

# Ravensworth South Coal Mine Modification

## Water Management Plan

21-Feb-2024

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## Water Management Plan

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## Quality Information

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			Name/Position	Signature
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## Glossary of terms and abbreviations

Abbreviation	Definition
AECOM	AECOM Australia Pty Ltd
AGL	AGL Energy Limited
AGLM	AGL Macquarie Pty Ltd as the proponent of the Project
CEMP	Construction Environmental Management Plan
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021 (NSW)
EPA	NSW Environment Protection Authority
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ERA	Environmental Risk Assessment
HSE	Health, Safety and Environment
LEP	Local Environmental Plan
LGA	Local Government Area
ML	Mining Lease
Mod-1	Modification DA86/51-Mod 1
Modification Report	The Modification Report titled "Ravensworth South Mine – Rehabilitation Amendment" prepared by Jacobs, dated 20 May, 2022, including the report titled "Ravensworth South Mine - Landform Amendment Modification Report - Response to submissions" prepared by Jacobs, dated 24 October 2022
MOP	Ravensworth Mining Operations Plan for Ravensworth Ash Disposal Area (Rehabilitation Management Plan) dated 20 June 2016. The MOP has since been superseded by the RMP (2022).
Narama void	Glencore's Narama void
PIRMP	Pollution Incident Response Management Plan
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
Roads Act	Roads Act 1993 (NSW)
RMP	Ravensworth Ash Disposal Area Rehabilitation Management Plan 2022
RSCM	Ravensworth South Coal Mine
SEARs	Secretary's Environmental Assessment Requirements
Secretary	Secretary of the NSW Department of Planning and Environment
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021 (NSW)
WMP	Water Management Plan

## 1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by AGL Macquarie Pty Ltd (AGLM) to prepare a Water Management Plan (WMP) associated with modification DA86/51-Mod 1, to change the operational management of Void 5 at the Ravensworth South Coal Mine (RSCM).

DA86/51-Mod 1 is approved under section 4.55(2) of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

### 1.1 Background

RSCM is owned and operated by AGLM. RSCM ceased operations in 2000 which left a number of voids from the incomplete filling of the mined area with overburden, which included Void 5. The rehabilitation of Void 5 commenced in 2014.

Void 5 and the rehabilitated area surrounding Void 5 reside within AGLM landholdings, and has previously been managed by AGLM in accordance with the following:

- *Ravensworth South - Final Void Rehabilitation Plan* dated 1 May 2012 (Approved Void 5 Rehabilitation Plan) approved under condition 2 of DA 86/51
- *Ravensworth Mining Operations Plan for Ravensworth Ash Disposal Area* (Rehabilitation Management Plan) dated 20 June 2016 (MOP) approved under the conditions of mining leases 1484 and 1485
- Environment Protection Licence 779 (EPL 779).

The original intent of the design of the ash disposal system was to transfer fly ash as a dense phase slurry to Void 5 via two slurry lines from the Ravensworth Plant at Bayswater Power Station. Decant water from the slurry was to be collected at a localised low point of the impoundment and is then pumped back to "Void 4" at Ravensworth No. 2 Mine, which is located directly north of RSCM. From Void 4, water would then be pumped back to the Bayswater Power Station for reuse in accordance with a separate consent, DA 144/93.

Hydrogeological investigations of the Void 5 decant basin identified that previous underground mining activity was resulting in water loss into the Ravensworth Underground mine workings. Water from Void 5's decant basin was flowing to the underlying Ravensworth Underground Mine and towards the Ravensworth Open Cut North Pit and the Narama Void.

AGLM engaged Jacobs to prepare the *Ravensworth South Mine - Rehabilitation Amendment Modification Report* (Jacobs, 2022) (Modification Report) to support the application to modify DA 86/51 (DA86/51-Mod-1). The application was submitted to the Department of Planning and Environment (DPE) on 20 May 2022 to make a number of changes to the rehabilitation arrangements previously approved for Void 5 under the Approved Void 5 Rehabilitation Plan (as augmented by the Ravensworth Void 5 Ash Emplacement Management Plan (Aurecon, 2015) (AEMP), MOP and EPL 779) to:

- reflect updated estimates of the amount of coal ash available for emplacement in Void 5, including in light of the fact that AGLM has committed to closing Bayswater Power Station (Bayswater) by no later than 2033
- reflect the further understanding of the hydrogeological conditions of Void 5
- facilitate the final rehabilitated landform within Void 5 to ensure it remains free draining and aligns with adjoining mining projects
- make further provision for the capping and rehabilitation of Void 5 by authorising the establishment of mine spoil borrow pits and the stockpiling of mine spoil or alternative capping materials from suitable offsite sources.

The modification, DA86/51-Mod-1, hereafter referred to as Mod-1, sought to:

- change the ash emplacement methodology within Void 5
- remove redundant pumping infrastructure with Void 5

- provide for the receipt, stockpiling and use of capping material, including mine spoil or alternative capping materials that has been classified as Excavated Natural Material under the *Protection of the Environment Operations (Waste) Regulation 2014* for Void 5
- clear vegetation to enable ongoing ash deposition in the Void 5 north arm
- introduce flexible options for the Void 5 final landform to ensure it remains free draining and is aligned with neighbouring final mining landforms
- update the boundary of DA 86/51 to reflect current land tenure and rehabilitation requirements.

DPE exhibited the modification application from 16 June 2022 until 2 July 2022 and received one public submission in support of the modification.

DPE approved Mod-1 subject to revised conditions under section 4.55(2) of the EP&A Act. As part of the revised conditions, AGLM is required to engage a suitably qualified and experienced person to develop a Water Management Plan (EMS) (Condition B8 of DA 86/51 Mod-1).

Figure 1 shows the Ravensworth South approval boundary site map.

## 1.2 Site details

The site identification details are summarised in Table 1.

**Table 1 Site identification details**

Item	Description
Owner	The owner of the RSCM is AGLM. The total area of AGLM landholding is approximately 10,000 hectares, including Liddell Power Station, the Ravensworth rehabilitation area, Lake Liddell and surrounding buffer lands.
Site address	The RSCM, within which Void 5 is located at 74 Lemington Road, Ravensworth, 2330 and is situated in the Upper Hunter Valley, off the New England Highway, approximately 18 km north-west of Singleton and 30 km south-east of Muswellbrook.
Title Identification relevant for Mod-1	Part of Lot 10 DP 1204457
Current land use zoning	The site is on land zoned RU1 – Primary Production.
Surrounding land use	The site is bounded by Ravensworth Operations, an open cut coal mine, to the north, south and west, and New England Highway and Glendell Open Cut Mine to the East. The nearest sensitive receivers are mining-affiliated rural residential properties located approximately 1 km to the southeast of Lemington Road. The nearest non-mining affiliated residential properties are located approximately 3 km south-east around Camberwell.



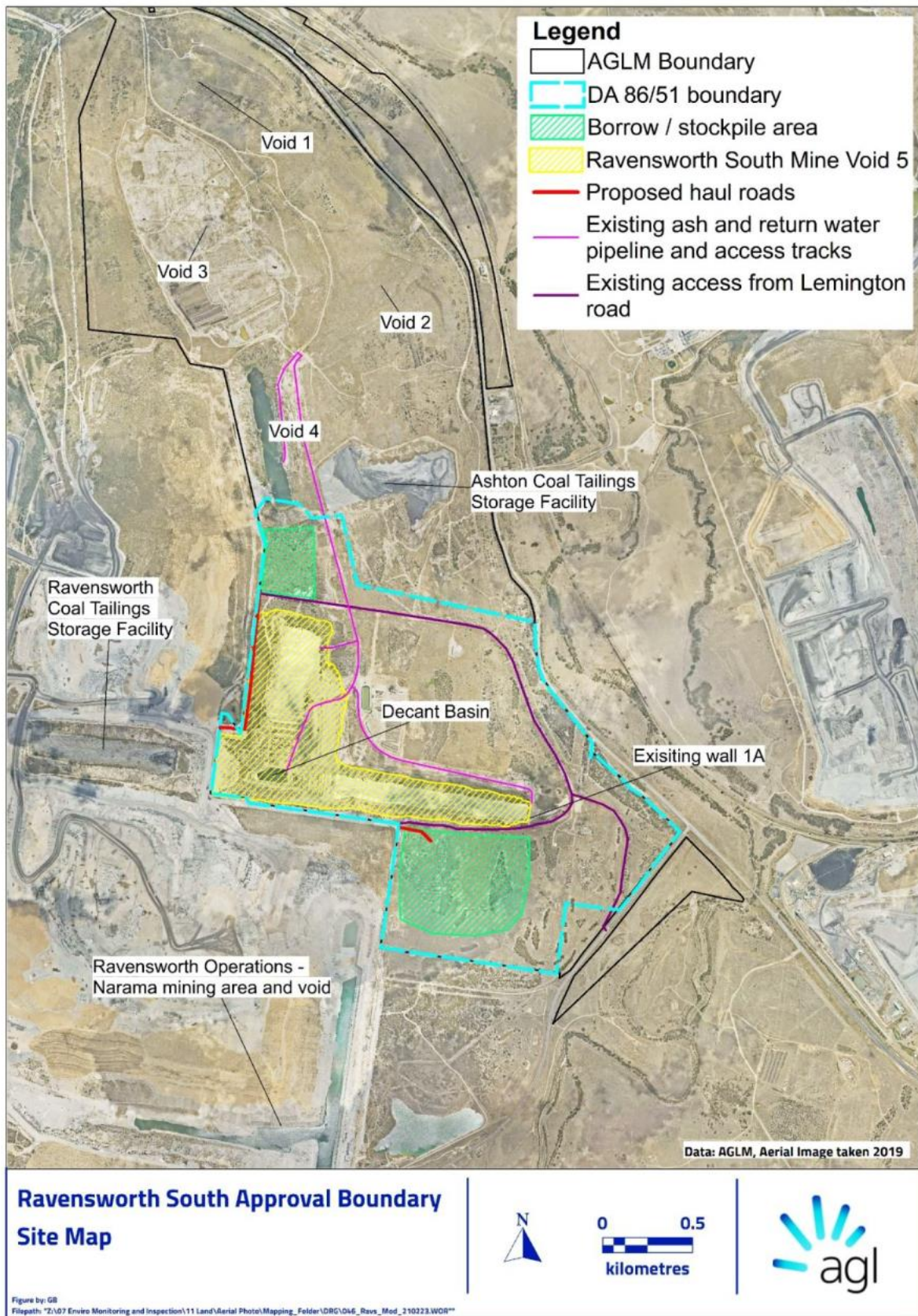


Figure 1 Ravensworth South approval boundary site map (Source: NSW Government of Planning and Environment - Notice of Modification)

