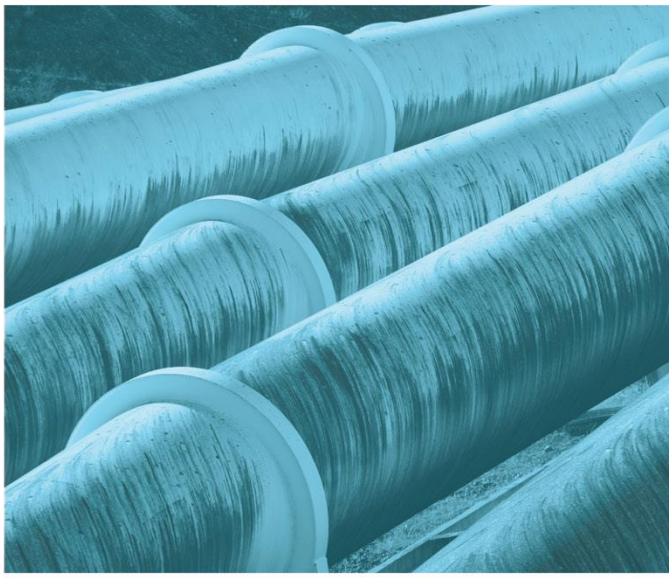



Cowal Gold Operations
Underground Development
Underground State Significant Development
Scoping Report

Prepared for Evolution Mining (Cowal) Pty Limited
August 2019

EMM
creating opportunities

EMM
creating opportunities

Servicing projects throughout Australia and internationally

SYDNEY
Ground floor, 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 1, 146 Hunter Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 10, 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

ADELAIDE
Level 1, 70 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Ground floor, 188 Normanby Road
Southbank VIC 3006
T 03 9993 1900

PERTH
PO Box 8155
Fremantle WA 6160

CANBERRA
PO Box 9148
Deakin ACT 2600

Cowal Gold Operations Underground Development

Underground State Significant Development
Scoping Report

Prepared for Evolution Mining (Cowal) Pty Limited
August 2019

EMM Sydney
Ground floor, 20 Chandos Street
St Leonards NSW 2065

T 02 9493 9500
E info@emmconsulting.com.au

www.emmconsulting.com.au

Cowal Gold Operations
Underground Development

Underground State Significant Development
Scoping Report

Report Number

J190140 R5

Client

Evolution Mining (Cowal) Pty Limited

Date

12 August 2019

Version

Final

Prepared by

Aaron Bowden
Associate Environmental Planner
12 August 2019

Approved by

Rob Morris
Associate Director
12 August 2019

Executive Summary

ES1 Introduction

Evolution Mining (Cowal) Pty Limited (Evolution Mining) is the owner and operator of the Cowal Gold Operations (CGO) located approximately 38 kilometres north-east of West Wyalong, New South Wales (NSW). CGO is an existing open cut mine site, which has been operational since commencement in 2005, and has current approvals in place to continue processing at a rate of 9.8 million tonnes of ore per annum (Mtpa) until 2032. The existing mine site is located immediately adjacent to the ephemeral lake, Lake Cowal.

The purpose of this Scoping Report is to request and inform the content of the Secretary's Environmental Assessment Requirements (SEARs) for the CGO Underground Development. The SEARs will specify the requirements for the Environmental Impact Statement (EIS) that will be prepared to accompany the application for the CGO Underground Development.

ES2 CGO Underground Development

The area of land to which the CGO's Development Consent (DA 14/98) is relevant includes Mining Lease (ML) 1535, ML 1791 and the CGO's water supply pipeline and Bland Creek Palaeochannel Borefield. Open pit mining operations are currently undertaken within ML 1535, which encompasses approximately 2,636 hectares (ha).

Evolution Mining seeks to extend mining operations at the CGO by way of an underground development, which would be wholly contained within ML 1535. The Underground Development proposal seeks to introduce an underground mine using stope mining practices, in addition to the existing open cut mine, to exploit an identified ore deposit in proximity to the current E42 pit. It is anticipated that this development will extend the mine life to the end of 2037.

ES3 Approvals strategy

To facilitate the Underground Development environmental impact assessment process, Evolution Mining proposes to seek approval under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for two separate but inter-related applications:

- **Underground workings EIS** – a State Significant Development (SSD) application under section 4.38 of the EP&A Act for the new underground component of the Underground Development. **This document represents the Scoping Report that will support the request for SEARs for the SSD application**; and

- **Surface changes modification** – a request for modification (Modification 16) to the existing CGO development consent (DA 14/98) under section 4.55 of the EP&A Act for the ancillary surface changes associated with the Underground Development.

It is intended that the Scoping Reports for each of the two applications are considered together. It is proposed that the preparation of the environmental impact statement (EIS)/assessment report, public exhibition periods, responses to submission, and determinations would be carried out concurrently for both applications.

ES4 Relevant matters to be addressed by the EIS

Preliminary environmental investigations have been carried out to identify the relevant matters to be addressed in the EIS for the CGO Underground Development, and the required level of assessment. This process was guided by

the draft guidelines for scoping an environmental impact statement (Guideline 3) prepared by the then NSW Department of Planning and Environment (DPE) in 2017 (DPE 2017a).

The identification of relevant matters has benefited from:

- consultation with the then DPE (now NSW Department of Planning, Industry and Environment (DPIE)) as the consent authority, including the Scoping Meeting held on Friday 31 May 2019 at the then DPE's offices;
- community and stakeholder consultation that included:
  - meetings with local councils, including:
    - Bland Shire Council in West Wyalong on Tuesday 4 June 2019
    - Lachlan Shire Council in Condobolin on Tuesday 4 June 2019
    - Forbes Shire Council in Forbes on Wednesday 5 June 2019
  - a presentation to the CGO Community Environmental Monitoring and Consultative Committee (CEMCC) in Forbes on Wednesday 5 June 2019;
  - a community information session in West Wyalong on Wednesday 5 June 2019; and
  - meetings with neighbouring landowners at their residences;
- preliminary site investigations carried out on Thursday 6 June 2019; and
- government agency consultation:
  - DPIE (Resources and Geosciences) at CGO on Tuesday 9 July 2019;
  - DPIE (Water) via video conference on Thursday 11 July 2019; and
  - DPIE (Environment and Heritage) via video conference on Thursday 25 July 2019.

Based on the findings of the scoping assessment, the following key issues will be addressed in the EIS for the Underground Development:

- subsidence;
- surface water;
- groundwater;
- biodiversity;
- heritage, including Aboriginal cultural heritage and historic heritage;
- noise, vibration and blasting;
- geology and geochemistry;
- air quality and greenhouse gas assessment;

- social; and
- economic.

Other issues or matters that require assessment, but may not require a standalone or detailed technical assessment in the EIS are:

- cumulative impacts, and
- climate change and other risks.

ES5 Overview of proposed engagement approach

Stakeholder engagement for the CGO Underground Development project has been comprehensive to date and reflects the importance Evolution Mining places on this aspect of its business. Building on previous engagement activities carried out prior to and following the commencement of operations in 2005, Evolution Mining will continue to engage with stakeholders during the approval process for the CGO Underground Development.

Engagement targeted specifically for the Underground Development will comprise several targeted initiatives, during both the EIS preparation and the public exhibition period as follows:

- community consultation sessions to be held in key local communities (including West Wyalong, Forbes and Condobolin);
- meetings with Bland Shire, Forbes Shire and Lachlan Shire Councils.
- meetings with neighbouring landowners; and
- presentations to the CEMCC.

In addition to these direct stakeholder and community engagement initiatives described above, project information will also be provided to the local community and targeted stakeholders through various mechanisms which may include via local radio, newspapers, letterbox leaflets, and the CGO webpage on the Evolution Mining website.

ES6 Environmental monitoring and management

Environmental management at the CGO encompasses a range of management plans and monitoring programs overseen by statutory planning provisions. Evolution Mining maintains an extensive monitoring program whereby data is collected, analysed and maintained for reporting, future examination and assessment.

This report presents the proposed assessment methodologies for each of the key specialist studies that will be developed to inform the EIS preparation. Proposed mitigation measures to minimise impacts, and the requirements for environmental monitoring and management in relation to the Underground Development would be determined during the preparation of the EIS.

Table of Contents

Appendices

Tables

Figures

1 Introduction

1.1 Overview

Evolution Mining (Cowal) Pty Limited (Evolution Mining) is the owner and operator of the Cowal Gold Operations (CGO) located approximately 38 kilometres (km) north-east of West Wyalong, New South Wales (NSW).

CGO is an existing open cut mine site which has been operational since commencement in 2005 and has approvals in place to continue processing at a rate of 9.8 million tonnes of ore per annum (Mtpa) until 2032. The existing mine site is located immediately adjacent to the ephemeral lake, Lake Cowal.

The area of land to which the CGO's Development Consent (DA 14/98) is relevant includes Mining Lease (ML) 1535, ML 1791 and the CGO's water supply pipeline and Bland Creek Palaeochannel Borefield. Open pit mining operations are currently undertaken within ML 1535, which encompasses approximately 2,636 hectares (ha).

Evolution Mining seeks to extend mining operations at the CGO by way of an underground development, which would be wholly contained within ML 1535. The Underground Development proposal seeks to introduce an underground mine using stope mining practices, in addition to the existing open cut mine, to exploit an identified ore deposit in proximity to the current E42 pit. It is anticipated that this development will extend the mine life to the end of 2037.

1.2 Approvals approach

To facilitate the Underground Development environmental impact assessment process, Evolution Mining proposes to seek approval under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for two separate but inter-related applications:

- **Underground workings EIS**– a State significant development (SSD) application under section 4.38 of the EP&A Act for the new underground component of the Underground Development. **This document represents the Scoping Report that will support the request for Secretary's Environmental Assessment Requirements (SEARs) for the SSD application**; and

- **Surface changes modification** – a request for modification (Modification 16) to the existing CGO development consent (DA 14/98) under section 4.55 of the EP&A Act for the ancillary surface changes associated with the Underground Development.

It is intended that the Scoping Reports for each of the two applications are considered together. It is proposed that the preparation of the environmental impact statement (EIS)/assessment report, public exhibition periods, responses to submission, and determinations would be carried out concurrently for both applications.

1.3 This scoping report

This scoping report has been prepared for the SSD component of the CGO Underground Development by EMM Consulting Pty Limited (EMM) on behalf of Evolution Mining, the applicant for the CGO Underground Development. It has been prepared in accordance with the draft Environmental Impact Assessment Guidance Series (DPE 2017a).

The purpose of this Scoping Report is to request and inform the content of the SEARs for the SSD EIS for the CGO Underground Development.

1.4 EPBC Act referral

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the assessment of environmental impacts on matters of national environmental significance (MNES) and Commonwealth land.

A preliminary review of the environmental risks of the CGO Underground Development has identified negligible to low impacts on MNES.

In the interests of transparency, Evolution Mining will formally refer the CGO Underground Development to the Commonwealth Department of Environment and Energy (DoEE) to seek confirmation that the action is not a controlled action. This is anticipated to occur in August 2019.

1.5 Proponent details

Key details of the proponent for the CGO Underground Development, the persons who prepared this scoping report, and the site owner are presented in Table 1.1.

Table 1.1 Proponent details

Requirement	Detail
Proponent	Evolution Mining (Cowal) Pty Limited
Group office	Level 24, 175 Liverpool Street SYDNEY NSW 2000
Postal address	PO Box 210 West Wyalong NSW 2671
ABN	74 084 669 036
Nominated contact	Danielle Wallace Superintendent, Environment and Social Responsibility Cowal Gold Operations
Contact details	0437 426 184 danielle.wallace@evolutionmining.com.au
Name and qualifications of persons who prepared Scoping Report	Aaron Bowden Associate Environmental Planner EMM Consulting 0414 474 306 aaron.bowden@emmconsulting.com.au
Site owner	Evolution Mining (Cowal) Pty Limited

2 Project details

2.1 Project definition

This Scoping Report addresses the SSD underground components of the CGO Underground Development. A summary description of each project component is presented in Table 2.1.

Table 2.1 Project definitions

Full component name	Abbreviated name	Brief component description
Cowal Gold Operations	CGO or 'the site'	Existing open cut mine and associated processing plant, integrated waste landform (IWL), tailings storage facilities (TSFs), waste rock emplacement areas, ore stockpiles and ancillary facilities.
Cowal Gold Operations Underground Development	CGO Underground Development	The overall proposed underground development project, including both the underground workings SSD and the Modification 16 surface changes.
Cowal Gold Operations Underground Development SSD	Underground SSD or 'the project'	The proposed underground workings to which this Scoping Report applies. The Underground SSD will include progressive development of the main decline and other drives/declines off the main open pit, underground stope mining to a final depth of approximately -850 m Australian Height Datum (AHD) and progressive backfill of voids with cemented pastefill.
Cowal Gold Operations Modification 16 to DA 14/98	Modification 16 (Mod 16)	The proposed surface changes to the existing CGO development consent associated with the proposed underground workings, covered in a separate Scoping Report. Mod 16 will modifications to the existing processing plant, an additional downstream lift of the IWL, peak workforce of 160 staff, pastefill plant for stope void backfill, and additional vehicles to be added to the mining fleet.

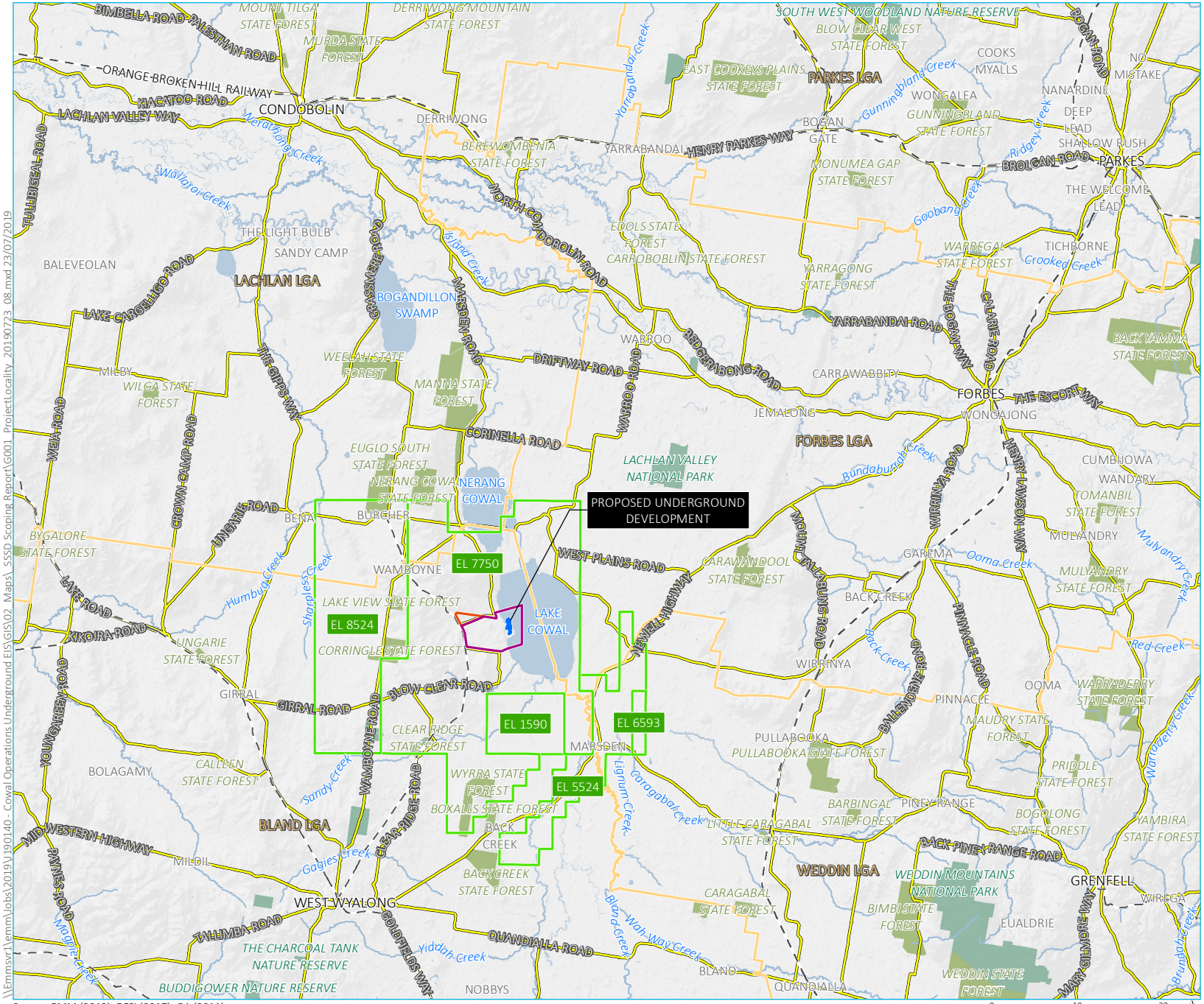
2.2 Site details

2.2.1 Project location

The CGO site (the site) is located approximately 38 km north-east of West Wyalong, 60 km south-west of Forbes, and approximately 350 km west of Sydney, as shown in Figure 2.1.

