

CULLEN VALLEY MINE

SITE WATER MANAGEMENT PLAN

for Shoalhaven Coal Pty Ltd

20 April 2022



DOCUMENT CONTROL

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1. INTRODUCTION

1.1 BACKGROUND

Cullen Valley Mine (CVM) is located near Cullen Bullen in the Western Coalfields of NSW, approximately 30 km north-west of Lithgow (see **Figure 1**). Underground mining commenced at CVM (formerly Tyldesley Colliery) around 1904 and continued up until the 1960s when the workings were abandoned. Early open cut operations were conducted on the site between 1948 and 1953.

The current development consent for CVM (DA 200-5-2003) was granted by the Department of Infrastructure and Planning (now the Department of Planning and the Environment (DPE)) in August 2004 for a period of 21 years. The conditions of DA 200-5-2003 were subsequently modified in December 2004 to allow for the transportation of product coal from CVM to domestic destinations other than Mount Piper Power Station (MPPS). The conceptual layout of the site as approved under DA 200-5-2003 is shown on **Figure 2**.

Mining of coal at CVM commenced in May 2000 using open cut methods following a four-month construction phase and continued until the site was placed in Care and Maintenance in early 2013.

Shoalhaven Coal Pty Ltd (trading as Castlereagh Coal Pty Ltd (Castlereagh Coal)) purchased CVM in May 2015 and has operated the mine under Care and Maintenance since that time. Castlereagh Coal intends to recommence open cut coal mining operations at CVM in early 2022 within the existing disturbance area approved under DA 200-5-2003. The operations are planned to recover approximately 450,000 tonnes of coal and to carry out associated rehabilitation activities, which are scheduled to be undertaken over a period of approximately 9 months. Coal produced from these operations will be transported by road to domestic destinations as currently approved.

1.2 DOCUMENT PURPOSE & SCOPE

This Site Water Management Plan (SWMP) document has been prepared to describe the operational management of water aspects, impacts and performance at CVM. This revision of the SWMP has been prepared in accordance with the requirements of DA 200-5-2003 for use by Castlereagh Coal during the recommencement of mining operations on site.

Other management documents that should be read in conjunction with this SWMP include:

- CVM Environmental Management Strategy (EMS);
- CVM Environmental Monitoring Program (EMP); and
- CVM Erosion and Sediment Control Management Plan (ESCP).

1.3 DOCUMENT OBJECTIVES

The objectives of the plan are to:

- Maintain compliance with CVM Environment Protection Licence (EPL) 10341, DA 200-5-2003 and other relevant environmental legislation;
- Describe the water management system implemented for CVM;
- Describe a program for the monitoring and management of surface water and groundwater on site; and
- Minimise impacts on water quality and water flows in the surrounding environment.

Statutory requirements from DA 200-5-2003 that relate to this SWMP and where they are addressed in this document are provided in **Table 1**.

Table 1 SWMP Requirements

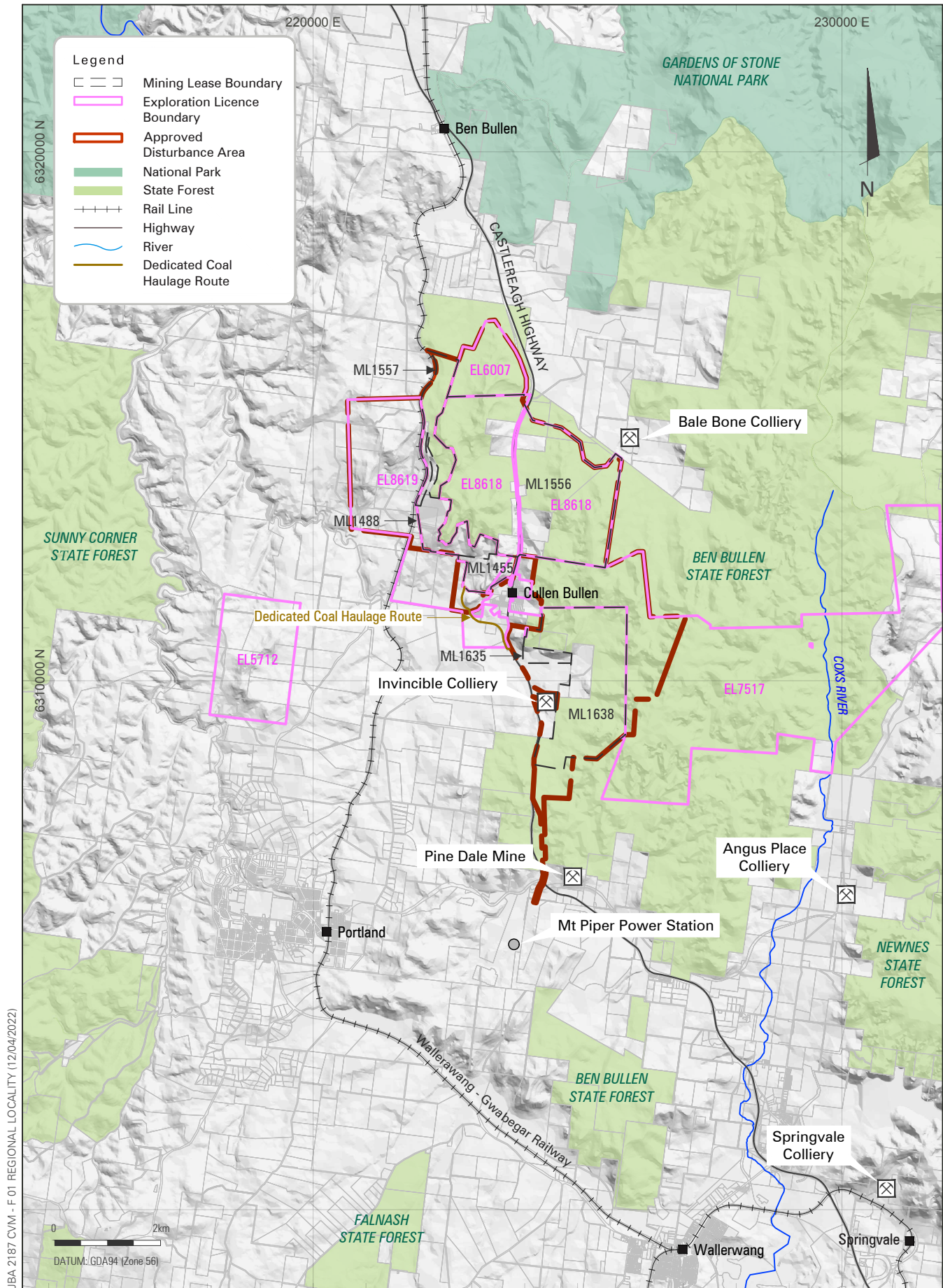
DA 200-5-2003 Condition	Requirement	Where Addressed
Schedule 4, Condition 39.	Except as may be expressly provided by a DEC licence, the Applicant shall comply with section 120 of the Protection of the Environment Operations Act 1997 during the carrying out of the development.	Section 2
Schedule 4, Condition 40.	Except as may be expressly provided by a DEC licence, the Applicant shall ensure that the discharges from any licenced discharge point comply with the limits in Table 14.	Section 3
Schedule 4, Condition 41.	(a) measure: the volume of water discharged from the site and water use on the site; and	Section 3.1.3
	(b) monitor the quality of the surface water discharged from the license discharge point/s at the development.	Section 3.1.3
Schedule 4, Condition 42.	For each monitoring/discharge point, the Applicant shall monitor (by sampling and obtaining results by analysis) the concentration of each pollutant in table 15, using the specified units of measure, frequency, and sampling method.	Section 3.1.3
Schedule 4, Condition 43.	Within 6 months of the date of this consent, the Applicant shall prepare (and then implement) a Site Water Management Plan for the development, in consultation with DEC and DPI, and to the satisfaction of the Director-General.	This SWMP
	(a) the predicted site water usage;	Section 2
	(b) a Surface Water Monitoring Program; and	Section 3, CVM EMP
	(c) an Erosion and Sediment Control Plan.	Section 3.1.3, CVM ESCP
Schedule 4, Condition 44.	(a) detailed baseline data on surface water flows and quality	Section 3
	(b) surface water impact assessment criteria;	Section 3
	(c) a program to monitor surface water flows and quality; and	Section 3
	(d) a program to monitor the effectiveness of the Erosion and Sediment Control Plan.	Section 3.1.3

