



**Evolution**  
MINING

## EXECUTIVE SUMMARY

### COWAL GOLD OPERATIONS MINE LIFE MODIFICATION

Environmental Assessment  
2016

## TABLE OF CONTENTS

ES1	BACKGROUND	ES-1
	ES1.1 MODIFICATION OVERVIEW	ES-1
	ES1.2 MODIFICATION BENEFITS	ES-1
	ES1.3 CONSULTATION	ES-1
ES2	ENVIRONMENTAL ASSESSMENT	ES-4
	ES2.1 GROUNDWATER	ES-4
	ES2.2 SURFACE WATER	ES-5
	ES2.3 NOISE AND BLASTING	ES-5
	ES2.4 AIR QUALITY	ES-5
	ES2.5 OTHER ENVIRONMENTAL ASPECTS	ES-7
ES3	REHABILITATION	ES-7

### LIST OF FIGURES

Figure ES-1	Regional Location
Figure ES-2	Modification General Arrangement

### LIST OF PLATES

Plate ES-1	Cowal Gold Operations Lake-fill Conditions
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## ES1 BACKGROUND

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

The location of the CGO is shown on Figure ES-1. The area of land to which the CGO's Development Consent (DA 14/98) is relevant includes Mining Lease (ML) 1535 and the CGO's water supply pipeline and Bland Creek Palaeochannel Borefield.

In addition, Evolution 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.

ML 1535 encompasses approximately 2,650 hectares. It is bordered by Evolution's Exploration Licence (EL) 7750 and is north-west of Evolution's EL 1590 (Figure ES-1).

Open pit mining operations at the CGO are supported by on-site facilities including water management infrastructure/storages, a process plant and tailings storage facilities. Mined waste rock from the open pit is hauled to waste rock emplacements. Ore mined from the open pit is hauled directly to the primary crusher (adjacent to the process plant), run-of-mine pads or low grade ore stockpiles prior to processing. Mineralised material is also separately stockpiled for potential future processing.

Gold is extracted from the ore using a conventional carbon-in-leach cyanide leaching circuit in the process plant. Tailings are pumped from the process plant via a pipeline to the tailings storage facilities. The gold product is recovered and poured as gold bars or doré.

Evolution is a major local and regional employer and the economic activity associated with the CGO has significant flow-on benefits to West Wyalong and the surrounding region.

### ES1.1 MODIFICATION OVERVIEW

Evolution exploration has identified additional gold resources within the E42 ore deposit located at depths greater than the currently approved final depth of the existing open pit (Figure ES-2).

The Cowal Gold Operations Mine Life Modification (the Modification) involves continued operations at the existing CGO within ML 1535 for an additional 8 years to allow an additional 1.7 million ounces (Moz) of gold production (i.e. a total of approximately 5.5 Moz over the life of the modified CGO).

Existing CGO infrastructure would continue to be used for the Modification, with some alterations where necessary, including modification of the existing tailings storage facilities to maximise/increase tailings storage capacity (Figure ES-2) and upgrades to the existing leach circuit within the process plant.

The proposed changes to the tailings storage facilities include connection of the existing two tailings storage facilities to utilise the area in between for additional tailings storage. The existing tailings management and seepage control measures would be replicated for this additional tailings storage area.

### ES1.2 MODIFICATION BENEFITS

The Modification would facilitate the continuity of employment for the existing CGO workforce (average of approximately 385 people, peak of approximately 435 people) for an additional 8 years, providing job security for employees and contractors, and would continue to stimulate demand in the local and regional economy.

The Modification would include the implementation of mitigation measures, and management (including performance monitoring), to minimise potential environmental impacts.

