Baralaba North Continued Operations Project

Environmental Impact Statement

SECTION 4

ROUTINE MATTERS

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4 ASSESSMENT OF ROUTINE MATTERS

This section provides an assessment of the routine matters identified in the Final ToR for the BNCOP (Attachment 1). The routine matters identified by DEHP are:

- land;
- visual character;
- biosecurity;
- waste management;
- cultural heritage;
- social and economic; and
- hazards and safety.

4.1 LAND

A description of the existing environment relating to land resources is provided in Section 4.1.2. Section 4.1.3 describes the potential impacts and Section 4.1.4 describes the proposed mitigation measures and management for land within the BNCOP Operational Land. A preliminary soil balance is provided in Section 5.3.2 (Table 5-1).

A Soil and Land Suitability Assessment was undertaken by Soil Mapping and Monitoring (2014) and is presented in Appendix J.

The Soil and Land Suitability Assessment has been prepared in accordance with the recognised industry standards and has been aligned with the requirements and recommendations specified by the DNRM.

4.1.1 Environmental Objectives and Performance Outcome

The relevant environmental objectives, as stated in the Final ToR, for land are that the:

- *activity is operated in a way that protects the environmental values of land including soils, subsoils and landforms;*
- *choice of the site, at which the activity is to be carried out, minimises serious environmental harm on areas of high conservation value and special significance and sensitive land uses at adjacent places;*
- *location for the activity on a site protects all environmental values relevant to adjacent sensitive use; and*
- *design of the facility permits the operation of the site, at which the activity is to be carried out, in accordance with best practice environmental management.*

The BNCOP would achieve the following performance outcome as identified in Schedule 5, Table 1 of the EP Regulation:

2 All of the following—

(a) activities that disturb land, soils, subsoils, landforms and associated flora and fauna will be managed in a way that prevents or minimises adverse effects on the environmental values of land;

(b) areas disturbed will be rehabilitated or restored to achieve sites that are—

(i) safe to humans and wildlife; and

(ii) non-polluting; and

(iii) stable; and

(iv) able to sustain an appropriate land use after rehabilitation or restoration;

(c) the activity will be managed to prevent or minimise adverse effects on the environmental values of land due to unplanned releases or discharges, including spills and leaks of contaminants;

(d) the application of water or waste to the land is sustainable and is managed to prevent or minimise adverse effects on the composition or structure of soils and subsoils.

4.1.2 Description of Environmental Values

To assist in protecting the environmental values within the BNCOP Operational Land, CCL aim to protect or enhance:

- the integrity of land and ecosystems at the BNCOP;
- the integrity of the topsoil as a resource to be used in rehabilitation;
- the stability of disturbed land and ensuring it is non-polluting;
- the suitability of the land to support beneficial post-mining land uses; and
- suitability of the land for agricultural use.

Topography and Landforms

The BNCOP is located in the Lower Dawson Sub-catchment Area of the Fitzroy Basin under the Water Resource (Fitzroy Basin) Plan 2011 (Qld) (Figure 2-10).

The topography of the Baralaba area is dominated by the Dawson River floodplain. The area is relatively flat with only slight undulation, with ground elevations ranging between 75 and 105 m AHD (Figure 2-20).

The Baralaba Township is sited adjacent to the Dawson River on relatively high ground, at approximately 93 m AHD. At 433 m AHD, Mount Ramsay is a key topographic feature in the region, located approximately 15 km south of Baralaba Township (Figure 2-20).

The development of the Baralaba Coal Mine and associated open cut mining area and spoil dumps (rising to a final height of approximately 136 m AHD after rehabilitation) have resulted in alteration of the surrounding topography.

The approved Baralaba North/Wonbindi North Mine would also result in alteration to the pre-mining topography of the locality.

Land Use

Land in the Baralaba area is predominately used for rural activities including dairy farming, beef cattle grazing and fattening, and limited crop cultivation.

Crops are generally restricted to providing forage for cattle, with Leucaena production well established within the area. Exotic improved pastures dominated by buffel grass are also common, while crops of cotton and wheat are produced on an opportunistic basis.

The properties on which the BNCOP would be located are consistent with the above land uses, and are used primarily for cattle grazing, with occasional cropping to provide fodder.

As described in Section 2.1.6, the BNCOP is located within zones identified and mapped as Priority Agricultural Areas (PAA) under the Central Queensland Regional Plan (DSDIP, 2013a) and includes areas mapped as potential SCL under section 25 of the SCL Act.

The BNCOP Operational Land is zoned as rural under the Duaringa Shire Planning Scheme 2011. Attachment 2 provides further information regarding local government planning schemes.

Soils

Soil surveys were undertaken within the BNCOP Disturbance Footprint and a wider soil investigation survey area to identify the principal soil types and their relative distribution.

The study was commissioned by CCL and undertaken by Soil Mapping and Monitoring (2014). The report is provided in Appendix J and details the soil landscape units identified.

Sixteen soil types were recognised and mapped within the BNCOP Disturbance Footprint (Figure 2-23). Of these, seven have been previously mapped and described within ML 80169 and ML 80170, nine are newly described and occur outside these leases. One additional soil type was mapped within the wider soil investigation survey area but does not occur within the BNCOP Operational Land and six soil types occur within the approved Baralaba North/Wonbindi North Mine (outside the BNCOP Disturbance Footprint). A detailed description of all 23 soil types identified within the wider soil investigation survey area can be found in Appendix J.

The main soil types mapped in the BNCOP Disturbance Footprint comprise Vertosols (37%), Sodosols (21%) and Chromosols (15%), while lesser areas of Kandosols, Dermosols and Tenosols were also observed (Appendix J).

Soil Condition

A broad range of soil physical and chemical constraints for agricultural land use were identified within the BNCOP Disturbance Footprint, including (Appendix J):

- dispersive subsoils;
- limited water holding capacity;
- subsoil salinity; and
- nutrient deficiencies.

A wide range of soil conditions were identified within the BNCOP Disturbance Footprint. Further detail on the condition of soils is provided in Appendix J.

Land Suitability

Land suitability mapping for the BNCOP Disturbance Footprint has been completed by Soil Mapping and Monitoring (2014) and is provided in Appendix J.

The land suitability assessment methodology described in the *Technical guidelines for Environmental Management of Exploration and Mining in Queensland* (Qld Department of Mines and Energy ([QDME], 1995) presents definitions, limitations, attribute values and subclass suitability rules for assessing the agricultural potential for both dryland cropping and grazing of lands within inland Qld.

The scheme uses a five class land suitability classification (Land Resources Branch Staff, 1990; DNRM/DSITIA, 2013a) with a common set of attributes/limitations, but separate decision rules for each land use.

The five standard suitability classes for semi arid land uses in Qld (namely dryland cropping and grazing) defined within the *Technical guidelines for Environmental Management of Exploration and Mining in Queensland* (QDME, 1995) are presented below (Appendix J):

- Class 1 - Suitable land with negligible limitations;
- Class 2 - Suitable land with minor limitations;
- Class 3 - Suitable land with moderate limitations;
- Class 4 - Marginally suitable land with severe limitations; and
- Class 5 - Unsuitable land with extreme limitations.

Further description of land use classifications is detailed in Appendix J.

Dryland Cropping

Land suitability assessment for dryland cropping for soils within the BNCOP Operational Land follows the framework and methodology prescribed in:

- *Guidelines for Agricultural Land Evaluation in Queensland* (DNRM/DSITIA, 2013b); and
- *Regional Land Suitability Frameworks for Queensland* (DNRM/DSITIA, 2013a).

Land suitability mapping for summer and winter dryland cropping has been prepared by Soil Mapping and Monitoring (2014) and is documented in Appendix J.

A summary of the spatial extent of the mapped land suitability classes for summer and winter dryland cropping within the BNCOP Disturbance Footprint is provided in Table 4-1.

Table 4-1
Land Suitability – Dryland Cropping

Land Suitability Class	Summer Area (ha)	Winter Area (ha)
1	-	-
2	5	-
3	91	5
4	68	91
5	1,322	1,390

Source: Appendix J.

Extreme climatic variability and the opportunistic nature of cropping in inland Central Qld mean soil moisture is the primary determinant for cropping success. Land suitability Classes 1, 2 and 3 for dryland cropping have only been assigned to soils with the capacity to store enough plant available moisture to effectively complete a crop cycle from planting to harvest with minimal in-crop rainfall events (Appendix J).

No Class 1 land was identified within the BNCOP Disturbance Footprint. Up to approximately 101 ha of the BNCOP Disturbance Footprint is suitable for dryland cropping (i.e. Classes 2 and 3) (Table 4-1). The remaining land is either marginal (Class 4) or unsuitable (Class 5) for summer cropping due to inherent soil and landscape constraints that directly limit cropping success (Appendix J).

The land suitability of the BNCOP Disturbance Footprint for winter dryland cropping is less than the summer dryland cropping (Table 4-1).

Grazing

Land suitability assessment for grazing within the BNCOP Disturbance Footprint follows the framework, methodology, criteria and decision rules (without change or addition) described in the *Technical Guidelines for Environmental Management of Exploration and Mining in Queensland* (QDME, 1995) (Appendix J).

A summary of the spatial extent of suitable grazing areas within the BNCOP Disturbance Footprint is presented in Table 4-2 (Appendix J).

Table 4-2
Land Suitability – Grazing

Land Suitability Class	Area (ha)
1	-
2	365
3	310
4	713
5	98

Source: Appendix J.

All soils within the BNCOP Disturbance Footprint are suited to grazing of some form (e.g. fattening, growing or breeding) (Appendix J).

Agricultural Land Class

Agricultural Land Class (ALC) in Qld has recently been revised (DNRM/DSITIA, 2013a) and now follows a simple, consistent hierarchical scheme that is applicable across the state. Three classes of agricultural land and one class of non-agricultural land are defined (DNRM/DSITIA, 2013a):

- Class A – crop land;
  - A1 – broadacre and horticultural crops;
  - A2 – horticultural crops only;
- Class B – limited crop land;
- Class C – pasture land;
  - C1 – sown or native pastures;
  - C2 – native pastures;
  - C3 – light grazing of native pastures; and
- Class D – non-agricultural land.

The classes indicate a decreasing range of land use choice, an increasing range of land use limitations and an increasing land degradation hazard (Appendix J). Further definition and description of ALC is provided in Appendix J.

Regional ALC mapping is presented in the Duaringa Shire Planning Scheme 2011. The regional mapping includes Classes A, B, C1 and C2 within the BNCOP Disturbance Footprint and surrounds.

ALC mapping within the BNCOP Disturbance Footprint has been prepared by Soil Mapping and Monitoring (2014) and is documented in Appendix J. Table 4-3 presents the extent of ALC classes in the BNCOP Disturbance Footprint.

Table 4-3
Agricultural Land Classification

Agricultural Land Classification	Area (ha)
A1	96
A2	-
Total A	**96**
Total B	**68**
C1	546
C2	776
C3	-
Total C	**1,322**
Total D	-

Source: Appendix J.

No Class D land was identified within the BNCOP Disturbance Footprint. Up to approximately 1,322 ha of the BNCOP Disturbance Footprint is pasture land (i.e. Class C). The remaining 164 ha is either crop land (Class A) or limited crop land (Class B) (Appendix J).

Stock Route Network

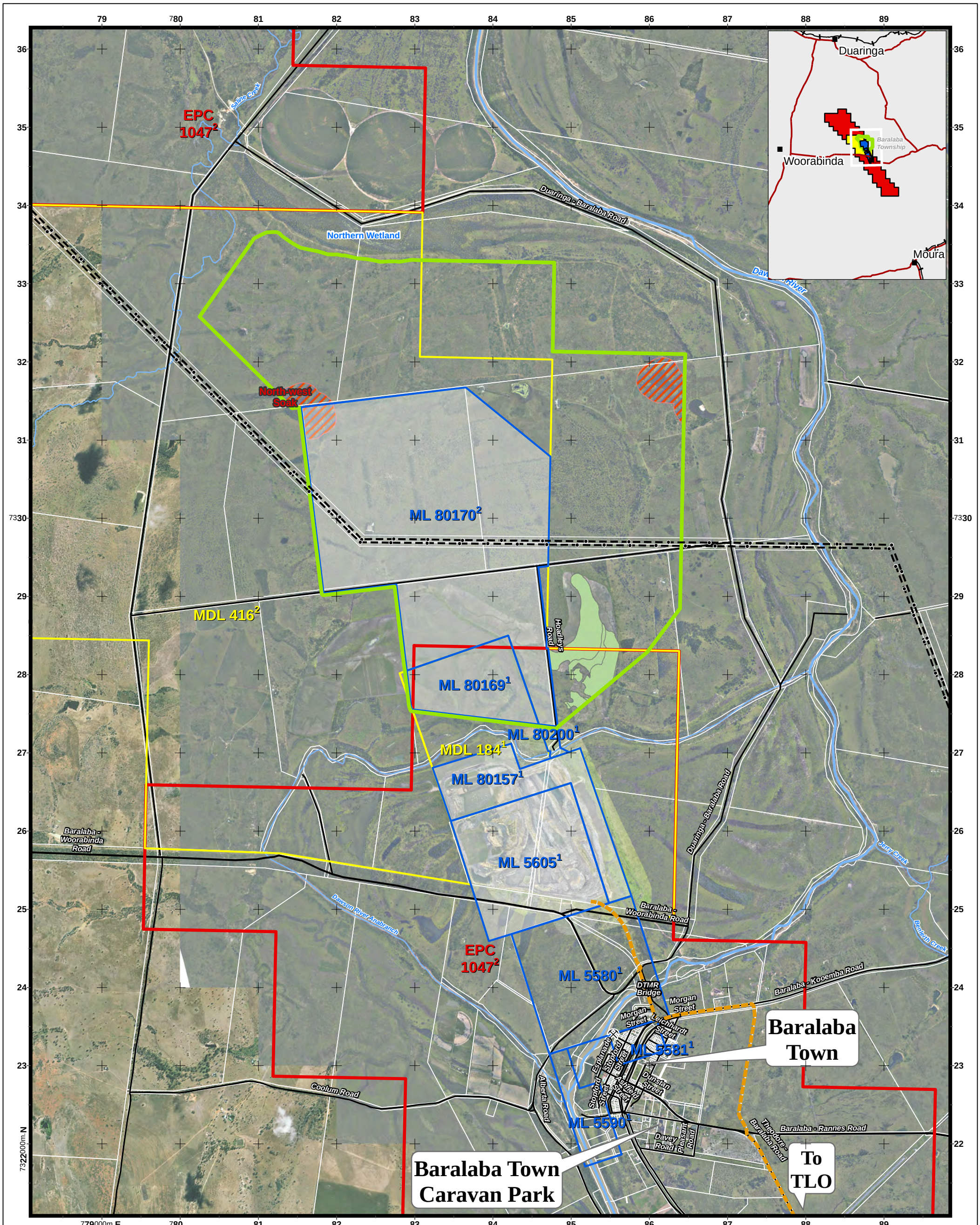
No areas of Travelling Stock Route occur within the BNCOP Disturbance Footprint and as such the BNCOP would not have any impact on a Travelling Stock Route.

Strategic Cropping Land

The BNCOP Disturbance Footprint lies within the Western Cropping Zone (WCZ) of the Strategic Cropping Management Area (DNRM 2011b, 2011c) (Figure 2-14). SCL trigger mapping produced by DNRM (2011a) indicates 'likely' (or potential) SCL triggered by the BNCOP Disturbance Footprint is an area of approximately 118 ha. The triggered land is confined to the southern end of the BNCOP Disturbance Footprint, and is wholly contained within one property (Appendix J) (Figure 4-1).

Soil Mapping and Monitoring (2014) conducted assessments in accordance with recognised standard land resource survey methodologies and analytical procedures (Isbell, 1996; McKenzie *et al*., 2002, 2008; National Committee on Soil and Terrain, 2009; and Rayment and Lyons, 2011) and concluded:

- 66.1 ha of decided SCL that complies with all SCL requirements (i.e. qualifies for relevant cropping history, complies with Zonal Criteria and meets minimum size requirements);



PROJECT **BARALABA NORTH CONTINUED OPERATIONS PROJECT**	DISCLAIMER: Cockatoo Coal Ltd has exercised all due care in the production of this map. Cockatoo Coal Ltd makes no warranty or representation to the client or third parties (expressed or implied) in respect to the information conveyed on this map, particularly with regard to any commercial investment decision made on the basis of this map. Use of this map by the client or third parties shall be at their own risk, and extracts from this map may only be published with the permission of Cockatoo Coal Ltd.			N 0 500 1,000 1,500 2,000 Metres		DATA SOURCES: VECTOR DATA: © DERM - LAND & PROPERTY DATA © GEOSCIENCE AUSTRALIA © SOIL MAPPING AND MONITORING, 2014 *PUBLICLY ACCESSIBLE DATA HAS BEEN INCORPORATED INTO THIS MAP (ACCREDITED ABOVE). COCKATOO COAL PROVIDES NO WARRANTY TO THE ACCURACY, COMPLETENESS OR CURRENCY OF THIS DATA.* *NOTE:* *¹ : HELD BY BARALABA COAL PTY LTD* *² : HELD BY WONBINDI COAL PTY LTD*
TITLE **Figure 4-1** **Strategic Cropping Land Identified within the BNCOP Disturbance Footprint**	REV	DESCRIPTION	DATE	SCALE **1:45,000**	CURRENT ISSUE SIGNATURES	
	0	Original map output	19/03/14	SIZE A3	DRAWN	MJS
	1	Data & Text Updates	01/04/14	DATUM GDA 94	CHECKED	BJD
	2			PROJECTION MGA Zone 55	APPROVED	BJD

Legend

Road..... Watercourse..... Cadastre..... Cockatoo Coal ML..... Cockatoo Coal MDL..... Cockatoo Coal EPC..... Area of Exclusion of Mining Activities.....

Product Road Transport Route. Powerline & Power Pole..... BNCOP Operational Land..... Clean Water Drain..... Dirty Water Drain..... Proposed Flood/Erosion Protection Levee..... SCL Area.....

Cockatoo Coal Limited

STATUS **FINAL**

PROJECT NO	DRAWING NO
Baralaba Nth	BBN-095-05-02-140410

Path: N:\Baralaba\Baralaba_North\PROJECTS\1403\BBN_095_140312_EIS_Section4_Figures\BBN_095_05_02_140410_SCL_in_BNCOP_A3P.mxd

- 3.5 ha of decided non-SCL that is otherwise compliant but does not meet minimum size requirements (i.e. excised land due to fragmentation by dissected slopes >3%); and
- 48.4 ha of decided non-SCL that fails to comply with Zonal Criteria 1, 6, 7 or 8.