1.4 DOCUMENT STRUCTURE

The document is structured as follows:

- **Section 1** introduces CVM and outlines the purpose, scope and objectives of this SWMP;
- **Section 2** describes the water management system at CVM;
- **Section 3** discusses the surface water and groundwater monitoring programs that have been implemented from CVM;
- **Section 4** outlines stakeholder engagement completed in the preparation of this SWMP and procedures for the response to water incidents and complaints;

- **Section 5** provides an overview of the roles and responsibilities of CVM personnel in relation to water monitoring and management;
- **Section 6** outlines the reporting requirements for this SWMP; and
- **Sections 7 and 8** provide a list of reference documents and abbreviations used in this SWMP.

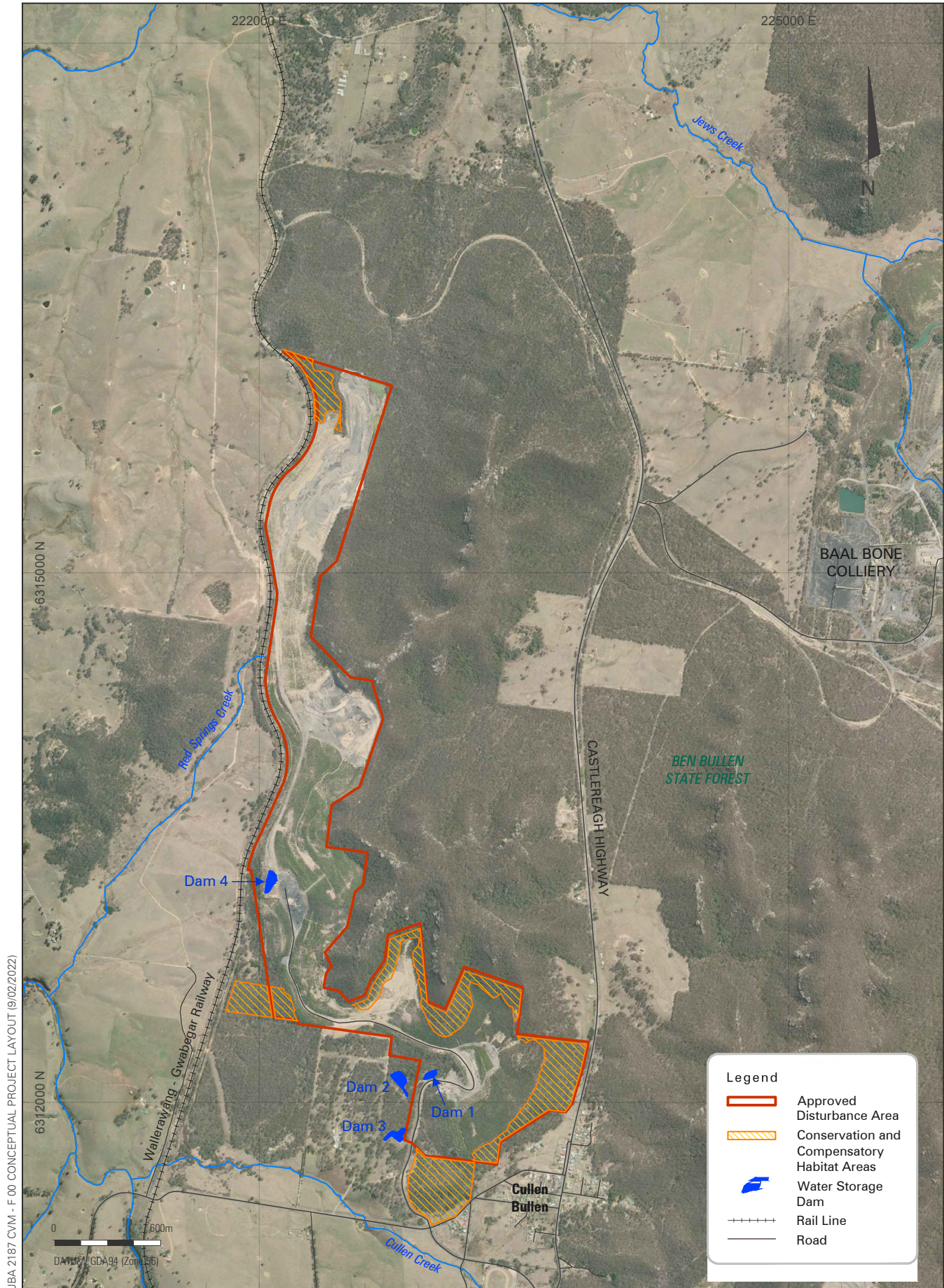


JBA 2187 CVM - F 01 REGIONAL LOCALITY (12/04/2022)

CULLEN VALLEY MINE

Regional Locality

FIGURE 1



JBA 2187 CVM - F 00 CONCEPTUAL PROJECT LAYOUT (9/02/2022)

2. SITE WATER MANAGEMENT

2.1 SITE WATER DEMAND

The water demand for the open cut mine will occur in two main areas:

- Process water is required for the surface facilities including makeup water for dust suppression on haul roads and coal handling equipment; and
- Potable water is required in the workshop kitchen and crib hut.

The total water demand during operations is estimated to be approximately:

- Process water 10 ML/annum; and
- Potable water 0.5 ML/annum.

The main process water usage is for dust suppression. For this significantly reduced day shift only production schedule, the use of process water will not exceed a 10 ML annual average. Additional non-potable water is required for firefighting purposes under the Coal Mines Regulations. Although not classed as a usage, water for firefighting must be available at all times.

2.2 WATER SUPPLY SYSTEM

The primary source of water for CVM is from the old mine underground workings. The water is pumped from the workings to two 150,000 L tanks. Distribution around the site is by gravity fed water mains. A secondary source of process water comes from the mine's pollution control dams. These dams control runoff from the active mining and rehabilitation areas (see **Figure 3**). Additional pollution control dams will be progressively built as the mine develops to the north.

One feature of the existing water pollution control dam system is the interconnection of all the dams via overland water distribution pipelines that allows water to be moved from dam to dam. The lowest dam in the system, located near the site office, is fitted with a pump which allows the water to be returned to the mine header tanks. This system allows all water to be retained and moved around the site.

It is proposed to continue extending the existing system as the mine develops. The additional pollution control dams required for the open cut mine will be joined by either pipeline or channels to allow transfer of water between storage dams.

