WAMBO COAL PTY LIMITED

SOUTH BATES EXTENSION UNDERGROUND MINE

EXTRACTION PLAN
LONGWALLS 17 TO 20

APPENDIX G
COAL RESOURCE RECOVERY PLAN

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WAMBO COAL PTY LIMITED
SOUTH BATES EXTENSION UNDERGROUND MINE

COAL RESOURCE RECOVERY PLAN
LONGWALLS 17 - 20

PREPARED BY
WAMBO COAL PTY LIMITED

FEBRUARY 2019
Project No. WAM-09-15
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DOCUMENT CONTROL

Document No.	CRRP LW17-20
Title	Coal Resource Recovery Plan for South Bates Extension Underground Mine Longwalls 17 to 20
General Description	A plan demonstrating the effective recovery of the available resource from the mining of Longwalls 17 to 20 at the South Bates Extension Underground Mine
Key Support Documents	Wambo Coal Extraction Plan for South Bates Extension Underground Mine Longwalls 17 to 20

Revisions

Rev No	Date	Description	By	Checked
A	April 2018	Final for Submission	WCPL and Resource Strategies	M. Berry
B	February 2019	Change to Longwall Layout	WCPL and Resource Strategies	M. Berry

The nominated Coordinator for this document is	Technical Services Manager

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1 INTRODUCTION

The Wambo Coal Mine is an open cut and underground coal mining operation located approximately 15 kilometres (km) west of Singleton, near the village of Warkworth, New South Wales (NSW) (**Figure 1**). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

The South Bates Extension Underground Mine is a component of the approved Wambo Coal Mine. The South Bates Extension Underground Mine ~~is scheduled to~~ commenced in Longwall 17 in December 2018 and involves extraction of coal by longwall mining methods from the Whybrow Seam within Coal Lease (CL) 397, Mining Lease (ML) 1594 and ML 1572 (**Figure 2**).

The potential environmental impacts of the existing Wambo Coal Mine were assessed in the *Wambo Development Project Environmental Impact Statement* (the Wambo Development Project EIS) (WCPL, 2003). Development Consent DA 305-7-2003 for the Wambo Coal Mine was granted on 4 February 2004 by the then NSW Minister for Urban Affairs and Planning under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

An application to modify the Development Consent (DA 305-7-2003 MOD 17) to allow the development of the South Bates Extension Underground Mine (Longwalls 17 to 25) in the Whybrow Seam was approved in December 2017. The application was accompanied by the *South Bates Extension Modification Environmental Assessment* (WCPL, 2017).

1.1 PURPOSE AND SCOPE

Purpose: This Coal Resource Recovery Plan (CRRP) for Longwalls 17 to 20 has been prepared to demonstrate the effective recovery of the available resource at the South Bates Extension Underground Mine.

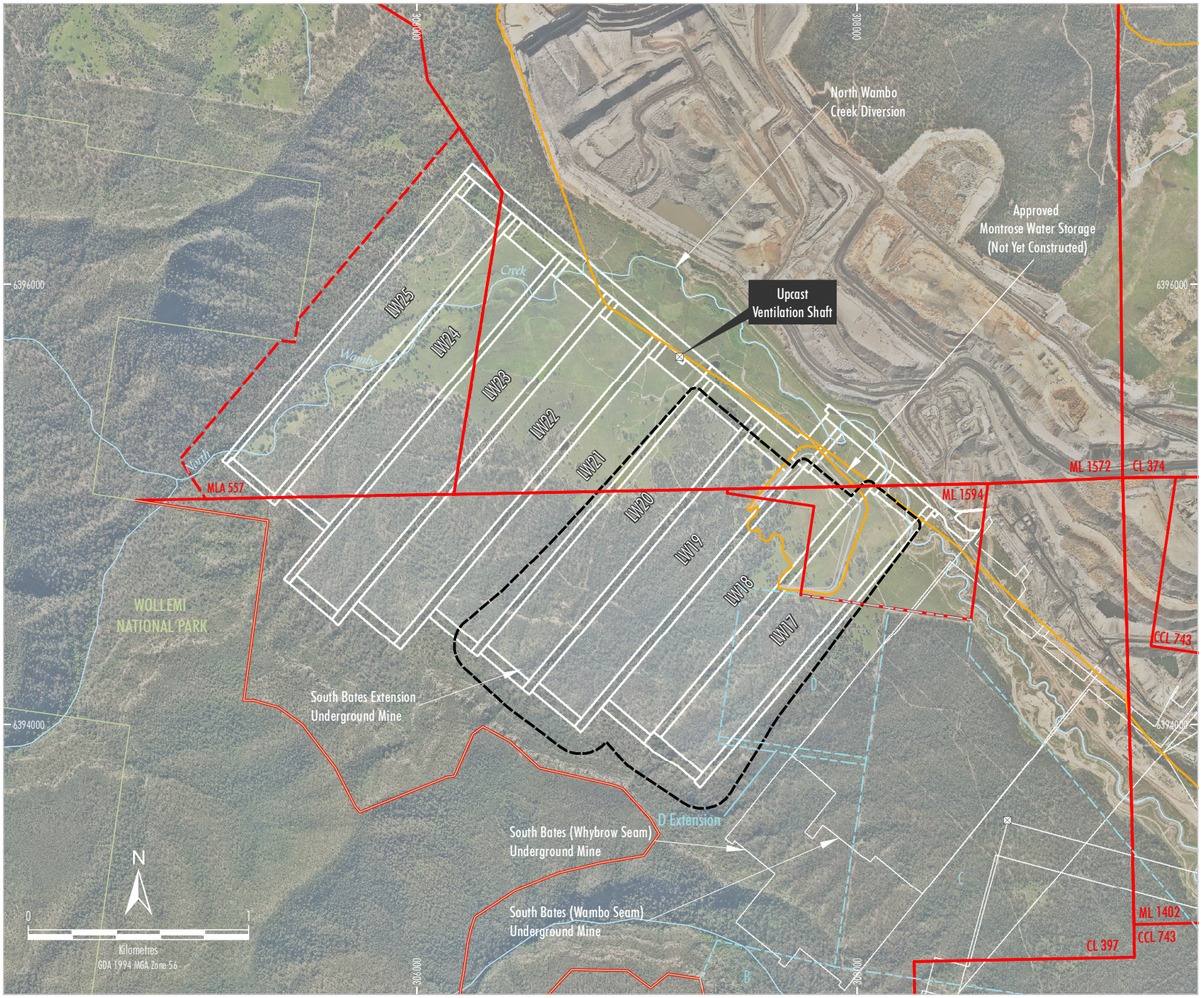
Scope: This CRRP includes Longwalls 17 to 20 of the South Bates Extension Underground Mine.

This CRRP has been prepared in accordance with Condition 22C(g) of Schedule 4 of the Development Consent (DA 305-7-2003) as a component of the South Bates Extension Underground Mine Longwalls 17 to 20 Extraction Plan. Condition 22C(g) of Schedule 4 of the Development Consent (DA 305-7-2003) requires:

> *22C. The Applicant must prepare and implement an Extraction Plan for the second workings within each seam to be mined to the satisfaction of the Secretary. Each Extraction Plan must:*
>
> *...*
>
> *(g) include the following to the satisfaction of the DRG:*
>
> - *a coal resource recovery plan that demonstrates effective recovery of the available resource;*

Plans 1 to 7 as described in the Draft *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining* (Version 5) (Department of Planning and Environment and NSW Trade & Investment – Division of Resources and Energy [DRE], 2015) are provided in **Attachment 1**. **Plan 1**, **Plan 2** and **Plan 7** (**Attachment 1**) present the approved mine plan, Longwalls 17 to 20 Application Area and surface features overlying Longwalls 17 to 20. **Plan 5** presents the current WCPL mining tenements and details land ownership.

This CRRP forms part of WCPL's Environmental Management System for the Wambo Coal Mine. The relationship of this CRRP to the Wambo Coal Mine Environmental Management System is described in Section 1.2 of the Extraction Plan.



