# SECTION 2

Strategic Context

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# 2 STRATEGIC CONTEXT

This section outlines the strategic context for the Project, with regard to the approvals history of the Project proposal, relevant strategic plans and policies, and the Project context of the natural and built environment.

This section also describes the strategic need for, and potential benefits of, the Project. Additional consideration of a range of other relevant strategic planning documents of potential relevance to the Project is provided in Attachment 6. Additional justification of the Project is provided in Section 8.

## 2.1 REGIONAL CONTEXT

The Dendrobium Mine is located within the Southern Coalfield of NSW (Figure 1-1a), and the broader Illawarra Region, which comprises the Wollongong, Shellharbour and Kiama LGAs.

Wollongong is the third largest city in NSW (Square Peg, 2022), and in 2020 the Wollongong LGA had a population of approximately 220,000 people (Wollongong City Council, n.d.).

Mining is an important contributor to the economy of the Wollongong LGA and the broader Illawarra Region (Square Peg, 2022). While the mining sector accounts for approximately 2% of regional employment, it is the fifth largest industry in the Illawarra Region in terms of economic output (Square Peg, 2022).

The existing and Project underground mining areas at the Dendrobium Mine are located within the Metropolitan Special Area (Figure 1-1b) which is declared under the *Water NSW Act 2014*. Public access to the Metropolitan Special Area is restricted, to maintain drinking water quality.

Mining within the Metropolitan Special Area has occurred for more than 100 years, including longwall mining for the existing Dendrobium Mine.

The existing Dendrobium Mine and the Project surface facilities are located primarily within the Wollongong LGA (Figure 1-1a to 1-3); however, the Project Application Area also incorporates portions of the adjoining Wingecarribee and Wollondilly LGAs associated with the Metropolitan Special Area and IMC's existing Mining Leases (Figure 1-1a).

Project longwall mining would continue to occur beneath catchment areas of the Metropolitan Special Area (Figure 1-3), where access by the public is prohibited and most industries are thereby precluded from operating (the permissibility of underground mining in the Metropolitan Special Area is described in Section 5 and Attachment 7).

### 2.1.1 Southern Coalfield Economic Ecosystem

The Southern Coalfield economic ecosystem includes metallurgical coal mines, coal exports through PKCT, and the production of primary steel at the BlueScope Port Kembla Steelworks (BAEconomics, 2020):

> *… the ongoing economic viability of the premium hard coking coal mining, iron smelting and coal transport and shipping businesses located in and around the Wollongong-Port Kembla area and elsewhere in the Southern Coalfield of NSW is critically dependent on the continuing success of both Illawarra Metallurgical Coal and BlueScope Steel.*

IMC's Dendrobium Mine and Appin Mine directly employ approximately 1,800 personnel in the Illawarra Region and IMC's operations play an important role in the Southern Coalfield economic ecosystem.

The continuation of the Dendrobium Mine as proposed for the Project is important to the continued financial sustainability of IMC's operations and, therefore, the broader Southern Coalfield economic ecosystem. This broader ecosystem is estimated to employ approximately 5,500 personnel in the Illawarra Region and, inclusive of indirect employment, up to approximately 25,000 people nationally (BAEconomics, 2020).

The closure of IMC's operations (i.e. Dendrobium Mine and Appin Mine) could cost the local Wollongong region around A$6.4 billion per year in lost regional product and the estimated loss to the Australian economy as a whole could be as high as A$10.7 billion per year (BAEconomics, 2020).

The Southern Coalfield economic ecosystem and the Dendrobium Mine and IMC's roles within this system are discussed further in Sections 1, 4.2 and 8.

## 2.2 PROJECT CONTEXT

### 2.2.1 Approved Dendrobium Mine

The Dendrobium Mine currently 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 the following:

- five approved underground mining domains, named Areas 1, 2, 3A, 3B and 3C (longwall mining is currently being undertaken in Area 3B, with extraction largely complete in Areas 1, 2 and 3A);
- approved operational capacity of up to 5.2 Mtpa of ROM coal; and
- approved mine life until 31 December 2030.

Existing approved underground mining operations at the Dendrobium Mine would continue to operate in accordance with the existing Development Consent DA 60-03-2001 (as modified) (Figures 1-6 and 1-7).

The existing surface operations of the Dendrobium Mine include the Dendrobium Pit Top, Kemira Valley Coal Loading Facility, Kemira Valley Rail Line, Dendrobium CPP, Dendrobium Shaft No 1 and No 2 and 3 Shafts and the West Cliff Stage 3 Coal Wash Emplacement Area. These facilities would continue to operate, and Dendrobium Mine activities at these facilities would be extended to 2041 under the Project.

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 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.

Accordingly, in the absence of the Project, there will be longwall discontinuity and, therefore, no production from the Dendrobium Mine for an extended period, which may potentially make the Dendrobium Mine (as well as Area 3C) and IMC less financially sustainable (Section 8).

The Project would provide continued employment of the existing Dendrobium Mine workforce of approximately 650 personnel. The Project activities and works, and interactions between activities under the Project and DA 60-03-2001, are described in Sections 3 and 4.

### 2.2.2 Review of the Independent Expert Panel for Mining in the Catchment

The effect of underground mining within the Metropolitan Special Area has been subject to multiple reviews, including the Stored Water Inquiry by Justice Reynolds (Reynolds, 1976), Southern Coalfield Inquiry (NSW Government, 2008a) and reviews by the Independent Expert Panel for Mining in the Catchment (IEPMC).

The most recent review by the IEPMC (2019) concluded there has been no observed material impacts to drinking water supplies due to mining in these catchments, including mining by the Dendrobium Mine:

> *Reservoir leakage rates – there is no measured evidence of significant long-term leakage from reservoirs due to mining in the Special Areas.*
>
> *…*
>
> *Watercourse bed leakage (at catchment scale) – from material presented to the Panel, there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies.*

Further, with respect to potential impacts on water quality in the catchment, the IEPMC (2019) concluded:

> *Although the impact of underground long-wall mining in the catchment could lead to small changes in the levels of impurities in water entering SCA's dams, these changes can be coped with by SW's* [Sydney Water's] *treatment plants as evidence to date does not suggest a sufficiently large change in soluble organic concentrations to be of concern.*

The revised Project mine plan has a reduced overall footprint and would, therefore, further reduce potential impacts to the Metropolitan Special Area when compared to the previous mine plan.

In addition, the recommendations of the IEPMC (2019) have been comprehensively considered and addressed in the preparation of this EIS (Sections 4, 7 and 8).