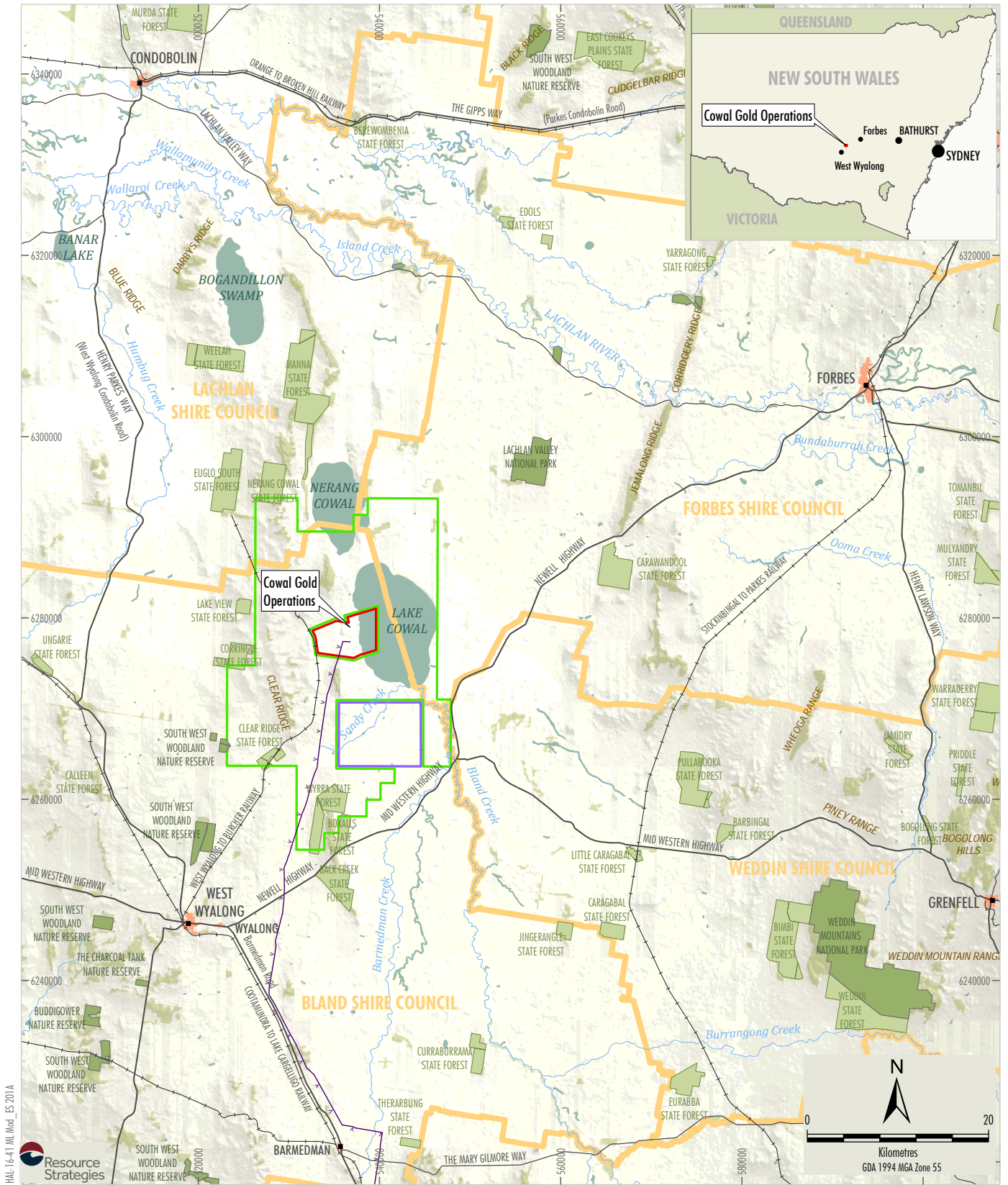
The Modification would result in additional contributions to regional and NSW output and business turnover and household income for an additional 8 years; as well as significant additional contributions to State royalties, State taxes, Commonwealth tax revenue and applicable contributions to local councils

### ES1.3 CONSULTATION

Consultation has been conducted with key state government agencies, local councils and the local community.

Consultation will continue during the assessment phase of the Modification.





