



Moolarben Coal Complex UG4 Ancillary Works Modification

Modification Report

APPENDIX D

SURFACE WATER REVIEW



Moolarben Coal Complex

Moolarben UG4 Ancillary Works Modification

Surface Water Review

Moolarben Coal Operations

0926-28-B1, 24 September 2019

For and on behalf of WRM Water & Environment Pty Ltd
Level 9, 135 Wickham Tce, Spring Hill
PO Box 10703 Brisbane Adelaide St Qld 4000
Tel 07 3225 0200



David Newton
Director

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Contents

1	Introduction	3
1.1	Background	3
1.2	Proposed modification	3
2	Surface Drainage Network	5
2.1	Existing Conditions	5
2.2	Changes due to the proposed Modification	5
3	Impact assessment	8
3.1	Potential Impacts	8
3.2	Impacts on Mine Site Water balance	8
3.3	Reduced surface runoff	8
3.4	Flood impacts	9
3.5	Water quality	9
3.6	Monitoring and Management	10
4	Summary	10
5	References	11

List of Figures

Figure 1.1	- Indicative Surface Infrastructure Location	4
Figure 2.1	- Downcast Ventilation Shaft Compound, Indicative layout	6
Figure 2.2	- Remote Services Infrastructure Area, Indicative layout (Arkhill 2019)	7

List of Tables

Table 3.1	- Captured catchment areas	8
Table 3.2	- Sediment dam volume calculations	9

1 Introduction

1.1 BACKGROUND

The Moolarben Coal Complex, located approximately 40 km north of Mudgee in New South Wales, comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining-related infrastructure (including coal processing and transport facilities).

1.2 PROPOSED MODIFICATION

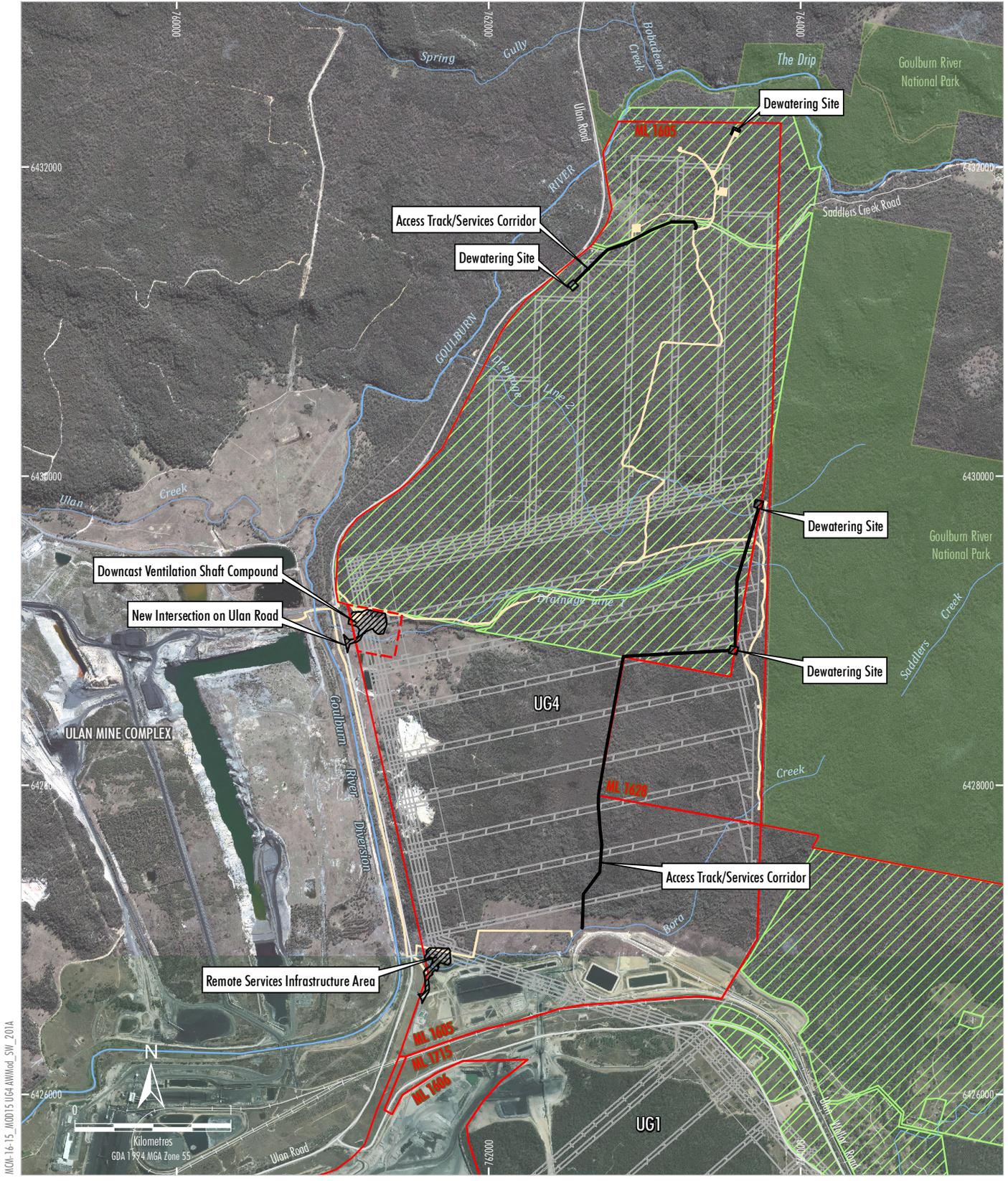
Moolarben Coal Operations Pty Ltd (MCO) is seeking to modify the Project Approval (05_0117) for Stage 1 of the Moolarben Coal Complex (referred to as the UG4 Ancillary Works Modification [the Modification]) to allow for changes to the currently approved operations, including:

- Relocation and expansions of dewatering sites and pads and extension of the associated access and infrastructure corridor for the UG4 underground workings and associated infrastructure;
- Development of a downcast ventilation shaft for UG4 and associated infrastructure; and
- Development of Remote Services Infrastructure Area.

The location of the surface infrastructure proposed under the Modification is shown in Figure 1.1.

The Modification will not change the approved underground mine configuration or production rates.

This report provides an assessment of the potential impacts of the Modification on surface water quality and quantity.



MCO-16-15_MDD15 UG4 ANWMod_SWI_201A

- LEGEND**
- Mining Lease Boundary
 - Mining Lease Application Boundary
 - Existing Biodiversity Offset Area
 - Existing/Approved Development
 - Underground Longwall Layout
 - Pipeline and Borefield Infrastructure
 - UG4 Ancillary Works Modification
 - Indicative Surface Infrastructure Area

Source: MCO (2019); NSW Department of Planning, Industry and Environment (2019)
 Orthophoto Mosaic: MCO (April 2016 - May 2012)

MOOLARBEN COAL
 MOOLARBEN COAL COMPLEX
 Indicative Surface Infrastructure Location

Figure 1.1

2 Surface Drainage Network

2.1 EXISTING CONDITIONS

Details of the surface drainage network in the vicinity of the Moolarben Coal Complex are provided in previous environmental assessments (WRM, 2013).

Most of the surface disturbance associated with the Modification will occur within the catchments of two minor drainage lines discharging directly to the Goulburn River (via Bora Creek and Drainage Line 1) as shown in Figure 1.1.

Bora Creek has a catchment area to the Goulburn River of 5.3 km² and Drainage Line 1 has a catchment area of 4.2 km² (Arkhill, 2019). Both of these watercourses pass through culverts under Ulan Road to join the Goulburn River diversion immediately to the west of Ulan Road.