### 2.2.3 Advice of the Independent Advisory Panel for Underground Mining

IMC sought to extend mining operations at the Dendrobium Mine through the previous application.

In October 2020, the IAPUM provided advice to the DPE on the previous application.

This advice included some 45 conclusions regarding potential subsidence, groundwater and surface water impacts of the previous application, and provided 14 specific recommendations regarding project assessment, conditioning and residual risks for consideration by the NSW Government.

IMC subsequently accepted all 14 recommendations of the IAPUM, noting that many of the recommendations were addressed to the DPE (IMC, 2020d).

### 2.2.4 Assessment and IPC Refusal of the Previous Application

The DPE concluded in its "whole-of-government" Assessment Report that the previous application was in the public interest and recommended approval (DPIE, 2020a).

It is noted that public and non-government organisation submissions on the EIS for the previous application primarily expressed support for approval of the proposed extension to the Dendrobium Mine (79%) (Section 6).

The "whole-of-government" Assessment Report for the previous application concluded (DPIE, 2020a):

> *Mining at Dendrobium has taken place for many years without any significant impacts on Sydney's drinking water supply, as was confirmed by the Catchment Panel in its Final Report.*

Notwithstanding the DPE's advice, the previous application was refused by the IPC in February 2021, primarily due to the IPC's view of the assessed potential impacts of the mine development on the Metropolitan Special Area.

The revised Project mine plan proposed in this EIS reduces the overall footprint, thereby reducing potential impacts on the Metropolitan Special Area (Sections 4, 7 and 8).

### 2.2.5 Parliamentary Motion

Following the IPC's refusal of the previous application and in recognition of the significance of the Dendrobium Mine to NSW, on 5 May 2021 the NSW Upper House agreed to a Parliamentary Motion requesting that any future development for the Project should be declared SSI and be determined by the Minister for Planning.

The Parliamentary Motion also stated that IMC should lodge a new planning proposal taking into account issues raised in the IPC's Statement of Reasons for refusal of the previous application, and the new application be subject to merit assessment consistent with applicable NSW planning controls and environmental standards.

Consistent with the Parliamentary Motion of 5 May 2021, this EIS provides IMC's revised application for the Project, which includes consideration of issues raised in the IPC's Statement of Reasons for refusal of the previous application (Sections 2.2.7 and 8).

### 2.2.6 SSI Declaration

In December 2021, the Project was declared SSI under section 5.12 of Part 5 of the EP&A Act by the Minister.

This declaration has reinforced the NSW Government's identification of the strategic importance of the continuation of the Dendrobium Mine to the financial sustainability of IMC's operations, and the overall financial sustainability of the Southern Coalfield economic ecosystem.

Further discussion of the significance of the Dendrobium Mine and IMC's regional operations to the economic ecosystem are provided in Section 7 and Appendix L.

### 2.2.7 Consideration of Feedback Raised by the IPC on the Previous Application

IMC has re-designed the Project to reduce the overall footprint compared to the previous application, thereby reducing potential impacts through:

- approximately 60% reduction in longwall mining area;
- approximately 78% reduction in peak annual surface water losses (from the previous application);
- no predicted connective fracturing from the seam-to-surface when using the Tammetta Equation;
- no longwall mining beneath 3rd, 4th and 5th order (or above) streams;
- approximately 50% reduction in the length of 1st and 2nd order streams longwall mined beneath;
- approximately 40% reduction in the number of swamps (listed as threatened) longwall mined beneath;
- commitment to avoid longwall mining beneath identified key stream features;
- reduction in number of Aboriginal heritage sites directly mined beneath from 22 to six sites (with the likelihood of direct impacts to these six sites expected to be approximately 1 in 10 based on extensive monitoring of subsidence-related impacts to heritage sites);
- no longwall mining beneath previously identified high archaeological significance Aboriginal heritage sites;
- longwall mining distance at least 400 m from named watercourses (i.e. the Avon River, Cordeaux River and Donalds Castle Creek);
- minimum longwall mining setback distance of 300 m from the Full Supply Level (FSL) of the Avon Dam;
- minimum longwall mining setback distance of 1,000 m from dam walls; and
- use of existing infrastructure (namely the Dendrobium Pit Top, Kemira Valley Coal Loading Facility, Kemira Valley Rail Line, Dendrobium CPP, Dendrobium Shaft No 1 and No 2 and 3 Shafts and the West Cliff Stage 3 Coal Wash Emplacement Area), which would reduce the requirement for additional disturbance.

As a result of the additional Project mine plan changes there is a reduced mine footprint and, therefore, a reduction in the potential impacts on the Metropolitan Special Area. These impact reductions are documented in Sections 7 and 8 of this EIS.

A summary of the features of the Project mine design, and how it has built on the constraints adopted in the previous application, is provided in Section 4.

## 2.3 KEY STRATEGIC PLANNING DOCUMENTS

### 2.3.1 Strategic Statement on Coal Exploration and Mining in NSW

The NSW Government's 2020 *Strategic Statement on Coal Exploration and Mining in NSW* outlines how the NSW Government will continue to support responsible resource development for the benefit of the State (NSW Government, 2020a).

The statement recognises the value of coal production to the NSW economy, including:

- how regional NSW communities depend on the coal industry, which provides more than 110,000 direct and indirect jobs in the State; and
- the significant benefits of royalties from coal that are used to fund public services and infrastructure (approximately $2 billion in 2018-2019).

The statement indicates that the NSW Government will take a balanced approach to the future of coal mining in the State by setting a clear and consistent policy framework that supports investment certainty.