Decided SCL areas within the BNCOP Disturbance Footprint can be seen on Figure 4-1.

Soil Mapping and Monitoring (2014) recommend that the above findings be validated and recorded as decided SCL and decided non-SCL (Appendix J).

SCL trigger areas that lie within the western section of the BNCOP Operational Land (i.e. ML 80169 and ML 80170) have been previously mapped (North Queensland Soil Assessment, 2011a, 2011b) and subsequently assessed, submitted, validated and mitigated for SCL status (Section 5.9) and were therefore not considered as part of the Soil and Land Suitability Assessment (Appendix J).

Priority Agricultural Areas

The BNCOP is located within zones identified and mapped as PAAs under the Central Queensland Regional Plan (DSDIP, 2013a) (Figure 2-13). PAAs are identified in the plan and comprise the region's strategic areas containing highly productive agricultural land uses. In these areas, Priority Agricultural Land Uses (PALUs) are the land use priority (Appendix J).

PALUs within the PAAs would be recognised as the primary land use and given priority over any other proposed land use. PAA co-existence criteria would enable compatible resource activities, such as the BNCOP, to co-exist with high value agricultural land uses within PAAs. DSDIP has yet to finalise any such criteria (Appendix J).

Native Title

Native Title has been extinguished over all lots within the BNCOP Operational Land under sections 15 and 23C of the *Native Title Act 1993* (Cth) due to freehold grants.

Existing Tenures

The BNCOP Operational Land would be located within two existing petroleum tenures. These are held by Arrow Energy Pty Ltd (EPP 831) and OME Resources Australia Pty Ltd (ATP 758) (Figure 2-18).

The granting of the ML for BNCOP is conditional upon CCL entering into co-development agreements with holders of petroleum leases (Arrow Energy Pty Ltd and OME Resources Australia Pty Ltd) under section 318CB of the MR Act. Attachment 2 provides further detail regarding these tenures.

Contaminated Land

A Contaminated Land Assessment was undertaken for the BNCOP by Environmental Earth Sciences QLD (EES) (2013) and is presented in Appendix K. The Contaminated Land Assessment was in the form of a *Stage 1 – Preliminary Site Investigation* which was prepared in accordance with the *Guidelines for Contaminated Land Professionals* (DEHP, 2012).

The preliminary site investigation, undertaken by EES, included an assessment of the BNCOP Disturbance Footprint history and contaminated land database search, site inspection and soil sampling. The preliminary site investigation covered the BNCOP Disturbance Footprint and a small parcel of CCL-owned land adjacent to the BNCOP Disturbance Footprint. The Baralaba Coal Mine and approved Baralaba North/Wonbindi North Mine area was not assessed as CCL has already been granted EAs for mining activities to commence in this area (EPML00223213 – Baralaba Coal Mine; and EPML00617113 – Baralaba North/Wonbindi North Mine).

The findings of the preliminary site investigation indicate that the majority of the BNCOP Disturbance Footprint has been used for cattle grazing since European settlement, and activities within the BNCOP Disturbance Footprint have been associated with grazing improvements including land clearing, fencing and provision of stock watering facilities.

The DEHP's Environmental Management Register (EMR) and Contaminated Land Register (CLR) were searched on 18 October 2013 for any records occurring on or near the BNCOP Disturbance Footprint. No records were identified (Appendix K).

Based on the preliminary site investigation, undertaken in accordance with the *Guidelines for Contaminated Land Professionals* (DEHP, 2012), no evidence of contamination or previous contaminating activities was found within the BNCOP Disturbance Footprint. As such, no further investigation or assessment is required and the BNCOP Disturbance Footprint is suitable for the intended use of the BNCOP.

4.1.3 Potential Impacts

Landforms and Topography

The BNCOP would alter the landforms and topography within the BNCOP Operational Land. Some topographic changes would be temporary (i.e. temporary bunds/levees and drains) while others would be permanent (i.e. rehabilitated BNCOP landforms) (Figure 5-1).

The extent of the approved Baralaba North/Wonbindi North Mine spoil dumps would be increased to the north, west and east by the BNCOP.

Waste rock mined during the development of the BNCOP would be disposed of in the Baralaba Central void or behind the advancing open cut operations in the Baralaba North pit as well as being placed in out-of-pit spoil dumps. The out-of-pit spoil dumps would not exceed 148 m AHD with the largest dump occurring to the east of the Baralaba North pit. At the cessation of mining one final void would remain (Figure 5-1).

A range of lesser topographic changes would be associated with the construction of roads, water management structures and erosion and sediment control features over the life of the BNCOP.

Soils

Potential impacts of the BNCOP on soils would relate primarily to:

- disturbance of soil resources within additional disturbance areas (e.g. development of the new open cut mining area);
- alteration of soil structure beneath infrastructure and roads;
- possible soil contamination resulting from spillage of fuels, lubricants and other chemicals;
- increased erosion and sediment movement due to exposure of soils during construction; and
- alteration of physical and chemical soil properties (e.g. structure, fertility and permeability) due to soil stripping and stockpiling operations.

Land Use – Agricultural Activities and Productivity

The BNCOP would result in the disturbance or alteration of existing agricultural lands in the short term. As shown in Tables 4-1 and 4-2, the majority of the BNCOP Disturbance Footprint has been identified as Land Suitability Class 4 (marginal land with severe limitations) or Class 5 (unsuitable land with extreme limitations).

In the long term, rehabilitation of the BNCOP Operational Land would result in areas suitable for agriculture as detailed below.

The following areas would be rehabilitated to Land Suitability Class 4:

- the backfilled voids (i.e. in-pit spoil dumps);
- the upper surface of elevated landforms; and
- the slopes of infrastructure areas.

The slopes of the elevated landforms would generally range between 10 to 15% and be rehabilitated to Land Suitability Class 5. The potential impact of the BNCOP on agricultural activities and productivity would be low based on:

- the proposed post-mining Land Suitability Classes proposed by CCL;
- the low quality of the existing agricultural lands;
- the relatively small area of decided SCL area; and
- the approved disturbance associated with the Baralaba North/Wonbindi North Mine.

Contaminated Land

Known or Potential Sources

EES (Appendix K) identified two areas of potential soil contamination on CCL-owned land outside and adjacent to the BNCOP Disturbance Footprint (i.e. a workshop area and cattle dip and yards). As both these areas are located outside the BNCOP Disturbance Footprint and CCL does not propose to utilise this land as part of the BNCOP, the areas do not pose a risk and are not discussed further in the EIS.

No known or potential sources of contaminated land relevant to past land use have been identified within the BNCOP Disturbance Footprint, therefore it is suitable for the intended use of the BNCOP (Appendix K).

Proposed Land Use

Proposed land uses that may result in land becoming contaminated are known as 'Notifiable Activities' and are listed in Schedule 3 of the EP Act.

The BNCOP would result in the extension and increased utilisation of existing facilities as well as the construction of a MIA. As a result, the following Notifiable Activities are relevant to the BNCOP:

- 7 – Chemical storage (other than petroleum products or oil under item 29).
- 15 – Explosives production or storage.
- 24 – Mine Wastes.
- 29 – Petroleum product or oil storage.
- 37 – Waste storage, treatment or disposal.

Inappropriate storage, handling and management of chemicals, explosives and wastes could result in land at the BNCOP becoming contaminated and listed on the EMR or CLR.

CCL would implement mitigation measures and management (Section 4.1.4) to prevent or reduce the potential for contamination within the BNCOP Operational Land.

Unexpected Occurrences of Land Contamination

Over the life of the BNCOP, unexpected soil contamination may be identified as a result of inappropriate waste management strategies.

If evidence of unexpected contamination is identified, work would cease in that area and action taken to appropriately delineate the contaminated soil or fill material.

Examples of such material may include (but are not limited to):

- buried or hidden rubbish, including containers that may have held chemicals or oil;
- previously unidentified fill material, other than waste rock (i.e. ash); or
- odorous or oily stained soil or fill material.

In accordance with the EP Act, this material would be managed or remediated and validated under supervision of a suitably qualified person. DEHP would be notified by telephone, as well as by written notification within 24 hours of detection and advised of appropriate remedial action.

Cumulative Impacts

The BNCOP would include 1,486 ha of land disturbance in addition to that already disturbed at the Baralaba Coal Mine and approved disturbance at the Baralaba North/Wonbindi North Mine. As detailed in Section 4.1.2, the majority of the BNCOP Disturbance Footprint has been identified as Class 4 (marginal land with severe limitations) or Class 5 (unsuitable land with extreme limitations). The disturbance of these areas is predicted to be short-term.

With the implementation of mitigation measures and management, the BNCOP is not expected to result in the proposed land becoming contaminated and as a result, cumulative impacts with nearby projects would not be expected to occur.

The BNCOP would result in a single final void within the BNCOP Operational Land (Figure 5-1). As the Baralaba Central void would be backfilled during operations at the BNCOP and the closest operating mine (Dawson Mine) is approximately 45 km south-east of the BNCOP Operational Land there is expected to be no significant cumulative impacts associated with the BNCOP final void. Cumulative drawdown impacts, including the Baralaba South Project, were assessed in the Groundwater Modelling and Assessment (HydroSimulations, 2014). It was concluded that, drawdown effects are small at the BNCOP, with maximum cumulative drawdown predicted to be <1 m at all bores (Appendix D).

Given the above, it is expected that the cumulative land impacts as a result of the BNCOP and surrounding operations is considered to be low.

4.1.4 Mitigation Measures and Management

Soils and Erosion Potential

General soil resource management practices would include the stripping and stockpiling of soil resources for use in rehabilitation. The objectives of soil resource management for the BNCOP Operational Land would be to:

- identify and quantify potential soil resources for rehabilitation (Section 5.3 and Appendix J);
- optimise the recovery of useable soil reserves during soil stripping operations;
- manage soil reserves so as not to degrade the resource when stockpiled; and
- establish effective soil amelioration procedures to maximise the availability of soil reserves for future rehabilitation works.

When managed in accordance with the Topsoil Management Plan, there should be no significant limitations to the use of topsoil material in rehabilitation.

Surface runoff from the spoil dumps would be directed to dedicated sediment dams. If necessary, perimeter drains would be installed around the toe of the spoil dumps.

During mine operations, erosion and sediment control structures would be designed and installed in accordance with the Best Practice Erosion and Sediment Control (IECA, 2008) and Soil Erosion and Sediment Control Engineering Guidelines for Queensland Construction Sites (Institute of Engineers Australia [IEAust] [Qld], 1996).

Erosion and sediment control structures would not be removed until disturbed areas have been stabilised and there is at least 70% ground cover vegetation.

Recommended topsoil stripping depths and further detail regarding control measures are detailed in Sections 5.3.2 and 5.3.3.

Land Use – Agricultural Activities and Productivity

Agricultural land resource management at the BNCOP would include the following key components:

- minimisation of disturbance to agricultural lands, where possible;
- management of soil resources within the BNCOP Operational Land so that they can be used for rehabilitation; and
- inclusion of agricultural lands in the BNCOP rehabilitation strategy.

As described in Section 4.1.3, rehabilitation of the BNCOP Operational Land would result in the backfilled voids (i.e. in-pit spoil dumps), the upper surface of elevated landforms and the slopes of infrastructure areas being suitable for agriculture (Class 4 land capability classification).

As part of the Rehabilitation Monitoring Program, CCL would monitor areas designated to be returned to SCL within the approved Baralaba North/Wonbindi North Mine for assessment against the SCL criteria defined in the SCL Act for the Western Cropping Zone (WCZ).

Contaminated Land

Measures used to prevent or reduce the potential for contamination of land from fuel, oils and chemical storage would include the following:

- hydrocarbon and chemical storage areas would be designed and bunded in accordance with Australian Standard (AS) 1940:2004 *The storage and handling of flammable and combustible liquids*;
- spill kits located adjacent to all petroleum and chemical storage areas and mobile spill kits installed on service vehicles;
- a register of spill kits would be maintained and all kits inspected for completeness at least quarterly;
- training of appropriate staff in the prevention of spills and the use of spill kits;
- explosives storage would be managed in accordance with AS 2187:2006 *Explosives – Storage, transport and use*; and
- waste oil and other chemicals would be stored in contained areas to minimise contamination risk.

Waste management strategies are discussed in detail in Section 4.4.

4.2 VISUAL CHARACTER

The following sub-sections present an assessment of potential visual impacts associated with the BNCOP. The potential visual impact was assessed through evaluating the level of visual modification associated with the BNCOP, in the context of the visual sensitivity of relevant surrounding land use areas (i.e. those areas from which the BNCOP may be visible).

4.2.1 Environmental Objective

The relevant environmental objective, as stated in the Final ToR, for visual character is that the:

- *activity is operated in a way that protects the environmental values of land including soils, subsoils and landforms.*

4.2.2 Description of Environmental Values

The area surrounding the BNCOP comprises a number of distinct land use types and landscape units of varying levels of quality which contribute to the environmental values of the area. These have been identified as follows:

- agricultural areas/rural setting;
- Baralaba North/Wonbindi North Mine (including approved landforms);
- Baralaba Coal Mine (including rehabilitated landforms);
- Baralaba Township;
- residential dwellings;
- local roads;
- Dawson River;
- Dawson River Anabranch;
- Dawson River floodplain;
- Saline Creek;
- Northern Wetland;
- Mount Ramsay (433 m AHD at its summit);
- Dawson Range State Forest;
- Redcliffe State Forest;
- Roundstone State Forest; and
- Dawson River Conservation Park.

The visual settings discussed below (e.g. local, sub-regional and regional) are based on distance from the BNCOP as follows:

- Regional Setting – greater than 5 km.
- Sub-regional Setting – 1 to 5 km.
- Local Setting – up to 1 km.

Regional Setting (>5 km)

Since the commencement of European settlement, the region has been altered by clearing for agriculture throughout the Dawson River floodplain, which dominates the visual landscape. The most noteworthy visual feature of the region is Mount Ramsay (located approximately 15 km south of the BNCOP Operational Land), which rises to approximately 433 m AHD (Figure 2-20).

The Dawson Range State Forest, Redcliffe State Forest, Roundstone State Forest and Dawson River Conservation Park all occur within the BNCOP Regional Setting (Appendix A).

The presence of these conservation areas along with Mount Ramsay, the Dawson River (including its associated anabranch, creeks and wetlands) and the vegetation associated with the Dawson River floodplain provides attributes consistent with moderate to high scenic quality to the regional setting.

Towns within the BNCOP regional setting include Duaringa (to the north), Moura (to the south) and Biloela (to the south-east).

The BNCOP regional setting also has attributes of low to moderate scenic quality associated with low topographic variation and cleared agricultural lands with scattered remnant vegetation.

Sub-regional Setting (1 to 5 km)

The topography of the sub-regional setting is dominated by the Dawson River floodplain. The area is relatively flat with only slight undulation, with ground elevations ranging between 75 and 105 m AHD. The Baralaba Township is sited adjacent to the Dawson River on relatively higher ground, at approximately 93 m AHD (2-20).

The Dawson River (including the surrounding vegetation), Dawson River Anabranch, Saline Creek and the Northern Wetland are of moderate to high scenic quality. The remainder of the sub-regional setting is of moderate scenic quality due to the cleared agricultural land and scattered remnant vegetation.

In addition to the Dawson River, Dawson River Anabranch and the Baralaba Township, the sub-regional setting contains several rural dwellings and local roads (which are assessed in Section 4.2.3).

The BNCOP sub-regional setting also has attributes of low to moderate scenic quality associated with the Baralaba Township, Baralaba Coal Mine and a number of rural residences.

Local Setting (up to 1 km)

The local setting has been modified over time with the majority of vegetation disturbed by agricultural clearing and mining activities.

Although the Baralaba North/Wonbindi North Mine is not fully constructed, the approved infrastructure and associated structures are considered to be a part of the existing landscape for the purposes of this assessment. These include the approved spoil dumps, pit and mine access roads.

The Northern Wetland and Saline Creek contain remnant native vegetation and are of moderate scenic quality.

Whilst there are patches of remnant vegetation within the local setting, the Baralaba Central and Baralaba North pits at the Baralaba Coal Mine and approved Baralaba North/Wonbindi North Mine, existing infrastructure (including the Powerlink ETL) and existing/approved spoil dumps give the local setting a low to moderate scenic quality.

Sensitive Visual Settings

It should be noted that the majority of locations with potential views of the BNCOP landforms already have views of the existing Baralaba Coal Mine and will eventually have views of the approved Baralaba North/Wonbindi North Mine.

The main issues to consider in the assessment of visual impacts are the number of sensitive viewing locations and the level to which the proposed works are visible (i.e. if the works are not seen, there is no impact).

The most visually sensitive locations in the vicinity of the BNCOP are privately owned rural residences and local roads. The potential views of the BNCOP from these locations would vary depending on the intervening topography and vegetation occurring between the sensitive location and the BNCOP. The distance from the BNCOP would also contribute to the potential views from each sensitive location.

Potential views of the BNCOP may be available from the following locations:

- rural residences to the east and west of the BNCOP Operational Land;
- Duaringa-Baralaba Road looking south and west towards the BNCOP Operational Land; and
- Olinda Road looking west towards the BNCOP Operational Land.

Views from the north would be limited due to the foreground vegetation associated with the Northern Wetland and Saline Creek.

Potential views from the Baralaba Township would also be limited from the south due to intervening vegetation and slight undulation.

4.2.3 Potential Impacts

The major components of the BNCOP which are considered to change and therefore potentially impact the visual landscape include:

- additional clearance and disturbance of vegetation within the BNCOP Operational Land;
- modification of approved topographical features including expanded placement of waste rock in out-of-pit spoil dumps (when compared to the approved Baralaba North/Wonbindi North Mine);
- extension of the Baralaba North pit;
- construction of flood levees and erosion protection levees; and
- lighting associated with night-time mining operations (including operation of the new CHPP).

Visual Impact Assessment Methodology

The methodology employed for this visual assessment included an analysis of the setting of the sensitive locations and assessment of the potential impacts associated with the BNCOP. The key factors considered as part of this assessment include sensitive land uses (e.g. residential areas, public roads and natural/recreation areas) and the visual form, scale and colour of the development.

The potential visual impacts of the BNCOP were qualitatively assessed using the techniques developed by EDAW (2006) which are largely based on those developed by the United States Department of Agriculture – Forestry Service (1974). The potential visual impacts were assessed by evaluating the level of visual modification of the development in the context of the visual sensitivity of relevant surrounding land use areas from which the BNCOP may be visible.

