SIMEC

MEMBER OF GFG ALLIANCE

TAHMOOR SOUTH - SURFACE WATER MANAGEMENT PLAN

Tahmoor Coal

Contents

1 Introduction

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates Tahmoor Mine, an underground coal mine extracting coking coal which is an ingredient in the production of steel. The mine surface operations are located south of Tahmoor NSW, which is within the greater Sydney Basin - approximately 80 km southwest of Sydney. Tahmoor Mine is within the Wollondilly Shire Council (WSC) Local Government Area (LGA). Underground workings extend north under the town of Tahmoor and Picton with two ventilation shafts being located on the outskirts of Tahmoor. The location of Tahmoor Mine in the regional context is shown in Figure 1 and the location of the ventilation shafts is shown in Figure 2.

Tahmoor Mine surface facilities are situated adjacent to Remembrance Drive between the townships of Tahmoor and Bargo (see Figure 1). The Tahmoor Mine surface facilities are located on land owned by Tahmoor Coal with mining conducted under both crown and freehold property. Surface facilities at Tahmoor Mine include administration buildings and offices, a materials store, diesel tanks, electrical workshop, mechanical workshop, bathhouse, ventilation fan, Coal Handling Preparation Plant (CHPP), storage areas, run of mine stockpile and product stockpiles. A third party owned power station is also located on-site and utilises methane from the mines' gas drainage system to produce electricity. Extracted coal is processed on site prior to transportation via rail to the Port Kembla Coal Terminal. The general arrangement of the Tahmoor Mine surface facilities and Reject Emplacement Area (REA) are shown in Figure 2 and Figure 3 respectively.

An Environmental Impact Statement (EIS) was exhibited in early 2019 seeking approval for the extraction of up to 48 million tonnes (Mt) of ROM coal over a 13-year mine life. Tahmoor Coal subsequently revised the proposed mine design and submitted amended development applications on two occasions (in February and August 2020). In April 2021, Tahmoor Coal received Development Consent SSD 8445 (the Consent) for the Tahmoor South Project, which involves use of the existing surface infrastructure and the extension of underground longwall mining to the south of existing workings. The approved Project longwalls are shown as longwall (LW) S1A-S6A, previously referred to as LW101A-106A, and LWS1B-S6B, previously referred to as LW101B-106B, in Figure 1. Figure 1 also presents the proposed length of LWS3B and LWS4B pending Planning Secretary approval. The Project has consent to extract up to 4 Mtpa of ROM coal, with a total of up to 33 Mt of ROM coal extracted over a 10-year period until 31 December 2033.

Modification 1 to SSD 8445 (MOD 1), approved in July 2022, sought to extend the commissioning date of the Water Treatment Plant. Modification 2 to SSD 8445 (MOD 2), approved in June 2023, proposed the underground storage of brine in the historical Tahmoor North Western Domain mining area and the temporary storage of excess mine water in the historical Tahmoor North mining area.

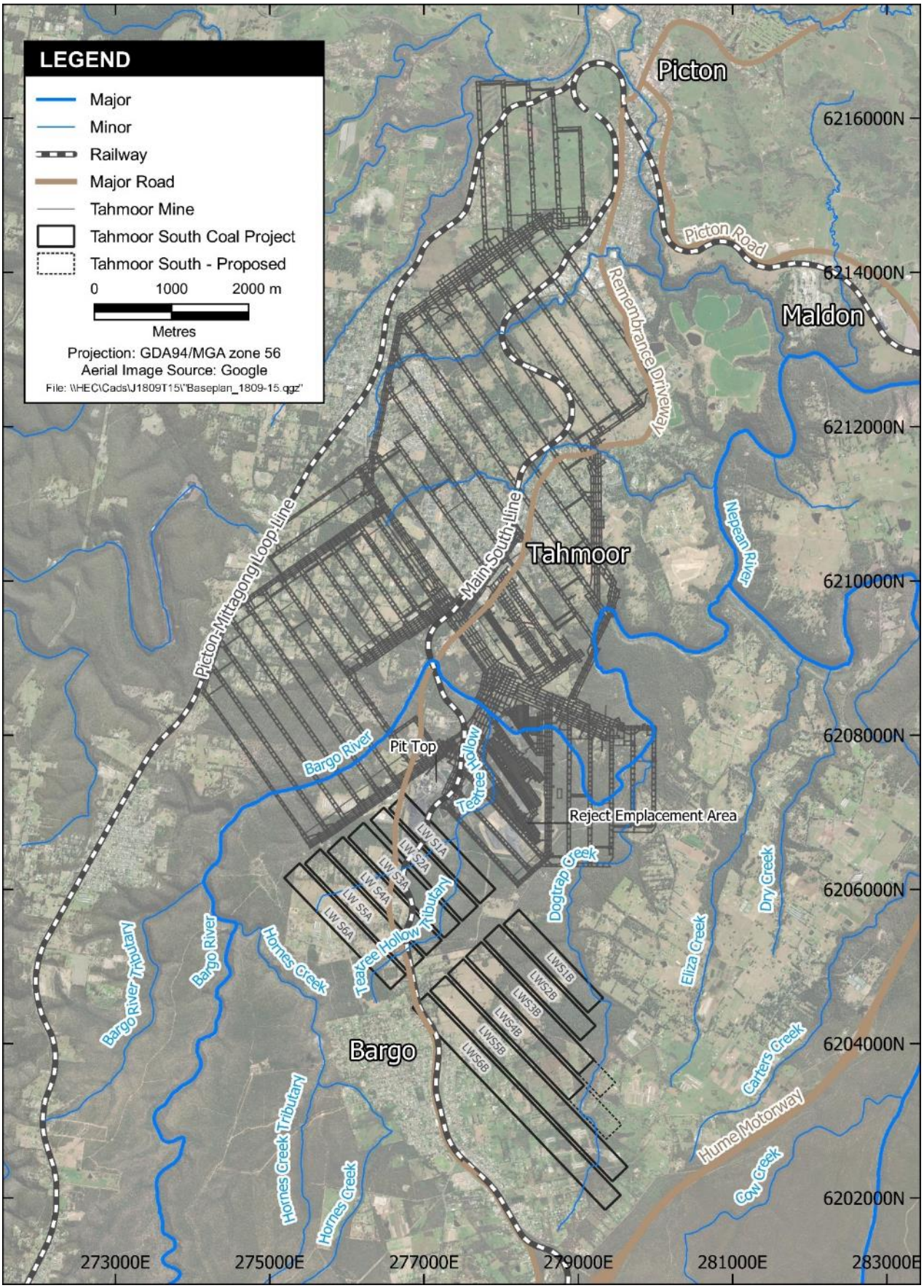


Figure 1 Project Location

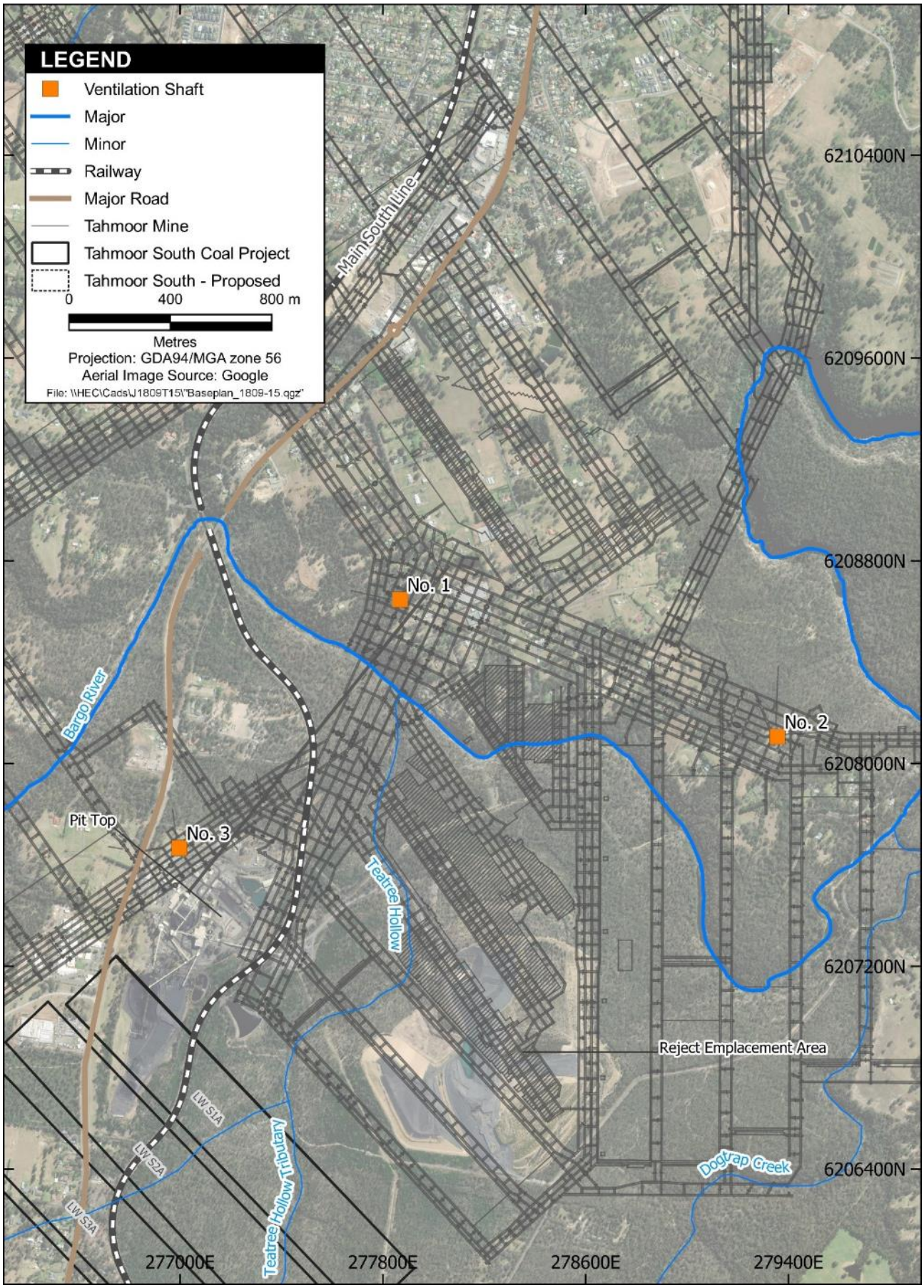


Figure 2 Ventilation Shaft Locations

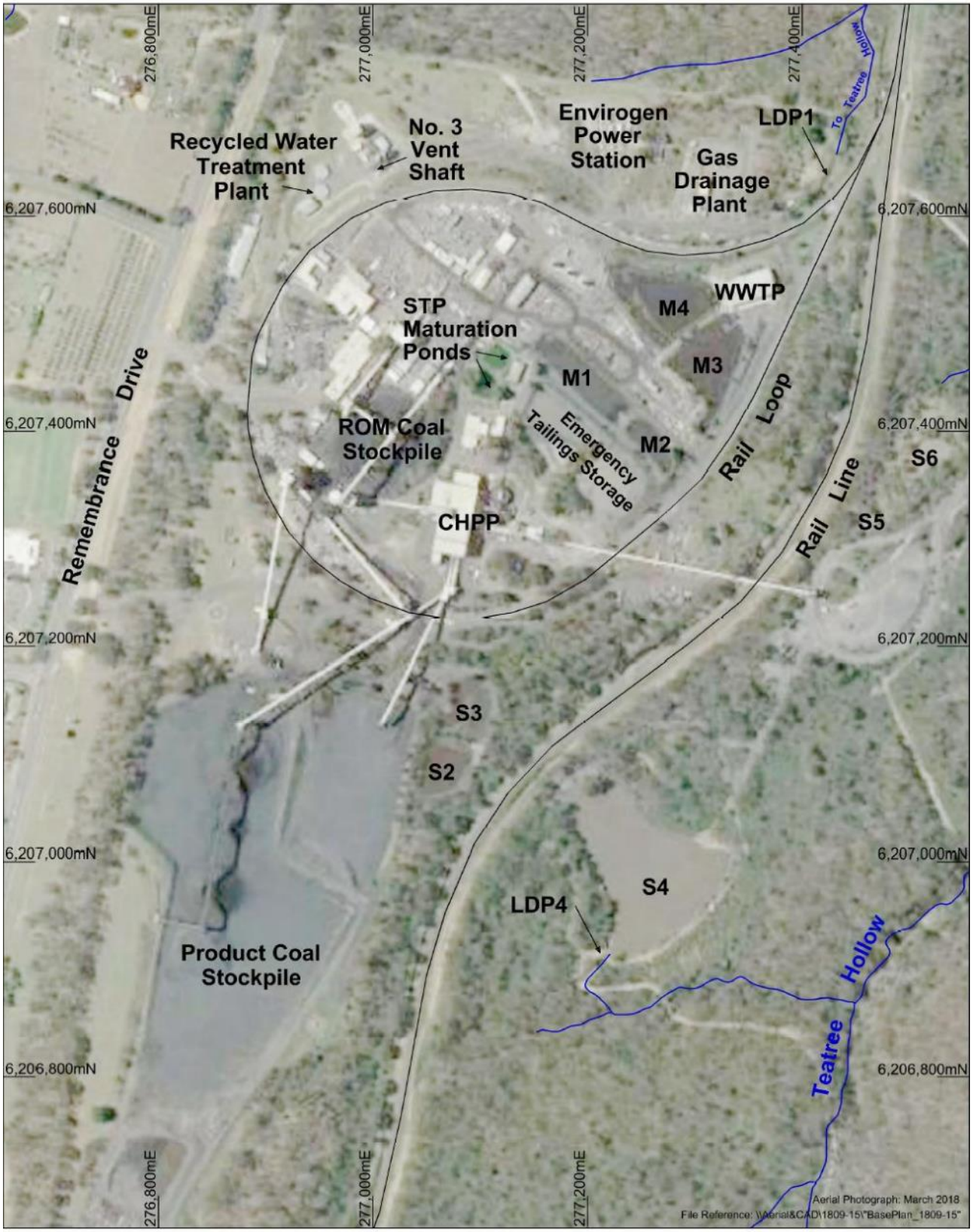


Figure 3 General Arrangement of Surface Facilities Area

Figure 4 Reject Emplacement Area

1.2 Purpose

The purpose of this Surface Water Management Plan (SWMP) is to provide a framework for Tahmoor Coal personnel to ensure that compliance is achieved with relevant internal and external regulatory requirements relating to surface water management at the Tahmoor Mine. The plan aims to ensure that impacts to surface water resources are controlled and managed within a structured framework.

This SWMP has been developed in accordance with the requirements of the Development Consent (SSD 8445) (the Consent) Condition B34, Schedule 2. The SWMP has been revised following approval of SSD 8445 MOD 2.

The SWMP relates specifically to the Tahmoor Mine surface facilities, including the REA, and broadly to the development of the Project.

Predicted subsidence and other mining related effects on surface water resources associated with the development of the Project is addressed in the LWS1A – S6A Extraction Plan Water Management Plan (WMP).

1.3 Scope

This SWMP includes management measures, monitoring requirements and Trigger Action Response Plans relating to:

- Surface water resources which may be impacted by the Project:
    - water quality,
    - water level and streamflow, and
    - morphology and channel stability.
- The Tahmoor Mine surface water management system.

2 Statutory Requirements and Legislation

2.1 Relevant Legislation

2.1.1 Water Management Act 2000

The NSW Department of Planning, Industry and Environment (DPE) – Water develops, assesses and recommends changes to water sharing/water resources plans and water management rules for regional water in NSW in accordance with the *Water Management Act 2000*. A primary objective of DPE – Water is the sustainable management and use of water resources, balancing environmental, social and economic considerations. DPE – Water has developed Water Sharing Plans (WSPs) for much of the State and these establish rules for sharing and trading water between the environment, town water supplies, basic landholder rights and commercial uses. The Natural Resources Access Regulator (NRAR) is an independent regulatory body established by DPE – Water and is responsible for compliance with and enforcement of the regulatory framework. The Tahmoor Mine is located within the Upper Nepean River Water Source which is regulated by the *Water Sharing Plan for Greater Metropolitan Region Unregulated River Water Sources*.

Water used in existing and on-going mining and coal processing operations will continue to be sourced from the underground operations (groundwater ingress and recycling of supply for mining operations) and from water captured within the existing pit top water management system. Some water is also supplied under agreement with Sydney Water.

2.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environmental Operations Act 1997* and the *Protection of the Environment Operations (General) Regulation 2009* set out the general obligations for environmental protection in NSW. The Tahmoor Mine operates in accordance with Environment Protection Licence (EPL) 1389.

2.2 Development Consent Conditions

In accordance with the Consent, Tahmoor Coal is required to prepare a Water Management Plan for the Tahmoor Mine. The requirements of the Water Management Plan are established by Condition B34 under Schedule 2 of the Consent.

The plan must:

a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
b) be prepared in consultation with DPE - Water and the Environment Protection Authority (EPA);
c) describe the measures to be implemented to ensure that Tahmoor Coal complies with the water management performance measures; and
d) utilise existing data from nearby mines and build on existing monitoring programs, where practicable.

2.2.1 Water Management Performance Measures

The water management performance measures specified in Condition B33 of the Consent are listed in Table 1 below. The performance measures have been/will be adhered to in the development and operation of the water management system for the Project, as described in this SWMP.

Table 1 Water Management Performance Measures

Feature	Performance Measure
Water management - general	• Maintain separation between clean and dirty (including both sediment-laden water and mine water) water management systems • Minimise the use of clean and potable water on site • Maximise water recycling, reuse and sharing opportunities to the extent that is reasonable and feasible • Maximise the capture and reuse of mine water and dirty water to meet operational demands for water to the extent that is reasonable and feasible • Minimise the use of make-up water from external sources • Design, install, operate and maintain water management systems in a proper and efficient manner • Minimise risks to the receiving environment and downstream water users
Aquatic and riparian ecosystems	• Maintain or improve baseline channel stability • Develop site-specific in-stream water quality objectives in accordance with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000)* and *Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)*
Erosion and sediment control works	• Design, install and maintain erosion and sediment controls in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction* including *Volume 1: Blue Book* (Landcom, 2004), *Volume 2A: Installation of Services* (DECC, 2008), *Volume 2C: Unsealed Roads* (DECC, 2008), *Volume 2D: Main Road Construction* (DECC, 2008) and *Volume 2E: Mines and Quarries* (DECC, 2008) • Design, install and maintain any new creek crossings generally in accordance with the *Fisheries NSW Policy* and *Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003). • Ensure all works on waterfront land are consistent with the guidance series for *Controlled Activities on Waterfront Land* (DPI Water, 2012)
Clean water diversions and storage infrastructure	• Design, install and maintain any new components of the clean water system to capture and convey the 100 year ARI flood • Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site
Sediment dams	• Design, install and/or maintain sediment dams to prevent off-site discharges to surface waters, except as may be permitted under condition B31 • Design, install and maintain sediment dams in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004) and *2E Mines and Quarries* (DECC, 2008) and the requirements under the POEO Act • Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water

Table 1 (Cont.) Water Management Performance Measures

Feature	Performance Measure
Above ground mine water storages	• Ensure adequate freeboards within all mine water storage dams at all times to minimise the risk of discharge to surface waters • New on-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and maintained, including being lined to comply with a permeability standard of < 1 x 10-9 m/s
Reject management	• Restrict emplacement of any reject material to the REA in a manner that is consistent with the EIS • Design and maintain tailings storage areas to prevent the movement of tailings seepage/leachate outside the REA
Chemical and hydrocarbon storage	• Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard

2.2.2 Surface Water Management Plan Conditions

This SWMP forms a component of the overarching Water Management Plan. The requirements of Condition B34 under Schedule 2 of the Consent specific to the SWMP are listed in Table 2. The section of this report in which the requirements have been addressed is also listed.

Table 2 Surface Water Management Plan Consent Conditions

Requirement	Where Addressed or Why not Addressed
Site water balance that includes details of:	Section 6 and Appendix D
• predicted annual inflows to and outflows from the site;	Appendix D details the site water and salt balance model which provides predictions of the annual inflows to and outflows from the site. A summary is provided in Section 6.
• sources and security of water supply for the life of the development (including authorised entitlements and licences);	Section 0 provides detail of the sources of water supply for the Tahmoor Mine. Section 3.5 details the Water Access Licences held by Tahmoor Coal.
• water storage capacity;	Table 14 of Section 0 lists the Tahmoor Mine water management storages and capacities.
• water use and management on the site, including any water stored underground in goaf areas of Tahmoor North Mine;	Section 0 provides detail of water use and management on the site.
• licensed discharge points and limits; and	Section 4.1.4 details the licenced discharge points and discharge limits.
• reporting procedures, including the annual preparation of a site water balance.	Section 10 describes the proposed reporting procedures.

Table 2 (Cont.) Surface Water Management Plan Consent Conditions

Requirement	Where Addressed or Why not Addressed
Salt balance that includes details of:	Appendix D details the site water and salt balance model. A summary is provided in Section 6.
• sources of saline material on the site;	Appendix D
• saline material and saline water management on the site;	Appendix D
• measures to minimise discharge of saline water from the site; and	Section 0 describes measures adopted for managing discharge of saline water from the site.
• reporting procedures, including the annual preparation of an updated salt balance.	Section 10 describes the reporting procedures.
Surface Water Management Plan that includes:	
• detailed baseline data on channel stability, water flows and water quality in the sections or parts of watercourses and/or water bodies potentially impacted by the development (including Teatree Hollow, Dogtrap Creek, Bargo River and all associated tributaries);	Section 3 describes the surface water resources within and adjacent to the Tahmoor Mine surface facilities. Section 4.2 presents baseline data on water flows and water quality.
• a detailed description of the surface water management system;	Section 5 provides a detailed description of the surface water management system.
• detailed plans, design objectives and performance criteria for water management infrastructure including:	Section 0 provides detail of the existing and proposed water management infrastructure including design objectives and performance criteria.
- any approved creek restoration works associated with the development;	N/A
- water run-off diversions and catch drains;	Diversion channels and collection drains are described in Section 5.
- erosion and sediment controls, including sediment dams;	Erosion and sediment control measures are described in the *Erosion and Sediment Control Plan.*
- any water storages, including mine water management systems;	Section 5 describes the Tahmoor Mine water management storages and water management system.
- water treatment plant required under the EPL;	Section 5.1.4 describes the Reverse Osmosis Wastewater Treatment Plant required under EPL 1389.
- compliance with the objectives for aquatic and riparian river systems set out in Table 4;	Section 4.2.3 lists the site specific guideline values for surface water quality.
- the sewage treatment plant; and	The sewage treatment plant is described in Section 5.1.2.
- reinstated drainage networks on rehabilitated areas of the site;	Section 7.1 describes the proposed progressive rehabilitation of the REA including drainage structures.

Table 2 (Cont.) Surface Water Management Plan Consent Conditions

Requirement	Where Addressed or Why not Addressed
• surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development for: - water supply for other water users; - downstream surface water flows and quality; - stream and riparian vegetation health; and - post-mining water pollution from rehabilitated areas of the site;	Section 9 describes the surface water performance criteria and Trigger Action Response Plans.
• a program to monitor and evaluate:	
- compliance with the relevant performance measures listed in Table 4 (Table 1 of the SWMP) and the performance criteria in this plan;	Section 8 describes the surface water monitoring program.
- controlled and uncontrolled discharges and seepage/leachate from the site;	
- impacts on water supply for other water users;	
- surface water inflows, outflows and storage volumes, to inform the Site Water Balance;	Section 8.5 describes the water management system monitoring program.
- the effectiveness of the surface water management system, and the measures in the Erosion and Sediment Control Plan;	Monitoring of erosion and sediment control measures is described in the *Erosion and Sediment Control Plan*.
- reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results;	Section 10 describes the Tahmoor Coal reporting procedures.
- a trigger action response plan to respond to any exceedances of the performance measures in Table 5, and to repair, mitigate and/or offset any adverse surface water impacts of the development, including measures to provide compensatory water supply to affected water users under condition B26;	Section 9 describes the surface water performance criteria and Trigger Action Response Plans. Section 9.4.3 describes measures to provide compensatory water supply to affected water users.
• a program to periodically update and validate the stream flow water balance model;	The Project does not involve the development of a stream flow water balance model.
Long-term water management strategy for the whole Tahmoor mining complex that**:**	Section 7 describes the development of the long-term water management strategy.
• includes detailed modelling of the potential water impacts of the mining complex as water levels recover following the cessation of mining operations within the complex and rehabilitation of these operations;	Section 7.3 describes the updated numerical groundwater modelling.
• identifies the measures that would be implemented at each of these mining operations to minimise any adverse water impacts;	Section 9 describes the surface water performance criteria and Trigger Action Response Plans.
• includes a water licencing strategy for the ongoing take of any water over time; and	Section 7.4 describes the water licencing strategy for the Project.
• includes a program to monitor and review the water impacts of the mining complex over time.	Section 8 presents a program to monitor relevant water resources prior to, during and post completion of mining activities.

2.2.3 Management Plan Requirements

Consent Condition E5 outlines the general requirements for all management plans. Table 3 outlines the requirements under this condition and identifies where these requirements have been addressed.

Table 3 Management Plan Requirements

Condition Reference	Condition	Where Addressed
E5	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
(a)	a summary of relevant background or baseline data;	Section 3 and Section 4
(b)	details of:	
(b) (i)	the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(b) (ii)	any relevant limits or performance measures and criteria; and	Section 2.2.1
(b) (iii)	the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 9 and Appendix A
(c)	any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Section 2.3
(d)	a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 5, Section 8, Section 9
(e)	a program to monitor and report on the:	
(e) (i)	impacts and environmental performance of the development; and	Section 8
(e) (ii)	effectiveness of the management measures set out pursuant to condition E5(d);	Section 9.7
(f)	a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 9.5
(g)	a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 9.6, Section 11
(h)	a protocol for managing and reporting any:	
(h) (i)	incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	Section 10.2 and Appendix A
(h) (ii)	complaint; or	Section 10.2.3
(h) (iii)	failure to comply with other statutory requirements;	N/A
(i)	public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 11.3
(j)	a protocol for periodic review of the plan.	Section 11.2

2.3 EIS Commitments

Condition A2(g) of the Consent requires that the Project is carried out generally in accordance with the EIS. The specific commitments made in the EIS which are relevant to this SWMP, and have not been specifically defined in the Consent, are listed in Table 4. The section of this report in which the requirements have been addressed is also listed.

Table 4 EIS Commitments Relevant to this SWMP

Requirement	Where Addressed or Why not Addressed
Surface Water	
A stream flow gauging station would be implemented at Teatree Hollow, downstream of the edge of the longwall and upstream of Licensed Discharge Point (LDP) 1.	Section 8 describes the water monitoring program.
Additional water level monitoring would be implemented to establish baseline water level data to enable the assessment of potential impacts to pool water levels.	
Enhanced low flow control weirs would be established at the existing gauging station at Dogtrap Creek and the proposed gauging station at Teatree Hollow to support the generation of reliable continuous flow data (including reliable low flow data) at these stations.	
A water quality monitoring site would be established on the Bargo River downstream of the confluence with Teatree Hollow and upstream of SW14 to increase the spatial representation of water quality sites downstream of LDP1.	
Geomorphology	
A geomorphology survey (baseline and post mining) of waterways overlying each longwall	A baseline geomorphology survey was conducted by Fluvial Systems in 2013 with key findings documented in Section 3. A post mining geomorphology survey will be undertaken as described in Section 8.
Pre, during and post-mining photographic surveys and visual inspections of geomorphological features for each longwall	Section 8.2.4 and Section 8.2.5 describes the monitoring of geomorphological features, headwater locations and knickpoint formation.
Annual catchment survey at 10 headwater photographic locations to monitor mining-induced subsidence impacts of the Project over time	
Monitoring of knickpoint formation during mining of each longwall and appropriate controls to prevent knickpoint formation	

2.4 Consultation

2.4.1 Internal Stakeholder Communication

Internal stakeholders include employees, contractors and visitors of Tahmoor Coal. *TAH-HSEC-00119-Communication and Engagement Procedure* has been developed to include the following:

a) Methods of communication between internal stakeholders;
b) Types of information that is communicated between internal stakeholders;
c) Responsibilities for communication of information to internal stakeholders; and
d) Review of communication methods, including the consideration of feedback to / from internal stakeholders.

2.4.2 External Stakeholder Communication

External stakeholders include neighbours and the local/regional community, local council, state and federal government agencies and regulators, and press/media. Any external communications relating to water management will be conducted in accordance with Tahmoor Coal's standard communications procedures. External stakeholders are identified in accordance with the following:

- *TAH-HSEC-00031 – Community Development Plan; and*
- *TAH-HSEC-00039 – Stakeholder Engagement Plan.*

External stakeholder communication is undertaken in accordance with:

- *TAH-HSEC-00039 – Stakeholder Engagement Plan; and*
- *TAH-HSEC-00119 – Communication and Engagement Procedure.*

These documents include information on the following topics:

a) Methods of communication to external stakeholders.
b) Types of information that is communicated between external stakeholders.
c) Responsibilities for communication of information to external stakeholders.
d) Review of communication methods, including the consideration of feedback to/from external stakeholders.

A key objective of *TAH-HSEC-00119 - Communication and Engagement Procedure* is to maintain positive relationships established with the local community and other external stakeholders.

2.4.3 Consultation to Date

A draft version of this SWMP was distributed to the following stakeholders for review and feedback:

1. *Department of Planning, Industry and Environment (DPE) - Water*
2. *Environment Protection Agency (EPA)*

A summary of the consultation outcomes is presented in Table 4 below.

Table 5 Stakeholder Consultation

Consulted Parties	Consultation Conducted	Outcomes of Consultation
DPE - Water	Draft SWMP provided to DPE – Water and EPA 14 December 2021	Comments received 19 January 2022 and actioned as documented in Appendix E
EPA		Comments received 22 December 2021 and actioned as documented in Appendix E
DPE - Water	Final Rev 0 SWMP provided to DPE 31/1/2021	Comments received 14 February 2022 and actioned as documented in Appendix E

3 Surface Water Resources

3.1 Regional Settings

Tahmoor Mine is located within the Bargo River catchment. From its headwaters near the townships of Hill Top and Yerrinbool, the Bargo River flows in a generally north-easterly direction through incised valleys and gorges to its confluence with the Nepean River (refer Figure 5).

The headwaters of the Nepean River rise in the coastal ranges to the south of Tahmoor Mine. Flows in the Nepean River near Tahmoor are highly regulated by the Upper Nepean Water Supply Scheme, operated by WaterNSW, which incorporates four major water supply dams on the Cataract, Cordeaux, Avon and Nepean Rivers. Releases from the Cordeaux, Avon and Nepean Dams are made to enable withdrawal for water supply purposes from the Pheasants Nest Weir located further downstream on the Nepean River. The Nepean Dam is situated some 18 km upstream of the Bargo River confluence, while the Pheasants Nest Weir is located approximately 7 km upstream of the confluence. Flows in the Nepean River near and downstream of the Project area (downstream of the Pheasants Nest Weir) are not part of a WaterNSW Drinking Water Catchment Area.

The Nepean River flows into the Warragamba River near Wallacia at which point it is referred to as the Hawkesbury-Nepean River. The Hawkesbury-Nepean catchment is one of the largest coastal catchments in NSW with an area of some 21,400 km^2 from its mouth in Broken Bay on the northern side of the Sydney Metropolitan area.

3.2 Local Surface Water Resources

The Project is located predominantly within the Teatree Hollow and Dogtrap Creek sub-catchments of the Bargo River catchment (refer Figure 5). Teatree Hollow and a third order[1] stream known as Teatree Hollow tributary overlie the approved LWS1A-S6A while Dogtrap Creek and its tributaries overlie the approved LWS1B-S6B (refer Figure 6 and Figure 7). Teatree Hollow and Dogtrap Creek flow generally north-northeast toward the Bargo River, with Teatree Hollow traversing bushland between the Tahmoor Mine surface facilities and the Reject Emplacement Area (REA) and Dogtrap Creek traversing predominantly bushland to the east of the REA (refer Figure 6 and Figure 7). The lower reaches of Tea Tree Hollow, Dogtrap Creek and the Bargo River have, to varying degrees, experienced subsidence-related effects due to historical mining operations at the Tahmoor Mine.

3.2.1 Bargo River

The Bargo River catchment area is approximately 130 square kilometres (km^2) at its confluence with the Nepean River. The Bargo River has intermittent flow in its upstream reaches which, to some degree, are regulated by the Picton Weir[2] which is located approximately 14 km upstream of the Nepean River confluence. Downstream of the Tahmoor Mine pit top (i.e. downstream of the Teatree Hollow confluence) flow is perennial due to persistent licensed discharges from Tahmoor Mine.

The lower 4 kilometres (km) of the river pass through the Bargo River Gorge, which is characterized by steep rock faces up to 110 m high. The river consists of a sequence of pools, glides and rock bars across sandstone bedrock, with occasional boulder fields and cobblestone riffles. The Bargo River flows into the Nepean River approximately 9 km downstream of the Teatree Hollow confluence.

[1] Strahler stream order classification scheme (Strahler, 1952).

[2] The weir was constructed in the late 19th century to supply the township of Bargo, is now heavily silted and no longer in use.

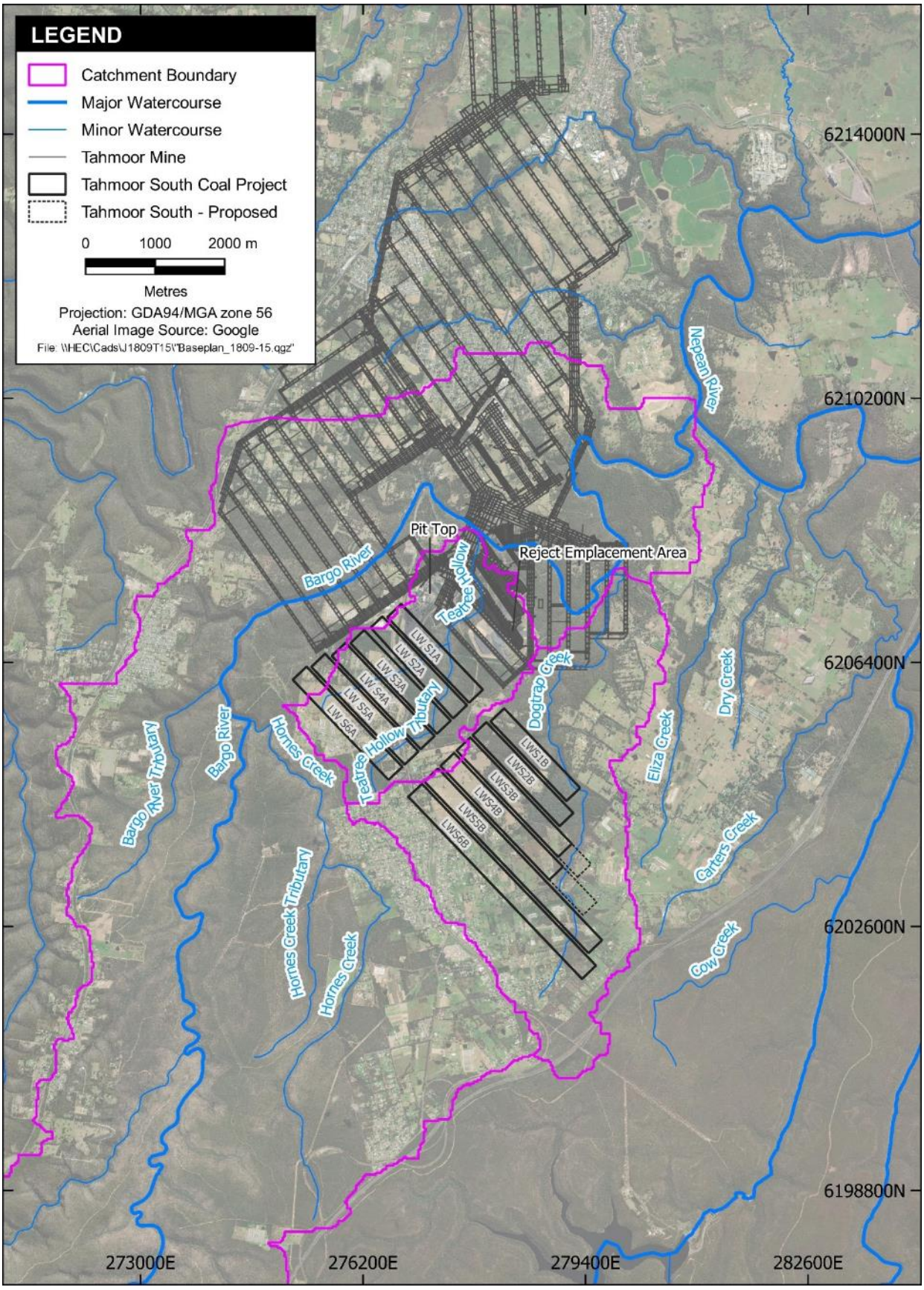
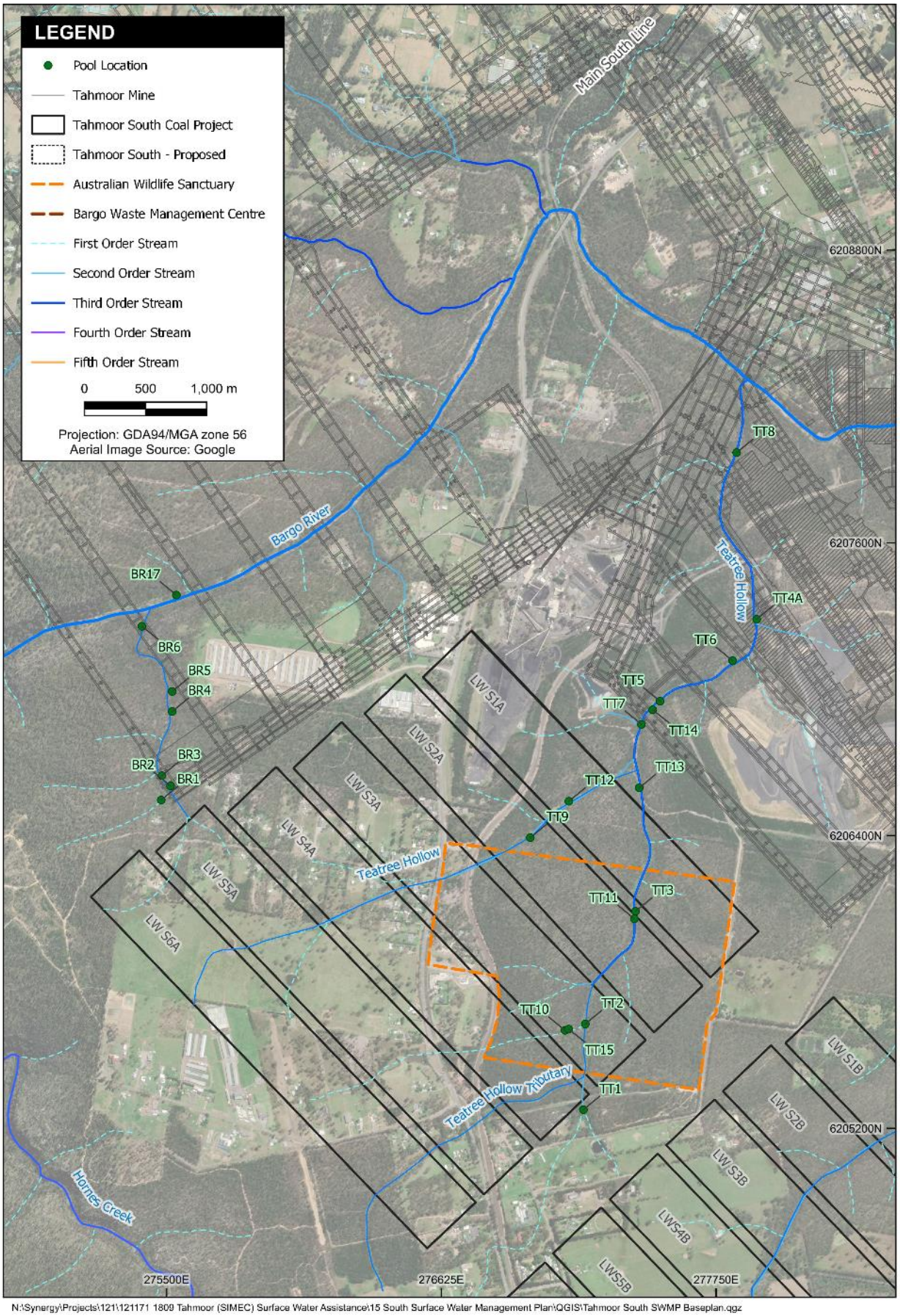
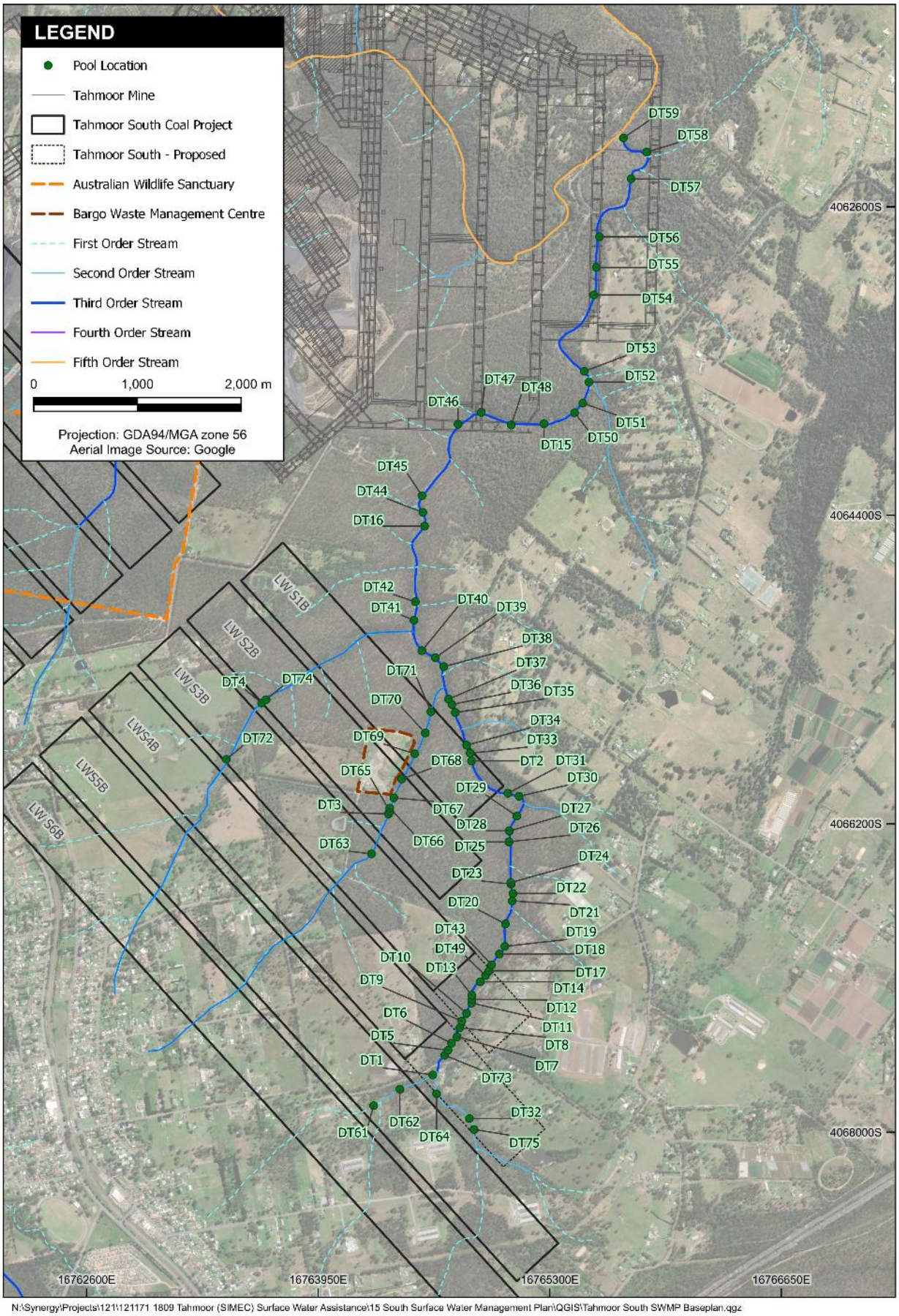


Figure 5 Surface Water Systems



N:\Synergy\Projects\121\121171 1809 Tahmoor (SIMEC) Surface Water Assistance\15 South Surface Water Management Plan\QGIS\Tahmoor South SWMP Baseplan.qgz

Figure 6 Teatree Hollow, Teatree Hollow Tributary and Bargo River Tributary Pool Locations



N:\Synergy\Projects\121\121171 1809 Tahmoor (SIMEC) Surface Water Assistance\15 South Surface Water Management Plan\QGIS\Tahmoor South SWMP Baseplan.qgz

Figure 7 Dogtrap Creek and Dogtrap Creek Tributaries Pool Locations

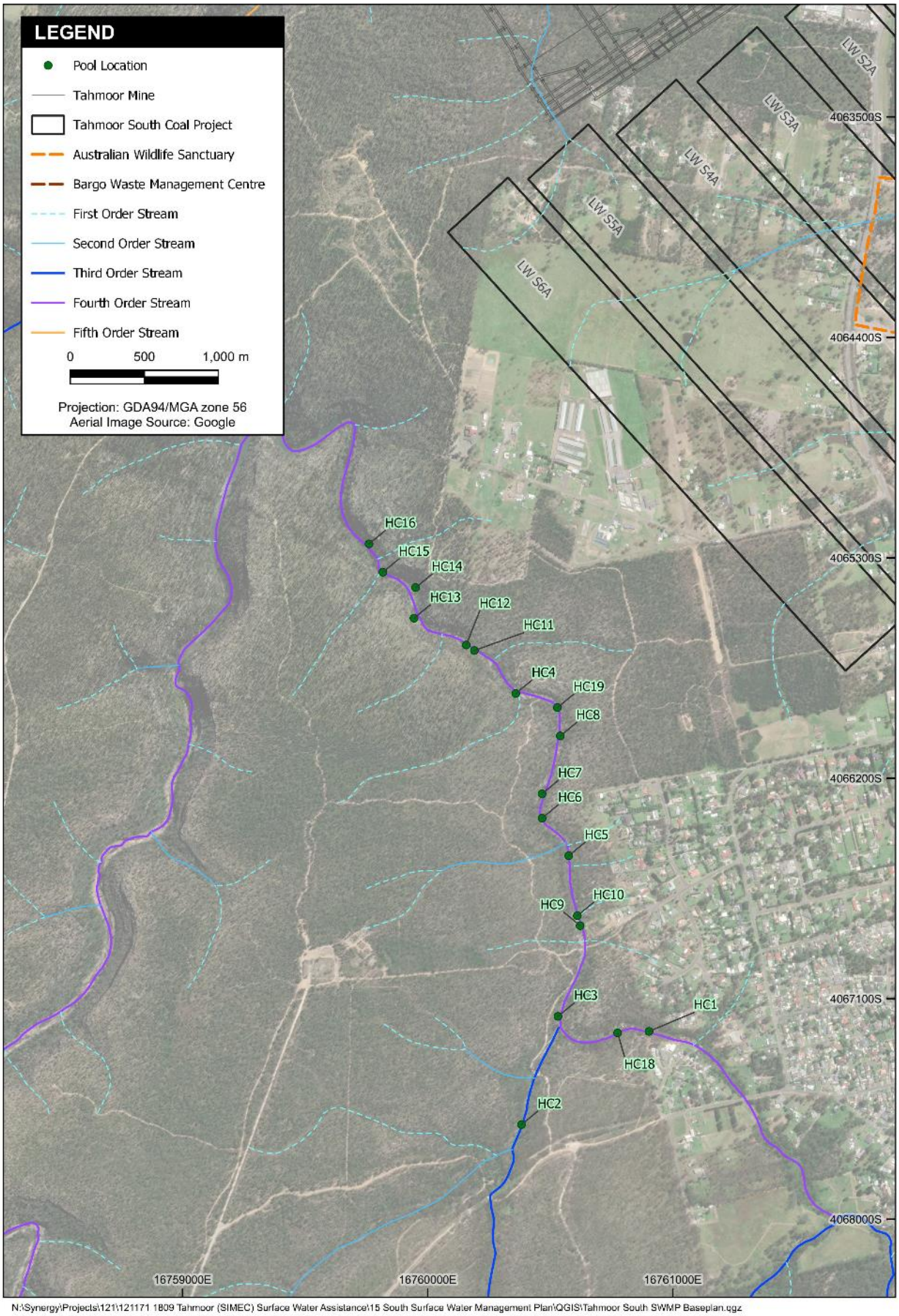


Figure 8 Hornes Creek Pool Locations

The headwaters of a second order tributary of the Bargo River overlie the western edge of the approved LWS5A (refer Figure 6). Rock slabs and bedrock outcrop were mapped in the mid to lower reach of the tributary and a total of 6 pools were identified with the dominant pool control comprising boulders (Fluvial Systems, 2013). Predominantly hard (likely to be fixed) knickpoints[3] of varying dimensions were observed in the Bargo River tributary (Fluvial Systems, 2013). The baseline geomorphology survey identified that the Bargo River tributary was generally in good geomorphic condition (i.e. essentially natural with intact form and process) (Fluvial Systems, 2013). Sites where the redirection of surface flow to the subsurface was observed, presumed to be associated with historical mining-induced bed fracturing, were classified as having moderate geomorphic condition (Fluvial Systems, 2013).