In addition, the *Strategic Statement on Coal Exploration and Mining in NSW* recognises the importance of metallurgical coal supply for use in the steelmaking process, and hence differing international demand factors to those anticipated for thermal coal (NSW Government, 2020a):

> *The use of coal in the manufacture of steel (coking coal) is likely to be sustained longer as there are currently limited practical substitutes available.*

The statement describes four areas for action within the NSW coal sector:

1. *Improving certainty about where coal mining should occur.*
2. *Supporting responsible coal production in areas deemed suitable for mining.*
3. *Addressing community concerns about the impacts of coal mining.*
4. *Supporting diversification of coal-reliant regional economies to assist with the phase-out of thermal coal mining.*

The Project would be consistent with the *Strategic Statement on Coal Exploration and Mining in NSW* as:

- The Dendrobium Mine is a metallurgical coal mine.
- The Project would facilitate the continuation of the approved Dendrobium Mine, represents a logical continuation of the development of the Dendrobium Mine within IMC's existing Mining Leases and would support the ongoing financial sustainability of IMC (Sections 3 and 4).
- The Project would be developed in a manner that is responsible and considers the benefits and consequences of the development for other land uses, including coexistence with the Metropolitan Special Area. The IEPMC (2019) has found no evidence of significant loss of water, or changes in water quality from mining, of concern to water supply (Section 2.2.2).
- The Project decision-making process will be informed by public involvement and participation through the Project EIS consultation program (Section 6), public exhibition of the EIS document, and assessment of the Project by the Minister in accordance with the EP&A Act.
- The Project incorporates relevant ESD considerations (Section 8.6.3).
- This EIS has been prepared using the best available science, and the Project would incorporate comprehensive management, monitoring and adaptive management (Section 7).
- Significant returns for society would be generated through:
  - continuation of current operational employment at the Dendrobium Mine of approximately 650 personnel, and generation of approximately 50 operational jobs and approximately 100 construction jobs for the region, with many more expenditure-induced indirect jobs;
  - enabling IMC to continue supporting BlueScope Steel's Australian operations at its Port Kembla Steelworks and the Australian steelmaking industry, including local and regional businesses;
  - enabling IMC to continue supporting the PKCT;
  - State and Commonwealth corporate tax contributions; and
  - payment of coal royalties to the NSW Government over the life of the Project.
- IMC is also committed to ongoing financial support for community projects through the Dendrobium Community Enhancement Program (DCEP).

Further consideration of the Project on social, environmental and economic grounds, including consideration of the principles of ESD, consideration of alternatives and a cost-benefit analysis developed in accordance with the *Guidelines for the economic assessment of mining and coal seam gas proposals* (NSW Government, 2015b) is provided in Sections 7 and 8, and Appendix L of this EIS.

### 2.3.2 NSW Net Zero Plan Stage 1: 2020-2030

The *Net Zero Plan Stage 1: 2020-2030* (NSW Government, 2020b) provides the foundational framework for NSW to reach net-zero emissions by 2050, and acknowledges the ongoing contribution of mining:

> *New South Wales' $36 billion mining sector is one of our biggest economic contributors, supplying both domestic and export markets with high quality, competitive resources. Mining will continue to be an important part of the economy into the future and it is important that the State's action on climate change does not undermine those businesses and the jobs and communities they support.*

Consistent with the Dendrobium Mine, the Project would continue to operate in consideration of the objectives of South32's company-wide Climate Change Strategy and annual *Sustainable Development Report*. Further discussion of the NSW Net Zero Plan, South32's company policy and Project-specific greenhouse gas reduction and mitigation measures is contained in Appendix R.

South32 supports the objectives of the Paris Agreement and is committed to achieving net zero operational greenhouse gas emissions by 2050. It has set a medium-term target to halve its operational greenhouse gas emissions (Scope 1 and 2) by 2035 and is forming partnerships with customers, suppliers and industry to reduce Scope 3 emissions.

South32 would achieve this target by optimising its business and operations to be more energy efficient and embed emissions abatement opportunities, unlocking low-carbon design and technology and would identify opportunities to partner with government and industry on a just transition to a low carbon future.

It is acknowledged that there is no definitive "best pathway" to net zero and some of the innovations needed by industry are not fully developed.

The NSW Government's long-term objective to reach net-zero emissions by 2050 is consistent with the target of South32's Climate Change Strategy. Project-specific, best-practice greenhouse gas mitigation measures (namely maximising gas capture to enable flaring) are described in Section 7.21, Appendix I and Appendix R.

### 2.3.3 Illawarra Shoalhaven Regional Plan 2041

The *Illawarra Shoalhaven Regional Plan 2041* (NSW Government, 2021) applies to the Wollongong, Kiama, Shellharbour and Shoalhaven LGAs. The *Illawarra Shoalhaven Regional Plan 2041* sets the strategic framework for the region, aiming to protect and enhance the region's assets and plan for a sustainable future until 2041. The Project is partially located within the area covered by the *Illawarra Shoalhaven Regional Plan 2041* (NSW Government, 2021).

The *Illawarra Shoalhaven Regional Plan 2041* recognises steelmaking and manufacturing as critical industry sectors within the region (NSW Government, 2021):

> *The region lies partly within the Southern Coalfield that provides the only hard coking coal in NSW and is in high demand for steel production around the world. As the region grows, the continued extraction of resource lands should remain a priority.*

The Project is located within the Southern Coalfield, and would provide for continued supply of metallurgical coal for the Australian steel industry and for export through the PKCT.

The *Illawarra Shoalhaven Regional Plan 2041* acknowledges that coal mining within the Metropolitan Special Area has the potential to affect water supply, security and infrastructure, and ecological integrity (NSW Government, 2021). In this regard, the *Illawarra Shoalhaven Regional Plan 2041* (NSW Government, 2021) concludes:

> *These risks must be carefully managed through assessment, management and regulation that is informed by best available science.*

IMC has designed the Project to reduce the potential impacts on water resources (as well as biodiversity values and other environmental values of the Metropolitan Special Area) as far as is practicable, in addition to provision of targeted offsets (Section 7). In addition, the Project has been assessed using the best available science, including adopting the advice of the IEPMC with respect to assessment of potential impacts of mine subsidence on groundwater and surface water resources.

The *Illawarra Shoalhaven Regional Plan 2041* also notes the infrastructure that facilitates mining industries, such as road and rail freight routes, should be protected from inappropriate development that could adversely affect current or future activities of these industries.

Future road and rail requirements associated with the Project and associated environmental impacts are described in Sections 4 and 7.

### 2.3.4 WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas

The *WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas* (WaterNSW, n.d.) were developed to protect the declared water catchments and Special/Controlled areas, and catchment infrastructure works in relation to the management of mining impacts.

