



SECTION 3

Description of Approved Operations

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3 DESCRIPTION OF APPROVED OPERATIONS

This section presents a description of the previous and existing approved operations, including a history of statutory approvals. Section 3.1 provides a brief overview of the long history of mining in the vicinity of the Project. The approved Dendrobium Mine and the Cordeaux Colliery are described in Sections 3.2 and 3.3, respectively.

3.1 HISTORY OF MINING IN THE VICINITY OF THE PROJECT

Underground mining in the vicinity of the Project has included:

- Kemira Colliery;
- Wongawilli Colliery;
- Nebo Colliery;
- Elouera Colliery;
- Cordeaux Colliery;
- Corrimal Colliery; and
- Dendrobium Mine.

The approximate extent of previous underground mining works is shown on Figure 3-1. Further details on the history of this mining activity are provided below.

There has been no previous mining in the proposed Project underground mining area. Figure 3-1 illustrates that underground coal mining has been undertaken throughout the Metropolitan Special Area, and the Project is a logical extension and continuation of this previous development.

Initially, mining was generally carried out using bord and pillar methods; however, more recently, coal has been extracted using longwall mining methods at Corrimal, Cordeaux, Kemira and Elouera Collieries, and at the Dendrobium Mine (Figure 3-2).

Kemira Colliery

Mining operations began in 1848 at the Albert Coal Mine at Mt Keira, but it was only in 1857 that the first commercial quantities of coal were produced from nearby Mt Keira at what later became known as the Kemira Colliery (NSW Government, 2008a).

The first successful fully mechanised longwall retreat mining operation in Australia commenced at the Kemira Colliery in 1965 (Illawarra Heritage Trail, 2018). Mining at the Kemira Colliery continued until approximately 2004, when facilities were decommissioned and rehabilitated.

Wongawilli, Nebo and Elouera Collieries

The Wongawilli Colliery first opened in around 1916 to feed the demand for suitable metallurgical coal for steelmaking (NSW Government, 2008a).

The Nebo Colliery commenced production in 1946 and coal was last extracted from that mine in 1993.

At this time, the Nebo Colliery was formally combined with the Wongawilli Colliery to form the Elouera Colliery. Nebo's surface facilities remained in use to provide access and ventilation for the Elouera Colliery.

The Nebo Portal site (now the Dendrobium Pit Top) was relinquished from the ownership and responsibility of Elouera Colliery in December 2001, to enable the Dendrobium Mine to acquire formal responsibility and ownership of the site.

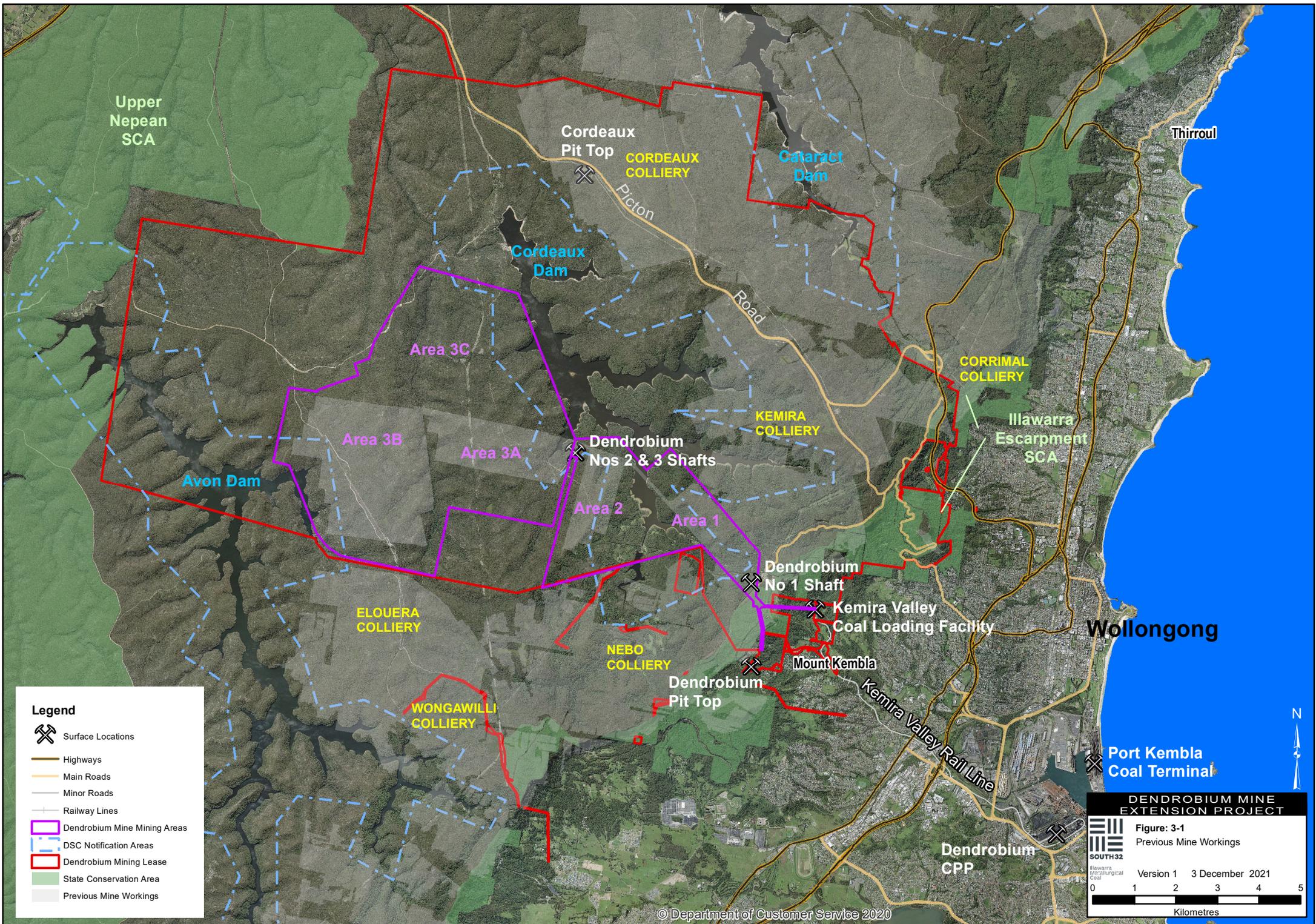
The Elouera Colliery was purchased by Gujarat NRE Coking Coal Ltd (now Wollongong Coal Limited) in December 2007 and now operates under the name of Wongawilli Colliery. The Wongawilli Colliery has since been combined with the Avondale Colliery and Huntley Colliery, located further south (Department of Planning and Infrastructure [DP&I], 2011a).

Corrimal and Cordeaux Collieries

The Corrimal Colliery commenced production in approximately 1870.

The Cordeaux Colliery was approved in 1974 and construction commenced in 1976. The first coal from the Cordeaux Colliery was produced in 1980.

In 1985, the Cordeaux operation holed into Corrimal Colliery workings to officially merge the two collieries in January 1986. Mining was then undertaken using longwall mining methods.



Legend

-  Surface Locations
-  Highways
-  Main Roads
-  Minor Roads
-  Railway Lines
-  Dendrobium Mine Mining Areas
-  DSC Notification Areas
-  Dendrobium Mining Lease
-  State Conservation Area
-  Previous Mine Workings

DENDROBIUM MINE EXTENSION PROJECT

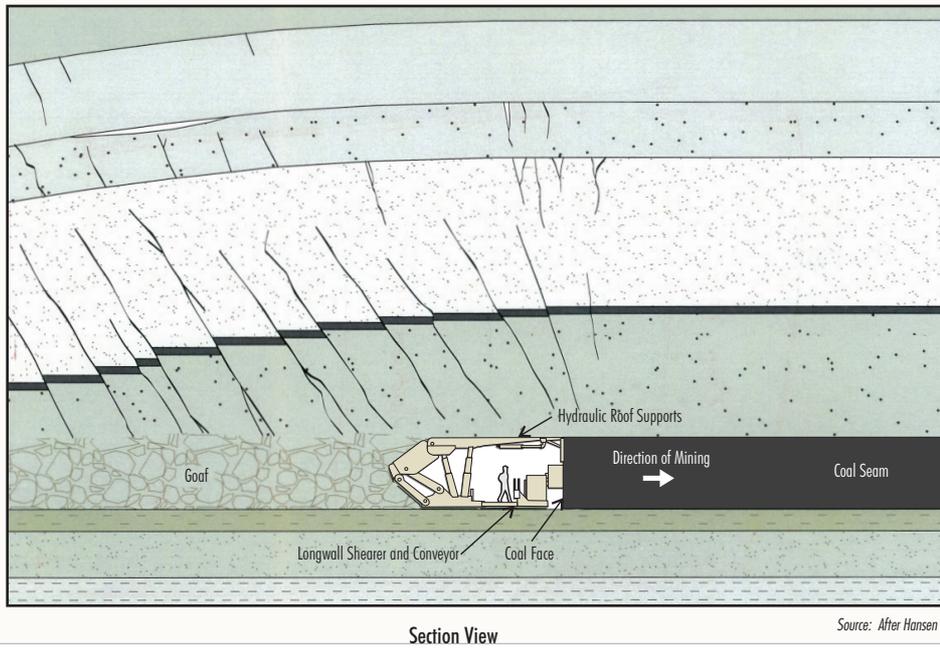
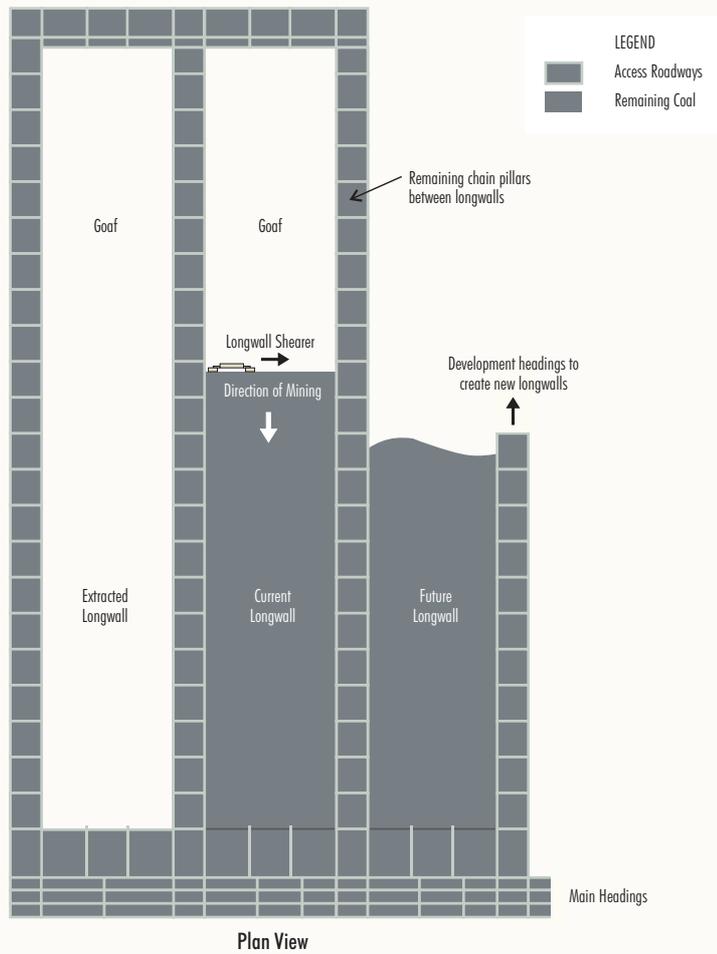
Figure 3-1
Previous Mine Workings