3.2.2 Teatree Hollow

Teatree Hollow has its headwaters in the northern part of the Bargo Township, above the approved LWS1A-S6A and between the existing Tahmoor Mine surface facilities and REA to the Bargo River. Teatree Hollow is a third order stream from the northern boundary of the approved LWS1A to the confluence with the Bargo River and has a total catchment area of approximately 6.8 km^2. A third order tributary joins with Teatree Hollow at the eastern edge of the approved LWS1A (refer Figure 6).

The baseline geomorphology survey (Fluvial Systems, 2013) identified that the upper to mid reach of Teatree Hollow and the mid to lower reach of Teatree Hollow Tributary were predominantly in good geomorphic condition while the mid to lower reach of Teatree Hollow and the upper reach of Teatree Hollow Tributary were predominantly in moderate geomorphic condition. The sites of moderate geomorphic condition related to minor culvert or track crossings, low riparian vegetation cover or discharge from the LDPs (Fluvial Systems, 2013). The upper reaches of Teatree Hollow and Teatree Hollow Tributary were characterised by a low relief landscape, with a dominant bed material of mud (cohesive clay/silt/sand) and notable grass coverage (Fluvial Systems, 2013). In the mid to lower reaches, the landscape was characterised as high relief with dominant bed material of mud, sand, boulders and/or exposed bedrock and little low flow channel grass coverage.

Exposed bedrock comprising rock slabs, rock bars and bedrock outcrop, were mapped in the upper reaches of Teatree Hollow Tributary and in the mid to lower reaches of Teatree Hollow. A total of 15 pools were mapped in Teatree Hollow and Teatree Hollow Tributary with the dominant pool control comprising boulders or cohesive clay/silt/sand high point (Fluvial Systems, 2013).

Hard (likely to be fixed) and soft (likely to be mobile) knickpoints of varying dimensions were mapped in Teatree Hollow and Teatree Hollow Tributary (Fluvial Systems, 2013). Soft knickpoints, with the potential to impact channel stability, were identified in the mid to lower reaches of Teatree Hollow and the upper to mid reach of Teatree Hollow Tributary. Two notable soft knickpoints were identified in Teatree Hollow, one located just downstream of pool TT13 and one located just downstream of pool TT5 (refer Figure 6). The deeply incised section downstream of pool TT5 extended for 130 m and comprised a bed sand deposit which was identified as rare for the area surveyed (Fluvial Systems, 2013).

3.2.3 Dogtrap Creek

Dogtrap Creek has its headwaters in the southern part of the Bargo Township, above the approved LWS1B-S6B and east of the REA to the Bargo River. Dogtrap Creek is a third order stream from approved LWS4B to the confluence with the Bargo River and has a total catchment area of approximately 13.6 km^2. Two second order tributaries join with Dogtrap Creek at the northern edge of approved LWS1B (refer Figure 7).

The outcomes of the geomorphology survey concluded that the majority of Dogtrap Creek and its tributaries were in good geomorphic condition with some sites in the upper reaches of Dogtrap Creek and

[3] A knickpoint is a part of a watercourse where there is a steep fall in channel bed elevation and, as such, may be susceptible to erosion and channel instability.

its tributaries characterised as moderate geomorphic condition. The sites of moderate geomorphic condition related to minor culverts, track crossings or low riparian vegetation cover. The upper reaches of Dogtrap Creek and its tributaries were characterised by a low relief landscape, with dominant bed material of mud or exposed bedrock and moderate grass coverage (Fluvial Systems, 2013). In the mid to lower reaches, the landscape was characterised as high relief with bed material predominantly comprising boulders and/or exposed bedrock and little low flow channel grass coverage. The frequency of bedrock features was found to be high in Dogtrap Creek comprising rock slabs, rock bars and exposed bedrock (Fluvial Systems, 2013). A total of 74 pools were mapped in Dogtrap Creek and the two main tributaries with the dominant pool controls comprising rockbars, boulders or gravel, cobble or sand bars (Fluvial Systems, 2013).

Predominantly hard knickpoints were mapped in the Dogtrap Creek catchment with some soft knickpoints mapped in the upper reaches of Dogtrap Creek and its tributaries. An isolated section of incised gully was observed in the upper reach of Dogtrap Creek approximately 100 m upstream of pool DT1 (refer Figure 7). The drainage line was incised to 1.2 m deep and two soft knickpoints were present in the main channel of Dogtrap Creek. A bank gully network had developed into the surrounding hillslope for a distance of approximately 50 m to the west of Dogtrap Creek (Fluvial Systems, 2013).

3.3 Hornes Creek

Hornes Creek catchment is located to the south-southwest of LW S1A-S6A. The catchment area of Hornes Creek is approximately 19.3 km^2 which comprises predominantly bushland, rural-residential area and residential area associated with the Bargo township. Hornes Creek is a fourth order stream to the south-west of LWS1A-S6A and at its confluence with the Bargo River (Fluvial Systems, 2013).

The baseline geomorphology survey (Fluvial Systems, 2013) identified that Hornes Creek was generally in good geomorphic condition. A total of 16 pools were mapped in Hornes Creek to the south-west of LWS1A-S6B with the dominant pool control comprising boulders or bedrock outcrop (refer Figure 8 for pool locations). Significant bedrock features comprised rock slabs and rockbars.

3.4 Licensed Discharge Points

In accordance with EPL 1389, Tahmoor Coal is licensed to discharge from one licenced discharge point (LDP) and three licenced overflow points (LOPs). The locations of the LDP and LOPs are shown in Figure 9 and summarised in Table 6.

Table 6 EPL 1389 Licenced Discharge Points

Discharge/Overflow Point	Type of Discharge Point	Location Description	Discharge Limit
LDP1	Discharge to waters Discharge quality monitoring Volume monitoring	Main water discharge - discharge drain located downstream of the final mine water treatment dam (dam M4)	15,500 kilolitres per day during low rainfall conditions Unlimited during wet weather conditions*†
LOP3	Discharge to waters	Overflow from sediment dam S9	Unlimited during wet weather conditions*†
LOP4		Overflow from sediment dam S4	
LOP5		Overflow from sediment dam S8	

* Defined as more than 10 millimetres (mm) rainfall within a 24 hour period.

† Provided that all practical measures are taken to reduce potential water quality impacts.

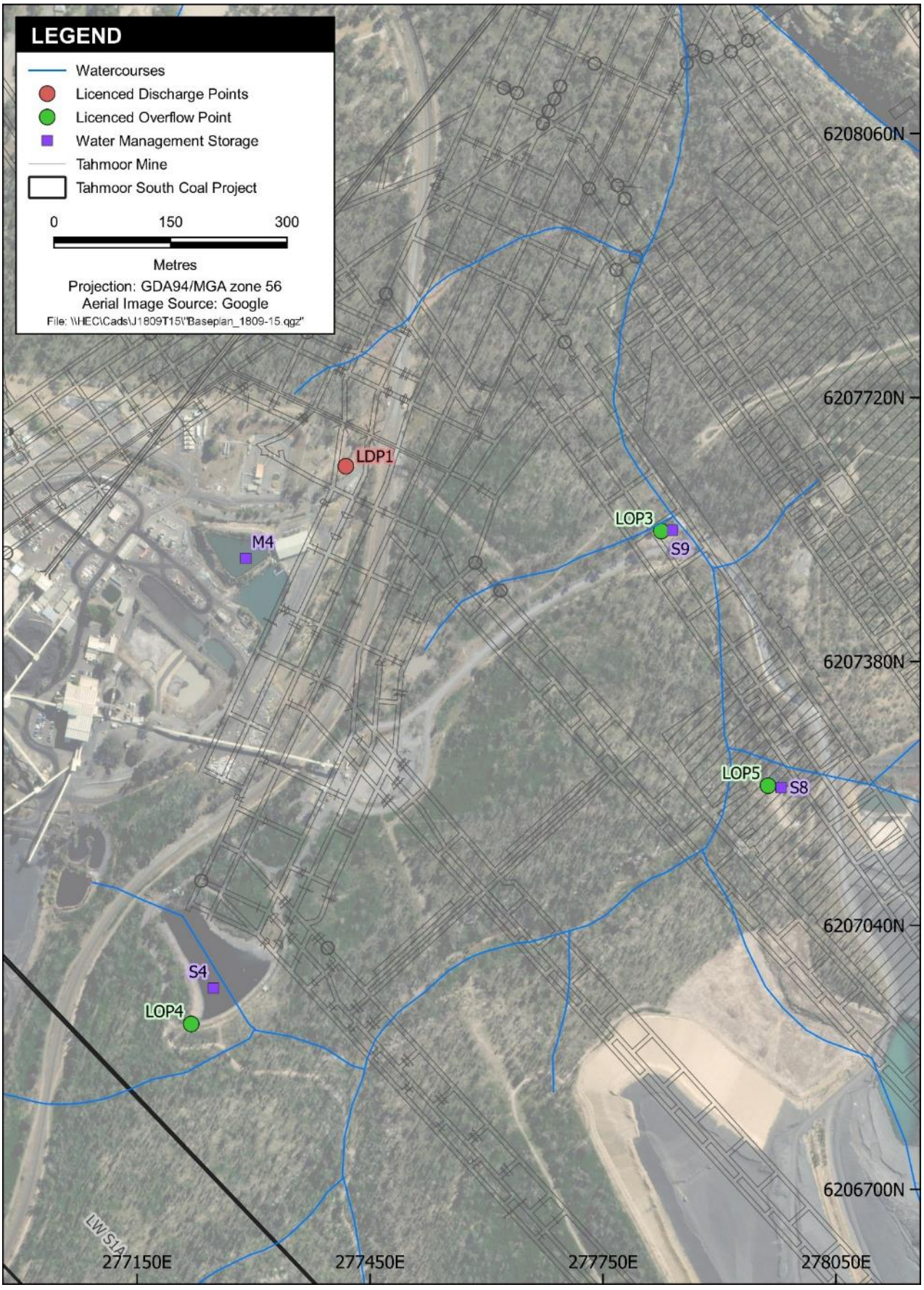


Figure 9 Tahmoor Mine Licenced Discharge Points

Water quality discharge limits for LDP1, as specified in EPL 1389, are listed in Table 7.

Table 7 EPL 1389 Licenced Discharge Point 1 Water Quality Limits

Constituent	Discharge Limit
Aluminium (µg/L)	110
Arsenic (µg/L)	200
Barium (µg/L)	6,440
Copper (µg/L)	5
Electrical Conductivity (µS/cm)	2,600
Enterococci (colony forming units per 100 ml)	1,700
Nickel (µg/L)	200
Total Nitrogen (mg/L)	8
pH	6.5-9
Total suspended solids (mg/L)	30
Turbidity (NTU)	150
Zinc (µg/L)	300

3.5 Water Access Licences

The Tahmoor Coal surface facilities are located within the Maldon Weir Management Zone of the Upper Nepean and Upstream Warragamba Water Source which is regulated in accordance with the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011*. The NSW Water Register[4] indicates that there are 24 Water Access Licences (WALs) for the Maldon Weir Management Zone with a total share component of 669 ML for the period July 2020 to June 2021 (inclusive).

Tahmoor Coal currently holds a WAL for the Sydney Basin Nepean Groundwater Source which is regulated in accordance with the *Greater Metropolitan Region Groundwater Sources Water Sharing Plan*. Additionally, Tahmoor Coal holds WALs for a number of Upper Nepean and Upstream Warragamba Water Source management zones as listed in Table 8.

[4] https://waterregister.waternsw.com.au accessed October 2021.

Table 8 Tahmoor Coal Water Access Licences

WAL Number	Water Sharing Plan	Water Source	Management Zone	Entitlement	Category
36442	Greater Metropolitan Region Groundwater Sources WSP	Sydney Basin Nepean Groundwater Source	Nepean (2)	1,642 units	Aquifer
25777	Greater Metropolitan Region Unregulated River Water Sources WSP	Upper Nepean and Upstream Warragamba Water Source	Maldon Weir	5 ML	Unregulated river
43572			Stonequarry Creek	16 ML	
43656			Maldon Weir	25 ML	
SWC839757			Maldon Weir	11 ML	

4 Baseline Surface Water Monitoring

4.1 Surface Water Monitoring Program

Tahmoor Coal has implemented an extensive surface water monitoring program within and adjacent to the Project area. The Tahmoor Mine surface water monitoring program includes water level, water quality and streamflow monitoring and was developed generally in accordance with a Before-After-Control-Impact (BACI) framework. The monitoring program aims to develop a baseline (before) dataset for a range of surface water features and to assess operational and post-mining (after) impacts through the monitoring of reference (control) and potential impact sites (impact).

The monitoring sites are characterised as follows:

- Reference site: a site which is to provide reference data against which potential future impacts associated with the Project activities could be compared; or
- Baseline/potential impact site: a site which is to be used to compare conditions before, during and after the Project activities.

The locations of the monitoring sites relevant to the Project and the Tahmoor Mine surface facilities are shown in Figure 10 and the site details summarised in Table 9. The monitoring site nomenclature is associated with the watercourse and pool number (i.e. TT12 is pool 12 on Teatree Hollow) and the type of monitoring to be implemented: water quality (Q), automated (continuous) and manual water level monitoring (La), monthly manual water level measurements only (Lm), rating relationship derived streamflow (R) and streamflow gauging station (F).

4.1.1 Water Level Monitoring

Surface water level data has been monitored continuously and downloaded monthly during the monitoring periods specified in Table 9. Monthly manual water level measurements have also been recorded at each site at the time of data download. Additionally, visual inspection records of the presence of water at each monitoring site and flow at the monitoring site have been recorded monthly.

4.1.2 Water Quality Monitoring

Water quality monitoring has been undertaken monthly at the sites listed in Table 9 and included the following:

- Field monitoring: pH, electrical conductivity (EC), temperature, dissolved oxygen (DO) and oxidation-reduction potential (ORP).
- Laboratory monitoring: pH, EC, total dissolved solids (TDS), major cations[5], sulphate, alkalinity, chloride, selected dissolved metals[6], selected total metals[7], total kjeldahl nitrogen, total nitrogen, total phosphorus, total cations and total anions.

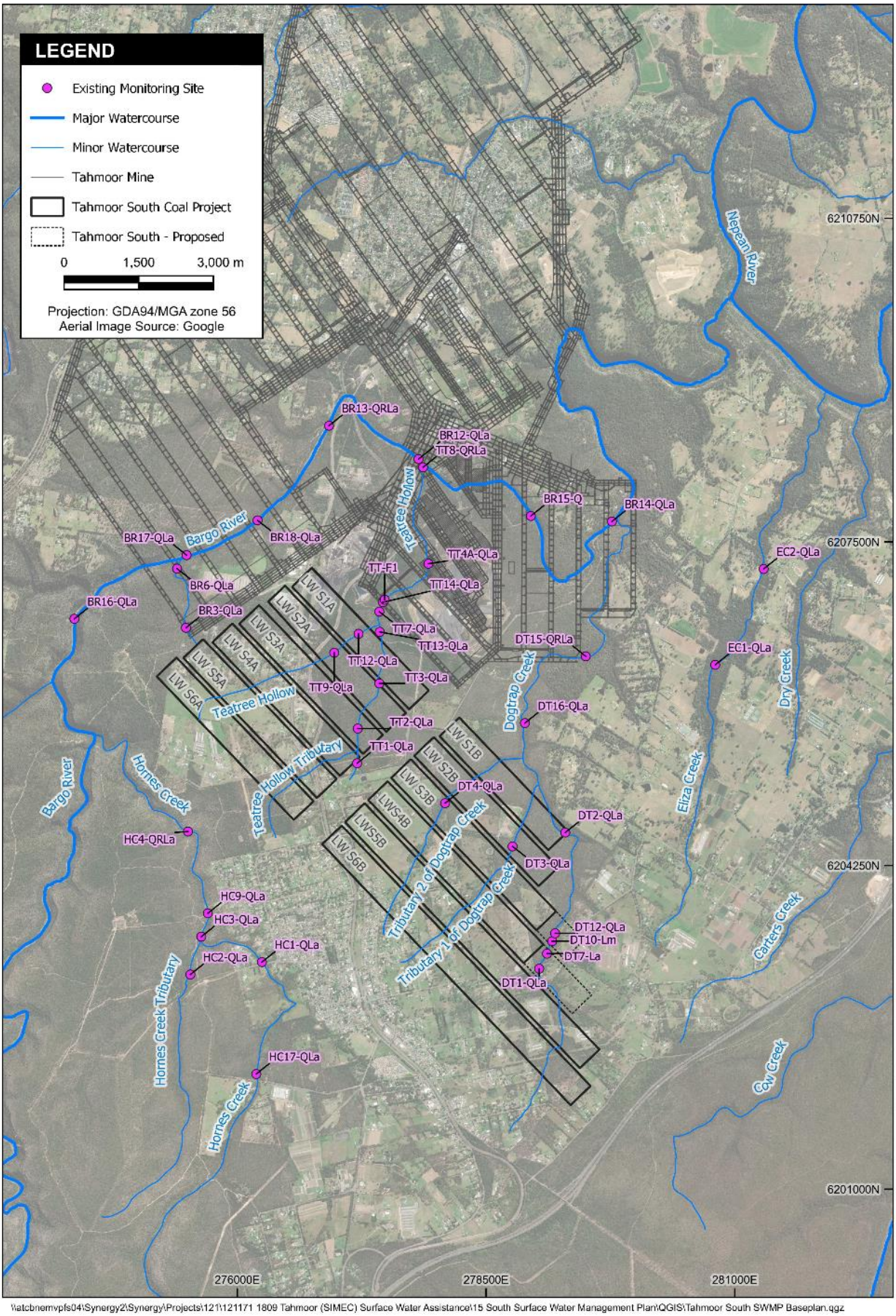
4.1.3 Streamflow Monitoring

Streamflow rating relationships have been derived for specific sites on the Bargo River, Dogtrap Creek, Teatree Hollow and Hornes Creek. A streamflow rating is a relationship specific to each gauging station site which enables flow rate to be derived from recorded water level at that particular site location. A period of time is normally required following station establishment to develop a rating relationship. Manual flow measurements (gaugings) were undertaken using an OSS-PC1 'Pygmy' current meter which was calibrated annually and serviced weekly. All gaugings conformed to the relevant Australian Standard (AS 3778.3.1-2001). For specific sites, the ratings were extended to high flows by theoretical means using

[5] Calcium, magnesium, sodium and potassium.
[6] Aluminium, arsenic, barium, copper, iron, lead, lithium, manganese, nickel, selenium, strontium and zinc.
[7] Aluminium, arsenic, barium, cadmium, copper, iron, lead, lithium, manganese, nickel, selenium, strontium and zinc.

surveyed stream cross-sections. The streamflow rating relationship for BR13-QRLa and HC4-QRLa were recently updated following review of the streamflow rating relationship and incorporating additional manual streamflow gauging measurements.

A streamflow gauging station has been constructed on Teatree Hollow (TT-F1). The gauging station is comprised of a concrete and steel v-notch weir to enable accurate and continuous low flow monitoring from commissioning.



\\atcbnemvpfs04\Synergy2\Synergy\Projects\121\121171 1809 Tahmoor (SIMEC) Surface Water Assistance\15 South Surface Water Management Plan\QGIS\Tahmoor South SWMP Baseplan.qgz

Figure 10 **Existing Surface Water Monitoring Sites**

Table 9 Surface Water Monitoring Sites

Site Name	Monitoring Type	Period of Monitoring
Bargo River Catchment		
BR3-QLa	Water level and water quality	Sept 2022-current (Q & La)
BR6-QLa	Water level and water quality	Sept 2022-current (Q & La)
BR13-QRLa	Water level, streamflow and water quality	Apr 2012 – Jun 2015 (Q) Feb 2019 – current (Q) Mar 2013 – current (La & R)
BR12-QLa	Water level and water quality	Jan 2019 – current (Q & La)
BR14-QLa	Water level and water quality	Apr 2012 – Jun 2015 (Q) Feb 2019 – current (Q) Mar 2013 – current (La)
BR15-Q	Water quality	July 2022 - current (Q & La)
BR16-QLa	Water level and water quality	Aug 2022 - current (Q & La)
BR17-QLa	Water level and water quality	Aug 2022 - current (Q & La)
BR18-QLa	Water level and water quality	Aug 2022 - current (Q & La)
Teatree Hollow Catchment		
TT-F1	Streamflow gauging station	Mar 2021 – Aug 2022 (derived baseline flow data) Sep 2022 – current (F)
TT1-QLa	Water level and water quality	Aug 2019 – current (Q) Feb 2020 – current (La)
TT2-QLa	Water level and water quality	Aug 2019 - Mar 2020 (Q) Jan 2020 - Mar 2020 (La) July 2022 - current (Q & La)

Q = water quality; La = automated and manual water level; R = rating relationship derived streamflow

Table 9 (Cont.) Surface Water Monitoring Sites

Site Name	Monitoring Type	Period of Monitoring
Teatree Hollow Catchment		
TT3-QLa	Water level and water quality	Aug 2019 - Mar 2020 (Q) Feb 2020 - Mar 2020 (La) July 2022 - current (Q & La)
TT4A-QLa	Water level and water quality	May 2020 – current (Q & La)
TT7-QLa	Water level and water quality	Mar 2019 – current (Q) Mar 2021 – current (La)
TT8-QRLa	Water level, streamflow and water quality	Sep 2012 – Jun 2015 (Q) Apr 2019 – current (Q) Mar 2013 – current (La & R)
TT9-QLa	Water level and water quality	July 2022 - current (Q & La)
TT12-QLa	Water level and water quality	Sep 2021 – current (Q & La)
TT13-QLa	Water level and water quality	Oct 2021 – current (Q & La)
TT14-QLa	Water level and water quality	Sep 2021 – current (Q & La)
Dogtrap Creek Catchment		
DT1-QLa	Water level and water quality	Aug 2019 – current (Q) Jan 2019 – current (La)
DT2-QLa	Water level and water quality	Feb 2020 – current (Q) Jan 2020 – current (La)
DT3-QLa	Water level and water quality	Aug 2019 – current (Q) Feb 2020 – current (La)
DT4-QLa	Water level and water quality	Nov 2020 – current (Q, La & R)

Q = water quality; La = automated and manual water level; R = rating relationship derived streamflow

Table 9 (Cont.) **Surface Water Monitoring Sites**

Site Name	Monitoring Type	Period of Monitoring
Dogtrap Creek Catchment		
DT15-QRLa	Water level, streamflow and water quality	Apr 2012 – Jun 2015 (Q & R) Mar 2013 – Nov 2015 (La & R) Feb 2019 - current (Q, La & R)
DT16-QLa	Water level and water quality	Mar 2021 – current (Q & LA)
DT7-QLa	Water level and water quality	Jun 2023 – current (Q & La)
DT10-QLa	Water level and water quality	Jun 2023 – current (Q & La)
DT12-QLa	Water level and water quality	Jun 2023 – current (Q & La)
Hornes Creek Catchment		
HC17-QLa	Water level and water quality	Mar 2019 – current (Q & La)
HC1-QLa	Water level and water quality	Sep 2019 – current (Q) Jan 2023 – current (La)*
H2-QLa	Water level and water quality	Mar 2020 – current (Q & La)
HC3-QLa	Water level and water quality	Sep 2019 – current (Q & La)
HC4-QRLa	Water level, streamflow and water quality	Sep 2019 – current (Q, La & R)
HC9-QLa	Water level and water quality	May 2012 – Jun 2015 (Q) Oct 2020 – current (Q) Mar 2013 – Nov 2015 (La) Feb 2019 – current (La)
Eliza Creek Catchment		
EC2-QLa	Water level and water quality	Sep 2019 – current (Q) Feb 2019 – current (La)
EC1-QLa	Water level and water quality	Feb 2019 – current (Q & La)

Q = water quality; La = automated and manual water level; R = rating relationship derived streamflow

* HC1-QLa water level sensor was relocated in January 2023 to approximately 20 metres upstream of the original location.

4.1.4 Licensed Discharge Point Monitoring

Monthly water quality and continuous flow monitoring are undertaken at LDP1, dam S9 (LOP3), dam S4 (LOP4) and dam S8 (LOP5). An extensive range of constituents are monitored including:

- selected dissolved and total metals;
- physicochemical parameters;
- nutrients; and
- Escherichia coli and flagellates.

A continuous turbidity meter has been installed in dam M3 to enable real time monitoring of dam turbidity levels prior to potential discharge to dam M4 and subsequently to LDP1. The continuous turbidity monitoring enables controls to be implemented in a timely manner in the event that turbidity levels may potentially exceed the LDP1 discharge limits.

4.2 Baseline Surface Water Data

The following sections present a summary of the baseline monitoring data for sites in the Bargo River, Teatree Hollow and Dogtrap Creek. Reference sites in Hornes Creek and Eliza Creek are outside the influence of the Project and the Tahmoor Mine surface facilities and have therefore not been discussed in the following sections.

4.2.1 Water Level and Streamflow Monitoring Data

Appendix B presents plots of the water level monitored over the period of record at each monitoring site. For comparative purposes, rainfall data from SILO Point Data[8] for a point in close proximity to the watercourses is also presented in the plots.

Field records of the presence of water in the pool and flowing water at monitoring sites in Teatree Hollow, Hornes Creek and the Bargo River tributary are collected during the monthly monitoring campaigns at each monitoring site. Due to data gaps[9] in the water level records for some sites, the field records have been used to calculate the frequency of days in which water was present at each monitoring site at the time of sampling. Table 10 presents a summary of the field records. The summary is presented for the period August 2019 to March 2022 only as this was a common period of record for majority of sites and thereby enables direct comparison between sites. Only those sites which were monitored from August 2019 are presented.

The data presented in Table 10 indicates that the monitoring sites on the Bargo River contained water at the time of each sampling event between August 2019 to March 2022. BR13-QRLa and BR14-QLa were flowing on all sampling occasions while BR12-QLa was flowing on 97% of sampling occasions. Based on the continuous water level records, in late 2019 and early 2020 during a drought period, connective streamflow in the Bargo River at monitoring sites BR13-QRLa and BR14-QLa ceased.

The presence of water at the monitoring sites on Teatree Hollow varied from upstream to downstream with TT1-QLa (upstream) recorded as dry on 13% of sampling occasions and TT4/TT4a-QLa (downstream) recorded as dry on 87% of sampling occasions. Based on the water level records for August 2019 to December 2021, Teatree Hollow tributary and Teatree Hollow have intermittent flow to monitoring site TT7-QLa and ephemeral flow at TT4/TT4A-QLa. As discharge from LDP1 reports to TT8-QRLa, the pool was recorded as holding water for the duration of monitoring.

The presence of water at the monitoring sites on Dogtrap Creek generally declined from upstream (DT1-QLa) to downstream (DT15-QRLa), varying between 100% of sampling occasions and 61% of sampling

[8] The SILO Point Data is a system which provides synthetic daily climate data sets for a specified point by interpolation between surrounding point records held by the Bureau of Meteorology – refer https://www.longpaddock.qld.gov.au/silo/point-data/.
[9] Data gaps occur due to site access restrictions, decommissioning of monitoring sites, sensor errors and dry periods.

occasions respectively. At the monitoring sites on the Dogtrap Creek tributaries (DT3-QLa and DT4-QLa), the presence of water was recorded on 84% of sampling occasions with DT3-QLa recorded as flowing on 71% of sampling occasions and DT4-QLa recorded as flowing on 55% of sampling occasions.

The data presented in Table 10 indicates that flowing water was recorded on at least 81% of sampling occasions at all monitoring sites in Hornes Creek. The number of sampling occasions in which the pools were recorded as dry declined from upstream to downstream with HC17-QLa (upstream) recorded as dry on 9% of sampling occasions and HC4-QRLa (downstream) holding water on all sampling occasions. Monitoring site HC2-QLa on Hornes Creek tributary was flowing on 81% of sampling occasions and dry on 16% of sampling occasions.

Table 10 Frequency of Samples with Water Present

Site	Number of Sampling Days	Number of Days Pool was Dry	Frequency of Sampling Days with Water Present	Frequency of Sampling Days with Flowing Water
Bargo River Catchment				
BR12-QLa	31	0%	3%	97%
BR13-QRLa	30	0%	100%	100%
BR14-QLa	32	0%	100%	100%
Teatree Hollow Catchment				
TT1-QLa	31	13%	3%	84%
TT7-QLa	32	19%	0%	81%
TT4A-QLa	30	87%	3%	10%
Dogtrap Creek Catchment				
DT1-QLa	31	0	100%	87%
DT2-QLa	31	5	84%	74%
DT3-QLa	31	5	84%	71%
DT4-QLa	31	5	84%	55%
DT15-QRLa	31	12	61%	58%
DT16-QLa	31	5	84%	74%
Hornes Creek Catchment				
HC1-QLa	32	6%	6%	88%
HC9-QLa	32	3%	9%	88%
HC4-QRLa	31	0%	13%	87%
HC17-QLa	32	9%	3%	88%
HC2-QLa	32	16%	3%	81%
HC3-QLa	32	0%	13%	88%

Table 11 presents summary statistics of streamflow recorded at select streamflow monitoring sites listed in Table 9. With the exception of TT-F1, the summary statistics have been derived for the full period of record at each site. The streamflow records for TT-F1 are presented for the baseline monitoring period to the commencement of mining of LW S1A in October 2022. It should be noted that high flow rates have been theoretically derived and, as such, may not be accurate (refer Section 4.1.3).

Table 11 Daily Streamflow Summary Statistics

Statistic (ML/d)	BR13-QRLa	TT-F1	TT8-QRLa	DT15-QRLa	HC4-QRLa
Min	0	0	0	0	0.5
Median	3.5	0.004	5.8	0.1	25
Mean	25	11	7	5	38
Max	8,513	854	980	732	497

4.2.2 Water Quality Monitoring Data

For comparative purposes and to provide an indication of baseline water quality conditions in the vicinity of the Project and the Tahmoor Mine surface facilities, water quality data for the period of record has been compared with the ANZECC (2000) and ANZG (2018) default guideline trigger values for the protection of aquatic ecosystems and recreational use in accordance with the perceived principal beneficial uses of the surface water resources in the area. The default guideline trigger values are summarised in Table 12.

Table 12 Surface Water Default Guideline Trigger Values

Parameter	ANZECC (2000) & ANZG (2018) Default Guideline Trigger Values		
	Aquatic Ecosystems (95%ile level of species protection) †	Upland Rivers (NSW) ‡	Recreational Use‡
pH (pH units)	-	6.5 - 8	6.5 - 8.5
EC (µS/cm) and TDS (mg/L)	-	EC 350	TDS 1,000
Total Alkalinity as $CaCO_3$ (mg/L)	-	-	500
Sulphate (mg/L)	-	-	400
Sodium (mg/L)	-	-	300
Aluminium (mg/L) pH > 6.5	0.055	-	-
Arsenic (mg/L) (As III)	0.024	-	-
Barium (mg/L)	-	-	1
Cadmium (mg/L)	0.0002	-	-
Copper (mg/L)	0.0014	-	1
Iron (mg/L)	-	-	0.3
Lead (mg/L)	0.0034	-	0.05
Manganese (mg/L)	1.9		0.1
Nickel (mg/L)	0.011	-	-
Selenium (mg/L)	0.011	-	0.01
Zinc (mg/L)	0.008	-	5
NOx (mg/L)	-	0.015	-
Total Phosphorous (mg/L)	-	0.02	-
Total Nitrogen (mg/L)	-	0.25	-

Note: EC = Electrical Conductivity; TDS = Total Dissolved Solids; - no relevant trigger value; † ANZG (2018); ‡ ANZECC (2000)

Water quality summary tables are presented in Appendix C for each monitoring site. Where multiple default guideline values are specified for a parameter, the most conservative value has been adopted for comparison. Where laboratory results have been recorded at below the limit of detection the result has been analysed assuming the concentration was equal to the limit of detection.

Bargo River

The field and laboratory pH records for monitoring sites on the Bargo River indicate slightly acidic to alkaline conditions, with some exceedances of the ANZECC (2000) default guideline value for pH recorded at all monitoring sites. The field EC records indicate that EC values have ranged between 64 µS/cm and 406 µS/cm at BR13-QRLa and between 99 µS/cm and 337 µS/cm at BR12-QLa. At BR14-QLa, field EC values have ranged between 181 µS/cm and 2,070 µS/cm due to the influence of higher EC water discharged at LDP1 in accordance with EPL 1389.

Exceedances of the default guideline values for aluminium, iron and zinc (dissolved and total) have been recorded historically at the monitoring sites on the Bargo River, including at BR13-QRLa which is located upstream of the confluence with Teatree Hollow and therefore upstream of releases from LDP1. This indicates that concentrations of aluminium and zinc are naturally elevated in the Bargo River. Exceedances of the ANZG (2018) default guideline value for dissolved and total copper at BR13-QRLa, BR14-QLa and BR12-QLa have also been recorded. Additionally, exceedances of the ANZECC (2000) default guideline values for total nitrogen and total phosphorus have been recorded historically at all monitoring sites.

Exceedances of the ANZG (2018) default guideline value for arsenic, barium and nickel have been recorded historically at BR14-QLa due to the influence of higher concentrations of these constituents discharged at LDP1. In accordance with EPL 1389, Tahmoor Coal propose to commission an upgraded wastewater treatment plant (WWTP) to reduce the concentration of constituents released to LDP1 (refer Section 5.1.4 for further details).

Teatree Hollow

The field and laboratory pH records for monitoring sites on Teatree Hollow and Teatree Hollow tributary indicate slightly acidic to alkaline conditions, with some exceedances of the ANZECC (2000) default guideline value range for pH recorded at all monitoring sites. Field and laboratory pH records for monitoring site TT8-QRLa consistently exceed the ANZECC (2000) default guideline value range due to the influence of higher pH water discharged at LDP1 in accordance with EPL 1389.

The field EC records for monitoring sites on Teatree Hollow and Teatree Hollow tributary, upstream of mining influences, indicate that maximum EC values have ranged from 218 µS/cm recorded at TT13-QLa to 663 µS/cm recorded at TT1-QLa. Within the area of potential mining influences, the field EC records indicated that maximum EC values have ranged from 384 µS/cm recorded at TT14-QLa to 2,490 µS/cm recorded at TT8-QRLa. It should be noted that TT8-QRLa on Teatree Hollow is influenced by higher EC water discharged at LDP1.

Exceedances of the default guideline values for aluminium, copper, iron and zinc (dissolved and total) have been recorded historically at TT1-QLa, TT2-QLa, TT7-QLa, TT12-QLa and TT13-QLa, located upstream of existing mining influences, indicating that these constituents are naturally elevated in the Teatree Hollow catchment. Additionally, exceedances of the ANZECC (2000) default guideline values for total nitrogen and total phosphorus have been recorded historically at all monitoring sites.

Exceedances of the ANZG (2018) default guideline value for arsenic, barium, cadmium and nickel have been recorded historically at TT8-QRLa due to the influence of higher concentrations of these constituents discharged at LDP1. The ANZG (2018) default guideline value for total lead was exceeded in one sample recorded at TT4A-QLa and 24% of samples recorded at TT8-QRLa, although the dissolved lead concentrations recorded at these sites did not exceed the ANZG (2018) default guideline value.

Dogtrap Creek

The field and laboratory pH records for monitoring sites on Dogtrap Creek and its tributaries indicate slightly acidic to slightly alkaline conditions, with some exceedances of the ANZECC (2000) default guideline trigger value for pH recorded at all monitoring sites except DT4-QLa.

Median EC values (field) recorded at monitoring sites on Dogtrap Creek and its tributaries have remained below the ANZECC (2000) default guideline trigger value (less than 350 µS/cm). During a period of drought in 2019, a maximum of 6,060 µS/cm EC (field) was recorded at DT1-QLa and a maximum of 2,380 µS/cm EC (laboratory) at DT15-QRLa. The field records indicate that there was no flowing water at the monitoring sites at the time of sampling.

Exceedances of the ANZG (2018) default guideline trigger values for aluminium, copper and zinc (dissolved and total) have been recorded historically at all monitoring sites on Dogtrap Creek and its tributaries, indicating that these constituents are naturally elevated in the Dogtrap Creek catchment. Additionally, exceedances of the ANZECC (2000) default guideline trigger values for total nitrogen and total phosphorus have been recorded historically at all monitoring sites.

One slight exceedance of the ANZG (2018) default guideline trigger value for total lead and total manganese was recorded at DT15-QRLa. At all other monitoring sites, the concentrations of total lead and total manganese have been recorded below the ANZG (2018) default guideline trigger value. No exceedances of the ANZG (2018) default guideline trigger values for arsenic, barium or nickel have been recorded at monitoring sites on Dogtrap Creek or its tributaries.

Hornes Creek

The field and laboratory pH records for monitoring sites on Hornes Creek indicate slightly acidic to alkaline conditions, with some exceedances of the ANZECC (2000) default guideline value range for pH recorded at all monitoring sites. The field EC records for monitoring sites on Hornes Creek indicate that maximum EC values have ranged from 306 µS/cm recorded at HC3-QLa to 694 µS/cm at HC9-QLa. Exceedances of the default guideline values for aluminium, copper, iron and zinc (dissolved and total) have been recorded at all monitoring sites. Exceedances of the ANZG (2018) default guideline value for dissolved manganese were recorded at HC4-QRLa (4% of samples) and HC9-QLa (9% of samples). Exceedances of the ANZG (2018) default guideline value for dissolved nickel were also recorded at HC9-QLa (15% of samples). Additionally, exceedances of the ANZECC (2000) default guideline values for total nitrogen and total phosphorus have been recorded at all monitoring sites.

The ANZG (2018) default guideline value for total lead was exceeded in one sample recorded at HC4-QRLa and two samples recorded at HC9-QLa, although the dissolved lead concentrations recorded at these sites did not exceed the ANZG (2018) default guideline value.

4.2.3 Site Specific Guideline Values

In order to reflect local conditions, ANZG (2018) recommend that site specific guideline values (SSGVs) should be derived for physical and chemical constituents monitored in surface water systems. ANZG (2018) recommend that the 80th percentile value of water quality monitoring data recorded over a period of 2 years should be adopted as the SSGV. The 20th percentile value of pH monitored over a period of 2 years is recommended to be adopted for the lower pH SSGV.

As constituent values may at times naturally exceed the 80th percentile value of the baseline water quality data, an exceedance of an SSGV is not considered as immediate evidence of an impact, rather an indication of potential changes in water quality characteristics which may result in impacts to aquatic ecosystems at monitored surface water sites.

As stated in Section 4.2.2, some constituents recorded at monitoring sites in the Bargo River, Teatree Hollow, Dogtrap Creek and Hornes Creek are naturally elevated above the default guideline values. As such, SSGVs have been derived for naturally elevated constituents where sufficient monitoring data is

available for the Bargo River, Teatree Hollow and Hornes Creek (refer LWS1A-S6A Water Management Plan). The Dogtrap Creek SSGVs will be detailed in the LWS1B-S6B Water Management Plan.

The SSGVs have also been derived for monitoring site TT8-QRLa which is located downstream of the Tahmoor Mine on Teatree Hollow. As TT4A-QLa is regularly dry (refer Table 10), SSGVs have not been derived for this site.

Where the baseline constituent values do not exceed the default guideline values, the default guideline values have been adopted. The SSGVs are only proposed for those constituents which are naturally elevated or which have the potential to be influenced by the Project. The water quality monitoring data for all constituents would continue to be recorded and reviewed throughout the duration of the Project to identify any additional constituents which may need to be assessed against the surface water quality TARP (refer Appendix A).

The SSGVs have been derived from baseline data up to commencement of mining of the relevant longwall. The relevant Extraction Plan Water Management Plan would be reviewed on an annual basis as a minimum and revised as required. The SSGVs for monitoring sites located upstream of the active subsidence zone would be revised to reflect additional recorded baseline monitoring data. The revised SSGVs would be documented in the revised Water Management Plan.

Table 13 presents the SSGVs for relevant surface water monitoring sites. The values that were derived from baseline monitoring data are shown in bold. Where laboratory results have been recorded at below the limit of detection the result has been analysed assuming the concentration was equal to the limit of detection.

In accordance with the surface water quality TARP presented in Appendix A, the SSGVs would be compared against monitored data in order to identify exceedances of the trigger levels and initiate further action.

Table 13 Site Specific Guideline Values

Parameter	BR12-QRLa	BR13-QRLa	HC9-QLa	HC4-QRLa	HC3-QLa
No. of Values[1]	35	35	34	28	30
pH (pH units)	6.5 - 8	6.5 - 8	**5.7 - 8**	6.5 - 8	6.5 - 8
EC (µS/cm)	350	350	**365**	350	350
Dissolved Aluminium (mg/L) pH > 6.5	**0.062**	0.055	**0.09**	**0.07**	**0.1**
Dissolved Copper (mg/L)	0.0014	0.0014	**0.002**	**0.002**	0.0014
Dissolved Iron (mg/L)	**0.54**	**0.65**	**4.5**	**0.62**	**0.5**
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011
Dissolved Zinc (mg/L)	0.008	**0.009**	**0.03**	0.008	0.008

Parameter	TT1-QRLa	TT2-QLa	TT7-QRLa	TT12-QLa	TT13-QLa	TT14-QLa	TT8-QRLa
No. of Values[1]	30	10[2]	33	11	11	11	29
pH (pH units)	6.5 – 8	**5.9 – 8**	6.5 – 8	6.5 – 8	6.5 – 8	6.5 – 8	6.5 - **9**
EC (µS/cm)	**531**	350	**361**	350	350	350	**2,258**
Dissolved Aluminium (mg/L) pH > 6.5	**0.06**	**0.13**	**0.06**	**0.08**	0.055	**0.1**	**0.09**
Dissolved Copper (mg/L)	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	**0.002**
Dissolved Iron (mg/L)	**0.71**	**0.49**	**0.86**	**0.56**	**0.42**	**0.54**	0.3
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011	0.011	**0.06**
Dissolved Zinc (mg/L)	**0.03**	**0.03**	**0.03**	0.008	0.008	0.008	**0.06**

Notes:

[1] Minimum number of values used in SSGV derivation – for some constituents, a greater number of values were used.

[2] Number of values used to derive SSGV for TT2-QLa, prior to commencement of mining LWS3A, is expected to be greater than 24.

5 Surface Facilities Water Management

5.1 Water Management System

The existing Tahmoor Mine water management system would be maintained and upgraded as required for the Project. The Tahmoor Mine water management system has been designed to:

- appropriately manage disturbed area runoff;
- increase to a practical maximum the capture and reuse of mine water and disturbed area runoff to meet operational demands;
- increase to a practical maximum on-site water recycling and reuse;
- reduce the capture and use of undisturbed area runoff;
- reduce the use of make-up water from external sources; and
- manage risks to the receiving environment and downstream water users.

The water management system at the Tahmoor Mine comprises infrastructure and management measures which are employed to manage water on the site and the movement of water onto and off the site.

5.1.1 Mine Water Storages

The locations of the Tahmoor Mine water management storages are shown in Figure 11. Table 14 provides a summary of the Tahmoor Mine water storages, with further details and locations provided in the sections which follow.

Table 14 Tahmoor Mine Water Management Storages

Dam	Catchment Area (ha)	Capacity (ML)	Details
S2	14.8	8.3	Captures and conveys mine affected water from product coal stockpiles.
S3			
S4	7.9	36.9	Captures and conveys mine affected water transferred from dam S2 and S3.
S5	6.6	0.5	Captures and conveys mine affected water from reject bin hardstand loading area.
S6		1.5	Captures and conveys mine affected water from the reject bin and loading area, haul road runoff and water transferred from dam S5.
S6a		0.7	Captures and conveys runoff from the haul road and water transferred from S6.
S7	14.9	41.5	Captures and conveys mine affected water from reject emplacement area.
S7a	41.1	12	Captures and conveys mine affected water from the reject emplacement area.
S7b	2.9	1.0	Captures and conveys mine affected water from the reject emplacement area.
S8	0.6	0.5	Captures and conveys reject emplacement area seepage and runoff.
S9	5.2	0.4	Captures and conveys mine affected water from the reject emplacement area.