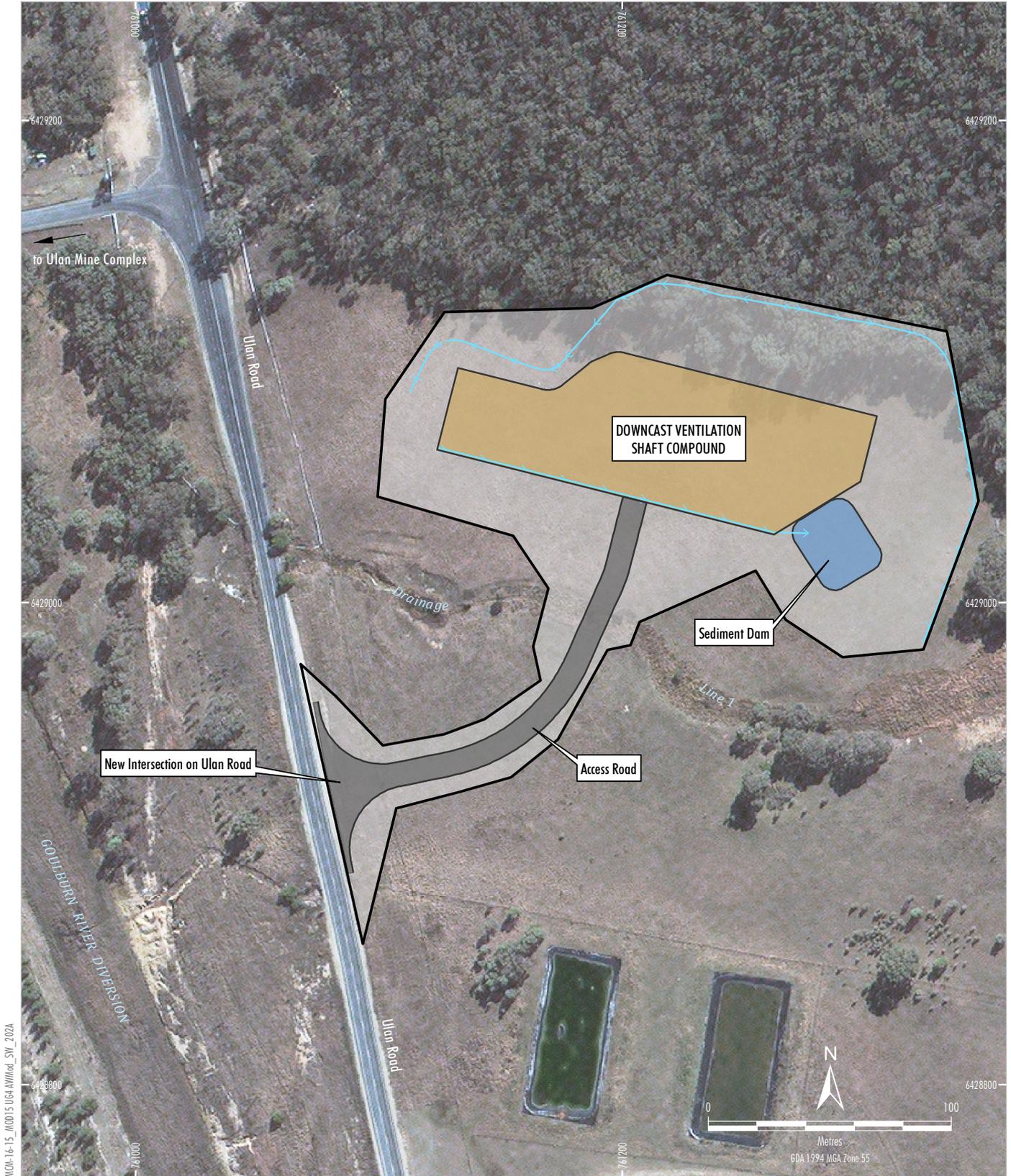
Additional small areas of disturbance (dewatering sites and associated access tracks) will occur in minor catchments overlying UG4, which also drain to the Goulburn River.

Bora Creek drains in a westerly direction along the northern side of the existing rail loop and coal processing area. Bora Creek is the receiving watercourse for overflows from sediment dams around the mine infrastructure area in accordance with Environment Protection Licence (EPL) 12932. EPL discharge location 1 is located on the Bora Creek and Goulburn River Confluence with discharge in accordance with currently approved EPL and Project Approval conditions.

