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5 REHABILITATION AND LANDSCAPE MANAGEMENT STRATEGY

This section outlines the Rehabilitation and Landscape Management Strategy for the CGM incorporating the Modification. This strategy presents the overall rehabilitation philosophy, principles and objectives and describes the conceptual rehabilitation domains, long-term land use strategy, conceptual post-mining landform and final landform and revegetation concepts. An overview of the status of rehabilitation at the approved CGM and a summary of the key findings from the CGM’s rehabilitation investigations and trials is provided in Section 5.2.

A Rehabilitation Proposal (Appendix I) has been prepared for this EA which provides a detailed description of how the CGM incorporating the Modification would be rehabilitated. Appendix I also describes in detail the results of rehabilitation investigations and trials undertaken at the CGM to date and how these findings would be incorporated into the rehabilitation programme.

Dr David Freudenberger (an expert in landscape restoration, ecosystem management and wildlife ecology with the Australian National University and former scientist with Commonwealth Scientific and Industrial Research Organisation’s Wildlife and Ecology division) has peer reviewed the Rehabilitation Proposal and concluded that the Proposal:

*is a highly professional and scientifically sound plan...Implementation of this plan will likely lead to ecologically successful minesite rehabilitation and mine closure.*

Dr Freudenberger’s peer review paper is included in Attachment 3.

The DRE’s MREMP facilitates a flexible response to changing circumstances and is designed to accommodate the development and refinement of final rehabilitation plans (NSW Department of Primary Industries-Mineral Resources [DPI-MR], 2006).

Accordingly, the Rehabilitation and Landscape Management Strategy presented would continue to be provisional to allow for the consideration of results from future rehabilitation investigations and trials (Section 5.6) and rehabilitation monitoring (Section 5.7) in consultation with regulatory authorities (consistent with current practice). The MOP would continue to be periodically reviewed and updated over the life of the mine to incorporate proposed rehabilitation concepts for approval prior to implementation.

5.1 REHABILITATION PRINCIPLES AND OBJECTIVES

The approved CGM rehabilitation philosophy is to operate as a non-intrusive land user and to create stable rehabilitated landforms that increase the areas of endemic vegetation in the mine area and the status of land-lake habitats (Barrick, 2009).

This philosophy would remain unchanged for the Modification and has led to the rehabilitation principles and objectives as described in Sections 5.1.1 and 5.1.2.

5.1.1 Rehabilitation Principles

The rehabilitation programme would include the following general principles:

- The rehabilitation of landforms is to be progressive and conducted in accordance with approved, verified plans.
- Final landforms are to be stable in the long-term and include native and/or endemic vegetation characteristic of remnant vegetation within the surrounding landscape.
- Endemic groundcover, understory, tree seeds and seedlings are to be cultivated and used in the rehabilitation programme.
- Rehabilitation concepts are to be flexible to allow for adjustments, based on investigations, to improve the programme.
- The annual rehabilitation programme and budget is to be prepared by a site team incorporating senior management representatives.

5.1.2 Rehabilitation Objectives

The rehabilitation objectives for the Modification would include:

- The water quality of Lake Cowal is not detrimentally affected by the new landforms.
- Revegetating the new landforms with selected native and/or endemic vegetation that is suited to the physiographic and hydrological features of each landform, and which expand on the areas of remnant endemic vegetation in the surrounding landscape.
• Designing final landforms so that they are stable and include revegetation growth materials that are suited to the landform and support self-sustaining vegetation.

• The placement (wherever possible) of soils on final landforms to enable the progressive establishment of vegetation.

• The expansion of habitat opportunities for wetland and terrestrial fauna species. This includes the design and implementation of rehabilitation works at the New Lake Foreshore in a manner consistent with the NSW Wetlands Policy (DECCW, 2010c).

• The selection of revegetation species in accordance with accepted principles of long-term sustainability (e.g. genotypic variation, vegetation succession, water/drought tolerances).

• Grazing of land within ML 1535 to be excluded during operations and during rehabilitation of the site. At lease relinquishment, rehabilitated final landforms are conserved (with grazing excluded), with some areas suitable for grazing surrounding the rehabilitated final landforms.

Specific rehabilitation objectives have been developed for the modified final landforms resulting from the Modification which consider the results of rehabilitation trials undertaken at the CGM to date. These objectives are described in Section 5.3.3.

5.2 REHABILITATION AT THE COWAL GOLD MINE

Approximately 200 ha of land within ML 1535 is under rehabilitation (i.e. either shaped and covered [i.e. with rock armour, topsoil and revegetation] or rehabilitated and under maintenance). Areas currently under rehabilitation include:

• Temporary Isolation Bund (shaped, topsoiled and revegetated with native and exotic grass species including scattered aquatic species such as Lignum [Duma florulenta], Rush [Eleocharis sp.] and River Red Gum [Eucalyptus camaldulensis]);

• Lake Protection Bund (shaped and lower batter rock armoured, topsoiled and revegetated with native and exotic grass species including scattered aquatic species such as Lignum, Rush sp. and River Red Gum);

• UCDS (rehabilitated and under maintenance);

• components of the ICDS (rehabilitated and under maintenance);

• northern tailings storage facility (starter embankment, and the first and second upstream lifts) (shaped, with majority of shaped batters rock armoured, topsoiled and revegetated with native and exotic grass species);

• southern tailings storage facility (starter embankment, downstream lift and the first and second upstream lifts) (shaped, with majority of shaped batters rock armoured, topsoiled and revegetated with native and exotic grass species);

• perimeter waste rock emplacement outer batter (most sections shaped, rock armoured, topsoiled and revegetated with native and exotic grass species);

• southern waste rock emplacement lower outer batter (south-eastern section) (shaped and some sections rock armoured, topsoiled and revegetated with native and exotic grass species and plantings of Eucalypt species including River Red Gum and Bimble Box [Eucalyptus populnea]);

• northern waste rock emplacement lower outer batter (north-eastern section) (shaped and rock armoured prior to commencement of the northern waste rock emplacement rehabilitation trial [Section 5.6]);

• embankments of contained water storage D9 (shaped, rock armoured, topsoiled and revegetated with native and exotic grass species); and

• Bland Creek Palaeochannel Borefield water supply pipeline (rehabilitated and under maintenance).

Photographs of rehabilitation areas (including rehabilitation trial areas) and rehabilitation activities undertaken at the CGM to date are shown on Plates 5-1 to 5-5 with additional photographs included in the Rehabilitation Proposal (Appendix I).