The level of visual modification of a proposed development can be measured as the level of visual contrast between the development and the existing visual environment.

Throughout the visual catchment (or zone of visual influence) the level of visual modification generally decreases as the distance from the development to various viewpoint locations increases, and is characterised as follows:

- Negligible (or very low) level of visual modification – where the development is distant and/or relates to a small proportion of the overall view.
- Low level of visual modification – where there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape. In this situation the development may be noticeable, but does not markedly contrast with the existing modified landscape.
- Moderate level of visual modification – where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- High level of visual modification – where the major components of the development contrast strongly with the existing landscape.

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed from various use areas, and is a function of both land use and duration of exposure (i.e. individuals generally perceive changes to the visual setting of their dwelling more critically than changes to the visual setting of the broader area in which they travel or work).

The visual sensitivity of the development depends on a range of viewer characteristics. The primary characteristics used in this visual assessment are land use, the distance to the BNCOP Operational Land and BNCOP landforms from viewers and its visibility from critical viewpoints. Typical visual sensitivity levels are presented in Table 4-4.

Visual Simulations

Visual simulation locations for the assessment were chosen based on the most potentially sensitive visual settings/land uses which would be routinely accessed or readily accessible and could be representative of the range of potential views of the BNCOP. The viewpoints represent locations within the regional (>5 km), sub-regional (1 to 5 km) and local (<1 km) settings.

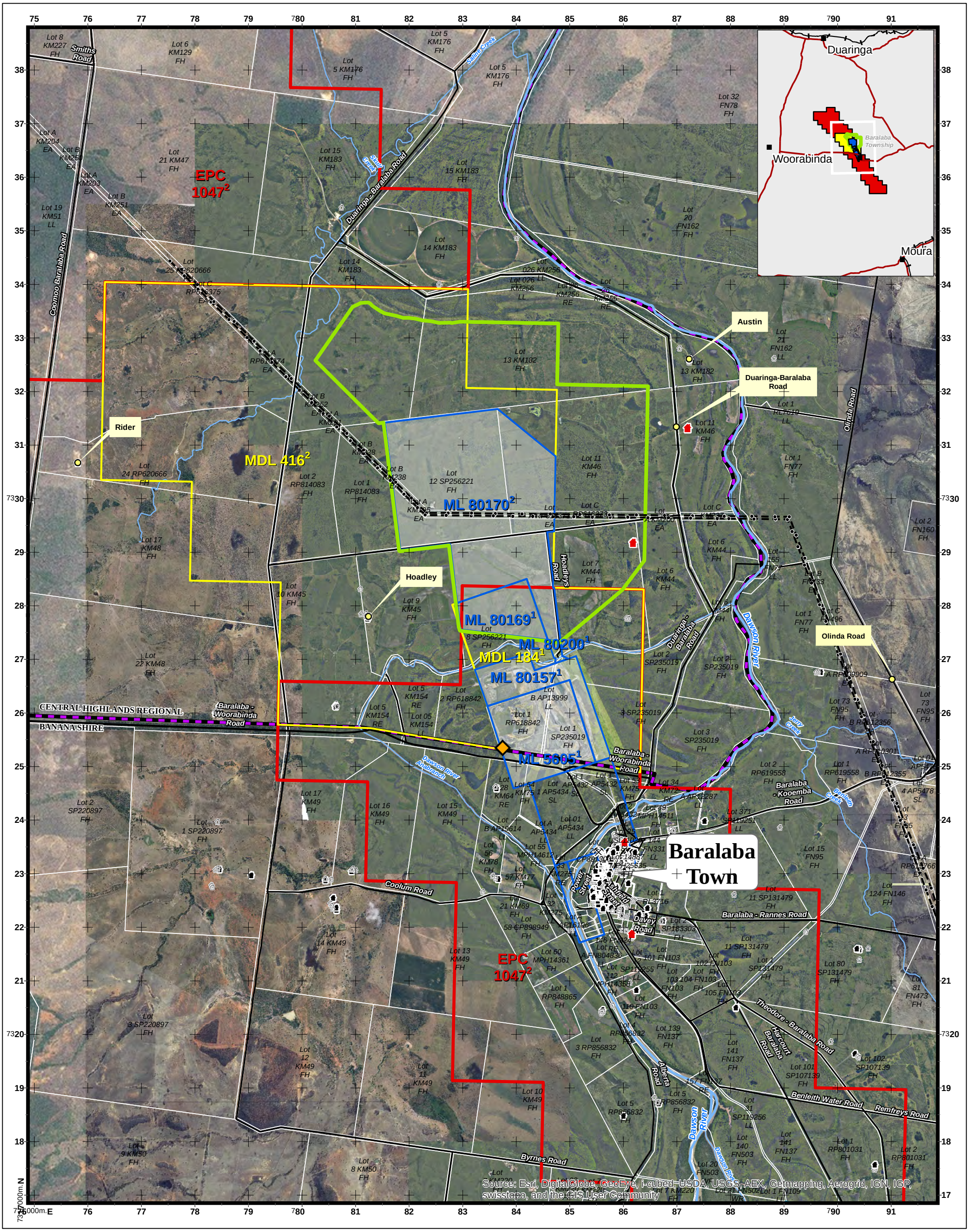
The visual simulation locations chosen for the assessment are shown on Figure 4-2.

Three visual simulations were prepared for each location (Figures 4-3 to 4-7) to show existing views as well as simulations of the landforms of the BNCOP. The visual simulations represent operations during the year of maximum impact and final (rehabilitated) landforms (end of mine).

Table 4-4
Typical Visual (Viewer) Sensitivity Levels

Use Area	Local Setting		Sub-Regional Setting		Regional Setting
	0-0.5 km	0.5-1 km	1-2.5 km	2.5-5 km	> 5 km
Natural Area – Recreation	High	High	High	Moderate	Low
Residential – Rural	High	High	High	Moderate	Low
Tourist Roads	High	Moderate	Moderate	Low	Low
Other Main Roads	Moderate	Low	Low	Low	Low
Local Roads	Low	Low	Low	Low	Low
Industrial Areas	Low	Low	Low	Low	Low

Source: EDAW (2006).



PROJECT

BARALABA NORTH CONTINUED OPERATIONS PROJECT

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N
0 500 1,000 1,500 2,000
Metres

DATA SOURCES:
VECTOR DATA:
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NOTE:
¹: HELD BY BARALABA COAL PTY LTD
²: HELD BY WONBINDI COAL PTY LTD

Legend

Road.....
Watercourse.....
Cadastre.....
Cockatoo Coal ML.....
Cockatoo Coal MDL.....
Cockatoo Coal EPC.....
Meteorological Station..
Residence / Building.....
Residence - COK Owned.....
Assessment Location
Powerline & Power Pole.....
Local Government Area.....
Existing Operational Land.....
BNCOP Operational Land.....

TITLE

Figure 4-2: Visual Simulation Locations

REV	DESCRIPTION	DATE
0	Original map output	21/10/13
1	Data Updates	12/12/13

SCALE **1:65,000**
SIZE A3
DATUM GDA 94
PROJECTION MGA Zone 55

CURRENT ISSUE SIGNATURES

DRAWN	MJS
CHECKED	BJD
APPROVED	BJD

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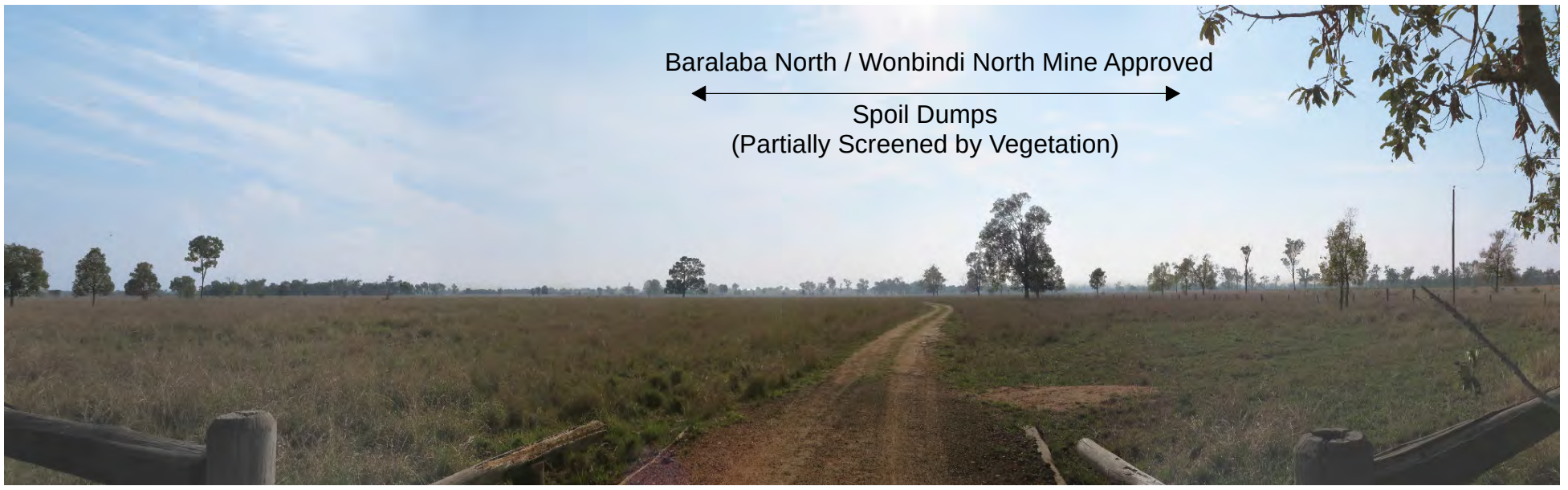
STATUS **FINAL**

PROJECT NO: Baralaba Nth
DRAWING NO: BBN-095-01-03-140408

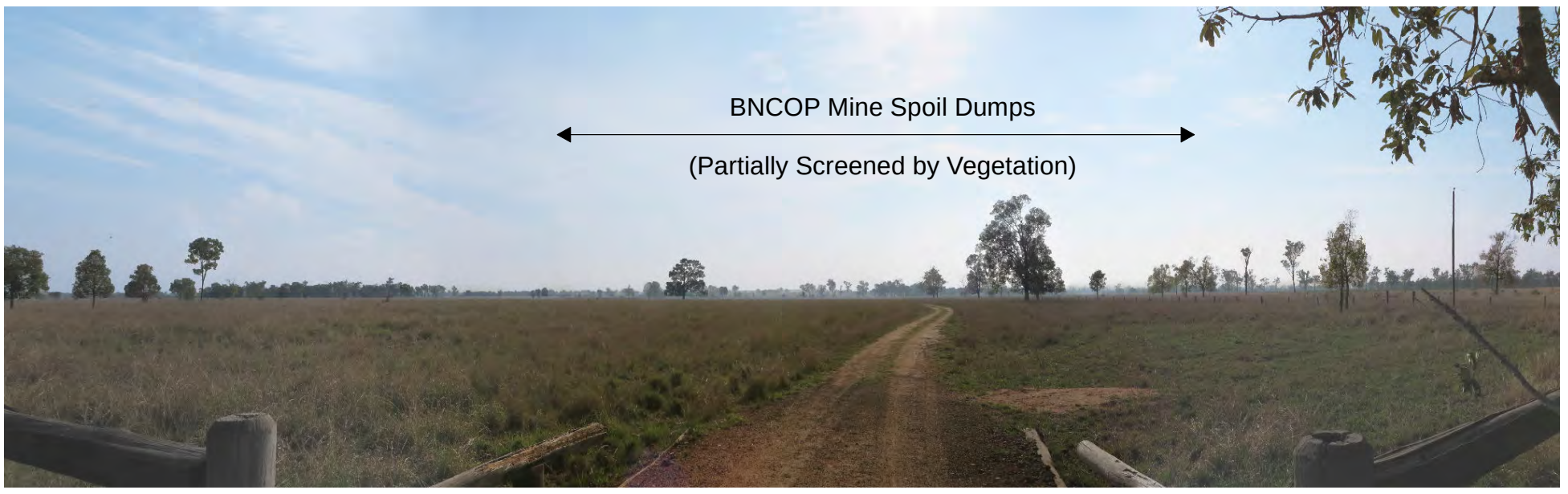
Path: N:\Baralaba\Baralaba_North\PROJECTS\1403\BBN_095_140312_EIS_Section4_Figures\BBN_095_01_03_140408_Visual_Assessment_Locations_A3P.mxd



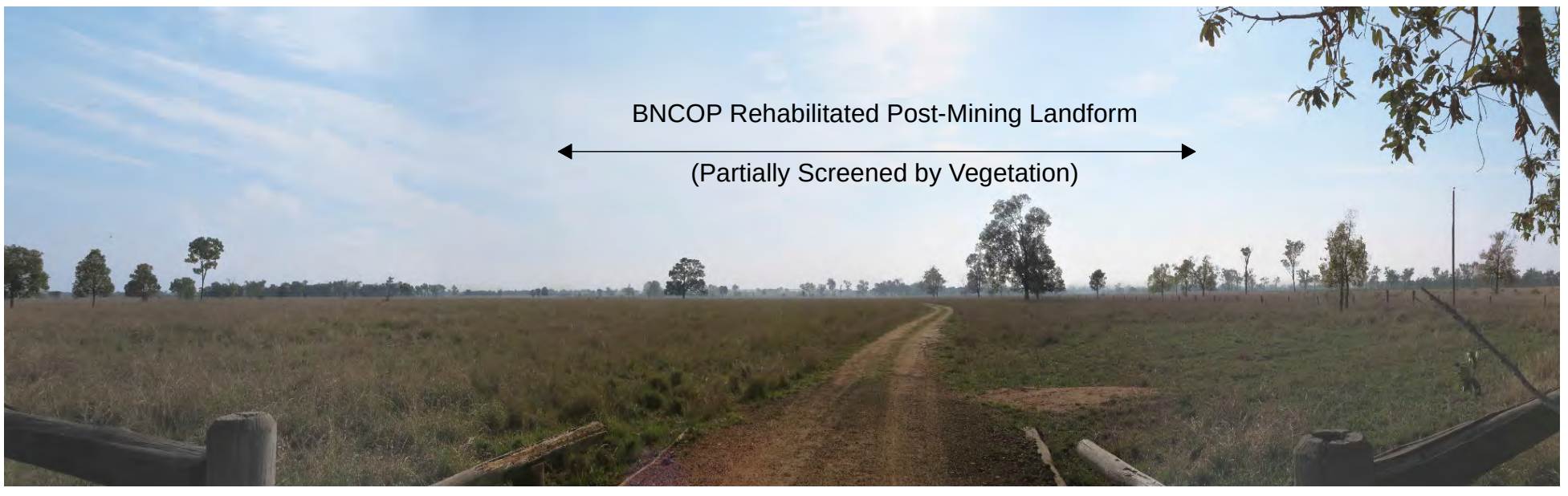
Existing View

Legend

Baralaba North / Wonbindi North Mine Approved Spoil Dumps



Development Simulation (Year 11)



End of Mine Simulations

PROJECT

BARALABA NORTH CONTINUED OPERATIONS PROJECT

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TITLE

Figure 4-3
Visual Simulation
Rider Dwelling

REV	DESCRIPTION	DATE
0	Original map output	06/03/14
1		
2		

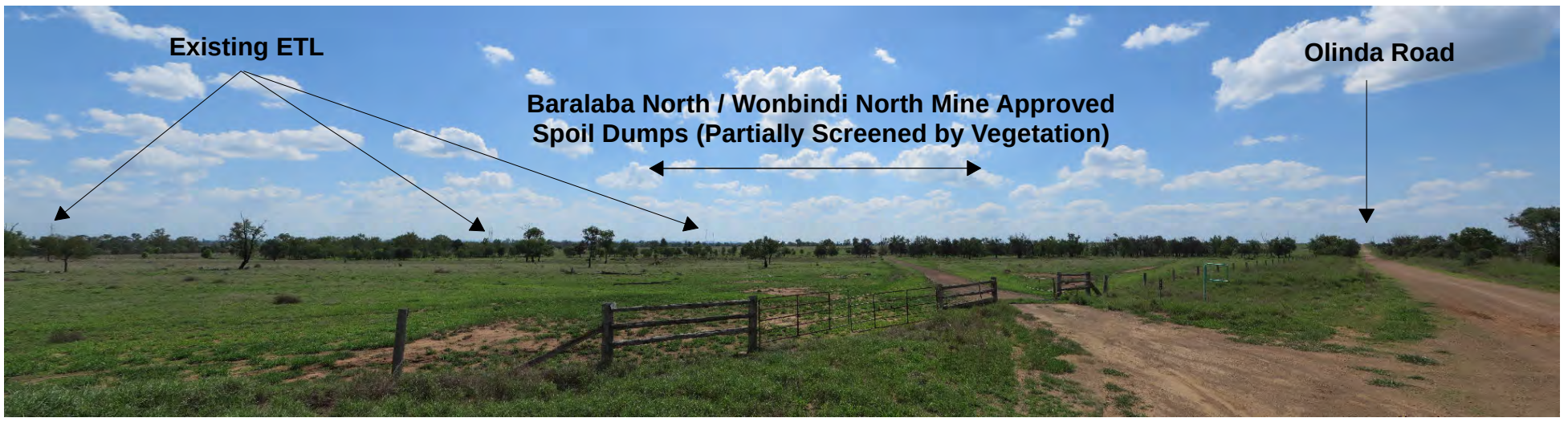
		CURRENT ISSUE SIGNATURES	
SIZE	A3	DRAWN	SLG
DATUM	GDA 94	CHECKED	BJD
PROJECTION	MGA Zone 55	APPROVED	BJD