2.2 CHANGES DUE TO THE PROPOSED MODIFICATION

The surface disturbance proposed under the Modification may be summarised as:

- The Downcast Ventilation Shaft Compound (DVSC). The general arrangement of the compound is shown in Figure 2.1. Key surface water management features of the DVSC include:
 - Clean water drains to divert undisturbed area runoff around the proposed disturbance area;
 - A sediment dam (1.2 ML capacity) to capture and treat stormwater from the compound (catchment area = 1.8 ha) prior to overflow via spillway to Drainage Line 1;
 - A culvert crossing where the DVSC access road crosses Drainage Line 1.
- Remote Services Infrastructure Area (RSIA). The general arrangement of the RSIA is shown in Figure 2.2. Key surface water management features include:
 - A clean water drain to divert undisturbed area runoff around the proposed disturbance area;
 - A sediment dam (0.63 ML capacity) to capture and treat stormwater from the RSIA compound (catchment area = 0.9 ha) prior to overflow via spillway to Bora Creek;
 - Culvert crossings where the RSIA access road crosses Bora Creek and a minor drainage line discharging to Bora Creek.
- Four dewatering sites with associated access tracks.



MCM-16-15_MDD15 UG4 AMMod_SW_2024

- LEGEND**
- UG4 Ancillary Works Modification
 - Indicative Surface Infrastructure Area
 - Pad
 - Water Management Diversion

Source: MCO (2019); NSW Department of Planning, Industry and Environment (2019)
 Orthophoto Mosaic: MCO (April 2016 - May 2012)

Figure 2.1



MCO-16-15_MDD15 UG4 ANWMod_SW_2024

- LEGEND**
- UG4 Ancillary Works Modification
 - Indicative Surface Infrastructure Area
 - Pad
 - Water Management Diversion

Source: MCO (2019); NSW Department of Planning, Industry and Environment (2019)
 Orthophoto Mosaic: MCO (April 2016 - May 2012)


MOOLARBEN COAL
 MOOLARBEN COAL COMPLEX
 Remote Services Infrastructure Area
 Indicative Layout

Figure 2.2

3 Impact assessment

3.1 POTENTIAL IMPACTS

The potential impacts of the Modification on surface water resources include:

- Impacts on the mine site water balance;
- Reductions in surface runoff volumes to receiving catchments;
- Impacts on flood levels and velocities;
- Adverse impacts on water quality due to land disturbance.

These potential impacts and proposed mitigation measures are discussed in the following sections.

3.2 IMPACTS ON MINE SITE WATER BALANCE

The Modification will have negligible impact on the site water balance because:

- Run-off from the proposed disturbance areas for the Modification will result in negligible water reporting to the site water management system; and
- underground dewatering via the proposed dewatering sites is already allowed for in previous assessments of the site water balance (i.e. MCO is not seeking to increase the approved amount of groundwater being pumped from underground workings).

3.3 REDUCED SURFACE RUNOFF

The DVSC and RSIA sediment dams (designed in accordance with Landcom (2004) and existing EPL 12932 conditions for sediment dams) will capture and temporarily detain surface runoff that drains to the Drainage Line 1 and Bora Creek catchments respectively. The proportions of captured catchment area (assuming 100% containment of surface runoff) are shown in Table 3.1. In reality, the captured proportion of runoff will be lower than indicated in Table 3.1 because some proportion of runoff will overflow from the sediment dams during significant rainfall events (44 mm [95th percentile 5 day rainfall]) that would exceed the dam design capacity. Hence, the impact of the Modification on runoff volume will be less than 0.5% which would be undetectable in the receiving watercourses.

Table 3.1 - Captured catchment areas

Location	Catchment	Total catchment (ha)	Captured catchment (ha)	Proportion of catchment captured
DVSC	Drainage Line 1	420	1.8	0.43%
RSIA	Bora Creek	530	0.9	0.17%

3.4 FLOOD IMPACTS

A flood impact assessment has been undertaken by Arkhill Engineers (2019). The assessment found that the Modification would result in:

- minor localised changes to flood levels and velocities along Drainage Line 1 and Bora Creek which would be on land owned by MCO;
- no increase in the flood level or velocity at Ulan Road; and
- no backwater effects impacting the adjacent MCO CHPP mine water dam infrastructure.

3.5 WATER QUALITY

Surface infrastructure associated with the Modification, including the DVSC and RSIA, access tracks and dewatering sites, will not be used for coal storage or handling, or for storage of significant quantities of fuel or chemicals. Hence, the major risk to water quality from the proposed infrastructure is due to potential increased erosion and sediment runoff from disturbed areas during construction.

