



SECTION 1

Introduction

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1 INTRODUCTION

The Dendrobium Mine is an underground coal mine situated in the Southern Coalfield of New South Wales (NSW) approximately 8 kilometres (km) west of Wollongong (Figures 1-1a and 1-1b).

Illawarra Coal Holdings Pty Ltd (Illawarra Metallurgical Coal [IMC]), a wholly owned subsidiary of South32 Limited (South32), is the owner and operator of the Dendrobium Mine¹.

This document is an Environmental Impact Statement (EIS) for the Dendrobium Mine Extension Project (the Project).

The Project proposes the extraction of additional metallurgical coal reserves within Consolidated Coal Lease (CCL) 768. The extraction of additional Project metallurgical coal reserves would be supported by the development of supporting infrastructure and the use and augmentation of existing surface facilities at the Dendrobium Mine.

IMC previously sought to extend mining operations at the Dendrobium Mine through a previous development application (known as the Dendrobium Mine – Plan for the Future: Coal for Steelmaking [the previous application]).

The NSW Department of Planning, Industry and Environment (DPIE) (now Department of Planning and Environment [DPE]) concluded in their “whole of government” Assessment Report that the previous application was in the public interest and recommended approval (DPIE, 2020a).

However, this previous application was refused by the Independent Planning Commission (IPC) in February 2021, primarily due to the IPC’s view of the potential impacts of the mine development on the Sydney drinking water catchment.

In recognition of the importance of the Dendrobium Mine to NSW, on 5 May 2021, the NSW Upper House passed a Parliamentary Motion recommending the Project be declared State Significant Infrastructure (SSI), with IMC to then submit a new application with a revised mine plan that takes into account the feedback from the IPC and that the assessment of any new application be undertaken over a period of no more than 24 weeks.

To address the key concerns raised by the IPC, IMC has re-designed the Project to reduce the overall footprint, thereby reducing potential impacts (Sections 4 and 7).

In December 2021, the Project was declared SSI, under section 5.12 of Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), by the Minister.

1.1 PROJECT OVERVIEW

1.1.1 Purpose of this Report

This EIS has been prepared to accompany an Infrastructure Application made for the Project, in accordance with Part 5 of the EP&A Act.

This EIS considers the potential environmental impacts of the Project in accordance with clauses 190 and 192 of the NSW *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and the Secretary’s Environmental Assessment Requirements (SEARs) issued by the DPE (Attachment 1).

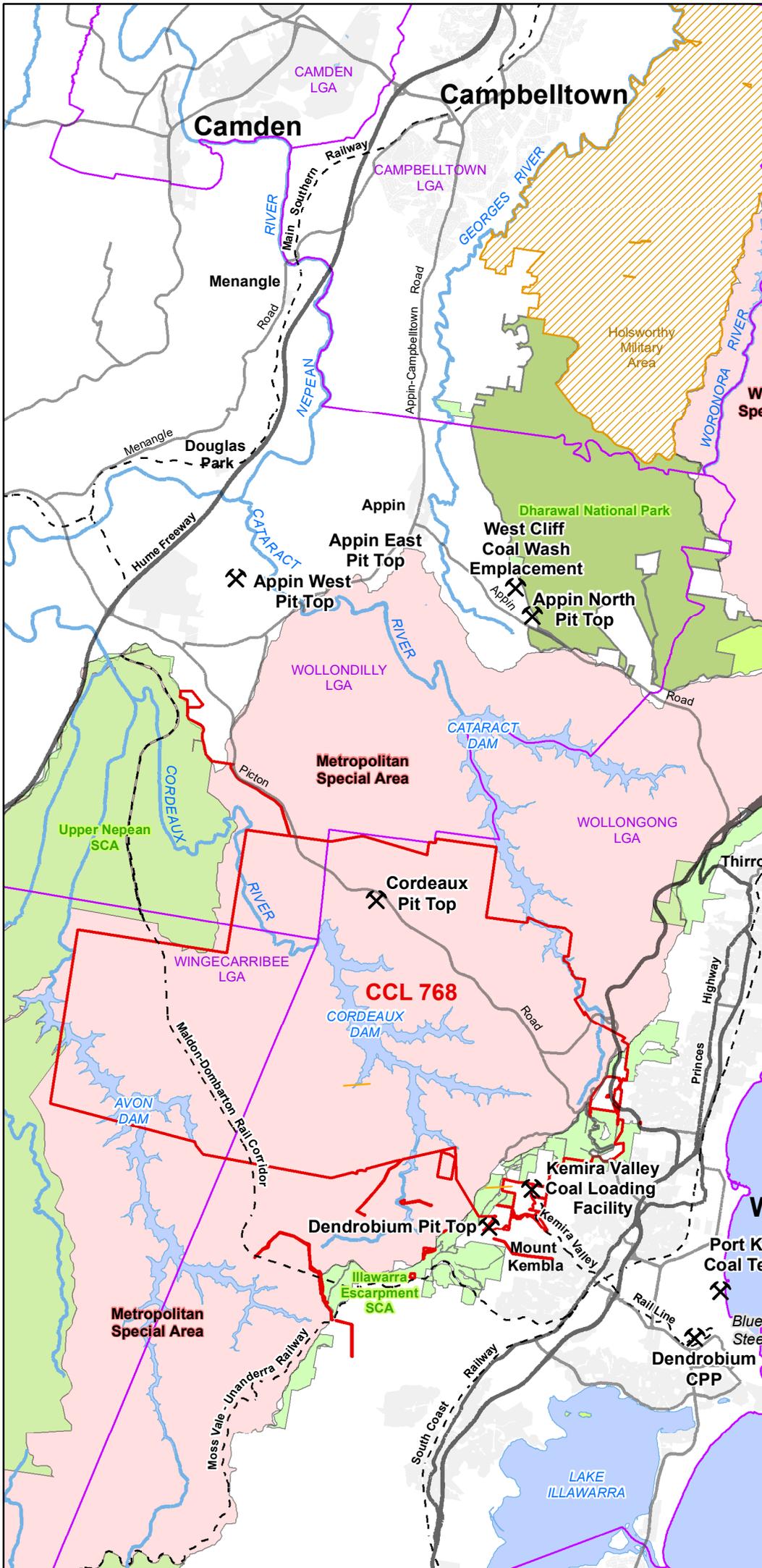
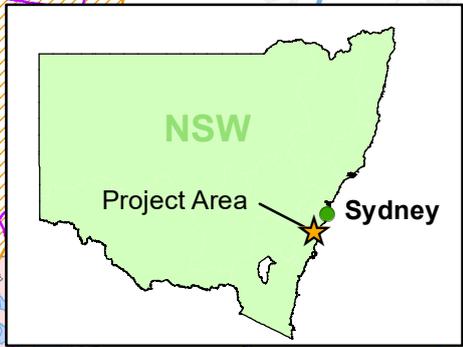
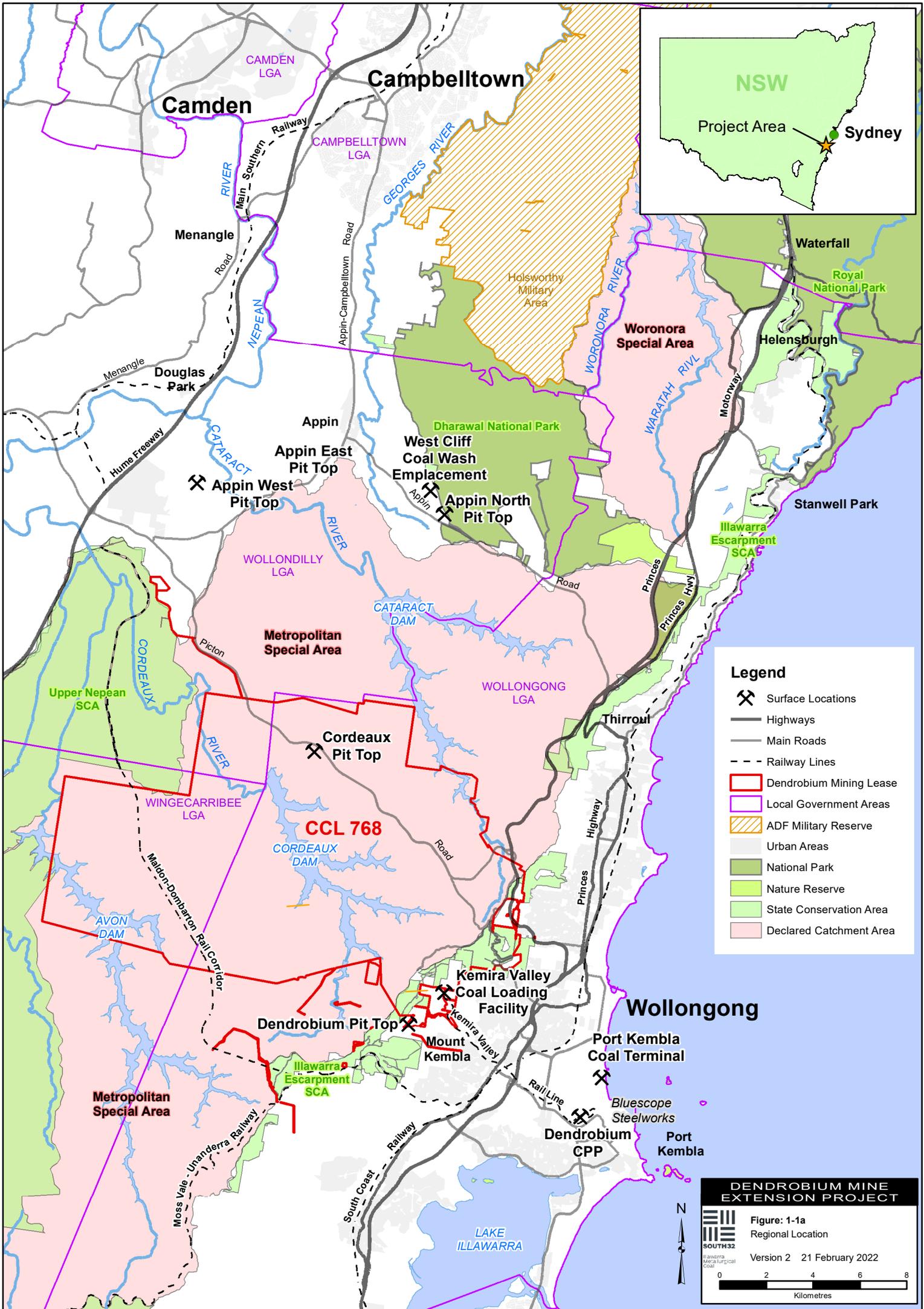
The SEARs were issued in accordance with the requirements of clause 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. A summary of the SEARs is provided in Section 1.3².

