Appendix 25

Visual Impact Assessment

BYERWEN COAL PROJECT

Visual Impact Assessment

Prepared for QCoal Pty Limited | December 2012

envisage

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FIGURES

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GLOSSARY

Landscape character assessment area - Covers the project area under the six mining leases and the immediate boundaries.

Landscape character impact - Indicates the overall level of likely impact on the landscape character, and considers the relationship between *'visual sensitivity'* and *'magnitude of visual change'.*

Landscape units - Identify areas with a common landscape character, based on features such as land use, vegetation cover and landform.

Magnitude of visual change - Describes the visual changes to the landscape or a viewpoint that would result from the project and categorises the level of such change.

Photomontages - Simulations of the project on photographs of the existing project area from surrounding key viewpoints.

Residual effects - Final look of the mine site at conclusion of rehabilitation.

Viewshed - Describes and/or illustrates the approximate main areas from where parts of the project may be seen during operation and/or following mine closure and rehabilitation.

Visual amenity assessment - Examines any potential changes to the main identified viewpoints from surrounding properties, public roads and any other sensitive receptors.

Visual amenity assessment area - Focuses on an approximate area within a 5km radius of the outer boundary of the project area. The area used for the lighting impact assessment covers approximately the same area.

Visual impact - An overall indication of potential visual impact for each identified viewpoint, by combining a ranking given for *'visual sensitivity'* with a ranking given for *'magnitude of visual change'.*

Visual sensitivity (related for landscape character) - The visual sensitivity of different landscape characters in regional areas such as the project area can be largely defined by considering aspects such as the degree of naturalness and uniqueness. The more disturbed or common a landscape is, generally the less it is valued, and the less *'visually sensitive'* it is.

Visual sensitivity (related to visual amenity) - Visual sensitivity related to visual amenity specifically defines the likely visual sensitivity of particular viewpoints that may be affected. Viewpoints are generally more sensitive the closer they are and the clearer the view of any changes. Also, the numbers of viewers affected is considered (such as views from roads with high traffic volumes) and whether viewers are permanent (such as residential viewers) or transient (such as roads).
Abbreviations

ABBREVIATIONS

AHD	Australian Height Datum
CHPP	Coal Handling and Processing Plant
DEM	Digital Elevation Model
EPC	Exploration Permit for Coal
KM	Kilometres
MIA	Mine Infrastructure Area
MLA	Mining Licence Application
ROM	Run of Mine
SR	Sensitive Receptor
TLF	Train Loading Facilities
TOR	Terms of Reference

EXECUTIVE SUMMARY

This report provides a visual impact assessment of the Byerwen Coal Project (the project) that addresses the requirements of the Terms of Reference (ToR) for the project.

The following describes the main visual changes of the project, as well as potential impacts on landscape character and visual amenity, lighting and cumulative impacts and the main recommendations for additional mitigation.

VISUAL CHANGES

The final look of the mine site at the conclusion of the rehabilitation phase would be of a substantially altered landform to the one that existed prior to the mine.

In the southern tenement, there will be three residual voids and associated rehabilitated ex-pit spoil dumps that would remain at the conclusion of mining and in perpetuity. In the northern tenement a residual void and rehabilitated ex-pit spoil dump would remain. There would also be five other residual ex-pit spoil dumps that would remain where the former mine pits were.

The final above ground-level landforms (i.e. ex-pit spoil dumps) would be up to a maximum of approximately 60m above the existing natural surface, with the longest being some 5km long (former West Pit 3). All would be rehabilitated with low native vegetation such as grasses and shrubs.

As a visual comparison, the local existing topography across the site includes knolls and hills of up to an elevation of 330-350m AHD, particularly through the central part of the site in the vicinity of the largest pit (West Pit). Therefore the proposed maximum height of 60m for these final landforms, which would give an overall final elevation of approximately 350m AHD, that being a level that would not significantly tower over the surrounding landscape.

However, these final landforms would be substantially different in form in terms of shapes that would not reflect the natural topography. These large elevated areas would cover very substantial surface areas and have relatively steep side slopes and flatter broad upper areas.

LANDSCAPE CHARACTER IMPACTS

The level of impact to all the landscape character focusses on the immediate project area.

During operation of the mine the landscape character impact level would be *moderate* for most of the project area, with a *high* section associated with the North Pit. The impact would be reduced to some extent in the longer term by committed project mitigation works that include both re-vegetation and landform rehabilitation works. Hence, the residual landscape character impact at the end of the mine would be *low* across most of the project area, with a smaller area of *moderate* impact associated with the disturbed area of the former North Pit due to the more hilly landform and vegetation affected on this part of the site.

VISUAL AMENITY IMPACTS

There would be no visual amenity impacts for any sensitive receptors within 5km of the project that are of any concern. There would be some visual amenity impacts to some public viewpoints, particularly along Collinsville-Elphinstone Road, although no higher than a moderate level, with that reducing to a low level following rehabilitation and the mine closure.

Retention of a vegetated buffer that exists in some places along Collinsville-Elphinstone Road would also reduce the cumulative impacts of both the Newlands Mine (Suttor Creek and Wollombi) by continuing to screen some views of the existing and future spoil mounds of this mine as well as the Byerwen project at those locations.

LIGHTING IMPACTS

The existing night-time visual environment of this region is one already affected by mines.

For this project, lighting would be designed to ensure any impact to surrounding viewpoints would be minimised. However, there are a number of components of the mine that would be lit at night such as the mine infrastructure area (MIA) and coal handling and processing plant (CHPP). It is anticipated that all viewpoints within a 5km radius of the active mine area, even where direct views are not possible, will notice a sky glow; however there are no sensitive receptors of any concern (i.e. private, occupied houses) within this 5km area.

It is anticipated that at some locations along the Collinsville-Elphinstone Road lights would be seen, particularly those of the MIA and CHPP in the southern tenement, which would be located 1km from that road and relatively brightly lit. Recommended retention of the existing vegetation buffers would contribute to further screening this lighting and reducing the impact at some locations, including near the access from Collinsville-Elphinstone Road.

CUMULATIVE IMPACTS

There would be a cumulative visual impact primarily due to the combined views of the existing Suttor Creek and Wollombi parts of the Newlands Mine to the south-west of the project area and the project itself. However, the lack of any affected sensitive receptors within 5km of the subject project means that there would not be a cumulative impact as a result of other projects on those sensitive receptors. The retention of some existing vegetation buffers would reduce this cumulative impact to some extent to travellers along Collinsville-Elphinstone Road.

1. INTRODUCTION

1.1 INTRODUCTION

This report provides a visual impact assessment of the project that addresses the requirements of the project ToR.

In summary the Terms of Reference require the following:

- Environmental values - An assessment of the existing landscape character and visual amenity values of the site and its immediate surrounds.
- Potential impacts of the project - On landscape character of the site and the surrounding area, and visual amenity impacts on particular panoramas and outlooks. Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the project. Assessment is also required of the visual impact of night lighting.
- Mitigation - Details of all management options to be implemented and how these will mitigate or avoid identified impacts.

The report responds to these Terms of Reference as well as providing supplementary information.

1.2 PROJECT DESCRIPTION

The project will comprise an open-cut coal mine located approximately 20km west of the township of Glenden in Queensland's Bowen Basin.

Four mining zones have been identified for the project, comprising nine open-cut pits. It is expected that above ground infrastructure and mining activities will have a total disturbance area of approximately 7,253ha.

The mining schedule is based on taking advantage of the area of shallowest depth from surface to top of coal and orienting the mining such that it advances progressively deeper along the coal seam wherever possible. The pits will become deeper as mining progresses to the east. The maximum depth below surface level of the open-cut pits will vary between 140m in East Pit 2 and 350m in South Pit 1.

The proponent of the project is Byerwen Coal Pty Ltd (Byerwen Coal). Byerwen Coal is a joint venture between QCoal Pty Ltd and JFE Steel. The project area consists of six mining leases, MLA 10355, MLA 10356, MLA 10357, MLA 70434, MLA 70435 and MLA 70436. The proponent holds the two underlying exploration tenements in the project area, EPC 614 and EPC 739. The project area covers a portion of the two underlying EPCs.

Figure 1.1 illustrates the location of project area.

The site is predominantly used for agriculture such as beef cattle grazing. Large parts of the site are vegetated, with dense forest particularly in the northern tenement area. Land uses around the site include existing open-cut mines such as the main Newlands Mine to the north-east and the Newlands Suttor and Wollombi Pits to the immediate south-west.

1.3 FINAL LANDFORM

The final look of the mine site at the conclusion of the rehabilitation phase would be of a substantially altered landform to the one that existed prior to the mine.

In the southern tenement, there will be three residual voids and associated rehabilitated ex-pit spoil dumps that would remain at the conclusion of mining and in perpetuity. In the northern tenement a residual void and rehabilitated ex-pit spoil dump would remain as part of the former North Pit. There would also be five other residual ex-pit spoil dumps that would remain where the former mine pits were.

The residual voids will be benched on all sides apart from the former high walls. The voids would not be visible from outside the project site.

The final above ground-level landforms (i.e. ex-pit spoil dumps) would be approximately 60m above the existing natural surface, with the longest being some 5km long (former West Pit 3). All would be rehabilitated with low native vegetation such as grasses and shrubs.

Integrated Design Solutions - 030799 Byerwen Coal Project - F1 Viewshed analysis - RevA 30 October 2012

Figure 1.1

Site location

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2. METHODOLOGY OF ASSESSMENT

2.1 GENERAL

In the absence of specifically applicable guidelines, the methodology has been tailored to address the potential visual impacts of an open-cut mining project. The applied methodology has been based on professional experience with similar mine projects, and existing guidelines used by government authorities in Australia such as the *Environmental Impact Assessment Guidance Note - Guidelines for Landscape Character and Visual Impact Assessment* (NSW Roads and Traffic Authority, 2009), *Visual Landscape Planning in Western Australia* (Western Australian Planning Commission, 2007) and the United Kingdom's well-regarded *Guidelines for Landscape and Visual Impact Assessment* (The Landscape Institute and Institute of Environmental Management and Assessment, 2002).

The methodology is shown in **Figure 2.1.**

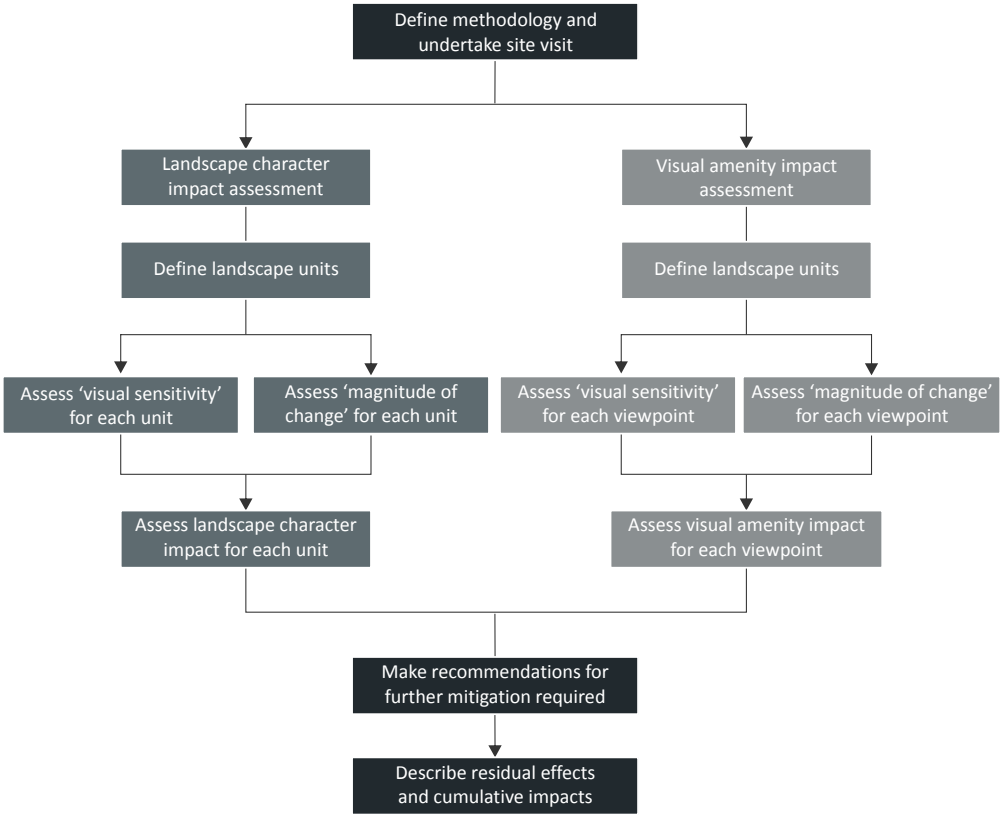

Figure 2.1
Impact assessment methodology

2.2 DEFINITION OF THE ASSESSMENT AREAS FOR THE PROJECT

The boundaries of the visual assessment area of the project varies depending on the two key potential impacts to be considered: that is, impacts in terms of landscape character, and impacts in terms of visual amenity. That is because impacts to landscape character are specific to the areas of the landscape directly affected by, or close to, the project, whereas impacts to visual amenity take into account a much wider area that considers viewpoints within and beyond the project area.

Thus, the two identified assessment areas for the visual impact assessment are defined as follows:

- Landscape character assessment area - Covers the project area under the six mining leases and the immediate boundaries.
- Visual amenity assessment area - Focuses on an approximate area within a 5km radius of the outer boundary of the project area. Such an area covers both local/ foreground views (within 1km) and sub-regional views (1-5km) where any visual changes and potential impacts are obviously of most concern. However, all sensitive receptors within approximately 10km have been identified and assessed, with those over 5km generally considered to have a low potential for visual amenity impact. The area used for the lighting impact assessment covers approximately the same area.

2.3 LANDSCAPE CHARACTER IMPACT ASSESSMENT METHODOLOGY

The landscape character assessment area was divided into three Landscape Units based on common landscape features such as land use, vegetation cover and landform. For each of these landscape units, the following assessment method has been used:

- Description of the existing landscape character (which identifies the scenic quality and *'visual sensitivity'* of the landscape (also sometimes called *'visual absorption capacity'*).
- Description of the visual changes to the landscape that would result from the project (which identifies the *'magnitude of change'* to the landscape).
- An assessment of impact to landscape character, taking into account of the relationship between the visual sensitivity and magnitude of visual change to each Landscape Unit.

A matrix defining the relationship between *'visual sensitivity'* and *'magnitude of change'* (weighing up the importance of each), and the resulting *'impact level'* ranking is provided as **Table 2-1.**

TABLE 2-1: MATRIX ILLUSTRATING RELATIONSHIP BETWEEN 'VISUAL SENSITIVITY' AND 'MAGNITUDE OF VISUAL CHANGE'

Potential level		Magnitude of change			
		Very High	High	Moderate	Low or Insignificant
Sensitivity	Very High	Very High impact	Very High impact	High impact	Moderate impact
	High	Very High impact	High impact	Moderate impact	Moderate impact
	Moderate	High impact	High impact	Moderate impact	Low impact
	Low or Insignificant	High impact	High impact	Low impact	Insignificant impact

Definition of *'visual sensitivity'* (related to landscape character)

The sensitivity of different landscape characters in regional areas such as the project area can be largely defined by considering aspects such as the degree of naturalness and uniqueness. The more disturbed or common a landscape is, generally the less it is valued, and the less *'visually sensitive'* it is.

Based on the general landscape character of the project area and its surroundings, sensitivity rankings for the landscape character of the project area are defined as follows:

- Insignificant - Containing predominantly industrial or mine infrastructure.
- Low - General, widespread rural landscape with low to moderate levels of native vegetation, and no identified special landscape features or interesting topographic features.
- Moderate - Rural land with a high amount of vegetation or undisturbed bushland with attractive landscape features such as main watercourses or interesting topographic features.
- High - There are no landscape types of this sensitivity within the assessment area. Examples of landscapes with a high visual sensitivity include natural areas valued for conservation values such as those with substantial natural vegetation, those with waterbodies and landscapes with varied and interesting topography. Also cultural landscapes highly valued by the general community such as attractive rural settings, some town settings and heritage landscapes.
- Very high - There are no landscape types of this sensitivity within the assessment area. Examples of landscapes with a very high visual sensitivity are dramatic natural landscapes such as those likely to be protected as World Heritage Areas or National Parks, although such protection is not essential. Highly valued, iconic cultural landscapes may also be included.

Definition of *'magnitude of visual change'* (related to landscape character)

For each of the Landscape Units, the magnitude of the potential visual change was identified, with this *'magnitude of visual change'* given one of five possible rankings:

- Insignificant - Minor scale of landform change and vegetation removal, existing urban/ infrastructure present.
- Low - Moderate scale of landform change and minor vegetation removal, existing urban/ infrastructure present.
- Moderate - Moderate scale of landform change and/or vegetation removal, minor watercourses possibly affected and existing urban/infrastructure possibly present on immediate site or seen in wider landscape.
- High - Large scale of landform change and/ or vegetation removal, minor watercourses possibly affected and no substantial urban/ infrastructure present on immediate site, yet possibly seen in wider landscape.
- Very high - Significant scale of landform change and major vegetation removal, major watercourses possibly affected, no existing urban/infrastructure present on immediate site nor seen in wider landscape.

2.4 VISUAL AMENITY IMPACT ASSESSMENT METHODOLOGY

The visual amenity assessment examines any potential changes to the main identified viewpoints from surrounding properties, public roads and any other sensitive receptors. The assessment process is based upon an overall indication of potential visual impact for each identified viewpoint, by combining a ranking given for *'visual sensitivity'* with a ranking given for *'magnitude of visual change'*. **Table 2-1** defines that relationship.

The assessment describes the predicted changes in views that would occur during the life of the project where relevant to a particular viewpoint. The visual impact assessment follows the methodology described previously, that being:

- An assessment of the visual sensitivity of each viewpoint
- A description of the likely visual change
- An assessment of the likely magnitude of visual change as a result of the project
- An overall assessment of the potential visual impact on each viewpoint.