5.2.1 Results of Rehabilitation Investigations and Trials

Numerous rehabilitation investigations and trials have been undertaken since construction of the CGM commenced in 2005 to determine the most appropriate rehabilitation methods, rehabilitation materials and revegetation species likely to achieve the rehabilitation objectives for the CGM’s final landforms.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
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<tbody>
<tr>
<td>Wood Mulch/Pallets and Cardboard</td>
<td>(Suppressed vegetation growth)</td>
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<tr>
<td>Rock Ribbon</td>
<td>(Susceptible to erosion downslope)</td>
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<tr>
<td>Rock Ribbon and Wheaten Hay</td>
<td>(Sparse vegetation cover)</td>
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<tr>
<td>Loose Rock</td>
<td>(Very limited vegetation growth)</td>
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<tr>
<td>Rock Mulch, Topsoil and Woodchips</td>
<td>(Stable yet high presence of weeds)</td>
</tr>
<tr>
<td>Rock Mulch and Topsoil</td>
<td>(Stable with higher presence of native grass sp.)</td>
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<tr>
<td>Bioremediation Solids</td>
<td>(Limited surface protection, susceptible to erosion)</td>
</tr>
<tr>
<td>Biosolids 45 t/ha</td>
<td>(Dense vegetation cover, dominated by exotic weed sp.)</td>
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<tr>
<td>Topsoil and Woodchips</td>
<td>(Stable, yet suppressed vegetation growth)</td>
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<tr>
<td>Topsoil and Wheaten Hay</td>
<td>(Sparse vegetation cover, potentially unstable in long-term)</td>
</tr>
<tr>
<td>Topsoil</td>
<td>(Patchy vegetation, potentially unstable in long-term)</td>
</tr>
<tr>
<td>Wheaten Hay</td>
<td>(Patchy vegetation, thick hay clumps restrict vegetation growth)</td>
</tr>
</tbody>
</table>
Rock Mulch and Topsoil Cross-ripped along the Contour
(Stable, with high presence of native grass sp.)

Rock Mulch, Topsoil and Native Pasture Hay
(Stable, consistent soil surface cover and high presence of native grass sp.)

Rock Ribbon
(Active erosion downslope and sparse vegetation cover)

Bioremediation Solids
(Limited surface protection resulting in active erosion)
Southern Waste Rock Emplacement Trial Design

Legend
(R) Rock mulch
(R + Wc) Rock mulch + woodchips
(R + T + Wc) Rock + topsoil + woodchips
(R + T) Rock + topsoil
(T) Topsoil
(C) Control or No treatment

<table>
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<tr>
<th>3 tiered batter (1:3)</th>
<th>Single continuous slope (1:5)</th>
<th>Single continuous slope (1:5)</th>
<th>3 tiered batter (1:3)</th>
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No Subsoil

Subsoil
Northern Waste Rock Emplacement trial area (looking west) prior to placement of hay mulch treatments.

Northern Waste Rock Emplacement trial area (looking south) showing rock mulch base layer prior to topsoil application on top two batters and topsoil and rock mulch layers combined on lower two batters.
Rehabilitation investigations and trials that have been undertaken to date have focussed on the following key aspects relevant to the CGM:

- **Rehabilitation Media**
  - Investigations and trials assessing the effectiveness of different surface treatments (e.g. native pasture hay, woodchips, rock mulch) and substrate types (e.g. oxide waste, subsoil and topsoil) in stabilising landform slopes.
  - Investigation into the geochemical suitability of rock armouring on the outer batters of mine landforms.

- **Water Management and Erosion Control on Landform Slopes**
  - Investigation into water management and erosion control concepts including hydrological and hydraulic modelling of different CGM landform slope designs (i.e. single slope compared with tiered slope) and different surface treatments (i.e. rock mulch or without rock mulch surface treatments) under various rainfall events.

- **Material Characterisation and Amelioration**
  - Investigation into the chemical and physical properties of soil resources and the optimum rates of gypsum application to improve suitability for plant growth and use on rehabilitation areas.

- **Revegetation**
  - Ongoing trials and research to determine the most appropriate revegetation species suited to substrate materials of the CGM's final landforms.

The Rehabilitation Proposal (Appendix I) provides a detailed description of the results of these investigations and trials.

### Key Findings of Rehabilitation Investigations and Trials

Key findings of the rehabilitation investigations and trials conducted at the CGM to date include the following (Appendix I):

- The surface cover treatment most likely to stabilise final landform slopes and support long-term vegetation growth includes rock mulch, topsoil and seed bearing native pasture hay (or clean wheaten straw hay) (DnA Environmental, 2013a and 2013b).

- Primary waste rock is suitable for use as rock armour (or rock mulch) on landform slopes due to the material being typically non-saline and NAF (GEM, 2008; 2013). However, primary waste rock materials with higher reactive sulphide contents (greater than 0.5% sulphur) are likely to present a risk of developing saline conditions when oxidised and these materials should either be excluded from use as rock armour or blended with the lower sulphur material in order to dilute the reactive sulphides (GEM, 2008; 2013).

- The inclusion of rock mulch in the surface cover placed on CGM landform slopes would provide resistance to erosion and would reduce surface water flow velocities on landform slopes during high rainfall events (Gilberts and Associates, 2009).

- The majority of stockpiled soil resources at the CGM are typically sodic and dispersive and therefore require treatment with gypsum to improve the soil structure and suitability for plant growth (some soil stocks however require treatment with lime or a gypsum-lime blend to reduce the acidity of the soil) (McKenzie Soil Management, 2013). To enhance the suitability of topsoil stocks for plant growth, gypsum application rates ranging between zero and approximately 35 tonnes per hectare per month (t/ha/m) have been recommended (McKenzie Soil Management, 2013). To enhance the suitability of subsoil stocks for plant growth, gypsum application rates ranging between approximately 73 and 153 t/ha/m have been recommended (McKenzie Soil Management, 2013).

- Various methods for treating or ameliorating soil at the CGM have been recommended by McKenzie Soil Management (2013), including treating soil stockpiles with gypsum (or other relevant treatment material); treating strongly sodic and dispersive soil stocks with gypsum in a dedicated soil amelioration farm; treating soil when re-applied to rehabilitation areas; and spreading gypsum on the surface of original soil profiles prior to soil stripping.

- Ameliorated soils are anticipated to improve revegetation outcomes for the CGM final landforms (due to improved soil properties for plant growth) and may increase the number and diversity of revegetation species able to be used in the CGM rehabilitation programme (i.e. additional species could be used that are typically less tolerant to deficient soils).
• Soil conditioning (with gypsum) and the application of surface cover treatments improves the effectiveness of revegetation techniques including direct seeding and tubestock planting (DnA Environmental, 2013a).

• The results from vegetation growth trials undertaken to date indicate that seedlings of select salt tolerant tree species continued to grow when planted in a substrate including CGM oxide and sulphide tailings material (Barrick, 2013c). As a result, it is considered salt tolerant tree species would likely establish and develop when planted on the top surfaces of the tailings storage facilities.

• The root systems of two year old tree species planted in substrates including topsoil and oxide waste rock and topsoil, subsoil and oxide waste rock continued to grow through the substrate profile (except for one plant where the root system desisted once entering oxide waste rock) (DnA Environmental, 2013a). Despite the small sampling size, there was no conclusive to suggest that these substrates would be a significant constraint to plant growth (DnA Environmental, 2013a).

Appendix I provides a detailed review of the results of the rehabilitation investigations and trials which have led to these key findings.

