



## **Cowal Gold Mine – Addendum to the Erosion and Sediment Control Management Plan**

On 22 July 2014, Barrick (Cowal) Pty Ltd (Barrick) was granted approval by the NSW Minister for Planning to modify the Development Consent (DA 14/98) for the Cowal Gold Mine (CGM) Extension Modification under Section 75W of the *Environmental Planning and Assessment Act, 1979*. The CGM Extension Modification involves the continuation and extension of open pit mining and processing operations at the CGM for an additional operational life of approximately 5 years (i.e. to 2024).

Key components of the modified layout of the CGM (relevant to the Erosion and Sediment Control Management Plan) include:

- construction of a new water supply storage (D10);
- modified design of contained water storage D5 to accommodate for the extension of the open pit;
- a revised rehabilitation cover system for outer batters of the waste rock emplacements, tailings storage facilities and lake protection bund to incorporate rock armouring;
- new soil stockpiles within the Internal Catchment Drainage System and a soil stockpile in the north of Mining Lease 1535; and
- construction of new pump station on the eastern side of Lake Cowal to improve the capacity/flow of the existing mine water supply pipeline, and an associated diesel generator and access track.

This addendum to the Erosion and Sediment Control Management Plan has been prepared to reflect the approved modification to the Development Consent.

COWAL GOLD MINE  
ADDENDUM TO THE EROSION AND SEDIMENT CONTROL  
MANAGEMENT PLAN



FEBRUARY 2015  
Project No. HAL-02-07  
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**ADDENDUM**  
**Erosion and Sediment Control Management Plan**

1. Replace Figure 1 with Figure 1 attached.
2. Replace the fourth paragraph of Section 3.3 with:

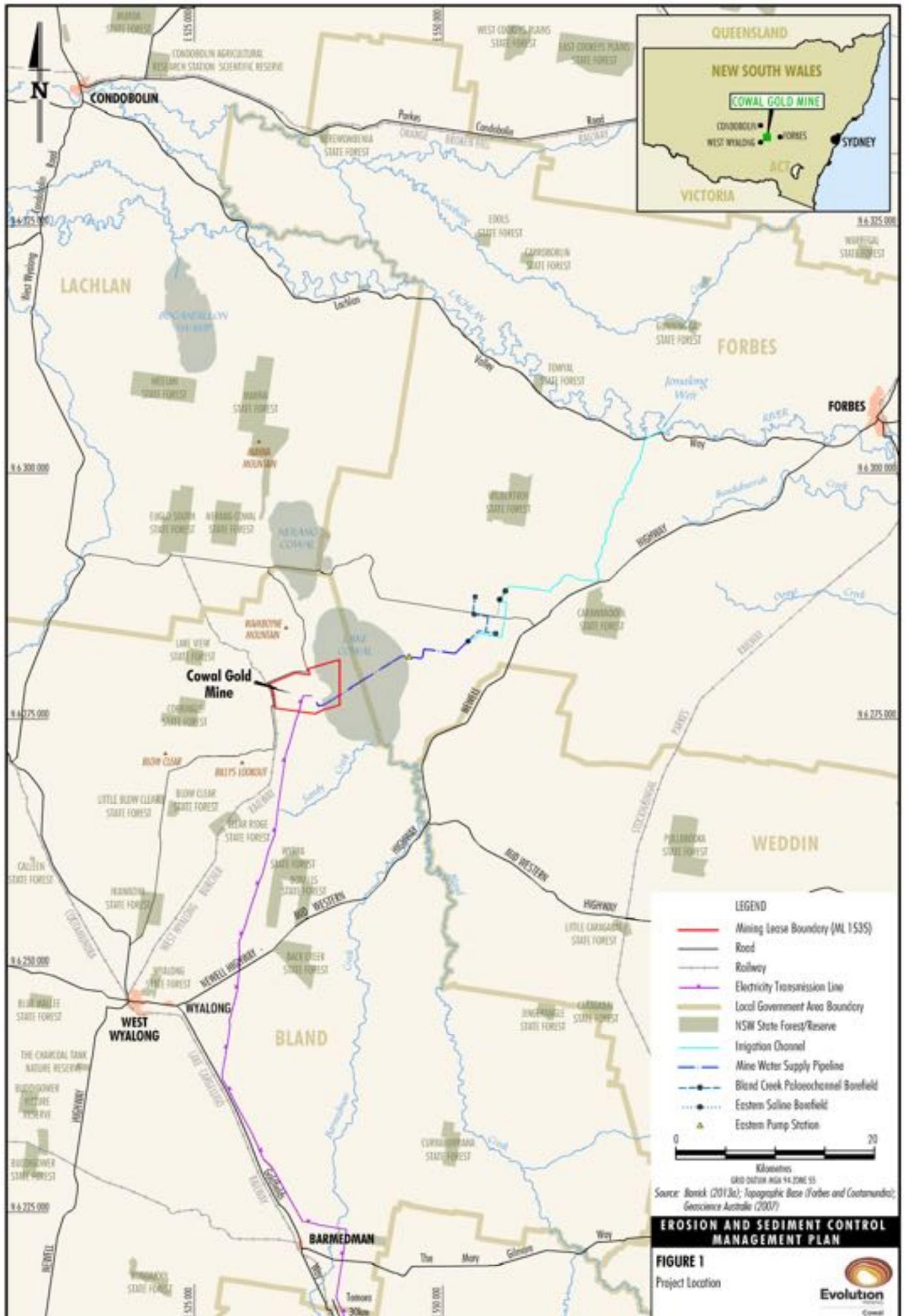
A summary of the function, design criteria and capacity of the contained water storages is provided in Table 3.

