Environmental Impact Statement (EIS) Report under the *Environmental Protection Act 1994*

Newlands Coal Extension Project proposed by Xstrata Coal Queensland Pty Ltd

Prepared by: Statewide Environmental Assessments, Department of Environment and Heritage Protection

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Contents

1 Introduction 1
2 Project details 2
2.1 Project location 2
2.2 The existing mine 2
2.3 Newlands Nature Refuge 5
2.4 Proposed mining operations 5
2.4.1 Construction 8
2.4.2 Operation 8
2.4.3 Workforce 9
2.4.4 Transport 9
2.4.5 Energy 9
2.4.6 Water supply and storage 9
2.4.7 Sewerage 9
2.4.8 Accommodation and other infrastructure 10
2.4.9 Decommissioning 10
3 The EIS process 12
3.1 Timeline of the EIS process 12
3.2 Approvals 13
3.2.1 Mineral Resources Act 1989 13
3.2.2 Environmental Protection Act 1994 13
3.2.3 Water Act 2000 13
3.2.4 Other approvals 14
3.3 Consultation program 14
3.3.1 Public consultation 14
3.3.2 Advisory bodies 15
3.3.3 Public notification 15
3.4 Matters considered in the EIS assessment report 16
3.4.1 The final TOR 16
3.4.2 The submitted EIS 16
3.4.3 Properly made submissions 16
3.4.4 The standard criteria 17
3.4.5 Prescribed matters 18
3.4.6 Notifiable activities 18
3.5 Environment Protection and Biodiversity Conservation Act 1999 19
3.5.1 Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development 19
4 Adequacy of the EIS in addressing the final TOR 19
4.1 Introduction 24
4.2 Project need and alternatives 24
4.3 Description of the project 25
4.4 Climate 25

4.4.1 Adequacy of the EIS chapter 25
4.4.2 Description of the climate – findings of the EIS 25
4.4.3 Extreme weather events – potential impacts and mitigation measures....25
4.5 Land....26
4.5.1 Assessment of the EIS chapter....26
4.5.2 Description of land values – findings of the EIS 27
4.5.3 Conclusion and outstanding issues 31
4.5.4 Proponent's commitments 31
4.6 Transport....32
4.6.1 Assessment of the EIS chapter....32
4.6.2 Description of traffic impacts – findings of the EIS 33
4.6.3 Conclusion and outstanding issues 34
4.6.4 Proponent's commitments 34
4.7 Waste....35
4.7.1 Assessment of the EIS chapter....35
4.7.2 Description of waste – findings of the EIS 35
4.7.3 Conclusion and outstanding issues 37
4.7.4 Proponent's commitments 37
4.8 Water 37
4.8.1 Assessment of the EIS chapters on surface water, groundwater and mine water 37
4.8.2 Description of surface water values – findings of the EIS....41
4.8.3 Description of groundwater values – findings of the EIS 44
4.8.4 Description of mine water management – findings of the EIS....46
4.8.5 Conclusion and outstanding issues 47
4.8.6 Proponent's commitments 48
4.9 Air quality 49
4.9.1 Assessment of the EIS chapter....49
4.9.2 Description of air quality – findings of the EIS 49
4.9.3 Conclusion and outstanding issues 51
4.9.4 Proponent's commitments 51
4.10 Noise and vibration....51
4.10.1 Assessment of the EIS chapter....51
4.10.2 Description of noise and vibration – findings of the EIS 52
4.10.3 Conclusion and outstanding issues 53
4.10.4 Proponent's commitments 53
4.11 Cultural heritage 53
4.11.1 Assessment of the EIS chapter....53
4.11.2 Description of the cultural heritage – findings of the EIS....54
4.11.3 Conclusion and outstanding issues 54
4.11.4 Proponent's commitments 54
4.12 Social values 54

