



Appendix P

Hazard, risk and public safety assessment



New Cobar Complex Project EIS

Hazards, risk and public safety assessment

Prepared for Peak Gold Mines
December 2020

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New Cobar Complex Project EIS

Hazards, risk and public safety assessment

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1 Introduction

1.1 Overview

Peak Gold Mines Pty Ltd (PGM), a wholly owned and operated subsidiary of Aurelia Metals Limited (Aurelia), owns and operates the Peak Gold Mines operation south-east of Cobar, far western New South Wales (NSW) see Figure 1.1.

The PGM operation comprises the New Cobar Complex located 3 kilometres (km) to the south-east of Cobar town centre and the Peak Complex located 10 km south-east of the town centre. Both complexes are located adjacent to Kidman Way, which connects Cobar to Hillston and Griffith to the south.

PGM has been operational since modern mining commenced at the Peak Complex in 1991 and all current mining operates under development approvals issued by Cobar Shire Council (CSC).

The New Cobar Complex Project State Significant Development (SSD) (the project) is an amalgamation of underground mining at New Cobar, Chesney and Jubilee deposits and development of new underground workings of the Great Cobar and Gladstone deposits to create the New Cobar Complex Project.

PGM is also seeking to consolidate all existing development approvals applicable to the New Cobar Complex into a single modern consent issued by the Department of Planning, Industry and Environment (DPIE). Approval will be sought for project elements accessed from, and undertaken within, the existing New Cobar Complex located within consolidated mining lease (CML) 6, mining purposes lease (MPL) 0854 and mining leases (ML) ML 1483 and ML 1805 (see Figure 1.2).

1.1.1 Background

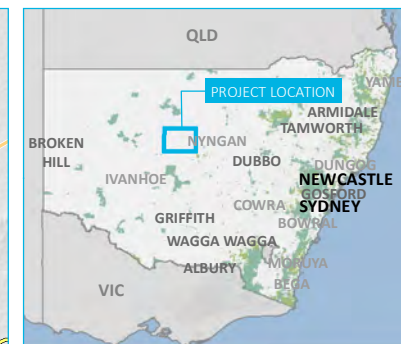
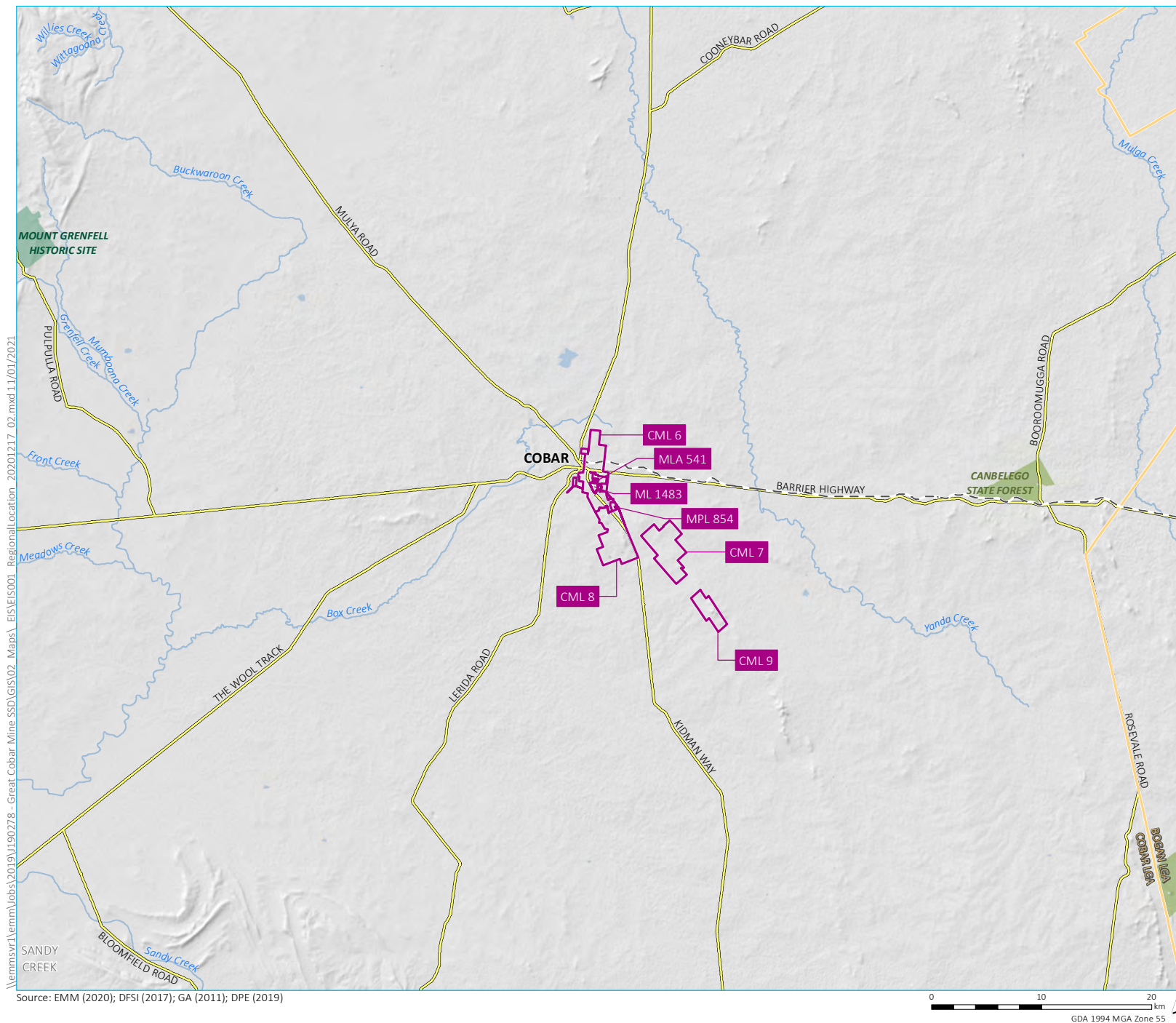
PGM has been operational since mining commenced at the Peak deposit in 1991 producing gold, copper, lead, zinc and silver. Mining at the New Cobar Complex commenced with the open cut in 2000, then transitioned to underground mining in 2004.

The current CSC development approvals at Peak Complex and New Cobar Complex allow for the operations to continue indefinitely and process up to 800,000 tonnes per annum (tpa) of ore. Ore processing, tailings storage and concentrate handling is undertaken at the Peak Complex with ore from the New Cobar Complex trucked by public road to processing facilities at the Peak Complex. Both the processing plant and the tailings storage facility (TSF) are located at the Peak Complex, and activities at those facilities are outside the scope of this project.

PGM has identified the Gladstone and Great Cobar deposits as targets for further mining to extend the life of operations at the New Cobar Complex. The Great Cobar deposit was historically exploited by surface and shallow underground mining between 1870 and 1919, but no mining of that deposit has been undertaken since that time.

PGM has obtained conditional approval for development of an exploration decline to facilitate exploration activities within the Great Cobar deposit. The objectives of the exploration activities are to:

- further define the mineral resource through underground drilling from an exploration decline; and
- taking of a bulk sample to provide further samples for metallurgical, geotechnical and associated test work.

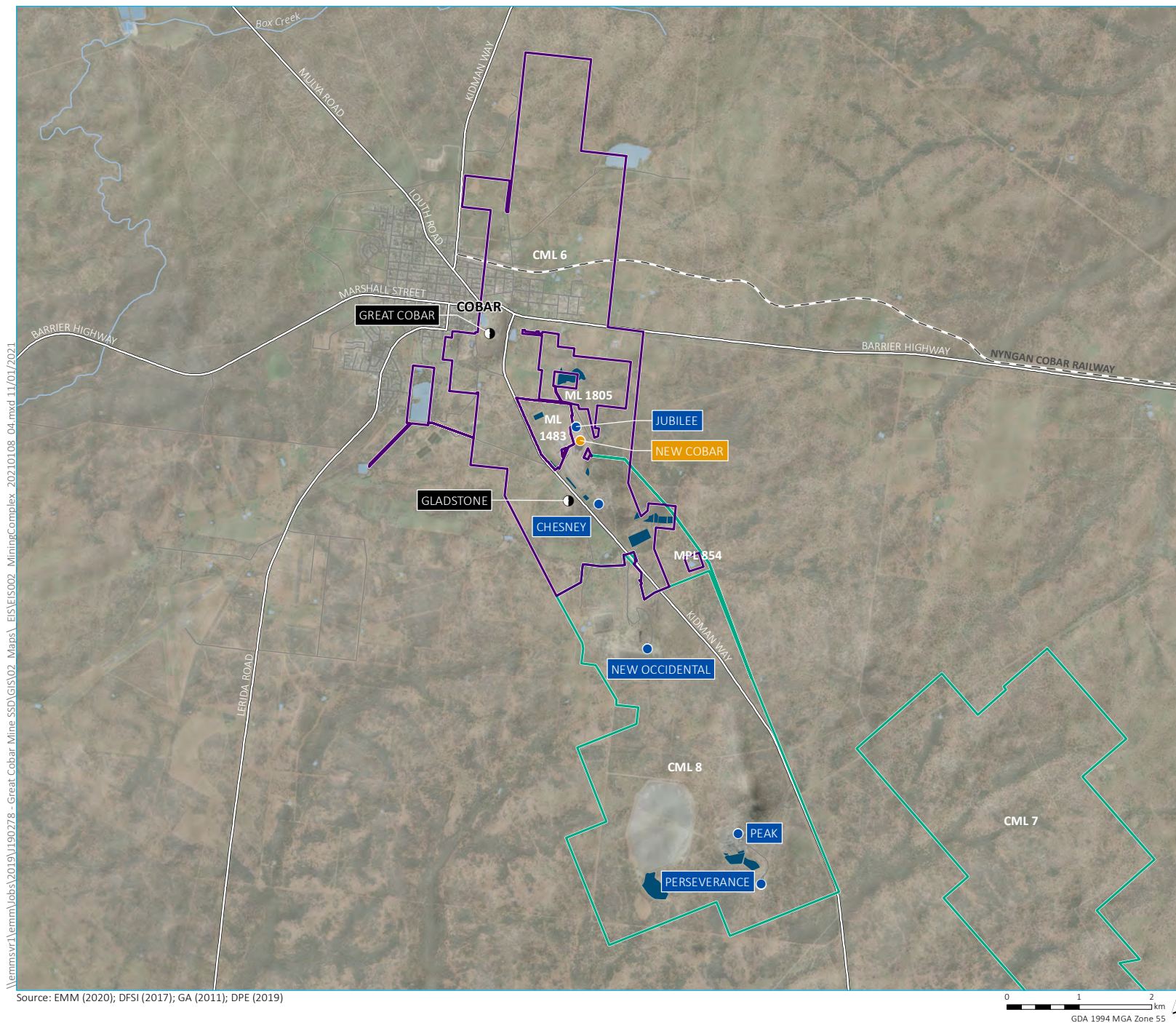


- KEY**
- Mining lease boundary
 - Rail line
 - Major road
 - Named watercourse
 - Waterbody
 - Local government area
 - NPWS reserve
 - State forest

Regional location of the
Peak Gold Mine

Peak Gold Mines
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Hazard, risk and public safety assessment
Figure 1.1





- KEY**
- Completed working
 - Current working
 - Future working
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Mine water management storage
 - Mining lease boundaries
 - New Cobar Complex
 - Peak Complex

Mining leases and mining complexes

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New Cobar Complex Project
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Figure 1.2



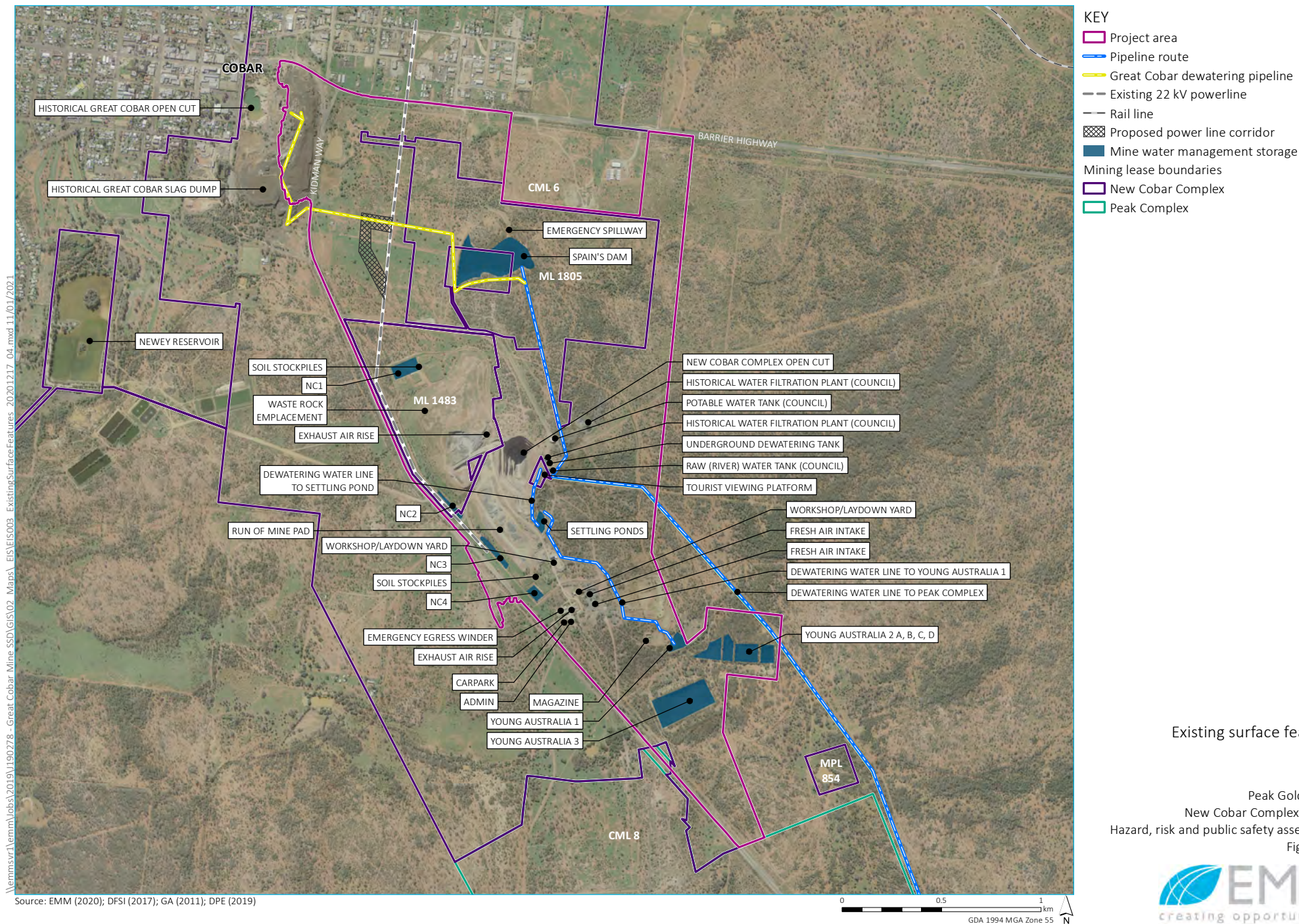
1.1.2 Project overview

All surface works associated with the project will be located underground or in the existing, operational mining New Cobar Complex except for a short (no more than 400 m) power line from an existing 22 kV line servicing PGM to a compact substation within the fresh air intake footprint.

PGM proposes to use the decline, infrastructure and intake and exhaust ventilation elements developed for the Great Cobar exploration drive (approved, but not yet constructed) to facilitate project development. Surface ventilation fans are not required during the development of exploration activities, however as they will be necessary during operation of mining, construction of a new powerline and compact substation, to be located adjacent to the fresh air intake is required. The power line will continue to the exhaust air rise where a ventilation fan will be installed at a depth of approximately 100 m or greater below ground level (bgl). An emergency egress winder headframe and winder house will be installed at the fresh air intake for the purpose of mine rescue in the event of an incident below ground preventing evacuation by conventional means. No additional new surface infrastructure is proposed.