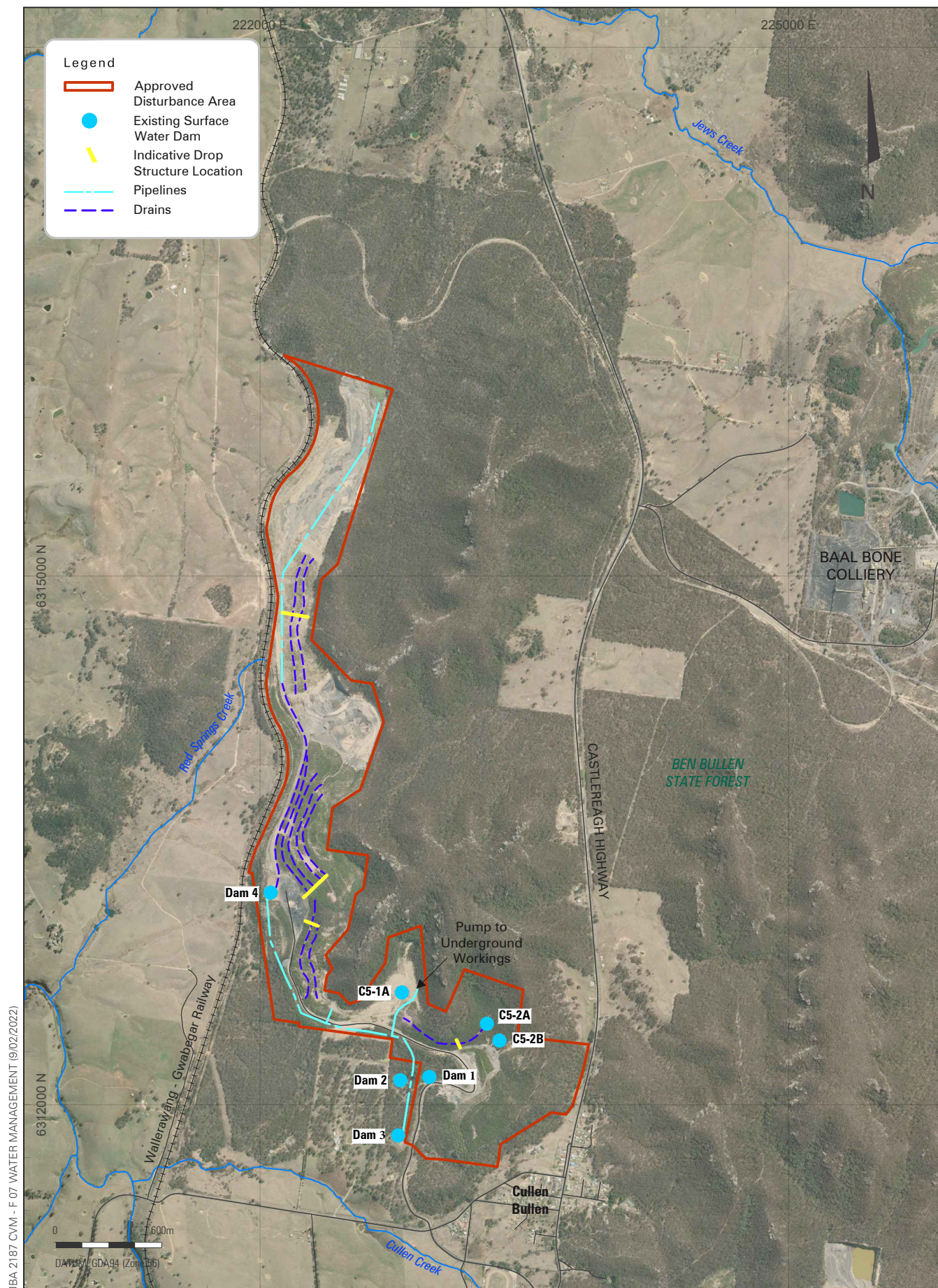
Potable water will continue to be trucked to site for use in CVM site infrastructure areas.

2.3 DRAINAGE & WATER MANAGEMENT CONTROLS

The fundamental principle of the CVM water management plan is the separation of clean and dirty water systems and the provision of sufficient pollution control facilities to treat contained dirty water for reuse, or to release it from the system, providing it is of a water quality acceptable for discharge. Smaller sedimentation basins, diversion drains, velocity control structures, hay bales and sediment fences will be used to enhance the performance of permanent structures.

In cases where the mining operations at CVM are located downstream of a clean water catchment, diversion drains and contour banks are used to divert water around disturbed mining areas and to reconnect to downstream clean water catchments, wherever practically possible. These diversion drains and contour banks are regularly monitored during operations to ensure that they remain effective in segregating clean water from disturbed areas.

The water management system for the CVM which has remained in place throughout the care and maintenance activities is shown on **Figure 3**.



JBA 2187 CVM - F 07 WATER MANAGEMENT (9/02/2022)

CULLEN VALLEY MINE

Water Management System

FIGURE 3

Water reuse is an important feature of the site water management system and any water contained within pollution control structures would be preferentially reused within the process water system. Dirty water from all disturbed areas passes through at least one primary settling pond prior to being fed into the main water storage dam (i.e. Dam 3) or to Dam 4, which are both listed as licenced discharge points under EPL 10341. These settling ponds and water management structures (particularly structures constructed to contain and treat runoff from newly disturbed areas associated with mining) are designed and constructed in accordance with *"Managing Urban Stormwater: Soils and Construction: Volume 2E Mines and Quarries"* (DECC 2008) (the Blue Book).

The catchment draining the areas associated with the historical mining and surface facilities area consists of two interconnected pollution control dams (Dam 1 and Dam 2) which drain to the main dam (Dam 3). Dam 3 is a licenced discharge point (LDP 001) under EPL 10341 and permits the discharge of surplus water to as tributary of Cullen Creek. A number of smaller sediment dams and structures have also been constructed within the catchment above Dam 1 and Dam 2 (e.g. C5-1A, C5-2A and C5-2B shown on **Figure 3** to assist in managing sediment laden water on site.

A fourth dam (Dam 4) has a capacity of approximately 38 ML and accepts catchment water from the coal storage and processing area as well as runoff from upslope disturbed and partially rehabilitated catchments. Dam 4 also receives any water which is pumped from the open cut mining areas via a network of pipelines. Dam 4 is a licenced discharge point (LDP 004) under EPL 10341 and permits the discharge of surplus water to a tributary of Red Springs Creek.

Table 2 provides a list of the main dirty water storages, their storage function, the recommended design criteria, storage capacity (where known) and storage capacity required to meet the recommended design criteria.

These dirty water storages were previously constructed to support previous operations at CVM and have remained in place since the mine was placed under care and maintenance in 2013 and will remain relevant to the proposed recommenced mining operations. The existing CVM dirty water dams which collect water from areas which have been largely rehabilitated were previously constructed with the capacity to contain surface water runoff from a 5 day 90th percentile rain event (i.e. 37.8 mm for the Lithgow region). In accordance with the requirements of the Blue Book, following a rainfall event, excess water will be removed from the dirty water dams at a rate required to achieve a five day pump out of the volume of water captured during the 5 day 90th percentile rain event for the dams.

Any new sediment dams or structures to be constructed for the proposed recommencement of mining operations will be constructed to contain surface water runoff from a 5 day 95th percentile rain event (i.e. 56.4 mm for the Lithgow region). Similarly, the capacity of these dams will be managed in accordance with the Blue Book requirements.

The open cut operation has been designed to provide a fully contained water management system, with clean water directed away from disturbed areas, where practically possible. The main containment area for dirty water will be in active pit areas, while water collected from the shaped in pit dumping profile (i.e. future rehabilitation areas) will be directed back to the site water management system via a series of sediment dams, contour banks, etc.

A dirty water drain will be constructed on the western end of each strip which will direct water into mining voids. Dirty water from the low wall and active dumping areas will also be directed into the active extraction area. Water contained in open cut mining voids will be pumped into separate in-pit sumps for use in dust suppression or can otherwise be pumped to Dam 4 and transferred between dams in the water management system as described in **Section 2.2**.

A bund wall has been constructed adjacent to the in-pit haul road for noise attenuation. The inside batter of this bund will act as a drainage structure which will also convey water back to the site water management system to contain any dirty water.

The Tyldesley Colliery underground workings are also used to store excess water from the WMS. The primary source of water for site use (when required) is from the abandoned and flooded Tyldesley Colliery underground workings via the Tilley's Bore (site GW01 on **Figure 4**) in accordance with Water Access Licence WAL27898.