Cockatoo Coal Limited

STATUS **FINAL**

PROJECT NO	DRAWING NO
Baralaba Nth	BBN-095-02-03-140408

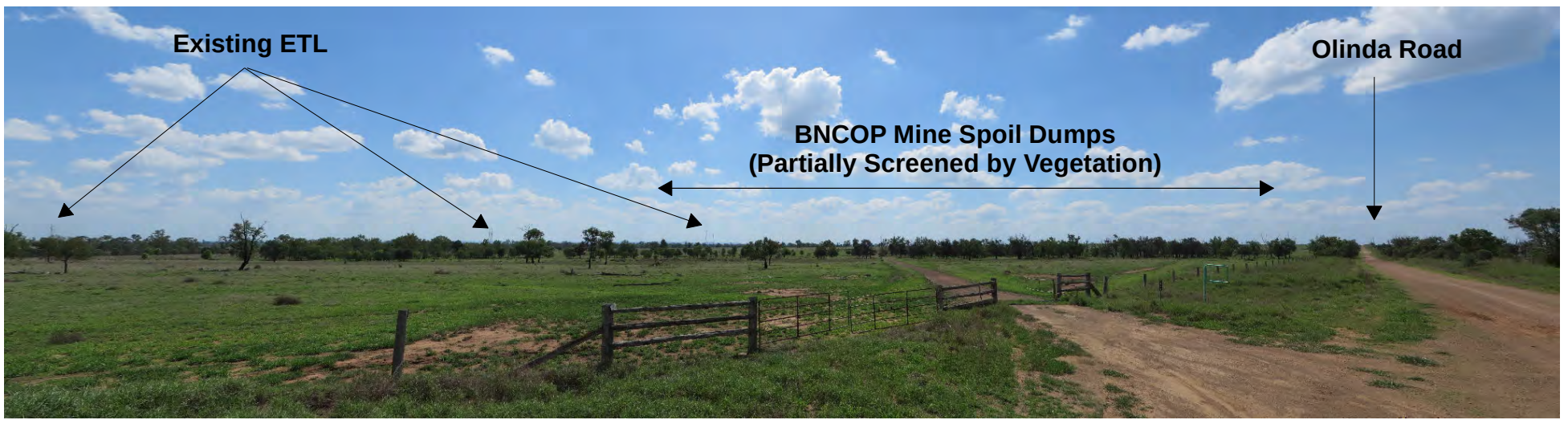
Path: N:\Baralaba\Baralaba_North\PROJECTS\1403\BBN_095_140312_EIS_Section4_Figures\BBN_095_02_03_140408_Visual_Simulation_Rider_A3P.mxd



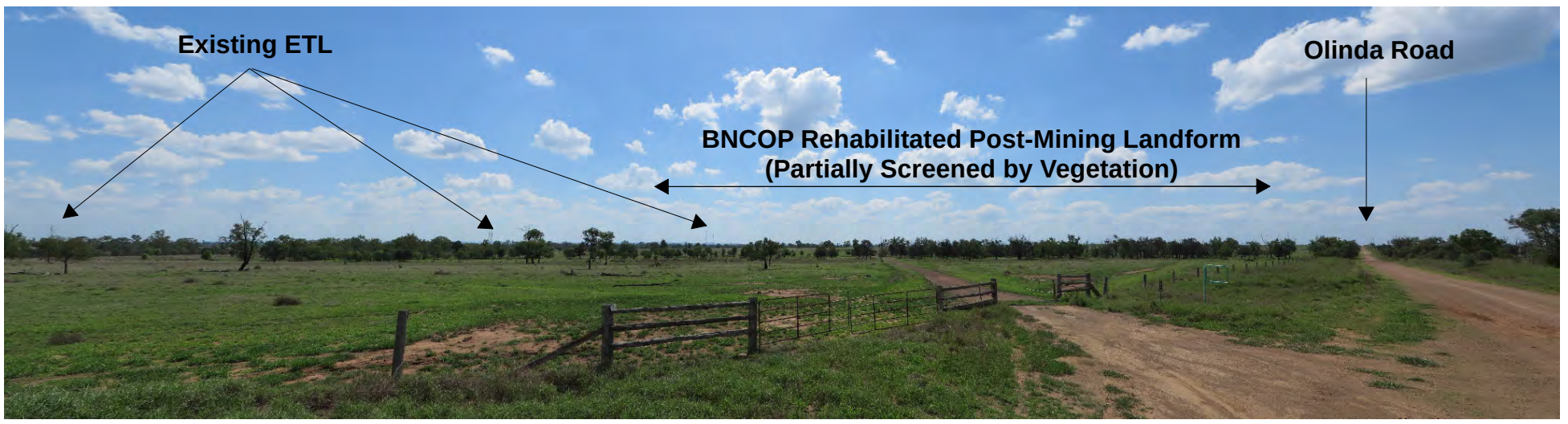
Existing View

Legend

Baralaba North / Wonbindi North Mine Approved Spoil Dumps



Development Simulation (Year 7)



End of Mine Simulations

PROJECT

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TITLE

Figure 4-4
Visual Simulation
Olinda Road

REV	DESCRIPTION	DATE
0	Original map output	12/3/14
1		
2		

		CURRENT ISSUE SIGNATURES	
SIZE	A3	DRAWN	SLG
DATUM	GDA 94	CHECKED	BJD
PROJECTION	MGA Zone 55	APPROVED	BJD

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STATUS **FINAL**

PROJECT NO	DRAWING NO
Baralaba Nth	BBN-095--03-01-140408

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Existing View

Legend

Baralaba North / Wonbindi North Mine Approved Spoil Dumps

Development Simulation (Year 15)

End of Mine Simulations

PROJECT

BARALABA NORTH CONTINUED OPERATIONS PROJECT

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TITLE

Figure 4-5
Visual Simulation
Hoadley Dwelling

REV	DESCRIPTION	DATE
0	Original map output	12/3/14
1		
2		

		CURRENT ISSUE SIGNATURES	
SIZE	A3	DRAWN	SLG
DATUM	GDA 94	CHECKED	BJD
PROJECTION	MGA Zone 55	APPROVED	BJD

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STATUS **FINAL**

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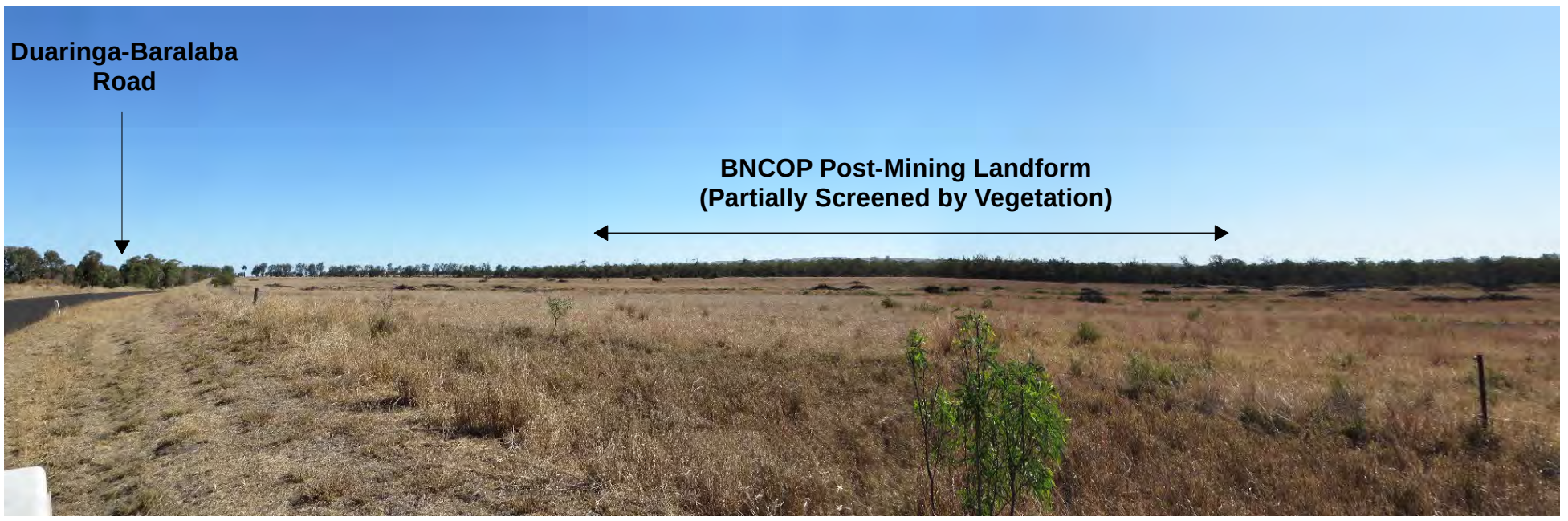
Existing View

Legend

Baralaba North / Wonbindi North Mine Approved Spoil Dumps

Development Simulation (Year 7)



End of Mine Simulations

PROJECT

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TITLE

Figure 4-6
Visual Simulation
Austin Dwelling

REV	DESCRIPTION	DATE
0	Original map output	12/3/14
1		
2		

		CURRENT ISSUE SIGNATURES	
SIZE	A3	DRAWN	SLG
DATUM	GDA 94	CHECKED	BJD
PROJECTION	MGA Zone 55	APPROVED	BJD

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STATUS **FINAL**

PROJECT NO	DRAWING NO
Baralaba Nth	BBN-095--06-01-140408

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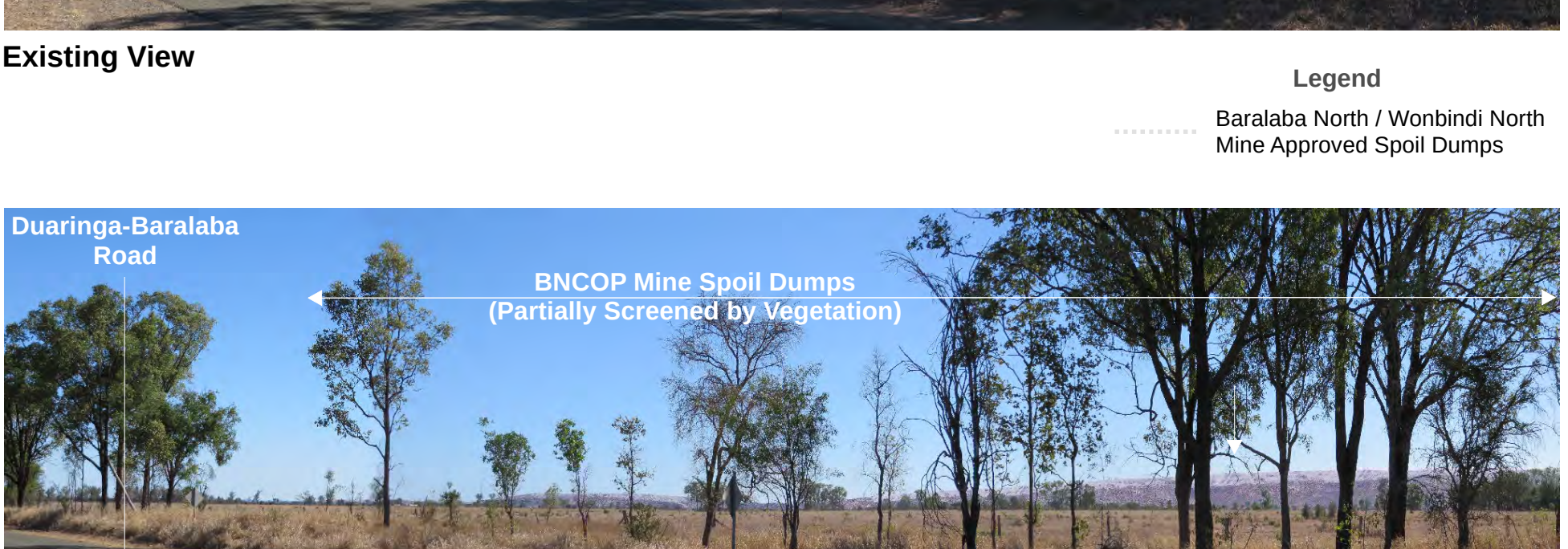
Existing View

Legend

Baralaba North / Wonbindi North Mine Approved Spoil Dumps

Development Simulation (Year 7)



End of Mine Simulations

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TITLE

Figure 4-7
Visual Simulation
Duaringa-Baralaba Road

REV	DESCRIPTION	DATE
0	Original map output	12/3/14
1		
2		

		CURRENT ISSUE SIGNATURES	
SIZE	A3	DRAWN	SLG
DATUM	GDA 94	CHECKED	BJD
PROJECTION	MGA Zone 55	APPROVED	BJD

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STATUS **FINAL**

PROJECT NO	DRAWING NO
Baralaba Nth	BBN-095--07-01-140408

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The visual simulations represent operations during Years 7, 11 and 15 of the BNCOP (depending on the position of each assessment location). These years are considered to be representative of worst case potential visual impacts for the assessment locations during operations at the BNCOP, as the spoil dumps in close proximity to the assessment locations would reach their maximum elevation during these years.

Visual Assessment

The potential visual impacts associated with the BNCOP were assessed in accordance with the matrix presented in Table 4-5, which considers the combination of visual modification and viewer sensitivity.

Table 4-5
Visual Assessment Matrix

		Viewer Sensitivity[1]		
		High	**Moderate**	**Low**
Visual Modification	**High**	H	H	M
	Moderate	H	M	L
	Low	M	L	L
	Very Low	L	VL	VL

Source: EDAW (2006).

[1] Based on Table 4-4.

Visual simulations were prepared for the locations identified in Table 4-6 and are shown on Figure 4-2.

As these simulation locations are proximal to different components of the BNCOP, different years would be most relevant to evaluating maximum potential visual impacts.

Table 4-6 summarises the results of the visual assessment undertaken for the BNCOP.

Regional Setting (>5 km)

Rider Dwelling

The Rider dwelling is located more than 5 km from the western boundary of the BNCOP Operational Land (Figure 4-2). Within the regional setting, visual sensitivity at the Rider dwelling is considered low given the distance to the BNCOP (i.e. >5 km). The existing view shows a relatively flat landscape with scattered trees in the foreground and a vegetated horizon line (Figure 4-3).

The approved Baralaba North/Wonbindi North Mine spoil dumps would not be visible from the Rider dwelling as they would be screened by vegetation. The view of the BNCOP spoil dumps from the Rider dwelling would also be predominantly screened by intervening vegetation on the horizon.

The development simulation (Year 11) and end of mine simulation (Figure 4-3) indicate that the level of visual modification at the Rider dwelling would be low.

As a result of the low level of visual modification and the low viewer sensitivity at the Rider dwelling (due to the distance to the BNCOP), a low level visual impact would be expected to occur (Table 4-6).

The level of visual impact at the Rider dwelling would be expected to progressively decrease as vegetation cover is established on the rehabilitated BNCOP landforms.

Table 4-6
Visual Impact Assessment Summary

Viewing Location	Viewer Sensitivity	Development Simulation Year	Visual Modification	Impact[1]	Impact After Final Rehabilitation	Visual Simulation
Rider Dwelling (> 5 km)	Low	11	Low	Low	Very Low	Figure 4-3
Olinda Road (~ 5 km)	Low	7	Low	Low	Very Low	Figure 4-4
Hoadley Dwelling (~1.5 km)	High	15	Moderate	High	Moderate	Figure 4-5
Austin Dwelling (< 1 km)	High	7	Low	Moderate	Low	Figure 4-6
Duaringa-Baralaba Road (< 1 km)	Low	7	High	Moderate	Low	Figure 4-7

[1] Based on the matrix provided in Table 4-5.

Sub-regional Setting (1 to 5 km)

Olinda Road

Olinda Road is located approximately 5 km from the BNCOP Operational Land (Figure 4-2). Within the sub-regional setting, visual sensitivity at Olinda Road is considered to be low given the distance to the BNCOP (i.e. approximately [~] 5 km) and the use of the location (i.e. local road).

The existing view shows a relatively flat landscape with a moderate density of trees between the road and the BNCOP Operational Land. The existing ETL infrastructure is visible beyond the tree line but spoil dumps are not easily identifiable (Figure 4-4).

The approved Baralaba North/Wonbindi North Mine spoil dumps will not be visible from Olinda Road as they will be screened by existing vegetation.

The development simulation (Year 7) and end of mine simulations (Figure 4-4) indicate that the level of visual modification would be low as the view of the spoil dumps is predominantly obstructed by tree lines and the topography of the land. Visual modifications above the existing vegetation on the horizon are almost indistinguishable from Olinda Road.

Given the low level of modification and the low visual sensitivity at Olinda Road (due to the distance to the BNCOP), a low level visual impact would occur (Table 4-6).

The level of visual impact at Olinda Road would be expected to progressively decrease as vegetation cover is established on the rehabilitated BNCOP landforms.

Hoadley Dwelling

The Hoadley dwelling is located approximately 1.5 km from the western boundary of the BNCOP Operational Land (Figure 4-2). The view from this dwelling towards the BNCOP is mostly obscured by intervening vegetation and comprises a small portion of the overall viewscape (Figure 4-5).

Within the sub-regional setting, visual sensitivity at the Hoadley dwelling is considered to be high given the distance to the BNCOP (i.e. approximately 1.5 km).

The development simulation (Year 15) from the Hoadley dwelling shows that the BNCOP spoil dumps would rise above the approved Baralaba North/Wonbindi North Mine spoil dumps. This increase would result in a moderate modification to the view at this location.

Figure 4-5 shows that the BNCOP spoil dumps would be partially screened by vegetation. The spoil dumps would be progressively rehabilitated to minimise this impact over time. The level of visual impact would progressively reduce once vegetation cover begins to establish on the rehabilitated BNCOP landforms (Figure 4-5).

Given the moderate level of modification (in comparison to the existing approved modifications) and the high viewer sensitivity at the Hoadley dwelling (due to the distance to the BNCOP), a high level visual impact would occur prior to rehabilitation (Table 4-6).

The level of visual impact at the Hoadley dwelling would be expected to progressively decrease to moderate as vegetation cover is established on the rehabilitated BNCOP landforms.

Local Setting (<1 km)

Austin Dwelling

The Austin dwelling is located less than 1 km from the north-eastern boundary of the BNCOP Operational Land (Figure 4-2). Within the local setting, visual sensitivity at the Austin dwelling is considered to be high given the distance to the BNCOP (i.e. < 1 km).

Views from this residence towards the BNCOP are mostly obscured by intervening vegetation and comprise a small portion of the overall viewscape (Figure 4-6).

The approved Baralaba North/Wonbindi North Mine spoil dumps will not be visible from this location as they will be screened by vegetation (Figure 4-6).

The development simulation (Year 7) and end of mine simulations (Figure 4-6) indicate that the level of visual modification associated with the BNCOP would be low. This is largely due to the existing topography and intervening vegetation.

In Year 7 the BNCOP spoil dumps would rise slightly above the existing tree line and come into view from the Austin dwelling (Figure 4-6).

Given the low level of modification and the high viewer sensitivity at the Austin dwelling (due to the distance to the BNCOP), a moderate level visual impact would occur (Table 4-6).

During the progressive rehabilitation the level of visual impact would reduce as vegetation begins to establish on the rehabilitated BNCOP landforms (Figure 4-6). Once rehabilitation is complete the colour of the spoil dumps would begin to match the surrounding vegetation and would result in a low impact at the Austin dwelling (Figure 4-6).