Some key introductory statements in the principles are of particular relevance to the Project, including the following (WaterNSW, n.d.) (emphasis added):

> *Mining in the Sydney drinking water catchment is likely to continue until at least 2050 with large areas of the catchment subject to mining production titles. Eighty three percent of Special Area land close to the water storages is under a mining production or exploration title. There are active mines in the Special Areas and close to WaterNSW water supply infrastructure works. They can damage infrastructure including dams, water storages, the canals and pipelines.*
>
> *…*
>
> *WaterNSW is involved in the assessment process for mining and coal seam gas activities because of its obligations to protect water quality and quantity, and its infrastructure. WaterNSW has regulatory powers to control access to Special Area land and also the powers that are granted to all owners of land where mining occurs. These powers allow WaterNSW to place obligations on third parties to conduct their operations to protect water quality and quantity and to maintain ecological integrity.*
>
> *WaterNSW has established a comprehensive governance framework with a number of mining companies proposing and carrying out significant underground coal mining in the Southern Coalfield.*
>
> *…*
>
> *WaterNSW expects to be compensated for any costs or economic loss resulting from the impacts of mining and coal seam gas activities on water supply infrastructure, catchment yield or loss of stored waters.*

Further, the introduction to the principles concludes:

> ***WaterNSW opposes any longwall mining located within the Dams Safety Committee notification areas surrounding WaterNSW's dams in the Declared Catchment, or elsewhere, where it is predicted to damage Sydney drinking water supply infrastructure.***

It is noted that the Project would not contravene this statement, as the proposal would involve the following which would protect WaterNSW drinking water supply infrastructure:

- no longwall mining beneath existing Avon and Cordeaux Dams;
- longwall mining at least 300 m from the FSLs of Sydney's water supply dams;
- longwall mining would be at least 1,000 m away from dam walls; and
- longwall mining at least 400 m from named watercourses (i.e. the Avon River and Cordeaux River).

The *WaterNSW Principles for Managing Mining and Coal Seam Gas Impacts in Declared Catchment Areas* provides six principles to protect the drinking water catchments and Special/Controlled areas, and catchment infrastructure works in relation to the management of mining impacts.

Each Principle, key WaterNSW statements explaining each Principle, and how they may apply to the Project are addressed in the sub-sections below (emphasis added where relevant).

#### *WaterNSW Principle 1*

> ***1. Protection of water quantity***
>
> *… Mining and coal seam gas activities under or near to water storages can create pathways for stored water to enter mines or move below and away from the base of the storage and out of the catchment. WaterNSW opposes any mining or coal seam gas activities under or near its water storages in Declared Catchment Areas, unless it can be demonstrated that there is an acceptable and very low risk of water being lost through these activities.*
>
> *Mining companies operating in Declared Catchment Areas must demonstrate a very low risk of water loss from catchment streams or storages and that appropriate safeguards are in place to prevent or minimise any loss.*
>
> ***In Declared Catchment Areas mining and coal seam gas activities must not result in a reduction in the quantity of surface and groundwater inflows to storages or loss of water from storages or their catchments.***

WaterNSW (2019) raised concerns regarding potential water quantity impacts on the previous proposal.

However, the most recent review by the IEPMC (2019) concluded there has been no observed material impacts to drinking water supplies due to mining in the catchments to date:

> *Reservoir leakage rates – there is no measured evidence of significant long-term leakage from reservoirs due to mining in the Special Areas.*
> *…*
> *Watercourse bed leakage (at catchment scale) – from material presented to the Panel, there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies.*

Further to the above IEPMC conclusion that mining to date has had no material impact on catchment scale water supply, the Project proposal incorporates additional design constraints that have further reduced the potential of the Project to impact water quantity in the catchment. These include an approximate 78% reduction in potential peak annual surface water losses when compared to the previous application, and no predicted connective fracturing from the seam-to-surface (when using the Tammetta Equation) (Section 4).

Based on the above, IMC concludes that the Dendrobium Mine incorporating the Project would continue to result in no material water loss at the catchment scale relevant to WaterNSW water supplies, and hence the Project would fully comply with WaterNSW Principle 1.

The NSW Government proposed an agreement that would require IMC to make payments to the NSW Government to offset water quantity and quality impacts during and post-mining. The terms of the proposed agreement with Government for the previous application were accepted by IMC.

This agreement with Government was developed consistent with the recommendations of the IEPMC to provide a “net beneficial” effect to Sydney’s drinking water supplies.

IMC would seek to enter a similar agreement with the NSW Government to offset water quantity and quality impacts during and post-mining for the Project.

The agreement would allow the Minister for Water, Property and Housing to spend these funds (as required) on priority water projects to result in a net benefit to Sydney’s drinking water supply.

Therefore, IMC has demonstrated that there is *a very low risk of water loss from catchment streams or storages and that appropriate safeguards are in place to prevent or minimise any loss* (WaterNSW, n.d.).

### *WaterNSW Principle 2*

> ***2. Protection of water quality in Declared Catchment Areas***
>
> *…*
>
> *WaterNSW considers that all mining and coal seam gas activities should have a neutral or beneficial effect on water quality in the Declared Catchment Areas during exploration, extraction/production and rehabilitation phases.*
>
> *Mining-induced subsidence can increase connectivity between surface water and groundwater. Water-rock interaction between freshly recharged surface water and newly opened fractures and bedding planes enhances chemical reactions and can release elements and metals from the sandstone rock mass into the water. Some of this groundwater, rich in elements and metals, may be discharged further downstream or into the water storage, polluting drinking water and increasing risks to human health with respect to water quality.*
>
> *The surface facilities associated with mining and coal seam gas activities must be managed to either contain any pollutants on the site or transfer them offsite for appropriate treatment and disposal.*
>
> ***In Declared Catchment Areas mining and coal seam gas activities must not result in a reduction in the quality of surface and ground water inflows to storages.***

WaterNSW raised concerns regarding potential water quality impacts on the previous proposal. However, with respect to potential impacts of mining on dam water quality, Professor Chris Fell AM, in the discussion paper regarding water treatment and the Sydney Drinking Water Catchment for the Office of the NSW Chief Scientist and Engineer (Fell, 2014), concluded the following:

> *Although the impact of underground long-wall mining in the catchment could lead to small changes in the levels of impurities in water entering SCA’s dams, these changes can be coped with by SW’s* [Sydney Water’s] *treatment plants as evidence to date does not suggest a sufficiently large change in soluble organic concentrations to be of concern.*

Similarly, this conclusion was supported by Advisian's literature review for WaterNSW into the effects of underground mining beneath the catchment areas (Advisian, 2016):

> *… although some consequences on water quality within the watercourses in the study are documented in the literature, these consequences are likely to be short term, sporadic and localised…Any consequences on water quality at the reservoirs would be treatable by the existing Sydney Water treatment plants.*

The Project would include measures to suitably manage potential water quality impacts associated with the construction of surface facilities, including the proposed ventilation shaft, ETL and other ancillary infrastructure.