Table 2 CVM Dirty Water Management Storages

Storage	Spills to	Catchment (ha) ¹	Function / Recommended Design Criteria	Recommended Capacity (ML) ²	Constructed Capacity (ML) ¹
Dam 1	Dam 2	20.3	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	7.4	5.0
Dam 2	Dam 3	18.9	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	6.9	30.0
Dam 3	Off-site via LPD 1	15.2	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	5.5	7.0
Dam 4	Off-site via LDP 4	85.1 ³	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	30.9	38.0
C5-1A	Dam 2	27.5	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	10.0	Capacity has not been surveyed
C5-2A	Dam 1	22.5	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	8.2	Capacity has not been surveyed
C5-2B	Dam 1	4.1	Dirty Water Sediment Dam / 5 day 90 th percentile rain event	1.5	Capacity has not been surveyed

1. As identified within Review of Surface Water Management at Cullen Valley Mine (WRM Water & Environment, 2012)

2. Capacity includes a 50% sediment zone sizing factor.

3. Area includes upslope catchments with informal storages of unknown capacity where rehabilitation has commenced.

WAL27898 is held for a total of 80 units of water from the Sydney Basin Murray Darling Basin Groundwater Source which is managed under the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2020*. When required, water from the underground workings can be transferred to CVM water tanks via this bore.

2.3.1 Sewage Treatment

Two sewage treatment systems have been installed at the CVM which are approved by the LCC. Effluent from the sewage treatment systems is removed on a regular basis by a locally based licenced contractor and disposed of at the LCC waste treatment facility.

2.3.2 Operating Procedures

The following general operating procedures apply to the management of the CVM site water management system:

- Monthly inspections and rain event inspections following more than 25 mm of rainfall in a 24-hour period of all dam structures and drainage lines. Any repair work required will be implemented as soon as practicable;
- All pumping systems to be checked on a monthly basis;
- Pumping and transfer records to be reviewed on a quarterly basis to record the use of water on site;
- All discharges of surplus water are to be managed and monitored in accordance with the EPL 10341 requirements;
- Dam levels are to be checked on a monthly basis or following more than 25 mm of rainfall in a 24-hour period. Depth gauge boards will be installed at each dam to identify available freeboard. These depth gauge boards will be used to determine the quantity of water which must be pumped from the dam to ensure adequate water storage capacity is held to capture surface runoff for the adopted design rainfall events in accordance with Blue Book requirements; and
- Excess water is to be transferred to the underground storage system within the decommissioned underground workings of the Tyldesley Colliery.

3. WATER MONITORING PROGRAM

3.1 SURFACE WATER MONITORING

3.1.1 Background

Background surface water quality data is monitored at one location upstream (Cullen Creek) and location downstream of the CVM (Dulhunty's Creek) (see **Figure 4**). Water samples within these creeks are collected and analysed on a monthly basis for pH, Total Suspended Solids (TSS) and oil and grease to determine background levels. Background water quality monitoring results collected during the period from 2011 to 2014 are presented in **Table 3**.

Surface water quality monitoring is also undertaken at these locations for CVM discharge events (see **Section 3.1.3**).

Background surface water quality results during the care and maintenance period are available on the Castlerea Coal website and are reported in the CVM Annual Review.

Table 3 Background Surface Water Monitoring Results

Parameter	pH		TSS (mg/L)		Oil & Grease (mg/L)		Electrical Conductivity (EC) (µS/cm)	
	U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S
No. of Samples	10	10	10	8	10	10	10	10
Minimum	3.95	7.00	8	2	<2	<2	235	93
Maximum	7.17	7.77	24	12	<5	<5	1,040	2,180
Average	6.36	7.42	16	6	-	-	672	1,203

3.1.2 Surface Water Impact Criteria

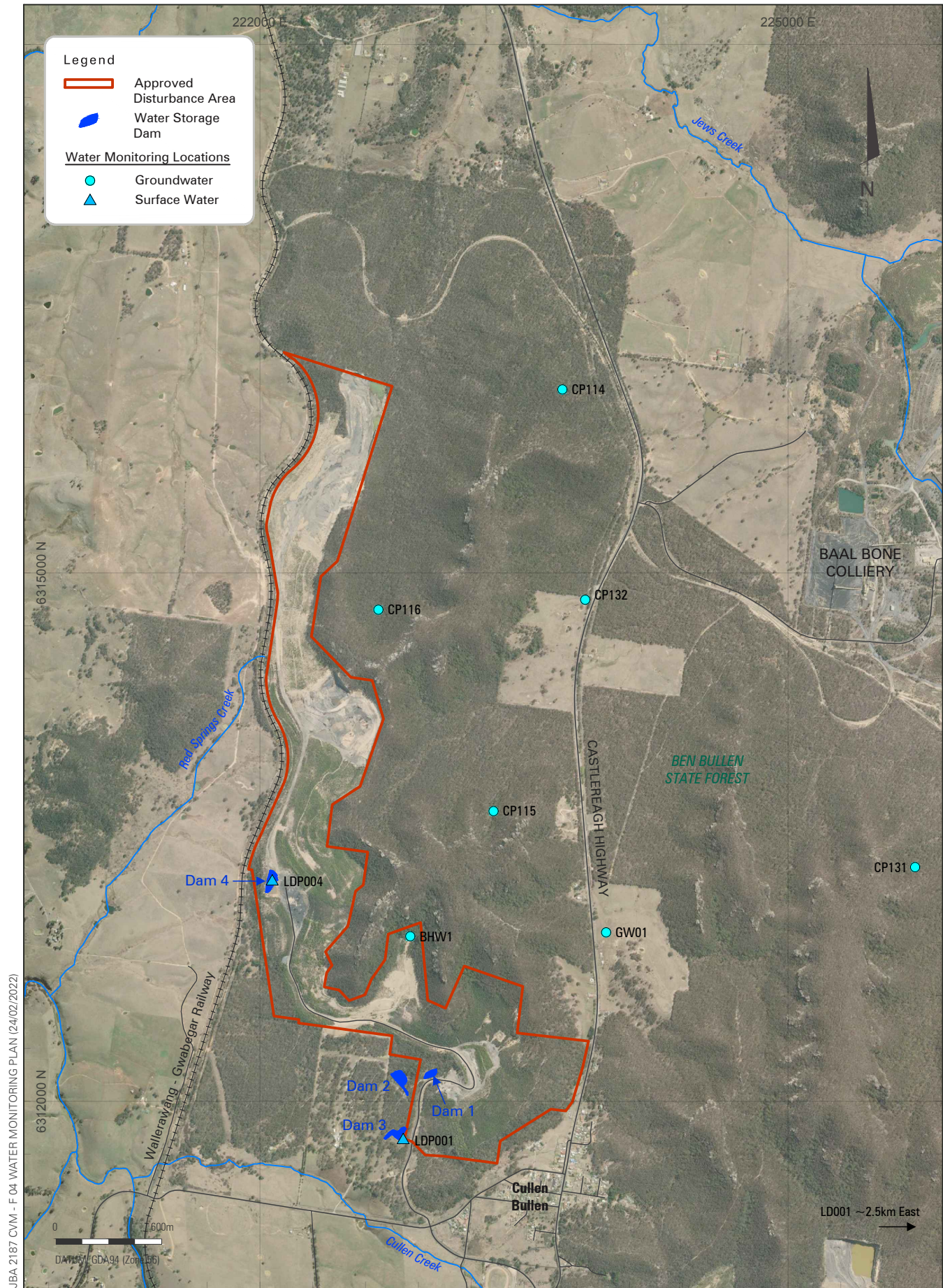
The main aim of the site water management system is to prevent negative impacts on receiving waters. In order to achieve this, all water discharged from site from the two approved discharge locations (LDP 001 and LDP 004 shown on **Figure 4**) will be required to meet the criteria specified in **Table 4**, as specified by Schedule 4, Condition 40 of DA 200-5-2003 and by EPL 10341. Compliance with these surface water discharge limits will be verified through the monitoring program described below in **Section 3.1.3**.