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**LEGEND**

- Mining Lease Boundary (ML 1535)
- Exploration Licence (EL 1590)
- Exploration Licence (EL 7750)
- National Park & Nature Reserve
- State Forest
- Local Government Area Boundary
- Electricity Transmission Line
- Railway

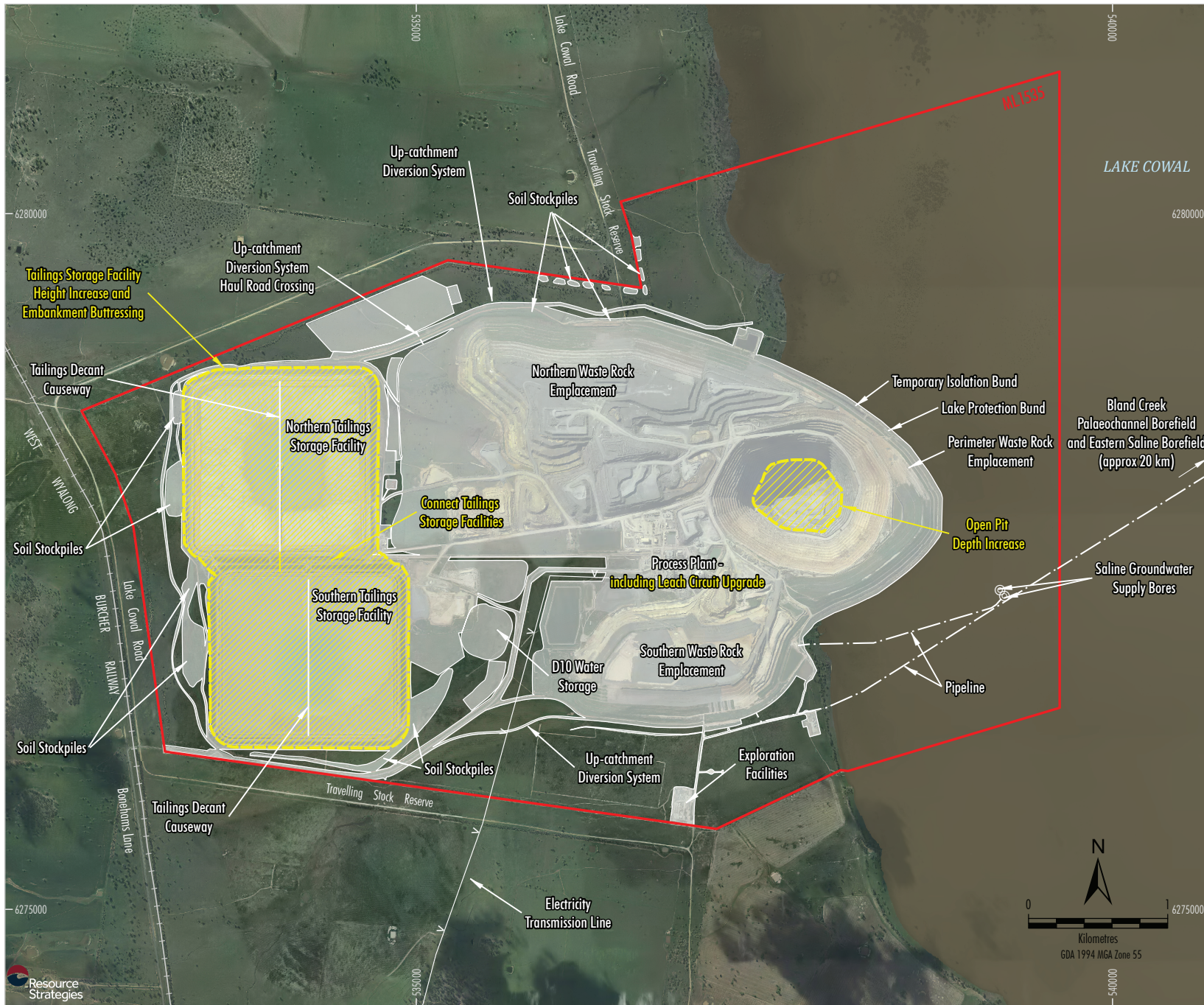
Source: Geoscience Australia (2006); NSW Department of Industry (2016)