4.12.1 Assessment of the EIS chapter....54
4.12.2 Description of social values – findings of the EIS....55
4.12.3 Conclusion and outstanding issues....56
4.12.4 Proponent's commitments....56
4.13 Health and safety....56
4.13.1 Assessment of the EIS chapter....56
4.13.2 Description of health and safety – findings of the EIS....57
4.13.3 Conclusion and outstanding issues....57
4.13.4 Proponent's commitments....58
4.14 Economy....58
4.14.1 Assessment of the EIS chapter....58
4.14.2 Description of the economy – findings of the EIS....58
4.14.3 Conclusion and outstanding issues....59
4.14.4 Proponent's commitments....59
4.15 Hazard and risk....59
4.15.1 Assessment of the EIS chapter....59
4.15.2 Description of the hazards and risks – findings of the EIS....59
4.15.3 Conclusion and outstanding issues....60
4.15.4 Proponent's commitments....60
4.16 Ecology....60
4.16.1 Assessment of the EIS chapter on ecology....61
4.16.2 Description of ecology – findings of the EIS....63
4.16.3 Potential impacts and mitigation measures....69
4.16.4 Weed and pest management....72
4.16.5 Conclusion and outstanding issues....73
4.16.6 Proponent's commitments....73
4.17 Matters of national environmental significance....74
4.17.1 Introduction....74
4.17.2 Controlling provisions....74
4.17.3 Assessment of the EIS chapter on MNES....74
4.17.4 Description of MNES values – findings of the EIS....76
4.17.5 Potential impacts and mitigation measures....80
4.17.6 Conclusion and outstanding issues....87
4.17.7 Proponent's commitments....88
4.18 Rehabilitation and decommissioning....89
4.18.1 Assessment of the EIS chapter....89
4.18.2 Description of rehabilitation and decommissioning – findings of the EIS....90
4.18.3 Conclusion and outstanding issues....92
4.18.4 Proponent's commitments....93
4.19 Biodiversity offset strategy....93
4.19.1 Introduction....93

4.19.2 Existing offset areas 94
4.19.3 Assessment of the proposed biodiversity offset strategy 96
4.19.4 Biodiversity offset strategy 97
4.19.5 Subsidence impacts in the Newlands Nature Refuge and Wollombi Brigalow Offset areas 98
4.19.6 Conclusion and outstanding issues 98
5 Adequacy of the environmental management plan 99
5.1 Outstanding issues 99
6 Recommendations about the suitability of the project 101
7 Recommendations for conditions for any approval 101
8 Suitability of the project 101
9 Approved by 102
Appendix A: A Summary of changes to Queensland Government departments 103

1 Introduction

This report provides an evaluation of the environmental impact statement (EIS) process pursuant to Chapter 3 of the *Environmental Protection Act 1994* (EP Act) for the Newlands Coal Extension Project proposed by Xstrata Coal Queensland Pty Ltd (Xstrata Coal) as manager on behalf of the Newlands Collinsville Abbot Point Joint Venture (NCA Joint Venture). The NCA Joint Venture is an unincorporated joint venture of Xstrata Coal (55%), Itochu Coal Resources Australia (25%), ICRA NCA (10%) and Sumisho Coal Australia Pty Ltd (10%). As the majority shareholder, Xstrata Coal has been appointed as the manager of the NCA Joint Venture Operations. Newlands Coal is appointed under the NCA Joint Venture as the operator of the existing Newlands Coal mine (the existing mine) on behalf of Xstrata Coal.

An application was made by the proponent under section 238 of the EP Act for an amendment to the environmental authority (EA) for the existing mine. Under section 246 of the EP Act it was determined that assessment of the Newlands Coal Extension Project would be by EIS. The draft terms of reference (TOR) were advertised in September 2011. Following a period of public consultation, the TOR were finalised in January 2012.

The Department of Environment and Heritage Protection (EHP), as the administering authority of the EP Act, coordinated the EIS process. This assessment report has been prepared pursuant to sections 58 and 59 of the EP Act. Section 58 of the EP Act lists the criteria that the EHP must consider when preparing an EIS assessment report, while section 59 of the Act states what the content must be.