Table 4 Surface Water Discharge Limits

Pollutant	Units of Measure	100% Concentration Limit
pH	pH units	6.5 - 8.5
TSS	mg/L	50
Oil and grease	mg/L	10

3.1.3 Surface Water Monitoring Program

Surface water samples are analysed on a monthly basis at Dam 3 (LDP 001) and Dam 4 (LDP 004) for pH, TSS and oil and grease. Additional monitoring is undertaken during a discharge event in accordance with EPL 10341. A summary of the parameters monitored during a discharge event is included in **Table 5**.



JBA 2187 CVM - F 04 WATER MONITORING PLAN (24/02/2022)

CULLEN VALLEY MINE

Water Monitoring Locations

FIGURE 4



In addition to the monitoring of surface water quality, Castlereagh Coal also records the following on a monthly basis:

- The volume of any water discharged from the site;
- The volume of water stored in site dams; and
- Water used on site.

Surface water level monitoring is also undertaken following more than 25 mm of rainfall in a 24-hour period with the use of depth gauge boards as described in **Section 2.3.2**. These depth gauge boards assist in determining the amount of freeboard available and quantity of water to be pumped from the dams in accordance with the requirements of the Blue Book.

The surface water monitoring program shall be reviewed on a regular basis to ensure its suitability in assessing and identifying potential impacts from CVM operations on the surrounding environment.

3.1.4 Monitoring of Erosion and Sediment Controls

The most effective method of monitoring the function of the erosion and sediment controls employed on site is the TSS contained in the water samples. Review of TSS monitoring results are used to complement the management measures in place for erosion and sediment control on site, as described in the CVM ESCP.

Table 5 Surface Water Monitoring Parameters for Discharge Events

Pollutant	Units of Measure	Frequency	Sampling Method
Total Iron	mg/L	Weekly during any discharge	Grab sample
Total Manganese	mg/L	Weekly during any discharge	Grab sample
pH	pH units	Weekly during any discharge	Grab sample
Oil and Grease	mg/L	Weekly during any discharge	Grab sample
Salinity	mg/L	Weekly during any discharge	Grab sample
TSS	mg/L	Weekly during any discharge	Grab sample
Electrical Conductivity	µs/cm	Weekly during any discharge	Grab sample

3.1.5 Surface Water Monitoring Trigger Values

The Australian and New Zealand Environment and Conservation Council Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000) (Water Quality Guideline) aim to protect and manage the environment supported by a water resource whilst maintaining economic and social development. The Water Quality Guideline provides guidance on general numerical values to assess water quality.

The Water Quality Guideline provide guidance on site specific assessment criteria and general numerical values to assess water quality. The Water Quality Guideline recommend that wherever possible, site-specific data is used to define trigger values for physical and chemical factors which can adversely impact the environment. This is a much more rigorous and accurate approach to assess potential project related impacts rather than application of the generic water quality values.

The trigger values adopted to the CVM have been set as the minimum and maximum levels recorded within the background surface water monitoring results as summarised within **Table 3**.

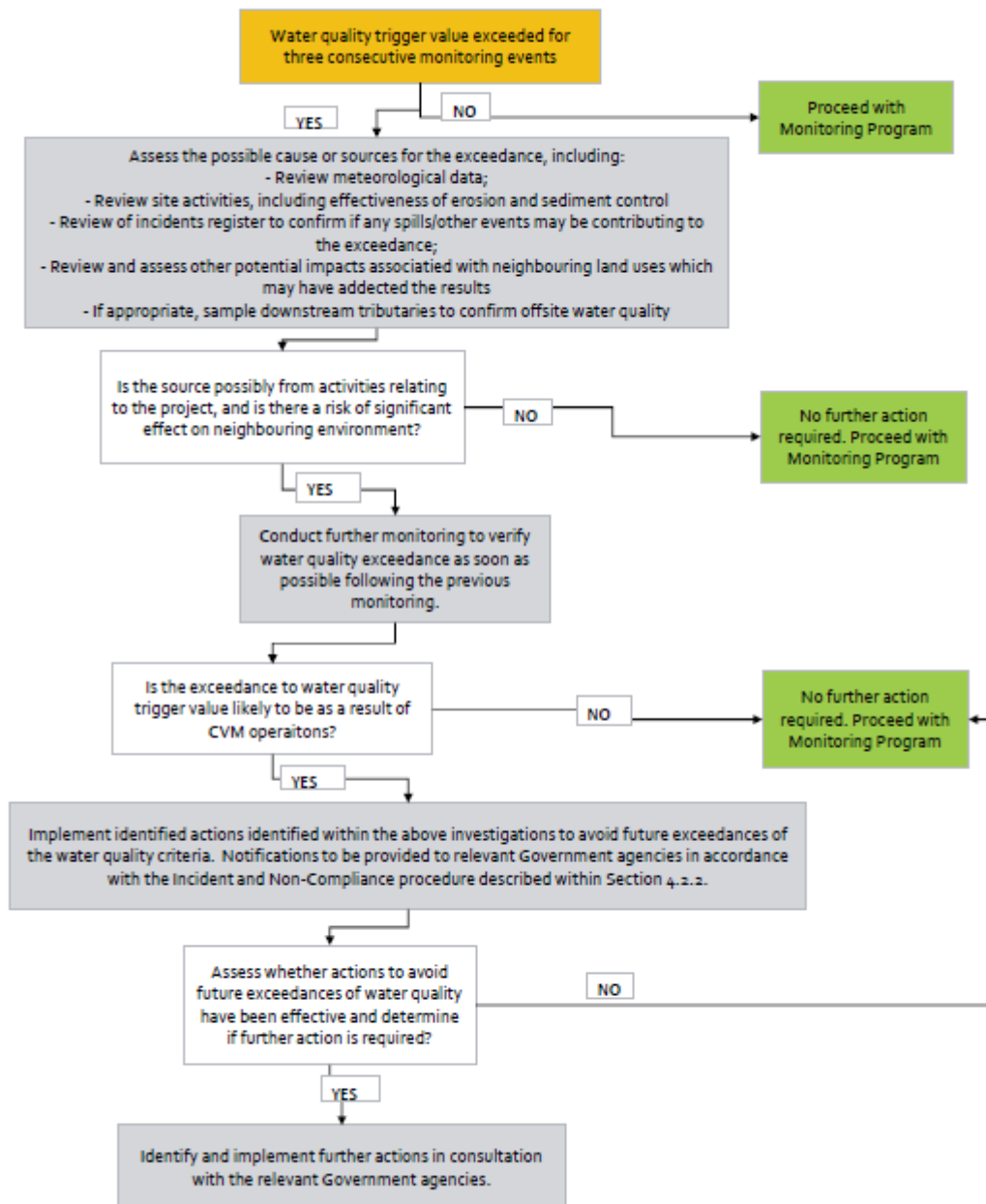
3.1.6 Surface Water Monitoring Response Plan

Castlereagh Coal will conduct reviews of the water monitoring information to identify potential project-related impacts on the receiving waters and to inform the appropriate response. A trigger action response plan will be implemented to manage any potential adverse impacts on surface water quality. Trigger value exceedances will initiate a preliminary investigation and additional water quality sampling will be undertaken if exceedances are related to water quality.

Further investigations and possible management responses may be required as per **Figure 5**. The water quality trigger action response plan will be activated if exceedances of water quality trigger value criteria for surface water (i.e. the minimum and maximum within **Table 3**) occurs.

It is important to note that data collected from environmental monitoring is inherently variable. The occasional excursion beyond a trigger value may be encountered due to a variety of factors or may indicate a potential project-related impact. The method used to calculate trigger values for the project recognises the inherent variability of natural systems by acknowledging natural and sampling induced variation.