The site is located adjacent to Lake Cowal in the Lachlan Catchment, an ephemeral inland wetland system. Lake Cowal is the largest natural inland lake in NSW, and when full is approximately 21 km long (north to south) and 9.5 km wide (east to west) covering an area of over 13,000 ha.

The area of land to which the CGO current development consent (DA 14/98) is relevant includes the underlying ML 1535, ML 1791 and the CGO water supply pipeline to the Bland Creek Palaeochannel Borefield and associated infrastructure. In addition, Evolution Mining holds development consent (DA 2011/64) for the operation of the Eastern Saline Borefield which was granted by the Forbes Shire Council on 20 December 2010.



KEY

- Mining Lease (ML1535)
- Mining Lease (ML1791)
- Proposed underground development
- Exploration Licence (EL)
- Rail line
- Main road
- Named watercourse
- Waterbody
- Local government area
- NPWS reserve
- State forest

Regional location of CGO

Evolution Mining
Cowal Gold Operations
SSD scoping report
Figure 2.1

EMM
creating opportunities

\\Emmsvr1\emm\Jobs\2019\J190140 - Cowal Operations Underground EIS\GIS\02_Maps_SSD Scoping Report\G001_ProjectLocality_20190723_08.mxd 23/07/2019

2.2.2 Project area description

The proposed Underground SSD works are located within and adjacent to the existing operational open cut pit and are wholly contained within ML 1535.

2.2.3 Existing CGO operations

CGO is an existing open cut mine site which has been operational since mining commenced in 2005, operating under the ML 1535 (due to expire 31 December 2032) and ML 1791 (due to expire 20 June 2040). The current open pit is located within ML 1535 and has an approved disturbance area which allows for the progressive expansion of the pit. When complete the total pit area will be approximately 131 ha and will have a final depth of -331 m AHD.

As per current approvals, CGO will mine approximately 167 million tonnes (Mt) of ore over the 28-year life span of the mine, processing at a rate of up to 9.8 Mtpa. Gold extraction is undertaken using a conventional carbon-in-leach cyanide leaching circuit. Use of the cyanide leaching circuit is carried out in accordance with a Cyanide Management Plan approved by the DPE. Currently concentrations of cyanide in the tailing's slurry stream at the process plant must not exceed the following:

- 20 milligrams per litre (mg/L) weak acid dissociable cyanide (CN_{WAD}) (90^{th} percentile over 6 months); and
- 30 mg/L CN_{WAD} (maximum permissible limit at any time).

Waste rock is presently managed at three rock emplacement sites within the mine site, the northern, southern and perimeter. The northern waste rock emplacement is licenced to be constructed to a maximum height of 308 m AHD, the southern to a maximum of 283 m AHD and perimeter 223 m AHD.

Approved heavy vehicle access to the site is via the designated route between the CGO site and West Wyalong with light vehicle access also available via Condobolin and Forbes. Hazardous goods are transported to site by truck either from Port Botany or their point of production (e.g. Yarwan, Queensland or Melbourne, Victoria etc.) via the approved local road network.

Open pit mining operations at the CGO are currently supported by the following on-site facilities:

- process plant, including:
  - primary crusher;
  - float tails leach circuit; and
  - carbon in-leach cyanide leaching circuit;
- stockpiles including:
  - run-of-mine (ROM) pads;
  - low-grade and high-grade ore stockpiles;
  - mineralised material stockpiles; and
  - soil and clay stockpiles;
- TSFs including:

- northern TSF; and
- southern TSF;

- waste rock emplacements surrounding the open pit including:
  - northern waste rock emplacement;
  - southern waste rock emplacement; and
  - perimeter waste rock emplacement;
- water management structures including:
  - lake protection bund;
  - temporary isolation bund;
  - water supply pipeline;
  - saline groundwater supply bores within ML 1535; and
  - water diversion systems (including Up-Catchment Diversion System and Internal Catchment Drainage System) and drainage;
- Ancillary facilities including access roads, internal roads and haul roads, electricity transmission lines, waste storage and transfer facility, workshop facilities and administration buildings.

The most recently approved modification to the CGO development consent (DA 14/98), Modification 14 (approved by DPE in October 2018) included (among other aspects) the modification of the existing TSFs into one larger facility which would also accommodate mine waste rock, and be referred to as the integrated waste landform (IWL).The works associated with development of the IWL have commenced.

Figure 2.2 Cowal Gold Operations project area

3 Project description

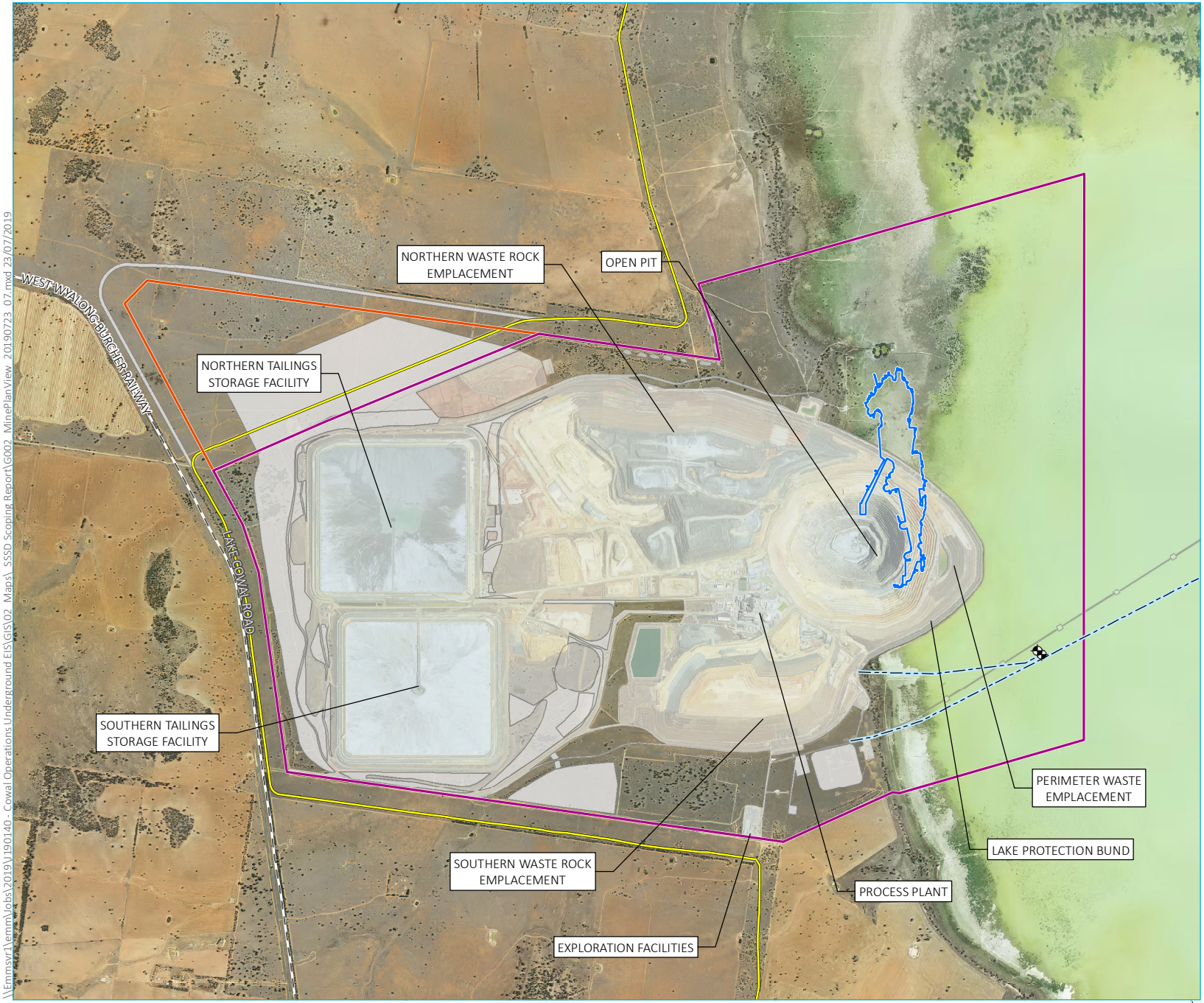
3.1 Proposed Underground Development scope

The project area for the Underground SSD application extends northwards under Lake Cowal from a decline entrance in the eastern part of the open pit, as presented in Figure 3.1, Figure 3.2 and Figure 3.3.

The proposed Underground Development scope of work is described in Table 3.1.

Importantly, the Underground Development SSD application involves no change to the following key components of the existing CGO:

- extent and depth of the open pit;
- lake isolation system;
- maximum waste rock emplacement heights;
- cyanide leaching circuit;
- cyanide destruction method;
- approved cyanide concentration limits in the aqueous component of the tailings slurry;
- water supply sources;
- approved daily or annual extraction limits of the Bland Creek Palaeochannel Borefield;
- site access road;
- power supply;
- exploration activities; or
- hours of operation.



KEY

- Mining lease (ML1535)
- Mining lease (ML1791)
- Proposed underground development
- Approved surface disturbance
- Rail line
- Main road
- Water supply pipeline
- Saline groundwater supply bore

\\Emmsvr1\emm\Jobs\2019\J190140 - Cowal Operations Underground EIS\GIS\02 Maps\ SSSD Scoping Report\G002 MinePlanView 20190723 07.mxd 23/07/2019

Source: EMM (2019); DFSI (2017); GA (2011)

0 1 2 km

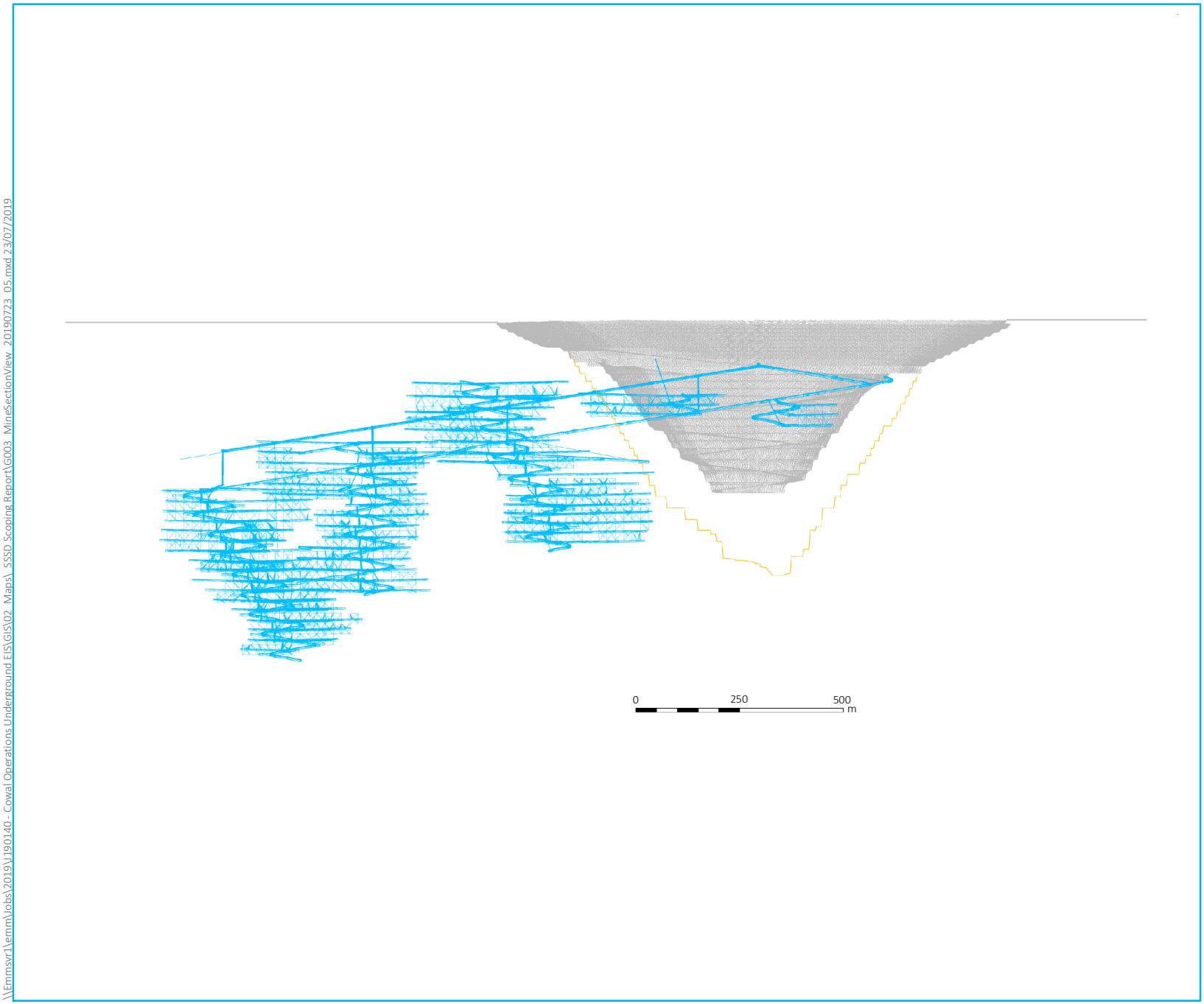
GDA 1994 MGA Zone 55

N

SSD UD project area and mine plan

Evolution Mining
Cowal Gold Operations
SSD scoping report
Figure 3.1

EMM
creating opportunities



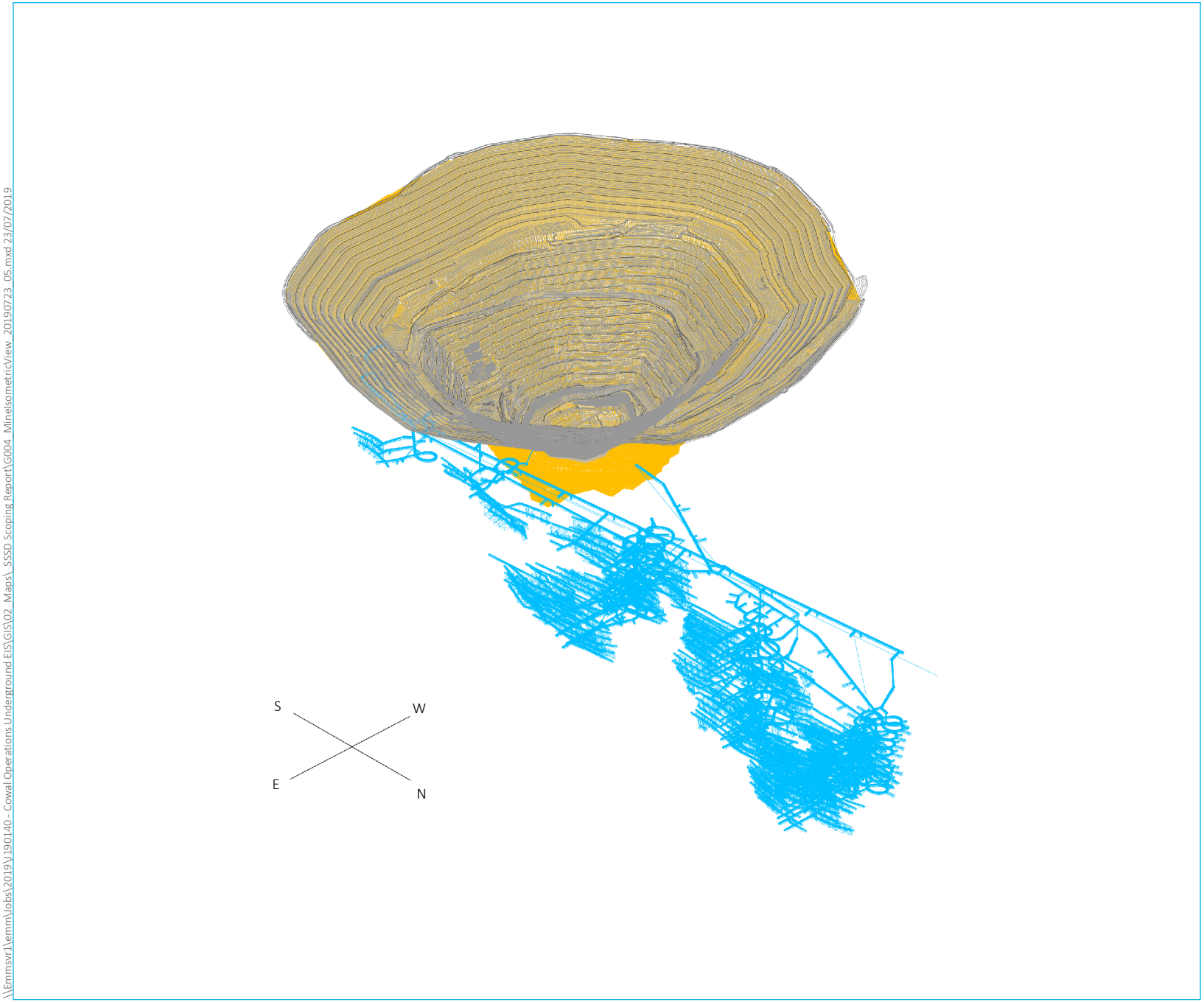
\\Emmsvr1\emm\Jobs\2019\J190140 - Cowal Operations Underground EIS\GIS\02_Maps_SSD Scoping Report\G003_MineSectionView_20190723_05.mxd 23/07/2019