Definition of *'visual sensitivity'* (related to visual amenity)

Visual sensitivity related to visual amenity specifically defines the likely visual sensitivity of particular viewpoints that may be affected. Viewpoints are generally more sensitive the closer they are and the clearer the view of any changes. Also, the numbers of viewers affected is considered (such as views from roads with high traffic volumes) and whether viewers are permanent (such as residential viewers) or transient (such as roads).

Potential visual sensitivity has been defined for those sensitive receptors and viewpoints that would be within 5km of the project in terms of the following general rankings, with professional judgement also contributing to chosen rankings:

- Insignificant - Residential (sensitive receptor) viewpoints within 5km with no or very limited potential for views or non-residential viewpoints over 2km away with low numbers of viewers and with no or very limited potential for views.
- Low - Residential (sensitive receptor) viewpoints between 2-5km away with potential for some limited views of the project; viewpoints between 2-5km away with low numbers of viewers (such as arterial roadways) with potential for some limited views of project; and viewpoints within 1km away viewed by low numbers of public and/ or transient viewers (such as local public roadways) with potential for some views of the project. Note that Wollombi Road falls within this category.
- Moderate - Residential (sensitive receptor) viewpoints between 1-2km away, with potential for some limited views of project; residential (sensitive receptor) viewpoints between 2-5km away with potential for some extensive views of project; viewpoints within 1-2km away viewed by high numbers of public and/or transient viewers (such as highways) or arterial roadways within 1km with low numbers of public and/or transient viewers, with potential for some wide views of project. Note that Collinsville-Elphinstone Road falls within this category as average daily volumes are in the order of 1,100 vehicles per day.
- High - Residential (sensitive receptor) viewpoints between 1-2km away with potential extensive views of mine infrastructure; and viewpoints within 1-2km away viewed by high numbers of public and/ or transient viewers (such as arterial roadways or highways).

Very high - Residential (sensitive receptor) viewpoints within 1km with potential extensive views of mine infrastructure; and viewpoints within 1km away viewed by high numbers of public and/or transient viewers (such as highways).

Definition of *'magnitude of visual change'* (related to visual amenity)

For each of the identified sensitive receptors and other potential viewpoints, the magnitude of the potential visual change was identified. *'Magnitude of visual change'* is determined by one of five possible rankings:

- Insignificant - Minor scale of change, not significantly different in scale or type to existing views and/or landscape character.
- Low - Low to moderate scale of change, not significantly different in scale or type to existing views and/or landscape character.
- Moderate - Moderate visual change to views as a result of landscape change and construction of mine infrastructure, where previously there was no mine or other infrastructure.
- High - High visual change to views as a result of landscape change and construction of mine infrastructure (such as vegetation removal and landform modification), where previously there was no mine infrastructure.
- Very high - Significant visual change to views as a result of substantial landscape change (such as extensive vegetation removal and major landform changes) and close proximity to the mine or associated infrastructure.

2.5 VIEWSHED

The viewshed broadly predicts areas from which the highest point/elevation of the combined mine activities would be wholly or partially seen (refer **Figure 3.2**, **Section 3.0**). The viewshed was created using GIS software (ArcGIS 10.1), with the viewshed calculation accomplished through geoprocessing existing topography (contours 2-10m), DEM (digital elevation model) and mine plans files containing elevation information. The highest areas of the combined mine plans were selected and five surrounding points were chosen. These points, along with the highest elevation from the mine plans were used to run the viewshed.

However, the limitation of the mapping is that it cannot take account of any existing features on the ground surface such as vegetation or buildings, and therefore in some cases a viewpoint shown within the area of visibility could actually be prevented from viewing the project as it would be hidden by intervening vegetation or buildings.

Therefore, the viewshed depicts a worst case scenario, with the assessment in this report providing a more tailored analysis of each viewpoint.

2.6 PHOTOMONTAGES

A number of photomontages (i.e. simulations of the project on photographs of the existing project area) from surrounding key viewpoints have been prepared to illustrate the impact of the project. The locations of the photomontages are indicated on **Figure 5.1**, and the photomontages provided as **Figures 5.2 to 5.4** in **Section 5.0**.

These cover:

- Photomontage location 1: Collinsville-Elphinstone Road (from railway bridge)
- Photomontage location 2: Wollombi Road
- Photomontage location 3: Collinsville-Elphinstone Road (south-east of Wollombi Road).

The photomontages illustrate four versions of the same viewpoint: the existing view, an outline of the approximate maximum visual envelope during the mine operation phase (i.e. worst-case scenario) and the likely final look without and following rehabilitation.

2.7 CUMULATIVE IMPACTS

The assessment of cumulative impacts focusses on those projects that would be seen from sensitive receptors and other viewpoints already affected by the project, encompassing an area of some 15km from the project. Such viewers could have an additional or cumulative impact as a result of viewing visual changes that occur both from the subject project as well as other planned projects.

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3. EXISTING VISUAL ENVIRONMENT

3.1 CONTEXT

3.1.1 General

The project lies within the northern Bowen Basin, with this major coal-producing region representing Australia's largest coal reserve and one of the world's largest deposits of bituminous coal. The Basin contains much of the known Permian coal resources in Queensland including virtually all of the known mineable prime coking coal.

The Bowen Basin covers an area of over 60,000km^2 in Central Queensland running from Collinsville to Theodore. The Basin has approximately 34 operational coal mines that can extract over 100 million tonnes annually.

The nearest towns to the site of the project are Glenden (approximately 20km to the east) and Collinsville (approximately 60km to the north).

The landscape surrounding the project area is largely used for pastoral agriculture such as beef cattle. The site context is shown in **Figure 3.1**.

3.1.2 Landform and land use

The topography of the surrounding area is gentle to moderately undulating or rolling, becoming hilly in some places. On the site the northern part is the most hilly, with the centre part hilly but less dramatic, and the southern part relatively flat.

There has been historic clearing of the project site, largely to support low intensity cattle grazing.

3.1.3 Vegetation

Various vegetation communities exist across the project area, with further information provided in the Terrestrial Ecology technical report of the EIS. Most of these vegetation communities will be impacted to some degree due to the need to clear for mine operations.

As stated in the conclusion of the Terrestrial Ecology report:

"[The] project area supports a relatively diverse range of vegetation communities and terrestrial flora and fauna species. While large parts of the project area are cleared, key areas of remnant vegetation are associated with the Suttor River in the west, Kangaroo Creek and surrounding areas in the north, and the east-west band of terrestrial vegetation associated with elevated areas in the centre of the project area.

Land clearance and habitat loss associated with the establishment of open cut pits and supporting infrastructure are the main impacts on the terrestrial flora and fauna values of the project area. The Project will result in the loss of approximately 2,342ha of remnant native vegetation from within the footprint. This will result in an overall reduction in the extent of endangered (321.7ha) and of concern (442.1ha) vegetation communities in the project area."

Loss of vegetation is considered as part of the landscape character and visual amenity assessment in this report.

3.1.4 Water catchment and water courses

The project area is located in the Burdekin River catchment. The northern and most of the central sections of the project area are within the Bowen sub-catchment and are drained by, Kangaroo Creek and tributaries, which forms part of the Rosella Creek sub-catchment. The southern section of the project area is within the Suttor sub-catchment and is drained by the Suttor River and its tributaries.

According to the Terrestrial Ecology technical report of the EIS: "Planned watercourse diversions will result in the loss of riparian vegetation and associated habitat resources for fauna species over the short-to-medium term. Subject to re-establishment of 'natural' channels which include riparian vegetation and appropriate management to prevent erosion, no significant impacts on terrestrial flora and fauna values are expected as a result of watercourse diversions."

There would be no significant impacts to the Suttor River due to the project.

3.1.5 Landmarks

There are no significant landmarks within the general vicinity of the project that have been identified.

3.1.6 Cultural heritage

Historical cultural heritage

Historical cultural heritage generally includes non-indigenous as well as shared indigenous and non-indigenous cultural heritage values. It relates to places or features of a place that are not solely associated with Aboriginal history, custom or occupation, that have aesthetic, architectural, historical, scientific, social or other significance to the present or past generations and potentially for future generations.

Twelve sites have been identified and include pastoral stations, homesteads, cattle yards, early roads, stock routes and communication lines. No sites of national, state or regional significance were identified on any registers of historical cultural heritage.

Of these twelve sites, two are within the project area and are considered to have low local significance, with a third site with medium local significance near the project area boundary. Management plans are proposed to mitigate potential project impacts when required, as detailed in the Historical Cultural Heritage chapter of the EIS.

Indigenous cultural heritage

The Birriah People and the Jangga People are the relevant Aboriginal Parties within the project area. Cultural Heritage Management Plans were developed between the proponent and each Aboriginal Party to provide a process by which these and other potential heritage values within the project area can be managed.

Approximately 100 known heritage values were identified within the project area, of which approximately 40 are within the project footprint. It is likely that other Aboriginal cultural heritage values exist within the project area and project footprint and these will be managed in accordance with the CHMPs.

This information has been summarised from the Indigenous Cultural Heritage chapter of the EIS, where more detailed information is provided.

3.2 LANDSCAPE CHARACTER ASSESSMENT AREA - EXISTING CONDITIONS

The landscape character assessment area has been categorised into three Landscape Units for the purposes of this assessment report (refer **Figure 3.1**):

- Landscape Unit 1: Southern flat rural landscape
- Landscape Unit 2: Central moderately hilly, semi-rural landscape
- Landscape Unit 3: Northern hilly forested landscape.

Each Landscape Unit has been rated according to its *'visual sensitivity'*, with the broad parameters for these ratings defined in **Section 2.3.**

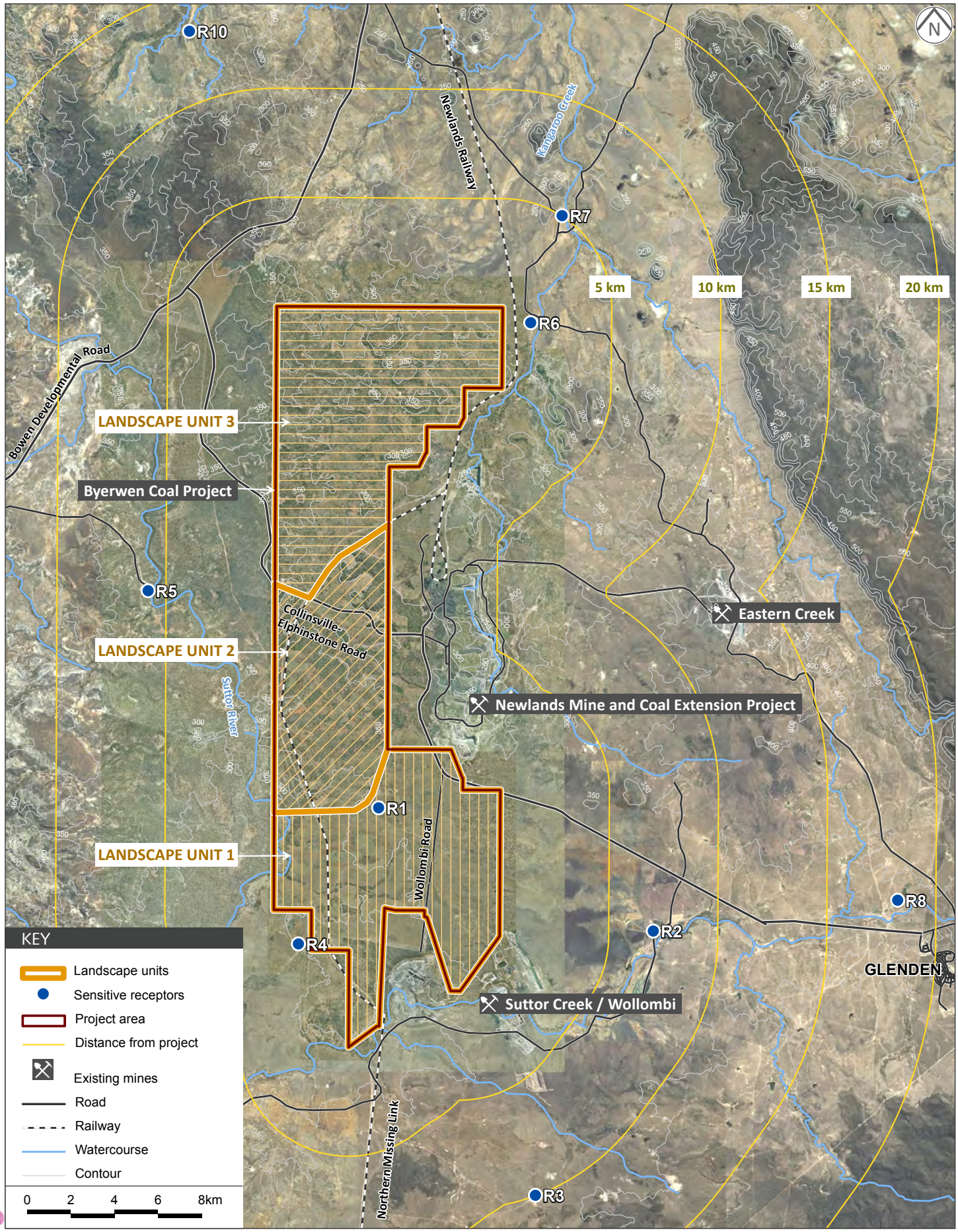
3.2.1 Landscape Unit 1: Southern flat rural landscape

Landscape Unit 1 covers the southern part of the project area. The dominant landscape character of this landscape type is one of a flat to gently undulating landform. There is generally little vegetation cover apart from scattered individual trees, although there are some limited denser pockets of vegetation. Typical images of this landscape type are shown in **Photographs 3-1.**

The scenic quality of this landscape is fairly low. It is widespread landscape type for the local area, and does not have any particularly special qualities.

The flat nature of the landform means that generally there are no vantage points that allow any elevated views over the surrounding area. In some places distant hills can be seen, and in the very south the overburden dumps of the Newlands Mine (Suttor Creek and Wollombi) located at the end of Wollombi Road are part of the backdrop, leading to a decreased scenic quality (refer **Photographs 3-2**).

Visual sensitivity - This landscape type has been assessed as having *a low visual sensitivity.*



Integrated Design Solutions - 030799 Byerwen Coal Project - F3-1 Viewshed analysis - RevB 19 November 2012

Figure 3.1

Site context and landscape units

envisage IDS

Photographs 3-1

Typical photographs of Landscape Unit 1 - Southern flat rural landscape

Photographs 3-2

Typical photographs of Newlands Mine (Suttor and Wollombi Pits) taken from Wollombi Road

3.2.2 Landscape Unit 2: Central moderately hilly, forested/rural landscape

Landscape Unit 2 covers the central part of the project area, where the landform transitions from the flatter southern landscape to the hillier northern landscape. There is a mix of forested areas interspersed with grazing pasture.

The presence of hills means that in some parts views are quite limited and enclosed by the topography, yet in other parts where the landform contains flatter areas some more distant views are possible. Typical images of this landscape type are shown in **Photographs 3-3.**

The scenic quality of this landscape type is low, as it is a widespread and common landscape without any notable topographic features or any particularly special qualities.

Visual sensitivity - This landscape type has been assessed as having *a low visual sensitivity.*

Photographs 3-3

Typical photographs of Landscape Unit 2 - Central moderately hilly, forested/rural landscape

3.2.3 Landscape Unit 3: Northern hilly forested/rural landscape

Landscape Unit 3 covers the northern part of the project area, where the landform becomes quite hilly and is mostly forested. The eastern end of a local ridge extends across the north-western corner, with a series of low hills present across the remaining north-eastern corner. These higher areas are forested. Between the higher areas are flatter, pastoral valleys that support cattle, and intermittent watercourses that have formed deep gullies.

The strong presence of hills means views are quite limited and enclosed by the topography in the lower areas, with distant views possible from vantage points on the hills and ridges. Typical images of this landscape type are shown in **Photographs 3-4.**

The scenic quality of this landscape type is moderate, as although it is relatively widespread and common, the presence of taller vegetation and hilly parts means that it could be considered to be a more interesting landscape than the other units of the project area.