3. Replace Table 3 with:

**Table 3**  
**Summary of Contained Water Storages**

Storage Number	Catchment/Function	Design Criteria	Approximate Storage Capacity (ML)
D1 (Existing)	Runoff from northern perimeter of the northern waste rock emplacement. Collected water is pumped to D6.	Runoff from contributing catchment resulting from a 1 in 100 year ARI rainfall event of 48 hours duration	57
D2 (Existing)	Runoff/seepage from ROM and low grade stockpile areas from the northern waste rock emplacement area, the batters of the northern tailings storage facility and other areas within the ICDS. Collected water is pumped to D6 or D9.	Runoff from contributing catchment resulting from a 1 in 100 year ARI rainfall event of 48 hours duration	195
D3 (Existing)	Runoff from perimeter catchment surrounding the open pit and the perimeter waste rock emplacement areas. Collected water is pumped to D6.	Runoff from contributing catchment resulting from a 1 in 100 year ARI rainfall event of 48 hours duration	39
D4 (Existing)	Runoff from the southern perimeter of the southern waste rock emplacement. Collected water is pumped to D6 or D9.	Runoff from contributing catchment resulting from a 1 in 100 year ARI rainfall event of 48 hours duration	69
D5 (as modified for the CGM Extension Modification approved on 22 July 2014)	Process plant area drainage collection. Water is pumped to D6.	Runoff from a 1 in 1,000 year ARI storm of 48 hours duration	92
D6 (Existing)	Process water supply storage. Main source of process plant make-up water requirements.	Runoff from a 1 in 1,000 year ARI storm of 48 hours duration above normal operating level	10
D8B (Existing)	Runoff from southern waste rock emplacement, the batters of the southern tailings storage facility and other areas within the ICDS. Water is pumped to D9.	Runoff from contributing catchment resulting from a 1 in 100 year ARI rainfall event of 48 hours duration	43
D9 (Existing)	Process water supply storage. Storage for raw water. Water is pumped to D6. Some water used for tailings storage facilities lift construction.	Runoff from a 1 in 1,000 year ARI storm of 48 hours duration above normal operating level	726
D10 (additional storage for the CGM Extension Modification approved on 22 July 2014)	Process water supply storage. Storage for raw water. Water is pumped to D9.	Runoff from a 1 in 1,000 year ARI storm of 48 hours duration above normal operating level	1,500

4. Remove Table 4.



5. Replace Figure 4 with attached Figure 4.
6. Insert the following text after the first paragraph of Section 3.4.1(d):

Additional soil stockpiles will be constructed west of the northern waste rock emplacement within the Internal Catchment Drainage System and in the north of Mining Lease (ML) 1535 (Figure 4). The erosion and sediment control systems for the stockpiles within the Internal Catchment Drainage System will be as described in Section 3.3.1.

For the stockpile in the north of ML 1535, prior to placement of the topsoil, upslope runoff would be directed around the stockpile area via a system of diversions/drains/bunds. Runoff from the soil stockpile area itself would be directed to a sediment basin constructed at the eastern boundary of the stockpile area (Figure 4).

