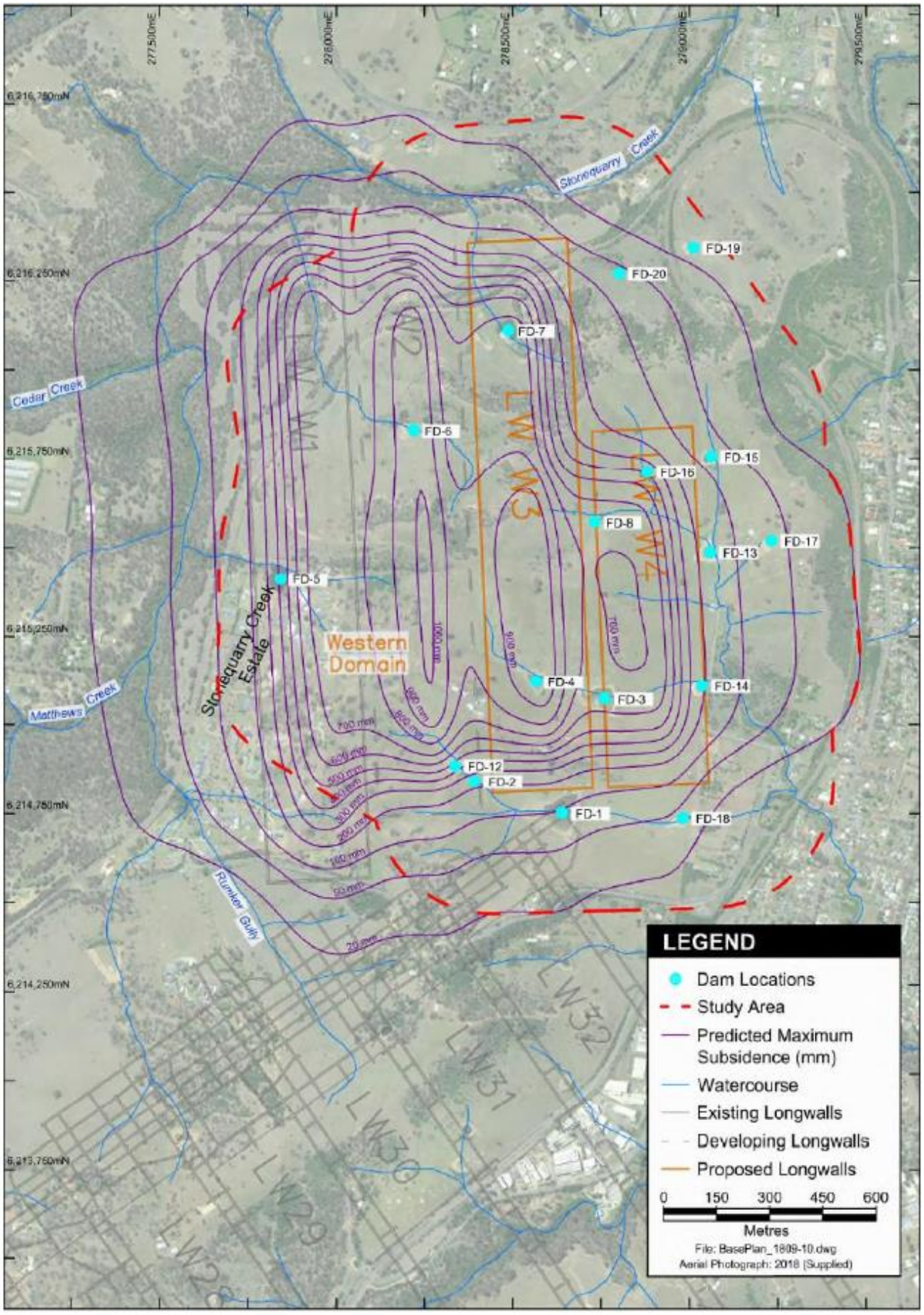

Figure 27Dams within the LW W3-W4 Study Area

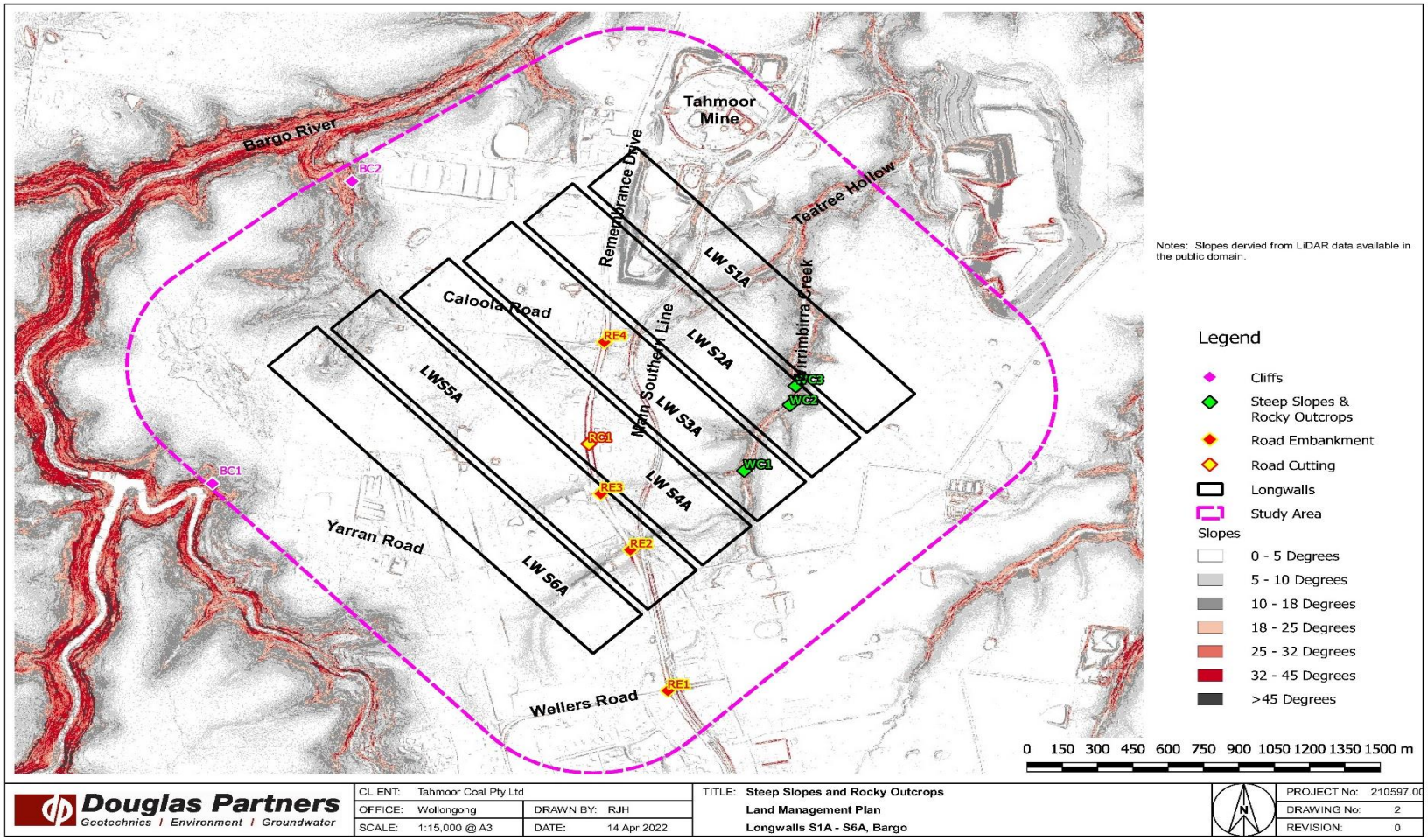

Figure 28 Figure Cliffs and natural slopes within the LW S1A-S6A Study Area

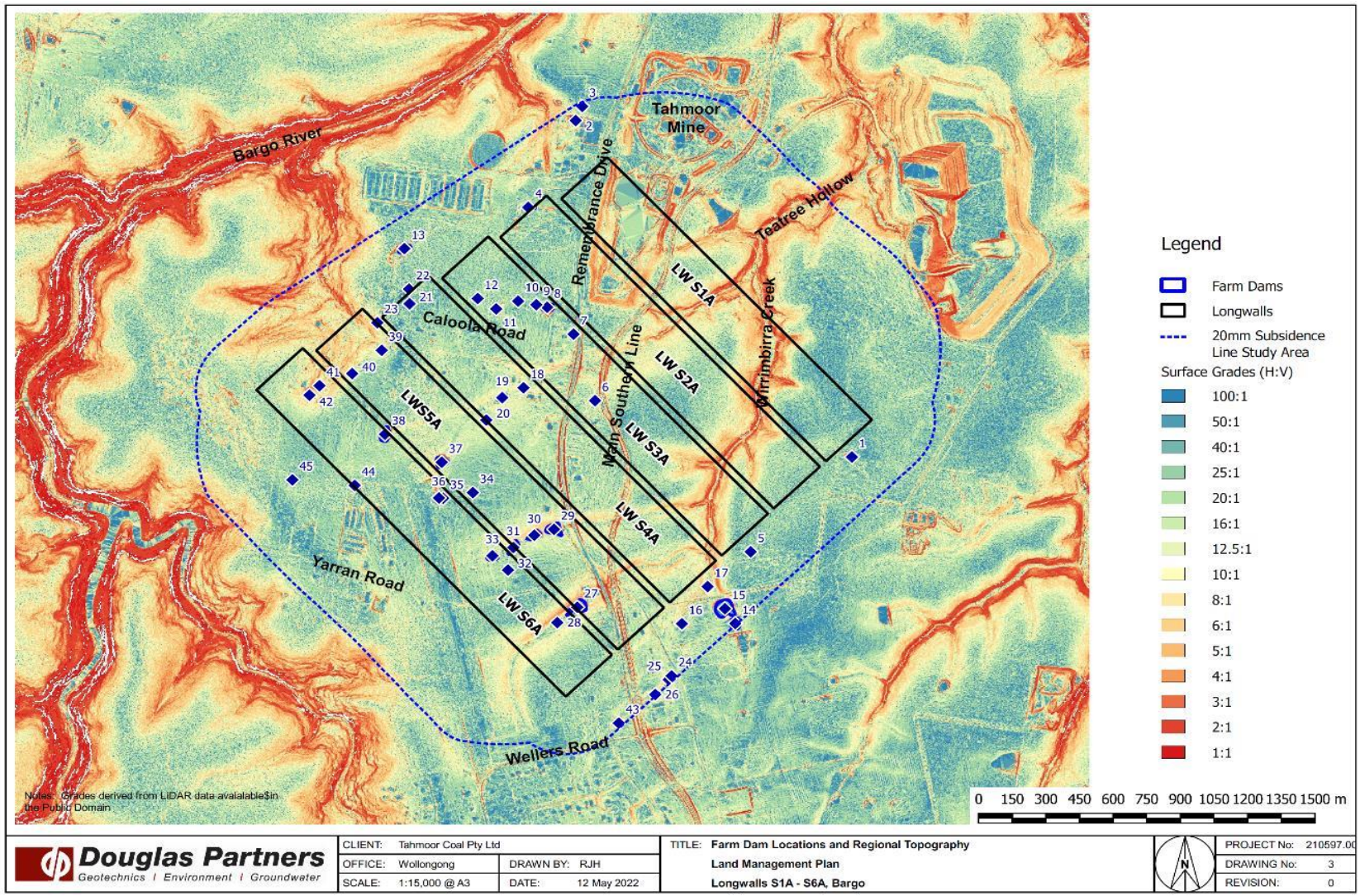

Figure 29 Dams within the LW S1A-S6A Study Area

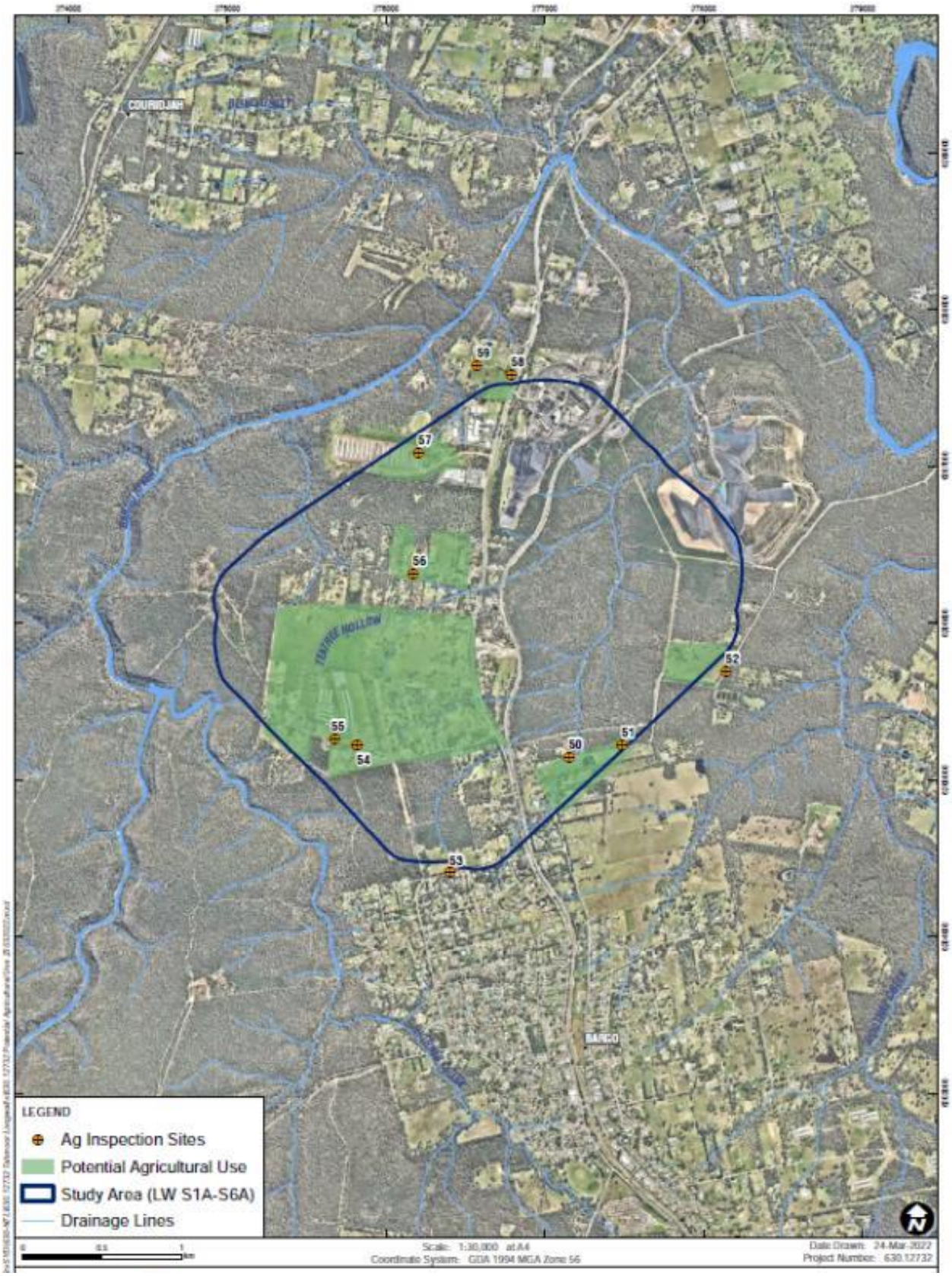

Figure 30 Agricultural land and inspection sites within the LW S1A-S6A Study Area

15 Site Water Management

15.1 Groundwater

15.1.1 Environmental Management

Historically, longwalls have been extracted within the Tahmoor North and Western Domains at a depth of approximately 450m in the Bulli Coal Seam. Current longwall extraction within the Tahmoor South Domain is occuring at depths of approximately 385m in the Bulli Coal Seam.

Groundwater piezometer boreholes located across Tahmoor Mine's Pit-top and REA areas are monitored quarterly for water quality and continual water level loggers downloaded by a third party contractor (for locations refer to **Figure 31).**

During 2023, pit-top monitoring boreholes / piezometers PT1 and PT2 were buried during construction activities at site. Both boreholes were deemed inaccessible, and will be remediated or replaced with new bores in the next reporting period.

It is noted that PT4 results have shown a progressive decrease in water level with stabilisation occurring towards the end of the reporting period as shown in **Figure 32**. This has most likely been influenced by mining extraction occurring within proximity to the monitoring site. REA piezometer levels have recorded relatively stable levels throughout 2023 (see **Figure 33**). For further information, refer to **Appendix 7** for pit-top and REA water quality data.