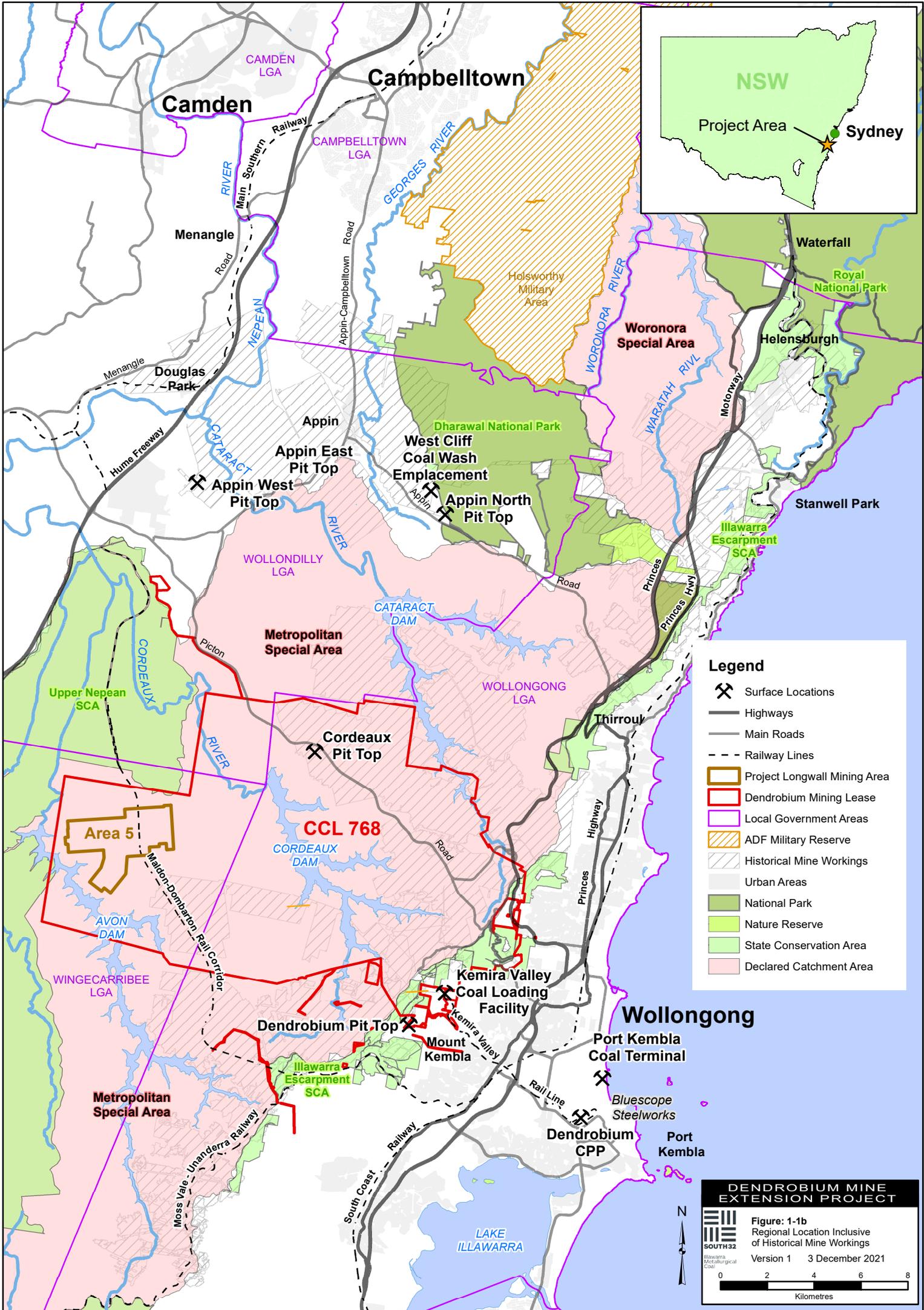
1.1.2 Background

The Dendrobium Mine currently extracts coal from the Wongawilli Seam within CCL 768 using underground longwall mining methods. The Dendrobium Mine primarily produces metallurgical coal for steelmaking and has an approved operational capacity of up to 5.2 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 December 2030 under Development Consent DA 60-03-2001.

¹ Throughout this EIS, South32 is referred to as IMC.

² The *Environmental Planning and Assessment Regulation 2000* was replaced by the *Environmental Planning and Assessment Regulation 2021*.





Legend

- Surface Locations
- Highways
- Main Roads
- Railway Lines
- Project Longwall Mining Area
- Dendrobium Mining Lease
- Local Government Areas
- ADF Military Reserve
- Historical Mine Workings
- Urban Areas
- National Park
- Nature Reserve
- State Conservation Area
- Declared Catchment Area

DENDROBIUM MINE EXTENSION PROJECT

Figure: 1-1b
Regional Location Inclusive
of Historical Mine Workings

Version 1 3 December 2021

Kilometres

SOUTH32
Illawarra Metallurgical Coal

Key surface facilities at the Dendrobium Mine include the:

- Dendrobium No 1 Shaft and No 2 and 3 Shafts (i.e. ventilation shafts);
- Dendrobium Pit Top;
- Kemira Valley Coal Loading Facility;
- Kemira Valley Rail Line;
- Dendrobium Coal Preparation Plant (CPP) located at Port Kembla; and
- West Cliff Stage 3 Coal Wash Emplacement Area.

The general arrangement of the approved Dendrobium Mine is shown on Figure 1-2.

The Project includes the extraction of additional metallurgical coal from the Bulli Seam in a new proposed underground mining area, namely Area 5 (Figure 1-3). The Project would provide continued employment for the existing Dendrobium Mine workforce, with an increase in employment during Project operations, construction and during additional underground development.

IMC is seeking Infrastructure Approval for Infrastructure Application SSI-33143123 under Division 5.2 of Part 5 of the EP&A Act for the Project.

The proposed action to extend underground mining and processing operations at the Dendrobium Mine was referred to the Federal Minister for the Environment in November 2021 (EPBC 2021/9115) (the proposed action). A delegate of the Federal Minister determined on 13 January 2022 that the proposed action is a “controlled action” and, therefore, the action also requires approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The proposed action is to be assessed pursuant to the NSW Assessment Bilateral Agreement between the Commonwealth of Australia and the State of NSW. Therefore, this EIS provides an assessment of potential impacts on the following controlling provisions considered by the Federal Minister to be relevant to the action:

- threatened species and communities listed under the EPBC Act; and
- water resources.

A summary indicating where supplementary SEARs that relate to the controlling provisions have been addressed in the EIS is provided in Attachment 2.

1.1.3 Project Objectives

The EP&A Regulation requires for SSI that an EIS must include a statement of the objectives of the infrastructure (clause 192(1)(b) of the EP&A Regulation).

The objectives of the Project (Section 1.1.3) can be summarised as follows:

- To facilitate continuity of mining at the Dendrobium Mine, directly through the addition of Area 5 for the Project, and also indirectly as the Project supports the financial sustainability of IMC (Dendrobium Mine and Appin Mine) as well as the broader Southern Coalfield economic ecosystem.
- To address the IPC’s concerns for the previous application.
- To avoid and minimise impacts on the Metropolitan Special Area.

Continuation of the Dendrobium Mine

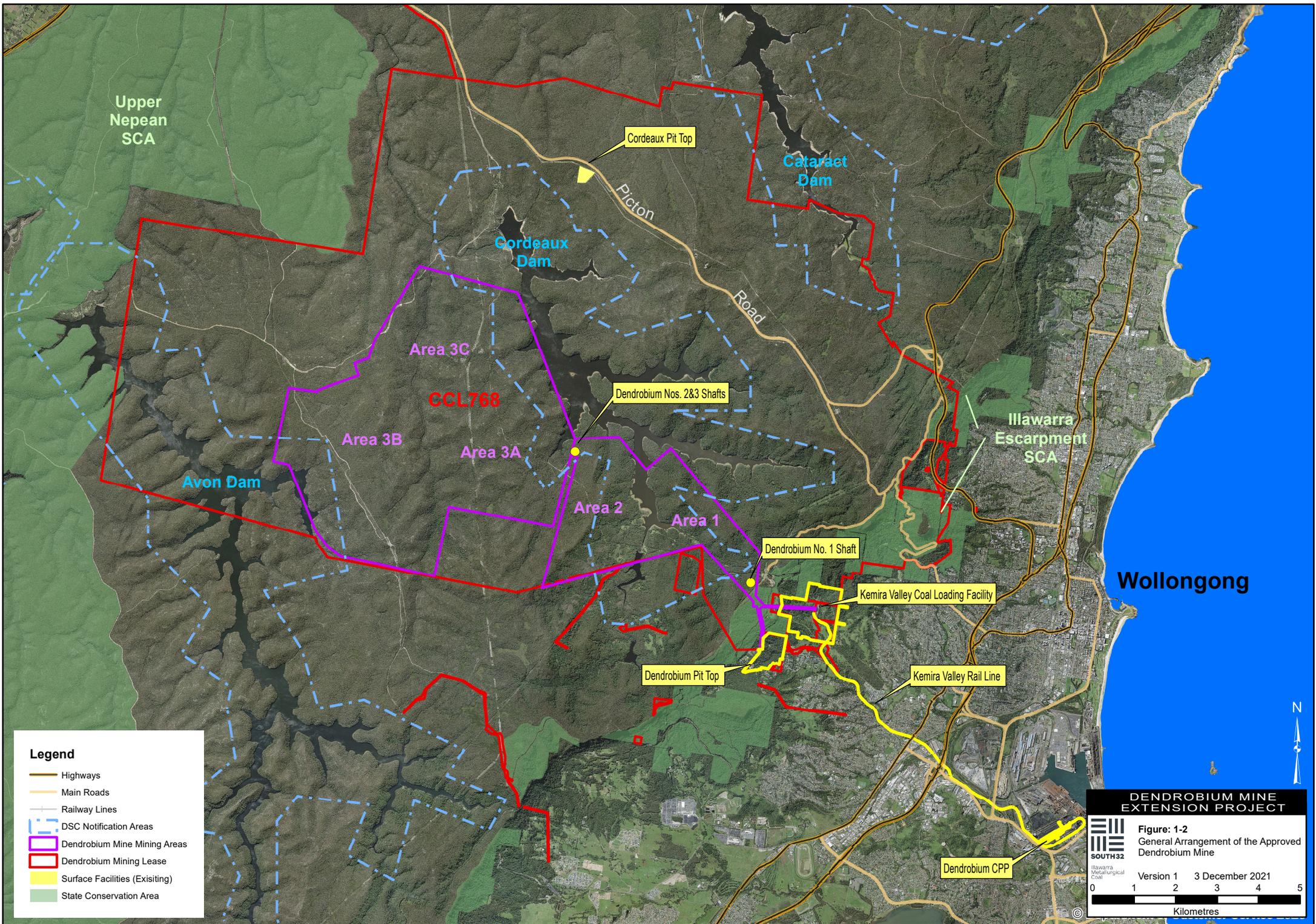
IMC is the largest coal producer in the Southern Coalfield and makes a significant contribution to the Southern Coalfield economic ecosystem.