 SOUTH32
Illawarra Metallurgical Coal

Version 1 3 December 2021

0 1 2 3 4 5
Kilometres

STH-16-02-DP-ES_Sect3_001A



Source: After Hansen Consulting (2008)



Illawarra Coal

DENDROBIUM MINE
Longwall Mining Method -
Conceptual Cross Section and Plan

Figure 3-2

Coal production ceased towards the end of March 2001 and recovery of longwall mining equipment was completed on 12 April 2001. Following cessation of mining, the Cordeaux Colliery was placed on care and maintenance and retains this status. The Cordeaux Colliery surface facilities are maintained by IMC.

Dendrobium Mine

Construction of the Dendrobium Mine commenced in January 2002, with longwall mining commencing in April 2005.

The Dendrobium Mine uses the sites of the former pit top associated with the Nebo Colliery (now the Dendrobium Pit Top) and the Kemira Valley Coal Loading Facility, which was previously used for coal receipt and distribution for the Cordeaux and Tower Collieries.

Kemira Valley Rail Line

Although the Dendrobium Mine has been in operation since 2005, the Kemira Valley Rail Line has been in operation since 1980 and, therefore, precedes the Dendrobium Mine.

The Kemira Valley Rail Line passes through the residential areas of Mount Kembla, Cordeaux Heights and Cringila, and is used to transport ROM coal from the Dendrobium Mine to the Dendrobium CPP.

3.2 DENDROBIUM MINE

3.2.1 Underground Mining Operations

The Dendrobium Mine extracts coal from the Wongawilli Seam (also known as the No. 3 Seam) within CCL 768 using underground longwall mining methods.

The Dendrobium Mine includes five approved underground mining domains, named Areas 1, 2, 3A, 3B and 3C (Figure 3-3). Longwall mining is largely complete in Areas 1, 2, 3A and 3B.

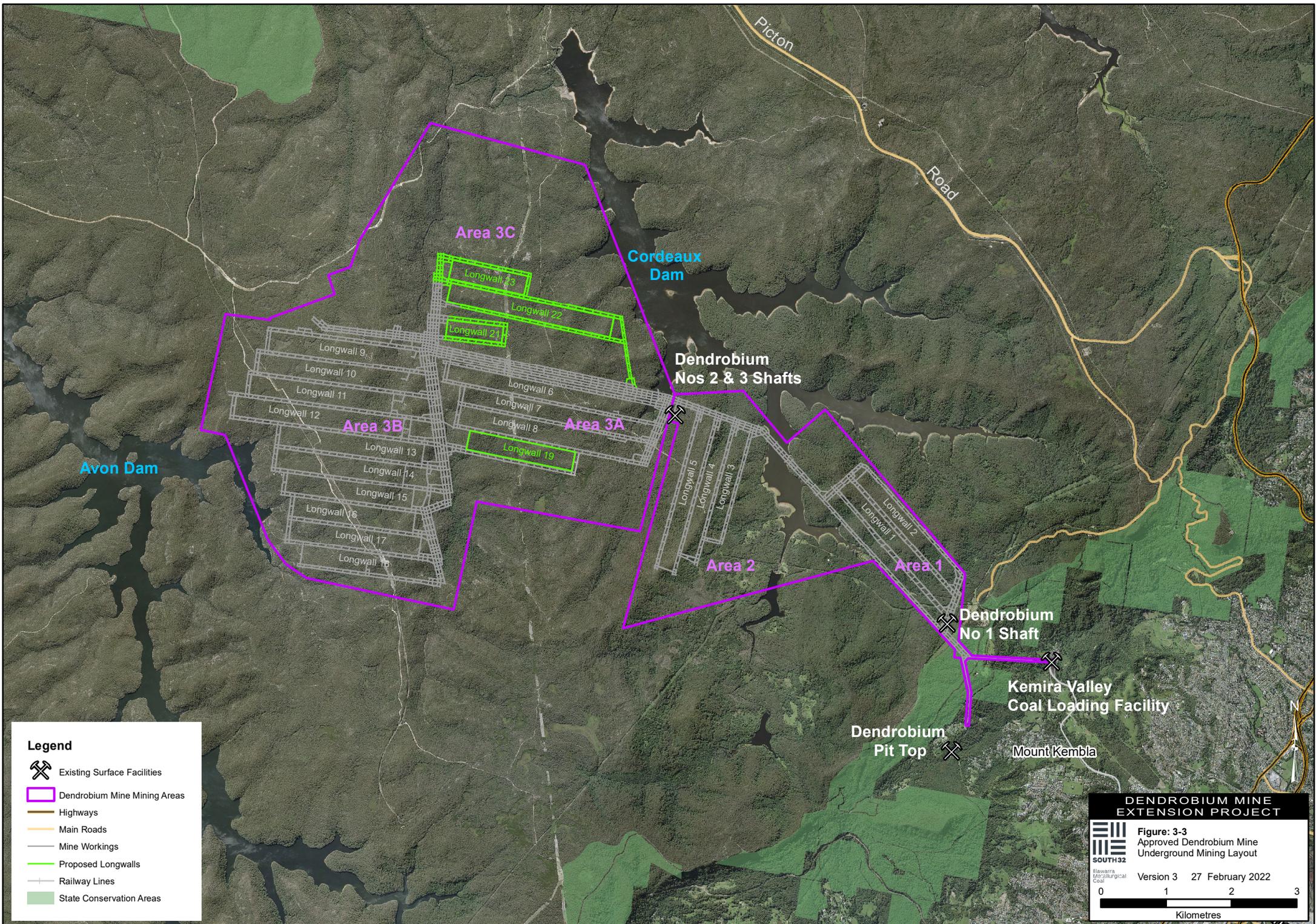
The Dendrobium Mine has an approved operational capacity of up to 5.2 Mtpa of ROM coal until 31 December 2030.

There is uncertainty regarding the ability to extract the remaining resource in the approved Area 3C and the timing, which is contingent on IMC's ability to effectively drain gas from the seam to achieve levels which facilitate safe extraction of the resource. Area 3C would be mined under Development Consent DA 60-03-2001, however, as the approved mine life of the Dendrobium Mine under Development Consent DA 60-03-2001 is 31 December 2030, the necessary extension to the operational life of the Dendrobium Mine under Development Consent DA 60-03-2001 to allow mining in the majority of Area 3C (i.e. areas where there is currently high gas content) after 31 December 2030 would be subject to a separate application for approval and is not part of this application.

The approved Dendrobium Mine underground mining layout is presented on Figure 3-3. Start and finish dates for longwalls extracted to date at the Dendrobium Mine are provided in Table 3-1.

**Table 3-1
Historical Start and Finish Dates for
Dendrobium Mine Longwalls to Date**

Area	Longwall	Start Date	Finish Date
1	1	03/04/2005	11/12/2005
1	2	08/02/2006	22/01/2007
2	3	29/03/2007	15/11/2007
2	4	19/12/2007	02/10/2008
2	5	03/12/2008	18/12/2009
3A	6	09/02/2010	28/03/2011
3A	7	04/05/2011	23/01/2012
3A	8	24/02/2012	29/12/2012
3B	9	09/02/2013	02/06/2014
3B	10	20/01/2014	20/01/2015
3B	11	18/02/2015	26/01/2016
3B	12	22/02/2016	31/01/2017
3B	13	04/03/2017	19/04/2018
3B	14	22/05/2018	26/02/2019
3B	15	09/04/2019	22/01/2020
3B	16	26/02/2020	04/11/2020
3B	17	12/12/2020	13/10/2021
3B	18	02/12/21	-



Legend

-  Existing Surface Facilities
-  Dendrobium Mine Mining Areas
-  Highways
-  Main Roads
-  Mine Workings
-  Proposed Longwalls
-  Railway Lines
- State Conservation Areas

**DENDROBIUM MINE
EXTENSION PROJECT**

 **Figure 3-3**
Approved Dendrobium Mine
Underground Mining Layout

Version 3 27 February 2022

0 1 2 3
Kilometres

3.2.2 Surface Facilities

Key surface facilities at the Dendrobium Mine (Figure 3-1) include the:

- Dendrobium Pit Top;
- Dendrobium Shaft No 1 and No 2 and 3 Shafts;
- Kemira Valley Coal Loading Facility;
- Kemira Valley Rail Line; and
- Dendrobium CPP located in Port Kembla.

Dendrobium Pit Top

The Dendrobium Pit Top is located adjacent to Mount Kembla village near the top of Cordeaux Road (Figure 3-4). Access to the Dendrobium Pit Top is off Cordeaux Road, approximately 8 km west of Wollongong.

Existing surface infrastructure at the Dendrobium Pit Top includes the following (Figure 3-4):

- administration buildings;
- workshop, machinery and equipment storage areas;
- personnel and materials access to the underground workings via the Dendrobium Tunnel;
- water management infrastructure (including sediment pond and a grey water treatment and oily water separation facility); and
- other ancillary infrastructure.

Dendrobium No 1 and No 2 and 3 Shafts

Dendrobium No 1 Shaft is located south-east of Area 1 (Figure 3-3).

Dendrobium No 2 and 3 Shafts are located in the Metropolitan Special Area between Areas 2 and 3A (Figure 3-3).

The general arrangements of the Dendrobium ventilation shaft sites are shown on Figure 3-5.

Dendrobium No 1 and No 2 Shafts are downcast (or intake) ventilation shafts that draw fresh air into the underground workings. Dendrobium No 3 Shaft is an upcast (or exhaust) ventilation shaft that uses fans to draw air out of the underground workings (Plate 3-1).