The location of all monitoring boreholes in the Tahmoor North, Tahmoor South and Western Domain mining areas are shown in **Figure 25** and reported in the Tahmoor Coal Six Monthly Subsidence Impact Reports (refer to **Appendix 14**, **Appendix 15**, **Appendix 16 and Appendix 17**).

There were no reportable incidents related to groundwater pollution during the reporting period.

Figure 31 Locations of Piezometers at Pit-top and the REA areas

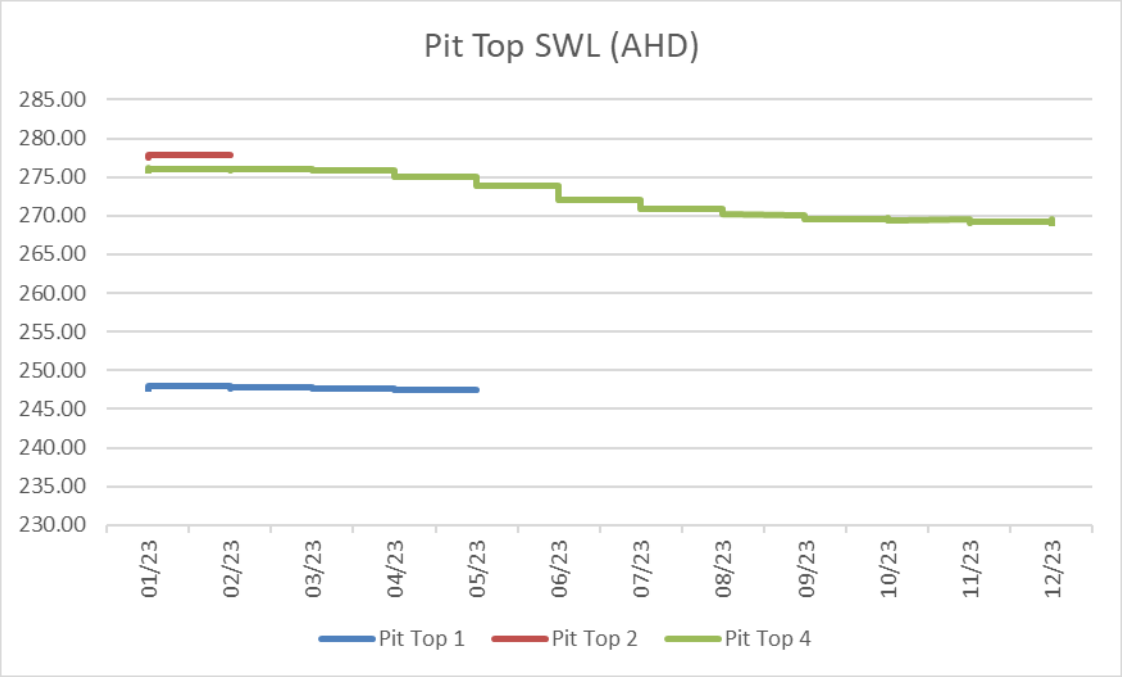

Figure 32 Piezometer groundwater levels for Pit-top for 2023.

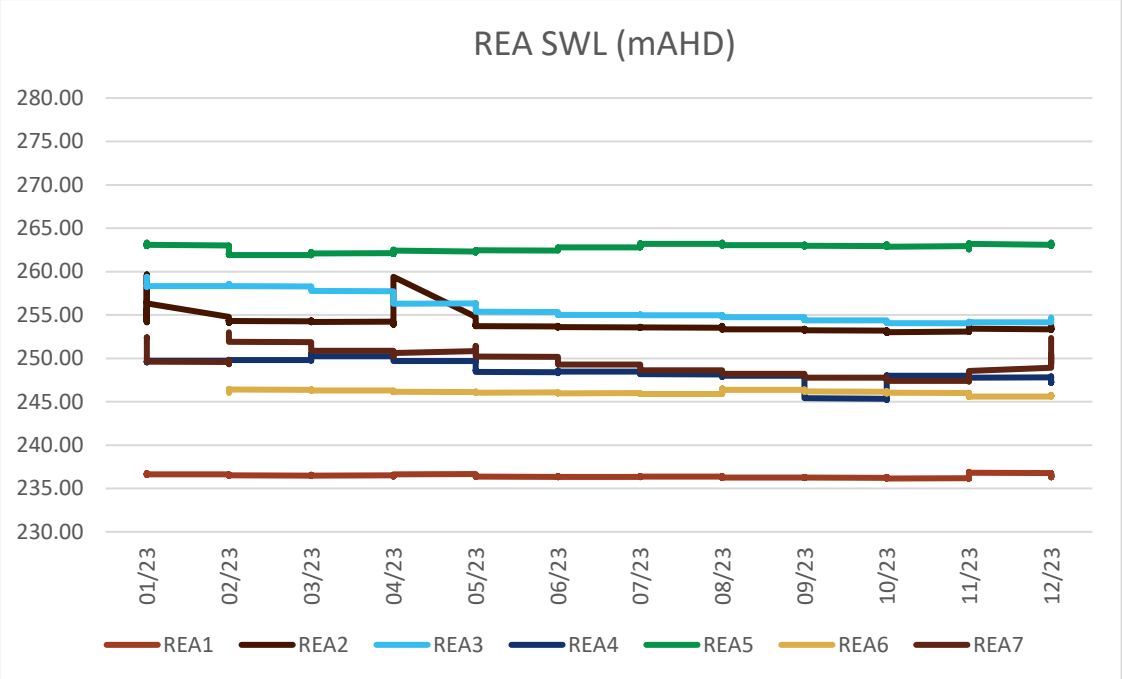

Figure 33 Piezometer groundwater levels for REA for 2023.

15.1.2 Water Access Licences Environmental Performance

During the reporting period the below water take has been calculated in accordance with condition B24 of consent SSD 8445.

Tahmoor Mine operates in accordance with Water Licence 36442, which allows an extraction limit of 1642 ML per annum (i.e. water year) of groundwater make from underground.

An independent contractor completed an analysis of water make for Tahmoor Mine. As of 30 June 2023, the cumulative groundwater make for water year 2022/23 was 1,068 ML, which is within the groundwater entitlement of 1,642 ML/y (refer to **Table 15-1** and **Figure 34**). As of 31 December 2023, the cumulative groundwater make between July to December 2023 was 673 ML, which is within the annual groundwater entitlement. **Table 15-1** provides a summary of groundwater outflow from 2015 to 2023 and is illustrated in **Figure 34**.

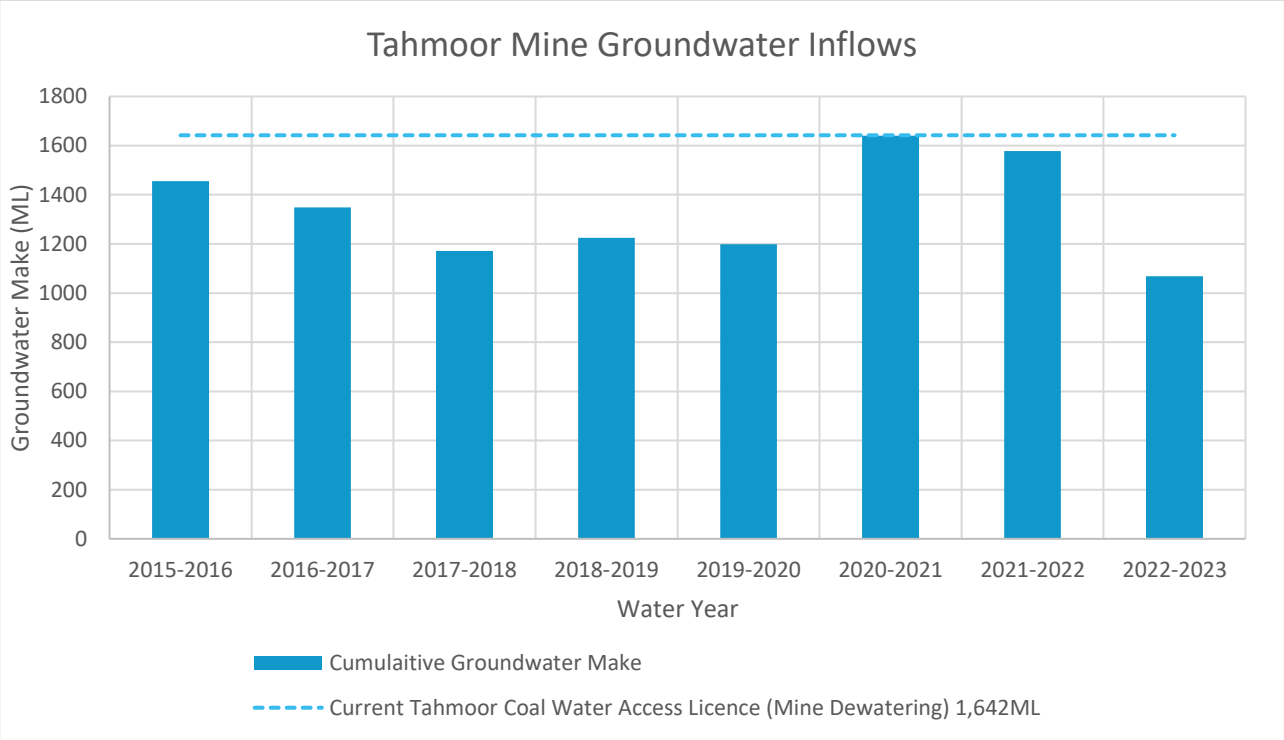

Figure 34 Calculated Groundwater Inflow Annual Volume (Water Year/Financial Year).