Source: EMM (2019); Evolution (2019)

Proposed underground development (section view)

Evolution Mining
Cowal Gold Operations
SSD scoping report
Figure 3.2

EMM
creating opportunities



Proposed underground development (isometric view)

Evolution Mining
Cowal Gold Operations
SSD scoping report
Figure 3.3

Source: EMM (2019); Evolution (2019)

Table 3.1 Proposed Underground Development SSD scope

Component	Approved CGO[1]	SSD underground scope
Tenement	Development approved to occur within the Development Application areas, including ML 1535 and ML 1791.	No change.
Mining Method	Open pit mining operations.	Addition of underground stope mining operations. Limited subsidence to the extent that there is no surface expression from underground mine (i.e. negligible subsidence impacts). Proposed backfill method will be to fill stope voids with cemented pastefill. The pastefill plant will be located with an existing disturbance area in proximity to the open pit.
Blasting	Open pit blasting as per DA 14/98.	Blasting will be used for the development of the underground workings decline(s) and is proposed to occur under independent firing conditions (in the preliminary phases). Increased consumption of blasting consumables, including ammonium nitrate and ammonium nitrate emulsion.
Life of Mine	28-year operational life of the CGO, up to 31 December 2032.	Extension of mine life to the end 2037 (i.e. 31 December 2037).
Gold Production	Producing a total of approximately 6.1 million ounces (Moz) of gold over the life of the CGO[2].	Producing an additional approximate 1.4 Moz of gold from the underground mine over the life of the CGO.
Mining Extent	Development of the open pit in stages as it is progressively deepened and widened within the existing disturbance area. Total open pit area of approximately 131 hectares (ha) and final depth of approximately – 331 metres (m) Australian Height Datum (AHD).	Development of the underground mine will be in stages, as main decline is progressively extended at depth. The underground footprint is estimated to be approximately 135 ha and final depth of approximately -850 m AHD. Development of the underground mine will be via several drives/declines off the main open pit, which will also allow for ventilation.
Ore Production and Processing	Approximately 167 Mt of ore produced over the life of the CGO.	Approximately 17 Mt of additional ore anticipated to be produced from the underground mine over the life of the CGO.
Waste Rock Management	Approximately 299 Mt of waste rock produced over the life of the CGO.	Approximately 3.9 Mt of additional waste rock produced from the underground mine over the life of the CGO.

Table 3.1 Proposed Underground Development SSD scope

Component	Approved CGO[1]	SSD underground scope
Water Supply Sources and Infrastructure	Water used for ore processing is sourced from the following internal and external sources: • Return water from the TSFs. • Open pit sump and dewatering borefield. • Rainfall runoff from mine waste rock emplacements, and other areas which is collected as part of the Internal Catchment Drainage System (ICDS) in contained water storages. • Saline groundwater supply borefield which is pumped from four production bores located in the south-east of ML 1535. • Eastern Saline Borefield located approximately 10 km east of Lake Cowal's eastern shoreline. • Bland Creek Palaeochannel Borefield which comprises four production bores within the Bland Creek Palaeochannel located approximately 20 km to the east-northeast of the CGO. • Licensed water accessed from the Lachlan River which is supplied via a pipeline from the Jemalong Irrigation Channel (i.e. Bore 4 offtake). Approval for duplication of existing water supply pipeline across Lake Cowal. Approval for construction of a new pump station and associated diesel generator and access track on the eastern side of Lake Cowal adjacent to the existing mine water supply pipeline to improve capacity/flows. Approval for construction of a new water supply storage (D10) within ML 1535.	No change to water supply sources or water management infrastructure at the CGO. It is anticipated that additional water will be met through purchases on the open market. Water demand associated with the underground development is anticipated to be approximately 15 litres per second (i.e. approximately peaking at 450 million litres per annum). The need for additional permits would be determined in liaison with DPIE (Water) during the EIS preparation. The permit duration may need to be extended for the additional mine life.
Power Supply Activities[4]	Electricity to the site via a 132 kilovolt (kV) electricity transmission line (ETL) from Temora, approximately 90 km south of the CGO.	No change.
Hours of Operation	24-hour operations, seven days a week.	No change.
Employment	The average workforce employed at the CGO is currently approximately 395 people (including Evolution staff and on-site contractor's personnel). During peak periods, the CGO employs up to 445 people. Approval for a short-term construction workforce of up to 100 people (approved road relocation and pipeline duplication).	The underground mine would require a peak workforce of approximately 160 additional people (including Evolution Mining staff and on-site contractor's personnel). The operation will be either contractor-run or owner-operator.

Table 3.1 Proposed Underground Development SSD scope

Component	Approved CGO[1]	SSD underground scope
Mining Fleet	The existing/approved mobile equipment fleet used for open pit ore extraction, waste rock handling, TSF lifts and rockfill buttress construction includes: • excavators; • haul trucks; • dozers; • loaders; • water trucks; • articulated dump trucks; • compactors; • rollers; • scrapers; • graders; and • drill rigs.	Typical mining equipment found in an underground metalliferous operation. Haul trucks (approximately 8), loaders (approximately 4), development and production drills (approximately 4), as well as ancillary equipment.

1. Approved CGO approved on 26 February 1999 as modified. Includes approval of Modification 14 on 4 October 2018.
2. Due to the processing of additional mineralised material, approved as part of Modification 14 on 4 October 2018.

3.1.1 Expected capital investment value

The current capital investment value estimate of the CGO Underground Development is greater than $30 million. The cost estimate is based on the concept design and is likely to be further refined during design development and the construction contractor procurement process.

3.1.2 Construction methodology

Underground mining would be carried out using underground stope mining methods. It is anticipated that there would be insignificant subsidence (<20mm) to the extent that there is negligible surface expression from the underground mine (i.e. negligible subsidence impacts).

It is proposed that the stope voids would be progressively backfilled with cemented pastefill. A pastefill plant would be constructed and located with an existing disturbance area in proximity to the open pit.

3.1.3 Workforce

It is currently expected that the peak workforce for the Underground SSD will be approximately 160 contractors and employees. Workforce numbers and arrangements will be confirmed during the final design and included within the EIS.

3.1.4 Schedule and hours of construction

CGO Underground Development requires a 24-hour-a-day, seven-days-a-week operation consistent with the existing open cut operations. A detailed project delivery schedule will be included in the EIS.

3.2 SSD operational infrastructure

The CGO Underground Development would be carried out in stages as target areas are progressively mined and backfilled. The following key design elements would be developed for the SSD scope of works for the CGO Underground Development, and are referred to in this Scoping Report as underground operational infrastructure:

- main decline off the open pit;
- additional drives and declines off the main decline and/or the open pit; and
- underground stope mining areas.

Key design elements for surface infrastructure (such as changes to the processing plant, IWL lift, water infrastructure etc) required for the CGO Underground Development are covered in the Scoping Report for the Modification 16 application.

3.3 Rehabilitation and mine closure

Consistent with CGO development consent (DA 14/98) Condition 2.4(b), rehabilitation of final landforms or disturbed areas would continue to be carried out progressively as soon as reasonably practicable following disturbance and would include interim rehabilitation measures. Progressive rehabilitation would aim to minimise erosion and sedimentation potential and minimise visual impacts of CGO.

Rehabilitation and mine closure activities will be explained in detail as part of the EIS. The Strategic Framework for Mine Closure published by the Australian and New Zealand Minerals and Energy Council and Mineral Resources Council of Australia (2000) and the Leading Practice Sustainable Development Program for the Mining Industry –

Mine Closure published by the Commonwealth Department of Industry, Innovation and Science (2016) would be used as a guide for mine closure.

Mine closure concepts and management measures would continue to be developed via the Mining Operations Plan (MOP) in consultation with the Division of Resources and Geosciences and other relevant regulatory authorities.

4 Strategic and statutory context

4.1 Historical development of CGO

Development consent (DA 14/98) for the CGO and the Bland Creek Palaeochannel Borefield water supply pipeline was granted by the then NSW Minister for Urban Affairs and Planning under Part 4 of the EP&A Act on 26 February 1999.

Development consent (DA 2011/64) for the operation of the Eastern Saline Borefield was granted by Forbes Shire Council on 20 December 2010.

The CGO Development Consent (DA 14/98) has been modified on 14 occasions, viz. 11 August 2003 (Mod 1), 22 December 2003 (Mod 2), 4 August 2004 (Mod 3), 23 August 2006 (Mod 4), 12 March 2008 (Mod 5), 11 February 2009 (Mod 7), 28 August 2009 (Mod 8), 10 March 2010 (Mod 6), 17 January 2011 (Mod 9), 6 July 2011 (Mod 10), 22 July 2014 (Mod 11), 13 May 2016 (Mod 12), 7 February 2017 (Mod 13) and 4 October 2018 (Mod 14).

The most recently approved Mod 14 involves (among other aspects) expansion of the CGO within ML 1535 and ML 1791, development of an IWL, duplication of the water supply pipeline and an increase to the CGO's approved ore processing rate of 7.5 Mtpa to 9.8 Mtpa.

4.1.1 Need for the proposal

The Underground Development would allow the CGO to maintain continuity of mine production at the CGO site beyond 2032 and develop an ore body that is most economically mined via underground methods.

The development would allow for access to higher grade ore, which in turn would improve the financial resilience of the CGO against rising operational costs, such as electricity and other external economic factors.

The Underground Development would include an increase in the operational workforce and would assist to facilitate the continuity of employment for the existing CGO workforce, providing job security for local mine employees and contractors, and to continue to stimulate demand in the local and regional economy.

The Underground Development would include the implementation of mitigation and management measures (including performance monitoring), to minimise potential impacts on the environment and community.

The Underground Development is anticipated to result in net production benefits to Australia and NSW (over and above the economic benefits of the approved CGO). The development would result in additional contributions to regional and NSW output and business turnover and household income. Contributions to the regional economy would include direct economic activity (e.g. direct employment and wages), expenditure by the CGO on inputs to production that can be sourced from the region such as repairs and maintenance etc., and expenditure of employee wages in the regional economy.

4.1.2 Alternatives considered

i Do nothing

If the CGO Underground Development was not to proceed, life of mine would end in 2032. In addition, the following consequences are likely to occur:

- The existing CGO would continue to operate as currently approved.

- There would be no additional employment for the existing CGO workforce, thereby forgoing job security for local mine employees and contractors.
- The incremental net benefits of the development would be foregone.
- Additional tax revenue from the development would not be created.
- Additional royalties for the State of NSW would not be generated.
- The additional potential social and environmental impacts of the underground development would not occur.
- The identified additional gold resource would remain unmined.

ii Other alternatives

The Underground Development involves the proposed introduction of an underground mine to the CGO. The currently proposed mine design has been developed in consideration of environmental and operational constraints.

Detail of these constraints, and where relevant, alternatives considered, are provided below.

Underground Mining Method

The orebody occurs such that open cut mining is not an economic mining method. The underground mine must be developed using open stope mining methods, as this is the most suitable methodology for the geometry of the ore body. Alternative mining methods are therefore not considered further.

Underground Mine Location

As the location of mining is constrained by the identified ore deposit, alternative mining locations have not been considered further.

4.2 NSW planning framework

The EP&A Act provides the statutory framework for the environmental impact assessment of development in NSW. The statutory trigger for development consent is provided for under section 4.2(1) of the EP&A Act.

The EP&A Act and NSW *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) form the statutory framework for planning approval and environmental assessment in NSW. This legislation is supported by Environmental Planning Instruments (EPIs) including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs).

Clause 7(1)(a) of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) provides that development for the purposes of underground mining requires development consent. The Mining SEPP supersedes the permissibility provisions of the applicable LEP *Bland Local Environmental Plan 2011.*

4.2.1 State Significant Development

Under the provisions of clause 8(1) and clause 5 to Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) mining development with a capital investment value of more than $30 million is declared State Significant Development (SSD). SSD requires the approval of the Minister for Planning (or his delegate – e.g. Independent Planning Commission (IPC) or Department of Planning and Environment (DP&E)). Before the Minister can approve an SSD project, an environmental impact statement (EIS) is required to be prepared. The EIS is required to be made available for public exhibition. Following public exhibition, the applicant is required to respond to issues raised in submissions received by the DP&E during the exhibition period.

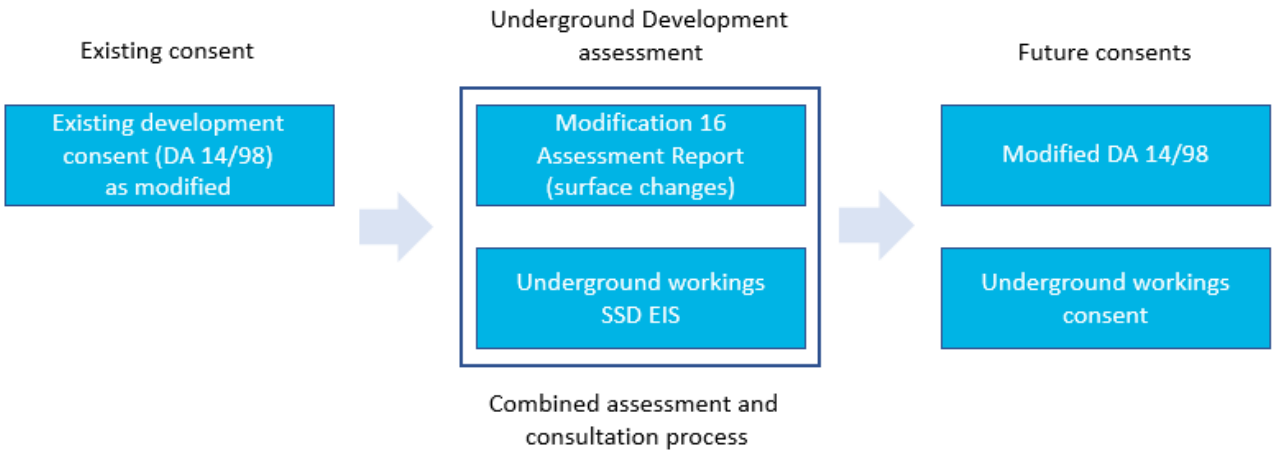
The CGO Underground Development would have a capital investment value of more than $30 million. Accordingly, Evolution Mining seeks approval for the development as SSD.

4.2.2 Modification 16

To allow for the changes to the existing operations associated with the additional ore production from the proposed Underground Development, Evolution Mining would also seek to modify the existing development consent under the provisions of section 4.55 of the EP&A Act.

The modification application would coincide with the SSD application for the underground workings component of the Underground Development proposal. This report is intended to be read in conjunction with the Mod 16 Scoping Report. A high level overview of the SSD/Modification 16 approval strategy is provided in Figure 4.1.