## 1.3 Project description

### 1.3.1 Project overview

Mod-1 will include the following:

- the removal of redundant pumping infrastructure from Void 5 to allow ash disposal in the area below the current internal terraces
- receiving, stockpiling and use of mine spoil or alternative materials for use in rehabilitation and capping of Void 5
- construction and operation of borrow pits to win mine spoil for capping of Void 5 and Void 4 following completion of ash disposal
- clearing vegetation to the west of the north arm of the void to enable ongoing ash deposition in Void 5
- updating the proposed final landform associated with the eastern wall of the eastern arm of Void 5 to include works comprising a 5 m downstream raising, if required.

### 1.3.2 Site description and access

RSCM is located on AGLM landholdings within the Singleton Local Government Area (LGA), approximately 22 kilometres (km) southeast of Muswellbrook, 20 km northwest of Singleton, and approximately 80 km northwest of Newcastle in NSW.

The site is bounded by Ravensworth Operations, an open cut coal mine, to the north, south and west, and New England Highway and Glendell Open Cut Mine and Ashton Coal to the East. The nearest sensitive receivers are mining affiliated rural residential properties located approximately 1 km to the southeast of Lemington Road. The nearest non-mining affiliated residential properties are located approximately 3 km south-east around Camberwell.

## 1.4 Scope

This WMP applies to activities carried out during the works associated with Mod-1. It incorporates all relevant requirements of the development consent, licences, permits, and approvals required for Mod-1.

This WMP incorporates a high-level Erosion and Sediment Control Plan and a Surface Water Management Plan specific for the project. Detailed Erosion and Sediment Control Plan would be developed for specific work items as required.

## 1.5 Purpose

The WMP has been prepared to guide water management during the implementation of Mod-1. The WMP aims to guide compliance with all relevant statutory requirements and ensure appropriate controls are in place to minimise and prevent risks to the water environment. It identifies key personnel roles and responsibilities, and procedures for project communications and complaints handling.

## 1.6 Relevant approvals and conditions

### 1.6.1 Project approvals

Mod-1 is approved under section 4.55(2)(a) of the EP&A Act by DA86/51 Mod-1, 19 April 2023.

RSCM operates under Environment Protection Licence 779 issued under the *Protection of the Environment Operations Act 1997* (POEO Act).

### 1.6.2 Development consent conditions

This WMP has been prepared in accordance with condition B8 of DA 86/51 Mod-1. AECOM was engaged by AGLM as suitably qualified and experienced to prepare the WMP.

A draft Water Management Plan (AECOM, 2023) (WMP) was submitted to DPE Water for review on 19 September 2023. A copy of DPE Water's response is provided in Appendix A.

Development consent conditions applicable to condition B8 are shown in **Table 2** with cross reference to sections within the WMP where the requirements have been addressed.

**Table 2 Relevant conditions of the Development Consent**

Condition	Section/reference
B8. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This document
a. be submitted for approval within 6 months of the approval of Mod 1;	This document
b. be prepared by a suitably qualified and experienced person/s;	This WMP has been completed by AECOM
c. be prepared in consultation with DPE Water;	Appendix A
d. describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 1);	Section 7.0
e. build on existing monitoring programs, where practicable;	Section 7.0
f. include a:	Section 6.0
i. Erosion and Sediment Control Plan that:	
• is consistent with the requirements of Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008);	
• identifies activities that could cause soil erosion, generate sediment or affect flooding;	Section 6.0
• describes measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;	Section 6.0
• describes the location, function, and capacity of erosion and sediment control structures and flood management structures; and	Section 6.0
• describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;	Section 6.0
ii. Surface Water Management Plan that includes:	Section 7.0
• a detailed description of the surface water management system;	
• details of the water licensing requirements for all water storages (i.e., exempt, harvestable rights or licenced);	Section 5.0
• surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development, for:	Section 7.4
- downstream surface water flows and quality;	
- stream and riparian vegetation health; and	
- post-mining water pollution from rehabilitated areas of the site;	
• a program to monitor and evaluate:	Section 7.0
- compliance with the relevant performance measures listed in Table 1;	

Condition	Section/reference
<ul style="list-style-type: none"> <li>- controlled and uncontrolled discharges and seepage/leachate from the site; and</li> <li>- the effectiveness of the surface water management system and the measures in the Erosion and Sediment Control Plan; and</li> </ul>	
<ul style="list-style-type: none"> <li>• a trigger action response plan to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development.</li> </ul>	Section 7.5

Other conditions of DA 86/51 Mod-1 that relate to water management are shown in Table 3 along with a discussion of their relevance to the construction of the Ravensworth Ash Line component of the project.

**Table 3 Other conditions of SSD relating to water management**

Condition	Comment/reference						
<p><b>Water Supply</b> B5. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply. <i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development, including during rehabilitation and post mine closure.</i></p>	Water requirements would be drawn from existing entitlements, no new water licences would be required for Mod-1.						
<p><b>Water Discharges</b> B6. The Applicant must ensure that all surface discharges from the site comply with: (a) discharge limits (both volume and quality) set for the development in any EPL; or (b) relevant provisions of the POEO Act and <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i>.</p>	Section 7.0						
<p><b>Water Management Performance Measures</b> B7. The Applicant must ensure that the development complies with the performance measures in Table 1. <i>Table 1: Water management performance measures</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Feature</th> <th>Performance measure</th> </tr> </thead> <tbody> <tr> <td>Water management – General</td> <td> <ul style="list-style-type: none"> <li>▪ Maintain separation between clean, dirty (i.e., sediment-laden) and mine water management systems</li> <li>▪ Minimise the use of clean and potable water on the site</li> <li>▪ Maximise water recycling, reuse and sharing opportunities</li> <li>▪ Design, install, operate and maintain water management systems in a proper and efficient manner</li> <li>▪ Minimise risks to the receiving environment and downstream water users</li> </ul> </td> </tr> <tr> <td>Erosion and sediment control works</td> <td> <ul style="list-style-type: none"> <li>▪ Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2C: Unsealed Roads (DECC,2008), and Volume 2E: Mines and Quarries (DECC, 2008)</i></li> <li>▪ Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with</li> </ul> </td> </tr> </tbody> </table>	Feature	Performance measure	Water management – General	<ul style="list-style-type: none"> <li>▪ Maintain separation between clean, dirty (i.e., sediment-laden) and mine water management systems</li> <li>▪ Minimise the use of clean and potable water on the site</li> <li>▪ Maximise water recycling, reuse and sharing opportunities</li> <li>▪ Design, install, operate and maintain water management systems in a proper and efficient manner</li> <li>▪ Minimise risks to the receiving environment and downstream water users</li> </ul>	Erosion and sediment control works	<ul style="list-style-type: none"> <li>▪ Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2C: Unsealed Roads (DECC,2008), and Volume 2E: Mines and Quarries (DECC, 2008)</i></li> <li>▪ Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with</li> </ul>	Section 7.4
Feature	Performance measure						
Water management – General	<ul style="list-style-type: none"> <li>▪ Maintain separation between clean, dirty (i.e., sediment-laden) and mine water management systems</li> <li>▪ Minimise the use of clean and potable water on the site</li> <li>▪ Maximise water recycling, reuse and sharing opportunities</li> <li>▪ Design, install, operate and maintain water management systems in a proper and efficient manner</li> <li>▪ Minimise risks to the receiving environment and downstream water users</li> </ul>						
Erosion and sediment control works	<ul style="list-style-type: none"> <li>▪ Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2C: Unsealed Roads (DECC,2008), and Volume 2E: Mines and Quarries (DECC, 2008)</i></li> <li>▪ Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with</li> </ul>						

Condition		Comment/reference
	the guidance series for <i>Controlled Activities on Waterfront Land (DPI Water, 2012)</i>	
Sediment dams	<ul style="list-style-type: none"> <li>▪ Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004)</i> and <i>2E Mines and Quarries (DECC, 2008)</i> and the requirements under the POEO Act or <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i></li> </ul>	
Mine water storages	<ul style="list-style-type: none"> <li>▪ Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water</li> <li>▪ New storages designed to contain the 100 year ARI storm event and minimise permeability</li> </ul>	

## 1.7 Related reports and plans

This WMP should be read in conjunction with the following documents (or the version in force at the time of reading):

- Ravensworth South Consolidated Consent Mod-1
- Ravensworth South Mine – Rehabilitation Amendment Modification Report (IS349200-NP-Rpt-001 | D), Jacobs Group (Australia) Pty Ltd, Newcastle West, 20 May 2022 (hereafter referred to as the Modification Report) and associated appendices including, but not limited to
  - Appendix A – Approvals
  - Appendix C – Updated mitigation measures
- Environmental Management Strategy (EMS) for Mod-1, (AECOM, 2023)
- AGL Ravensworth South Modification 1 – Landform Amendment, Department of Planning and Environment, NSW Government, Sydney, April 2023
- AGLM EMS: Water Management Plan (AGLM-HSE-PLN-009.02).