**CGO MINE LIFE MODIFICATION  
Regional Location**

**Figure ES-1**





- LEGEND**
- Mining Lease Boundary (ML 1535)
  - Approximate Extent of Approved Surface Development
  - Modification Components

Source: Evolution - Orthophoto (August 2016)



**CGO MINE LIFE MODIFICATION**  
**Modification General Arrangement**

**Figure ES-2**

## ES2 ENVIRONMENTAL ASSESSMENT

A number of environmental studies were completed to assess potential environmental impacts associated with the Modification.

Environmental monitoring, mitigation and management at the CGO is currently conducted in accordance with the conditions of Development Consent (DA 14/98), Environment Protection Licence 11912 and ML 1535.

The environmental studies completed for the Modification indicate that existing monitoring, mitigation and management measures could continue to be implemented to minimise the potential impacts of the CGO on existing environmental values and the nearest private dwellings.

### ES2.1 GROUNDWATER

A Hydrogeological Assessment for the Modification was conducted by Coffey Services Australia Pty Ltd.

#### *Open Pit Mining*

The key findings of the Hydrogeological Assessment relevant to potential impacts associated with continued mining operations at the CGO are as follows:

- Groundwater inflow to the open pit did not increase during the 2012 and the recent 2016 lake-fill events, which supports the predictions of previous assessments that Lake Cowal is hydraulically separated from the underlying aquifers and the CGO open pit.
- No significant change in groundwater inflow to the open pit is expected due to the Modification.
- Groundwater drawdown due to open pit mining and extraction from the ML 1535 groundwater supply bores would generally be confined to the saline aquifers within ML 1535.
- The open pit would continue to act as a groundwater sink.
- Other than Evolution, there are no known users of the saline aquifers surrounding ML 1535.

Based on the above, negligible incremental impacts to Lake Cowal and other groundwater users were predicted due to open pit mining for the Modification.

Groundwater from the Bland Creek Palaeochannel (Figure ES-2) would continue to be supplied to the CGO for the Modification.

#### *External Groundwater Supply*

Groundwater levels in the Bland Creek Palaeochannel would continue to be managed in accordance with the existing Groundwater Contingency Strategy (developed in consultation with the NSW Office of Water and other groundwater users) to minimise impacts of groundwater supply on other groundwater users.

To date, water level monitoring in the Bland Creek Palaeochannel has determined when Evolution has periodically ceased supply from the Bland Creek Palaeochannel and commenced supply from alternative internal or other external water supplies (e.g. from the Lachlan River).

The Hydrogeological Assessment predicted that Evolution could continue groundwater supply from the Bland Creek Palaeochannel Borefield and Eastern Saline Borefield in accordance with the existing Groundwater Contingency Strategy for the Modification.

Therefore, no additional impacts to other groundwater users were predicted due to the continued use of the Bland Creek Palaeochannel Borefield and Eastern Saline Borefield.

#### *Licensed Groundwater Extraction*

Evolution holds appropriate water access licences to account for groundwater inflow to the open pit.

No new Water Access Licences would be required for groundwater inflow to the open pit from the alluvial aquifers or the fractured rock system, the ML 1535 saline groundwater supply bores or the Eastern Saline Borefield.

There would be no change to the existing daily or annual extraction limits from the Bland Creek Palaeochannel Borefield for the Modification, and no new Water Access Licenses would be required.



## ES2.2 SURFACE WATER

A Hydrological Assessment for the Modification was conducted by Hydro Engineering & Consulting Pty Ltd.