Figure 4.1 CGO Underground Development approvals process



4.2.3 Other NSW approvals and licences

In addition to development consent under the EP&A Act, the Underground Development proposal would require a number of additional approvals under other relevant environmental legislation. Each of these separate environmental approvals is considered in Table 4.1.

Table 4.1 Other NSW approvals and licences

Stakeholder agency	Legislation	Requirement
Environment Protection Authority (EPA)	*Protection of the Environment Operations Act 1997* (POEO Act)	The proposal would likely require an amendment to EPL 11912 as a scheduled activity under the POEO Act.
Department of Premier and Cabinet (Heritage)	*Heritage Act 1977*	No impacts to non-Aboriginal heritage likely as part of the proposal.
DPIE (Environment and Heritage)	*Biodiversity Conservation Act 2016* (BC Act)	Impacts on threatened species and endangered ecological communities are likely to be minimal.

Table 4.1 Other NSW approvals and licences

Stakeholder agency	Legislation	Requirement
		Biodiversity Development Assessment Report (BDAR) waiver request is included in Appendix B of this scoping report.
	National Parks and Wildlife Act 1974 (NPW Act)	Impacts to Aboriginal heritage and archaeology likely to be minimal. Evolution Mining to carry out due diligence assessment as part of EIS preparation. Permits are not required for an SSD mining proposal for impacts to Aboriginal heritage (section 4.41 of the EP&A Act). The CGO currently holds the following permits and consents: • Permit 1468 authorising certain archaeological works in the ML 1535 area, water pipeline and borefield area. • Consent 1467 authorising the destruction of Aboriginal objects in the ML 1535 area, water pipeline area and borefield area. • Permit 1681 authorising certain archaeological works in the road upgrade area and the relocated TSR. • Consent 1680 authorising the destruction of Aboriginal objects in the road upgrade and the relocated TSR. • AHIP C0004750 for ML 1791 and the new proposed TSR. • Care Agreement C0004976.
DPIE (Fisheries)	*Fisheries Management Act 1994* (FM Act)	No impacts to threatened species or key fisheries habitat likely as part of the proposal. No permits likely to be required under the FM Act.
DPIE (Resources and Geoscience)	*Mining Act 1992*	The Underground Development would be undertaken under the existing Mining Lease (ML 1535). The Mining Operations Plan (MOP) would also be amended to take into account the operational changes and future rehabilitation of the Underground Development workings.
	Pipelines Act 1967	An existing pipeline supplies water to the CGO site. No additional licences for pipelines are anticipated as part of the Underground Development.
DPIE (Water)	*Water Management Act 2000* (WM Act)	The Underground Development may require the extension of existing water use

Table 4.1 Other NSW approvals and licences

Stakeholder agency	Legislation	Requirement
		licences and permits. The proposal may also interfere with an aquifer. The need for a water use approval or an activity approval under the WM Act would be determined during the EIS preparation.
Rural Fire Service (RFS)	*Rural Fires Act 1997* (RF Act)	A bushfire safety authority would not be required under the RF Act for the Underground Development.
Transport for NSW (Roads)	*Roads Act 1993*	No approvals are likely required under section 138 of the *Road Act 1993*, as all development would be contained within ML 1535.

4.2.4 Commonwealth approvals

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the assessment of environmental impacts on matters of national environmental significance (MNES) and Commonwealth land.

A search (with a buffer of 10 km) was carried out on 18 June 2019, using the DoEE website Protected Matters Search Tool (refer to Appendix A). A list of the potential MNES that may be impacted by the CGO Underground Development proposal is provided in Table 4.2.

A preliminary review of the environmental risks of the proposed underground development has identified negligible impacts on MNES, given there are no additional surface impacts associated with the underground development. No Commonwealth lands/agencies are likely to be affected by the proposal.

In the interests of transparency, Evolution Mining will formally refer the project to the Commonwealth Department of Environment and Energy (DoEE) to seek confirmation that the project is not a controlled action. Submission of the DoEE referral is currently anticipated to occur in August 2019.

Table 4.2 MNES under the EPBC Act

MNES	Matters relevant to the CGO Underground Development
World heritage properties	None
National heritage places	None
Wetlands of international importance	None within search tool buffer radius (10 kilometres). The search tool identified four wetlands of international importance over 500 kilometres away.
Great Barrier Reef Marine Park	Not applicable
Commonwealth marine areas	Not applicable
Commonwealth listed threatened ecological communities (TECs)	Three Commonwealth listed TECs may/are likely to occur in the vicinity of the proposal: • Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia • Weeping Myall Woodlands • White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
Commonwealth listed threatened species	Twenty one listed threatened species, including four critically endangered bird species.

Table 4.2 MNES under the EPBC Act

MNES	Matters relevant to the CGO Underground Development
Commonwealth listed migratory species	Thirteen listed migratory species, including the critically endangered Curlew Sandpiper and Eastern Curlew.
Other matters	
Commonwealth land	None
Commonwealth heritage places	None
Nuclear actions (including uranium mines)	None proposed
A water resource, in relation to coal seam gas development and large coal mining development	None proposed
Nationally important wetlands	The Lake Cowal / Wilbertroy Wetlands are listed as being of National significance in the Australian Wetlands Database.

5 Scoping of key issues

5.1 Issues identification

5.1.1 Scoping process

Preliminary environmental investigations have been carried out to identify the relevant matters to be addressed in the EIS for the Underground SSD component of the CGO Underground Development, and the required level of assessment. This process was guided by the draft guidelines for scoping an environmental impact statement as prepared by the DPE (2017a) and included:

- involving the DPIE, the community and other stakeholders early in the process;
- undertaking a process of identifying and characterising relevant matters, taking into account an initial scientific and technical assessment and stakeholder responses; and
- reporting the outcomes of that assessment in this Scoping Report.

The following environmental specialist assessments methodologies are currently proposed by EMM for the preparation of the EIS. This scope will be amended as necessary following inputs received from DPIE, the community and stakeholder agencies during consultation as part of the Scoping Phase.

5.2 Groundwater

5.2.1 Existing environment

A significant number of hydrogeological studies and site investigations have been conducted for the CGO area and surrounds. The conceptual model of the existing groundwater regime in the region developed by Coffey in 2018 supports the two groundwater systems which the CGO open pit interacts with, (i) the alluvial groundwater system and (ii) fractured rock groundwater system.

Groundwater inflow to the open pit is managed by in-pit sumps (which also collect incidental rainfall). Current groundwater inflow to the open pit is estimated to be approximately 159 ML/annum, with approximately 10% of groundwater inflows from the alluvial groundwater system and 90% of groundwater inflows from the fractured rock groundwater system.

Groundwater inflow to the open pit is estimated to have generally decreased since 2008 as the adjacent aquifers surrounding the CGO open pit have become depressurised. No material increase in groundwater inflow to the open pit occurred during and following the 2010, 2012 or the most recent 2016 lake-fill events; based on monitored pit dewatering records.

Within ML 1535, monitoring data shows some drawdown in the Cowra Formation (alluvial system) due to groundwater inflow to the CGO open pit. The monitoring data indicates that this drawdown is localised, and is considered to have not significantly affected groundwater levels in the Cowra Formation or Lachlan Formation outside of ML 1535.

Previous studies indicated that Lake Cowal is hydraulically separated from the underlying aquifers, due to the very low permeability of the clay pan deposits that form the lake bed. Based on this, it was predicted there would be very low potential for significant quantities of water to infiltrate from Lake Cowal to the underlying aquifers (i.e. associated with the Cowra Formation).

Monitoring data collected since the 2010, 2012 and 2016 lake-fill events indicates no increase in groundwater inflow to the open pit has occurred, which supports the predictions of previous assessments regarding the hydraulic separation of Lake Cowal from the underlying aquifers.

5.2.2 Key environmental risks

The development of underground stopes beneath Lake Cowal is predicted to result in a groundwater flow toward the underground workings. Ground movement associated with the underground mining operation will also likely result in changes to the stress field in the host rock surrounding the working and this may affect the hydraulic properties of the rock. These stress changes may arise from creation of the mine void and from blasting operations associated with the stope mining method.

5.2.3 Assessment methods

i Influence of underground mining on groundwater

EMM has engaged Coffey to prepare a hydrogeological (groundwater) assessment to inform the preparation of the EIS for the Underground Development. Coffey has a long track record of working at the CGO. Groundwater seepage to the underground mine workings will likely be influenced by the zone of increased permeability arising from mining disturbance. Underground mining studies will assess the extent of disturbance of the surrounding rock and this will be used to assess the extent of disturbance leading to changes (expected to be increases) in the rock permeability.

The rate and timing of groundwater inflow will change as the underground operation develops. It is anticipated that assessment of the extent of drawdown and the rate of groundwater inflow will need to be assessed during mine development of declines and during mining over the course of the planned underground operation and in the long term following completion of mining. Modelling of groundwater behaviour will take account of the proposed mine plan to assess inflows and groundwater drawdown over the life of the mine.

The experience obtained from the operation of the existing open cut operation provides useful data which will assist in the assessment of groundwater effects of the underground operation. Records of open cut groundwater inflows used previously for calibration of groundwater modelling of the open cut operation provide a valuable basis for assessment of the hydraulic properties of the host rock at depth.

The following fieldwork program and associated data analyses may be required (pending further review and assessment):

- Installation of piezometers to assess the groundwater levels in rock and lakebed sediments in the underground mine area;
- Testing of newly installed piezometers to assess hydraulic conductivity and water quality; and
- Testing of the permeability and thickness of the lakebed sediments in the area for the proposed underground mine.

ii Bland Creek Palaeochannel water supply

The mine water supply is currently drawn in part from the Bland Creek Palaeochannel. This water resource is an important part of the mine water supply. Coffey has developed a regional model of the Bland Creek Palaeochannel aquifer system and this model will be used to predict impacts of groundwater extraction for mine use, on the groundwater system.

The Bland Creek Palaeochannel system is also widely used for irrigation in an area where water resources are not abundant. Previously the Bland Creek Palaeochannel groundwater model has been calibrated taking account of mining and agricultural groundwater extraction. Given the importance of this resource it is expected that review of groundwater records, including records for mining and agricultural usage, will need to be carried out as part of re-calibration of the groundwater model for use in assessment of mine water usage effects to the end of planned underground mining operations. Importantly, no increases to extraction limits in the Bland Creak Palaeochannel borefield are proposed as part of the underground development.

iii Saline supply borefields

In addition to the Bland Creek Palaeochannel, the saline borefields are an additional source of water for the CGO. The hydrogeological assessment will include the collation and review of groundwater monitoring data, including groundwater level and groundwater quality results from bores located within the eastern saline supply borefield (ESB), and groundwater supply data including data from mine saline supply borefield (MSSB) and ESB.

iv Hydrogeological assessment and predictive model

The hydrogeological assessment will include an update of the CGO groundwater model, and a quantitative assessment based on predictive modelling of potential groundwater drawdown on the water supply borefields. The study will include an assessment of any connectivity between Lake Cowal and underlying aquifers and commentary against the relevant criteria identified in Department of Primary Industries NSW Aquifer Interference Policy (2012a), Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources (2012b), and the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources (2012c). Following the assessment, Evolution Mining would also seek any applicable licences under the Water Management Act 2000.

5.3 Surface water

5.3.1 Existing environment

The CGO is located on the western side of Lake Cowal, an ephemeral freshwater lake predominantly filled by runoff from Bland Creek to the south, and flood breakout from the Lachlan River to the north. Lake Cowal occupies an area of 105 square kilometres (km^2), holds approximately 150 gigalitres of water and has a maximum depth of approximately 4 m when full. When flows are sufficient, Lake Cowal overflows into Nerang Cowal to the northwest, and ultimately drains to the Lachlan River via Bogandillon Creek.

The existing CGO water management infrastructure is designed to separate Lake Cowal from the CGO, contain potentially contaminated water (contained water) generated within the mining area, and to divert all other water around the perimeter of the site.

The effectiveness of the lake isolation system was demonstrated under peak water levels in Lake Cowal during the lake-fill events in recent years. During the lake-fill periods, no material increase in groundwater inflow to the open pit occurred, based on pit dewatering monitoring data. This indicates that the lake protection bund and lacustrine clay on the lake's bed are preventing significant loss of water from the lake to the open pit.

5.3.2 Key environmental risks

The surface water impact assessment specialist study will consider mine water usage across the underground development (SSD), noting that surface changes would be considered under Modification 16. The Underground Development proposal is likely to cause only very minor changes to the mine water balance, however all changes will be assessed.

5.3.3 Assessment methods

EMM has engaged Hydro Engineering and Consulting (HEC) to prepare a hydrological assessment to inform the preparation of the EIS for the Underground Development. The hydrological assessment would update the description of the existing physical and hydrological setting (including relevant Water Sharing Plans) that was undertaken for the Modification 14 Surface Water Assessment. This would be based on an updated review of available meteorological, surface water (level, flow and quality) and mine development data.

The update would include the latest recorded water supply, storage and use. Proposed changes to the water management system associated with the Underground Development would be detailed and included on a schematic to illustrate how they the integrate into the overall water management system.

The existing (Modification 14) GoldSim site water balance model would be revised based on the proposed changes to operational water management as a result of the Underground Development – primarily relating to the extension in life of mine and water supply requirements for underground mining. Simulated water management system performance including in-pit and underground water volumes, water supply security and containment dam security would be included. A key input to the model would comprise underground groundwater inflows identified in the groundwater study.

5.4 Subsidence/geotechnical assessment

5.4.1 Existing environment

The land surrounding the existing CGO is characterised by flat to gently undulating topography, and is located on the central western plains of NSW, towards the western edge of the exposed rocks of the Lachlan Fold Belt geological formation. The landforms are mainly ephemeral lacustrine (i.e. Lake Cowal), extensive gilgai areas, stagnant alluvial plains with ephemeral drainage lines and low hills (e.g. Cowal West Hill).

In early 2019, Evolution Mining commenced the GRE46 underground exploration decline within the area of the Underground Development. The decline is intended to assess the quality and quantity of the target ore body, but also provides important information relating to the local geological and groundwater conditions. Since the GRE46 decline commenced, no associated surface deformation (subsidence) has been observed.

5.4.2 Key environmental risks

The principal intention of Evolution Mining is to design the Underground Development to have minimal surface impacts and negligible subsidence. However, the key risks for the proposal, with respect to surface subsidence assessment for the EIS preparation include:

- Deformation caused by underground mining resulting in damage to earth walls causing leakage or drainage of Lake Cowal;
- Chimneying or rapid failure of underground stopes causing flooding of underground workings during Lake-fill conditions;
- Damage to surface infrastructure, including the processing plant, workshops;
- Induced instability to the open pit mine;
- Rock mass damage due to underground mine workings resulting in changes to rockmass permeability and ground water flow; and

- Changes to ground water flow paths may increase water egress into underground workings.

5.4.3 Assessment methods

EMM has engaged subsidence specialists Beck Engineering (Beck) to prepare a subsidence assessment for the Underground Development. Beck has extensive experience in subsidence assessment across the mining industry. As part of the subsidence assessment, Beck Engineering will prepare a three dimensional, discontinuum, strain softening, dilatant, hydromechanically coupled simulation model to consider subsidence impacts. Numerical modelling will use the Abaqus 2018 Explicit finite element (FE) code, which has features relevant to this project scope including:

- Higher-order tetrahedral elements;
- Detailed structural information built explicitly in the model paired with a very accurate representation of the most complex mining geometry;
- Minor faults simulated as a discrete fracture network (DFN), if required;
- Possibility of including numerous intermediate mining steps for a better replication of the planned mining sequence to achieve most accurate simulation results; and
- Detailed representation of the planned mining sequence of the underground mine.

Mining of the open pit and underground mine will be represented in sufficiently small steps to capture the stress path. For this scope, this means approximately quarterly steps (depending on the mine life). Simulation of the open pit mined to date will be used to calibrate model parameters using open pit monitoring data such as prism and LIDAR measurements.

Beck will use the three dimensional structural model and geotechnical models provided by Evolution Mining. Lithological units, alteration and discontinuities will be used as provided. Models will accommodate multiple geotechnical domains and complex fault networks. DFN comprising smaller scale structures to improve the structural resolution will be included if considered necessary.