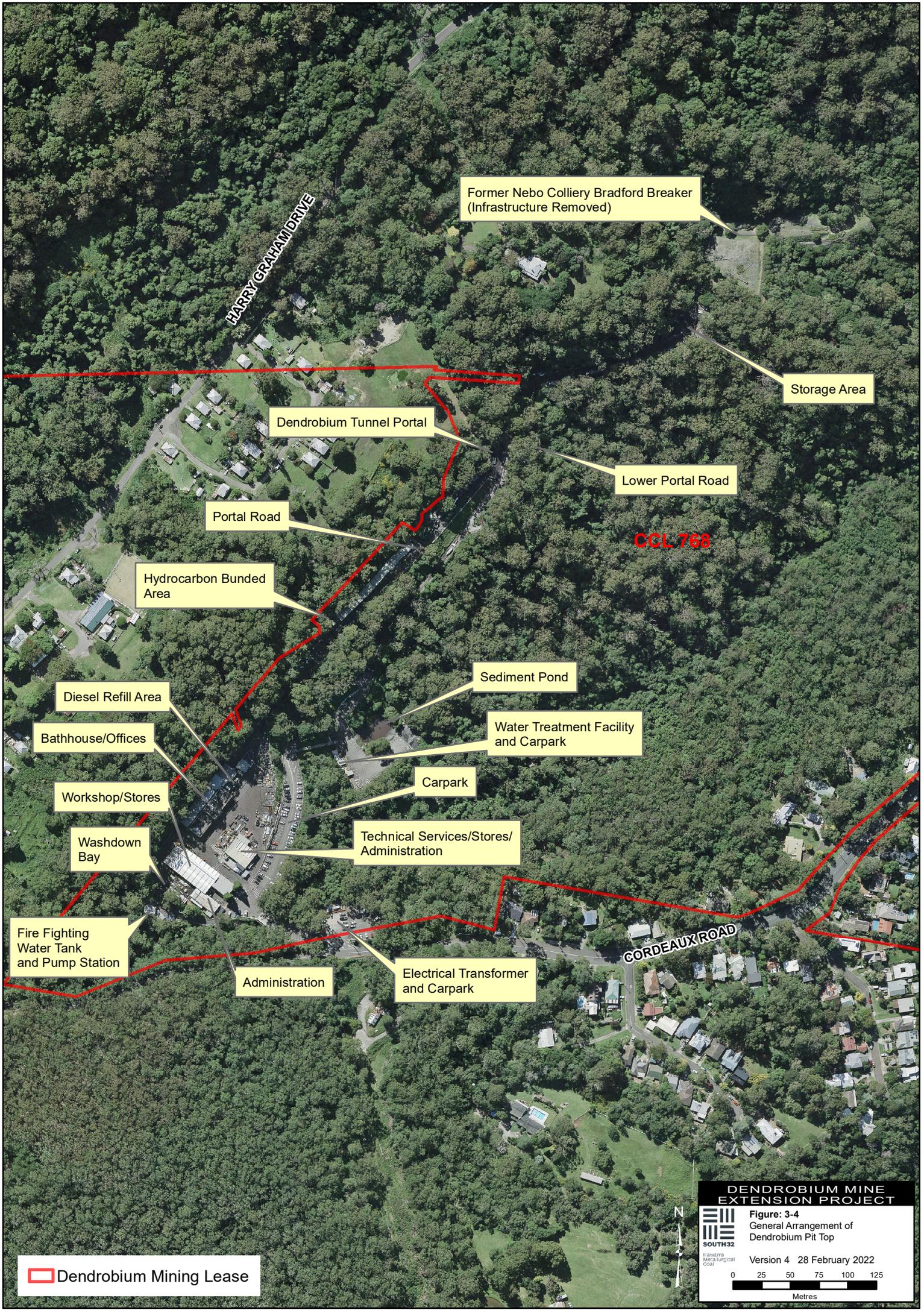
Plate 3-1 - Dendrobium No 2 and 3 Shafts

Kemira Valley Coal Loading Facility

The Kemira Valley Coal Loading Facility is located approximately 2 km north-east of the Dendrobium Pit Top (Figure 1-2). Access to the Kemira Valley Coal Loading Facility is northwards from Stones Road near Mount Kembla village.

ROM coal is transported from the underground operations to the Kemira Valley Coal Loading Facility via an underground conveyor network, reaching the surface via the Kemira Valley Tunnel. The ROM coal is sized, fed through a rill tower and deposited onto a stockpile with a 150,000 tonne (t) capacity. An enclosed rail-loading chute is used to load the coal onto rail wagons beneath the stockpile (Plate 3-2).

A general arrangement of the coal loading facility is shown in Figure 3-6.



 Dendrobium Mining Lease

DENDROBIUM MINE EXTENSION PROJECT

Figure: 3-4
General Arrangement of Dendrobium Pit Top

Version 4 28 February 2022

0 25 50 75 100 125
Metres

 SOUTH32
I'll work with you to get it right

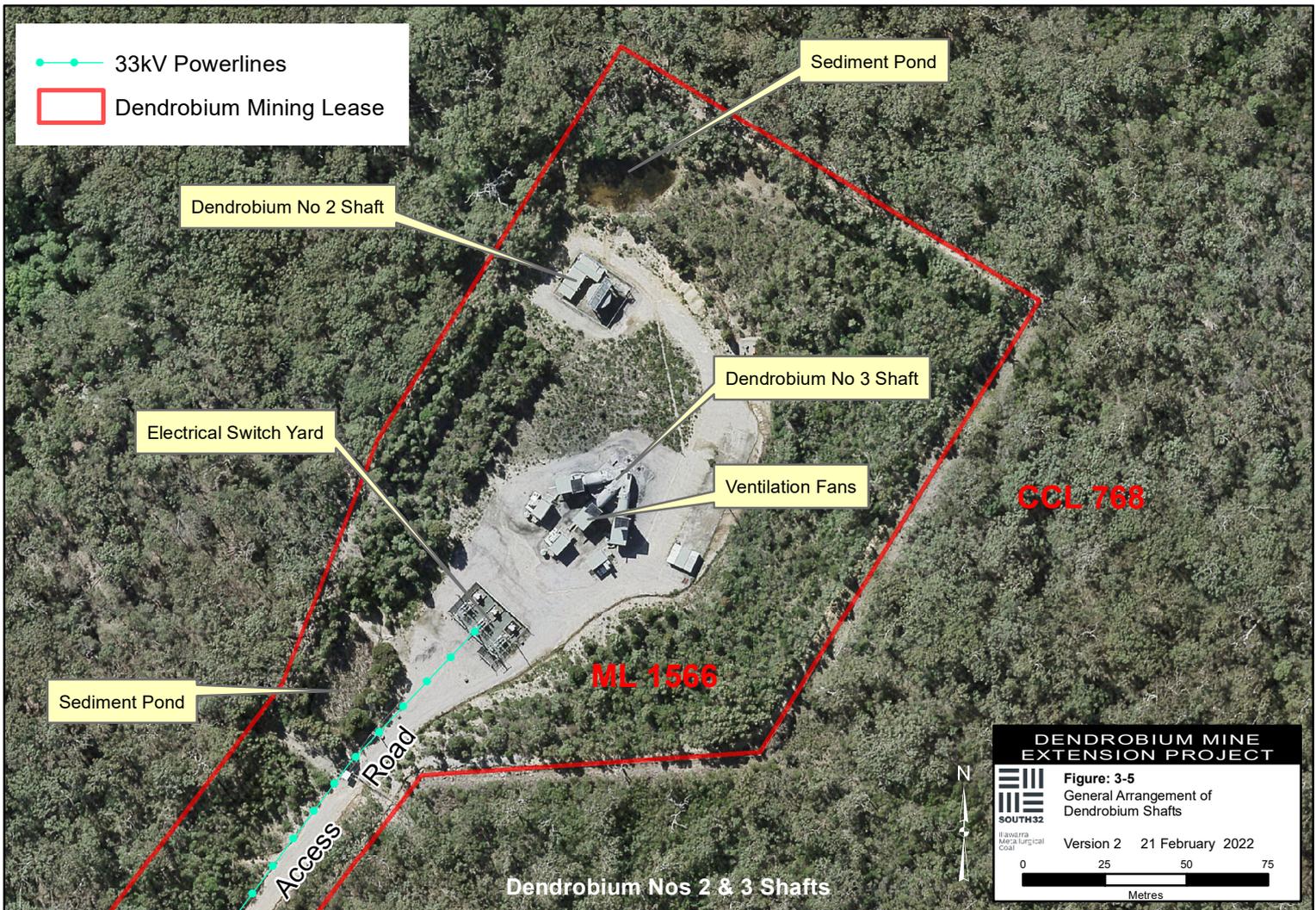




Plate 3-2 - Train Loading at the Kemira Valley Coal Loading Facility

Existing infrastructure at the Kemira Valley Coal Loading Facility includes the following (Figure 3-6):

- site office;
- site amenities;
- Kemira Valley Tunnel portal;
- coal sizer;
- coal conveyor;
- rill tower;
- coal stockpile;
- sedimentation ponds;
- buffer dam;
- other ancillary infrastructure;
- Kemira Valley Rail Line; and
- rail loading infrastructure (beneath the coal stockpile).

Kemira Valley Rail Line

The Kemira Valley Rail Line is a private rail line, approximately 9 km long. ROM coal is transported from the Kemira Valley Coal Loading Facility to the Dendrobium CPP at Port Kembla via the Kemira Valley Rail Line (Figure 1-2).

Train movements are not permitted on the Kemira Valley Rail Line between 11.00 pm and 6.00 am, unless written approval is obtained from the EPA.

Dendrobium Coal Preparation Plant

The existing Dendrobium CPP is located on Flinders Street within the Port Kembla Steelworks industrial precinct (Figure 1-2).

The Dendrobium CPP is also known as the Dendrobium Washery, or Port Kembla Coal Processing Plant.

The Dendrobium CPP consists of the following infrastructure (Figure 3-7):

- administration building;
- CPP;
- ROM and product coal stockpiles;
- storage areas;
- parking and access roads;
- Kemira Valley Rail Line;
- maintenance workshop;
- rail unloading facility; and
- other ancillary infrastructure.

3.2.3 ROM Coal Transport, Stockpiling and Processing

Sized ROM coal is stockpiled at the Kemira Valley Coal Loading Facility prior to transport to the Dendrobium CPP via the Kemira Valley Rail Line.