Figure 5 Water Quality Trigger Action Response Plan



3.2 GROUNDWATER MONITORING

3.2.1 Background

Specific groundwater impact limits for CVM are not specified in DA 200-5-2003 or in EPL 10341. However, groundwater monitoring has been completed at the site since 2011 at the locations shown on **Figure 4**.

Background groundwater monitoring results are published on the Castlereagh Coal website and reported in the CVM Annual Review.

3.2.2 Groundwater Monitoring Program

Groundwater Monitoring Network

The CVM groundwater monitoring program comprises the sampling of groundwater quality and groundwater levels at six bores located to the north-east of the site (refer **Figure 4**). A summary of these monitoring bores is provided in **Table 6**.

Table 6 Groundwater Monitoring Bores

Monitoring Bore	Bore Depth*	Bore Screen*	Screen Geology	Monitoring Purpose	Monitoring Parameters	Monitoring Frequency
CP114	42.1	36.9 – 41.9	Marangaroo Sandstone / Conglomerate	Baseline monitoring for regional change below target coal seams	Groundwater quality and level	Six monthly
CP115	75.8	68.2 – 71.2	Lithgow Seam	Groundwater quality in the Lithgow seam	Groundwater quality and level	Six monthly
CP116	67.4	53.8 – 56.8	Lithgow Seam	Groundwater quality in the Lithgow seam	Groundwater quality and level	Six monthly
CP131**	74.59	70.58 – 73.58	Lithgow Seam	Baseline monitoring for regional change; indicator between Baal Bone and Tyldesley Colliery Underground Workings	Groundwater quality and level	Six monthly
CP132	41.38	32.7 – 35.7	Lithgow Seam	Baseline monitoring for regional change	Groundwater quality and level	Six monthly
GW01	No data	No data	Tyldesley Colliery Underground Workings	Monitor water levels in Tyldesley Colliery underground workings	Groundwater level	Six monthly
BHW1	52.55	No data	Tyldesley Colliery Underground Workings	Monitor water levels in Tyldesley Colliery underground workings	Groundwater level	Six monthly
LD 001	104	100 – 104	Invincible Colliery Underground Workings	Monitor water levels in Invincible Colliery underground workings.	Groundwater quality and level	Annual

				Water in this bore is not affected by CVM operations and would be used to provide background data during TARP investigations (refer to Section 3.2)		
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* Metres below ground level

** Data from CP131 is unavailable from May 2020 onwards due to fire damage to the bore standpipe.

Groundwater Monitoring Methods

Groundwater monitoring will be undertaken on a six-monthly basis, with all samples to be collected generally in accordance with the requirements of AS 5667 (1998). Field sampling at each site will include:

- Extraction of four bore volumes from each bore, where possible. The volume to be extracted for each bore will vary and be determined by the monitoring contractor during each sampling event; and
- Field monitoring of pH and EC concentrations to confirm stabilisation of the groundwater extracted and ensure a representative sample has been collected.

The monitoring contractor will notify the CVM Environment Officer at the conclusion of each monitoring event if:

- Groundwater extraction from a bore has not resulted in stabilisation of pH and EC concentrations prior to sampling, the monitoring contractor will notify the Environment Officer; or
- Field pH or EC concentrations trigger the respective TARP levels for the bore, as described below in **Section 3.2.3**.

All groundwater sample will be laboratory tested for the following:

- pH, EC and Hardness;
- Major ions (including sodium, potassium, calcium, magnesium, chloride, sulphate, bicarbonate, carbonate, nitrate, nitrite); and
- Total and dissolved metals and metalloids (including aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, molybdenum, nickel, selenium and zinc).

3.2.3 Groundwater Impact Review Levels

Following a review of groundwater data and bore construction details by Umwelt (2017), trigger values were developed for bores CP115, CP 116 and GW01. These bores were selected as the locations most likely to record potential offsite groundwater impacts associated with CVM operations due to being located down dip of the site in the representative coal seams.

Monitoring results outside of the values presented in **Table 7** will be used as triggers for further investigation by CVM personnel. It is noted that monitoring results outside of these values do not necessarily reflect an environmental impact associated with CVM operations, as variations within these bores may be influenced by other factors not associated with site activities.

Exceedances of groundwater quality and trigger levels in **Table 7** will require further investigation by CVM as described below. These trigger levels will be reviewed on an annual basis as further monitoring data is collected for each bore.

Table 7 Groundwater Monitoring Trigger Levels

Monitoring Bore	Groundwater Level (mAHD)	pH	EC ($\mu\text{S}/\text{cm}$)	Sulphate (mg/L)	Hardness (mg of CaCO_3/L)
CP115	892 – 896	Range 6.26 – 7.3	Upper Limit 970	Upper Limit 380	Upper Limit 376
CP116	890 - 894	Range 5.82 – 7.2	Upper limit 840	Upper Limit 140	Upper Limit 210
GW01 ¹	N/A bore is located in underground workings	Range 6.14 – 6.82	Upper limit 939	Upper limit 338	Total Alkalinity ² Upper limit 100 mg of CaCO_3

¹ Baseline data was collected for GW01 over 11 monitoring events in 2016-17 and it is expected trigger level ranges will be reviewed in future to be consistent with those adopted for other bores

² Total Alkalinity is used as a trigger for this bore until sufficient baseline data for hardness has been collected.

3.2.4 Groundwater Trigger Action Response Plan

Trigger Action Response Plans (TARPs) for groundwater have been developed to outline the actions to be undertaken by CVM in the event that an exceedance of the groundwater trigger levels in **Table 7** is recorded during monitoring. These actions are described in **Table 8** and involve a review to assess whether an exceedance of trigger values (groundwater quality or groundwater levels) is attributable to CVM operations or has been caused by other sources (e.g. environmental factors or other land uses). TARP investigations will be undertaken by the CVM Environment Officer (or delegate).

TARP levels and actions will be regularly reviewed as further data is obtained from the groundwater monitoring network, or in response to groundwater monitoring investigations.

Table 8 Groundwater Monitoring TARP

TARP Level	Groundwater Level / Quality
Trigger	If a groundwater value is recorded at a representative bore outside of the trigger values in Table 7 .
Actions / Responses Level 1	<p>Investigate further and determine if levels are consistent with trends against groundwater logger data observed from other CVM monitoring bores;</p> <p>Consult with monitoring contractor to confirm that monitoring was undertaken in accordance with required sampling methodology and that equipment failure /error did not contribute to the result;</p> <p>Review data against other available monitoring bore data in the area (including LD 001 for Invincible Colliery, located approximately 4.5 km east of CVM) to determine potential for broader trends to contribute to the result.</p> <p>Review activities undertaken preceding the sampling event to determine if there are any activities that could have contributed to the result;</p> <p>Investigate any external influence which may be affecting the results, including climatic data;</p> <p>Review the structural integrity of the bore / suitability for further sampling to determine if replacement of the entire bore is required.</p> <p>If no further investigation is required, report findings in the Annual Review and report results in the Annual Review.</p> <p>If further investigation is required proceed to TARP level 2.</p>
Actions / Responses Level 2	If the result cannot be attributed to non-compliance with sampling procedures, or similar trends observed in surrounding bores, then additional water level / quality monitoring of the bore should be undertaken within three months of the initial trigger monitoring event;

	<p>If the additional level / quality monitoring is outside of the groundwater trigger levels for that site, immediately notify the CVM Operations Manager and proceed to TARP Level 3.</p> <p>If the additional level / quality monitoring is within groundwater trigger levels, then no further action is required. Report the results of any additional monitoring and associated findings in the Annual Review.</p>
Actions / Responses Level 2	<p>Environment Officer or delegate to notify DPE if groundwater triggers have been exceeded on three occasions and commence investigation with suitably qualified groundwater specialist (noting that the notification to DPE does not necessarily indicate material environmental harm is likely to have occurred);</p> <p>If the results are indicative of potential material environmental harm, the Environment Officer or delegate is to notify DPE and the EPA in accordance with the requirements of Da 200-5-2003 and EPL 10341;</p> <p>Provide the results of the specialist groundwater study to regulatory agencies as required; and</p> <p>Report the results of the investigation and associated findings in the Annual Review.</p>
Plan	<p>Prioritise implementation of any required actions from the response assessments / investigations, including any associated findings from regulatory agencies; and</p> <p>Review groundwater trigger levels and this TARP on an annual basis.</p>

Source: Umwelt (2017)

4. STAKEHOLDER ENGAGEMENT

4.1 SWMP CONSULTATION

Correspondence with regulatory agencies relating to this revision of the SWMP included as **Appendix A**.