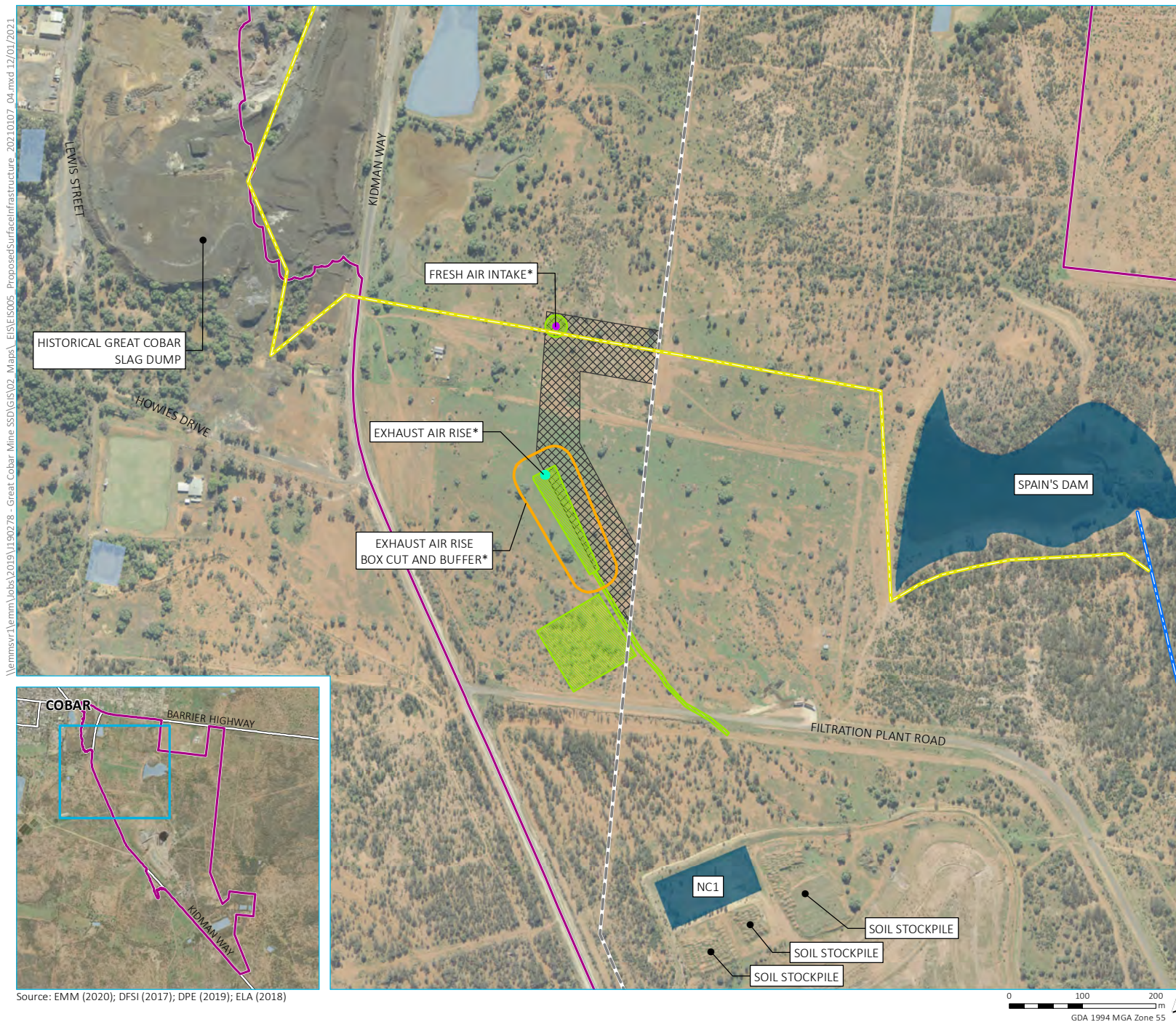
The existing surface infrastructure and facilities at the New Cobar Complex currently support underground mining of the New Cobar, Chesney and Jubilee deposits, and will continue to be used for this project (Figure 1.3 and Figure 1.4). Access to all underground workings in the complex is from a portal and decline at the base of the New Cobar Complex open cut. SSD approval will be sought for the following project elements accessed from, and undertaken within, the existing New Cobar Complex:

- Underground mining of the New Cobar Complex including, but not limited to, New Cobar, Jubilee and Chesney (existing development approval issued by CSC).
- Underground mining of the New Cobar Complex including Great Cobar and Gladstone (not yet approved).
- Groundwater dewatering of the relevant historic and proposed underground workings via the historic Great Cobar Shaft (existing development approval issued by CSC).
- Increase of the number of ore haulage trucks between the New Cobar Complex and Peak Complex from 25 loaded trips per day (50 movements in and out) to 50 loaded trips (100 movements in and out) per day (daylight hours only) averaged over a calendar year. The increase of daily truck movements will provide flexibility to PGM if there are unforeseen production disruptions (eg bad weather).
- Crushing and screening of ore within the existing New Cobar Complex ROM pad (existing approval by CSC).
- Transportation of ore to the Peak Complex via Kidman Way for processing, using road registered heavy vehicles (existing approval by CSC).
- Harvesting of waste rock and:
 - immediately deploying the material underground for use in stope backfilling operations (waste rock will remain underground and will not be transported to the surface as a preference); and
 - transportation of non-acid forming material to the surface and storage within the existing waste rock emplacement (WRE) prior to use across the complexes for construction / rehabilitation tasks (eg tailings dam lifts).
- Deposition of potentially acid forming waste rock brought to the surface and stored within the WRE where at end of mine life it would be capped, or progressively returned underground for disposal.
- Continuation of all other approved activities within the New Cobar Complex.



Existing surface features

Peak Gold Mines
New Cobar Complex Project
Hazard, risk and public safety assessment
Figure 1.3



- KEY**
- Project area
 - Major road
 - Existing indicative pipeline route
 - Existing Great Cobar dewatering pipeline
 - Existing 22 kV powerline
 - Exhaust air rise*
 - Exhaust air rise buffer*
 - Fresh air intake*
 - Proposed power line corridor
 - Waterbody
 - Mine water management storage
 - Area of approved vegetation clearance (indicative)*
- *Approved under existing REF approvals, but not yet constructed.

Proposed surface infrastructure

Peak Gold Mines
New Cobar Complex Project
Hazard, risk and public safety assessment
Figure 1.4

Processing will remain at the Peak Complex at the existing approved rate of up to 800,000 tpa, with production of ore from the Great Cobar and Gladstone deposits making up for the future decrease in production from other workings across PGM.

Additionally, there are remaining resources in the New Cobar, Jubilee and Chesney deposits that are mineral rich, but which are currently not economical to mine in isolation. Keeping the New Cobar Complex operational and gaining access to Great Cobar and Gladstone deposits will lead to increases in economies of scale and maximise opportunities to mine these resources, and keep PGM operational until 2035.

1.2 Purpose of this report

EMM Consulting (EMM) has been engaged by PGM to prepare and submit an environmental impact statement (EIS) to support an SSD application for development consent under section 4.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared to the form and content requirements set out in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) as well as clause 8(1) and clause 5 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The Peak Complex, which is not part of this SSD application will continue to operate under local government (CSC) approvals, as there is no proposed change to this arrangement.

PGM requested Secretary's Environmental Assessment Requirements (SEARs) from DPIE for the SSD EIS in December 2019; these were received in February 2020, and were re-issued in October 2020 following the receipt of a Biodiversity Development Assessment Report (BDAR) waiver. The SEARs included a requirement to assess potential hazards and risks to public safety associated with the construction and operation of the project, including:

An assessment of the likely risks to public safety, paying particular attention to potential subsidence risks, geochemical risks, and the handling, transport and use of any dangerous goods, in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33).

The EIS must take into account the following environmental planning instruments, policies, guidelines and plans:

- *Planning for Bush Fire Protection 2006* (NSW Rural Fire Service (RFS))

Consideration of bushfire risk has also been incorporated in this assessment; however, the assessment of geochemical risk has been assessed in a separate document, appended to the groundwater impact assessment (Appendix I of the EIS). Assessment of road safety is included in the traffic and transport impact assessment (Appendix M of the EIS), and assessment of flooding safety is included in the surface water impact assessment (Appendix J of the EIS). The bushfire assessment is included as Appendix A of this report.

The focus of this report and the project is the New Cobar Complex. Hazards and risks associated with the processing plant and TSF at the Peak Complex, as well as the Peak Complex more generally, are outside the scope of this report and have not been considered further.

This hazard, risk and public safety assessment (HRPSA) has been prepared to determine whether the project represents an offensive or hazardous development as defined by *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33), thereby posing an unacceptable risk to surrounding land uses.

This HRPSA addresses the SEARs and provides information that can be used in the EIS and will support the SSD application for the project.

1.3 Other relevant assessments

1.3.1 Human health risk assessment

A human health risk assessment (HHRA) has been prepared for the project by SLR Consulting Australia Pty Ltd (SLR) (Appendix F of the EIS). The HHRA is consistent with established national and international risk assessment frameworks and has considered risks associated with metals in airborne dust and deposition to soil at 40 locations throughout Cobar (including residences, public facilities, parks, schools, child-care centres, a hospital and an aged care facility).

Modelling undertaken as part of the HHRA predicted negligible change to blood lead (Pb) levels of pregnant females, their unborn offspring, or 1–2 year old children as a result of the project and predictions were well below the target action level of the National Health and Medical Research Council (NHMRC). All estimates were consistent with the range of blood lead levels reported for Australian children in communities not affected by point sources of Pb.

The HHRA concluded that the risks to human health as a result of this project are negligible.

1.3.2 Geotechnical and subsidence assessment

A geotechnical and subsidence assessment has been prepared for the project by Beck Engineering (BE) (Appendix H of the EIS). The assessment considered potential for subsidence and surface deformation from the project, including impacts to surface infrastructure and environmentally sensitive sites. The assessment concluded that predicted subsidence will be less than 15 mm and potential for subsidence-related impacts is considered negligible. Given the negligible amount of predicted subsidence, only low levels of subsidence monitoring (such as annual survey pick-ups) will be implemented (as required).

2 Legislative context

SEPP 33 requires the consent authority to consider a project's potential to cause hazards or be offensive, including consideration of the location of the development and the way in which it is to be carried out. Where SEPP 33 identifies a development as 'potentially hazardous and/or offensive', proponents are required to undertake a preliminary hazard analysis (PHA) to determine the level of risk to people, property and the environment at the proposed location and in the presence of controls.

This HRPSA has been prepared following the appropriate guidelines, policies and industry requirements and following consultation with stakeholders including community members and relevant government agencies.

Legislation, guidelines and policies referenced are as follows:

- *Environmental Planning and Assessment Act 1979*;
- *NSW Rural Fires Act 1997*;
- *AS/NZ ISO 31000:2018 Risk Management – Principles and Guidelines*;
- *HB 203:2006 Environmental Risk Management – Principles and Process*;
- *MDG1010 Minerals Industry Safety and Health Risk Management Guideline* (DTI 2011);
- *Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Code) (NTC 2020);
- *Hazardous and Offensive Development Application Guidelines – Applying SEPP 33* (DoP 2011a);
- *Assessment Guideline – Multi Level Risk Analysis* (DPI 2011);
- *Hazardous Industries Planning Advisory Paper No 3 Risk Assessment* (DoP 2011b); and
- *Hazardous Industries Planning Advisory Paper No 6 Hazard Analysis* (DoP 2011c).

3 SEPP 33 risk screening

3.1 Overview

Potentially hazardous or offensive development is defined in SEPP 33 as development which poses a significant risk to, or which would have an adverse impact on, human health, life, property or the biophysical environment, if it were to operate without employing any control measures.

A development is classified as a hazardous or offensive development if the thresholds in *Applying SEPP 33* (DoP 2011a) are exceeded. These thresholds are provided in a series of tables and figures, which compare the quantities of transported and stored and used hazardous materials to the distance from publicly accessible areas.

The bulk hazardous materials that will be used by the project are diesel and explosives. Diesel and explosives will continue to be stored at the surface infrastructure area and magazine, respectively (Figure 3.1). These materials and their SEPP 33 thresholds are described below (regarded as a preliminary screening by DPIE).

It is noted that the New Cobar Complex is an existing mining precinct and as such, the hazardous materials discussed in this chapter are already stored on-site, in compliance with requirements from WorkCover NSW and SafeWork NSW. The quantity of hazardous materials required on-site is not expected to increase as a result of the project.

3.2 Hazardous materials

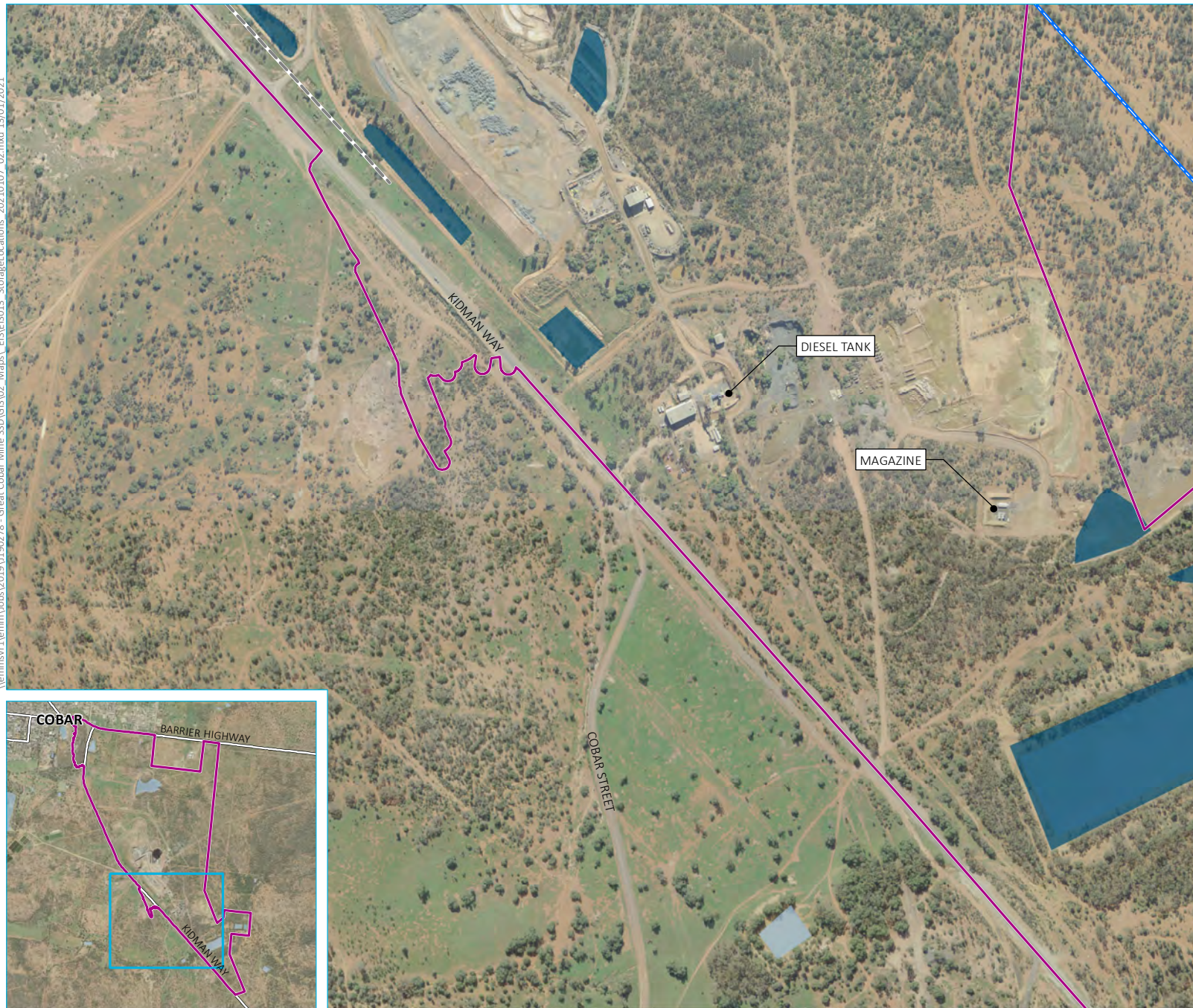
3.2.1 Diesel

Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids (AS 1940:2004) classifies diesel as a combustible liquid (Class C1). However, diesel is not classified as a dangerous good (for transport purposes) under NTC (2020) as its flash point is above 60°C.

As part of existing operations at New Cobar, PGM stores diesel on-site in an above ground bunded tank at the surface infrastructure area. The maximum storage capacity of the tank is 55,000 L; however, approximately 40,000 L is typically stored within the tank at any one time. The quantity of diesel required on-site is not expected to increase as a result of the project. Diesel is and will continue to be stored and handled on-site in accordance with AS 1940:2004.

Diesel is not a hazardous material and, therefore, its storage and use on-site does not qualify the project as potentially hazardous or offensive development.

\\jemmsvr1\jemm\Jobs\2019\190278 - Great Cobar Mine SSD\GIS\02 Maps\ EIS\E5013 StorageLocations_20210107_02.mxd 13/01/2021



- KEY
- Project area
 - Major road
 - Pipeline route
 - Existing 22 kV powerline
 - Waterbody
 - Mine water management storage

Material storage locations

Peak Gold Mines
New Cobar Complex Project
Hazard, risk and public safety assessment
Figure 3.1



Source: EMM (2020); DFSI (2017); DPE (2019); ELA (2018)

0 100 200
m
GDA 1994 MGA Zone 55

3.2.2 Flammable liquids

Hydrocarbons, paints and cleaning substances can be Class 3 flammable liquids under NTC (2020). Hydrocarbons, paints and cleaning substances are not stored on-site as part of existing operations at the New Cobar Complex and will not be stored as part of the project. These substances have not been considered as part of the SEPP 33 risk screening.