IMC operates two underground mines producing metallurgical coal. The Appin Mine is an older operation (1962), operates at depth (> 500 metre [m] depth of cover) and is a high gas and highly complex operation in the Bulli Seam. The Appin Mine employs some 1,150 employees and contractors.

Dendrobium Mine currently mines the Wongawilli Seam, commenced operations in 2002 and is a simpler and lower operating cost mine, relative to Appin Mine. The Dendrobium Mine employs some 650 employees and contractors.

The Project proposes to extend the mine life of the Dendrobium Mine through the addition of a new underground mining area (namely Area 5) with extraction in Area 5 currently forecast to commence in 2027. The Project targets the Bulli Seam, as is currently mined at the Appin Mine. Appin Mine product is well known to BlueScope, having been used for many decades in iron and steelmaking at BlueScope’s Port Kembla Steelworks.

The product coal from the Project would be a high quality metallurgical coal suitable for use in steel production domestically and internationally. There would be a small portion of pulverised coal injection (PCI) product extracted in the later stages of Area 5 extraction.



Legend

- Highways
- Main Roads
- Railway Lines
- DSC Notification Areas
- Dendrobium Mine Mining Areas
- Dendrobium Mining Lease
- Surface Facilities (Existing)
- State Conservation Area

DENDROBIUM MINE EXTENSION PROJECT

Illawarra Metallurgical Coal

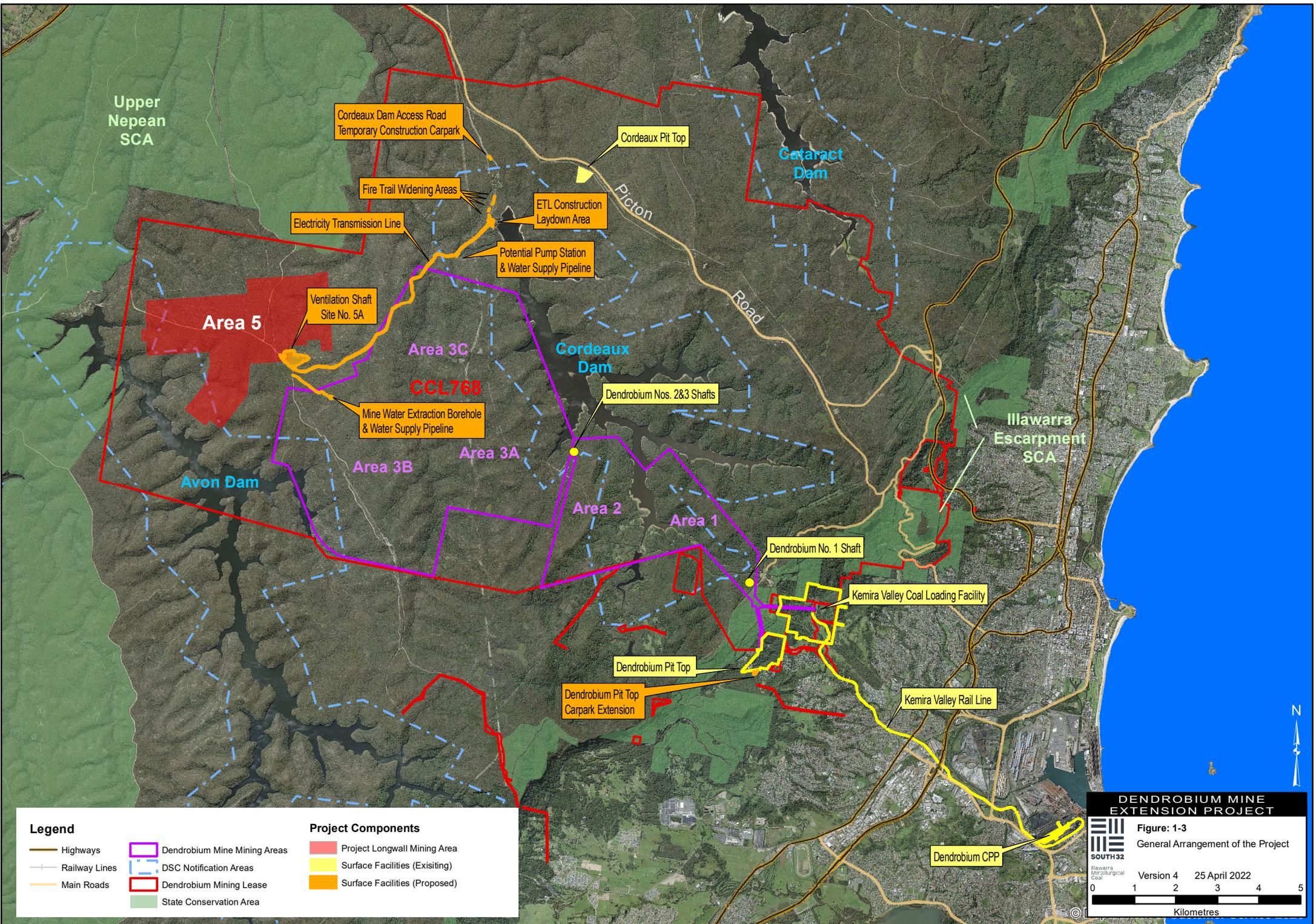
Figure 1-2
General Arrangement of the Approved Dendrobium Mine

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Kilometres





Upper Nepean SCA

Cordeaux Dam Access Road
Temporary Construction Carpark

Cordeaux Pit Top

Cataract Dam

Fire Trail Widening Areas

ETL Construction Laydown Area

Electricity Transmission Line

Potential Pump Station & Water Supply Pipeline

Picton Road

Area 5

Ventilation Shaft Site No. 5A

Area 3C

Cordeaux Dam

Dendrobium Nos. 2&3 Shafts

Mine Water Extraction Borehole & Water Supply Pipeline

Area 3B

Area 3A

Area 2

Area 1

Dendrobium No. 1 Shaft

Illawarra Escarpment SCA

Avon Dam

Kemira Valley Coal Loading Facility

Dendrobium Pit Top

Dendrobium Pit Top Carpark Extension

Kemira Valley Rail Line

Dendrobium CPP

Legend		Project Components	
	Highways		Project Longwall Mining Area
	Railway Lines		Surface Facilities (Existing)
	Main Roads		Surface Facilities (Proposed)
	DSC Notification Areas		
	Dendrobium Mining Lease		
	State Conservation Area		
	Dendrobium Mine Mining Areas		

DENDROBIUM MINE EXTENSION PROJECT

Figure: 1-3
General Arrangement of the Project

Version 4 25 April 2022

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Kilometres

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The Project also includes the use of the existing surface facilities until 2041. This is required to support the potential extraction of the remaining approved resource in Area 3C (Wongawilli Seam), the extraction of which is highly dependent on the development of technology and techniques to support the safe and efficient mining of the resource. Currently, there is significant uncertainty surrounding the mining of the remaining Area 3C resource.

If the Project does not proceed, the Dendrobium Mine is most likely to close after depletion of Longwall 23 in Area 3 (currently forecast in approximately 2027), leading to significant job losses at the Dendrobium Mine and likely flow on effects to the broader IMC, Port Kembla Coal Terminal (PKCT) and the Southern Coalfield economic ecosystem.

Approval of the Project would maximise optionality for IMC and, if the Project is approved and developed, allow coal from Area 5 to be supplied (individually or in a blend with Appin Mine metallurgical coal) to both domestic and export customers.

Historically, the Dendrobium Mine has delivered lower operating costs (than the Appin Mine) making a significant contribution to the overall financial sustainability of IMC.

Therefore, the continued operation of the Dendrobium Mine via the Project would continue to support the financial sustainability of IMC and the broader Southern Coalfield economic ecosystem.

The Project would provide economies of scale for both IMC and the PKCT, supporting the overall financial sustainability of coal mining in the Southern Coalfield.

The Project may (subject to future decisions by, and agreements between, BlueScope and IMC) create optionality for BlueScope to use Bulli Seam product from the Dendrobium Mine as a blend with product from the Appin Mine, or as a discrete coal providing freight cost and carbon advantages to BlueScope.

Ultimately, the blends of coal for coke production are controlled by the end user and subject to agreements with coal suppliers.

If the Dendrobium Mine were to close, the greater IMC complex would lose the benefits of the lower operating costs relative to Appin Mine and the synergies (e.g. labour, overheads and capital, equipment and supply flexibility, and technical support) that have supported IMC for many decades. The capital and operating costs of PKCT would also be absorbed across fewer export tonnes emanating from IMC (Appin Mine) and the remaining producers.

Access to the export market is also critical to ensure the operations can work at a scale that supports the financial sustainability of both IMC and PKCT and ultimately the Southern Coalfield economic ecosystem.

Refined Mine Design

IMC previously sought to extend mining operations at the Dendrobium Mine through a development application for the previous application.

IMC has reviewed the mine plan from the previous application and has adopted a significantly different mine design for the Project that:

- avoids mining beneath significant features (identified by IMC) that may be susceptible to subsidence;
- considers previous mining experience in Dendrobium Mine Area 3B; and
- responds to key stakeholder feedback (including the advice received from the IPC and Independent Advisory Panel for Underground Mining [IAPUM] on the previous application).