The disturbance areas associated with access tracks and dewatering sites are small and will be managed using suitable erosion and sediment control measures, based on “*Managing Urban Stormwater: Soils and Construction*” (Landcom, 2004) consistent with Project Approval (05_0117).

Stormwater run-off associated with the DVSC and RSIA will be managed by:

- separating clean water runoff from upslope catchments using clean water diversion drains;
- controlling erosion from earthworks batters using suitable methods; and
- directing surface runoff from trafficable areas to sediment dams.

The arrangement of key surface water management features is shown in Figure 2.1 and Figure 2.2. Sediment dam sizing is based on:

- a design rainfall depth of 44 mm (95th percentile 5 day rainfall) in accordance with EPL 12932;
- runoff coefficient of 100%;
- 50% volume allowance for sediment storage.

The calculation of sediment dam volumes for the DVSC and RSIA is summarised in Table 3.2.

The DVSC and RSIA will be dewatered back to the mine site water system where practical. In rainfall events in exceedance of Landcom (2004) dam design criteria, dams will fill and spill in accordance with the EPL license which would be varied as necessary.

Table 3.2 - Sediment dam volume calculations

Location	Catchment area (ha)	Runoff volume for 44 mm rainfall (m ³)	Including 50% allowance for sediment storage (m ³)	Adopted sediment dam volume (ML)
DVSC	1.8	792	1,188	1.2
RSIA	0.9	396	594	0.63

3.6 MONITORING AND MANAGEMENT

The water management infrastructure associated with the Modification will be managed in accordance with the Surface Water Management Plan (SWMP) which will be revised to include the Modification surface water infrastructure and associated water management measures.

Construction activities will be managed in accordance with the erosion and sediment control strategy as detailed in the SWMP which describes the measures used to minimise the generation of sediment and erosion (e.g. through progressive rehabilitation) and the management and capture of sediment runoff.

4 Summary

The Modification represents a minor additional area of surface disturbance at the Moolarben Coal Complex. The potential surface water impacts and proposed management measures to limit these impacts are summarised below:

- The Modification will have negligible impact on the site water balance because sediment run-off from the proposed disturbance areas will result in negligible water reporting to the site water management system and underground dewatering via the proposed dewatering sites is already allowed for in previous assessments of the site water balance.
- Proposed sediment dams (designed in accordance with Landcom (2004) and existing EPL12932 conditions for sediment dams) to capture runoff from the DVSC and RSIA will reduce runoff volumes to their receiving watercourses (Drainage Line 1 and Bora Creek respectively) by less than 0.5% which would be undetectable.
- A flood impact assessment by Arkhill Engineers (2019) has shown:
 - minor localised impacts on flood levels and velocities along Drainage Line 1 and Bora Creek which would be on land owned by MCO;
 - no increase in flood level or velocity at Ulan Road; and
 - no backwater effects impacting the adjacent MCO CHPP mine water dam infrastructure.
- The disturbance areas associated with access tracks and dewatering sites are small and will be managed using suitable measures in accordance with “Managing Urban Stormwater: Soils and Construction” (Landcom, 2004).
- The DVSC and RSIA will not be used for coal storage or handling, or for storage of significant quantities of fuel or chemicals. Hence, the only risk to water quality from the proposed infrastructure is due to potential increased erosion and sediment runoff from areas of disturbance and stored construction materials. Stormwater associated with the DVSC and RSIA will be managed by:
 - separating clean water runoff from upslope catchments using clean water diversion drains;
 - controlling erosion from earthworks batters using appropriate controls; and
 - directing surface runoff from trafficable areas to sediment dams which have been sized in accordance with Landcom (2004).

5 References

- Arkhill, 2019 *Moolarben Coal - UG4 Ancillary Works Modification, Flooding Review*, Report prepared by Arkhill Engineers, Ref. MN1900054-0, 1 August 2019.
- Landcom, 2004 *Managing Urban Stormwater: Soils & Construction Volume 1, 4th edition*, March.
- WRM, 2013a *Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment*, Report prepared by WRM Water & Environment, Ref. 0926-01-C, May 2013.