Table 13 (Cont.) Tahmoor Mine Water Storages

Dam	Catchment Area (ha)	Capacity (ML)	Details
S10	0.4	0.2	Captures and conveys runoff from the haul road.
S11	2.6	0.3	Captures and conveys runoff from the storage area and access road.
M1	8.8	1.8	Captures and conveys mine site surface runoff, water transferred from dam STP2, the CHPP and pumped groundwater from mine workings.
M2		0.5	Captures and conveys water transferred from dam M1 and runoff from the surrounding reject conveyor area.
M3	0.8	9.0	Captures and conveys mine affected water transferred from dams M1 and M2 and runoff from the surrounding store yard and road areas.
M4	7.4	8.0	Captures and conveys mine affected water transferred from dams M1, M2 and M3 and runoff from the surrounding hardstand and storage areas.
M5	2.8	3.0	Captures and conveys runoff from no. 2 upcast shaft site and the access road.
M6		4.5	Captures and conveys water transferred from dam M5.

A schematic representation of the current Tahmoor Mine water management system is shown in Figure 12, including locations of flow monitoring undertaken across the system. Figure 13 presents a schematic representation of the proposed Tahmoor Mine water management and monitoring system, including the Project and post commissioning of the Water Treatment Plant (WTP) scheduled for December 2023. The proposed changes to the water management system are described in the following sections.

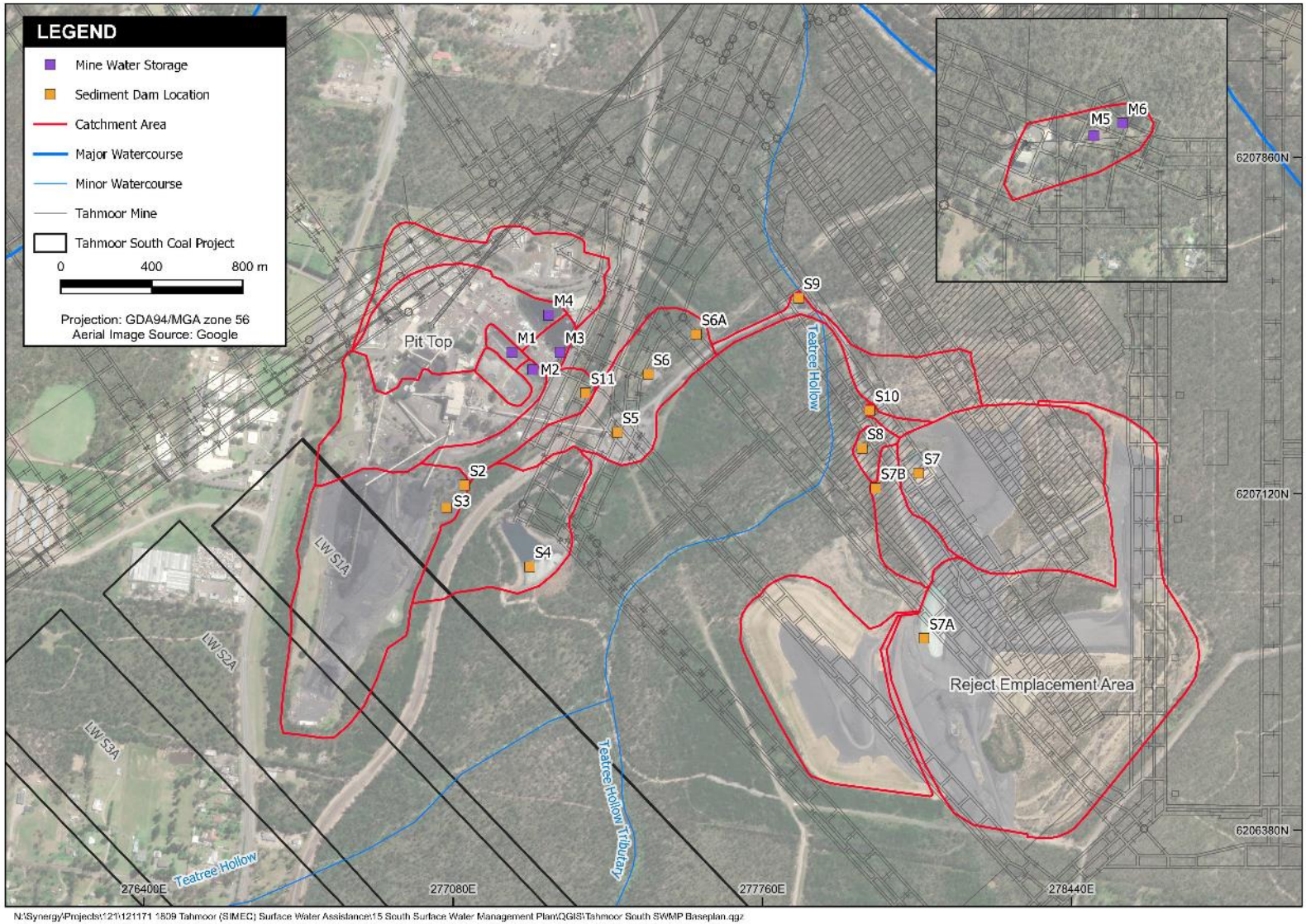


Figure 11 **Tahmoor Mine Water Management Storages and Sediment Dams**

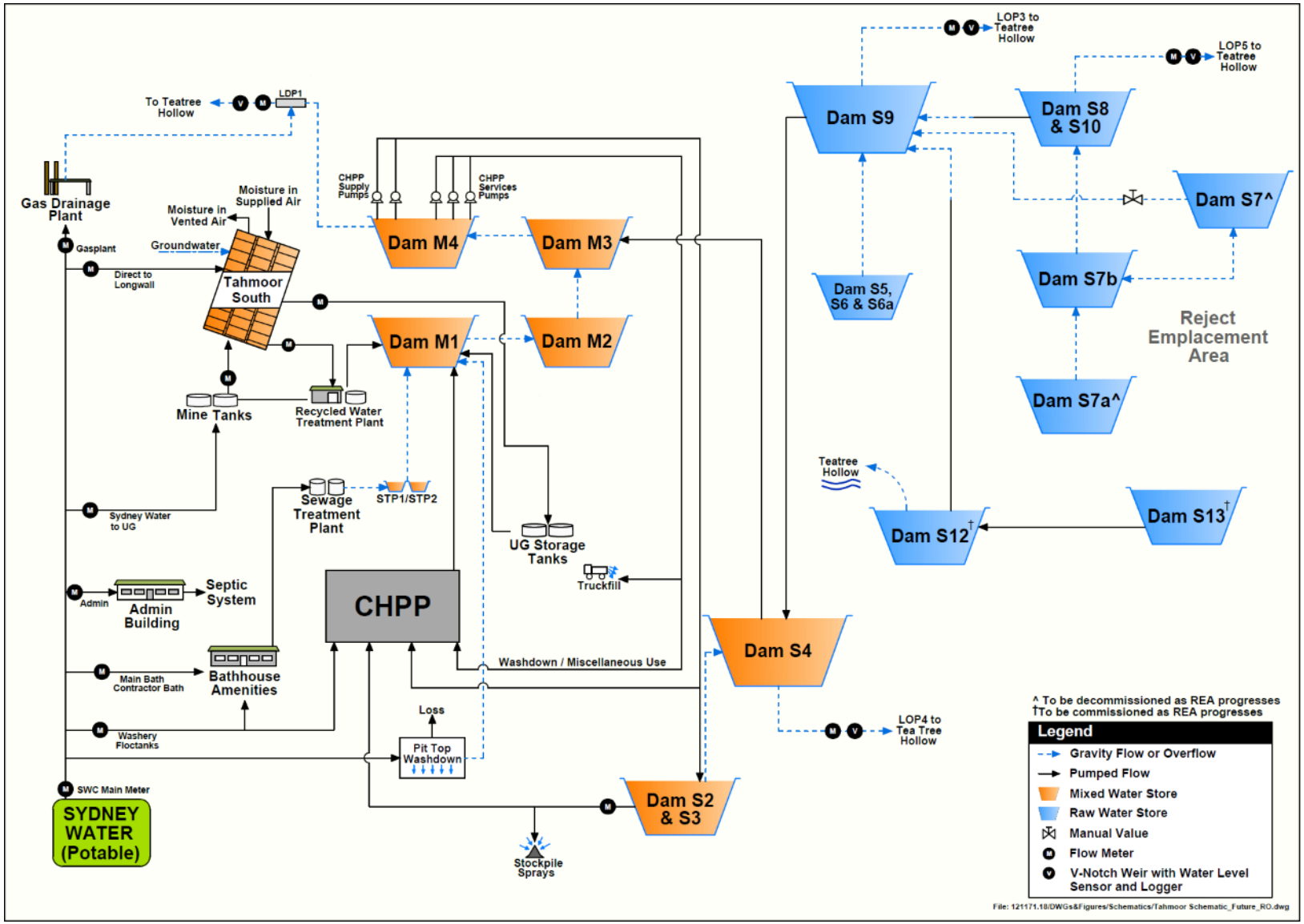


Figure 12 Schematic Representation of Existing Water Management System (prior to commissioning WTP)

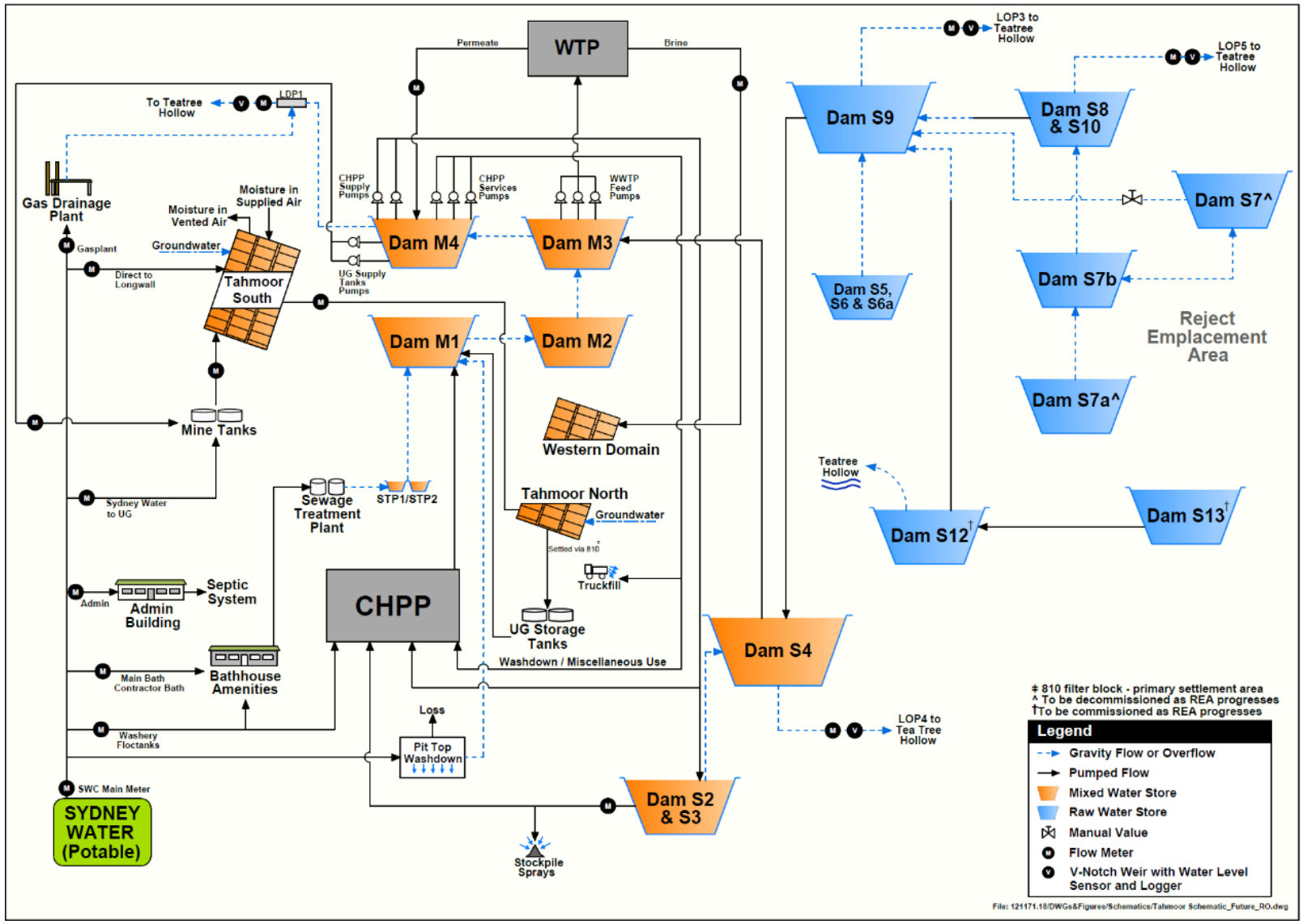


Figure 13 **Schematic Representation of Proposed Water Management System (post commissioning of WTP)**

5.1.2 Pit Top Area

The pit top area is predominantly located within the rail loop and encompasses the main surface operations including the Coal Handling and Preparation Plant (CHPP), workshop, warehouse, storage yard areas and mine water dams M1, M2, M3 and M4 (refer Figure 3). The dams are interconnected such that dam M1 flows to M2, M2 flows to M3 and M3 flows to M4. Dam M1 is dosed with flocculent and dam M2 with coagulant, as required, to enhance sediment settling and improve discharge water quality.

The CHPP incorporates screening and cyclone circuits to remove overburden and inter-burden rock fragments. The CHPP also separates the coal into coking and thermal products. Coal wash reject material is produced as a waste stream from the CHPP with the fine rejects dewatered in the CHPP using a belt filter press prior to being combined with coarse rejects. This material is conveyed to a transit area on the eastern side of the rail loop prior to being trucked onsite and placed in the REA.

Runoff from the workshop area and waste oil tank/storage area reports to an oil water separator. Treated water from the separator reports to dam M1, while the recovered waste oil is transferred to an waste oil tank at the pit top prior to disposal off site. Runoff from the remaining pit top area, including the ROM coal stockpile area and the CHPP, drains to dams M2, M3 and M4. Excess water in M4 is discharged to Teatree Hollow via LDP1. A non-toxic binding agent is used regularly to control dust emissions from the pit top area.

A Gas Drainage Plant and Envirogen Power Station are located adjacent to the mine pit top area (refer Figure 3). Drainage from this area reports to a surface drain on the outside of the rail loop which discharges to Teatree Hollow via LDP1. The product coal stockpile area drains to dams S2 and S3. Water overflows from these storages into the larger dam S4 where water is automatically dosed with a flocculent. Water from dam S4 is transferred to dam M3 while overflow reports to Teatree Hollow via LOP4 in accordance with EPL 1389.

Effluent from the main bathhouses, production offices and CHPP are treated onsite via the existing sewage treatment plant (STP). The STP discharges into two maturation ponds (STP1 and STP2) which overflow to dam M1. Separate septic treatment systems are used to treat sewage from the demountable offices located on site and the main administration building.

An upgraded STP has been installed prior to secondary workings (i.e. October 2022) in accordance with Consent Condition B50. The STP is located near dam M1 and used to treat sewage from the mine production offices, mine bathhouses and the CHPP. The upgraded STP comprises a secondary treatment, alkalinity dosing, filtration and ultra-violet disinfection. The upgraded STP has been designed with a peak capacity of 61 kL/day.

Transfer from dam M4 to the mine tanks occurs via the UG supply tank pumps. This water is then used for underground supply purposes. Water required in the CHPP is supplied (recycled) from dam M4. A small volume of potable water is supplied by Sydney Water for pump glands, flocculation and reagent dosing. Water in dam M4 is also pumped to a truckfill point near the REA for use in dust suppression on the haul road to the REA and on the REA itself. Water for dust suppression on the product coal stockpile area is drawn from dams S2 and S3.

A Recycled Water Treatment Plant (RWTP), located in an area adjacent to the rail loop, is used to treat a maximum of 1 ML/d of water recovered from the underground mine. Recycled water is then reused in the underground for non-potable purposes. Recovered water in excess of the non-potable underground demand is directed to dam M1. Following commissioning of the WTP, the RWTP is proposed to be decommissioned (refer Section 5.1.4).

5.1.3 Hazardous Chemical and Hydrocarbon Storage

Management of hazardous substances and dangerous goods is undertaken in accordance with the *Work Health and Safety Regulation 2011*, the NSW *Dangerous Goods (Road and Rail Transport) Act 2008,* the NSW *Dangerous Goods (Road and Rail Transport) Regulation 2014* and the *Protection of the Environment*

operation Act 1997 as described in *TAH-HSEC-00059 - Hazardous Substances and Dangerous Goods*. Hazardous chemicals and hydrocarbon products are stored in bunded areas in accordance with relevant Australian Standards.

5.1.4 Water Treatment Plant

At present, excess water from the Tahmoor Mine is transferred from dam M3 to dam M4 and subsequently discharged to LDP1.

In order to improve the quality of water discharged to LDP1, a WTP is to be commissioned as per Consent Condition B30.

Water Treatment Plant

Under normal operations, the WTP will treat up to 6 ML/d of water from dam M3, with a maximum of 7.2 ML/d able to be treated. The WTP is expected to be commissioned December 2023. Following commissioning, permeate would be transferred to dam M4 and reused for the Tahmoor Mine with excess water discharged offsite via LDP1. Revised limits for specific constituents will be instated for water discharged at LDP1.

In accordance with EPL 1389:

- New limits for the concentration of substances discharged from LDP1 will replace the interim concentration limits listed in Table 7.
- The limits will be based on the actual measured performance of the WTP when operated in an effective and efficient manner. The EPA will consider recommendations made by Tahmoor Coal in relation to statistical parameters for discharge limits.
- The WTP must be operated and maintained to achieve 90% availability during the reporting period when input water is available.

The WTP has been designed to achieve the treated water quality requirements listed below in Table 15.

Table 15 WTP Water Quality Requirements

Parameter	Units	EPL 1389 Design Parameters
pH	-	6.5-8.0
Electrical Conductivity	µS/cm	350
Bicarbonate Alkalinity as $CaCO_3$	mg/L	185
Dissolved Aluminium	mg/L	0.055
Dissolved Arsenic	mg/L	0.024
Dissolved Barium	mg/L	0.7
Dissolved Copper	mg/L	0.0014
Dissolved Nickel	mg/L	0.011
Dissolved Zinc	mg/L	0.008
Total Nitrogen	mg/L	0.25

Brine management

The WTP will produce a brine by-product. Brine is proposed to be transferred underground to the historical Tahmoor North Western Domain for disposal. As a contingency for when brine is unable to be pumped underground for disposal, for example during maintenance periods of pumping infrastructure, the WTP will have the capacity to store brine for up to eight hours of plant operation. Four brine storage tanks located adjacent to the WTP would store up to 46 kL of brine each, equating to a maximum storage capacity of 184 kL of brine at any given time.

Water quality monitoring of brine would be undertaken prior to underground disposal, as summarised in Section 8.5.

5.1.5 Ventilation Shafts

Three ventilation shafts service the existing underground mining operations. No. 1 shaft is located on Stratford Road, Tahmoor and is considered to be a clean water catchment devoid of potential surface water contaminants (refer Figure 2). Stormwater runoff from the no. 1 ventilation shaft area discharges to the Bargo River. No. 2 shaft is located on Rockford Road, Tahmoor. The no. 2 shaft is the main up-cast ventilation fan. Runoff from the surface area around the no. 2 shaft is directed via a surface drain to sediment dams M5 and M6 for settling (refer inset in Figure 11). These storages overflow to the Bargo River. The no. 3 ventilation shaft site is located adjacent to the mine pit top (refer Figure 2). Drainage from the area around the no. 3 shaft site reports to a series of sediment dams. Overflow from these structures is discharged to Teatree Hollow via LDP1.

5.1.6 Reject Emplacement Area

Existing REA

Rejects from the CHPP comprise dewatered fines and coarse reject. These reject streams are mixed and transported via conveyor to a bin and loading area prior to placement in the REA which is located some 1.5 km east of the pit top area – refer Figure 4. The REA stormwater management system comprises a network of collection drains and sediment dams (S7, S7a, S7b, S8, S9 and S10). Runoff which collects in these storages is pumped to dam S4 for automatic flocculant dosing. Water from dam S4 is pumped to mine water dam M3 or, during wet weather, discharges to Teatree Hollow via LOP4 in accordance with EPL 1389. The REA is also currently served by LOP3 for overflow from dam S9 and LOP5 for overflow from dam S8 (refer Figure 9 and Figure 12**Error! Reference source not found.**).

REA Extension

The REA is proposed to be developed in stages over the Project life. The staging of the REA and proposed water management system would be designed in accordance with the Tahmoor South Second Project Amendment Report (SIMEC, 2020). As with the current REA, drainage (runoff and seepage) from the REA would be directed to a series of sediment dams (refer Figure 12 and Figure 13). As indicated in Figure 14, changes to the REA water management system would comprise infilling of dams S7, S7a and S7b and commissioning of an additional sediment dam (S12). The design of sediment dam 12 is currently in progress.

Surface drains and batter chute drains would be designed to collect runoff from the REA expansion and direct runoff to the sediment dams. Controlled discharge from sediment dam S12 would be directed to Teatree Hollow via a LOP.

In accordance with the Consent, erosion and sediment control for the REA development, including the additional sediment dam, would continue to be designed, installed and maintained in accordance with the *Managing Urban Stormwater: Soils and Construction series including Volume 1: Blue Book* (Landcom, 2004) and *Volume 2E: Mines and Quarries* (DECC, 2008).

5.1.7 Underground Water Storage

As shown in Figure 13, water would be pumped from Tahmoor South (active underground) to the drift bottom underground storage to enable settlement of fines prior to water being pumped to the surface. To ensure that untreated mine water does not discharge via LDP1 following commissioning of the WTP, during periods of significant rainfall or maintenance of the WTP, water transferred from the Tahmoor Central pit bottom area (within the Tahmoor South Project area) will be directed to the historical Tahmoor North mine area for temporary storage via a series of underground pipes. The presence of the natural dip of the seam to the west of the proposed temporary storage area will ensure that mine water temporarily stored in the historical Tahmoor North mining area does not flow into Tahmoor North Western Domain where brine is to be disposed.

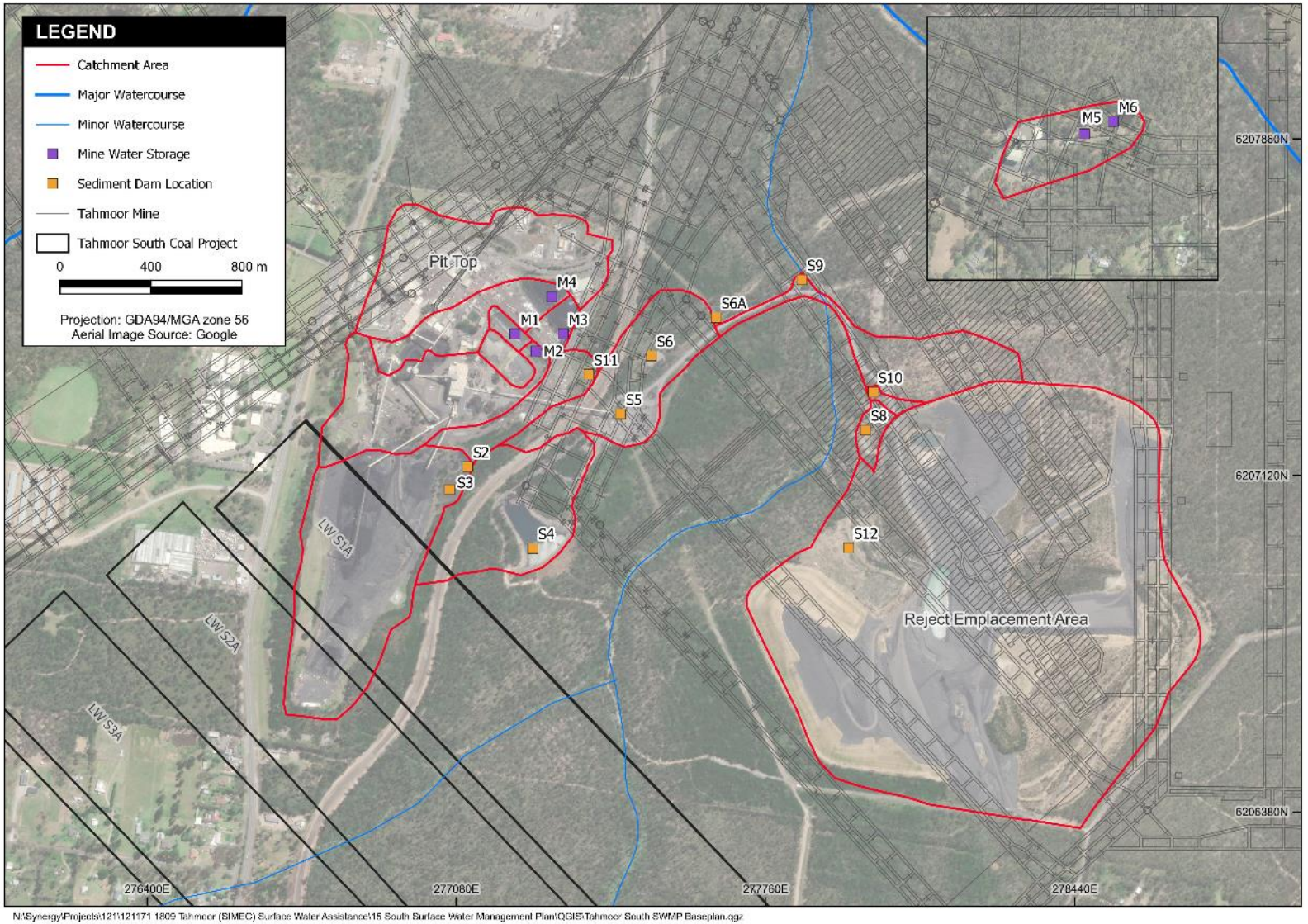


Figure 14 **Tahmoor Mine Proposed Water Management Storages and Sediment Dams**

6 Site Water and Salt Balance

A water balance model of the Tahmoor Mine water management system was developed to simulate the management of water over the remaining Tahmoor North and the approved Project mine life. The Site Water and Salt Balance report is provided in Appendix D. It is noted that the Site Water and Salt Balance presented in Appendix D would be further refined following approval of MOD 2 and incorporating design details for sediment dam 12 (refer Section 5.1.6). This SWMP will be updated to present the revised Site Water and Salt Balance following completion of model updates.

The model simulates:

- the water balance of all water management storages;
- the generation of runoff from rainfall over mine surface facility catchments;
- the recovery of water from underground mining operations and the rate of excess mine water required to be stored;
- on-site and off-site supply of water to meet the demands of the CHPP, the underground mine and for dust suppression;
- water recycling and reuse rates; and
- the volume of water released to LDPs.

The model includes a salt balance to predict the mass of salt:

- generated from surface runoff;
- transferred between water management storages;
- treated and recycled on-site;
- proposed to be stored underground; and
- released to LDPs.

In summary the predictions of the Project water and salt balance model indicate the following.

1. Based on the model results, the WTP would treat an average of 3.8 ML/d with an average of 3.6 ML/d permeate and 0.2 ML/d brine produced.
2. Production of permeate via the WTP would reduce the reliance on Sydney Water supply, with the average annual Sydney Water demand predicted at 303 ML based on the results of all 133 model realisations (a 39% reduction on average based on historical records).
3. Release to LDP1 is predicted at 652 ML/annum or 1.8 ML/d on average, with a median EC of 350 µS/cm predicted following commissioning of the WTP.
4. Release to LOPs is predicted at 75 ML/annum or 0.2 ML/d on average, with a median EC of 1,823 µS/cm predicted.

7 Long-Term Water Management Strategy

In accordance with Consent Conditions A29 to A31, the long-term water management strategy for Tahmoor Mine would be developed progressively as the Project development progresses. Progressive development of the long-term water management strategy is described below while the SWMP describes the progressive development of the long-term water monitoring strategy.

7.1 Progressive Rehabilitation

Rehabilitation of the pit top area and the REA is detailed in the Tahmoor Coal: Rehabilitation and Topsoil Management Procedure (SIMEC, 2020) and reported in the Annual Environmental Management Report (AEMR). Rehabilitation works would continue throughout the life of the Project with outcomes reported in the AEMR.

7.2 Reject Emplacement Area

Progressive Rehabilitation

In accordance with Tahmoor Coal: Reject Disposal (SIMEC, 2021), following completion of each REA stage, a minimum of 300 mm topsoil would be placed above the active reject and contour ploughed for revegetation. During rehabilitation works, permanent drainage infrastructure would be constructed to direct runoff from rehabilitated areas to a sediment basin prior to discharge offsite at a LOP. Drainage infrastructure would include graded banks, swale drains and batter chutes at 60 metre (m) intervals (SMEC, 2021). Following rehabilitation completion and confirmation of the water quality characteristics of runoff from the rehabilitated areas, runoff may be diverted directly to a LOP rather than via a sediment basin in order to reduce the hydraulic load on the sediment basins.

Closure Planning

During detailed closure planning for the REA a specific long-term management strategy would be developed in consultation with regulatory agencies and in accordance with relevant regulatory guidelines. Key objectives of the long-term management strategy would comprise:

- maintaining a stable landform;
- ensuring the landform surface is resistant to erosion;
- maintaining a surface cover that reduces the risk of infiltration, promotes shedding of surface water runoff and promotes growth of vegetation; and
- reducing the risk of environmental impact from seepage.

7.3 Detailed Modelling of Potential Impacts to Water Resources

Following confirmation of the groundwater inflow rates to Tahmoor South underground, the existing numerical groundwater model would be updated and simulated for the post-mining recovery period. The model predictions would then be used to assist with decision-making and planning on the following aspects:

- potential water related impacts associated with the post-mining recovery period; and
- groundwater and surface water licensing for the post-recovery period.

7.4 Water Licensing Strategy

Tahmoor Coal has developed a water licensing strategy for long-term operations at the Tahmoor Mine and for post-mining. The proposed water licensing strategy was presented to NRAR for discussion and subsequently submitted in October 2021. In 2022 the groundwater model was

updated and requirements for WALs subsequently updated. In addition to the existing WALs held by Tahmoor Coal, as listed in Table 8, Tahmoor Coal would seek to obtain additional WALs as necessary based on monitored site data and model predictions of groundwater and surface water reductions associated within mining operations.

8 Water Monitoring Plan

8.1 Overview and Objective

The water monitoring program for the Project would be progressively developed as the Project development progresses. In addition to the existing monitoring sites detailed in Section 4.1, additional monitoring sites are proposed as described in the following sections. It is noted that the number and location of proposed monitoring sites to be established will be dependent on:

- Gaining the necessary land access agreements; and
- The suitability of the site for the proposed monitoring.

The aim of the monitoring program is to identify where there is a risk of impact to surface water resources as a result of the Project. The monitoring program aims to assess the condition of each monitoring site for the following three phases:

- Prior to commencement of the Project – baseline survey of the condition of the site before commencement of the Project;
- During the Project – monitoring of the condition of the site during the Project to establish whether there has been any change to the site or if changes have occurred from the effects of subsidence; and
- Post completion of the Project – monitoring of the condition of the site after mining to identify whether there has been any change to the site in the period since mining, and to assess if the ground surface conditions have stabilised.

Further detail on the surface water monitoring plan specific to LWS1A-S6A is provided in the LWS1A-S6A Water Management Plan.

8.2 Surface Water Monitoring Program Design

8.2.1 Water Quality Monitoring

Water quality monitoring is proposed to be undertaken monthly at existing and proposed monitoring sites. The water quality monitoring is to comprise:

- Field monitoring: pH, EC, temperature, DO and ORP.
- Laboratory monitoring: pH, EC, TDS, major cations (calcium, magnesium, sodium and potassium), sulphate, alkalinity, chloride, selected dissolved metals (aluminium, arsenic, barium, copper, iron, lead, lithium, manganese, nickel, selenium, strontium and zinc), selected total metals (aluminium, arsenic, barium, cadmium, copper, iron, lead, lithium, manganese, nickel, selenium, strontium and zinc), total kjeldahl nitrogen, total nitrogen, total phosphorus, total cations and total anions.

Monitoring at proposed sites will commence a minimum of 12 months prior to the potential occurrence of mining related effects.

8.2.2 Water Level Monitoring

In accordance with the current monitoring program, automated and manual water level monitoring is proposed to be undertaken at specific monitoring sites. The automated water level monitoring will comprise installation of a water pressure sensor that continuously records pressure measurements. Water level measurements will also be recorded manually on a monthly basis at sites with and without automated water level monitoring.

Monitoring at the proposed sites is proposed to commence a minimum of 12 months prior to the potential occurrence of mining related effects.

8.2.3 Streamflow Gauging Stations

A streamflow gauging station has been constructed on Teatree Hollow (TT-F1 in Figure 15). Baseline streamflow data is available for this location from January 2020 to October 2022. The streamflow monitoring data will be assessed as described in the LWS1A-S6A Water Management Plan and has been used to estimate the annual streamflow volume reduction in Teatree Hollow in relation to WALs held by Tahmoor Coal.

A similar structure will be constructed on Dogtrap Creek at DT-F1 (located approximately 230 m upstream of DT15-QRLa). It is proposed that the streamflow gauging station on Dogtrap Creek would be installed approximately four years prior to commencement of mining LWS1B to enable collection of a significant period of baseline flow data for Dogtrap Creek downstream of the approved LWS1B-S6B.

8.2.4 Monitoring of Pool Physical Features and Natural Behaviour

Visual inspections of the physical features and natural behaviour of pools will be undertaken prior to, during and following completion of the Project. A baseline inspection of mapped pools in Teatree Hollow, Teatree Hollow tributary, the Bargo River tributary, Dogtrap Creek, Dogtrap Creek tributaries and Hornes Creek will be undertaken in stages prior to the commencement of secondary extraction for the Project (refer Figure 6 to Figure 8 for pool locations). Following commencement of secondary extraction, visual inspection of pools in the active subsidence zone will be undertaken monthly during the active subsidence zone and active subsidence period. Following completion of mining, visual inspections will be undertaken on a quarterly basis for a minimum of 12 months.

8.2.5 Channel Morphology and Stability Monitoring

Photographic surveys and visual inspections of geomorphological features and stream reaches will be undertaken prior to, during and post-mining activities. The photographic surveys and visual inspections will comprise:

- annual catchment survey at headwater sites;
- monitoring of knickpoint formation prior to and during mining of each longwall;
- monitoring of channel morphology at select sites; and
- geomorphology survey (post mining) of waterways overlying each longwall.

The location of survey points has been and will be selected with consideration to features mapped during the baseline geomorphology survey and to the predicted subsidence effects associated with the Project (refer Figure 17 for channel morphology, knickpoint and headwater sites associated with LWS1A-S6A).

Visual inspection of headwater, channel morphology and knickpoint sites will be undertaken prior to the commencement of secondary extraction from the Project to confirm/revise the findings of the baseline geomorphology survey. Following commencement of secondary extraction, visual inspection of knickpoint formation and channel morphology sites in the active subsidence zone will be undertaken monthly during the active subsidence period. Following completion of mining, visual inspections will be undertaken on a quarterly basis for a minimum of 12 months.

8.3 Quality Assurance / Quality Control

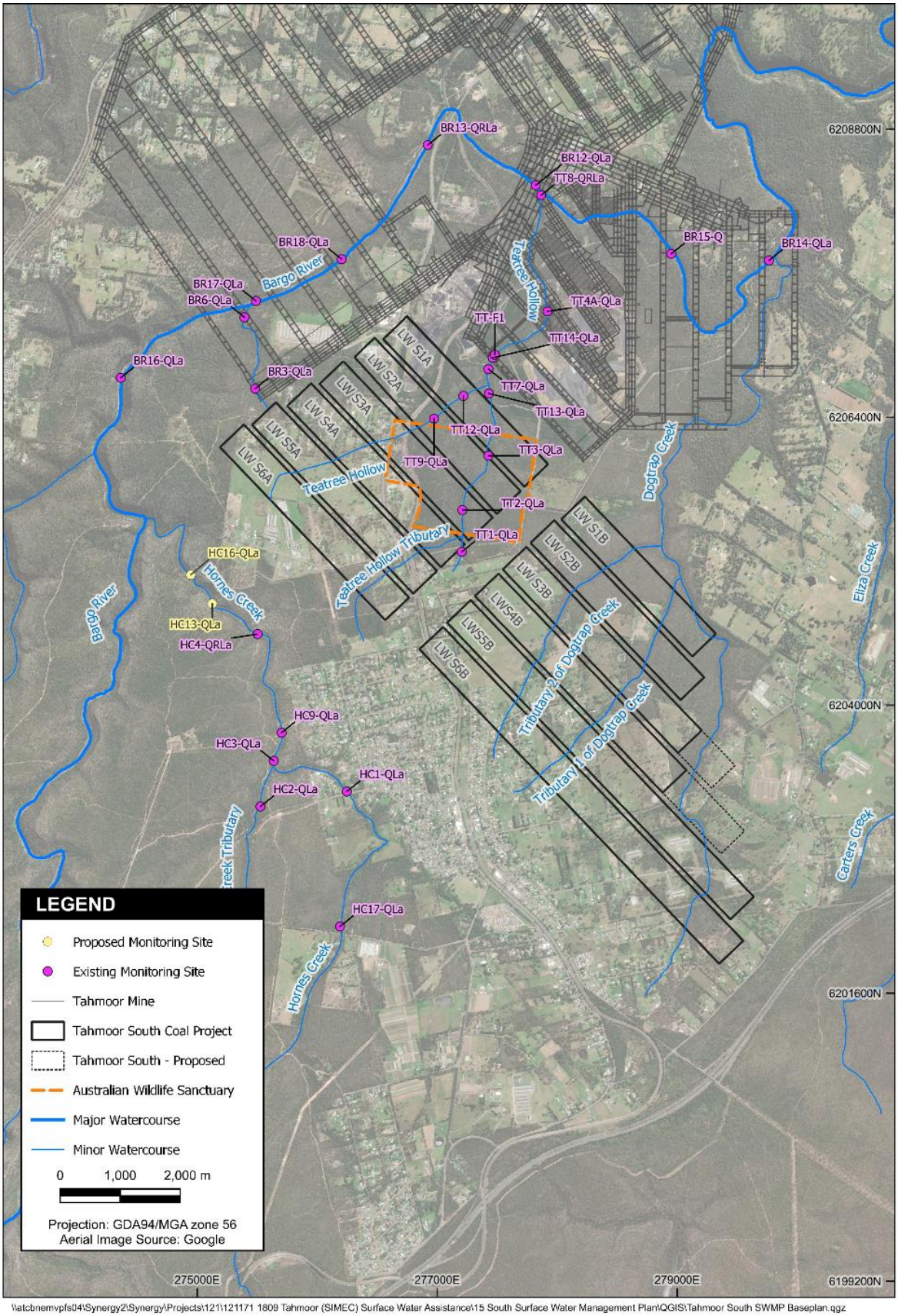
A Before-After-Control-Impact (BACI) framework has been implemented, where feasible, for surface water and has been incorporated in the design of the relevant Trigger Action Response Plan (TARP) (refer Appendix A). The monitoring program aims to develop a baseline (before)

dataset for a range of surface water and groundwater features and to assess operational and post-mining (after) impacts through the monitoring of reference (control) and performance measure (impact) sites.

Quality assurance and quality control (QA/QC) for water quality monitoring is and would continue to be undertaken in accordance with the *Australian and New Zealand Guidelines for Fresh & Marine Water Quality* (ANZG, 2018). The sample collection is and would continue to be undertaken by an experienced field technician. The sample analysis undertaken by a National Association of Testing Authorities (NATA) accredited laboratory and the data analysis undertaken by a specialist consultant. Where a data record is identified as potentially erroneous by the specialist consultant, the value is and would be queried with and reviewed by the field technician. The same process is and would be undertaken for pool water level records, with the records also verified through comparison of the manual field measurements and automatic water level logger records.

8.4 Surface Water Monitoring Sites

The existing and proposed monitoring site locations are shown in Figure 15 to Figure 17. A summary of the proposed monitoring sites to be implemented progressively over the life of the Project is provided in Table 17.



\\atcbnemvpfs04\Synergy2\Synergy\Projects\121\121171 1809 Tahmoor (SIMEC) Surface Water Assistance\15 South Surface Water Management Plan\QGIS\Tahmoor South SWMP Baseplan.qgz

Figure 15 **Existing and Proposed Monitoring Sites on Teatree Hollow, Bargo River, Hornes Creek and Associated Tributaries**

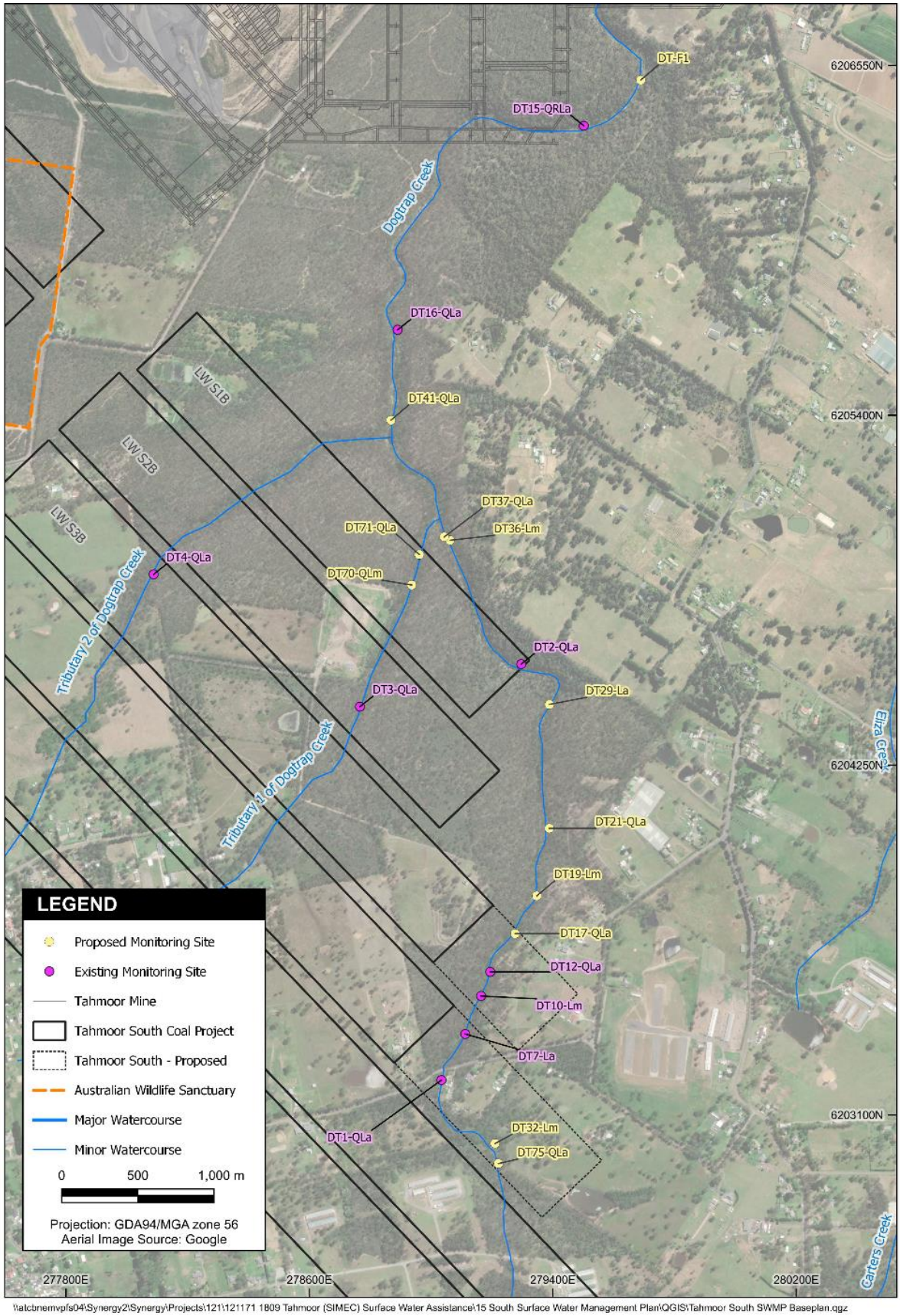


Figure 16 **Existing and Proposed Monitoring Sites on Dogtrap Creek and Dogtrap Creek Tributaries**

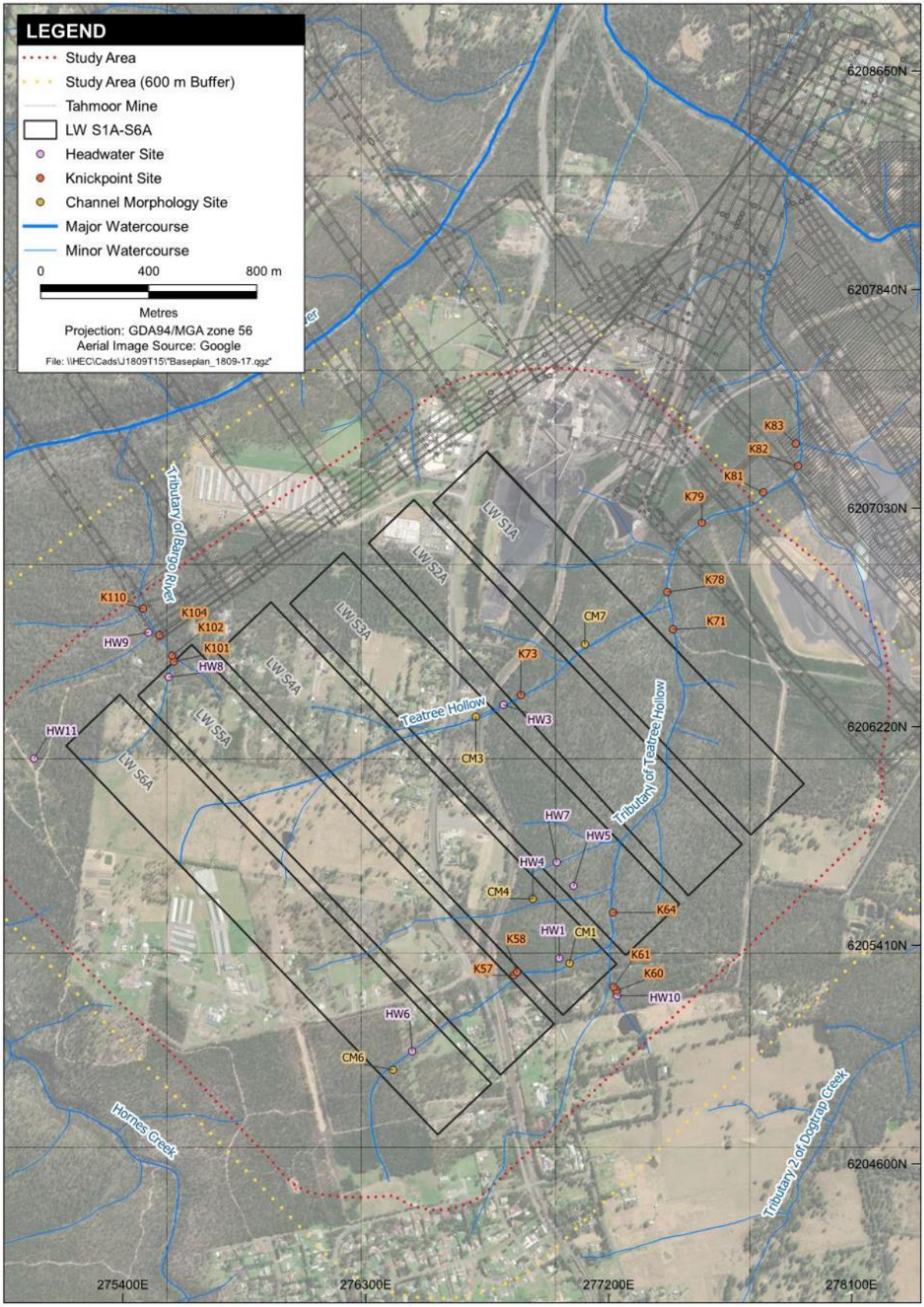


Figure 17 LWS1A-S6A Morphology and Channel Stability Monitoring Sites

Table 16 Proposed Surface Water Monitoring Sites

Site	Purpose / Reason for Monitoring	Monitoring Type
Dogtrap Creek Catchment		
DT-F1	Monitoring of potential impacts to streamflow associated with mining of LWS1B-S6B	Streamflow gauging
DT75-QLa	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek	Water level and water quality
DT32-Lm	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek; surface water-groundwater connectivity monitoring†	Manual water level
DT17-QLa	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek; surface water-groundwater connectivity monitoring†	Water level and water quality
DT19-Lm	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek	Manual water level
DT21-QLa	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek; surface water-groundwater connectivity monitoring†	Water level and water quality
DT29-La	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek	Water level
DT36-Lm		Manual water level
DT37-QLa	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek; surface water-groundwater connectivity monitoring†	Water level and water quality
DT41-QLa	Baseline characterisation; monitoring of potential Project impacts to Dogtrap Creek	Water level and water quality
DT70-QLm	Baseline characterisation; monitoring of potential impacts to Dogtrap Creek tributary associated with the Project and Bargo Waste Management Centre	Manual water level and water quality
DT71-QLa		Water level and water quality
Hornes Creek Catchment		
HC13-QLa (proposed)	Baseline characterisation; monitoring of potential impacts to Hornes Creek outside of the predicted subsidence zone	Water level and water quality
HC16-QLa (proposed)	Baseline characterisation; monitoring of potential impacts to Hornes Creek outside of the predicted subsidence zone	Water level and water quality

† adjacent to proposed groundwater monitoring bore

8.4.1 Surface Water Monitoring Program

A summary of the proposed surface water monitoring program is presented in Table 17. The program, as it relates to surface water has been/will be undertaken in phases: prior to mining (secondary extraction), during secondary extraction and subsidence and following the end of mining and cessation of subsidence.