3.2.3 Processing substances

Ore is processed at the processing plant at the Peak Complex which comprises a range of mills, flotation columns, flotation cell banks and other associated equipment. Ore processing is not included as part of the project and therefore processing substances have not been considered as part of the SEPP 33 risk screening.

3.2.4 Gases

Gases are not stored on-site as part of existing operations at the New Cobar Complex and will not be stored as part of the project. Gases have not been considered as part of the SEPP 33 risk screening.

3.2.5 Explosives

PGM is authorised to manufacture, supply, transport, possess and store Class 1.1B, 1.1D and 5.1 explosives at the New Cobar Complex in accordance with Licence Number XMNF200002. It is a condition of the licence that PGM must comply with the requirements of the *NSW Explosives Act 2003* and *NSW Explosives Regulation 2005*, as well as the SafeWork NSW (2013) *General Explosives Licence and Security Clearance Conditions*. No changes to this licence are proposed as part of the project.

Explosives are stored at the New Cobar Complex in an external magazine (storage IDs 1N and 2N) (Figure 3.1). The maximum storage capacity of storage 1N is 50,000 kg or 50 t with a typical storage quantity of approximately 40,000 kg or 40 t ammonium nitrate emulsion. The maximum storage capacity of storage 2N is 7,500 kg or 7.5 t of ammonium nitrate emulsion suspension or gel with a typical quantity of 7,500 kg or 7.5 t. Both types of explosive are classified as Class 5.1 dangerous goods. The quantity of explosives required on-site is not expected to increase as a result of the project.

The magazine is approximately 340 m east of Kidman Way at its closest point. The closest privately-owned residence (R31) is approximately 1.4 km west of the magazine at its closest point.

Table 3 of Applying SEPP 33 (DoP 2011) defines the threshold level for storage of Class 5.1 dangerous goods as 5 t. The project exceeds the SEPP 33 threshold for Class 5.1 dangerous goods and is therefore considered potentially hazardous and a preliminary hazard assessment (PHA) is required.

However, the New Cobar Complex is an existing mining precinct and as such, the quantities of ammonium nitrate emulsion described above are already transported, stored and used on-site. The nearest residence is also well outside the threshold distance for the combined amounts of ammonium nitrate emulsion stored on site if they were classed as the more volatile Class 1.1 dangerous goods. The quantity of hazardous materials required on-site is not expected to increase as a result of the project, and therefore a PHA has not been prepared.

Ammonium nitrate emulsion is transported directly to the New Cobar Complex magazine from the Orica manufacturing facility in the Hunter Valley, NSW. The materials are transported by Orica in accordance with the *Australian Code for the Transport of Explosives by Road and Rail* (WRMC 2009).

There are a number of approved plans and procedures already in place at the New Cobar Complex to reduce the potential hazards and risks associated with the manufacture, supply, transport and storage of explosives on-site

(Section 6). On-site explosives storage has been designed and constructed in accordance with *Australian Standard 2187.1:1998 Explosives – Storage, Transport and Use: Storage* (AS2187.1:1998).

3.3 Offensive development

SEPP 33 states that a potentially offensive industry is a development which, if it were to operate without employing any measures to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land.

Without the implementation of management measures, the project will have potential to emit noise, dust and water pollution that could impact the locality and existing or future development of adjacent land.

The following sections consider these potential emissions and the measures that will be implemented to prevent the emissions or reduce their impacts.

3.3.1 Noise

A noise and vibration impact assessment (NVIA) was prepared as part of the EIS for the project (Appendix G of the EIS) with the impacts and management measures summarised below.

Operational, construction and traffic noise as a result of the project will be compliant the relevant assessment criteria at sensitive receptor locations, and sleep disturbance is unlikely to be caused by project activities.

Blast vibration limits will be complied with by managing the amount of explosives used in the maximum instantaneous charge (MIC). PGM will continue to use their vibration prediction model when planning blasting programs, to ensure compliance.

Noise and vibration will continue to be monitored to ensure compliance with relevant guidelines, conditions and licences.

3.3.2 Air quality

An air quality impact assessment (AQIA) has been prepared as part of the EIS for the project (Appendix E of the EIS) with the impacts and management measures summarised below.

Conservative emission concentrations were adopted in the emission calculations for the AQIA. Despite the high level of conservatism, the increased emissions from the project are not predicted to adversely impact the air quality environment in the populated areas of Cobar

Air quality management measures will continue to be implemented and air quality levels will be monitored.

3.3.3 Water quality

The project's potential impacts on groundwater and surface water resources were assessed as part of the EIS (Appendix I and Appendix J of the EIS, respectively).

Ongoing project activities including mine dewatering, waste rock management and surface water runoff may have an impact on water quality at the New Cobar Complex. The implementation of PGM's water management strategy to maintain a zero-discharge site and maximise the capture and reuse of site rainfall runoff will reduce the likely impacts of the project on water quality to a low level.

3.3.4 Summary of potentially offensive development

The above sections demonstrate that, even though the project could result in offensive emissions, these emissions can be prevented or reduced to acceptable levels with the implementation of management measures.

DoP (2011b) states that compliance with NSW Environmental Protection Authority (EPA) requirements should be sufficient to demonstrate that a proposal is not an offensive industry. PGM holds Environmental Protection Licence (EPL) 3596 under the provisions of the NSW *Protection of the Environment Operations Act 1997* (POEO Act). The EPL is administered by the EPA.

An application to vary EPL 3596 will be submitted as part of the project. If the EPA deems that a license can still be granted, which is likely given that potential impacts of the project can be prevented or suitably managed, the project will not be classed as offensive industry.

3.4 Will the project be hazardous or offensive?

The preliminary screening of potentially hazardous substances demonstrates that the screening threshold for Class 1.1d explosives will be exceeded and the project qualifies as potentially hazardous industry. Therefore, in principle, SEPP 33 applies to the project and a PHA is required. However, as noted previously, the New Cobar Complex is an existing mining precinct and as such, the quantity of explosives described above is already stored on-site. The quantity of hazardous materials required on-site is not expected to increase as a result of the project and a PHA has not been prepared.

There are a number of approved plans and procedures already in place at the New Cobar Complex to reduce the potential hazards and risks associated with the manufacture, supply, transport and storage of explosives on-site (Section 5).

The storage and use of hazardous materials will continue to be undertaken in accordance with the following Australian Standards:

- *Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids*; and
- *Australian Standard 2187.1:1998 Explosives – Storage, Transport and Use – Storage*.

Emissions from the project will be prevented or reduced to acceptable levels with the implementation of management measures. Further, PGM will apply to vary their existing EPL from the EPA as part of the project. Therefore, the project does not qualify as potentially offensive industry and a PHA is not required.

4 Bushfire hazard

EMM prepared a bushfire hazard assessment to comply with the requirement to consider the guideline *Planning for Bushfire Protection* (PBP) (RFS 2006). This guideline was updated in 2019 (RFS 2019), and the bushfire assessment considers both documents. The bushfire hazard for the project is summarised here and presented in full in Appendix A.

4.1 Methodology

Bushfire risks associated with the project have been assessed generally in accordance with PBP 2019, with the following steps undertaken in the assessment process:

- determine whether the project area has been mapped as bushfire prone land and requires compliance with PBP 2019;
- identify the regional fire weather, history of bushfire and existing ignition sources for the project area and surrounds;
- identify the location, extent, and vegetation formation of any bushland on or within 1 km of the project area;
- identify the slope and aspect of the project area and of any bushfire prone land within 1 km of the project area;
- identify any features on or adjoining the project area that may mitigate the impact of a bushfire on the proposed development;
- identify potential bushfire impacts, including those related to bushfire impacting on the project, as well as bushfire emanating from the project and into the locality; and
- identify mitigation measures for asset protection zones (APZs), handling, storage and management of potential ignition sources, availability of fire-suppression equipment, and emergency management procedures and planning (including access), in relation to the identified bushfire hazards.

4.2 Existing environment

4.2.1 Weather and climate

The project is within Cobar Bush Fire Management Committee (BFMC) area, which comprises the following regional weather characteristics:

- a hot, arid climate with the driest months usually from May to September;
- annual median rainfall is 376 mm (Cobar MO (48027) rainfall gauge) (Bureau of Meteorology 2020), although variations from this figure can be extreme; and
- the bushfire season generally runs from October to March (Cobar BFMC 2011).

Prevailing weather conditions associated with the bushfire season in the Cobar BFMC area are hot dry days with temperatures often exceeding 40°C, humidity of less than 10% and dry westerly winds. There are frequent dry electrical storms during the bushfire season (Cobar BFMC 2011).

4.2.2 History and ignition sources

The Cobar BFMC area has on average 40 bushfires per year, with most of these being minor fires of less than 1,000 ha in area. Several major fires have occurred over the past 40 years, including the summers of 1974/75, 1984/85 and 2000/01. These fires have followed exceptionally wet seasons which resulted in a heavy body of both winter and summer fuels.

The direction of fires within the Cobar BFMC area has been strongly influenced by the prevailing weather conditions. The prevailing winds which run predominately from the north east or from the south west also influences fire behaviour and patterns. Extensive plains areas and undulating hills give little resistance to wind force, valleys tend to funnel the wind and create swirling action under extreme conditions.

There are few natural lines of control that occur in the Cobar BFMC area. The area is devoid of any river or lake system, although the Darling and Lachlan Rivers form the northern and southern boundaries, respectively. Roads and dedicated fire trails, including the vast network of mallee trails, act as primary control lines during times of high fire activity.

Historical evidence indicates that the main sources of ignition in the Cobar BFMC area is lightning associated with dry summer storms (Cobar BFMC 2011).

4.2.3 Vegetation assessment

In accordance with Appendix 1 of PBP 2019, vegetation within 140 m of the project area was assessed to determine its formation and classification.

The native vegetation adjacent to the surface infrastructure and in the broader locality align with the Semi-arid Woodlands (Shrubby sub-formation) and Arid Shrublands (Acacia sub-formation), vegetation formations, as classified by Keith (2004). The areas of vegetation mapped as cleared/exotic vegetation are likely to be a mix of sparse shrubland dominated by non-native species, areas with minimal vegetation, planted exotic trees found in roadside areas, cropland, heavily grazed pastures, parklands, residential properties, commercial/industrial development, and cleared land associated with past and present mining infrastructure and activities.

Vegetation recorded as PCT 125: Mulga – Ironwood shrubland on loams and clays mainly of the Cobar Peneplain Bioregion was mapped and ground-truthed by Eco Logical Australia (2020) as being present close to the proposed new surface infrastructure of the power line and emergency egress winder.

4.2.4 Slope assessment

A slope analysis has been undertaken that encompasses the land surrounding, and for a 1 km buffer beyond, the surface infrastructure. This allows for an understanding of the slope classifications under the vegetation hazard, and therefore potential fire behaviour surrounding the surface infrastructure and immediate surrounds. The land surrounding the surface infrastructure is a generally flat landscape with some areas of steeper slopes associated with low hills and various permanent and ephemeral water courses, as well as ground disturbance related to past mining development.

Slopes within 1 km of the surface infrastructure vary in gradient from less than 2.5 degrees (°) (flat land) to areas that are over 17.5°. These isolated areas of steeper gradient are related to past land disturbance and earthworks for stockpiles, bunds, roads, tracks, and pits associated with mining. There are also some steeper slopes associated with low hills (Fort Bourke Hill) and lower lying areas from permanent and ephemeral watercourses that are linked to the dams.

4.2.5 Features of adjoining land that may mitigate the impact of bushfire

The surface infrastructure is surrounded by areas that have been highly modified through agricultural, residential, and commercial land uses. These areas contain modified vegetation or non-vegetated areas, and include:

- historically cleared agricultural land comprising livestock grazing;
- historically cleared informal residential accommodation;
- rural-residential properties containing managed land within the curtilage of buildings;
- the town of Cobar, containing managed land for infrastructure, residential, commercial and recreational use; and
- existing commercial mining operations resulting in past land clearing for pits, stockpiles, tailings, dams and hardstand areas.

Areas of native vegetation remain as a patchwork of semi-arid woodlands and arid shrublands, and it is these areas that are within proximity to the surface infrastructure that remain a potential hazard.

4.3 Potential impacts

Bushfire is capable of damaging surface infrastructure in the project site and consequently impacting upon the safety of staff and contractors during the construction and operation of the project. Bushfire emanating from the construction and operation of the surface infrastructure poses a human safety and property threat as well as threatening native flora, fauna, and ecosystems within the locality of the project.

Fire suppression operations can be made more challenging as a result of bio-physical risk factors, as discussed in the sections above. This includes weather conditions, vegetation characteristics, terrain and aspect, and existing potential ignition sources which can contribute to the risk of bushfire originating from surrounding areas outside the project site. There are additional risks associated with other project related activities. The potential ignition of unplanned bushfires from the construction and operation phases of the proposed new surface infrastructure are likely to be from the following sources:

- inadequate storage of combustible liquids (eg fuel) and other chemicals;
- vehicle and machine movement over vegetation;
- sparks generated from hot works (eg welders and grinders);
- human error, such as non-compliance of hot works procedures or incorrect disposal of cigarette butts;
- diesel generators, causing ignition of vegetation;
- power line failure, causing ignition of vegetation; and
- electrical equipment failure, causing ignition of vegetation.

It is noted that the project has very few new above ground new infrastructure elements, consisting only of the single new power line and the compact substation. All other surface works associated with the project will be located in an approved existing operational mining complex. All management measures for bushfire risk are

included within the existing Mine Operations Plan (MOP), *Peak Gold Mines Emergency Management Plan* (PGM 2020) and related processes and guidelines.

The bushfire prevention and protection measures described in Section 6 will assist in mitigating the identified bushfire impacts during the construction and operation of the project.

5 Hazard and risk assessment

5.1 Overview

This section identifies hazard scenarios for atypical but possible events (eg accidents) that could occur during the project's construction, operation and closure phases. It describes qualitative criteria for rating the consequences, likelihoods and risks of these scenarios. Risk ratings are compared to DPI's (2011) qualitative risk assessment criteria to determine if the project, in the presence of controls, would be acceptable from a public risk perspective.

The activities completed as part of the hazard and risk assessment and their objectives included:

1. Hazard identification to:
 - a) Identify all hazards associated with the project (based on project infrastructure, types of equipment, hazardous materials present, proposed operation and maintenance activities and external factors).
 - b) Identify credible events associated with the hazards (ie the mechanisms by which the hazard potential is realised).
 - c) Identify credible causes and potential consequences for the identified events (ie the potential ways in which the event could arise).
 - d) Identify proposed controls to prevent and mitigate against the events (eg any existing aspects of the design that could prevent and/or mitigate against the event and resulting consequences).
 - e) Determine the likelihood of the events (the likelihood of an event was estimated using the scale shown in Table 5.1).
2. Risk assessment to:
 - a) Determine the risk of the identified events.
 - b) Assess the risks associated with the project.

Table 5.1 Qualitative measures of likelihood

Level	Likelihood
A	Practically impossible
B	Not likely to happen
C	Possible or could happen
D	Likely to happen at some point
E	Almost certain to happen

5.2 Risk criteria

Qualitative ratings were assigned to the potential consequences of incidents to public safety and/or the environment (Table 5.2). The likelihood (Table 5.1) and consequence ratings (Table 5.2) were combined to determine the risk rating (Table 5.3).

Table 5.2 Qualitative measures of consequence

Descriptor	Potential consequences to public safety	Potential consequences to the environment and/or society
1	No impact off site.	Limited, low significance environmental impacts to a small area of low significance. Low level repairable damage to commonplace structures. Short-term local social issues or disruptions.
2	Minor injury or short-term health effects requiring restricted work.	Minor short-term environmental impacts not affecting environmental systems. Moderate damage to items of local cultural significance or minor damage to items of regional significance. Minor medium-term social impacts on local population.
3	Major injury or health effects (eg lost time injuries or permanent disabilities). Minor injury or health effects to multiple people.	Medium-term environmental impacts affecting local environmental systems. Moderate damage to items of regional cultural significance. Ongoing local social issues.
4	Total permanent disability. Major injuries or health effects to multiple people.	Long-term environmental impacts with significant effects locally and some effects regionally. Irreparable damage to items of regional cultural significance. Widespread local social issues and moderate regional social issues.
5	Fatality or multiple fatalities.	Regional long-term environmental impacts on critical species, habitat or environmental systems. Irreparable damage to items of national cultural significance. Ongoing major regional social impacts.