4.2 EXTERNAL COMMUNICATIONS

4.2.1 Community Complaints

All community complaints received by CVM are recorded in the Castlereagh Coal Complaints Register. The register is regularly maintained and published on the Castlereagh Coal website to document a summary of all complaints received and follow-up actions taken by CVM personnel in response.

Further detail on the management of community complaints is provided within Section 6.1.3 of the CVM EMS.

4.2.2 Incidents and Non-Compliances

Schedule 6, Condition 5 of DA 200-5-2003 requires CVM to report any non-compliance to the requirements outlined in **Section 3** in the Annual Review.

Any reporting of a breach in compliance will outline the following:

- The date, time, and nature of the exceedance/incident;
- The cause (or likely cause) of the exceedance/incident;
- Reference to the development consent condition which is considered to be non-compliant and the reasons for it;
- What action has been taken to date; and
- Describe the proposed measures to address the exceedance/incident and the proposed timeframe for completion.

Any incident will be reported to DPE and other relevant regulatory authorities immediately after becoming aware of the incident. Any non-compliance must be notified to DPE by the operator within seven days of becoming aware of the non-compliance. These notifications for incidents or non-compliances will be submitted in writing via the DPE's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident, as outlined above.

5. ROLES & RESPONSIBILITIES

Table 9 outlines the key roles and responsibilities for CVM personnel in relation to this SWMP.

Table 9 SWMP Roles and Responsibilities

Ref	Control Measure	Responsibility	Timing
1.	Review and approve this SWMP and provide adequate resources for its implementation on site.	Operations Manager	Ongoing
2.	Complete regular inspections site water storage structures and controls to confirm that management measures are being implemented to minimise potential impacts.	Mining Supervisor	Monthly
	Assist the Environment Officer with investigations into site water related incidents, non-compliances, and complaints.		As required
3.	Manage the implementation of this SWMP during CVM operations.	Environment Officer	Ongoing
	Respond to complaints and maintain CVM Complaints Register.		Ongoing
	Investigate water monitoring exceedances and incidents and prepare associated reporting for regulatory agencies as required.		As required
	Review groundwater trigger levels and TARPs and update this SWMP, if required.		Annual
	Facilitate regular training of CVM personnel in the requirements of this SWMP.		Annual
	Document water monitoring and management in the Annual Review.		
	Complete review of this SWMP to ensure consistency with current CVM operations and industry standards and procedures.		Five Yearly
4.	Comply with the requirements of this SWMP.	All CVM personnel	Ongoing

6. REPORTING

6.1 ANNUAL REPORTING

In accordance with Schedule 6, Condition 5 of DA 200-5-2003, CVM will continue to submit an Annual Review to DPE and relevant agencies which includes results of monitoring in this SWMP. Information to be provided in the Annual Review will include:

- A summary of the water monitoring results for the development during the year;
- A detailed analysis of these monitoring results against the relevant impact assessment criteria, monitoring results from previous years, and predictions made in the EIS;
- Identification of any trends in the monitoring over the life of the development;
- Identification of any non-compliances during the reporting period and the findings of any TARP investigations; and
- A description of what management actions were or are being taken to ensure compliance with relevant planning criteria.

A copy of each CVM Annual Review is provided to DPE, Department of Regional NSW-RR, EPA, LCC and the representatives of the mine Community Consultative Committee (CCC).

6.2 STAKEHOLDER REPORTING

In accordance with Schedule 6, Condition 8 of DA 200-5-2003 CVM has established a CCC to oversee the environmental performance of the mine. While in operation, the CCC will meet at least twice a year and will review and provide advice on environmental performance including this document, monitoring results, audit reports or complaints.

6.3 AUDITING

In accordance with Schedule 5, Condition 6 of DA 200-5-2003, Castlereagh Coal is required to commission an Independent Environmental Audit within 2 years of the date of consent, and every five years thereafter, for submission to DPE, unless otherwise approved. This audit report is required to consider the effectiveness of the SWMP and will provide environmental management advice to ensure its ongoing effectiveness.

6.4 REVIEW

This SWMP will be reviewed on at least a five yearly basis to ensure that it remains consistent with operations at CVM and in accordance with general industry standards and procedures. Reviews will consider the need to modify the SWMP associated management measures in place at CVM. The SWMP will also be reviewed (and if necessary, updated) in response to:

- Relevant findings from Independent Environmental Audits;
- Findings from water data investigations, community complaints or monitoring non-compliances relating to water impacts; and
- Directions from regulatory agencies.

Castlereagh Coal is currently conducting a work program to address a regulatory notice from the Department of Regional NSW – RR in relation to landform stability and surface water management. Upon the completion of this work program, Castlereagh Coal will review this SWMP to determine the need for revision to the water management framework described within this SWMP. If required, this SWMP will be updated to address any required changes.

Approval of any major amendments to this SWMP will be sought from the Secretary of DPE and other stakeholders, as required under DA 200-5-2003.

7. REFERENCES

- Castlereagh Coal (2022) *Cullen Valley Mine Environmental Management Strategy*
- Castlereagh Coal (2022) *Cullen Valley Mine Environmental Monitoring Program*
- Castlereagh Coal (2022) *Cullen Valley Mine Erosion and Sediment Control Management Plan*
- International Environmental Consultants (2003) *Cullen Valley Mine Lease Extension Project*
- Umwelt (2017) *Water Management Plan, Cullen Valley Mine*

8. ABBREVIATIONS

Abbreviation	Meaning
CCC	Community Consultative Committee
CVM	Cullen Valley Mine
DEC	Department of Environment and Conservation (now DPE - Environment, Energy and Science)
DPE	Department of Planning and Environment
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Program
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
LCC	Lithgow City Council
SWMP	Site Water Management Plan
TSS	Total Suspended Solids

APPENDIX A

STAKEHOLDER ENGAGEMENT



DOC22/160662

Shoalhaven Coal Pty Limited

Via: Major Projects Planning Portal

9 March 2022

**MISCELLANEOUS MANAGEMENT PLANS
Cullen Valley Mine - DA-200-5-2003**

I refer to 3 draft management plans prepared for the Cullen valley Mine, received by the Environment Protection Authority (EPA) via the Major Projects Planning Portal, and your request for EPA comment on the draft plans.

The EPA encourages the development of Environmental Management Plans/Programs to ensure that proponents have determined how they will meet their statutory obligations and environmental objectives as specified by any Project/Development Approval and/or the conditions of an environment protection licence. Please note however that it is not the EPA's role to endorse these plans given the EPA sets conditions/criteria for environmental protection and management and therefore cannot be directly involved in the development of strategies to comply with such conditions/criteria.

The EPA has reviewed the following 3 plans submitted to the portal and provides some comments on each one below:

- Cullen Valley Mine: Site Water Management Plan (18 February 2022, Draft)
- Cullen Valley Mine: Air Quality Management Plan (11 February 2022, Draft)
- Cullen Valley Mine: Noise Management Plan (14 February 2022, Draft)

Site Water Management Plan

Section 2.3 of the Site Water Management Plan discusses dirty water flow across the mine site. Reference is made to the capacities of sediment dams 1 through to 4 and that 'Dam 1' is sized to contain runoff from a 1 in 10 year, 72-hour storm event (or 171 mm of rain). Little context is provided for these figures - i.e. is this capacity for the sub-catchment reporting to Dam 1 and what about the balance of the site including 'Dam 4'?