Table 17 Monitoring Program for Surface Water Resources

Feature	Monitoring Component / Location	Pre-mining Monitoring	During Mining Monitoring	Post-mining Monitoring
Surface Water Monitoring				
Streamflow	Existing site: TT-F1 Proposed site: DT-F1	Continuous record. Data downloaded prior to the commencement of secondary extraction in relevant catchment.	Continuous record. Data downloaded and reviewed monthly.	Continuous record, data downloaded and reviewed quarterly for 12 months following the completion of mining or as required in accordance with a Watercourse Corrective Action Management Plan.
Surface water quality	Teatree Hollow, Teatree Hollow tributary, Dogtrap Creek, Dogtrap Creek tributaries, Bargo River, Bargo River tributaries, Hornes Creek, Hornes Creek tributariesand Eliza Creek	Monthly sampling prior to secondary extraction of the relevant longwall.	Monthly sampling and analysis or as required by a specified action relevant to a trigger level.	Monthly sampling and analysis for a minimum of 12 months following the completion of mining or as required in accordance with a Watercourse Corrective Action Management Plan.
		Field analysis: pH, electrical conductivity (EC) and dissolved oxygen (DO), temperature and oxygen reduction potential (ORP). Laboratory analysis for: pH, EC, total dissolved solids, total suspended solids, turbidity, major cations[†], sulphate, alkalinity, chloride, dissolved and total metals[‡], total kjeldahl nitrogen, total nitrogen, total phosphorus, total cations and total anions.		
Pool water level	Pools in Teatree Hollow, Teatree Hollow tributary, Dogtrap Creek, Dogtrap Creek tributaries, the Bargo River, the Bargo River tributary, Hornes Creek, Hornes Creek tributaries	Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.	Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.	Continuous record and monthly manual measurements for a minimum of 12 months following the completion of mining or as required in accordance with a Watercourse Corrective Action Management Plan.

[†] Calcium, magnesium, sodium and potassium.

[‡] Aluminium, arsenic, barium, copper, iron, lead, lithium, manganese, nickel, selenium, strontium and zinc.

Table 17 (Cont.) Monitoring Program for Surface Water Resources

Feature	Monitoring Component / Location	Pre-mining Monitoring	During Mining Monitoring	Post-mining Monitoring
Surface Water Monitoring				
Physical features and natural behaviour of pools and reaches	Teatree Hollow, Teatree Hollow tributary, Dogtrap Creek, Dogtrap Creek tributaries, Bargo River tributary, Hornes Creek pools and reaches	One observation prior to mining using fixed location photo points.	Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone[^] using fixed location photo points.	Quarterly observations over 12 months for pools that are no longer within the active subsidence zone or as required in accordance with a Watercourse Corrective Action Management Plan.
Morphology and channel stability	Headwater and knickpoint sites in Teatree Hollow, Teatree Hollow tributary, the Bargo River tributary, Dogtrap Creek, Dogtrap Creek tributaries	One observation prior to mining using fixed location photo points. One catchment survey of 10 headwater sites.	Observations of knickpoint formation every month during the active subsidence period for sites within the active subsidence zone using fixed location photo points. Annual catchment survey of 10 headwater sites.	One observation of knickpoint formation at sites that are no longer within the active subsidence zone using fixed location photo points. One catchment survey of 10 headwater sites. Post-mining geomorphology survey following completion of mining.

[^] Survey area to include upstream, downstream and adjacent pools (to the extent of the potential impact) where a trigger exceedance has occurred at a potential impact site(s) in accordance with the TARPs

8.5 Water Management System Monitoring

Visual inspection, monitoring and maintenance of the Tahmoor Mine water management system is undertaken on a regular basis by Tahmoor Coal as summarised in Table 18. Routine inspections of each water management storage are conducted on a monthly basis and during or immediately following a high rainfall event. Each water management storage is inspected for:

- physical defects (piping, cracking, slumping, bulging or heaving);
- functionality of critical controls (outlet pipes and spillways);
- changes to the storage structure that may affect performance;
- water storage level;
- sediment level;
- presence and rate of seepage; and
- required maintenance works.

Table 18 Water Management System Monitoring and Maintenance

Component	Frequency
Visual Inspection	
Sediment load and turbidity of dam M1, M2, M3, M4 and water discharged at LDP1	Daily(1)
Dam M3, M4, REA dams and drainage lines	Monthly
Sediment level in dam M1, M2 and emergency tailings dams	Monthly
Monitoring and Data Review	
Turbidity levels of water discharged from CHPP	Daily
Turbidity levels of water discharged from underground dewatering lines 1, 2 and 3	Daily
Turbidity levels of water pumped from S4 to M3	Daily
LDP1 water quality (EPL 1389 defined constituents)	Monthly
Dam S9 (LOP3), dam S4 (LOP4) and dam S8 (LOP5) water quality(2)	Monthly
WTP brine water quality(3)	Monthly(4)
Maintenance	
Removal of accumulated sediment from dam M1 and M2	As required(5)
Calibration of turbidity meter	Daily
De-silting of drainage lines	As required(5)
Flocculant dosing of dam M1	Daily
De-silting of dams	As required(5)
Service/replacement of pumps and equipment	As required(5)

Notes:

1. Normal workdays, excludes public holidays.
2. pH, EC, turbidity, oil and grease, total suspended solids, dissolved aluminium, dissolved arsenic, dissolved barium, dissolved copper, dissolved nickel, dissolved zinc.
3. pH, EC, dissolved aluminium, dissolved arsenic, dissolved barium, dissolved copper, dissolved nickel, dissolved zinc.
4. Monitoring would be undertaken monthly for six months following commissioning of the WTP. Should it be identified that there is little variability in the monitoring results month to month, monitoring would be reduced to quarterly.
5. Defined by the Environment and Community Department following visual inspection.

Continuous flow monitoring will continue to be undertaken as indicated in Figure 12 and Figure 13. This data, in addition to records of the volume of potable water supplied by Sydney Water, would be used to inform the annual preparation of an updated site water balance.

Monitoring of discharge to LDP1 and overflow from dam S9 (LOP3), dam S4 (LOP4) and dam S8 (LOP5) would continue to be undertaken in accordance with EPL 1389, as described in Section 4.1.4.

Following commissioning of the WTP, the composition of brine would be monitored as summarised in Table 18. Monitoring would initially be undertaken monthly for six months following commissioning of the WTP. Should it be identified that there is little variability in the brine monitoring results month to month, monitoring would be reduced to quarterly.

9 Performance Criteria, Management Measures and Trigger Action Response Plan

9.1 Performance Criteria

The performance criteria for surface water resources associated with the Project comprise no significant adverse mining-related effects to:

- surface water quality;
- surface water flows;
- water supply for other water users;
- stream and riparian vegetation health; and
- maintenance or improvement of channel stability.

The environmental monitoring program to be implemented over the life of the Project has been designed to enable assessment of the Project performance in relation to the above criteria.

9.2 Trigger Action Response Plan

9.2.1 Surface Water Performance Criteria and TARPs

A series of surface water TARPs have been developed relating to the performance indicators to be adopted during mining, in accordance with Condition C8(g)(viii) of the Consent. The surface water TARPs relevant to the Tahmoor Mine and mining of LWS1A-S6A are provided in Appendix A. The surface water TARPs relevant to mining of LWS1B-S6B will be detailed in the LWS1B-S6B Water Management Plan.

The primary aims of the TARP are to:

- Define appropriate trigger levels for surface water and groundwater resources;
- Develop specific actions to respond to high risk of exceedance of any performance measure to ensure that the measure is not exceeded; and
- Present a plan in the event that a performance measure is exceeded or is likely to be exceeded and describe the management / corrective actions to be implemented (i.e. notifications to relevant agencies, groundwater reviews, revision in any WCMAP and/or Six Monthly Subsidence Impact Reports).

The 'Normal Condition' section of each TARP indicates that the environment is performing within normal levels or natural variability. Deviation from baseline or expected condition triggers an increased level of risk to the environment (Level 1 or higher based on escalating corresponding risk).

9.2.2 Water Management System Performance Criteria and TARPS

Performance criteria and TARPs pertaining to the Tahmoor Mine water management system are documented in the Tahmoor Coal *Environmental Management Framework* and included in Appendix A. The TARPs are currently implemented at the Tahmoor Mine and will continue to be implemented throughout the duration of the Tahmoor Mine operations.

9.3 Implementation of Monitoring Program and TARP Requirements

Tahmoor Coal's standard approach for all monitoring, reporting, investigation and remediation is to commence all tasks as soon as practicable. The following sections provide more information on this standard approach to be adopted during the pre-mining, mining and post-mining phases:

(i) All monitoring commitments will be tracked on a weekly basis so that tasks are completed as required, taking into consideration land access and environmental factors. Post-mining monitoring will typically be completed within one month of the completion of the relevant

longwall and prior to the influence from the active subsidence zone on the feature from the next longwall.

(ii) Following the receipt of monitoring data and laboratory results, specialist consultants will review the data against the relevant TARPs as soon as practicable. If any TARP trigger has occurred, specialist consultants will notify Tahmoor Coal as soon as practicable. Monitoring results and TARP triggers will also be discussed during the monthly Environmental Response Group meetings, and any relevant information from other disciplines will be shared within the group. It is noted that discussions amongst specialists from different disciplines will not be restricted to ERG meetings, and relevant specialists will be included at any time to discuss results and assist with the completion of required actions and responses, as required.

(iii) In the event of a TARP trigger occurrence, Tahmoor Coal will initiate all requirements (actions and responses) in accordance with the relevant TARP (i.e. investigation, report, negotiation, CMA determination, or similar) as soon as practicable and endeavour to commence actions and responses within one month of the exceedance being recorded. This timeframe is noted to be subject to issues outside of Tahmoor Coal's control such as land access constraints, inclement weather, extended timeframes where further monitoring is required, and inability to communicate with a third party / landholder.

(iv) Tahmoor Coal will complete the required actions and responses relating to the TARP trigger as soon as practicable and will endeavour to finalise these requirements, subject to issues outside of Tahmoor Coal's control, as follows:

- Level 1 and Level 2 TARP trigger actions and responses within three months of the exceedance being recorded;
- Level 3 and Level 4 TARP trigger actions and responses within six months of the exceedance being recorded; and
- Exceeds Performance Measures actions and responses in accordance with the timeframes provided in the relevant TARPs.

The TARPs define levels of variation in environmental conditions following commencement of mining, as compared to normal (baseline) conditions, and the actions required to be implemented in response to each level of variation. The assessment and investigation action and responses have been designed accordingly:

- A Level 1 or Level 2 trigger would initiate an initial assessment.
- A Level 3 trigger would initiate a detailed investigation, incorporating findings from the initial assessment. A Level 3 trigger may also initiate development of a Watercourse Corrective Action Management Plan (WCAMP) (detailed further in Section 9.4.2).

9.4 Management, Remediation and Verification Measures

9.4.1 Mitigation Measures and Corrective Management Actions

For watercourses which are affected by mining activities but the effects do not extend as far as surface fracturing or flow diversion, corrective management actions (CMAs) would be implemented as described in the TARPs (refer **Appendix A**). The CMAs would be proposed and implemented based on the nature of non-fracture effects. The monitoring of and success of the CMAs would be reported in the Six Monthly Subsidence Impact Report and Annual Review.

In accordance with Consent Condition C12 and as described in the TARPs (refer **Appendix A**), a Watercourse Corrective Action Management Plan (WCAMP) will be prepared for watercourses damaged by subsidence impacts. 'Damage' of a watercourse is considered to relate to mining-induced fracturing of a watercourse and redirection of streamflow and/or localised and transient increases in water quality constituents.

9.4.2 Pool and Watercourses

A WCAMP would be developed where subsidence results in fracturing of the stream bed or controlling rockbars of watercourses. The development of a WCAMP is triggered in the following TARPs:

- Stream water quality for all watercourses within subsidence area;
- Stream water quality for other watercourses (Bargo River and Hornes Creek);
- Pool water level for all watercourses within subsidence area;
- Pool water level for other watercourses (Bargo River and Hornes Creek);
- Physical features and natural behaviour of watercourses within the subsidence area; and
- Physical features and natural behaviour of pools for other watercourses (Bargo River and Hornes Creek).

In the event that a WCAMP is required, it may be appropriate to implement the WCAMP at a later date, e.g., at the conclusion of subsidence. The timeframe for implementation of remediation works would be detailed in the WCAMP.

The WCMAP would be developed in collaboration with relevant government agencies and would incorporate performance measures and indicators for assessing the effectiveness of the remediation works implemented. The performance measures and indicators would relate to the effectiveness of the remediation works for improving pool water holding capacity, pool water level recession and aquatic habitat and stream health.

9.4.3 Water Supply for Other Users

It is intended that potential impacts to water supply for other water users will be identified through a trigger exceedance of the surface water related TARPs (i.e. water quality, pool water level and streamflow) and the groundwater related TARPs (i.e. groundwater level, groundwater quality and surface water-groundwater interaction). Exceedance of a relevant trigger will initiate further investigation including assessment of the potential reduction in the quantity or quality of water supply for other water users. Where it is identified that a reduction in the quantity or quality of water supply for other water users has occurred as a result of mining related effects, Tahmoor Coal will enter into negotiations with the relevant landholder and regulatory agencies to formulate a remediation agreement. Potential remediation measures may include:

- Providing a suitable offset(s) to compensate for the reduction in the quantity of water resources/flow; and/or
- Make good provisions, to be negotiated with an affected landholder, in the event that water supply from a surface water system (as designated by a Water Supply Works and Water Use Approval) is impacted.

Further detail on the remediation measures for private groundwater bores impacted by mining activities is provided in the Groundwater Management Plan.

9.4.4 Stream and Riparian Vegetation Health

Monitoring, management and remediation of impacts to stream and riparian vegetation health are detailed in the Biodiversity Management Plan.

9.4.5 Channel Morphology and Stability

If notable development of soft knickpoints and/or notable erosion and sedimentation of headwater streams was observed, the knickpoints and headwater streams would be professionally assessed in order to identify appropriate corrective management actions. The most reliable approach to erosion control comprises rock grade structures, however, the exact nature of the management measure would be assessed based on the nature of the erosion and sedimentation and site access restrictions.

9.5 Contingency Plan

In accordance with Conditions C8(g)(ix) and E5(f) of the Consent, in the event that performance measures (in the form of pre-defined triggers) are considered to have been exceeded or are likely to be exceeded, a response will be undertaken in accordance with these TARPs (refer to **Appendix A**). This response is a contingency plan that describes the management / corrective management actions which would be implemented where required to remedy the exceedance.

If a WCMAP is required in accordance with the TARP, the WCAMP will be prepared in accordance with Section 3.6.3 of the LWS1A-S6A Extraction Plan Main Document.

The success of remediation measures that have been implemented for any TARP exceedance would be reviewed as part of any WCMAP, the Six Monthly Subsidence Impact Reports and the Annual Review.

9.6 Continuous Improvement

Tahmoor Coal have adopted the "Plan-Do-Check-Act" model as shown in **Figure 18**. This model will be applied to all aspects of Tahmoor Coal's environmental management and is utilised to embed the continuous improvement process in all system documents.

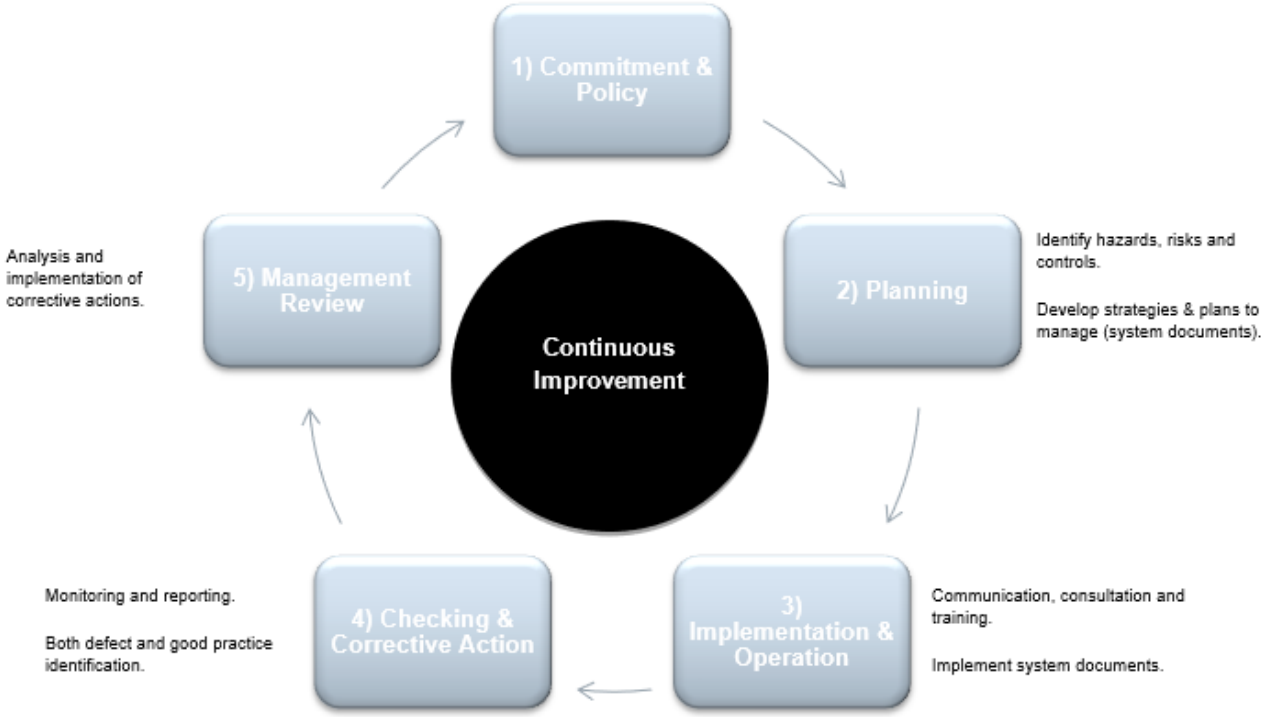


Figure 18 Continuous Improvement Model

9.7 Effectiveness

The effectiveness of water monitoring, management and remediation measures will continue to be evaluated throughout the life of the Project. Additional management controls will be investigated and implemented where practicable.

10 Implementation and Reporting

10.1 General Requirements

This section of the management plan describes the key elements of implementation and reporting specific to the management of surface water resources.

A description of requirements and procedures that are applicable to the extraction of LW S1A-S6A in general are provided in the Extraction Plan Main Document. This detail includes:

- Environmental Management System Framework;
- General reporting requirements, including details regarding the Six Monthly Subsidence Impact Report, Annual Review, and Annual Return;
- Incident management and reporting requirements;
- Non-compliance management and reporting requirements;
- Exceedances management and reporting requirements;
- Compliant and dispute management protocol;
- Audit and review requirements for general environmental performance, including internal audits and reviews, and independent environmental audits;
- General roles and responsibilities;
- Employee and contractor training requirements;
- Response groups to facilitate the review of monitoring data;
- Internal and External Stakeholder Communication Procedures;
- Access to information requirements, including Tahmoor Coal website and the Tahmoor Colliery Community Consultative Committee;
- Document control protocol; and
- Risk assessment for built and natural features and corresponding outcomes.

10.2 Reporting Requirements

10.2.1 Performance Measure Exceedance

In accordance with Condition E4 of the Consent, where any exceedance of the criteria or performance measures outlined within this document has occurred, Tahmoor Coal will:

- Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the relevant government agency describing those options and any preferred remediation measures / corrective management actions or other course of action;
- Within 14 days of the exceedance occurring (or other timeframe agreed by the Planning Secretary), submit a report to the Planning Secretary describing these remediation options and any preferred remediation measures / corrective management actions or other course of action; and
- Implement reasonable remediation measures / corrective management actions as directed by the Planning Secretary.

10.2.2 Incidents and Non-Compliances

The Consent defines an incident as ‘an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance'.

Material Harm is defined within the Consent as ‘harm to the environment that:

- involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or results in actual or potential loss or property damage of an amount, or
- amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

Tahmoor Coal manages and responds to incidents in accordance with the following plans:

a) TAH-HSEC-232 - Emergency and Incident Manual;
b) TAH-HSEC-00155 - Pollution Incident Response Management Plan; and
c) TAH-HSEC-00224 - Notification of Environmental Pollution Incidents.

These plans have been developed to manage preparation, incident response and reporting requirements under the Protection of the Environment Operations Act 1997 (NSW).

The management plans provide roles and responsibilities, management strategies, action and response plans and record management protocols for incidents and emergencies.

In accordance with Condition E9, the Planning Secretary will be notified in writing via the Major Projects website immediately after Tahmoor South becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 8 of the Development Consent.

A Written Incident Notification will be submitted to the Planning Secretary via the Major Projects website within seven days after Tahmoor Coal becomes aware of an incident.

Written Incident Notifications will include:

a) the development and application number;
b) details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
c) how the incident was detected;
d) when Tahmoor Coal became aware of the incident;
e) any actual or potential non-compliance with conditions of consent;
f) describe what immediate steps were taken in relation to the incident;
g) identify further action(s) that will be taken in relation to the incident; and
h) identify a project contact for further communication regarding the incident.

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, Tahmoor Coal will provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a Detailed Incident Report.

Detailed Incident Reports will include:

a) a summary of the incident;
b) outcomes of an incident investigation, including identification of the cause of the incident;
c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and

d) details of any communication with other stakeholders regarding the incident.

The Consent defines a non-compliance as 'an occurrence, set of circumstances or development that is in breach of the consent'. Non-compliances or system defects detected during monitoring, inspections and audits will be managed in accordance with the *TAH-HSEC-00173 Tahmoor Coal Environmental Management Framework Document*, with corrective action plans developed and implemented to rectify any issues.

The Planning Secretary will be notified in writing via the Major Projects website within seven days after Tahmoor Colliery becomes aware of any non-compliance.

If a non-compliance is detected, the following steps will be followed:

a) Identify and confirm the non-compliance (i.e. review against approval criteria or condition and confirm that a non-compliance has occurred);
b) Complete internal environmental incident reporting documentation including an investigation to capture all relevant information;
c) In accordance with the relevant approval, determine what action (i.e. external reporting) is required. Specifically, determine if immediate reporting is required and to which stakeholders, or ensure that the event is captured for future reporting;
d) Following the incident investigation, develop a corrective action plan aimed at preventing future re-occurrence; and
e) Complete all required reporting and consult with relevant agencies on the corrective action plan to be implemented.

A non-compliance notification will identify the following:

a) the development and the application number,
b) the condition of consent that the development is non-compliant with
c) the way in which it does not comply and the reasons for the non-compliance (if known); and
d) any actions which have been, or will be, undertaken to address the non-compliance.

A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

10.2.3 Complaints and Disputes

Community Complaints at Tahmoor Coal are managed in accordance with *TAH-HSEC-00119- Communication and Engagement and TAH-HSEC-00120- Community Complaints & Enquiry Procedure.* Tahmoor Coal operates a 24-hour complaints line (1800 154 415) for receiving community complaints and other stakeholder communications. The general process detailed in *TAH-HSEC-00120- Community Complaints & Enquiry Procedure* for responding to complaints is:

a) Acknowledging all complaints and responding to the complainant within 24 hours where practicable;
b) Registering all complaint details in Cority;
c) Investigating complaints impartially considering the facts and the circumstances prevailing at the time;
d) Implementing corrective actions if required; and
e) Reporting to relevant stakeholders of investigation outcomes and corrective actions taken.

A record of all community complaints in relation to activities undertaken by the licensee must be kept in a legible form and be in accordance to Tahmoor Coal's Environmental Protection Licence 1389.

The following information will also be kept in the event of a community complaint; as required by Section M4 in Tahmoor Coal's EPL 1389:

a) The date and time of the complaint;

b) The method by which the complaint was made;
c) Any personal details of the complainant which were provided by the complainant or a note to that effect;
d) The nature of the complaint;
e) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) If no action was taken by the licensee, the reasons why no action was taken.

These records must be kept for at least 4 years after the complaint was made and be able to be produced to any authorised officer who asks to see them.

In the event of a dispute or conflict between Tahmoor Coal personnel and a member of the community, the Tahmoor Coal E&C Manager will facilitate communication between both parties to reach a resolution, which may include a meeting with the complainant to discuss the issue.

Where relevant, negotiations will be initiated in accordance with any relevant Consent conditions. This general process is documented in *TAH-HSEC-00119- Communication and Engagement*. If a dispute cannot be resolved, the matter will be escalated to involve the site Operations Manager or General Manager as required and may involve consultation with the relevant government agency to assist in reaching a determination on the matter.

10.2.4 Specific Reporting for Surface Water Resources

Monitoring and management of surface water resources relevant to the Project will be reported in the Six Monthly Subsidence Impact Report and Annual Review reports. The Six Monthly Subsidence Impact Report will also include review and reporting of the suitability of monitoring sites (including reference sites).

10.2.5 Specific Reporting for Site Water Management

Water management performance at the Tahmoor Mine is documented each year in the Annual Environmental Management Review or Annual Review and is distributed among relevant government agencies and uploaded to the Tahmoor Coal website. Information reported in the document relates to any water related incidents, water related community complaints, water make volume for the year, water quality and discharge volumes from site. In accordance with EPL 1389, LDP1 water quality results and discharge volumes are uploaded to the Tahmoor Coal website on a monthly basis.

As a component of the Annual Environmental Management Review or Annual Review, the site water and salt balance would be updated and the performance of the water management system would be assessed through comparison of the monitored and predicted water and salt balance. Revision to the WMP would be undertaken if the performance review indicates that the water management system has, or is likely to be, unable to meet its regulatory performance requirements. The WMP revision would document the measures to be implemented and their effectiveness in meeting regulatory requirements.

11 Review and Improvement

11.1 Audit

Audits of the SWMP shall be conducted in consultation with the Plan owner and nominated individuals and shall focus on the content and implementation.

Audits on the content shall consist of a determination of understanding of the SWMP by the individual's allocated responsibility under this plan.

Audits on the implementation shall consist of reviews of the safe working procedures and risk assessments developed to ensure safe operation of the SWMP, they may also involve discussions with personnel involved in the management plan to determine understanding and compliance.

Should an audit of the SWMP determine that a deficiency is evident in the content or implementation; a corrective action must be developed and implemented. Actions will be assigned to a nominated individual and tracked in Cority.

Tahmoor Coal is responsible to verify that the nominated corrective action has been implemented by way of a follow up audit.

Any changes to the SWMP are to be managed and communicated to all personnel in line with the Change Management Process.

11.2 Review

This SWMP will be reviewed:

Event based: In accordance with Condition E7 (a) of the Consent, a review will be required within 3 months of any incident, event or finding that identifies an inadequacy in the SWMP, risk assessment or associated documents to continue to effectively manage the identified hazard; a change to the workplace itself or any aspect of the work environment, a change to a system of work, a process or a procedure; or

In accordance with Condition E8 if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review; or

Time based: in the absence of regular event-based reviews and in accordance with Condition E7 (b-e) of the Consent, this plan will be reviewed within three months of:

b) the submission of an Annual Review under Condition E13;
c) the submission of an Independent Environmental Audit under Condition E15;
d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or
e) notification of a change in development phase under Condition A19.

If deemed appropriate, external service providers may be included in the review process. All reviews are to be documented.

11.3 Access to Information

Information pertaining to Tahmoor Coal's general environmental performance against internal targets and external approvals criteria is reported to the community via the mine website and Tahmoor Coal's Community Consultative Committee (TCCCC). Examples of reports to government agencies include:

a) Environmental Protection Licence Annual Return (submitted to Environment Protection Authority);
b) Annual Review (submitted to Department of Planning & Infrastructure, Council, TCCCC etc.); and
c) Independent Environmental Audit (submitted to Department of Planning & Infrastructure).

These reports are prepared in accordance with relevant guidelines and *TAH-HSEC-00119- Communication and Engagement* and are published on Tahmoor Coal's website in accordance with *TAH-HSEC-00221-Website Management Procedure.*

In accordance with Condition E23, Tahmoor Coal have made the following information and documents publicly available on its website:

i. the EIS;
ii. all current statutory approvals for the development;
iii. all approved strategies, plans and programs required under the conditions of this consent;
iv. the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;
v. minutes of CCC meetings;
vi. regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;
vii. a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
viii. a summary of the current phase and progress of the development;
ix. contact details to enquire about the development or to make a complaint;
x. a complaints register, updated monthly;
xi. a register of incident and non-compliance notifications made to the Planning Secretary, updated monthly;
xii. the Annual Reviews of the development;
xiii. audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report;
xiv. annual returns made under the National Greenhouse and Energy Reporting legislation
xv. any other matter required by the Planning Secretary; and
xvi. Tahmoor Coal will keep such information up to date, to the satisfaction of the Planning Secretary.

12 References

AECOM (2018). "Tahmoor South Project Environmental Impact Statement". Prepared for Tahmoor Coal, December.

ANZECC (2000). "Australian and New Zealand Guidelines for Fresh and Marine Water Quality". National Water Quality Management Strategy, Paper No. 4. Volume 1. The Guidelines, Chapter 1-7. Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ).

ANZG (2018). "Australian and New Zealand Guidelines for Fresh and Marine Water Quality". Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines.

DECC (2008). "Managing Urban Stormwater Soils and Construction – Volume 2E – Mines and Quarries". NSW Department of Environment and Climate Change, Sydney, June.

Fluvial Systems (2013). "Tahmoor South Project Environmental Impact Statement Technical Specialists Report Geomorphology". Prepared for Tahmoor Coal, December.

HydroSimulations (2018). "Tahmoor South Project EIS: Groundwater Assessment". Prepared for Tahmoor Coal, December.

Landcom (2004). "Managing Urban Stormwater: Soils & Construction Volume 1", 4th edition, March.

Strahler, AN (1952). "Dynamic Basis of Geomorphology", *Bulletin of the Geological Society of America*, no. 63, pp. 923–938.

13 Change Information

13.1 Change Information

Details of the document history are provided in Table 19.

Table 19 Document History

Version	Date Reviewed	Review Team	Change Summary
0.1	7/12/2021	Michelle Grierson, April Hudson, Natalie Brumby, Thomas O'Brien, Zina Ainsworth	Minor text changes
0.2	13/12/2021	Michelle Grierson, April Hudson, Natalie Brumby, Thomas O'Brien, Zina Ainsworth	Minor text changes
1.0	22/12/2021	DPE-Water and EPA	Revision in response to DPE-Water and EPA comments
1.1	18/3/2022	DPE-Water	Revision in response to DPE-Water comments
2.0	17/06/2022	Natalie Brumby	Reviewed in accordance with Condition 46 of DA 67/98 and condition E7(b) of SSD 8445 following submission of the 2021 Annual Review to DPE. Reviewed in accordance with condition E7(e) of SSD 8445 following change in development phase under condition A9 (construction commencement on 16th May 2022).
3.0	18/09/2022	ATC Williams, Natalie Brumby	Reviewed in accordance with Condition E7(c) and (d) following an Independent Environmental Audit (10th August 2022), following the approval of any modification (Mod 1 approved 19th July 2022) and following commencement of secondary extraction of the conditions of the Consent SSD 8445.
4.0	20/06/2023	Natalie Brumby	Reviewed in accordance with Condition E7(b) following the submission of an Annual Review (31st March 2023) and Condition E7(c) following the submission of an Independent Environmental Audit (2nd June 2023) of the Consent SSD 8445.
5.0	12/09/2023	ATCW Williams, Natalie Brumby	Reviewed and updated in accordance with Condition E7 (d) following the approval of any modification (MOD 2 - 13th June 2023) of the Consent SSD 8445.

Appendix A Trigger Action Response Plans

SITE WATER MANAGEMENT PLAN TARP – LDP1 DISCHARGE WATER QUALITY

Feature	Methodology and relevant monitoring	Management		
		Trigger	**Action**	**Response**
Controlled and uncontrolled discharge – exceedance of EPL 1389 water quality discharge limits	LDP1 DISCHARGE WATER QUALITY LOCATION (refer Figure 9): LDP1 MONITORING: • Daily: Sediment load and turbidity monitoring of water discharged at LDP1 • Monthly: EPL 1389 defined constituents (refer Table 7) in water discharged at LDP1	**Level 1**		
		Constituent levels below EPL 1389 water quality discharge limits	Continue monitoring and review of data as per monitoring program	No response required
		Level 2		
		Constituent levels equal to EPL 1389 water quality discharge limits	• Notify Environment and Community Department • Conduct site inspection and investigation to identify source of elevated constituent levels and define corrective actions	• Implement corrective actions as required • If pH level is equal to the lower EPL 1389 water quality discharge limit, avoid human contact and begin neutralisation treatment • Continue monitoring and review of data as per monitoring program
		Level 3		
		Constituent levels above EPL 1389 water quality discharge limits (or below the lower discharge limit for pH)	• Notify Environment Coordinator • Conduct site inspection and investigation to identify source of elevated constituent levels and define corrective actions	• Implement corrective actions (i.e. eliminate source of exceedance, close valves between dam M3 and dam M4 etc.) • If pH level is below the lower EPL 1389 water quality discharge limit, avoid human contact and begin neutralisation treatment • Immediately conduct water quality monitoring at LDP1 and assess effectiveness of corrective action • Submit exceedance notification to the EPA following investigation
		Level 4		
		Constituent levels significantly above EPL 1389 water quality discharge limits (or significantly below the lower discharge limit for pH)	• Notify Environment Coordinator • Conduct site inspection and investigation to identify source of elevated constituent levels and define corrective actions	• Implement corrective actions (i.e. eliminate source of exceedance, close valves between dam M3 and dam M4 etc.) • If pH level is below the lower EPL 1389 water quality discharge limit, avoid human contact and begin neutralisation treatment • Immediately conduct water quality monitoring at LDP1 and assess effectiveness of corrective action • Immediately conduct field water quality monitoring at TT8-QRLa to assess effect on downstream watercourse • Engage external specialist support as necessary • Implement Pollution Incident Response Management Plan as required • Submit exceedance notification to the EPA following investigation

SITE WATER MANAGEMENT PLAN TARP – LDP1 DISCHARGE WATER QUANTITY

Feature	Methodology and relevant monitoring	Management		
		Trigger	**Action**	**Response**
Controlled and uncontrolled discharge – exceedance of EPL 1389 water quantity discharge limit	LDP1 DISCHARGE WATER QUANTITY LOCATION (refer Figure 8): LDP1 MONITORING: continuous flow monitoring at LDP1 EPL 1389 WATER QUANTITY DISCHARGE LIMIT: • 15,500 kilolitres per day during low rainfall conditions • Unlimited during wet weather conditions*†	**Level 1**		
		Discharge rate below EPL 1389 water quantity discharge limit	Continue monitoring and review of data as per monitoring program	No response required
		Level 2		
		Discharge rate equal to EPL 1389 water quantity discharge limit	• Notify Environment and Community Department • Conduct site inspection and investigation to identify source of elevated flow rate • Identify high priority pumping requirements, reduce flow rate from high flow source and investigate potential for alternative storage	• Implement corrective actions as required • Continue monitoring and review of data as per monitoring program
		Level 3		
		Discharge rate greater than EPL 1389 water quantity discharge limit	• Notify Environment Coordinator • Conduct site inspection and investigation to identify source of elevated flow rate • Identify high priority pumping requirements, reduce flow rate from high flow source and investigate potential for alternative storage	• Implement corrective actions • Continue monitoring and assess effectiveness of corrective actions • Review mine water management protocols and identify opportunities for improvement • Submit exceedance notification to the EPA following investigation
		Level 4		
		Discharge rate significantly greater than EPL 1389 water quantity discharge limit	• Notify Environment Coordinator • Conduct site inspection and investigation to identify source of elevated flow rate • Identify high priority pumping requirements, reduce flow rate from high flow source and investigate potential for alternative storage • Conduct inspection of downstream watercourse to identify potential impacts and provide recommendations to remedial action	• Implement corrective actions • Continue monitoring and assess effectiveness of corrective actions • Review mine water management protocols and identify opportunities for improvement • Engage external specialist support as necessary • Conduct inspection of downstream watercourse to assess effectiveness of remedial action • Submit exceedance notification to the EPA following investigation

* Defined as more than 10 millimetres (mm) rainfall within a 24 hour period.

† Provided that all practical measures are taken to reduce potential water quality impacts.

SITE WATER MANAGEMENT PLAN TARP – DAM M2/M3 CLARITY

Feature	Methodology and relevant monitoring	Management		
		Trigger	**Action**	**Response**
Dam M2 and Dam M3 turbidity levels	DAM M2/M3 CLARITY LOCATION (refer Figure 10): Dam M2/M3 MONITORING: daily monitoring of turbidity levels and visual inspection of water clarity of dam M2 and dam M3	**Level 1**		
		Dam M2/M3 overflow discharge is clear and turbidity is less than 55 NTU	Continue monitoring as per monitoring program	No response required
		Level 2		
		Dam M2/M3 overflow discharge clarity is murky and turbidity is greater than 55 NTU and less than 75 NTU for more than 2 hours	• Visually inspect clarity of feed water from washery, underground, dam M1 and dam M2 • Contact Washery Control to verify that tailings overflow clarity is within specification • Contact Outbye Coordinator to ascertain any changes in underground dewatering water quality • Notify Environment and Community Department or Environmental Coordinator • Add flocculant to M3 entry and coagulant at Dam M2	• Continue monitoring turbidity at dam M3 to identify change in clarity • Continue monitoring turbidity at LDP1
		Level 3		
		Dam M2/M3 overflow discharge is discoloured and turbidity is greater than 75 NTU and less than 100 NTU	• Add flocculant to dam M1 • Increase flocculant at M3 entry and ensure coagulation at dam M2 • Contact Washery Control to verify that tailings overflow clarity is within specification • Contact Outbye Coordinator to ascertain any changes in underground dewatering water quality	• Continue monitoring turbidity at dam M3 to identify change in clarity • Continue monitoring turbidity at LDP1 • Monitor turbidity levels in watercourse approximately 100 m downstream of LDP1 to assess effect
		Level 4		
		Dam M2/M3 overflow discharge is notably discoloured and turbidity is greater than 100 NTU for more than 1 hour	• Review strategy with Production Coordinator and Environmental Coordinator • Inspect all washery dams for water quality issues • Close valves between dam M3 and dam M4 • Over-ride stockpile dam high level alarm to enable continued pumping and overflow to dam S4	• Liaise with Environment and Community Manager and CHPP Manager to define course of action • Prepare recovery plan • Continue monitoring turbidity at dam M3 to identify change in clarity • Continue monitoring turbidity at LDP1 • Submit exceedance notification to the EPA if EPL 1389 discharge limits are exceeded • Monitor turbidity levels in watercourse approximately 100 m downstream of LDP1 to assess effect

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP1 STREAM WATER QUALITY FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA[1]

<table>
<tr><th>Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th>Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td colspan="3">Normal Condition</td></tr>
<tr><td rowspan="5"><u>Performance Measure Feature</u>
All watercourses within the Subsidence Area[1].

<u>Performance Measure</u>
No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.

The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur[2]. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures.

<u>Performance Indicator</u>
Exceedance of the site specific guideline values (SSGVs), as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.

<u>TARP Objective</u>
This TARP defines levels of variation in surface water quality from normal conditions[3] and the actions required to be implemented in response to each level of variation.

<u>Assessment Criteria</u>
SSGV as listed in table below.</td><td rowspan="5"><u>Locations</u>
<table><tr><th>Longwall</th><th>Potential Impact Sites</th><th>Reference Sites</th></tr><tr><td>LW S1A</td><td>TT7-QLa
TT12-QLa
TT13-QLa
TT14-QLa</td><td rowspan="3">TT1-QLa</td></tr><tr><td>LW S2A</td><td>TT9-QLa[4]
TT3-QLa[5]
All sites above</td></tr><tr><td>LW S3A</td><td>TT2-QLa
All sites above</td></tr><tr><td>LW S4A</td><td rowspan="3">BR2-QLa
TT1-QLa
All sites above</td><td rowspan="3">DT4-QLa
DT3-QLa</td></tr><tr><td>LW S5A</td></tr><tr><td>LW S6A</td></tr><tr><td>N/A</td><td>TT8-QRLa</td><td>TT1-QLa</td></tr></table>
All monitoring locations are shown in Figure 15.

<u>Monitoring Frequency</u>
Pre-mining
Monthly sampling prior to secondary extraction of relevant longwall.

During Mining
Monthly sampling and analysis or as required by a specified action relevant to a trigger level.

Post-mining
Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.</td><td>• Exceedance of an SSGV does not occur or occurs for less than three consecutive months.</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td colspan="3">Level 1</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as required for Normal Condition.
• Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.
• Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.
• Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.
• Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).</td><td>• Report trigger exceedance to DPE and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
• Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g. limestone cobbles for increasing pH level).
• Implement CMAs, subject to land access.
• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td colspan="3">Level 2</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact site in four or five consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as stated in Level 1.
• Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 2 has been reached or at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change that resulted in a water quality change).
• If increased monitoring is adopted, undertake further analysis of water quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.
• Review CMAs in light of findings from further investigations and consider additional remediation options.
• Review Water Management Plan and modify if necessary.</td><td>• Responses as stated in Level 1.
• Advise DPE and key stakeholders of any required amendments to Water Management Plan.
• Provide findings of CMA review to DPE and key stakeholders for consultation.
• Implement additional CMAs, subject to land access.</td></tr>
<tr><td colspan="3">Level 3</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact site in six consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as stated in Level 2.
• Increase monitoring and review of data frequency to fortnightly for sites where Level 3 has been reached and at corresponding reference sites, subject to land access.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effects unrelated to mining or the prevailing climate.</td><td>• Responses as stated in Level 2.
• If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:
o Offer site visit with DPE and other key stakeholders.
o Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.
o Implement approved WCAMP, subject to land access.</td></tr>
</table>

Site Specific Guideline Value (SSGV)							
Parameter	**TT1-QLa**	**TT2-QLa**	**TT7-QLa**	**TT12-QLa**	**TT13-QLa**	**TT14-QLa**	**TT8-QRLa**
No. of Values[6]	30	10[7]	33	11[8]	11[8]	11[8]	29
pH (pH units)	6.5 – 8	5.9 – 8	6.5 – 8	6.5 – 8	6.5 – 8	6.5 – 8	6.5 - 9
EC (µS/cm)	531	350	361	350	350	350	2,258
Dissolved Aluminium (mg/L) pH > 6.5	0.06	0.13	0.06	0.08	0.055	0.1	0.09
Dissolved Copper (mg/L)	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.002
Dissolved Iron (mg/L)	0.71	0.49	0.86	0.56	0.42	0.54	0.3
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011	0.011	0.06
Dissolved Zinc (mg/L)	0.03	0.03	0.03	0.008	0.008	0.008	0.06

Notes:
[1] Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.
[2] Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.
[3] As defined by the site specific guideline value (SSGV).
[4] Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall (with the exception of TT12-Qla, TT13-Qla, TT14-Qla which will have 12 months of baseline data). Additional sites will be included prior to commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be included in the Water Management Plan and provided to the relevant government agencies for review and approval.
[5] SSGVs have not been derived for TT3-QLa as the pool was dry on five of eight sampling occasions.
[6] Minimum number of values used in SSGV derivation – for some constituents, a greater number of values were adopted.
[7] Number of values used to derive SSGV for TT2-QLa, prior to commencement of mining LWS3A, is expected to be greater than 24.
[8] TT12-QLa, TT13-QLa, TT14-QLa – a minimum of 12 samples (12 months) would be collected prior to secondary extraction.

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP2 STREAM WATER QUALITY FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)

<table>
<tr><th>Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th>Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><td rowspan="13"><u>Performance Measure Feature</u>
Other watercourses.