Visual sensitivity to change - This landscape type has been assessed as having a *moderate visual sensitivity.*

Photographs 3-4

Typical photographs of Landscape Unit 3 - Northern hilly forested/rural landscape

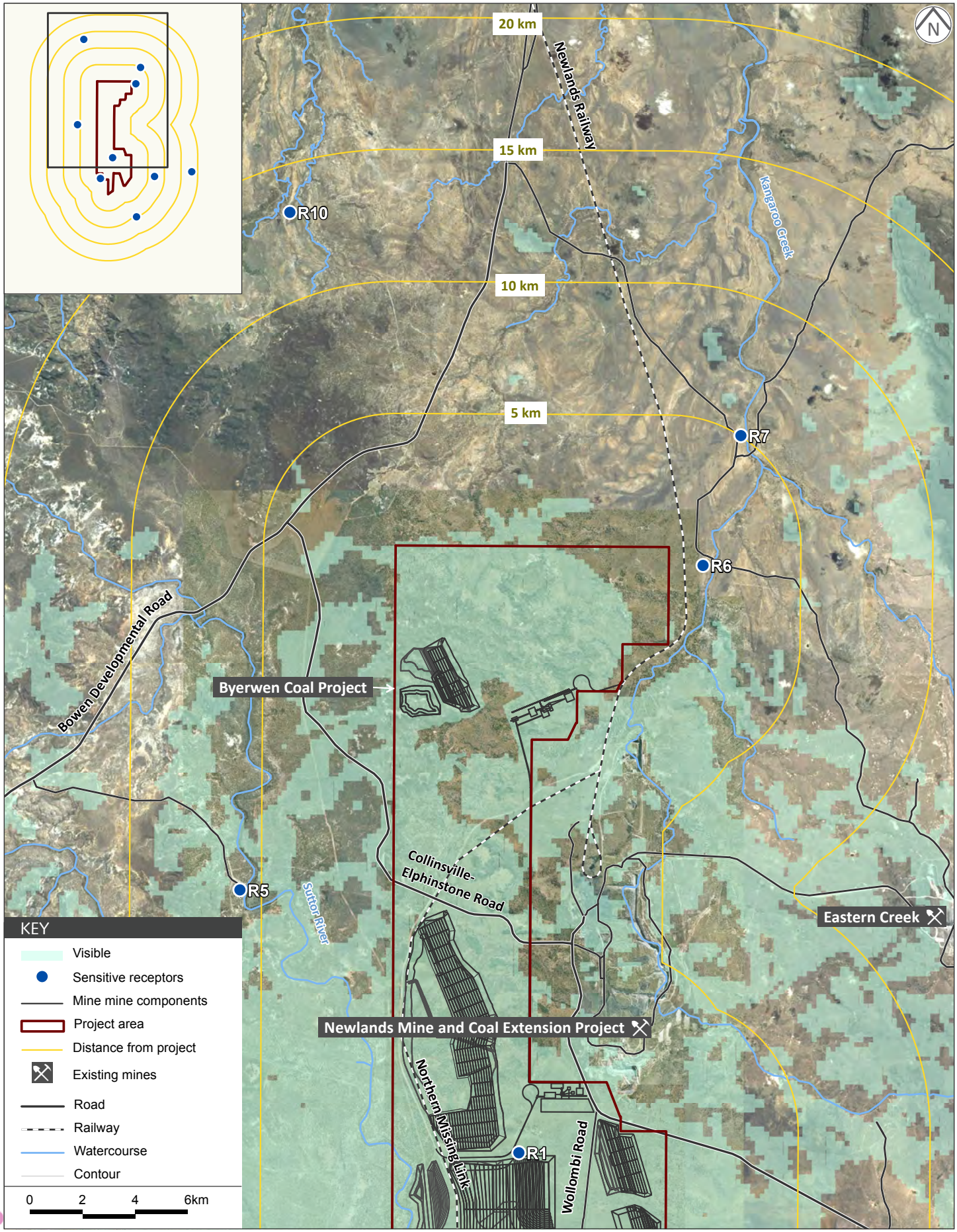
3.3 VISUAL AMENITY ASSESSMENT - POTENTIAL SENSITIVE RECEPTORS AND VIEWPOINTS

3.3.1 Identification of potential sensitive receptors

All potential sensitive receptors (that is permanent residents and other potentially sensitive land use viewers) in the general vicinity of the project area are identified in **Figures 3.2a, 3.2b** and **Table 3-1.** The shaded area in the figures represents the approximate area potentially seen by sensitive receptors (not taking into account elements such as vegetation and buildings that could obscure views).

TABLE 3-1: SENSITIVE RECEPTORS IDENTIFIED FOR PROJECT - EVALUATION OF NEED FOR DETAILED VISUAL AMENITY ASSESSMENT

Sensitive Receptors (refer Figures 3.2a and 3.2b)	Description	Potential for views of parts of project	Further assessment needed
R 1- Suttor North Homestead	Unoccupied house purchased by proponent	Not relevant	No
R 2 - Suttor Creek Homestead	House 7km from project site boundary with no visibility	No	No
R 3 - Lancewood Homestead	House 10km from site boundary	No	No
R 4 - Wollombi homestead	House unoccupied	Not relevant	No
R 5 - Cerito Homestead	House approximately 6km from nearest project area boundary with no visibility	Of no concern due to distance	No
R 6 - Byerwen Homestead	House approximately 1.3km from nearest site boundary, yet over 9km from nearest active mine area with no visibility	No	No
R 7 - Weetalaba Homestead	House approximately 5km from nearest site boundary with no visibility	No	No
R 8 - Glenden Homestead	House approximately 13km from nearest site boundary	Of no concern due to distance	No
R 9	Two sheds, no house	Not relevant	No
R10 - Fig Tree Homestead	House approximately 13km from nearest site boundary	Of no concern due to distance	No



Integrated Design Solutions - 030799 Byerwen Coal Project - F3-2 Viewshed analysis - RevB 19 November 2012

Figure 3.2a

Viewshed analysis

envisage IDS

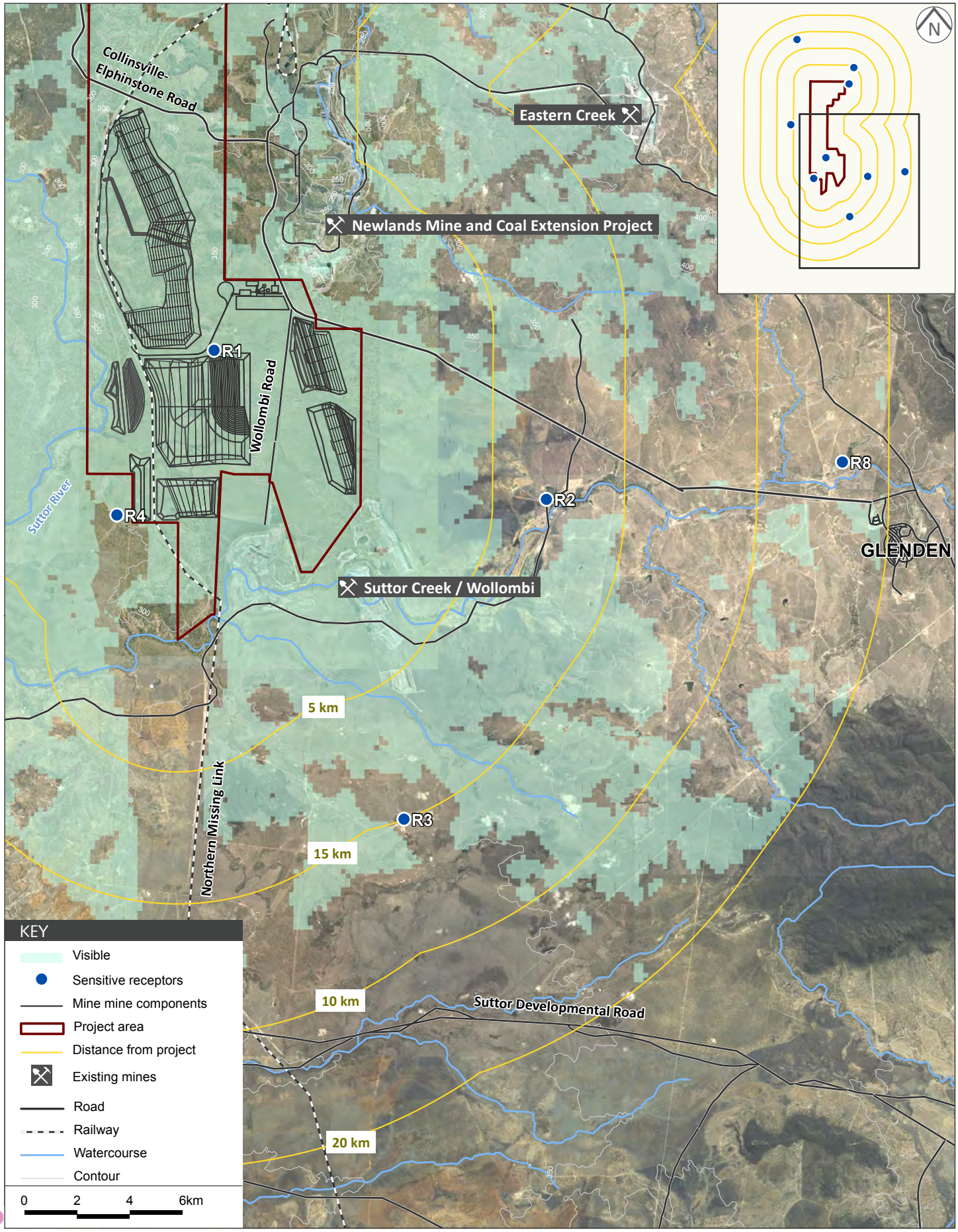


Figure 3.2b

Viewshed analysis

Table 3-1 also defines whether additional assessment of any sensitive receptors is needed based on the status of the sensitive receptor, the potential for any parts of the project to be seen and the distance from the project. In terms of distance, it has been assumed that any sensitive receptors beyond a maximum distance of 5km from the project area are beyond that from which any visual change could reasonably be assumed to be of major concern, and therefore no additional assessment has been undertaken.

On the basis of **Table 3-1**, there are no occupied houses within 5km that are within the area of the project's visibility, and therefore no further assessment has been undertaken for any sensitive receptors.

3.4 IDENTIFICATION OF OTHER POTENTIAL VIEWPOINTS OF PROJECT

Other potential viewpoints of the project have also been assessed up to a distance of 5km. For this project, four main other potential viewpoints have been identified, with all located on surrounding public roads.

3.4.1 Assessed viewpoint A: Collinsville-Elphinstone Road (from railway bridge)

Collinsville-Elphinstone Road is a regional state-controlled road that connects Glenden and areas further south to the Bowen Developmental Road which leads to Collinsville in the north.

The visual sensitivity of this viewpoint is *moderate* for it is in an elevated position along a public roadway that crosses the central part of the project area, yet supports only a low level of regional and local traffic. From this location there is potential for quite clear views towards the central part of the mine, particularly when travelling south.

Visual sensitivity of viewpoint: *moderate.*

3.4.2 Assessed viewpoint B: Wollombi Road

Wollombi Road is a local, unsealed road that essentially provides general vehicle access to Newlands Mine (Suttor Creek and Wollombi) and traverses across the southern part of the project area. It has very low levels of traffic, and therefore any changes to views as a result of the project would be of *low to insignificant* sensitivity.

Visual sensitivity of viewpoint: *low to insignificant.*

3.4.3 Assessed viewpoint C: Collinsville-Elphinstone Road (north of Wollombi Road)

On the southern side of the intersection of Collinsville-Elphinstone Road and Wollombi Road there is an overpass that provides access for mine traffic between Newlands Mine (Suttor Creek and Wollombi pits) and the main Newlands Mine. Just north of that intersection, Collinsville-Elphinstone Road travels within the project area boundary, thereby allowing close views of less than 1km of the existing landscape and potential views of the project, leading to this viewpoint being of *moderate* visual sensitivity. The main potential viewers would be those travelling south, with the overpass blocking all but very close views for those travelling north.

Visual sensitivity of viewpoint: *moderate.*

3.4.4 Assessed viewpoint D: Collinsville-Elphinstone Road (south-east of Wollombi Road)

South-east of the intersection with Wollombi Road, Collinsville-Elphinstone Road travels along the project site boundary, thereby allowing close views of the project area and potential views of the southern part of the project. This viewpoint has therefore been assessed of being of high visual sensitivity where the road is immediately alongside the project area.

However, the reduced scenic quality due to current views of Newlands Mine (Suttor Creek and Wollombi - which have extensive mounds from out of pit spoil) have slightly lessened the visual sensitivity for this public viewpoint. Yet, its close proximity of less than 1km from Collinsville-Elphinstone Road means that its visual sensitivity is *moderate.*

Visual sensitivity of viewpoint: *moderate.*

3.4.5 Assessed viewpoint E: Collinsville-Elphinstone Road (infrastructure corridor crossing)

The proposed central infrastructure corridor crosses Collinsville-Elphinstone Road along the road to the south-east of the existing railway bridge (i.e. Viewpoint A). At this location there would therefore be close views of this corridor, although those views would be limited to a small section of that road. This viewpoint has therefore been assessed as being of *moderate* visual sensitivity where the road is immediately alongside the project area.

Visual sensitivity of viewpoint: *moderate.*

4. DESCRIPTION OF THE PROJECT

4.1 MAIN COMPONENTS RELEVANT TO VISUAL IMPACT ASSESSMENT

This section provides a description of the main components of the mine that are most relevant to an assessment of visual impact, that being those components likely to create large landform change and or be visible outside of the project area. A full description of the project is provided in Chapter 7 of the main EIS and rehabilitation and decommissioning is described in Chapter 10.

In particular, components that have the potential for greatest visual impact during the establishment and operation of the mine are:

- Four open cut mining zones, comprising nine open pits (with the maximum depth below surface level of the open cuts varying between 140m in East Pit 2 and 350m in South Pit 1)
- Out of pit waste rock dumps for each mine pit (60m high)
- ROM stockpiles (two pads approximately 7.5ha in area, with stockpiles 10m high)
- The two Coal Handling and Process Plants (CHPPs) (approximately 30m high)
- Product coal stockpiles (southern and northern product stockpiles approximately 5 ha and 3 ha respectively, with stockpiles approximately 20m high)
- Two (southern and northern) mine infrastructure areas (MIAs) (both with footprints of approximately 250m by 250m (6.2ha))
- Train loading facilities (train loading bin approximately 20m high)
- Two infrastructure corridors within the project tenements: water and road infrastructure corridor and drainage and rail infrastructure corridor
- Seven nights a week lighting of some components
- Haul roads and access roads
- Vegetation clearing and rehabilitation.

Descriptions of these key components are provided. The visual aspects of the final landform are addressed in **Section 4.3.**

4.1.1 Main mining operations

The proposed mine layout is shown in **Figure 7-3, Appendix A.**

The southern and northern tenement areas are split by the rail alignment of the Goonyella to Abbot Point (GAP) rail line, also referred to as the Northern Missing Link.

Mining will commence in the southern tenement area, adjacent to initial infrastructure, to allow for the staged ramp up of production. Two CHPPs will be constructed, one in the northern tenement area and the other in the southern.

Open-cut mining

The open-cut pits will become deeper as mining progresses. The maximum depth will be approximately 350m below surface in South Pit 1.

The maximum extent of the open-cut pits, the approximate depth at which coal seams are located and the year in which the maximum extent is reached is provided in **Table 4-1.**

TABLE 4-1: PIT EXTENTS (ha) AND MAXIMUM EXTENTS

Pit Name	Extent (ha)	Year of Maximum Extent
South Pit 1	1,489	41-46
South Pit 2	258	26-30
East Pit 1	282	36-40
East Pit 2	255	41-46
West Pit 1	549	11-15
West Pit 2	299	21-25
West Pit 3	601	41-46
North Pit 1	286	26-30

The broad mining methodology for each open pit is:

- Vegetation clearing (where required)
- Topsoil stripping and storage or direct spreading
- Blasting of the waste rock (where required)
- Removal of waste rock by truck, excavator and drag line in box cuts, creating new mining strips and filling in old/previously mined voids
- Possible blasting of coal and the excavation of ROM coal by excavator and/or drag line
- Hauling of ROM coal to the ROM pad by off-road trucks and then to the CHPPs for washing and processing and train load out
- Final landform re-profiling, topsoiling and revegetation activities by earthmoving equipment.

Mining will commence in West Pit 1, adjacent to the southern CHPP. The years of mining for each of the open pits are provided in **Table 4-2.** Figures in **Appendix A** illustrate the mine layout and sequencing at the following times: Figure 7-6 (Year 5), Figure 7-7 (Year 10), Figure 7-8 (Year 16 (North)), Figure 7-9 (Year 25 (North)) and Figure 7-10 (Year 25 (South)).

TABLE 4-2: MINE SCHEDULE FOR OPEN PITS

Open Pit	Years of Mining
South Pit 1	6-46
South Pit 2	6-30
East Pit 1	26-40
East Pit 2	31-46
West Pit 1	1-15
West Pit 2	11-25
West Pit 3	21-46
North Pit 1	16-30

Out of pit waste rock dumps

Waste rock is scheduled to be placed back into each pit from approximately year three of the commencement of operations of that pit. Waste rock will be dumped in-pit once the initial mining strips are established, however out of pit dumping will continue sporadically over the life of mine.

West Pit - There will be a single out of pit dump for waste rock from West Pit 1, West Pit 2 and West Pit 3, which will merge with the in-pit dump to create a final landform approximately 60m above the natural ground level.

South Pit - There will be two out of pit waste rock dumps for South Pit 1, which will not merge with in-pit dumps as they are separated by third party linear infrastructure. Out of pit waste rock dumps will be up to 60m above ground level.

There will be two out of pit waste rock dumps for South Pit 2. The more westerly waste rock dump is separated from the pit by the GAP rail line. The out of pit dump to the east of the rail lines will merge with the in-pit dump to form a final landform.

East Pit and North Pit - East Pit 1, East Pit 2 and North Pit 1 will each have a single out of pit waste rock dump, which will merge with the in-pit dump to form a final landform up to 60m above ground level.

ROM coal stockpiles

The southern and northern ROM pads near each CHPP facility will be used for ROM stockpiling, and be approximately 300m by 250m (7.5ha). ROM coal stockpiles will be approximately 10m high.

Coal handling and processing plant (CHPP)

There will be two CHPPs built for the project, the southern CHPP and the northern CHPP, of similar design to each other and other plants already in place throughout the Bowen Basin. The CHPPs will stand approximately 30m high and will have an overhead crane, concrete floor, be a free-standing steel structure, and be fully lit to provide adequate lighting for continuous 24 hour operations.

Product coal stockpiles

Product conveyors will deliver product coal from the southern and northern CHPPs to nearby product coal stockpiles. The southern and northern product coal stockpiles will be approximately 20m high. The southern and northern product stockpile areas will be approximately 5ha and 3ha respectively.

Mine Infrastructure Area

There will be two MIAs, one adjacent to the southern CHPP and one adjacent to the northern CHPP. The southern MIA will be established in the initial (south) construction phase and the northern MIA will be established in the second (north) construction phase (approximately Year 15). Both MIAs will contain similar facilities with the northern smaller than the southern. Refer **Figure 7-16, Appendix A** for plans of each MIA. Both southern and northern MIA footprints are approximately 250m by 250m (6.2ha).

Co-disposal dams will be constructed at each of the CHPPs. The southern co-disposal dam will be approximately 2,000m by 500m and the northern approximately 300m by 300m.