Based on the above key findings, the rehabilitation programme for the CGM incorporating the Modification (Section 5.3) would include:

• a modified cover system concept for the waste rock emplacement and tailings storage facility batters (Sections 5.3.3);

• a modified cover system concept for the top surfaces of the tailings storage facilities (Section 5.3.3);

• continued rehabilitation investigations and trials to determine the most effective cover system materials likely to stabilise the CGM final landforms in the long-term, and to determine the most effective revegetation techniques and species suited to the substrate materials of CGM final landforms (Section 5.6); and

• various soil amelioration methods to improve the structure and function of soil stocks to enhance suitability for plant growth (Section 5.4.1).

5.3 REHABILITATION CONCEPTS FOR THE CGM INCORPORATING THE MODIFICATION

This section presents the rehabilitation concepts for the CGM incorporating the Modification. Sections 5.3.1 describes the long-term land use strategy and the conceptual post-mining landform, Section 5.3.2 outlines the conceptual rehabilitation domains and Section 5.3.3 details the final landform and revegetation concepts.

Figures 3-2 to 3-4 show the progressive rehabilitation concepts for the Modification.

These concepts may be revised and refined if necessary throughout the life of the mine via the MREMP, based on the outcomes of ongoing consultation with relevant regulatory authorities, and the results of ongoing rehabilitation investigations and trials.

5.3.1 Long-term Land Use Strategy and Conceptual Post-Mining Landform

In accordance with Development Consent (DA 14/98) Condition 3.10(E), a long-term land use strategy has been developed for the CGM (Barrick, 2013c). The strategy is relevant to land within ML 1535, the CGM's water supply pipeline (associated with the Bland Creek Palaeochannel) (Figure 1-2) and Barrick-owned land outside ML 1535.

The long-term land use strategy would remain unchanged for CGM incorporating the Modification and would be applied to the modified landforms which would result from the Modification. A conceptual view of the proposed long-term land use areas and the conceptual post-mining landform is shown on Figure 5-1.

At lease relinquishment, it is proposed that land use within the former ML 1535 area would include fenced conservation areas to conserve and enhance wildlife values and would include areas suitable for agricultural production including commercial and recreational fishing of lake areas or managed grazing by livestock (Figure 5-1).
Barrick-owned land outside the former ML 1535 area (with the exception of Compensatory Wetland and Northern and Southern Offset Areas) (Figure 5-1) would continue to be used for farming/agricultural production by Barrick and/or licensees that sign agreements to conduct agricultural activities on Barrick-owned land. It is anticipated that areas of lakebed country would be available for commercial and recreational fishing when inundated, and may be used for cropping and/or managed livestock grazing when dry, consistent with existing and historical uses of Lake Cowal. Consistent with the CGM’s approved Land Management Plan (Barrick, 2003a), the RVEP Areas (Figure 5-1) would continue to be maintained for the term of Barrick’s tenure of the land.

Some infrastructure may be retained and transferred to local landholders for use following lease relinquishment including electricity infrastructure, water storages, pipelines, bores and associated pump stations. If the CGM’s Bland Creek Palaeochannel Borefield, eastern saline borefield and the saline groundwater bores within the former ML 1535 area are retained for local use, the pipelines would remain in place.

Alternatively, if the infrastructure is not required for local use, the bores would be plugged, capped and decommissioned in accordance with relevant regulatory guidelines, the pump stations would be removed and the pipelines raised and dismantled for recycling. Infrastructure decommissioning activities are described further in Section 5.3.3.

Long-term land uses would ultimately be subject to consultation with relevant regulatory authorities and key stakeholders including surrounding landholders.

Prior to lease relinquishment, a mechanism for providing long-term security and protection of the conservation areas would be established (e.g. a covenant on the title of the relevant lands restricting use of the land to conservation purposes only). The mechanism would be determined in consultation with the relevant regulatory authorities and would be detailed in the Mine Closure Plan, or final MOP.

### 5.3.2 Conceptual Rehabilitation Domains

Consistent with contemporary rehabilitation guidelines and rehabilitation planning best practice, conceptual rehabilitation domains would be incorporated in the rehabilitation programme for the CGM incorporating the Modification. Based on the Draft ESG3: Mining Operations Plan (MOP) Guidelines March 2013 (DRE, 2013), the following conceptual rehabilitation domains have been developed for the Modification and are shown on Figure 5-2:

- Domain 1A – Final Void;
- Domain 2B – Water Management Infrastructure;
- Domain 3C – Infrastructure Area – Grassland/Scattered Eucalypt Woodland;
- Domain 4D – Tailings Storage Facilities – Eucalypt Woodland;
- Domain 5D – Waste Rock Emplacements – Eucalypt Woodland;
- Domain 6D – Woodland Corridor – Eucalypt Woodland; and
- Domain 7E – Compensatory Wetland – Riverine Woodland/Freshwater Communities.

The conceptual rehabilitation domains for the CGM incorporating the Modification have been based on the rehabilitation principles and objectives and the long-term land use strategy described in Sections 5.1.1, 5.1.2 and 5.3.1, respectively.

The CGM’s ROMP (Section 5.5) would be revised to incorporate the conceptual rehabilitation domains and describe rehabilitation objectives relevant to each domain. Specific rehabilitation objectives have been developed for the CGM’s final landforms (e.g. tailings storage facilities and waste rock emplacements) and are described in Section 5.3.3. The rehabilitation domain objectives would be consistent with these objectives and with the rehabilitation objectives for the CGM incorporating the Modification (Section 5.1.2).
5.3.3 Final Landform and Revegetation Concepts

The currently approved final landform design concepts would remain unchanged for the Modification and would be applied to the modified landforms which would result from the Modification (i.e. the expanded open pit and modified waste rock emplacements and tailings storage facilities). The final landforms for the CGM incorporating the Modification would be:

- designed wherever possible to be compatible with regional landscape features;
- progressively constructed as a ROM operation wherever possible and left with untrimmed surface roughness to lower runoff coefficients and promote water absorption and storage; and
- revegetated with endemic vegetation communities, selected specifically for their suitability to the created elevation, substrate conditions and the overriding objective of re-establishing a greater extent of endemic vegetation within ML 1535.

Figure 5-1 shows the conceptual final landform for the CGM incorporating the Modification. Key features of the final landform include:

- a final void;
- rehabilitated waste rock emplacements surrounding the final void to the north, east and south and a rehabilitated mineralised material emplacement adjacent to the rehabilitated northern waste rock emplacement (the material in this emplacement may however be processed in the future, subject to market conditions);
- two rehabilitated tailings storage facilities located near the western extent of ML 1535;
- a woodland corridor between the rehabilitated northern waste rock emplacement and rehabilitated northern tailings storage facility;
- areas surrounding the rehabilitated waste rock emplacements and tailing storage facilities associated with rehabilitated site infrastructure areas (i.e. the former process plant area and former water management infrastructure areas); and
- permanent water management features including the UCDS and low mounds associated with the ICDS.

A detailed description of the final landform and revegetation concepts is provided in the Rehabilitation Proposal (Appendix I) and a summary provided below.

A conceptual view of the landscape surrounding the final landforms including features such as Wamboyne Mountain and Billys Lookout is shown on Figure 5-3.