The key findings of the Hydrological Assessment are as follows:

- The extension to the CGO open pit would not change the existing lake isolation system (Plate ES-1) that currently separates the CGO open pit from Lake Cowal.
- The Modification would not change the design objectives of the Internal Catchment Drainage System (ICDS) and Up-Catchment Diversion System (UCDS) as described below:
  - The UCDS (Plate ES-1) would continue to divert up-catchment runoff around the CGO.
  - The ICDS would continue to control runoff from active mining areas.
- Water balance modelling concluded that no spills from contained water storages in ML 1535 are predicted.
- No causal link between the existing operations at the CGO and water quality in Lake Cowal has been identified, and negligible impacts to surface water quality are predicted due to the Modification.
- Negligible additional impacts to the catchment and hydrology of Lake Cowal are predicted due to the Modification.
- It is expected there would be continued reliable supply of water available from the Lachlan River trading market.
- Consistent with the approved CGO, the final void water level would stabilise well below the spill level, and water captured in the final void would become hypersaline (consistent with predicted long-term final void behavior for the existing CGO).

The Site Water Management Plan, Surface Water, Groundwater, Meteorological and Biological Monitoring Programme and Erosion and Sediment Control Management Plan would be updated to incorporate the Modification.

## ES2.3 NOISE AND BLASTING

A Noise and Blasting Assessment was prepared by Renzo Tonin & Associates.

## Noise

The Modification would require additional mobile plant items (particularly haul trucks) due to the proposed deeper open pit. Accordingly, a minor increase in noise levels at privately-owned dwellings is expected due to the Modification.

In summary, predictive noise modelling indicated:

- eight privately-owned receivers would be within the Modification Noise Management Zone (i.e. 1 to 5 A-weighted decibels [dBA] above the project-specific noise limit); and
- two privately-owned receivers would be within the Modification Noise Affection Zone (i.e. greater than 5 dBA above the project specific noise limit).

By comparison, for the approved CGO there are:

- five privately-owned receivers within the Modification Noise Management Zone; and
- three privately-owned receivers within the Modification Noise Affection Zone<sup>1</sup>.

Evolution would continue to implement the noise management measures and monitoring programme detailed in the Noise Management Plan.

In accordance with the NSW *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* and Development Consent (DA 14/98) conditions, receivers within the moderate Noise Management Zone would be offered mitigation measures at the dwelling (e.g. mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity).

## Blasting

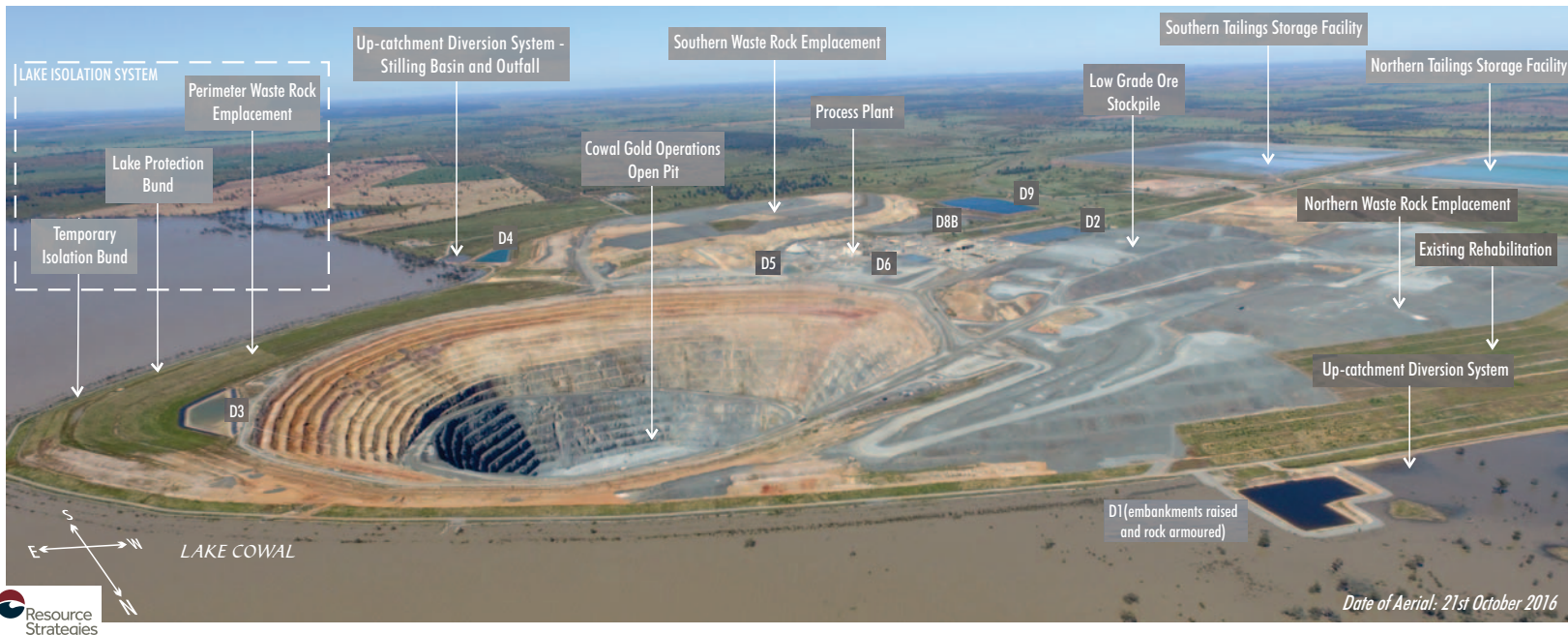
It was predicted that the CGO could continue to operate in compliance with relevant blast overpressure and vibration criteria at all privately-owned dwellings for the Modification.

