BLOOMFIELD

MINING OPERATIONS (BLOOMFIELD COLLIERY)

FINAL VOID MANAGEMENT PLAN

Ver	Date	Description	By	Chk	App
1	13/06/12	Final Draft	GL	JH	GB
2	22/08/17	Revised Final – Revised and Updated	GL		BC
3	7/11/17	Revised Final – incorporating DPE consultation	GL		BC

CONTENTS

INTRODUCTION

This Final Void Management Plan (FVMP) has been prepared in response to Project Approval, 07_0087, (Approval) granted under section 75J of the Environmental Planning and Assessment Act (EP&A) and Modifications issued under section 75w of the Environmental Planning and Assessment Act 1979.

The FVMP takes into consideration the commitments stated in the Part 3A Environmental Assessment, various conditions outlined in schedules 2 to 5 of the Approval granted under Section 75 J of the Environmental Planning and Assessment Act 1979. In addition, commitments outlined in Bloomfield Group Environment Management Policy are also taken into account.

PURPOSE AND OBJECTIVES

The purpose of the FVMP is to:

- address the relevant conditions of the development consent;
- address commitments made within the Environmental Assessment;
- address legislative requirements and guidelines relevant to the FVMP and related management plans; and
- provide a clear and concise description of responsibilities in relation to Landscape Management (including Rehabilitation, Final Void Management & Mine Closure) during the operation and subsequent closure of the Bloomfield group mining operations.

SCOPE

This FVMP outlines the planning strategy for the cessation of mining operations covered by the project area as shown in Figure 1. It should be noted that the scope of this plan specifically addresses the area covered by the Approval. The Coal Handling Preparation Plant (CHPP) and associated infrastructure will continue to operate after mining operations cease and is operating under the Abel Coal Project (05_0136).

The Bloomfield Colliery Mining Operations Plan (MOP) approved by DRG provides a detailed outline of the objectives, closure criteria and monitoring for mine closure on a domain by domain basis covering ML1738. This includes the CHPP operating under the Abel Coal Project (05_0136).

RELATIONSHIP WITH OTHER PLANS

The EMS establishes the overall environmental management strategy for mining and related activities on the site. The LMP provides the framework for rehabilitation and mine closure related issues. This document, the FVMP outlines the planning strategy for the cessation of mining operations at the Bloomfield Colliery.