The material model for the rock mass will be a strain-softening dilatant material model with a generalised Hoek-Brown yield criterion for the rock mass and structures. This material model is used because it realistically captures the evolution of damage and deformation for rock masses and structures.

Material properties will initially be assigned according to current geotechnical classifications and measurement data using our material property estimation scheme. If available, comparison of the model results to inter-ramp or larger scale failures will be undertaken.

5.5 Noise, vibration and blasting assessment

5.5.1 Existing environment

Existing noise management and monitoring measures are described in the currently approved Noise Management Plan (NMP) prepared under DA 14/98 and EPL 11912. The existing monitoring program includes operator-attended monitoring at locations representative of six privately-owned dwelling locations and two reference locations.

Evolution has entered into noise mitigation agreements with the landowners of several private receivers. Noise mitigation/management agreements have also been discussed with other privately-owned receivers in accordance with the NSW Voluntary Land Acquisition and Mitigation Policy (2018).

5.5.2 Key environmental risks

Noise related to the proposed underground operations, including blasting, ventilation and material haulage and handling, has the potential to increase the overall mine noise and vibration levels.

5.5.3 Assessment methods

The noise, vibration and blasting assessment specialist study will assess impacts across both the SSD and Mod 16 scope. The quantitative desktop assessment will be prepared in accordance with the EPA Noise Policy for Industry (NPfI) and Australian and New Zealand Environment and Conservation Council (ANZECC) blast guidelines, as follows:

- undertake a desktop review of historical noise and blasting compliance reports and any other relevant documents and/or studies such as complaint investigations and independent environmental audits;
- analyse the existing meteorological environment to identify noise enhancing weather conditions;
- establish the existing operating noise level from the site based on previous noise impact assessments;
- develop an operational computer noise model of the proposed surface activities related to underground operations only using Bruel and Kjaer proprietary software, Predictor. The model will include features which affect noise propagation, such as topography, ground types, buildings or other solid structures and meteorological parameters;
- predict noise from the activities associated with the proposed underground operations;
- determine the total operating noise level of the existing and proposed operations and assess against the project consent noise limits and the NPfI;
- where an exceedance of criteria is predicted, recommend feasible and reasonable noise mitigation measures. These measures, including their likely effectiveness, would be initially discussed and agreed with Evolution then incorporated in the noise model;
- predict and assess blast overpressure and ground vibration levels;
- assess the potential for cumulative noise impacts with other industry in the area in accordance with NPfI methods; and
- assess potential road traffic noise impacts on public roads due to any proposed increase in vehicle movements.

5.6 Air quality and greenhouse gas assessment

5.6.1 Existing environment

Air quality management and monitoring at the CGO is conducted in accordance with the currently approved Air Quality Management Plan. The existing CGO air quality monitoring network currently consists of one high volume air sampler, located near the Coniston residence, measuring total suspended particulate (TSP) concentrations. In addition, there are 12 dust deposition gauges in use at the approved CGO.

An analysis of the monitoring data by Pacific Environment Limited (PEL) in 2018 indicates the CGO has been operating in compliance with relevant TSP and dust deposition criteria listed in Condition 6.1(a), Schedule 2 of the CGO Development Consent (DA 14/98).

While some dust deposition gauges recorded annual average dust deposition levels above the relevant criteria, these elevated dust deposition levels are generally considered by PEL to be attributable to local background sources and not the CGO.

5.6.2 Key environmental risks

Key risks associated with air quality and greenhouse gases for the underground development are as follows:

- demonstrating compliance with cumulative impact assessment criteria, accounting for background air quality and existing approved CGO emission sources;
- accurate quantification of all emission sources associated with the project, including diesel combustion, to the requirements of EPA.

It is considered that, following review of predicted air quality pollutant concentrations and baseline conditions presented in the modelling study for the approved Modification 14, the risk for assessment criteria non-compliance at surrounding sensitive receptor locations is low.

Accurate quantification of emission sources will be undertaken using the most recent and applicable emission estimation resources used for approval by the NSW EPA on projects of this nature.

5.6.3 Assessment methods

Based on relevant project experience, we anticipate that the scope of the air quality assessment for the Underground SSD EIS will require the following:

- a quantitative assessment of the potential for air quality impacts of the project in accordance with relevant EPA guidelines;
- an assessment of the likely greenhouse gas emissions from the project; and
- details of proposed mitigation, management and monitoring measures.

The relevant guideline for the air quality assessment will be the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (EPA 2016). The following scope of works will be completed:

- Collate and process all available relevant local and regional air quality and meteorological monitoring data. Monitoring data from the onsite meteorological and air quality monitoring networks at the CGO site will be the primary resources for baseline analysis and modelling inputs.
- Undertake detailed analysis of all collected monitoring data. Identify intra-annual and inter-annual trends, key monitoring statistics, and data gap analysis.
- Establish impact assessment criteria and baseline air quality environment.
- In consultation with the acoustics team, establish the meteorological environment.
- In consultation with the CGO environment team and the acoustics team, develop a sensitive receptor location list for use in the assessments.
- Develop a meteorological dataset suitable for use by an atmospheric dispersion model, using a combination of local and regional monitoring resources and meteorological modelling.

- Calculate air pollution emissions (TSP, PM_{10}, $PM_{2.5}$, metals and metalloids and processing fugitives) for two emission scenarios, at this point expected to be representative of underground workings establishment and maximum underground operations. The emission scenarios will be confirmed with Evolution Mining and would be consistent with the noise modelling scenarios where practicable.

- Undertake atmospheric dispersion modelling and present model predictions of ground level concentrations of all pollutants calculated for the two modelling scenarios quantified.

- Assess cumulative impacts accounting for background air quality and existing CGO operations against applicable assessment criteria and provide analysis of compliance.

- Quantify greenhouse gas emissions from the project. Incorporate greenhouse gas assessment findings into the air quality impact assessment report.

- Provide recommendations for potential additional air quality mitigation measures, as required.

5.7 Social impact assessment

5.7.1 Existing environment

CGO is primarily located in the Bland Shire LGA. The CGO's area of social influence generally extends to the towns of West Wyalong, Forbes and Condobolin.

West Wyalong is located 38km south-west of the mine site and has a population of 3,141 people with a median age of 42 years. West Wyalong is the central hub within the Bland Shire LGA accounting for close to half of the LGA's total population (ABS QuickStats, 2017). West Wyalong reported 83 percent labour force participation with a comparatively low unemployment rate when compared to NSW and Australia. Of the employed people in West Wyalong, 10.9 percent worked in gold ore mining. Other major industries of employment included local government administration 5.9 percent, supermarket and grocery stores 4.4 percent, secondary education 3.0 percent and grain-sheep or grain-beef cattle farming 2.7 percent (ABS QuickStats, 2017).

The town of Forbes is located approximately 75km from the mine site. The population of Forbes is approximately 8,433 with 86 percent born in Australia and a median age of 42. Forbes is the largest town in Forbes Shire LGA and reported 64 percent labour force participation. The main industries of employment for workers in Forbes are health care and assistance, retail trade, agriculture, forestry and fishing, and education and training. Mining accounted for 3 percent of employment (REMPLAN Community Profile, 2016).

Condobolin is approximately 111km travel distance by car from CGO. Condobolin has a population of 3,486 people with a median age of 38. The suburb has a high proportion of Aboriginal and Torres Strait Islander people (22.1 percent) compared to NSW and Australia. Condobolin has a higher unemployment rate than both Forbes and West Wyalong (8.1 percent). Top industries of employment include local government administration, primary education and grain-sheep or grain-beef cattle farming (ABS QuickStats, 2017).

5.7.2 Assessment methods

The scoping phase of the social impact assessment (SIA) for the CGO Underground Development was conducted in accordance with the DPE Social impact assessment guideline for State significant mining, petroleum production and extractive industry development (2017c). This phase has aimed to identify and understand the project's area of social influence and apply scoping methodology to identify potential social impacts with their associated level of assessment required in the EIS.

The two key objectives of the SIA scoping phase were that:

- potentially affected people and the project's area of social influence were adequately identified and understood; community members from the major town centres in the area of influence were invited to a community information session and potentially affected sensitive receivers were interviewed to understand their particular concerns; and

- social impacts needing further investigation in the EIS are identified and assigned a proportionate level of assessment; a list of potential social impacts was presented to key stakeholders and the community with a rating scale indicating level of concern. This included an open-ended question where respondents could raise additional concerns or perceived benefits of the proposed underground development.

The area of social influence for the CGO Underground Development was identified through:

- gaining an understanding of how the mine is currently operating, including where the workforce lives and how they are transported to the mine;

- information gathered for the previously approved Modification 14 and discussion with Evolution Mining's project team;

- prior engagement undertaken by Evolution Mining with Forbes Shire, Lachlan Shire and Bland Shire Councils as well as previous minutes of the longstanding Community Environmental Management Consultative Committee (CEMCC);

- stakeholder identification and issues published in previous Stakeholder360© with social licence measurement reporting conducted by Deloitte (2018); and

- anecdotal experiences shared by the Evolution Mining project team relating to Evolution's historical relationships with the community and issues raised in relation to CGO in previous engagement activities.

Key inputs to this section include:

- primary data gained through targeted community and stakeholder scoping engagement conducted between 3-7 June 2019 – a detailed summary of engagement findings, activities undertaken, how stakeholders were identified and consulted can be found in section 6 of this Scoping Report; and

- desktop review of the community profiles in the identified area of social influence

i Social impacts

The Underground Development has the potential to cause the following social impacts:

- *Increased demand on housing supply and accommodation in the towns of West Wyalong, Forbes and Condobolin due to an increased construction worker population*

  West Wyalong, Forbes and Condobolin are expecting to experience increased pressure on the already limited housing supply in their respective townships as a result of the approximately 160 additional jobs at the mine. Forbes Shire and Bland Shire signalled the need for more housing supply in the area to address the anticipated demand. This supply may occur in the form of land release and fast-tracked residential planning approvals. An increased population is likely to bring social changes to these towns. For example, there is the potential for more construction workers in local pubs and cafes, which has an economic benefit to local business owners but also may lead to anti-social behaviour.

- *Increased demand on community infrastructure and services due to an increase in workforce*

  If the additional workforce were to move into the area with their families there is potential for pressure to be placed on the capacity of local community infrastructure, such as health centres, schools, libraries, community facilities, recreational areas and open space. This was considered to be a moderate level of concern from those consulted in line with the demand for housing.

- *Disturbance caused to sensitive receivers related to construction noise*

  Noise disturbance due to an increase in movements of trucks and construction machinery. Mine vehicle noise could affect sensitive receivers who reside closest to the mine site.

- *Increased traffic on local roads during construction*

  There is potential for increased truck movements on local roads surrounding the CGO site. There would also likely be an increased number of buses transporting workers predominantly to West Wyalong. Increased traffic could affect neighbouring properties and users of local roads. There are currently designated mine-traffic roads and other routes that are reserved for local traffic only.

The impacts listed above were identified by the community members, local council representatives, landowners and the CEMCC. These issues are summarised in Table 5.1 below, and possible mitigation measures are proposed for further consideration in the EIS preparation.

Table 5.1 Potential social impacts

Potential impact	Likely affected parties	Level of community/ stakeholder concern	Possible mitigation	Level of assessment in EIS
Demand on housing supply and accommodation due to population change	Existing and future residents in towns in area of social influence Visitors Councils	High	Consider amending fatigue policy restrictions, work with Council on land release, residential planning approvals	Comprehensive SIA and engagement
Demand on community infrastructure and services due to population change	Local residents of towns in area of social influence Councils	Moderate	Consider addressing in VPA with relevant Councils	Comprehensive SIA and engagement
Noise disturbance	Neighbouring landowners	Low	Investigate mitigations at receiver end	Comprehensive SIA and engagement with neighbouring landowners
Traffic on local roads	Neighbouring properties only	Low	Address in Traffic Management Plan	Address in EIS specialist study

ii Social benefits

The Underground Development will result in continued significant investment into the local economy and the employment of approximately 160 additional employees and contractors at the peak of development. These additional employees would contribute to additional local demand for goods and services in West Wyalong and surrounding townships, with commercial benefits for local retailers and service providers.

iii Mine closure planning

The existing consent for CGO includes provisions for mine closure planning. The proposed Underground Development will generally not change these provisions with the exception of the timeframe originally proposed for closure of the mine and the change in height of the IWL (considered as part of the MOD16 scoping report). As is generally the case with the closure of large resource development projects, there will likely be a reduction in economic benefit where the source of local employment and spending is reduced. The scale of this impact is dependent on the scale of the economic benefit that the project was contributing to the area.

iv Next steps

The next phase of the SIA program will involve:

- a comprehensive baseline social profile on communities in the area of social influence;
- further engagement with landholders, the community and key stakeholders on key social impacts as noted above. This will provide the opportunity for input to the development of appropriate mitigation and enhancement strategies;
- assessment and prediction of social impacts against existing baseline conditions;
- cross-referencing with other technical specialists such as noise, traffic and economic specialists to identify the social considerations of these studies; and
- identification of appropriate management and enhancement measures to address significant social impacts and any residual effects.

5.8 Economic assessment

Evolution Mining is a leading, growth focussed Australian gold company. CGO is a sustainable, reliable and low cost production gold operation. In the 2018/19 financial year, CGO produced over 240,000 ounces of gold and operating mine cash flow was $226 million.

Through local employment and spending, CGO is a significant contributor to the economy of the Riverina. Through royalties and taxation, CGO is also an important contributor to the NSW and Commonwealth economy. Evolution Mining's strong community support includes:

- Partnership with Wiradjuri Condobolin Corporation (WCC);
- Total local procurement spend of approximately $28 million per annum;
- Supporting local charities and sports clubs;
- Approximately 75% of employees are permanent residents; and
- Approximately 6% of employees identify as Indigenous.

5.8.1 Key economic risks

The discontinuation of mining operations at CGO would likely have a deleterious impact on the local economy of West Wyalong, and the broader regional economy of the Riverina region. The Underground Development would allow continuation of ore production and processing, and likely increase local employment and local domestic product.

Because local housing supply is constrained in West Wyalong, there may be pressure on housing costs associated with the Underground Development, due to increases in housing demand from the increased mine staff cohort. There may however be local benefits from increased demand associated with staff increases including local salary inflation and increased demand for local services and supplies.

5.8.2 Assessment methods

EMM has engaged AEC Group to prepare an economic impact assessment to inform the EIS preparation for the Underground Development EIS. The economic and social impact assessments will be closely aligned, to ensure consistency in assessment methodology and outcomes. The economic impact assessment would include a cost benefit analysis (CBA), which would:

- Establish the base case and the define the project;
- Identify incremental costs and benefits;
- Quantify and value the economic costs and benefits of the Project including mining costs and benefits, and environmental costs and benefits (benefit transfer); and
- Develop of a spreadsheet model which considers risk and uncertainty, unquantified impacts, and the distribution of costs and benefits.

The economic impact assessment would also include a local effects analysis (LEA) of direct effects in accordance with the *Guidelines for the economic assessment of mining and coal seam gas proposals* (DP&E, 2015). The LEA would include:

- Development of input-output model of the regional economy;
- Preparation of summary information on the structure of the regional economy;
- Sort and allocate financial data;
- Analysis of the construction and operation regional economic impacts; and
- Consideration of the regional economic effects of cessation of the mine.

5.9 Visual assessment

5.9.1 Existing environment

The area surrounding ML 1535 comprises a number of distinct land use types and landscape units of varying levels of scenic quality, including agricultural areas, Lake Cowal, residential dwellings, a game reserve, Billy's Lookout and the associated ridgeline system, and Wamboyne Mountain.

Most of the local and sub-regional setting has been cleared for grazing and/or cultivation (including land within Lake Cowal itself) and has low to moderate scenic quality. Remnant tree and shrub vegetation occur primarily on rocky elevated ground, areas of impeded drainage, patches of sandy soils, the shoreline of Lake Cowal and road verges.

The most sensitive visual settings in the vicinity of the CGO are rural residences. Only limited views of the existing CGO are available from the viewpoints along the Newell Highway due to intervening topography and roadside vegetation.

Overhead lighting of structures, mobile lighting plants on waste rock emplacement and mobile vehicle mounted lights lead to night-time light emissions.