Duaringa-Baralaba Road

The Duaringa-Baralaba Road is located less than 1 km from the eastern boundary of the BNCOP Operational Land (Figure 4-2). Within the local setting, visual sensitivity at Duaringa-Baralaba Road is considered to be low given the distance to the BNCOP and the use of the sensitive location (i.e. main road).

Views from this road towards the BNCOP show a relatively flat topography with little intervening vegetation to obscure views of the BNCOP (Figure 4-7).

The approved Baralaba North/Wonbindi North Mine spoil dumps will be visible from this road, however a small proportion will be screened by the vegetation in the foreground.

The year of maximum impact (Year 7) and end of mine simulations (Figure 4-7), when compared to the approved visual modification, indicate that the level of visual modification would be high. This is largely due to the existing topography and a lack of intervening vegetation.

A large portion of the BNCOP spoil dump would be visible from the Duaringa-Baralaba Road during Year 7 of the BNCOP. The visual impact of the spoil dump (Figure 4-7) would result from the contrasting colour and texture of the undisturbed natural areas. This would result in a moderate level of visual impact (Table 4-6).

Given the high level of modification (in comparison to the existing approved modifications) and the low visual sensitivity at the Duaringa-Baralaba Road (due to the distance to the BNCOP), a moderate level visual impact is expected prior to rehabilitation (Table 4-6).

As the rehabilitation progresses the level of contrast between the spoil dump and the surrounding landscape would decrease, reducing the impact of the BNCOP at the Duaringa-Baralaba Road. The end of mine simulation indicates that a low visual impact would result once rehabilitation at the BNCOP is complete.

Night-Lighting

The BNCOP would result in changes to existing night-lighting due to the operation of a CHPP and new MIA, increased ROM production and associated works at the BNCOP.

Night-lighting would be emitted from the following three main sources at the BNCOP:

- overhead lighting of the CHPP area and MIA;
- fixed lights on top of spoil dumps; and
- mobile vehicle mounted lights (e.g. work vehicles in various locations within the BNCOP Operational Land).

Direct views of night-lighting sources, including mobile machinery lights and operational lighting, would potentially be available from some exposed positions. Night-lighting impacts on the local and sub-regional settings occur with a glow above operational areas that contrasts with the night sky. This effect decreases with distance, however, the glow is visible at nearby residences and along local roads.

Cumulative Impacts

The assessment of cumulative visual impacts associated with the BNCOP has taken into consideration the combined effects of the BNCOP with the Baralaba Coal Mine.

It is expected that the views of both the BNCOP and the Baralaba Coal Mine would be visible from a number of sensitive locations (public roads, rural residences, etc.). The Baralaba Coal Mine rehabilitated landforms would be visible from the Hoadley dwelling and Duaringa-Baralaba Road (Figures 4-5 and 4-7). The Baralaba Coal Mine is expected to cease operations by the end of 2014 while the BNCOP is anticipated to commence in April 2015. The visual impact associated with the Baralaba Coal Mine is expected to gradually decrease as vegetation cover is established on the rehabilitated landforms.

Given the above, it is expected that the cumulative visual impacts as a result of the BNCOP and surrounding operations in a sub-regional context is considered to be low.

4.2.4 Mitigation Measures and Management

Mitigation measures and management proposed to limit the level of visual impact on the surrounding land use during the BNCOP are discussed below.

Progressive Rehabilitation

Progressive rehabilitation would be implemented at the BNCOP, gradually reducing the contrast between the landforms of the BNCOP and the surrounding landscape. Rehabilitation activities would include planting of native tree and shrub species consistent with those found in other elevated landforms in the region (Section 5). CCL would implement a Rehabilitation Management Plan, which would outline rehabilitation goals, objectives, indicators and completion criteria for the BNCOP.

Section 5 of the EIS contains further detail regarding the proposed rehabilitation and post-mine land uses for the BNCOP.

Night-Lighting

Whilst ensuring the operational safety is not compromised, CCL would seek to minimise light emissions from the BNCOP by select placement, configuration and direction of lighting to reduce off-site nuisance where practicable.

CCL would take all reasonable and feasible measures, in consideration of AS 4282:1997 *Control of the obtrusive effects of outdoor lighting*, to mitigate visual and off-site lighting impacts of the BNCOP.

4.3 BIOSECURITY

4.3.1 Environmental Objectives

The relevant environmental objectives, as stated in the Final ToR, for biosecurity are that:

- *the spread of weeds and pest animals is minimised; and*
- *existing weeds and pests are controlled.*

4.3.2 Description of Environmental Values

Exotic Flora and Declared Plants

Weed species occur within the BNCOP Disturbance Footprint and are likely due to the high level of past clearance and the current land use (e.g. grazing) (Appendix A). Pasture weed species such as Guinea Grass (*Megathyrsus maximus*), Buffel Grass (*Cenchrus ciliaris*), Sabi Grass (*Urochloa mosambicensis*) and Noogoora Burr (*Xanthium pungens*) are common (Appendix A).

Declared plants are listed under the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) (LP Act) and are targeted for control because they have, or could have, serious economic, environmental or social impacts. A low abundance of weeds declared under the LP Act and weeds of national significance (WoNS) were recorded during the survey of the BNCOP locality (Appendices A and B).

Five WoNS (also declared under the LP Act) were recorded within the BNCOP locality, namely the Velvety Tree Pear (*Opuntia tomentosa*), Fireweed (*Senecio madagascariensis*), Lantana (*Lantana camara*), Water Stargrass (*Hymenachne amplexicaulis*), Water Hyacinth *(Eichhornia crassipes)* and a sixth declared weed (i.e. not a WoNS), Mother of Millions (*Bryophyllum* spp.), were recorded (Attachment A of Appendix A).

The Velvety Tree Pear is the only declared weed or WoNS recorded within the BNCOP Disturbance Footprint (Attachment A of Appendix A).

Introduced and Declared Animals

One introduced amphibian (the Cane Toad), three introduced birds, seven introduced mammals and two introduced fish have been recorded across the BNCOP Disturbance Footprint and also in the surrounding habitats (Attachment A of Appendix A and Appendix B).

Declared animals recorded by RPS Australia East (2014) are the European Rabbit (*Oryctolagus cuniculus*), European Hare (*Lepus europaeus*), European Red Fox (*Vulpes vulpes*), Feral Cat (*Felis catus*) and Pig (*Sus scrofa*) (Attachment A of Appendix A).

4.3.3 Potential Impacts

Exotic Flora and Declared Plants

Exotic flora can degrade native vegetation communities and *Novel Biota and their Impact on Biodiversity* is a key threatening process under the EPBC Act. Without weed management, there is a potential for existing exotic WoNS (and declared plants under the LP Act) to become more prevalent or for new weeds to be introduced into the area.

Activities that could spread weeds during construction and operation include soil disturbance, vehicle movements and movement of soil. Disturbed areas (including those undergoing rehabilitation) provide a substrate in which weed species may grow (Appendix A).

Introduced and Declared Animals

Declared animals have corresponding key threatening processes under the EPBC Act, namely, *Competition and Land Degradation by Rabbits*; *Predation by European Red Fox*; *Predation by Feral Cats*; *Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs.*

Activities associated with the BNCOP may provide increased refuge and scavenging resources (e.g. discarded food scraps) for these species, unless appropriately managed to discourage exotic animals (Appendix A).

4.3.4 Mitigation Measures and Management

The following measures would be implemented at the BNCOP in order to control and limit the spread of pests and weeds:

- vegetation clearance procedures;
- progressive rehabilitation;
- declared animal control strategies;
- weed management; and
- control of cattle grazing.

These measures are outlined below.

Vegetation Clearance Procedures

Vegetation clearance procedures would be adopted for the BNCOP and include the following measures to control and limit the spread of pests and weeds:

- Boundaries of areas to be cleared, and those not to be cleared, would be defined during construction and operation.
- An internal Ground Disturbance Permit would be required prior to any clearing so that clearing activities are authorised prior to disturbance.
- Clearing of native vegetation would be undertaken progressively over 15 years and only in areas required for mining activities within the following year. This would have the effect of minimising the area of exposed land.
- A suitably trained and qualified person would be present during the clearing of habitat.

Progressive Rehabilitation

The areas disturbed by the BNCOP (e.g. spoil dumps and infrastructure areas) would be progressively rehabilitated and revegetated, so the post-mining landforms are safe and stable. Rehabilitation would commence within one year of areas becoming available.

The revegetation program would aim to provide a minimum vegetation cover of 70%. Areas not covered with vegetation would be minimised and vegetation growth is to be promoted if required. The flora species composition and vegetation community structure (ground cover, understorey and overstorey) of the revegetation would be similar to appropriate reference sites chosen based on their current land use, soil type, vegetation community type and health.

Further detail regarding rehabilitation at the BNCOP is provided in Section 5.

Declared Animal Control Strategies

Declared animals would be discouraged at the BNCOP by maintaining a clean, rubbish-free environment. Feral animal control strategies (e.g. baiting, trapping) would be implemented in the BNCOP Operational Land in accordance with relevant standards to maintain low abundance of declared animals. The following threat abatement plans would be relevant:

- *Competition and Land Degradation by Rabbits* (DEWHA, 2008a).
- *Threat Abatement Plan for Predation by the European Red Fox* (DEWHA, 2008b).
- *Threat Abatement Plan for Predation by Feral Cats* (DEWHA, 2008c).
- *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs* (Commonwealth Department of the Environment and Heritage, 2005).

Appropriately qualified persons would be engaged to undertake bi-annual pest animal control in the BNCOP Operational Land.

Weed Management

Weed management (prevention, monitoring and control) would be undertaken to lessen the abundance and species of weeds in the BNCOP Operational Land and minimise the potential for weeds to spread into adjacent habitat areas. Weeds that are present on-site would be identified by regular surveys (of tracks, revegetation [rehabilitation] areas and topsoil stockpiles, etc.) on a bi-annual basis.

Declared plants listed under the LP Act would be specifically targeted for control. CCL would comply with relevant legal obligations associated with the control, supply, sale, keeping and transport of declared plants in Qld.

Weed prevention techniques would be implemented in the BNCOP Operational Land and include washdown of machinery when moving from weed infested areas. Weed control techniques would be implemented in the BNCOP Operational Land as required. Physical removal and chemical application are the main weed control methods available.

Specific weed control methods would be in accordance with those specified by the DAFF (2014). The control techniques used would be documented and areas subject to weed control would be mapped for follow-up inspection and management.

Control of Cattle Grazing

Cattle would be selectively excluded from the BNCOP Operational Land for the life of the BNCOP. Cattle would be excluded from the North-west Soak and HESN Wetland Protection Area.

4.4 WASTE MANAGEMENT

This section identifies potential waste streams that are likely to be produced over the life of the BNCOP. The potential impacts caused by the waste streams and proposed mitigation measures, management and monitoring are outlined in Sections 4.4.3 and 4.4.4, respectively.

The BNCOP has been designed to minimise the use of resources and generation of wastes throughout all phases (e.g. construction, operations and decommissioning), and to ensure compliance with the relevant legislation relating to waste.

The management of waste (non-mineral) across the BNCOP is governed by Qld legislation, including:

- *Environmental Protection Act 1994* (Qld) (EP Act);
- Environmental Protection Regulation 2008 (Qld) (EP Regulation);
- Environmental Protection (Waste Management) Regulation 2000 (Qld); and
- *Waste Reduction and Recycling Act 2011* (Qld) (WRR Act).

The EP Act defines 'waste' as anything that is *left over, or unwanted by-product, from an industrial, commercial, domestic or other activity; or surplus to the industrial, commercial, domestic or other activity generating the waste*. For further detail regarding waste management legislation refer to Attachment 2.

Section 65 of the EP Regulation states:

> *(1) Regulated waste is waste that—*
>
> *(a) is commercial or industrial waste, whether or not it has been immobilised or treated; and*
>
> *(b) is of a type, or contains a constituent of a type, mentioned in schedule 7, part 1.*
>
> *(2) Waste prescribed under subsection (1) includes—*
>
> *(a) for an element—any chemical compound containing the element; and*
>
> *(b) anything that contains residues of the waste.*
>
> *(3) However, waste is not regulated waste if it is mentioned in schedule 7, part 2.*

4.4.1 Environmental Objective and Performance Outcome

The relevant environmental objective, as stated in the Final ToR, for waste is that:

> *Any waste generated, transported, or received as part of carrying out the activity is managed in a way that protects all environmental values.*

The BNCOP would achieve the following performance outcome, as stated in Schedule 5, Table 1 of the EP Regulation:

> *1 Both of the following apply—*
>
> *(a) waste generated, transported or received is managed in accordance with the waste and resource management hierarchy in the Waste Reduction and Recycling Act 2011;*
>
> *(b) if waste is disposed of, it is disposed of in a way that prevents or minimises adverse effects on environmental values.*

4.4.2 Sources of Waste

The primary source of waste to be produced at the BNCOP is excavated waste (i.e. waste rock, overburden and interburden) and slimes and coarse rejects from the CHPP. Other wastes (regulated and non-regulated) expected to be produced at the BNCOP include the following:

- recyclable waste;
- refurbishable items;
- green waste;
- scrap metal;
- personal protective equipment (PPE);
- air filters;
- timber and wooden pallets;
- waste oils;
- engine oil/fuel filters;
- empty waste oil containers;
- hydrocarbon contaminated material;
- waste greases;
- paints;
- miscellaneous chemicals;
- batteries;
- ozone depleting substances; and
- tyres.

It should be noted that the quantity of each waste to be produced at the BNCOP encompasses the amount of waste currently approved to be produced as part of the Baralaba North/Wonbindi North Mine in combination to the additional wastes expected to be produced at the BNCOP. Table 4-7 identifies the quantity of waste currently approved to be produced in addition to the total waste quantities predicted for the BNCOP.

Construction

The predominant waste streams likely to be produced during the construction phase of the BNCOP include general waste (i.e. food scraps, non-Class 1, 2 and 5 plastics), recyclable wastes (i.e. Class 1, 2 and 5 plastics, steel cans, etc.), refurbishable items (i.e. pipes, fittings, etc.), waste oils/grease (from machinery and vehicle maintenance), sewage (from offices and workshops) and tyres (from light and heavy vehicles). The management strategies for these waste streams are outlined in Section 4.4.4.

It is anticipated that construction of the BNCOP components to support the planned maximum production rate would take approximately 13 months upon grant of all required approvals. During this time a number of materials would be brought to and stored on-site. Any waste resulting from the storage and use of these materials would be managed in accordance with Qld and Commonwealth Government legislation and policy requirements.

Operations

The waste produced during the operations phase of the BNCOP would be similar to those produced during construction (with the addition of waste rock, topsoil and CHPP rejects) with generally increased quantities.

Topsoil and waste rock produced during the operations phase of the BNCOP would be reused around the site where practicable (i.e. for progressive rehabilitation). Any topsoil and waste rock that is not able to be reused around the BNCOP Disturbance Footprint would be stockpiled. The spoil dumps would not exceed a height of approximately 148 m AHD.

The operations phase of the BNCOP would result in the largest quantity of regulated wastes of all three phases (construction, operations and decommissioning). The predominant regulated wastes that would be produced during operations would include waste oils, empty waste oil containers, waste grease, and sewage. The management strategies for these waste streams are outlined in Section 4.4.4.

A sewage treatment plant would be located on site within the MIA to treat all sewage produced at the BNCOP. Until the sewage treatment plant is operational all sewage from the temporary ablution blocks will continue to be pumped by licensed contractor and transported to the local council sewage treatment plant. Once operational, the sewage treatment plant would result in the BNCOP placing no additional pressure on the local council sewage treatment infrastructure.

Effluent would either be treated and returned to mine water dam and process water dam for later mine consumption (provided the recycled water complies with the standards under section 18AE of the Public Health Regulation 2005 [Qld]) or disposed of sediment dams. Sludge would be removed off-site by a licensed contractor to a licensed disposal facility.

Decommissioning

Infrastructure at the BNCOP would be decommissioned in accordance with the Post-Mine Land Use Plan and would, in general, be dismantled or demolished and removed. Where possible, decommissioning would be phased throughout the life of the BNCOP. During decommissioning, all efforts would be made to follow the waste and resource management hierarchy using waste disposal as a last option. Areas of potential contamination would be investigated and managed/remediated if required (Section 4.1 and Appendix K).

Section 5 describes further the rehabilitation objectives and decommissioning of the BNCOP.

Waste Inventory

Table 4-7 identifies the significant waste streams expected to be produced as part of the BNCOP. Quantities listed for each waste are on an annual basis and were predicted based on CCL's experience and the amount of waste produced at similar sized coal mine operations in Qld.

Table 4-7
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
Non-regulated								
Excavated waste (i.e. waste rock, overburden, etc.)	Solid	Mining activities	Consistent with the Baralaba North/ Wonbindi North EM Plan	N/A	18-45 Mbcm	Potential for erosion and saline runoff	Low	Placed as infill in the mine void behind the advancing mining operations (i.e. in-pit spoil dump) (g), or placed in out-of-pit spoil dumps to a maximum height of approximately 148 m AHD (g).
Topsoil	Solid	Mining activities	Consistent with the Baralaba North/ Wonbindi North EM Plan	N/A	390,000 m^3	Potential for erosion and saline runoff	Low	Where stripped topsoils cannot be used directly for progressive rehabilitation (c), the topsoil would be stockpiled separately (g). Specific soil management, stockpiling and re-application procedures would be developed for the BNCOP.
CHPP rejects (i.e. coarse and fine rejects and slimes)	Solid/Liquid	Mining activities	Consistent with the Baralaba North/ Wonbindi North EM Plan	N/A	0.05-0.6 Mtpa	Potential for erosion, saline runoff, and acid formation	Low	In-pit co-disposal with waste rock in the Baralaba Central void and/or behind the advancing open cut operations in the Baralaba North pit (g). If required, the remaining slimes would be temporarily stored in the slimes dam and rehabilitated in accordance with the Rehabilitation Management Plan at the cessation of mining.
General waste (i.e. food scraps, non-Class 1 [PET], 2 [HDPE] and 5 [PP plastics])	Solid	Kitchenettes, crib rooms, administration areas, workshop, etc.	500 m^3	500 m^3	1,000 m^3	Putrescible and attractive to fauna	Medium	Stored on-site in bins for regular transport off-site by a licensed waste transport contractor to a licensed landfill (Banana Shire Waste Disposal Scheme) (g).