The upslope stockpile diversions and sediment basin would be constructed, operated and maintained in accordance with Landcom (2004) *Managing Urban Stormwater – Soils and Construction Volume 1* and Department of Environment and Climate Change (DECC) (2008) *Managing Urban Stormwater – Soils and Construction Volume 2E Mines and Quarries* (Gilbert and Associates Pty Ltd, 2013).

7. Under the subheading *Tailings Storages* in Section 3.4.2(b), replace the text under the Rehabilitation Objectives heading with:

The rehabilitation objectives for the tailings storages are (Barrick, 2013):

- to establish permanently stable landforms;
- during operations, stabilise batters so that they provide minimal habitat value for bird life (i.e. pasture cover);
- post-operations, to establish vegetative communities (including Eucalypt and Riverine woodland species and understorey species such as Rush sp. 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.

Consistent with the rehabilitation concepts for the outer batters of the waste rock emplacement's, benign primary waste rock mulch will be incorporated into the rehabilitation cover system for the outer batters of the tailings storage facilities to provide long-term stability, control surface water runoff downslope and reduce erosion potential. The rock mulch will be cross-rippled with topsoil along the contour of the slope to create 'troughs and banks' to further minimise the potential for erosion downslope and enhance vegetation establishment within the troughs.

Rehabilitation of the storage top surfaces can only be undertaken at the completion of milling. 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.



8. Under the subheading *Northern and Southern Waste Rock Emplacements* in Section 3.4.2(b), replace the fifth paragraph under the Erosion and Sediment Control System heading with:

Drainage on the top surfaces of the waste rock emplacements would be managed via a series of small shallow basins (depressions), and would include a rehabilitation cover system 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.

9. Under the subheading *Northern and Southern Waste Rock Emplacements* in Section 3.4.2(b), insert the following text after the second paragraph:

Rehabilitation Objectives

The rehabilitation objectives for the modified 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.

Based on the results of rehabilitation trials and research conducted to date, the rehabilitation cover system for the outer batters of the waste rock emplacements will include benign primary waste rock mulch to provide long-term stability, control surface water runoff downslope and reduce erosion potential. The rock mulch will be cross-rippled with topsoil along the contour of the slope to create 'troughs and banks' to further minimise the potential for erosion downslope and enhance vegetation establishment within the troughs.

Should the mineralised material emplacement (Figure 4) 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.

10. Under the subheading *Temporary Isolation Bund* in Section 3.4.2(c), insert the following text after the first paragraph:

To provide for future lake level rises, the height of the Temporary Isolation Bund will be raised by approximately 0.5 m and the outer batter slope of the bund will be rock armoured (with benign primary waste rock mulch) to protect against wave action from lake water.

11. Under the subheading *Lake Protection Bund* in Section 3.4.2(c), insert the following text after the third paragraph:

Consistent with the rehabilitation concepts for the outer batters of the waste rock emplacements and tailings storage facilities, benign primary waste rock mulch will be incorporated into the rehabilitation cover system for the outer batter of the Lake Protection Bund to provide long-term stability, control surface water runoff downslope and reduce erosion potential. The rock mulch will be cross-ripped with topsoil along the contour of the slope to create ‘troughs and banks’ to further minimise the potential for erosion downslope and enhance vegetation establishment within the troughs.

12. Under the subheading *Perimeter Waste Rock Emplacement* in Section 3.4.2(c), insert the following text after the third paragraph:

Consistent with the rehabilitation concepts for the outer batters of the waste rock emplacements and tailings storage facilities, benign primary waste rock mulch will be incorporated into the rehabilitation cover system for the outer batter of the Perimeter Waste Rock Emplacement to provide long-term stability, control surface water runoff downslope and reduce erosion potential. The rock mulch will be cross-ripped with topsoil along the contour of the slope to create ‘troughs and banks’ to further minimise the potential for erosion downslope and enhance vegetation establishment within the troughs.

13. After the last paragraph in Section 5 (Erosion and Sediment Control Systems – Borefield and Pipeline) (prior to Section 5.1) insert the following text (Note: with incorporation of the December 2009 Addendum, Section 4 of the ESCMP became Section 5):

Construction and operation of the eastern pump station for the Bland Creek Palaeochannel pipeline on the eastern side of Lake Cowal (Figure 1) (including the associated diesel generator and access track) will be undertaken in accordance with the construction and operation measures described in Section 5.1 and 5.2.