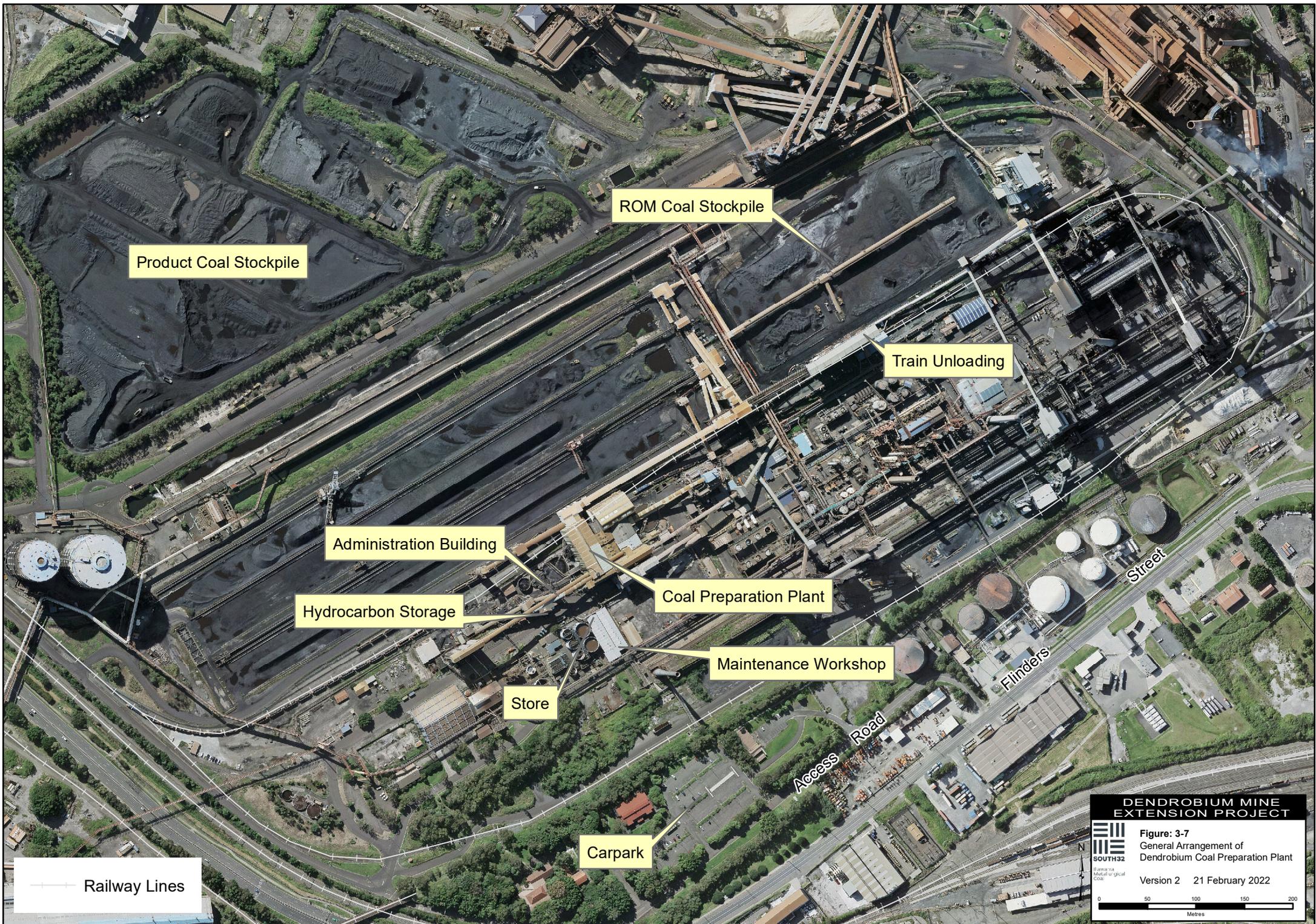
ROM coal from the Dendrobium Mine is processed at the Dendrobium CPP to primarily produce metallurgical coal products for use in steelmaking.

The Dendrobium CPP has the capacity to process up to 5.2 Mtpa of ROM coal.

3.2.4 Product Coal Handling and Transportation

Product metallurgical coal is temporarily stockpiled at the Dendrobium CPP prior to being delivered to the Port Kembla Steelworks for domestic steelmaking, or to the PKCT for transport to Liberty Primary Steel Whyalla Steelworks or export.

Product coal transportation occurs on a continuous basis (24 hours per day, seven days per week) on internal haul roads within the Port Kembla industrial precinct.



Product Coal Stockpile

ROM Coal Stockpile

Train Unloading

Administration Building

Hydrocarbon Storage

Coal Preparation Plant

Maintenance Workshop

Store

Carpark

Access Road

Flinders

Street

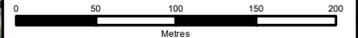
Railway Lines

DENDROBIUM MINE EXTENSION PROJECT



Figure 3-7
General Arrangement of
Dendrobium Coal Preparation Plant

Version 2 21 February 2022



3.2.5 Coal Wash Management

The Dendrobium CPP currently produces up to approximately 1.1 Mtpa of coal wash. Coal wash is approved for transport by road from the Dendrobium CPP to the West Cliff Coal Wash Emplacement Area (Figures 1-1a and 1-1b) (Section 3.4).

Coal wash is also supplied to third parties for use as an engineering fill material or for other beneficial uses.

3.2.6 Approval History

Development Consent DA 60-03-2001

The potential environmental impacts associated with the development of the Dendrobium Mine were assessed in the *Environmental Impact Statement for the Dendrobium Underground Coal Mine* (Olsen Environmental Consulting, 2001).

Following a Commission of Inquiry, the Dendrobium Mine was approved on 20 November 2001 by the NSW Minister for Urban Affairs and Planning (the Minister) under the EP&A Act.

Among other conditions and requirements, Development Consent DA 60-03-2001, issued in November 2001, required further approval from the Minister for:

- emplacement of coal wash at the West Cliff Stage 3 Coal Wash Emplacement Area; and
- longwall extraction in parts of Area 3 (described as Area C in the original consent).

The West Cliff Stage 3 Coal Wash Emplacement Area was approved on 20 December 2007 by the Minister for Planning under Condition 1.1(c) of Development Consent DA 60-03-2001.

An application to modify the originally approved Area 3 mining footprint was lodged in November 2007 under section 75W of the EP&A Act. Approval was granted on 8 December 2008, subject to modified conditions, including the requirement to prepare Subsidence Management Plans (SMPs).

In addition to the two applications described above, other approved modifications to the Development Consent DA 60-03-2001 include:

- a modification application made in February 2002 to permit the access of construction traffic to the Bradford Breaker Emplacement Area via Cordeaux Road and Benjamin Road, Mount Kembla;
- a modification application made in May 2002 to allow vehicles to access Benjamin Road, Mount Kembla;
- a modification application made in March 2005 for the construction and operation of an above-ground coal sizing plant at the Kemira Valley Coal Loading Facility;
- a modification application made in December 2008 for amendment of the approved layout for underground mining Area 3 (to split into Areas 3A, 3B and 3C);
- a modification application made in March 2015 to modify the conditions relating to biodiversity offsets; and
- a modification application made in July 2018 to switch electricity supplier and upgrade electricity supply infrastructure.

EPBC Act Approval

Approval Decision EPBC 2001/214, relating to the Dendrobium Mine under the EPBC Act, was issued on 20 December 2001. The approval was subject to six conditions relating to the management of potential impacts on threatened species.

Subsidence Management Plan Approvals

The conditions of Development Consent DA 60-03-2001 and CCL 768 require the preparation of SMPs prior to longwall extraction.

The following SMP approvals have been issued for the Dendrobium Mine to date:

- Subsidence Environmental Management Plan approval for Longwalls 1 and 2 in Area 1, issued in March 2005.
- SMP approval for Longwalls 3 to 5 in Area 2, issued in March 2007.
- SMP approval for Longwall 6, issued in December 2009.

- SMP approval for Longwalls 6 to 8 and 19, issued in June 2010.
- SMP approval for Longwalls 9 to 18, issued in February 2013.
- Further approval by the Secretary for Longwalls 14 and 15, issued in December 2016.
- Further approval by the Secretary for Longwall 16, issued in May 2018.
- Further approval by the Secretary for Longwall 17, issued in July 2019.
- Further approval by the Secretary for Longwall 21, issued in December 2019.
- Further approval by the Secretary for Longwall 18, issued in December 2020.
- Further approval by the Secretary for Longwall 19, issued in March 2021.

3.2.7 Environmental Monitoring and Management

The Dendrobium Mine has an Environmental Management Strategy (EMS) that provides a framework to allow the operation to be conducted in an environmentally responsible manner and in accordance with relevant statutory requirements.

A list of key strategies, plans and programs in place at the Dendrobium Mine is shown on Figure 3-8.

Further discussion of the existing content of these strategies, plans and programs, and how they would continue to be relevant to the majority of the Project, is provided under the relevant sub-sections in Section 7.

A summary of the existing environmental monitoring regime at the Dendrobium Mine is provided in Table 3-2, and the locations of relevant environmental monitoring sites are shown on Figures 3-9a to 3-9c.

3.2.8 ROM Coal Production in the Absence of the Project

In January 2022, it is estimated that approximately 32 Mt of potentially extractable ROM coal remained in the approved underground mining areas at the Dendrobium Mine.

There is uncertainty regarding the ability to extract the remaining resource in the approved Area 3C and the timing, which is contingent on IMC's ability to effectively drain gas from the seam to achieve levels that facilitate safe extraction of the resource. Area 3C would be mined under Development Consent DA 60-03-2001; however, as the approved mine life of the Dendrobium Mine under Development Consent DA 60-03-2001 is 31 December 2030, the necessary extension to the operational life of the Dendrobium Mine under Development Consent DA 60-03-2001 to allow mining in the majority of Area 3C (i.e. areas where there is currently high gas content) after 31 December 2030 would be subject to a separate application for approval.

3.3 CORDEAUX COLLIERY

The Cordeaux Colliery is owned and operated by Endeavour Coal Pty Ltd, a wholly owned subsidiary of South32. The Cordeaux Colliery is located within CCL 768.

Coal production ceased at the Cordeaux Colliery towards the end of March 2001, and recovery of longwall mining equipment was completed in April 2001. Following the cessation of mining, the Cordeaux Colliery was placed on care and maintenance.