## ES2.4 AIR QUALITY

An Air Quality Impact Assessment was prepared by Pacific Environment Limited.

No exceedances of the relevant air quality criteria were predicted at any privately-owned receiver.

<sup>1</sup> Note that one of these receivers was recently acquired by Evolution.



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CGO MINE LIFE MODIFICATION

Cowal Gold Operations  
Lake-fill Conditions

Plate ES-1



Existing mitigation, management and monitoring measures described in the Air Quality Management Plan would continue for the Modification.

## ES2.5 OTHER ENVIRONMENTAL ASPECTS

With regard to other relevant environment aspects, it was predicted:

- The Modification would require a small number of additional delivery trucks during primary ore processing campaigns, however, peak deliveries during oxide processing would not change. Therefore, no additional impacts to the surrounding road network are expected.
- The Modification would not change potential impact mechanisms to the public or to public property, to the extent that previously identified hazard or risk levels for the CGO would increase.
- There would be no increase in existing/approved surface disturbance areas at the CGO, therefore, there would be no change to biodiversity impacts, Aboriginal heritage impacts or non-Aboriginal heritage impacts associated with the Modification.

## ES3 REHABILITATION

A Rehabilitation Proposal has been prepared for the Modification to provide a description of rehabilitation principles, objectives, concepts and methods that would be used to guide rehabilitation for the Modification.

The Rehabilitation Proposal for the Modification retains the approved final landform design concepts for the CGO and the overarching rehabilitation principles and objectives.

Rehabilitation would continue to be progressive (Plate ES-1) and include revegetating final landforms with native and/or endemic species characteristic of remnant vegetation within the surrounding landscape which are suited to the physiographic and hydrological features of the CGO's final landforms. The Rehabilitation Proposal presented would continue to be provisional to allow for the consideration of results from future rehabilitation investigations, trials and rehabilitation monitoring (consistent with current practice).

The CGO's approved Long-term Land Use Strategy would remain unchanged and would be applied to the modified landforms which would result from the Modification (i.e. the modified tailings storage facilities and modified final void). The Long-term Land Use Strategy for the CGO post-mining would continue to include fenced elevated landforms with grazing excluded and areas suitable for agricultural production.

The approved rehabilitation strategies and objectives for the tailings storage facilities would remain unchanged for the Modification and would be applied to the revised design for the tailings storage facility final embankments. Similarly, the approved rehabilitation concepts for the final void would also remain unchanged.

The rehabilitation management measures and rehabilitation monitoring programme detailed in the CGO's Rehabilitation Management Plan (RMP) would continue to be implemented for the Modification and the RMP revised where necessary to reflect the rehabilitation concepts for the Modification.