Waste Rock Emplacements

The rehabilitation objectives for the waste rock emplacements are to:

- stabilise batter slopes with rock armour (primary waste rock mulch) to control surface water runoff downslope and reduce erosion potential in the long-term;
- provide a stable plant growth medium able to support long-term vegetation growth including native and/or endemic Eucalypt woodland, shrubland and grassland species suited to slope and elevated positions similar to those remnants in the surrounding landscape; and
- conserve the rehabilitated area post-mining and exclude grazing and agricultural production.

Should the mineralised material emplacement remain as a final landform, the rehabilitation objectives and concepts for the waste rock emplacements described in this section would be applied to the mineralised material emplacement.

The approximate final heights of the modified northern and southern waste rock emplacements would be 308 m AHD and 283 m AHD, respectively (Section 1.2). The increased final heights of the northern and southern waste rock emplacements would remain below the vegetated ridgeline to the west and other regional topographic features such as Billys Lookout and Wamboyne Mountain. The Modification would not involve a change to the area or height of the perimeter waste rock emplacement. Figure 5-3 shows a conceptual view of the elevation of the modified northern and southern waste rock emplacements within the wider landscape surrounding the CGM incorporating the Modification.

Consistent with the approved CGM, waste rock emplacements would be designed to meet the long-term goal of directing potential seepage generated from waste rock emplacement areas toward the open pit during operation and post-closure.
FIGURE 5-3
Conceptual View of the CGM Incorporating the Modification within the Regional Landscape
The existing topography of the northern waste rock emplacement extension footprint would be altered by stripping soil to slope towards the open pit to provide drainage control (i.e. the base drainage control zone). Oxide waste rock would be placed and compacted in the extension footprint and any waters permeating through the waste rock emplacement would be intercepted by this layer/zone and preferentially flow towards the open pit.

Based on the results of rehabilitation investigations and trials (Section 5.2.1 and Appendix I), the rehabilitation cover system for the waste rock emplacement batters would include:

- **benign (primary) rock mulch**;
- **low salinity and gypsum-treated topsoil**; and
- **a patchwork layer or rows of seed bearing native pasture hay (or clean wheaten hay)**.

Rock armouring the waste rock emplacement batter slopes would aim to provide long-term slope stability, control surface water runoff downslope and reduce erosion potential. Consistent with the currently approved design, outer batter slopes would be 1(V):5(H).

The rock mulch and topsoil layers would be cross-ripped with approximately 10 tonnes per hectare (t/ha) gypsum, followed by seeding with an initial cover crop (e.g. Rye Grass) and/or planting with tubestock including native and/or endemic tree and shrub species. A layer (approximately 5 centimetres [cm] deep) of locally harvested seed bearing native pasture hay (or clean wheaten hay) would then be spread in a patchwork pattern or in rows to provide initial soil protection and soil stability for vegetation establishment. Cross-ripping along the contour of the slope is proposed to create ‘troughs and banks’ to minimise the potential for erosion downslope and enhance vegetation establishment within the troughs.

Consistent with the approved rehabilitation concepts (Barrick, 2009), drainage on the top surfaces of the waste rock emplacements would be managed via a series of small shallow basins (depressions), a rehabilitation cover system (including subsoil and topsoil) that absorbs rainfall and comprises woodland vegetation. The use of depressions would be aimed at maximising internal drainage without creating permanent ponding during normal and heavy rainfall events (Barrick, 2009).

A bund around the perimeter of the top surfaces of the waste rock emplacement would also be constructed to provide a contained catchment and minimise surface water runoff from the top surface down the batters.

A conceptual cross-section of the modified northern waste rock emplacement is shown on Figure 3-5. The conceptual cross-section shown on Figure 3-5 is also representative of the concept for the southern waste rock emplacement.

Consistent with currently approved revegetation concepts, revegetation of the waste rock emplacements would aim to re-establish endemic woodland, shrub and grassland communities similar to those remnants in the regional landscape that are suitable to the physiographic and hydrological features of the landform and surface rehabilitation materials.

Results of rehabilitation trials, in particular the trial on the northern waste rock emplacement (Section 5.6), would continue to be used to determine the revegetation species suited to the cover system materials for the waste rock emplacement batters.

A provisional list of revegetation species considered suitable for revegetation of the CGM waste rock emplacements has been developed by DnA Environmental (2013b) (Appendix I). These species would be used in the northern waste rock emplacement rehabilitation trial and proposed vegetation growth trials (Section 5.6).

Consistent with the approved CGM, revegetation species lists developed for the waste rock emplacements may be refined in consultation with regulatory authorities based on the results of rehabilitation investigations and trials. Revegetation species would be selected following consideration of their suitability and performance relative to both stability and ecosystem reconstruction.

**Tailings Storage Facilities**

The approved rehabilitation objectives for the tailings storage facilities would remain unchanged for the Modification and would be:

- to establish permanently stable landforms;
- during operations, stabilise batters so that they provide minimal habitat value for bird life (i.e. revegetated with pasture cover only);
• post-operations, to establish vegetative communities (including Eucalypt and Riverine woodland species and understorey species such as Rush and pasture species) which are endemic to the region and which enhance remnant habitat extension opportunities; and
• to conserve the rehabilitated area post-mining and exclude grazing and agricultural production.

The approximate final heights of the modified northern and southern tailings storage facilities would be 248 m AHD and 255 m AHD respectively (Section 1.2). The Modification would not involve a change to the area of the tailings storage facilities. Consistent with the currently approved design, the overall slope of the tailings storage facilities outer batters would be 1(V):5(H).

Consistent with the approved CGM, at the completion of processing, the tailings storage facilities would be rehabilitated as follows (Barrick, 2009):

• The decant area would be allowed to dry and the decant tower would be permanently capped with fill and/or a concrete plug.
• The underdrains (which previously conveyed decanted water to the reclaim dam) would be grouted.
• The tailings discharge pipes and monitoring systems would be dismantled for re-use or disposal with the bulk of CGM infrastructure.
• The tailings storage facilities would be fenced during rehabilitation and post-mining to exclude grazing.

Similar to the waste rock emplacements, the rehabilitation cover system for the tailings storage facility batters would include:

• benign (primary) rock mulch;
• low salinity and gypsum-treated topsoil; and
• a patchwork layer or rows of seed bearing native pasture hay or clean wheaten hay.

The application method would be the same as applied for the waste rock emplacement batters described above.

The top surfaces of the tailings storage facilities would form a low, internally draining landform, with drainage affected by controlled placement of cover materials and a number of shallow swales. The tailings storage facilities surfaces would form contained catchments to minimise surface water runoff from the top surface down the batters.

A conceptual cross-section of the modified northern tailings storage facility is shown on Figure 3-6. The conceptual cross-section shown on Figure 3-6 is also representative of the concepts for the southern tailings storage facility.

The rehabilitation cover system materials for the top surfaces (i.e. a capillary break layer of rock, subsoil and topsoil) would remain unchanged for the Modification. However, the depth of the subsoil layer (which would be placed above the capillary break layer of rock) would be reduced.