Rehabilitation of existing CGO landforms has commenced and is progressing in accordance with the Landscape Management Plan and Rehabilitation Management Plan prepared in accordance with DA 14/98. Trees and shrubs have been established in accordance with the requirements of the Bland Shire Council for the maintenance of satisfactory visual amenity from outside ML 1535. The visual appearance of buildings, structures, facilities or works have been designed with the intention of blending with the surrounding landscape.

5.9.2 Key environmental risks

The majority of works associated with the Underground Development would not be visible by neighbours or publicly accessible areas.

5.9.3 Assessment methods

GIS modelling software will be used to prepare a viewshed analysis (using topographical contours, vegetation; operational infrastructure and final landform data) for the current landform.

This analysis will be run on the existing landform, a nominated 'working' landform and the final designed landform for the purpose of assessing the likely visual impact on visual receptors. This will include photomontage images for representative viewpoints. The significance of changes compared to the existing and approved development will be assessed.

5.10 Ecology assessment

5.10.1 Existing environment

The CGO is located in the central north-west of the NSW South Western Slopes Interim Biogeographic Regionalisation for Australia Bioregion. As part of the CGO development a number of biodiversity values were impacted. To offset these impacts, areas of native vegetation were set aside for biodiversity conservation by Evolution Mining as part of the existing CGO (i.e. the Northern Offset Area and Southern Offset Area). Evolution is also in the process of securing an additional four biodiversity offset areas, approved as a component of the Mod 14 approval. Many flora surveys and monitoring programs have been conducted in ML 1535 and the broader Lake Cowal catchment as part of the CGO.

5.10.2 Key environmental risks

As mentioned previously, the overall design intent of the Underground Development proposal is to avoid surface impacts, particularly due to subsidence and changes to the local surface and groundwater regimes.

The project involves underground mining, with minimal surface works outside currently approved footprints. Risks to biodiversity will depend on the location and extent of underground workings, and the level of subsidence that may occur at the surface. Should surface disturbance occur, including impacts to land overlying areas to be mined contain biodiversity values, these will need to be assessed in accordance with the BC Act, FM Act and the Commonwealth EPBC Act.

A key aspect in the early stages of the project will be to inform the EPBC Act referral and determined whether MNES will potentially be impacted by the project.

5.10.3 Assessment methods

It is proposed that a desktop assessment is undertaken and will include the interrogation of databases and relevant legislation and policies, as well as a current literature. The desktop assessment will present the mapping of the findings and provide knowledge gaps and recommendations for further work where relevant.

Consultation with the DoEE and DPIE (Environment and Heritage) would also be carried out as part of the EIS preparation.

Given the minimal predicted level of impact on biodiversity values anticipated with the Underground Extension (assuming subsidence is minimal), a Biodiversity Development Assessment Report (BDAR) waiver request has been prepared to accompany the request for SEARs for the proposal (refer to Appendix B).

The findings of the groundwater, surface water and subsidence assessments will be utilised for the ecology specialist study developed for the preparation of the EIS.

The proposed methodology and preliminary findings of these studies will also be included in the request for SEARs and DoEE referral documentation, to provide confidence to DP&E, OEH and DoEE that surface ecological impacts can be avoided or minimised through underground mine design development.

5.11 Aboriginal and non-Aboriginal heritage assessments

5.11.1 Existing environment

Lake Cowal sits in the Country of the Wiradjuri people. Wiradjuri was the largest language grouping in the area that is now NSW. It is generally accepted that Aboriginal occupation of Australia dates back at least 45,000 years, and the Wiradjuri were likely present in the Lachlan and Lake Cowal area from the beginning of this time.

Evolution Mining has obtained permits and consents under sections 87 and 90 of the NSW *National Parks and Wildlife Act, 1974* (NPW Act) for the management of Aboriginal heritage at the approved CGO. The majority of the previously registered sites within ML 1535 have been the subject of management and mitigation measures, and as such have been managed (i.e. salvaged) in accordance with the CGO permits and consents and the Indigenous Archaeology and Cultural Heritage Management Plan.

The only historic heritage items in the ML 1535 area and surrounds listed as heritage items under the Bland LEP were the Cowal West Homestead and Shearing (Wool) Shed. The approved demolition of the Cowal West Homestead Complex occurred during 2011 to 2012. The relocation and reconstruction of the Shearing Shed at the Lake Cowal Conservation Centre was completed in April 2013.

5.11.2 Key environmental risks

Because the proposal is largely located underground and within the existing approved disturbance area of the mine, the proposed Underground Development is likely to have negligible impact on Aboriginal and non-Aboriginal heritage.

It is noted that, *Cowal West Group comprising homestead, quarters, shed and stables* is listed as a heritage item I11 on the *Bland Local Environmental Plan 2011* which is within the project area boundary (Lot 7 DP 753083). However, despite the listing, the heritage elements to which this listing relates have been removed as part of historical mine development. A number of Aboriginal heritage sites and archaeological relics are also located within the mine site, but they will not be affected by the Underground SSD.

Registered Aboriginal Parties (RAPs) registered under the existing development consent would be notified during the preparation of the EIS and any documentation circulated for their review prior to the public exhibition period.

5.11.3 Methods

The scope of works will include a desktop due diligence assessment comprising:

- a summary of statutory requirements and relevant legislation;
- a register search for listed heritage sites; and
- review of existing works and surveys completed to date.

5.12 Traffic and transport assessment

5.12.1 Existing environment

In the vicinity of the CGO, the Newell Highway (HW17) is a sealed arterial road which links West Wyalong, Forbes and Parkes. Traffic along this highway includes a range of heavy vehicles such as B-doubles and road trains. The Newell Highway is a State Road and is under the management and control of Transport for NSW (Roads).

The approved CGO access route from West Wyalong comprises Ungarie Road, Wamboyne Road, Blow Clear Road and Bonehams Lane. This route was upgraded in 2005 as part of relevant CGO works and is therefore of recent design construction standard and provides a 7 m to 8 m carriageway with 1 m sealed shoulders.

5.12.2 Key environmental risks

The Underground Development has the potential to increase traffic numbers on local roads. The traffic assessment will assess the likely project impacts to road capacity, traffic safety and site access including Austroads intersection design standards and the likely maximum size of vehicles using each intersection.

The traffic and transport assessment will also include consideration of local haulage routes for hazardous materials, in the context of condition 5.4(b)(i) of the existing CGO Development Consent (14/98).

5.12.3 Assessment methods

The study methodology will follow the standard Roads and Maritime Services guidelines for traffic impact assessment incorporating the following:

- site observations and existing road network and traffic generation;
- proposed site access and circulation;
- traffic generation by the project;
- impacts to the road network;
- impacts to intersection operations;
- traffic safety and review of accident history;
- adequacy of the site truck and car parking areas.

A visual inspection of the primary affected main and local roads in the area between the CGO, West Wyalong, Condobolin and Forbes will be undertaken by specialist EMM personnel to confirm their current general road widths and traffic conditions. Photographs will be taken at the key relevant project access intersection locations.

Existing RMS and Council traffic data for the study area road network would be reviewed and used to confirm the current daily and hourly traffic volumes for each route, which would then enable the project access and transport route traffic impacts to be assessed.

The traffic assessment will primarily focus on impacts during the development of the project, including a quantification of any forecast additional operational traffic generated to determine whether any additional impacts would be expected. Based on this understanding, the likely additional site operations daily and peak hourly traffic movements are likely to be minimal.

EMM has engaged Pinnacle Risk Management (Dean Shewring) to advise on appropriate risk management responses to any changes in hazardous material transport associated with the Underground Development proposal. Dean has a long involvement in responding to the requirements of condition 5.4(b)(i) of the existing consent.

6 Community and other stakeholder engagement

6.1 Introduction

Stakeholder engagement and consultation for the CGO Underground Development commenced in May 2019 with the Scoping Meeting held with the then DPE. Stakeholder activities have been led by Evolution Mining with the support of EMM Consulting and Elton Consulting.

6.2 Stakeholder identification

Identified stakeholder groups with an interest in the project include:

- State and Commonwealth government agencies;
- adjacent landowners and lessees of Evolution Mining properties;
- nearby towns and communities including West Wyalong, Condobolin and Forbes;
- Forbes Shire, Bland Shire and Lachlan Shire councils;
- local Aboriginal groups;
- CEMCC;
- environmental groups including the Lake Cowal Foundation Limited;
- recreational users of Lake Cowal in times of inundation;
- local primary producers, irrigators and other users of local borefields;
- the general public; and
- local media.

6.3 Community and other stakeholder engagement

Community and other stakeholder engagement for the Underground Development has been comprehensive to date and reflects the importance Evolution Mining places on engaging with the local community and ensuring it maintains its social licence to operate.

The following consultation tasks were carried out during the Scoping Phase for the CGO Underground Development:

- face to face sessions with neighbouring residents;
- meetings with senior representatives of the local councils were held at:
    - Bland Shire Council on Tuesday 4 June 2019 in West Wyalong;

- Lachlan Shire Council on Tuesday 4 June 2019 in Condobolin;
- Forbes Shire Council on Wednesday 5 June 2019 at Forbes;

- a community information session was held on Wednesday 5 June 2019 at the West Wyalong Services and Citizens Club;
- short intercept surveys of people attending the community information session were conducted by the project teams. Simple questions to gauge key areas of concern relating to potential environmental and social impacts, level of project awareness, and how people would prefer to be engaged throughout SIA and EIS process;
- a presentation to the CEMCC was made at its regular meeting on Wednesday 5 June 2019.

6.4 Feedback received during scoping phase consultation

6.4.1 Community survey

Four local community residents completed the scoping phase survey. The survey recipient's feedback was generally favourable, with two participants stating that Evolution Mining had good lines of communication with the community. One participant stated that '[Evolution Mining] has the best record in Australia and they provide funds for the town'.

Participants were asked to rate a series of impacts by level of concern. The scale was a unidirectional five-point scale, with '1' representing no concern and '5' representing a high level of concern. None of the level of concern scores exceeded 3. The key issues identified in responses were:

- Housing affordability and availability –related to population increases and a greater need for housing.
- Health and wellbeing – with one adjacent landowner identifying air quality and sleep disturbance as concerns they have had with existing operations.

6.4.2 CEMCC meeting

Evolution Mining presented to the CEMCC on Wednesday 5 June 2019 at Forbes Shire Council. The overall sentiment of the CEMCC members was of support of the proposal, particularly in terms of the social and economic benefits of the mine.

The prospect of local population growth was identified as a positive, and one participant stated that it was 'great to have professional people in town' which enhanced diversity and culture. A participant stated that, 'part of Evolution Mining's strength is that they integrate into the community'. One participant stated they did not foresee any noticeable impacts associated with the proposal.

Economic benefits focused on business activity and income growth. One participant stated that the mine would bring more economic growth to the community and increase wages. This was supported by another participant who believed the mine would increase the need for subsidiary businesses in industrial areas.

When asked for feedback on the likely environmental risks for consideration in the EIS preparation, the responses raised can be summarised as follows:

- Noise and blasting – as an underground development, potential noise impacts from the project were not considered a high concern. Vibration and blasting were noted as moderate concerns for some participants.

- Air quality – had the lowest level of concern and participants stated that the company was easily accessible and had a good track record in responding to previous complaints.
- Accommodation – the need for additional housing and the potential impacts on the community of construction worker accommodation located in local towns were identified as moderate risks.
- Traffic – the potential for minor traffic increases on local roads was identified by some participants. The requirement for mine staff to use designated roads was also noted.
- Water – the potential need an extension to water licences was identified as a potential concern for local water users.

6.4.3 Landowner meetings

Evolution Mining attended meetings with neighbouring landowners at their residences. The landowners identified noise, vibration from blasting, visual impacts, air quality, sleep disturbance and light spill as key issues for consideration in the preparation of the EIS.

The landowners commended Evolution Mining for its responsiveness to their concerns during existing operations and stated that they preferred face to face contact for future consultation.

6.4.4 Council meetings

Council meetings were facilitated with three councils impacted by the Underground Development proposal. Feedback was received from Forbes Shire, Bland Shire and Lachlan Shire Councils.

a Forbes Shire Council

Forbes Shire Council was positive about the proposed underground development.

Impacts of the mine on local housing affordability and the availability of accommodation were identified as the key consideration for the EIS preparation. However, it was noted that 300 houses were currently being built in the Forbes LGA which may offset some of the impact.

Council outlined suggestions for consultation activities such as local events, pop up stalls, pop up events and utilising existing organisations in the area.

b Bland Shire Council

Bland Shire Council was positive about the proposed underground development. It was considered good news for the area particularly considering the impact of the current regional drought which was negatively affecting farmers.

One concern raised was that there could be a decrease in local spending when large companies like Evolution Mining are perceived to be putting resources into the town. It was observed that residents may feel they do not need to invest or shop locally if the town is more supported by a large corporation like Evolution Mining.

Subsidence was identified as an environment risk of moderate concern for the EIS preparation by Council.

Housing for additional mine staff (during both construction and operation) was raised as a significant concern. There is currently an undersupply of housing, and Council is looking into fast-tracking housing if necessary. In general, Council would like workers to be integrated into the town, rather than having accommodation 'enclaves'.

c Lachlan Shire Council

Feedback from Lachlan Shire Council was positive. Council enquired about potential impacts to the community including traffic, movement of hazardous materials and housing.

Housing was discussed and Council stated that accommodation availability in the area was historically constrained. Several upcoming developments and subdivisions have recently been approved may increase local housing supply.

6.5 NSW Government agencies

At the Scoping Meeting with the then DPE on 31 May 2019, the Department requested that Evolution Mining consult with relevant government departments during the scoping phase to assist them in the preparation of their SEARs. During the Scoping Phase, Evolution Mining has consulted with the following agencies:

- DPIE (Resources and Geosciences) at CGO on Tuesday 9 July 2019;
- DPIE (Water) via video conference on Thursday 11 July 2019; and
- DPIE (Environment and Heritage) via video conference on Thursday 25 July 2019.

A summary of the outcomes of consultation with NSW Government agencies follows.

6.5.1 DPIE (Resources and Geosciences)

At the DPIE (Resources and Geosciences)/CPDP meeting, Evolution Mining provided a general overview of the Underground Development proposal, provided a technical description of the mine design and general approach, and provided some further background on the mineralogy of the area.

DPIE (Resources and Geosciences) noted that the Resources Regulator should be consulted during the EIS preparation process, and that they would provide the Resources Regulator with an update following this CPDP meeting. It was requested however that Evolution also consult with the Resources Regulator independently of the CPDP process. DPIE (Resources and Geosciences) advised that they appreciated the early involvement in the project and were keen to see the Division continue to have involvement throughout the development of the project.

Following the meeting, the Division of Resources and Geosciences addressed correspondence to Evolution Mining summarising the outcomes of the CPDP meeting and reiterating that they did not have any outstanding issues to address (refer to Appendix C).

6.5.2 DPIE (Water)

At the DPIE (Water) meeting, Evolution Mining provided a general overview of the underground proposal, and a technical description of the mine design and provided an update on the current GRE-46 exploration decline. Evolution Mining also discussed the proposed approval pathway, including SSD and Modification components.

DPIE (Water) and Evolution Mining discussed the likely project water licensing requirements, and Evolution Mining confirmed that at this stage the approval would not be seeking an increase to any extraction limits, only an extension in time for existing permits (up to 5 years).

Coffey (groundwater specialists) provided a summary of the existing CGO groundwater knowledge and current groundwater model. Coffey also described the proposal for the installation of additional monitoring bores to inform the groundwater impact assessment for the SSD EIS (subject to further detailed design and assessment). DPIE (Water) noted that key SEARs considerations would likely include impacts associated with subsidence, potential connectivity with Lake Cowal surface water, the level of detail in the groundwater impact assessment, confirmation

of likely inflows to the underground works, and quantification of any changes to the site water demand and water balance.

6.5.3 DPIE (Environment and Heritage)

At the DPIE (Environment and Heritage) meeting, Evolution Mining provided a general overview of the Underground Development proposal, provided a technical description of the mine design and general approach, and explained its proposed approach to the assessment of biodiversity and Aboriginal heritage.

Evolution Mining explained that it would seek a waiver from the need to prepare a BDAR for the Underground SSD EIS, under the provisions of Part 6 of the *Biodiversity Conservation Act 2016*, given the likely negligible impacts on biodiversity associated with the proposal. The DPIE representatives agreed that the BDAR waiver request was appropriate given the nature of the proposal.