The Act requires that this EIS assessment report must:

- address the adequacy of the EIS in addressing the final TOR
- address the adequacy of the draft environmental management plan (EM plan)
- make recommendations about the suitability of the project
- recommend any conditions on which any approval required for the project may be given.

In providing the required content this assessment report will summarise key issues associated with the potentially adverse and beneficial environmental, economic and social impacts of the project. It will discuss the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project. It will also discuss those issues of particular concern that were either not resolved or require specific conditions for the project to proceed.

Section 2 of this EIS assessment report describes the project in order to provide context for the findings of the report. Section 3 outlines the EIS process that has been followed for the project and the approvals that will be necessary for its commencement. Section 4 addresses the adequacy of the EIS, discusses the main issues with regard to the environmental management of the project, and outlines the environmental protection commitments made in the EIS. Section 5 of this EIS assessment report assesses the adequacy of the EM plan for the project in incorporating the environmental protection commitments and meeting the content requirements set out in section 203 of the EP Act. Section 6 makes recommendations for conditions to be included in the draft EA, which would set out the environmental monitoring, management and reporting requirements for the mine. Section 7 makes recommendations for any further approvals required by the project.

The giving of this EIS assessment report to the proponent completes the EIS process under the EP Act.

2 Project details

The main features of the proposed Newlands Coal Extension Project are described briefly in this chapter. More detailed information on the assessment of these features is discussed in section 4.

2.1 Project location

The proposed project would be located adjacent to the existing Newlands Coal mine in the Northern Bowen Basin, within the Whitsunday Regional Council area, approximately 140 kilometres (km) west of Mackay and 30km north-west of Glenden.

The EIS outlined that the project area would comprise approximately 11,674 hectares (ha) of undulating terrain west of the Redcliffe Tableland. The area is traversed by ephemeral tributaries of Eastern Creek, Wilson Creek and Cerito Creek, in the far upper reaches of the Burdekin River catchment, and supports areas of remnant vegetation. The land on which the proposed project would be located is controlled through land lease tenure by Xstrata Coal.

Glenden is the closest township to the mine and has a residential population of approximately 1360. The town was developed in 1983 specifically to service the existing mine and is the primary local accommodation and service centre for mine employees and contractors.

2.2 The existing mine

The existing mine operations cover over 11 mining leases, encompassing an area of approximately 20,166ha (Figure 1). The existing mine currently produces approximately 10.5 million tonnes (Mt) per annum of product export coal and is made up of 4 distinct mining operations which are operated in accordance with the existing EA. These are:

1. Main deposit, which includes an open cut mine area, the Northern Underground mining operation and the coal handling and processing plant (CHPP) within existing mining leases.
2. Eastern Creek, an open cut mining operation.
3. Suttor Creek, an open cut mining operation.
4. Wollombi, an open cut mining operation.

These operations and their ongoing operation and progression within the existing mining leases continue under the existing EA and are not the subject of this EIS assessment report.

Of the already approved infrastructure associated with the existing mine a number of facilities would be utilised by the proposed extension (Figure 2). While consideration has been given to these facilities within the EIS they do not require further approval and were not the subject of the EIS and the EIS assessment report. These facilities include:

- a CHPP and rail load out facility
- a tailings and rejects storage system
- a waste landfill area
- a sewage treatment plant
- a transport network
- a potable water treatment plant
- a fuel handling infrastructure
- administration and workshops
- telecommunications infrastructure
- underground surface facilities and entry
- a Cerito Creek Dam
- the Newlands Nature Refuge.