Table 5.3 Risk ratings

Consequence	Likelihood				
	A	B	C	D	E
5	Moderate	Moderate	High	High	High
4	Low	Moderate	Moderate	High	High
3	Low	Low	Moderate	Moderate	High
2	Low	Low	Low	Moderate	Moderate
1	Low	Low	Low	Low	Moderate

5.3 Hazard scenarios

Four hazard scenarios were considered for the project, these include:

- explosives – uncontrolled detonation in the magazine;
- explosives – uncontrolled detonation in transit;
- combustible materials – fire on site; and
- combustible materials – fire in transit.

A risk assessment was undertaken for the four scenarios, with a description of mitigating factors presented in Table 5.4

It must be noted that the hazard scenarios described are ones have the potential to occur with ongoing activities at the New Cobar Complex. In the 20-year history of operations at the New Cobar Complex, none of the below scenarios have eventuated.

Table 5.4 Hazard scenarios – risk assessment

Scenario	Description	Likelihood	Consequence	Risk
Explosives – uncontrolled detonation in the magazine	The magazine meets the requirements of the Australian Standards – and as such the occurrence of this event would require all of the signage and magazine integrity measures to be defeated in the one event. This is prevented by: fire proof construction, removal of vegetation in the magazine compound, firefighting equipment present in the magazine compound, training and authorisation of workers handling explosives, procedures for storing like with like in magazines, licensing audits of magazines, regular inspection and auditing of magazines, and supervision of workers involved in explosives handling. As for other hazardous materials on site, storage and handling of explosives will be in line with PGM’s Fire and Explosion Control Plan. If all these controls fail then the magazine will detonate which is countered by: preferential failure of the roof of the magazine to direct the blast upwards, cleanliness of the magazine compound (to limit debris), protective bunds around the magazine (again to redirect energy (over-pressure, flying debris, etc.) from leaving the magazine compound), and distance of the magazine from populated locations. It is conceivable in extreme circumstances that the magazine could explode but if this were to happen then only negligible injuries to the public could arise due to the distance of the magazine from the project boundary, therefore a risk of low has been determined.	A	1	L
Explosives – uncontrolled detonation in transit	Explosives are regularly transported around Australia at a tolerable level of risk. PGM use reputable providers and transport companies – confirming that they are implementing transport in line with applicable Codes and using qualified and approved workers. This could lead to a conceivable in extreme circumstances event where nearby members of the public could suffer fatal injuries, therefore a risk of moderate has been determined.	B	5	M

Table 5.4 Hazard scenarios – risk assessment

Scenario	Description	Likelihood	Consequence	Risk
Combustible materials – fire on site	Diesel stored on site is a combustible substance. The potential for fire is mitigated by a combination of: fit for purpose storage locations kept in asset protection zones (APZ) clear of ignition sources and other fuel (e.g. vegetation, waste, etc.); storage containers/tanks appropriately rated for the material; training and induction of workers so they are alert to the requirement to not smoke or introduce ignition sources to these storage areas; signage of the compound (including HAZMAT codes to aid emergency responders); firefighting equipment around the storage location; site emergency responders capable of executing the best response for the arising situation, and; linkage and/or agreements with off-site responding agencies. A risk of low has been determined.	A	1	L
Combustible materials – fire in transit	Combustible materials are regularly transported around Australia at a tolerable level of risk. PGM use reputable providers and transport companies – confirming that they are implementing transport in line with applicable Codes and using qualified and approved workers. This could lead to a conceivable in extreme circumstances event where nearby members of the public could suffer fatal injuries, therefore a risk of moderate has been determined.	A	5	M

6 Management and mitigation measures

6.1 Overview

The health, safety and wellbeing of PGM's employees and contractors is their number one priority. The pursuit of ongoing safety performance improvement has seen a recent renewed focus on workplace hazard reporting and action plans, fatigue management, increased visible safety leadership, improved communication channels between the contractor and site management, and root cause analysis of all reportable incidents.

6.2 Project design

6.2.1 New infrastructure

Risk reduction and public safety will be considered during the design of the project and can be managed through existing and proposed APZs and construction standards.

There are no new proposed permanent habitable buildings for the project. The fresh air intake, exhaust air rise and box cut have been previously approved by CSC and occur within a historically cleared area, with any remnant vegetation within the footprint and for a buffer of approximately 30 m surrounding this infrastructure to be cleared as part of the previously approved air rise box cut and buffer. The compact substation and emergency egress will be located within the previously cleared and fenced area surrounding the previously approved fresh air intake and buffer. As the project does not include the construction of any habitable buildings and the proposed surface infrastructure is not within mapped bushfire prone land, there are no requirements for specific APZs or bushfire construction standards according to AS 3959-2018.

However, the MOP includes the requirement of fire breaks in place around the Peak and New Cobar complexes perimeter and operations fences, with annual maintenance. It is recommended that the vegetation close to the proposed new surface infrastructure and fencing is also maintained as a firebreak and inspected by the PGM Emergency Services Officer quarterly.

6.2.2 Existing infrastructure

Existing permanent buildings associated with the operational mining complex within the project area comprise the administration buildings and workshops. These buildings are also not within mapped bushfire prone land, therefore, there are no requirements for specific APZs or bushfire construction standard according to AS 3959-2018. However, due to vegetation hazard being in proximity to these structures, and in accordance with PBP 2019 (section 8.3.5 and 8.3.6), it is recommended:

- a minimum 10 m APZ for the structures and associated buildings, and
- that the APZs must be maintained to the standard of an Inner Protection Area (IPA) for the life of the mine.

It is noted that in many instances, administration and workshop buildings require access roads, on-site parking, and hardstand/loading areas. In these cases, it is prudent to place these facilities in the most appropriate location in order to establish defensible space for fire-fighting purposes, as well as to mitigate the potential for ignition of surrounding bushland from project sources.

There is other existing surface infrastructure associated with the approved existing and operational mining complex within the project area. The infrastructure is also not within mapped bushfire prone land, therefore there are no requirements for specific APZs in accordance with PBP 2019. However, due to vegetation hazard being in proximity to these structures and in accordance with PBP 2019 (8.3.6), it is recommended a minimum 10 m APZ (maintained

to the standard of an IPA) should be provided around any infrastructure that may be considered vulnerable to bushfire or pose an ignition risk. This includes the explosives magazine and diesel fuel tanks. It is noted that the existing explosives magazine has an existing APZ of approximately 30 m.

6.3 Proposed mitigation measures

The following measures are recommended for existing and proposed surface infrastructure for the project:

- Diesel generators and associated fuel storage tanks are to be designed, housed, and maintained so as not to serve as an unacceptable risk to surrounding vegetation hazard. Diesel generators and associated fuel storage tanks should be located away from the hazard, wherever possible.
- Adequate storage and handling requirements for potentially combustible substances at the surface infrastructure in accordance with *AS 1940 The storage and handling of flammable and combustible liquids*, *AS 1596 The storage and handling of LP gas* and other relevant Australian Standards.
- The proposed overhead power line should be designed and maintained so that it will not serve as a bushfire risk to surrounding bush, with no part of a tree being closer to a power line than the distance set out in *ISSC3 Guideline for Managing Vegetation Near Power Lines*.
- It is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under section 99 of the *Rural Fires Act 1997*.
- Notification of the local NSW RFS Fire Control Centre is recommended for any works that have potential to ignite surrounding vegetation, proposed to be carried out during a bushfire fire danger period (1 October to 31 March, however, may vary due to local conditions) to ensure weather conditions are appropriate.

6.4 Existing PGM management plans

PGM has a portfolio of existing management plans and procedures relevant to the New Cobar Complex that will continue to be implemented and reviewed as part of the ongoing operation of the project. This section of the HRPSA identifies existing plans and procedures of relevance to this assessment and on-site hazard and risk management.

6.4.1 Emergency Management Plan (PLN-06-040)

PGM has an Emergency Management Plan (PLN-06-040), which details the responsibilities, actions, reporting requirements and resources available to ensure effective and timely management of emergencies on or affecting operations at both the New Cobar and Peak complexes. The plan also describes PGM's incident management system.

As part of the preparation of this plan, a formal risk review was undertaken to identify activities involving emergency situations that may occur in underground workings and on the surface. The risk assessment will be reviewed and evaluated every three years to ensure that:

- control measures are working effectively;
- all emergency control hazards are identified;
- workers are using control measures in accordance with the instruction and training provided; and
- the control measures remain effective in minimising risk.

An individual risk assessment is also required to be conducted for tasks that could cause injury due to inappropriate emergency response.

The Emergency Management Plan and related processes and guidelines have existing requirements for:

- fire prevention and protection, including the provision of firefighting water supply and reticulation system;
- provision of firefighting facilities and equipment;
- maintenance and inspection of fire protection systems;
- fire response resources;
- fire control strategies and training, and
- review and audits, in line with relevant Work Health and Safety legislation, Australian standards and other relevant requirements.

The Emergency Management Plan also has requirements for the handling, storage and management of potential hazardous substances and potential ignition sources. These include:

- Machinery should be maintained and operated in a manner that would minimise the potential to start a fire. This would include ensuring that spark-free exhausts are fitted and that all fuel, electrical and braking systems are maintained in good order, and when operating in grassed areas the undercarriage of vehicles are de-grassed daily.
- Ensure that the site remains a 'No Smoking' site.
- A Hot Work Permit is required to be approved prior to hot works being undertaken outside of workshops (or other designated areas) that could generate a flame, fire, heat or spark.
- No fires, welding, or angle grinding at field sites on Total Fire Ban days.
- The PGM operating licence prevents the lighting of fires at any time without prior approval. The only exception is the use of a fire bucket/special burners.
- No uncontained fires - must be in fire buckets or other approved burners.
- All contractors and staff are to be trained in the use of the extinguishers.

The Emergency Management Plan will be updated to encompass the proposed new surface infrastructure and to account for the increase in ore truck movements on Kidman Way and workforce numbers. These updates will be required to cover potential bushfire risk, emergency response and access/egress arrangements (to ensure safe access to/from the public road system for firefighters providing property protection during a bushfire, and for project staff/occupant egress for evacuation).

6.4.2 Emergency Preparedness Procedure (PRO-06-040-01) and Emergency Response Procedure (PRO-06-040-04)

PGM has an Emergency Preparedness Procedure (PRO-06-040-01) and Emergency Response Procedure (PRO-06-040-04), which are designed to support a structured approach for the planning, development, implementation,

testing and maintenance of emergency response procedures and equipment. The procedures provide the minimum emergency preparedness requirements for both the New Cobar and Peak complexes and apply to all workers.

PGM is equipped for emergencies with the following equipment available on-site:

- fire and evacuation alarms;
- radio broadcasts;
- shaft accident alarm and underground stench gas alarm (underground only);
- on-site communication systems (two-way radio, landline and mobile phones);
- well-equipped first aid room;
- mine site compliance ambulance;
- spill kits;
- eye wash stations and safety showers;
- firefighting equipment; and
- mine site compliant light vehicles.

Both procedures detail the risk management framework at PGM's New Cobar and Peak complexes, which include four primary methodologies or tools:

- Level 1 – Take 5;
- Level 2 – Job Safety Analysis (JSA);
- Level 3 – Workplace Risk and Control Assessments (WRAC); and
- Level 4 – Quantitative Risk Assessments.

Each of these tools are underpinned by appropriate training, a formal hazard reporting and corrective action process and a risk register.

6.4.3 Fire Prevention and Protection Procedure (PRO-06-040-02)

Hazards associated with fires and explosions were identified as principal hazards by PGM as part of their Broad Brush Risk Assessment (BBRA). Consequently, PGM has a Fire Prevention and Protection Procedure (PRO-06-040-02), which is designed to ensure that the risks associated with the potential of any fire and/or explosion are managed and compliant with the *NSW Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*.

There are a range of fire and explosion hazards at PGM's New Cobar and Peak complexes. The specific details of these hazards and associated causes and controls are listed in PGM's Fire and Explosion Risk Assessment, which is stored in PGM's Risk and Compliance Management System (HUB).

6.4.4 Incident and Crisis Management Procedure (PRO-08-028)

PGM has an Incident and Crisis Management Procedure (PRO-08-028) to ensure that environmental-related events and reporting of hazards, near misses and incidents are undertaken and controlled at the Peak and New Cobar complexes. The procedure describes the responsibilities and procedures implemented to manage environmental-related incidents and emergencies across PGM's operations.

6.4.5 Fire and Explosion Plan (PLN-01-100)

PGM has a Fire and Explosion Plan to ensure that the risks associated with the potential of any fire and/or explosion are managed (prevented and mitigated), and compliant with *Work Health and Safety (Mine) Regulation 2014*. This plan sets out roles and responsibilities and control measures to avoid and manage the potential risks of a fire or explosion on site. This plan also provides linkages to other relevant PGM plans and procedures.

7 Conclusion

Preliminary screening of potentially hazardous substances undertaken as part of this HRPSA has found that the project exceeds the SEPP 33 screening threshold for explosives. However, the New Cobar Complex is an existing project and explosives are already stored on site at quantities greater than the SEPP 33 screening threshold for new developments, and remains in compliance with requirements from WorkCover NSW and SafeWork NSW. The quantity of hazardous materials transported, stored and used on-site is not expected to increase as a result of the project, therefore the project is not considered represent an offensive or hazardous development.

The project is not located in an area mapped as bushfire prone. Existing APZs surround existing infrastructure, and new infrastructure that presents a bushfire risk will be located in areas already cleared of vegetation.

Four hazard scenarios were assessed to determine risk to public safety or the environment, and no scenario was found to have the potential for moderate or greater offsite consequences.

The continuation of PGM's management and mitigation measures will manage the risks to the environment and public safety as well as bushfire risk to acceptable and compliant levels.

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Acronyms

Acronym	Meaning
APZs	Asset protection zones
AQIA	Air quality impact assessment
BBRA	Broad Brush Risk Assessment
BE	Beck Engineering
CML	Consolidated mining lease
Cobar BFMC	Cobar Bush Fire Management Committee
CSC	Cobar Shire Council
DoP	Department of Planning
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
HAZMAT	Hazardous Materials
HHRA	Human health risk assessment
HRPSA	Hazard, risk and public safety assessment
IPA	Inner Protection Area
kV	kilovolt
Mbgl	Metres below ground level
MIC	Maximum instantaneous charge
ML	Mining lease
MOP	Mine Operations Plan
NAF	Non-acid forming
NHMRC	National Health and Medical Research Council
NSW	New South Wales
NVIA	Noise and vibration impact assessment
PAF	Potentially acid forming
Pb	Lead
PBP	Planning for Bushfire Protection
PGM	Peak Gold Mines Pty Ltd
PHA	Preliminary hazard analysis
POEO Act	Protection of the Environment Operations Act
RFS	Rural Fire Service
ROM	Run-of-mine

Acronym	Meaning
SEARs	Secretary's Environmental Assessment Requirements
SEPP 33	State Environmental Planning Policy No. 33
SLR	SLR Consulting Australia Pty Ltd
SSD	State Significant Development
tpa	Tonnes per annum
TSF	Tailings storage facility
WRE	Waste rock emplacement

Appendix A

Bushfire hazard assessment

18 December 2020

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Re: New Cobar Complex Underground Project SSD - 10419 - Bushfire hazard assessment