## 2.0 Legislation and guidelines

This WMP considers a range of legislation, policy and guidelines, as outlined below.

### 2.1 Legislation

#### 2.1.1 Protection of the Environment Operations Act 1997

The POEO Act is administered by the EPA and prohibits the pollution of water, land or air. The POEO Act provides for the licensing of specific activities. RSCM operates under Environmental Protection License (EPL) No. 779. The EPL sets emission and operational limits and includes water monitoring requirements at a range of sites associated with AGLM's operations.

Under the POEO Act, there is a legal responsibility to ensure that runoff leaving a site meets an agreed water quality standard, including water being discharged from sedimentation ponds after storm events. Part 5.7 of the POEO Act includes a duty to notify relevant authorities of pollution incidents.

#### 2.1.2 Water Management Act 2000

The *Water Management Act 2000* was introduced to provide a comprehensive singular piece of legislation to effectively manage and regulate access and use of the State's water resources. Water Management (General) Regulation 2018.

### 2.1.3 The Water Management (General) Regulation

The *Water Management (General) Regulation 2018* provides dispositions on matters relevant to water management in NSW.

### 2.1.4 Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002

The *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* aims to meet salinity and environmental objectives in the Hunter River whilst still allowing industries to discharge excess saline water under high dilution scenarios.

## 2.2 Standards and guidelines

### 2.2.1 NSW Aquifer Interference Policy

The *NSW Aquifer Interference Policy* sets out the requirements for obtaining water licences for aquifer interference activities under NSW water legislation and establishes considerations in assessing and providing advice on whether more than minimal impacts might occur to a key water-dependent asset.

### 2.2.2 Managing Urban Stormwater: Soils and Construction (Volume 1)

*Managing Urban Stormwater: Soils and Construction (Volume 1)* is a comprehensive guideline for use in construction to ensure all industries comply with appropriate stormwater management practices. Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

### 2.2.3 The Australian and New Zealand Guidelines for Fresh and Marine Water Quality

The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)* provides a framework for managing water quality in rivers, lakes, estuaries and marine waters in Australia and New Zealand.

### 2.2.4 Approved Methods for the Sampling and Analysis of Water Pollutants in NSW

*Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* provides guidance for the monitoring and analysis of water pollutants in NSW for comparison with limits or performance criteria listed in statutory instruments.

### 2.2.5 NSW Water Quality and River Flow Objectives

The *NSW Water Quality and River Flow Objectives* are an agreed set of environmental values and long-term goals for NSW surface water. These objectives include a range of water quality indicators for both fresh and estuarine surface waters relevant for the assessment of waterway conditions.

### 2.2.6 Guideline: Pollution Incident Response Management Plans

The *Guideline: Pollution Incident Response Management Plans* is a framework for EPL holders to ensure their site operations comply with the pollution incident response management plan obligations under the POEO Act.

The previous version of this guideline was from March 2012 and is the version to which AGLM prepared their existing PIRMPs.

### 2.2.7 Guidelines for Controlled Activities on Waterfront Land

The *Guidelines for Controlled Activities on Waterfront Land* (DPI Water, 2012) relate to the design of stormwater outlets and spillways from infrastructure including roads, buildings, constructed basins/wetlands, swales or other drainage works into a watercourse or waterfront land.

### 3.0 Roles and responsibilities

AGLM's key personnel will be responsible for the management of contractors and sub-contractors and will each have the respective responsibilities provided in Table 4 below.

**Table 4 AGLM roles and responsibilities**

Role	Responsibilities
General Manager	<ul style="list-style-type: none"> <li>Accountable for all environmental matters regarding AGLM operations</li> <li>Monitor and improve environmental performance</li> <li>Renew operating licences</li> <li>Comply with all licence conditions and regulatory reporting requirements</li> <li>Provide adequate resources for the implementation of this WMP</li> </ul>
Senior Leader – Ash Management	<ul style="list-style-type: none"> <li>Review environmental management programs including the establishment of environmental objectives and targets</li> <li>Ensure all appropriate approvals have been obtained prior to commencing works</li> <li>Ensuring that all staff or contractors under their control are aware of environmental compliance issues and environmental controls listed in this WMP</li> <li>Order Stop-work for an activity that may cause environmental harm</li> <li>Ensure employees are equipped with sufficient skills to meet the objective of competent delivery of the project</li> </ul>
Senior Civil Engineer – Ash Management	<ul style="list-style-type: none"> <li>Oversee project implementation</li> <li>Overall responsibility for the RSCM site</li> <li>Develop environmental management programs including the establishment of environmental objectives and targets</li> <li>Secure all appropriate approvals prior to commencing works</li> <li>Ensuring that all staff or contractors under their control are aware of environmental compliance issues and environmental controls listed in this WMP</li> <li>Order Stop-work for an activity that may cause environmental harm</li> <li>Promote continual improvement and provide support as required</li> </ul>
Works Co-Ordinator	<ul style="list-style-type: none"> <li>Participate in awareness and environment training</li> <li>Ensuring that all staff or contractors under their control are aware of environmental compliance issues and environmental controls listed in this WMP</li> <li>Assist in overseeing project implementation</li> <li>Assist the Environment Advisor with investigations into non-compliances, incidents or complaints</li> <li>Report and raise any issues that arise that may have an environmental impact</li> <li>Promote continual improvement and provide support as required</li> </ul>
Environment Manager	<ul style="list-style-type: none"> <li>Oversee the implementation of this WMP</li> <li>Notify regulatory authorities and affected stakeholders of incidents or non-compliances in accordance with this WMP</li> <li>Order Stop-work for an activity that may cause environmental harm</li> <li>Coordinate ongoing consultation with stakeholders</li> <li>Coordinate periodic reviews of this WMP</li> <li>Facilitate training of all employees and contractors in accordance with this WMP</li> <li>Undertake internal environmental audits and facilitate independent audits</li> </ul>
Environment Advisor	<ul style="list-style-type: none"> <li>Assist the Environment Manager as required in the implementation of this WMP</li> <li>Ensure this WMP achieves its intended outcomes</li> <li>Ensure effective internal and external communication programs are in place</li> </ul>

Role	Responsibilities
	<ul style="list-style-type: none"> <li>• Provide training to all relevant personnel</li> <li>• Order Stop-work for an activity that may cause environmental harm</li> <li>• Coordinate investigations of environmental related non-compliances, incidents, or complaints</li> <li>• Coordinate the management of records required under this WMP</li> <li>• Review and action environmental inspection and audit findings Monitor environmental aspects, particularly in relation to waste management and construction and access works</li> </ul>
All personnel	<ul style="list-style-type: none"> <li>• Undertake works in accordance with this WMP</li> <li>• Participate in awareness and environment training</li> <li>• immediately report and raise any issues that arise that may have an environmental impact</li> </ul>

### 3.1.1 Contractor key personnel

The contractor key personnel will include service providers engaged by AGLM for Mod-1 and any sub-contracted personnel. Table 5 outlines the contractor key personnel and responsibilities.

**Table 5 Contractor roles and responsibilities**

Role	Responsibilities
HSE Advisor	<ul style="list-style-type: none"> <li>• Initiate and support any external independent environmental audit program by liaising and providing required information</li> <li>• Communicate environmental performance to the AGLM Environment Manager/Advisor</li> <li>• Assist in the management and investigation of environmental non-compliances, incidents or complaints</li> <li>• Manage the contractor's environmental management plan</li> <li>• Provide necessary technical input</li> <li>• Co-ordinate environmental compliance</li> <li>• Assist in developing environmental objectives and targets and environmental management programs</li> <li>• Identify environmental incidents</li> <li>• Report and raise any issues that arise that may have an environmental impact</li> </ul>
Site Superintendent	<ul style="list-style-type: none"> <li>• Ensure that environmental considerations are integrated into all business functions where practical</li> <li>• Monitor and improve environmental performance</li> <li>• Comply with all environmental requirements and regulatory and other reporting requirements</li> <li>• Ensure appropriate licences are held by sub-contractors (i.e., waste) where necessary</li> <li>• Participate in awareness and environment training</li> <li>• Report and raise any issues that arise that may have an environmental impact</li> </ul>
Contractor staff / Subcontractors	<ul style="list-style-type: none"> <li>• Undertake works in accordance with this WMP</li> <li>• Participate in awareness and environment training</li> <li>• Report and raise any issues that arise that may have an environmental impact</li> </ul>



## 4.0 Environmental setting

### 4.1 Geology and soils

The geology of the RSCM area is comprised of Quaternary Alluvium and Whittingham Coal Measures. The sub-horizontal sedimentary strata is characteristic of coal seams, clay stones, tuffs, siltstones, sand stones and conglomerates. The RSCM area is located at the base of the Bayswater Syncline, and this structure has caused the local geology to dip from both the east and the west.