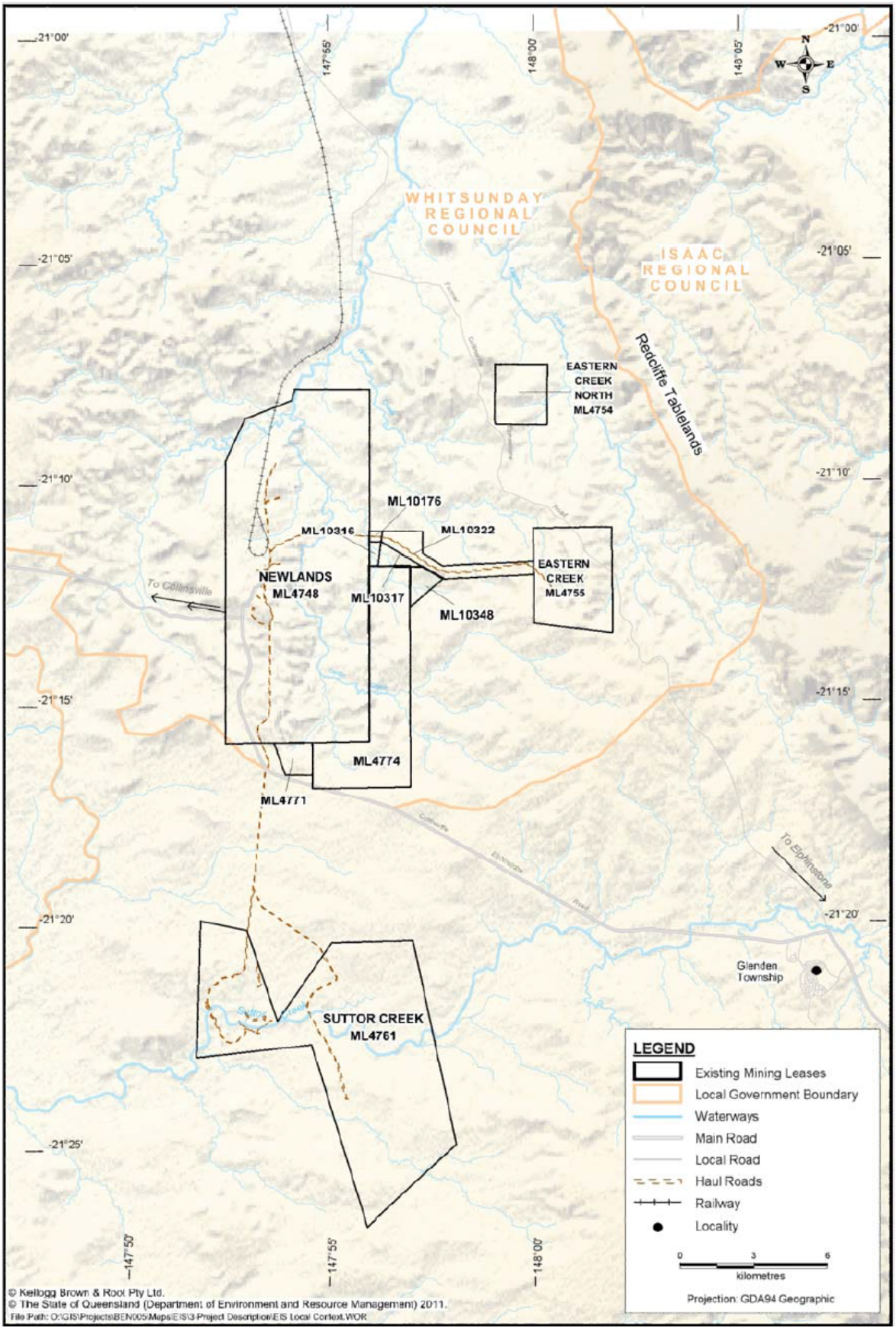

Figure 1 **Existing mining leases**
(Figure reproduced from the EIS)