Further, the Project includes provision of water quality improvement actions to target reduced sedimentation in the Special Catchment Areas and mitigation, offset and/or compensatory measures to achieve net neutral or beneficial effect on water quality in the Avon Dam and Cordeaux Dam catchments that have been previously agreed between the NSW Government and IMC for the previous application. These measures would be consistent with (and additional to) those proposed by WaterNSW and the Office of Environment and Heritage NSW (OEH) in the *Special Areas Strategic Plan of Management* (2015) to minimise sedimentation which has been identified as the key parameter of concern for water quality in the Metropolitan Special Area.

Based on the above, IMC concludes that Dendrobium Mine, incorporating the Project, would continue to result in no material impacts on water quality at the catchment scale relevant to WaterNSW water supplies, and hence the Project would fully comply with WaterNSW Principle 2.

IMC would seek to enter into an agreement with the NSW Government for a range of measures such that any small changes arising from the Project would *not result in a reduction in the quality of surface and ground water inflows to storages* (WaterNSW, n.d.) and would have a neutral or beneficial effect on water quality in the Declared Catchment.

***WaterNSW Principle 3***

> ***3. Protection of human health in Declared Catchment Areas***
>
> *In Declared Catchment Areas, impacts on water quality from mining and coal seam gas activities can increase risks to human health. WaterNSW must ensure that raw water supplied to customers meets agreed quantities and standards and can be treated to meet Australian Drinking Water Guidelines.*
>
> *…*
>
> *Cumulative impacts from mining or other contaminating source activities must also be considered.*
>
> *…*
>
> ***Mining and coal seam gas activities must not pose increased risks to human health as a result of using water from the drinking water catchments.***

The analysis conducted by Professor Chris Fell AM (2014) found there was no evidence that the small changes in the levels of impurities associated with longwall mining would result in additional water treatment requirements for WaterNSW:

> *Although the impact of underground long-wall mining in the catchment could lead to small changes in the levels of impurities in water entering SCA's dams, these changes can be coped with by SW's* [Sydney Water's] *treatment plants as evidence to date does not suggest a sufficiently large change in soluble organic concentrations to be of concern.*

Further, the most recent review by the IEPMC (2019) concluded the following with respect to potential impacts of mining on dam water quality:

> *Although surface fracturing elevates metal loads in watercourses, there is no evidence that mining in the Special Areas is currently compromising the ability of WaterNSW to meet raw water supply agreement standards.*

IMC would seek to enter into an agreement with the NSW Government regarding a range of measures such that any small changes arising from the Project would *not result in a reduction in the quality of surface and ground water inflows to storages* (WaterNSW, n.d.) and would have a neutral or beneficial effect on water quality in the Declared Catchment.

### *WaterNSW Principle 4*

> ***4. Protection of water supply infrastructure***
>
> *WaterNSW's water supply infrastructure is extensive and includes dams, associated storages, canals and tunnels, and pipelines.*
>
> *WaterNSW opposes mining (first or second workings) under any of its prescribed dams. Subsidence from mining and coal seam gas activities can impact on, and destabilise, water supply infrastructure. Mining and coal seam gas activities can also affect the integrity of monitoring sites that are critical for the WaterNSW's water resource assessment and operational management.*
>
> *WaterNSW's water supply infrastructure must always be safe and serviceable. This will require comprehensive plans that include monitoring, modelling, preventative measures, contingency plans and rehabilitation measures (if needed).*
>
> ***The integrity of the WaterNSW's water supply infrastructure must not be compromised.***

The Project has adopted design constraints, such that the Project would comply with WaterNSW Principle 4, no WaterNSW water supply infrastructure would be compromised by the Project, and all WaterNSW infrastructure would remain safe and serviceable.

### *WaterNSW Principle 5*

> ***5. Protection of ecological integrity in Special Areas***
>
> *Much of the land around Sydney's water storages is classified as Schedule One Special Area. The Special Areas are mostly unspoilt bushland with significant ecological values and they play a vital role to protect water quality. Mining activities including exploration have had an impact on the ecological integrity of the Special Areas.*
>
> *WaterNSW expects mining and coal seam gas companies to plan, construct, operate and rehabilitate all existing and future activities to maintain and protect ecological integrity. If impacts cannot be avoided, offsets may be necessary to ensure the overall ecological integrity of the Special Areas is not compromised.*
>
> ***The ecological integrity of the Special Areas must be maintained and protected.***

A range of avoidance measures have been incorporated into the design for the Project, which are additional to those from the previous application.

The Project EIS includes biodiversity and ecology assessments and a proposal for offsetting unavoidable residual impacts on ecology consistent with NSW *Biodiversity Conservation Act 2016* (BC Act) requirements and the *Addendum to NSW Biodiversity Offsets Policy for Major Projects: Upland swamps impacted by longwall mining subsidence* (OEH, 2016a).

It is noted that, under the BC Act, potential ecological impacts from the Project have been assessed in accordance with the *Biodiversity Assessment Method* (the BAM) (DPIE, 2020b), which sets a standard that would result in no net loss of biodiversity values in NSW.

The comprehensive suite of biodiversity offset and mitigation measures proposed for the Project (Sections 7.7 to 7.9) and other compensatory measures (Sections 7 and 8 and Appendices D and E) would result in the Project maintaining and protecting the ecological integrity of the Special Areas, and hence compliance with WaterNSW Principle 5.

### *WaterNSW Principle 6*

> ***6. Sound and robust evidence regarding environmental impacts***
>
> *Sound decisions about mining and coal seam gas proposals rely on a robust environmental impact assessment process. In particular, there must be adequate and reliable data and information on the potential impacts on water quantity and quality. This is necessary to ensure appropriate selection of measures to prevent, minimise, mitigate and offset impacts.*
>
> *…*
>
> *The environmental planning assessment of major mining and coal seam gas projects should consider cumulative impacts, including impacts of past activities, the proposed project, and reasonably foreseeable projects in the area.*
>
> ***Information provided by proponents, including environmental impact assessments for proposed mining and coal seam gas activities, must be detailed, thorough, scientifically robust and holistic. The potential cumulative impacts must be comprehensively addressed.***

This EIS assesses the whole life of the proposed Project, and also considers the potential mine closure requirements, including management of post-mining impacts to water quantity and quality, for the Dendrobium Mine (incorporating the Project) in accordance with the existing Development Consent DA 60-03-2001 (as modified) (Appendix Q).

Potential cumulative impacts have been considered, including both previously approved and proposed Project mining activities, in the context of other existing land uses in the catchment.