LEGEND

- Mining and Coal Lease Boundary
- Mining Lease Application Boundary
- National Park Boundary
- Existing/Approved Surface Development Area
- Approved Underground Development
- Ventilation Shaft
- Remnant Woodland Enhancement Program (RWEP) Area
- Extraction Plan Application Area

Source: NSW Department of Industry (2017); WCPL (2019)
Orthophoto: WCPL (May 2017)

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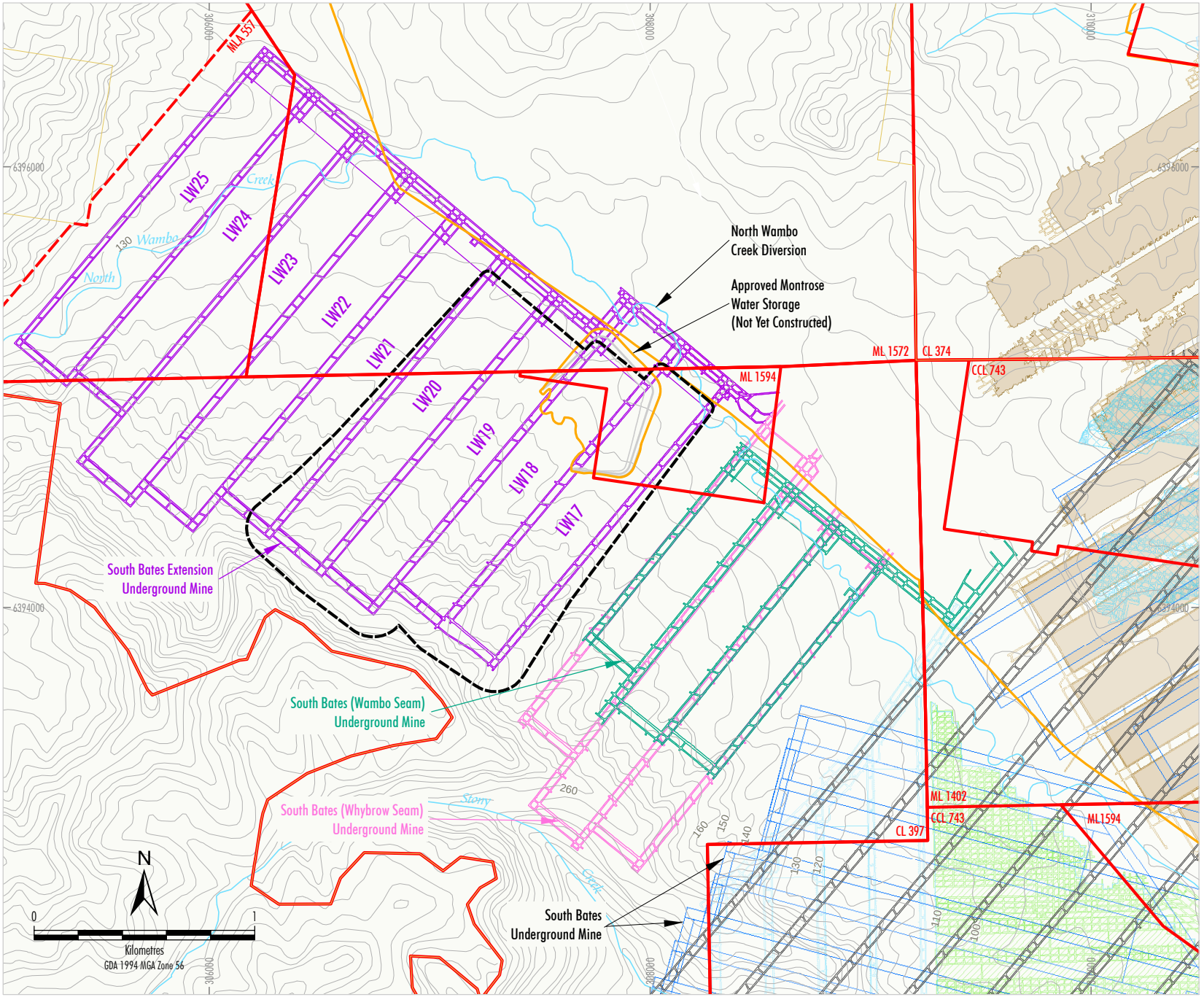
WAMBO COAL MINE

Aerial Photograph of Longwalls 17 to 20

Figure 1

WAM-09-15_SBX_EP_LW17-20_CRRP_202C



LEGEND

- WCPL Owned Land
- Mining and Coal Lease Boundary
- Mining Lease Application Boundary
- Existing/Approved Surface Development Area
- South Bates Extension Underground Mine
- Extraction Plan Application Area
- Existing Homestead Mine Workings in Whybrow Seam
- Existing Wollemi and Ridge Workings in Whybrow Seam
- Existing United Mine Workings in Woodlands Hill/Arrowfield Seam
- Existing North Wambo Underground Workings in Wambo Seam
- Existing South Bates Underground Mine Workings in Whybrow Seam
- Existing/Approved South Bates Underground Mine Workings in Wambo Seam
- Approved Arrowfield and Woodlands Hill Seam Workings

Source: NSW Department of Lands (July 2017); WCPL (2019)

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WAMBO COAL MINE

Longwalls 17 to 20 Layout

Figure 2

WAM-09-15_SBX_EP_LW17-20_CRRP_201E

2 RESOURCE DESCRIPTION

2.1 SITE GEOLOGY OVERVIEW

The Wambo Coal Mine is situated within the Hunter Coalfield subdivision of the Sydney Basin, which forms the southern part of the Sydney-Gunnedah-Bowen Basin (WCPL, 2003). The coal-bearing rocks of the Sydney Basin are Permian in age and are typically associated with low-lying gentle topography (WCPL, 2003). The overlying rocks of Triassic age cover large parts of the Sydney Basin and tend to form prominent escarpments where they outcrop (WCPL, 2003).

Mining activities at the Wambo Coal Mine include both open cut and underground mining of several coal seams from the Wittingham Coal Measures, which combine with the Newcastle Coal Measures to form the Singleton Supergroup (**Figure 3**). A summary of the coal measure stratigraphy underlying the Wambo Coal Mine area is provided in **Figure 3**.

Wittingham Coal Measures are divided into the Jerrys Plains Subgroup, Vane Subgroup, Denman Formation and Archerfield Sandstone (WCPL, 2003). The Jerrys Plains Subgroup contains eight formations with 15 named coal seams (WCPL, 2003). The Jerrys Plains Subgroup is up to 800 metres (m) thick and generally consists of relatively coarse clastic sediments (Department of Mineral Resources, 1993). The sedimentary rock layers above and between coal seams are typically lithic sandstone, siltstone and conglomerate, while minor carbonaceous claystone and tuff occurs throughout the sequence (WCPL, 2003).

Coal seams previously, currently and approved to be mined at the Wambo Coal Mine include (**Figure 3**):

- Whybrow Seam;
- Redbank Creek Seam;
- Wambo Seam;
- Whynot Seam;
- Arrowfield Seam; and
- Woodlands Hill Seam.

These seams dip gently to the south-west at approximately 2 to 3 degrees, with minor local variations due to varying thicknesses of inter-seam sediments and fault zones (WCPL, 2003). Faulting usually trends north or north-east to south-west with normal throws of up to 10 m, with some low angle thrusts (i.e. reverse faults) of variable throw (MineConsult, 2001).

The South Bates Extension Underground Mine mines the Whybrow Seam, which produces a low ash thermal coal. Run-of-mine (ROM) coal will be crushed and washed at the Wambo Coal Mine Coal Handling and Preparation Plant. Product coal from the South Bates Extension Underground Mine will be considered suitable for export and domestic markets.