<u>Performance Measure</u>
Negligible environmental consequences including beyond those predicted in the EIS.

<u>Performance Indicator</u>
The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water quality changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River.

<u>TARP Objective</u>
This TARP defines levels of variation in surface water quality from normal conditions[1], indicators of exceedance of the performance measure and the actions required to be implemented in response to each level of variation or exceedance of the performance measure.

<u>Assessment Criteria</u>
SSGV as listed in table below.</td><td rowspan="13"><u>Locations</u>
<table><tr><th>Longwall</th><th>Potential Impact Sites</th><th>Reference Sites</th></tr><tr><td>LW S1A</td><td>BR12-QLa
BR13-QRLa</td><td rowspan="2">BR16-QLa[2,3]</td></tr><tr><td>LW S2A</td><td>BR18-QLa[2]
All sites above</td></tr><tr><td>LW S3A</td><td>BR17-QLa[2]
All sites above</td><td></td></tr><tr><td>LW S4A
LW S5A</td><td>BR6-QLa[2]
All sites above</td><td>DT4-QLa
DT3-QLa
All sites above</td></tr><tr><td>LW S6A</td><td>HC13-QLa[2]
HC16-QLa[2]
HC4-QRLa
HC9-QLa
HC3-QLa
All sites above</td><td>HC2-QLa
HC17-QLa
HC1-QLa
All sites above</td></tr></table>All monitoring locations are shown in Figure 15.

<u>Monitoring Frequency</u>
Pre-mining
Monthly sampling prior to secondary extraction or other relevant mining activity.

During Mining
Monthly sampling and analysis or as required by a specified action relevant to a trigger level.

Post-mining
Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.</td><td>Trigger</td><td>Action</td><td>Response</td></tr>
<tr><td colspan="3">Normal Condition</td></tr>
<tr><td>• Exceedance of an SSGV does not occur or occurs for less than three consecutive months.</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td colspan="3">Level 1</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact site in three consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as required for Normal Condition.
• Assess if the trigger was exceeded during the baseline period prior to commencement of mining activities.
• Review water quality trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions.
• Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater quality monitoring results) necessary to inform assessment.
• Consider and decide on reasonable and feasible options for remediation as relevant (e.g. limestone cobbles for increasing pH level).</td><td>• Report trigger exceedance to DPE and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
• Provide DPE and key stakeholders with proposed CMAs for consultation (e.g. limestone cobbles for increasing pH level).
• Implement CMAs, subject to land access.
• Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td colspan="3">Level 2</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact sites in four or five consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as stated in Level 1.
• Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 2 has been reached or at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change that resulted in a water quality change).
• If increased monitoring is adopted, undertake further analysis of water quality trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions.
• Review CMAs in light of findings from further investigations and consider additional remediation options.
• Review Water Management Plan and modify if necessary.</td><td>• Responses as stated in Level 1.
• Advise DPE and key stakeholders of any required amendments to Water Management Plan.
• Provide findings of CMA review to DPE and key stakeholders for consultation.
• Implement additional CMAs, subject to land access.</td></tr>
<tr><td colspan="3">Level 3</td></tr>
<tr><td>• Exceedance of an SSGV occurs at a given potential impact site in six consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as stated in Level 2.
• Increase monitoring and review of data frequency to fortnightly for sites where Level 3 has been reached and at corresponding reference sites, subject to land access.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.
• Undertake an investigation to determine if an exceedance of the performance measure is likely.
•</td><td>• Responses as stated in Level 2.
• If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</td></tr>
<tr><td colspan="3">Exceeds Performance Measure</td></tr>
<tr><td>• It is concluded from the Level 3 investigation that mining results in exceedance of an SSGV at a given potential impact site for six or more consecutive months.</td><td>• Investigate reasons for the performance measure exceedance.
• Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with future longwall extraction.</td><td>• Submit a report to DPE (in accordance with E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).
• Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.
• Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).
• Offer site visit with DPE and other key stakeholders.
• Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.
• Implement approved WCAMP, subject to land access.</td></tr>
</table>

Site Specific Guideline Value (SSGV)					
Parameter	BR12-QLa	BR13-QRLa	HC9-QLa	HC4-QRLa	HC3-QLa
No. of Values[4]	35	35	34	28	30
pH (pH units)	6.5 - 8	6.5 - 8	5.7 - 8	6.5 - 8	6.5 - 8
EC (µS/cm)	350	350	365	350	350
Dissolved Aluminium (mg/L) pH > 6.5	0.062	0.055	0.09	0.07	0.1
Dissolved Copper (mg/L)	0.0014	0.0014	0.002	0.002	0.0014
Dissolved Iron (mg/L)	0.54	0.65	4.5	0.62	0.5
Dissolved Manganese (mg/L)	1.9	1.9	1.9	1.9	1.9
Dissolved Nickel (mg/L)	0.011	0.011	0.011	0.011	0.011
Dissolved Zinc (mg/L)	0.008	0.009	0.03	0.008	0.008

Notes:
[1] As defined by the SSGV.
[2] Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.
[3] Data collected from BR11-QRLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities. [4] Minimum number of values used in SSGV derivation - for some constituents, a greater number of values were adopted.

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP3 POOL WATER LEVEL FOR ALL WATERCOURSES WITHIN THE SUBSIDENCE AREA[1]

Performance Measure and Indicator, TARP Objective and Assessment Criteria

Performance Measure Feature
All watercourses within the Subsidence Area[1].

Performance Measure
No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS.

The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur[2]. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures.

Performance Indicator
Water level decline as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure.

TARP Objective
This TARP defines levels of variation in pool water level from normal conditions[3] and the actions required to be implemented in response to each level of variation.

Assessment Criteria
- Comparison of baseline and operational recorded water level data (all levels).
- Water level recession analysis for Level 2 and above.

Monitoring Program

Locations

Longwall	Potential Impact Sites	Reference Sites
LW S1A	TT7-QLa TT12-QLa TT13-QLa TT14-QLa	TT1-QLa
LW S2A	TT9-QLa[4] TT3-QLa All sites above	
LW S3A	TT2-QLa All sites above	
LW S4A	BR2-QLa[4] TT1-QLa All sites above	DT4-QLa DT3-QLa
N/A	TT8-QRLa	TT1-QLa

All monitoring locations are shown in Figure 15.

Monitoring Frequency

Pre-mining
Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.

During Mining
Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.

Post-mining
Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.

Management

Trigger	Action	Response
Normal Condition		
• The recorded water level has not declined below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	• Continue monitoring and review of data as per monitoring program.	• No response required.
Level 1		
• The recorded water level has declined by greater than 10 centimetres (cm) below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level) and the same has not occurred at the reference site(s).	• *Actions as required for Normal Condition.* • Review water level trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions. • Review streamflow data recorded at TT-F1 and conduct streamflow reduction assessment. • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment.	• Report trigger exceedance to DPE and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
Level 2		
• The recorded water level has declined atypically[5] below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).	• *Actions as stated in Level 1.* • Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 2 has been reached and at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change that resulted in a water level change). • If increased monitoring is undertaken, conduct further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions. • Review Water Management Plan and modify if necessary.	• *Responses as stated in Level 1.* • Advise DPE and key stakeholders of any required amendments to Water Management Plan.
Level 3		
• The recorded water level has declined atypically[6] below the recorded baseline minimum level for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).	• *Actions as stated in Level 2.* • Increase monitoring and review of data frequency to fortnightly for sites where Level 3 has been reached and at corresponding reference sites, subject to land access. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate.	• *Responses as stated in Level 2.* • If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts: • Offer site visit with DPE and other key stakeholders. • Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.

Notes:
[1] Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.
[2] Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.
[3] As indicated by the baseline water level and recession rate.
[4] Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The pool water levels for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.
[5] 'Atypical' surface water characteristics relate to a notable and/or rapid water level decline or change in the slope of the falling limb of the hydrograph or the water level recessionary behaviour below the cease to flow level which is inconsistent with baseline conditions and cannot be attributed to climatic conditions

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP4 POOL WATER LEVEL FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)

Performance Measure and Indicator, TARP Objective and Assessment Criteria

Performance Measure Feature
Other watercourses.

Performance Measure
Negligible environmental consequences including beyond those predicted in the EIS, including:

- Negligible diversion of flows or changes in the natural drainage behaviour of pools.

Performance Indicator
The performance measure will be considered to be exceeded if a Level 3 TARP is triggered in relation to water level changes and the investigation outcomes indicate a mining related impact based on monitoring data for sites in Hornes Creek and the Bargo River.

TARP Objective
This TARP defines levels of variation in pool water level from normal conditions[1] and the actions required to be implemented in response to each level of variation.

Assessment Criteria

- Comparison of baseline and operational recorded water level data (all levels).
- Water level recession analysis for Level 2 and above.

Monitoring Program

Locations

Longwall	Potential Impact Sites	Reference Sites
LW S1A	BR12-QLa BR13-QRLa	BR16-QLa[2,3]
LW S2A	BR18-QLa[2] All sites above	
LW S3A	BR17-QLa[2] All sites above	
LW S4A LW S5A	BR6-QLa[2] All sites above	DT4-QLa DT3-QLa All sites above
LW S6A	HC13-QLa[2] HC16-QLa[2] HC4-QRLa HC9-QLa HC3-QLa All sites above	HC2-QLa HC17-QLa HC1-QLa All sites above

All monitoring locations are shown in Figure 15.

Monitoring Frequency

Pre-mining
Continuous record and monthly manual measurements. Data downloaded prior to the commencement of secondary extraction of the relevant longwall.

During Mining
Continuous record and monthly manual measurements. Data downloaded and reviewed monthly.

Post-mining
Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.
.

Management

Trigger	Action	Response
Normal Condition		
• The recorded water level has not declined below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level).	• Continue monitoring and review of data as per monitoring program.	• No response required.
Level 1		
• The recorded water level has declined by greater than 10 centimetres (cm) below the recorded baseline minimum level (for more than one 24 hour period for automated pool water level) and the same has not occurred at the reference site(s).	• *Actions as required for Normal Condition.* • Review water level trends along watercourse (upstream to downstream) to identify spatial changes with consideration to climatic conditions. • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, groundwater level monitoring results) necessary to inform assessment. •	• Report trigger exceedance to DPE and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
Level 2		
• The recorded water level has declined atypically[4] below the recorded baseline minimum level for less than one month (as a consecutive period) and the same has not occurred at the reference site(s).	• *Actions as stated in Level 1.* • Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 2 has been reached or at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change that resulted in a water level change). • If increased monitoring is adopted, undertake further analysis of water level trends along creek (upstream to downstream) to identify spatial changes with consideration to climatic conditions. • Complete water level recession analysis for sites where Level 2 has been reached. • Review Water Management Plan and modify if necessary.	• *Responses as stated in Level 1.* • Advise DPE and key stakeholders of any required amendments to Water Management Plan.
Level 3		
• The recorded water level has declined atypically[4] below the recorded baseline minimum level for greater than one month (as a consecutive period) and the same has not occurred at the reference site(s).	• *Actions as stated in Level 2.* • Increase monitoring and review of data frequency to fortnightly for sites where Level 3 has been reached and at corresponding reference sites, subject to land access. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing), other catchment changes, effect unrelated to mining or the prevailing climate. • Undertake an investigation to determine if an exceedance of the performance measure is likely.	• *Responses as stated in Level 2.* • If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.
Exceeds Performance Measure		
• It is concluded from the detailed investigation that mining has resulted in an atypical[3] decline in water level for greater than one month (as a consecutive period).	• Investigate reasons for the performance measure exceedance. • Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with further longwall extraction.	• Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE). • Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days. • Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project). • Offer site visit with DPE and other key stakeholders. • Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.

Notes:
[1] As indicated by the baseline water level and recession rate.
[2] Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.
[3] Data collected from BR11-QRLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities.
[4] 'Atypical' surface water characteristics relate to a notable and/or rapid water level decline or change in the slope of the falling limb of the hydrograph or the water level recessionary behaviour below the cease to flow level which is inconsistent with baseline conditions and cannot be attributed to climatic conditions.

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP5 PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF WATERCOURSES WITHIN THE SUBSIDENCE AREA[1]

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	**Action**	**Response**
Performance Measure Feature All watercourses within the Subsidence Area[1]. **Performance Measure** No greater subsidence impact or environmental consequences to water quality, water flows (including baseflow) or stream health (including riparian vegetation), than predicted in the EIS. The EIS concludes that where the longwalls directly mine beneath the streams, it is considered likely that fracturing would result in surface water flow diversion and that localised and transient increases in water quality constituents would occur[2]. The performance measure will be considered to be exceeded if subsidence impacts cannot be repaired in a manner that restores pool water holding capacity and stream health. Remediation measures will be developed as required and detailed in the Watercourse Corrective Action Management Plan (C12 of the SSD 8445). These plans will contain relevant performance indicators specific to remediation performance measures. **Performance Indicator** Variation in pool physical features and natural behaviour, as defined in the Level 1 to Level 3 trigger, where a Level 3 trigger denotes progression towards a potential exceedance of the performance measure. **TARP Objective** This TARP defines levels of variation in pool physical features and natural behaviour and the actions required to be implemented in response to each level of variation. **Assessment Criteria** Comparison of baseline and operational pool physical features and natural behaviour.	**Locations** Accessible pools and reaches in Teatree Hollow, Teatree Hollow Tributary and Bargo River Tributary (subject to land access). **Monitoring Frequency** **Pre-mining** One observation prior to mining using fixed location photo points. **During Mining** Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone[3] using fixed location photo points. **Post-mining** Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.	**Normal Condition**		
		• No observed impact to pool water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions.	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s)[3]. AND/OR • Visual observation of fracturing.	• *Actions as required for Normal Condition.* • Assess visual change along watercourse (upstream to downstream) to observe any spatial changes with consideration to climatic conditions. • Discuss findings with and obtain other relevant information from key specialists (e.g. subsidence monitoring results, surface water monitoring results, groundwater monitoring results) necessary to inform assessment. • Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 1 has been reached and at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base).	• Report trigger exceedance to DPE and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.
		Level 2		
		• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).	• *Actions as stated in Level 1.* • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate). • Review Water Management Plan and modify if necessary. • If the changes have been confirmed to be related to mining effects: ○ Increase monitoring and review of data frequency to fortnightly for sites where Level 2 has been reached and at corresponding reference sites, subject to land access.	• *Responses as stated in Level 1.* • Advise DPE and key stakeholders of any required amendments to Water Management Plan.
		Level 3		
		• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s). AND • The change in behaviour has been investigated and confirmed to be related to mining effects.	• *Actions as stated in Level 2.*	• *Responses as stated in Level 2.* • Offer site visit with DPE and other key stakeholders. • Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection. • Implement approved WCAMP, subject to land access.

Notes:
[1] Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.
[2] Due to the predicted surface fracturing of watercourses which directly overlie the longwall panels.
[3] Survey area to include upstream, downstream and adjacent pools (to the extent of the potential impact) where a trigger exceedance has occurred at a potential impact site(s) in accordance with the TARPs.

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP6 PHYSICAL FEATURES AND NATURAL BEHAVIOUR OF POOLS FOR OTHER WATERCOURSES (BARGO RIVER AND HORNES CREEK)

<table>
<tr><th>Performance Measure and Indicator, TARP Objective and Assessment Criteria</th><th>Monitoring Program</th><th colspan="3">Management</th></tr>
<tr><td rowspan="11"><u>Performance Measure Feature</u>
Other watercourses.

<u>Performance Measure</u>
Negligible environmental consequences including beyond those predicted in the EIS, including:
• Negligible diversion of flows or changes in the natural drainage behaviour of pools;
• Negligible gas releases and iron staining; and
• Negligible increase in water turbidity.

<u>Performance Indicator</u>
The performance measure will be considered to be exceeded if changes in physical features and natural behaviour of pools occur for three consecutive months and the investigation outcomes indicate a mining related impact based on visual observation records for sites in Hornes Creek and the Bargo River.

<u>TARP Objective</u>
This TARP defines levels of variation in pool physical features and natural behaviour and the actions required to be implemented in response to each level of variation.

<u>Assessment Criteria</u>
Comparison of baseline and operational pool physical features and natural behaviour.</td><td rowspan="11"><u>Locations</u>
<table><tr><th>Longwall</th><th>Potential Impact Sites</th><th>Reference Sites</th></tr><tr><td>LW S1A</td><td>BR12-QLa
BR13-QRLa</td><td>BR16-QLa[1,2]</td></tr><tr><td>LW S2A</td><td>BR18-QLa[1]
All sites above</td><td></td></tr><tr><td>LW S3A</td><td>BR17-QLa[1]
All sites above</td><td></td></tr><tr><td>LW S4A</td><td rowspan="2">BR6-QLa[1]
All sites above</td><td>DT4-QLa</td></tr><tr><td>LW S5A</td><td>DT3-QLa
All sites above</td></tr><tr><td>LW S6A</td><td>HC13-QLa[1]
HC16-QLa[1]
HC4-QRLa
HC9-QLa
HC3-QLa
All sites above</td><td>HC2-QLa
HC17-QLa
HC1-QLa
All sites above</td></tr></table>
Pre-mining
One observation prior to mining using fixed location photo points.

During Mining
Observations every month during the active subsidence period (after 200 m of secondary extraction of relevant longwall) for sites within the active subsidence zone using fixed location photo points.

Post-mining
Monthly sampling and analysis for a minimum of 12 months following the completion of mining activities or as required in accordance with a Watercourse Corrective Action Management Plan.</td><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td>Normal Condition</td></tr>
<tr><td>• No observed impact to pool water level, overland connected flow, iron staining, gas release, turbidity or channel stability - as compared with baseline conditions.</td><td>• Continue monitoring and review of data as per monitoring program.</td><td>• No response required.</td></tr>
<tr><td>Level 1</td></tr>
<tr><td>• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs in one month and the same has not occurred at the reference site(s).
AND/OR
• Visual observation of fracturing.</td><td>• Actions as required for Normal Condition.
• Assess visual change along watercourse (upstream to downstream) 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.
• Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 1 has been reached and at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. surface fracturing of weathered bedrock that does not affect water holding capacity of rockbar control or pool base).</td><td>• Report trigger exceedance to DPE and key stakeholders.
• Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review.</td></tr>
<tr><td>Level 2</td></tr>
<tr><td>• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for two consecutive months and the same has not occurred at the reference site(s).</td><td>• Actions as stated in Level 1.
• Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g. whether there has been subsidence induced fracturing other catchment changes, effect unrelated to mining or the prevailing climate).
• Review Water Management Plan and modify if necessary.
• If the changes have been confirmed to be related to mining effects:
o Increase monitoring and review of data frequency to fortnightly for sites where Level 2 has been reached and at corresponding reference sites, subject to land access.
o Undertake an investigation to determine if an exceedance of the performance measure is likely.</td><td>• Responses as stated in Level 1.
• Advise DPE and key stakeholders of any required amendments to Water Management Plan.
• If relevant, notify DAWE of any predictions of an exceedance of a performance measure within two business days.</td></tr>
<tr><td>• Exceeds Performance Measure</td></tr>
<tr><td>• Visually observed anomalous change in water level, overland connected flow, iron staining, gas release or turbidity - as compared with baseline conditions - occurs for three consecutive months and the same has not occurred at the reference site(s).
AND
• The change in behaviour has been investigated and confirmed to be related to mining effects.</td><td>• Actions as stated in Level 2.
• Investigate reasons for the performance measure exceedance.
• Based on the outcomes of the investigation, review predictions of subsidence impacts and environmental consequences associated with further longwall extraction.</td><td>• Responses as stated in Level 2.
• Submit a report to DPE (in accordance with Condition E4 of SSD 8445) within 14 days of the exceedance occurring (or other timeframe agreed by DPE).
• Notify DAWE of any detection or predictions of an exceedance of a performance measure within two business days.
• Submit an Impact Response Plan to DAWE (in accordance with Condition 11 of the DAWE Consent for the Tahmoor South Project).
• Offer site visit with DPE and other key stakeholders.
• Develop Watercourse Corrective Action Management Plan (WCAMP) in consultation with the Resources Regulator, DPE and other key stakeholders (in accordance with C12 of SSD 8445). The stream remediation measures in the WCAMP could include grout curtain and grout pattern injection.
• Implement approved WCAMP, subject to land access.</td></tr>
<tr><td colspan="4">[1] Sites to be installed, subject to land access. The monitoring program relevant to this TARP has been designed to record at least 24 months of baseline data prior to commencement of mining of the relevant longwall. Additional sites will be included prior to the commencement of mining the relevant longwall. The derived SSGV for each relevant monitoring site would be updated in the Water Management Plan and provided to the relevant government agencies for review and approval.
[2] Data collected from BR11-QRLa (water quality data collected between 2012-2021 and water level data collected between 2013-2021) will be used in combination with data from BR16-QLa (once established) to provide a long-term baseline dataset for the Bargo River upstream of mining activities.</td></tr>
</table>

LWS1A-S6A WATER MANAGEMENT PLAN TARP – WMP7 CHANNEL STABILITY, SEDIMENTATION AND EROSION

Performance Measure and Indicator, TARP Objective and Assessment Criteria	Monitoring Program	Management		
		Trigger	**Action**	**Response**
Performance Measure Feature No performance measure relevant[1,2,3]. **TARP Objective** This TARP defines levels of variation in channel stability, erosion and sedimentation and the actions required to be implemented in response to each level of variation. **Assessment Criteria** Comparison of baseline and operational condition of headwater streams and soft knickpoints.	**Locations** 10 headwater sites and soft knickpoints, as shown in Figure 22 of the Water Management Plan. **Monitoring Frequency** **Pre-mining** • One observation prior to mining using fixed location photo points. • One inspection of 10 headwater sites. **During Mining** • Observations of knickpoint formation every month during the active subsidence period for sites within the active subsidence zone using fixed location photo points. • Annual inspection of 10 headwater sites. **Post-mining** • One observation of knickpoint formation at sites that are no longer within the active subsidence zone using fixed location photo points. • One inspection of 10 headwater sites. • Post-mining geomorphology survey following completion of mining.	**Normal Condition**		
		• No further development of soft knickpoints or increased erosion of headwater streams.	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• Visually observed minor increase in knickpoint development and/or minor erosion and sedimentation of headwater streams.	• *Actions as required for Normal Condition.* • Discuss findings and obtain other relevant information from key specialists (e.g. subsidence monitoring results, biodiversity monitoring results) necessary to inform assessment. • Consider increasing monitoring and review of data frequency to fortnightly at sites where Level 2 has been reached or at other relevant sites, subject to land access. Reasons for not increasing monitoring frequency could include confident identification of causation (e.g. singular, anthropogenic, non-mining related change that resulted in increased erosion). • Consider and decide on reasonable and feasible options for remediation as relevant (e.g. enhanced vegetation establishment, rock armouring).	• Report trigger exceedance to DPE and key stakeholders. • Report trigger exceedance and investigation outcomes in Six Monthly Subsidence Impact Report and Annual Review. • Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for approval (e.g. enhanced vegetation establishment, rock armouring). • Implement CMAs, subject to land access. • Monitor and report on success of CMAs in Six Monthly Subsidence Impact Report and Annual Review.
		Level 2		

		• Visually observed moderate increase in knickpoint development and/or moderate or greater increase in erosion and sedimentation of headwater streams.	• *Actions as stated in Level 1.*
			• Increase monitoring and review of data frequency to fortnightly for sites where Level 3 has been reached and at corresponding reference sites, subject to land access.
			• Undertake an investigation to assess if the change in behaviour is related to mining effects (e.g. subsidence induced, other catchment changes, effect unrelated to mining or the prevailing climate).
			• Obtain specialist advice on further CMAs.
			• Review CMAs in light of findings from further investigations and consider additional remediation options.
			• Review Water Management Plan and modify if necessary.
				• *Responses as stated in Level 1.*
				• Advise DPE and key stakeholders of any required amendments to Water Management Plan.
				• If it is concluded from the detailed investigation that watercourses have been damaged by subsidence impacts:
				  ○ Offer site visit with DPE and other key stakeholders.
				  ○ Provide findings of CMA review to DPE and key stakeholders for consultation.
				  ○ Implement additional CMAs, subject to land access.

Notes:
[1] Subsidence Area is defined as the 'Subsidence Study Area' as illustrated in Figure 1 of Appendix 2 of SSD 8445.
[2] It is noted that SSD 8445 does not specify a performance measure in relation to channel stability, sedimentation and erosion for all watercourses within the Subsidence Area[1].
[3] It is noted that no soft knickpoints have been mapped in Hornes Creek or Bargo River. Therefore, assessment of 'decline in baseline channel stability' for these watercourses is not applicable.