Further detail regarding the revised Project mine design is provided in Sections 2 and 4.

Further detail regarding how the revised Project mine design would result in a reduction in potential impacts to the Sydney drinking water catchment is provided in Section 7.

This EIS presents and assesses IMC's preferred indicative design and staging for the Project and how this would be integrated with the extraction of the approved Dendrobium Mine Areas 3B and 3C under Development Consent DA 60-03-2001.

Details of how the Project addresses the principles of ecologically sustainable development (ESD) are provided in Section 8.

1.1.4 Project Summary

The Project would include the following activities:

- longwall mining of the Bulli Seam in a new underground mining area (Area 5);
- development of underground roadways from existing Dendrobium Mine underground areas (namely Area 3) to Area 5;
- use of existing Dendrobium Mine underground roadways and drifts for personnel and materials access, ventilation, dewatering and other ancillary activities related to Area 5;
- development of new surface infrastructure associated with mine ventilation and gas management and abatement, water management and other ancillary infrastructure;
- handling and processing of up to 5.2 Mtpa of ROM coal;
- extension of underground mining operations within Area 5 until approximately 2035;
- use of the existing Dendrobium Pit Top, Kemira Valley Coal Loading Facility, Dendrobium CPP and Dendrobium Shafts with minor upgrades and extensions until approximately 2041;
- transport of ROM coal from the Kemira Valley Coal Loading Facility to the Dendrobium CPP via the Kemira Valley Rail Line;
- handling and processing of coal from the Dendrobium Mine (including the Project) and IMC's Appin Mine (if required) to the Dendrobium CPP to 2041;
- delivery of coal from the Dendrobium CPP to Port Kembla for domestic use at the Port Kembla Steelworks and Liberty Primary Steel Whyalla Steelworks or export through the Port Kembla Coal Terminal (PKCT);
- transport of coal wash by road to customers for engineering purposes (e.g. civil construction fill), for other beneficial uses and/or for emplacement at the West Cliff Stage 3 and Stage 4 Coal Wash Emplacement Area;
- development and rehabilitation of the West Cliff Stage 3 Coal Wash Emplacement Area (noting that opportunities for beneficial use of coal wash would be maximised);
- continued use of the Cordeaux Pit Top for mining support activities such as exploration, environmental monitoring, survey, rehabilitation, administration and other ancillary activities;

- progressive development of sumps, pumps, pipelines, water storages and other water management infrastructure;
- controlled release of excess water (similar to the current regime in the Environment Protection Licence [EPL] 3241) and/or beneficial use;
- monitoring, rehabilitation and remediation of subsidence and other mining effects; and
- other associated infrastructure, plant, equipment and activities.

An indicative Project general arrangement showing the underground mining area is provided in Figure 1-3.

Table 1-1 provides a comparative summary of activities associated with the Project compared to the approved Dendrobium Mine.

1.1.5 Site Location and Tenure

The Infrastructure Application Area for the Project includes those lands listed in the real property description provided in support of the Infrastructure Application (Attachment 3).

The Project is located in the Wollongong, Wingecarribee and Wollondilly Local Government Areas (LGAs) (Figure 1-1a). A description of land zoning in the Infrastructure Application Area for the Project under the relevant local environmental plans (LEPs) for these LGAs is provided in Attachment 7.

The Project underground mining area is located within the catchments of the Avon and Cordeaux Rivers, which are part of Sydney's drinking water catchment. These catchments are included within the Metropolitan Special Area (a WaterNSW Special Area) declared under the NSW *Water NSW Act 2014* (Figure 1-4).

There has been a long history of underground coal mining in these water catchments, with mining having occurred in the Southern Coalfield for more than 100 years and continuing to do so through existing operational mines (Section 3.1).

Relevant land ownership information for land parcels within the immediate vicinity of the Project is provided in Attachment 4.

The Project underground mining area would be located wholly within CCL 768. No additional mining tenements are required for the proposed underground mining associated with the Project.

**Table 1-1
Summary Comparison of the Approved Dendrobium Mine and the Project**

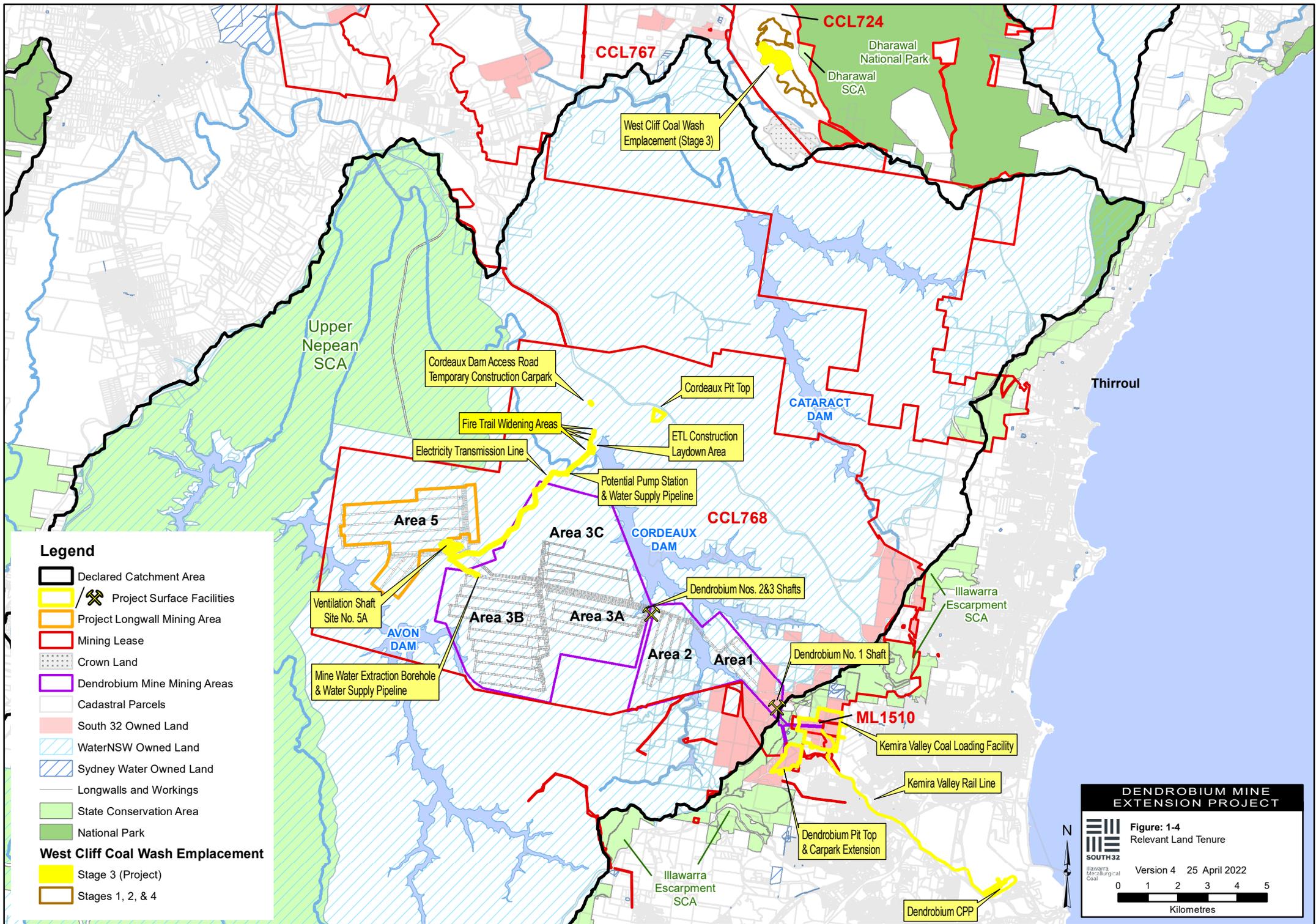
Component	Approved Dendrobium Mine (DA 60-03-2001)	Project
Mine Life	Until 31 December 2030.	Until 31 December 2041 ² .
Mining Method	Underground extraction using longwall mining methods.	No change.
Resource	Mining of the Wongawilli Seam in Areas 1, 2, 3A, 3B and 3C within CCL 768.	Approximately 31 Mt of additional ROM coal within the Bulli Seam in Area 5 within CCL 768.
Annual Production	Handling and processing of up to 5.2 Mtpa of ROM coal.	No change.
Coal Handling and Processing	<p>Transport of coal from underground workings to the Kemira Valley Coal Loading Facility via an underground conveyor network.</p> <p>Sizing and stockpiling of coal at the Kemira Valley Coal Loading Facility prior to transport to the Dendrobium CPP via the Kemira Valley Rail Line, in accordance with the approved hours of operation.</p> <p>Processing of up to 5.2 Mtpa of sized ROM coal at the Dendrobium CPP.</p>	No change.
Management of Mining Waste	<p>Transportation of up to approximately 1.1 Mtpa of coal wash by road from the Dendrobium CPP to the West Cliff Stage 3 and Stage 4¹ Coal Wash Emplacement Area.</p> <p>Development and rehabilitation of the West Cliff Stage 3 Coal Wash Emplacement Area.</p> <p>Supply of coal wash to customers for engineering purposes (e.g. civil construction fill) or for other circular economy opportunities (e.g. beneficial uses).</p>	<p>No change.</p> <p>No change.</p> <p>No change.</p>
General Infrastructure	<ul style="list-style-type: none"> • Dendrobium Pit Top. • Kemira Valley Coal Loading Facility. • Kemira Valley Rail Line. • Dendrobium CPP. • Dendrobium No 1 Shaft and No 2 and 3 Shafts. • West Cliff Stage 3 Coal Wash Emplacement Area. 	<p>Continued use of existing infrastructure with minor upgrades and extensions.</p> <p>Development of new surface infrastructure associated with mine ventilation and gas management and abatement at Shaft Site No. 5A to support underground mining operations in Area 5, and other ancillary infrastructure (including electricity transmission line [ETL] to proposed mine ventilation infrastructure) and minor fire trail upgrades.</p> <p>Development of additional carpark facilities.</p>
Product Transport	Delivery of product coal from the Dendrobium CPP to the BlueScope Port Kembla Steelworks or to PKCT for transport to Liberty Primary Steel Whyalla Steelworks or for export.	No change.