1 Introduction

1.1 Overview

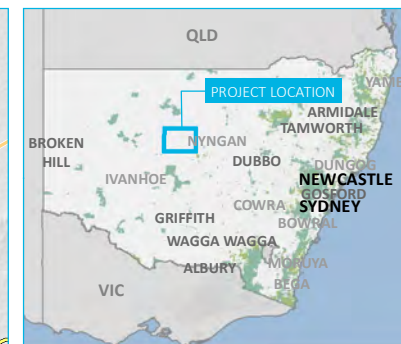
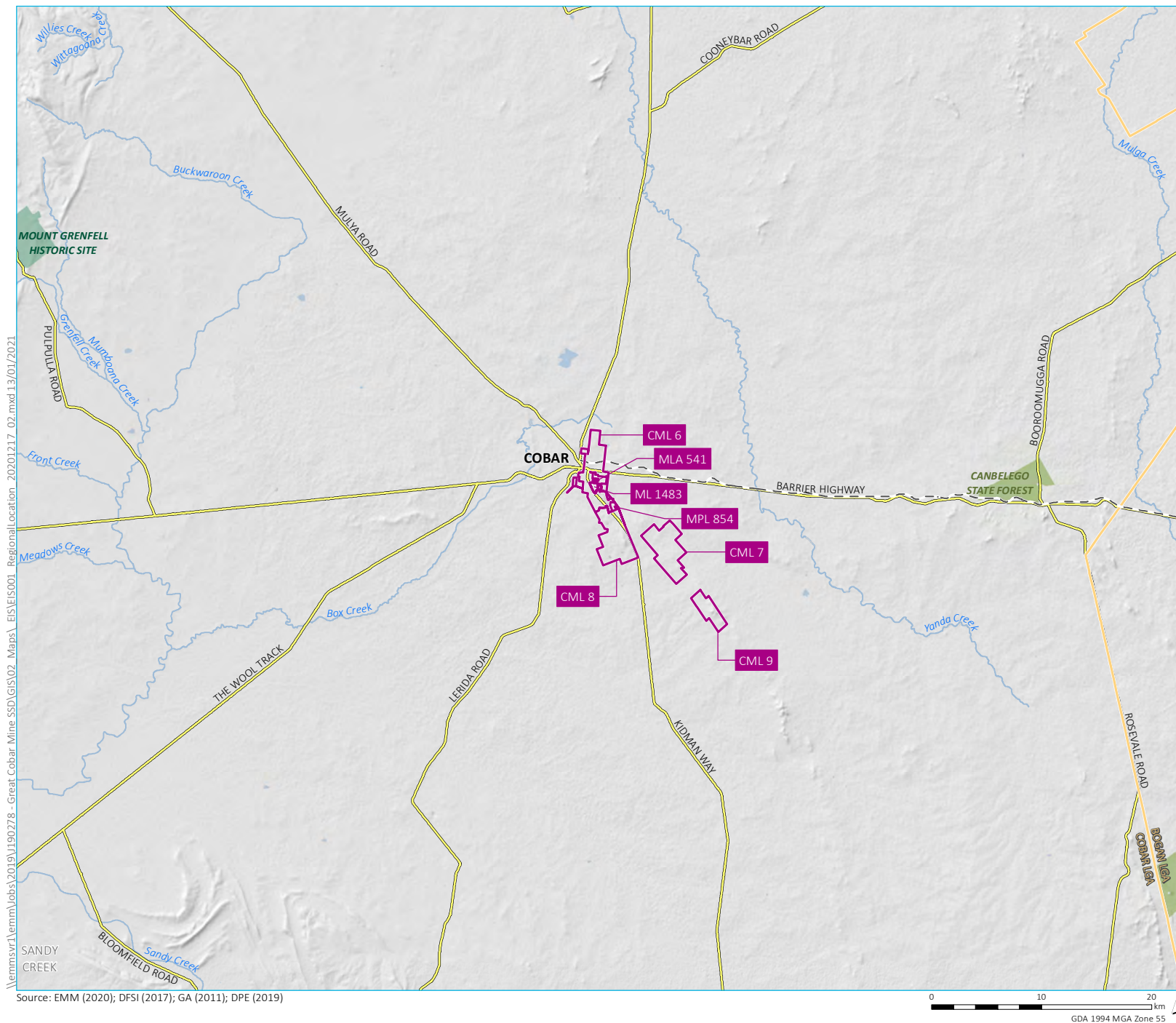
Peak Gold Mines Pty Ltd (PGM), a wholly owned and operated subsidiary of Aurelia Metals Limited (Aurelia), owns and operates the Peak Gold Mines operation south-east of Cobar, far western New South Wales (NSW) see Figure 1.1.

The PGM operation comprises the New Cobar Complex located 3 kilometres (km) to the south-east of Cobar town centre and the Peak Complex located 10 km south-east of the town centre. Both complexes are located adjacent to Kidman Way, which connects Cobar to Hillston and Griffith to the south.

PGM has been operational since modern mining commenced at the Peak Complex in 1991 and all current mining operates under development approvals issued by Cobar Shire Council (CSC).

The New Cobar Complex Project State Significant Development (SSD) (the project) is an amalgamation of underground mining at New Cobar, Chesney and Jubilee deposits and development of new underground workings of the Great Cobar and Gladstone deposits to create the New Cobar Complex Project.

PGM is also seeking to consolidate all existing development approvals applicable to the New Cobar Complex into a single modern consent issued by the Department of Planning, Industry and Environment (DPIE). Approval will be sought for project elements accessed from, and undertaken within, the existing New Cobar Complex located within consolidated mining lease (CML) 6, mining purposes lease (MPL) 0854 and mining leases (ML) ML 1483 and ML 1805 (see Figure 1.2).



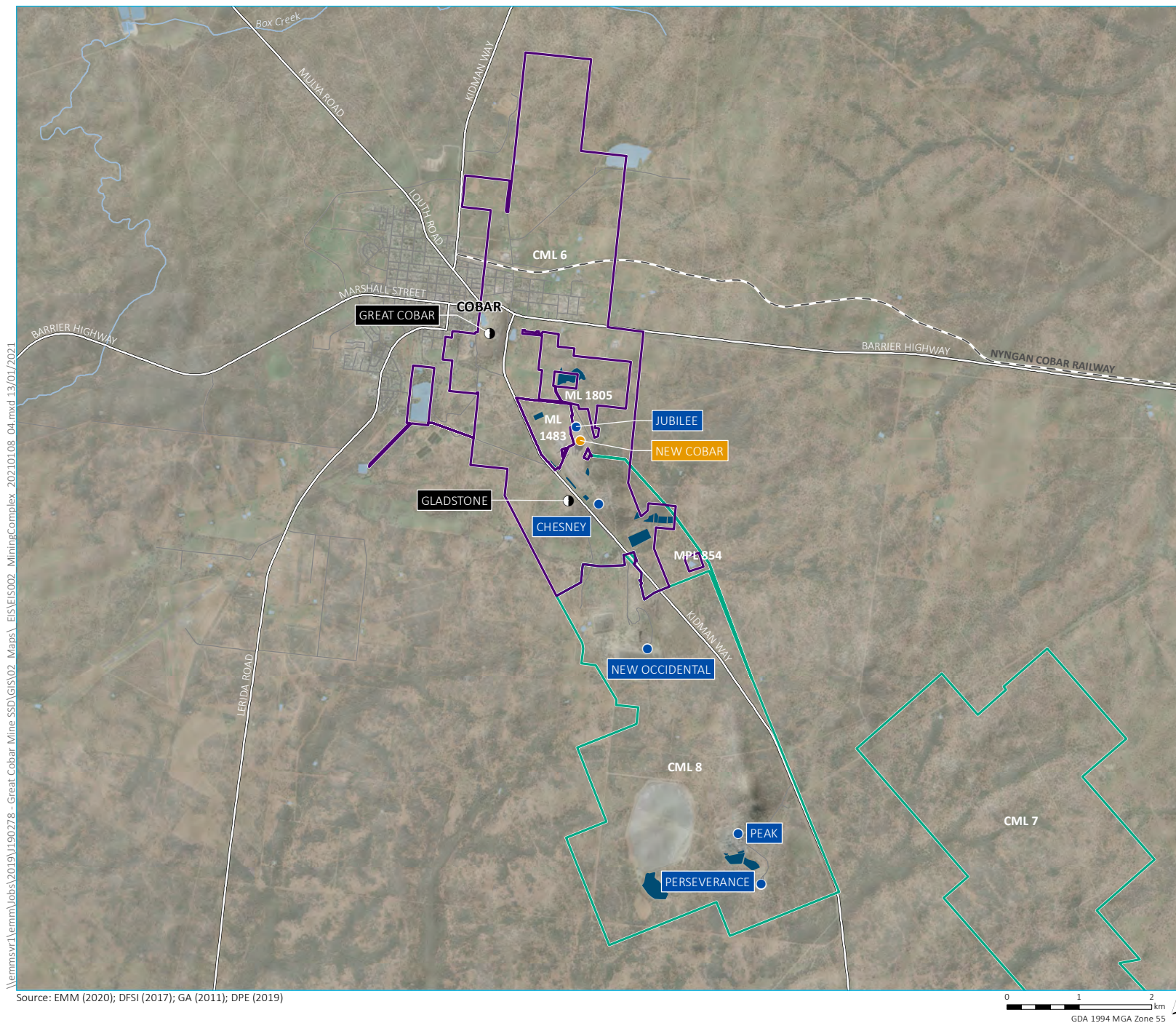
KEY

- Mining lease boundary
- Rail line
- Major road
- Named watercourse
- Waterbody
- Local government area
- NPWS reserve
- State forest

Regional location of the Peak Gold Mine

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 1.1





- KEY**
- Completed working
 - Current working
 - Future working
 - Rail line
 - == Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Mine water management storage
 - Mining lease boundaries
 - New Cobar Complex
 - Peak Complex

Mining leases and mining complexes

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 1.2



1.1.1 Background

PGM has been operational since mining commenced at the Peak deposit in 1991 producing gold, copper, lead, zinc and silver. Mining at the New Cobar Complex commenced with the open cut in 2000, then transitioned to underground mining in 2004.

The current CSC development approvals at Peak Complex and New Cobar Complex allow for the operations to continue indefinitely and process up to 800,000 tonnes per annum (tpa) of ore. Ore processing, tailings storage and concentrate handling is undertaken at the Peak Complex with ore from the New Cobar Complex trucked by public road to processing facilities at the Peak Complex. Both the processing plant and the tailings storage facility (TSF) are located at the Peak Complex, and activities at those facilities are outside the scope of this project.

PGM has identified the Gladstone and Great Cobar deposits as targets for further mining to extend the life of operations at the New Cobar Complex. The Great Cobar deposit was historically exploited by surface and shallow underground mining between 1870 and 1919, but no mining of that deposit has been undertaken since that time.

PGM has obtained conditional approval for development of an exploration decline to facilitate exploration activities within the Great Cobar deposit. The objectives of the exploration activities are to:

- further define the mineral resource through underground drilling from an exploration decline; and
- taking of a bulk sample to provide further samples for metallurgical, geotechnical and associated test work.

1.1.2 Project overview

1.1.3 Project overview

All surface works associated with the project will be located underground or in the existing, operational mining New Cobar Complex except for a short (no more than 400 m) power line from an existing 22 kV line servicing PGM to a compact substation within the fresh air intake footprint.

PGM proposes to use the decline, infrastructure and intake and exhaust ventilation elements developed for the Great Cobar exploration drive (approved, but not yet constructed) to facilitate project development. Surface ventilation fans are not required during the development of exploration activities, however as they will be necessary during operation of mining, construction of a new powerline and compact substation, to be located adjacent to the fresh air intake is required. The power line will continue to the exhaust air rise where a ventilation fan will be installed at a depth of approximately 100 m or greater below ground level (bgl). An emergency egress winder headframe and winder house will be installed at the fresh air intake for the purpose of mine rescue in the event of an incident below ground preventing evacuation by conventional means. No additional new surface infrastructure is proposed.

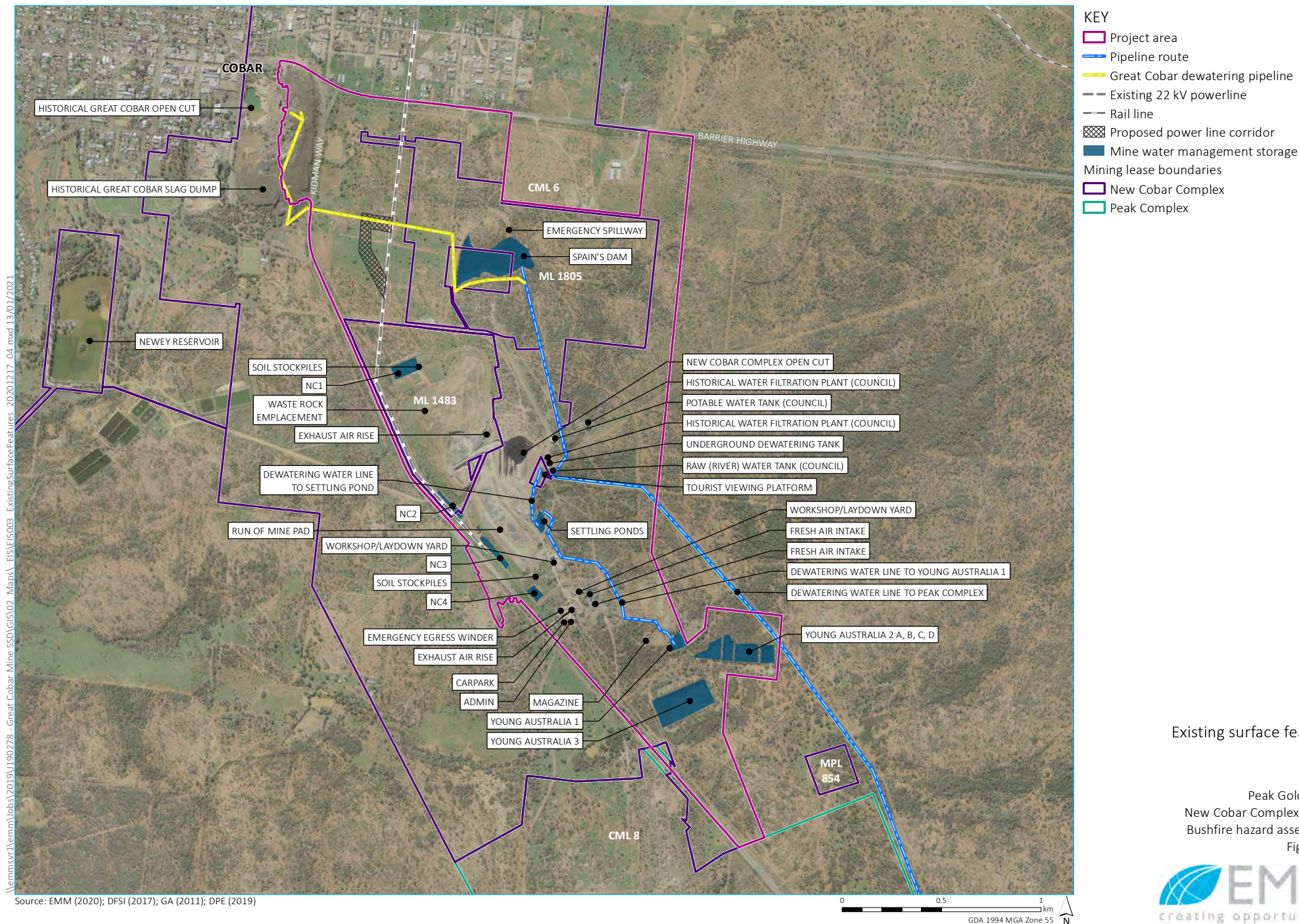
The existing surface infrastructure and facilities at the New Cobar Complex currently support underground mining of the New Cobar, Chesney and Jubilee deposits, and will continue to be used for this project (Figure 1.3 and Figure 1.4). Access to all underground workings in the complex is from a portal and decline at the base of the New Cobar Complex open cut. SSD approval will be sought for the following project elements accessed from, and undertaken within, the existing New Cobar Complex:

- Underground mining of the New Cobar Complex including, but not limited to, New Cobar, Jubilee and Chesney (existing development approval issued by CSC).
- Underground mining of the New Cobar Complex including Great Cobar and Gladstone (not yet approved).

- Groundwater dewatering of the relevant historic and proposed underground workings via the historic Great Cobar Shaft (existing development approval issued by CSC).
- Increase of the number of ore haulage trucks between the New Cobar Complex and Peak Complex from 25 loaded trips per day (50 movements in and out) to 50 loaded trips (100 movements in and out) per day (daylight hours only) averaged over a calendar year. The increase of daily truck movements will provide flexibility to PGM if there are unforeseen production disruptions (eg bad weather).
- Crushing and screening of ore within the existing New Cobar Complex ROM pad (existing approval by CSC).
- Transportation of ore to the Peak Complex via Kidman Way for processing, using road registered heavy vehicles (existing approval by CSC).
- Harvesting of waste rock and:
 - immediately deploying the material underground for use in stope backfilling operations (waste rock will remain underground and will not be transported to the surface as a preference); and
 - transportation of non-acid forming material to the surface and storage within the existing waste rock emplacement (WRE) prior to use across the complexes for construction / rehabilitation tasks (eg tailings dam lifts).
- Deposition of potentially acid forming waste rock brought to the surface and stored within the WRE where at end of mine life it would be capped, or progressively returned underground for disposal.
- Continuation of all other approved activities within the New Cobar Complex.