Appendix B Surface Water Level Plots

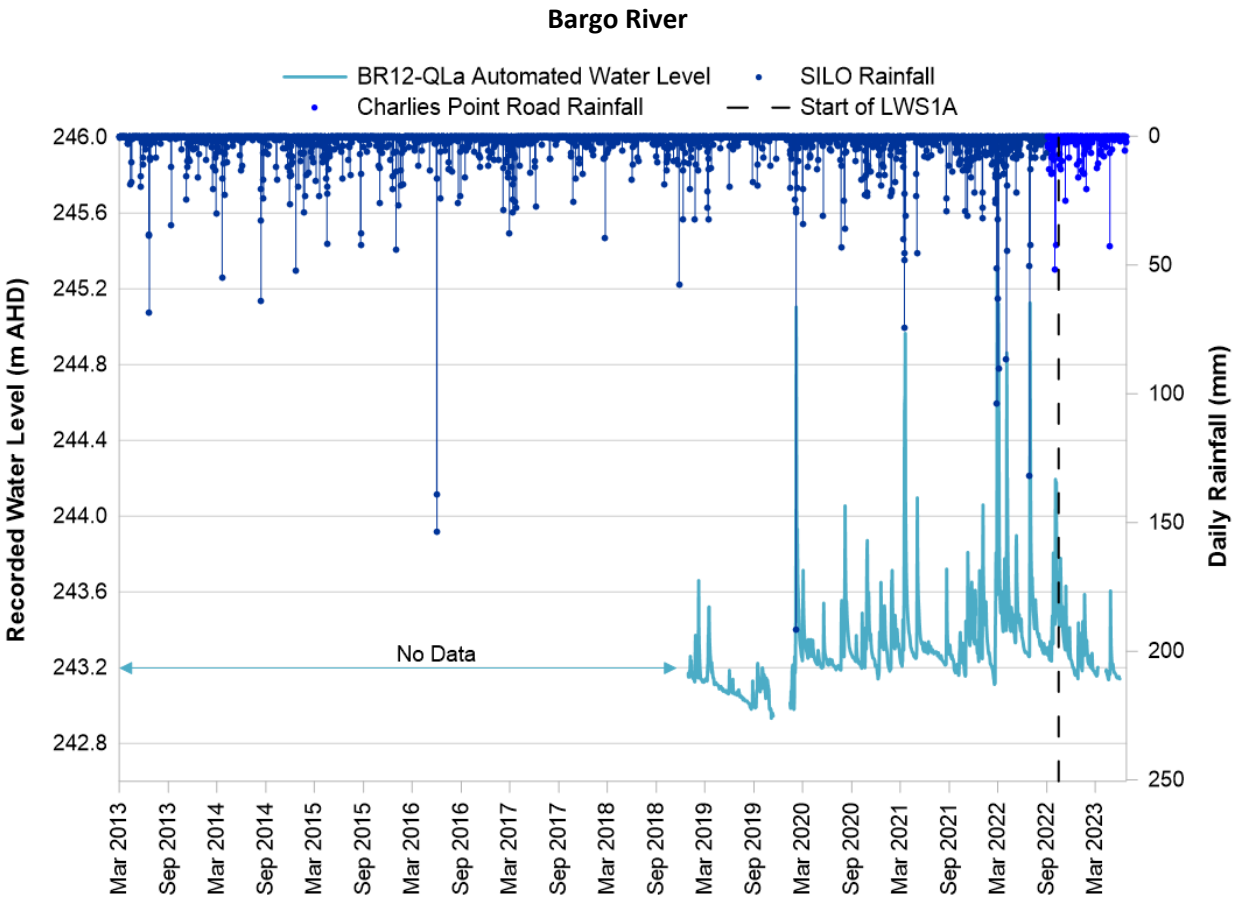


Figure B1 BR12-QLa Water Level Records

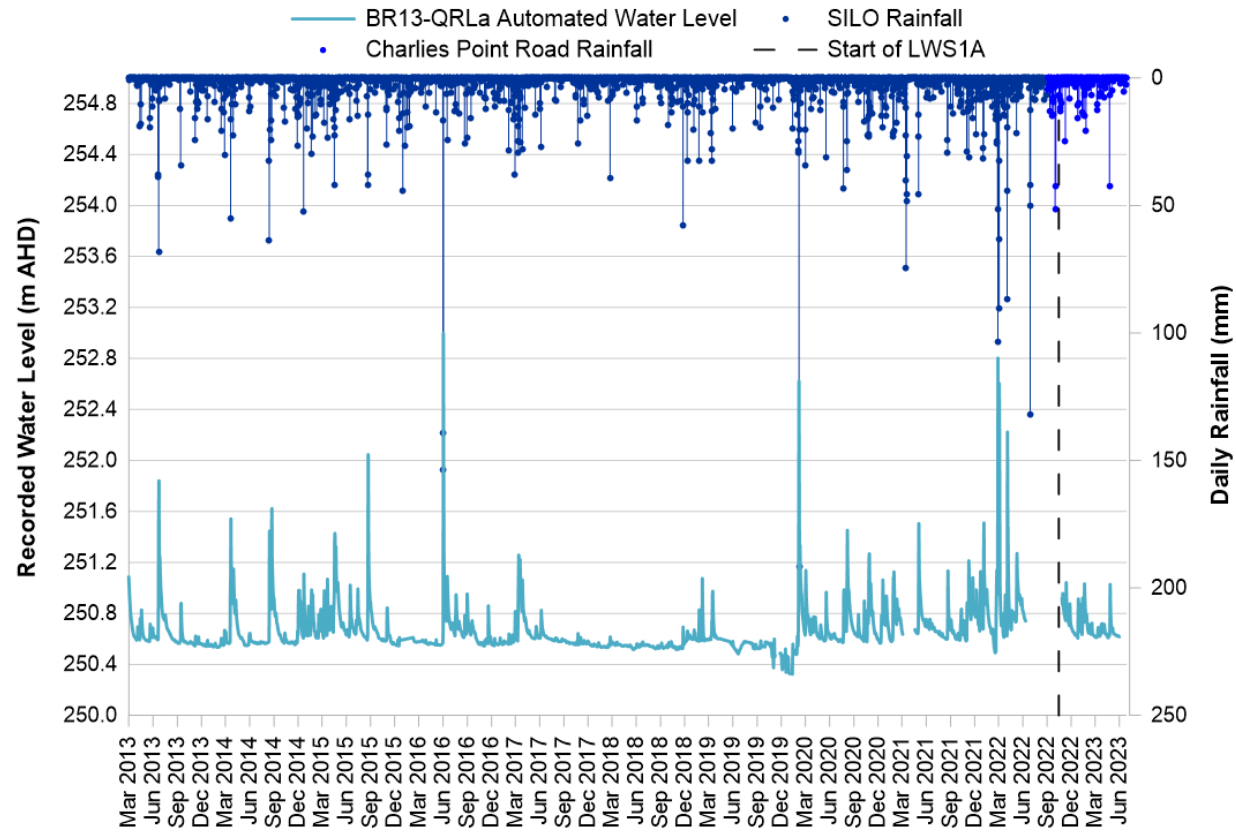


Figure B2 BR13-QRLa Water Level Records

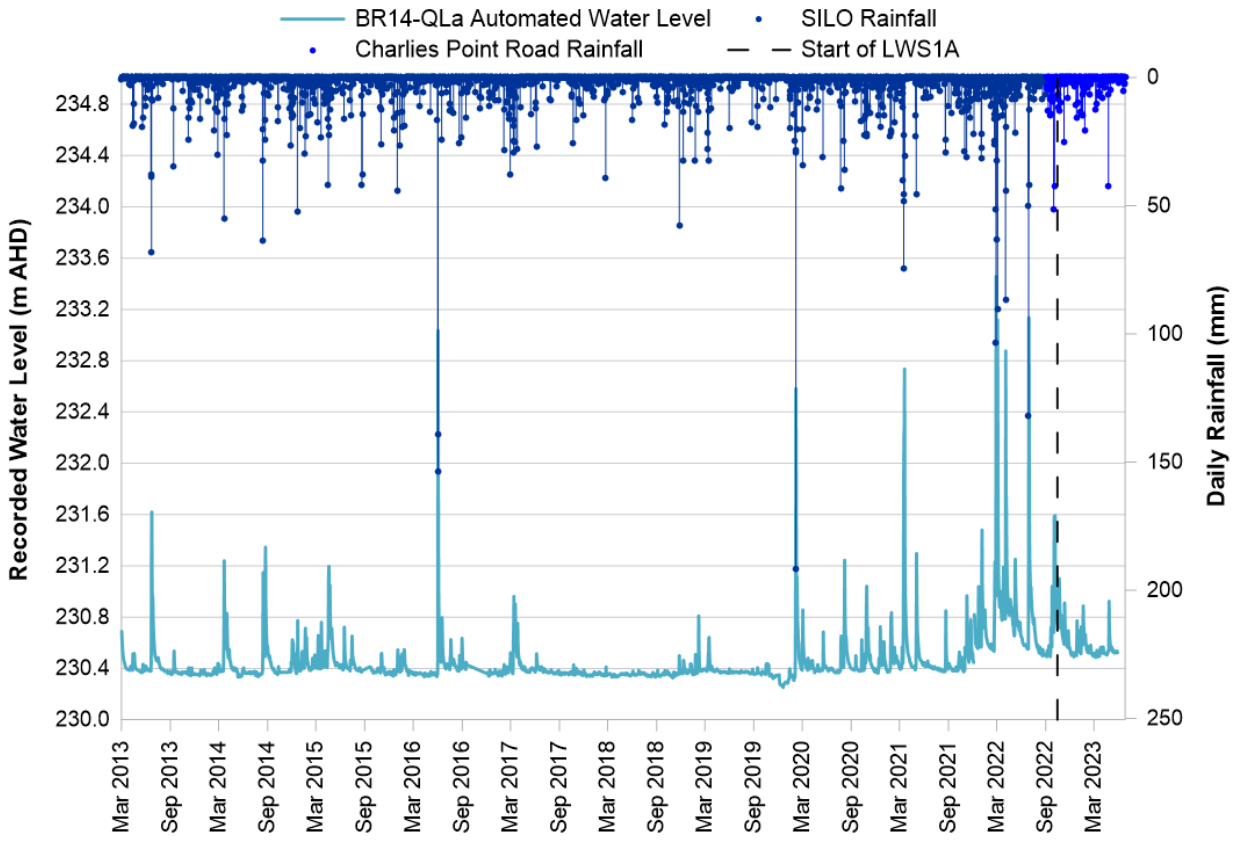


Figure B3 BR14-QLa Water Level Records

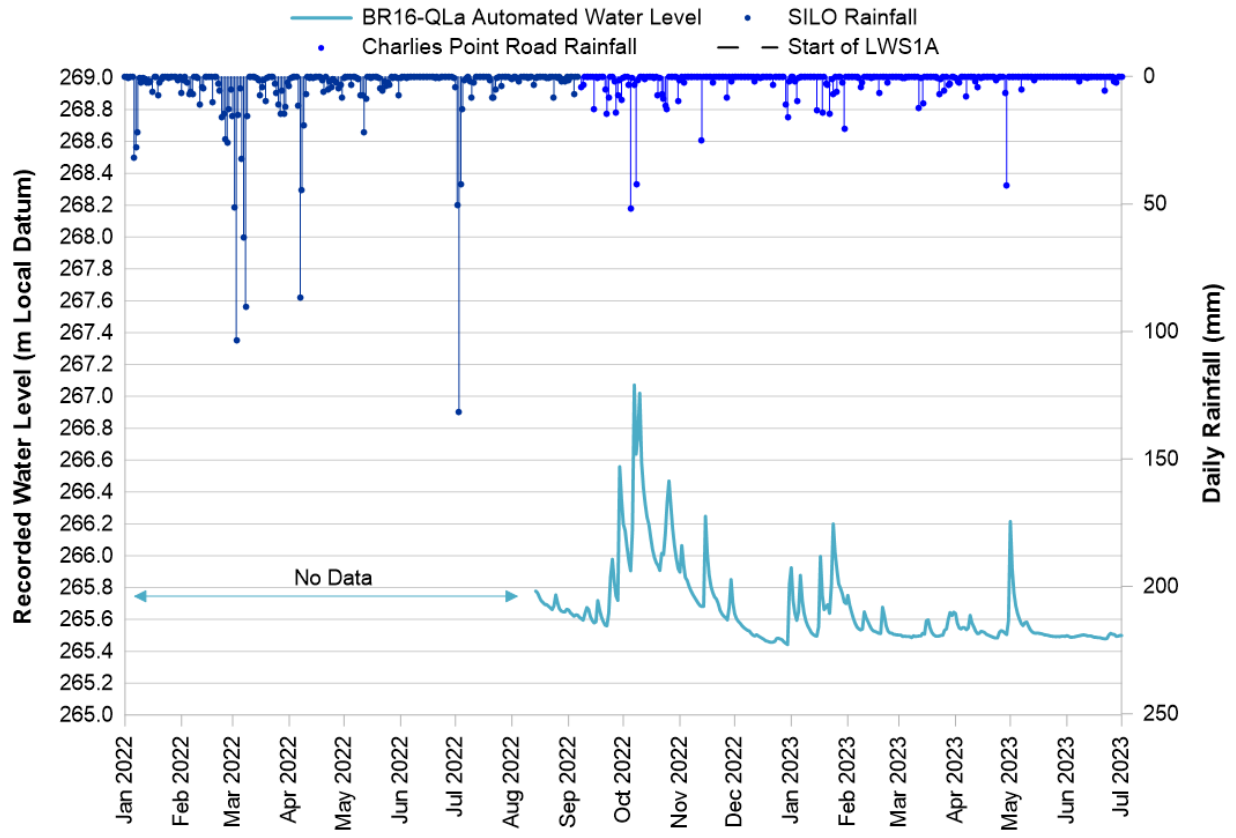


Figure B4 BR16-QLa Water Level Records

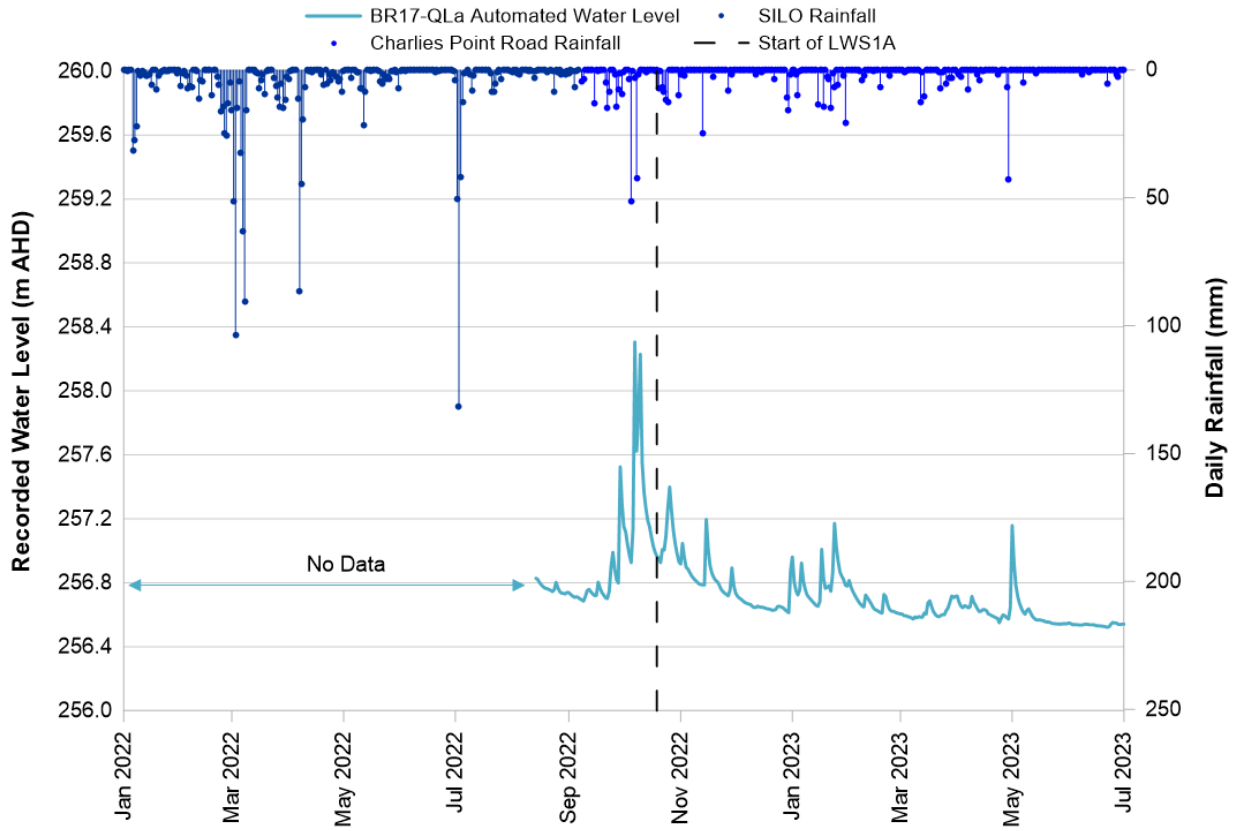


Figure B5 BR17-QLa Water Level Records

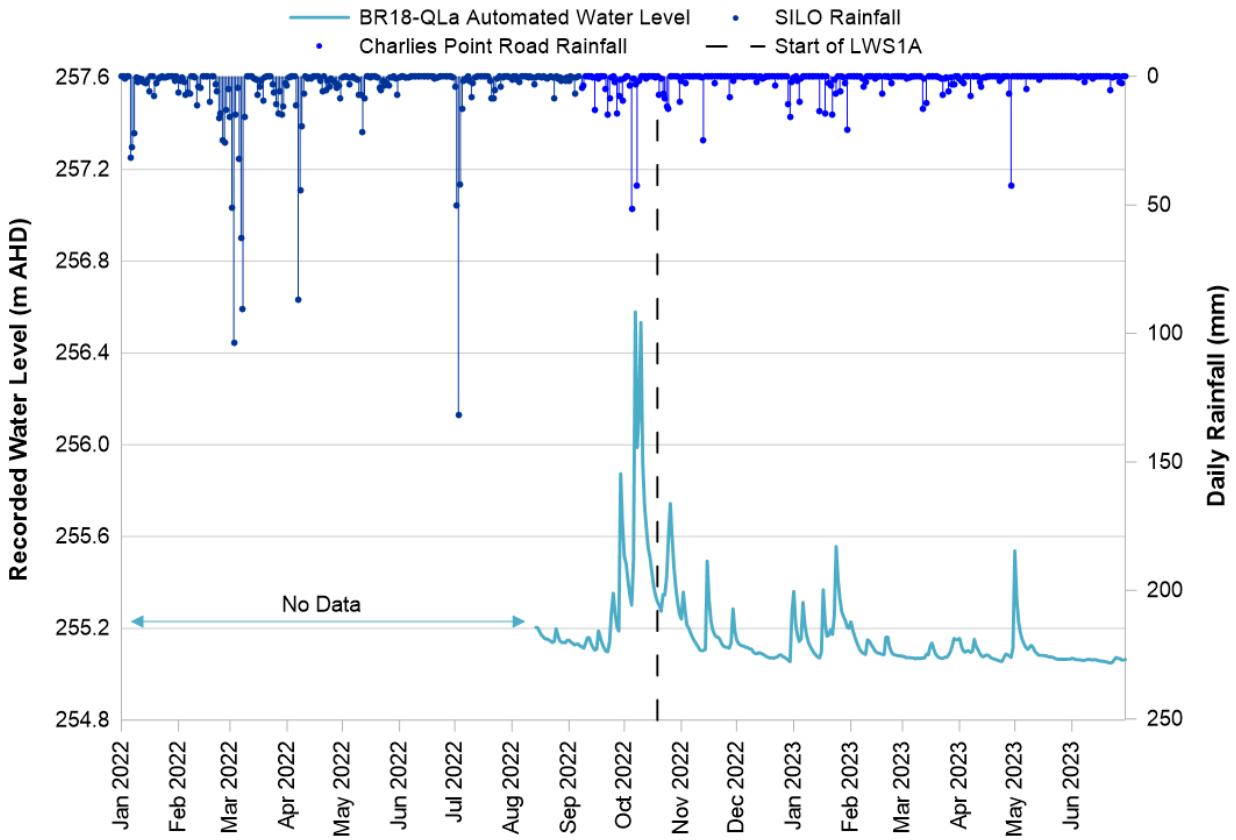


Figure B6 BR18-QLa Water Level Records

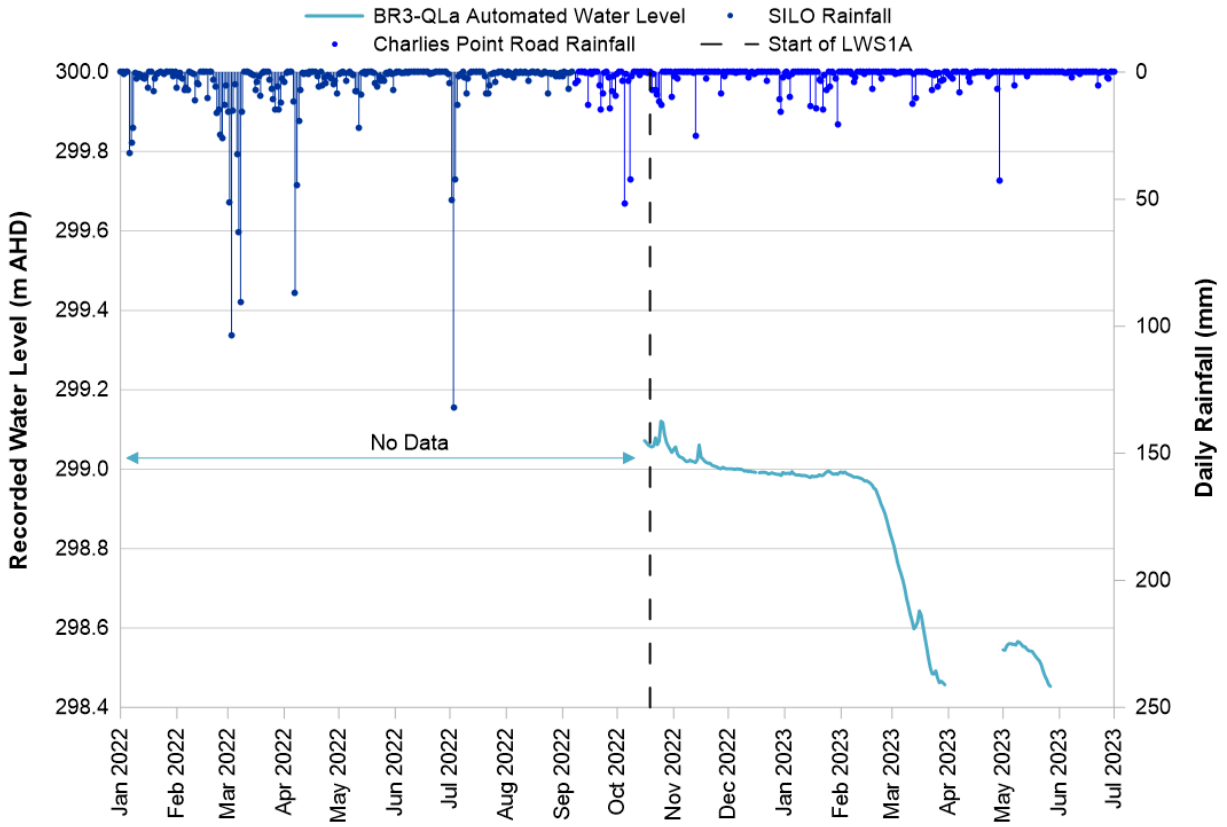


Figure B7 BR3-QLa Water Level Records

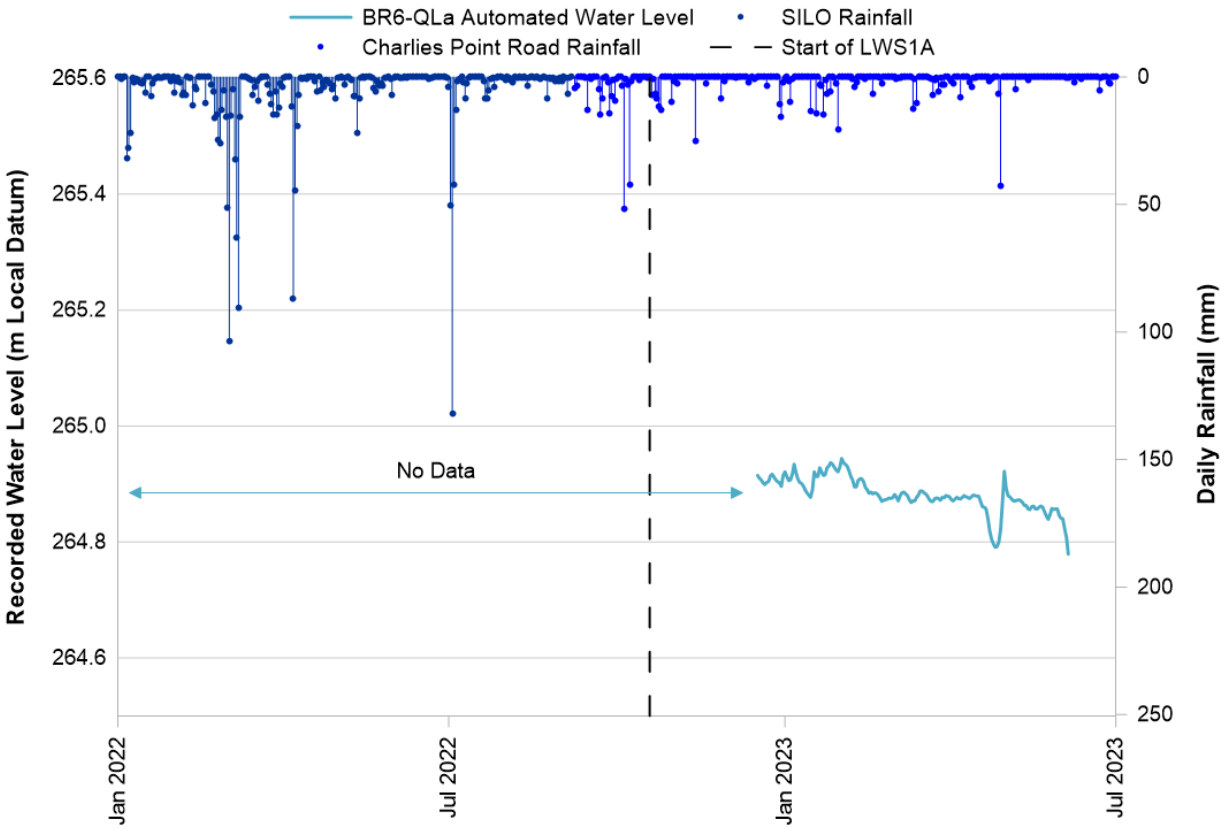


Figure B8 BR6-QLa Water Level Records

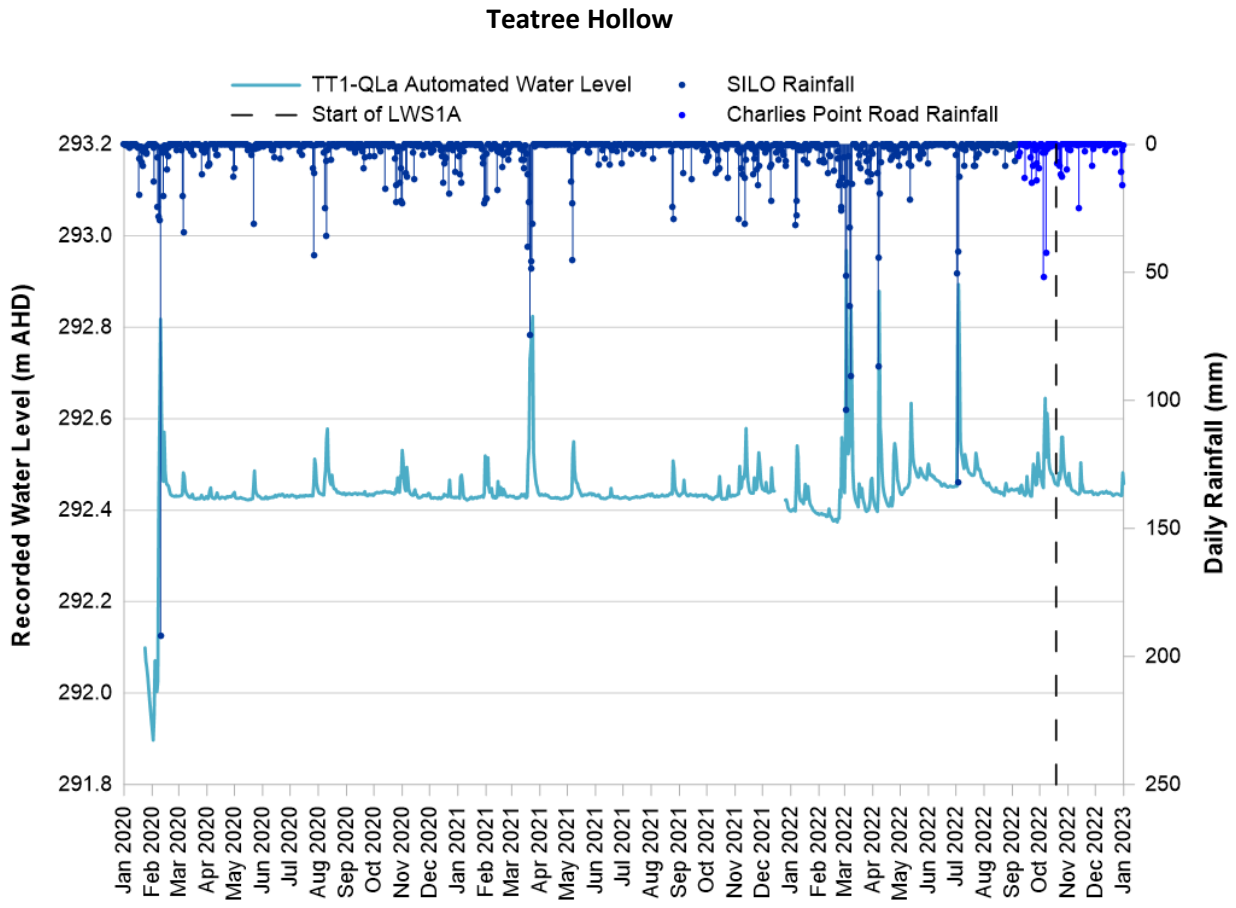


Figure B9 TT1-QLa Water Level Records

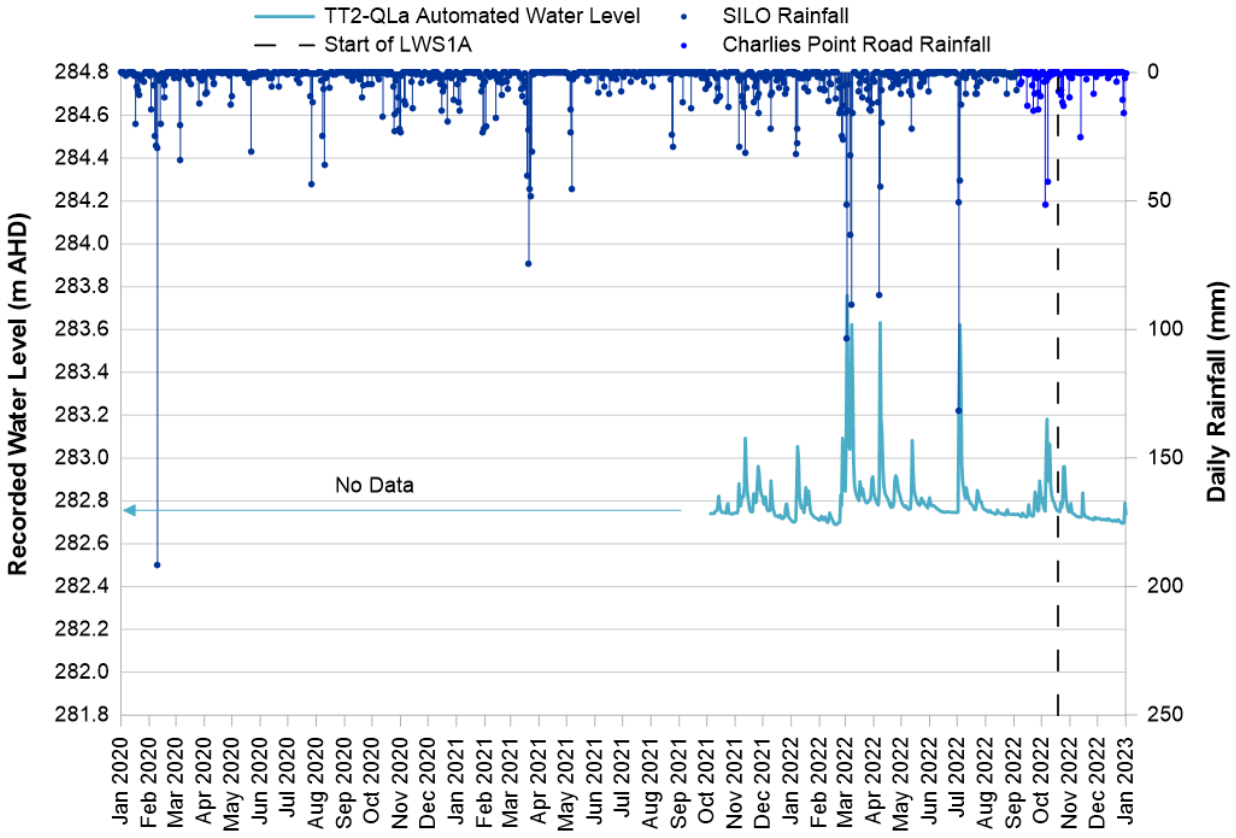


Figure B10 TT2-QLa Water Level Records

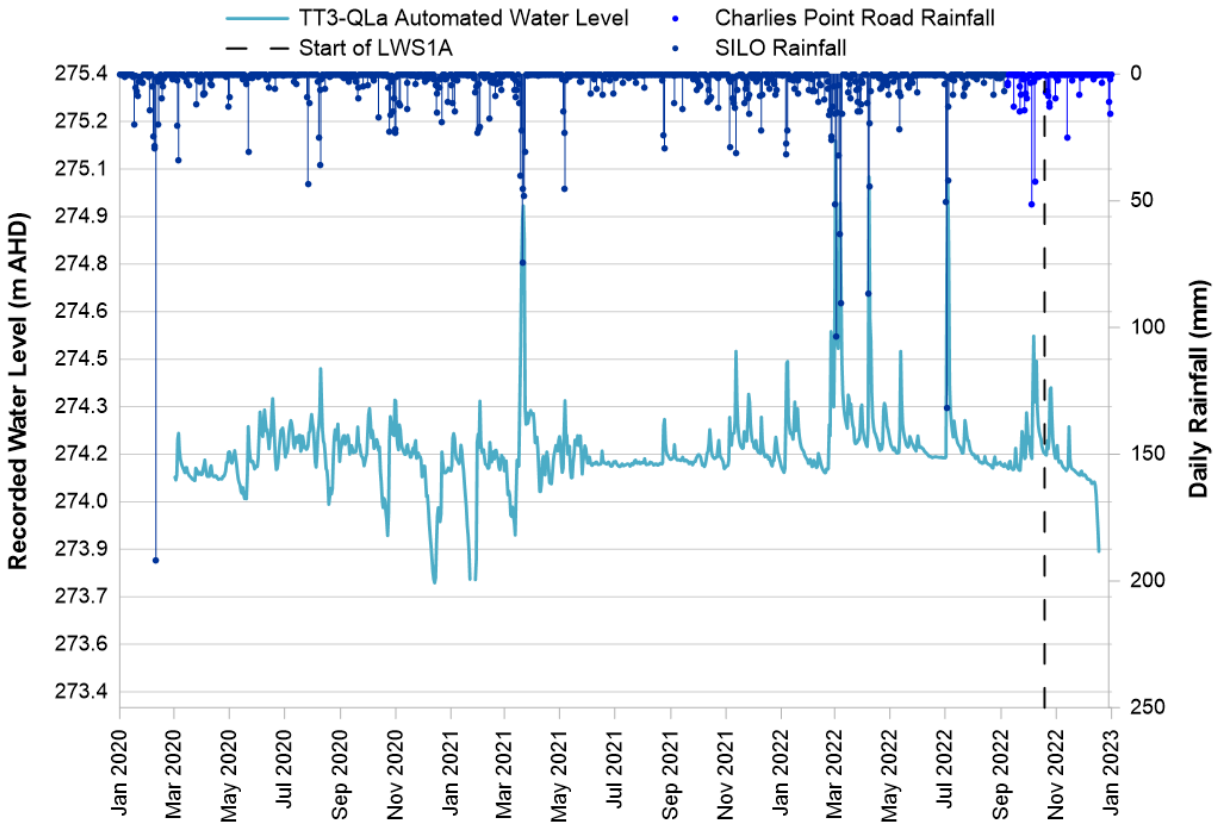


Figure B11 TT3-QLa Water Level Records

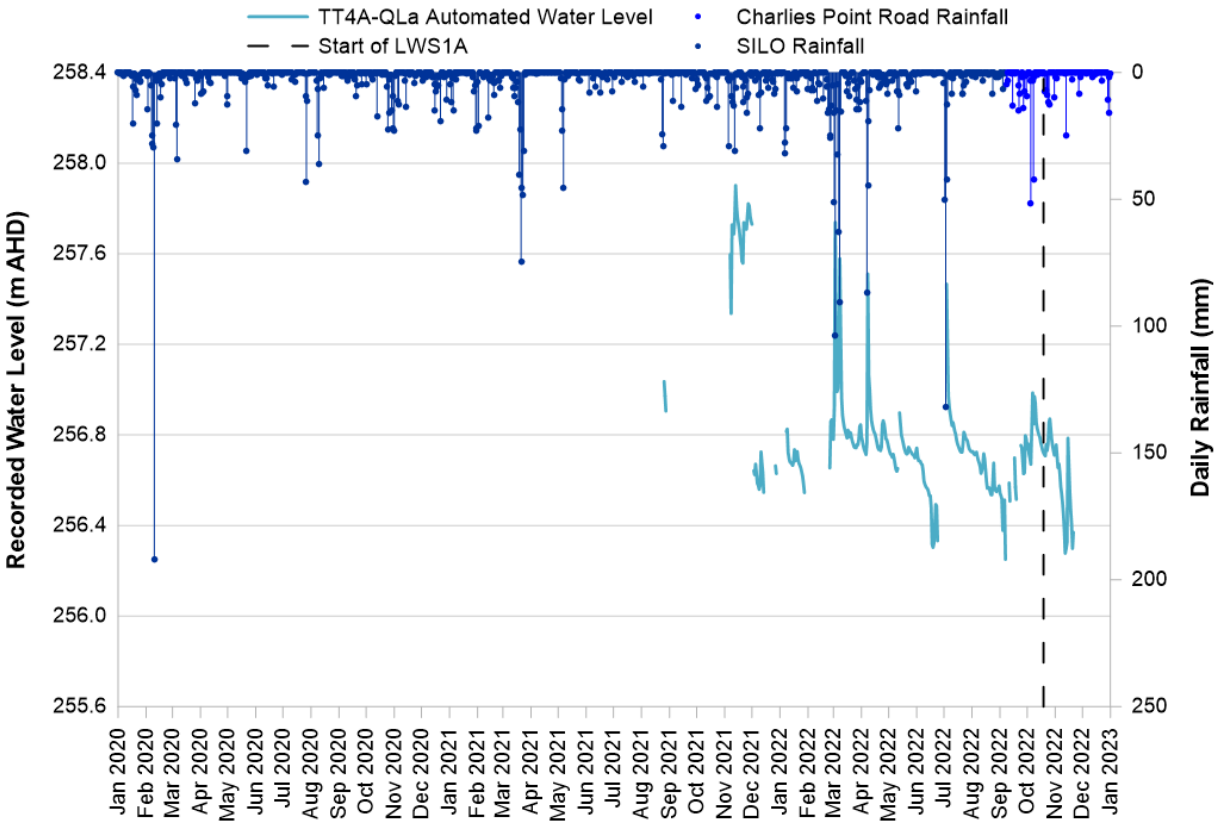


Figure B12 TT4A-QLa Water Level Records

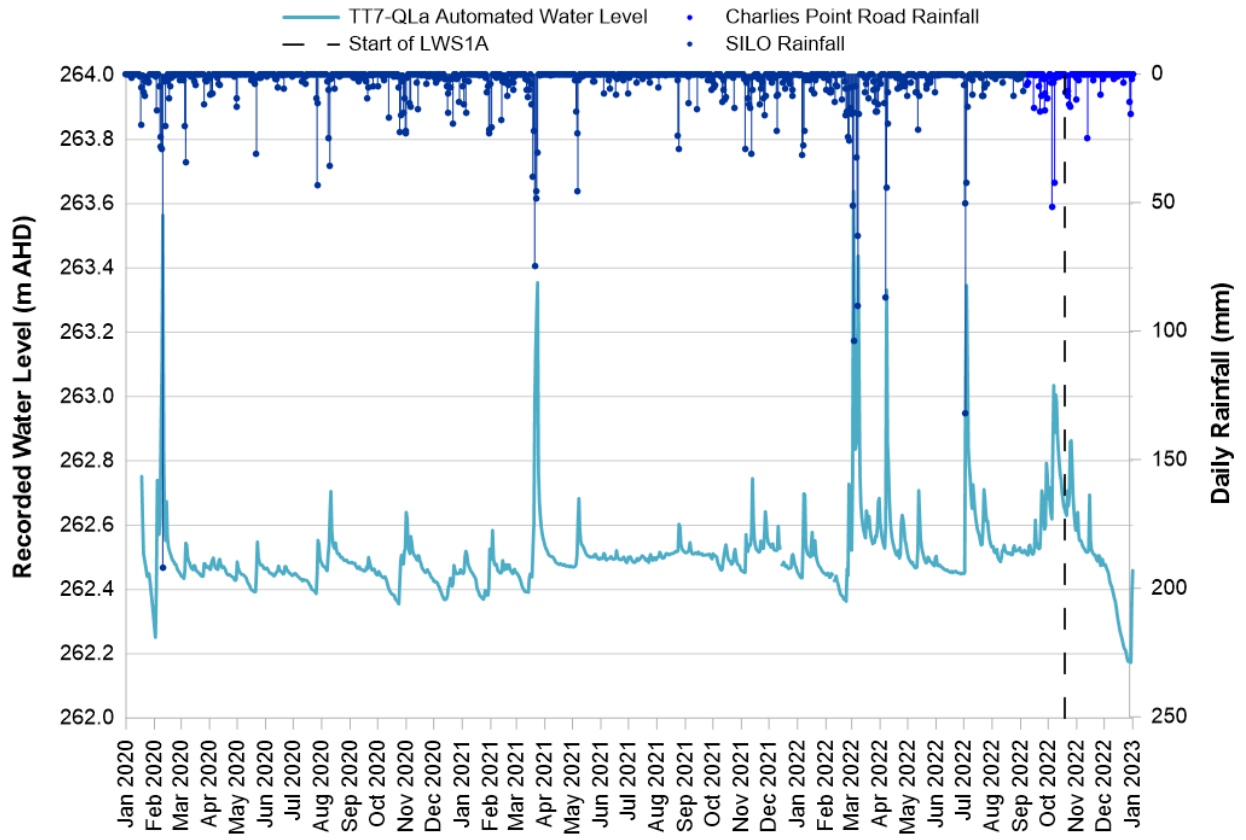


Figure B13 TT7-QLa Water Level Records

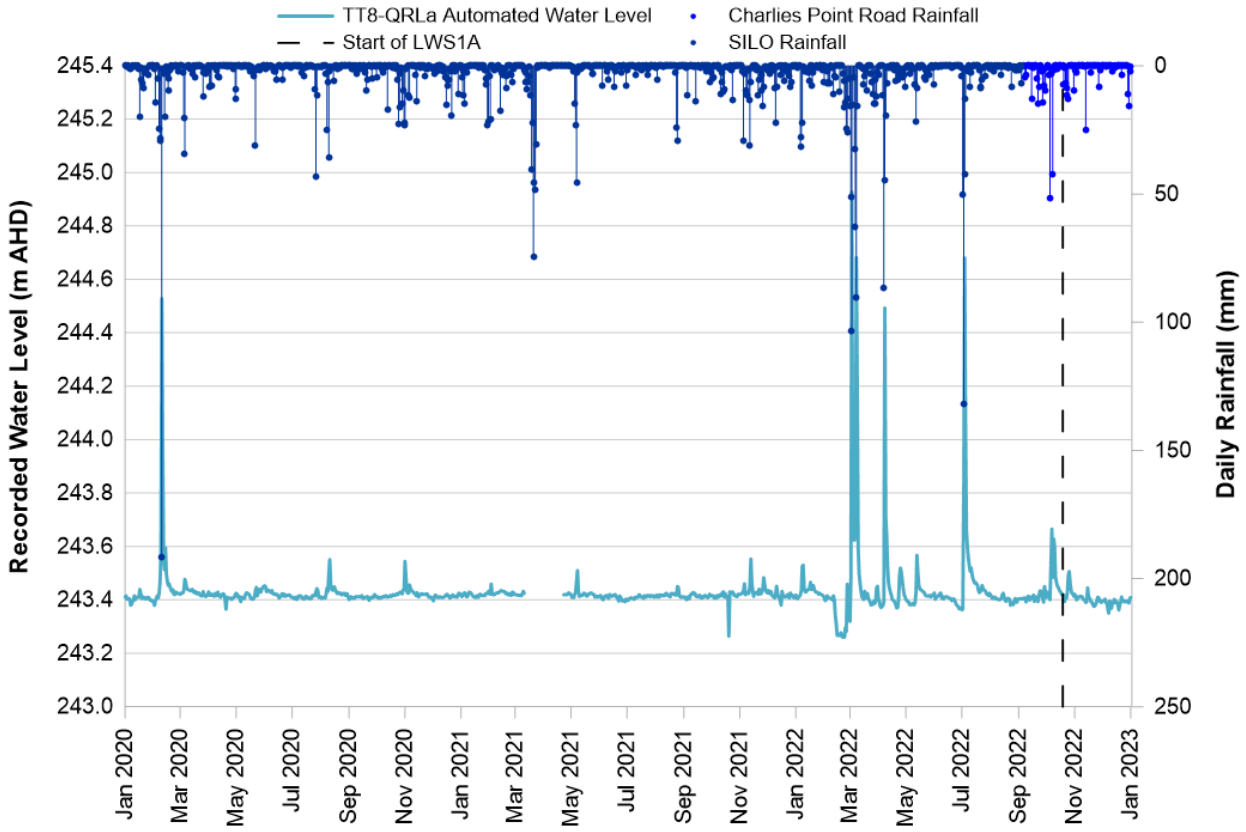


Figure B14 TT8-QRLa Water Level Records

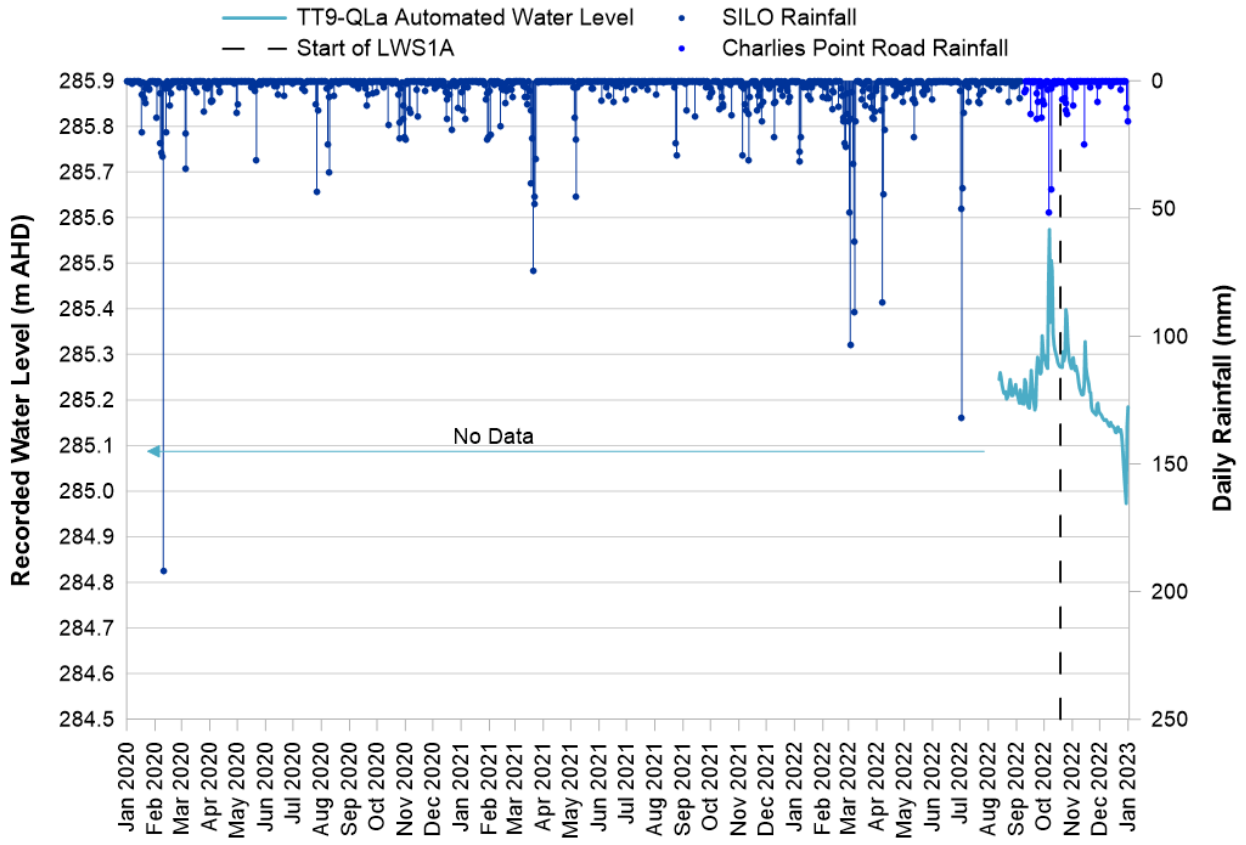


Figure B15 TT9-QLa Water Level Records

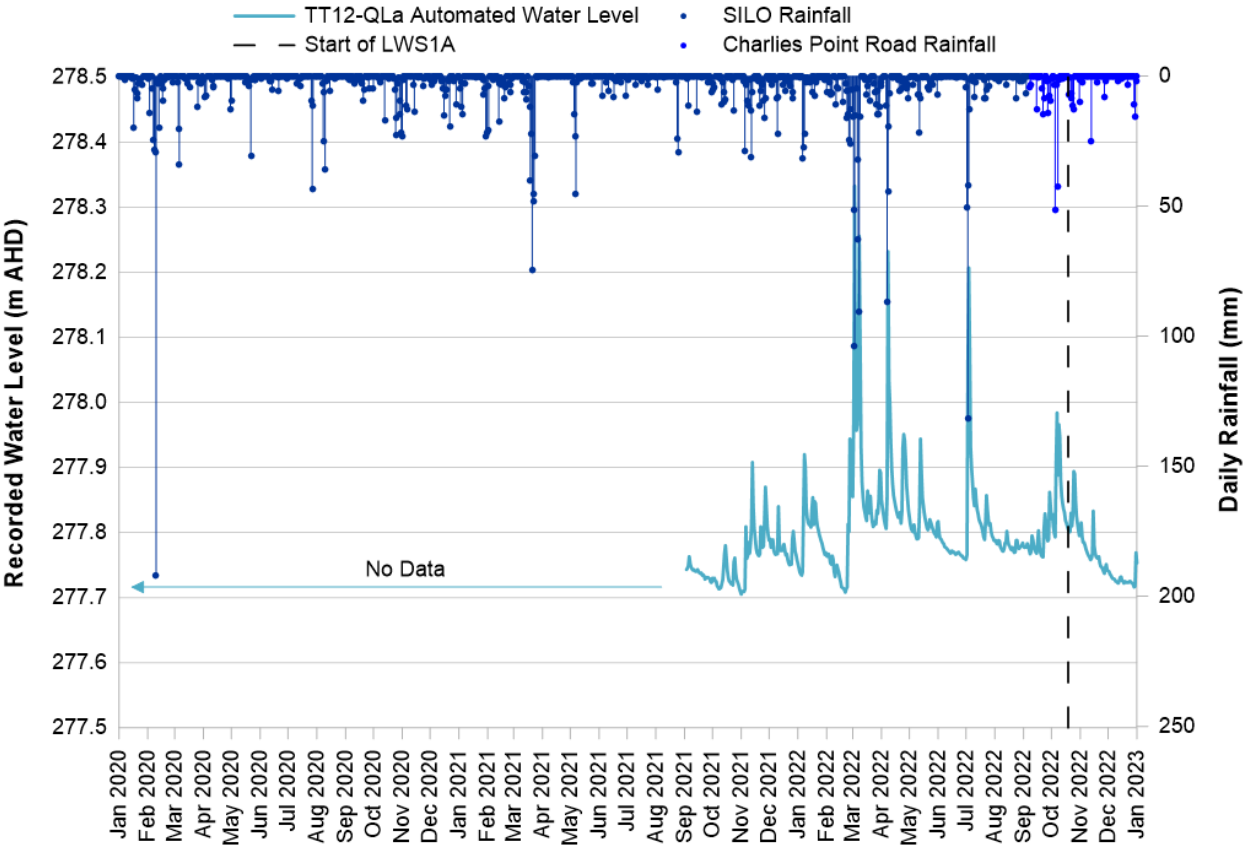


Figure B16 TT12-QLa Water Level Records

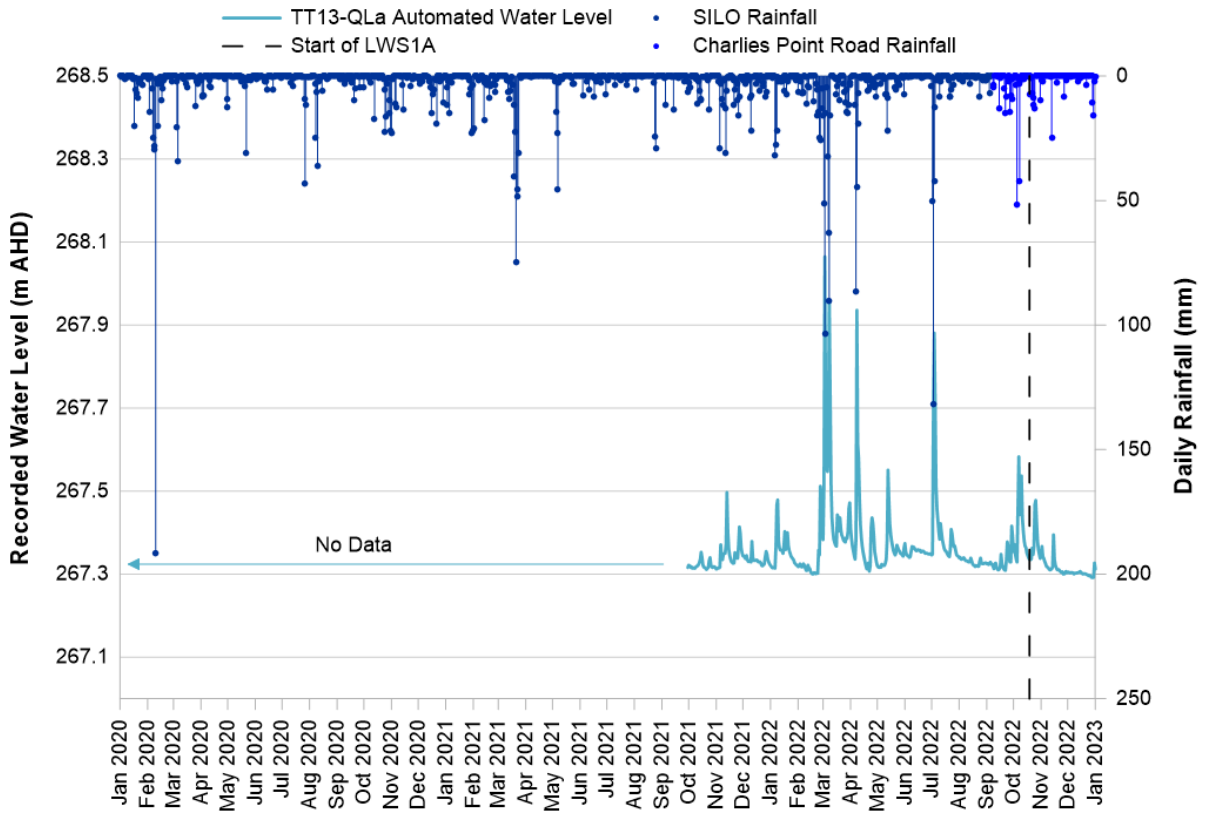


Figure B17 TT13-QLa Water Level Records

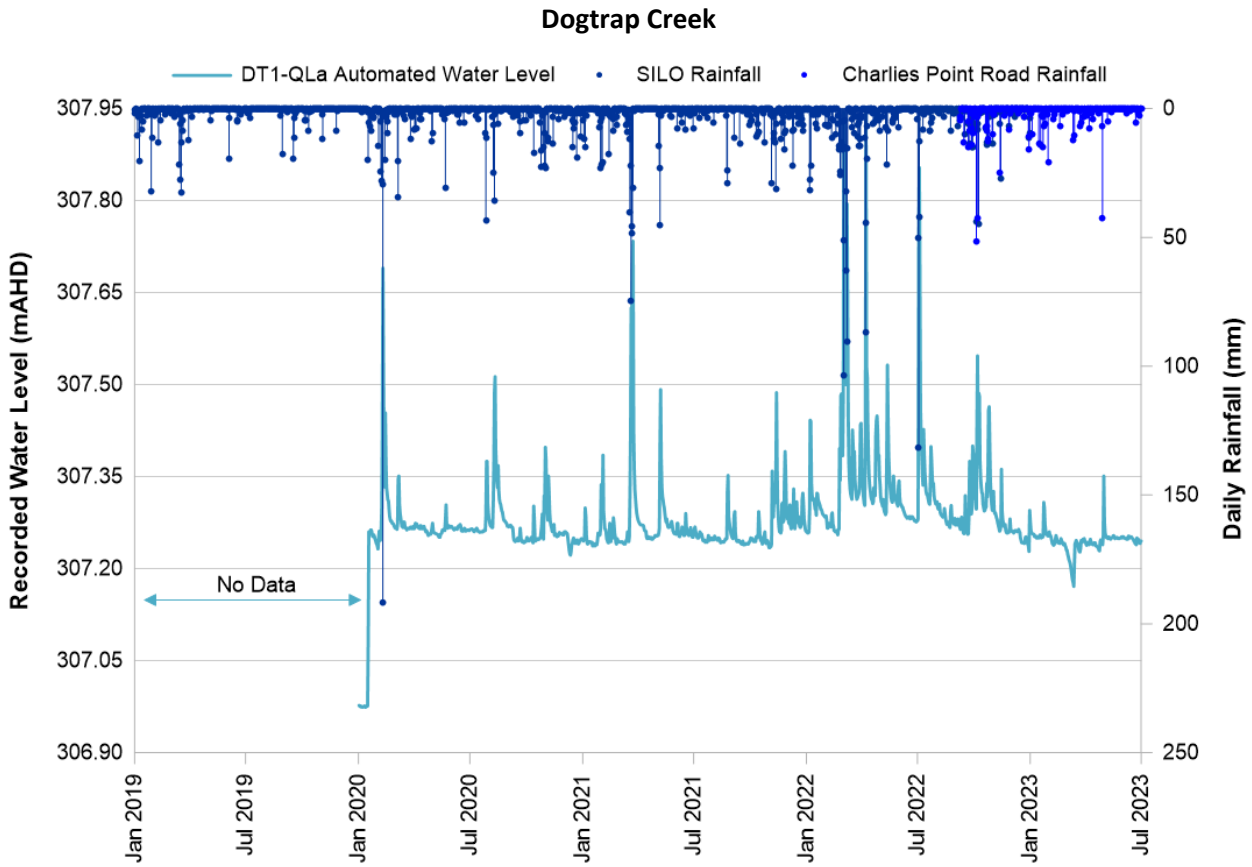


Figure B18 DT1-QLa Water Level Records

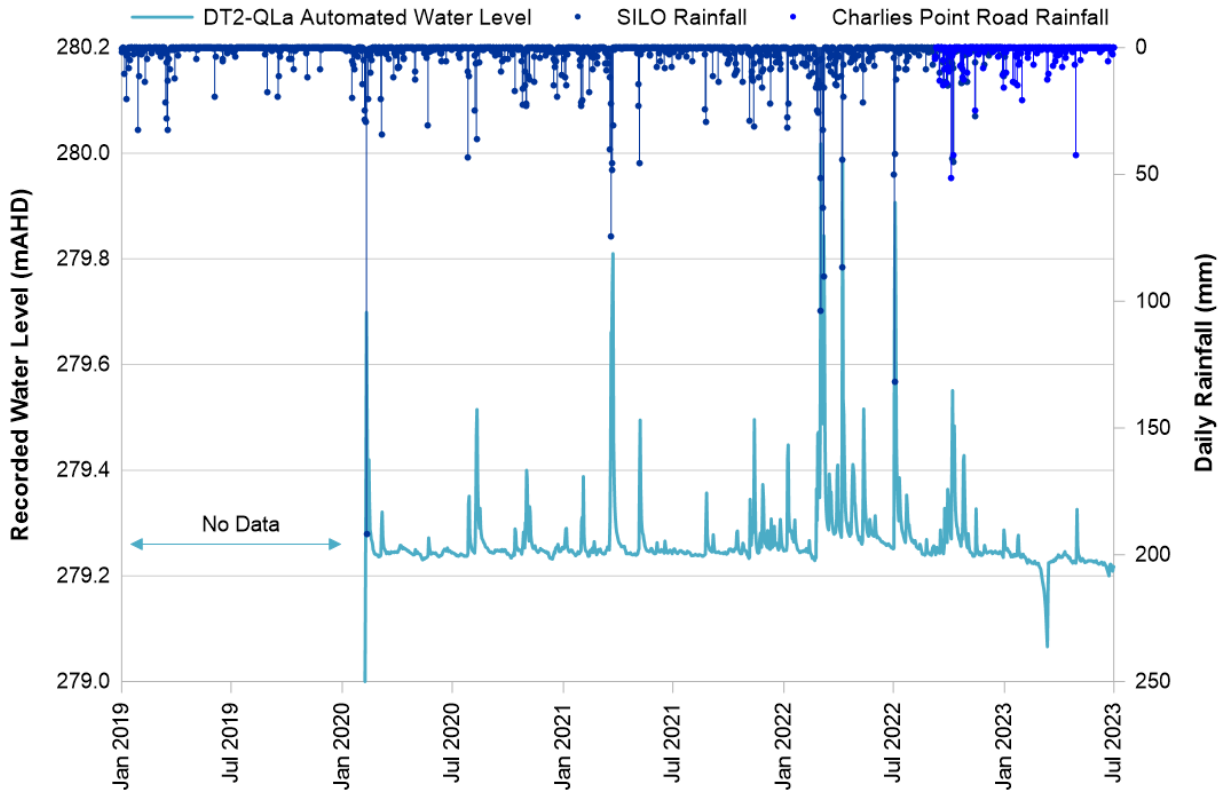


Figure B19 DT2-QLa Water Level Records

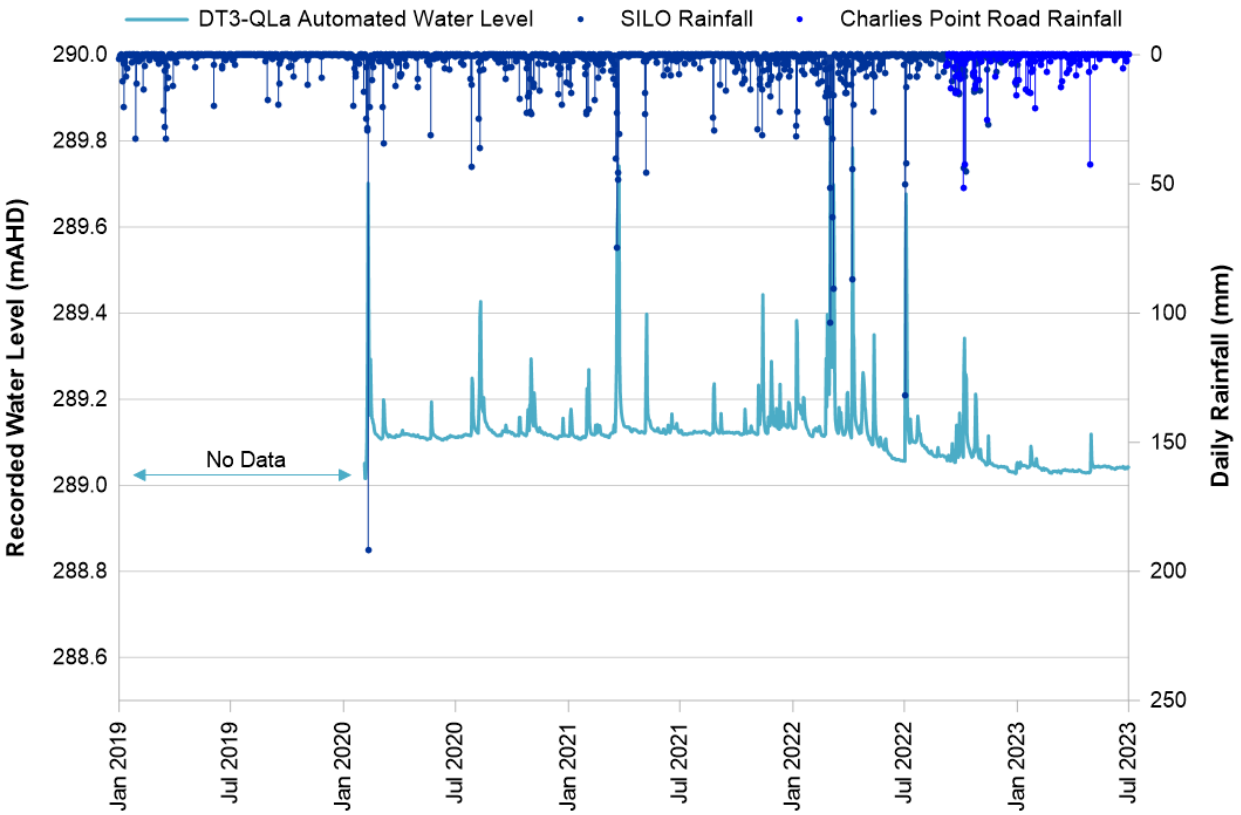


Figure B20 DT3-QLa Water Level Records

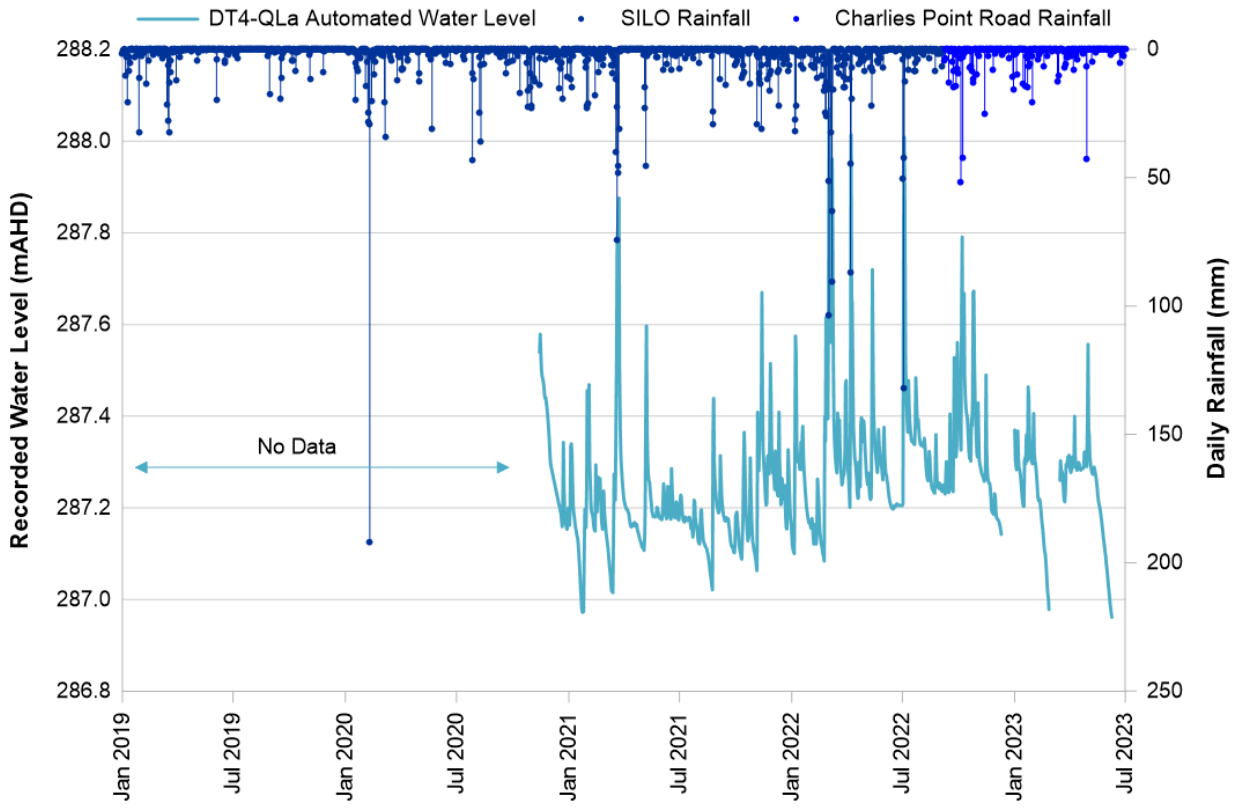


Figure B21 DT4-QLa Water Level Records

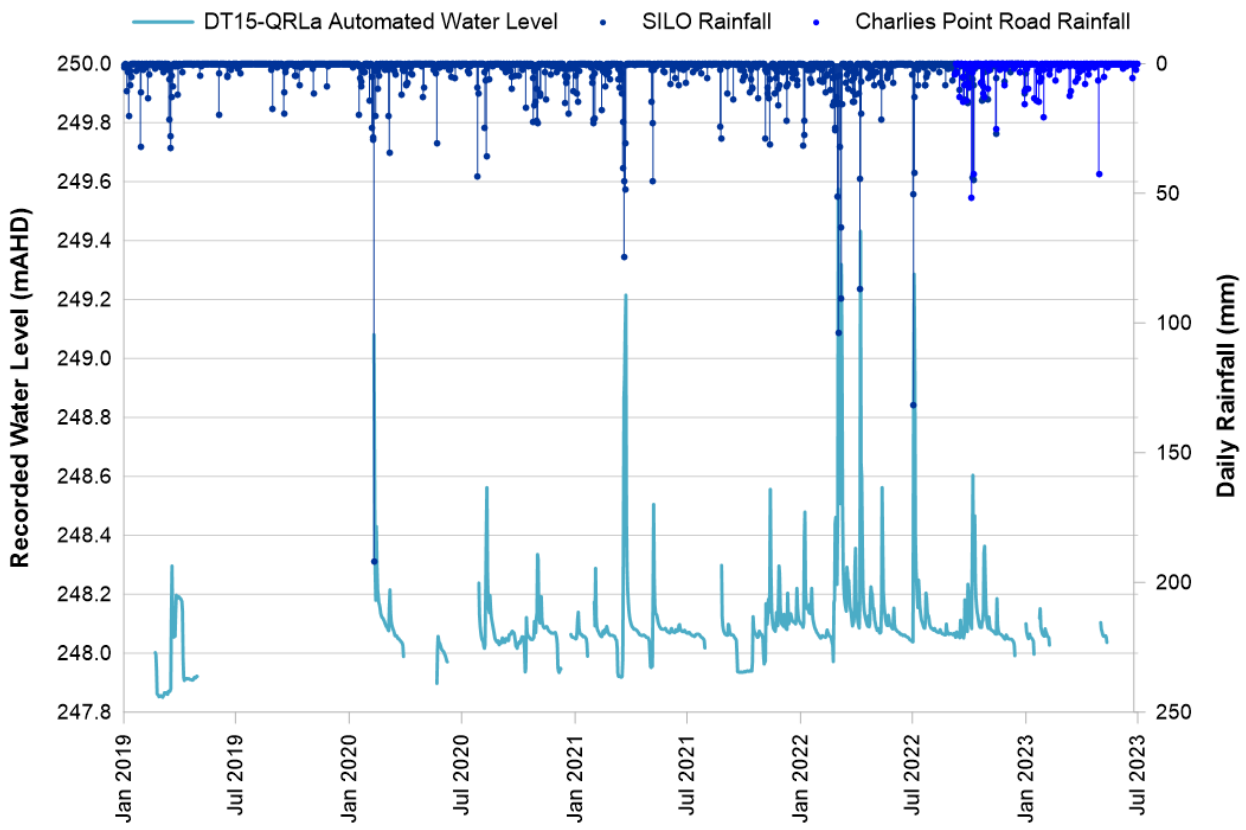


Figure B22 DT15-QRLa Water Level Records

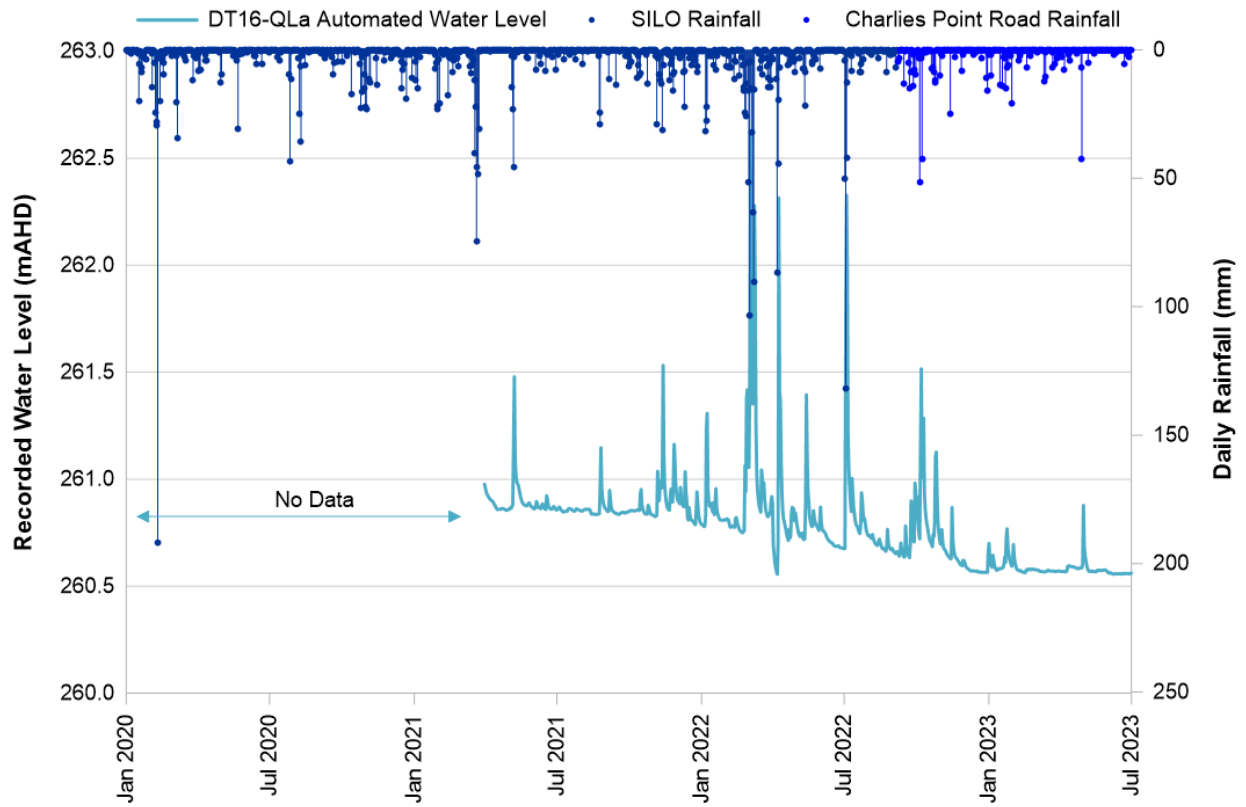


Figure B23 DT16-QLa Water Level Records

Hornes Creek

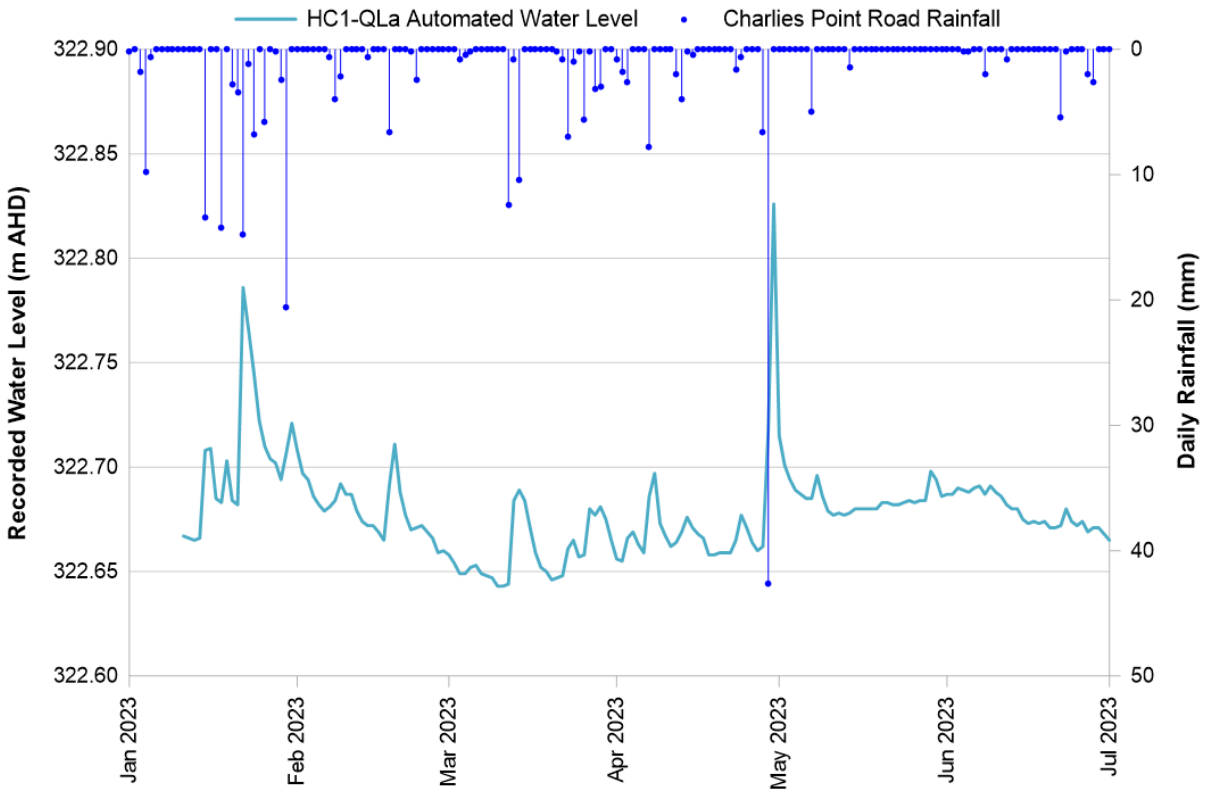


Figure B24 HC1-QLa Water Level Records