This EIS and the associated supporting specialist assessments are based upon evaluation of comprehensive datasets developed over a long period of mining by IMC within the Special Areas and utilise and build upon the comprehensive data collected to support the previous application. Project offset and management measures have been developed using the best available science and analysis of this data, and where relevant, adopting assessment methodologies recommended by the IEPMC (e.g. the application of the Tammetta Equation).

IMC therefore concludes the Project has been assessed in a manner that is detailed, thorough, scientifically robust and holistic as required by NSW assessment methodology. Cumulative impacts have been comprehensively assessed and the Project complies with WaterNSW Principle 6.

#### 2.3.5 Other Strategic Planning Documents

The following strategic planning documents have also been considered in the planning of the Project and the preparation of this EIS:

- *A Plan for Growing Sydney* (NSW Government, 2014).
- *South East and Tablelands Regional Plan* (NSW Government, 2017).
- *Our Greater Sydney 2056 Western City District Plan – connecting communities* (NSW Government, 2018a).
- *Our Wollongong 2028 – Community Strategic Plan* (Wollongong City Council, 2018).
- *Wingecarribee Local Planning Strategy 2015-2031* (Wingecarribee Shire Council, 2016).
- *Create Wollondilly – Community Strategic Plan 2033* (Wollondilly Shire Council, 2013).
- *Greater Sydney Local Strategic Plan 2016-2021* (Greater Sydney Local Land Services, 2016).
- *Developments adjacent to National Parks and Wildlife Service lands: Guidelines for consent and* planning *authorities* (National Parks and Wildlife Services [NPWS], 2020).
- *Special Areas Strategic Plan of Management 2015* (WaterNSW and OEH, 2015).

These documents are discussed further in Attachment 6.

## 2.4 STRATEGIC NEED FOR, AND POTENTIAL BENEFITS OF, THE PROJECT

### 2.4.1 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 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 PCI product extracted in the later stages of Area 5 extraction.

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, PKCT and the Southern Coalfield economic ecosystem (Sections 2.4.2 and 2.4.3).

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 (Section 2.4.3).

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 (Sections 2.4.2 and 2.4.3).

### 2.4.2 Importance of Local Metallurgical Coal Supply

The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically.

BlueScope blends coal from its supply base to produce a coke product for use in its operation and for export, with current operations at BlueScope designed to primarily utilise coal produced in the Illawarra Region, supplemented by imported coal and iron ore.

Local supply provides significant benefits to both BlueScope and NSW. For BlueScope, these benefits relate to, but are not limited to, coal quality, delivered cost, supply chain certainty, just-in-time supply with associated working capital benefits, and the maintenance of a competitive supply base, whilst minimising their carbon footprint associated with raw material freight.

For NSW, these benefits include royalties from local production and economic benefits (both generated by IMC but also related businesses such as BlueScope).

Coal from both IMC operations (i.e. the Dendrobium Mine and Appin Mine) is currently blended for sale into the export and domestic markets. This is forecast to continue if the Project proceeds, except in circumstances where a single source of supply from either mine is preferred by a customer and agreed to by IMC.

The dependency of the Port Kembla Steelworks on the continued supply of metallurgical coal from local sources in the Southern Coalfield was acknowledged by the NSW Legislative Council (5 May 2021), the DPE (2020a), and the independent economic study commissioned by the DPE for the previous application (BAEconomics, 2020). BlueScope has actively supported the continuation of mining in the Southern Coalfield in its prior submissions to the IPC stating (15 December 2020):

> *The purpose of BlueScope's submission is to firstly emphasise to the Independent Planning Commission, and the state of NSW, the critical importance of a continuation of mining in the Southern Coalfield of NSW for the ongoing production of iron and steel at the Port Kembla Steelworks.*
>
> *Metallurgical coal supplies for BlueScope are reliant upon an ongoing commercially viable coal mining sector in the Southern Coalfield. BlueScope understands that export sales are critical to the mining operations remaining commercially viable. Further, local supplies of metallurgical coal are vital for the continuing economic health of the Illawarra Region and NSW at large, including the 4,500 direct jobs and contractors, supporting around 8,900 jobs that rely on Port Kembla Steelworks, the largest steel production facility in Australia.*
>
> *This importance has only been enhanced as the production of domestic steel has become a critical part of:*
>
> *a) The development of sustainable and secure supply chains post the COVID pandemic; and*
>
> *b) the significant step up in investment in renewable energy projects across NSW because of recently announced NSW Government policies.*
>
> *The second purpose of this submission is to emphasis the important role of the Dendrobium Mine, operated by South32, as one key mine that supplies metallurgical coal for steelmaking at Port Kembla.*

In addition, the importance of multiple local metallurgical coal supplies to the Port Kembla Steelworks is outlined by the ACCC (2017) which noted the disadvantages the Port Kembla Steelworks may face if it were required to source metallurgical coal from the Bowen Basin in Queensland (rather than the Illawarra Region):

> *… there is significant additional cost associated with transporting substitute coking coal from alternative sources to the Australia steelmakers as well as potential capacity constraints limiting the ability of one steelmaker to import large volumes of coal by ship.*
>
> *…*
>
> *In relation to transportation cost, BlueScope would incur significantly higher freight logistics costs to ship coal from the Bowen Basin via the Queensland coal exporting ports to its steel mill at Port Kembla compared to the costs associated with the supply of coal from South32 and Metropolitans mines in the Illawarra to its steelworks and Port Kembla. Market inquiries indicate that the cost of transporting coal from the Bowen Basin to Port Kembla is likely to be between $US10 -15 per tonne.*

BlueScope is a major contributor to the Illawarra Region, NSW and Australia, generating an economic input of $ 1.9 billion per annum based on analysis by Wollongong City Council. As a consequence, BlueScope's proposed Port Kembla Steelworks Blast Furnace Reline Project has gained Critical State Significant Infrastructure (CSSI) status.

The Port Kembla Steelworks Blast Furnace Reline Project is expected to extend the life of its blast furnace operations to approximately 2045. BlueScope is continuing with current blast furnace technology given the prevailing view that 'green steel' is still under development and many years away.

This creates ongoing metallurgical coal demand for the life of the blast furnace.