Soil landscape mapping indicates that shallow soils comprising residual and colluvial loams and sands would be present on ridgelines, with brown solodic soils on the lower slopes.

Further geological information can be sourced from Jacobs, Ravensworth South Mine – Rehabilitation Amendment – Modification Report Appendix D – Groundwater technical reports, dated 24/03/2022.

### 4.2 Topography, drainage and flooding

The local topography is characterised by low hills and alluvial flats with elevations ranging from 60 to 120 m Australian Height Datum (AHD). Surface water features include: the Hunter River, Bayswater Creek and Bowmans Creek and their respective tributaries. The Hunter River, Bayswater Creek, and Glennies Creek have historically had permanently flow from Glenbawn Dam, Lake Liddell, and Lake St Clair respectively.

RSCM is located entirely within the Bayswater Creek and Bowmans Creek catchments, which extend approximately 30 km and 14 km to the north of Ravensworth, respectively. Surface water runoff from the site is anticipated to drain to Bowmans Creek and Bayswater Creek located east and west of the site, respectively.

Water from Lake Liddell discharges into Bayswater Creek under controlled release. As such, Bayswater Creek is highly modified with high salinity levels.

Bowmans Creek is highly modified with indications of high salinity levels and generally low flows to the creek.

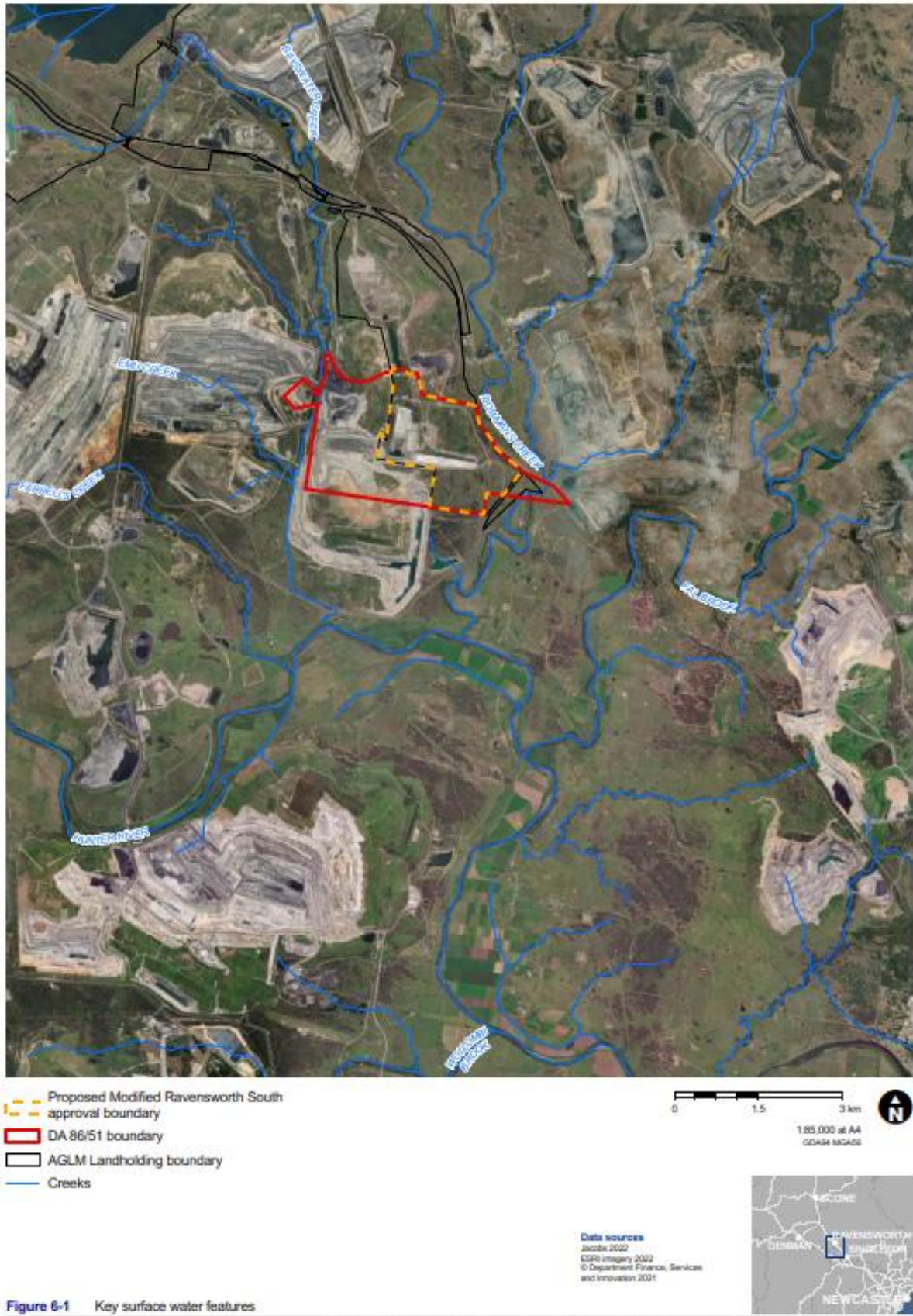


Figure 2 Key surface water features (Source: Jacobs, 2022) (note image shows the original DA 86/51 boundary prior to modification)

### 4.3 Sensitive receiving environments

Lake Liddell and Bayswater Creek have been mapped as Key Fish Habitat. However, no threatened species are predicted to occur, and only minimal suitable aquatic habitat features appear to be present along the banks of the waterways. Bayswater Creek has been highly modified downstream including the construction of a diversion channel and a drop structure near the confluence of Bayswater Creek and the Hunter River which prevents the migration of fish upstream. As such, these waterways have been classified as Type 3 minimal Key Fish Habitat.

Commercial fishing is prohibited in the waterways within the Project area and no waterways are part of the drinking water catchments for any surrounding townships. Overall, no waterways within the Project area are considered to be sensitive receiving environments.

### 4.4 Water quality

Waterways within the wider Hunter River catchment area are affected by high salinity. Sources of salt within waterways in the catchment include rainfall and weathering products which enter streams via surface runoff pathways and groundwater sources.

The Modification Report included an analysis of monitoring records from various sources collected within the study area. Generally, water sampling data indicated that discharge water quality was within the range specified in EPL 779 (Jacobs, 2020).

When considering water quality in relation to recommended guidelines for protection of aquatic ecosystems or primary industry (ANZG, 2018), there were instances of some parameters exceeding the recommended guidelines. In particular, electrical conductivity was found to be outside the recommended range of 125 – 2250  $\mu\text{S}/\text{cm}$  in Lake Liddell and Pikes Creek. However, median electrical conductivities are suggested to exceed 5500  $\mu\text{S}/\text{cm}$  in water sources within the Hunter River catchment. Therefore, the values recorded are considered consistent with regional water quality issues.

The quality of water released from Lake Liddell into Bayswater Creek is subject to regulation by the Hunter River Salinity Trading Scheme (HRSTS) and water quality parameter limits implemented under EPL 779.

### 4.5 Potential impacts

According to the impact assessment undertaken for Mod-1, potential impacts to water and soil could occur through the following activities:

- demolition and removal of redundant pumping infrastructure
- receiving, stockpiling and use of mine spoil
- removal of vegetation
- transportation of mine spoil and vegetation and the movement of heavy vehicles across exposed earth
- Storing and using fuels and other chemicals with potential for spills and leaks.

## 5.0 Water licensing requirements

AGLM currently holds a number of water access licences (WAL) under the WM Act, associated with the ongoing operation of Bayswater. Mod-1 does not involve groundwater abstraction and any required harvesting of surface water is covered by existing entitlements. A new WAL or modification to existing WALs would not be required.

## 6.0 Erosion and Sediment Control Plan

Below is a high-level Erosion and Sediment Control Plan (ESCP) for Mod-1. Detailed ESCP's will be prepared for relevant work components of Mod-1. Erosion and sediment control activities will be undertaken in accordance with Project Approvals, guidelines from *Managing Urban Stormwater: Soils and Construction Volume 1: Blue Book* (Landcom, 2004) and *Volume 2E: Mines and Quarries (DECC, 2008)*. The following guiding principles will be followed in combination with the management measures set out in Section 8.

### 6.1.1 Surface disturbance procedures

The following procedure will be followed:

- delineation of area to be disturbed, clearly marking area to prevent accidental damage to adjacent vegetation during surface disturbance activities
- implementation of flora and fauna management strategies, in line with the EMS (AECOM, 2023)
- surface water run-off drainage assessment and installation of structures to restrict clean surface run-off water from entering disturbance area, will be undertaken as part of the pre-clearance assessment
- if the surface disturbance is located in an area likely to contain acid sulfate soils, then an Acid Sulfate Soil Management Plan will be developed for the works.

### 6.1.2 General erosion and sediment control principles

Erosion and sediment control principals include the following:

- minimising the area to be disturbed
- implementing erosion and sediment control structures
- implementation of erosion and sediment management plans and protocols by a suitably qualified person
- revegetating areas as soon as practical.