Table 1-1 (Continued)
Summary Comparison of the Approved Dendrobium Mine and the Project

Component	Approved Dendrobium Mine (DA 60-03-2001)	Project
Water Management	<p>Water management infrastructure to separate clean, oily and dirty water.</p> <p>Use of a combination of recycled treated mine water and potable water purchased from Sydney Water in underground and surface operations.</p> <p>Release of water in accordance with the conditions of EPL 3241.</p>	<p>No change (with augmentations and extensions to existing water management infrastructure as required).</p> <p>No change.</p> <p>No change (release volumes and release infrastructure to be modified as required based on Project mine inflow rates).</p> <p>Development of temporary water supply infrastructure for construction water supply for Shaft Site No. 5A.</p> <p>Provision of offsets (funding of “indirect” offsets) for predicted surface water take as a result of the Project that would result in a net gain to Metropolitan water supplies.</p>
Workforce	<p>Current workforce of approximately 650 operational personnel.</p>	<p>At full development, the Project would employ approximately 700 operational personnel (650 existing workforce, additional 50 workforce for the Project).</p> <p>Up to approximately 100 personnel would also be required for construction and development activities.</p>
Hours of Operation	<p>Operated on a continuous basis, 24 hours per day, seven days per week.</p> <p>Trains do not travel on the Kemira Valley Rail Line between 11.00 pm and 6.00 am, unless written approval is obtained from the NSW Environment Protection Authority (EPA) for emergency use of the rail line.</p>	<p>No change.</p>

¹ Development and rehabilitation of the West Cliff Coal Wash Emplacement Area would continue to be conducted in accordance with Project Approval 08_0150 for the Appin Mine.

² Area 5 mine life to approximately 2035. Use of surface infrastructure that forms part of the Project proposed to continue until 2041 to allow receipt of coal mined in approved Area 3C, and the potential for receipt of Appin Mine coal (if required) at the Dendrobium CPP to the end of the currently approved Appin Mine life under Project Approval 08_0150.



Legend

- Declared Catchment Area
- / Project Surface Facilities
- Project Longwall Mining Area
- Mining Lease
- Crown Land
- Dendrobium Mine Mining Areas
- Cadastral Parcels
- South 32 Owned Land
- WaterNSW Owned Land
- Sydney Water Owned Land
- Longwalls and Workings
- State Conservation Area
- National Park

West Cliff Coal Wash Emplacement

- Stage 3 (Project)
- Stages 1, 2, & 4

DENDROBIUM MINE EXTENSION PROJECT

Figure 1-4
Relevant Land Tenure

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Similarly, no additional mining tenements are required for the continued use of the Dendrobium Mine surface facilities for the Project.

1.1.6 Applicant

Illawarra Coal Holdings Pty Ltd (ABN 69 093 857 286) is the applicant for the Project³. Illawarra Coal Holdings Pty Ltd is a wholly owned subsidiary of South32 Limited. Throughout this EIS Illawarra Coal Holdings Pty Ltd is referred to as IMC. The contact details for Illawarra Coal Holdings Pty Ltd are:

Illawarra Coal Holdings Pty Ltd
Level 35
108 St Georges Terrace
PERTH WESTERN AUSTRALIA 6000
Phone: (02) 4286 3000

The Illawarra Coal website is:

<https://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal>

The Dendrobium Mine is located at Cordeaux Road, Mount Kembla NSW 2526.

1.1.7 Interaction with the Approved Dendrobium Mine

Approved Dendrobium Mine

The existing operations at the Dendrobium Mine are undertaken in accordance with Development Consent DA 60-03-2001 (as modified), as well as the Approval Decision (EPBC 2001/214) under the EPBC Act.

The Project does not include the approved underground mining operations in the Wongawilli Seam in Areas 1, 2, 3A, 3B and 3C at the Dendrobium Mine and associated surface activities (such as monitoring and remediation). These underground mining operations would continue to operate in accordance with Development Consent DA 60-03-2001 (as modified).

However, a number of other existing activities and works currently approved at the Dendrobium Mine would be covered by the Infrastructure Approval for the Project (if granted). These activities and works are described in Section 4.

It is proposed that, if Infrastructure Approval is granted for the Project, surface facilities and underground roadways used by the Project would be operated in accordance with the conditions of the Infrastructure Approval, as well as DA 60-03-2001, until such time as DA 60-03-2001 is modified such that activities are undertaken in accordance with the Infrastructure Approval for the Project.

During the life of the Project, it is proposed that the extraction of Project Area 5 would be integrated with the extraction of approved Dendrobium Mine Area 3C (Section 4.5).

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 and is not part of this application.

Coal Wash Management

Coal wash produced at the Dendrobium CPP as part of the Project would be transported by road to the West Cliff Stage 3 and Stage 4 Coal Wash Emplacement Area.

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.

³ At all relevant times in relation to the Project, Illawarra Coal Holdings Pty Ltd will be acting as agent for and on behalf of Dendrobium Coal Pty Ltd in respect of all mining and exploration tenements held by Dendrobium Coal Pty Ltd.

However, it is noted that activities at the West Cliff Coal Wash Emplacement Area are now covered by the Appin Mine Project Approval 08_0150, 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 Emplacements is proposed as part of the Project, notwithstanding operation of the emplacement would continue to occur under Appin Mine Project Approval 08_0150.

Table 1-2 and Figures 1-5 and 1-6 provide a summary of the interaction of the Project with the approved Dendrobium Mine.

1.1.8 Interaction with the Approved Appin Mine

Coal Wash Management

As described in Section 1.1.7, development and rehabilitation of the West Cliff Stage 3 and Stage 4 Coal Wash Emplacement Area⁴ would continue to be conducted in accordance with Project Approval 08_0150 for the Appin Mine, with current approval for use until 31 December 2041.

The environmental impacts of the West Cliff Coal Wash Emplacement Area have been previously assessed as part of the *Application for Further Approval of West Cliff Emplacement Stage 3* (Cardno Forbes Rigby, 2007) and the *Bulli Seam Operations Environmental Impact Statement* (Illawarra Coal, 2009).

The currently approved West Cliff Coal Wash Emplacement Area has sufficient capacity for the Project and other IMC operations (Section 3). This is partly due to IMC's supply of coal wash for engineering purposes (e.g. civil construction fill), or for other beneficial uses, reducing the quantity of coal wash required to be emplaced at the West Cliff Coal Wash Emplacement Area.

Therefore, there is no proposed change to the capacity, extent, height, final landform or rehabilitation of the West Cliff Stage 3 and Stage 4 Coal Wash Emplacement Area required for the Project.

Processing of Appin Mine Coal

ROM coal from the Appin Mine would continue to be transported to the West Cliff CPP for processing; however, it could also be transported to the Dendrobium CPP for processing, if required (consistent with Project Approval 08_0150).

The Project would extend the life of the Dendrobium Mine to 2041, which would allow for the potential receipt of Appin Mine ROM coal at the Dendrobium CPP, if required, to continue to the end of the currently approved Appin Mine life (i.e. 2041).

Table 1-2 provides a summary of the interaction of the Project with the approved Appin Mine.

1.1.9 Interaction with BlueScope Port Kembla Steelworks

BlueScope owns and operates the BlueScope Port Kembla Steelworks in the Wollongong LGA. The Port Kembla Steelworks is located on approximately 742 hectares (ha) of land adjacent to Port Kembla Harbour (Figure 1-7) and operates under a number of approvals.

The Dendrobium CPP is located within the Port Kembla Steelworks and is integrated with its operations. Metallurgical coal from IMC's operations that is sold to BlueScope for steelmaking would continue to be transported to operations within the Port Kembla Steelworks via infrastructure operated by BlueScope. The handling and use of IMC's metallurgical coal at BlueScope's operations beyond the Dendrobium CPP would occur in accordance with the approvals for the Port Kembla Steelworks, and these activities are not part of the Project.

1.1.10 Interaction with Port Kembla Coal Terminal

The PKCT operates in accordance with Project Approval 08_0009 (Figure 1-7). It receives coal from a number of operations in the region via a combination of public and private roads and rail.

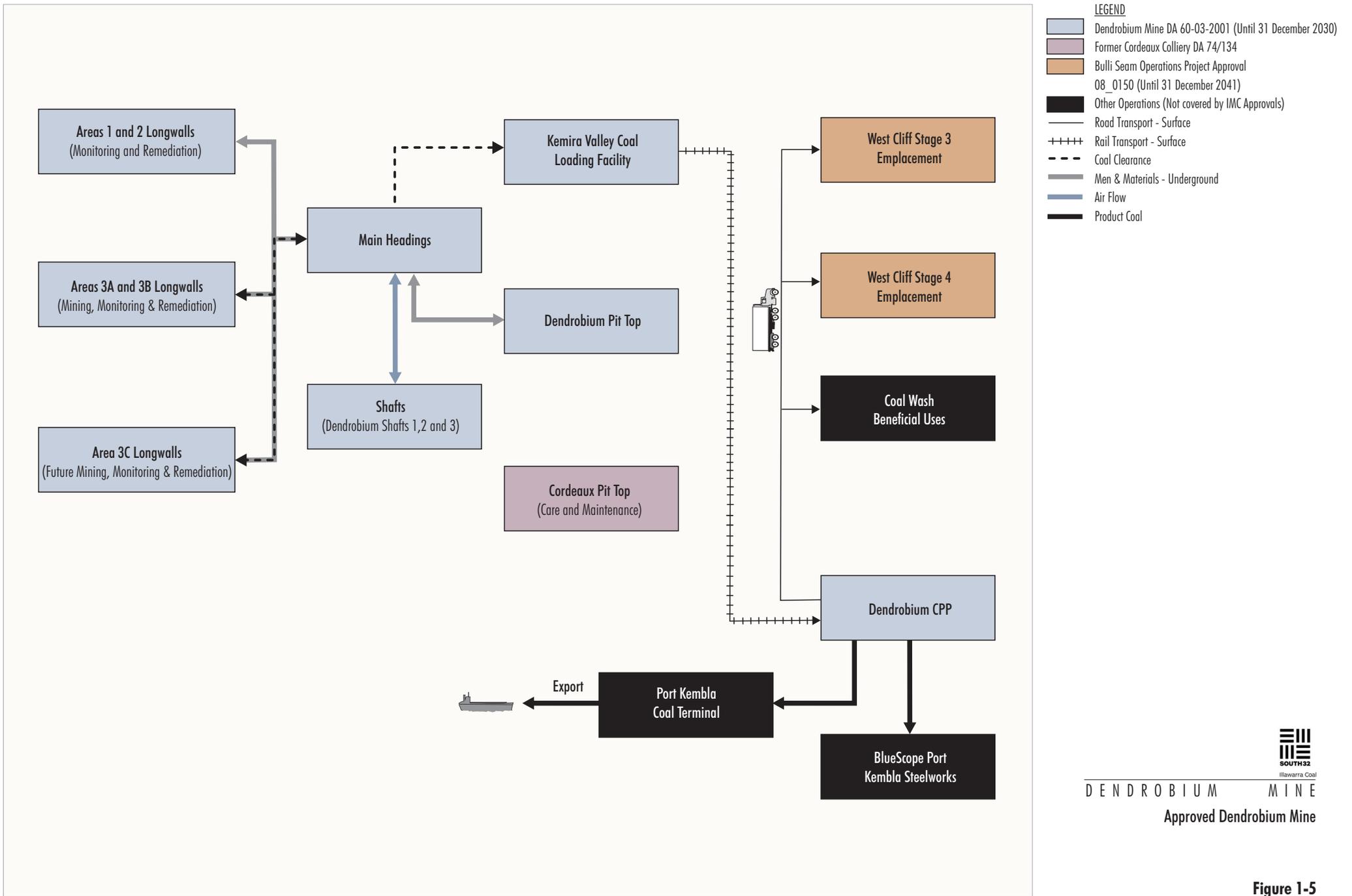
⁴ Stage 4 of the West Cliff Coal Wash Emplacement Area has not yet been commenced.