4.1.2 Product coal transport and train loading facilities

The GAP rail line traverses the project tenements from south to north. Two TRF connections to the GAP railway are planned, one in the northern and one in the southern tenement area.

There will be two Train Loading Facilities (TLFs), one at the northern tenement area and the other in the southern tenement area. These TLFs will be located adjacent to the CHPPs and each will have its own associated rail loop linking to the GAP rail line.

Coal will be loaded onto trains via the southern and northern TLFs comprising rail loop, train loading bin and rail spur, connected to the GAP rail line. The southern rail spur and rail loop will be approximately 5km in length, and the northern rail spur and rail loop will be approximately 2.5km in length.

A train loading bin will be positioned above the rail line. The train loading bin structure will be approximately 20m high.

4.1.3 Infrastructure Corridors

There are two infrastructure corridors within the project tenements:

- Southern infrastructure corridor
- Central infrastructure corridor.

The central infrastructure corridor (100m total width) connects the southern CHPP and MIA to the northern CHPP and MIA and contains:

- Road for light and heavy mine site vehicles
- Power lines
- Raw water supply pipeline
- Communications.

It would include a bridge over both Collinsville-Elphinstone Road and the GAP/Alpha Rail further north.

The southern infrastructure corridor (400m total width) connects the GAP rail line to the southern CHPP and contains:

- Southern rail line
- Drainage diversions to divert water flowing between West Pit 1 and South Pit 1
- Raw water supply
- Powerlines.

Depending on an evaluation of security requirements, the infrastructure corridor may be fenced along both sides. Security fencing will be provided near road crossings and where the infrastructure is visible from public roads.

Lighting

The main parts of the mine that would be lit at night, seven days a week, would be:

- MIA and CHPP
- Active mine pits (by vehicles and equipment)
- Haul and access roads (by vehicles and equipment).

Roads

Roads associated with the mine are divided into the following categories:

- ROM coal haul roads and waste rock haul roads within the mine site
- Site access roads and other internal roads for light and heavy vehicles, including roads within the infrastructure corridor
- Public access roads to the mine site
- Closures and relocations of public roads and stock routes.

The main crossing points are required to be established where roads cross the Collinsville-Elphinstone Road, the GAP rail line and potentially the proposed Alpha Coal Project rail line which will run parallel to the GAP rail line.

There will be two site access roads which connect the Collinsville-Elphinstone Road to the southern and northern CHPP along a road within in the central infrastructure corridor. The main gate will be along the site access road from the intersection with Collinsville-Elphinstone Road, and will be serviced by a permanently manned security building.

4.2 CLEARING AND REHABILITATION

The majority of the land has been previously disturbed and modified to allow grazing of cattle. There will be some areas of the mine site, such as the rehabilitated spoil dumps, and final void in the open pits, that are not returned to their previous land use. These areas will be contoured to a maximum height of 60m above ground level and seeded. They will be left in a stable condition that minimises the potential to generate future pollution or adverse effects on environmental values. Topsoil will be stripped, salvaged and stockpiled to ensure viability for future rehabilitation.

The indicative rehabilitation programme is as follows:

- Year 1 to 6 - commence rehabilitation on the initial South Pit out of pit dump.
- Year 6 to 10 - continue rehabilitation of South Pit out of pit spoil dumps and commence rehabilitation of West Pit out of pit spoil dumps. Where possible commence rehabilitation of in-pit dump areas.
- Year 10 to 25 - continue rehabilitation of the West Pits and South Pits, in-pit and out of pit spoil dumps. (North Pit operational in year 16.)
- Year 25 to 50 - continue progressive rehabilitation and finalise rehabilitation on the West Pits, South Pits, East Pits and North Pit dump areas. In year 46 mining has ceased, non-rehabilitated in-pit spoil dumps are reshaped and drained to the final voids. There will be removal of all infrastructure, buildings, roads, rail, plant and equipment including the CHPPs. Dams will be left for potential future use or decommissioned.

4.3 FINAL LANDFORM

The final landform will consist of the following (refer **Figures 7-11** and **7-12, Appendix A**):

In the southern tenement, there will be three residual voids and associated rehabilitated ex-pit spoil dumps that would remain at the conclusion of mining and in perpetuity, those being parts of: West Pit 3, East Pit 2 and South Pit 1. In the northern tenement a void and rehabilitated ex-pit spoil dump would remain as part of the North Pit.

The ex-pit spoil dumps would be rehabilitated with low native vegetation such as grasses and shrubs.

The following describes the main visual attributes of the residual landforms.

West Pit 3

A long linear void would remain of some 5km long. The void pit floor would be approximately 200m below ground level, with a high wall of that height along the north-eastern side. On the opposite side the final ground would slope up towards the top of the residual ex-pit spoil dump to a height of approximately 60m above the surrounding ground level.

Overall the residual spoil would cover an area of some 8km by 5km, designed with side slopes reaching 60m high and relatively flat over the majority of its area. The area incorporates the former West Pit 2 and 3 mine pits.

East Pit 2

A rectangular-like void would remain of some 3km long by 1.8km wide. The void pit floor would be approximately 300m below ground level, with a high wall of that height along the eastern side. On the opposite side the final ground would slope up towards the top of the residual ex-pit spoil dump to a height of approximately 60m above the surrounding ground level.

Overall the residual spoil would cover an area of some 4km by a variable width of 2-3km, designed with side slopes reaching 60m high and relatively flat over the majority of its area.

South Pit 1

A smaller, triangular-shaped residual void would remain for the South Pit, some 2km long at its longest side. The void pit floor would be approximately 100m below ground level, with a high wall of that height along the eastern side. On the opposite side the final ground would slope up towards the top of the residual ex-pit spoil dump to a height of approximately 60m above the surrounding ground level.

Overall the residual spoil would cover an area of some 3km long by 1km wide, designed with side slopes of 60m high and relatively flat over the majority of its area.

North Pit

A rectangular-like void would remain of some 2km long by 800m wide. The void pit floor would be approximately 200m below ground level, with a high wall of that height along the north-eastern side. On the opposite side the final ground would slope up towards the top of the residual ex-pit spoil dump to a height of approximately 60m above the surrounding ground level.

Overall the residual spoil would cover an area of some 3km by a variable width of some 1km, designed with side slopes reaching 60m high and relatively flat over the majority of its area. A second smaller rehabilitated dump would remain just to the west.

Other ex-pit spoil dumps

There would also be five other residual ex-pit spoil dumps that would remain, with all having an approximate final height of 60m above the natural ground level. The largest of these would be where East Pit 1 and South Pit 2 were formally located.

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5. IMPACT ASSESSMENT

The impact assessment addresses the three main types of impact relevant to the assessment, and as defined in the Terms of Reference:

- Impact to landscape character of the site and the surrounding area
- Impact on the visual amenity of particular panoramas and outlooks (identified here as sensitive receptors (SR) and other viewpoints)
- Impact in terms of night-time lighting.

Residual effects and cumulative impacts are addressed in subsequent sections. The assessment focuses on the impact from the main landform changing features such as mine pits and out of pit mounds, and the highest structures during the life of the mine (such as the CHPP and train loading facilities.

5.1 LANDSCAPE CHARACTER IMPACT ASSESSMENT

The landscape character impact assessment is based on the Landscape Units previously described in **Section 3.0,** considers the relationship between *'visual sensitivity'* (defined in Section 3.0) and *'magnitude of visual change',* which indicates the overall the level of likely visual impact.

5.1.1 Magnitude of visual change to landscape character

The largest landscape and landform change would occur across Landscape Units 1 and 2 due largely to construction of an extensive open-cut mining operation involving creation of mine pits, vegetation clearing, pit progression, out-of-pit waste rock dumps and creation of the mine infrastructure area, coal stockpiles, haul roads, water management infrastructure, rail transport infrastructure and other infrastructure.

Far less landscape and landform change would occur to Landscape Unit 3 where a much smaller open cut mining operation would be located.

Landscape Unit 1: Southern flat rural landscape

Magnitude of visual change during mining operations

Substantial landform change would occur across this Landscape Unit during operation of the mine primarily due to:

- East Pit 1 (years 26-40) and East Pit 2 (years 31-46)
- South Pit 1 (years 6-46) and South Pit 2 (years 6-30)
- Out-of-pit waste rock dumps to the west of all of the above four pits (60m high)
- Re-location of some existing drainage paths to form a drainage and infrastructure corridor north of South Pit 1 and a drainage easement between South Pit 1 and 2.

Other elements involving landscape change, but minimal landform change would be:

- Construction of the southern mine infrastructure area (MIA) located near the intersection of Collinsville-Elphinstone Road and Wollombi Road, with the largest structure being a CHPP (30m high), with product stockpiles (approximately 20m high) covering an area of some 5 hectares (ha)
- Construction of a rail line, rail loop and train loading facility (with a (train loading bin approximately 20m high) near the MIA
- Construction of a co-disposal dam immediately south of the MIA (close to ground level).

Therefore the magnitude of such extensive visual change to the existing landscape character across most of Landscape Unit 1 during the mining operations, including substantial landform change, would be *high*.

Magnitude of visual change at the end of the mine

Substantial landform change would remain across this Landscape Unit at the end of the mine primarily due to residual landforms from the former East and South Pits, including:

- A final void in East Pit 2 approximately 2km long at its longest side and 100m below ground level.
- A waste rock dump in East Pit 2 to a height of approximately 60m above the surrounding ground level, covering an area of some 3km long by 1km wide.
- A final void in South Pit 1 approximately 3km long by 1.8km wide and 300m deep.
- A waste rock dump in South Pit 1 to a height of approximately 60m above the surrounding ground level, covering some 4km by a variable width of 2-3km.
- There would also be five other residual ex-pit spoil dumps that would remain with all having an approximate final height of 60m above the natural ground level, the largest being where East 1 and South Pit 2 were formally located
- The rehabilitated creek diversion in the south of this Landscape Unit would remain.

The magnitude of such visual change to the existing landscape character at the end of the mine would be *moderate* in Landscape Unit 1. This represents a change from a *high* magnitude of such visual change during mining operations due to the re-shaping and rehabilitation works that would serve to reduce the visual contrast somewhat over time.

Overall level of impact on landscape character

This overall assessment combines values for visual sensitivity (provided in **Section 3.2** and magnitude of visual change (provided above):

- During mining operations - moderate
- At end of mine - low.

Landscape Unit 2: Central moderately hilly, forested/rural landscape

Magnitude of visual change during mining operations

Substantial landform change would occur across this Landscape Unit during operation of the mine primarily due to:

- West Pit 1 (years 1-15), West Pit 2 (years 11-25) and West Pit 3 (years 21-46)
- An extensive out of pit waste rock dump to the west of West Pit 2 and West Pit 3 (60m high).

The central infrastructure corridor (100m total width) connects the southern CHPP and MIA to the northern CHPP and MIA through part of this unit and contains:

- Road for light and heavy mine site vehicles
- Power lines
- Raw water supply pipeline
- Communications.

It includes a bridge over Collinsville-Elphinstone Road. There would be clearing of up to 100m to create this corridor, thus leading to a substantial loss of vegetation and a visible, cleared swathe.

The magnitude of such extensive visual change to the existing landscape character across most of Landscape Unit 2 during the mining operations phase, including substantial landform change, would be *high.*

Magnitude of visual change at the end of the mine

Substantial landform change would occur across this Landscape Unit at the end of the mine primarily due to residual change from the former West Pits, including:

- A long linear void would remain of some 5km long and 200m deep
- A residual ex-pit spoil dump to a height of approximately 60m above the surrounding ground level, covering an area of some 8km by 5km
- The rehabilitated creek diversion in the south of this Landscape Unit would remain.

The magnitude of such visual change to the existing landscape character at the end of the mine would be moderate in Landscape Unit 2. This represents a change from a *high* impact during mining operations due to the re-shaping and rehabilitation works that would serve to reduce the visual contrast somewhat over time.

Nevertheless, the long term impact on the current landscape character would be high due to the extensive nature of the landform change.

Overall level of impact on landscape character

This overall assessment combines values for visual sensitivity (provided in **Section 3.2** and magnitude of visual change (provided above):

- During mining operations - moderate
- At end of mine - low.

Landscape Unit 3: Northern hilly forested/rural landscape

Landscape character and landform change to this Landscape Unit during operation of the mine would be far more limited and include:

- Construction of North Pit 1 (years 16-30)
- An out of pit waste rock dump to the west of North Pit 1 (60m high).

Other elements involving landscape change, but minimal landform change would be:

- Construction of the northern mine infrastructure area (MIA) located east of North Pit 1, with the largest structure being a CHPP (30m high), with product stockpiles (approximately 20m high) covering an area of some 3ha
- Construction of a rail line, rail loop and train loading facility (with a (train loading bin approximately 20m high) near the MIA
- Construction of a small co-disposal dam near the MIA.

The central infrastructure corridor (100m total width) connects the southern CHPP and MIA to the northern CHPP and MIA through part of this unit and contains:

- Road for light and heavy mine site vehicles
- Power lines
- Raw water supply pipeline
- Communications.

It includes a bridge over GAP/Alpha Rail further north. There would be clearing of up to 100m to create this corridor, thus leading to a substantial loss of vegetation and a visible, cleared swathe.

The magnitude of such overall extensive visual change, including substantial landform change, to the existing landscape character during mining operations would be *high* where the mine pit is located, yet this would be limited to a relatively small part. Overall the magnitude of visual change to the remainder of Landscape Unit 3 would be *low.*

Magnitude of visual change at the end of the mine

Landscape character and landform change to this Landscape Unit at the end of the mine would be more limited than the other units, and due to:

- A residual rectangular-like void some 2km long 800m wide, and approximately 200m deep
- A residual spoil dump that would cover an area of some 3km by a variable width of some 1km, 60m high
- A second smaller rehabilitated dump would remain just to the west of the main dump.

The magnitude of such visual change to the existing landscape character at the end of the mine would be *moderate* in Landscape Unit 3, yet this would be limited to a relatively small part. This represents a change from a *high* impact during mining operations for the affected area due to the re-shaping and rehabilitation works that would serve to reduce the visual contrast over time.

Overall the magnitude of visual change to the remainder of Landscape Unit 3 would be *low.*

Overall level of impact on landscape character

This overall assessment combines values for visual sensitivity (provided in **Section 3.2** and magnitude of visual change (provided above):

- During mining operations - *high* (mining area), *low* (other areas)
- At end of mine - *moderate* (mining area), *low* (other areas).

5.2 VISUAL AMENITY IMPACT

As described in **Section 3.3.1** (and **Table 3-1** in that section) there are no identified sensitive receptors within a 5km radius of the project and within the approximate viewshed due to there being no occupied houses within this zone. Therefore the detailed visual amenity assessment has been limited to the five public viewpoints from surrounding roads within 5km, as identified in **Section 3.4.** The locations of the main identified viewpoints and the photomontages are indicated in **Figure 5.1.**

The assessment describes the predicted changes in views that would occur during the life of the project where relevant to a particular viewpoint. The visual impact assessment follows the methodology described previously, that is:

- A description of the likely visual change
- An assessment of the visual sensitivity of each viewpoint
- An assessment of the likely magnitude of visual change
- An overall assessment of the potential visual impact.

5.2.1 Assessed viewpoint A: Collinsville-Elphinstone Road (from railway bridge)

The visual sensitivity of this viewpoint has been assessed as *moderate*, for it is at an elevated position along a public roadway, albeit with a low amount of regional and local traffic.

Figures 5-2a to **5-2d** (photomontage location 1) illustrates the 'worst case' view from this viewpoint. From this location there is potential for quite clear views of the central part of the mine, particularly when travelling south. The extent of visual impact to this viewpoint would increase over time as the West Pit areas and associated out of pit waste rock mounds (with ongoing rehabilitation) move closer towards it. At Year 25 these mounds would be a quite a large distance of some 4km away, with the closest part of the mounds in the final stages being about 1km away. The magnitude of visual change to this viewpoint would vary over the life of the mine, with the overall change being *low* except for the last few years where it would be *moderate.*

This ranking, combined with the visual sensitivity ranking of moderate, leads to the visual amenity impact on this viewpoint as being generally low except for the last few years where it would be *moderate,* when it is closest to this viewpoint and approximately 1km away. This level of impact would be reduced to a *low* level following successful rehabilitation of the mounds (which would reduce the visual/colour contrast) and the removal of other infrastructure.

Visual amenity impact on viewpoint during mine operation: *moderate* (limited to last few years of the mine).

Visual amenity impact on viewpoint at end of mine: *low* (following successful rehabilitation).

5.2.2 Assessed viewpoint B: Wollombi Road

This viewpoint has been assessed as being of low or insignificant visual sensitivity previously, and would have low to insignificant visual impacts over the project life. Nevertheless, this viewpoint is on a local public road located between different mine pits, so for completeness, one of the possible views that would be seen from Wollombi Road has been illustrated in **Figures 5-3a** to **5-3d** (photomontage location 2) to show a likely worst case view at that particular location.

5.2.3 Assessed viewpoint C: Collinsville-Elphinstone Road (north of Wollombi Road)

This viewpoint has been assessed as being of *moderate* visual sensitivity.

Potentially close views would be possible when immediately opposite the MIA, where it is as close as 100m from the MIA, particularly if there was any loss to the existing vegetation buffer. The closest component being the administration building, and the CHPP which would be approximately 30m high is about 1km away. There are currently some trees of up to 10m high along the road boundary at this location, which would screen some of the MIA, assuming that these trees are retained. The magnitude of visual change during mining operations would be *moderate*, assuming retention of an adequate vegetation buffer at least 25m wide along Collinsville-Elphinstone Road.

Following the end of the mine and removal of MIA, there would unlikely to be any views of the mine from this viewpoint, assuming that there would be intervening trees remaining that would obscure more distant views towards the rehabilitated mine. The magnitude of visual change at the end of the mine would therefore be effectively none.

Visual amenity impact on viewpoint during mine operation: *moderate.*

Visual amenity impact on viewpoint at end of mine: *none* (following CHPP decommissioning).