The representatives agreed that the likely negligible impacts on Aboriginal heritage did not necessitate a formal Aboriginal Cultural Heritage Assessment (ACHA) under the guidelines prepared under the *National Parks and Wildlife Act 1974*, and that a due diligence level of assessment was appropriate. It was also agreed that the existing registered Aboriginal parties (RAPs) identified in previous assessments at CGO would be the appropriate Aboriginal representatives to be notified during the preparation of the EIS, and that a new call for registrants was not required.

6.6 Ongoing stakeholder engagement

Evolution Mining is committed to continuing to engage with project stakeholders during the approval process for the CGO Underground Development. Engagement targeted specifically for the CGO Underground Development will comprise several initiatives, as follows:

- two rounds of community consultation sessions to be held in West Wyalong, Condobolin and Forbes:
  - The first round is proposed for Q1 2020 during the preparation of the Underground Development SSD EIS and the Assessment Report for Modification 16; and
  - The second round will be held during the public exhibition period currently targeted for June/July 2020.
- Additional presentations to the CGO CEMCC during the SSD EIS/Modification 16 Assessment Report preparation and public exhibition. DPE will be invited to present to the CEMCC during the EIS/Assessment Report preparation; and
- Aboriginal parties (RAPs) registered as part of the existing development assessment process would be notified as part of the EIS preparation. The proposed consultation strategy would be discussed with the OEH prior to commencement of engagement activities.

In addition to these direct stakeholder and community engagement initiatives project information will also be provided to the local community and targeted stakeholders via the following:

- CGO pages on the Evolution Mining website (https://evolutionmining.com.au/cowal/);
- emails and newsletters to key groups/individuals including registered on the Evolution Mining CGO mailing list;
- updates in the local newspapers and local radio programs;
- displays in the Evolution Mining office in the West Wyalong retail centre (Newell Highway).

7 Conclusion

The purpose of this Scoping Study is to accompany the request for SEARs for the Underground SSD to provide an overview of Evolution Mining's proposal to extend mining operations at the CGO. The document is intended to be read in conjunction with the Scoping Report for the Modification 16 application for the Underground Development proposal.

The Evolution Mining Underground Development proposal seeks to introduce an underground mine using stope mining practices, in addition to the existing open cut mine, to exploit a newly identified ore deposit. This development will extend the mine life to 2036.

This scoping document has been prepared by EMM Consulting Pty Limited (EMM) on behalf of Evolution Mining, the applicant for the CGO Underground Development.

This document outlines the development of the project scope, the proposed assessment pathway, how Evolution Mining intends to undertake the impact assessment, report on the findings of Scoping Phase consultation, and identify the range of consultation proposed as part of the assessment report preparation and public exhibition.

Based on the findings of the scoping assessment, the following key issues will be addressed in the EIS for the underground workings:

- subsidence
- surface and groundwater
- biodiversity
- heritage, including Aboriginal cultural heritage and historic heritage
- noise, vibration and blasting
- geology and geochemistry
- air quality and greenhouse gas assessment
- social, and
- economic.

Other issues or matters that require assessment, but may not require a standalone or detailed technical assessment in the EIS are:

- cumulative impacts, and
- climate change and other risks.

Abbreviations

ABN	Australian Business Number
AHD	Australian height datum
ANZECC	Australian and New Zealand Environment and Conservation Council
BC Act	*Biodiversity Conservation Act 2016* (Commonwealth)
BDAR	Biodiversity Development Assessment Report
CBA	cost benefit analysis
CGO	Cowal Gold Operations
CMP	Cyanide Management Plan
CPDP	Conceptual Project Development Plans
DFN	discrete fracture network
DoEE	Department of Environment and Energy (Commonwealth Government))
DoI	Department of Industry
DP	deposited plan
DP&E	Department of Planning and Environment
DPIE	Department of Planning, Infrastructure and Environment
DUAP	Department of Urban Affairs and Planning (former)
Elton Consulting	Elton Consulting Proprietary Limited
EMM	EMM Consulting Proprietary Limited
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPI	environmental planning instrument
EPL	environment protection licence
ESCMP	Erosion and Sediment Control Management Plan
ETL	electricity transmission line
Evolution Mining	Evolution Mining Limited (the applicant)
FE	finite element
FM Act	*Fisheries Management Act 1994*
ha	hectare
HEC	Hydro Engineering and Consulting Pty Ltd
ICDS	Internal Catchment Drainage System
IPC	Independent Planning Commission
IWL	Integrated Waste Landform
km	kilometres
kV	kilovolt
LEA	local effects analysis
LEP	local environmental plan

m	metre
Mining SEPP	*State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
ML	mining lease
MLA	mining lease application
MNES	matters of national environmental significance
Modification 14	The most recently approved (2018) modification to the original development consent (14/98) for the Cowal Gold Operations.
Moz	million ounces
Mt	million tonnes
Mtpa	million tonnes per annum
NPfI	*Noise Policy for Industry* (EPA, 2017)
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage
POEO Act	*Protection of the Environment Operations Act 1997*
SEARs	Secretary's environmental assessment requirements
SEPP	State environmental planning policy
SIA	social impact assessment
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State significant development
TSF	tailings storage facility
TSP	total suspended particles
PM	particulate matter (10 microns or 2.5 microns in diameter)
MW Act	*Water Management Act 2000*
UCDS	Up-catchment Diversion System

References

Australian Bureau of Statistics (ABS), 2017, *QuickStats*
(Available: *https://www.abs.gov.au/websitedbs/censushome.nsf/home/quickstats*)

Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ), 1990, *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*

Australian and New Zealand Minerals and Energy Council and Mineral Resources Council of Australia, 2000, *Strategic Framework for Mine Closure*

Coffey International Pty Ltd, 2018, *Cowal Gold Operations conceptual groundwater model* (developed as part of DA 14/98 MOD 14)

Deloitte, 2018, *Evolution Mining Stakeholder Perception Survey 2018 (Cowal)*

Department of Planning (DoP), 2011, *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*

Department of Planning and Environment (DP&E), 2015, *Guidelines for the economic assessment of mining and coal seam gas proposals*

- 2017a, draft *Guideline 3 – Scoping an Environmental Impact Statement*
- 2017b, draft *Guideline 6 – Community and Stakeholder Engagement Guideline*
- 2017c*, Social impact assessment guideline For State significant mining, petroleum production and extractive industry development*
- 2018, *Cowal Gold Mine Modification Assessment* (DA 14/98 MOD 14)

Department of Urban Affairs and Planning (DUAP), 1998, *Cowal Gold Development Consent* (DA 14/98)

Department of Environment and Climate Change (DECC), 2008, *Managing Urban Stormwater: Soils and Construction*

- 2009, *Interim Construction Noise Guideline*

Department of Environment Climate Change and Water (DECCW), 2011

Department of Industry, Innovation and Science, 2016, *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure*

Department of Primary Industries (DPI), 2012a, *NSW Aquifer Interference Policy*

- 2012b, *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources*
- 2012c, *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources*

EPA, 2016, *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*

- 2017, *Noise Policy for Industry*
- 2018, *NSW Voluntary Land Acquisition and Mitigation Policy* (2nd edition)

Office of Environment and Heritage (OEH), 2010, *Aboriginal Cultural Heritage Consultation Requirements for Proponents*

- 2012, *The land and soil capability assessment scheme: second approximation,* 2nd Edition
- 2017, *The Biodiversity Assessment Method*

REMPLAN, 2016, *Community Profile* (Available: *https://www.remplan.com.au/community/*)

Roads and Maritime Services (RMS), 2002, *Guide to Traffic Generating Developments*

- 2004, *Road Classification Review Information Paper and Invitation of Submissions*

Appendix A

Protected matters tool search results

Australian Government
Department of the Environment and Energy

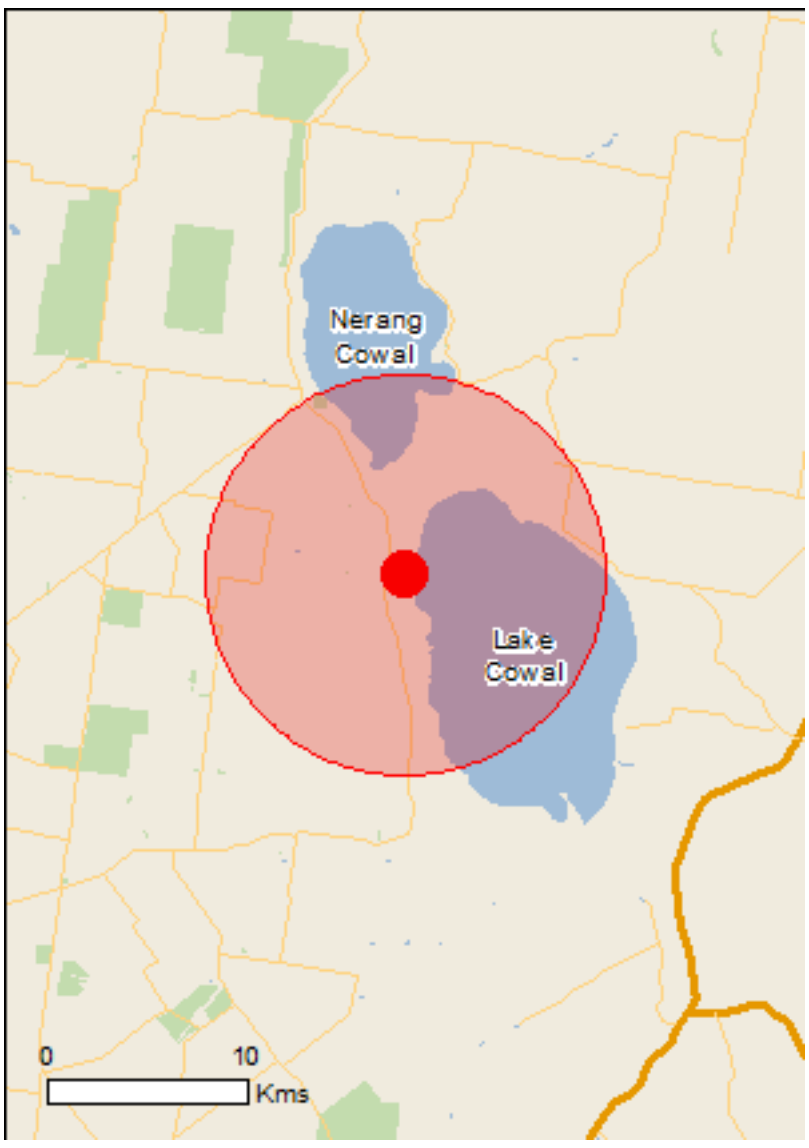
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

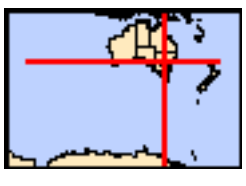
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 18/06/19 16:35:38



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	21
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	600 - 700km upstream
Hattah-kulkyne lakes	400 - 500km upstream
Riverland	500 - 600km upstream
The coorong, and lakes alexandrina and albert wetland	700 - 800km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica baueri		
Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri		
Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Polytelis swainsonii](#) Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
[Rostratula australis](#) Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
[Macquaria australasica](#) Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Mammals		
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
[Nyctophilus corbeni](#) Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to occur within area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
[Austrostipa metatoris](#) [66704]	Vulnerable	Species or species habitat may occur within area
[Austrostipa wakoolica](#) [66623]	Endangered	Species or species habitat likely to occur within area
[Swainsona murrayana](#) Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
[Tylophora linearis](#) [55231]	Endangered	Species or species habitat may occur within area
Reptiles		
[Aprasia parapulchella](#) Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat may occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Lake Cowal/Wilbertroy Wetlands	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.59598 147.39633

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix B

BDAR waiver request

19 June 2019

Philippa Duncan
Department of Planning, Industry and Environment
320 Pitt Street
Sydney NSW 2001

Re: Biodiversity Development Assessment Report Waiver
Cowal Gold Operations Underground Development

Dear Ms Duncan,

This letter is to support the Scoping Report for the Underground Development (the application) at the Cowal Gold Operations (the site), located approximately 38 kilometres north-east of West Wyalong in New South Wales (NSW) (Figure A.1 and Figure A.2). The currently approved development consent (DA 14/98) authorises an ore processing rate of 9.8 million tonnes per annum (Mtpa) until 2032.

It is requested that the Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development (SSD) application waive the requirement for the preparation of a Biodiversity Development Assessment Report (BDAR) under the *Biodiversity Assessment Method* set out under the NSW *Biodiversity Conservation Act 2016*. As detailed below, the site has minimal biodiversity values and it is considered that a BDAR is not warranted for the proposed underground development at this site.

EMM has prepared a BDAR waiver request for the application in accordance with the NSW Office of Environment and Heritage (OEH) *BDAR waiver determinations for SSD and SSI applications fact sheet*, as detailed in Table 1 and Table 2 below. The waiver request has been prepared by a qualified ecologist on behalf of the applicant, Evolution Mining (Cowal) Pty Limited. The waiver request would be subject to the findings of the subsidence and groundwater impact assessments to be prepared to inform the Environmental Impact Statement, due for finalisation in Q1 2020. At this stage of project development, it is assumed that there will be no indirect impacts to surface terrestrial ecology values from groundwater drawdown.

We request that the NSW Department of Planning, Industry and Environment consider waiving the BDAR requirement for the application and would be happy to discuss any questions in relation to this site.