**Table 1-2
Interaction of Existing and Proposed Approvals**

Operations	Existing Approval / Consent	Proposed Approval	Current Status / Comments
Underground Mining			
Areas 1, 2 and 3A	DA 60-03-2001	Continuation of DA 60-03-2001	Currently approved development – mining has occurred in these domains.
Area 3B	DA 60-03-2001	Continuation of DA 60-03-2001	Currently approved development – currently mining in this area.
Area 3C	DA 60-03-2001	Continuation of DA 60-03-2001 with modification	Currently approved development – mining delayed due to high gas content identified; therefore, modification to DA 60-03-2001 would be required to allow mining of the majority of Area 3C post-2030 subject to a separate application and approval.
Area 5	-	SSI-33143123	New development for the Project – new mining domain.
Surface Facilities			
Dendrobium No 1 Shaft and No 2 and 3 Shafts	DA 60-03-2001	SSI-33143123	Currently approved development – to be used by the Project.
Dendrobium Pit Top	DA 60-03-2001	SSI-33143123	Currently approved development – to be used by the Project.
Kemira Valley Coal Loading Facility	DA 60-03-2001	SSI-33143123	Currently approved development – to be used by the Project.
Kemira Valley Rail Line	DA 60-03-2001	SSI-33143123	Currently approved development – to be used by the Project.
Dendrobium CPP	DA 60-03-2001	SSI-33143123	Currently approved development – to be used by the Project.
West Cliff Stage 1 and Stage 2 Coal Wash Emplacement Area	PA 08_0150 for Appin Mine	Continuation of PA 08_0150 for Appin Mine	Currently approved development under PA 08_0150.
West Cliff Stage 3 Coal Wash Emplacement Area	PA 08_0150 for Appin Mine	SSI-33143123/ Continuation of PA 08_0150 for Appin Mine	Currently approved development – to be used by the Project.
West Cliff Stage 4 Coal Wash Emplacement Area	PA 08_0150 for Appin Mine	SSI-33143123/ Continuation of PA 08_0150 for Appin Mine	Currently approved development – to be used by the Project.

Table 1-2 (Continued)
Interaction of Existing and Proposed Approvals

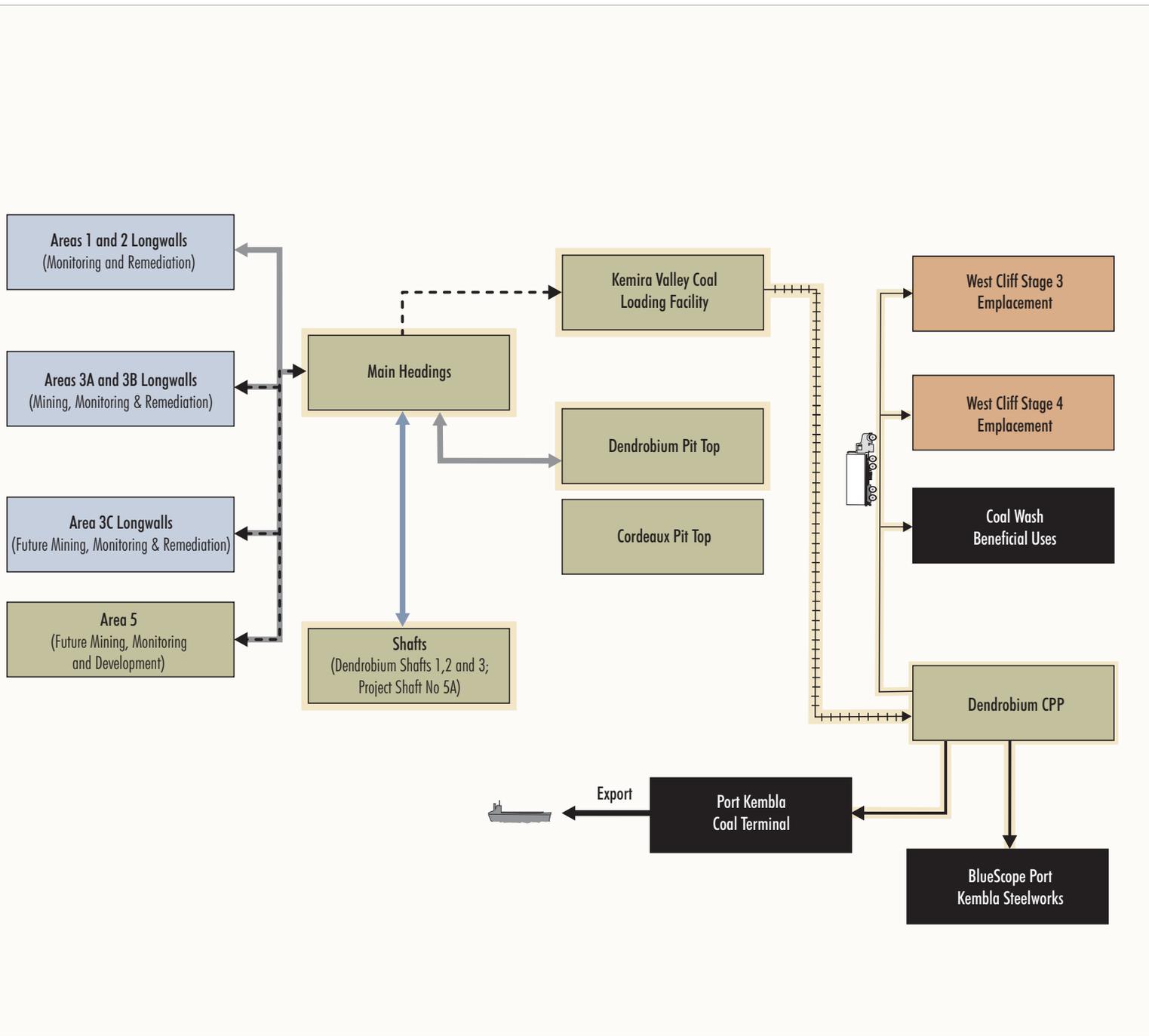
Operations	Existing Approval / Consent	Proposed Approval	Current Status / Comments
Surface Facilities (continued)			
Shaft Site No. 5A (and associated water supply infrastructure, construction carpark and minor fire trail upgrades)	-	SSI-33143123	New development for the Project – new ventilation shafts and associated infrastructure.
33 kiloVolt (kV) ETL	-	SSI-33143123	New development for Project – new ETL.
Dendrobium Pit Top Carpark Extension	-	SSI-33143123	New development for the Project – Dendrobium Pit Top Carpark Extension.
Cordeaux Pit Top	D74/134 issued by Wollongong Council in 1974	SSI-33143123	Currently approved development – to be used by the Project. Council Approval to be surrendered if Infrastructure Approval granted.



- LEGEND**
- Dendrobium Mine DA 60-03-2001 (Until 31 December 2030)
 - Former Cordeaux Colliery DA 74/134
 - Bulli Seam Operations Project Approval 08_0150 (Until 31 December 2041)
 - Other Operations (Not covered by IMC Approvals)
 - Road Transport - Surface
 - Rail Transport - Surface
 - Coal Clearance
 - Men & Materials - Underground
 - Air Flow
 - Product Coal