SUPERGROUP	GROUP	SUBGROUP	FORMATION	SEAM
SINGLETON SUPERGROUP	NARRABEEN GROUP		WIDDEN BROOK CONGLOMERATE	
	NEWCASTLE COAL MEASURES [1]	GLEN GALLIC SUBGROUP	Greigs Creek Coal	
			Redmanvale Creek Formation	
			Dights Creek Coal	
		DOYLES CREEK SUBGROUP	Waterfall Gully Formation	
			Pinegrove Formation	
		HORSESHOE CREEK SUBGROUP	Lucernia Coal	
			Strathmore Formation	
			Alcheringa Coal	
			Clifford Formation	
		APPLETREE FLAT SUBGROUP	Charlton Formation	
			Abbey Green Coal	
		WATTS SANDSTONE		
	WITTINGHAM COAL MEASURES	DENMAN FORMATION		
		JERRYS PLAINS SUBGROUP	Mount Leonard Formation	***Whybrow Seam*** [2]
			Althorpe Formation	
			Malabar Formation	***Redbank Creek Seam*** [2]
				Wambo Seam [2]
				Whynot Seam [2]
				Blakefield Seam
			Mount Ogilvie Formation	*Glen Munro Seam*
				Woodlands Hill Seam [2]
			Milbrodale Formation	
			Mount Thorley Formation	***Arrowfield Seam*** [2]
				Bowfield Seam [3]
				Warkworth Seam [3]
			Fairford Formation	
			Burnamwood Formation	*Mount Arthur Seam* [3]
				Piercefield Seam [3]
				Vaux Seam [3]
				Broonie Seam
				Bayswater Seam
		ARCHERFIELD SANDSTONE		
		VANE SUBGROUP	Bulga Formation	
			Foybrook Formation	
			Saltwater Creek Formation	

[1] Previously known as the Wollombi Coal Measures.
[2] Coal reserves currently approved to be mined at the Wambo Coal Mine.
[3] Coal reserves proposed to be mined by the United Wambo Open Cut Coal Mine Project (SSD 7142).

WAM-09-15_SBX.EP_LW17-20_CRRP_001A

After: DMR (1993)

Peabody

WAMBO COAL MINE

Stratigraphy of the Wambo Coal Mine Area

Figure 3

2.2 OVERBURDEN LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS

The overburden of the Longwalls 17 to 20 Application Area consists predominately of interbedded sandstone and siltstone layers, with minor claystone, mudstone, shale, tuffaceous and coal layers (Mine Subsidence Engineering Consultants [MSEC], 2018).

There are no massive sandstone or conglomerate units within the overburden. The largest is a 17 m thick sandstone layer located approximately 30 m above the Whybrow Seam. Otherwise, the thicknesses of the formations within the overburden are typically less than 10 m. Other boreholes in the vicinity of the mining area indicate the presence of other larger sandstone units with thicknesses up to 20 m in the lower part of the overburden (MSEC, 2018).

No adjustment factors have been applied in the subsidence prediction model for any massive strata units or for softer floor conditions, as the longwalls are supercritical in width and therefore are predicted to achieve the maximum subsidence for single-seam mining conditions (MSEC, 2018; 2019).

Estimates of the range of material strength and stiffness properties present in the overburden materials are summarised in **Table 1**.

Table 1
Strength Property Estimates for Lithology in the Vicinity of the South Bates Extension Underground Mine

Unit Lithology	Unit Thickness Range (m)	UCS Range (MPa)	Laboratory Elastic Modulus* Range (GPa)	Poisson's Ratio
Roof Material above Whybrow Seam	10 – 13	24 – 43 [36 mean]	11.5 – 12.2	0.155

* Young's Modulus (E) derived from laboratory and sonic UCS data, E = 300 x UCS (units are in GPa).

Note: UCS = unconfined compressive strength.
MPa = megapascal.
GPa = gigapascal.

2.3 LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS (ROOF AND FLOOR STRATA)

The overburden of the Whybrow Seam predominately comprises of interbedded sandstone and siltstone layers, with minor claystone, mudstone, shale, tuffaceous and coal layers throughout the overburden (MSEC, 2018). Longwalls 17 to 20 will mine the Whybrow Seam.

Historical workings are discussed in **Section 2.6**.

Estimates of the range of material strength and stiffness properties present in the roof of the mine workings coal seams are summarised in **Table 1**.

2.4 EXISTENCE AND CHARACTERISTICS OF GEOLOGICAL STRUCTURE

Regional geological structure in the Longwalls 17 to 20 Application Area consists of several faults. The largest structure in the area is the Redmanvale Fault which has a throw greater than 20 m and is located to the south-west of the longwalls.

The first longwall in the series (i.e. Longwall 17) is located at a distance of 985 m from the interpreted location of the Redmanvale Fault at seam level. The successive longwalls in the series (i.e. Longwalls 18 to 20) progressively approach the fault, with Longwall 20 located closest to the fault at a distance of 590 m at seam level. The progressive mining towards the fault will allow the surface movements in the vicinity of the fault to be continually monitored and reviewed (MSEC, 2018).

There is a series of north to south trending faults through the north-eastern ends of Longwalls 17 to 20 and north-east to south-west trending faults through the south-western end of Longwall 17. These minor faults have throws up to approximately 5 m (MSEC, 2018). A series of normal faults have been identified during inseam drilling from MG17 16CT. A series of normal fault structures in a north-east direction with a throw of 6-11 m and a minor 1.5 m in MG19 has been identified from the inbye side of MG18 CT16 in LW19. A minor normal 2 m fault trending in an east west has also been identified in MG18 between CT15 & 16.

2.5 STABILITY OF UNDERGROUND WORKINGS

The design intent of the workings and method of extraction is such that the first workings provide long-term stable access to the longwall blocks or pillar panels, and the second workings are mined such that the overburden collapses (i.e. "goafs") in a controlled manner as the coal is removed. All of the subsidence movements that occur at the surface are generally the result of a new equilibrium being achieved (i.e. chain pillars and overlying strata compress elastically and overburden caves and eventually ‘re-supports’ itself on bulked and broken ground).

DRG indicated it was satisfied that WCPL would achieve the required outcomes of the first workings condition of the Development Consent (DA 305-7-2003, Condition 22E of Schedule 4) for Longwalls 17 to 20 on 27 March 2018, subject to the following condition:

> *The Mine Manager must undertake adequate monitoring of the stability of first workings in the subject area and to implement appropriate ground support of the roadways in accordance with the results of the said monitoring, to ensure compliance with the outcome requirements of Schedule 4, Condition 22E of the Development Consent for DA 305-7-2003 (MOD12).*

On 4 September 2018, WCPL requested that DRG consider minor changes to the first workings relating to Longwall 17. DRG indicated that it was satisfied that WCPL could achieve the outcomes of the first workings condition of the Development Consent (DA 305-7-2003, Condition 22E of Schedule 4) with respect to the variation to the previously endorsed plan.

As a result of the geological structures identified in the vicinity of Longwalls 18 to 20 (as described in **Section 2.4**), additional changes to the first workings are required (as shown on Figures 1 and 2). WCPL will seek approval for these changes to the first workings from the NSW Resources Regulator.

The longwall blocks are also designed with barrier pillars at the ends of the blocks to protect the adjacent first workings pillars and remnant pillars left between the augered areas from any abutment loading. Adequate set-back from highwall crests is also provided.

The chain pillars are designed to provide serviceable gate roads for access and ventilation and may yield or crush out after mining is completed.

2.6 HISTORICAL MINING

There are no other currently existing longwalls immediately above or below Longwalls 17 to 20. The closest extracted longwalls are in the adjacent South Bates (Whybrow and Wambo Seam) Underground Mine, which is to the south-east of Longwall 17. Extraction in the Whybrow Seam (Longwalls 11 to 13) was completed in June 2017. Extraction in the Wambo Seam (Longwalls 14 to 16) was completed in November 2018. ~~Extraction of Longwall 14 in the Wambo Seam was completed in January 2018. Extraction of Longwall 15 is scheduled for completion in May 2018 and Longwall 16 is scheduled for completion in September 2018.~~

3 RESOURCE RECOVERY

3.1 MINING GEOMETRY

The currently approved orientation and footprint of the South Bates Extension Underground Mine was assessed as part of the *South Bates Extension Modification Environmental Assessment* (WCPL, 2017).

Longwalls 17 to 20 are the first four of nine longwalls at the South Bates Extension Underground Mine.

The layout of Longwalls 17 to 20 is presented in **Plan 1** (**Attachment 1**), and key panel dimensions for Longwalls 17 to 20 are presented in **Table 2**.

Table 2
Key Longwall Panel Dimensions

Dimension	Longwall 17	Longwall 18	Longwall 19	Longwall 20
Gate Road Width (m)	5.4			
Gate Road Height (m)	2.5 to 2.8			
Maingate Chain Pillar Width (m)	31	30	31	26
Tailgate Chain Pillar Width (m)	25	31	30	31
Longwall Void Width (m)[1]	261	261	261	261
Longwall Void Length (m)[2]	1,485	1,388	1,465	1,485
Extraction Height (m)	2.8 to 3.0	2.8 to 3.0	2.8	2.8

[1] Including gate roads.
[2] Including installation headings.