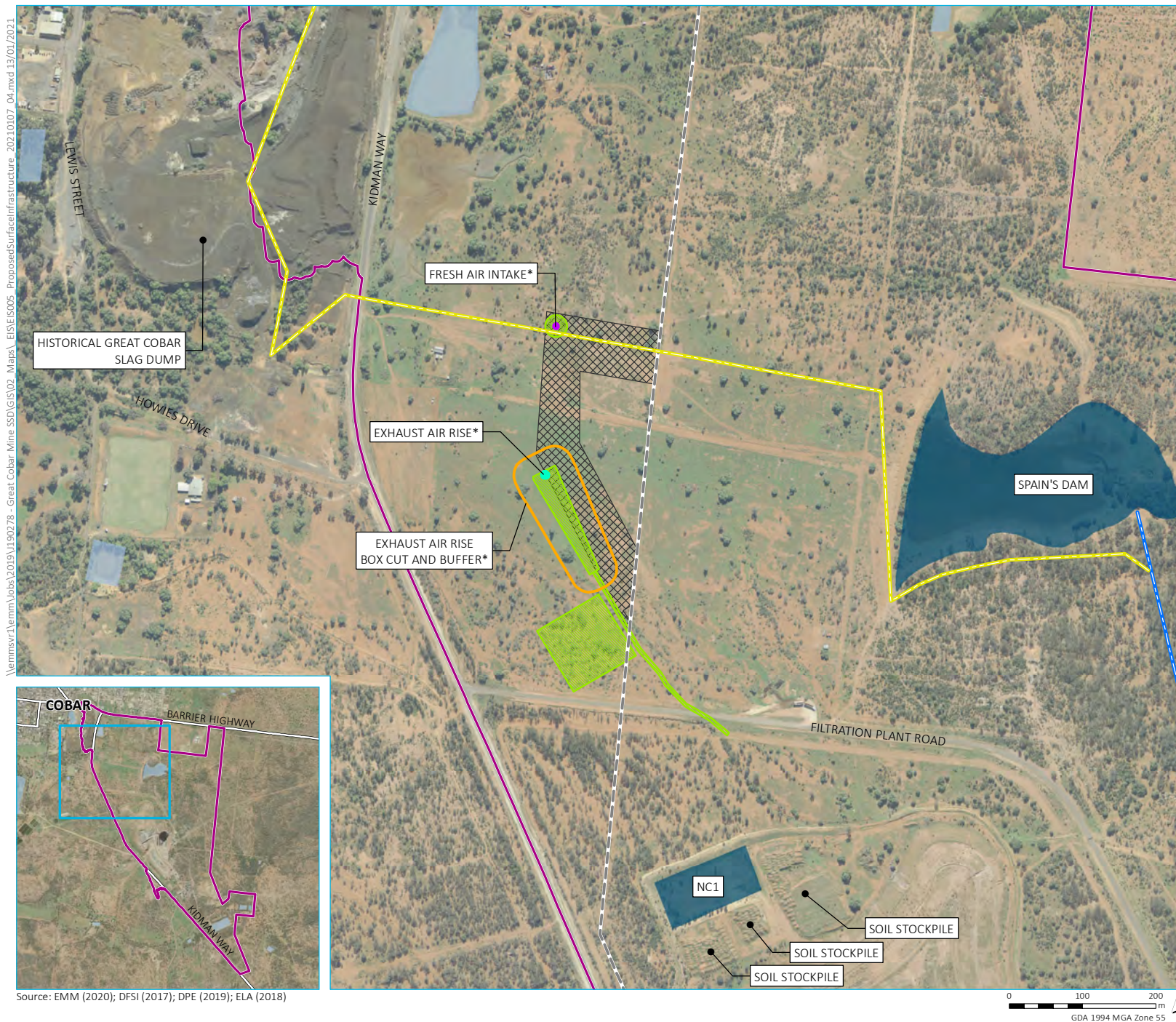
Processing will remain at the Peak Complex at the existing approved rate of up to 800,000 tpa, with production of ore from the Great Cobar and Gladstone deposits making up for the future decrease in production from other workings across PGM.

Additionally, there are remaining resources in the New Cobar, Jubilee and Chesney deposits that are mineral rich, but which are currently not economical to mine in isolation. Keeping the New Cobar Complex operational and gaining access to Great Cobar and Gladstone deposits will lead to increases in economies of scale and maximise opportunities to mine these resources, and keep PGM operational until 2035.



Existing surface features

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 1.3



- KEY**
- Project area
 - Major road
 - Existing indicative pipeline route
 - Existing Great Cobar dewatering pipeline
 - Existing 22 kV powerline
 - Exhaust air rise*
 - Exhaust air rise buffer*
 - Fresh air intake*
 - Proposed power line corridor
 - Waterbody
 - Mine water management storage
 - Area of approved vegetation clearance (indicative)*
- *Approved under existing REF approvals, but not yet constructed.

Proposed surface infrastructure

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 1.4

1.2 Purpose of this report

EMM Consulting (EMM) has been engaged by PGM to prepare and submit an environmental impact statement (EIS) to support an SSD application for development consent under section 4.12 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared to the form and content requirements set out in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) as well as clause 8(1) and clause 5 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The Peak Complex, which is not part of this SSD application will continue to operate under local government (CSC) approvals, as there is no proposed change to this arrangement.

PGM requested Secretary's Environmental Assessment Requirements (SEARs) from DPIE for the SSD EIS in December 2019; these were received in February 2020 and were re-issued in October 2020 following the receipt of a Biodiversity Development Assessment Report (BDAR) waiver. The SEARs included a requirement to assess potential bushfire risks associated with the construction and operation of the project. This bushfire hazard assessment has been prepared to address the relevant SEARs, provide information to be used in the EIS and support the SSD application for the project. The bushfire related matters and EMM responses are tabulated below (Table 1.1).

Table 1.1 Bushfire related SEARs and EMM responses

Item no.	Authority comments	EMM responses
1	The EIS must address the following specific issues: Hazards - including an assessment of the likely risks to public safety, paying particular attention to potential subsidence risks, geochemical risks, and the handling, transport and use of any dangerous goods, in accordance with <i>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development</i>. The EIS must take into account the following environmental planning instruments, policies, guidelines and plans: • <i>Planning for Bush Fire Protection 2006</i> (RFS) [updated 2018]	Refer to sections 4.3

2 Legislation

2.1 Environmental Planning and Assessment Act 1979

Under section 10.3 of the EP&A Act, the identification of bushfire prone land is required for all LGAs. The bushfire prone land mapping for each LGA provides the trigger for consideration of the provisions of *Planning for Bushfire Protection 2019* (NSW Rural Fire Service) (NSW RFS) (herein referred to as PBP 2019) for new development on land which is bushfire prone.

Under section 4.14 of the EP&A Act, SSD projects are exempt from requiring a bushfire safety authority. However, given the scale of many SSD projects, the requirements of PBP 2019 should be applied as appropriate, and consultation with NSW RFS is encouraged. Even where comments are sought at the approval stage of a project, further consultation with NSW RFS may be required at subsequent stages of project development (eg during detailed design).

2.2 NSW Rural Fires Act 1997

Bushfire suppression and management is regulated by the *Rural Fires Act 1997* (RF Act). Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* to enhance bushfire protection through the development assessment process. The objectives of the NSW RF Act are to provide for the:

- prevention, mitigation, and suppression of bush and other fires in NSW;
- co-ordination of bushfire fighting and bushfire prevention throughout the State;
- protection of people from injury or death, and property from damage, as a result of bushfires; and
- protection of the environment.

The RF Act places emphasis on cooperative fire management and wildfire suppression planning between the various organisations involved in fire management. With respect to the project area and dependent on the fire emergency, either the NSW RFS or Fire and Rescue NSW (FRNSW) would respond to fill the role of designed combat agency and/or assist as the secondary agency.

Under section 63 of the RF Act it states that it is the duty of the owner or occupier of land to take the notified steps and any other practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of a bushfire on or from that land.

Part 3, Division 4 of the RF Act stipulates that the Bush Fire Coordinating Committee (BFCC) must constitute a Bush Fire Management Committee (BFMC) for each area in NSW that is subject to the risk of bushfires. Each BFMC is required to prepare and submit to the BFCC a draft Bush Fire Risk Management Plan (BFRMP), a strategic document that identifies community assets at risk and sets out a five year program of coordinated multi-agency (including NSW RFS and FRNSW) treatments to reduce the risk of bushfire to the assets identified. The project occurs within the Cobar BFMC area.

3 Bushfire hazard

3.1 Methodology

3.1.1 Project area definition

For the purposes of this bushfire assessment, the 'project area' is defined as all surface infrastructure (existing and proposed) within CML 6 that is south of the Barrier Highway and east of Kidman Way.

3.1.2 Planning for bushfire protection

Under section 10.3 of the EP&A Act, the identification of bushfire prone land is required for all LGAs. The bushfire prone land mapping for each LGA provides the trigger for consideration of the provisions of PBP 2019 for new development on land which is bushfire prone.

The project area is not mapped as bushfire prone land (Figure 3.1), therefore the project is not considered development on bushfire prone land requiring compliance with PBP 2019. However, the project could be affected by bushfire or pose a bushfire risk, and therefore, to assess potential bushfire risk and where relevant to the project, this assessment has generally been undertaken in consideration of the following overall aims and objectives of PBP 2019:

- afford buildings and their occupants protection from exposure to a bushfire;
- provide for a defensible space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ensure that appropriate operational access and egress for emergency service personnel and occupants is available;
- provide for ongoing management and maintenance of bushfire protection measures; and
- ensure that utility services are adequate to meet the needs of fire fighters.

PBP 2019 provides an assessment framework for the potential impacts of bushfire upon the proposed new assets and establishes bushfire protection measures that are to be addressed and collectively form an effective mitigation strategy in order to reduce the bushfire impacts. For the purposes of this EIS and in keeping with PBP 2019, the project is considered 'other development', as it is not residential subdivision, residential infill, or special fire protection purpose (developments that involve buildings designed to accommodate groups of vulnerable people such as schools, childcare centres, hospitals or any place that occupants may be more vulnerable to bushfire attack).

As outlined within section 2, surface works associated with the project will be located in an approved existing, operational mining complex, with all management measures associated with bushfire risk included within the existing Mining Operations Plan (MOP), and *Peak Gold Mines Emergency Management Plan* (PGM 2020) and related processes and guidelines. There is very little change to the existing surface infrastructure and above ground operation proposed for the project, therefore the matters addressed within this bushfire hazard assessment primarily relate to the new proposed surface infrastructure and construction and operation of these, as well as small increases in number of truck movement and staff, including:

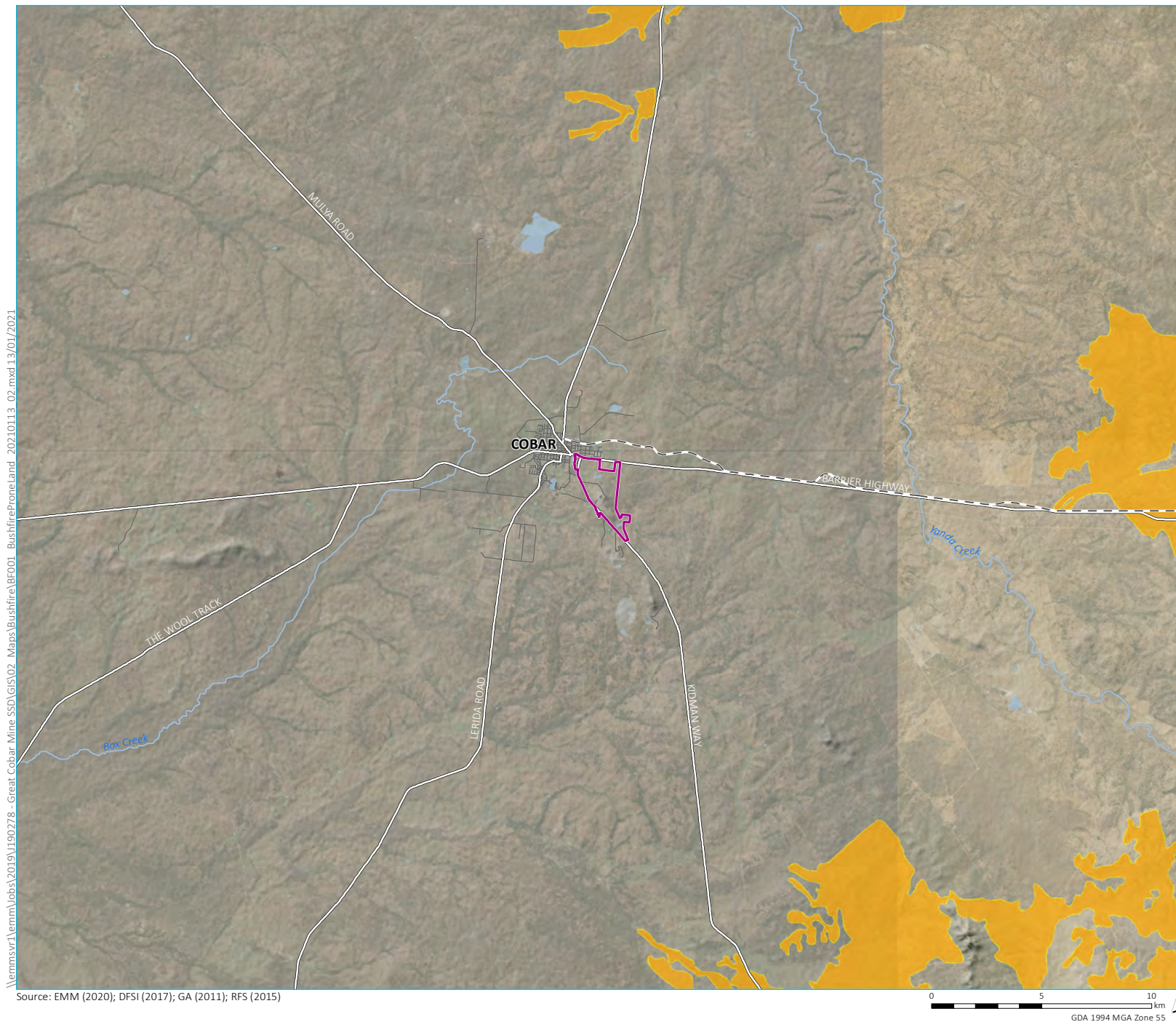
- no new ventilation shafts will be required; the ventilation shafts installed as part of the exploration decline will be required for ongoing mining operations and will remain in place. A new ventilation fan will be required to maintain a safe volume of air flow in the underground workings;
- construction and operation of a single new power line, within an easement measuring approximately 20 m wide and 400 m long, that will extend westward from an existing 22 kV power line. This power line will connect to a pad-mounted compact substation to supply power for an emergency egress winder at the fresh air intake shaft and a ventilation fan to be installed at the exhaust air rise;
- increase of the currently capped 25 trips (50 movements in and out) to 50 trips (100 movements in and out) per day (day light hours) averaged over a calendar year for ore transport movements between New Cobar Complex and Peak Complex, and

- increase in workforce numbers, with mining and underground maintenance staff increasing from 57 FTE in 2020/21 to a peak of 272 FTE in 2026/27. These however will not be new employees; during the same period, as mining at the Peak Complex ramps down, staff will relocate to New Cobar Complex as their primary location of employment activity. PGM will continue to maintain operational control across the complexes.

The project does not comprise the construction of any new permanent habitable buildings. Existing permanent buildings associated with the approved existing and operational mining complex within the project area comprise

- administration building and associated carpark; and
- the workshops and associated laydown yards.

Section 8.3.1 of PBP 2019 states that, where located on bushfire prone land, no bushfire specific performance requirements are provided in the National Construction Code 2019 (NCC) for Building Code of Australia (BCA) Class 5 to 8 buildings (which include offices, shops, factories, warehouses, public car parks and other commercial or industrial facilities). Therefore, *Australian Standard 3959 -2018 Construction of Buildings in Bushfire-prone Areas* (AS 3959-2018) or the National Association of Steel Framed Housing (2014) *Steel Framed Construction in Bush Fire Areas* (NASH Standard) does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions of the NCC are taken as acceptable solutions, but the aim and objectives of PBP 2019 apply in relation to other matters such as access, emergency and evacuation planning, water supply and other services.



- KEY**
- Project area
 - Rail line
 - Major road
 - Minor road
 - Named watercourse
 - Waterbody
 - Bushfire prone land
 - Vegetation category 2
 - Vegetation buffer

Bushfire prone land mapping

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 3.1



Other existing surface infrastructure associated with the approved existing and operational mining complex within the project area comprise:

- historic open cut;
- explosives magazine;
- diesel fuel tanks;
- administration and car parking;
- workshop and laydown yard;
- run of mine (ROM) pad;
- waste rock emplacement (WRE);
- soil stockpiles;
- New Cobar (NC) Dams 1, 2, 3, 4 (runoff from disturbed areas and WRE);
- settling ponds (for mine dewatering);
- an existing headframe, shaft and emergency egress;
- two exhaust air rises; and
- dewatering/site runoff water storage/evaporation ponds (Spain's Dam and Young Australia dams) and mine dewatering lines.

Blasting will be used for the development of the underground workings and is proposed to occur under independent firing conditions (in the preliminary phases) and is not considered relevant to bushfire risk for this project, as all blasting will occur underground. Explosives are to be stored in the existing approved magazine at New Cobar Complex, with no change in the way the explosives are stored, handled and transported, as currently approved. Similarly, diesel will be stored in the existing approved diesel storage tank at New Cobar Complex, with no change in the way the diesel is stored, handled and transported, as currently approved.