Table 15-1 Summary of Groundwater Outflow

Water Year/Financial Year	Water Licence #	Water Sharing plan/source and management zone (as applicable)	Entitlement per water year (ML)	Total Water Make into Underground (ML) per water year *includes vent air and water entrained in ROM
FY19 (July 18-June 19)	36442	Greater Metropolitan Region Groundwater Sources / Sydney Basin Nepean Groundwater Source	1642	1266*
FY20 (July 19-June 20)	36442	Greater Metropolitan Region Groundwater Sources / Sydney Basin Nepean Groundwater Source	1642	1348*
FY21 (July 20-June 21)	36442	Greater Metropolitan Region Groundwater Sources / Sydney Basin Nepean Groundwater Source	1642	1628*
FY22 (July 21-June 22)	36442	Greater Metropolitan Region Groundwater Sources / Sydney Basin Nepean Groundwater Source	1642	1347*
FY23 (July 22-June 23)	36442	Greater Metropolitan Region Groundwater Sources / Sydney Basin Nepean Groundwater Source	1642	1068*

An independent contractor calculated the estimated water take from surface water sources, as presented in **Table 15-2**. This water take was within entitlement of Water Access Licences held during the reporting period.

Table 15-2 Water take estimates from surface water sources for the 2023 reporting period

WAL	Water Sharing Plan	Water source	Entitlement	FY23	Jul – Dec 2023
25777 43656 SWC839757	Greater Metropolitan Region Unregulated River Water Sources WSP 2023	Maldon Weir	41ML	13.3 ML	8.8 ML
43572		Stonequarry Creek	9ML	7.3 ML	0 ML

15.1.3 Further Improvements

Tahmoor Coal will continue to implement the Tahmoor South Groundwater Management Plan (TAH-HSEC-00373), and ongoing monitoring and reporting will occur in accordance with the conditions in the relevant water licences.

15.2 Surface Water

15.2.1 Environmental Management

15.2.1.1 Water Quality

Tahmoor Coal is licensed to discharge water from one (1) Licenced Discharge Point (LDP) and overflow from three (3) Licenced Overflow Points (LOPs) during periods of wet weather (as per EPL 1389, which refers to more than 10 mm of rainfall within a 24 hour period at the premises). The location of the LDP and LOPs are described in **Table 15-3** below and shown in **Appendix 4.**

Table 15-3 Licensed Discharge and Overflow Points Locations

Point	Location
LDP 1	Discharge from Dam M4
LOP 3	Overflow from the REA Dam S9
LOP 4	Overflow from REA Dam S4
LOP 5	Overflow from REA Dam S8

15.2.1.2 Water Discharge

On average Tahmoor Mine discharged 4,800 kL/day, with a total of 1,752,121 kL or approximately 1,752 ML discharged during the reporting period. This is shown in **Table 15-4, Figure 35** and **Figure 36.** The peak shown in **Figure 36** on 29th April 2023 was as a result of high rainfall event and corresponds to the peak in **Figure 37** for the total daily rainfall recorded at the Stockpile Weather Station. This is in accordance with EPL 1389 (more than 10 mm rainfall in 24 hrs, recorded from the Stockpile Weather Station).

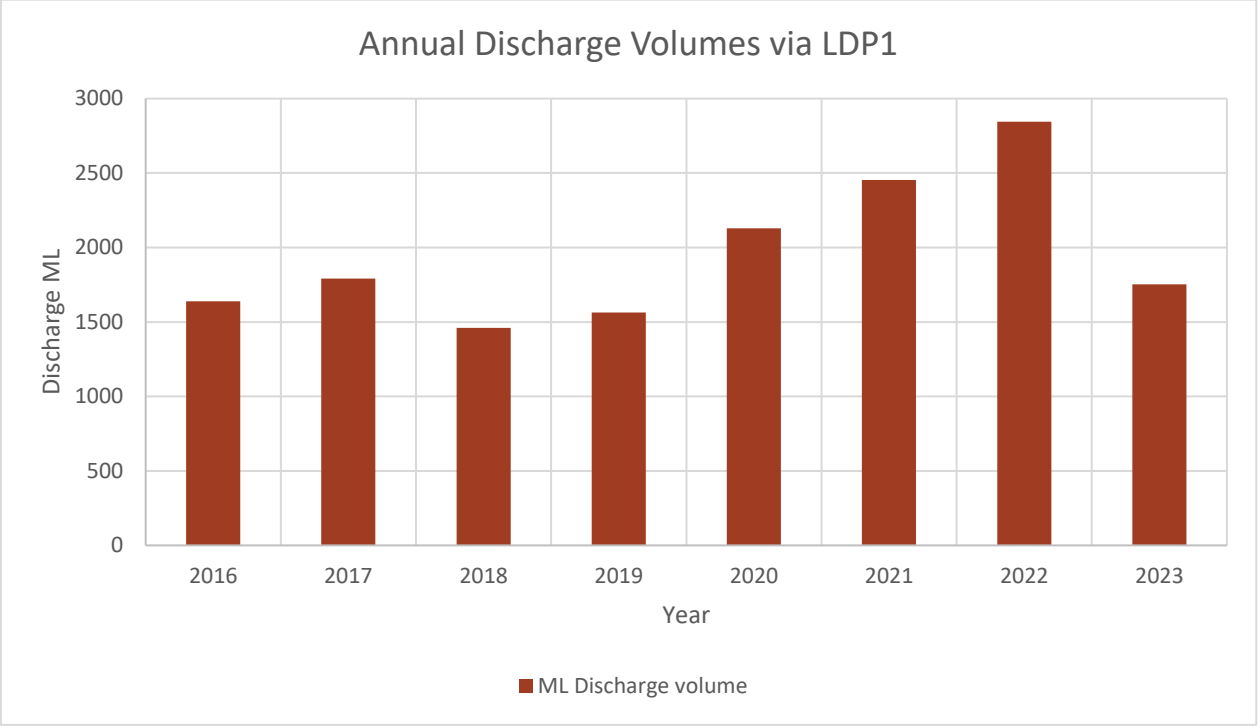

Figure 35 Volume (ML) of Discharge from LDP1 for the past 8 years.

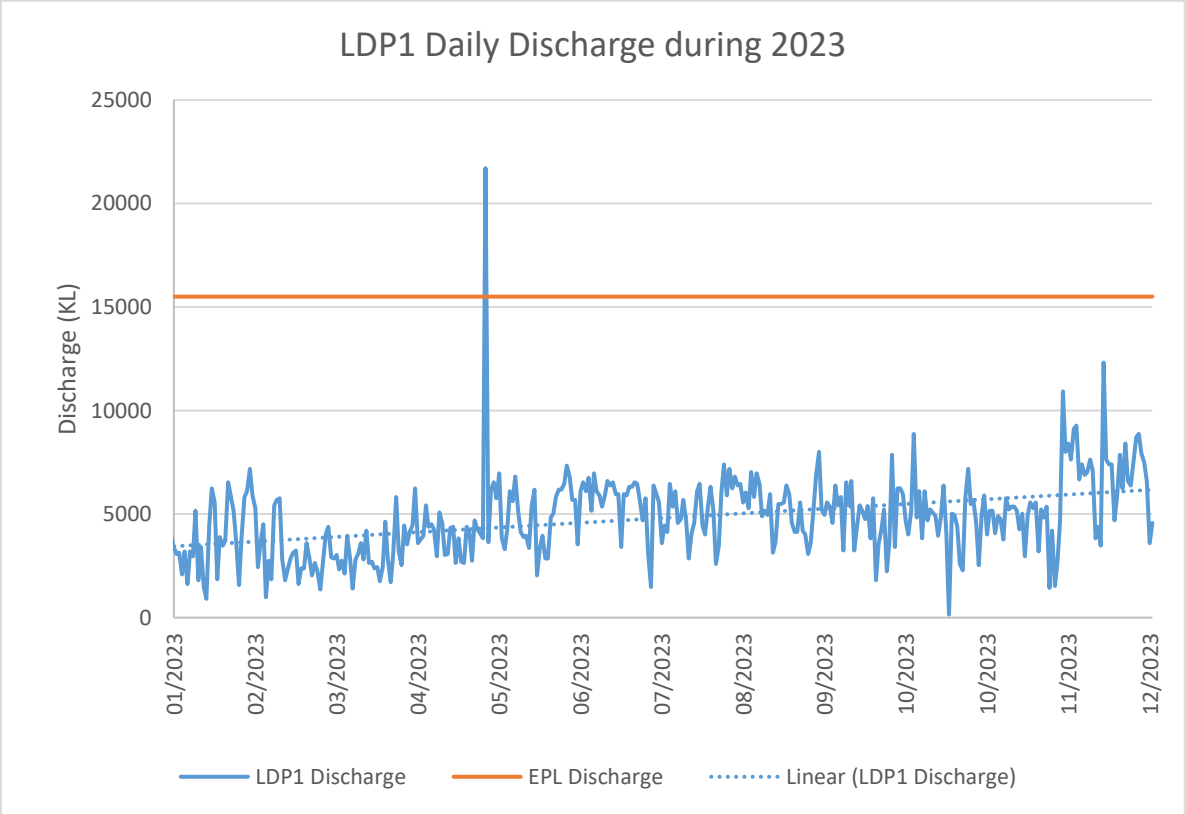

Figure 36 Daily Discharge (kL) via LDP1

*The spike recorded at the end of April was attributed to a high rainfall event (refer to **Figure 34** below **Table 15.4** for further details). This is in accordance with EPL 1389 which allows daily discharge over the prescribed limit when more than 10 mm of rainfall is recorded in 24 hours.

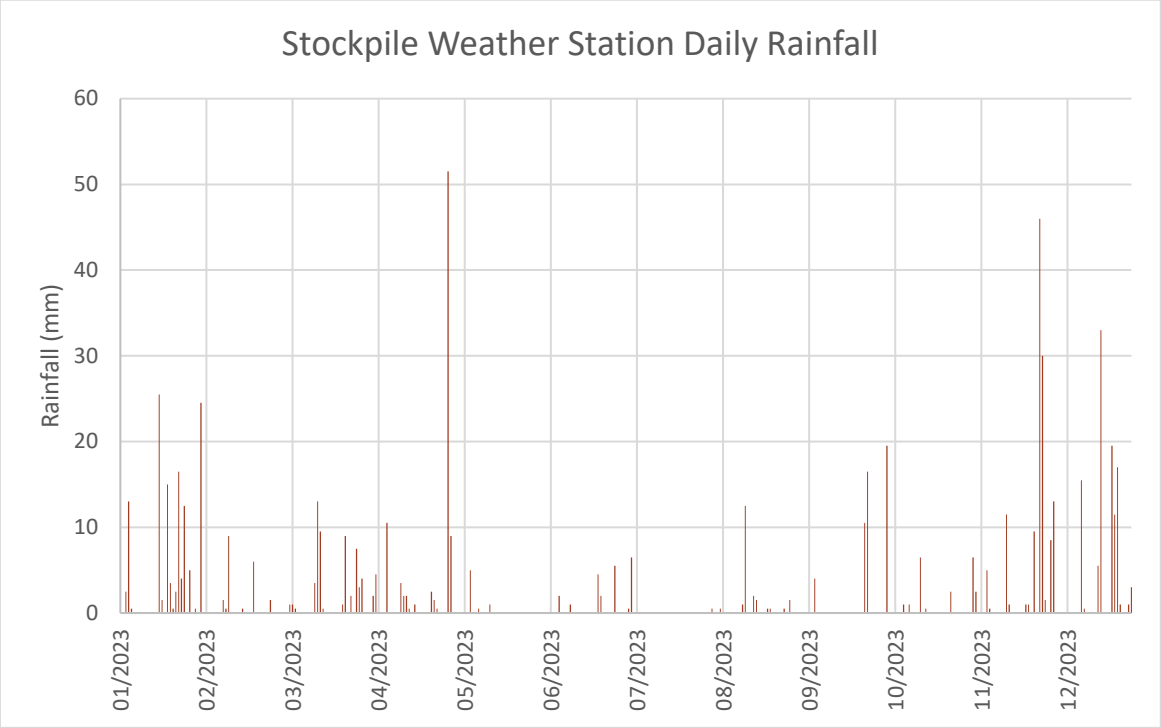

Figure 37 Daily rainfall from Stockpile weather station

Table 15-4 Daily Discharge (KL) via Licence Discharge Point 1 (LDP1).