3.2 COVER DEPTH

The depth of cover above Longwalls 17 to 20 ranges from approximately 60 m to 100 m above the finishing (north-eastern) ends of the longwalls, up to 200 m to 330 m above the commencing (south-western) ends of the longwalls.

The cover depth increases to the south-west, consistent with the seam dip and topography.

3.3 MINING METHOD

Longwalls 17 to 20 will be extracted using retreating longwall mining methods for secondary extraction of panels with approximately 261 m void width (extraction face of approximately 250 m). Construction of development main headings, maingates and tailgates will be undertaken using continuous miners.

3.4 MINING SCHEDULE

WCPL operates its mines seven days per week, 24 hours per day on a rotating shift basis. The proposed sequence of mining for Longwalls 17 to 20 at the South Bates Extension Underground Mine and anticipated/actual start and completion dates are summarised in **Table 3**.

Table 3
Proposed Mining Schedule (Secondary Extraction)

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
Longwall 17	December 2018	6 months	May 2019
Longwall 18	July 2019	5 months	November 2019
Longwall 19	December 2019	5 months	April 2020
Longwall 20	May 2020	5 months	September 2020

3.5 FUTURE MINING

Longwalls 21 to 25 at the approved South Bates Extension Underground Mine will be the subject of a future Extraction Plan.

In addition to the approved South Bates Extension Underground Mine, the Development Consent (DA 305-7-2003) provides consent for underground mining by longwall methods in the Arrowfield and Woodlands Hill Seams (**Figure 1**). The future workings in the Arrowfield and Woodlands Hill Seams are located to the south-east of Longwalls 17 to 20 (**Figures 1 and 2**). The approved future underground longwall workings are described in the Wambo Development Project EIS (WCPL, 2003) and *South Wambo Underground Mine Modification Environmental Assessment* (WCPL, 2016) and will be the subject of a future Extraction Plan.

Further to underground mining activities, the Development Consent (DA 305-7-2003) provides consent for open cut mining. The seams approved for open cut mining include the Whybrow, Redbank Creek, Wambo and Whynot Seams.

An application to modify the Development Consent (DA 305-7-2003 MOD 16) was lodged in November 2016 to support the proposed United Wambo Open Cut Coal Mine Project. The Modification would allow integrated open cut mining at the United Coal Mine and Wambo Coal Mine.

Mining of the Whybrow Seam by open cut mining methods in the South Bates Extension Underground Mine area is not viable due to increasing depth of cover and the presence of Remnant Woodland Enhancement Program (RWEP) areas.

3.6 RESOURCE RECOVERY

Resource estimates and proposed recovery for Longwalls 17 to 20 are summarised in **Table 4**. The mining layout for Longwalls 17 to 20 maximises resource recovery, which is estimated to be approximately 80% ~~85%~~.

Table 4
Estimated Resource Recovery from Longwalls 17 to 20

Aspect	Million Tonnes
Available Resource	8.47
Development ROM Coal	0.62
Longwall ROM Coal	6.13
Total ROM Coal Recovered	**6.75**

The extent of Longwalls 17 to 20 is constrained by the extent of the approved South Bates (Whybrow Seam) Underground Mine to the south-east, faults to the north-west of the longwalls (Section 2.4), the extent of the approved Montrose West open cut pit and geological structures to the north-east and the Wollemi National Park escarpment to the south-west.

3.7 MINE PLAN JUSTIFICATION

The sequence of underground mining at the Wambo Coal Mine has been adopted to minimise the potential for sterilisation of coal reserves. The **Approved Plan** (**Attachment 1**) presents the Longwalls 17 to 20 layout which has been developed in consideration of detailed exploration drilling and key environmental studies, as described in the *South Bates Extension Modification Environmental Assessment* (WCPL, 2017).

The monitoring of subsidence impacts associated with the extraction of Longwalls 17 to 20 is described in the Subsidence Monitoring Program for Longwalls 17 to 20 (Appendix H of the Extraction Plan) and the relevant management plans summarised in Section 3 of the Extraction Plan.

4 REFERENCES

Department of Mineral Resources (1993) *Hunter Coalfield Regional Geology 1:100 000 Sheet*. New South Wales.

Department of Planning and Environment and NSW Trade & Investment – Division of Resources and Energy (2015) *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining.* Version 5. Draft.

MineConsult (2001) *Wambo Strategic Mine Plan Vol 1*. Report prepared for Wambo Mining Corporation Ltd.

Mine Subsidence Engineering Consultants (2018) *South Bates Extension Subsidence Assessment – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan Application for the South Bates Extension WYLW17 to WYLW20.* Report prepared for Wambo Coal Pty Limited.

Mine Subsidence Engineering Consultants (2019) *South Bates Extension Subsidence Assessment – The Effects of the Modified Finishing Ends of Whybrow Longwalls 17 to 20 on the Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of an Application to Amend the Extraction Plan.* Report prepared for Wambo Coal Pty Limited.

Wambo Coal Pty Limited (2003) *Wambo Development Project Environmental Impact Statement.*

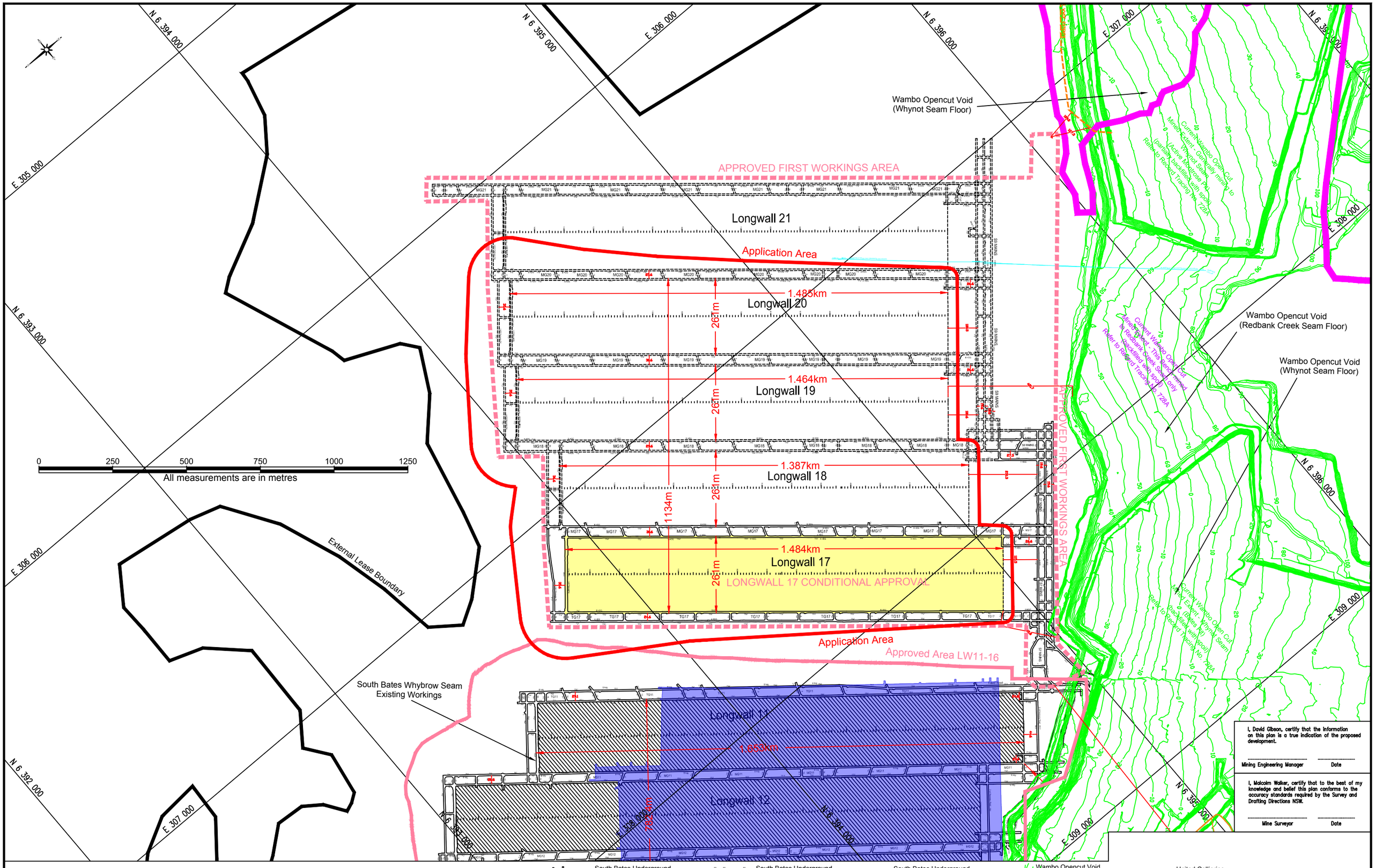
Wambo Coal Pty Limited (2016) *South Wambo Underground Mine Modification Environmental Assessment.*