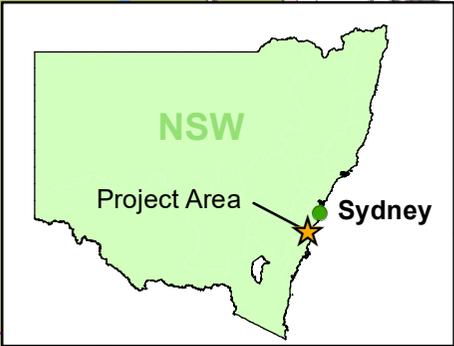

D E N D R O B I U M M I N E
 Approved Dendrobium Mine

Figure 1-5



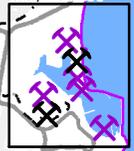
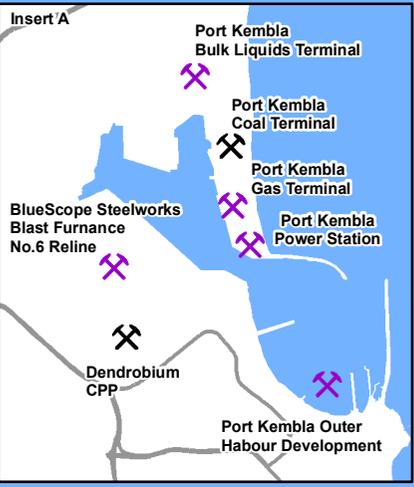
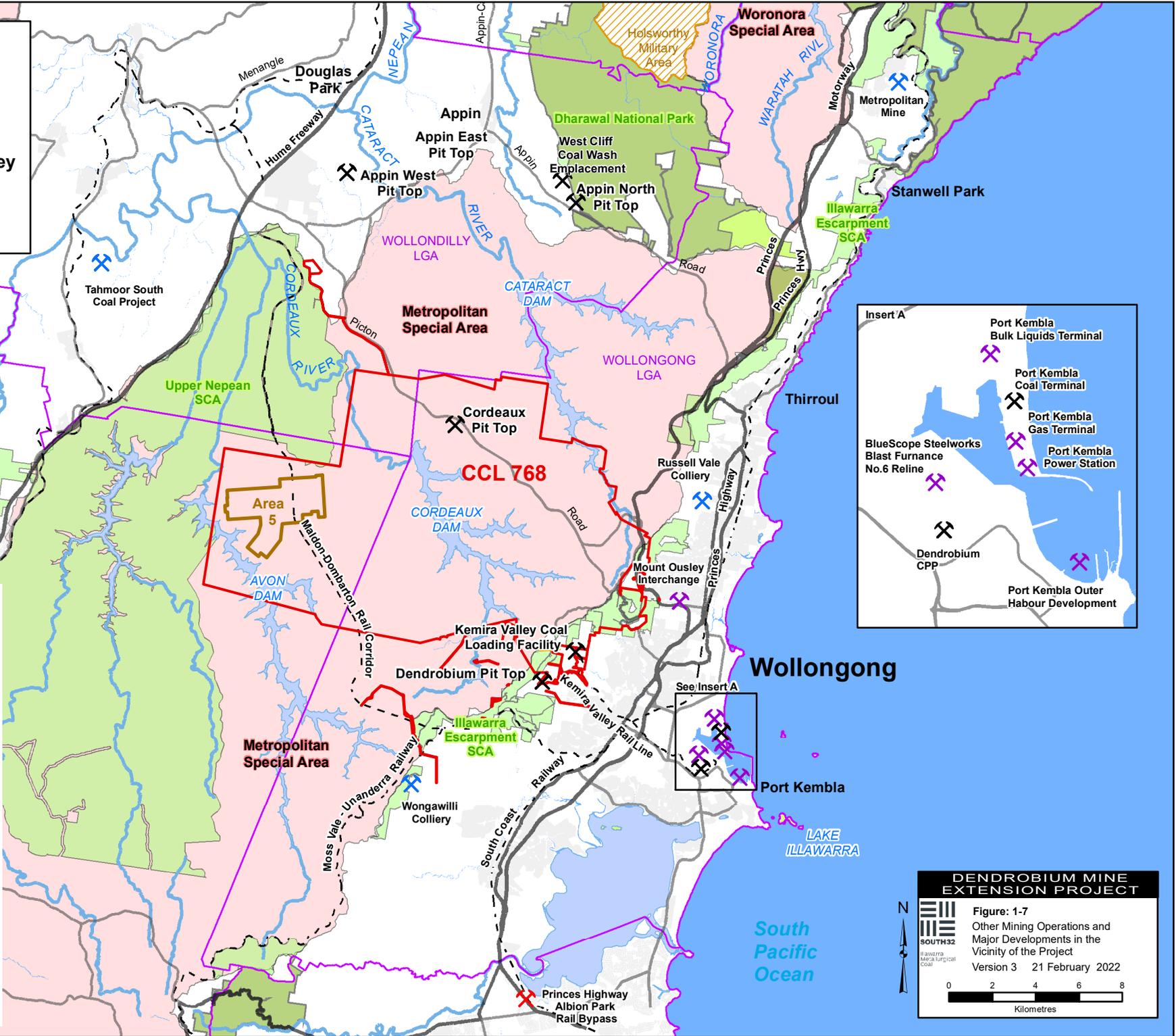
- LEGEND**
- New Infrastructure Approval (Until 31 December 2041)
 - Overlap - New Infrastructure Approval prevails to extent of any inconsistency with DA 60-03-2001
 - DA 60-03-2001 (Until 31 December 2030)
[Note: Area 3C to be extracted prior to end of 2030, or future modification sought]
 - Project Approval 08_0150 (Until 31 December 2041)
 - Other Operations (Not covered by IMC Approvals)
 - Road Transport - Surface
 - Rail Transport - Surface
 - Coal Clearance
 - Men & Materials - Underground
 - Air Flow
 - Product Coal

Figure 1-6



Legend

- Surface Locations
- Mining Operations
- Other Major Developments
- Proposed Other Major Developments
- Dendrobium Mining Lease
- Project Longwall Mining Areas
- Highways
- Main Roads
- Railway Lines
- Local Government Areas
- ADF Military Reserve
- Urban Areas
- National Park
- Nature Reserve
- State Conservation Area
- Declared Catchment Area



DENDROBIUM MINE EXTENSION PROJECT

Figure: 1-7
Other Mining Operations and Major Developments in the Vicinity of the Project

Version 3 21 February 2022

0 2 4 6 8
Kilometres

Metallurgical coal from the Project to be sold for export would be transported to the PKCT via private roads within the Port Kembla Steelworks, where it would be stockpiled for transport to Liberty Primary Steel Whyalla Steelworks or for export.

The handling and stockpiling of Project metallurgical coal at the PKCT would occur in accordance with the approvals for the PKCT, and these activities are not part of the Project.

1.2 POTENTIAL CUMULATIVE INTERACTIONS WITH OTHER PROJECTS

Key proposed or approved projects (in addition to those described above) in the Wollongong LGA and other adjacent LGAs that may potentially interact with, or have potential cumulative impacts with the Project include:

- BlueScope Port Kembla Steelworks Blast Furnace No 6 Reline;
- Port Kembla Outer Harbour Development;
- Port Kembla Gas Terminal;
- Port Kembla Power Station;
- Port Kembla Bulk Liquids Terminal;
- Princes Highway Albion Park Rail Bypass;
- Tahmoor South Coal Project (SIMEC);
- Cordeaux Colliery (IMC-owned, under care and maintenance);
- Russell Vale Colliery (Wollongong Coal, to restart in 2021/2022);
- Wongawilli Colliery (Wollongong, under care and maintenance); and
- Metropolitan Mine (Peabody).

Figure 1-7 shows the locations of these other major developments relative to the Project.

The Scoping Report for the Project describes whether the Project is likely to generate cumulative impacts with other developments/projects in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects*. Cumulative impacts have been assessed as relevant in the EIS.

1.3 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The SEARs for the Project were issued by the DPE on 23 December 2021, with an amendment to the SEARs issued on 25 January 2022 for the EPBC Act assessment requirements.

A summary of the SEARs is provided in Tables 1-3 and 1-4, as well as in the relevant section of the EIS where the SEARs are addressed.

A detailed reconciliation of where the SEARs (including the supplementary EPBC Act requirements) have been addressed in the EIS is provided in Attachment 2.

1.4 PROJECT CONSULTANTS

This EIS was prepared by IMC and Resource Strategies Pty Ltd with specialist input provided by the following organisations:

- IMC (*project design, alternatives and justification, baseline data, stream mapping, geographical information system management, land tenure, resource economics, geological structure review, consultation, preliminary hazard analysis, rehabilitation and environmental management and monitoring*);
- Mine Subsidence Engineering Consultants (MSEC) (*subsidence predictions and impact assessment*);
- Watershed HydroGeo (*groundwater assessment and numerical groundwater modelling*);
- Hydro Engineering & Consulting Pty Ltd (HEC) (*surface water assessment and site water balance*);
- Niche Environment and Heritage (Niche) (*baseline flora and fauna surveys, biodiversity development assessment report, Aboriginal cultural heritage assessment, historical heritage assessment*);
- Cardno (*aquatic ecology assessment*);
- The Transport Planning Partnership (TTPP) (*road transport assessment*);
- Ramboll Australia Pty Ltd (Ramboll) (*air quality and greenhouse gas assessment*);

**Table 1-3
Secretary’s Environmental Assessment Requirements – Reference Summary¹**

Summary of EIS Requirements	EIS Reference
General Requirements	
<p>The Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> and must have regard to the <i>State Significant Infrastructure Guidelines</i>.</p> <p>Note: The <i>Environmental Planning and Assessment Regulation 2000</i> was replaced by the <i>Environmental Planning and Assessment Regulation 2021</i>, which replicates the requirements of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> in Division 8 of Part 5 of <i>Environmental Planning and Assessment Regulation 2021</i>.</p>	EIS (general structure and content)
<p>In particular, the EIS must include:</p> <ul style="list-style-type: none"> • a stand-alone executive summary; 	Executive Summary
<ul style="list-style-type: none"> • a full description of the development, including: <ul style="list-style-type: none"> - historical mining operations at the mine and in the surrounding region; 	Section 3
<ul style="list-style-type: none"> - details of the resource to be extracted and justification for the proposed mine design, having regard to the advice of Regional NSW – Mining, Exploration and Geosciences (MEG) (see Attachment 2); 	Section 4
<ul style="list-style-type: none"> - the mine layout and likely staging or sequencing of the development, including construction, exploration, operation and rehabilitation; 	Section 4
<ul style="list-style-type: none"> - coal production rates (ROM and product) and a life of mine production schedule; 	Section 4.5
<ul style="list-style-type: none"> - forecast production tonnages split into market segment, including export/domestic and thermal/metallurgical coal markets; 	Section 4 ²
<ul style="list-style-type: none"> - coal processing and transportation arrangements; 	Sections 4.6 and 4.7
<ul style="list-style-type: none"> - surface infrastructure and facilities; 	Section 4.10
<ul style="list-style-type: none"> - workforce requirements during all phases of the development (on a full-time equivalent basis); 	Section 4.14
<ul style="list-style-type: none"> - a waste management strategy; 	Section 4.11
<ul style="list-style-type: none"> - a water management strategy; 	Section 4.9
<ul style="list-style-type: none"> - a rehabilitation strategy; 	Section 4.13 and Attachment 9
<ul style="list-style-type: none"> - the likely interactions between the development and any other historical, existing, approved or proposed mining or infrastructure projects in the vicinity of the site; 	Sections 1.1, 1.2 and 4.15
<ul style="list-style-type: none"> • strategic context for the development in regard to supply of coal for steelmaking or other purposes; 	Section 2
<ul style="list-style-type: none"> • the statutory context for the development including any approvals that must be obtained before the development may commence; 	Section 5
<ul style="list-style-type: none"> • consideration of alternatives; 	Sections 2 and Attachment 11
<ul style="list-style-type: none"> • an assessment of the likely impacts of the development on the environment focusing on the specific issues identified below, including: <ul style="list-style-type: none"> - a description of the existing environment likely to be affected by the development, using sufficient baseline data; 	Section 7 and Appendices A to S
<ul style="list-style-type: none"> - an assessment of the likely impacts of all stages of the development, including appropriate worst-case scenarios, consideration of any cumulative impacts, taking into consideration any relevant legislation, environmental planning instruments (EPIs), guidelines, policies, plans and industry codes of practice and with consideration to advice provided by agencies in Attachment 2; 	