5.2.4 Assessed viewpoint D: Collinsville-Elphinstone Road (south-east of Wollombi Road)

This viewpoint has been assessed as being of *moderate* visual sensitivity. **Figures 5-4a** to **5-4d** (photomontage location 3) illustrates this general viewpoint, however at a further distance than where the nearest out of pit dumps would be the closest (i.e. just south of the overpass and Wollombi Road). In **Figures 5-4a** to **5-4d** the nearest out of pit dumps are approximately 3.7km away.

The worst case would begin from approximately Year 25 when the out of pit dumps from the East Pit 1 would be approximately 500m from the road.

The potential magnitude of visual change from about Year 25 would be *moderate*, and this combined with the visual sensitivity ranking of moderate, leads to the visual amenity impact on this viewpoint as being generally *moderate* following Year 25 when the dumps would be seen within 500m.

This level of impact would be reduced to a *low* level following successful rehabilitation of the mounds (which would reduce the visual/colour contrast) and the removal of other infrastructure.

Visual amenity impact on viewpoint during mine operation: *moderate* (after Year 25).

Visual amenity impact on viewpoint at end of mine: *low* (following successful rehabilitation).

5.2.5 Assessed viewpoint E: Collinsville-Elphinstone Road (central infrastructure corridor)

This viewpoint has been assessed as being of *moderate* visual sensitivity and is where the central infrastructure corridor would cross Collinsville-Elphinstone Road. No photomontage has been prepared of this viewpoint. At this location there would be close views of a proposed bridge over the road and for some distance along the corridor, where a swathe of some 100m will be cleared of vegetation.

The magnitude of visual change for the corridor will be *low* during the mine life, with this lessening further over time due to familiarity with the changes. This level of impact would be reduced further at the end of the mine assuming rehabilitation of areas close to Collinsville-Elphinstone Road.

Visual amenity impact on viewpoint during mine operation: *low.*

Visual amenity impact on viewpoint at end of mine: *low to insignificant* (following rehabilitation).

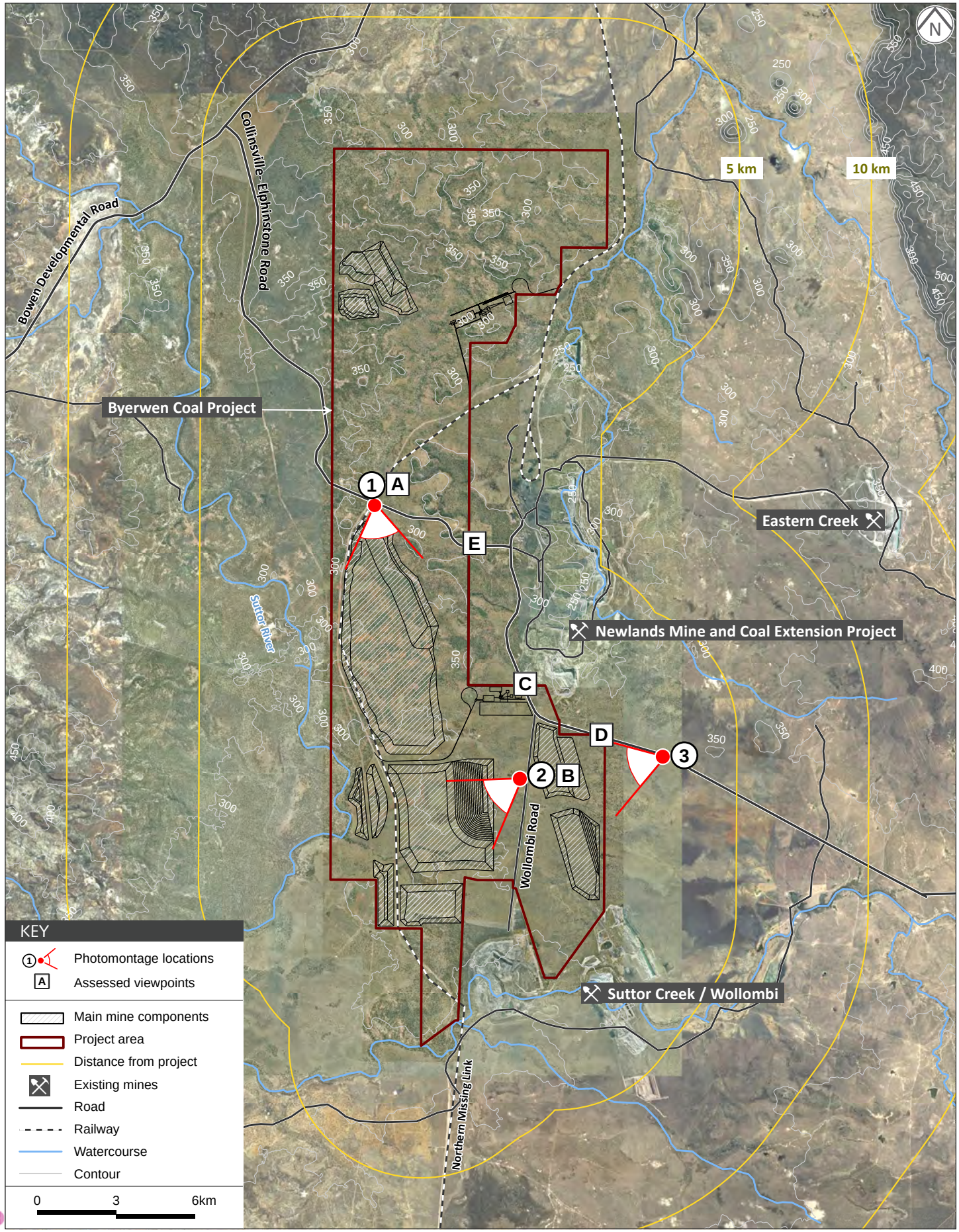
5.3 LIGHTING IMPACTS

The existing night-time visual environment of this region is one already affected by mines, with the nearest being the Newlands Mine (Suttor Creek and Wollombi) although that mine does not have a CHPP or MIA which tend to be the most brightly lit mine components. From some locations sky glow may also be seen from the main Newlands Mine to the west of the project area, although direct views of that mine are not possible from the main Collinsville-Elphinstone Road.

For this project, lighting would be designed to ensure any impact to surrounding viewpoints would be minimised. However, there are a number of components of the mine that would be quite brightly lit at night such as the MIA and CHPP. The mine pit would also be lit by vehicles and equipment operating in the pit, but the main glare of this lighting would be directed inwards. It is anticipated that all viewpoints within a 5km radius of the active mine area, even where direct views are not possible, will notice a sky glow.

There are no sensitive receptors of any concern (i.e. a private, occupied houses) within this 5km area, although beyond this distance it may still be possible to see a sky glow, with this adding to the current lights of the Newlands Mine (Suttor Creek and Wollombi) in the south of the project area for at least the next 15 years of its planned life.

It is anticipated that at some locations along the Collinsville-Elphinstone Road lights would be seen, particularly those of the MIA and CHPP in the southern tenement, which would be located approximately 1km from that road.



Integrated Design Solutions - 030799 Byerwen Coal Project - F5-1 Photomontage locations - RevC 26 November 2012

Figure 5.1

Assessed viewpoints and photomontage locations

6 MITIGATION MEASURES

6.1 GENERAL MITIGATION MEASURES

The following are committed project mitigation measures that will occur during the life of the project, and at its closure:

- Progressive rehabilitation of disturbed mine areas
- Decommissioning of infrastructure at the end of operations and rehabilitation of disturbed areas
- Lighting designed to ensure any impact to surrounding sensitive receptors and roads would be minimised.

These mitigation measures reduce the potential visual impact to the landscape character and surrounding viewpoints by preventing views of any occupied houses within 5km and ensuring that where practical vegetation is restored, disturbed watercourses are rehabilitated and the final extensive mounds are left in a stable and vegetated condition.

6.2 MITIGATION MEASURES FOR SPECIFIC VIEWPOINTS

The following recommendations for mitigation are to address the visual impact to Assessed Viewpoints C and D during mining operations and at the mine closure (where the impact level would be moderate during the mine operation):

Recommendation 1: It is recommended that a buffer be maintained that is at least 25m wide that is free of disturbance, and any existing vegetation within that area is retained:

- North of the Wollombi Road, Collinsville-Elphinstone Road intersection until at least 250m past the MIA (which would be as close as 100m from that road, with the CHPP 1km away and brightly lit at night) (i.e. Assessed viewpoint C).
- South of Wollombi Road where the project area is directly alongside Collinsville-Elphinstone Road to reduce the cumulative views of both the existing Newlands Mine (Suttor Creek and Wollombi) and the project (i.e. Assessed viewpoint D).

It should be noted that it is not feasible to establish any screen planting or mounding to screen the views of the mine that would be possible from the railway bridge along Collinsville-Elphinstone Road (i.e. Assessed viewpoint A - refer **Figures 5.2a** to **5.2d**). It has been assumed that rehabilitation would occur along the central infrastructure corridor (i.e. as seen from Assessed viewpoint E).

The retention of a vegetation buffer at the two recommended areas would reduce the potential visual impact levels of assessed (and public) viewpoints C and D as described in **Section 5.3.**

Recommendation 2: Usual rehabilitation techniques generally focus on low growing species such as grasses, groundcovers and shrubs. However, it is recommended that trees are also included where possible, particularly around the base areas of residual mounds to blend them better into the landscape. The forested nature of the northern tenement area also makes it preferable to restore this landscape to a more forest-like one.

Figure 5.2a
PHOTOMONTAGE LOCATION 1 > Collinsville - Elphinstone Road (from railway bridge)
Existing view

Figure 5.2b
PHOTOMONTAGE LOCATION 1 > Collinsville - Elphinstone Road (from railway bridge)
Worst case scenario visual envelope

Figure 5.2c
PHOTOMONTAGE LOCATION 1 > Collinsville - Elphinstone Road (from railway bridge)
Worst case scenario - unrehabilitated

Figure 5.2d
PHOTOMONTAGE LOCATION 1 > Collinsville - Elphinstone Road (from railway bridge)
Worst case scenario - rehabilitated

Figure 5.3a
PHOTOMONTAGE LOCATION 2 > Wollombi Road
Existing view

Figure 5.3b
PHOTOMONTAGE LOCATION 2 > Wollombi Road
Worst case scenario visual envelope

Figure 5.3c
PHOTOMONTAGE LOCATION 2 > Wollombi Road
Worst case scenario - unrehabilitated

Figure 5.3d
PHOTOMONTAGE LOCATION 2 > Wollombi Road
Worst case scenario - rehabilitated

Figure 5.4a
PHOTOMONTAGE LOCATION 3 > Collinsville - Elphinstone Road (south-east of Wollombi Road)
Existing view

Figure 5.4b
PHOTOMONTAGE LOCATION 3 > Collinsville - Elphinstone Road (south-east of Wollombi Road)
Worst case scenario visual envelope

Figure 5.4c
PHOTOMONTAGE LOCATION 3 > Collinsville - Elphinstone Road (south-east of Wollombi Road)
Worst case scenario - unrehabilitated

Figure 5.4d
PHOTOMONTAGE LOCATION 3 > Collinsville - Elphinstone Road (south-east of Wollombi Road)
Worst case scenario - rehabilitated

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7. RESIDUAL EFFECTS

The final look of the mine site at the conclusion of the rehabilitation phase would be of a substantially altered landform to the one that existed prior to the mine.

In the southern tenement, there will be three residual voids and associated rehabilitated ex-pit spoil dumps that would remain at the conclusion of mining and in perpetuity, those being parts of the former: West Pit 3, East Pit 2 and South Pit 1. In the northern tenement a residual void and rehabilitated ex-pit spoil dump would remain as part of the former North Pit. There would also be five other residual ex-pit spoil dumps that would remain mostly where the former mine pits were.

The residual voids will be benched on all sides apart from the former high walls. The voids would not be visible from outside the project site.

The final above ground-level landforms (i.e. ex-pit spoil dumps) would be approximately 60m above the existing natural surface, with the longest being some 5km long (former West Pit 3). All would be rehabilitated with low native vegetation such as grasses and shrubs.

As a visual comparison, the local existing topography across the site includes knolls and hills of up to 330-350m AHD, particularly through the central part of the site in the vicinity of the largest pit (West Pit). Therefore the proposed maximum height of 60m for these final landforms, which would give an overall final height of approximately 350m AHD, that being a level that would not significantly tower over the surrounding landscape.

However, these final landforms would be substantially different in form in terms of shapes that would not reflect the natural topography. These large elevated areas would cover very substantial surface areas and have relatively steep side slopes and flatter broad upper areas.

Infrastructure will generally be removed, depending upon post-mining land uses and the specific infrastructure type considered. Rehabilitation and revegetation will be progressive throughout the life of the mine, with final rehabilitation and revegetation of disturbed areas conducted as part of mine closure. Native pasture and shrub species would be used for the progressive and final rehabilitation and revegetation.

The residual effects of the project have been considered within the impact assessment in **Section 5.0.**

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8. CUMULATIVE IMPACTS

8.1 DESCRIPTION OF CUMULATIVE IMPACTS

The assessment of cumulative impacts focuses on existing and planned future mines and other planned infrastructure projects within 15km of the Byerwen Coal Project. These projects, and others in the general vicinity, are indicated in **Figure 33-1 (a and b), Appendix A.**

8.1.1 Existing and planned projects within 15km

Existing mines

Newlands Mine - The existing mine comprises operations over 11 mining leases encompassing an area of approximately 20,166 hectares, with those open-cut operations within 15km of the project being (Xstrata Xstrata Coal Queensland Pty Ltd, 2012):

- Newlands (main deposit) - Existing mining operations, coal handling and preparation plant, airstrip, coal loader, run-of-mine and product stockpiles, mine voids, waste rock dumps and main administration and warehouse complex. Lease expiry date 2018.
- Suttor Creek and Wollombi (immediately south-west of subject project) - active open cut mining area, temporary infrastructure, mine stockpiles, extensive waste rock dumps, processing at main Newlands Mine. Approximately 15 years remaining.
- Newlands South - Open cut mining area undergoing rehabilitation and tailings storage area. Lease expiry date 2018.
- Eastern Creek South - Active open cut mining area, ROM stockpiles, waste rock dump and voids. Lease expiry date 2018.

Future mines and planned infrastructure projects

Other planned mines within 15km:

- Newlands Coal Extension project (involves a substantial extension to the existing mining operations east of the main deposit and around the existing Eastern Creek Pit (over approximately next 26 years)).

Other future planned infrastructure projects within 15km are:

- Central Queensland Gas Pipeline - proposed start up 2014
- Goonyella to Abbot Point Rail Project - construction proposed start date 2015, finish date 2016
- Central Queensland Integrated Rail Project - construction proposed start date 2013, finish date 2015.

8.1.2 Assessment of cumulative impacts

Currently from parts of the Collinsville-Elphinstone Road the active and rehabilitated high spoil dumps of the Newlands Mine (Suttor Creek and Wollombi). These are currently a visually dominant feature in the south of the project area, with the high and extensive mounds, some yet to be rehabilitated and therefore grey in colour, the most visible element. This visual contrast will reduce somewhat with revegetation over time, with completion due in some 15 years.

There are currently no outside views of any other parts of the Newlands Mine complex within 15km of the project area, apart from the main entry gates along Collinsville-Elphinstone Road and the overpass over this road near the intersection with Wollombi Road.

The addition of the subject project would increase the number of industrial-like structures in the general area and overall would change the relatively undisturbed rural and vegetated landscape character to a more disturbed active mining area.

The three other planned infrastructure projects (i.e. Central Queensland Gas Pipeline, Goonyella to Abbot Point Rail Project and Central Queensland Integrated Rail Project) would have a lesser impact. Yet these would nevertheless add to the overall cumulative loss of scenic quality and further detract from the rural character.

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9. SUMMARY OF IMPACTS

9.1 LANDSCAPE CHARACTER IMPACT

The level of impact to all the landscape character focusses on the immediate project area. Three Landscape Units have been identified across the project area, with these used to assess the potential level of impact on the existing landscape character.
Table 9-1 summarises the landscape character impact assessment (detailed in **Section 5.0**).

TABLE 9 - 1: SUMMARY OF LANDSCAPE CHARACTER IMPACTS TO PROJECT AREA

Landscape Unit (refer Figure 3-1)	Visual sensitivity	Magnitude of visual change	Overall landscape character impact during mine operations	Overall landscape character impact at end of mine
Landscape Unit 1	Low	High	Moderate	Low
Landscape Unit 2	Low	High	Moderate	Low
Landscape Unit 3	Moderate	High (mining area) Low (other areas)	High (mining area) Low (other areas)	Moderate (mining area) Low or insignificant (other areas)

During operation of the mine the landscape character impact level would be *moderate* for most of the project area, with a *high* section associated with the North Pit. The impact would be reduced to some extent in the longer term by committed project mitigation works that include both revegetation and landform rehabilitation works. Hence, the residual landscape character impact at the end of the mine would be *low* across most of the project area, with a smaller area of *moderate* impact associated with the disturbed area of the former North Pit due to the more hilly landform and vegetation affected on this part of the site.

9.2 VISUAL AMENITY IMPACTS

Overall the visual amenity impact to any viewpoint in the long term would be no greater than a moderate impact following rehabilitation measures. Although the project would cause substantial visual change, the potential level of impact is notably tempered by its location in a rural area that is quite remote and with a low, sparse population. There are also low traffic volumes on the main road through the area, Collinsville-Elphinstone Road, which provides the only opportunity for public views apart from the local Wollombi Road.

There would be no visual amenity impacts for any sensitive receptors within 5km of the project that are of any concern. There would be some visual amenity impacts to some public viewpoints, particularly along Collinsville-Elphinstone Road, although no higher than a moderate level, reducing to a low level following rehabilitation and the mine closure.