Day	Jan (kL)	Feb (kL)	Mar (kL)	Apr (kL)	May (kL)	Jun (kL)	Jul (kL)	Aug (kL)	Sep (kL)	Oct (kL)	Nov (kL)	Dec (kL)	EPL Daily Discharge Limit (kL)
1	3653	7185	4012	4134	6177	5692	5968	6460	4958	4635	5155	7633	15500
2	1440	5898	4382	4445	6531	3536	5556	5556	5556	4012	5155	9110	15500
3	3951	5287	2914	6247	5761	6107	3594	6037	5354	5155	4073	9270	15500
4	3420	2437	2860	3594	6965	6531	4445	5287	4571	8870	4893	6675	15500
5	3080	3594	3024	3771	3831	6107	4134	7038	6389	4828	4763	7408	15500
6	3136	4508	2334	3951	3305	6747	6460	5829	5421	6107	3771	6892	15500
7	2085	992	2752	5421	4258	5155	5354	6965	5829	3831	5761	7038	15500
8	3192	2752	2134	4382	6107	6965	6107	6460	3248	6107	5221	7633	15500
9	1616	1846	3951	4508	5624	6107	4571	4893	6531	4699	5354	7112	15500
10	3192	5421	2860	4258	6819	5898	4763	5155	5421	5221	5354	3831	15500
11	2969	5692	1397	2969	5155	5354	5692	4958	6603	5089	5155	4382	15500
12	5155	5761	2806	5089	4134	5898	4635	5968	3248	4893	4258	3478	15500
13	1799	2806	3080	4571	3891	6603	2860	3136	4320	3951	5023	12310	15500
14	3420	1799	3594	3024	3951	6389	4073	3653	5421	4893	2969	7633	15500
15	1483	2334	2806	3080	3362	6531	4571	5489	5155	6389	4958	7408	15500
16	917	2860	4196	4320	5354	5968	6107	5489	4763	4012	5556	7408	15500
17	4445	3136	2646	4382	6177	5968	6460	5556	5354	149	5287	4699	15500
18	6247	3248	2699	2646	2037	3420	4445	6389	3831	5023	5556	5829	15500
19	5556	1616	2385	3831	3362	5968	4012	5968	5761	4958	3192	7860	15500
20	1846	2385	2437	2699	3951	5898	5354	4571	1799	4382	5221	6247	15500
21	3891	2385	1753	2646	2860	6318	6318	4134	3536	2593	4828	8400	15500
22	3478	3594	2437	4382	2860	6318	5155	4134	4258	2284	5354	6603	15500
23	3712	2860	4635	4196	4828	6531	2593	5556	5221	5761	1440	6389	15500
24	6531	2037	2806	2752	5023	6460	3478	4196	2234	7185	4196	7483	15500
25	5898	2646	1707	4699	5829	5556	6037	4012	3712	5489	1527	8710	15500
26	5155	2234	3136	4258	6177	4699	7408	3080	7860	5692	2699	8870	15500
27	3712	1354	5829	4073	6177	5761	5898	3594	3420	4571	4699	7936	15500
28	1572	2646	3192	3831	6460	3136	7185	5287	6247	2540	10920	7483	15500
29	3891		2540	21700	7333	1483	6247	6892	6247	4958	8010	6603	15500
30	5829		4445	3653	6819	6389	6819	8010	5968	5898	8400	3594	15500
31	6107		3536		5692		6389	5221		4012		4571	15500
MIN	917	992	1397	2646	2037	1483	2593	3080	1799	149	1440	3478	149
MAX	6531	7185	5829	21700	7333	6965	7408	8010	7860	8870	10920	12310	21700
AVERAGE	3625	3261	3074	4584	5058	5650	5248	5322	4941	4780	4958	6984	4800

The highlighted cell indicates an exceedance due to a high rainfall event with more than 10 mm of rainfall received from our stockpile weather station on site. This is in accordance EPL 1389 which allows daily discharge over the prescribed limit when more than 10 mm of rainfall is recorded in 24 hours at the premises.

15.2.2 Environmental Performance

15.2.2.1 Water Quality

Mine inflow water is pumped to the surface and directed to a series of mine pit-top treatment dams, which also captures storm water from the site. This combined water is settled through a network of dams across site and is then discharged via an approved Licence Discharge Point into Teatree Hollow Creek which flows into the Bargo River.

A Licence Discharge Point (LDP1) and multiple overflow points (refer **Appendix 4**) are sampled and tested monthly and as required by a third party contractor in accordance with Environmental Protection Licence (EPL) 1389 conditions and EPA *Approved methods for sampling and analysis of water pollutants in NSW*. Water samples from the Bargo River are also taken monthly at an upstream location, downstream location and at the confluence of Teatree Hollow Creek and Bargo River. A schematic of the Tahmoor Mine water management system and water quality infrastructure is outlined within **Appendix 6**. This schematic details main water sources and their flow paths across the mine site and eventual discharge via LDP1.

EPL 1389 states maximum discharge limits for analytes discharged via LDP1. These results are provided in **Table 15-3** for the reporting period. The water quality trend for LDP1 is outlined in **Appendix 7** and shows relatively consistent results this reporting period and has maintained this trend over the previous last 6 years of monitoring since January 2018. There have been no non-compliances or exceedances of limits set by the EPL during the reporting period.

During 2020, the installation of a real-time turbidity monitor was completed and has continued to form an integral part of the water management system on site. The additional use of flocculent mixed into the discharge dam series (Dams M1-M4) via a dosing pump allows controlled dosing depending on the turbidity readings received from the real-time monitor.

In accordance with EPL 1389, a new Water Treatment Plant was constructed and commissioned, and will improve water quality for mine discharge waters which will be reported in the next Annual Review.

Table 15-5 LDP1 Discharge Water Quality

	pH	Electrical Conductivity	Total Suspended Solids (TSS)	Turbidity	Enterococci	Total Nitrogen	Aluminium	Arsenic	Barium	Copper	Nickel	Zinc
	pH Unit	µS/cm	mg/L	NTU	CFU/100ml	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
100th Percentile Concentration Limits	6.5-9	2,600	30	150	1700	8	110	200	6440	5	200	300
Jan-2023	8.5	1260	30*	59.7*	800*	2.4	20	16	1840	<1	27	73
Feb-2023	8.6	1630	12	8.4	200	2.1	20	18	2850	<1	34	107
Mar-2023	8.3	1330	13	24.2	130	2.2	10	18	2520	1	25	63
Apr-2023	8.6	1810	6	6.0	13	2.6	<10	38	2320	<1	47	48
May-2023	8.6	1660	17	21	21	2.0	20	19	1950	1	33	53
Jun-2023	8.6	2130	<5	2.5	86	2.5	<10	28	2200	<1	56	94
Jul-2023	8.4	2070	<5	1.3	1	2.9	<10	53	3540	<1	64	90
Aug-2023	8.6	2000	8	9.0	<1	2.6	<10	30	3540	<1	50	87

Sep-2023	8.5	1880	9	4.7	17	2.5	<10	28	3720	<1	46	28
Oct-2023	8.6	1960	14	14.3	2	3	30	30	2830	<1	64	45
Nov-2023	8.3	1230	<5	7.9	84	3.5	10	28	3160	1	57	96
Dec-2023	8.3	1280	<5	2.3	190	1.7	30	20	2010	<1	29	32

*Note: 25mm of rainfall receive on site in 24-hour period prior to sampling

15.2.2.2 Potable Water Supply

Sydney Water potable water is utilised across Tahmoor Mine with applications in amenities across pit-top facilities and sent underground for mining applications. Emphasis is placed on utilising recycled water and seeking to reduce Sydney Water potable water use on site where possible. The average monthly potable water usage for 2023 was 42 ML/month. This is up from 2022 which was 37 ML/month but similar to the previous reporting period for 2021 being 43 ML/month.

15.2.2.3 Recycled Water Treatment Plant

Tahmoor Coal historically recycled mine water from the sealed longwall goafs to the south of the No.3 Shaft for reuse in the mine operations underground and various surface facilities.

Due to issues with water extraction to supply the Recycled Water Treatment Plant, recycling of water for use at the site had ceased during this reporting period. However further investigations are underway for re-use of waters from the new Water Treatment Plant that was constructed during this reporting period.

Table 15-6 Recycled and Potable Water Use

Water usage	2018	2019	2020	2021	2022	2023
Potable Water usage (kL)	133 389	414 115	396 435	525 301	449 600	508 773
Recycled Water usage (kL)	388 449	291 372	186 584	65 259*	48*	0
ROM tonnes	2 110 328	2 388 854	2 354 901	2 747 965	2,324,202	2,733,692
Potable Water Intensity (L/ROM tonne)	63	173	168	191	193	186

*Reduction in recycled water usage for the reporting period is attributed to issues with the operation of the Recycled Water Treatment Plant.

15.2.2.4 Water Storage Volumes

Data regarding stored water volume in site dams is provided within **Appendix 5.**

Tahmoor Coal does not participate in any salinity trading scheme, and therefore is not required to report on controlled discharge water.

15.2.3 Further Improvements

Through the operation of the Water Treatment Plant (which uses Reverse Osmosis technology), further improvements to the discharge water quality will be reported in the next reporting period. The implementation of a pilot plant trial operated for 8 weeks and was successfully completed in December 2021, ensuring that Reverse Osmosis technology is fit for purpose.

16 Rehabilitation

The Tahmoor South Project was approved in April 2021, extending mining activities until 10 years from the commencement of second workings (ie 19 October 2032). The area for refuse emplacement will remain within the current approval extent, increasing the allowable height of the Refuse Emplacement Area (REA) to 320 RL. This will involve the stripping of top rehabilitated sections to emplace refuse material higher, which will then be capped with topsoil and re-rehabilitated as per the Rehabilitation Management Plan and Rehabilitation Strategy approved by the Department.

A summary of rehabilitation at the Tahmoor Mine Site is provided within **Table 16-1** and **Figure 39** below. Approximately one point eight (1.8) hectares of land in the eastern section of the REA was capped with top soil, contour ploughed and rehabilitated with seed mix containing both a cover crop for stability and native seed mix from Tahmoor Coal's native seed list. Rock armoured drainage lines were also completed for this section. Rehabilitation forecast for the next reporting period will include inter-planting hiko cells and/or tubestock with-in Rehabilitation Stage 5 of the REA.

Table 16-1 Rehabilitation Summary

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2022	**2023**	**2024**
A. Total mine footprint (ha)	142.5	142.5	142.5
B. Total active disturbance (ha)	74	72.2	70.2
C. Land being prepared for rehabilitation (ha)	4.5	1.8	0
D. Land under active rehabilitation (ha) (Total rehabbed to date)	68.5	70.3	72.3
E. Completed Rehabilitation (ha)	**0**	**0**	**0**

Annual rehabilitation monitoring was conducted by Ecological Australia during November 2023. Bushfires affected the area including stages 6 and 9 and adjoining bushland containing the permanent reference sites and plots during late 2019. During the annual walkover in late 2020, evidence of epicormic growth across all affected sites were noted and regrowth of grasses and forbs as groundcover had begun to regenerate. Further growth and regeneration of vegetation continued in 2021 and into 2022 through-out the rehabilitation areas. During the reporting period, weed cover has significantly decreased across all monitoring plots compared with 2022 results. This may be partly attributed to the warmer, dryer weather conditions in addition to the successful weed management controls undertaken during 2023. Continued regular weed maintenance activities will be undertaken this reporting period to maintain control over areas identified within the 2023 Rehabilitation Walkover Assessment (**Appendix 9**).

Generally, no major changes in the vegetation quality and structure other than expected growth, including the impact of slightly lower than average rainfall, were observed over the past twelve months.