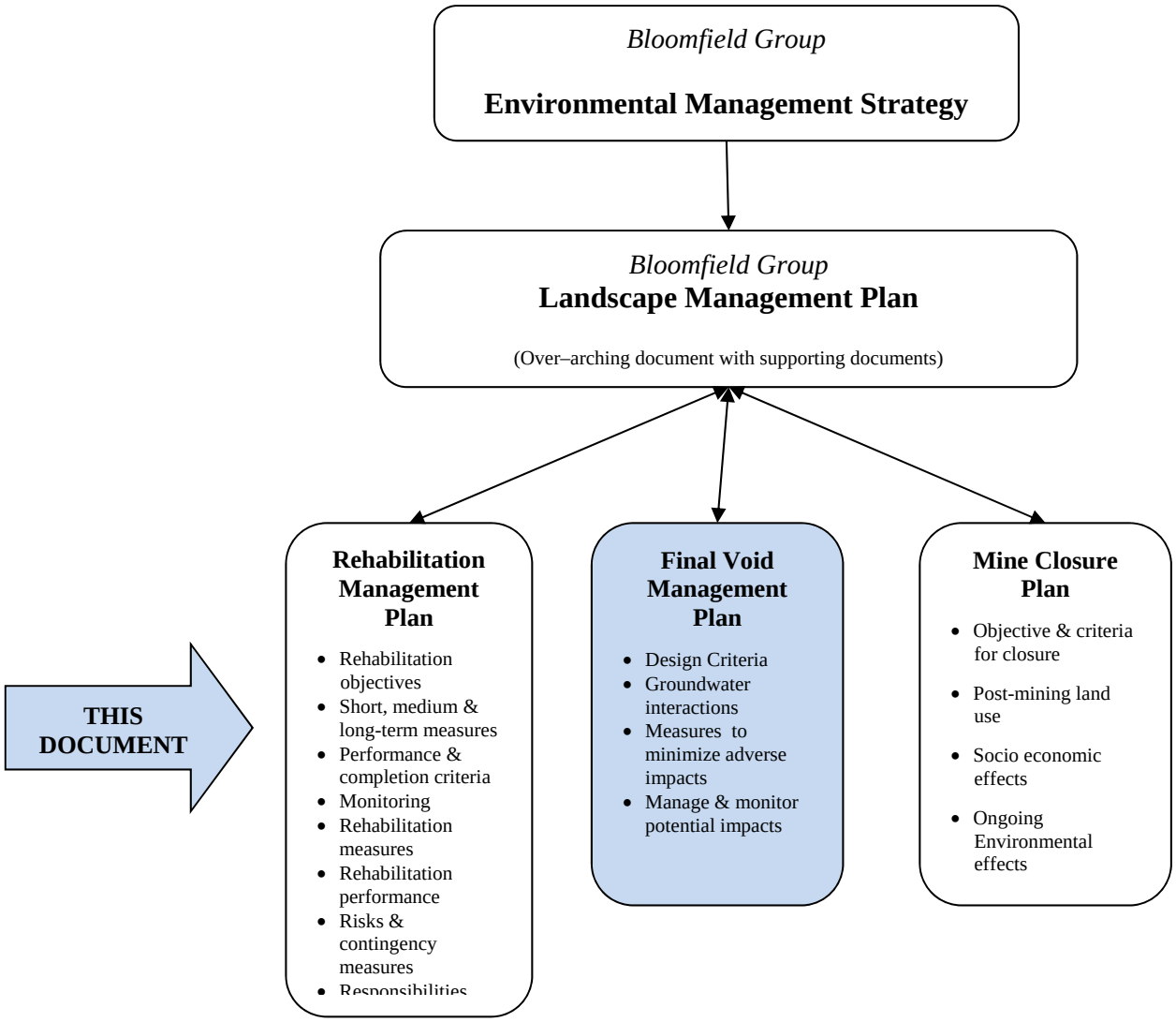


Figure 2 RELATIONSHIP WITH OTHER DOCUMENTS

STATUTORY OBLIGATIONS

Approval was granted by the Minister for Planning on 3 September 2009 under Section 75J of the Environmental Planning and Assessment Act, 1979. Section 28 of Schedule 3 of the Approval states that:

Requirement	FVMP Reference
The Final Void Management Plan must:	
(a) justify the final location and future use of the final void;	Location of Final Void, Future Use of Final Void
(b) incorporate design criteria and specifications for the final void based on verified groundwater modelling predictions and a re-assessment of post-mining groundwater equilibration; and	Design Criteria of Final Void
(c) describe what actions and measures would be implemented to: • minimise any potential adverse impacts associated with the final void; and	Potential Impacts of the Final Void
• manage and monitor the potential impacts of the final void	Monitoring of Final Void

In addition to the Approval granted under the Environmental Planning and Assessment Act, 1979 there is a range of other relevant legislation that has been taken into consideration in developing the FVMP. These include the Mining Lease and requirements of the Environment Protection Licence (EPL) that must be satisfied.

CONSULTATION WITH REGULATORY AUTHORITIES

The closure, decommissioning and rehabilitation process will be regulated by the DRG. Relevant agencies will be consulted throughout the process and include the following:

- ❑ environmental inspections following the submission of the Annual Environmental Management Report
- ❑ submission of Mining Operations Plan for Closure, Decommissioning and Rehabilitation;
- ❑ periodic inspections with Departmental throughout closure process;
- ❑ the preparation and submission to DRG of "as constructed" drawings of final landforms on completion of decommissioning.

Throughout the mining phase, copies of the Annual Review will continue to be distributed to the relevant authorities to enable feedback on the strategy and overall progress of rehabilitation.

ROLES AND RESPONSIBILITIES

The company directors are responsible for the overall rehabilitation and environmental performance of Bloomfield Colliery. Senior Operational managers have direct responsibility for the mine closure process. The Environmental Officer provides direction and advice to ensure site environmental compliance is maintained. The key management positions are shown are shown in Table 1.

Table 1 MANAGEMENT TEAM

Position	Name
Managing Director	John Richards
Manager Technical Services	Simon Grassby
Manager of Mining Development	Garry Bailey
Mine Manager	Brendon Clements
Environmental Officer	Greg Lamb

LOCATION OF FINAL VOID

The location of proposed final void was nominated in the 2009 Environmental Assessment. There will be one final void remaining post closure, located in the northern extension of S Cut where it will join with Creek Cut. Development of this void will progress generally in accordance with the 2009 Environmental Assessment.