It is the EPA's preference that all dirty water management structures on mine and quarry sites are designed in accordance with the guidance provided in the publication "*Managing Urban Stormwater: Soils and Construction: Volume 2E Mines and Quarries*" (DECC 2008). This document refers to the

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need to ensure that sediment retention basins (in an environment like Cullen Valley Mine with 'Type F or D' soils) can hold a 95%, 5-day rainfall event (56.4 mm in the Lithgow district) and are pumped down within a 5-day period to restore dam capacities. The EPA notes that this document was not referenced in the preparation of this management plan.

The Site Water Management Plan contains little detail on how the 4 sediment dams are to be monitored with regard to maintaining capacities after rainfall events (section 2.3.2 states simply that '*Dam levels are to be checked on a monthly basis or after rainfall events...*' and that '*excess water is to be transferred ...*'). The EPA would recommend that techniques such as depth gauge boards could be used to indicate the amount of freeboard available at a dam and how much water needs to be removed to restore dam capacity.

Air Quality and Noise Management Plans

The EPA notes that:

- both these plans refer to the Environmental Monitoring Program (EMP) for further details on the air and noise monitoring to be undertaken at the site. The EPA recommends that the relevant sections of the EMP are copied into the respective air and noise management plans for the sake of completeness.
- The Water Management Plan includes details of surface water monitoring (and not just referring the reader to the EMP).
- The EMP has not been forwarded to the EPA for review to date.

If you have any specific questions regarding this matter please contact Mr Andrew Helms on 6333 3805 or via e-mail at EPA.Southopsregional@epa.nsw.gov.au. For general enquiries to the EPA please call (02) 9995 5000 or e-mail info@epa.nsw.gov.au.

Yours sincerely



SHERIDAN LEDGER
A/Manager
Regulatory Operations Regional South

Via: Major Project Portal / Email

Re. Cullen Valley Coal – CVM Site Water Management Plan

I refer to your request of 18 February 2022 for advice regarding Cullen Valley Coal – CVM Site Water Management Plan. The Resources Regulator has reviewed the request.

It should be noted that the Resources Regulator has issued notices to Cullen Valley mine to address risks associated with landform stability and surface water management structures located in the rehabilitated landform. Following the outcomes of this process, which may lead to modifications of the surface water management system, a future amendment to the CVM Site Water Management Plan may be subsequently required.

Background

The Mining Act Inspectorate within the Resources Regulator undertake risk-based compliance and enforcement activities in relation to obligations under the *Mining Act 1992*. This includes undertaking assessment and compliance activities in relation to mine rehabilitation activities and determination of security deposits.

The Mine Safety Inspectorate within the Resources Regulator is responsible for ensuring the mine operators' compliance with the Work Health and Safety (WHS) legislation, in particular the effective management of risks associated with the principal hazards as specified in the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*.

Contact

Should you require any further information or clarification, please contact the Office of the Executive Director (ED.ResourcesRegulator@planning.nsw.gov.au)

Yours sincerely,



Peter Day
Executive Director
Resources Regulator

15 March 2022

Cullen Valley Management Plans – April 2022 Department Review

Management/Monitoring Plans	Reviewed Y/N	Comments/Notes	Response
Environmental Monitoring Program	Y	<p>Questions marked in <u>underlined</u></p> <ul style="list-style-type: none"> • A figure showing monitoring locations is provided. <u>The EMP needs to include a figure clearly showing sensitive receiver locations.</u> • <u>The EMP needs to describe whether the air quality monitoring locations are representative of the operation.</u> • A brief description of the monitoring of deposited dust and PM₁₀ is provided. <u>Further detail on the frequency of monitoring and processes to deal with exceedances should be provided.</u> Met Station is present. • Attended noise monitoring is undertaken quarterly. There is an exemption from the requirement to carry out continuous noise monitoring – letter attached as an Appendix to the Plan. <u>There is no/little discussion on exceedances and how that would be managed, maybe be discussed further in the other plans.</u> • There is a commitment that blasting will not occur and if it were to occur a Blast MP would be submitted for approval prior to blasting occurring. • The EMP needs to describe how monitoring of coal tonnage, truck movements etc will be monitored. • Rehab monitoring undertaken monthly, no reference to MOP. 	<ul style="list-style-type: none"> • Figure 4 land ownership has been included to illustrate the privately owned land surrounding CVM. It also includes labels for the land descriptors used within the noise criteria. • Section 2.2.1 of the EMP indicates that the monitoring locations are representative of the operations. • Air Quality monitoring frequency and process to deal with exceedances of criteria has been clarified within Section 2.2.1. • Noise monitoring process to deal with exceedances of criteria has been clarified within Section 2.3.3. • No Blast MP required as no blasting will occur in near future. • Section 2.9 has been included to describe the management of coal tonnages and haulage in accordance with the requirements of DA 200-5-2003. • Reference included within Section 2.7.3 to the MOP (soon to be Rehabilitation Management Plan). • Noted. • Referred to the 2021 IEA submitted to DPE in March 2022.

		<ul style="list-style-type: none"> • Consultation refers to the EMS,NMP,AQMP, WMP,CHVMP and FFMP. • Restates or refers to condition requirements for audits and complaints etc. Last audit was in 2016. 	
Noise Monitoring Program	N	<p>TO NOTE: The consent conditions have a letter as an appendix which has a series of commitments – many refer to particular plant to be used on-site to reduce noise emissions. <u>Please include these commitments.</u></p>	<p>CVM has been under Care and Maintenance since 2013. Accordingly, contractor equipment will be utilised for the recommencement of mining operations. Section 2.3.4 has been updated to include the methods to be implemented to manage noise emissions from the mining operations.</p>
Site Water Management Plan	N	<p>(a) Predicted site water usage is 10ML per annum for the proposed works and this would not be exceeded This is primarily used for dust suppression on haul roads. Water sourced from the underground workings and the pollution control dams.</p> <p>Questions:</p> <ul style="list-style-type: none"> - Can't find any consultation with EPA and DPI Water. Please provide this. - for WAL27898, what is the available licence amount and from what water sharing plan is the water drawn? - How is clean water diverted around the extraction area and face? I couldn't find this detail in section 2.3. 	<ul style="list-style-type: none"> - DA200-5-2003 does not require the EMP to be prepared in consultation with EPA or DPI Water. The EPA reviewed the site water management plan and provided comments in its letter correspondence dated 9 March 2022. - WAL27898 is for a total of 80 units. Section 2.3 of the Site Water Management Plan has been updated to reference the details of this WAL and WSP which it is drawn from. - Section 2.3 has been updated to include a reference to the diversion drains/contour banks which are installed upstream of disturbed areas to divert water around mining operations where this is practically possible

		<ul style="list-style-type: none"> - 2.2.3 – stronger commitment to maintain freeboard to ensure the required rainfall events are captured. 	<ul style="list-style-type: none"> - Section 2.3.2 has been revised and updated to strengthen commitment to maintain adequate freeboard in accordance with Blue Book requirements.
Surface Water Monitoring Program	N	<p>Question</p> <ul style="list-style-type: none"> - Section 3 – there are no procedures or commitments to undertake corrective actions or mitigation measures if the surface water criteria is exceeded. You must include these. 	Sections 3.15 and 3.16 have been included to provide a mechanism for investigation and/or corrective action in the event the surface water criteria/trigger level is exceeded.
Fire Management Plan	Yes	<p>Notes.</p> <p>The Plan could expand more on how it's suitably equipped to deal with fires, however, RFS is satisfied with Plan.</p> <p>Combustion issue is discussed – is being managed with RR.</p>	Noted.