Based on the outcomes from vegetation growth trials undertaken to date, it is expected that a reduction of subsoil within the cover system would unlikely change the revegetation outcomes for the tailings storage facility top surfaces (Appendix I).

Consistent with the currently approved rehabilitation strategy, revegetation of the tailings storage facilities would use a combination of native and/or endemic plant species and pasture species to rapidly stabilise landforms in the initial period following construction.

Post-operations, the tailings storage facilities would be revegetated with plant species that may include:

• In the central, occasionally wet area, species such as River Red Gum and understorey species such as Rush.
• On the remainder of the covered storage surface, Eucalypt and Riverine woodland species (including salt tolerant species) which typically occur in the surrounding landscape.

Similar to the revegetation concepts for the waste rock emplacements, the revegetation species list developed for the tailings storage facilities may be refined based on the results of rehabilitation investigations and trials in consultation with regulatory authorities.

Rehabilitation trials would continue to be undertaken to determine the most suitable revegetation species for the top surfaces of the tailings storage facilities including River Red Gum and understorey species such as Rush. A description of the rehabilitation trials that would be undertaken relevant to the tailings storage facilities is provided in Section 5.6.
**Final Void**

The rehabilitation objectives for the final void would remain unchanged for the Modification and are to (Barrick, 2009):

- create habitat opportunities for waterbirds at the approximate level at which void water will reach equilibrium, where feasible; and
- leave the void surrounds safe (for humans and stray stock).

At the completion of mining, the final void would be surrounded on three sides by the revegetated mine waste rock emplacements.

The Modification would increase the surface area of the final void to approximately 131 ha, and at the end of mining the void would have a maximum depth at approximately -263 m AHD (i.e. approximately 470 m below the natural surface level). The berm widths and slope angles would continue to be reviewed and monitored through ongoing geotechnical studies and data collection during mine development.

The long-term hydrological characteristics for the modified final void are detailed in Appendix B and summarised in Section 4.1. Modelling indicates that the void would reach an equilibrium water level estimated to be between approximately 125 to 135 m AHD (approximately 80 m below spill level) (Appendix B). Predictions of average void salinity confirm that salt concentrations in void waters would slowly increase towards hyper-salinity (Appendix B).

A bund would be constructed around the perimeter of the final void which would be planted with an initial cover crop (to assist in stabilising the bund following construction) and native and/or endemic Eucalypt woodland species. The final void would be screened from public views on Lake Cowal Road by the tailings storage facilities and waste rock emplacements and would be fenced upon completion of mining. Signposted warnings to the public would also be placed along the fence.

Rehabilitation concepts for the final void may be revised following the outcomes of rehabilitation trials and investigations in consultation with relevant regulatory agencies.

**New Lake Foreshore**

The Modification would not change the existing New Lake Foreshore components associated with the approved CGM (i.e. the height of the perimeter waste rock emplacement would remain unchanged and there would be no change to the Temporary Isolation Bund or the Lake Protection Bund). As a result, the rehabilitation concepts for the New Lake Foreshore would remain unchanged for the Modification.

A summary of the approved New Lake Foreshore rehabilitation concepts is provided below.

Similar to the design of the northern and southern waste rock emplacements, the outer batter slope of the perimeter waste rock emplacement and the Temporary Isolation Bund would be maintained at 1(V):5(H). A conceptual cross-section through the lake isolation system is shown in Appendix I.

The construction of the New Lake Foreshore has been completed and the Temporary Isolation Bund and Lake Protection Bund topsoiled and revegetated with native and exotic grass species including scattered aquatic species such as Lignum, Rush sp. and River Red Gums. The outer batter slopes of the Lake Protection Bund have been rock armoured to further protect against lake level rises as occurred during 2012 (Barrick, 2012).

Barrick received approval from the DRE on 14 May 2012 (via approval of a variation to the Cowal Gold Mine Mining Operations Plan [January 2011 – September 2012] [Barrick, 2011]) to raise the height of the Temporary Isolation Bund by 0.5 m to provide for future lake level rises. These works have not yet commenced and will occur once the lake water recedes and conditions are suitable for the works to commence.

Consistent with the approved rehabilitation strategy, the Temporary Isolation Bund would remain in place until the New Lake Foreshore (Lake Protection Bund and the first batter of the Perimeter Waste Rock Emplacement) is stabilised. The Temporary Isolation Bund would then be reworked (and breached) by light machinery (i.e. small excavator and bob cat) when the level of the lake is lower than the bund, to create a series of low mounds (Barrick, 2009). The mounds would comprise a mixture of the inert bund rock and lakebed sediments (Barrick, 2009).

The revegetation concepts for the New Lake Foreshore would also remain unchanged for the Modification.
As described in the currently approved rehabilitation strategy, rehabilitation of the New Lake Foreshore would be an iterative process and revegetation species would continue to be selected in consideration of:

- the Lake Cowal’s hydrological regime (wetting and drying cycles);
- species occurring in relevant reference sites (including lake and slope woodland communities);
- species performance during revegetation trials; and
- suitability to substrate conditions.

Subject to these parameters, species may be selected from the following vegetative suites:

- fringing lake vegetation on the foreshore batters (i.e. Eucalypt dominated woodland including River Red Gum, River Cooba [Acacia stenophylla], Wilga [Geijera parviflora], Kurrajong [Brachychiton populneus], Green Wattle [Acacia deanei] and Grey Box [Eucalyptus microcarpa]); and
- freshwater habitats (i.e. Foxtail [Austrostipa densiflora], Rush, Cane Grass [Eragrostis australasica] and Lignum).

Monitoring results from the lake foreshore trial area sites indicate that planting of Lignum and Rushes from tubestock and cuttings has been successful with an increase in Lignum succession in recent years with higher rainfall (Plate 5-5) (DnA Environmental, 2013a). However, limited establishment of hand broadcast tree and shrub seed has occurred, likely due to the dispersive nature of the soil and low rainfall received during the germination period (DnA Environmental, 2013a).

Based on monitoring results to date and in consideration of the approved proposed works for the Temporary Isolation Bund (as described above), rehabilitation activities for the New Lake Foreshore and Lake Protection Bund would include:

- planting tubestock and cuttings and/or direct seeding of select revegetation species including River Red Gum and wetland species such as Lignum and Rush species.

**Infrastructure Areas**

The general rehabilitation concepts for the infrastructure areas would remain unchanged for the Modification. A summary of these rehabilitation concepts is provided below.

**Workshop**

At the completion of mining, the mine fleet would be demobilised and the workshop dismantled. The footprint area would be tested for contamination from fuels and lubricants and any contaminated soils removed for proper disposal in accordance with EPA requirements. The area would then be contour ripped, topsoiled and revegetated with endemic Eucalypt woodland and native pasture species.

**Reagent and Fuel Storage Areas**

Unused reagents and fuels at the completion of processing would be returned to the supplier in accordance with all relevant safety and handling procedures. Storage areas would be tested for contamination from fuels and lubricants and any contaminated soils removed for proper disposal in accordance with the EPA requirements. The area would then be contour ripped, topsoiled and revegetated with endemic Eucalypt woodland and native pasture species.