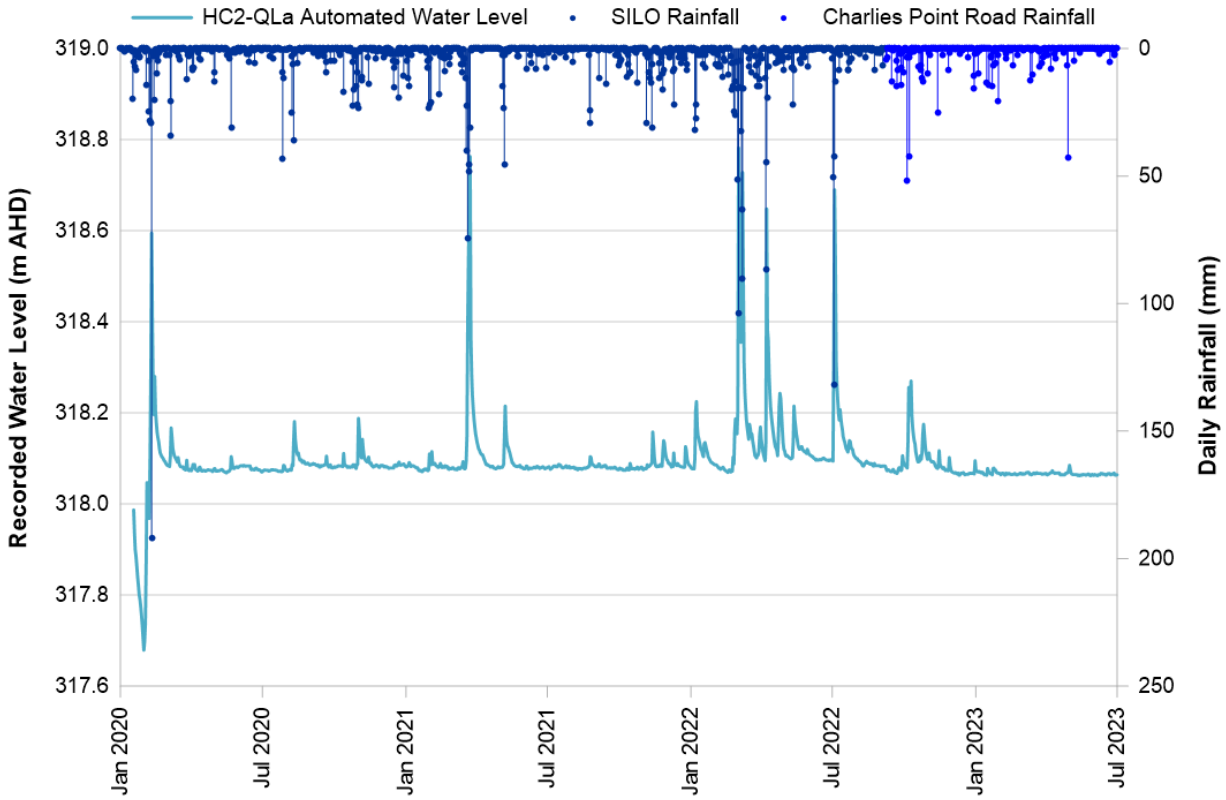


Figure B25 HC2-QLa Water Level Records

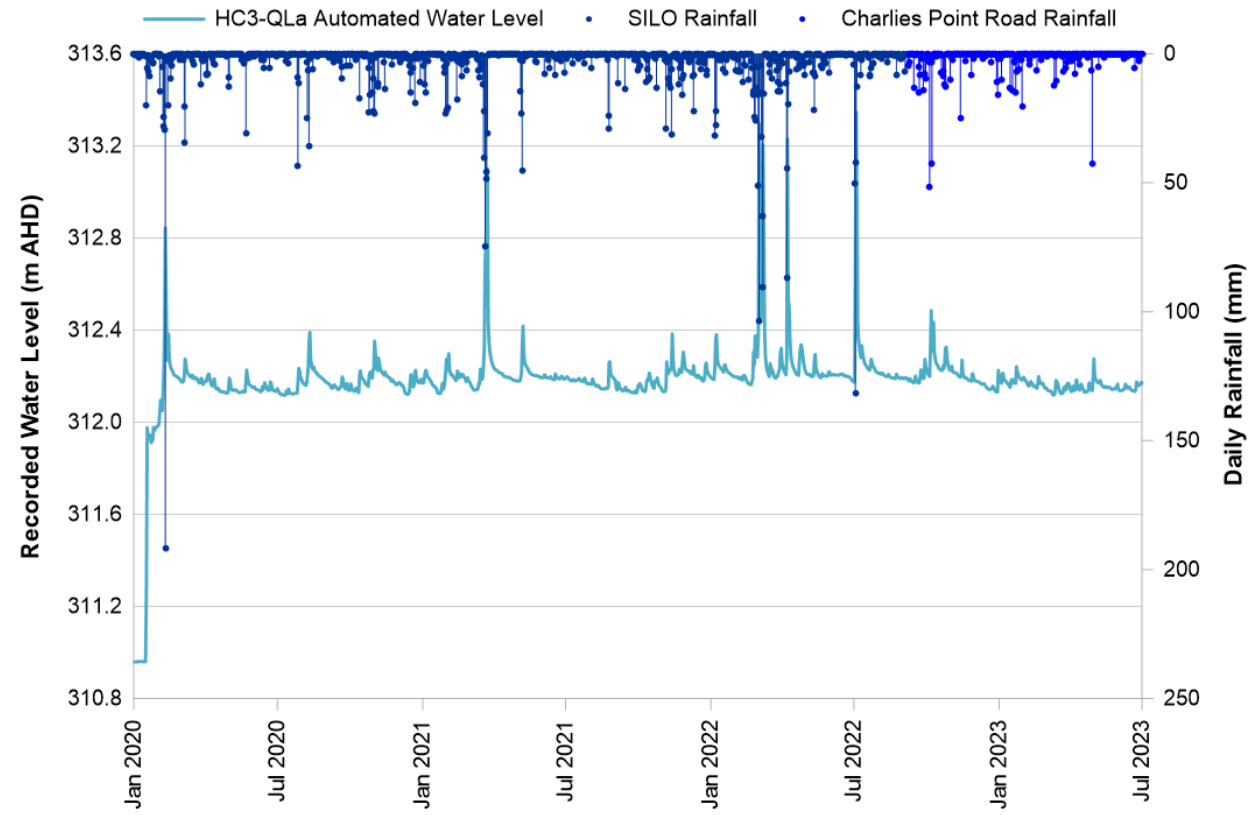


Figure B26 HC3-QLa Water Level Records

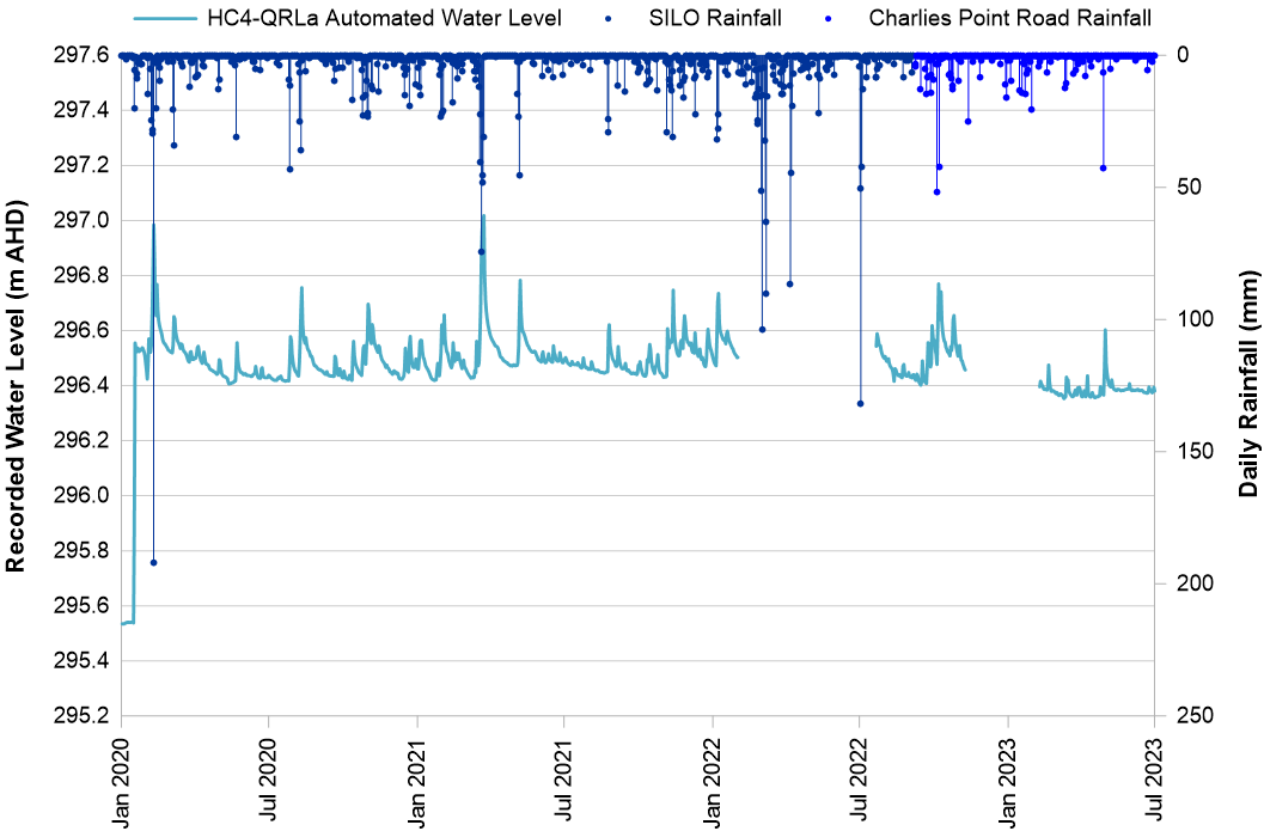


Figure B27 HC4-QRLa Water Level Records

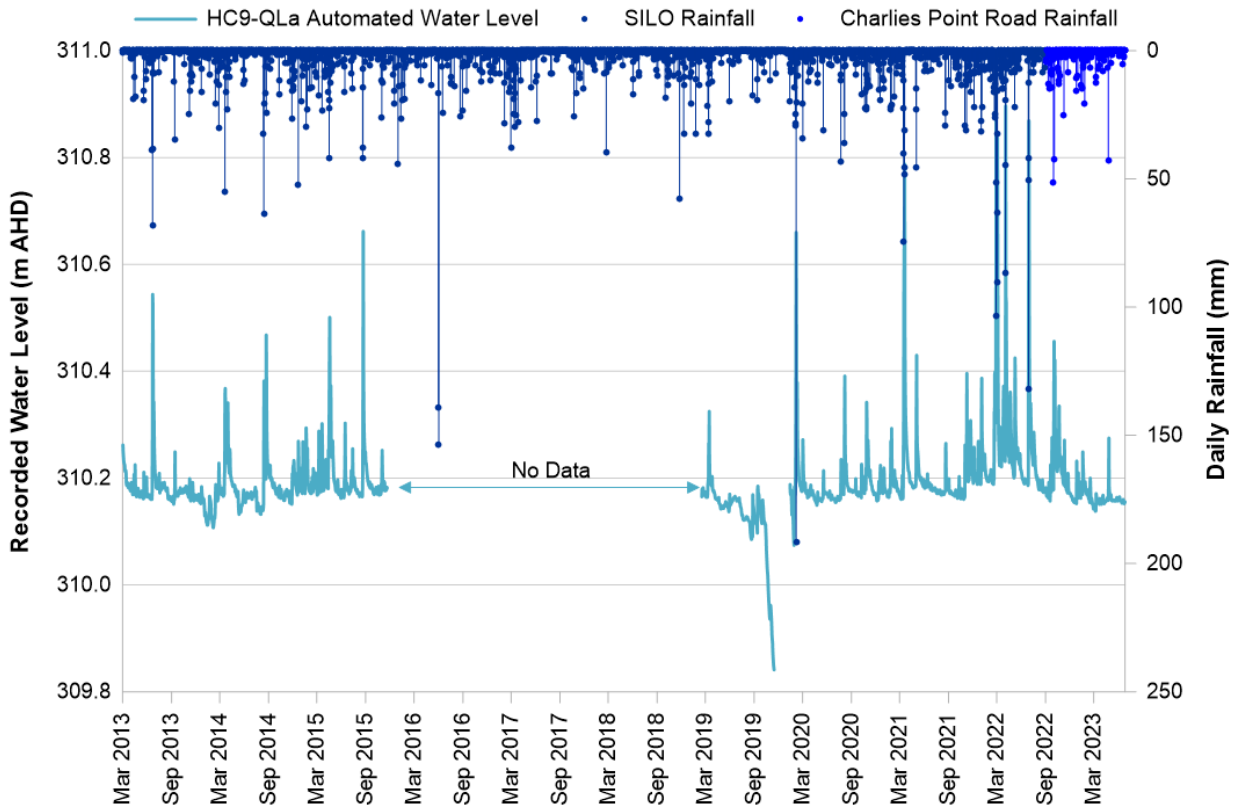


Figure B27 HC9-QLa Water Level Records

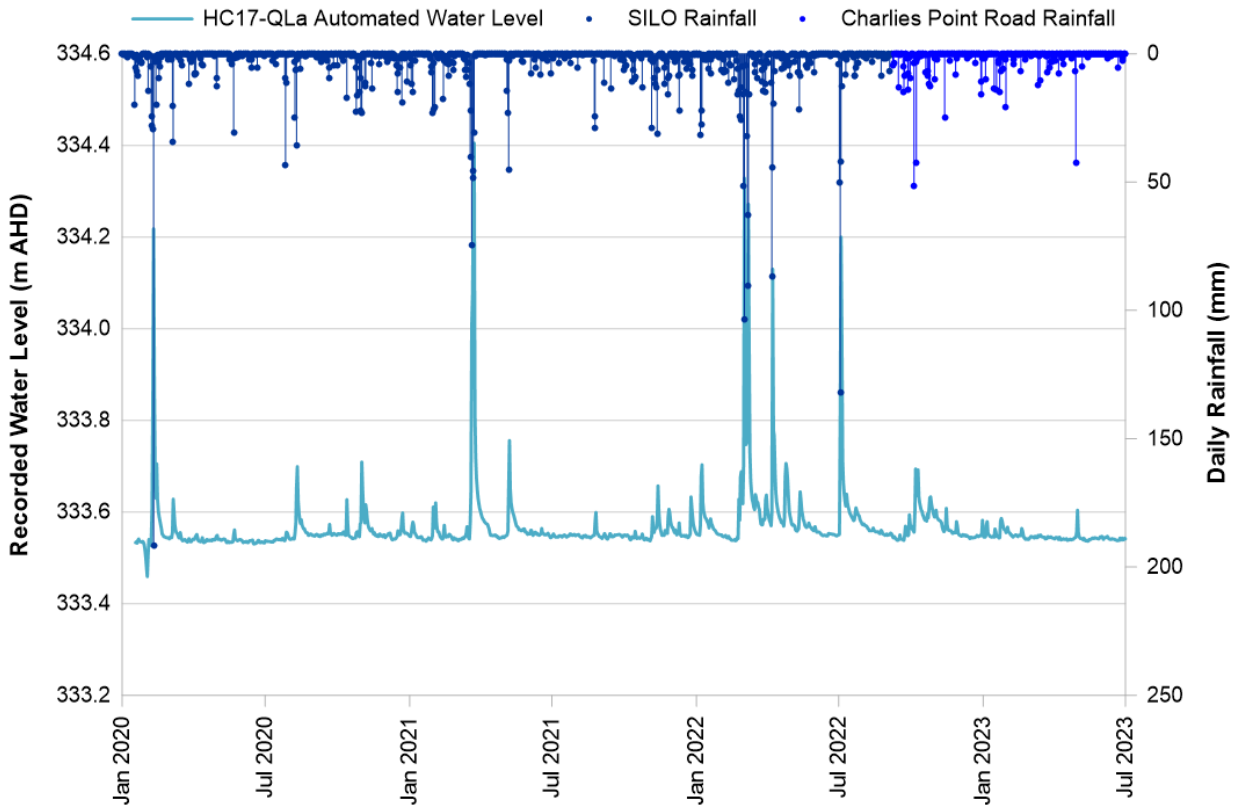


Figure B29 HC17-QLa Water Level Records

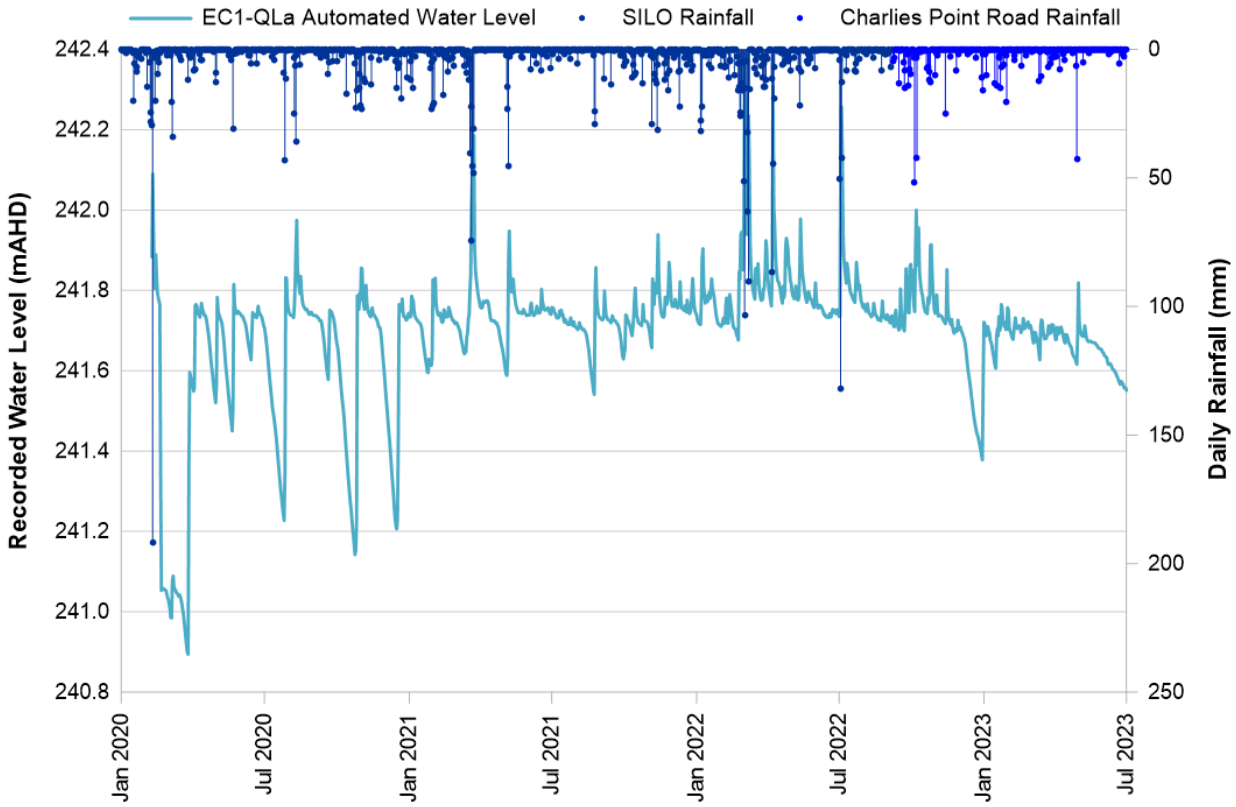


Figure A30 EC1-QLa Water Level Records

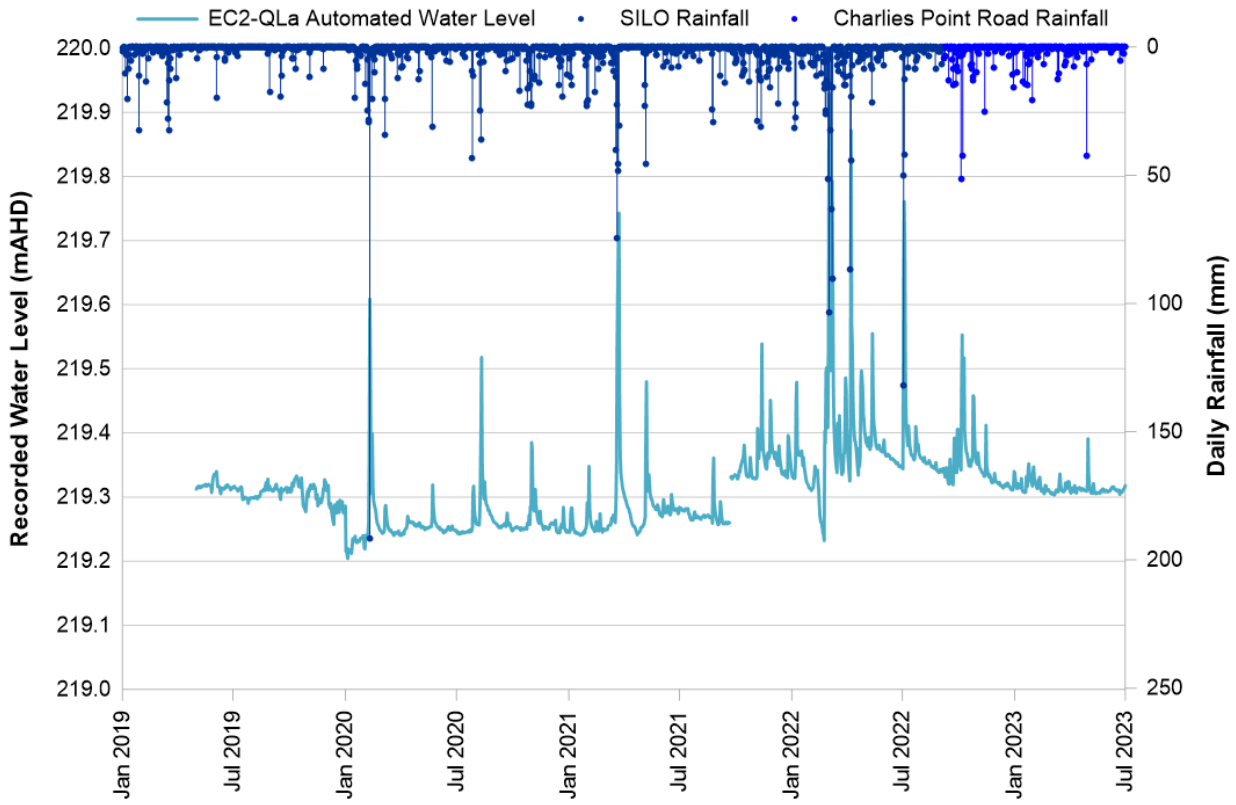


Figure A31 EC2-QLa Water Level Records

Appendix C Water Quality Monitoring Summary Tables

Bargo River (BR12-QLa and BR13-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	BR12-QLa					BR13-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	40	6.1	7.3	9.1	10%	41	0.3	7.0	9.1	15%
Lab pH	6.5 - 8‡	37	5.6	6.7	8.2	35%	39	4.1	6.6	7.8	46%
Field EC (µS/cm)	350‡	40	99.2	193	337	0%	41	64.1	190	406	5%
Lab EC (µS/cm)	350‡	37	98	194	404	3%	37	87	189	490	8%
Field DO	-	40	2.9	9.6	99.3	-	41	4.8	10.0	104.9	-
Sulphate as Turbidimetric SO_4	400*	37	<1	5	24	0%	64	3	5	18	0%
Total Alkalinity as $CaCO_3$	500*	37	4	11	72	0%	64	<1	8	57	0%
Chloride	400*	37	20	45	85	0%	64	16	46	119	0%
Dissolved Calcium	-	37	2	3	19	-	64	1	3	17	-
Dissolved Magnesium	-	37	2	5	13	-	64	1	5	14	-
Dissolved Potassium	-	37	12	23	38	-	64	10	23	50	-
Dissolved Sodium	-	37	2	2	8	-	64	1	2	13	-
Dissolved Aluminium	0.055†	37	<0.01	0.02	0.1	22%	37	<0.01	0.02	0.16	22%
Dissolved Arsenic	0.024†	37	<0.001	0.001	0.002	0%	37	<0.001	0.001	0.001	0%
Dissolved Barium	1*	37	0.01	0.01	0.09	0%	37	0.01	0.01	0.06	0%
Dissolved Copper	0.0014†	37	<0.001	0.001	0.002	3%	37	<0.001	0.001	0.004	3%
Dissolved Iron	0.3*	37	<0.05	0.30	1.56	49%	37	<0.05	0.32	1.52	51%
Dissolved Lead	0.0034†	37	<0.001	0.001	0.001	0%	37	<0.001	0.001	0.001	0%
Dissolved Lithium	-	8	<0.001	0.003	0.008	-	9	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	37	0.03	0.08	1.10	0%	37	0.03	0.14	0.64	0%
Parameter (mg/L unless otherwise stated)	**Guideline Value**	**BR12-QRLa**					**BR13-QRLa**				