Wambo Coal Pty Limited (2017) *South Bates Extension Modification Environmental Assessment.*

ATTACHMENT 1

LONGWALLS 17 TO 20
PLANS 1 TO 7

Plan 1 – Proposed and Existing Workings
Plan 2 – Surface Features
Plan 2a – Surface Features (Aerial Photo)
Plan 3 –Whybrow Seam Structure
Plan 4 – Existing and Proposed Wambo Seam Workings
Plan 5 – Mining Titles and Land Ownership
Plan 6 – Geological Sections (Boreholes)
Plan 7 – Proposed and Existing Subsidence Monitoring



I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager ..... Date .....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor ..... Date .....

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For LW17-LW20 Submission	MB,PJ
B	23/8/2018	MJW	Main Headings Stepped around Weak roof and faulted area	MB,DG
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG

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Prepared by NWU Survey Ph: 02 65 702318

South Bates Underground Mine (Whybrow Seam) Extraction Plan - Longwalls 17 to 20 (Revision B) Plan 1 - Proposed and Existing Workings

Drawing No.	Revision No.
2406	B_19/11/2018

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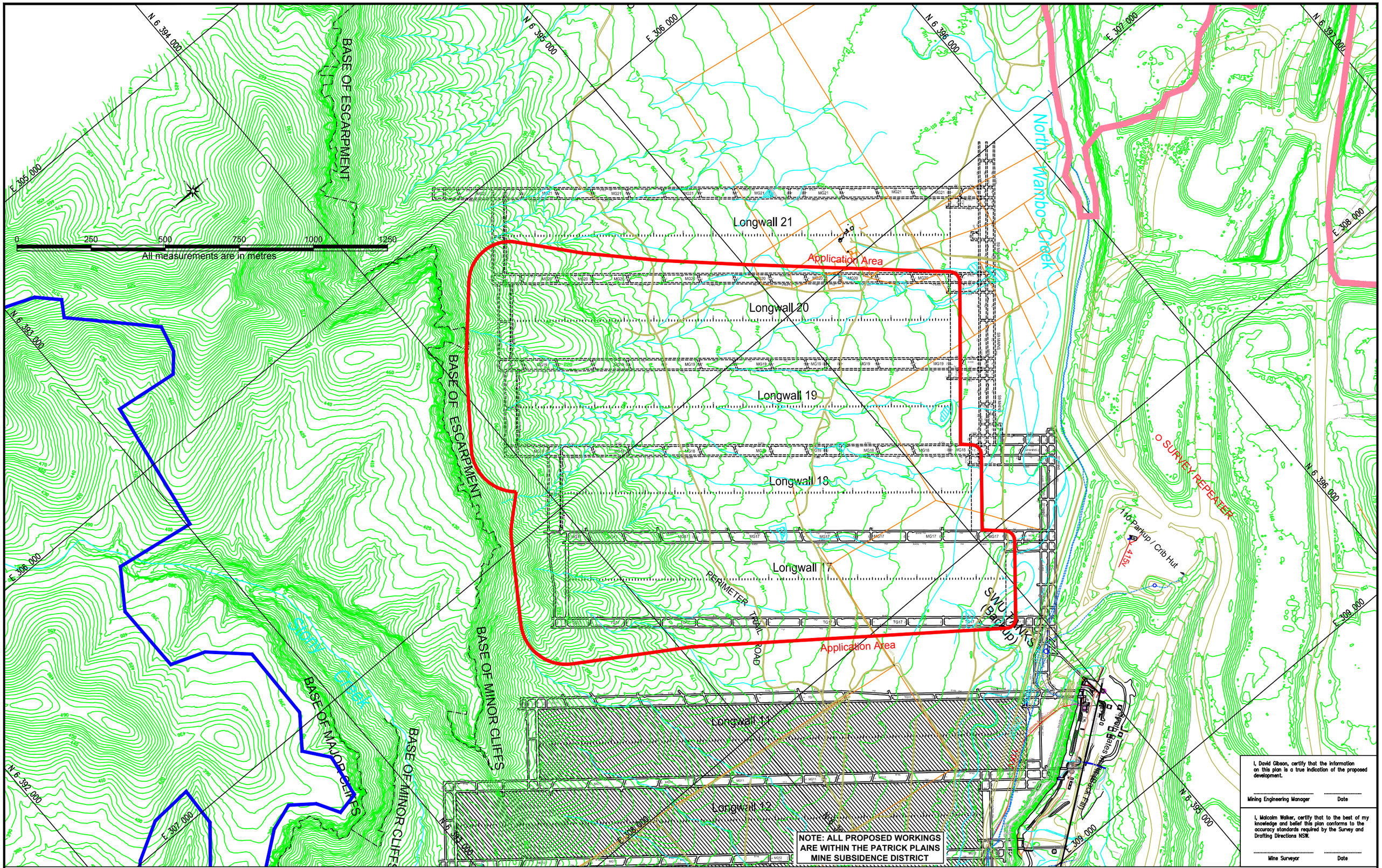

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Mining Engineering Manager ..... Date .....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor ..... Date .....

Current Open Cut Extraction Approval Area (MOP 2020)

Full Extraction Boundary Application Area

Patrick Plains Mine Subsidence District Western Extents

South Bates Underground Existing Workings

South Bates Underground Proposed Workings

85 Surface Contours

Water pipelines

Buildings

Tracks

Fences

11kV Buried Cables

Powerlines

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For submission LW17-LW20	MA,PJ					
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG					

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South Bates Underground Mine (Whybrow Seam) Extraction Plan - Longwalls 17 to 20 (Revision B) Plan 2 - Surface Features

Drawing No. 2407

Revision No. B_19/11/2018

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E 306 000
E 308 000
N 6 396 000
N 6 395 000
N 6 394 000
N 6 393 000

0 250 500 750 1000 1250
All measurements are in metres

Current Wambo Open Cut Mined Extent - Generally mining to Whynot Seam (Active Mooropse pit) (partially backfilled with spoil) Refer to Record Tracing No. 728A

Current Wambo Open Cut Mined Extent - This Bench mined to Redbank Creek Seam only (backfilled with spoil) Refer to Record Tracing No. 728A

Current Wambo Open Cut Mined Extent - Whynot Seam (Bates Pit) (backfilled with spoil) Refer to Record Tracing No. 728A

Application Area

Longwall 21
Longwall 20
Longwall 19
Longwall 18
Longwall 17
Longwall 16
Longwall 15
Longwall 14
Longwall 13
Longwall 12

Workup / Crib Hut
Portals
South Bates Pit
RESERVE
Major Cliffs

South Bates Whybrow Seam Underground Existing Workings
South Bates Whybrow Seam Underground Proposed Workings
South Bates Underground (Wambo Seam)
North Wambo Underground Workings (Wambo Seam)
Wollemi - Homestead Underground Workings (Whybrow Seam)

Full Extraction Boundary Application Area
Current Open Cut Extraction Approval Area
Wollemi National Park Reserve
Creeks
85 Surface Contours
30 Wambo Opencut Void Contours (Generally Whynot Seam Floor)

I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager ..... Date .....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor ..... Date .....