A number of surface facilities associated with the Cordeaux Colliery (Figure 3-10) have been progressively decommissioned and rehabilitated (Attachment 9). However, the Cordeaux Pit Top and the Corrimal No. 3 Shaft Site were retained, as they have strategic value for access to potential future underground mining areas.

3.3.1 Cordeaux Pit Top

The Cordeaux Pit Top was used for personnel and materials access and coal clearance while the Cordeaux Colliery was operating. Access to the Cordeaux Pit Top is off Picton Road, approximately 16 km south-east from its intersection with the Hume Motorway.

Infrastructure used during the operation of the Cordeaux Colliery remains at the Cordeaux Pit Top (Figure 3-11).

The Cordeaux Pit Top currently functions as a storage facility and office for IMC staff undertaking environmental, survey and exploration activities within IMC tenements.

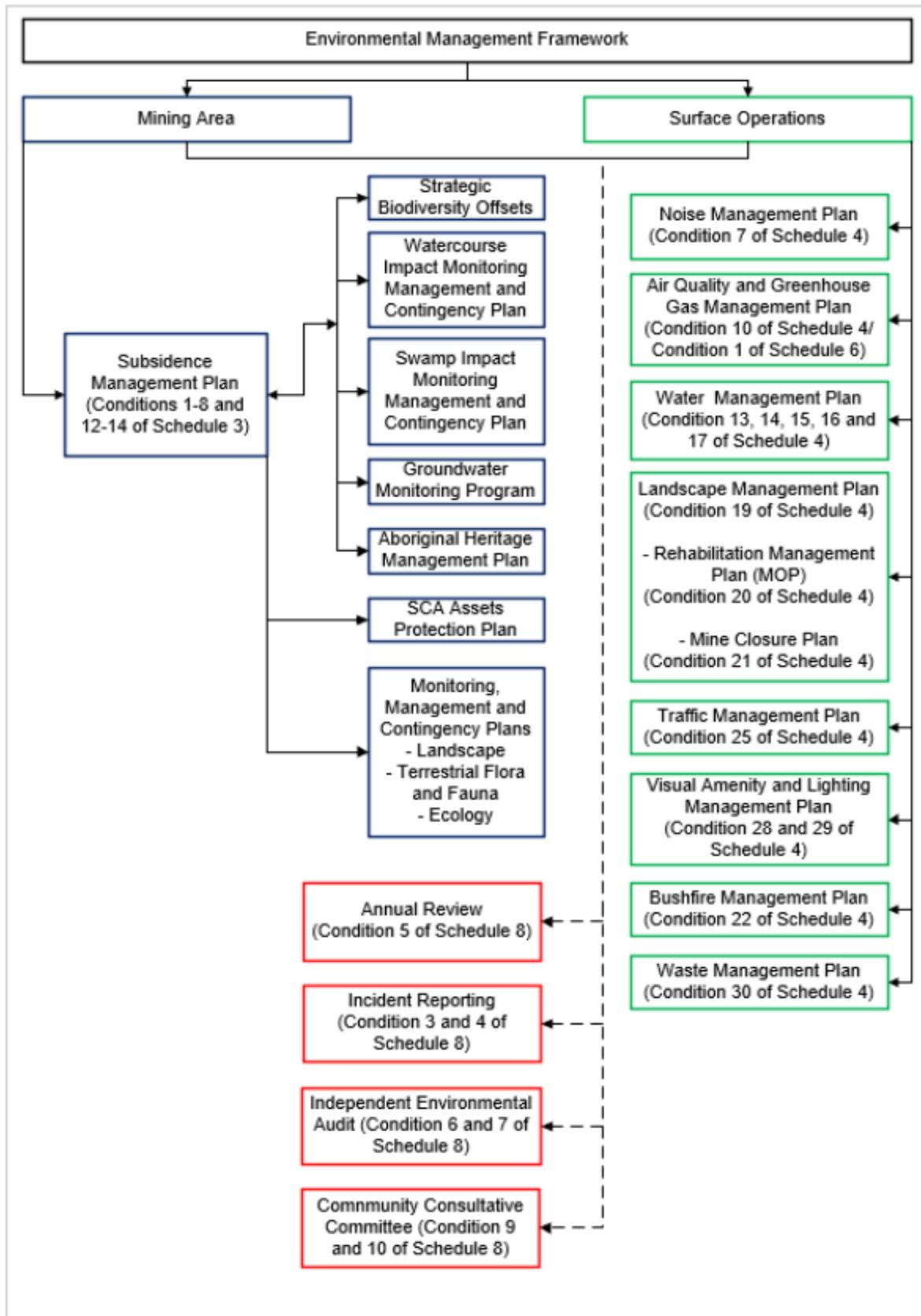
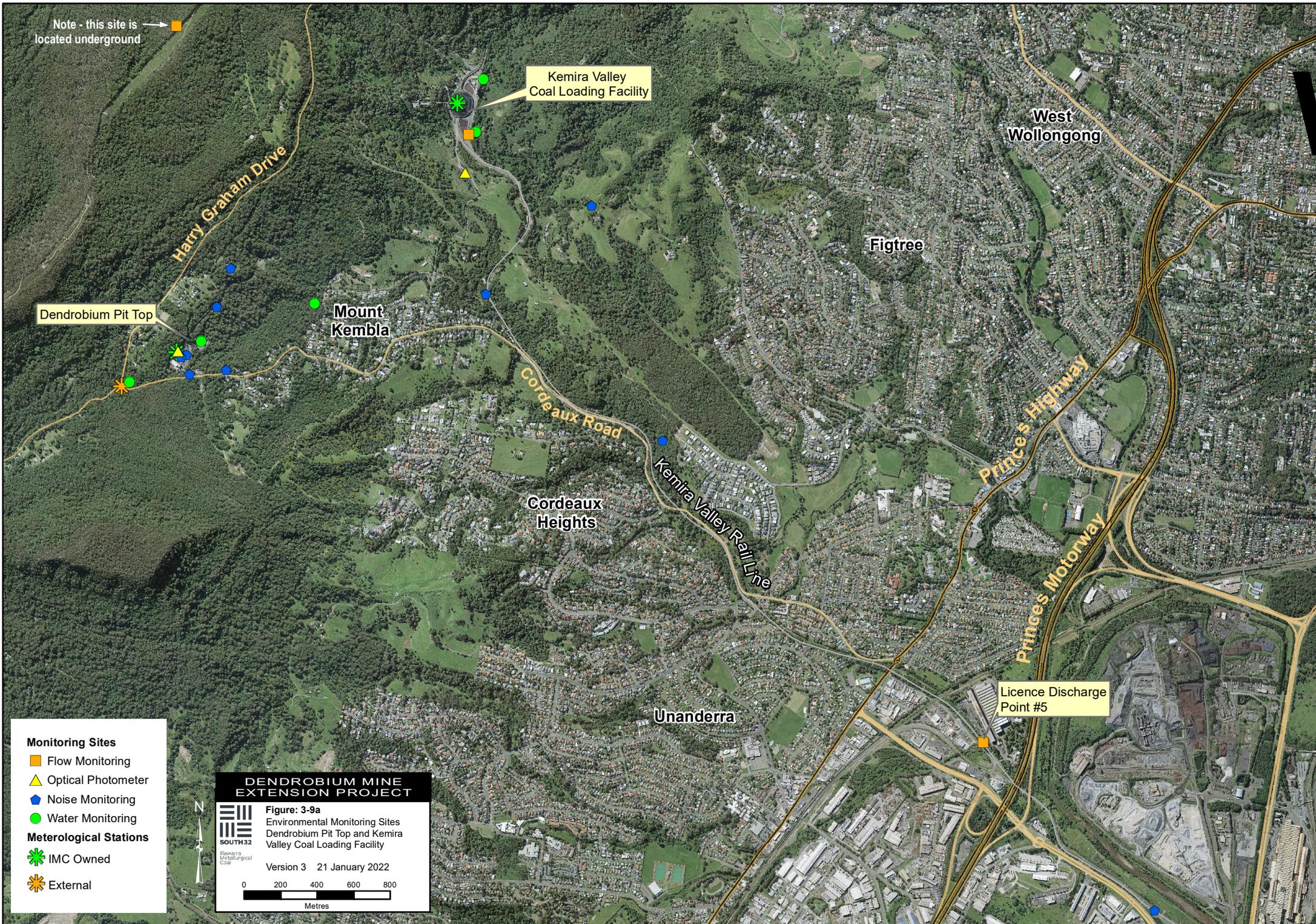


Figure 3-8 - Overview of the Dendrobium Mine Environmental Management Strategy

Note: The requirement for a Rehabilitation Management Plan (RMP) is satisfied by the Mining Operations Plan (MOP).

Note - this site is located underground



- Monitoring Sites**
- Orange square: Flow Monitoring
 - Yellow triangle: Optical Photometer
 - Blue pentagon: Noise Monitoring
 - Green circle: Water Monitoring
- Meteorological Stations**
- Green asterisk: IMC Owned
 - Orange asterisk: External