Yours sincerely,

Ryl Parker
Ecologist

Dr Steven Ward
Associate Ecologist

Table 1 BDAR waiver request information requirements

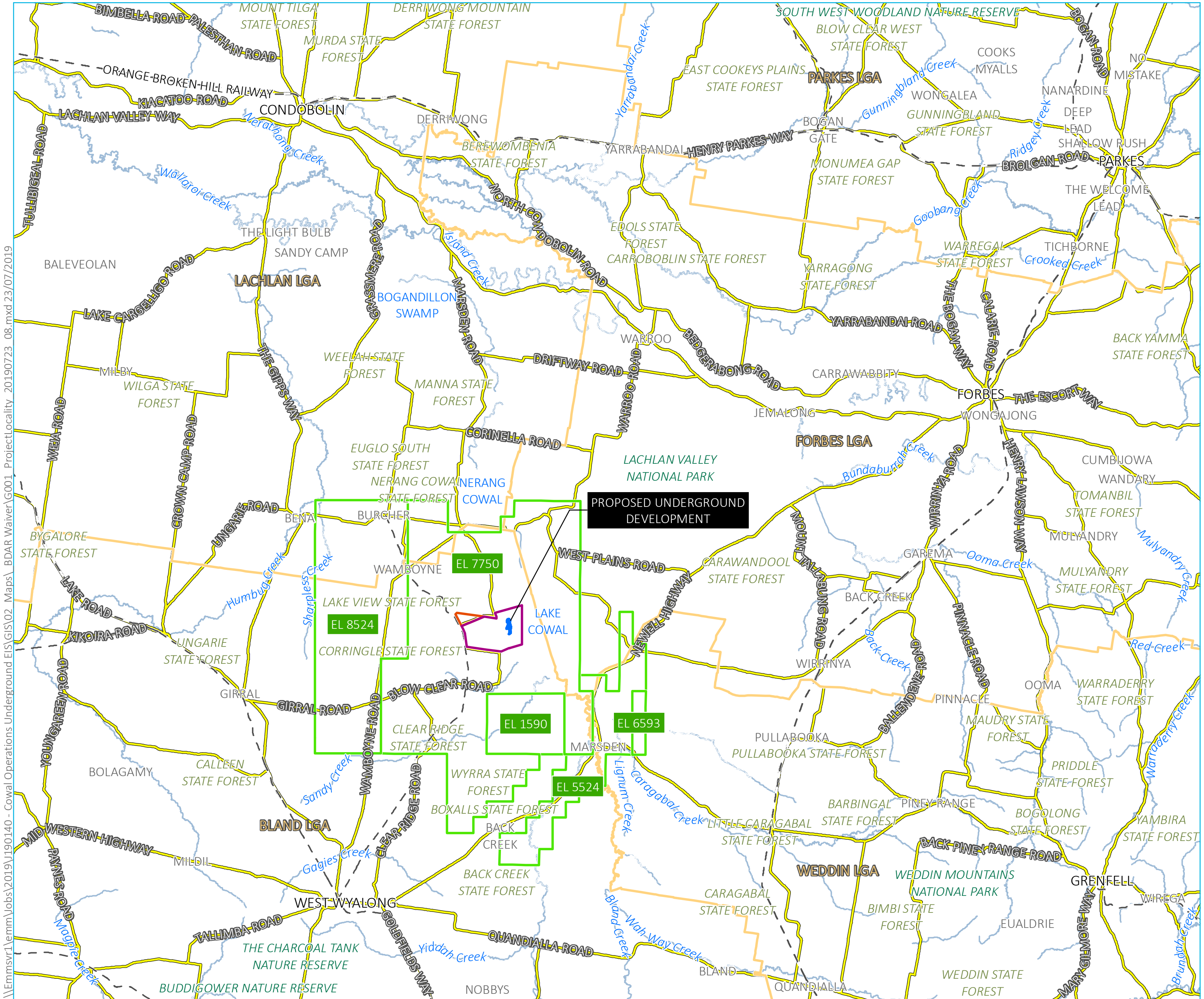
ADMIN	**1. Proponent name and contact details** • Evolution Mining (Cowal) Pty Limited • Contact Details – Name: Danielle Wallace, Daytime phone: 02 6975 4759, Mobile: 0437 426 184, Email: Danielle.Wallace@evolutionmining.com.au **2. Project ID** • Cowal Gold Operations, Lake Cowal Road, Lake Cowal, NSW 2671. **3. Name / ecological qualifications of person completing TABLE 2** • Ryl Parker – Ecologist. Preparation of report. • Dr Steven Ward – Associate Ecologist, Accredited Assessor (BAAS17062). Quality review.
SITE DETAILS	**1. Street address, Lot and DP, local government area** • Lake Cowal, LGA - Bland Shire Council • Lot 2/DP 530299, Lot 7303/DP 1143731, Lot 23/DP753097, Lot 24/DP753094 **2. Description of existing development site** The site consists an existing operational open cut mine with associated infrastructure. The proposal is for the development of an underground mine adjacent to, and accessed from the existing open cut. The open cut mine is situated on the edge of Lake Cowal. Images of the site currently can be found in Appendix B. **3. Location map showing the development site in the context of surrounding areas and landscape features.** **Satellite image of site in context of adjoining sites.** See Appendix A. Note that all proposed works will occur underground and impacts to the surface will be negligible. Changes to ore processing, waste rock emplacement and tailings storage will be addressed under Modification 16 to the existing consent (DA 14/98). None of the surface works will incur ecological impacts as they will occur within the existing approved mine disturbance area. **4. Site Map** See Appendix A.
PROPOSED DEVELOPMENT	**1. Project description and proposed site plan** The proposed development will have no surface impacts and negligible subsidence impacts (See Appendix A). Evolution recently obtained approval for development of an exploration decline (GRE46 exploration decline) in order to further explore an identified underground orebody immediately adjacent to the existing open pit mine. While the development is not yet complete – on the basis of drilling results obtained to date – Evolution is now considering development of an underground mining operation. Drilling works are continuing associated with the underground resource, and hence the mine design is still subject to further detailed design. During the preliminary scoping meeting with the then NSW Department of Planning and Environment on 31 May 2019, it was agreed to split the assessment into two separate assessments: one for the SSD application (underground) and one for the Modification 16 application (surface changes associated with the underground development). This document covers the SSD application. Hence this report only covers underground works, and consequently there will be no direct surface impacts. The proposed SSD development would encompass: • An underground mining operation beneath Lake Cowal via underground stope mining methods, wholly contained within existing Mining Lease 1535. • Extension of the life of mine beyond 2032 to 2037. • Development of an underground mining fleet and associated workforce. • No surface disturbance and negligible subsidence impact.
IMPACTS ON BIODIVERSITY VALUES	See Table 2.

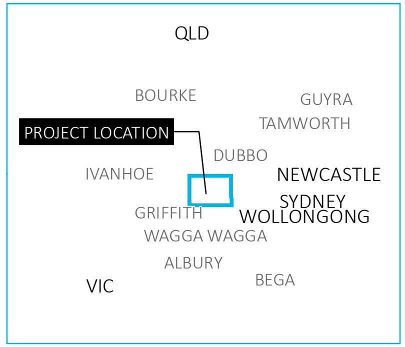
Table 2 Impacts of the proposed development on biodiversity values

Biodiversity value	Meaning	Relevant (✓or NA)	Explain and document potential impacts including additional impacts prescribed under the BC Regulation Attach additional supporting documentation where appropriate
Vegetation abundance - 1.4(b) BC Regulation	Occurrence and abundance of vegetation at a particular site	✓	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. The groundwater in the region is hydraulically separate from the ephemeral waters of Lake Cowal. Subject to the findings of the groundwater and surface water assessments, it is understood that the proposed underground development would not impact the Lake. Treatment of extracted material is covered under other approvals. Accordingly, the proposed development will not impact on or interfere with vegetation abundance.
Vegetation integrity 1.5(2)(a) BC Act	Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state	✓	As per the response to vegetation abundance, the proposed development will have no surface impacts. Accordingly, the proposed development will not impact on or interfere with vegetation integrity.
Habitat suitability 1.5(2)(b) BC Act	Degree to which the habitat needs of threatened species are present at a particular site	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on or interfere with habitat suitability.
Threatened species abundance 1.4(a) BC Regulation	Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on or interfere with threatened species abundance.
Habitat connectivity 1.4(c) BC Regulation	Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on or interfere with habitat connectivity.
Threatened species movement 1.4(d) BC Regulation	Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on or interfere with threatened species movement.
Flight path integrity 1.4(e) BC Regulation	Degree to which the flight paths of protected animals over a particular site are free from interference	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on or interfere with the flight path integrity of protected animals over the site.
Water sustainability 1.4(f) BC Regulation	Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site.	**NA**	The proposed development will have negligible surface impacts outside of the approved mine disturbance area. Accordingly, the proposed development will not impact on water sustainability.

Appendix A

Location map and mine layout





KEY

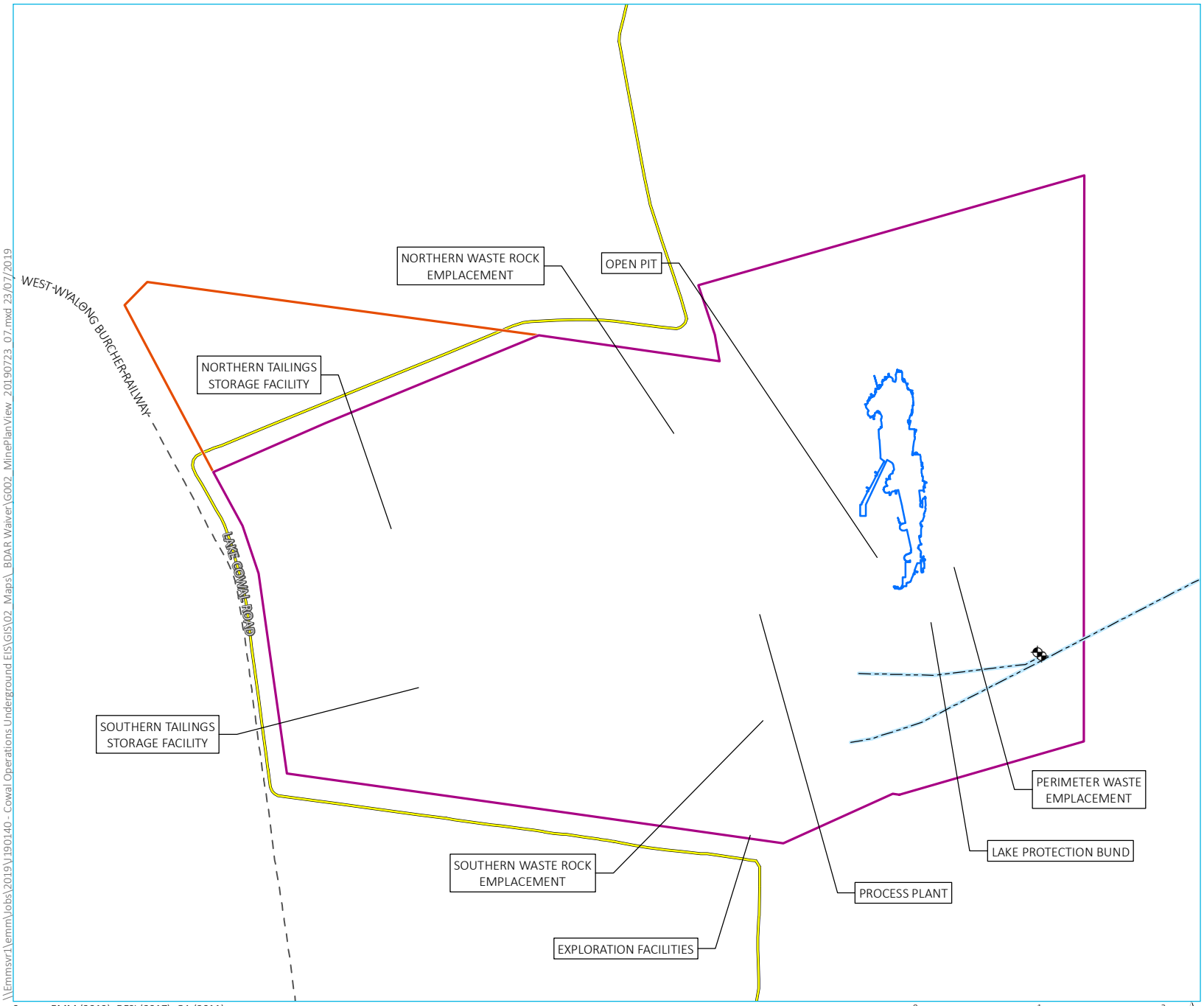
- Mining Lease (ML1535)
- Mining Lease (ML1791)
- Proposed underground development
- Exploration Licence (EL)
- Rail line
- Main road
- Named watercourse
- Waterbody
- Local government area
- NPWS reserve
- State forest

Locality Map

Evolution Mining
Cowal Gold Operations
BDAR waiver
Figure A.1

[redacted]

\\Emmsvr1\emm\Jobs\2019\J190140 - Cowal Operations Underground EIS\GIS\02_Maps\BDAR Waiver\G001_ProjectLocality_20190723_08.mxd 23/07/2019



\\Emmsvr1\emm\Jobs\2019\J190140 - Cowal Operations Underground EIS\GIS\02_Maps_BDAR Waiver\G002_MinePlanView_20190723_07.mxd 23/07/2019

Mine layout

Evolution Mining
Cowal Gold Operations
BDAR waiver
Figure A.2

[redacted]

Appendix B

Current site image

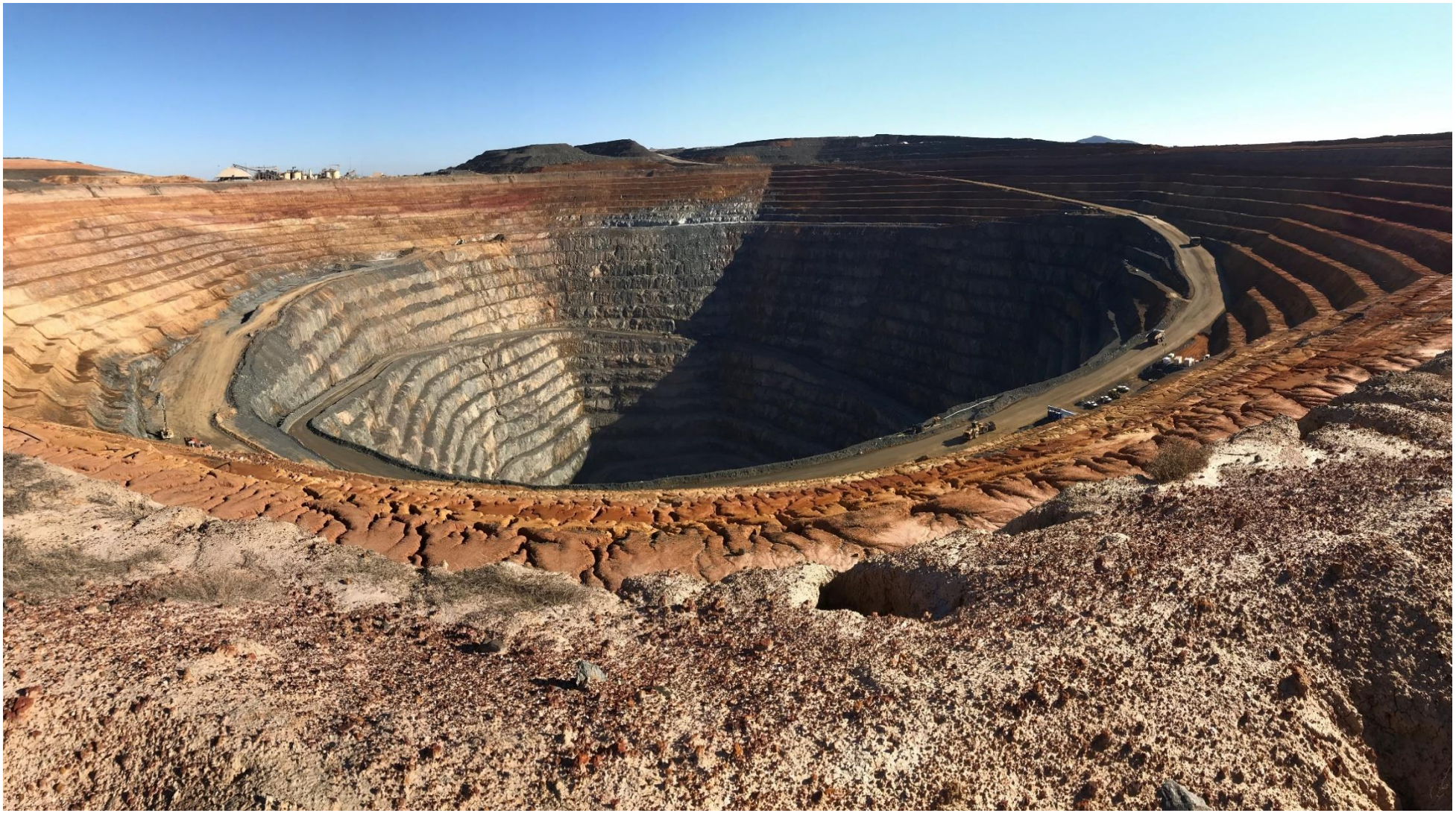


Figure B.1 Photo taken of the open pit mine above the area where the underground portal entries would be developed

Appendix C

CPDP correspondence

DOC19/638092

Danielle Wallace
Superintendent Environment & Social Responsibility
Cowal Operations - Evolution Mining
Lake Cowal Road
Lake Cowal NSW 2671

Email: danielle.wallace@evolutionmining.com.au

Dear Danielle

Cowal Operations Underground Project - Conceptual Project Development Plan Presentation

Thank you for the presentation of the Conceptual Project Development Plan (CPDP) to the Division of Resources & Geoscience (the Division) technical officers on 9 July 2019.

The CPDP process gives the proponent the opportunity to discuss all aspects of the project with the Division before commencing the development assessment process. This step assists in streamlining the assessment process for a new project allowing for early engagement with the Division. The CPDP provides the proponent with the opportunity to demonstrate that the proposal is a responsible and sustainable mining development while drawing out any matters that may require attention during the approval pathway with regard to resource utilisation, mine design and rehabilitation.

The CPDP meeting did not highlight any significant issues which the Division consider could not be appropriately managed.

The Division considers the deposit is a significant resource which will continue to bring economic benefits to the State and region. At this early stage, the Division considers the project to be a responsible utilisation of the State's valuable resources, however will conduct a comprehensive Resource & Economic Assessment during the development assessment process.

Please note that the Division requires the proponent to consider the '*Indicative Secretary's Environmental Assessment Requirements – For state significant mining developments (October 2015)'* (Indicative SEARs) in preparation of the Environmental Impact Statement. In addition to the indicative SEARs, the Division may recommend additional project-specific SEARs to ensure the EIS is appropriately targeted to enable adequate assessment of the project.

Indicative SEARs are available at http://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/~/media/6A2B386AFC324ECA9B4FFD0BC5D3AF20.ashx

For further enquiries regarding this matter please contact the Assessment Coordination Unit on 02 4063 6534 or assessment.coordination@planning.nsw.gov.au.

Yours sincerely

Mr Adam W. Banister
Senior Advisor - Assessment Coordination Unit
Resource Operations
Division of Resources & Geoscience
26 July 2019