Generally, characteristics and variations that were recorded include:

- Overall good health recorded in canopy species, especially Allocasuarina littoralis;
- Natural colonisation of local native shrubs, forbs, grasses and sedges noted across the REA and are similar to the species noted in the control monitoring plots;
- A continued increase in the diameter of all canopy species;
- Senescent Acacia parramattensis across most revegetation areas;
- Species abundance is much higher across the REA in comparison to previous years with the structure of the monitoring plots continuing to develop;
- Native grass cover was variable across plots, with most plots maintaining a consistent percentage of native grass cover or slight increase in cover, the exception being plot H1 which had a moderate decrease;
- Live understorey cover was also variable across plots but showed a slight decrease overall;
- Despite a slight overall reduction in understorey cover of forbs and shrubs, regeneration of midstorey and canopy species remains stable with emergent juveniles including *Acacia* spp., *A. littoralis, Eucalyptus globoidea* and *E. punctate;*
- Overall good growth rates in younger areas of the REA;
- Second generation plants recorded in most revegetation areas;
- Treatment of *Acacia saligna* across Stages 1 to 5 has controlled the spread of this species;
- Exotic weed, *Eragrostis curvula,* is still present within in the upper benches of Stages 14 and 16 and Stage 12, however not as prevalent as cover recorded in 2022;
- Weed cover in western slope of Stage 1 and Stage 5 also has decreased overall since 2022 however exotic grasses still require attention and continued monitoring;
- Biological nutrient recycling recorded across the REA;
- Rabbit herbivory impact low, but evident in some areas; and
- Overall erosion control adequate.

The reference plots and permanent monitoring plots which were burnt by fire in 2019 have recovered well and have a diversity and abundance of species similar to those species within the REA. There is continued evidence of nutrient recycling with termite mounds, ants and scats noted in those burnt plots. Litter cover has stabilised in these plots with grass, leaf litter and twigs recorded in all plots.

Most reference and permanent monitoring plots recorded a slight decrease in native understorey species cover and diversity, though regeneration of midstorey and canopy species remains stable with emergent juveniles including *Acacia* spp., *A. littoralis, Eucalyptus globoidea* and *E. punctata.* Similar changes to vegetation structure and composition were observed in the reference plots and

may be a result of slightly below average rainfall and higher than average temperatures experienced throughout the year.

16.1Environmental Performance

16.1.1 Rehabilitation Performance

The Rehabilitation Improvement Plan TARP includes a classification status of each assessed area forming the basis for the TARP for each stage showed in **Table 16-2** and **Table 16-3**. This is used in the Annual Rehabilitation walkover to categorise the successfulness of the rehabilitation in **Appendix 9**. Over the reporting period, stages 7, 8 and 10 have undergone earthworks to allow further refuse emplacement within the approved REA profile. These stages were excluded from the Rehabilitation Walkover Assessment for 2023, however Stage 8 emplacement was finalised, capped with topsoil and rehabilitated during 2023, once rehabilitation has matured this stage with be re-incorporated in the walkover assessment. All stages have maintained their status rating from 2022 results, however Stage 12 status rating has changed from a status C to a status NC1 due to some minor erosional issues identified in this stage (see **Figure 38** and **Figure 39** for location of stages).

Table 16-2 TARP Classification

Annual Rehabilitation Status	Description	Action
VC	Generally, exceeds the good practice standards and regulatory requirements by a significant margin.	No further action. Continue to maintenance activities as scheduled.
C	Generally good practice standards and regulatory requirements subject to normal variance.	No further action. Continue to maintenance activities as scheduled.
NC1	Not complying with some regulatory requirements and improvement needed to meet required good practice standards. Required works minor in nature and generally within budgeted site program.	Undertake minor works to improve rehabilitation to minimum standard prior to next annual inspection.
NC2	Not complying with significant risk to this inspection item, urgent corrective action needed. Requirements generally substantial in nature and beyond a budgeted site program.	Undertake major works required to improve rehabilitation to minimum standard prior to next annual inspection.

Table 16-3 TARP Rehabilitation Performance

Area	Status Rating	Comments/Opportunity for improvement
Stage 1-2	C	Minor gully erosion to be improved, continued weed control.
Stage 3-5	C	Continued weed control for priority and environmental weeds.
Stage 7	N/A	Recently modified with earthworks in this stage.

Stage 8	**N/A**	Recently modified with earthworks in this stage.
Stage 6 & 9	**C**	Continued weed control for priority and environmental weeds
Stage 10	**N/A**	Recently modified with earthworks in this stage.
Stage 12	**NC1**	Opportunity for some minor gully erosion works.
Stages 14-16	**C**	Continued weed control for priority and environmental weeds.

Figure 38 Rehabilitation Stages, monitoring plots and features noted during the Annual Rehabilitation Walkover during 2023

16.1.2 Rehabilitation and Emplacement Areas

During 2023, a portion of the top section of the current Refuse Emplacement Area was stripped to allow additional drying area and emplacement of refuse material. This will allow for further vertical emplacement which will negate the need for future disturbance outside the already approved REA profile in accordance with the Tahmoor South Consent SSD 8445 and supporting EIS.

In accordance with Development Consent SSD 8445, Tahmoor Coal formally retired 327 x PCT1081 Biobanking Credits and received confirmation from the Biobanking Information Management System on 27 April 2023 (Transaction number 202304-RT-850) as per the requirements of the NSW Biodiversity Offset Scheme prior to any clearing of the PCT1081.

Tahmoor Coal is currently continuing to emplace refuse within the current approved boundary of the REA as part of normal operations. The emplacement areas utilised during the reporting period were confined to the western lobe and adjoining valley section and an area located east of Dam S7. Future emplacement of refuse material will be confined to the adjoining valley section, the area located east of Dam S7 and the top section of the REA (Refer to **Figure 39**).

Limited opportunities are available for rehabilitation works during the next reporting period, however additional inter-planting will be undertaken with-in Rehabilitation Stage 5 (refer to Figure 39).

Tahmoor Coal is continuing to sample upstream and downstream of the Bargo River, as well as the EPA Licenced Discharge Point at the mine and overflow points of dams located at the REA.

16.1.3 Further Improvements

During the next reporting period, a minor erosional issue identified within Rehabilitation Stage 12 during the Annual Rehabilitation Walkover Assessment will be remediated to prevent further erosional issues occurring.

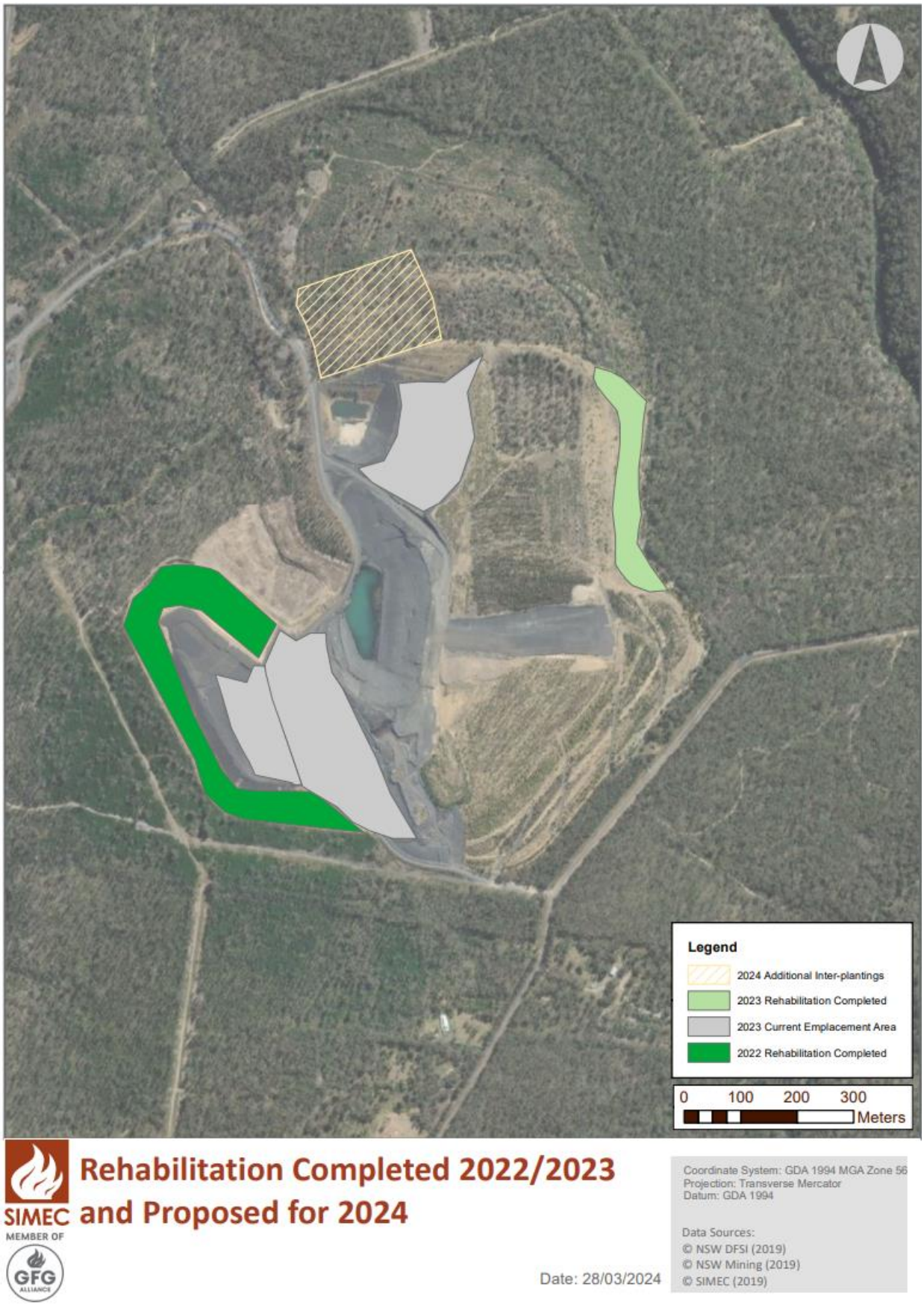

Figure 39 Refuse Emplacement Areas and completed Rehabilitation works during 2022 and 2023, and proposed inter-planting works for 2024.

16.2 Actions for the Next Reporting Period

During 2024, Rehabilitation works will be focused on inter-planting in Rehabilitation Stage 5. Rehabilitation targets for the next reporting period (1st January 2024 – 31st December 2024) are outlined in **Table 16-4** below.

Table 16-4 Rehabilitation Targets for 2024

Category	Targets for 2024 (ha)				
	Q1	Q2	Q3	Q4	Total (Target)
Disturbed	0	0	0	0	0
Levelled/Re-contoured	0	0	0	0	0
Rehabilitation Seeding	0	0	0	0	0
Established	0	0	0	0	0

A summary of maintenance activities completed and proposed for all rehabilitated land is outlined within **Table 16-5 below**.

Table 16-5 Rehabilitation Maintenance Activities

Nature of Treatment	Area (Ha) this Reporting period	Area (Ha) next reporting period	Comments, Control Strategies, Treatment Detail
Additional erosion control (drains re-contouring, rock protection)	<1	<1	Eastern Batter: Drainage lines re-contoured and rock armouring reinstated in sections, check drains installed. Logs placed along contours and scattered on the batter. During next reporting period, areas identified in the Rehabilitation Walkover assessment will be the focus. Routine improvements and maintenance to existing stormwater drainage systems and erosion/sediment controls on disturbed areas and around dams will continue to be undertaken as required.
Re-covering (detail – further topsoil, subsoil sealing, etc)	0	1.0	Recovering required around S7 Dam area and capping of exposed batters on eastern and southern sides
Soil treatment (detail – fertiliser, lime, gypsum, etc)	1.8	2.0	Fertiliser applied to the Eastern Batter during rehabilitation seeding works in 2023. Fertiliser will also be applied during seeding works around Dam S7.
Treatment management (detail – grazing, cropping, slashing, weeding etc)	<1	<1	Targeted weed spraying undertaken throughout the REA with pockets of weeds identified in the 2022 Rehab Walkover assessment prioritised. Similar weed management activities projected for 2024.
Adversely affected by weeds (detail, type and treatment)	<1	<1	Weed spraying continued on a monthly regime during 2023, with Acacia saligna and pockets of

			weeds noted during the 2022 walkover assessment and noted as being successfully controlled during the 2023 walkover. Minor weed species will need continued control during 2023, including Eragrostis curvula in Stages 14, 16, 12 and identified on the western side of Stages 1 & 5.
Re-seeding/planting (detail – species density, season, etc)	0	3.0	Additional interplantings of grasses and canopy trees proposed for 2024 in Stage 5 (refer to **Figure 37**).
Feral animal control (detail – additional fencing, trapping, baiting, etc)	80	80	Continued baiting of rabbits for next reporting period.

16.3 Mine Closure

16.3.1 Post mining Land use

There are several post mining land use options that may be applicable for the Tahmoor Mine site including residential land use, industrial land use or a return to native bushland.

The likely final land use option for most of Tahmoor Coal's closure domains will be a return to native bushland (refer to **Figure 40**). However, the final land use options will be confirmed in the detailed closure planning process, which involves undertaking a final land use analysis required 5 years prior to the cessation of mining activities at Tahmoor Mine.