A summary of the assessment of each affected public viewpoint with a moderate level of visual sensitivity or higher is included in **Table 9-2,** with recommended mitigation measures noted to address any of those viewpoints where such measures are feasible, as described in **Section 6.2.**

TABLE 9-2: VISUAL IMPACT TO PUBLIC VIEWPOINTS WITHIN 5KM WITH MODERATE VISUAL SENSITIVITY OR HIGHER

Assessed viewpoints (all public)	Timeframe	Closest distance away	Visual sensitivity	Magnitude of visual change	Overall visual impact	Recommended mitigation
Viewpoint A: Collinsville-Elphinstone Road (from railway bridge)	Operating mine - closest in last few years	1-4 km	Moderate	Moderate	Moderate	Further mitigation not feasible during operation
	End of mine/residual	1km	Moderate	Low	Low	Not required
Viewpoint C: Collinsville-Elphinstone Road (north of Wollombi Road)	Operating mine (all years)	100m	Moderate	Moderate	Moderate	Retain vegetated buffer
	End of mine/residual	Not relevant	Not relevant	None	None	Not relevant
Viewpoint D: Collinsville-Elphinstone Road (south of Wollombi Road)	Operating mine - from Year 25	500m	Moderate	Moderate	Moderate	Retain vegetated buffer
	End of mine/residual	500m	Moderate	Low	Low	Retain vegetated buffer
Viewpoint E: Collinsville-Elphinstone Road (where central infrastructure crosses)	Operating mine (all years - limited area affected)	<100m	Moderate	Low	Low	Not required
	End of mine/residual	<100m	Moderate	Low (rehabilitation assumed)	Low to Insignificant	Not required assuming adequate rehabilitation

Assessed viewpoints C and D can be mitigated further through retention of existing vegetated buffers, yet any screening of Assessed Viewpoint A (from railway bridge at Collinsville-Elphinstone Road) is not possible due to the elevation of that viewpoint. However, the impact on this viewpoint would be low following rehabilitation.

Retention of a vegetated buffer along Collinsville-Elphinstone Road would also reduce the cumulative impacts of both the Newlands Mine (Suttor Creek and Wollombi) by continuing to screen some views of the existing and future spoil mounds of this mine as well as the Byerwen project.

9.3 LIGHTING IMPACTS

It is anticipated that all viewpoints within a 5km radius of the active mine area, even where direct views are not possible, will notice a sky glow.

There are no sensitive receptors of any concern (i.e. a private, occupied house) within this 5km area, although beyond this distance it may still be possible to see a sky glow, with this adding to the current glow of the Newlands Mine (Suttor Creek and Wollombi) for at least the next 15 years of its planned life.

It is anticipated that at some locations along the Collinsville-Elphinstone Road lights would be seen, particularly those of the MIA and CHPP in the southern tenement, which would be located approximately 1km from that road and relatively brightly lit.

9.4 CUMULATIVE IMPACTS

Overall, the area most affected by cumulative impact would be the views from the regional road of Collinsville-Elphinstone Road, from where that road crosses the central project down to its southern boundary. Within that area there would be cumulative visual impact primarily due to the combined views of the existing Suttor Creek and Wollombi parts of the Newlands Mine just to the south-west of the project area and the project itself.

However, the two main mitigating factors to take into account when considering that impact are that:

- There would be no sensitive receptors already affected by the existing and planned mines that appear to be also affected by the project
- Although there would be an additional loss of scenic quality and rural landscape character, the scenic quality of the overall landscape has been assessed as *low* or *moderate*, and of a type that is relatively widespread and common.

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10. REFERENCES

The Landscape Institute and Institute of Environmental Management and Assessment, 2002. *Guidelines for Landscape and Visual Impact Assessment.* Spoon press, United Kingdom.

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Western Australian Planning Commission, 2007. *Visual Landscape Planning in Western Australia.*

Xstrata Coal Queensland Pty Ltd, 2012. *Newlands Coal Extension Project Environmental Impact Statement*

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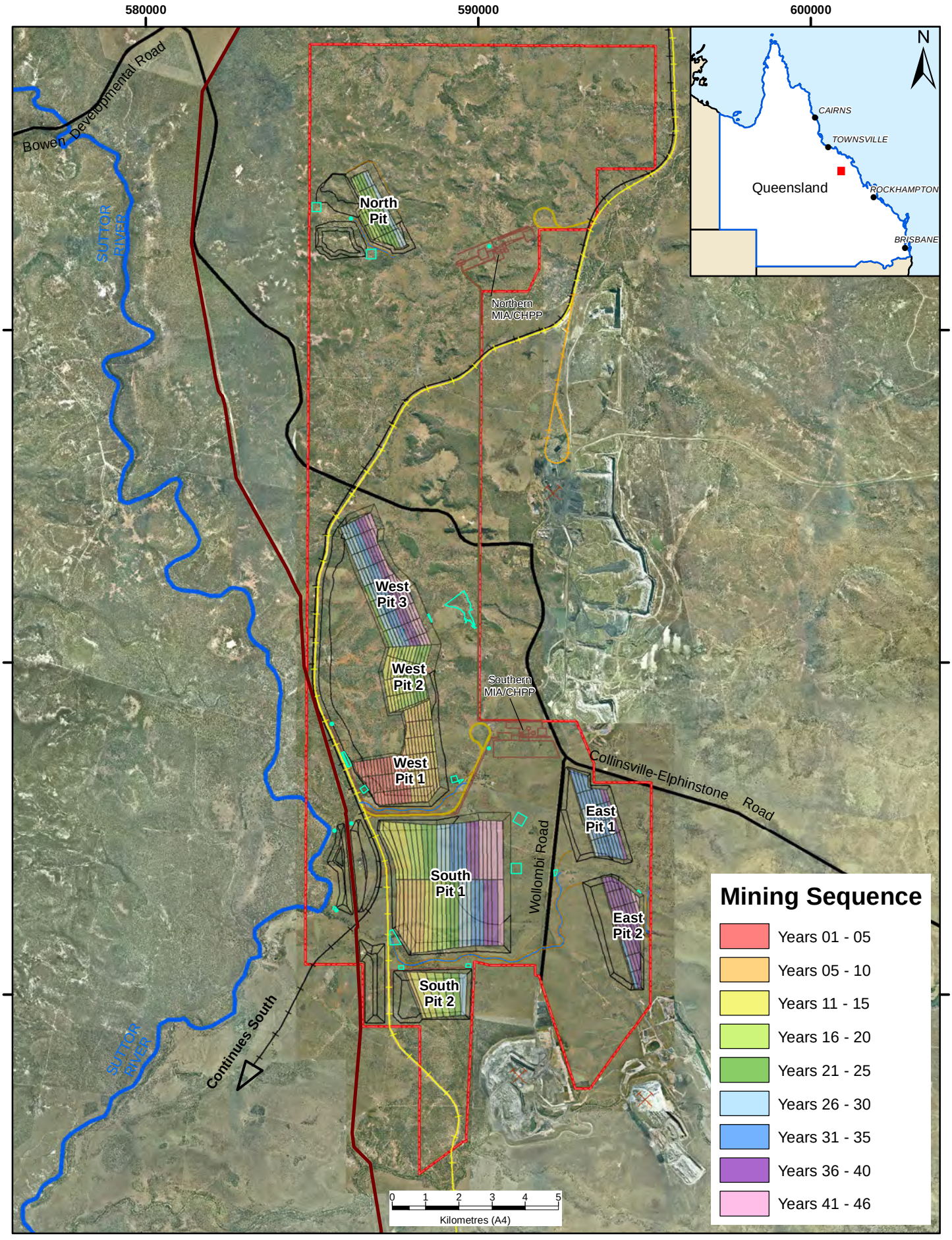
APPENDIX A - PROJECT PLANS

Project plans reproduced from EIS:

- Figure 7-3: Proposed Mine Layout
- Figure 7-6: Year 5 Proposed Mine Layout and Sequencing
- Figure 7-7: Year 10 Proposed Mine Layout and Sequencing
- Figure 7-8: Year 16 (North) Proposed Mine Layout and Sequencing
- Figure 7-9: Year 25 (North) Proposed Mine Layout and Sequencing
- Figure 7-10: Year 25 (South) Proposed Mine Layout and Sequencing
- Figure 7-11: Final Landform (North)
- Figure 7-12: Final Landform (South)
- Figure 7-16: Mine Infrastructure Area Location and Layout
- Figure 33-1 (a and b): Cumulative impacts



Legend

- Project Area
- Waste Rock Dumps and Pits
- Burdekin to Moranbah Pipeline
- Existing Mine Site
- GAP Rail line
- Newlands Mine Rail Loop
- Alpha Coal Project Rail Line
- Train Loading Facilities
- Central Infrastructure Corridor
- Dam (mine affected, sediment affected, clean water)
- Suttor River
- Drainage Bund
- Drainage Diversion
- Formed Road
- Mine Infrastructure

Proposed Mine Layout and Sequencing

Figure 7-3 | **Byerwen Coal Project**

Date: *28/02/2013*

Author: samuel.ferguson

Map Scale: 1:150,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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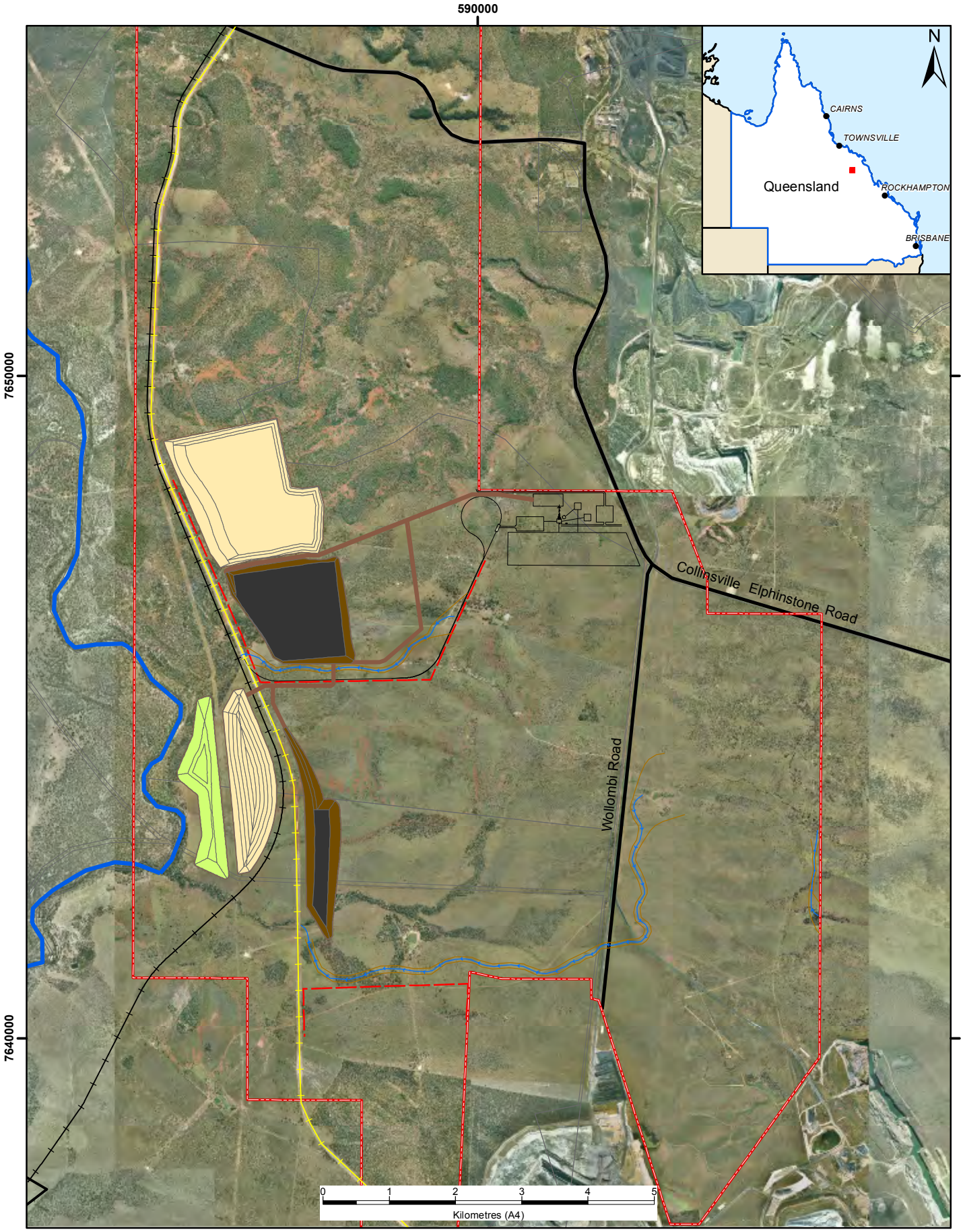

Legend

- Completed Rehab
- Expit Spoil Dump
- Highwall
- Pit Floor
- Haul Road
- Creek Drainage Bund
- Creek Drainage Diversion
- GAP Railway
- Alpha Coal Project Rail Line
- Mine Infrastructure
- Project Area
- Powerline Diversion
- Suttor River
- Roads
- Cadastre

Year 5 Proposed Layout	
Figure 7-6	**Byerwen Coal Project**
Date: *20/09/2012*	**Author:** samuel.ferguson
	Map Scale: 1:75,000
Revision: R1	**Coordinate System:** GDA 1994 MGA Zone 55
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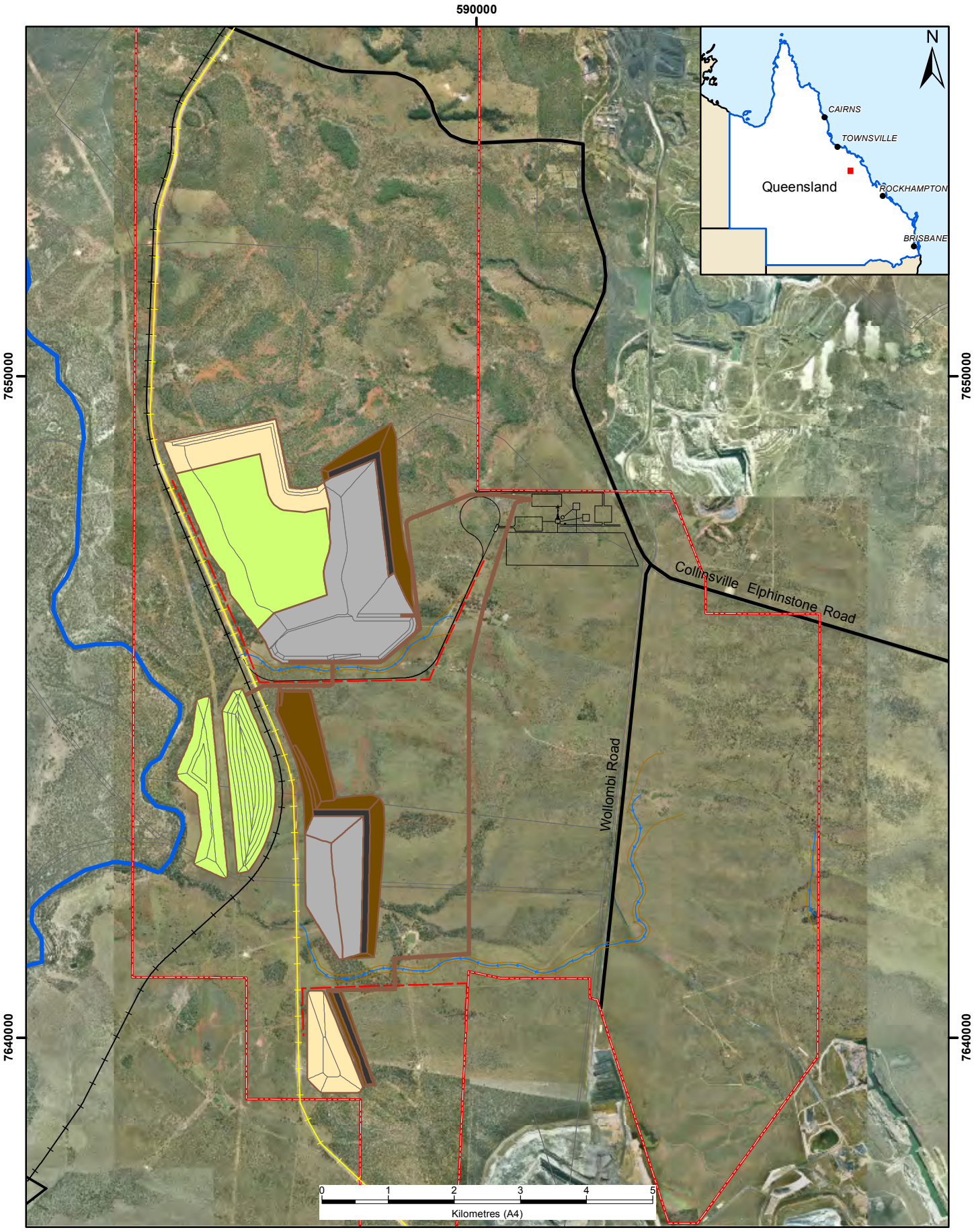

Legend

- Completed Rehab
- Inpit Spoil Dump
- Expit Spoil Dump
- Highwall
- Pit Floor
- Haul Road
- Creek Drainage Bund
- Creek Drainage Diversion
- GAP Railway
- Alpha Coal Project Rail Line
- Mine Infrastructure
- Project Area
- Powerline Diversion
- Suttor River
- Roads
- Cadastre

Year 10 Proposed Layout		QCOAL GROUP
Figure 7-7	**Byerwen Coal Project**	elp
Date: *20/09/2012*	**Author:** samuel.ferguson	
	Map Scale: 1:75,000	
Revision: R1	**Coordinate System:** GDA 1994 MGA Zone 55	