Table 1-3 (Continued)
Secretary’s Environmental Assessment Requirements – Reference Summary¹

Summary of EIS Requirements	EIS Reference
General Requirements (continued)	
<ul style="list-style-type: none"> - a description of the measures that would be implemented to avoid, mitigate and/or offset the likely impacts of the development, and an assessment of: <ul style="list-style-type: none"> o whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented; o the likely effectiveness of these measures, including performance measures where relevant; o whether contingency plans would be necessary to manage any residual risks; and o a description of the measures that would be implemented to monitor and report on the environmental performance of the development if it is approved; 	Section 7, Attachment 10 and Appendices A to S
<ul style="list-style-type: none"> • a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; 	Attachment 10
<ul style="list-style-type: none"> • an evaluation of the project as a whole having regard to: <ul style="list-style-type: none"> - relevant matters for consideration under the <i>Environmental Planning and Assessment Act 1979</i>, including the principles of Ecologically Sustainable development and the objects of the Act; 	Sections 8.3 and 8.6
<ul style="list-style-type: none"> - the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; 	Sections 2.3.4 and 8.2
<ul style="list-style-type: none"> - the strategic need and justification for the project, including the relative importance of its role in supplying coal to BlueScope Steel, including in the context of medium to long term changes in steel production moving to “green steel” operations; 	Section 2, Section 8.2, Attachment 11 and Appendix R
<ul style="list-style-type: none"> - feasible alternatives to the development (and its key components), including the consequences of not carrying out the development; and 	Section 8.2 and Attachment 11
<ul style="list-style-type: none"> - the biophysical, economic and social costs and benefits of the development; 	Section 7, Section 8.5 and Appendices A to S
<ul style="list-style-type: none"> • a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading. 	EIS Cover Page
Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the infrastructure.	Appendix M
Where relevant, the assessment of key issues below, and any other significant issues identified in the risk assessment, must include:	Section 7 and Appendix A to S
<ul style="list-style-type: none"> • adequate baseline data; 	
<ul style="list-style-type: none"> • consideration of the potential cumulative impacts due to other developments in the vicinity (completed, underway or proposed); and 	Section 7 and Appendices A to S
<ul style="list-style-type: none"> • measures to avoid, minimise and if necessary, offset predicted impacts, including detailed contingency plans for managing any significant risks to the environment. 	Section 7, Attachment 10 Appendices A to S
The EIS must also be accompanied by:	Attachment 13
<ul style="list-style-type: none"> • a report from a qualified quantity surveyor providing a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived. The report shall be prepared on company letterhead and indicate applicable GST component of the CIV and include certification that the information provided is accurate at the date of preparation; and 	
<ul style="list-style-type: none"> • an estimate of jobs that will be created during the construction and operational phases of the proposed infrastructure. 	Section 4

Table 1-3 (Continued)
Secretary’s Environmental Assessment Requirements – Reference Summary¹

Summary of EIS Requirements	EIS Reference
Key Issues	
• Justification and Alternatives.	Section 8 and Attachment 11
• Subsidence.	Sections 7.3 to 7.11 and Appendices A to G
• Water.	Sections 7.5 to 7.9 and Appendices B to E
• Biodiversity.	Sections 7.7 to 7.9 and Appendices D and E
• Heritage.	Sections 7.10 and 7.11 and Appendices F and G
• Land.	Section 7.4 and Appendix O
• Transport.	Sections 7.12 and Appendix H
• Hazards and Bushfire.	Section 7.22 and Appendices M and N
• Visual.	Section 7.18
• Waste.	Section 4.11
• Rehabilitation and Final Landform.	Attachment 9 and Appendix Q
• Social.	Section 7.20 and Appendix K
• Economic.	Section 7.19 and Appendix L
Engagement	
<p>During the preparation of the EIS and subsequent assessment process, you must consult with the Dendrobium Community Consultative Committee (DCCC) in accordance with the Community Consultative Committee Guidelines: State Significant Projects.</p> <p>You must also consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups including the Aboriginal community and affected landowners.</p> <p>The EIS must detail the engagement undertaken and demonstrate how it was consistent with the Undertaking Engagement Guide: Guidance for State Significant Projects. The EIS must detail how issues raised and feedback provided have been considered and responded to in the project.</p>	Section 6

¹ The complete version of the SEARs is presented in Attachment 1.

² Forecast production tonnages cannot be accurately split into market segments, as product coal is blended with coal from the Appin Mine to meet customer specifications, and sold as a single IMC product. In addition, this information is considered commercial in confidence (as recognised by the Mining, Exploration and Geoscience [MEG] in its advice to the SEARs). IMC can provide this information commercial in confidence to DPIE if requested.

**Table 1-4
Content Requirements of an EIS – Clauses 190 and 192 of the EP&A Regulation**

Summary of Clauses 190 and 192 of the EP&A Regulation	EIS Reference
The EIS must include:	
• Summary of the EIS.	Executive Summary
• Objectives of the Project.	Sections 1.1.3 and 8
• Analysis of any feasible alternatives to the Project, including the consequences of not carrying out the Project.	Section 8
• Description of the Project.	Section 4
• Description of the environment likely to be affected by the Project.	Section 7
• The likely impacts on the environment of the Project.	Section 7
• Description of the measures proposed to mitigate any adverse effects of the Project on the environment.	Sections 7 and 8
• A list of any approvals that must be obtained under any other Act or law before the Project may lawfully be carried out.	Section 5
• Compilation (in a single section of the EIS) of the measures proposed to mitigate any adverse effects of the Project on the environment.	Section 8
• The reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ESD.	Section 8

- Renzo Tonin & Associates (*noise and blasting assessment*);
- Square Peg Social Performance (*social impact assessment*);
- Ernst and Young Global Limited (EY) (*economic assessment*);
- JBS&G Australia Pty Ltd (JBS&G) (*land contamination assessment*);
- Pells Sullivan Meynink Consulting Pty Limited (PSM) (*geological structures review*);
- SLR Consulting (SLR) (*mine closure study*);
- Gordon Geotechniques Pty Ltd (GGPL) (*geotechnical assessment*);
- Risk Mentor (*facilitation of environmental risk assessment*);
- Professor Bruce Hebblewhite (*subsidence and height of fracturing assessments peer review*);
- Brian Barnett (*groundwater assessment peer review*); and
- Palaris (*greenhouse gas emission and mitigation measures peer review*).

Peer reviews undertaken for the Subsidence and Height of Fracturing Assessments, Groundwater Assessment and the greenhouse gas emission estimates are included as Attachment 5.

1.5 DOCUMENT STRUCTURE

This EIS comprises a main text component and supporting studies, which include Appendices A to S. An overview of the main text is presented below:

Section 1	Provides an introduction to the Project and this EIS.
Section 2	Outlines the strategic planning context relevant to the Project.
Section 3	Describes the history and components of the approved Dendrobium Mine and the Cordeaux Colliery.
Section 4	Describes the various components and stages of the Project.
Section 5	Outlines the statutory provisions relevant to the Project.
Section 6	Describes the consultation and engagement undertaken in relation to the EIS and ongoing community involvement.

Section 7	Details the environmental assessment of the Project, including a description of the existing environment, an assessment of potential impacts and a description of measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the potential impacts of the Project.	Attachment 12	Independent Planning Commission and Agency Issues Reconciliation Table.
		Attachment 13	Capital Investment Value Report.
		Attachment 14	Community Information.
		Attachment 15	Coal Resource and Reserve Statement.
Section 8	Describes how the Project (when compared with other alternatives) is in the public interest and balances impacts, strategic needs, and benefits.	Appendices A to S contain supporting information, including a number of specialist reports:	
		Appendix A	Subsidence Assessment.
		Appendix B	Groundwater Assessment.
Section 9	Lists the documents referenced in Sections 1 to 8 of this EIS.	Appendix C	Surface Water Assessment.
		Appendix D	Biodiversity Development Assessment Report (BDAR).
Section 10	Defines abbreviations, acronyms and terms used in Sections 1 to 8 of this EIS.	Appendix E	Aquatic Ecology Assessment.
		Appendix F	Aboriginal Cultural Heritage Assessment (ACHA).
Attachments to the main text are also provided as follows:		Appendix G	Historical Heritage Assessment with Statement of Heritage Impact.
Attachment 1	Secretary’s Environmental Assessment Requirements.	Appendix H	Road Transport Assessment.
Attachment 2	Cross Reference to Assessment Requirements.	Appendix I	Air Quality and Greenhouse Gas Assessment.
Attachment 3	Infrastructure Application Area and Real Property Descriptions.	Appendix J	Noise and Blasting Assessment.
Attachment 4	Land Ownership and Landholder Key.	Appendix K	Social Impact Assessment (SIA).
Attachment 5	Peer Review Letters.	Appendix L	Economic Assessment.
Attachment 6	Relevant Strategic Planning Documents.	Appendix M	Environmental Risk Assessment (ERA).
Attachment 7	Consideration of Environmental Planning Instruments.	Appendix N	Preliminary Hazard Analysis (PHA).
Attachment 8	Aquifer Interference Policy Considerations and Water Licensing Addendum.	Appendix O	Land Contamination Assessment.
		Appendix P	Geological Structure Review.
Attachment 9	Rehabilitation Strategy and Mine Closure Addendum.	Appendix Q	Mine Closure Study.
		Appendix R	Greenhouse Gas Report.
Attachment 10	Summary of Mitigation Measures.	Appendix S	Geotechnical Assessment.
Attachment 11	Consideration of Alternatives.		