A mine closure plan was developed as part of the Environmental Impact Statement for the Tahmoor South Project, referred to as the Rehabilitation and Mine Closure Strategy (SLR,2020).

16.3.2 Rehabilitation Indicators

The REA key rehabilitation indicators include the following:

- Maximum height of RL320 (SSD 8445);
- Maximum slope on final landform external batters will be 1:4 (generally will be 1:8);
- External batters should have gently sloping contour drains, reporting to water storage dams;
- Topsoil placement depth >300 mm;
- All final landform slopes to be contour ploughed prior to seeding or planting;
- Target <10% weed infestation within monitoring transects;
- Target evidence of second-generation flora germination in monitoring transects (monitored annually); and
- Rehabilitation monitoring transects contain flora species and structural characteristics like the desired vegetation communities at the analogue/reference sites (monitored annually).

Soils located at Tahmoor Mine have been identified as part of the Lucas Heights Soil Landscape and occurring adjacent to the Gymea Soil Landscape. Soil limitations of the landscape include stoniness, hard setting surfaces and low soil fertility. Erosion on the landscape is generally low. Where possible, deeper soil horizons are reserved for subsoil and capping material, while the top soil horizons with the highest organic content is reserved for rehabilitation and direct seeding/planting applications.

A combination of sterile cover crops and grasses for initial stability while native shrub and tree seed mixes establish are used at the REA to achieve the rehabilitation objective outcome of surrounding native bushland in the area. A species list has been developed and refined based on Tahmoor Coal's development consents and the results of the annual rehabilitation monitoring (which identifies which species have performed more successful than others during each year).

Hollow bearing trees and timber logs from clearing activities at the REA are salvaged and stockpiled for use throughout rehabilitation areas. Logs and hollows are spread throughout rehabilitation areas where accessible, to provide structure and encourage habitation colonisation by native fauna.

All mine closure domains including active domains still in operational use, are described in the Tahmoor Mine Conceptual Mine Closure Plan (TAH-HSEC-00121), the Rehabilitation Management Plan (TAH-HSEC-00402) and Rehabilitation Strategy (TAH-HSEC-00401). Inactive Domains are assessed to establish an annual record of the status of each domain, including photographic monitoring to show progress and changes year to year included in the annual rehabilitation walkover (**Appendix 9**). To date the Refuse Emplacement Area is the only Domain currently undergoing active rehabilitation activities.

Regular surveying is conducted in active landform areas to monitor maximum slope to conform to final landform designs.

Tahmoor Coal has five (5) identified primary closure domains based on operational function and geography (ie. 1, 2, 3, 4 and 5). Most of these domains are connected or within close proximity of one another, and will therefore share similar final landforms and rehabilitation objectives. A schedule of these domains, with the rehabilitation status comparing last reporting period to this reporting period, is provided in **Table 16-6** and shown in **Appendix 10.**

Table 16-6 Tahmoor Coal Closure Domains

Domain	Description	Rehabilitation Status	
		2022	**2023**
1	Tahmoor Mine Main Pit-top Area	-	-
1A	CHPP	Active Area	Active Area
1B	Rail Loading Facility	Active Area	Active Area
1C	Main Workshop and Administration Area	Active Area	Active Area
1D	No.3 Shaft and Gas Drainage Plant	Active Area	Active Area
1E	Sewage/Water Treatment Plant	Active Area	Active Area
2	Product Stockpile Area	Active Area	Active Area
3	Refuse Emplacement Area	Active Area, Ecosystem Est., and Ecosystem Dev.	Active Area, Ecosystem Est., and Ecosystem Dev.
4	No.1 Ventilation Shaft	Active Area	Active Area
5	No.2 Ventilation Shaft	Active Area	Active Area
6	Off Title Subsidence Area	Active Area	Active Area

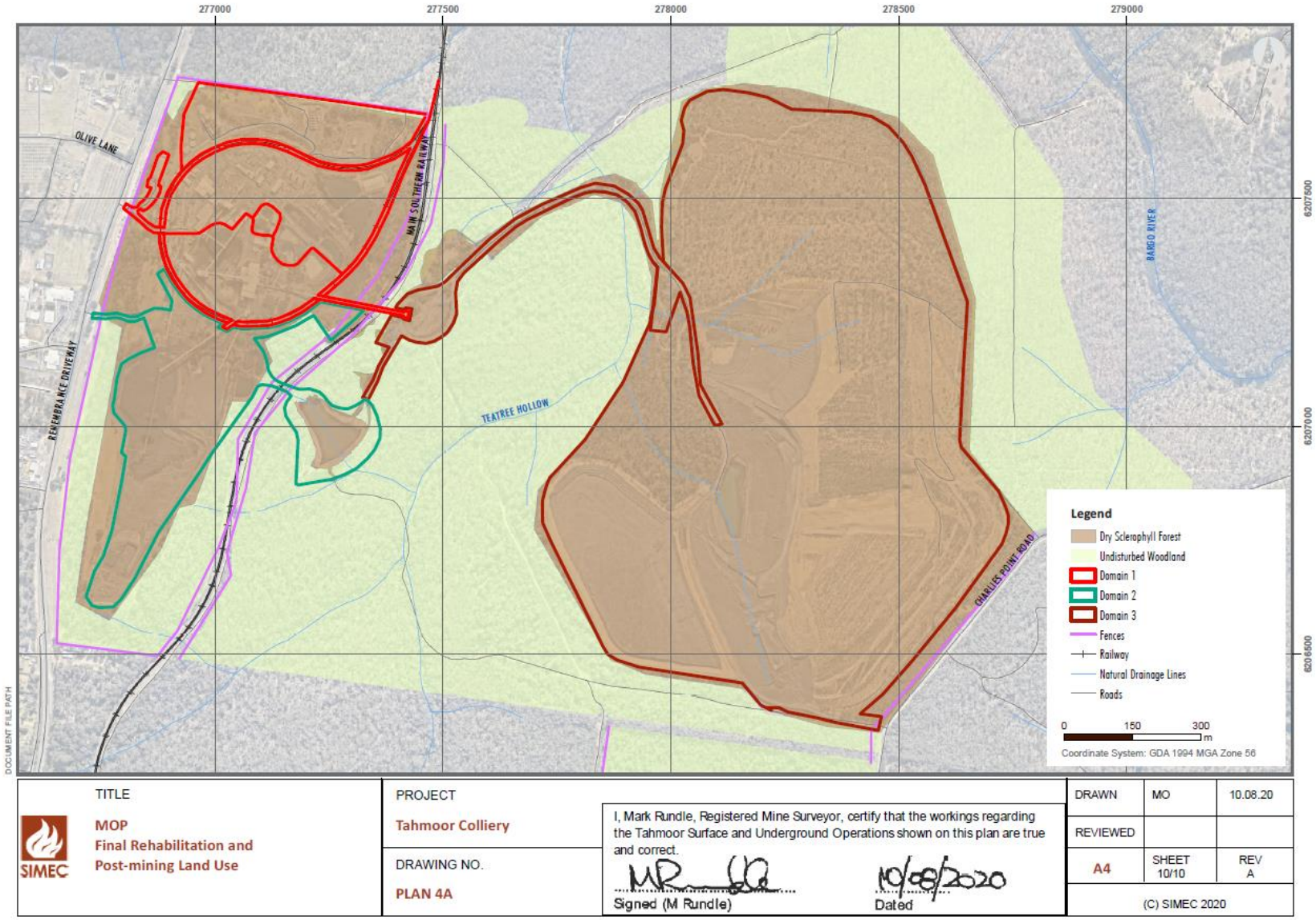

Figure 40 Final rehabilitation and post-mining land use.

17 Weeds

17.1 Environmental Management

A Weed Management Procedure (TAH-HSEC-00107) has been developed as part of the site Environmental Management System. The purpose of this plan is to outline management strategies and controls for noxious and environmental weeds, so that weed infestations are controlled and kept at an acceptable level on all lands owned or managed by the mine. A summary of weed species targeted during the reporting period, and control methods used, is provided in **Table 17-1.**

Table 17-1 Weed Target Species

Target Weed Species	Date of Control	Treatment Method
African Lovegrass (Eragrostis curvula)	All seasons	Herbicide (Glyphosate)
Hedge Mustard (Sisymbrium orientale)	All seasons	Herbicide (Glyphosate Dicamba)
Whiskey Grass (Andropogon virginicus)	All seasons	Herbicide (Glyphosate)
Serrated Tussock (Nassella trichotoma)	All seasons	Herbicide (Glyphosate)
Fireweed (Senecio riensis madagasca)	Winter or as detected	Hand Weeding & Herbicide (Glysophate) Late Autumn
Western Australian Golden Wattle (Acacia saligna)	All seasons	Cut stump removal and herbicide application
Couch (Cynodon dactylon)	All seasons	Herbicide (Glyphosate)
Fountain Grass (Cenchrus setaceus)	All seasons	Herbicide (Glyphosate)
Catsear (Hypochaeris radicata)	All seasons	Herbicide (Glyphosate)
Narrow-leafed Cotton Bush (Gomphocarpus fruticosus)	All seasons	Herbicide (Glyphosate Dicamba)
Flaxleaf Fleabane (Conyza bonariensis)	All seasons	Herbicide (Glyphosate resistant)
Scarlet Pimpernel (Anagallis arvensis)	All seasons	Herbicide (Glyphosate Dicamba)
Veined Verbena (Verbena rigida)	All seasons	Herbicide (Glyphosate Dicamba)
Paspalum (Paspalum dilatatum)	All seasons	Herbicide (Glyphosate)
Red-flowered Mallow (Modiola caroliniana)	All seasons	Hand weeding & Herbicide (Glyphosate)
Pampas Grass	All seasons	Herbicide (Glyphosate)
Plantain (Plantago)	All seasons	Herbicide (Glyphosate)

17.2 Environmental Performance

Weed management of all land owned or managed by Tahmoor Coal has continued through the reporting period. Monthly Environmental inspections across Pit-top, REA, Shaft site 1, Shaft site 2 and the Bargo shaft site continually monitor weed prevalence across these sites and target areas of concern to be controlled within the next month by Tahmoor Coal's Grounds Maintenance Contractors.

During the reporting period, the monthly environmental inspections noted Pampas grass starting to re-emerge in the same area as the parent plants that were controlled during 2022. Continued weed maintenance and control have been implemented in this area and continued inspections around this area will suppress any further re-emergence or spread.

Continuation of the current weed control program and control of Whiskey Grass, African Lovegrass, Hedge Mustard, *Acacia saligna* and seedling *Leptospermum laevigatum* has been recommended and is monitored monthly by Tahmoor Coal's Grounds Maintenance Contractor.

During the reporting period there has been a prevalence yet controllable quantity of weed species germinating on site, which may have been influenced by the drier than average conditions for 2023. Weeds identified across site during the Monthly Environmental Inspections include African lovegrass, Blackberry, Narrow-leafed cotton bush and flaxleaf fleabane as most identified across pit-top. This was managed and maintained monthly by Tahmoor Coal's Grounds Maintenance Contractor.

There were no reportable incidents related to weed management during the reporting period.

17.3 Further Improvements

Tahmoor Coal will continue weed management monitoring and maintenance activities within associated leased and owned land, across pit-top and rehabilitation areas at the REA, with particular focus on any problematic weed pockets identified in the Annual Rehabilitation walkover or during the Monthly Environmental Inspections.

18 Bushfire Management

18.1 Environmental Management

During 2020, Tahmoor Coal reviewed and updated the Bushfire Management Plan (BMP) in consultation with the Wollondilly Rural Fire Service (RFS) to include an updated hazard reduction burn schedule as a response to the Green Wattle Bushfire of November 2019 to January 2020 (refer to **Figure 41**). The BMP provides significant detail on the location of all Tahmoor Coal land holdings with detailed maps showing Asset Protection Zones (APZ), Land Management Zones (LMZ) and Strategic Fire Zones (SFZ), gate/track/road access for all locations, and a detailed schedule of hazard reduction activities required for each location. For further information the Bushfire Management Plan can be viewed on the Tahmoor coal's website, accessible through the following link: Plans – Tahmoor Colliery.

18.2 Environmental Performance

During 2023, Tahmoor Coal undertook Annual Asset Protection Zone maintenance during spring keeping light vehicle access roads maintained and perimeters around Pit-top, REA access roads, Shaft site 1, Shaft site 2 and Tahmoor Coal owned neighbouring properties on Charlies Point Road south of the REA (refer to **Figure 41**).

No hazard reduction burns were completed during the reporting period and no wildfires were reported in the region.

18.3 Further Improvements

Tahmoor Coal will continue to implement hazard control strategies outlined in the current Bushfire Management Plan and in consultation with the Wollondilly/Wingecaribee Bush Fire Management Committee.