Section 8.3.6 of PBP 2019 states that, where mining and associated activities are carried out on bushfire prone land, consideration should be given to any hazards and risks associated with bushfire. PBP 2019 also states that it may be necessary to implement measures to control and manage any identified hazards and risks, and that given the potential hazards and risks, bushfire management and operations plans should be prepared to cover any mining activities undertaken on bushfire prone land, with the same provisions as detailed within section 8.3.5 (of PBP 2019) for wind and solar farms.

3.1.3 Assessment requirements

The SEARs for the project specify assessment of 'Hazards – including an assessment of the likely risks to public safety...'. As the project is not on land identified as bushfire prone under section 10.3 of the EP&A Act, there is no formal trigger for the project to consider the provisions of PBP 2019.

However, in addressing likely risks to public safety, this bushfire assessment provides an overview of the existing environment related to bushfire hazard and an assessment of the potential bushfire hazards associated with the proposed new surface infrastructure for the project, and has generally been undertaken in accordance with the aforementioned requirements of PBP 2019 (section 4.1.2). This bushfire assessment

identifies how the bushfire protection measures and aims and objectives of PBP 2019, as relevant to the project, are met. Recommendations are also provided for bushfire mitigation during the construction and operation of proposed new surface infrastructure within the project area, as well as the continued operation of the existing surface infrastructure within the project area. These recommendations address how a bushfire impacting on the project, and the risk of fire potentially emanating from the project should be managed, including recommendations to facilitate a coordinated response to bushfire risks.

3.1.4 Assessment method

Bushfire risks associated with the project have been assessed generally in accordance with PBP 2019, with the following steps undertaken in the assessment process:

- determine whether the project area has been mapped as bushfire prone land and requires compliance with PBP 2019 (Section 4.1.2);
- identify the regional fire weather, history of bushfire and existing ignition sources for the project area and surrounds (Section 4.2.1 and 4.2.2);
- identify the location, extent, and vegetation formation of any bushland on or within 1 km of the project area (Section 4.2.3);
- identify the slope and aspect of the project area and of any bushfire prone land within 1 km of the project area (Section 4.2.4);
- identify any features on or adjoining the project area that may mitigate the impact of a bushfire on the proposed development (Section 4.2.5);
- identify potential bushfire impacts, including those related to bushfire impacting on the project, as well as bushfire emanating from the project and into the locality (Section 4.3), and
- identify mitigation measures for asset protection zones (APZs), handling, storage and management of potential ignition sources, availability of fire-suppression equipment, and emergency management procedures and planning (including access), in relation to the identified bushfire hazards (Section 4.4).

3.2 Existing environment

3.2.1 Regional fire weather

An analysis of the fire weather experienced in the region provides insight into bushfire behaviour potential within the project area and surrounds. Forest Fire Danger Index (FFDI) is based upon the LGA and Fire Weather District, as determined by the NSW RFS, where the development is to be located. The FFDI measures the degree of danger of fire in Australian vegetation and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing wind. The 1:50 year fire weather scenario for most of NSW is determined as FFDI 80 (NSW RFS 2017), and is the FFDI that has been used to inform bushfire behaviour on land within the project area (Far Western Fire Weather Area). The project is within Cobar BFMC area, which comprises the following regional weather characteristics:

- a hot, arid climate with the driest months usually from May to September;
- annual median rainfall is 376 mm (Cobar MO (48027) rainfall gauge) (BoM 2020), although variations from this figure can be extreme; and
- the bushfire season generally runs from October to March (Cobar BFMC 2011).

Prevailing weather conditions associated with the bushfire season in the Cobar BFMC area are hot dry days with temperatures often exceeding 40°C, humidity of less than 10% and dry westerly winds. There are frequent dry electrical storms during the bushfire season (Cobar BFMC 2011).

3.2.2 History of bushfire and existing ignition sources

The Cobar BFMC area has on average 40 bushfires per year, with most of these being minor fires of less than 1,000 ha in area. Several major fires have occurred over the past 40 years, including the summers of 1974/75, 1984/85 and 2000/2001. These fires have followed exceptionally wet seasons which resulted in a heavy body of both winter and summer fuels. The 1984/85 wildfires were the largest and most recent fires in history to burn in proximity to the project area, with the closest fire occurring approximately 10 km to the south of the project area, and burning approximately 140 km to the south to the Yathong Nature Reserve (DPIE 2020). The 1984/1985 wildfires burnt a total of 3,500,000 ha within the western division of NSW (NSW Parliamentary Research Service 2014).

The direction of fires within the Cobar BFMC area has been strongly influenced by the prevailing weather conditions. The prevailing winds which run predominately from the north east or from the south west also influences fire behaviour and patterns. Extensive plains areas and undulating hills give little resistance to wind force, valleys tend to funnel the wind and create swirling action under extreme conditions.

There are few natural lines of control that occur in the Cobar BFMC area. The area is devoid of any river or lake system, although the Darling and Lachlan Rivers form the northern and southern boundaries, respectively. Roads and dedicated fire trails, including the vast network of mallee trails, act as primary control lines during times of high fire activity.

Historical evidence indicates that the main sources of ignition in the Cobar BFMC area is lightning associated with dry summer storms (Cobar BFMC 2011).

3.2.3 Vegetation assessment

Vegetation fuel is one of the key factors (with weather and topography) which influences how a fire behaves. Fuel attributes vary between different vegetation groups, by type, quantity, arrangement and moisture content. Based on these attributes, fuels will also vary in how they ignite, spread and the intensity with which they burn. Grouping vegetation types with similar fuel attributes together provides a means to generally characterise fire behaviour potential.

In accordance with Appendix 1 of PBP 2019, vegetation within 140 m of the project area was assessed to determine its formation and classification. Previous vegetation mapping within the project area has been undertaken by Eco Logical Australia as part of the *Great Cobar Pit dewatering pipeline flora and fauna assessment* (Eco Logical Australia 2019) and *Great Cobar Exploration Project - Flora and Fauna Assessment* (Eco Logical Australia 2020). Regional vegetation mapping within the broader locality comprises *State Vegetation Type Map: Western Region, Version 1.0. VIS_ID 4492* (DPIE 2015). Vegetation, including corresponding vegetation formation, mapped within a 1 km buffer of the surface infrastructure is listed in Table 3.1.

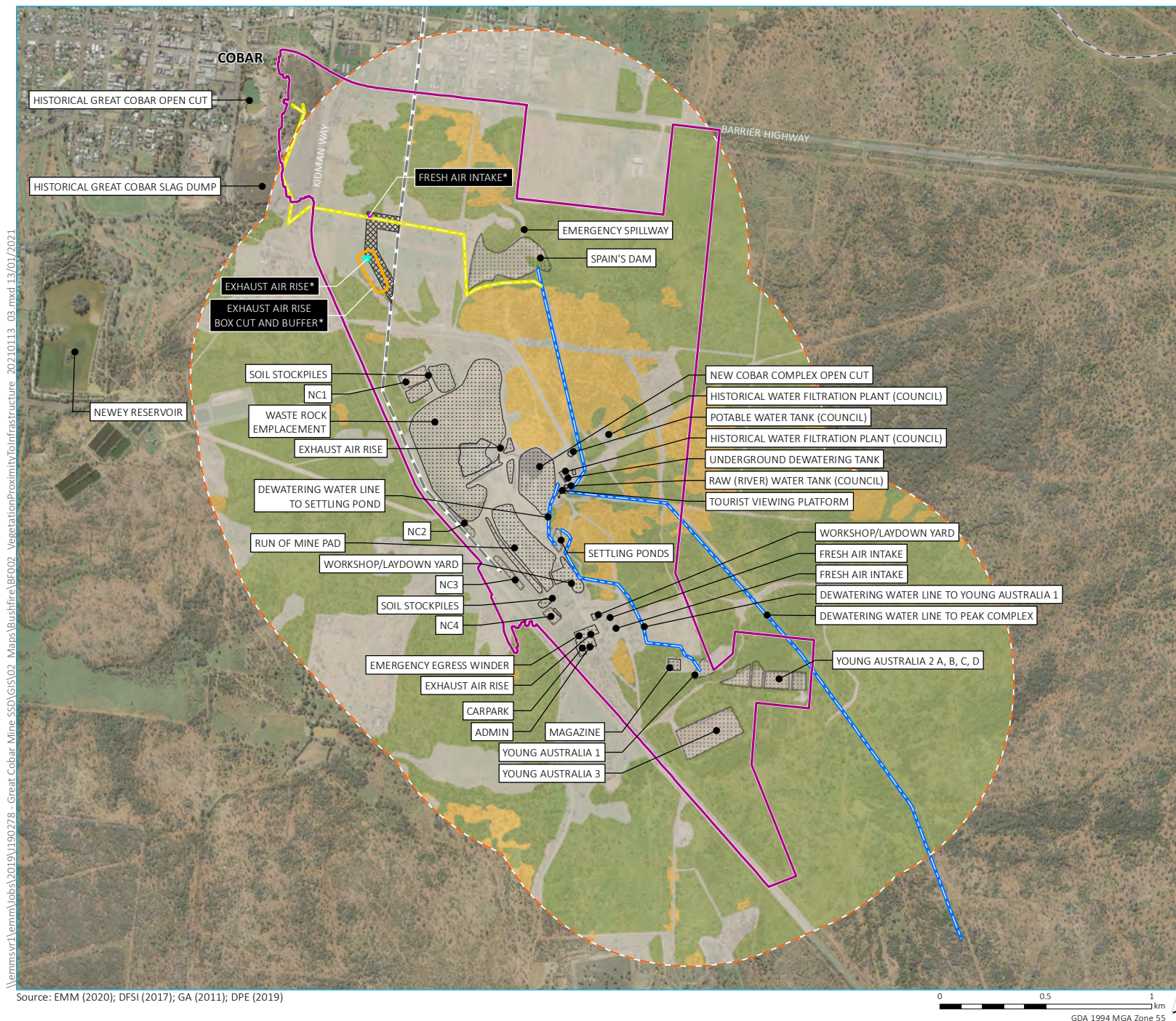
Table 3.1 Vegetation within and surrounding the project area

Plant community type (PCT)	Vegetation formation (Keith 2004)	PBP 2019 classification
72 – White Cypress Pine - Poplar Box woodland on footslopes and penepains mainly in the Cobar Penepain Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Grassy Woodland and Semi-Arid Woodland (including Mallee)
103 - Poplar Box - Gum Coolabah - White Cypress Pine shrubby woodland mainly in the Cobar Penepain Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Grassy Woodland and Semi-Arid Woodland (including Mallee)

Table 3.1 Vegetation within and surrounding the project area

Plant community type (PCT)	Vegetation formation (Keith 2004)	PBP 2019 classification
105 - Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Grassy Woodland and Semi-Arid Woodland (including Mallee)
108- Gum Coolabah - Mulga open woodland on gravel ridges of the Cobar Peneplain Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Grassy Woodland and Semi-Arid Woodland (including Mallee)
109 – Poplar Box - Mulga - Ironwood woodland on red loam soils on plains in the Cobar Peneplain Bioregion and north-eastern Mulga Lands Bioregion	Semi-arid Woodlands (Shrubby sub-formation)	Grassy Woodland and Semi-Arid Woodland (including Mallee)
125 - Mulga - Ironwood shrubland on loams and clays mainly of the Cobar Peneplain Bioregion	Arid Shrublands (Acacia sub-formation).	Arid-shrublands (acacia and chenopod)
229 - Derived mixed shrubland on loamy-clay soils in the Cobar Peneplain Bioregion	Arid Shrublands (Acacia sub-formation).	Arid-shrublands (acacia and chenopod)

Data from Eco Logical Australia (2019), Eco Logical Australia (2020) and DPIE (2015) combined with aerial imagery interpretation has been used to show the likely Keith (2004) vegetation formations within 1 km of the surface infrastructure (Figure 3.2).



- KEY**
- Project area
 - Pipeline route
 - Great Cobar dewatering pipeline
 - Existing 22 kV powerline
 - Rail line
 - Exhaust air rise*
 - Exhaust air rise buffer*
 - Fresh air intake*
 - Proposed power line corridor
 - Existing surface feature
 - 1 km infrastructure buffer
- Vegetation formation**
- Cleared land/exotic vegetation
 - Arid shrubland (Acacia sub-formation)
 - Semi-arid woodland (shrubby sub-formation)
- * Approved under existing REF approvals, but not yet constructed.

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Vegetation within proximity of the proposed new surface infrastructure

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 3.2



The native vegetation adjacent to the surface infrastructure and in the broader locality align with the Semi-arid Woodlands (Shrubby sub-formation) and Arid Shrublands (Acacia sub-formation), vegetation formations, as classified by Keith (2004). The areas of vegetation mapped as cleared/exotic vegetation are likely to be a mix of sparse shrubland dominated by non-native species, areas with minimal vegetation, planted exotic trees found in roadside areas, cropland, heavily grazed pastures, parklands, residential properties, commercial/industrial development, and cleared land associated with past and present mining infrastructure and activities.

Eco Logical Australia (2020) describe the location of the proposed new surface infrastructure as formerly cleared and heavily grazed paddocks, with small patches of regenerating and partly cleared shrubland. In areas mapped as cleared/exotic, Eco Logical Australia (2020), describe vegetation at all stratum levels as mostly absent at the time of survey, with large areas of bare soil present. *Schinus molle* (Pepper Trees) are scattered across this area, along with *Eremophila sturtii* (Narrow-leaf Emu-bush) to a lesser degree. Where ground cover does occur, it is dominated by the exotic species *Heliotropium amplexicaule* (Blue Heliotrope) of which much has died off, with only leaf litter remaining. Eco Logical Australia (2020) map one PCT within proximity of the proposed surface infrastructure, namely PCT 125 – Mulga – Ironwood shrubland on loams and clays mainly of the Cobar Penepplain Bioregion.

Eco Logical Australia (2020) describe this vegetation as regenerating and partly cleared, and occurring in a low-moderate condition state. The overstorey has been partially cleared and where present consists of *Acacia aneura* (Mulga) and *Callitris glaucophylla* (White Cypress Pine). The midstorey is actively regenerating, at times dense and includes Mulga, Narrow-leaf Emu-bush, *Geijera parviflora* (Wilga) and *Dodonaea viscosa* (Sticky Hop-bush). The ground cover is largely absent, though scattered individuals of Blue Heliotrope, *Enchylaena tomentosa* (Ruby Saltbush), and *Sclerolaena birchii* (Galvanised Burr) are present (Eco Logical Australia 2020). Mapping of PCT 125 (Eco Logical Australia 2020), in proximity to the proposed new surface infrastructure, is shown within Figure 3.3, with Photograph 3.1 through to Photograph 3.4 showing the vegetation in the general area of the proposed power line and box cut.



Figure 3.3 Vegetation mapping for the *Great Cobar Exploration Project -Flora and Fauna Assessment*, Eco Logical Australia (2020)



Photograph 3.1 Looking north from general power line corridor clearly demonstrating the heavily disturbed nature of the proposed project area.



Photograph 3.2 Looking south-east from box cut location towards existing power lines clearly demonstrating the heavily disturbed nature of the proposed project area.



Photograph 3.3 Looking north-east from box cut location clearly demonstrating the heavily disturbed nature of the proposed project area.



Photograph 3.4 Looking west from general power line corridor towards existing power lines clearly demonstrating the heavily disturbed nature of the proposed project area.

3.2.4 Slope assessment

Section A1.5 of PBP 2019 states that effective slope is the slope of the ground under the hazard (vegetation). When identifying effective slope, it may be found that there are a variety of slopes covering different distances within the vegetation. Effective slope is considered to be the slope under the vegetation which will most significantly influence bushfire behaviours for each aspect. This is usually the steepest slope.

Slopes are classified in accordance with PBP 2019 and are combined with vegetation formation in an area to determine APZs for a development type. Slopes are classified according to the following PBP 2019 categories:

- all flat and upslope vegetation (considered 0°);
- >0 to 5 degrees (°) downslope vegetation;
- >5 to 10° downslope vegetation;
- >10 to 15° downslope vegetation; and
- >15 to 18° downslope vegetation.

A slope analysis that encompasses the land surrounding the surface infrastructure and for a 1 km buffer beyond has been undertaken. This allows understanding of the slope classifications under the vegetation hazard and therefore potential fire behaviour surrounding the surface infrastructure and immediate surrounds. As shown in Figure 4.4, the land surrounding the surface infrastructure is a generally flat landscape with some areas of steeper slopes associated with low hills and various permanent and ephemeral water courses, as well as ground disturbance related to past disturbance from mining development.