Table 4-7 (Continued)
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
Recyclable waste (i.e. aluminium, steel cans, Class 1, 2 and 5 plastics, paper towels, paper and cardboard)	Solid	Kitchenettes, crib rooms, administration areas, workshop etc.	135 m^3	200 m^3	500 m^3	Small in size and light in weight	Low	Stored on-site in bins for regular transport off-site by a licensed waste transport contractor for recycling (d). Confidential papers would be segregated into locked paper bins for shredding and recycling (d).
Refurbishable items (i.e. pipe work and associated components and fittings, wing nuts, conveyor rollers and belt)	Solid	CHPP and workshops	<5 t	<10 t	<15 t	Rust formation	Low	Items would be stockpiled within a designated area. If condition is acceptable, items would be reused directly (c). Where items are at the end of their life, they would be collected and disposed of as appropriate (g). Where items are contaminated with hydrocarbons, they would be managed as regulated waste.
Green waste (i.e. grass, cleared timber and weeds)	Solid	Clearing of vegetation	Consistent with the Baralaba North/ Wonbindi North EM Plan	277 ha of additional remnant vegetation cleared by the BNCOP	277 ha of additional remnant vegetation cleared by the BNCOP	Attractive to fauna	Low	Mulched and/or placed in timber stacks for reuse on-site during rehabilitation (c). Waste vegetation would be burned where appropriate (g).
Scrap metal (i.e. stainless steel, aluminium and any item considered to be metal [ferrous or non-ferrous] including machine and vehicle parts)	Solid	Construction activities, infrastructure maintenance and workshops	50 m^3	20 m^3	80 m^3	Rust formation	Low	Smaller items would be placed in scrap metal skips for collection by a licensed contractor. Larger items would be left in an accessible location where specific collection arrangements can be made. All grease and oil is to be removed prior to placement in skips. A licensed contractor would remove all scrap metals for segregation at a licensed recycling facility (d).

Table 4-7 (Continued)
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
PPE and other small items (i.e. gloves, hard hats, safety glasses and face masks)	Solid	Bathhouse and contractor facilities	<20 kg	<50 kg	<50 kg	Light weight and small in size	Low	Equipment that is not deemed damaged would be reused (c). Only sufficiently used/damaged PPE would be disposed of (g).
Air filters (i.e. engine air filters)	Solid	Vehicle and machinery maintenance at workshops	< 1 t	< 1 t	< 1 t	N/A	Low	Air filters would be temporarily stored in the appropriate air filter skip/bin. Final disposal would be off-site (g).
Timber/wooden pallets (i.e. reusable pallets)	Solid	Workshop and administration areas	< 1 t	< 1 t	< 1 t	N/A	Low	Pallets that are reusable would be returned to the supplier (c). The remainder would be sent to general waste (g).
Mine affected water	Liquid	Any water that has been used or potentially contaminated by mining operations, including mine runoff water, groundwater seepage into pit, or water that has been used at the CHPP.	Consistent with the Baralaba North/ Wonbindi North Mine Water Management Plan	Refer to Appendix C for mine affected water volumes	Refer to Appendix C for mine affected water volumes	Liquid	Low	Mine affected water would be reused (c) for dust suppression and construction and/or road maintenance around the BNCOP. Discharge to the Dawson River Anabranch would be subject to meeting water quality release limits specified in relevant permits agreements. Further water management strategies are discussed in Section 4.4.4 and Appendix C.
Regulated								
Waste oils	Liquid	Machinery and vehicle maintenance and workshop	250 kL	160 kL	620 kL	Liquid	Medium	Collection and storage in designated self bunded Transtanks for transport by a licensed regulated waste contractor to a regulated waste receiver for reuse (c), recycling (d) or disposal (g).

Table 4-7 (Continued)
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
Engine oil/fuel filters	Solid/Liquid	Vehicle and machinery maintenance at workshop	Consistent with the Baralaba North/ Wonbindi North EM Plan	2,000	6,000	Liquid contents	Medium	Collection and storage in sealed oil filter disposal pod. Transportation by a licensed regulated waste contractor to a licensed regulated waste receiver for treatment (solvent wash) to recover oil (c).
Waste grease (i.e. from machinery)	Liquid	Workshop, large machinery maintenance	<50 kL	<60 kL	<100 kL	Liquid	Medium	Stored in tanks or appropriately sealed containers in a designated bunded area. Transported by a licensed regulated waste contractor to a licensed regulated waste receiver for treatment, recycling (d) or disposal (g).
Sewage	Liquid	Offices and workshops	Consistent with the Baralaba North/ Wonbindi North EM Plan	< 50 kL	< 25 kL	Liquid	Medium	During construction there would be temporary ablution blocks which would not be connected to a sewage system and would require pumping out by licensed contractor. Once the sewage treatment plant is operational, within the MIA, the effluent would be treated (f) and returned to mine water storages for later mine consumption (c) if compliant with relevant standards.
Empty waste oil containers	Solid	Workshop	< 1 t	< 2 t	< 5 t	N/A	Medium	All drums would be segregated and sealed prior to collection by a licensed regulated waste contractor and transported to a licensed waste receiver where drums and containers would be rinsed and recycled (d).

Table 4-7 (Continued)
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
Paints (i.e. general paint, air dried insulating varnish)	Liquid/Gas	Industrial area infrastructure and workshop	< 0.5 t	< 1 t	< 1 t	Liquid	Medium	Transported to a designated sealed and bunded area for collection by a licensed regulated waste contractor and transported to a licensed regulated waste receiver for treatment (f) and disposal (g).
Hydrocarbon contaminated material (i.e. oily rags)	Solid/Liquid	Workshop servicing trucks and light/heavy vehicles	< 2 t	< 2 t	6 t	Liquid contents	Medium	Collection and storage in regulated sealed disposal bin. Transported by a licensed regulated waste contractor to a licensed regulated waste receiver for appropriate disposal (g).
Miscellaneous chemicals (i.e. engine coolant, solvents, sealants, etc.)	Liquid/Gas	Workshop and administration	< 5 kL	< 10 kL	< 20 kL	Liquid	Medium	Transported to a designated sealed and bunded area for collection by a licensed regulated waste contractor and transported to a licensed regulated waste receiver for treatment and disposal (g).
Batteries (i.e. dry cell, gel cell, lead acid)	Solid	Operation of portable electrical equipment (radios, phones, etc.) within the workshop and other areas	80	100	145	Liquid contents	Medium	Segregation and storage within dedicated containers in battery storage area for collection by a licensed regulated waste transport contractor to a licensed regulated waste facility for recycling (d) or disposal (g).
Ozone depleting substance (i.e. refrigerants and air conditioning substances)	Liquid/Gas	Air conditioning units, fridges and cars throughout site	50 kg	100 kg	360 kg	Liquid/Fumes	High	Ozone depleting substances would be contained at the source in cylinders and returned to the supplier for reuse and recycling (c)(d).

Table 4-7 (Continued)
Estimated Maximum Wastes Produced by the BNCOP (Per Annum)

Waste Type/Waste Category	Form	Source	Approximate Quantity (per annum)			Attributes that may Affect Dispersal	Risk of Causing Environmental Harm*	Management Strategies (Waste Management Hierarchy Level)^
			Existing/Approved	Construction	Operations			
Tyres (i.e. light and heavy vehicle tyres)	Solid	Tyres from light and heavy vehicles	100	100	180	N/A	Low	Segregation and storage in a designated area with no grass or other flammable material within a 10 m radius. Tyres would be transported off-site to a supplier for retreading where practicable (c) or disposed on-site in a designated tyre disposal area in the backfilled pit (g).

* In consideration of potential hazards, toxicity and dispersal mechanisms.

^ Waste Management Hierarchy as defined in section 9 of the WRR Act: (c) waste reuse; (d) waste recycling; (f) treat waste before disposal; (g) waste disposal. The measures identified above will be implemented only once waste avoidance and reduction measures have been exhausted.

4.4.3 Potential Impacts

Key waste management risks associated with the BNCOP include inappropriate storage or disposal of waste material that have the potential to impact on the following environmental values:

- health and wellbeing of the workforce and community;
- water quality for agricultural use and aquatic flora and fauna;
- the biological integrity and diversity of ecosystems and processes; and
- suitability of the land for a beneficial post mining land use.

Potential impacts of waste generated by the BNCOP during all three phases of the project include:

- groundwater and surface water contamination caused by release or spills of solid or liquid waste either directly to receiving waters or indirectly via run-off from waste contaminated sites;
- degradation of native flora and fauna habitat as a result of inappropriate storage and management of waste;
- land contamination caused by spills or inappropriate waste disposal;
- littering due to unsuitable storage and containment measures for general waste;
- hygiene issues (including odour) associated with the storage, treatment and disposal of putrescibles waste;
- increased vermin and potential spread of disease due to inappropriate storage and disposal of waste;
- reduced visual amenity due to improper storage of waste;
- decreased air quality due to odours and airborne contaminants;
- increased fire hazards due to poorly managed waste storage;
- increased pressure on existing waste management infrastructure; and
- risks to human health and safety through poor management of hazardous materials.

Cumulative Impacts

Although the BNCOP would result in increased waste quantities compared to that which is already approved for the Baralaba North/Wonbindi North Mine, the cumulative impact of the BNCOP is expected to be low. Table 4-7 identifies that the quantities of significant waste to be produced at the BNCOP do not vary greatly from those already approved to be produced as part of the Baralaba North/Wonbindi North Mine.

The total waste produced at the BNCOP (that would require disposal off-site, as part of the Banana Shire Waste Disposal Scheme) is expected to be minor when compared to the total volume of waste already being disposed as part of this scheme.

Considering the above, local scale impacts are expected to be minor, and impacts to the wider region are expected to be negligible.

4.4.4 Mitigation Measures, Management and Monitoring

CCL would manage the waste produced at the BNCOP in accordance with the waste and resource management hierarchy as stipulated in the WRR Act. If waste must be disposed of, CCL would do so in a way that prevents or minimises adverse effects on environmental values.

The management methods identified below aim to minimise the potential environmental impacts associated with waste generation at the BNCOP.

Best practice waste management strategies have been selected with consideration of the waste management hierarchy outlined in the WRR Act.

Control strategies that would be implemented across the BNCOP to effectively manage wastes include:

- operating procedures to define the location and size of the waste storage areas, the management for each type of waste and methods of dealing with accidents, spills, and other incidents that may impact on waste management;
- designated waste collection areas would be located on-site for storage of wastes prior to disposal;
- waste produced at the BNCOP would be collected and transported to the MIA;

- segregation of wastes into general waste, recyclable waste, and hazardous waste;
- removal of all general waste from site as part of the Banana Shire Waste Disposal Scheme; and
- recyclable and hazardous material would be managed as described in Table 4-7 and Appendix O.

Waste Management Program

A detailed Waste Management Program has been developed by CCL and would be implemented at the BNCOP. It defines and describes the objectives and measures for protecting or enhancing environmental values from impacts by waste.

The Waste Management Program addresses the principles of the waste and resource management hierarchy in accordance with the WRR Act and would include proposed methods for waste management at the BNCOP to achieve the highest possible level of waste management.

Waste Management Principles

CCL would minimise the impact of waste on the environment and the community by committing to adopt the appropriate waste management principles.

The application of the waste management hierarchy is an underlying principle of all waste management in Qld. The waste management hierarchy identifies the most preferred to the least preferred waste management option:

- avoid;
- reduce;
- reuse;
- recycle;
- recover;
- treat; and
- dispose.

Waste Avoidance

Where possible, raw materials would be delivered in bulk form. Where bulk delivery is not feasible, consideration shall be given to the purchase of products based on minimalist packaging and use of biodegradable materials. CCL would also consider the use of alternative products to ensure that unnecessary waste is not produced.

Waste Reduction

CCL would reduce the amount of waste being produced at the BNCOP by limiting the amount of materials brought onto the site to that which is necessary. Waste production at the BNCOP would be minimised by limiting the amount of unnecessary materials on-site.

Waste Reuse and Recycling

A recycling program would be established and promoted, encouraging the recycling of waste materials such as paper, cardboard, scrap metal and air filters.

Waste oils and metals (including metal drums) would be managed in accordance with the Commonwealth *Product Stewardship Arrangements for Oil Administrative Guidelines* (Commonwealth Department of the Environment and Heritage, 2005b).

Waste streams would be reused wherever ongoing health, safety and reliability can be ensured.

Waste Recovery

Waste recovery is not proposed to be undertaken at the BNCOP.

Treatment

Sewage treatment would occur on-site at the BNCOP. The treated effluent would then be returned to mine water storages for later mine consumption (provided the recycled water complies with the standards under section 18AE of the Public Health Regulation 2005 [Qld]).

Disposal

Where disposal is required, CCL would endeavour to minimise the quantity and/or volume of such waste materials. Waste that is not able to be disposed on-site would be transferred to a suitably licensed waste disposal facility by a registered waste carrier.

Waste would be disposed on-site in a way that prevents or minimises adverse effects on environmental values.

Collection and Storage

Designated waste collection areas would be located on-site for storage of waste prior to disposal. Waste produced at the BNCOP operations would be collected and transported to the MIA where:

- waste would be segregated into general waste, recyclable waste and hazardous waste;
- general waste would be collected in bins;
- waste oils, chemicals, batteries and other hazardous or regulated substances would be stored in bunded areas or on bunded pallets;
- recyclable waste would be separated and stored for collection; and
- scrap tyres would be stockpiled in accordance with DEHP Operational Policy *Disposal and Storage of scrap tyres at mine sites* (DEHP, 2010b). To minimise the risk of fire, tyre stockpiles would be:
  - less than 3 m high and 200 square metres (m^2) in area;
  - more than 10 m from any other tyre storage area; and
  - more than a 10 m radius from any grass.

Different forms of waste (i.e. metals, paper, oils, batteries, general waste, etc.) would be stored on-site according to waste stream, taking into consideration public health, hygiene and safety standards. For example, flammable material or combustible liquid wastes would be stored in facilities designed to meet the AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*.

Bins located within offices and workshops would be appropriately labelled to avoid cross-contamination and ensure separation of different waste streams. Also, bins would be emptied regularly into the relevant skip to keep vermin and pest numbers to a minimum.

As stated above, CCL have developed a Waste Management Program which would be implemented at the BNCOP.

Hazardous waste would be stored in a separate storage area to ensure that all hazardous waste is managed to prevent environmental harm.

The management of hazardous material is described in Appendix O.

Cleaner Production

Cleaner production means the continuous application of an integrated preventative environmental strategy to processes, products and services to increase efficiency and reduce risks to people and the environment.

Cleaner production techniques could be implemented during all phases of the BNCOP through:

- Input substitution: This refers to the use of less polluting raw and adjunct materials and the use of process auxiliaries (such as lubricants and coolants) with a longer service lifetime.
- Product selection: Wherever practicable, non-hazardous products are selected in preference to hazardous materials.
- Improved operation and maintenance: This involves the selection and use of the most appropriate and practicable fixed and mobile equipment for use in coal extraction, transportation and processing, and high levels of maintenance to ensure items are operating efficiently.
- Reuse of resources: Resources that would otherwise be classified as wastes (e.g. wooden pallets, cleared vegetative material, waste water, metals) are reused on-site.
- Technology modifications: This includes improving process automation, process optimisation, equipment redesign and process substitution.
- Closed-loop recycling: Where a product is recycled and used again in the same form (e.g. wooden pallets).

CCL would contribute to cleaner production outcomes by applying the following aspects to the BNCOP:

- limiting the extent of ground to be disturbed during construction and operations (i.e. minimising the disturbance footprint of the BNCOP);
- selecting the most efficient and practical coal extraction and processing technology to ensure the appropriate energy intensity and production efficiency;
- selecting the most efficient and productive machinery and equipment throughout the life of the BNCOP to minimise the purchase of machinery and equipment;

- selecting the most appropriate processes during operation and maintenance, such as the reuse of runoff for dust suppression, and the recycling of effluent from the sewage treatment plant for reuse or irrigation; and
- recycling appropriate materials (i.e. glass, paper, cardboard, timber and Class, 1, 2 and 5 plastics).

Waste Monitoring and Auditing

The waste streams, quantities produced and implemented management practices would be recorded by CCL over the life of the BNCOP. The following activities would be undertaken during the auditing of waste production and management:

- assessment of the wastes being produced compared to the predicted waste streams and quantities (Table 4-7);
- identify potential improvement in waste management practices (including establishment of reduced waste targets where possible);
- monthly inspection reports about waste storage systems and transportation would be prepared and sent to the senior management team;
- inspections of the waste storage areas would occur on a regular basis to ensure that all waste is appropriately stored and separated;
- monitor the implementation and success of the Waste Management Program; and
- monitor compliance with relevant Commonwealth and Qld legislation.

Employees would be required to notify employers within 24 hours of becoming aware of an incident that has potential to cause, or threaten to cause, material or serious environmental harm. This notification would be delivered verbally or in writing in accordance with the DEHP guideline *The Duty to Notify of Environmental Harm*.

Natural Resource Use Efficiency

Water

The sources of water used at the BNCOP would be supplied according to the following priority (excluding potable water supplies):

- mine water supplied from pit dewatering (including groundwater inflows);
- recycled process water recovered from the CHPP;
- surface runoff water captured and stored within the mine water dam and process water dam; and
- water supply 'make-up' sourced directly from the Dawson River as required via a licensed agreement.

This priority would ensure that CCL utilises all water that is available on-site before obtaining water from other sources, therefore ensuring the efficient use of this resource at the BNCOP.

Water management is discussed further in Sections 2.8 and 3.3 and Appendix C.

Energy

Power for the BNCOP would be supplied via a 22 kV overhead power line from the proposed Ergon Energy Baralaba Switching/Substation.

Power would be reticulated around the site via a combination of 22 kV overhead power lines and buried cables. Switchrooms and substations would be strategically located around the site to minimise the amount of cable installation required and would typically be located close to the infrastructure with the highest power demands (e.g. the CHPP).

CCL would limit energy usage to that which is essential for the BNCOP to progress. CCL would implement measures so that energy is not wasted through unnecessary activities.

As detailed in Attachment 2, CCL would be subject to annual reporting obligations in relation to:

- GHG emissions;
- energy production;
- energy consumption; and
- any other information specified under the *National Greenhouse and Energy Reporting Act 2007* (Cth).

4.5 CULTURAL HERITAGE

The environmental objective for cultural heritage and a description of the environmental values relevant to cultural heritage in the vicinity of the BNCOP is provided in Sections 4.5.1 and 4.5.2, respectively. Section 4.5.3 describes the potential impacts of the BNCOP on cultural heritage and outlines proposed mitigation measures.