Figure 3 shows the general location of final void (Tailings Dam) as detailed in the Mining Operations Plan 2012-2016. The MOP has been extended to 31 December 2017 as approved by DRG.

FUTURE USE OF FINAL VOID

The Bloomfield washery, rail loading facility and associated infrastructure will continue to operate after the mining is scheduled to be completed. Active washery infrastructure and transport will therefore continue in the mining lease area after mining is completed.

The washery, rail loading facility and associated infrastructure is approved under Project Approval 05_0136 for the Abel Underground Mine. Project Approval 05_0136 was issued to Donaldson Coal (owned by Yancoal) and was granted in June 2007. It allows for the Abel Underground Mine as well as the continued use of the Bloomfield washery and rail loading facility, management of water associated with the washery, coarse reject and tailings disposal and coal handling.

These items associated with the operation of the washery are currently used to process coal from Bloomfield and Abel Underground Mine. When mining is completed at Bloomfield Colliery, the washery will continue processing coal from the Abel Underground Mine. Project Approval 05_0136 permits operations until 2030.

A final void will remain at the end of Bloomfield mining operations. This void will be used as an active disposal site for reject material from the washery, as approved by the Abel Project.

The Bloomfield Colliery Mining Operations Plan (MOP) approved by DRG provides a detailed outline of the objectives, closure criteria and monitoring for mine closure including the final void. Further details are also outlined in the Mine Closure Plan.

DESIGN CRITERIA FOR FINAL VOID

The final void remaining at the end of Bloomfield mining operations will be used as an active disposal site for reject material from the washery, as approved by the Abel Project.

Once capacity has been reached, the reject disposal area will be rehabilitated by shaping to a stable, undulating self-draining landform with mixed cover of pasture and native vegetation. The Bloomfield Colliery Mining Operations Plan (MOP) approved by DRG provides a detailed outline of the objectives, closure criteria and monitoring for mine closure including the final void.

Groundwater Model

The groundwater levels in the Bloomfield mining area shows the cumulative effects of long-term mining activity both at Bloomfield and at former open cut and underground mines to the west (eg Buchanan). There is no evidence to suggest what pre-mining groundwater levels might have been as mining commenced at Bloomfield over 170 years ago.

Groundwater modelling was undertaken as part of the 2009 Environmental Assessment. A numerical groundwater model of the groundwater system was designed to simulate groundwater conditions over a 200 km^2 area. The area of potential impact incorporated the neighbouring Donaldson and Abel mining projects.

A model simulation of the mining operation was run for the proposed life of the project, and for a period of 100 years after completion of mining to predict the post-mining recovery of regional groundwater levels.

The void has been assumed to remain as a permanent open void in the groundwater modelling so that the impact of the project could be assessed (as far as possible) separately from the impacts of neighbouring mines. However with ongoing processing of coal at the washery the final void will be progressively backfilled by deposition of washery rejects.

A summary of the key groundwater modelling predicted for each open cut pit in the 2009 EA is presented below.

- The dewatering operations at Bloomfield and Donaldson have caused cones of drawdown in groundwater levels along the southern margin of the Bloomfield Open Cut. This appears to have had negligible impact on groundwater levels in the alluvium/colluvium, or in the Permian coal measures lithologies that are stratigraphically above the zones that have been directly intersected by the open cut.
- Dewatering will continue to be required as mining progresses. The total groundwater inflow rate is predicted to average 1.4 ML/d (500 ML/yr), peaking at 2.1 ML/d (770 ML/yr) in Year 6 (around 2014).
- Maximum drawdowns of approximately 40m are predicted in the coal measures near the southern end of the lease, but as the pit retreats to the north in later years,

groundwater levels are predicted to recover to above 2008 levels even before completion of mining at Bloomfield.

- Recovery modelling has predicted that groundwater levels will recover to well above current levels, and recovery will stabilise over the Bloomfield lease area within 20-30 years after completion of mining.

To verify the impacts the project may potential have on groundwater and comparison with the groundwater model predictions, groundwater monitoring will be undertaken in accordance with the Water Management Plan (WMP). A summary of the results will be included in the Annual Environmental Management Report (AEMR).