Surface disturbance activities will not be carried out in periods of predicted high rainfall in order to manage offsite stormwater discharge. Predicted high rainfall scenarios may include the following:

- Heavy rainfall experienced during the work and is to be stopped
- Where the site is waterlogged and likely to be damaged by plant movement
- Where consistent rainfall is experienced and likely to persist during the day.
- The Site Superintendent is to make the decision as to whether work needs to be stopped.

### 6.1.3 Erosion and sediment control structures

Erosion and sediment control structures are currently in place. Where a new disturbance is undertaken, AGL will where practicable, implement a combination of the following water management control structures to ensure environmental impacts are managed:

- earth diversion banks to be constructed upgradient of the stockpiles/disturbance areas to divert water around these areas. The clean water to be diverted into the nearest permanent clean water catchment area by construction of shallow excavated channels located upgradient of the diversion banks
- sediment fencing to be constructed immediately downstream of stockpiles/disturbance areas
- check dams to be constructed across a swale, drain or waterway
- blanket protection to be provided for concentrated flows, with suitable geotextile lining covering the full width of the channel
- sediment traps which may include the use of geotextile material secured with aggregate bags or rock bunds.

- New stockpiling/spoil excavation activities will be undertaken with appropriate erosion and sediment control measures to prevent pollution of waters. This may include:
  - Minimising the number of stockpiles, area used for stockpiles, and duration stockpiles are left exposed
  - Locating stockpiles away from drainage lines, waterways and areas susceptible to wind erosion
  - Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required.

#### **6.1.4 Maintenance and removal of erosion and sediment control structures**

Erosion and sediment control structures will be inspected for effectiveness prior to commencement of earth disturbing works, and thereafter daily in accordance with the environmental inspection protocol set out in Section 9.1.

Erosion and sediment controls will only be removed once surfaces have been stabilised, including trapped sediment in drainage lines being removed.

## 7.0 Surface Water Management Plan

Below is a high-level Surface Water Management Plan for Mod-1. The Contractor would be required to develop a detailed Surface Water Management Plan for relevant Mod-1 works. The following guiding principles will be followed in combination with the management measures set out in Section 5.

### 7.1 Water use and disposal

The following measures will apply to reduce impacts associated with water use and disposal:

- Any water collected from worksites will be treated and discharged (where possible) to avoid any potential contamination or local stormwater impacts. Measures will be designed in accordance with the relevant guidelines where appropriate.
- Water use during construction will be minimised where possible and measures to reduce water use will be applied.

### 7.2 Pollution prevention

To prevent pollution from chemical and oil spills the following measures apply:

- Limit fuels and chemicals stored onsite to a minimum.
- All required chemicals and fuels to be located within a bunded enclosure located away from drainage lines and stormwater drains.
- Plant and equipment must be regularly inspected to check for oil leaks.
- Refuelling of vehicles or machinery is to occur within a containment or hardstand area designed to prevent the escape of spilled substances to the surrounding environment.
- Spill kits will be provided on site and kept stocked for clean-up of accidental chemical/fuel spills and will be readily accessible.
- All pollution incidents, including spills, will be managed in accordance with the AGLM Pollution Incident Response Management Plan (PIRMP).

### 7.3 Water monitoring program

Routine water monitoring will be undertaken as part of environmental monitoring programs that are already in place in accordance with *Approved Methods of Sampling and Analysis of Water Pollutants in NSW*, EPL 779 conditions, and due diligence obligations.

The water monitoring program shall build upon the Coal Ash Repository Water Sampling Program detailed in the report titled, Bayswater Ash Dam and Ravensworth Void North Watering Monitoring Program developed by AECOM, dated 13 May 2022 (doc ref: 60671110 - AGLM\_BWAD & RVN\_PRS WSP\_20220513), hereafter referred to as AECOM, 2022, to satisfy Mod-1 Condition B8(f) and EPL779 condition U2.2.

#### 7.3.1 Water monitoring locations

Surface water quality monitoring of surrounding water bodies will be undertaken upstream and downstream of the project area. Monitoring location shall expand on AECOM, 2022 as detailed in Table 6. Monitoring locations are shown in Figure 3 and Figure 4.