Rev.	Drawn	Description	Checked
A	MJW	For LW17 to LW20 Submission	MB,PJ
B	MJW	Revision B for LW18-20 approval	PJ,DG

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South Bates Underground Mine (Whybrow Seam)
Extraction Plan - Longwalls 17 to 20 (Revision B)
Plan 2a - Surface Features (Aerial Photo)

Date	Scale:	Drawn	Checked	Approved	Sheet Size
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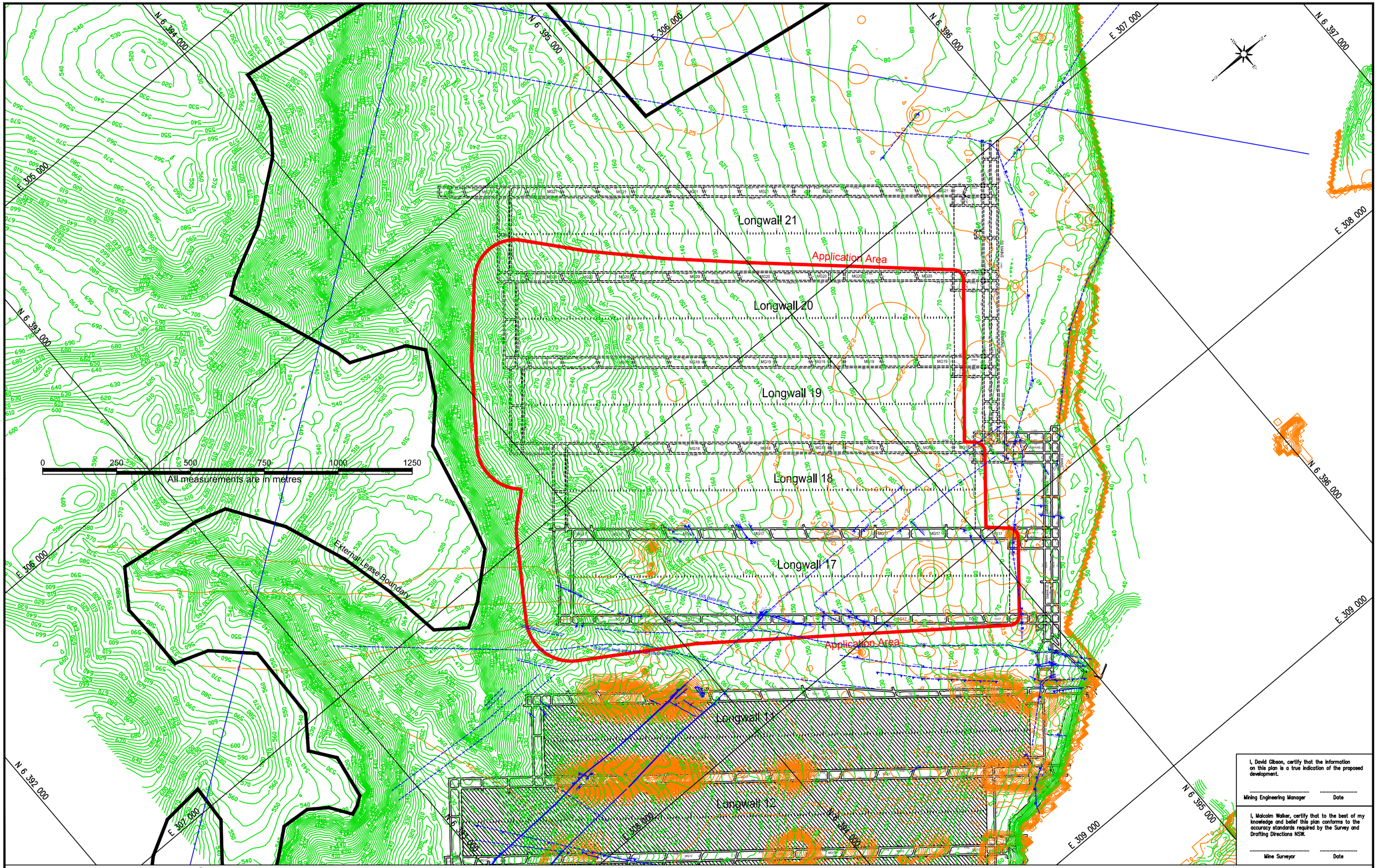
Drawing No. 2408
Revision No. B_19/11/2018



I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager ..... Date .....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor ..... Date .....

Full Extraction Boundary Application Area

South Bates Underground Existing Workings

South Bates Underground Proposed Workings

Whybrow Seam Faults

Whybrow Seam Dykes

220 Whybrow Seam Overburden Thickness Isopach

3.0 Whybrow Seam Thickness Isopach

TG11-14-01 Inseam drill holes

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For LW17 to LW20 submission	MB,PJ
B	19/11/2018	MJW	Revision B for LW18-20 approval	MB,DG

Peabody

WAMBO COAL PTY LIMITED
ABN 13 000 668 057

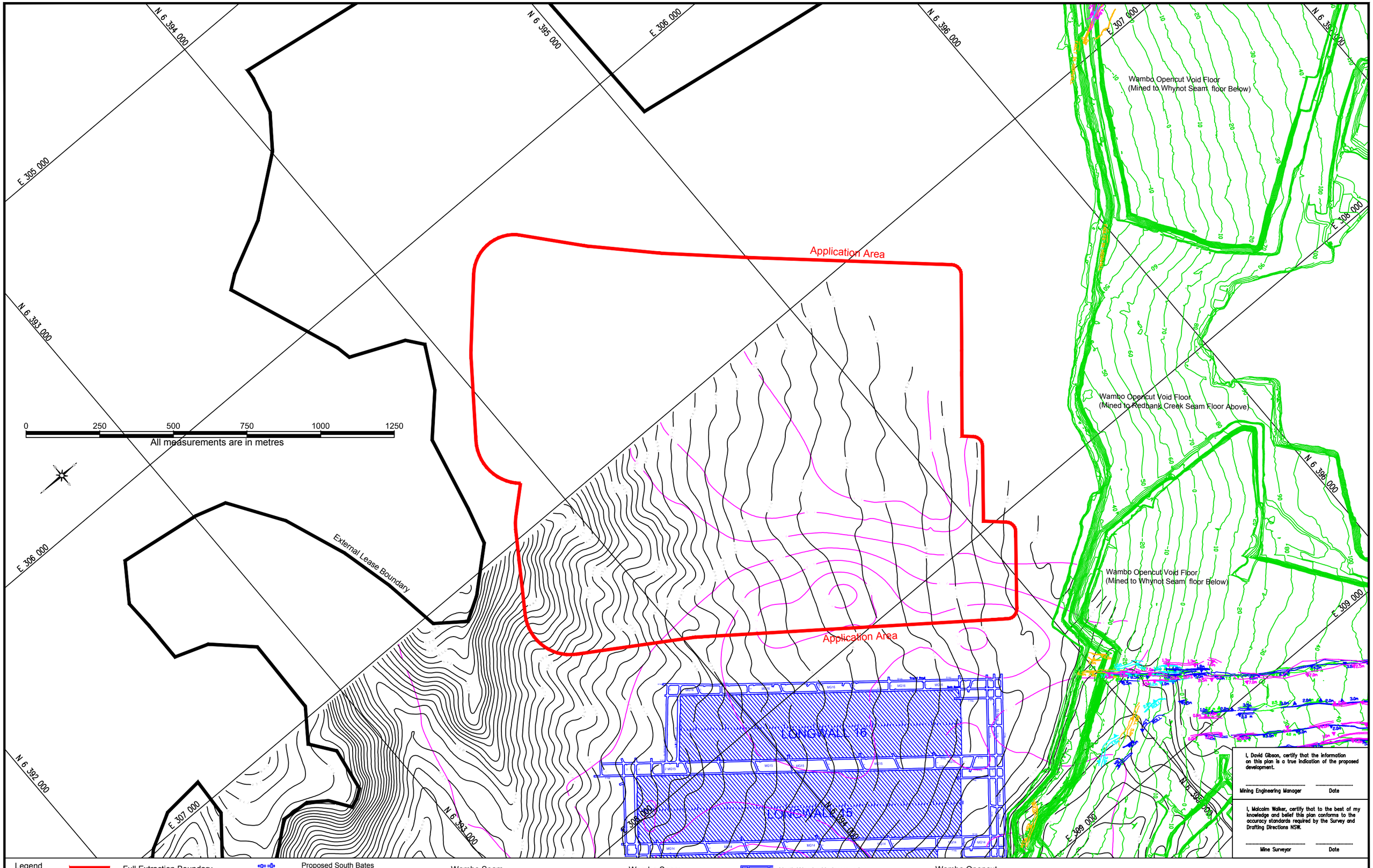
Jerry's Plains Rd, Warkworth
Via Singleton, NSW, 2330

Phone: 02 65 702200
Fax: 02 65 702290

Prepared by NWU Survey Ph: 02 65 702318

South Bates Underground Mine (Whybrow Seam) Extraction Plan - Longwalls 17 to 20 (Revision B) Plan 3 - Whybrow Seam Structure

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
2409	B_21/11/2018	31/3/2018	1: 4000	MJW	MAB, PJ	PJ	A0



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Mining Engineering Manager ..... Date .....