After completion of mining at Bloomfield, the washery will continue to operate and tailings/rejects disposal to the final void will commence. Water will be recycled from the tailings as part of the washery water circuit. Therefore it is expected that groundwater levels will recover faster than the modeling prediction of 20-30 years.

POTENTIAL IMPACTS OF THE FINAL VOID

The measures to be implemented to minimise or manage potential adverse impacts of the final void are grouped into the following:

- Air quality;
- Surface Water;
- Groundwater; and
- Rehabilitation.

Air Quality

Post mining, dust generation may occur as a result of the emplacement of coarse rejects, overburden capping and topsoil, as well as during the period of exposure before groundcover is established during rehabilitation. Dust management during will continue to be carried out in accordance with EPL conditions.

The methodology for air quality monitoring is established in the Bloomfield Colliery Air Quality Monitoring Program. Existing mitigation techniques and monitoring methods will continue to be carried out during the filling of the final void with washery rejects material and rehabilitation.

Surface Water

While the final void is being used as the tailings deposition area surface flows within the void footprint will collect in the tailings area and will be recycled from the tailings as part of the washery water circuit.

Post rehabilitation, surface flows will continue to be directed through a series of drains to the site water storage dams. Appropriate catchment management will be undertaken for the final landform to ensure there is no residual risk of contamination or nutrient enrichment occurring in site water storage dams and drainage structures. Surface water monitoring will be conducted for a minimum of five years after the completion of rehabilitation, in accordance with the methods outlined in the Water Management Plan and reported in the AEMR.

Groundwater	Monitoring of groundwater in the vicinity of the final void will continue for a minimum of five years after the completion of rehabilitation to ensure no adverse impacts on the groundwater system occur and to verify groundwater modelling predictions. Monitoring will be conducted as per the Water Management Plan, with analysis of groundwater data reported in the AEMR.
Rehabilitation	Rehabilitation of the mine site area is proposed to be rehabilitated in accordance with its pre mining land capability to create a stable, undulating landscape with a mix of pasture and tree areas suitable for grazing and general habitat. Mitigation of potential impacts on ecological systems will be mitigated through use of the completion criteria outlined in the Bloomfield MOP. A summary closure criteria is provided in the Mine Closure Plan.

MONITORING OF FINAL VOID

Bloomfield employs an extensive environmental monitoring program as part of the Bloomfield Colliery environmental monitoring network, as required by PA 07_0087 and EPL 396. This program is designed to incorporate all impact assessment criteria and other regulatory required monitoring regimes and includes monitoring of the following:

- Air quality;
- Noise and blasting
- Surface and groundwater quality
- Rehabilitation assessments;
- Erosion assessments; and
- Visual and lighting assessments.

This monitoring network will be reviewed in consultation with DRG and Office of Environment and Heritage (OEH) to ensure it is appropriate for future use of the final void prior to the completion of mining operations. The reviewed monitoring program will continue to operate for a period of five years following the completion of mining operations or until lease relinquishment is achieved. Monitoring results during the mine closure phase will continue to be reported in the Bloomfield Colliery AEMR.