**Process Plant and Administration Area**

The process plant and administration area buildings would be dismantled and removed following the cessation of processing.

The foundations and floors would be retained if a suitable alternative use is agreed with the ultimate landholder. Alternatively, they would be excavated for disposal at the base of the void or as buried landfill in an approved manner. If the foundations and floors are removed, the area would then be contour ripped, topsoiled and revegetated with endemic Eucalypt woodland and native pasture species.

Internal powerlines, pipelines and the explosives magazine would be dismantled and removed.
Internal Access Road and Other Roads

All internal roads would be contour ripped, topsoiled and revegetated with endemic Eucalypt woodland and native pasture species, unless otherwise agreed with the ultimate landholder.

Transmission Line and Substation

At the end of the mine life, the ETL (from Temora) would be the property of the electricity utility and would likely remain in place.

Water Supply Infrastructure

The Bland Creek Palaeochannel bores and associated pump stations (including the eastern pump station and diesel tank) may be transferred to local landholders or, alternatively, dismantled and the bores plugged, capped and decommissioned in accordance with the regulatory guidelines.

The pipeline would either be raised and dismantled for recycling or kept in place if required for local use. If dismantled, the section of pipeline in the bed of Lake Cowal would be raised when the lake is dry. If this is not possible due to successive high rainfall seasons, any decision to remove the pipeline would be discussed with the relevant regulatory authorities. However, given the likely maintenance period for CGM rehabilitation, it is likely that the Lake Cowal would be sufficiently dry at some stage during this period.

Given the water supply from the saline groundwater supply bores is highly saline, it is unlikely that these bores would be suitable and/or requested for ongoing future use by local landholders post-closure of the CGM. Notwithstanding, consultation would include discussions between Barrick and local landholders regarding potential transfer of the saline groundwater supply borefield infrastructure for private use.

It is likely, however, that the saline groundwater supply bores and associated pipelines would be dismantled and the bores plugged, capped and decommissioned in accordance with the regulatory guidelines.

The pipeline within the ML 1535 boundary within Lake Cowal would be dismantled and removed during dry lake conditions.

Permanent Water Management Features

The Modification would not involve a change to the existing UCDS or the existing low mounds associated with the ICDS.

The UCDS has been constructed to simulate endemic drainage features in the region and includes a low flow drainage path within a wider floodplain (approximately 65 m wide). The channel includes constructed features such as low flow and overbank zones, meanders and pool/riffle sequences. The northern extent of the UCDS includes constructed rock outfalls at confluences with existing natural drainage lines to minimise erosion. The UCDS has been revegetated with riparian vegetation including rapid germinating pasture species to assist in stabilising the channel.

The UCDS will remain to facilitate permanent drainage of adjacent areas upslope of the rehabilitation site to Lake Cowal and the existing low mounds associated with the ICDS will be retained to contain runoff generated within the rehabilitation site catchment.

Exploration Areas

All open drillholes would be plugged, capped and decommissioned in accordance with the regulatory guidelines. Access tracks and areas disturbed by exploration activities would be revegetated in accordance with the procedures adopted for the internal site roads.

Woodland Corridor

Consistent with the EIS (North Limited, 1998), a woodland corridor would be established between the rehabilitated northern waste rock emplacement and the rehabilitated northern tailings storage facility (Figure 5-1) to provide connectivity between the rehabilitated landforms and facilitate fauna movement between the rehabilitated landforms.

The woodland corridor would include native and/or endemic woodland species characteristic of remnant woodland communities in the surrounding landscape.

5.4 GENERAL REHABILITATION PRACTICES AND MEASURES

5.4.1 Soil Amelioration and Management

Various soil amelioration methods would be implemented for the CGM incorporating the Modification based on recommendations provided by McKenzie Soil Management (2013) (Appendix I). These methods would include (Appendix I):

- deep-ripping and applying gypsum (or other relevant treatment) to existing and proposed soil stockpiles;
• placing and treating strongly sodic and dispersive soil stocks with gypsum in a dedicated soil amelioration farm;
• applying gypsum to soil during re-application on rehabilitation areas; and
• spreading gypsum on the surface of original soil profiles prior to soil stripping.

Details of the gypsum (and other relevant treatment) application rate requirements estimated by McKenzie Soil Management for each soil stockpile are provided in Appendix I. Figure 5-4 shows the indicative location of soil stockpiles at the approved CGM as at July 2013. A summary of the proposed soil amelioration methods is provided below.

Treatment of Soil Stockpiles

Based on McKenzie Soil Management’s recommendations, soil stockpiles would be deep ripped with gypsum (or lime, or a gypsum-lime blend) applied at the approximate rates relevant to each soil stockpile (Appendix I). Strongly sodic and dispersive soil stocks however would be placed and treated in the soil amelioration farm (described below).

Based on the results of soil testing, the surface layer of the soil stockpile (up to approximately 1 m deep) would be stripped for rehabilitation use. The new surface of the stockpile would then be deep ripped with gypsum (or other relevant treatment) (at a rate determined from soil testing results). This process would be repeated until all soil within the stockpile has been treated.

Soil Amelioration Farm

The Modification would include a soil amelioration farm (i.e. a dedicated soil stockpile) located immediately north of the service corridor road and west of contained water storage D2 (Figure 5-4) where strongly sodic and dispersive soils would be treated/ameliorated over a period of time to reduce the sodicity and dispersiveness of the soil (and to improve other chemical characteristics).

The soil farm would be approximately 0.5 m deep. The surface would be deep-ripped with gypsum to a depth of approximately 450 millimetres to incorporate as much gypsum through the soil profile to optimise the calcium/sodium exchange process (Appendix I). A soluble fine-grade gypsum would be used to provide a consistent cover of gypsum across the soil surface (Appendix I).

A spray irrigation system may be installed to enhance drainage through the soil profile to expedite the calcium/sodium exchange process should monitoring results indicate that rainfall is insufficient (Appendix I). A drainage collection system (including a toe drain around the perimeter of the farm, a seepage collection dam and a pump system) would be installed to collect and transfer sodium rich drainage water to an appropriate contained water storage within ML 1535 (Appendix I). Prior to the placement of soil on the ground surface, topsoil would be stripped and stockpiled separately.

Some vegetation would be established on the soil surface to assist in increasing infiltration of water into the soil profile (via formation of shrinkage cracks) to encourage drainage of sodium salts and facilitate the calcium/sodium exchange process (Appendix I). A thick application of hay mulch with some vegetation cover would likely be the most desirable soil surface cover (Appendix I). Hay mulch and vegetation establishment would also improve other soil characteristics such as organic carbon content, structural stability, biological activity and promote development of the soil seed bank (Appendix I).

The term of treatment would vary depending on approximate gypsum requirement, the amount of rainfall (or irrigation water) and on-going soil testing results (Appendix I). If the farm is irrigated, the soil would require a drying period prior to re-handling the material (Appendix I).

The design concepts of the soil farm described above are provisional, with detailed design concepts to be confirmed as a result of research including simulation modelling of quantitative predictions of water and gypsum requirements (Appendix I).