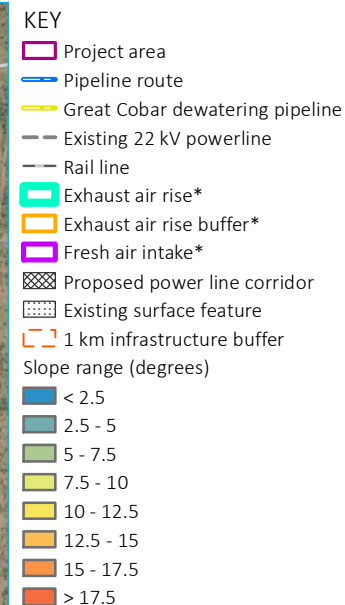
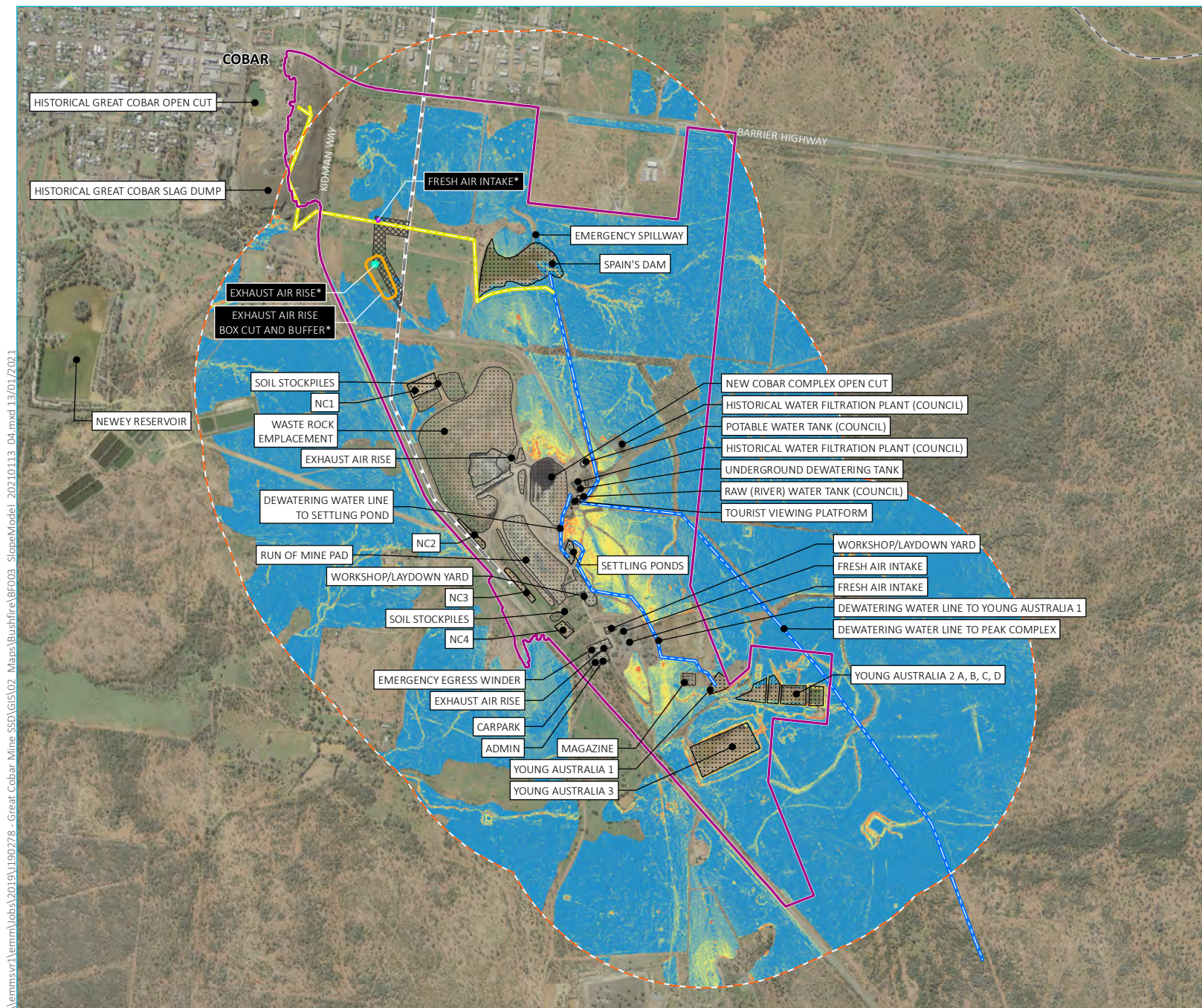
Slopes within 1 km of the surface infrastructure vary in gradient from less than 2.5 degrees (°) (flat land) to areas that are over 17.5° in gradient. These isolated areas of steeper gradient are associated with past land disturbance and earthworks for stockpiles, bunds, roads, tracks, and pits associated with mining. There are also some steeper slopes associated with low hills (Fort Bourke Hill) and lower lying areas from permanent and ephemeral watercourses that are associated with the dams.

3.2.5 Features of adjoining land that may mitigate the impact of bushfire

The surface infrastructure is surrounded by areas that have been highly modified through agricultural, residential, and commercial land uses. These areas contain modified vegetation or non-vegetated areas, and include:

- historically cleared agricultural land comprising livestock grazing;
- rural-residential properties containing managed land within the curtilage of buildings;
- the town of Cobar, containing managed land for infrastructure, residential, commercial and recreational use; and
- existing commercial mining operations resulting in past land clearing for pits, stockpiles, tailings, dams and hardstand areas.

These features may mitigate the impact of high intensity bushfire on the surface infrastructure, particularly as the landscape has been historically substantially cleared for miners' accommodation (known locally as Cornish Town from the 1870s to the 1960s), agriculture, mining and the ongoing management of vegetation for these land uses. Areas of native vegetation remain as a patchwork of semi-arid woodlands and arid shrublands, and it is these areas that are within proximity to the surface infrastructure that remain a potential hazard.



* Approved under existing REF approvals, but not yet constructed.

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Slope within proximity of the proposed new surface infrastructure

Peak Gold Mines
New Cobar Complex Project
Bushfire hazard assessment
Figure 3.4



3.3 Potential impacts

The occurrence of a bushfire is capable of damaging surface infrastructure associated with the project infrastructure, consequently impacting upon the safety of staff and contractors during the construction and operation of the project. Bushfire emanating from the construction and operation of the surface infrastructure poses a threat to human safety, property, native flora, fauna, and ecosystems within the locality of the project.

Fire suppression operations can be made more challenging as a result of bio-physical risk factors, as discussed in the sections above. This includes weather conditions, vegetation characteristics, terrain and aspect, and existing potential ignition sources, which can contribute to the risk of bushfire originating from outside the project in surrounding areas. The addition of activities associated with the construction and operation of the project adds additional risks. The potential ignition of unplanned bushfires from the construction and operation phases of the proposed new surface infrastructure are likely to be from the following sources:

- Construction:
 - diesel generators, causing ignition of vegetation;
 - inadequate storage of flammable liquids (eg fuel) and other chemicals;
 - vehicle and machine movement over vegetation;
 - sparks generated from hot works (eg welders and grinders); and
 - human error, such as non-compliance of hot works procedures or incorrect disposal of cigarette butts.
- Operation:
 - Power line failure, causing ignition of vegetation;
 - vent shaft fan, compact substation failure, causing ignition of vegetation; and
 - the same potential ignition risks identified for construction, during any maintenance activities associated with the proposed new surface infrastructure.

It is noted that the project has very few new above ground new infrastructure elements, consisting only of the single new power line and the compact substation. All other surface works associated with the project will be located in an approved existing, operational mining complex, with all management measures associated with bushfire risk included within the existing MOP, *Peak Gold Mines Emergency Management Plan* (PGM 2020) and related processes and guidelines.

The project includes an increase in ore truck movements on Kidman Way from a currently capped 25 trips (50 movements in and out) to 50 trips (100 movements in and out) per day (day light hours) averaged annually. Annual labour estimates for the New Cobar Complex range from 57 FTE in 2020/21 to a peak of 272 FTE in 2026/27. These however will not be new employees; during the same period, as mining at the Peak Complex ramps down, staff will relocate to New Cobar Complex as their primary location of employment activity. PGM will continue to maintain operational control across the complexes.).

There is potential, that the increase in both trucks and workforce may impact upon both firefighting access from public roads to project roads in a bushfire emergency, as well as staff egress on project roads and staff/general public egress on public roads in a bushfire emergency.

The bushfire prevention and protection measures described in Section 4.4 will assist in mitigating the identified bushfire impacts during the construction and operation of the project.

3.4 Commitments and management measures

Table 3.2 Commitments and management measures

Impact	Mitigation measure	Responsibility	Timing
APZs and construction standards	• There are no new proposed permanent habitable buildings for the project: – the fresh air intake, exhaust air rise and box cut have been previously approved by CSC (Great Cobar Exploration Decline) and occur within a historically cleared area, with any remnant vegetation within the footprint and for a buffer or approximately 10 m surrounding this infrastructure to be cleared as part of the previously approved air rise box cut and buffer; and – the compact substation will be located within the previously cleared and fenced area surrounding the previously approved air rise box cut and buffer, therefore – as the project does not include the construction of any habitable buildings, and the proposed surface infrastructure is not within mapped bushfire prone land, there are no requirement for specific APZs or bushfire construction standard according to AS 3959-2018. – However, the MOP includes the requirement of fire breaks in place around the Peak and New Cobar Mining Complexes perimeter and operations fences, being maintained annually. It is recommended that the vegetation in proximity to the proposed new surface infrastructure and fencing is also maintained as a firebreak and inspected by the PGM Emergency Services Officer quarterly. • As outlined within section 3.1.2, existing permanent buildings associated with the approved existing and operational mining complex within the project area comprise the administration buildings and workshops. These buildings are also not within mapped bushfire prone land, therefore, there are no requirements for specific APZs or bushfire construction standard according to AS 3959-2018. However, due to vegetation hazard being in proximity to these structures, and in accordance with PBP 2019 (section 8.3.5 and 8.3.6), it is recommended: – a minimum 10 m APZ for the structures and associated buildings, and – that the APZs must be maintained to the standard of an Inner Protection Area (IPA) for the life of the mine. – it is noted that in many instances, administration and workshop buildings require access roads, on-site parking, and hardstand/loading areas. In these cases, it is prudent to place these facilities in the most appropriate location in order to establish defensible space for fire-fighting purposes, as well as to mitigate the potential for ignition of surrounding bushland from project sources, and – standard for an IPA is contained within Appendix 4 of PBP 2019. • As outlined within section 3.1.2, there is other existing surface infrastructure associated with the approved existing and operational mining complex with the within the project area. The infrastructure is also not within mapped bushfire prone land, therefore, there are no requirements for specific APZs in accordance with PBP 2019. However, due to vegetation hazard being in proximity to these structures, and in accordance with PBP 2019 (8.3.6), it is recommended a minimum 10 m APZ (maintained to the standard of an IPA) should be provided around any infrastructure that may be considered vulnerable to bushfire, or pose an ignition risk. This includes the explosives magazine and diesel fuel tanks. It is noted that the existing explosives magazine has an existing APZ of approximately 30 m..	• PGM	• Prior to and during construction; and • quarterly during operation.

Table 3.2 **Commitments and management measures**

Impact	Mitigation measure	Responsibility	Timing
Handling, storage and management of potential ignition sources	• The MOP, <i>Peak Gold Mines Emergency Management Plan</i> (PGM 2020) and related processes and guidelines has existing requirements for the handling, storage and management of potential ignition sources. Those requirements relevant to the proposed new surface infrastructure are: – machinery should be maintained and operated in a manner that would minimise the potential to start a fire. This would include ensuring that spark-free exhausts are fitted and that all fuel, electrical and braking systems are maintained in good order, and , when operating in grassed areas, the undercarriage of vehicles are de-grassed daily; – ensure that the site remains a ‘No Smoking’ site; – a Hot Work Permit is required to be approved prior to hot works being undertaken outside of workshops (or other designated areas) that could generate a flame, fire, heat or spark; – no fires, welding, or angle grinding at field sites on Total Fire Ban days; – the PGM operating licence prevents the lighting of fires at any time without prior approval. The only exception is the use of a fire bucket/ special burners; – no uncontained fires - must be in fire buckets or other approved burners; and – all contractors and staff are to be trained in the use of the extinguishers. • The following measures are recommended for surface infrastructure for the project: – diesel generators and associated fuel storage tanks are to be designed, housed, and maintained so as not serve as an unacceptable risk to surrounding vegetation hazard. Diesel generators and associated fuel storage tanks should be located away from the hazard, wherever possible. – adequate storage and handling requirements for potentially flammable substances at the surface infrastructure in accordance with <i>AS 1940 The storage and handling of flammable and combustible liquids</i>, <i>AS 1596 The storage and handling of LP gas</i> and other relevant Australian Standards. – the proposed overhead power line should be designed and maintained so that it will not serve as a bushfire risk to surrounding bush, with no part of a tree being closer to a power line than the distance set out in <i>ISSC3 Guideline for Managing Vegetation Near Power Lines</i>; – it is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under section 99 of the RF Act; and – notification of the local NSW RFS Fire Control Centre is recommended for any works that have potential to ignite surrounding vegetation, proposed to be carried out during a bushfire fire danger period (1 October to 31 March, however may vary due to local conditions) to ensure weather conditions are appropriate.	• PGM	• Construction; and • operation.

Table 3.2 **Commitments and management measures**

Impact	Mitigation measure	Responsibility	Timing
Availability of fire-suppression equipment	- The MOP, <i>Peak Gold Mines Emergency Management Plan</i> (PGM 2020) and related processes and guidelines has existing requirements for: - fire prevention and protection, including the provision of firefighting water supply and reticulation system; - provision of firefighting facilities and equipment; - maintenance and inspection of fire protection systems; - fire response resources; - fire control strategies and training, and - review and audits, in line with relevant Work Health and Safety legislation, Australian standards and other relevant requirements. - It is recommended that suitable provisions be included in the detailed design for the proposed new surface infrastructure (as required) and that the MOP, <i>Peak Gold Mines Emergency Management Plan</i> (PGM 2020) and related processes and guidelines are updated to include the proposed new surface infrastructure.	PGM	- Detailed design: - construction; and - operation.
Emergency management procedures and planning	- The <i>Peak Gold Mines Emergency Management Plan</i> (PGM 2020) details the responsibilities, actions, reporting requirements and the resources available to ensure effective and timely management of emergencies on, or affecting operations, at the Peak Gold Mines. The plan identifies bushfire as a hazard and provides the following processes and guidelines, as related to bushfire risk: <i>Emergency Preparedness</i> (PRO-06-040-001); <i>Fire Prevention and Protection</i> (PRO-06-040-002); <i>Emergency Response</i> (PRO-06-040-004); <i>Guideline GDL-06-040-08 - Fire – bushfire, developed for anticipated bushfire emergency scenario</i>; and <i>Fire and Explosion Control Plan</i>. - The <i>Peak Gold Mines Emergency Management Plan</i> (PGM 2020) and associated processes and guidelines related to potential bushfire will be updated to encompass the proposed new surface infrastructure and to account for the increase in ore truck movements and workforce numbers, as related to potential bushfire risk, emergency response and access/egress arrangements (to ensure safe access to/from the public road system for firefighters providing property protection during a bushfire and for project staff/occupant egress for evacuation).	PGM	- Prior to construction; and - operation.

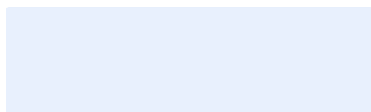
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Acronyms

Acronym	Meaning
APZ	Asset protection zone
AS 3959-2018	<i>Australian Standard 3959 -2018 Construction of Buildings in Bushfire-prone Areas</i>
BCA	Building Code of Australia
BDAR	Biodiversity Development Assessment Report
BFCC	Bush Fire Coordinating Committee
BFMC	Bush Fire Management Committee
BFRMP	Bush Fire Risk Management Plan
bgl	below ground level
CML	Consolidated mining lease
CSC	Cobar Shire Council
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
FFDI	Forest Fire Danger Index
FRNSW	Fire and Rescue NSW
IPA	Inner Protection Area
km	kilometre
kV	kilovolt
ML	mining lease
MOP	Mining Operations Plan
MPL	mining purposes lease
NASH Standard	<i>Steel Framed Construction in Bush Fire Areas</i>
NCC	National Construction Code 2019
NSW RFS	NSW Rural Fire Service
PCT	Plant community type
PBP 2019	Planning for Bushfire Protection
PGM	Peak Gold Mines Pty Ltd
RF Act	<i>Rural Fires Act 1997</i>
RFS	Rural Fire Service
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
SRD SEPP	<i>State Environmental Planning Policy (State and Regional Development) 2011</i>
TSF	tailing storage facility
tpa	tonnes per annum
WRE	waste rock emplacement

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