4.5.1 Environmental Objective

The environmental objective, as stated in the Final ToR, for cultural heritage is:

> *The construction and operation of the project should aim to ensure that the nature and scale of the project does not compromise the cultural heritage significance of a heritage place or heritage area.*

4.5.2 Description of Environmental Values

The environmental values relevant to cultural heritage that are to be protected during the operation of the BNCOP include:

- recognition of cultural heritage sites and landscape features;
- respect for knowledge, culture and traditions; and
- conservation of items or areas of cultural significance.

Indigenous Cultural Heritage

In 2005, an Aboriginal cultural heritage investigation report (including a field survey) was completed for the Baralaba Coal Mine (Central Queensland Cultural Heritage Management, 2005). A search of the Aboriginal Cultural Heritage Register and Aboriginal Cultural Heritage database was also undertaken to assist in determining if there were any existing records of Aboriginal cultural heritage in a broader area including the BNCOP Operational Land.

It was concluded that no cultural heritage material was encountered during the survey (Central Queensland Cultural Heritage Management, 2005).

There are two noteworthy Indigenous cultural heritage values in the Baralaba region (Central Queensland Cultural Heritage Management, 2005). These are the former Baralaba Aboriginal Reserve and the *Munda garra*, or rainbow serpent, which is reported by the Gaangalu Nation People to have formed many of the geographical features in the country, including waterways, mountains, and other places of note. Neither of these values occur within the BNCOP Operational Land.

In December 2012, the Gaangalu Nation People were registered as the Native Title Claimants (QC12/9-1) over the BNCOP Operational Land. The Gaangalu Nation People are comprised of the Gangulu People, the Ghungalu People and the Kangoulu People.

Since the acquisition of the Baralaba Coal Mine, CCL has continued to work with the Aboriginal groups to ensure the duty of care obligations have been satisfactorily met in all on-ground activities.

Non-Indigenous Cultural Heritage

A Non-Indigenous Cultural Heritage Assessment was undertaken for the BNCOP by Converge Heritage and Community (2014) and is presented in Appendix L.

The assessment was prepared in consideration of the relevant principles and criteria contained in the *Burra Charter* (International Council on Monuments and Sites Inc, 2000) and the *Queensland Heritage Act 1992* (Qld) (QH Act).

Historical Overview

The following historical overview is a summary of the history detailed in Appendix L.

Mining in the region commenced in 1890 with the discovery of coal at Callide Creek by prospectors Peters, Dunn and Otty. Initial mining efforts were limited to several small scale shafts.

Further exploration in the Dawson River area in 1899, by assistant government geologist Benjamin Dunstan, described the coal that had been located at the foot of Mount Ramsay (to the south-east of the BNCOP Disturbance Footprint) as being of exceptional quality and recommended that the surrounding land be designated a coal reserve. The release of Dunstan's report in 1901 resulted in a flurry of exploration activities in the region.

The township of Baralaba, located to the south of the BNCOP Operational Land, was established relatively late in the history of Qld. The original town comprised drillers for coal, timber cutters and carters. In 1917, a second town area was settled on the Benleith portion of the Nulalbin run at the terminus of the new railway line from Rockhampton.

Mount Morgan Gold Mining Company Limited opened the Dawson Valley Colliery (located approximately 4 km south of the BNCOP Operational Land) and by 1924, was producing 150 tonnes of coal per day. Extended operations recommenced at the Dawson Valley Colliery once Mount Morgan Ltd acquired the leases in 1936. Mining continued despite setbacks caused by the 1954 and 1967 floods but was finally ceased in 1969.

The historic Dawson Valley Colliery (part of Mount Morgan Gold Mine) is located on the inactive leases currently held by Baralaba Coal Pty Ltd (CCL, 2013a). In 2009, the Queensland Heritage Council entered the Dawson Valley Colliery on the Queensland Heritage Register (Place ID 602723). A Conservation Management Plan has been developed for the historic site (CCL, 2013a).

The types of places identified in the BNCOP Operational Land directly relating to the pastoral industry, were all post 1940-50s after heavy machinery became more readily available post World War II. These places include dams, fencing and stock yards.

The BNCOP Operational Land is located in an area that was minimally cleared up until the late 1950s and 1960s. At this time, despite its location just outside of the Brigalow Scheme areas, large areas of Brigalow were cleared, as is evident by remnant gilgais in the central and southern parts of the BNCOP Operational Land.

It is also apparent that, despite MLs covering this region since 1903, no mining activity has occurred within the BNCOP Operational Land to date.

An analysis of land suitability in the former Duaringa Shire (following the Brigalow Scheme) identifies the BNCOP Operational Land as improved pastures or arable with pasture rotations, although it is noted that crops were grown along the Dawson River floodplain in the 1970s.

Homesteads and infrastructure associated with the pastoral industry were located closer to available water (i.e. the Dawson River). As such, the BNCOP Operational Land occupies the back paddocks of both the historic station of Nulalbin and more recent subdivisions.

Further discussion on the early European settlement and the pastoral history of relevance to non-Indigenous cultural heritage items in the vicinity of the BNCOP is provided in Appendix L.

Non-Indigenous Heritage Values of Relevance to the BNCOP

Converge Heritage and Community (2014) (Appendix L) completed historical and archival research and review of heritage registers prior to their survey of the BNCOP Disturbance Footprint.

No items of significance were identified on the following heritage lists within the BNCOP Disturbance Footprint (Appendix L):

- World Heritage List;
- National Heritage List;
- Commonwealth Heritage List;
- Queensland Heritage Register;
- Local Heritage Register;
- Register of National Estate (former); or
- National Trust of Australia Register.

Items with identified heritage values in the vicinity of the BNCOP Disturbance Footprint included the Dawson Valley Colliery (former). This item has been entered on the Queensland Heritage Register (QHR 602723) and is located approximately 4 km from the BNCOP Disturbance Footprint, fringing the Baralaba Township (Appendix L).

Of the five features of interest identified in the assessment, only one site (a telephone line) was assessed as having any (low) cultural heritage significance. The remaining four items (earthen banked dams) were assessed as having no cultural heritage significance, and therefore further mitigation of these dams was considered to be unnecessary (Appendix L).

The remnant telephone line has been integrated into a boundary fence line which cuts through part of the northern section of the BNCOP Disturbance Footprint. White insulators along the telephone line are thought to date to the 1950s–1960s period. Poles associated with the telephone line are placed approximately 100 m apart for a total distance of approximately 3 km across the BNCOP Disturbance Footprint. It was noted during the survey that the height of the poles was unusually low (approximately 2.2 m) compared to similar features observable in other parts of Central Qld (Appendix L).

Although the alignment of the telephone line and the relatively low height of the poles is of interest, it is considered to be unremarkable and is unlikely to contribute significant information in relation to the evolution of the history of Qld and has insufficient integrity to contribute significant information in relation to the history of the region (Appendix L).

4.5.3 Potential Impacts, Mitigation Measures and Management

Indigenous Cultural Heritage

Under section 86 of the ACH Act, a cultural heritage management plan is required to be prepared by CCL in accordance with the requirements of Part 7 of the ACH Act.

CCL has entered into a Cultural Heritage Investigation and Management Agreement (CHIMA) with the Gaangalu Nation People. The CHIMA was approved as a Cultural Heritage Management Plan (CHMP) pursuant to section 107 of the ACH Act by the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs on 12 August 2013.

The CHMP provides for the engagement of the Gaangalu Nation People prior to the commencement of any ground disturbance works, which allows for an assessment of the cultural heritage values within the proposed area of disturbance, and for the development of appropriate management strategies.

The CHMP applies to all land within the BNCOP Operational Land and includes the following provisions:

- Establishment of a Coordinating Committee comprised of representatives from CCL and the Gaangalu Nation People Endorsed Parties for the purposes of coordination, implementation, management and future conduct of matters arising in relation to the CHMP.
- Reporting of discovery of any Aboriginal Cultural Heritage within the BNCOP Operational Land.
- Process for obtaining approval for BNCOP works and cultural heritage management, including the implementation of agreed management arrangements relevant to previously identified significant areas and objects (through initial cultural heritage assessments in accordance with an initial cultural heritage assessment agreement).
- Procedures in relation to the discovery of any human remains.
- Access to the BNCOP Operational Land and surrounding areas covered by the CHIMA.

The BNCOP would be constructed and operated in accordance with the above provisions.

Non-Indigenous Cultural Heritage

The assessment has identified five features of interest, all of which would be directly impacted by the BNCOP. Only one of these places (the telephone line) is considered to have any (low) non-Indigenous cultural heritage significance.

The recording of the telephone line undertaken as part of the Non-Indigenous Cultural Heritage Assessment was determined by Converge Heritage and Community (2014) to be a sufficient mitigation measure.

Converge Heritage and Community therefore concluded that none of the features of interest identified within the BNCOP Disturbance Footprint require further management to mitigate the impact of the BNCOP on their cultural heritage values (Appendix L).

Potential for Further Sites and Places to Exist within the BNCOP Disturbance Footprint

It is considered that there is low potential for further historic places and items to exist within the BNCOP Disturbance Footprint.

Notwithstanding, as a cautionary approach, a process for managing historic cultural heritage material which may be located during further development within the BNCOP Disturbance Footprint is provided in Appendix B of the Converge Heritage and Community (2014) report (Appendix L). Examples of currently unknown non-Indigenous cultural heritage sites or places may include or be related to:

- remains from settlement pastoral/cultivation activities such as camp refuse, dams, telegraph lines and remnant fencing; and
- survey/blazed trees.

Additionally, CCL would demonstrate diligence whilst undertaking works within the BNCOP Disturbance Footprint, particularly during any clearing or construction phases associated with initial preparation of the area. All staff or contractors of CCL would be informed of their obligations under section 89 of the QH Act to report to the DEHP any archaeological items (as defined under the QH Act) that may constitute an important source of information about an aspect of the history of Qld. The process outlined in Appendix B of the Converge Heritage and Community (2014) report (Appendix L) would be adopted if any potential Non-Indigenous Cultural Heritage items are identified.

Cumulative Impacts

The BNCOP is not expected to impact values of cultural heritage values and as a result, cumulative impacts with nearby projects would not be expected to occur.

4.6 SOCIAL VALUES

A Social Impact Assessment (SIA) was undertaken for the BNCOP by Coffey Environments (2014), and is presented in Appendix M.

Potential impacts of the BNCOP on the social values of the local and regional communities were identified through direct engagement with potentially affected stakeholders, and the analysis of potential impacts against the attributes of the existing social environment. The assessment of potential impacts was completed using an impact significance assessment methodology. In this approach, the significance of an impact is assessed by considering the sensitivity of a particular social value and the magnitude of a predicted impact.

A description of the existing social values is provided in Section 4.6.2. The potential impacts of the BNCOP on social values are described in Section 4.6.3, while consideration of appropriate management measures, mitigation and monitoring is considered in Section 4.6.4.

4.6.1 Environmental Objectives

The environmental objectives, as stated in the Final ToR, relevant to social values are to aim to:

- *avoid or mitigate adverse social and economic impacts arising from the project; and*
- *capitalise on opportunities potentially available to affected communities.*

4.6.2 Description of Environmental Values

Social and Cultural Area

Due to the proximity of the BNCOP to the Baralaba Township (i.e. approximately 7 km), the Baralaba community constitutes the primary social and cultural area of influence for the SIA (Appendix M) (i.e. the primary study area).

In relation to broader potential impacts of the BNCOP, the secondary social and cultural area of influence includes the Central Highlands Regional, Banana Shire and the Woorabinda Aboriginal Shire LGAs (Appendix M).

Population and Demography

Based on Australian Bureau of Statistics census data, the population of the Baralaba community was 479 in 2011. Population growth in Baralaba between 2006 and 2011 has been substantial, and has been notably higher than the rest of Qld. This level of population growth is directly attributable to the recommencement of mining operations at the Baralaba Coal Mine in 2008 (Appendix M).

The population of the secondary study area (i.e. the Banana Shire, Central Highlands Regional and Woorabinda Aboriginal Shire LGAs) in 2011 was 44,116 which accounts for approximately 1% of the population of Qld. Table 4-8 outlines the population change between 2006 and 2011 in the primary and secondary study areas.

Table 4-8
Population Changes from 2006 to 2011

Locality	2006 Population	2011 Population	Population Change 2006 to 2011
Primary Study Area			
Baralaba (state suburb)	290	479	65.2%
Moura (state suburb)	1,774	1,899	7.0%
Secondary Study Area			
Banana (S) LGA	13,361	14,456	8.2%
Central Highlands (R) LGA	26,479	28,715	8.4%
Woorabinda (S) LGA	852	945	10.9%
State			
Queensland	3,904,534	4,332,737	11.0%

Source: Appendix M.

Stakeholder Engagement and Community Consultation Program

CCL has an established consultation program which has been ongoing for a number of years for its Baralaba projects.

Consultation undertaken specifically for the BNCOP has included both targeted consultation undertaken for the SIA, as well as a broader consultation program for the EIS (Section 1.3), both of which informed the SIA (Appendix M and Attachment 3).

BNCOP specific consultation was conducted with the local community, affected landowners and other relevant stakeholders, including interested and affected persons and other advisory agencies/groups (Section 1.3).

A summary of the stakeholder engagement and community consultation program in the form of a Public Consultation Report is provided in Appendix M.

Workforce Profile

The following workforce profile and community characteristics description is a summary of the detail presented in Appendix M.

Construction Workforce

The construction workforce requirements for the BNCOP would vary during the construction period, however there is anticipated to be a peak requirement for 130 personnel and an average of an additional 76 personnel.

The source of the construction workforce would be dependent upon the availability of required contractors and where such contractors are based, however in accordance with current CCL practice, every opportunity would be provided to contractors from the local and regional area.

Operations Workforce

Upon commencement of operations at the BNCOP, CCL is anticipated to have an existing operations workforce of up to approximately 190 personnel associated with the Baralaba North/Wonbindi North Mine.

With the wind down of operations at the Baralaba Coal Mine in 2014, it is anticipated that this workforce would roll directly to the BNCOP, thereby reducing the additional operations workforce requirement for the BNCOP to an estimated 190 personnel (i.e. doubling of the operations workforce to increase production from 1 to 3.5 Mtpa.

Table 4-9 provides a summary of the predicted employment sources for the BNCOP operations workforce. For existing operations, CCL has demonstrated a commitment to employ people from the local and regional area, and this approach would be continued for the BNCOP. In accordance with this intention it is expected that approximately 68% of the operations workforce would be sourced from within the Banana and Central Highlands LGAs. The remaining 32% would be sourced from other areas in Qld.

Intangible Community Characteristics

Based on respondent's views communicated during the SIA (Appendix M), the residents of the local community placed a high value on maintaining a safe and healthy environment. A strong public perception of community safety was identified, and living in a quiet and friendly place was considered by residents as a preferred environment in which to raise a family.

The mining and agriculture sectors provide the basis for the local economy, and there was recognition that the competing interests of these sectors need to be balanced and supported so that they may provide a prosperous future. Within the Baralaba community there was optimism as to the positive effect which the BNCOP might have upon local economic conditions.

Table 4-9
Source of Operations Workforce

Locality	Baralaba North/Wonbindi North Mine (190 personnel)	Additional required BNCOP Workforce (190 positions)	Full BNCOP Workforce (380 personnel)
Banana LGA	75% (143)	40% (76)	57.5% (219)
Central Highlands LGA	10% (19)	10% (19)	10% (38)
Queensland	15% (28)	50% (95)	32.5% (123)

Source: Appendix M.

A detailed description of the existing social environment of the local and regional communities is provided in Appendix M.

4.6.3 Potential Impacts

Coffey Environments (2014) concluded that the BNCOP is likely to have a range of both positive and negative social impacts within the community.

As described in Appendix M, the potential social impacts of the BNCOP include the following:

- The provision of employment and training opportunities (including opportunities for the Indigenous community) (Section 4.7).
- The injection of wealth into local and regional economy (Section 4.7).
- Population growth, demographic change, and population decline upon decommissioning.
- Land use changes as a result of the BNCOP (Section 4.1).
- Potential impacts on air quality (Section 3.5).
- Potential noise and vibration impacts (Section 3.6).
- Increased demand for permanent and temporary housing in the local and regional community.
- Loss of training and employment opportunities upon decommissioning.
- Competition for labour between existing businesses and the BNCOP.
- Loss of local economic stimulus upon decommissioning.
- Potential impacts on the capacity of social infrastructure and services to service the local and regional communities.
- Increased traffic and heavy vehicle volumes in Baralaba (including along the product coal road transport route) (Section 3.7).
- Fear of major disaster or hazard (flooding) (Sections 3.4 and 4.8).
- Potential impacts on social cohesion.

The haulage of coal along the product coal road transport route (i.e. Middle Road) was a key issue raised during the course of community and stakeholder consultation undertaken for the BNCOP.

Residents along Middle Road engaged as part of the SIA targeted consultation program expressed concerns as to safety, amenity and property valuation effects associated with the increase in haulage trucks size and number of traffic movements.

There was a perception within the community that the haulage trucks presented a safety issue, and concerns were also raised as to the noise and lighting effects associated with increased truck movements.

Increased heavy vehicle traffic associated with coal haulage along Middle Road was identified as an issue which has a high level of sensitivity and the magnitude of the effect is considered to be moderate, resulting in a significance rating of high prior to implementation of any social mitigation or management measures (Appendix M).

The potential impacts of the BNCOP on other social values of the local and regional communities (e.g. increased regional employment and training opportunities, competition for labour, social cohesion, etc.) are considered in detail in Appendix M.

Cumulative Impacts

The concurrent development of mining and other major infrastructure projects in the region has the potential to deliver both beneficial and adverse social and economic impacts to the local and regional communities.

Beneficial cumulative impacts may include increased economic activity, increased government revenues through taxation and royalties, and other associated direct benefits for industries other than mining (such as construction, port activities and retail).

Potential cumulative social and economic impacts that can be collectively created by multiple projects include (Appendix M):

- Population growth placing demand on social infrastructure (such as childcare, education and health).
- Labour shortage and labour draw through demand for mining and construction workers.
- Upward pressure on wages due to labour shortage, affecting the viability of some businesses.
- Impacts on agricultural production from land disruption and competition for land.

- Impacts on residential, industrial and commercial property availability and values.
- Impacts on trade-exposed industries through exchange rates.

Coffey Environments (2014) concluded that only the Dawson Mine (located approximately 45 km south-east of the BNCOP and approximately 10 km from Moura) has the potential to provide cumulative effects on the social impacts of the BNCOP.