An annual soil sampling programme would be implemented to assess the performance of the farm and to inform the requirements for additional treatment measures. Soil samples would be taken at consistent locations across the soil farm area to the depth of the soil profile. Analysis of the soil samples would focus on exchangeable cations, EC, pH and dispersibility of the soil (Appendix I).

In accordance with recommendations made by McKenzie Soil Management, soil stocks requiring the highest gypsum application would be ameliorated first as these soils would likely involve the longest treatment period (Appendix I).
Once soil test results indicate the soils are likely suitable for rehabilitation use, the soil would be removed from the farm and placed directly on rehabilitation areas or stockpiled separately. The soil farm establishment process would then be repeated using the next volume of soil stocks requiring amelioration.

Soils ameliorated within the farm are anticipated to improve revegetation outcomes for the CGM final landforms (due to improved soil properties for plant growth) and may increase the number and diversity of revegetation species able to be used in the CGM rehabilitation programme (i.e. additional species could be used that are typically less tolerant to deficient soils) (Appendix I).

Detail regarding the design, implementation and management of the soil amelioration farm would be included in the MOP and developed in consultation with the DRE and other relevant regulatory authorities.

**Treatment of Soil on Rehabilitation Areas**

Consistent with current rehabilitation procedures at the approved CGM, gypsum would continue to be applied to soil used on rehabilitation areas. The rate of gypsum application would be based on soil testing results and would consider the prior treatment of the soil (i.e. while stockpiled or within the soil amelioration farm).

Based on McKenzie Soil Management’s recommendations, soil re-application activities would include:

- deep-ripping the soil surface to minimise compaction;
- applying coarse grade gypsum at a minimum of approximately 5 t/ha to rehabilitation areas to provide a prolonged source of electrolyte to minimise dispersion of surface soils for as long as possible and to assist with the revegetation establishment; and
- applying native pasture hay to protect the surface soil and to encourage vigorous native plant growth.

**Treatment of Original Soil Profile**

McKenzie Soil Management has indicated that the most effective way of ameliorating soil is by spreading gypsum on the surface of original soil profiles prior to soil stripping (Appendix I).

Based on McKenzie Soil Management’s recommendations, gypsum would be applied to the surface of proposed Modification disturbance areas (including new soil stockpile areas) prior to soil stripping (where practicable). Soil sampling and testing would be undertaken prior to stripping to characterise the soil and determine appropriate gypsum application rates.

**Soil Management**

The general protocol for management of stockpiled soil for the Modification would include soil handling measures that optimise the retention of soil characteristics (in terms of nutrients and micro-organisms) favourable to plant growth. The protocol would include:

- locating soil stockpiles outside the Lake Cowal floodplain;
- leaving the surface of the completed soil stockpiles in a "rough" condition to help promote water infiltration and minimise erosion prior to vegetation establishment;
- deep ripping soil stockpiles with gypsum (or other relevant treatment) and seeding to maintain soil organic matter levels, soil structure and microbial activity;
- installing signposts for all soil stockpiles with the date of construction and type of soil; and
- recording details of all soil stockpiles on a site database which includes the location and volume of each stockpile and the stockpile maintenance records (e.g. ameliorative treatment, weed control, seeding).

Long-term topsoil stockpiles would continue to be constructed up to 3 m in height with slopes at a maximum acceptable angle to resist erosion. Subsoil stockpiles would vary in height as determined by storage volumes and available space within the footprint of approved disturbance areas.

Consistent with the approved strategy of soil resource management, Modification disturbance areas would be clearly delineated and stripped of soil resources including topsoil, followed by the separate removal of subsoil (where practicable). Stripped soils would be either directly replaced on rehabilitation areas or stored in additional soil stockpiles (Figure 1-3).

The CGM’s Soil Stripping Management Plan (Barrick, 2003d) would be updated to reflect the soil management measures described above. Details of soil stripping procedures and soil re-handling activities would continue to be provided in the MOP.
A detailed soil stockpile inventory would continue to be maintained to track soil resource accounting. McKenzie Soil Management’s recommendations (including the treatment requirements for each soil stockpile and the soil characteristics) would be incorporated into the inventory. The inventory would be regularly updated to reflect soil treatment measures and soil usage.

A preliminary estimate of soil resources available for rehabilitation is provided in Appendix I. Following the completion of stripping of all Modification disturbance areas, consistent with current practices, an aerial survey would be conducted to confirm approximate soil resource stocks.

5.4.2 Plant Species Selection for Revegetation

As described in Section 5.3.3, the modified final landforms would be revegetated with endemic vegetation communities, selected specifically for their suitability to the created elevation, substrate conditions and the overriding objective of re-establishing a greater extent of endemic vegetation within ML 1535. The revegetation concepts for the Modification landforms are described in Section 5.3.3.

Consistent with the MREMP (DPI-MR, 2006), revegetation concepts would continue to be informed by the results of the rehabilitation investigations, trials and monitoring and the rehabilitation programme refined in consultation with relevant regulatory agencies.

5.4.3 Seed Collection and Habitat Enhancement Measures

The Vegetation Clearance Protocol developed for the approved CGM would continue to be implemented for vegetation clearance activities associated with the Modification.

As a part of the Vegetation Clearance Protocol, during the preliminary habitat assessment phase, trees may be examined for their provision of seed and to identify roosting/nesting habitat resources that may be impacted by the vegetation clearance activities.

Where available, seed would be collected at the time of vegetation clearance and habitat features (i.e. hollows and logs) would be salvaged for use in rehabilitation or habitat enhancement programmes within ML 1535 and/or within the Modification Offset Areas and RVEP areas (Figure 5-1).

5.4.4 Erosion and Sediment Control

Barrick would continue to implement measures to prevent land degradation (i.e. erosion, salinity, and loss of soil structure and nutrients) and rehabilitate previously degraded land or land affected by Barrick activities.

The erosion and sediment control systems detailed in the approved CGM’s Erosion and Sediment Control Management Plan (Barrick, 2003e) would continue to be implemented for the Modification.

Rehabilitation monitoring at the approved CGM also includes monitoring of erosion incidence on rehabilitation areas (Section 5.7 and Appendix I). Erosion monitoring and measures to control erosion on rehabilitation areas would continue to be undertaken for the Modification.

5.4.5 Weed and Pest Control

**Pest Control**

Barrick would continue to undertake pest control activities in accordance with procedures detailed in the FFMP (Barrick, 2003f), the LMP (Barrick, 2003a) and the ROMP (Barrick, 2013b), including:

- regular property inspections to assess the status of pest populations on-site (including rehabilitation areas) and for all Barrick-owned land;
- mandatory pest control for declared pests (i.e. rabbits, pigs, wild dogs and plague locust species including the Australian Plague Locust, Migratory Locust and the Spur-throated Locust) in accordance with Pest Control Orders under the NSW Rural Lands Protection Act, 1998; and
- inspections to assess the effectiveness of control measures implemented and review these if necessary.