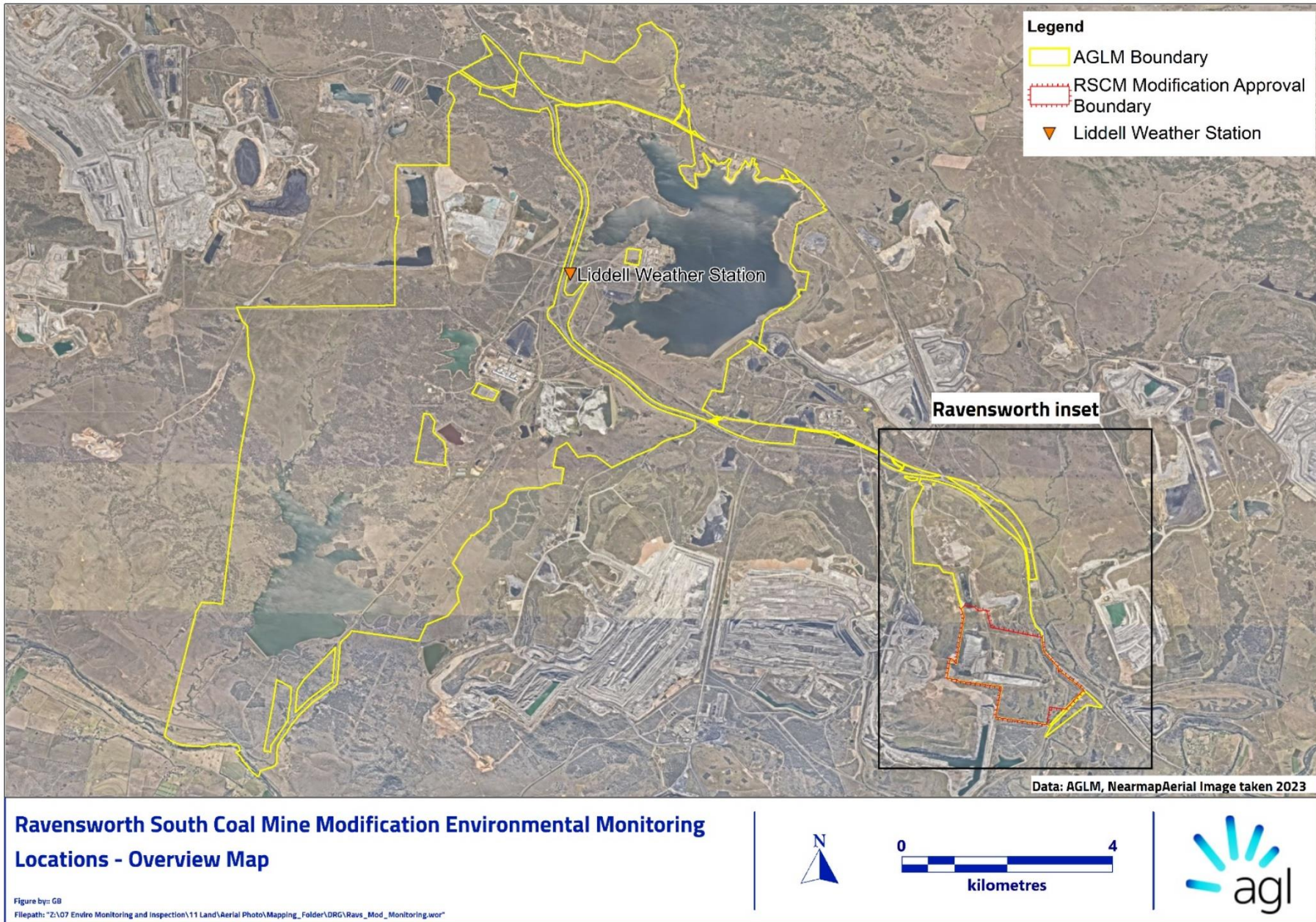


Figure 3 Environmental monitoring locations - overview



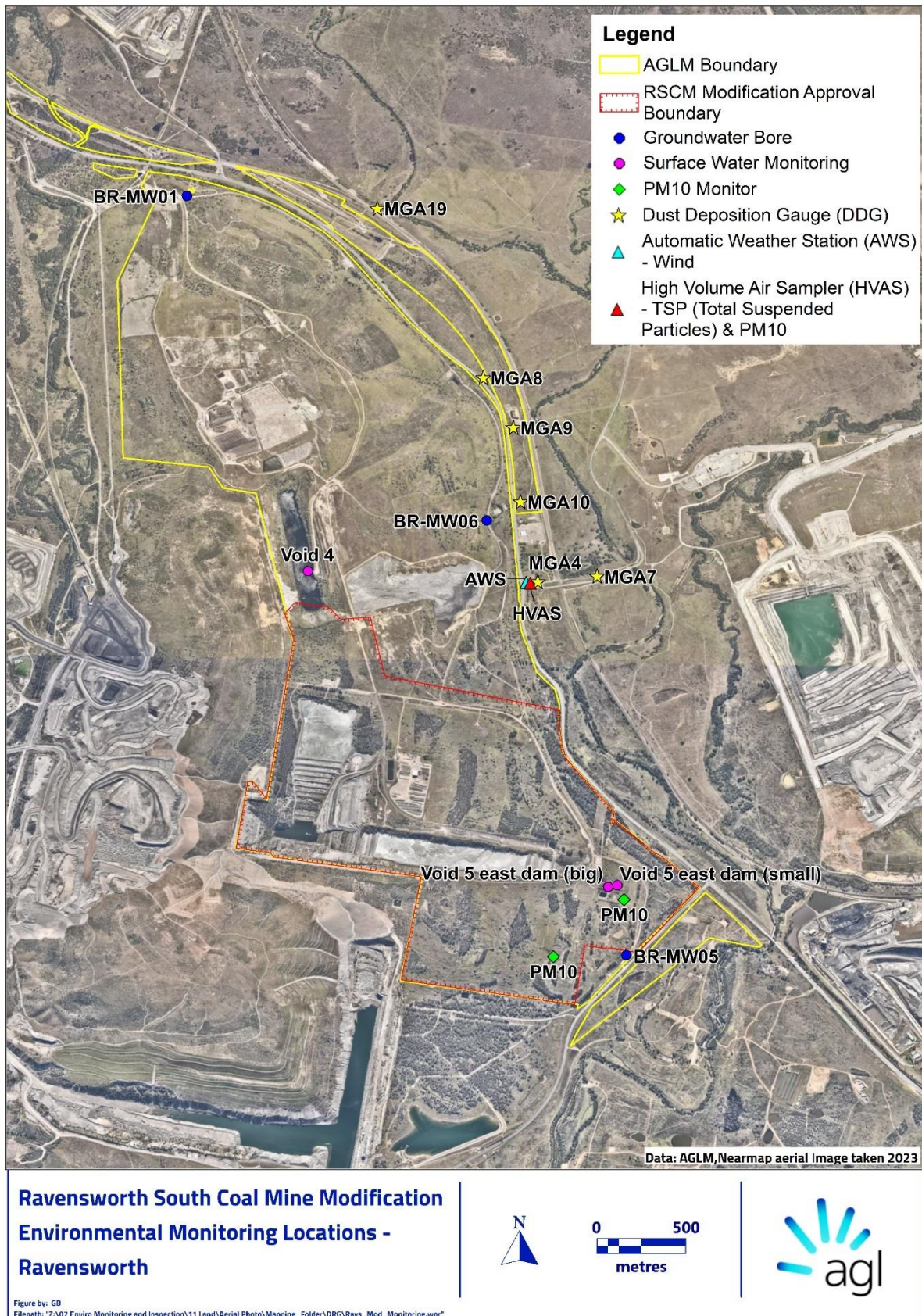


Figure 4 Environmental monitoring locations

**Table 6 Surface Water Monitoring Network and Rationalisation**

Setting	Sampling Location ID	Rationale
Void 4 West	SW05_EPL24	Assess water quality of return water collected from Void 5 that is contained within in Void 4 West.
Eastern retention facilities	RVN_5 SW E Small	Assess the quality of water contained in the retention facilities located to the east of Void 5.
	RVN_5 SW E Big	
Bowmans Creek	BMC_SW01	Assess water quality within Bowmans Creek up stream of potential influence of Void 5.
	BMC_SW02	Assess water quality within Bowmans Creek down stream of potential influence of Void 5 factoring in contribution from Swamp and Bettys Creek.
	BMC_SW03	Assess water quality within Bowmans Creek downstream of Void 5.

Groundwater quality monitoring will be undertaken from existing groundwater wells around Void 5 and the immediate surroundings as detailed in Table 7.

**Table 7 Ground Water Monitoring Network and Rationalisation**

Sampling Location ID	Depth (mbgl)	Diameter (m)	Rationale
BR-MW01	52.0	0.125	Assess ambient groundwater quality to the north of Voids 1 and 2.
BR-MW05	32.6	0.125	Assess groundwater quality to the southeast of Void 5 East (i.e., downgradient).
BR-MW06	20.0	0.125	Assess groundwater quality to the east of Void 4.

Further to the above, an additional groundwater quality monitoring well is to be installed directly east of Void 5, as referenced in the Modification Report (*Void 5 Water Loss Investigation - Seepage Investigation Report* (Jacobs, 2018)).

### 7.3.2 Sampling parameters

All surface water and groundwater sampling will be conducted in accordance with the *Approved methods of sampling and analysis of water pollutants in NSW*.

Water quality parameters that are to be measured by means of a calibrated handheld water quality meter and visual inspection include:

- temperature (°C)
- dissolved oxygen (mg/L)
- electrical conductivity (µS/cm)
- reduction-oxidation potential (Redox) (mV)
- pH
- turbidity (NTU).

Sampling analysis for surface water location will be undertaken as follows:

- Physico-Chemical Properties: pH, EC, Turbidity and Suspended Solids.
- Metals/Metalloids: Aluminium, Antimony, Arsenic (As(III) AS(V)), Barium, Beryllium, Boron, Cadmium, Chromium (Cr(III) and Cr(VI)), Cobalt, Copper, Iron, Lead, Lithium, Magnesium,

Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Titanium, Vanadium, Zinc.

- Nutrients: Ammonia as N, Nitrate as N, Nitrite as N, Nitrite + Nitrate as N, Total Kjeldahl Nitrogen as N, Total Nitrogen as N, Reactive and Total Phosphorus.
- Hydrocarbons: Total Recoverable Hydrocarbons and Polycyclic Aromatic Hydrocarbons.
- BTEXN: Benzene, Toluene, Ethylbenzene and Xylene and Naphthalene.
- Anion and Cations: Magnesium, Calcium, Sodium, Potassium, Sulphate, Chloride.
- Other: Cyanide (total and free) and Fluoride.

Sampling analysis for groundwater location will be undertaken as follows:

- Physico-Chemical Properties: pH, EC, Total Dissolved Solids, Total alkalinity (as CaCO<sub>3</sub>), Total Hardness (as CaCO<sub>3</sub>).
- Metals/Metalloids: Aluminium, Antimony, Arsenic (As(III) AS(V)), Barium, Beryllium, Boron, Cadmium, Chromium (Cr(III) and Cr(VI)), Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Titanium, Vanadium, Zinc.
- Nutrients: Ammonia as N, Nitrate as N, Nitrite as N, Nitrite + Nitrate as N, Total Kjeldahl Nitrogen as N, Total Nitrogen as N, Reactive and Total Phosphorus.
- Hydrocarbons: Total Recoverable Hydrocarbons and Polycyclic Aromatic Hydrocarbons.
- BTEXN: Benzene, Toluene, Ethylbenzene and Xylene and Naphthalene.
- Anion and Cations: Magnesium, Calcium, Sodium, Potassium, Sulphate, Chloride.
- Other: Cyanide (total and free) and Fluoride.

### 7.3.3 Monitoring frequency

Water quality monitoring shall be conducted during the project as follows, if there is water present in the location (surface water, groundwater) at the time of the required sampling and if it safe to do so:

- Prior to the commencement of the project
- During the project:
  - Surface water: Monthly
  - Groundwater: Quarterly
- Up to four surface water rain event per annum where a continuous rainfall as measured by AGLM's rain gauge(s) or nearby weather station exceeds 20mm over a 24 hour period.

For safety reasons, rain event sampling will be undertaken post peak flows, when flows are constant and sampling locations can be safely accessed.

### 7.3.4 Water monitoring records

Field observations and measurements will be documented in quality-controlled field sheets. All field notes will be retained on site with Project documentation. The following records must be kept in respect of any samples required to be collected for the water quality monitoring:

- Surface water:
  - Sample location ID
  - Name(s) of sampler/s
  - Date and time of sampling
  - Sample collection method
  - Details of inter-laboratory and intra-laboratory duplicates
  - Field observations (e.g., flow conditions, colour, turbidity odour, sheen etc.).

- Groundwater:
  - Monitoring well ID
  - Name(s) of sampler/s
  - Date and time of gauging/purging/sampling
  - Purging/sampling method
  - Measured Standing Water Level (SWL) in bore and total depth of well
  - Field chemistry (pH, EC, DO, Redox, Temp) recorded during purging
  - Total volume of water removed from the bore and rate of removal
  - Details of inter-laboratory and intra-laboratory duplicates
  - Observations of the sampled water (e.g., colour, turbidity, odour, sheen, etc.).

## 7.4 Assessment criteria

### 7.4.1 Performance measures

Condition B7 states AGLM must comply with the water management performance measures provided in Table 1 of the consent.

The features that are relevant to the project are reproduced in Table 8. The effectiveness of the water management actions implemented during the project can be assessed based on the key performance indicators (KPI) set for each performance measure.

**Table 8 Relevant performance measures from condition B7**

Feature	Performance Measure	KPI
Water Management - General	<ul style="list-style-type: none"> <li>• Maintain separation between clean, dirty and mine water management systems.</li> <li>• Minimise the use of clean and potable water on the site.</li> <li>• Maximise water recycling, reuse and sharing opportunities.</li> <li>• Design, install, operate and maintain water management systems in a proper and efficient manner.</li> <li>• Minimise risks to the receiving environment and downstream water users.</li> </ul>	<p>Water use records are reviewed to minimise potable water use and to maximise water recycling opportunities.</p> <p>Erosion and sediment controls are installed and maintained in accordance with ESCP.</p> <p>Monitoring program is implemented to identify potential water quality issues.</p>
Erosion and sediment control works	<ul style="list-style-type: none"> <li>• 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 2C: Unsealed Roads (DECC,2008), and Volume 2E: Mines and Quarries (DECC, 2008).</li> <li>• Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012).</li> </ul>	<p>Erosion and sediment controls are installed as per ESCP and maintained in good working order.</p>

Feature	Performance Measure	KPI
Sediment dams	<ul style="list-style-type: none"> <li>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 or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</li> </ul>	
Mine water storages	<ul style="list-style-type: none"> <li>Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water</li> <li>New storages designed to contain the 100 year ARI storm event and minimise permeability</li> </ul>	

#### 7.4.2 Surface water impact assessment criteria

The potential water quality impacts associated with the project will relate primarily to increased turbidity and suspended solids as a result of increased erosion. Surface water impact assessment criteria have been developed based on the *Water Quality Guidelines* (ANZG, 2018).