### 2.4.3 Southern Coalfield Economic Ecosystem

The independent economic assessment undertaken on behalf of DPE for the previous application by BAEconomics concluded the worst-case scenario would be the closure of the Dendrobium Mine and Appin Mine which would lead to broader impacts to the Southern Coalfield economic ecosystem, such as the cessation of coal exports through PKCT and the production of primary steel at the Port Kembla Steelworks (BAEconomics, 2020):

> *….the ongoing economic viability of the premium hard coking coal mining , iron smelting and coal transport and shipping businesses located in and around the Wollongong Port Kembla area and elsewhere in the Southern coalfield of NSW is critically dependent on the continuing success of Illawarra Metallurgical Coal and BlueScope steel. Major changes in either of these businesses would have flow on effects to the other as well as to other significant coal and iron and steel related businesses.*

The independent economic assessment (BAEconomics, 2020) goes further in stating the future of IMC and the broader Southern Coalfield economic ecosystem is related:

> *….the historical linkages and dependencies between Illawarra Metallurgical Coal and the primary steelmaking operations at BlueScope mean that the failure of one will compromise the other.*

Closure of IMC operations could cost the local Wollongong region around $6.4 billion per year in lost regional product and the estimated loss to the Australian economy as a whole could be as high as $10.7 billion per year (BAEconomics, 2020).

In addition, the closure of IMC's operations could result in the loss of employment for some estimated 5,500 direct personnel in the Illawarra Region, and inclusive of the indirect workforce losses, up to approximately 25,000 total jobs nationally (BAEconomics, 2020).

Without the Project, the Dendrobium Mine and other operations may become less financially sustainable (i.e. the Appin Mine), which in turn may result in the PKCT and other Southern Coalfield mines becoming less financially sustainable (the mines in the Southern Coalfield currently operating, including IMC's operations, Peabody's Metropolitan Mine and SIMEC's Tahmoor Colliery engage approximately 2,500 personnel) (BAEconomics 2020).

***Port Kembla Coal Terminal***

In addition, IMC is a key enabler to support a viable PKCT and hence local competitive supply of metallurgical coal to the Port Kembla Steelworks and the seaborne market. IMC currently provides 60% of the hard coking coal and 75% of the total coal exported through PKCT.

PKCT provides access to seaborne export and domestic markets and therefore underpins the operation of the mines in the Southern Coalfield region.

The maintenance of a strong local coal industry is important for competition and ongoing supply to both the domestic and export markets.

IMC forms a key part of the local coal and supporting industries which includes IMC, Tahmoor Mine (SIMEC), Metropolitan Mine (Peabody Energy) Russell Vale (Wollongong Coal), PKCT and BlueScope. This industry generates significant benefits for the region (e.g. economic, employment) as well as significant taxes and royalties for NSW as identified in BAEconomics (2020).

Current mine approvals in the Southern Coalfield foreshadow a reduction in total coal production with current approvals for Tahmoor Mine to 2033, Metropolitan Mine to 2032 and Russell Vale to (approximately 2026). This is likely to increase the cost burden on PKCT.

PKCT primarily supplies services to the five operating mines in the Southern Coalfield, however, from a volume perspective, IMC is forecast to contribute a minimum of 75% of the export volumes shipped through PKCT over the next 10 years and hence fund the bulk of the port operating costs and is important to the ongoing financial viability of PKCT.

This proportion may increase if the throughput of the other Southern Coalfield operations who use PKCT decreases (noting the port costs are allocated on a throughput basis with less tonnage increasing cost for the remaining users).

Based on current operating structures and cost regimes applicable to PKCT, reduced throughput is expected to increase costs per tonne for the use of PKCT.

Coal from the Project, if developed, is forecast to make up approximately 35% of the coal shipped through PKCT.

As the major shipper (forecast to be a minimum of 75%), continued supply of coal from IMC is critical for the viability of PKCT.

The importance of competition has been well developed in the various economic reports (as described above). A cost effective port is essential to support the Southern Coalfield operations.

### 2.4.4 Potential Benefits of the Project

This EIS presents the potential benefits and impacts from the Project in NSW, including a cost-benefit analysis (Section 7 and Appendix L) and Social Impact Assessment (SIA) (Appendix K) considering potential implications with and without the Project.

Over the life of the Project, production at many existing coal mines in NSW may decline or cease as existing coal mining operations deplete their reserves, or as less-efficient and higher-cost coal mines begin to close. Metallurgical coal projects such as the Project will, therefore, be important in maintaining the generation of royalties and employment in the NSW mining industry.

As stated by the NSW Government, mining will continue to be an important part of the State economy into the future, and the Project represents a mining proposal that aligns with key NSW Government policy objectives.

In addition, the Project would generate significant returns for society through:

- continuation of current operational employment at the Dendrobium Mine of approximately 650 personnel, and generation of approximately 50 operational jobs and approximately 100 construction jobs for the region, with many more expenditure-induced indirect jobs;
- enabling IMC to continue supporting BlueScope's Australian operations at its Port Kembla Steelworks, and the Australian steelmaking industry, including local and regional businesses;
- enabling IMC to continue supporting the PKCT;
- State and Commonwealth corporate tax contributions;
- payment of coal royalties to the NSW Government over the life of the Project; and
- ongoing financial support by IMC for local community projects through the allocation of funds through the DCEP.

Further justification of the Project, including an evaluation of costs and benefits that contains a consideration of socio-economic impacts, benefits, and linkages, is provided in Section 8.

## 2.5 AGREEMENTS WITH GOVERNMENT

As described in Section 2.3, the NSW Government proposed an agreement that would require IMC to make payments to the NSW Government to offset water quantity and quality impacts during and post-mining. The terms of the proposed agreement with Government for the previous application were accepted by IMC.

This agreement with Government was developed consistent with the recommendations of the IEPMC to provide a "net beneficial" effect to Sydney's drinking water supplies.

IMC would seek to enter into a similar agreement with the NSW Government to offset water quantity and quality impacts during and post-mining for the Project.

The agreement would allow the Minister for Water, Property and Housing to spend these funds (as required) on priority water projects to result in a net benefit to Sydney's drinking water supply.

In addition, IMC's existing annual contribution of $0.03 per saleable tonne (increased by Consumer Price Index [CPI] annually) paid to the DCEP would be continued for the Project.

## 2.6 CONSIDERATION OF ALTERNATIVES

Clause 192(1)(c) of the EP&A Regulation requires that an EIS must include:

> *(c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure*

In addition, the *State Significant Infrastructure Guidelines* (DPIE, 2021a) and SEARs for the Project require consideration of feasible alternatives.

Consideration of key alternatives to the Project is provided in Attachment 11 and summarised below.

The key, feasible alternatives to the Project considered were as follows:

- Consequences of not proceeding with the Project.
- Alternative longwall mining locations within IMC's existing coal tenements.
- Alternative underground mining methods within the Project underground mining area (Area 5).
- Alternative longwall layouts within the Project underground mining area to further avoid direct beneath surface features.
- Alternative mine parameters within the Project underground mining area to consider the implications of sub-surface fracturing and potential surface water losses.