Barrick undertakes pest control activities in conjunction with adjacent landholders for more effective pest control. This process is facilitated via consultation with local landholders and landholder groups.
**Weed Control**

Weeds would continue to be managed in accordance with measures described in the LMP (Barrick, 2003a) and the ROMP (Barrick, 2013b). The weed management programme is aimed at minimising the possibility of new weed incursion and controlling the spread of any existing noxious weeds on-site (including rehabilitation areas) and on all Barrick-owned land.

The weed management programme includes the following measures:

- identification of noxious weeds by annual site inspections;
- communication with other landholders/leaseholders and regulatory authorities to keep weed management practices in line with regional weed control activities;
- mechanical removal of identified noxious weeds and/or the application of approved herbicides in authorised areas (herbicide use in wetland areas would be strictly controlled);
- implementation of follow-up site inspections to determine the effectiveness of the weed control measures;
- where practicable, prevention of the establishment of new weeds on Barrick-owned land by minimising seed transport of weed species through the use of a vehicle wash bay; and
- pest control activities.

Rehabilitation monitoring at the approved CGM also evaluates of floristic diversity and documents the presence of exotic plant species in the rehabilitation areas. If present, weed incursion is recorded and control measures implemented where necessary.

These measures would remain unchanged for the Modification.

**5.4.6 Bushfire Management**

Bushfire management at the approved CGM includes fuel management strategies, planning and implementation procedures for hazard reduction and strategies for reducing fire hazards and related risks on-site and on Barrick-owned land. These strategies and procedures would continue to be implemented for the Modification.

**5.5 REHABILITATION AND OFFSET MANAGEMENT PLAN**

A ROMP has been developed for the approved CGM in accordance with Development Consent (DA 14/98) Condition 3.6(d).

The ROMP would be revised (where necessary) to reflect the rehabilitation concepts for the CGM incorporating the Modification as described in Section 5.3, the proposed rehabilitation investigations and trials (Section 5.6), the proposed soil amelioration and management measures (Section 5.4.1) and any changes to the rehabilitation monitoring programme resulting from the Modification (Section 5.7).

The revised ROMP would be prepared in consultation with the relevant regulatory authorities and in consideration of the relevant DRE rehabilitation guidelines.

**5.6 REHABILITATION INVESTIGATIONS AND TRIALS**

Rehabilitation investigations and trials proposed for the Modification would be an extension of the trials undertaken to date and would include (Appendix I):

- **Material Amelioration** – continued investigation into the optimal soil treatment measures for stockpiled soil resources to improve their suitability for future rehabilitation use, including research into the detailed design concepts of the soil amelioration farm.
- **Rehabilitation Media** – continued investigation into the effectiveness of various applications associated with the rock mulch, topsoil and hay cover system in stabilising landform slopes (i.e. controlling erosion) and providing a suitable medium for revegetation.
- **Revegetation** – ongoing and new vegetation growth trials relevant to revegetation species suited to the surface rehabilitation materials of CGM final landforms, including the tailings storage facilities and waste rock emplacements, to refine revegetation objectives.

Rehabilitation of the CGM incorporating the Modification would continue to be an iterative process, whereby the results of the rehabilitation trials and monitoring would continue to be used to inform and refine the rehabilitation programme in consultation with relevant regulatory agencies.
A detailed description of the proposed rehabilitation investigations and trials is provided in Appendix I.

5.7 REHABILITATION MONITORING

The current rehabilitation monitoring programme implemented at the approved CGM would be applied to the additional rehabilitation areas resulting from the Modification. The current methodology includes landscape function analysis indicators, soil analyses indicators, an ecological assessment and rehabilitation performance indicators and completion criteria to assess the performance of rehabilitation areas.

As progressive rehabilitation of completed landform features (e.g. batter slopes) occurs, additional rehabilitation monitoring sites would be included in the monitoring programme to assess the performance of the rehabilitation areas.

Aspects of the current monitoring methodology may be refined to reflect the Modification (i.e. establishment of additional rehabilitation monitoring sites, identification of relevant reference sites representative of the Modification final landforms [if necessary], development of performance indicators and completion criteria relevant to the modified final landforms [if necessary] and incorporation of the conceptual rehabilitation domains).

A detailed description of the current rehabilitation monitoring methodology is provided in Appendix I.

5.7.1 Rehabilitation Performance Indicators and Completion Criteria

Rehabilitation performance indicators and completion criteria have been developed (based on monitoring data obtained from relevant reference sites) to assess rehabilitation performance at the approved CGM. These indicators and criteria are detailed in Appendix I.

The performance indicators and completion criteria developed by DnA Environmental (2011) have been based on five major stages of ecosystem development consistent with the DRE’s draft Rehabilitation and Environmental Management (REMP) Guidelines (NSW Department of Industry & Investment, 2010):

- landform establishment;
- growth medium development;
- ecosystem establishment;
- ecosystem development; and
- ecosystem sustainability.

Once the DRE’s REMP Guidelines are finalised and released, the indicators and criteria (Appendix I) would be updated to reflect the guidelines (if necessary).

If necessary, performance indicators and completion criteria would be developed should additional reference sites be incorporated into the rehabilitation monitoring programme which are considered representative of the Modification final landforms.

5.7.2 Ongoing Rehabilitation Evaluation

The existing monitoring data analysis, assessment and review process would continue to be implemented for the Modification.

Rehabilitation monitoring data would be used to:

- track revegetation and/or regeneration progress against performance indicators and completion criteria;
- assess the performance of landform design and rehabilitation concepts and methods;
- evaluate the effectiveness of environmental management measures/controls; and
- identify the requirement for intervention strategies or ameliorative/contingency measures.

The results of rehabilitation trials and investigations would continue to be used to inform and refine future rehabilitation concepts, practices and measures for the Modification.

Consistent with the approved rehabilitation programme (Barrick, 2009), rehabilitation performance for the Modification would be considered to be satisfactory when monitoring data indicates the completion criteria have been met.
5.8 MINE CLOSURE AND LEASE RELINQUISHMENT

Upon the cessation of mining operations, tenure of ML 1535 would be maintained by Barrick until such a time when lease relinquishment criteria have been met and rehabilitation is to the satisfaction of relevant regulatory authorities including the DRE and the DP&I. It is anticipated that lease relinquishment criteria would include:

- Rehabilitated landforms are stable and consistent with the nominated post-mining land use which has been developed in consultation with relevant regulatory agencies and key stakeholders.
- The water quality of Lake Cowal has not been detrimentally affected by the final landforms.
- Rehabilitated final landforms are indicative of a landscape on a trajectory towards a self-sustaining ecosystem and comprise self-sustaining native and/or endemic species characteristic of remnant vegetation communities in the surrounding landscape.
- All Mining Lease conditions (including public safety considerations) have been satisfied.
- Hard-stand areas and infrastructure have been removed (unless otherwise agreed with the ultimate landholder).


In accordance with Barrick internal requirements and standards, a Mine Closure Plan would be developed to reflect the Modification and would include proposed mine closure concepts and decommissioning management measures. Mine closure concepts and management measures would continue to be developed via the MREMP in consultation with the DRE and other relevant regulatory agencies.