Table 9 provides the surface water impact assessment criteria which will be used as trigger values for assessing surface water impacts during project.

**Table 9 Surface water impact assessment criteria**

Pollutant	Unit of measure	Concentration limit
pH	pH	6.5-9.5
Turbidity	NTU	6 - 50
Salinity (electrical conductivity)	µS/cm	125 - 2200

#### 7.5 Trigger action response plan

The Trigger Action Response Plan (TARP) for the project is provided in Table 10. The objective of the TARP is to present a set of procedures to be followed and actions to be implemented should an exceedance of the performance measures (Section 7.4.1) or assessment criteria (Section 7.4.2) be identified. The TARP outlines different levels of notification (i.e., internal or external) and actions required to mitigate, repair or offset adverse water quality impacts that may occur as a result of the construction phase.

Table 10 Trigger Action Response Plan

Trigger	Action	Response	Plan
Forecasts of significant rain (greater than 20mm predicted over a 24 hour period)	<ul style="list-style-type: none"> <li>• Ensure erosion and sediment controls are installed correctly and maintained before event</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequacies in erosion and sediment control measures are to be rectified as soon as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Site inspection checklist to be used to document inspections of erosion and sediment controls and action undertaken</li> </ul>
Water monitoring indicates: <ul style="list-style-type: none"> <li>• turbidity is greater at the downstream location compared to the sampling result at the upstream location; or sediment or oil and grease are visible at the downstream location</li> </ul>	<ul style="list-style-type: none"> <li>• Notify Site Supervisor</li> <li>• Initiate an investigation to review erosion and sediment control measures</li> <li>• Identify corrective actions or additional control measures to be implemented where relevant to mitigate potential water quality impacts</li> </ul>	<ul style="list-style-type: none"> <li>• If required, implement corrective actions or install additional erosion and sediment control measures where required</li> </ul>	<ul style="list-style-type: none"> <li>• A summary of monitoring results, investigations and corrective actions to be retained onsite with project documentation</li> </ul>
Water monitoring indicates exceedance of surface water impact assessment criteria specified in Section 7.4	<ul style="list-style-type: none"> <li>• Contractor to notify AGLM Environment Advisor</li> <li>• Initiate investigation to determine the cause of the exceedance</li> <li>• Conduct additional monitoring to confirm water quality parameters</li> <li>• Identify corrective actions where relevant</li> </ul>	<ul style="list-style-type: none"> <li>• Implement corrective actions or additional mitigation measures</li> <li>• Continue water quality monitoring to assess the effectiveness of corrective actions</li> </ul>	<ul style="list-style-type: none"> <li>• A summary of monitoring results, investigations, corrective actions and notification to regulatory authorities to be retained onsite with project documentation</li> <li>• If required, amend the WMP (and related plans) to reflect changes to methodology</li> </ul>
Uncontrolled discharge related to AGLM's operations	<ul style="list-style-type: none"> <li>• Contractor to notify AGLM Environment Advisor</li> <li>• Undertake notification as required by the consent and EPL</li> <li>• Contain contaminated water to prevent further environmental harm</li> <li>• Initiate investigation to determine the cause of the incident</li> <li>• Conduct further sampling immediately to confirm water quality parameters</li> </ul>	<ul style="list-style-type: none"> <li>• If required, implement corrective actions to address the investigation findings</li> <li>• Continue water quality monitoring to assess the effectiveness of corrective actions</li> <li>• Follow any written reporting requirements required by the consent and EPL</li> </ul>	<ul style="list-style-type: none"> <li>• A summary of monitoring results, investigations, corrective actions and notification to regulatory authorities to be retained onsite with project documentation</li> <li>• If required, amend the WMP (and related <b>plans</b>) to reflect changes to methodology</li> </ul>

Trigger	Action	Response	Plan
Potential pipeline leak identified through routine inspection or alarm	<ul style="list-style-type: none"> <li>• Operator to notify their supervisor and initiate investigation</li> <li>• In the event of pipeline leak alarm, shutdown slurry pumping</li> <li>• If required, AGLM to notify the EPA and DPE immediately after becoming aware of the incident</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake corrective actions if required to address pipeline leak</li> <li>• Once the condition is clear, manually reset pipeline leak alarm</li> <li>• If required, submit to EPA and DPE a summary of the investigation findings and corrective actions implemented</li> </ul>	<ul style="list-style-type: none"> <li>• Routine inspection checklist to be retained on site with project documentation</li> <li>• Results of investigations, corrective actions and notification to regulatory authorities to be retained onsite with project documentation</li> </ul>

## 8.0 WMP management measures

The environmental management measures provided in Table 11 will be implemented to minimise the potential for surface water and soil erosion impacts during Mod-1.



Table 11 WMP management measures

Reference	Environmental management measures	Responsibility	Timing
SW1	To prevent pollution from sedimentation and oil spills: <ul style="list-style-type: none"> <li>• Limit fuels and chemicals stored onsite to a minimum</li> <li>• All required chemicals and fuels to be located within a bunded enclosure located away from drainage lines and stormwater drains</li> <li>• Plant and equipment must be regularly inspected to check for oil leaks</li> <li>• Refuelling of vehicles or machinery is to occur away from drainage lines or waterways to prevent the escape of spilled substances to the surrounding environment.</li> </ul>	Contractor	Construction
SW2	New stockpiling/spoil excavation activities will be undertaken with appropriate erosion and sediment control measures to prevent pollution of waters. This may include: <ul style="list-style-type: none"> <li>• Minimising the number of stockpiles, area used for stockpiles, and duration stockpiles are left exposed</li> <li>• Locating stockpiles away from drainage lines, waterways and areas susceptible to wind erosion</li> <li>• Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required.</li> </ul>	Contractor	Construction
SW3	Erosion and sediment control measures will be implemented and maintained at all work sites generally in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 and Volume 2D (commonly referred to as the “Blue Book”) where appropriate. Additionally, any water collected from worksites will be treated and discharged (where possible) to avoid any potential contamination or local stormwater impacts. Measures will be designed in accordance with the relevant guidelines where appropriate.	Contractor	Prior to disturbance for borrow pits, Construction
SW4	Water use during construction will be minimised where possible and measures to reduce water use will be applied.	Contractor	Construction
SW5	To prevent ponding of water, scouring and erosion which could impact on downstream water quality the following management measure will be implemented for the borrow pits (if required): <ul style="list-style-type: none"> <li>• Earth bunds to be constructed around the perimeter of borrow-pits to avoid soil and erosion run-off</li> <li>• Any water that is collected in the borrow pits is to be managed appropriately in accordance with the Blue Book and/or reused for operational purposes</li> <li>• Once borrow pits are stabilised, the final landform would be designed to be free draining.</li> </ul>	Contractor	Prior to disturbance of borrow pits, Construction
SW6	Spill kits will be provided on site, and kept stocked for clean-up of accidental chemical/fuel spills and will be readily accessible	Contractor	Construction

Reference	Environmental management measures	Responsibility	Timing
SW7	All pollution incidents, including spills, will be managed in accordance with the AGL HSE Incident, Near Miss and Hazard Management Standard AGL-HSE-STD-011	Contractor	Construction
SW8	Clean surface runoff will be diverted away from disturbed soil and stockpiles	Contractor	Construction
SW9	Work will not be carried out in periods of predicted high rainfall in order to manage offsite stormwater discharge. Predicted high rainfall scenarios may include the following: <ul style="list-style-type: none"> <li>• Heavy rainfall experienced during the work and is to be stopped</li> <li>• Where the site is waterlogged and likely to be damaged by vehicle and rig movement</li> <li>• Where consistent rainfall is experienced and likely to persist during the day.</li> </ul> The Site Superintendent is to make the decision as to whether work needs to be stopped.	Contractor	Construction
SW10	Ground disturbance will be minimised, and disturbed areas stabilised progressively	Contractor	Construction Decommissioning
SW11	Controls will only be removed once surfaces have been stabilised, including trapped sediment in drainage lines being removed	Contractor	Construction Decommissioning

## 9.0 Monitoring, compliance and reporting

### 9.1 Water use and disposal

The contractor will be required to maintain records of water use and disposal, along with records of any measures implemented to reduce water use.

### 9.2 Environmental inspections

An environmental inspection protocol for Mod-1 approved disturbance activities is proposed as set out in Table 12.