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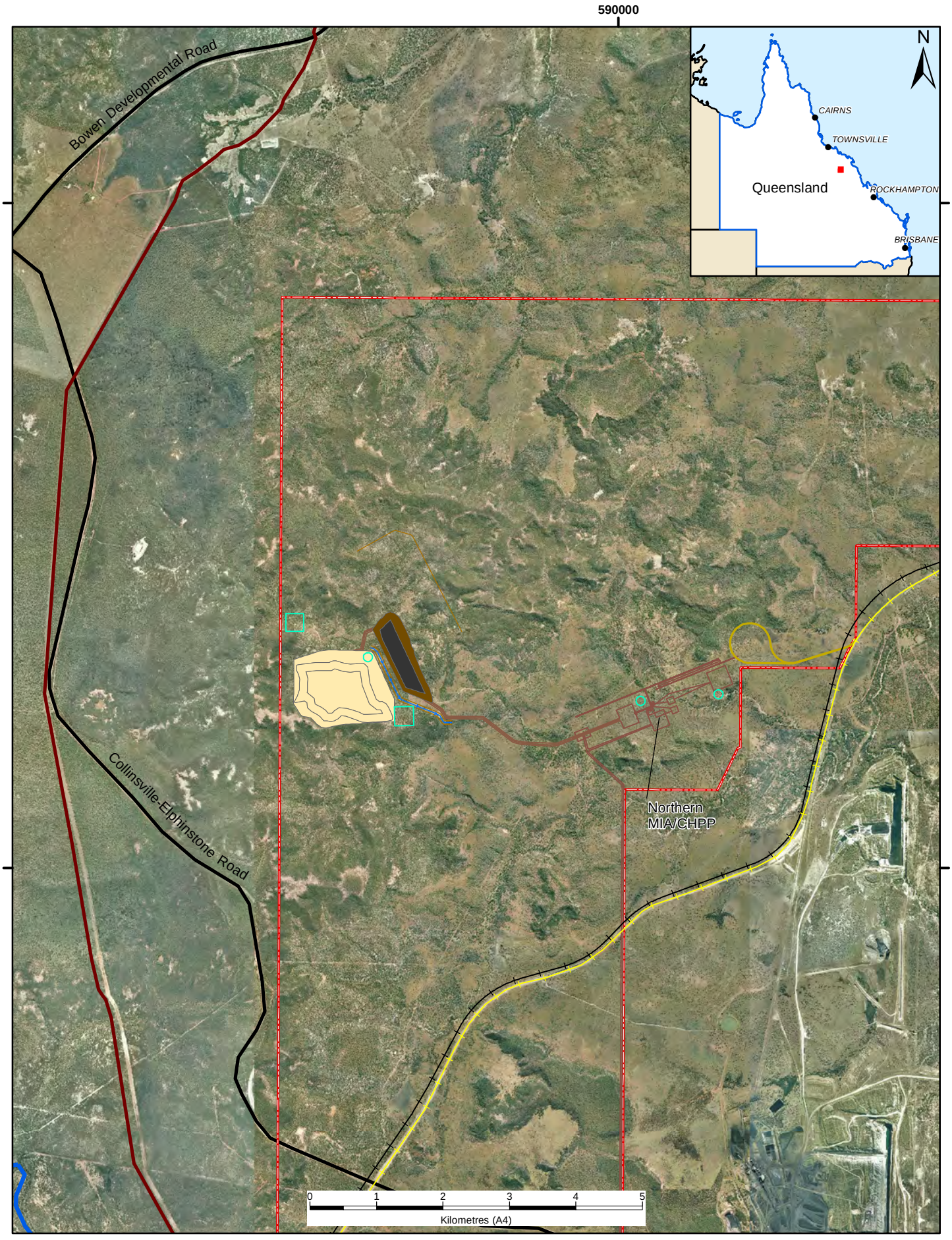

Legend

- Expit Waste Rock Dump
- Highwall
- Pit Floor
- GAP Rail line
- Project Area
- Suttor River
- Formed Roads
- Mine Infrastructure
- Drainage Bund
- Drainage Diversion
- Dam (mine affected, sediment affected, clean water)
- Train Loading Facilities
- Alpha Coal Project Rail Line
- Burdekin to Moranbah Pipeline

Year 16 (North) Proposed Mine Layout

QCOAL GROUP

Figure 7-8

Byerwen Coal Project

Date: *28/02/2013*

Author: samuel.ferguson

Map Scale: 1:75,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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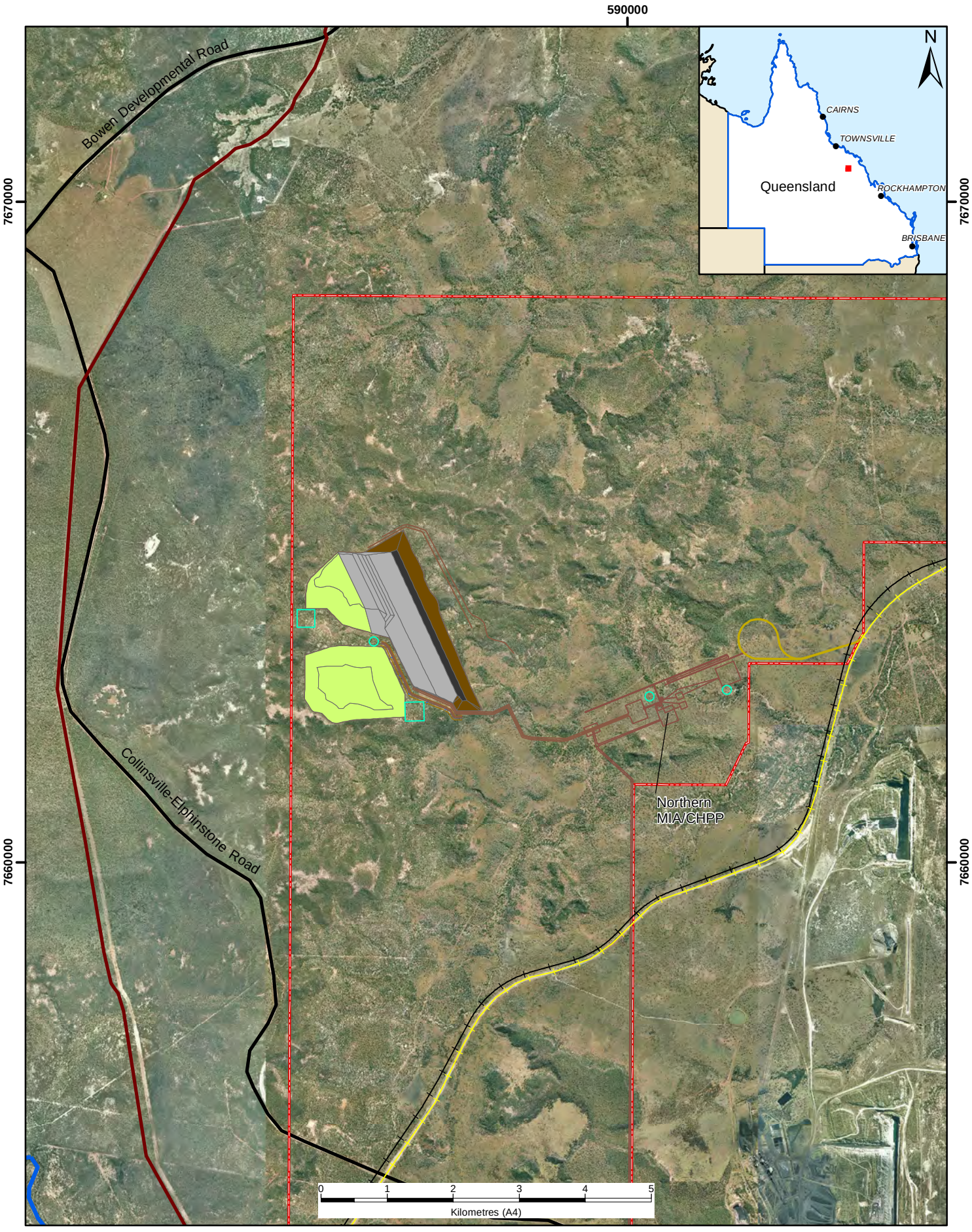

Legend

- Completed Rehab
- Inpit Waste Rock Dump
- Highwall
- Pit Floor
- GAP Rail line
- Project Area
- Suttor River
- Formed Roads
- Mine Infrastructure
- Drainage Bund
- Drainage Diversion
- Dam (mine affected, sediment affected, clean water)
- Train Loading Facilities
- Alpha Coal Project Rail Line
- Burdekin to Moranbah Pipeline

Year 25 (North) Proposed Mine Layout

Figure 7-9

Byerwen Coal Project

Date: *28/02/2013*

Author: samuel.ferguson

Map Scale: 1:75,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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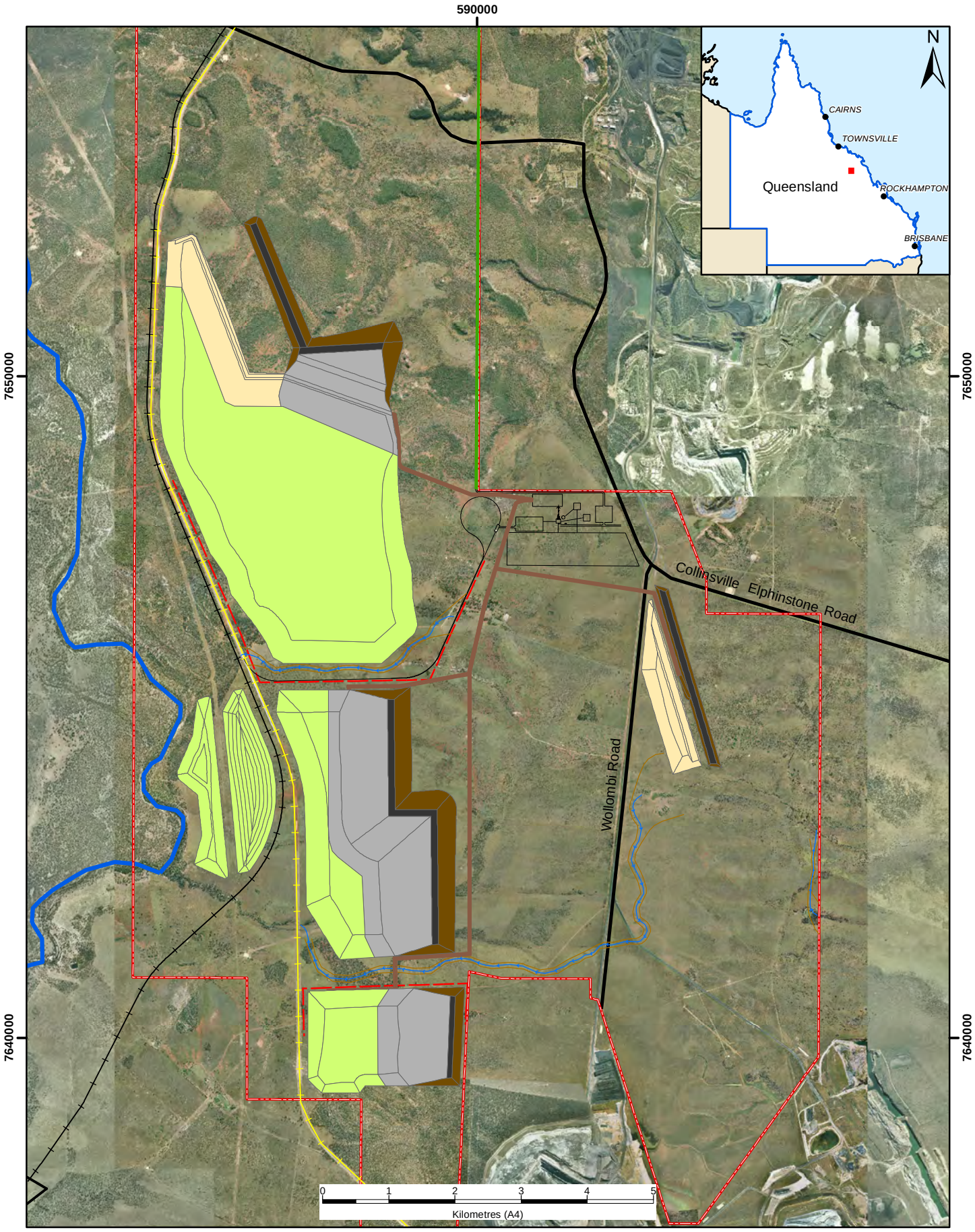

Legend

- Completed Rehab
- Inpit Spoil Dump
- Expit Spoil Dump
- Highwall
- Pit Floor
- Haul Road
- Creek Drainage Bund
- Creek Drainage Diversion
- GAP Railway
- Alpha Coal Project Rail Line
- Mine Infrastructure
- Water, Power and Road Infrastructure Corridor
- Project Area
- Powerline Diversion
- Suttor River
- Roads

Year 25 Proposed Layout (South)

Figure 7-10 | **Byerwen Coal Project**

Date: *4/10/2012*

Author: samuel.ferguson

Map Scale: 1:75,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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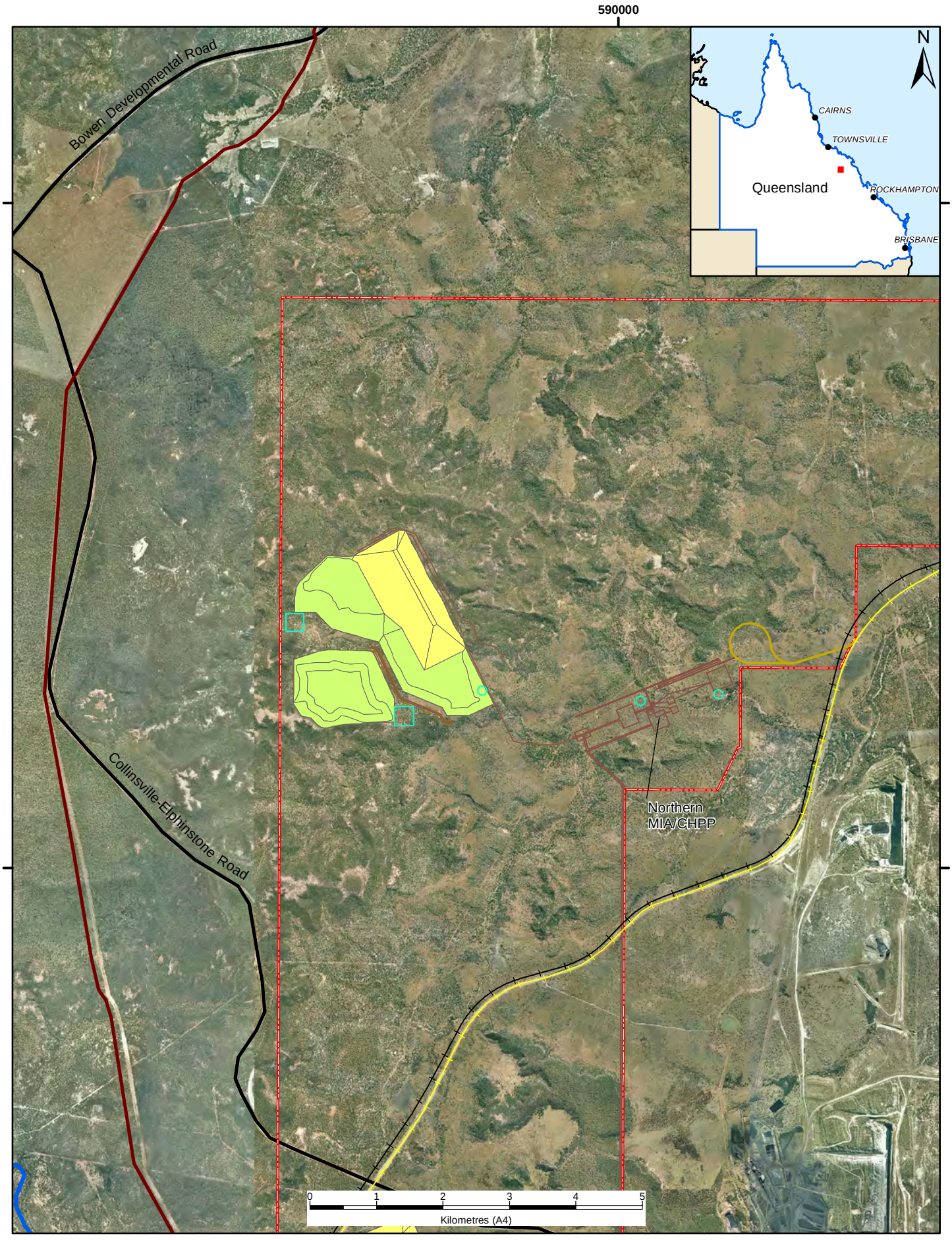

Legend

- Completed Rehab
- Final Void
- GAP Rail line
- Project Area
- Suttor River
- Formed Roads
- Mine Infrastructure
- Drainage Bund
- Drainage Diversion
- Dam (mine affected, sediment affected, clean water)
- Train Loading Facilities
- Alpha Coal Project Rail Line
- Burdekin to Moranbah Pipeline

Final Landform (North)