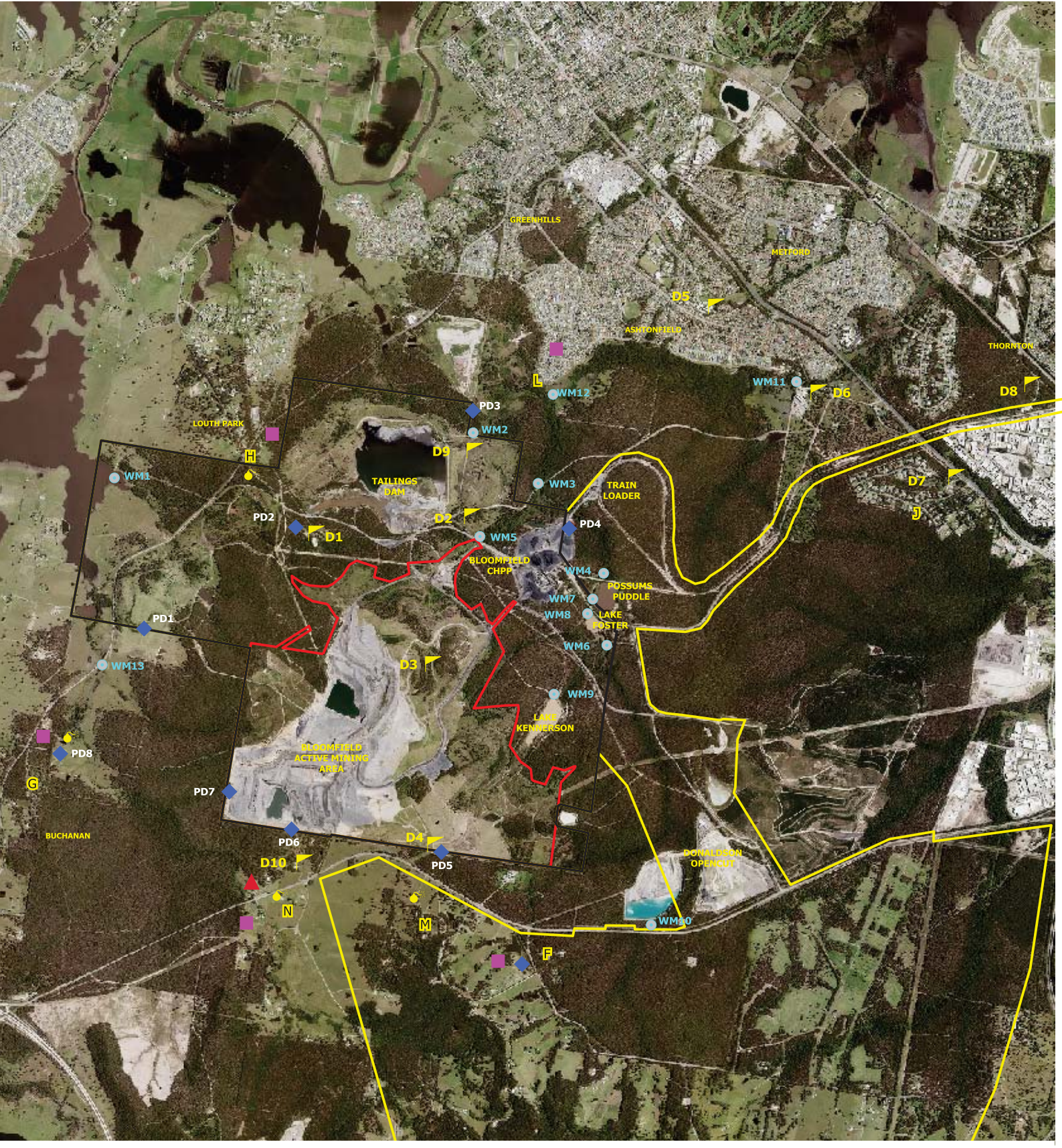
Monitoring of the environment within and surrounding Bloomfield Colliery will include the assessment of:

- Air quality impacts;
- Surface and groundwater levels and quality;
- Landform stability and landscape design performance; and
- Vegetation community establishment.

Rehabilitation Management Plan

As part of the RMP, Bloomfield Colliery has established Completion Criteria that identifies and outlines a number of criteria which have been developed as a result of previous onsite rehabilitation successes as well as generally accepted industry practices. In accordance with the RMP, performance and completion criteria for rehabilitation areas will be assessed periodically post seeding. The adopted criteria provide a simple and effective checklist which enables objective testing of rehabilitation success and will continue to be utilised following the completion of mining operations.

FIGURES



LEGEND

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- Bloomfield Project Area
- Abel Mine Project Area
- Bloomfield Mining Lease
- Blast Monitor
- Dust Monitor
- High Volume Air Sampler
- Noise Monitor
- Peizometers
- Water Monitoring