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Mine Surveyor ..... Date .....

Legend

- Full Extraction Boundary / Application Area
- Proposed South Bates Underground Wambo Seam Workings (MOD 15)
- —350— Wambo Seam Overburden Thickness Isopach
- — 3.2 — Wambo Seam Thickness Isopach
- North Wambo Underground Workings (Wambo Seam)
- —10— Wambo Opencut Void Contours (5m)

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For LW17 to LW20 submission	MB,PJ
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG

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South Bates Underground Mine (Whybrow Seam)
Extraction Plan - Longwalls 17 to 20 (Revision B)
Plan4 - Existing and Proposed Wambo Seam Workings

Drawing No. 2410

Revision No. B_19/11/2018

Date	Scale:	Drawn	Checked	Approved	Sheet Size
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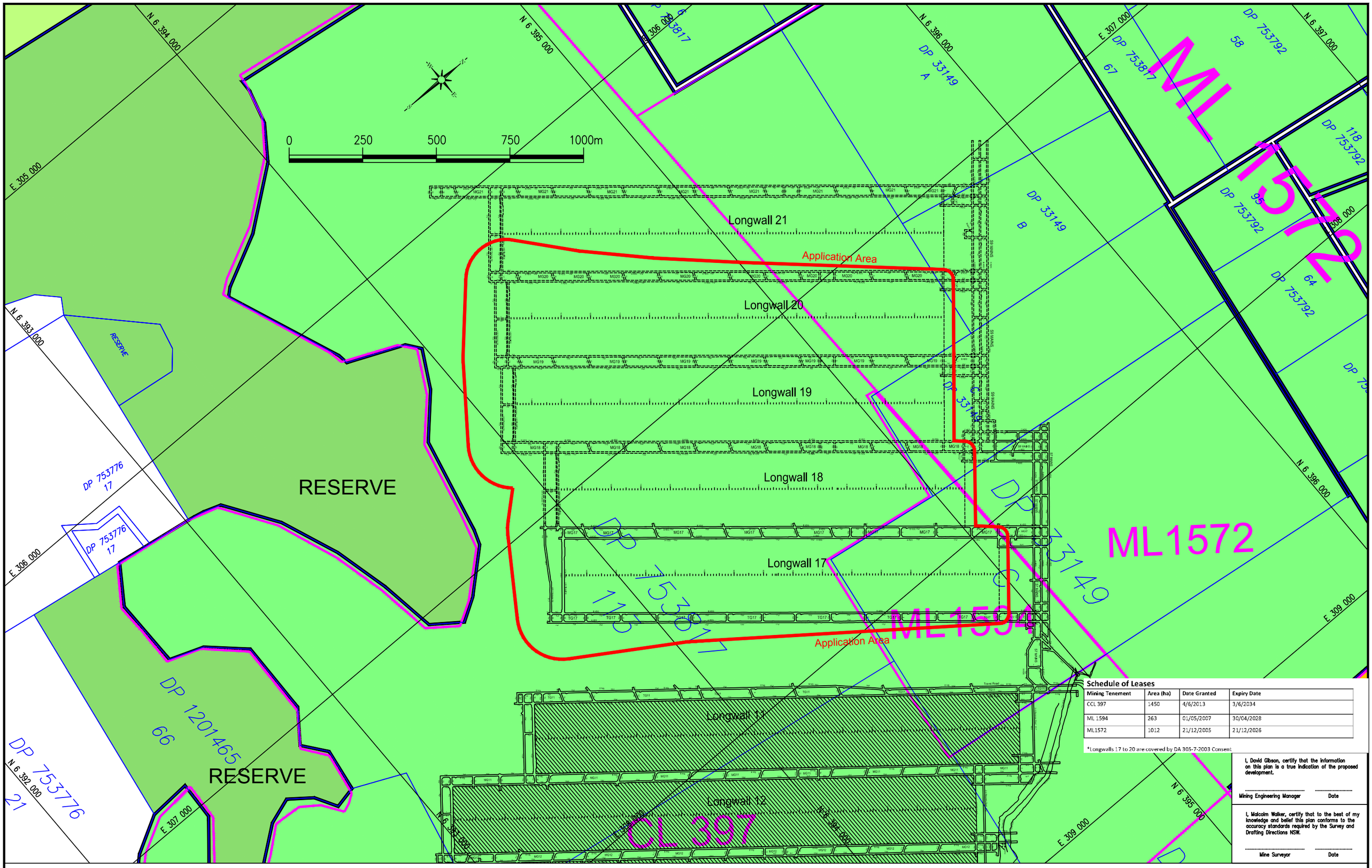

Schedule of Leases

Mining Tenement	Area (ha)	Date Granted	Expiry Date
CCL 397	1450	4/6/2013	3/6/2034
ML 1594	263	01/05/2007	30/04/2028
ML1572	1012	21/12/2005	21/12/2026

*Longwalls 17 to 20 are covered by DA 305-7-2003 Consent

I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager ..... Date .....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor ..... Date .....

Full Extraction Boundary Application Area

South Bates Whybrow Underground Existing Workings

South Bates Whybrow Underground Proposed Workings

DP 73823 Digital Cadastral Database (DCDB)

Reserve

Wambo Coal Pty. Ltd

Wambo Mining Lease

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For LW17 to LW20 submission	MB,PJ					
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG					

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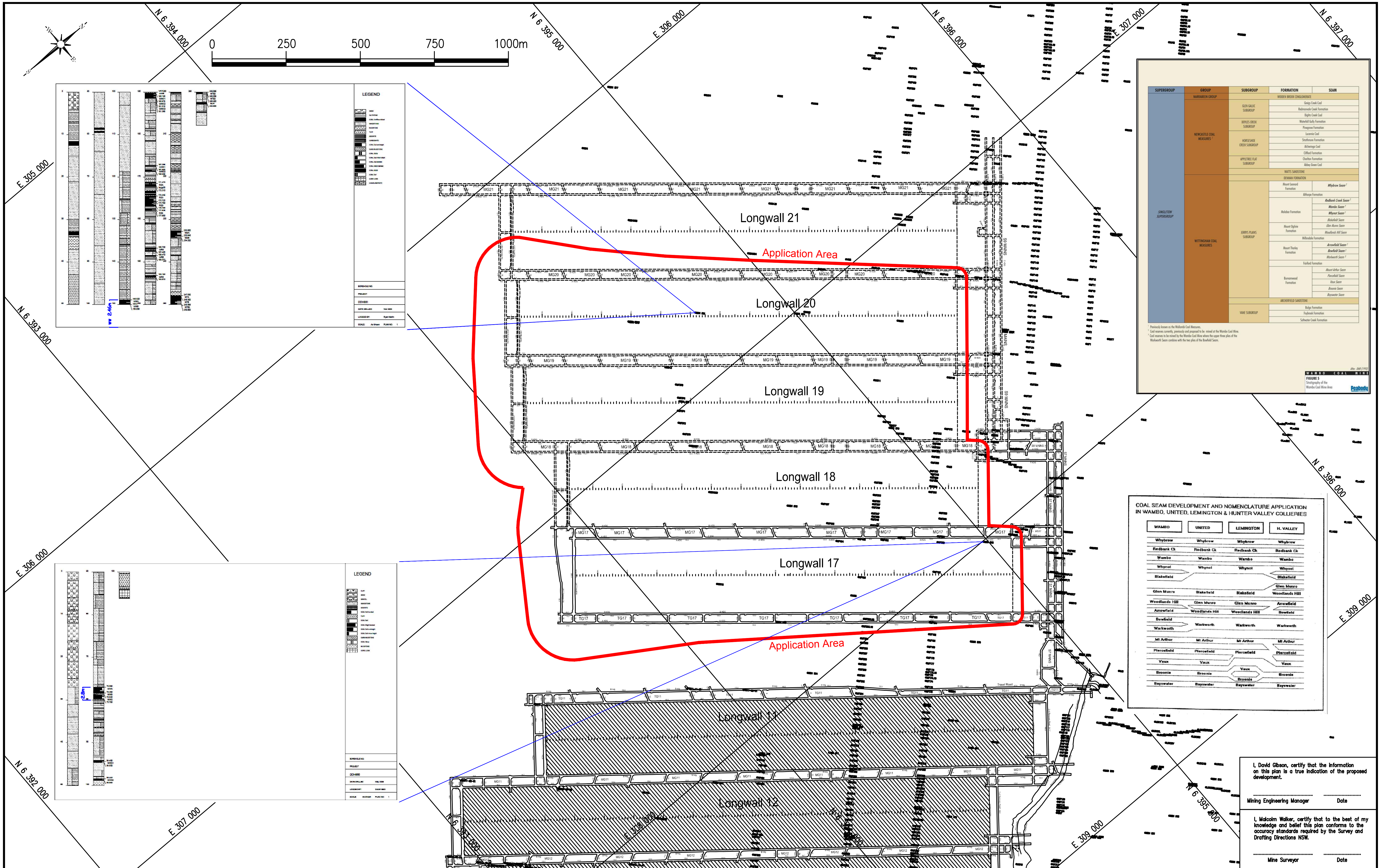
South Bates Underground Mine (Whybrow Seam)
Extraction Plan - Longwalls 17 to 20 (Revision B)
Plan 5 - Mining Titles and Land Ownership