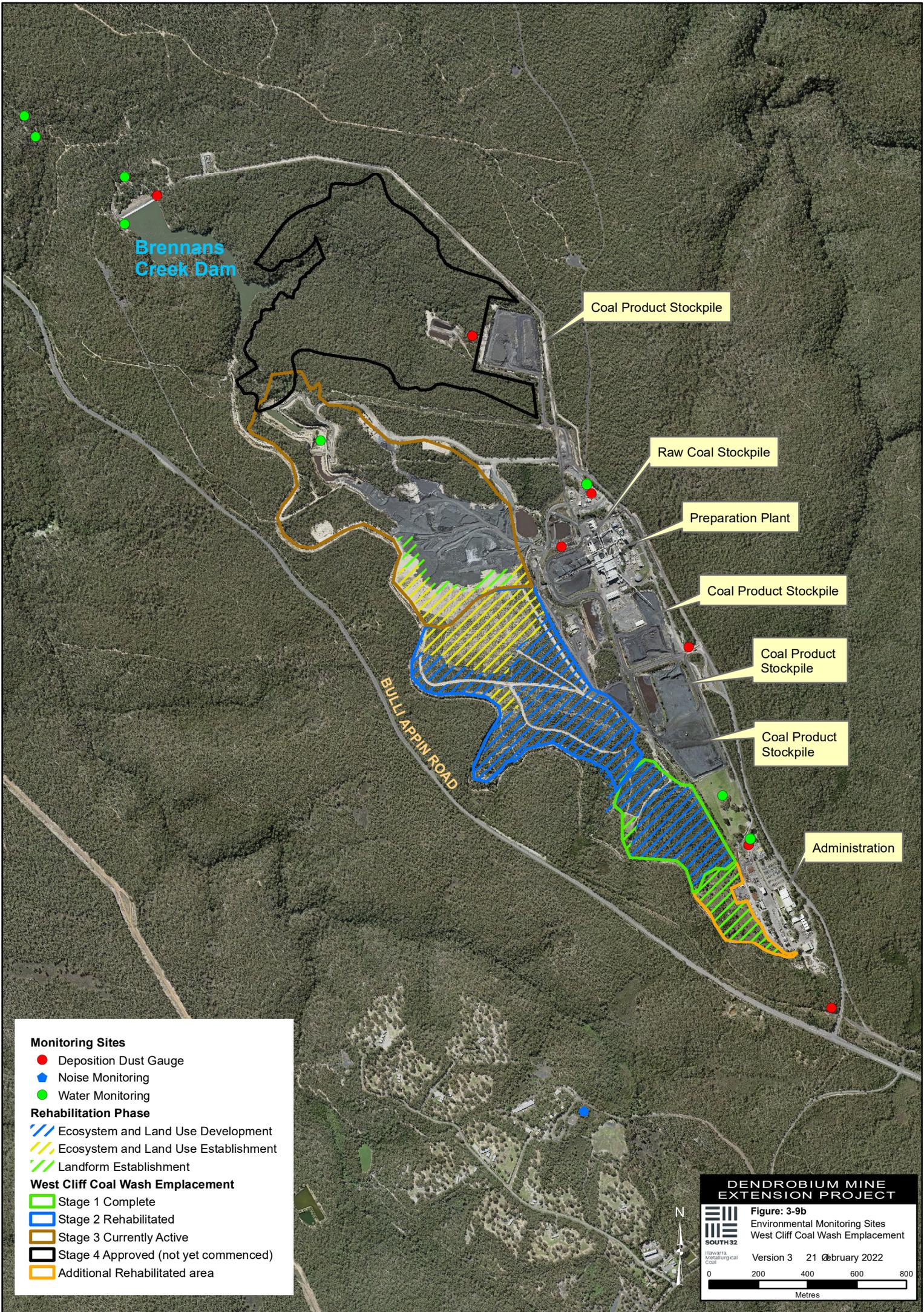
DENDROBIUM MINE EXTENSION PROJECT

Figure 3-9a
Environmental Monitoring Sites
Dendrobium Pit Top and Kemira
Valley Coal Loading Facility

Version 3 21 January 2022

0 200 400 600 800
Metres

SOUTH32
Illawarra Metallurgical Coal



Monitoring Sites

- Deposition Dust Gauge
- Noise Monitoring
- Water Monitoring

Rehabilitation Phase

- ▨ Ecosystem and Land Use Development
- ▨ Ecosystem and Land Use Establishment
- ▨ Landform Establishment

West Cliff Coal Wash Emplacement

- ▨ Stage 1 Complete
- ▨ Stage 2 Rehabilitated
- ▨ Stage 3 Currently Active
- ▨ Stage 4 Approved (not yet commenced)
- ▨ Additional Rehabilitated area

Coal Product Stockpile

Raw Coal Stockpile

Preparation Plant

Coal Product Stockpile

Coal Product Stockpile

Coal Product Stockpile

Administration

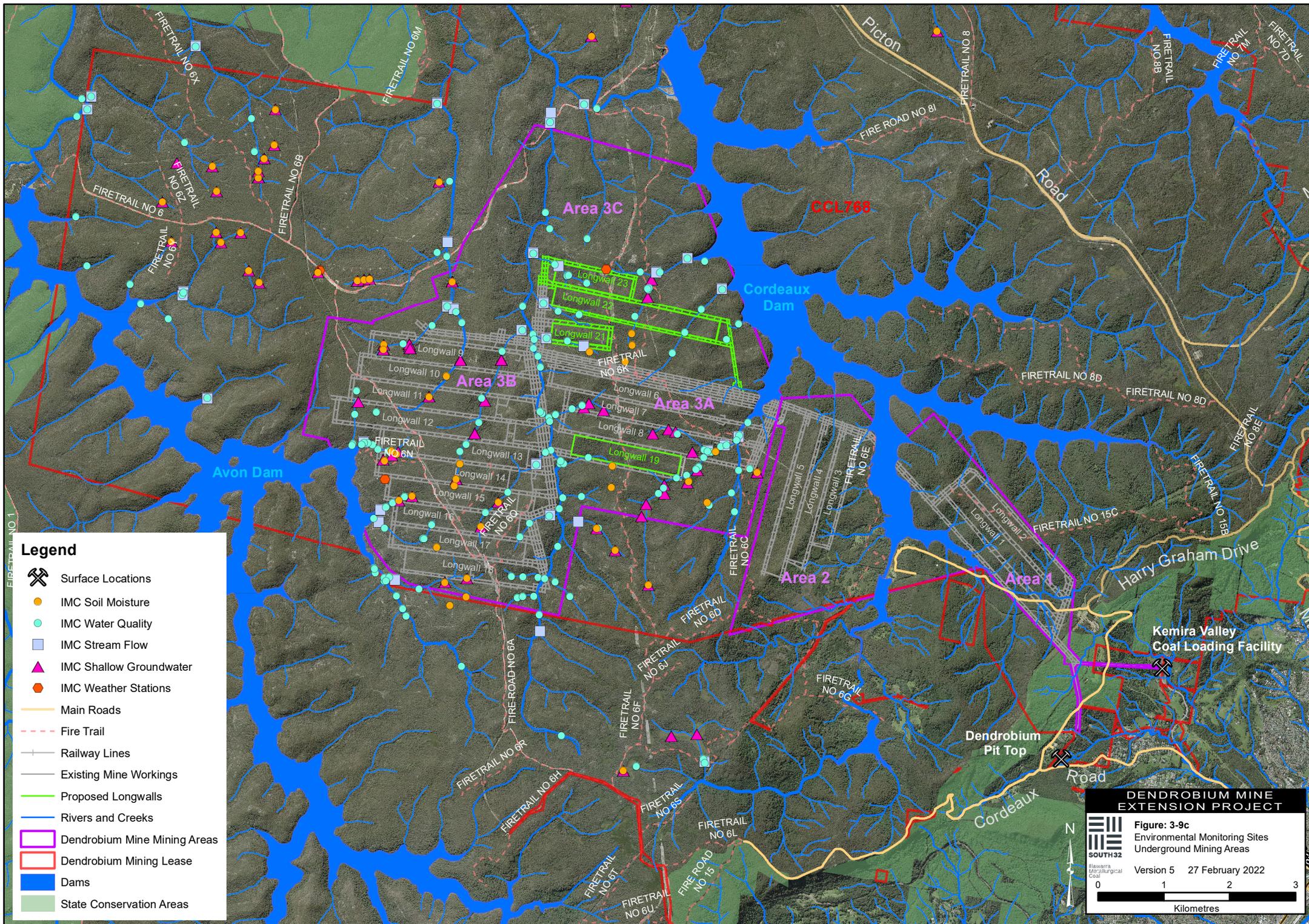
BULL APPIN ROAD

DENDROBIUM MINE EXTENSION PROJECT

Figure: 3-9b
Environmental Monitoring Sites
West Cliff Coal Wash Emplacement

Version 3 21 February 2022

0 200 400 600 800
Metres



Legend

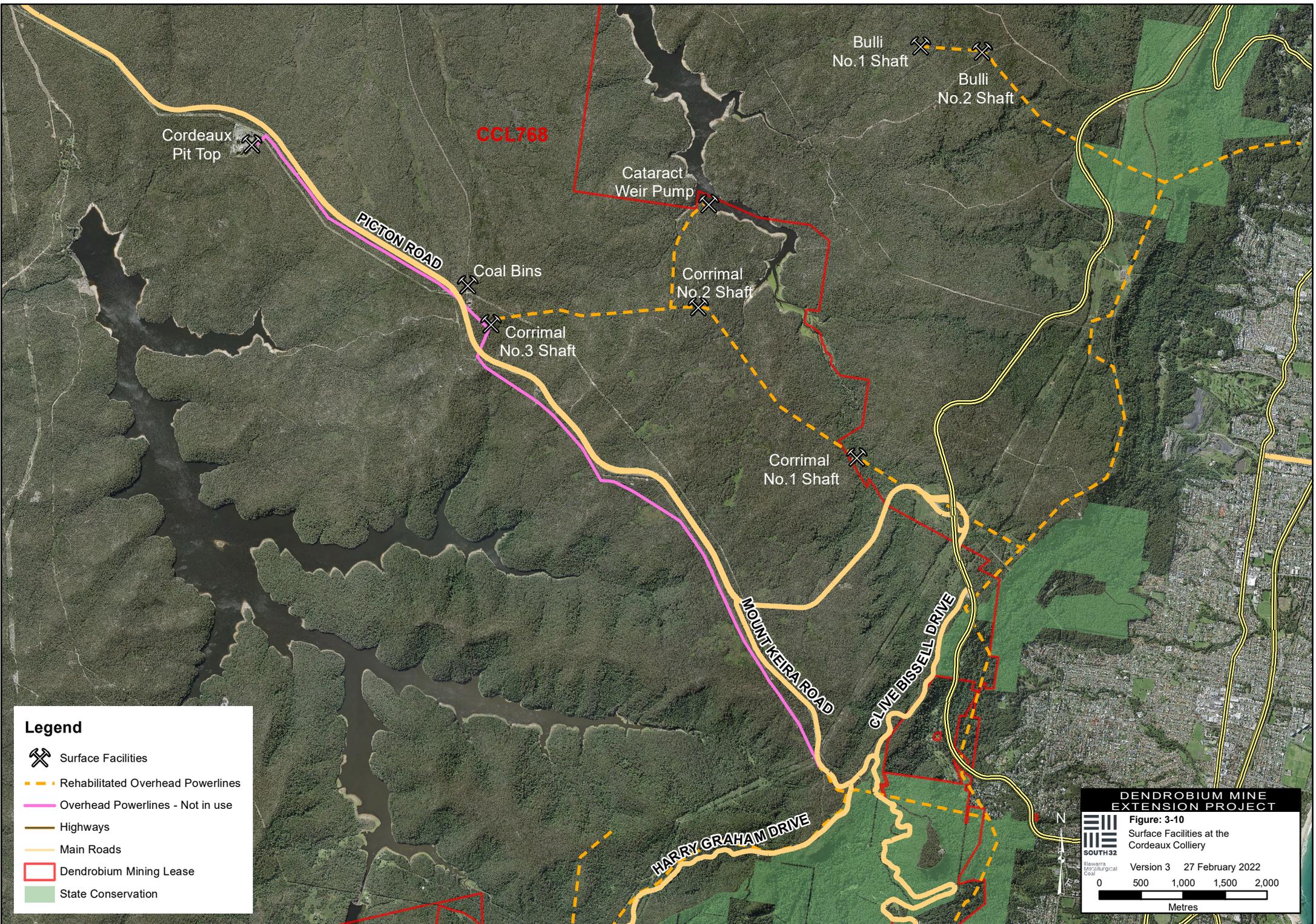
-  Surface Locations
-  IMC Soil Moisture
-  IMC Water Quality
-  IMC Stream Flow
-  IMC Shallow Groundwater
-  IMC Weather Stations
-  Main Roads
-  Fire Trail
-  Railway Lines
-  Existing Mine Workings
-  Proposed Longwalls
-  Rivers and Creeks
-  Dendrobium Mine Mining Areas
-  Dendrobium Mining Lease
- Dams
- State Conservation Areas