*Consequences of Not Proceeding with the Project*

If the Project did not proceed, while there would be reduced environmental impacts, there would be likely significant adverse socio-economic implications given:

- In the absence of the Project, operations at Dendrobium Mine would most likely cease following the completion of Longwall 23 in Area 3, with associated:
  - Discontinuation of employment opportunities for the existing Dendrobium Mine and the Project, royalty payments, taxes and expenditure with regional businesses.
  - Increased risks to the financial sustainability of the Appin Mine, as continued operation of the Dendrobium Mine via the Project offsets the higher costs of IMC's Appin Mine operations and, as such, supports the financial sustainability of IMC and the broader Southern Coalfield economic ecosystem.
  - Increased risks of impacts on downstream industries in the Southern Coalfield economic ecosystem that currently transport or directly use Project coal, including PKCT and Port Kembla Steelworks.
- There would also be increased risks to the availability of local supplies of metallurgical coal to the Port Kembla Steelworks, given that:
  - Non-IMC coal supplies are not currently approved past 2033, compared to anticipated demand up to approximately 2045 based on BlueScope's recent decision to seek Infrastructure Approval for the Blast Furnace No. 6 Reline Project.
  - As such, while BlueScope may be able to source alternate supplies of metallurgical coal locally, the quantity and longevity of this option is uncertain.
  - It should be noted that, ultimately, decisions around coal supplies and blends as important ingredients for steelmaking lie with the end user and any coal supply arrangement is contingent upon future decisions by and agreements between the end user and supplier as to coal supply. As such, while BlueScope has stated that over 80% of its coal supplies are currently sourced from mines in the Illawarra Region (BlueScope, 2020), with IMC currently supplying approximately 60% of its total hard coking coal requirements, the make-up of specific future coal supplies to the Port Kembla Steelworks is outside of IMC's control. Similarly, decisions by non-IMC operations regarding their product sales is outside of IMC's control.

*Alternative Longwall Locations to the Project*

Alternative longwall locations, including scenarios involving underground mining larger portions of IMC's existing tenements compared to the Project, which could result in increased resource recovery, may also result in associated increased economic, environmental and social impacts.

While these alternative locations could potentially meet the Project objective of continuity of mining, it is considered they would not meet the Project objective of addressing the concerns raised by the IPC.

Accordingly, these alternatives were not adopted for the Project.

*Alternative Underground Mining Methods within the Project Underground Mining Area*

Bord and pillar mining would not be economic for the Project as longwall mining is the only economic primary production method in Australia to use at depths from the surface that are greater than about 200 m (Department of Planning [DoP], 2008). Therefore, bord and pillar mining would not meet the Project objective of continuity of mining.

The consequences of not carrying out the Project are described above. Accordingly, alternative mining methods were not adopted for the Project.

*Alternative Longwall Layouts within the Project Underground Mining Area*

The Project has already significantly reduced potential impacts compared to the previous application, including an approximately 60% reduction in mining area, no mining beneath 3rd order and above streams, no mining beneath previously identified high archaeological (scientific) significance Aboriginal heritage sites and reduction in number of Aboriginal heritage sites directly mined beneath from 22 to six sites, and is therefore considered to address the concerns raised by the IPC.

Reductions in longwall layout to further reduce potential impacts to surface features are not considered reasonable and feasible as:

- Avoidance of streams defined as "significant" by WaterNSW and upland swamps would result in a mine plan that is not economically viable:
  - These alternatives would not meet the Project objective of continuity of mining.
  - The consequences of not carrying out the Project are described above.
  - Accordingly, these alternatives were not adopted for the Project.
- Any mine design seeking to achieve no risk of potential impacts to Aboriginal cultural heritage may not be economically viable:
  - Avoidance of directly mining beneath previously identified Aboriginal heritage sites (which are identified as having low or medium archaeological [scientific] significance) would result in a decrease in resource recovery and a mine plan that may be less economically viable, and would not achieve no risk of potential impact.
  - There are other factors that affect potential impacts to cultural values, for example potential impacts to streams, and for some stakeholders, any mining development may be considered to impact intangible cultural values.
  - This alternative would not meet the Project objective of continuity of mining and/or would not materially change the Project objective relating to addressing the IPC concerns or minimising potential impacts.
  - Accordingly, this alternative was not adopted for the Project. It is noted that the longwall layout for the Project results in a reduction in the number of Aboriginal heritage sites directly mined beneath from 22 to six sites in comparison to the previous application (with the likelihood of direct impacts to these six sites expected to be approximately 1 in 10, based on extensive monitoring of subsidence related impacts to heritage sites).

*Alternative Mine Parameters within the Project*

The Project has already significantly reduced potential surface water impacts compared to the previous application, and is therefore considered to address the concerns raised by the IPC:

- As the Project targets areas of relatively higher depth of cover and lower cutting height (in the Bulli Seam), there is no predicted seam-to-surface fracturing (or free drainage) when calculated using the Tammetta Equation.
- There is an estimated reduction of approximately 78% in peak annual surface water losses for the Project compared to the previous application.
- IMC proposes that surface water offsets would be provided for the Project, consistent with the terms agreed with the NSW Government for the previous application.

Reductions in longwall width and/or cutting height to limit the predicted height of connective fracturing would adversely affect the financial sustainability of the Project and are not considered reasonable and feasible given that:

- Significant reductions in longwall widths/cutting heights to limit the predicted height of fracturing using the Tammetta Equation to below the Bald Hill Claystone would not be financially sustainable, given the significantly increased operating costs and reduced resource recovery.

- Marginal reductions in longwall width/cutting heights are not expected to materially change potential surface water losses (i.e. surface water losses would occur and surface water offsets would be required).
- Accordingly, these alternatives do not satisfy the Project objectives of maintaining longwall continuity and/or would not materially change the Project objectives to address the IPC's concerns and minimise potential impacts. The consequences of not carrying out the Project are described above.
- It is noted that subsidence-related effects for reduced longwall width and cutting height would still be sufficient to result in impacts and consequences to surface features (adverse environmental impacts are still anticipated for reduced longwall widths down to approximately 150 m) and, as such, these alternatives would not satisfy the Project objective of further minimising impacts in the Metropolitan Special Area. Consideration of alternative mine layouts is provided above.

Accordingly, these alternatives were not adopted for the Project.