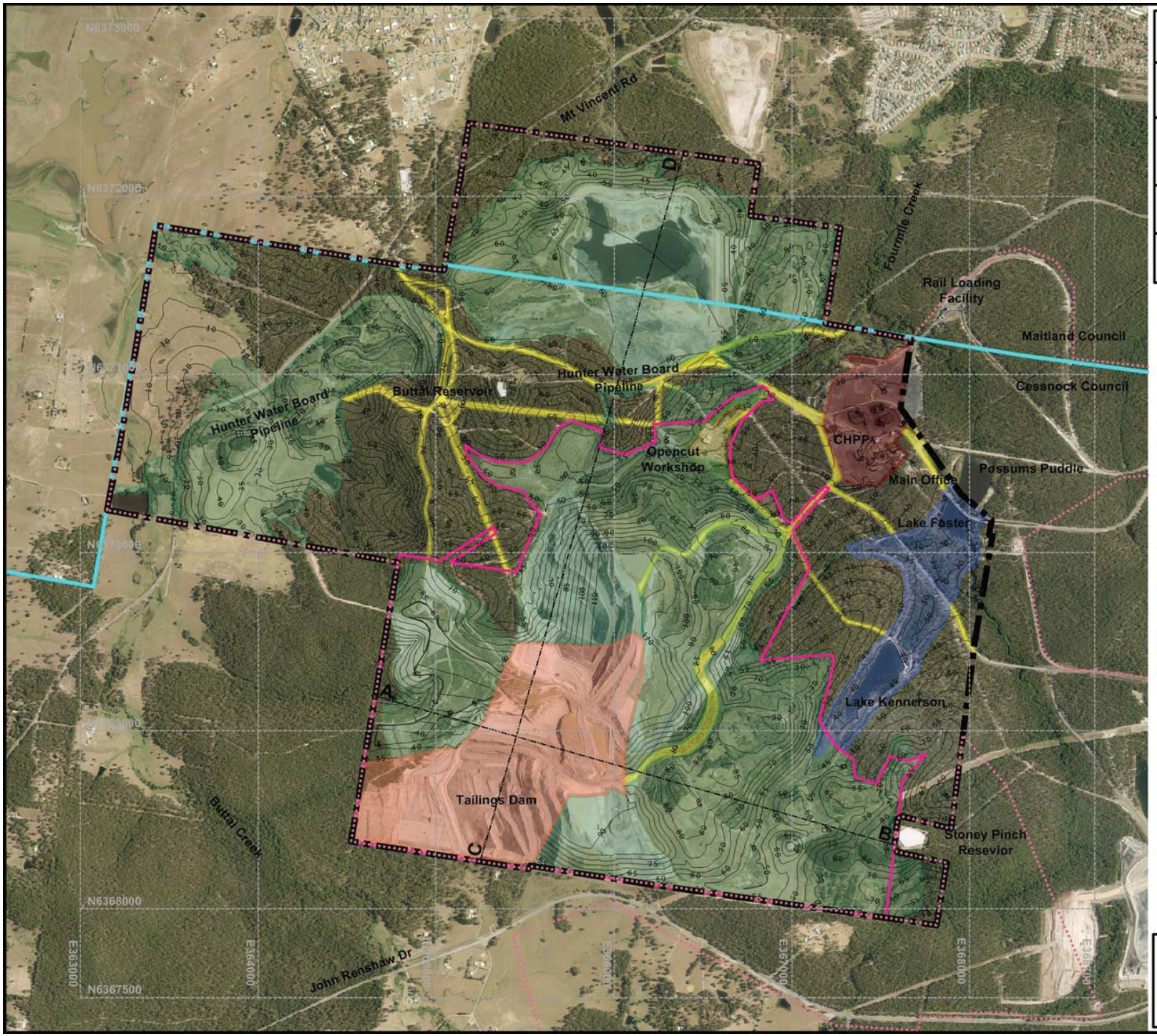
THE Bloomfield GROUP

Bloomfield Colliery

Final Void Management Plan

Figure 1 Bloomfield Colliery Project Area

Scale: 1:33,333	Date: January 2016 Photo: January 2016	Drawing: A3



Bloomfield Collieries Pty Ltd

Final Void Management Plan

Figure 3 - Final Rehabilitation and Post-mining Landuse

Scale	Date	Datum
1:20,000	30/03/2012	MGA

Map Prepared by Greg Lamb

Legend

- CCL 761 / ML-----
- 07-0087 Approval Area (Mod 1)
- 05-0136 Able Coal Project
- Council Boundary
- Surface Contours 5 m
- Sections
- CHPP Domain Area
- Tailings Dam Domain Area
- Water System Domain Area
- Infrastructure Domain Area
- Open Cut Workshop Domain Area
- Rehabilitation Domain Area
- Orthophotomap - Feb 2011

Source:
Mining Operation Plan
2012 - 2016

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