As the Dawson Mine had recently reduced its associated workforce by approximately 200 persons, any potential cumulative impacts are considered to be positive (i.e. potential opportunity for re-employment in the region) (Appendix M).

4.6.4 Mitigation Measures, Management and Monitoring

Mitigation and management measures for potential impacts of the BNCOP on social values were derived following the assessment of the level of significance attributed to respective identified potential impacts. The mitigation and management measures were identified through direct consultation with the community, the examination of the potential impacts of the BNCOP and stakeholder negotiations (Appendix M).

A residual impact evaluation was undertaken for the BNCOP, which defined any potential residual impacts that would remain following successful implementation of all identified management and mitigation measures.

Mitigation Measures and Management

Coffey Environments (2014) concluded that following the application of relevant mitigation and management measures, the BNCOP would have a generally positive social effect on the local and regional area (Appendix M).

The haulage of coal along Middle Road was a key issue raised during the course of community and stakeholder consultation undertaken for the BNCOP (Appendix M). The key avoidance, mitigation and management measures proposed to manage potential impacts of increased heavy vehicle movements along Middle Road are described in Section 3.7.

Action Plan

CCL would implement the Social Impact Action Plan developed as part of the SIA for the BNCOP (Appendix A of Appendix M). The Social Impact Action Plan would assist CCL, its contractors, state and local governments, and other project partners in managing any potential adverse impacts while maximising the benefits associated with the BNCOP.

In accordance with the Qld Government *Social Impact Assessment Guideline* (DSDIP, 2013b), the Social Impact Action Plan includes proposed mitigation and management measures for the following key components:

- Community and stakeholder engagement: Strategies to build on CCL's existing community and stakeholder engagement processes to facilitate the establishment of a working partnership with the communities in which it operates.
- Workforce management: Strategies for local and equal opportunity employment recruitment and identifies important partnerships, such as with Skills Queensland, to address skills gaps and training requirements.
- Local business and industry: Strategies to inform local business of the goods and service provision opportunities and raise awareness of CCL's business vendor register and compliance requirements of business to secure contracts.
- Housing and accommodation: Strategies to meet the accommodation requirements of the BNCOP.
- Health and community wellbeing: Strategies to minimise existing and potential impacts upon residents of the community of Baralaba.

In addition, CCL would liaise with the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs and Skills Queensland to match the skills required by the BNCOP with those of Indigenous residents where the opportunities exist.

Demobilisation Strategy

Prior to completion of mining at the BNCOP, CCL would develop a Demobilisation Strategy in consultation with employees, contractors, state and local governments and other project partners.

The Demobilisation Strategy would address the economic sustainability of the Baralaba Township during decommissioning and post-closure. The strategy would include specific strategies and actions and assign responsibility.

The Demobilisation Strategy would include a plan for transitional employment to address loss of training and employment opportunities for the local community upon decommissioning.

Monitoring Framework

The Social Impact Action Plan outlines a monitoring framework, which would allow CCL to monitor whether the proposed actions are meeting identified objectives throughout the life of the BNCOP. This monitoring framework would be further developed in consultation with stakeholders.

Annual reports on performance and outcomes would be generated for the Social Impact Action Plan, and would detail milestones and outcomes achieved to date and provide recommendations for improving performance. Relevant information from these reports would inform the BNCOP Annual Report.

4.7 ECONOMY

An Economic Assessment was undertaken for the BNCOP by Gillespie Economics (2014) and is presented in Appendix N.

The economic assessment is primarily concerned with the effect of a proposal on an economy in terms of specific indicators, such as gross regional output (business turnover), value-added, income and employment. The economic assessment is based on analysis of an input-output table for 2011, developed by Gillespie Economics for the local, regional and Qld economies (Appendix N).

A description of the environmental values including a summary of the existing local, regional and Qld economies is provided in Section 4.7.2. The potential impacts of the BNCOP on the local, regional and Qld economies are described in Section 4.7.3. The proposed mitigation and management measures are provided in Section 4.7.4.

4.7.1 Environmental Objectives

The relevant environmental objectives, as stated in the Final ToR, for economic values are to aim to:

- *avoid or mitigate adverse social and economic impacts arising from the project; and*
- *capitalise on opportunities potentially available to affected communities.*

4.7.2 Description of Environmental Values

The following description of values relevant to the economy is a summary of the detail provided in Appendix N.

The economic assessment was conducted at three different scales to assess the potential impact of the BNCOP on the local, regional and Qld economies. The local economy adopted for the BNCOP is the Banana LGA. The combined Banana and Central Highlands LGAs was adopted as the regional economy for the BNCOP.

Value-added for the local economy in 2011 (i.e. Banana LGA) is estimated at $1,431M, comprising $489M to households as wages and salaries (including payments to self-employed persons and employers) and $942M in other value-added contributions.

Value-added for the regional economy in 2011 (i.e. Central Highlands and Banana LGAs) is estimated at $5,045M, comprising $1,657M to households as wages and salaries (including payments to self-employed persons and employers) and $3,389M in other value-added contributions.

The mining sector and agriculture, forest and fishing sectors are of greater relative importance to the local and regional economies than to the Qld economy (Table 4-10), while the manufacturing, building, trade and service sectors are of less relative importance than they are to the Qld economy (Table 4-10).

In terms of output and value-added, the coal mining sector and other mining sectors are the most significant sectors of both the local and regional economies.

Table 4-10
Contributions to Employment, Gross Regional Product and Output by Industry Sector – Local, Regional and Qld Economies (2011)

Sector	Total Employment (%)			Contribution to Gross Regional Product (%)			Contribution to Output (%)		
	Local	Regional	Qld	Local	Regional	Qld	Local	Regional	Qld
Agriculture, Forestry and Fishing	17	11	3	6	3	2	7	4	2
Mining	22	30	3	54	64	11	53	63	10
Manufacturing	8	4	9	6	3	9	10	5	15
Utilities	4	2	1	5	2	3	6	2	3
Building	5	8	9	4	5	8	5	8	14
Trade Accommodation	14	15	22	5	5	11	5	4	11
Business Services	10	11	21	10	9	33	8	8	30
Public Personal Services	20	18	33	8	6	18	6	5	15

Source: After Appendix N.
Note: Rows may not sum to 100% due to rounding.

The most significant sectors for local and regional employment are the coal mining sector, sheep, grains and beef sector, retail trade sector and education sector.

The coal mining sector, other mining sector, and education sector are the most significant sectors for local and regional household income.

4.7.3 Potential Impacts

The economic assessment (Appendix N) included consideration of the impacts of the BNCOP (including construction) on the local (i.e. Banana LGA), regional (i.e. Banana and Central Highlands LGAs) and Qld economies, and also other potential economic impacts associated with the BNCOP.

Construction

Short-term construction/development activities would require additional construction workforce for short periods, resulting in a total workforce of up to approximately 430 people (peak) (Section 2.1.7). An additional 76 personnel would be required on average during the construction phase.

The construction phase of the BNCOP is predicted to have the following flow-on effects for the local economy (Appendix N):

- $65M in annual direct and indirect regional output or business turnover;
- $23M in annual direct and indirect regional value-added;
- $8M in annual direct and indirect household income; and
- 157 direct and indirect jobs.

For the regional economy, the construction phase of the BNCOP is predicted to have the following flow-on effects (Appendix N):

- $72M in annual direct and indirect output;
- $26M in annual direct and indirect value added;
- $9M in annual direct and indirect household income; and
- 184 direct and indirect jobs.

The construction phase of the BNCOP is predicted to have the following flow-on effects on the Qld economy (Appendix N):

- $134M in annual direct and indirect output;
- $56M in annual direct and indirect value added;
- $31M in annual direct and indirect household income; and
- 422 direct and indirect jobs.

Operations

At full development, the BNCOP operational workforce would be in the order of 380 on-site personnel, including a mixture of direct CCL employees and contractors (Section 2.1.7).

The operation of the BNCOP is predicted to have the following annual average incremental impacts on the local economy (Appendix N):

- $341M in annual direct and indirect regional output or business turnover;
- $39M in annual direct and indirect regional value added;
- $12M in annual direct and indirect household income; and
- 355 direct and indirect jobs.

For the regional economy, the operation of the BNCOP is predicted to have the following impacts (Appendix N):

- $364M in annual direct and indirect regional output or business turnover;
- $49M in annual direct and indirect regional value added;
- $19M in annual direct and indirect household income; and
- 472 direct and indirect jobs.

Flow-on impacts from the BNCOP are likely to affect a number of different sectors of the local and regional economies. The sectors most impacted by output, value added and income flow-ons are likely to be accommodation, cafes and restaurants; other repairs and maintenance; construction services; professional, scientific and technical services; retail trade; wholesale trade; rental and hiring services; and ownership of dwellings sectors (Appendix N).

The operation of the BNCOP is predicted to have the following annual average incremental impacts on the Qld economy (Appendix N):

- $921M in annual direct and indirect regional output or business turnover;
- $320M in annual direct and indirect regional value added;
- $165M in annual direct and indirect household income; and
- 2,460 direct and indirect jobs.

The potential impacts of the BNCOP on the Qld economy are expected to be substantially greater than for the local and regional economies (Table 4-11), as more BNCOP and household expenditure would be captured, and there is a greater level of inter-sectoral linkages in the larger Qld economy (Appendix N).

Other Potential Economic Impacts

The summary of other potential economic impacts below is further detailed in Appendix N.

Potential Contraction in Other Sectors

The BNCOP would create increased demand for labour during both the construction and operation phases.

Where labour resources in an economy are limited and the mobility of in-migrating labour from outside the economy is restricted, increased demand for labour resources (e.g. the BNCOP) may drive up local and regional wages. In these situations, there may be a reduction in economic activity in other sectors of the local and regional economy.

As the local and regional economies are not at full employment and are open economies with potential to use labour resources that reside outside of these economies, the BNCOP is not expected to result in any significant reduction in economic activity in other sectors of the local and regional economies.

In addition, the BNCOP may provide alternative employment opportunities for the estimated 200 people that have recently lost their jobs at the nearby Dawson Mine.

Housing Impacts

The BNCOP would create increased demand for accommodation during both the construction and operation phases.

Where housing supply is insufficient to meet demand, even temporarily, this may manifest itself in increased property prices and higher rent prices. While this may be seen as beneficial for property owners, it can adversely affect existing tenants, particularly those on lower incomes who can be priced out of the market.

CCL has developed an accommodation strategy that includes the provision of a range of housing types (Section 2.1.7). This is expected to limit impacts associated with increased house prices described above.

Table 4-11
Potential Impacts of the BNCOP on the Local, Regional and Qld Economies

Direct and Indirect Output or Business Turnover (Annual)		Direct and Indirect Value Added (Annual)		Direct and Indirect Household Income (Annual)		Direct and Indirect Jobs	
Construction	Operations (Incremental)	Construction	Operations (Incremental)	Construction	Operations (Incremental)	Construction	Operations (Incremental)
Contribution to the Qld Economy							
$134M	$921M	$56M	$320M	$31M	$165M	422	2,460
Contribution to the Regional Economy							
$72M	$364M	$26M	$49M	$9M	$19M	184	472
Contribution to the Local Economy							
$65M	$341M	$23M	$39M	$8M	$12M	157	355

Source: Appendix N.

End of BNCOP Life

The establishment and operation of the BNCOP would stimulate demand in the local, regional and Qld economy, for up to 15 years, leading to increased business turnover in a range of sectors and increased employment opportunities. Conversely, the cessation of the mining operations in the future would result in a contraction in local, regional and Qld economic activity.

The magnitude of the local and regional economic impacts of cessation of the BNCOP would depend on a number of interrelated factors at the time, including the movements of workers and their families, alternative development opportunities, and economic structure and trends in the regional economy at the time.

New mining resource developments in the region would help broaden the region's economic base and buffer against impacts of the cessation of individual activities. In this respect, the local and regional area is highly prospective with considerable coal resources.

4.7.4 Mitigation and Management Measures

CCL would work in partnership with the Banana Shire Council, Central Highlands Regional Council and the local community so that the benefits of the projected economic growth in the region are maximised and impacts avoided or mitigated, as far as possible.

As discussed in Section 4.6.4, the Social Impact Action Plan includes proposed mitigation and management measures for the following key components relevant to economic values:

- Workforce management: Strategies for local and equal opportunity employment recruitment and identifies important partnerships, such as with Skills Queensland, to address skills gaps and training requirements.
- Local business and industry: Strategies to inform local business of the goods and service provision opportunities and raise awareness of CCL's business vendor register and compliance requirements of business to secure contracts.
- Housing and accommodation: Strategies to meet the accommodation requirements of the BNCOP, including development of workforce accommodation (Section 2.1.7) to reduce excess demand for short-term and long-term accommodation.

In addition, CCL would liaise with the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs and Skills Queensland to match the skills required by the BNCOP with those of Indigenous residents where the opportunities exist.

The local business and industry component of the Social Impact Action Plan would include adoption of the Queensland Resources and Energy Sector Code of Practice for Local Content (Queensland Resource Council, 2013).

As described in Section 4.6.4, prior to completion of mining at the BNCOP, CCL would develop a Demobilisation Strategy in consultation with employees, contractors, state and local governments and other project partners.

4.8 HAZARDS AND SAFETY

Appendix O describes the potential hazards and safety risks associated with the BNCOP in the form of a preliminary risk assessment in accordance with Australian Standard/New Zealand Standard (AS/NZS) International Standards Organisation (ISO) 31000:2009 *Risk Management – Principles and Guidelines* (ISO 31000:2009) and IEC/ISO 31010:2009 *Risk Management – Risk Assessment Techniques*.

The objective of the Hazards and Safety Assessment (Appendix O) is to identify the on-site and off-site risks posed by the BNCOP to people, their property and the environment and assess the identified risks using applicable qualitative criteria. This assessment considers hazardous materials, natural events, environmental hazards (i.e. animal attack) and events at nearby sites.

4.8.1 Environmental Objective

The relevant environmental objectives, as stated in the Final ToR, for hazards and safety during construction and operation of the BNCOP are to ensure:

- *the risk of, and the adverse impacts from, natural and man-made hazards are avoided, minimised or mitigated to protect people and property;*
- *the community's resilience to natural hazards is maintained or enhanced; and*
- *developments involving the storage and handling of hazardous materials are appropriately located, designed and constructed to minimise health and safety risks to communities and individuals and adverse effects on the environment.*

4.8.2 Description of Environmental Values

The BNCOP is located within north-eastern part of the Brigalow Belt South Bioregion (Figure 2-9), as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) (DotE, 2014a), and has creek systems typical of semi-arid Australia. Such systems contain very little to no basal flows during the dry season, contrasting with the wet season, when high flow events are experienced.

Land in the Baralaba district is predominately used for rural activities including dairy farming, beef cattle grazing and fattening, and limited crop cultivation. Crops are generally restricted to providing forage for cattle, with Leucaena well-established within the area. Exotic improved pastures dominated by buffel grass are also common, while crops of cotton and wheat are produced on an opportunistic basis.

Sensitive Receptors and Community Values

Sensitive receptors to the BNCOP were identified based on a consultation with stakeholders and review of aerial imagery surrounding the BNCOP. Locations identified as sensitive receptors include:

- Baralaba Township (which is supported by a range of services including the health care facility, police, school, hotel, café, sporting and recreational facilities); and
- residential dwellings (Figure 4-2).

4.8.3 Potential Impacts

A number of hazardous materials and chemical substances would be used during construction, operations and decommissioning of the BNCOP.

The major potentially hazardous materials required for the BNCOP include the following:

- diesel;
- lubes, oils and greases;
- chemicals; and
- explosives.

An indicative list of all hazardous materials and substances being used or stored at the BNCOP (including the quantity of each substance) is presented in Appendix O.

In addition to the potentially hazardous materials identified above, natural events may result in hazardous situations within the BNCOP Operational Land and the surrounding locality. Such natural events include bushfires, landslides, floods and wildlife hazards (e.g. snake bite, animal attack or vector-borne diseases) (Appendix O). Section 3.4 and Appendix F of the EIS describe in detail the flooding risk associated with the BNCOP.

The BNCOP has the potential to affect hazards away from the site. The off-site hazards include, but are not limited to, the following (Appendix O):

- altering flooding characteristics;
- altering the natural bushfire regime; and
- detrimentally impacting the water quality of the surrounding aquatic environment.

CCL has considered the likelihood of the BNCOP affecting hazards away from the Operational Lands and implemented suitable hazards management strategies to decrease these risks.

Appendix O contains a full preliminary hazard analysis for the construction and operational phases of the BNCOP. The results of the Preliminary Hazard Analysis indicate that residual risk levels are tolerable with respect to surrounding land uses and do not preclude approval of the BNCOP.

4.8.4 Mitigation Measures and Management

The following processes and measures would be implemented at the BNCOP to reduce the risk of impacts on health, safety and the environment associated with the BNCOP:

- The transport, storage and handling of all dangerous goods, explosives and hazardous substances would be undertaken in accordance with relevant legislation and guidelines.
- All chemicals would be managed in accordance with the relevant material safety data sheet (MSDS).
- All equipment and vehicle operators would be trained in the safe operation of the equipment (including operating procedures for the refilling and maintenance of fuel storage tanks and mine vehicles) and the relevant emergency response procedures in the event of an incident.
- CCL and all contractors would be required to manage and remove from site all waste oil generated during their operations.
- Waste hydrocarbons and oil filters would be collected, stored and removed from site by licensed contractors.
- Chemical storage areas would be designed and bunded in accordance with AS 1940:2004.
- Regular inspection programs would be undertaken to ensure the structural integrity of fuel tanks and bunds.
- Spill control kits would be located at all chemical storage areas and in all service vehicles and key staff would be trained in spill prevention and clean up.
- The explosives magazine would be fenced, signed and maintained in accordance with AS 2187:2006.

CCL would also develop an Emergency Response Plan that would be implemented at the BNCOP.

The Emergency Response Plan would outline the procedures (including evacuation procedures) that would work alongside or in conjunction with emergency services to ensure that the health and well-being of CCL personnel, contractors and the public is maintained.

In addition, CCL are currently developing a Risk Management System in accordance with the conditions of EPML00223213 – Baralaba Coal Mine and EPML00617113 – Baralaba North/Wonbindi North Mine. This Risk Management System would be augmented and implemented at the BNCOP. CCL has undertaken consultation with the Qld Ambulance Service (QAS) and the Qld Police Service (QPS) and Qld Fire and Emergency Services (QFES) and has conducted on-site exercises involving both QAS and QFES and the local Banana Shire Counter Disaster Committee.