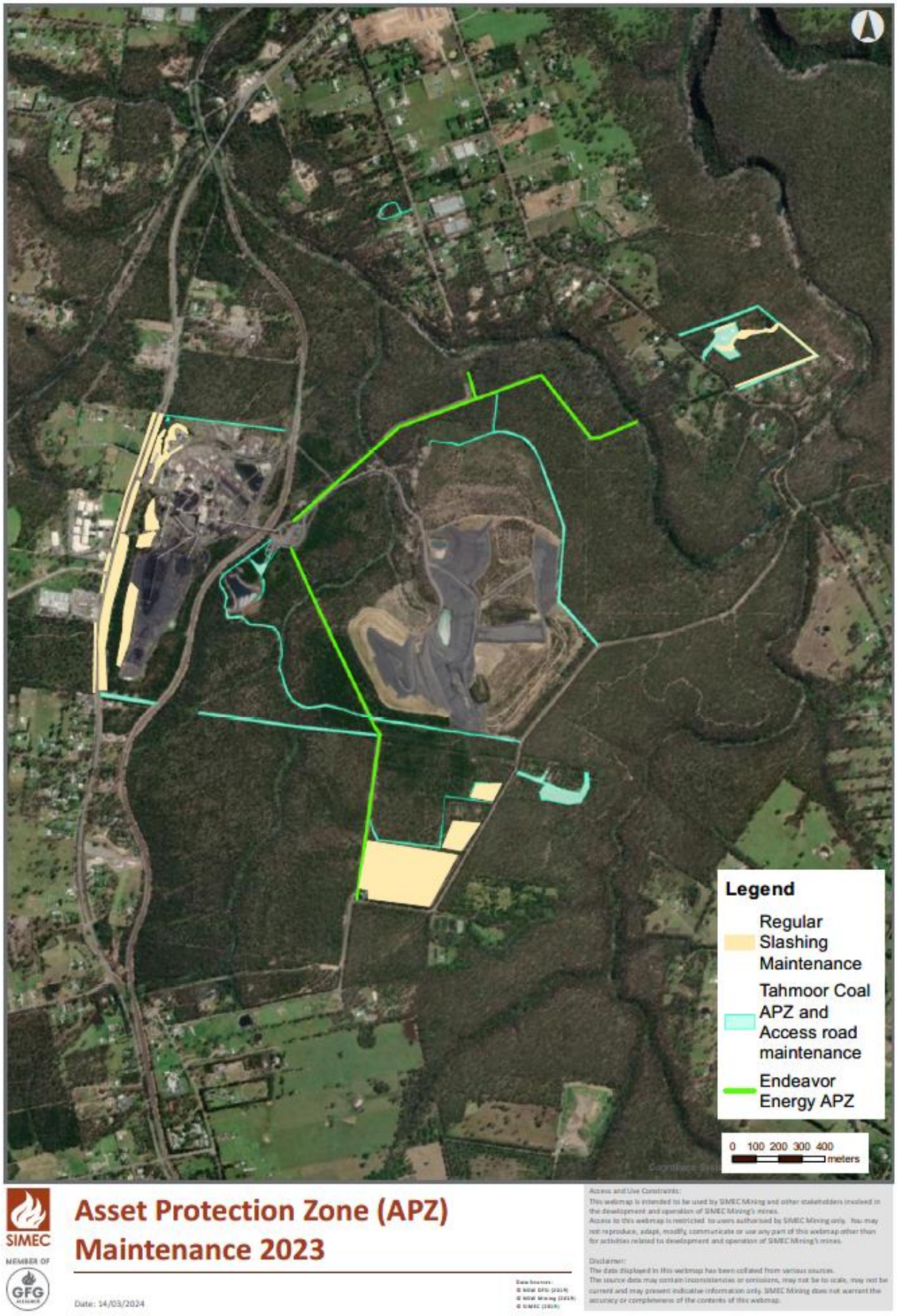

Figure 41 Annual Asset Protection Zone (APZ) and Fire trail maintenance for Tahmoor Coal during 2023

19 Traffic Management

Traffic is managed in accordance with the approved Traffic Management Plan (TAH-HSEC-00370) and in accordance with consent SSD 8445 conditions B61, B62, B67, A10, A11, A13, A15.

During the reporting period truck and train times and tonnes have been recorded and reported in **Appendix 12** and **Appendix 13** in accordance with condition B61 of SSD 8445.

Tahmoor Coal operations have been in accordance with condition A11(c) and A13 of consent SSD8445 during the reporting period (refer to **Appendix 12** and **Appendix 13**).

20 Community

20.1 Community Engagement Activities

Tahmoor Coal recognises that genuine partnerships with stakeholders and local communities are an essential part of community engagement.

Tahmoor Coal has established a good working relationship with the local community throughout its operations and seeks to continue this as new projects are established. There is a focus on providing timely and accurate information regarding its performance to its varied stakeholders.

The method of consultation used varies depending on the scale of project, stakeholder type and preferred method of communication.

The following consultation methods are commonly used to communicate and engage with stakeholders:

- Newsletters – distributed by email, website, post and printed posters displayed in various locations;
- Resident Information Packs – Distributed to residents in current and future proposed mining areas and website;
- Face to face consultation meetings, eg. Local landholders, schools, businesses and community groups;
- Website (https://www.tahmoorcolliery.com.au/) containing a variety of information and reports;
- 24-hour complaints line – phone number displayed on newsletter, website and distributed as required, eg. Face to face meetings;
- Tahmoor Coal Community Consultative Committee (TCCCC) Meetings – four (4) quarterly meetings held in 2023 (2 March, 1 June, 7 September and 7 December);
- Community Information Sessions – as required at various locations (open to all members of the public);
- Displays of Tahmoor Coal operations at community events (eg Illuminate Wollondilly Festival of Art & Light at Picton in September 2023); and
- Six Monthly Subsidence Impact Reports – distributed to TCCCC and available on Tahmoor Coal website.

20.2 Community Contributions

Tahmoor Coal contributes to the social and economic development of sustainable communities associated with its operations and ensures the rights of communities in which it operates are respected and supported. This is achieved by:

- Identifying the communities and stakeholders associated with our operations and actively engaging with them as early as possible and throughout the life cycle of the operations to establish relationships based on mutual benefit and active participation;
- Respecting the cultural, customs, interests and rights of communities, including indigenous peoples and vulnerable or disadvantaged groups;

- Working with governments, local authorities, community representatives, inter-governmental and non-governmental organisations and other interested parties to develop and support projects that benefit the communities associated with our operations; and
- Contributing an indicative amount of $100,000 each year to fund initiatives that benefit the communities associated with our operations, particularly those located in more remote areas or in regions with a lower level of social and economic development and infrastructure.

20.3 Community Investment Program

In 2023 some of the major sponsorships and donations included support for:

- Australian Wildlife Sanctuary: Tahmoor Coal sponsored and provided a grant of $65,268 to build new enclosures for the now listed endangered Koala, as well as the endangered Tasmanian Devil and Eastern Quoll at the Australian Wildlife Sanctuary. The project involved building natural aesthetically pleasing enclosures, surrounded by native landscaping and pathways;
- Wollondilly Beach Bus: The Wollondilly Beach Bus is a free service travelling from Wollondilly to North Wollongong beach every Thursday during January. The program primarily targets the 8000 young people in the Local Government Area. Wollondilly is significantly transport disadvantaged and has a lack of free or affordable entertainment options for young people. The service enables people to meet with or develop new friendships while undertaking a recreational activity that promotes healthy lifestyle and fitness. Ultimately, it connects the community throughout summer, providing them with an opportunity to socialise, exercise and unwind. Tahmoor Coal has sponsored this initiative for 11 years and provided financial support to allow two buses to run at no cost to participants during January 2023;
- Illuminate Wollondilly Festival of Art & Light: Attracting around 22,000 people, Illuminate Wollondilly encourages visitors, locals, friends and families to stroll through the town of Picton taking in the enchanted ambiance as an amazing range of local artworks are projected onto landmark buildings to illuminate the historic town. Tahmoor Coal was a sponsor for this event and set up a stall featuring a Virtual Reality (VR) underground experience for children and adults to enjoy; and
- Buxton Youth Day – Skate & Paint: Neighbourhood Watch Wollondilly organised the Skate & Paint youth day for over 300 locals to enjoy a skate workshop, Aboriginal dot painting, boomerang throwing, leaf painting and many more activities to encourage young people to connect to their community and engage with activities they enjoy.

In accordance with the Tahmoor Coal Community Development Plan and Community Investment Program, all community investment activities, whether financial or in-kind support, should target the following group-wide focus areas:

- Community development;
- Education;
- Health; and
- Environment.

An overview of the Tahmoor Coal community contributions during 2023 are outlined in **Table 20-1** below.

Table 20-1 Community Contributions in 2023

Category	Contributions in 2023
Community Development	$53,520
Health	$10,301
Environment	$4,000
Education, Art & Culture	$33,660
Total	**$101,481**

20.4 Community Complaints

A total of three (3) community complaints were received for the reporting period and is illustrated in **Figure 42** and **Table 20-2**. The complaints received related to the following categories:

- Vibration (1); and
- Miscellaneous (2).

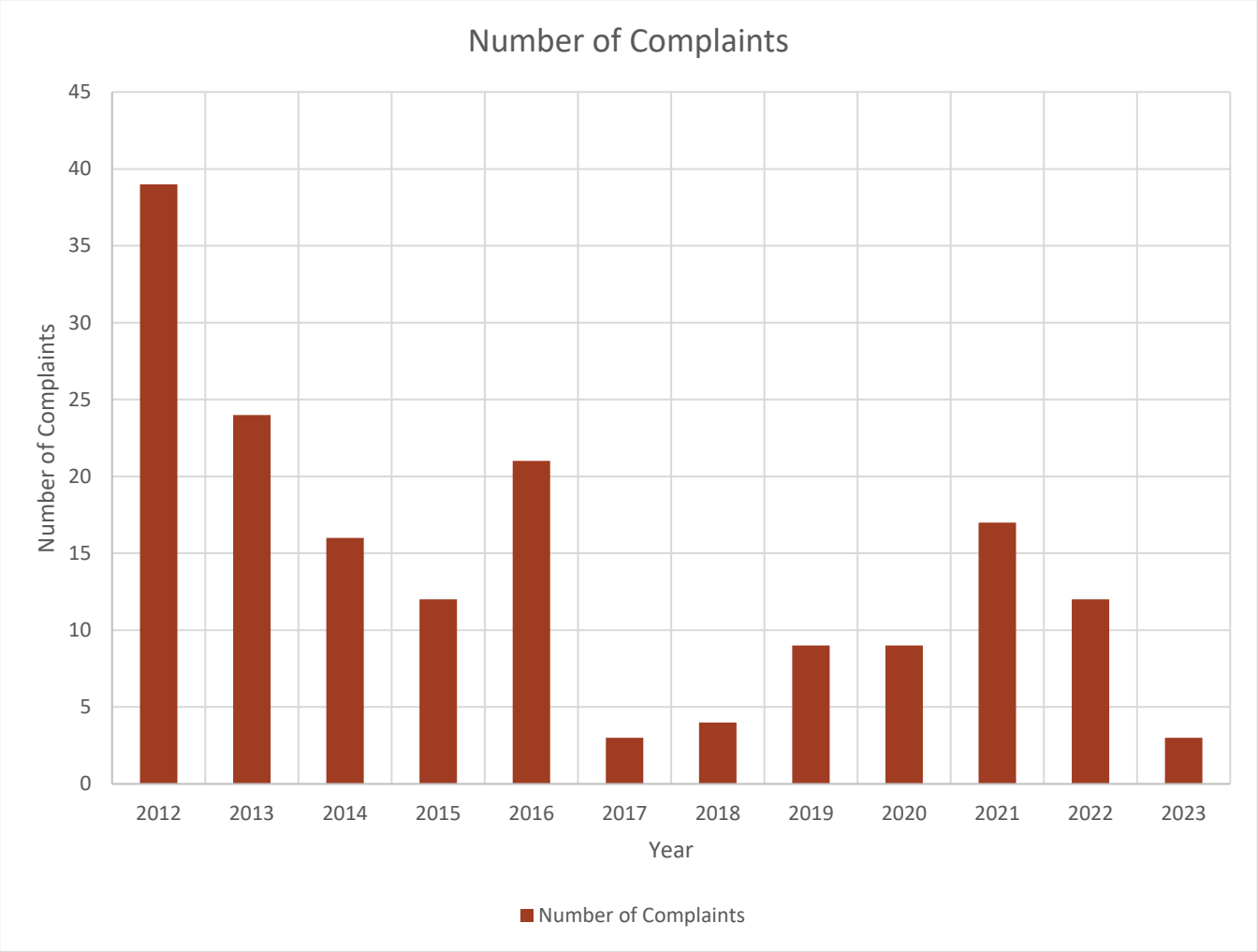

Figure 42 Community Complaint Statistics

Table 20-2 Complaint Details

Date	Type	Complaint Details
21/02/2023	Miscellaneous	Loss of TV channels possibly due to noise monitor installed on neighbouring property. Contacted Novecom (noise monitor provider) for advice. Novecom advised they have not received a complaint of this nature and it would be highly unlikely for a noise monitor operated by batteries and solar to interfere with tv signal.
21/03/2023	Miscellaneous	Disrespectful behaviour experienced by a local resident from a Tahmoor Coal consultant. Contacted the consultancy company to report the unfavourable behaviour experienced by the resident during a monthly inspection.
29/04/2023	Vibration	Rattling windows and vibrations. Checked location of property from longwall operations and pit-top (3.5km away). Investigated the site operations and coal train activities and found noise levels for the period were within baseline conditions for site and no unusual activity was undertaken during this time.