14. Replace Section 9 (Rehabilitation) with the following (Note: with incorporation of the December 2009 Addendum, Section 8 of the ESCMP became Section 9):

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, 2013). This philosophy has led to the rehabilitation principles and objectives as described below.

The rehabilitation programme would be undertaken in accordance with the following general principles (Barrick, 2013):

- 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, understorey, 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 rehabilitation programme.

- The annual rehabilitation programme and budget is to be prepared by a site team incorporating senior management representatives.

The rehabilitation objectives for the CGM 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 (Department of Environment, Climate Change and Water, 2010).
- 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.

As described in Section 3.4.2(b) and consistent with the approved CGM Rehabilitation Proposal described in the *Cowal Gold Mine Extension Modification Environmental Assessment* (Barrick, 2013), rehabilitation concepts for the outer batters of the waste rock emplacements, tailings storage facilities' and the lake protection bund will be rock armoured with primary waste rock mulch to provide long-term slope stability, control surface water runoff downslope and reduce erosion potential.

Rehabilitation concepts and measures are described in detail in the CGM's Rehabilitation Management Plan. Progressive rehabilitation works and proposed soil stripping works and areas will be detailed in the MOP in accordance with the requirements of the Conditions of Authority for ML 1535 and the NSW Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy's (2013) *ESG3: Mining Operations Plan (MOP) Guidelines*.

15. At the end of Section 13 (Annual Environmental Management Report) insert the following (Note: with incorporation of the December 2009 Addendum, Section 12 of the ESCMP became Section 13):

***Review of this ESCMP***

In accordance with Condition 9.1(c) of the Development Consent (as modified on 22 July 2014), this ESCMP will be reviewed, within three months of the submission of:

- an Annual Review under Condition 9.1(b);
- an incident report under Condition 9.3(a);
- an audit under Condition 9.2(a);
- an Annual State of the Environment Report under Condition 9.2(b);
- the approval of any modification to the conditions of the Development Consent; or
- any direction of the Secretary under Condition 1.1(c).

Where this review leads to revisions of the ESCMP, then within four weeks of the review, the revised ESCMP will be submitted for the approval of the Secretary of the Department of Planning and Environment (unless otherwise agreed with the Secretary).

This ESCMP will be made publicly available on Barrick's website ([www.barrick.com](http://www.barrick.com)), in accordance with Condition 9.4(a)(iii) of the Development Consent (as modified on 22 July 2014). A hard copy of the ESCMP will also be kept at the CGM.

16. Insert the following references into Section 14 (References) (Note: with incorporation of the December 2009 Addendum, Section 13 of the ESCMP became Section 14):

Barrick (Cowal) Limited (2009) *Cowal Gold Mine E42 Modification Modified Request Environmental Assessment*.

Barrick (Cowal) Limited (2013) *Cowal Gold Mine Extension Modification Environmental Assessment*.

Department of Environment and Climate Change (2008) *Managing Urban Stormwater – Soils and Construction Volume 2E Mines and Quarries*.

Department of Environment, Climate Change and Water (2010) *New South Wales Wetlands Policy*.

Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy (2013) *ESG3: Mining Operations Plan (MOP) Guidelines September 2013*.

Gilbert and Associates Pty Ltd (2013) *Cowal Gold Mine Extension Modification Hydrological Assessment*.

Landcom (2004) *Managing Urban Stormwater – Soils and Construction Volume 1*.

17. Insert the following Revision Status Register to the front page of the Erosion and Sediment Control Management Plan:

### Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DP&E Approval Date
All	ESCMP-O (September 2003) Document No. 684736	Original Erosion and Sediment Control Management Plan (ESCMP)	DLWC and EPA	September 2003
Annexure	ESCMP Amendments (i) to (v) (December 2004) Document No. 684887	Amendments to include additional water management and temporary erosion and sediment control measures prior to development of the CGM, and to remove contained water storage D7.	DLWC and EPA	21 December 2004
Addendum	Addendum dated December 2009 Document No. 684889	Revised to reflect Development Consent as modified on 28 August 2009 (in relation to introduction of the saline groundwater borefield within ML 1535).	DECCW, DoP	10 March 2010
Addendum	Addendum dated February 2015 Document No. 00653984	Revised to reflect Development Consent as modified on 22 July 2014.	DP&E	21 March 2016