Drawing No.	Revision No.
2411	B_19/11/2018

Date	Scale:	Drawn	Checked	Approved	Sheet Size
31/03/2018	1: 4000	MJW	PJ	DG	A0



I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager   Date

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor   Date

Full Extraction Boundary Application Area

South Bates Underground Existing Workings

South Bates Underground Proposed Workings

DDH864 ◉ Borehole

Whybrow Seam = WW   Redbank Creek Seam = RC   Wambo Seam = WMA   Whynot Seam = WTA

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
A	31/3/2018	MW	For LW17 to LW20 Submission	MB,PJ
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG

REV.	DATE	BY	DESCRIPTION	CHK.

Peabody

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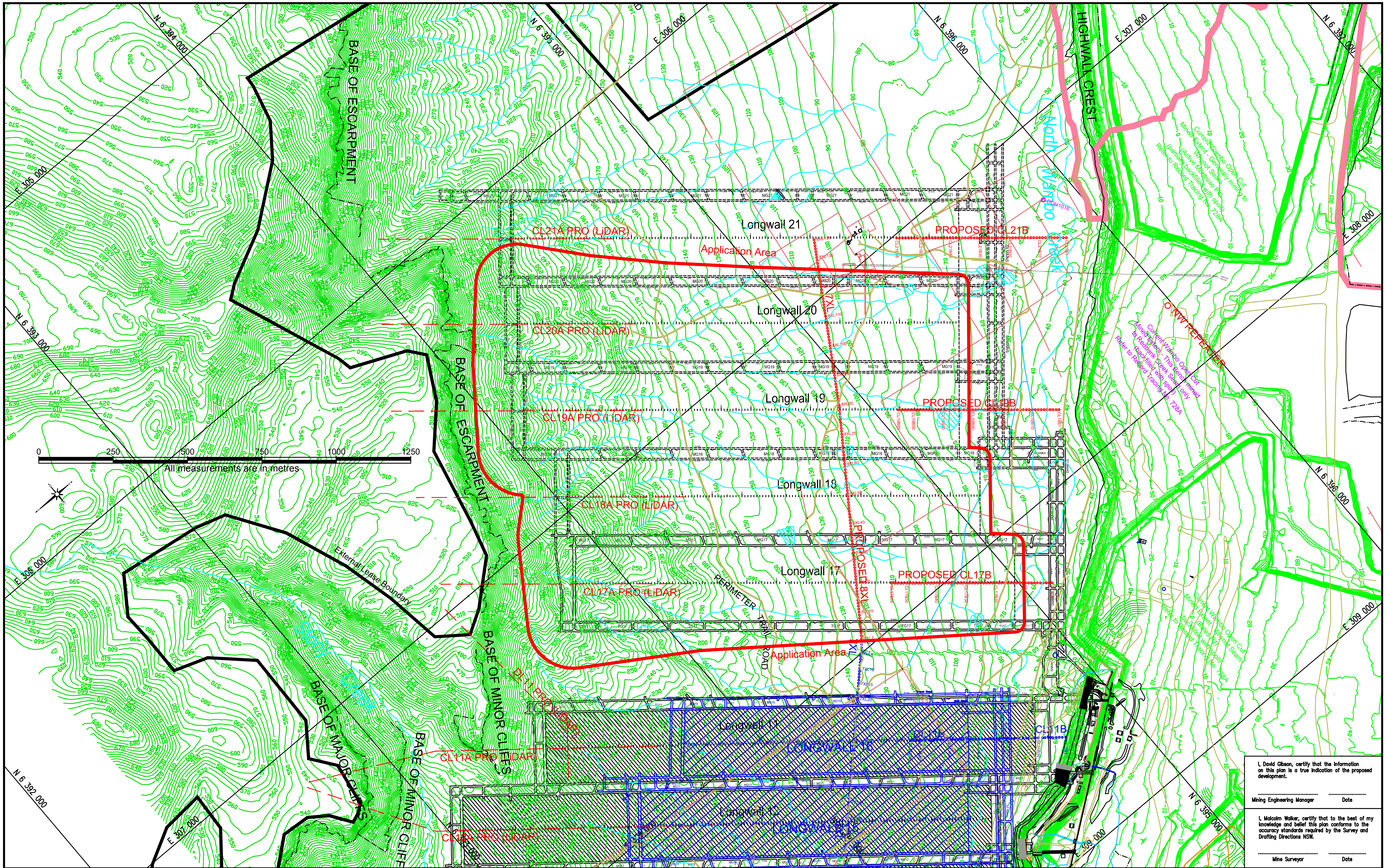
South Bates Underground Mine (Whybrow Seam)
Extraction Plan - Longwalls 17 to 20 (Revision B)
Plan 6 - Geological Sections (Boreholes)

Drawing No. 2412

Revision No. B_19/11/2018

Date	Scale:	Drawn	Checked	Approved	Sheet Size
31/03/2018	1:4000	MJW	PJ	DG	A0



I, David Gibson, certify that the information on this plan is a true indication of the proposed development.

Mining Engineering Manager .... Date ....

I, Malcolm Walker, certify that to the best of my knowledge and belief this plan conforms to the accuracy standards required by the Survey and Drafting Directions NSW.

Mine Surveyor .... Date ....

Legend

- Current Open Cut Extraction Approval Area
- Full Extraction Boundary Application Area
- South Bates Whybrow Underground Workings
- South Bates Whybrow Underground Proposed Workings
- Wollemi - Homestead Underground Workings (Whybrow Seam)
- South Bates Wambo Underground Workings
- 90 Depth of Cover Contours
- 30 40 Wambo Opencut Void 5m Contours (AHD) (Whybrow/Wambo Seam)
- Proposed Subsidence Monitoring LiDAR Profile Locations
- 1XL95 Proposed Subsidence Monitoring Marks for South Bates Underground
- 7XL95 Existing Subsidence Monitoring Marks (South Bates UG)

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.
A	31/03/2018	MJW	For LW17 to LW20 Submission	MB,PJ					
B	19/11/2018	MJW	Revision B for LW18-20 approval	PJ,DG					

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South Bates Underground Mine (Whybrow Seam)
Extraction Plan - Longwalls 17 to 20 (Revision B)
Plan 7 - Proposed and Existing Subsidence Monitoring

Date	Scale:	Drawn	Checked	Approved	Drawing No.	Revision No.	Sheet Size
31/03/2018	1:4000	MJW	PJ	DG	2413	B_19/11/2018	A0