DENDROBIUM MINE EXTENSION PROJECT

Figure: 3-9c
 Environmental Monitoring Sites
 Underground Mining Areas

Version 5 27 February 2022

0 1 2 3
 Kilometres



CGL768

Cordeaux Pit Top

Bulli No.1 Shaft

Bulli No.2 Shaft

Cataract Weir Pump

PICTON ROAD

Coal Bins

Corrimal No.2 Shaft

Corrimal No.3 Shaft

Corrimal No.1 Shaft

MOUNTKERA ROAD

OLIVE BISSELL DRIVE

HARRY GRAHAM DRIVE

Legend

-  Surface Facilities
-  Rehabilitated Overhead Powerlines
-  Overhead Powerlines - Not in use
-  Highways
-  Main Roads
-  Dendrobium Mining Lease
-  State Conservation

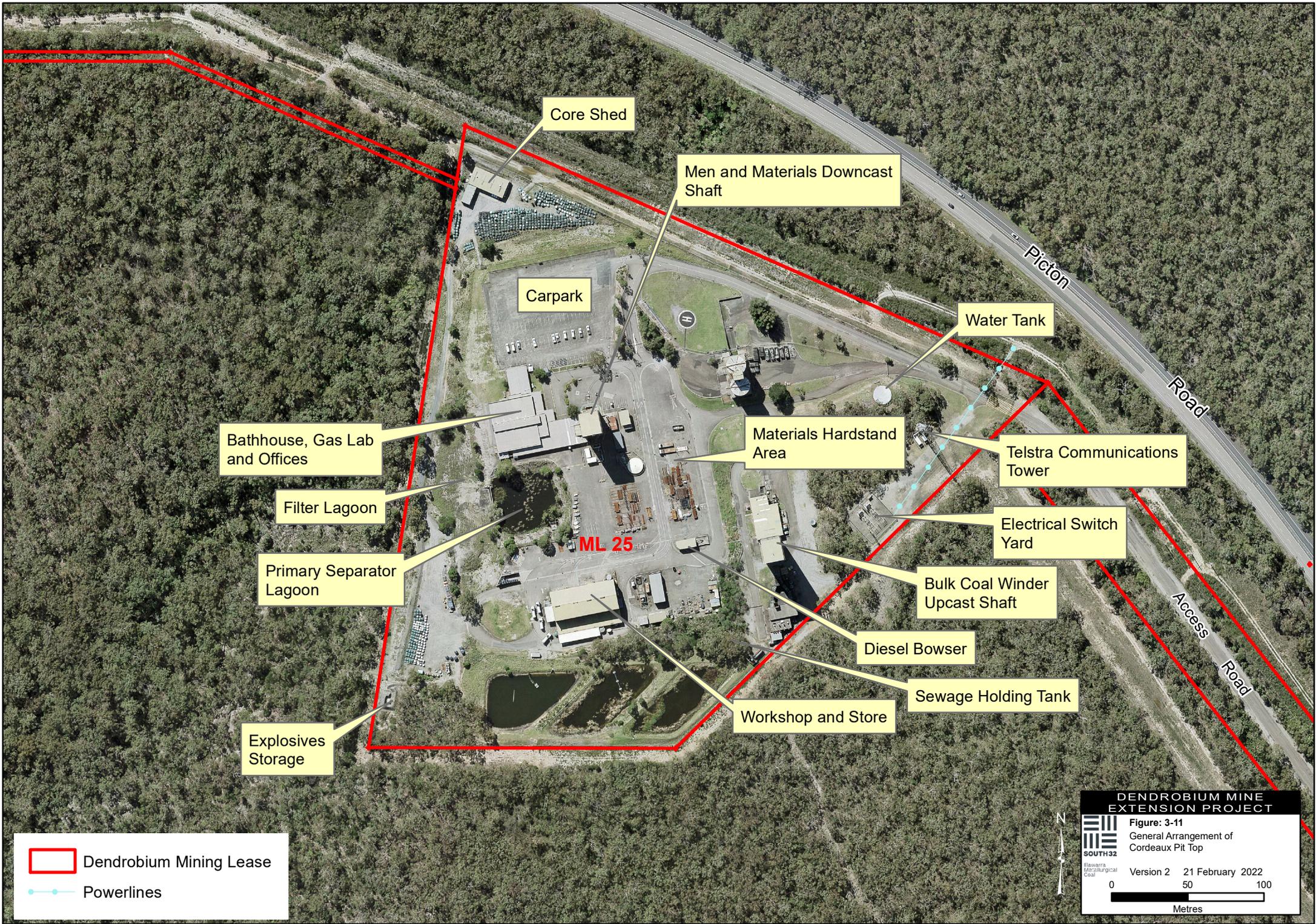
DENDROBIUM MINE EXTENSION PROJECT

Figure: 3-10
Surface Facilities at the Cordeaux Colliery

Version 3 27 February 2022

0 500 1,000 1,500 2,000
Metres

 Blawiearra Colliery Coal



Dendrobium Mining Lease
—●— Powerlines

**DENDROBIUM MINE
EXTENSION PROJECT**

Figure: 3-11
 General Arrangement of
 Cordeaux Pit Top

Version 2 21 February 2022
 0 50 100

 Metres

Table 3-2
Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

Environmental Aspect	Environmental Management Documentation	Environmental Monitoring¹
Surface Facilities		
Noise	Noise Management Plan (NMP)	<ul style="list-style-type: none"> Operational attended noise monitoring – R1, R6a, R39a. Operational Pit Top real-time directional noise monitoring system (DNMS) – continuous. Attended Locomotive noise monitoring – annual testing. Unattended real-time rail noise monitoring – as needed.
Air Quality	Air Quality and Greenhouse Gas Management Plan (AQGGMP)	<ul style="list-style-type: none"> Meteorology – wind speed, wind direction, temperature and rainfall at Dendrobium Pit Top and Kemira Valley Coal Loading Facility. Optical Photometers – Points 21 (Pit Top) and 20 (Kemira Valley Coal Loading Facility). Monitoring and recording of energy use and greenhouse gas emissions on a monthly basis.
Surface Water	Water Management Plan	<ul style="list-style-type: none"> Water quality and volume – LDP 5. Water volume – LDP 24, LDP 25. Surface water quality – Dend 7, Dend 10, Dend 12, Dend 13, PTSP. Erosion and sediment control structures.
Road Transport	Traffic Management Plan (TMP)	<ul style="list-style-type: none"> Compliance with Drivers' Code of Conduct.
Lighting	Lighting and Visual Amenity Management Plan	<ul style="list-style-type: none"> Inspections; lighting surveys and assessment.
Waste	Waste Management Plan	<ul style="list-style-type: none"> Recording waste movements; waste contractor audits; site inspections.
Landscape	Landscape Management Plan	<ul style="list-style-type: none"> Monitoring and recording of weed abundance, rehabilitation, water quality, drainage structures, erosion and sediment controls and fencing.
Bushfire	Bushfire Management Plan	<ul style="list-style-type: none"> Monitoring fire protection zones and boundaries in Dendrobium Pit Top, Kemira Valley Coal Loading Facility and VS1, 2 and 3. Recording information relating to monitoring, inspections and observations, correspondence, notification and approvals.
West Cliff Stage 3 Coal Wash Emplacement Area		
Geotechnical Stability	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> Surveyed emplacement height. Compaction testing.
Surface Water	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> Water quality – emplacement subsurface drainage. Erosion and sediment control structures.
Noise	Appin Mine Noise Management Plan	<ul style="list-style-type: none"> Attended noise monitoring – AE-NS4.
Air Quality	Appin Mine Air Quality and Greenhouse Gas Management Plan	<ul style="list-style-type: none"> Real-time PM₁₀ monitoring – W-PF1.