21 Incidents, Notifications and Non-Compliances

Tahmoor Coal had a total of two (2) incidents during the reporting period, both relating to spill management onsite. In addition, Tahmoor Coal notified DPHI on eleven (11) separate accounts regarding TARP triggers for environmental and built features during the reporting period. A summary of all environmental incidents and notifications for 2023 is outlined within **Table 21-1**.

Table 21-1 2023 Incidents, notifications and non-compliances

Date	Classification (if required)	Type	Location	Details	Action(s) taken
03/02/2023	Cat 0	Incident - Spill Management	Pit-top - Yard	Hydraulic Fluid Spill	Spill immediately and cleaned up appropriately. E&C Team notified with PIRMP tested and successful.
28/02/2023	NA	LW S1A Subsidence Notification 1 for environmental features	Teatree Hollow Creek – TT11, TT3 and section downstream TT2	Physical Features and Natural Behaviour TARP triggered (WMP5) – Reduction in pool water level	A WCAMP will be prepared (if required) and implemented following the cessation of subsidence movements associated with Tahmoor South mining.
28/02/2023	NA	LW S1A Subsidence Notification 2 for environmental features	Various locations	Shallow Groundwater bores (OSPs & Private bores) & VWPs	TARP implemented. Review and modify the Water Management Plan, particularly the wording in the relevant TARPs for these triggers. Reassessment of TARp triggers. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
28/02/2023	NA	LW S1A Subsidence Notification 3 for environmental features	Pool TT9 on Teatree Hollow Creek	Surface Water Level TARP triggered (WMP3) – Reduction in pool water level	TARP implemented. No actions other than ongoing monitoring as per the LW S1A-S6A Water Management Plan.
20/03/2023	NA	LW S1A Subsidence Notification 4 for environmental features	Teatree Hollow Creek - area proximal to TT12	Physical Features and Natural Behaviour TARP triggered (WMP5)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
14/04/2023	NA	LW S1A Subsidence Notification 5 for	Pool TT3, TT7, TT9, TT12 and TT13	Stream Water Quality TARP	TARP implemented. No actions other than ongoing monitoring as per the LW

Date	Classification (if required)	Type	Location	Details	Action(s) taken
		environmental features		triggered (WMP1)	S1A-S6A Water Management Plan.
14/04/2023	NA	LW S1A Subsidence Notification 6 for environmental features	Pool TT7 and TT13	Physical Features and Natural Behaviour TARP triggered (WMP5)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
05/05/2023	NA	LW S1A Subsidence Notification 7 for environmental features	TT12 & TT13	Physical Features and Natural Behaviour TARP triggered (WMP5)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
31/05/2023	NA	LW S1A Subsidence Notification – built feature	Remembrance Driveway – Pegs R47 & R48	Increase in compressive strain	TARP implemented. Increased monitoring frequency of 2D survey, visual inspections and testing of Telco cable line.. Completion of weekly gas detection survey. Meetings with all relevant stakeholders.
02/06/2023	NA	LW S1A Subsidence Notification 8 for environmental features	Pool TT12, TT2 & TT3	Physical Features and Natural Behaviour TARP triggered (WMP5)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
02/06/2023	NA	LW S1A Subsidence Notification 9 for environmental features	Pool TT12 & TT13	Pool Water Level TARP trigger (WMP3)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
16/08/2023	NA	LW S1A Subsidence Notification 10 for environmental features	Pools TT7, TT2, TT3, TT11, TT10, TT14 & TT15	Physical Features and Natural Behaviour TARP triggered (WMP5) and Stream Water Quality TARP triggered (WMP1)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.
03/09/2023	Cat 0	Incident - Spill Management	Pit-top - Yard	Oil Spill	Spill immediately contained and cleaned up appropriately. E&C notified

Date	Classification (if required)	Type	Location	Details	Action(s) taken
					with PIRMP tested and successful.
10/11/2023	NA	LW S2A Subsidence Notification 1 for environmental features	Pools TT2, TT3, TT7, TT9, TT10, TT11, TT12, TT13, TT14 & TT15	Stream Water Quality TARPs triggered (WMP1)	TARP implemented. Frequency of visual inspections increased to fortnightly at impacted sites. Ongoing monitoring as per the LW S1A-S6A Water Management Plan.

22 Activities to be Completed during the Next Reporting Period (1st January 2024 – 31st December 2024)

The following activities are aimed to improve the environment and/or community performance of Tahmoor Coal and are planned to be completed during the next reporting period:

- Progress Myrtle Creek and Redbank Creek CMAP;
- Further improvement to the site water management system including operation of Water Treatment Plant for processing discharge waters;
- Continue Aquatic Health Monitoring Program for the Bargo River as directed in EPL 1389;
- Continue Ecological Toxicity monitoring as directed in EPL1389;
- Continued community engagement for Tahmoor South mining; and
- Undertake studies required to support Extraction Plan for LW S1B-S6B, including obtaining baseline monitoring data from surface water and groundwater monitoring.

23 Related Documents

Related Documents directly related to or references from this document are provided below in **Table 23-1**.

Table 23-1 Related Documents

Document Title	Document Number
Tahmoor South Air Quality and Greenhouse Gas Management Plan	TAH-HSEC-00379
Tahmoor South Water Management Plan	TAH-HSEC-00369
Tahmoor south Groundwater Management Plan	TAH-HSEC-00373
Tahmoor South Noise Management Plan	TAH-HSEC-00372
Tahmoor South Biodiversity Management Plan	TAH-HSEC-00378
Tahmoor South Bushfire Management Plan	TAH-HSEC-00377
Tahmoor South Traffic Management Plan	TAH-HSEC-00370
Erosion & Sediment Control Plan	TAH-HSEC-00374
Weed Management Procedure	TAH-HSEC-00107
Rehabilitation Management Plan	TAH-HSEC-00402
Rehabilitation Strategy	TAH-HSEC-00401
Longwall S1A-S6A Extraction Plan	TAH-HSEC-00360
LW S1A-S6A Subsidence Monitoring Program	TAH-HSEC-00367
LW S1A-S6A Biodiversity Management Plan	TAH-HSEC-00363
LW S1A-S6A Heritage Management Plan	TAH-HSEC-00364
LW S1A-S6A Land Management Plan	TAH-HSEC-00362
LW S1A-S6A Built Features Management Plan	TAH-HSEC-00366
LW S1A-S6A Public Safety Management Plan	TAH-HSEC-00365
LW S1A-S6A Water Management Plan	TAH-HSEC-00361
LW W3-W4 Heritage Management Plan	TAH-HSEC-00331
LW W3-W4 Land Management Plan	TAH-HSEC-00330
LW W3-W4 Biodiversity Management Plan	TAH-HSEC-00325
LW W3-W4 Built Features Management Plan	TAH-HSEC-00332
LW W3-W4 Public Safety Management Plan	TAH-HSEC-00333
LW W3-W4 Water Management Plan	TAH-HSEC-00328
Australian Wildlife Sanctuary Management Plan	MSEC1074
Wollondilly Shire Council Management Plan	MSEC1193-03
Jemena Management Plan	MSEC1193-06
Sydney Potable Water Management Plan	MSEC1193-04
Sydney Water Sewer Management Plan	MSEC1193-05

Telstra Management Plan	-
NBN Management Plan	-
TPG Management Plan	-
Wollondilly Anglican College Management Plan	MSEC1193-11
Bargo Chicken Breeder Production Complex Management Plan	MSEC1193-14
Tahmoor Garden Centre Management Plan	MSEC1193-15
Aboriginal Cultural Heritage Assessment: Amended Tahmoor South Project (Niche, 2020)	
Conceptual Mine Closure Plan	TAH-HSEC-00121

24 Abbreviations

Abbreviations used in this document are provided below in **Table 24-1**.

Table 24-1 Abbreviations

Abbreviation	Definition
ACM	Asbestos containing materials
AEMR	Annual Environmental Management Report
APZ	Asset Protection Zones
ASTs	Above ground storage tanks
AUSRIVAS	Australian River Assessment System
BC Act	*Biodiversity Conservation Act 2016*
BMP	Bushfire Management Plan
CCL	Consolidated Coal Lease
CHPP	Coal Handling Preparation Plant
CMAP	Corrective Management Action Plan
DA	Development Application
DC	Development Consent
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPIE	Department of Planning, Industry and Environment
DPHI	Department of Housing and Infrastructure
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environmental Protection Licence
ERG	Tahmoor Coal Environmental Response Group
GHG	Greenhouse gas
GIS	Global Information System
HHRT	Historical Heritage Technical Report
IPC	Independent Planning Commission
km	Kilometre
KL	Kilolitres
LDP1	Licenced Discharge Point 1
LMZ	Land Management Zones
LOP	Licenced Overflow Point
LW	Longwall
LW W1	Longwall West 1
LW W1-W2	Longwall West 1 and Longwall West 2
LW W2	Longwall West 2

Abbreviation	Definition
LW W3	Longwall West 3
LW W3-W4	Longwall West 3 and Longwall West 4
LW W4	Longwall West 4
LW S1A	Longwall South 1A
LW S1A-S6A	Longwalls South 1A to South 6A
LW S2A	Longwall South 2A
LW S6A	Longwall South 6A
m	Metres
ML	Mining Lease
MOP	Mining Operation Plan
NC	Non Compliance
NGERS	National Greenhouse and Energy Reporting
NSW	New South Wales
ODS	Ozone depleting substances
OSP	Open Stand Pipe
PCBs	Polycholorinated Biphenyls
PIRMP	Pollution Incident Response Management Plan
PM10	Particulate Matter smaller than 10 micrometres
PRP	Pollution Reduction Program
QA	Quality assurance
RAPs	Registered Aboriginal Parties
REA	Refuse Emplacement Area
RFS	Rural Fire Service
RWTP	Recycled Water Treatment Plant
Resources Regulator	Department of Regional NSW – Resources Regulator
ROM	Run of Mine
SFZ	Strategic Fire Zones
SLR	SLR Consulting Australia Pty Ltd
SMF	Syntheci Mineral Fibre
TSS	Total Suspended Solids
Tahmoor Coal	Tahmoor Coal Pty Ltd
Tahmoor Mine	Tahmoor Coal Mine
TARP	Trigger Action Response Plan
TCCCC	Tahmoor Coal Community Consultative Committee
USTs	Underground storage tanks
VWP	Vibrating Wire Piezometer

Abbreviation	Definition
WLEP	Wollondilly Local Environment Plan
WAL	Water Access Licence
WMP	Water Management Plan
WTP	Water Treatment Plant

25 Appendices

Table 25-1 Appendix Details

Appendix Number	Details
Appendix 1	Noise Monitoring Locations
Appendix 2	Quarterly Noise Monitoring Assessment Results
Appendix 3	Air Quality Monitoring Points
Appendix 4	Licence Discharge and Overflow Monitoring Sites
Appendix 5	Dam Water Volumes
Appendix 6	Surface Water Management Schematic
Appendix 7	Surface Water Monitoring Graphs
Appendix 8	Pit-top and REA Groundwater Monitoring data
Appendix 9	Tahmoor Annual Rehabilitation monitoring 2023
Appendix 10	Closure Domains
Appendix 11	Tahmoor South Longwall schedule
Appendix 12	2023 Truck Timetable
Appendix 13	2023 Train Timetable
Appendix 14	Western Domain - Six Monthly Subsidence Impact Report 8 (Jan-June 2023)
Appendix 15	Western Domain - Six Monthly Subsidence Impact Report 9 (July - Dec 2023)
Appendix 16	Tahmoor South - Six Monthly Subsidence Impact Report 2 (Jan-June 2023)
Appendix 17	Tahmoor South - Six Monthly Subsidence Impact Report 3 (July-Dec 2023)