QCOAL GROUP

Figure 7-11

Byerwen Coal Project

Date: *28/02/2013*

Author: samuel.ferguson

Map Scale: 1:75,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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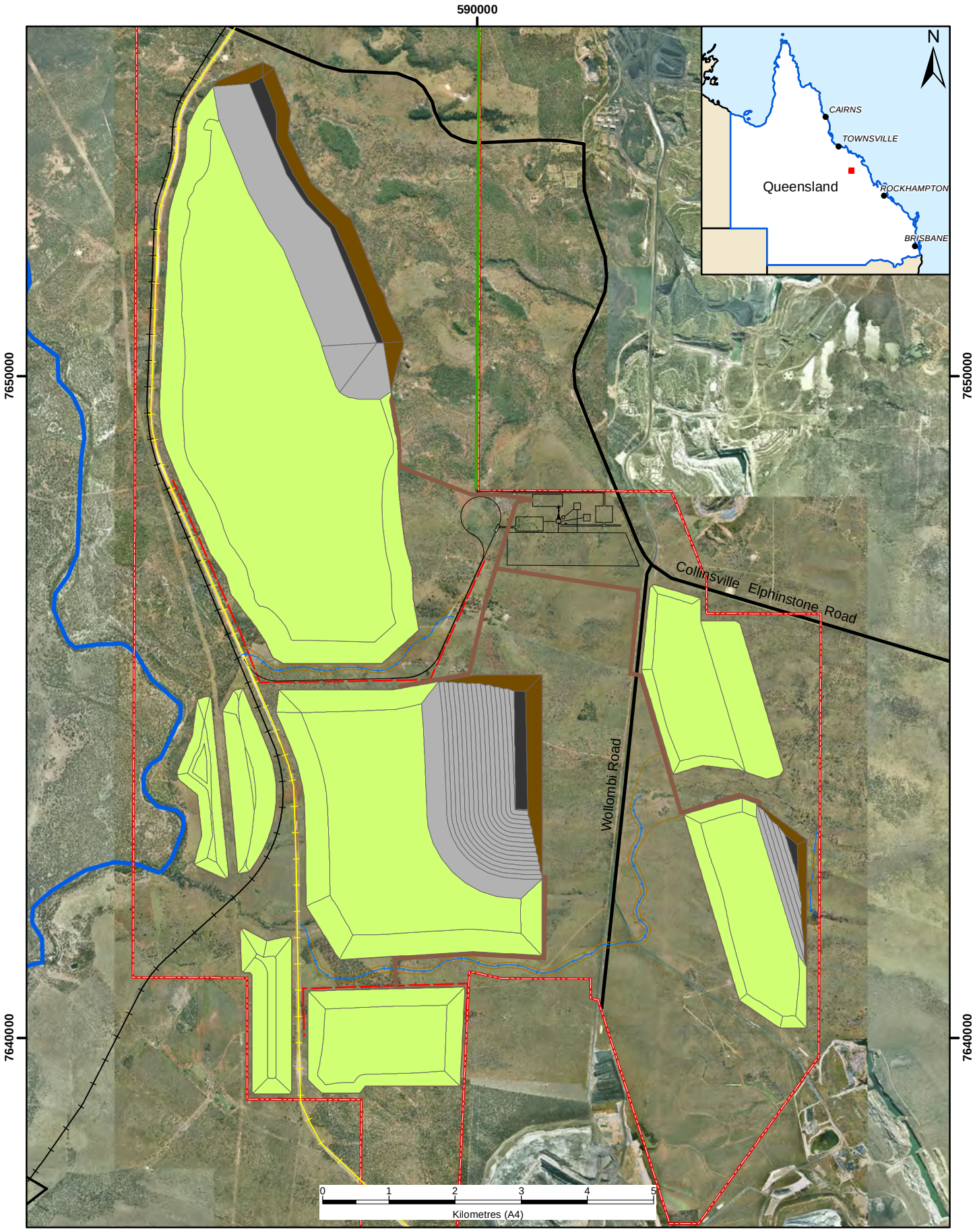

Legend

- Completed Rehab
- Inpit Spoil Dump
- Highwall
- Pit Floor
- Haul Road
- Creek Drainage Bund
- Creek Drainage Diversion
- GAP Railway
- Alpha Coal Project Rail Line
- Mine Infrastructure
- Water, Power and Road Infrastructure Corridor
- Project Area
- Powerline Diversion
- Suttor River
- Roads

Final Landform (South)

Figure 7-12 | **Byerwen Coal Project**

Date: *4/10/2012*

Author: samuel.ferguson

Map Scale: 1:75,000

Revision: R1

Coordinate System: GDA 1994 MGA Zone 55

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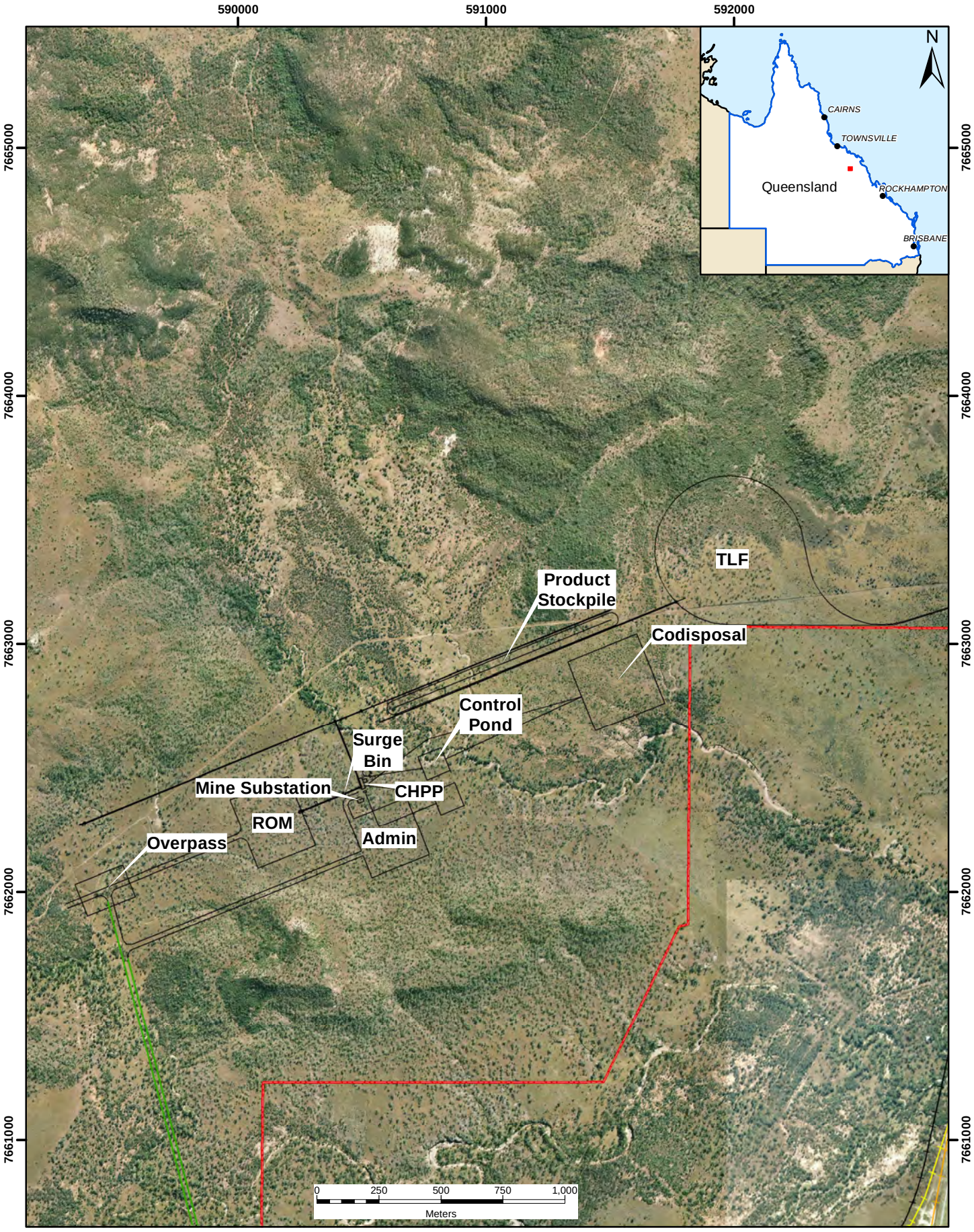

Legend

- Project Area
- Mine Infrastructure
- Water, Power and Road Infrastructure Corridor

Northern Mine Infrastructure Area and Train Loading Facilities	QCOAL GROUP
Figure 7-16	**Byerwen Coal Project**
Date: *4/10/2012*	**Author:** samuel.ferguson
	Map Scale: 1:20,000
Revision: R1	**Coordinate System:** GDA 1994 MGA Zone 55
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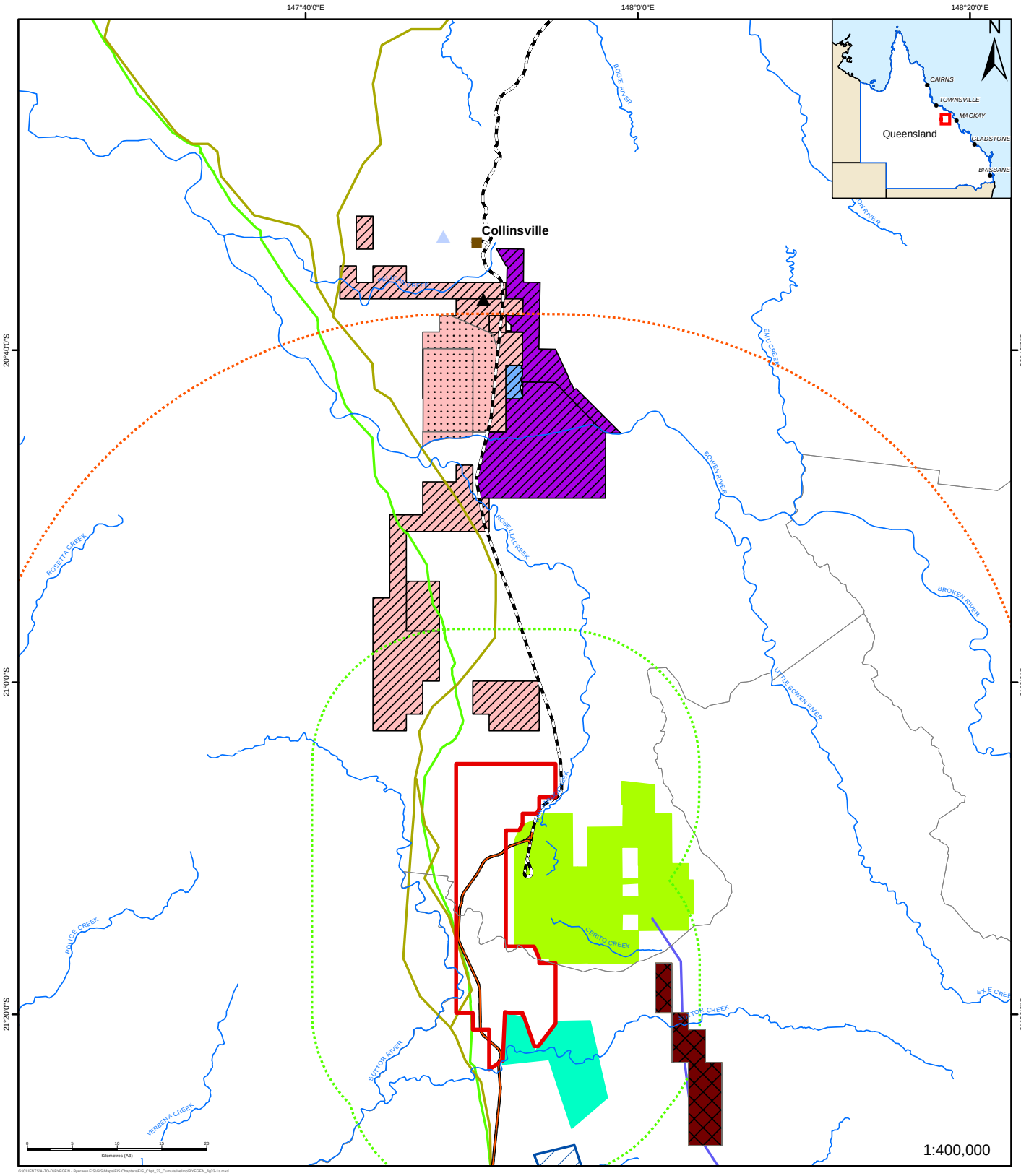
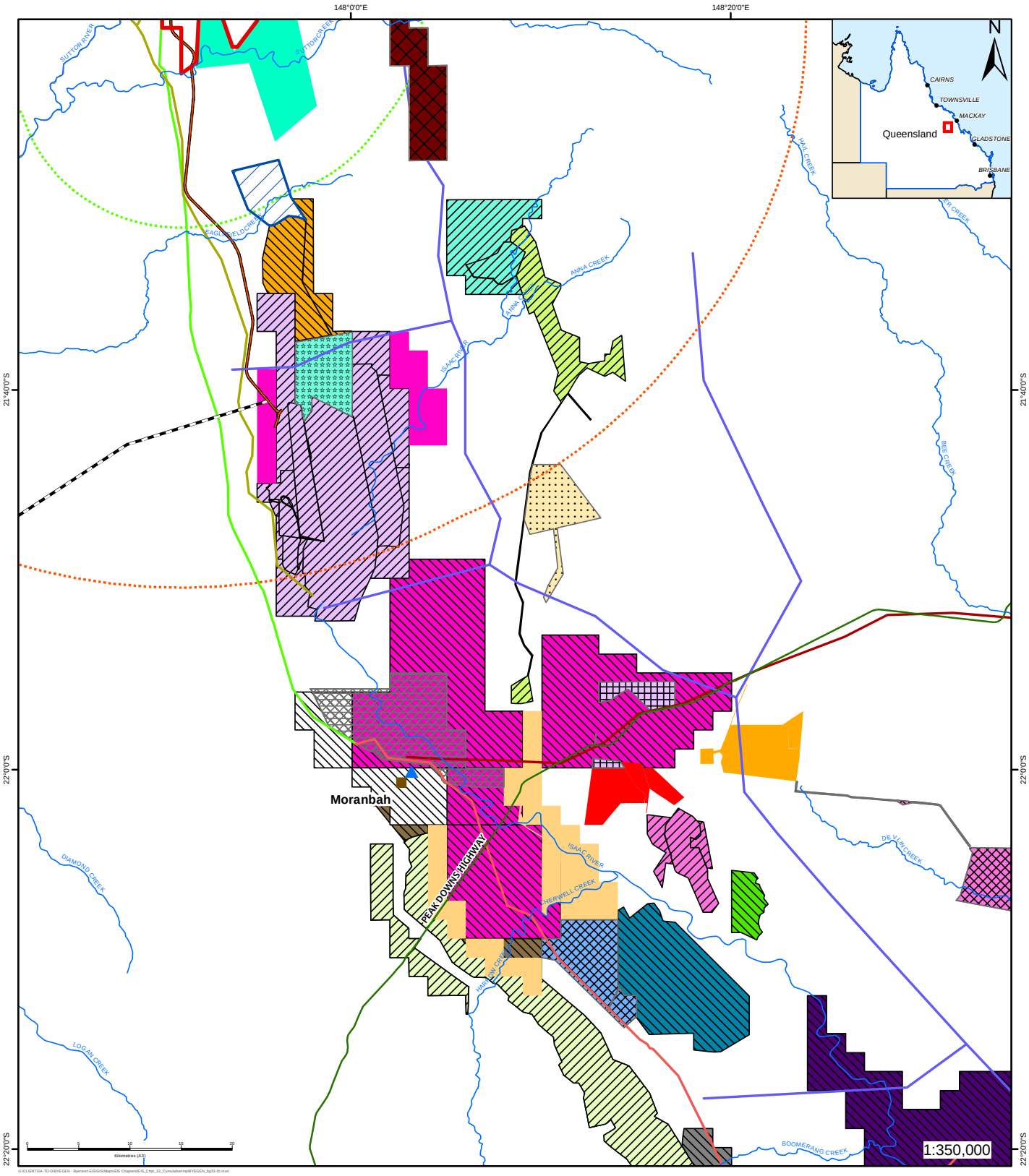


Legend

- Cows Coal Project (Approximate Location)
- Collinsville Project (Approximate Location)
- Arrow Bowen Pipeline Project (Approximate Location)
- Northern Missing Link
- Central Queensland Integrated Rail Project (Approximate Location)
- Goonyella to Abbot Point Rail Project
- North Queensland Gas Pipeline
- Suttor Creek East Project
- Lancewood Project
- Drake Coal Project
- Newlands & Newlands Extension Projects
- Suttor Creek Project
- Sonoma Coal Project
- Jax Project
- Sarum Project
- Major Watercourses
- 15 km extent
- 50 km extent
- 150 km extent
- Local Government Boundaries
- Byerwen Project Area

Cumulative Impacts - Map 2		
Figure 33-1(a)	**Byerwen EIS**	
Date: 12/12/2012		
Drafted, Checked: SF, RO		
Revision: R1	**Coordinate System:** GCS GDA 1994	



Legend

- Moranbah Airport, Power & Ammoniun Nitrate Projects (Approximate Locations)
- Bow Energy Gas Pipeline (Approximate Location)
- Arrow Bowen Pipeline Project (Approximate Location)
- Northern Missing Link
- Central Queensland Integrated Rail Project (Approximate Location)
- Central Queensland Gas Pipeline
- Goonyella to Abbot Point Rail Project
- Connors River Pipeline (Approximate Location)
- North Queensland Gas Pipeline
- Suttor Creek East Project
- Lancewood Project
- Ellensfield Coal Mine Project
- Carborough Downs Mine Expansion Project
- Cordilla Coal Mine Project
- Eagle Downs Coal Project
- Eagle Field Expansion Project
- Grosvenor Coal Project
- Integrated Issac Plains Project
- Millenium Expansion Project
- Moorvale Coal Project
- Suttor Creek Project
- Talwood Project
- Bowen Basin Coal Growth - Caval Ridge
- Caval Ridge Mine Project - Change 5
- Goonyella Riverside Mine
- Bowen Basin Coal Growth - Daunia Mine
- New Lenton Project
- Burton Project
- Wards Well Underground
- Saraji East
- PL 224
- Moranbah CSG Operation
- Moranbah South
- Olive Downs North
- Winchestor South
- Willunga Project
- Major Watercourses
- 15 km extent
- 50 km extent
- 150 km extent
- Main Towns
- Local Government Boundaries
- Highway
- Byerwen Project Area

Cumulative Impacts - Map 2

Figure 33-1(b) | **Byerwen EIS**

Date: 12/12/2012
Drafted, Checked: SF, RO
Revision: R1

Coordinate System: GCS GDA 1994

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