Table 3-2 (Continued)
Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

Environmental Aspect	Environmental Management Documentation	Environmental Monitoring ¹
West Cliff Stage 3 Coal Wash Emplacement Area (continued)		
Rehabilitation	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> • <i>Annual visual inspection of fixed photo points.</i> • <i>Annual BioMetric vegetation assessment.</i> • <i>Random meander transects.</i> • <i>Fauna monitoring.</i>
Underground Mining Areas		
Subsidence Movements	Area 3B SMP	<ul style="list-style-type: none"> • <i>Airborne Laser Scanning (ALS).</i> • <i>2D monitoring lines.</i> • <i>3D monitoring points and survey control.</i>
Land Resources	Area 3B SMP	<ul style="list-style-type: none"> • <i>Inspection of mapped cliffs within 400 m of longwall face.</i> • <i>Inspection of mapped steep slopes within 400 m of longwall face.</i> • <i>Inspection of fire trails within 400 m of longwall face.</i>
Upland Swamps	Area 3B SMP	<ul style="list-style-type: none"> • <i>Observational, photo point, pool water level and erosion monitoring (impact sites) – Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A, 35B, 149, 150 and 151.</i> • <i>Observational, photo point, pool water level and erosion monitoring (reference sites) – Swamps 2, 7, 15a, 22, 24, 25, 33, 84, 85, 86, 87 and 88.</i> • <i>Shallow groundwater level monitoring (impact) – Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A and 35B.</i> • <i>Shallow groundwater level monitoring (reference) – Swamps 2, 7, 15A, 22, 24, 25, 33, 84, 85, 86, 87 and 88.</i> • <i>Soil moisture monitoring (impact) – Swamps 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A and 35B.</i> • <i>Soil moisture monitoring (reference) – Swamps 2, 7, 22, 24, 25, 33, 84, 85, 86, 87 and 88.</i> • <i>Monitoring of composition and distribution of species, swamp size and ecosystem function.</i>
Surface Water	Area 3B SMP	<ul style="list-style-type: none"> • <i>Flow monitoring – WWU, WWL_A, WC21S1, WC15S1, DCU, DC13S1, DCS2, LA4S1, WC12S1, LA3S1, LA2S1, NDCS1, NDTs1, LC5S1 (reference site), CR36S1.</i> • <i>Water quality monitoring – WWU1, WWU4, WC Rockbar 39, WC Pool 49, WWM2, WC21_S1, WC21 Pools 30 and 53, LA4_S1, LA4_S2, LA5_S1, LA5_S2, LA3 Pool 4, LA2 Pool 5, LA1, LA_1, NDC Pool 1, NDC Pool 3, ND1 Pool 2, WC Pool 46, WC Pool 43b, Wongawilli Creek (FR6), WC21 Pool 5, WC15 Pool 28, WC15 Pool 9, WC Pool 2, WC7 Pool 1, WC12 Pool 1, CR36_S1, LC5_S1 (reference site), DC13 Pool 2b, DC Pool 22, DCL3, Donalds Castle Creek (FR6).</i> • <i>Observational and photo point monitoring – Native Dog Creek, Wongawilli Creek, Donalds Castle Creek, WC21, WC15, LA4, DC13, ND1, WC6, WC7, WC8, WC9, WC12, WC16, WC18, LA5, LA2, LA1, ND2, DC13.</i> • <i>Swamps 5, 10, 11, 13, 14, 23, 35a, 35b, 1a, 1b, 3, 4, 8.</i> • <i>Observational and photo point monitoring (reference sites) – Wongawilli Creek, Sandy Creek, Gallaghers Creek, LC5, WC11, DC10, SC9A, CR36, D10.</i> • <i>Swamps 2, 7, 15a, 22, 24, 25, 33, 84, 85, 86, 87, 88.</i>

Table 3-2 (Continued)
Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

Environmental Aspect	Environmental Management Documentation	Environmental Monitoring ¹
Underground Mining Areas (Continued)		
Biodiversity	Area 3B SMP	<ul style="list-style-type: none"> • <i>Upland swamp monitoring</i> – see above. • <i>Threatened frog species surveys</i>. • <i>Macroinvertebrate sampling Australian River Assessment System (AUSRIVAS) protocol</i>.
Aboriginal Heritage	Area 3B SMP	<ul style="list-style-type: none"> • <i>Observational monitoring of known Aboriginal sites, including sandstone shelter sites</i>.
Groundwater	Groundwater Monitoring Program	<ul style="list-style-type: none"> • <i>Deep groundwater pressure monitoring</i> – network of vibrating wire piezometers that extend vertically from near the surface to within the coal measures. • <i>Deep groundwater chemistry monitoring</i> – S1911, S1932, S2001a, S2313, S2314, S2376A, S2377A, S2378A, S2379A, S2436A. • <i>Shallow groundwater monitoring</i> – see upland swamps above. • <i>Underground mine water balance</i> – mine water pumping in and out of the mine, water in ventilation air, water in extracted coal and underground water storage and use. • <i>Mine water quality</i> – underground workings, inter-seam boreholes, flooded adjacent mine workings.
Built Features	Built Features Management Plans	<ul style="list-style-type: none"> • <i>As agreed with asset owners</i>.

¹ As required by management plans under the Development Consent DA 60-03-2001, CCL 768 and EPL 3241.

3.3.2 Approval History

The Cordeaux Colliery, including the Cordeaux Pit Top, was approved by Development Consent D74/134, issued by the Wollongong City Council on 20 December 1974. Construction subsequently commenced in 1976.

CCL 768 was issued under the NSW *Coal Mining Act 1973* in October 1991. It consolidated a number of mineral leases, coal leases, private land leases and mining purposes leases held for the Cordeaux Colliery as well as various future mining areas, including the Dendrobium Mine and the Project Area.

3.3.3 Environmental Monitoring and Management

Care and maintenance activities and other activities at the Cordeaux Colliery are primarily managed through:

- EPL 611 issued by the EPA under the NSW *Protection of the Environment Operations Act 1997* (PoEO Act); and
- the MOP approved under the conditions of CCL 768.

3.4 APPIN MINE

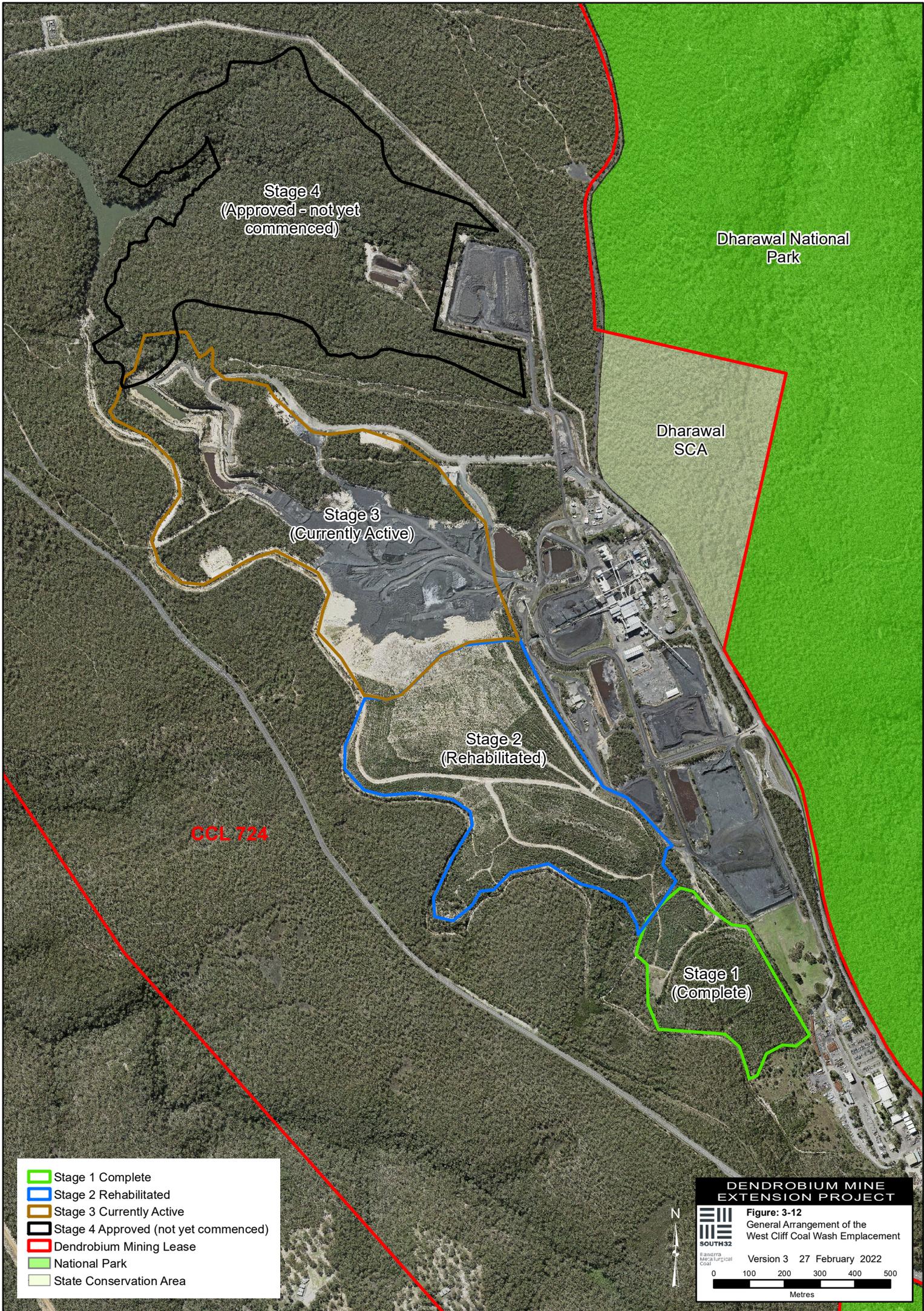
The Appin Mine (Project Approval 08_0150) was approved under the EP&A Act in December 2011.

The Appin Mine interacts with the Dendrobium Mine via the following:

- the Appin Mine is approved to provide a portion of ROM coal to the Dendrobium CPP for processing, if required; and
- coal wash from the Dendrobium CPP is backloaded into empty Appin Mine product coal trucks and is transported to the West Cliff Coal Wash Emplacement Area.

A general arrangement of the West Cliff Coal Wash Emplacement Area is shown in Figure 3-12.

The West Cliff Coal Wash Emplacement Area will comprise four stages. Stage 1 and Stage 2 of the Coal Wash Emplacement Area were completed in 2001 and 2010, respectively. Coal wash is approved for emplacement at the West Cliff Stage 3 and Stage 4 Coal Wash Emplacement Area.



Stage 4
(Approved - not yet commenced)

Dharawal National Park

Dharawal SCA

Stage 3
(Currently Active)

Stage 2
(Rehabilitated)

CCL 724

Stage 1
(Complete)

- ▭ Stage 1 Complete
- ▭ Stage 2 Rehabilitated
- ▭ Stage 3 Currently Active
- Stage 4 Approved (not yet commenced)
- Dendrobium Mining Lease
- National Park
- State Conservation Area

DENDROBIUM MINE EXTENSION PROJECT

Figure: 3-12
General Arrangement of the West Cliff Coal Wash Emplacement

Version 3 27 February 2022

0 100 200 300 400 500
Metres

The West Cliff Stage 3 Coal Wash Emplacement Area was approved under the Dendrobium Mine Development Consent DA 60-03-2001 (by Modification) in December 2007.

However, it is noted that activities at the West Cliff Coal Wash Emplacement Area are now covered by the Appin Mine Project Approval (which includes Stage 4), approved in December 2011, in accordance with Condition 8, Schedule 5 of Development Consent DA 60-03-2001:

8. *All references in this consent (including conditions 3 – 7 of this schedule and Appendix 3) that have direct application to the West Cliff Coal Wash Emplacement shall cease to have force and effect subsequent to the grant of any project approval under Part 3A of the Environmental Planning & Assessment Act 1979 which includes the West Cliff Colliery and the West Cliff Coal Wash Emplacement Area.*

Ongoing use of the West Cliff Stage 3 and Stage 4 Emplacement Areas is proposed as part of the Project, notwithstanding, operation of the emplacement would continue to occur under Appin Mine Project Approval 08_0150.

Emplacement in Stage 3 is underway and Stage 4 has not yet commenced.