		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	40	6.1	7.3	9.1	10%	41	0.3	7.0	9.1	15%
Lab pH	6.5 - 8‡	37	5.6	6.7	8.2	35%	39	4.1	6.6	7.8	46%
Field EC (µS/cm)	350‡	40	99.2	193	337	0%	41	64.1	190	406	5%
Lab EC (µS/cm)	350‡	37	98	194	404	3%	37	87	189	490	8%
Field DO	-	40	2.9	9.6	99.3		41	4.8	10.0	104.9	
Sulphate as Turbidimetric SO_4	400*	37	<1	5	24	0%	64	3	5	18	0%
Total Alkalinity as $CaCO_3$	500*	37	4	11	72	0%	64	<1	8	57	0%
Chloride	400*	37	20	45	85	0%	64	16	46	119	0%
Dissolved Calcium	-	37	2	3	19		64	1	3	17	
Dissolved Magnesium	-	37	2	5	13		64	1	5	14	
Dissolved Potassium	-	37	12	23	38		64	10	23	50	
Dissolved Sodium	-	37	2	2	8		64	1	2	13	
Dissolved Aluminium	0.055†	37	<0.01	0.02	0.1	22%	37	<0.01	0.02	0.16	22%
Dissolved Arsenic	0.024†	37	<0.001	0.001	0.002	0%	37	<0.001	0.001	0.001	0%
Dissolved Barium	1*	37	0.01	0.01	0.09	0%	37	0.01	0.01	0.06	0%
Dissolved Copper	0.0014†	37	<0.001	0.001	0.002	3%	37	<0.001	0.001	0.004	3%
Dissolved Iron	0.3*	37	<0.05	0.30	1.56	49%	37	<0.05	0.32	1.52	51%
Dissolved Lead	0.0034†	37	<0.001	0.001	0.001	0%	37	<0.001	0.001	0.001	0%
Dissolved Lithium	-	8	<0.001	0.003	0.008		9	<0.001	0.001	0.001	
Dissolved Manganese	1.9†	37	0.03	0.08	1.10	0%	37	0.03	0.14	0.64	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Bargo River (BR12-QRLa and BR13-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	BR12-QLa					BR13-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	37	<0.001	0.001	0.006	0%	37	<0.001	0.001	0.006	0%
Dissolved Selenium	0.011†	37	<0.01	0.01	0.01	0%	37	<0.01	0.01	0.01	0%
Dissolved Strontium	-	37	0.01	0.03	0.14	-	37	0.01	0.03	0.13	-
Dissolved Zinc	0.008†	37	<0.005	0.005	0.021	8%	37	<0.005	0.005	0.036	22%
Total Aluminium	0.055†	37	<0.01	0.06	3.06	51%	64	<0.01	0.055	0.92	50%
Total Arsenic	0.024†	37	<0.001	0.001	0.004	0%	64	<0.001	0.001	0.006	0%
Total Barium	1*	37	0.01	0.01	0.10	0%	64	0.01	0.02	0.06	0%
Total Cadmium	0.0002†	0	-	-	-	-	30	<0	0.0001	0.0001	0%
Total Copper	0.0014†	37	<0.001	0.001	0.003	24%	64	<0.001	0.001	0.003	11%
Total Iron	0.3*	37	0.07	0.78	3.62	81%	64	0.12	1.06	3.28	86%
Total Lead	0.0034†	37	<0.001	0.001	0.003	0%	64	<0.001	0.001	0.003	0%
Total Lithium	-	37	<0.001	0.001	0.008	-	64	<0.001	0.001	0.004	-
Total Manganese	1.9†	37	0.04	0.08	1.02	0%	64	0.03	0.14	0.65	0%
Total Nickel	0.011†	37	<0	0.001	0.006	0%	64	<0.001	0.001	0.007	0%
Total Selenium	0.011†	37	<0.01	0.01	0.01	0%	64	<0.01	0.01	0.01	0%
Total Strontium	-	37	0.01	0.03	0.15	-	64	0.01	0.03	0.14	-
Total Zinc	0.008†	37	<0.005	0.006	0.05	24%	64	<0.005	0.006	0.04	33%
Nitrogen Oxides	0.015‡	37	<0.01	0.15	0.78	97%	64	<0.01	0.11	1.54	94%
Total Nitrogen	0.25‡	37	<0.1	0.40	1.4	73%	64	<0.10	0.40	1.9	78%
Total Phosphorus	0.02‡	37	<0.01	0.01	0.2	11%	64	<0.01	0.01	0.16	14%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Bargo River (BR14-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	BR14-QLa				
		No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	41	7.7	8.6	10.7	93%
Lab pH	6.5 - 8‡	35	6.3	8.4	8.9	74%
Field EC (µS/cm)	350‡	41	181.2	1004	2070	85%
Lab EC (µS/cm)	350‡	34	180	977	2260	85%
Field DO	-	41	5.6	9.7	100.0	-
Sulphate as Turbidimetric SO_4	400*	54	6	11	33	0%
Total Alkalinity as $CaCO_3$	500*	54	23	433.5	1100	39%
Chloride	400*	54	22	60	118	0%
Dissolved Calcium	-	54	1	9	20	-
Dissolved Magnesium	-	54	1	8	15	-
Dissolved Potassium	-	54	25	205	504	-
Dissolved Sodium	-	54	2	12	27	-
Dissolved Aluminium	0.055†	34	0.02	0.055	0.2	50%
Dissolved Arsenic	0.024†	34	0.002	0.011	0.051	21%
Dissolved Barium	1*	34	0.09	0.85	2.39	38%
Dissolved Copper	0.0014†	34	<0.001	0.001	0.002	3%
Dissolved Iron	0.3*	34	<0.05	0.16	0.45	32%
Dissolved Lead	0.0034†	34	<0.001	0.001	0.001	0%
Dissolved Lithium	-	8	0.041	0.1395	0.24	-
Dissolved Manganese	1.9†	34	0.004	0.02	0.10	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Bargo River (BR14-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	BR14-QLa				
		No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	34	0.002	0.024	0.064	62%
Dissolved Selenium	0.011†	34	<0.01	0.01	0.01	0%
Dissolved Strontium	-	34	0.04	0.22	0.52	-
Dissolved Zinc	0.008†	34	<0.005	0.012	0.04	68%
Total Aluminium	0.055†	54	0.03	0.135	0.84	96%
Total Arsenic	0.024†	54	<0.001	0.017	0.086	31%
Total Barium	1*	54	0.1	1.07	4.56	54%
Total Cadmium	0.0002†	20	0.0001	0.0001	0.0001	0%
Total Copper	0.0014†	54	<0.001	0.001	0.006	22%
Total Iron	0.3*	54	<0.05	0.47	1.06	56%
Total Lead	0.0034†	54	<0.001	0.001	0.007	7%
Total Lithium	-	54	0.026	0.5025	1.39	-
Total Manganese	1.9†	54	0.02	0.03	0.11	0%
Total Nickel	0.011†	53	0.002	0.025	0.097	75%
Total Selenium	0.011†	54	<0.01	0.01	0.01	0%
Total Strontium	-	54	0.04	0.26	0.75	-
Total Zinc	0.008†	54	<0.005	0.019	0.11	89%
Nitrogen Oxides	0.015‡	54	0.03	0.93	2.92	100%
Total Nitrogen	0.25‡	54	0.4	1.30	3.3	100%
Total Phosphorus	0.02‡	54	<0.01	0.02	0.15	30%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT1-QLa and TT4A-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT1-QLa					TT4A-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	33	6.3	6.8	8.3	24%	11	6.6	7.6	8.3	27%
Lab pH	6.5 - 8‡	32	6.1	6.8	7.7	9%	10	6.5	7.1	8.2	30%
Field EC (µS/cm)	350‡	33	279	467	663	88%	11	157	232	1250	36%
Lab EC (µS/cm)	350‡	32	158	459.5	780	78%	10	170	207.5	1250	30%
Field DO	-	33	0.2	7.8	81.3	-	9	0.2	9.9	99.7	-
Sulphate as Turbidimetric SO_4	400*	32	9	23.5	126	0%	10	6	9	26	0%
Total Alkalinity as $CaCO_3$	500*	32	23	54.5	187	0%	10	35	48	712	10%
Chloride	400*	32	25	88	149	0%	10	12	28.5	109	0%
Dissolved Calcium	-	32	5	10	55	-	10	5	7	34	-
Dissolved Magnesium	-	32	5	13	37	-	10	3	5.5	19	-
Dissolved Potassium	-	32	22	52	72	-	10	22	25.5	234	-
Dissolved Sodium	-	32	3	8	31	-	10	3	4.5	14	-
Dissolved Aluminium	0.055†	32	<0.01	0.02	0.35	25%	10	0.02	0.075	0.66	70%
Dissolved Arsenic	0.024†	32	<0.001	0.001	0.003	0%	10	<0.001	0.001	0.001	0%
Dissolved Barium	1*	32	0.01	0.04	0.15	0%	10	0.04	0.05	0.51	0%
Dissolved Copper	0.0014†	32	<0.001	0.001	0.004	19%	10	<0.001	0.001	0.004	20%
Dissolved Iron	0.3*	31	<0.05	0.39	0.98	68%	9	<0.05	0.24	0.4	33%
Dissolved Lead	0.0034†	32	<0.001	0.001	0.001	0%	10	<0.001	0.001	0.001	0%
Dissolved Lithium	-	11	<0.001	0.001	0.001	-	10	<0.001	0.01	0.642	-
Dissolved Manganese	1.9†	32	0.01	0.10	3.00	3%	10	0.00	0.01	0.07	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT1-QLa and TT4A-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT1-QLa					TT4A-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	32	<0.001	0.001	0.003	0%	10	<0.001	0.001	0.007	0%
Dissolved Selenium	0.011†	32	<0.01	0.01	0.01	0%	10	<0.01	0.01	0.01	0%
Dissolved Strontium	-	32	0.03	0.09	0.70	-	10	0.04	0.06	0.52	-
Dissolved Zinc	0.008†	32	<0.005	0.017	0.215	75%	10	<0.005	0.005	0.034	30%
Total Aluminium	0.055†	32	0.06	0.17	1.31	100%	10	0.09	0.205	2.44	100%
Total Arsenic	0.024†	32	<0.001	0.001	0.003	0%	10	<0.001	0.001	0.002	0%
Total Barium	1*	32	0.01	0.05	0.16	0%	10	0.03	0.06	0.50	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	32	<0.001	0.001	0.008	25%	10	<0.001	0.001	0.004	40%
Total Iron	0.3*	32	0.38	1.30	3.59	100%	10	0.16	0.61	1.3	90%
Total Lead	0.0034†	32	<0.001	0.001	0.003	0%	10	<0.001	0.001	0.006	10%
Total Lithium	-	32	<0.001	0.001	0.003	-	10	<0.001	0.0095	0.71	-
Total Manganese	1.9†	32	0.01	0.12	2.97	3%	10	0.004	0.01	0.13	0%
Total Nickel	0.011†	32	<0.001	0.001	0.01	0%	10	<0.001	0.0015	0.008	0%
Total Selenium	0.011†	32	<0.01	0.01	0.01	0%	10	<0.01	0.01	0.01	0%
Total Strontium	-	32	0.03	0.09	0.74	-	10	0.04	0.06	0.51	-
Total Zinc	0.008†	32	<0.005	0.0185	0.34	72%	10	<0.005	0.005	0.04	40%
Nitrogen Oxides	0.015‡	32	<0.01	0.04	0.57	78%	10	0.05	0.09	3.25	100%
Total Nitrogen	0.25‡	32	0.20	0.55	7.3	94%	10	0.2	0.35	4.0	90%
Total Phosphorus	0.02‡	32	<0.01	0.03	2.58	59%	10	<0.01	0.02	0.44	20%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT2-QLa and TT3-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT2-QLa					TT3-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	12	5.81	7.05	8.17	42%	7	6.31	6.90	7.4	14%
Lab pH	6.5 - 8‡	12	6.35	6.96	8.34	17%	5	6.2	6.58	7.33	40%
Field EC (µS/cm)	350‡	12	156.7	213	542	8%	7	138.5	183	240	0%
Lab EC (µS/cm)	350‡	12	148	242	542	17%	5	131	159	240	0%
Field DO	-	10	0.16	6.2	11.27	-	6	4.7	9.8	11	-
Sulphate as Turbidimetric SO_4	400*	12	7	11.5	27	0%	5	8	10	11	0%
Total Alkalinity as $CaCO_3$	500*	12	14	29	107	0%	5	21	25	33	0%
Chloride	400*	12	21	40	121	0%	5	23	30	52	0%
Dissolved Calcium	-	12	4	5.5	31	-	5	4	4	5	-
Dissolved Magnesium	-	12	4	5	15	-	5	4	5	5	-
Dissolved Potassium	-	12	10	25	66	-	5	16	19	33	-
Dissolved Sodium	-	12	3	5.5	14	-	5	2	3	4	-
Dissolved Aluminium	0.055†	12	0.02	0.07	0.47	58%	5	<0.01	0.03	0.18	40%
Dissolved Arsenic	0.024†	12	<0.001	0.001	0.006	0%	5	<0.001	0.001	0.001	0%
Dissolved Barium	1*	12	0.01	0.01	0.07	0%	5	0.01	0.01	0.02	0%
Dissolved Copper	0.0014†	12	<0.001	0.001	0.004	8%	5	<0.001	0.001	0.001	0%
Dissolved Iron	0.3*	11	<0.05	0.31	0.75	55%	4	0.18	-	0.51	50%
Dissolved Lead	0.0034†	12	<0.001	0.001	0.002	0%	5	<0.001	0.001	0.001	0%
Dissolved Lithium	-	12	<0.001	0.001	0.001	-	5	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	12	0.006	0.016	0.652	0%	5	0.007	0.010	0.040	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT2-QLa and TT3-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT2-QLa					TT3-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	12	<0.001	0.001	0.002	0%	5	<0.001	0.001	0.001	0%
Dissolved Selenium	0.011†	12	<0.01	0.01	0.01	0%	5	<0.01	0.01	0.01	0%
Dissolved Strontium	-	12	0.025	0.03	0.276	-	5	0.022	0.03	0.029	-
Dissolved Zinc	0.008†	12	<0.005	0.012	0.034	50%	5	<0.005	0.005	0.006	0%
Total Aluminium	0.055†	12	0.07	0.175	3.39	100%	5	0.08	0.12	0.52	100%
Total Arsenic	0.024†	12	<0.001	0.001	0.01	0%	5	<0.001	0.001	0.001	0%
Total Barium	1*	12	0.01	0.01	0.09	0%	5	0.01	0.01	0.02	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	12	<0.001	0.001	0.012	17%	5	<0.001	0.001	0.001	0%
Total Iron	0.3*	12	0.22	0.48	1.95	83%	5	0.43	0.52	0.92	100%
Total Lead	0.0034†	12	<0.001	0.001	0.006	8%	5	<0.001	0.001	0.001	0%
Total Lithium	-	12	<0.001	0.001	0.001	-	5	<0.001	0.001	0.001	-
Total Manganese	1.9†	12	0.006	0.0165	0.779	0%	5	0.006	0.01	0.044	0%
Total Nickel	0.011†	12	<0.001	0.001	0.005	0%	5	<0.001	0.001	0.002	0%
Total Selenium	0.011†	12	<0.01	0.01	0.01	0%	5	<0.01	0.01	0.01	0%
Total Strontium	-	12	0.02	0.03	0.30	-	5	0.02	0.03	0.03	-
Total Zinc	0.008†	12	<0.005	0.014	0.05	67%	5	<0.005	0.005	0.012	20%
Nitrogen Oxides	0.015‡	12	<0.01	0.055	0.57	92%	5	<0.01	0.04	0.07	80%
Total Nitrogen	0.25‡	12	0.20	0.40	5.00	75%	5	0.20	0.20	0.40	40%
Total Phosphorus	0.02‡	12	<0.01	0.02	0.79	33%	5	<0.01	0.01	0.03	20%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT7-QLa and TT8-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT7-QLa					TT8-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	33	6.4	7.0	8.0	15%	29	6.8	8.7	8.9	97%
Lab pH	6.5 - 8‡	35	5.8	6.6	7.4	29%	30	8.5	8.7	8.8	100%
Field EC (µS/cm)	350‡	33	147.9	258	687	30%	29	147	2120	2490	93%
Lab EC (µS/cm)	350‡	35	137	246	703	34%	29	1250	2120	2490	100%
Field DO	-	33	0.7	9.6	98.2	-	7	9.3	11.3	102.8	-
Sulphate as Turbidimetric SO_4	400*	35	6	9	36	0%	51	11	19	40	0%
Total Alkalinity as $CaCO_3$	500*	35	11	33	126	0%	51	609	984	1320	100%
Chloride	400*	35	24	50	195	0%	51	50	80	122	0%
Dissolved Calcium	-	35	3	5	42	-	51	5	18	27	-
Dissolved Magnesium	-	35	4	6	15	-	51	9	14	21	-
Dissolved Potassium	-	35	17	34	81	-	51	250	468	651	-
Dissolved Sodium	-	35	3	4	12	-	51	14	24	40	-
Dissolved Aluminium	0.055†	35	<0.01	0.03	0.27	29%	29	<0.01	0.04	0.11	38%
Dissolved Arsenic	0.024†	35	<0.001	0.001	0.002	0%	29	0.022	0.057	0.094	86%
Dissolved Barium	1*	35	0.01	0.02	0.15	0%	29	1.28	2.50	5.36	100%
Dissolved Copper	0.0014†	35	<0.001	0.001	0.004	9%	29	<0.001	0.001	0.007	45%
Dissolved Iron	0.3*	34	0.07	0.52	1.54	82%	29	<0.05	0.05	0.48	3%
Dissolved Lead	0.0034†	35	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.003	0%
Dissolved Lithium	-	11	<0.001	0.001	0.004	-	6	0.563	0.8885	1.09	-
Dissolved Manganese	1.9†	35	0.01	0.06	0.59	0%	29	0.004	0.02	0.06	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT7-QLa and TT8-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT7-QLa					TT8-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	35	<0.001	0.002	0.011	0%	29	0.019	0.053	0.081	100%
Dissolved Selenium	0.011†	35	<0.01	0.01	0.01	0%	29	<0.01	0.01	0.01	0%
Dissolved Strontium	-	35	0.02	0.03	0.18	-	29	0.34	0.54	0.90	-
Dissolved Zinc	0.008†	35	<0.005	0.011	0.091	60%	29	0.02	0.045	0.111	100%
Total Aluminium	0.055†	35	0.06	0.16	0.75	100%	51	0.02	0.11	0.70	86%
Total Arsenic	0.024†	35	<0.001	0.001	0.002	0%	51	0.023	0.069	0.162	92%
Total Barium	1*	35	0.01	0.03	0.13	0%	51	1.32	3.08	6.47	100%
Total Cadmium	0.0002†	0	-	-	-	-	22	0.0001	0.0001	0.0003	9%
Total Copper	0.0014†	35	<0.001	0.001	0.004	11%	51	<0.001	0.002	0.006	75%
Total Iron	0.3*	35	0.39	0.90	3.04	100%	51	<0.05	0.10	0.77	6%
Total Lead	0.0034†	35	<0.001	0.001	0.002	0%	51	<0.001	0.002	0.015	24%
Total Lithium	-	35	<0.001	0.001	0.005	-	51	0.625	1.22	1.82	-
Total Manganese	1.9†	35	0.01	0.07	0.67	0%	51	0.01	0.02	0.10	0%
Total Nickel	0.011†	35	<0.001	0.002	0.01	0%	50	0.019	0.059	0.111	100%
Total Selenium	0.011†	35	<0.01	0.01	0.01	0%	51	<0.01	0.01	0.01	0%
Total Strontium	-	35	0.02	0.03	0.18	-	50	0.35	0.67	1.12	-
Total Zinc	0.008†	35	<0.005	0.023	0.09	71%	51	0.017	0.067	0.32	100%
Nitrogen Oxides	0.015‡	35	<0.01	0.05	2.47	80%	51	0.20	1.82	12.50	100%
Total Nitrogen	0.25‡	35	<0.1	0.30	4.5	57%	51	1.60	2.80	13.5	100%
Total Phosphorus	0.02‡	35	<0.01	0.01	0.13	20%	51	<0.01	0.03	0.14	55%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT12-QLa and TT13-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT12-QLa					TT13-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	14	6.5	7.2	7.5	0%	13	6.3	6.8	7.2	23%
Lab pH	6.5 - 8‡	13	6.1	6.8	7.6	15%	13	5.7	6.5	7.4	62%
Field EC (µS/cm)	350‡	14	167.7	203	260	0%	13	130.8	163.9	218	0%
Lab EC (µS/cm)	350‡	13	165	187	250	0%	13	119	152	377	8%
Field DO	-	13	8.5	10.8	108.3	-	12	7.7	9.8	99.9	-
Sulphate as Turbidimetric SO_4	400*	13	<4	6	9	0%	13	7	9	15	0%
Total Alkalinity as $CaCO_3$	500*	13	34	43	54	0%	13	13	22	76	0%
Chloride	400*	13	24	32	44	0%	13	22	28	66	0%
Dissolved Calcium	-	13	4	5	6	-	13	2	3	15	-
Dissolved Magnesium	-	13	5	6	8	-	13	3	4	12	-
Dissolved Potassium	-	13	20	24	36	-	13	15	20	42	-
Dissolved Sodium	-	13	3	3	5	-	13	2	4	8	-
Dissolved Aluminium	0.055†	13	<0.01	0.06	0.23	54%	13	<0.01	0.02	0.21	23%
Dissolved Arsenic	0.024†	13	<0.001	0.001	0.001	0%	13	<0.001	0.001	0.001	0%
Dissolved Barium	1*	13	0.01	0.01	0.02	0%	13	0.01	0.01	0.04	0%
Dissolved Copper	0.0014†	13	<0.001	0.001	0.002	8%	13	<0.001	0.001	0.003	8%
Dissolved Iron	0.3*	12	0.13	0.33	0.82	58%	12	0.07	0.23	0.79	33%
Dissolved Lead	0.0034†	13	<0.001	0.001	0.001	0%	13	<0.001	0.001	0.001	0%
Dissolved Lithium	-	13	<0.001	0.001	0.005	-	13	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	13	0.01	0.02	0.02	0%	13	0.00	0.01	0.07	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT12-QLa and TT13-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT12-QLa					TT13-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	13	<0.001	0.001	0.001	0%	13	<0.001	0.001	0.001	0%
Dissolved Selenium	0.011†	13	<0.01	0.01	0.01	0%	13	<0.01	0.01	0.01	0%
Dissolved Strontium	-	13	0.03	0.03	0.05	-	13	0.02	0.02	0.09	-
Dissolved Zinc	0.008†	13	<0.005	0.005	0.012	8%	13	<0.005	0.005	0.007	0%
Total Aluminium	0.055†	13	0.08	0.14	0.39	100%	13	0.06	0.09	0.49	100%
Total Arsenic	0.024†	13	<0.001	0.001	0.001	0%	13	<0.001	0.001	0.001	0%
Total Barium	1*	13	0.01	0.01	0.02	0%	13	0.01	0.01	0.04	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	13	<0.001	0.001	0.049	15%	13	<0.001	0.001	0.001	0%
Total Iron	0.3*	13	0.27	0.79	1.24	85%	13	0.22	0.48	1.3	77%
Total Lead	0.0034†	13	<0.001	0.001	0.003	0%	13	<0.001	0.001	0.001	0%
Total Lithium	-	13	<0.001	0.001	0.004	-	13	<0.001	0.001	0.001	-
Total Manganese	1.9†	13	0.01	0.01	0.03	0%	13	0.004	0.01	0.07	0%
Total Nickel	0.011†	13	<0.001	0.001	0.002	0%	13	<0.001	0.001	0.001	0%
Total Selenium	0.011†	13	<0.01	0.01	0.01	0%	13	<0.01	0.01	0.01	0%
Total Strontium	-	13	0.03	0.03	0.05	-	13	0.02	0.02	0.10	-
Total Zinc	0.008†	13	<0.005	0.005	0.04	15%	13	<0.005	0.005	0.01	8%
Nitrogen Oxides	0.015‡	13	<0.01	0.07	0.13	92%	13	<0.01	0.01	0.06	38%
Total Nitrogen	0.25‡	13	<0.10	0.40	0.8	85%	13	<0.1	0.20	0.7	23%
Total Phosphorus	0.02‡	13	<0.01	0.02	0.05	15%	13	<0.01	0.01	0.06	31%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT14-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT14-QLa				
		No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	16	6.6	7.3	7.6	0%
Lab pH	6.5 - 8‡	15	6.1	6.9	7.9	20%
Field EC (µS/cm)	350‡	16	167	207	502	13%
Lab EC (µS/cm)	350‡	15	155	195	389	13%
Field DO	-	16	8.4	10.0	109.3	-
Sulphate as Turbidimetric SO_4	400*	15	18	24	52	0%
Total Alkalinity as $CaCO_3$	500*	15	3	4	6	0%
Chloride	400*	15	24	34	61	0%
Dissolved Calcium	-	15	<4	8	9	-
Dissolved Magnesium	-	15	27	43	152	-
Dissolved Potassium	-	15	4	5	23	-
Dissolved Sodium	-	15	5	5	10	-
Dissolved Aluminium	0.055†	15	<0.01	0.05	0.25	47%
Dissolved Arsenic	0.024†	15	<0.001	<0.001	<0.001	0%
Dissolved Barium	1*	15	0.01	0.02	0.14	0%
Dissolved Copper	0.0014†	15	<0.001	<0.001	<0.001	0%
Dissolved Iron	0.3*	14	0.1	0.39	0.61	71%
Dissolved Lead	0.0034†	15	<0.001	<0.001	<0.001	0%
Dissolved Lithium	-	15	<0.001	0.002	0.018	-
Dissolved Manganese	1.9†	15	0.01	0.02	0.34	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Teatree Hollow (TT14-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	TT14-QLa				
		No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	15	<0.001	<0.001	0.002	0%
Dissolved Selenium	0.011†	15	<0.01	<0.01	<0.01	0%
Dissolved Strontium	-	15	0.02	0.03	0.14	-
Dissolved Zinc	0.008†	15	<0.005	<0.005	0.006	0%
Total Aluminium	0.055†	15	0.04	0.18	1.14	93%
Total Arsenic	0.024†	15	<0.001	<0.001	<0.001	0%
Total Barium	1*	15	0.01	0.02	0.18	0%
Total Cadmium	0.0002†	0	-	-	-	-
Total Copper	0.0014†	15	<0.001	<0.001	0.027	13%
Total Iron	0.3*	15	0.35	0.82	1.51	100%
Total Lead	0.0034†	15	<0.001	<0.001	<0.001	0%
Total Lithium	-	15	<0.001	<0.001	0.017	-
Total Manganese	1.9†	15	0.01	0.02	0.49	-
Total Nickel	0.011†	15	<0.001	<0.001	0.004	0%
Total Selenium	0.011†	15	<0.01	<0.01	<0.01	0%
Total Strontium	-	15	0.02	0.04	0.16	-
Total Zinc	0.008†	15	<0.005	<0.005	0.02	27%
Nitrogen Oxides	0.015‡	15	<0.01	0.04	0.06	60%
Total Nitrogen	0.25‡	15	<0.1	0.20	0.6	47%
Total Phosphorus	0.02‡	15	<0.01	<0.01	0.04	13%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC1-QLa and HC2-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC1-QLa					HC2-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	36	6.27	6.92	8.14	14%	32	6.12	6.64	8.63	44%
Lab pH	6.5 - 8‡	31	5.80	6.58	7.19	29%	27	5.46	6.19	7.59	89%
Field EC (µS/cm)	350‡	36	137.9	228	350	0%	32	61.7	137.5	339	0%
Lab EC (µS/cm)	350‡	31	129	240	331	0%	27	62	153	449	4%
Field DO	-	36	1.34	8.15	97.2	-	32	0.17	10.05	99.8	-
Sulphate as Turbidimetric SO_4	400*	31	14	25	36	0%	27	10	19	35	0%
Total Alkalinity as $CaCO_3$	500*	31	2	4	7	0%	27	<1	2	12	0%
Chloride	400*	30	19	40	65	0%	26	14	34	70	0%
Dissolved Calcium	-	30	4	12	35	-	26	2	4	26	-
Dissolved Magnesium	-	31	15	30	56	-	27	4	7	148	-
Dissolved Potassium	-	31	4	7	18	-	27	1	2	37	-
Dissolved Sodium	-	31	3	5	9	-	27	1	3	20	-
Dissolved Aluminium	0.055†	31	<0.01	0.04	0.33	45%	27	<0.01	0.02	0.12	33%
Dissolved Arsenic	0.024†	31	<0.001	0.001	0.002	0%	27	<0.001	0.001	0.002	0%
Dissolved Barium	1*	30	0.01	0.02	0.07	0%	26	0.01	0.04	0.091	0%
Dissolved Copper	0.0014†	31	<0.001	0.001	0.003	23%	27	<0.001	0.001	0.003	4%
Dissolved Iron	0.3*	31	<0.05	0.36	2.22	71%	27	0.06	0.15	0.44	15%
Dissolved Lead	0.0034†	31	<0.001	0.001	0.001	0%	27	<0.001	0.001	0.001	0%
Dissolved Lithium	-	8	<0.001	0.001	0.001	-	7	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	31	0.02	0.13	1.30	0%	27	0.02	0.07	1.07	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC1-QLa and HC2-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC1-QLa					HC2-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	31	<0.001	0.001	0.007	0%	27	<0.001	0.001	0.002	0%
Dissolved Selenium	0.011†	31	<0.01	0.01	0.01	0%	27	<0.01	0.01	0.01	0%
Dissolved Strontium	-	31	0.02	0.04	0.14	0%	27	0.00	0.01	0.47	0%
Dissolved Zinc	0.008†	31	<0.005	0.005	0.023	19%	27	<0.005	0.01	0.02	59%
Total Aluminium	0.055†	31	0.07	0.17	1.74	100%	27	0.05	0.1	1.1	93%
Total Arsenic	0.024†	31	<0.001	0.001	0.002	0%	27	<0.001	0.001	0.002	0%
Total Barium	1*	30	0.01	0.03	0.06	0%	26	0.008	0.04	0.09	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	31	<0.001	0.001	0.009	32%	27	<0.001	0.001	0.002	7%
Total Iron	0.3*	31	0.46	1.43	5.64	100%	27	0.09	0.44	1.13	70%
Total Lead	0.0034†	31	<0.001	0.001	0.002	0%	27	<0.001	0.001	0.001	0%
Total Lithium	-	31	<0.001	0.001	0.001	0%	27	<0.001	0.001	0.001	0%
Total Manganese	1.9†	31	0.03	0.15	1.10	0%	27	0.02	0.07	1.25	0%
Total Nickel	0.011†	31	<0.001	0.001	0.007	0%	27	<0.001	0.001	0.003	0%
Total Selenium	0.011†	31	<0.01	0.01	0.01	0%	27	<0.01	0.01	0.01	0%
Total Strontium	-	31	0.02	0.04	0.14	0%	27	0.00	0.01	0.48	0%
Total Zinc	0.008†	31	<0.005	0.008	0.033	45%	27	<0.005	0.011	0.025	63%
Nitrogen Oxides	0.015‡	30	<0.01	0.10	1.98	80%	26	<0.01	0.04	0.38	77%
Total Nitrogen	0.25‡	31	<0.1	0.40	2.70	90%	27	<0.10	0.20	3.00	37%
Total Phosphorus	0.02‡	31	<0.01	0.03	0.34	58%	27	<0.01	0.01	0.18	11%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC3-QLa and HC4-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC3-QLa					HC4-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8‡	37	6.57	7.15	8.22	5%	36	6.67	7.43	8.40	6%
Lab pH	6.5 - 8‡	31	5.73	6.56	7.25	45%	29	5.8	6.62	7.39	28%
Field EC (µS/cm)	350‡	37	102.2	211	306	0%	36	113.7	241.5	536	14%
Lab EC (µS/cm)	350‡	31	111	211	293	0%	29	109	254	436	10%
Field DO	-	37	0.69	9.83	102.7	-	36	1.25	10.345	102.1	-
Sulphate as Turbidimetric SO_4	400*	31	12	25	33	0%	29	14	30	47	0%
Total Alkalinity as $CaCO_3$	500*	31	<1	3	6	0%	29	<1	3	9	0%
Chloride	400*	30	16	39	62	0%	28	21	52.5	101	0%
Dissolved Calcium	-	30	5	8.5	20	-	28	1	9	31	-
Dissolved Magnesium	-	31	9	24	57	-	29	12	21	66	-
Dissolved Potassium	-	31	2	6	14	-	29	2	6	16	-
Dissolved Sodium	-	31	3	5	7	-	29	3	6	12	-
Dissolved Aluminium	0.055†	31	<0.01	0.05	0.45	42%	29	<0.01	0.03	0.22	31%
Dissolved Arsenic	0.024†	31	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.002	0%
Dissolved Barium	1*	30	0.01	0.02	0.03	0%	28	0.01	0.02	0.07	0%
Dissolved Copper	0.0014†	31	<0.001	0.001	0.002	19%	29	<0.001	0.001	0.003	24%
Dissolved Iron	0.3*	31	0.06	0.28	1.36	48%	29	<0.05	0.32	2.78	52%
Dissolved Lead	0.0034†	31	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.001	0%
Dissolved Lithium	-	7	<0.001	0.001	0.001	-	5	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	31	0.022	0.048	0.337	0%	29	0.02	0.05	2.57	3%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC3-QLa and HC4-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC3-QLa					HC4-QRLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	31	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.003	0%
Dissolved Selenium	0.011†	31	<0.01	0.01	0.01	0%	29	<0.01	0.01	0.01	0%
Dissolved Strontium	-	31	0.014	0.03	0.105	0%	29	0.01	0.04	0.13	0%
Dissolved Zinc	0.008†	31	<0.005	0.005	0.01	10%	29	<0.005	0.005	0.019	14%
Total Aluminium	0.055†	31	0.07	0.14	1.45	100%	29	0.02	0.09	4.65	76%
Total Arsenic	0.024†	31	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.002	0%
Total Barium	1*	30	0.01	0.02	0.04	0%	28	0.01	0.03	0.08	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	31	<0.001	0.001	0.004	13%	29	<0.001	0.001	0.005	21%
Total Iron	0.3*	31	0.35	0.83	1.65	100%	29	0.28	1.01	5.01	97%
Total Lead	0.0034†	31	<0.001	0.001	0.003	0%	29	<0.001	0.001	0.005	3%
Total Lithium	-	31	<0.001	0.001	0.001	0%	29	<0.001	0.001	0.002	0%
Total Manganese	1.9†	31	0.027	0.056	0.311	0%	29	0.02	0.06	2.31	3%
Total Nickel	0.011†	31	<0.001	0.001	0.002	0%	29	<0.001	0.001	0.004	0%
Total Selenium	0.011†	31	<0.01	0.01	0.01	0%	29	<0.01	0.01	0.01	0%
Total Strontium	-	31	0.02	0.04	0.11	0%	29	0.02	0.04	0.14	0%
Total Zinc	0.008†	31	<0.005	0.005	0.028	16%	29	<0.005	0.005	0.022	28%
Nitrogen Oxides	0.015‡	30	<0.01	0.08	1.13	87%	28	<0.01	0.06	0.88	82%
Total Nitrogen	0.25‡	31	<0.1	0.50	3.80	81%	29	<0.1	0.40	2.20	76%
Total Phosphorus	0.02‡	31	<0.01	0.02	0.11	32%	29	<0.01	0.02	0.19	34%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC9-QLa and HC17-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC9-QLa					HC17-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8.‡	40	3.14	6.89	8.37	38%	39	5.67	6.91	8.47	21%
Lab pH	6.5 - 8‡	35	4.02	6.37	7.31	54%	37	5.58	6.5	7.2	46%
Field EC (µS/cm)	350‡	40	113.4	241.5	694	23%	39	85.9	169	401	10%
Lab EC (µS/cm)	350‡	35	111	251	767	20%	37	1	176	478	11%
Field DO	-	40	1.61	9.41	102.6	-	39	0.27	9.76	100	-
Sulphate as Turbidimetric SO_4	400*	54	13	32	96	0%	37	11	21	43	0%
Total Alkalinity as $CaCO_3$	500*	54	<1	3	8	0%	37	<1	3	15	0%
Chloride	400*	53	16	51	250	0%	36	15	38.5	109	0%
Dissolved Calcium	-	53	2	8	20	-	36	4	8	38	-
Dissolved Magnesium	-	54	1	20	65	-	37	6	13	82	-
Dissolved Potassium	-	54	2	5	17	-	37	2	4	23	-
Dissolved Sodium	-	54	2	6	17	-	37	2	3	16	-
Dissolved Aluminium	0.055†	35	<0.01	0.04	0.34	37%	37	<0.01	0.05	0.88	49%
Dissolved Arsenic	0.024†	35	<0.001	0.001	0.001	0%	37	<0.001	0.001	0.004	0%
Dissolved Barium	1*	34	0.01	0.03	0.23	0%	36	0.00	0.01	0.07	0%
Dissolved Copper	0.0014†	35	<0.001	0.001	0.004	29%	37	<0.001	0.001	0.006	16%
Dissolved Iron	0.3*	35	0.23	0.95	13.4	83%	37	0.07	0.26	1.84	38%
Dissolved Lead	0.0034†	35	<0.001	0.001	0.001	0%	36	<0.001	0.001	0.001	0%
Dissolved Lithium	-	7	<0.001	0.001	0.001	-	8	<0.001	0.001	0.001	-
Dissolved Manganese	1.9†	35	0.02	0.15	2.28	9%	37	0.02	0.06	1.61	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Hornes Creek (HC9-QLa and HC17-QRLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	HC9-QLa					HC17-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	35	<0.001	0.001	0.02	14%	37	<0.001	0.001	0.005	0%
Dissolved Selenium	0.011†	35	<0.01	0.01	0.01	0%	37	<0.01	0.01	0.01	0%
Dissolved Strontium	-	35	0.01	0.04	0.14	-	37	0.01	0.03	0.21	-
Dissolved Zinc	0.008†	35	<0.005	0.009	0.083	54%	37	<0.005	0.005	0.253	41%
Total Aluminium	0.055†	54	<0.01	0.12	2.55	80%	37	0.09	0.2	2.51	100%
Total Arsenic	0.024†	54	<0.001	0.001	0.01	0%	37	<0.001	0.001	0.005	0%
Total Barium	1*	53	0.01	0.03	0.25	0%	36	0.01	0.01	0.07	0%
Total Cadmium	0.0002†	19	0.0001	0.0001	0.0001	0%	0	-	-	-	-
Total Copper	0.0014†	54	<0.001	0.001	0.017	35%	37	<0.001	0.001	0.011	19%
Total Iron	0.3*	54	0.4	1.79	25.80	100%	37	0.23	0.68	4.24	95%
Total Lead	0.0034†	54	<0.001	0.001	0.004	4%	37	<0.001	0.001	0.003	0%
Total Lithium	-	54	<0.001	0.001	0.009	-	37	<0.001	0.001	0.006	-
Total Manganese	1.9†	54	0.03	0.09	2.53	11%	37	0.02	0.06	1.53	0%
Total Nickel	0.011†	54	<0.001	0.002	0.023	22%	37	<0.001	0.001	0.006	0%
Total Selenium	0.011†	54	<0.01	0.01	0.01	0%	37	<0.01	0.01	0.01	0%
Total Strontium	-	54	0.02	0.04	0.13	-	37	0.01	0.03	0.22	-
Total Zinc	0.008†	54	<0.005	0.0115	0.172	63%	37	<0.005	0.008	0.263	38%
Nitrogen Oxides	0.015‡	53	<0.01	0.09	2.88	81%	36	<0.01	0.07	5.26	78%
Total Nitrogen	0.25‡	54	<0.1	0.40	3.60	72%	37	<0.1	0.40	6.60	65%
Total Phosphorus	0.02‡	54	<0.01	0.015	0.16	35%	37	<0.01	0.02	0.7	43%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT1-QLa and DT2-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT1-QLa					DT2-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8.5‡	38	5.98	7.07	8.42	13%	33	6.28	7.06	8.02	6%
Lab pH	6.5 - 8.5‡	26	5.97	6.885	7.92	27%	26	5.67	6.66	7.35	23%
Field EC (µS/cm)	350‡	38	121.5	240	6060	18%	33	85	212	252	0%
Lab EC (µS/cm)	350‡	26	160	233.5	6260	19%	26	92	193.5	266	0%
Field DO	-	38	0.2	8.515	99.8	-	33	4.2	8.9	94	-
Sulphate as Turbidimetric SO_4	400*	26	1	5	59	0%	26	1	5	10	0%
Total Alkalinity as $CaCO_3$	500*	26	1	28.5	55	0%	26	10	22.5	38	0%
Chloride	400*	23	26	46	106	0%	26	19	40.5	58	0%
Dissolved Calcium	-	26	3	4	81	-	26	2	4	5	-
Dissolved Magnesium	-	26	3	6	198	-	26	2	5	7	-
Dissolved Potassium	-	26	16	28	900	-	26	10	24.5	32	-
Dissolved Sodium	-	26	3	4.5	32	-	26	3	5	7	-
Dissolved Aluminium	0.055†	25	0.01	0.05	0.36	36%	26	0.02	0.08	0.64	73%
Dissolved Arsenic	0.024†	26	0.001	0.001	0.001	0%	26	0.001	0.001	0.001	0%
Dissolved Barium	1*	26	0.016	0.022	0.751	0%	26	0.008	0.0155	0.021	0%
Dissolved Copper	0.0014†	26	0.001	0.001	0.002	12%	26	0.001	0.001	0.018	12%
Dissolved Iron	0.3*	26	0.17	0.45	0.96	77%	26	0.1	0.33	0.71	54%
Dissolved Lead	0.0034†	26	0.001	0.001	0.001	0%	26	0.001	0.001	0.001	0%
Dissolved Lithium	-	5	0.001	0.001	0.001	-	6	0.001	0.001	0.001	-
Dissolved Manganese	1.9†	26	0.01	0.0405	0.785	0%	26	0.001	0.007	0.084	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT1-QLa and DT2-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT1-QLa					DT2-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	26	0.001	0.001	0.002	0%	26	0.001	0.001	0.001	0%
Dissolved Selenium	0.011†	26	0.01	0.01	0.01	0%	26	0.01	0.01	0.01	0%
Dissolved Strontium	-	26	0.03	0.045	1.03	-	26	0.019	0.038	0.05	-
Dissolved Zinc	0.008†	26	0.005	0.005	0.022	23%	26	0.005	0.005	0.024	23%
Total Aluminium	0.055†	26	0.01	0.13	0.73	81%	26	0.08	0.215	0.98	100%
Total Arsenic	0.024†	26	0.001	0.001	0.001	0%	26	0.001	0.001	0.001	0%
Total Barium	1*	26	0.016	0.026	0.787	0%	26	0.009	0.018	0.024	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	26	0.001	0.001	0.006	27%	26	0.001	0.001	0.036	27%
Total Iron	0.3*	26	0.24	1.04	2.14	96 %	26	0.24	0.635	1.24	88%
Total Lead	0.0034†	26	0.001	0.001	0.001	0 %	26	0.001	0.001	0.002	0%
Total Lithium	-	26	0.001	0.001	0.001	-	26	0.001	0.001	0.001	-
Total Manganese	1.9†	26	0.012	0.054	0.788	0 %	26	0.004	0.0105	0.095	0%
Total Nickel	0.011†	26	0.001	0.001	0.001	0%	26	0.001	0.001	0.001	0%
Total Selenium	0.011†	26	0.01	0.01	0.01	0 %	26	0.01	0.01	0.01	0%
Total Strontium	-	26	0.031	0.047	1.12	-	26	0.021	0.0395	0.054	-
Total Zinc	0.008†	26	0.005	0.006	0.03	31%	26	0.005	0.005	0.027	38%
Nitrogen Oxides	0.015‡	26	0.01	0.045	1.14	85%	26	0.01	0.095	1.03	88%
Total Nitrogen	0.25‡	26	0.2	0.55	2.6	96%	26	0.2	0.5	2.3	92%
Total Phosphorus	0.02‡	26	0.01	0.02	0.13	46%	26	0.01	0.02	0.11	46%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT3-QLa and DT4-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT3-QLa					DT4-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8.5‡	33	6.36	7	8.05	0%	33	6.35	7.18	7.86	3%
Lab pH	6.5 - 8.5‡	27	5.75	6.83	7.51	22%	27	5.59	6.85	7.72	11%
Field EC (µS/cm)	350‡	33	76	179	233	0%	33	155	270	339	0%
Lab EC (µS/cm)	350‡	27	82	167	238	0%	27	154	269	360	7%
Field DO	-	33	5.12	8.51	94	-	33	2.71	9.17	94.6	-
Sulphate as Turbidimetric SO_4	400*	27	1	5	12	0%	27	3	12	26	0%
Total Alkalinity as $CaCO_3$	500*	27	10	34	55	0%	27	24	48	92	0%
Chloride	400*	27	14	31	40	0%	27	22	43	80	0%
Dissolved Calcium	-	27	2	6	8	-	27	6	11	16	-
Dissolved Magnesium	-	27	2	4	6	-	27	4	6	9	-
Dissolved Potassium	-	27	8	19	27	-	27	17	29	42	-
Dissolved Sodium	-	27	3	5	8	-	27	3	5	7	-
Dissolved Aluminium	0.055†	27	0.01	0.03	0.44	26%	27	0.01	0.04	0.66	37%
Dissolved Arsenic	0.024†	27	0.001	0.001	0.001	0%	27	0.001	0.001	0.002	0%
Dissolved Barium	1*	27	0.008	0.015	0.027	0%	27	0.014	0.026	0.036	0%
Dissolved Copper	0.0014†	27	0.001	0.001	0.003	7%	27	0.001	0.001	0.004	22%
Dissolved Iron	0.3*	27	0.05	0.3	0.59	48%	27	0.06	0.34	1	56%
Dissolved Lead	0.0034†	27	0.001	0.001	0.001	0%	27	0.001	0.001	0.002	0%
Dissolved Lithium	-	7	0.001	0.001	0.001	-	6	0.001	0.001	0.001	-
Dissolved Manganese	1.9†	27	0.001	0.017	0.073	0%	27	0.004	0.031	0.123	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT3-QLa and DT4-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT3-QLa					DT4-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	27	0.001	0.001	0.001	0%	27	0.001	0.001	0.002	0%
Dissolved Selenium	0.011†	27	0.01	0.01	0.01	0%	27	0.01	0.01	0.01	0%
Dissolved Strontium	-	27	0.019	0.048	0.069	-	27	0.042	0.075	0.105	-
Dissolved Zinc	0.008†	27	0.005	0.005	0.061	22%	27	0.005	0.005	0.06	30%
Total Aluminium	0.055†	27	0.04	0.12	0.75	93%	27	0.03	0.23	1.01	96%
Total Arsenic	0.024†	27	0.001	0.001	0.001	0%	27	0.001	0.001	0.001	0%
Total Barium	1*	27	0.01	0.017	0.031	0%	27	0.018	0.028	0.039	0%
Total Cadmium	0.0002†	0	-	-	-	-	0	-	-	-	-
Total Copper	0.0014†	27	0.001	0.001	0.004	22%	27	0.001	0.001	0.004	33%
Total Iron	0.3*	27	0.12	0.49	1.2	74%	27	0.3	0.82	1.44	96%
Total Lead	0.0034†	27	0.001	0.001	0.002	0%	27	0.001	0.001	0.001	0%
Total Lithium	-	27	0.001	0.001	0.001	-	27	0.001	0.001	0.001	-
Total Manganese	1.9†	27	0.004	0.019	0.077	0%	27	0.012	0.038	0.14	0%
Total Nickel	0.011†	27	0.001	0.001	0.001	0%	27	0.001	0.001	0.002	0%
Total Selenium	0.011†	27	0.01	0.01	0.01	0%	27	0.01	0.01	0.01	0%
Total Strontium	-	27	0.021	0.049	0.072	-	27	0.043	0.08	0.111	-
Total Zinc	0.008†	27	0.005	0.005	0.064	30%	27	0.005	0.008	0.059	48%
Nitrogen Oxides	0.015‡	27	0.01	0.01	0.56	48%	27	0.01	0.04	2.98	70%
Total Nitrogen	0.25‡	27	0.1	0.3	1.7	63%	27	0.1	0.5	3.6	93%
Total Phosphorus	0.02‡	27	0.01	0.01	0.09	19%	27	0.01	0.02	0.1	48%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT15-QRLa and DT16-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT15-QRLa					DT16-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Field pH	6.5 - 8.5‡	30	6.06	7.265	8.3	13%	32	6.5	7.185	8.36	3%
Lab pH	6.5 - 8.5‡	31	5.14	6.97	7.49	23%	27	5.94	6.87	7.58	11%
Field EC (µS/cm)	350‡	30	174.4	249.75	323	0%	32	183.1	270.2	700	19%
Lab EC (µS/cm)	350‡	30	132	247.5	2380	10%	27	173	256	702	15%
Field DO	-	29	3.78	9.3	95.4	-	32	3.98	8.83	94	-
Sulphate as Turbidimetric SO_4	400*	47	1	15	108	0%	40	3	16	124	0%
Total Alkalinity as $CaCO_3$	500*	47	6	30	53	0%	40	15	38.5	62	0%
Chloride	400*	47	25	44	767	4%	40	30	48.5	128	0%
Dissolved Calcium	-	47	4	7	36	-	40	4	9	28	-
Dissolved Magnesium	-	47	2	6	70	-	40	3	7	22	-
Dissolved Potassium	-	47	12	27	275	-	40	21	31	64	-
Dissolved Sodium	-	47	5	7	24	-	40	6	8	15	-
Dissolved Aluminium	0.055†	29	0.01	0.05	0.26	45%	27	0.01	0.05	0.21	48%
Dissolved Arsenic	0.024†	29	0.001	0.001	0.002	0%	27	0.001	0.001	0.001	0%
Dissolved Barium	1*	29	0.015	0.02	0.286	0%	27	0.016	0.021	0.066	0%
Dissolved Copper	0.0014†	29	0.001	0.001	0.004	10%	27	0.001	0.001	0.005	11%
Dissolved Iron	0.3*	29	0.05	0.28	2.36	48%	27	0.05	0.21	0.75	33%
Dissolved Lead	0.0034†	29	0.001	0.001	0.001	0%	27	0.001	0.001	0.001	0%
Dissolved Lithium	-	6	0.001	0.001	0.001	-	7	0.001	0.001	0.001	-
Dissolved Manganese	1.9†	29	0.001	0.006	2.33	3%	27	0.001	0.009	0.045	0%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Dogtrap Creek (DT15-QRLa and DT16-QLa) Water Quality Summary

Parameter (mg/L unless otherwise stated)	Guideline Value	DT15-QRLa					DT16-QLa				
		No. Samples	Min	Median	Max	% Exceedance	No. Samples	Min	Median	Max	% Exceedance
Dissolved Nickel	0.011†	29	0.001	0.001	0.003	0%	27	0.001	0.001	0.002	0%
Dissolved Selenium	0.011†	29	0.01	0.01	0.01	0%	27	0.01	0.01	0.01	0%
Dissolved Strontium	-	29	0.038	0.077	0.421	-	27	0.055	0.08	0.285	-
Dissolved Zinc	0.008†	29	0.005	0.006	0.044	24%	27	0.005	0.005	0.015	11%
Total Aluminium	0.055†	47	0.04	0.33	2.1	96%	40	0.02	0.32	2.1	98%
Total Arsenic	0.024†	47	0.001	0.001	0.003	0%	40	0.001	0.001	0.003	0%
Total Barium	1*	47	0.015	0.02	0.29	0%	40	0.019	0.0245	0.066	0%
Total Cadmium	0.0002†	18	0.0001	0.0001	0.0001	0%	14	0	0.0001	0.0001	0%
Total Copper	0.0014†	47	0.001	0.001	0.009	26%	40	0.001	0.001	0.003	28%
Total Iron	0.3*	47	0.07	0.54	3.98	70%	40	0.14	0.44	2.4	70%
Total Lead	0.0034†	47	0.001	0.001	0.004	2%	40	0.001	0.001	0.003	0%
Total Lithium	-	47	0.001	0.001	0.003	-	40	0.001	0.001	0.006	-
Total Manganese	1.9†	47	0.001	0.009	2.28	2%	40	0.005	0.0125	0.133	0%
Total Nickel	0.011†	47	0.001	0.001	0.004	0%	40	0.001	0.001	0.002	0%
Total Selenium	0.011†	47	0.01	0.01	0.01	0%	40	0.01	0.01	0.01	0%
Total Strontium	-	47	0.039	0.071	0.43	-	40	0.048	0.095	0.288	-
Total Zinc	0.008†	47	0.005	0.008	0.059	49%	40	0.005	0.005	0.022	25%
Nitrogen Oxides	0.015‡	47	0.01	0.44	1.47	94%	40	0.01	0.595	1.68	93%
Total Nitrogen	0.25‡	47	0.2	1	8	98%	40	0.2	1.15	2.6	98%
Total Phosphorus	0.02‡	47	0.01	0.02	0.56	45%	39	0.01	0.02	0.37	38%

† ANZG (2018) default guideline value for aquatic ecosystems (95% level of species protection for slightly to moderately disturbed ecosystems) – the default guideline value relates to the total concentration of a constituent although should also be compared with the dissolved concentration which represents the bioavailable fraction; ‡ ANZECC (2000) default guideline value for Upland Rivers in NSW; * ANZECC (2000) water quality guideline value for recreational purposes.

Appendix D Site Water and Salt Balance

Appendix E Stakeholder Comments and Responses

Stakeholder	Stakeholder Comment	Response
Department of Planning, Industry and Environment (DPE) - Water (19 January 2022)	A copy of the Fluvial Systems geomorphological survey and report on stream condition should be made available to DPE Water and a copy held on site for reference.	A copy of the *Tahmoor South Project Environmental Impact Statement Technical Specialists Report Geomorphology* (Fluvial Systems, 2013) has been provided to DPE and a copy held on site for reference.
	A record of pre- and post- subsidence state of key rock bars and pools should be maintained for review of impact predictions reporting.	The Extraction Plan will present the monitoring and reporting requirements in relation to potential subsidence impacts on pool physical features and surface water resources. The reporting requirements will include record of the pre- and post-subsidence conditions of key rock bars and pools.
Environment Protection Agency (EPA)	Section 8.1.1 Water Monitoring Plan Chloride be added to the list of parameters to be analysed in the monthly monitoring program. Chloride analysis will provide the ability to distinguish electrical conductivity caused by alkaline mine water from conductivity caused by background salinity from the local Ashfield shale (Wianamatta) rock unit and its product soils. This is the case for Tea Tree Hollow where higher conductivity readings in the upper sections are likely due to shale seeps but alkalinity dominates the creek below the LDP1 discharge further downstream (related observation are made in section 4.2.2 of the plan).	Chloride is currently monitored at all monitoring sites on a monthly basis by Tahmoor Coal. Chloride was inadvertently excluded from Section 4.1.2, Section 8.2.1 and Appendix B of the draft SWMP. Section 4.1.2, Section 8.2.1 and Appendix C (previously Appendix B) have been updated to include chloride.
	Appendix B Water Quality Monitoring Tables There appear to be a few typographical or transcription errors in the tables which could be reviewed for accuracy. A couple of examples are given here. The data presented in the table on page 72 (BR1-QLa etc) appears to have been inadvertently copied to the table on page 74 (BR14-QLa). There appears to be an error in data presented in the table on page 76. The median field electrical conductivity at TT4-QLa is not given but values range from 157 to 1238 uS/cm. The corresponding total alkalinity values for TT4-QLa are only 3 to 19 mg/L which are much lower than would be expected from a site downstream of the reject emplacement sedimentation basins. A similar comment applies for TT8-QLa located downstream of the minewater discharge (median EC 2097 uS/cm but the median total alkalinity is only 14 mg/L, on page 78).	The water quality data summary tables in Appendix C (previously Appendix B) of the revised SWMP have been corrected and reviewed for accuracy. The total alkalinity values have now been entered into the correct row and indicate that a range of 52 to 712 mg/L has been recorded at TT4-QLa and a range of 681 to 1,320 mg/L total alkalinity recorded at TT8-QLa.

Stakeholder	Stakeholder Comment	Response
Department of Planning, Industry and Environment (DPE) - Water (14 February 2022)	Describe the water management system for the REA expansion and new ventilation shaft site. Describe the new approved STP.	Additional detail on the proposed management of water stored in sediment dams S12 and S13 has been included in Section 5.1.4 of the revised SWMP. Figure 12 of the SWMP has been revised to reflect the updated text. Section 5.1.1 of the SWMP has been revised to provide details of the upgraded sewage treatment plant.
	Provide details of on-site chemical and hydrocarbon storage.	Section 5.1.2 of the revised SWMP describes the management of hazardous chemicals and hydrocarbon storage. Hazardous chemicals and hydrocarbon products are stored in bunded areas in accordance with relevant Australian Standards.

Appendix F Approval Letter (Received 14/04/2022)

Planning, Industry & Environment

Zina Ainsworth
Environment & Community Manager
Tahmoor Coal Pty Ltd
2975 Remembrance Drive
Tahmoor, NSW, 2573

DATEWILLBEINSERTEDHERE

Dear Ms. Ainsworth

Tahmoor South Coal (SSD-8445)
Surface Water Management Plan

I refer to the Surface Water Management Plan submitted in accordance with Condition B34(e)(iv) of Schedule 2 of the Development Consent for Tahmoor South Coal (SSD-8445).

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the relevant conditions of consent.

Accordingly, the Secretary has approved the Surface Water Management Plan (Revision 1, dated 18 March 2022). Please ensure that the approved plan is placed on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Wayne Jones on (02) 6575 3406.

Yours sincerely

Wayne Jones
Team Leader - Post Approval
Resource Assessments

As nominee of the Secretary