**Table 12 Water management monitoring plan**

Monitoring activity	Frequency	Responsibility	Records
Erosion and sediment controls effectively installed	Pre-commencement of disturbance	Contractor/AGLM	Inspection checklist
Erosion and sediment controls ongoing condition	Daily during clearing activities Weekly during operation	Contractor/AGLM	General observations/ Inspection checklist
Rainfall and weather forecasts	Daily	Contractor	General observations/ Inspection checklist
Environmental site inspection: <ul style="list-style-type: none"> <li>• Inspection of control measures – clean, adjust and replace as required</li> <li>• Inspection of disturbed areas and stockpiles – ensure dust and sediment control measures are active</li> <li>• Inspection of sealed roads – identify any sediment/soil which has been transferred offsite</li> <li>•</li> </ul>	Weekly	Contractor	Inspection checklist
Adverse weather event inspection: <ul style="list-style-type: none"> <li>• Inspection of control measures</li> <li>• Inspection of disturbed areas and stockpiles</li> <li>• Inspection of sealed roads</li> </ul>	As required	Contractor	Inspection checklist

The Contractor will establish and maintain a system of records that provides full documentation of all inspections. Records are to include the following:

- Before and after photos of each site
- Document the date the control is installed and removed
- Document checks and any issues with each control.

### 9.3 Incidents, complaints and non-compliance reporting

Incidents, complaints and non-compliance reporting will be managed in accordance with the procedures outlined in the EMS (AECOM, 2023).

## 10.0 Continual improvement and review

The WMP will be reviewed and updated as necessary during the project to allow new or changing environmental risks relating to the project to be addressed.

In accordance with condition C5 of Mod-1, the WMP will be reviewed within three months of:

- the submission of an incident report required under condition C7 or C8 of Mod-1
- the submission of an Independent Environmental Audit under condition C9 of Mod-1
- the approval or modification to the conditions of consent of Mod-1.

Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Other triggers for WMP review may include:

- major change in the methodology
- findings and recommendations of site inspections
- changes in environmental legislation and/or policies.

## 11.0 References

AECOM (2023) *Ravensworth South Coal Mine Modification, Environmental Management System*

ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Governments and Australian state and territory governments (ANZG) Canberra, Act, Australia.

DECCW (2006) *NSW Water Quality and River Flow Objectives*, Department of Environment, Climate Change and Water, NSW Government, Sydney

Landcom (2004) *Managing Urban Stormwater: Soils and Construction – Volume 1* (also known as the Blue Book), Landcom, Sydney

Jacobs (2022) Ravensworth South Mine Modification – Groundwater Assessment (IS349200 | 4), Jacobs Group (Australia) Pty Ltd, Newcastle West, 24 March 2022

(Modification Report) Ravensworth South Mine – Rehabilitation Amendment Modification Report (IS349200-NP-Rpt-001 | D), Jacobs Group (Australia) Pty Ltd, Newcastle West, 20 May 2022

DPE (2023) AGL Ravensworth South Modification 1 – Landform Amendment, Department of Planning and Environment, NSW Government, Sydney, April 2023

DPE (2020) *Independent Audit Post Approval Requirements*, Department of Planning and Environment, NSW Government, Sydney.

DPE (2020) *Compliance Reporting Post Approval Requirements*, Department of Planning and Environment, NSW Government, Sydney

AECOM (2022), Bayswater Ash Dam and Ravensworth Void North Water Monitoring Program Coal Ash Repositories - Pollution Reduction Study, (60671110 - AGLM\_BWAD & RVN\_PRS WSP\_20220513), AECOM Australia, Pty Ltd, 13 May 2022

# Appendix A

Regulator consultation

Department of Planning, Housing and Infrastructure



Our ref: DA86-51-PA-8

Matthew Parkinson  
Manager Environment and Approvals  
AGL MACQUARIE PTY LIMITED  
New England Highway  
Muswellbrook New South Wales 2333

7 February 2024

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Subject: Ravensworth South/No.2 - Water Management Plan

Dear Mr Parkinson

Reference is made to your post approval matter, DA86-51-PA-8, Water Management Plan, submitted as required by Schedule 2, Condition B8 of DA 86/51-Mod 1 to the NSW Department of Planning, Housing and Infrastructure (NSW Planning) on 18 October 2023.

NSW Planning has reviewed the Water Management Plan and considers more information is required to satisfy the condition of consent. Under the provisions of Schedule 2, Condition B8 of the consent, I, as nominee of the Planning Secretary, request that an amended Water Management Plan be submitted as a response to this request for information (RFI-001) addressing the points raised in attached review table by 23 February 2024 (or as otherwise agreed by the Planning Secretary).

Should you wish to discuss the matter further, please contact Kiera Plumridge, (Environmental Assessment Officer) on 02 8836 0060 or [kiera.plumridge@dpie.nsw.gov.au](mailto:kiera.plumridge@dpie.nsw.gov.au), or email [compliance@planning.nsw.gov.au](mailto:compliance@planning.nsw.gov.au).

Yours sincerely

APPROVERSIGNATUREANDDETAILSWILLBEINSERTEDHERE

As nominee of the Planning Secretary

**Ravensworth South Coal Mine (DA86/51-Mod 1)  
Post Approval Review**



Document: "Ravensworth South Coal Mine Modification Water Management Plan" prepared by AECOM  
Revision: Revision C – 18-Oct-2023  
Reviewed: KP – 31/1/24

<b>B8. Water Management Plan</b>	<b>Sufficient (Yes/No/Partial)</b>	<b>Document Reference and Comment</b>	<b>Action Required</b>	<b>Company Response (21-Feb-2024)</b>
B8. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	-			
(a) be submitted for approval within 6 months of the approval of Mod 1;	Yes	Notice of Modification dated 19 April 2023, and Ravensworth South Coal Mine Modification Water Management Plan (AECOM, 2023) Revision C as submitted dated 18 October 2023 which is 6 months and meets this requirement.	N/A	
(b) be prepared by a suitably qualified and experienced person/s;	Yes	The WMP was prepared by AECOM.	N/A	
(c) be prepared in consultation with DPE Water;	Yes	Appendix A contains copies of correspondence with DPE – Water noting DPE – Water had no comment.	N/A	
(d) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 1);	Yes	Section 7.4 contains a table of the water management performance measures from Table 1 contained in Consent Condition B7. KPI descriptors provided for 'water management – general' and 'erosion and sediment control works' items but no others.		
(e) build on existing monitoring programs, where practicable;	Yes	Section 7.3 contains detail of the existing water monitoring programs undertaken for the site, noting that water monitoring going forward builds upon the Coal Ash Repository Water Sampling Program detailed in the Bayswater Ash Dam and Ravensworth Void North Watering Monitoring Program (AECOM, 2022). Monitoring locations, sampling parameters, monitoring frequency, and record keeping are detailed appropriately in the remainder of the section.	N/A	
(f) include a:	-			
(i) Erosion and Sediment Control Plan that:	Yes	Section 6 contains details of the erosion and sediment control plan (ESCP) and is in accordance with the Blue Book (Landcom, 2004).		
• is consistent with the requirements of Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008);	Yes	Section 4.5 contains details of the potential impacts of the project relating to water and soil.		
• identifies activities that could cause soil erosion, generate sediment or affect flooding;	Yes	Sections 6.1.1 and 6.1.2 contain details of the procedures and control principles to be implemented on site to control erosion and sediment.		
• describes measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;	Yes	Section 6.1.3 contains details of the controls to be implemented on site to control erosion and sediment.		
• describes the location, function, and capacity of erosion and sediment control structures and flood management structures; and	Yes	Section 6.1.4 contains details of the maintenance activities to be implemented on site to control erosion and sediment.		
• describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;	Yes	Section 7 contains details of the surface water management plan (SWMP).		
(ii) Surface Water Management Plan that includes:	Yes			
• a detailed description of the surface water management system;	Yes			



**Ravensworth South Coal Mine (DA86/51-Mod 1)  
Post Approval Review**



Document: "Ravensworth South Coal Mine Modification Water Management Plan" prepared by AECOM  
 Revision: Revision C – 18-Oct-2023  
 Reviewed: KP – 31/1/24

<ul style="list-style-type: none"> <li>• details of the water licensing requirements for all water storages (i.e. exempt, harvestable rights or licenced);</li> </ul>	Yes	Section 5 contains details of the water licensing requirements.		
<ul style="list-style-type: none"> <li>• surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development, for:                             <ul style="list-style-type: none"> <li>– downstream surface water flows and quality;</li> <li>– stream and riparian vegetation health; and</li> <li>– post-mining water pollution from rehabilitated areas of the site;</li> </ul> </li> </ul>	Yes	Section 7.3.1 contains detail of surface water and groundwater monitoring locations and rationale, and Section 7.4.2 contains detail of the surface water impact assessment criteria.		
<ul style="list-style-type: none"> <li>• a program to monitor and evaluate:                             <ul style="list-style-type: none"> <li>– compliance with the relevant performance measures listed in Table 1;</li> <li>– controlled and uncontrolled discharges and seepage/leachate from the site; and</li> <li>– the effectiveness of the surface water management system and the measures in the Erosion and Sediment Control Plan; and</li> </ul> </li> </ul>	Partial	Section 7.4 contains a table of the water management performance measures from Table 1 contained in Consent Condition B7. KPI descriptors provided for 'water management – general' and 'erosion and sediment control works' items but no others. As noted in review table of EMS, please include figure showing monitoring locations to be included directly within WMP.	Include figure showing monitoring locations.	Figures 3 and 4 have been included to show environmental monitoring locations.
<ul style="list-style-type: none"> <li>• a trigger action response plan to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development.</li> </ul>	Yes	Section 7.5 contains the trigger response action plan (TARP) with appropriate detail.		
<b>General Comments</b>			<b>Action Required</b>	<b>Company Response</b>