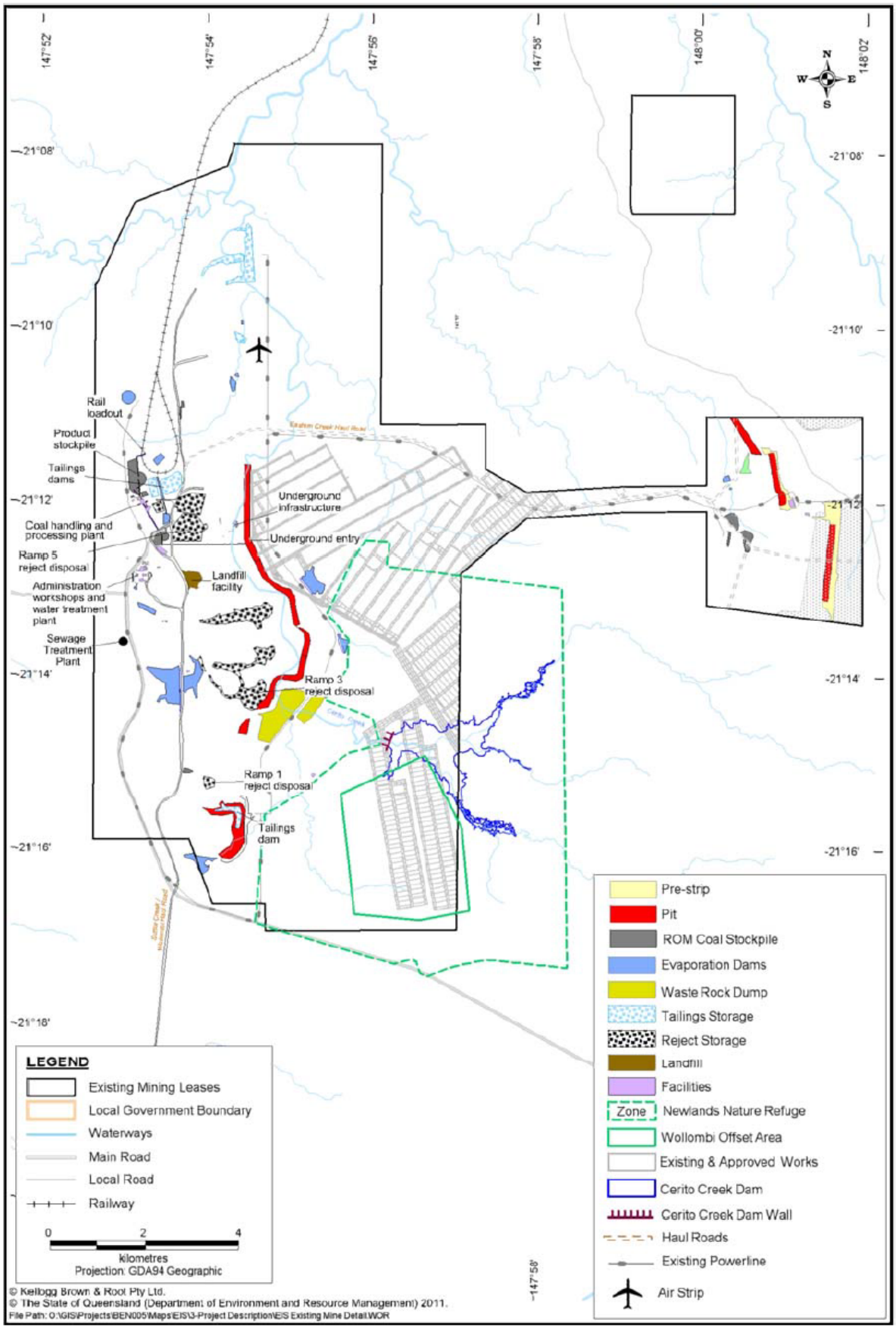

Figure 2 **Existing infrastructure to be utilised as part of the Newlands Coal Extension Project**
(Figure reproduced from the EIS)

2.3 Newlands Nature Refuge

The existing Newlands Coal Mine manages an offset area (the Woolombi Offset Area). This area was created because the mine operator was required to offset the loss of 260ha of remnant brigalow woodland protected under the EPBC Act which was to be cleared as part of the Wollombi mine development. This Wollombi Offset Area was the primary offset for the clearing of vegetation at the Wollombi mine, in accordance with the approval under the EPBC Act (EPBC 2005/2015; issued 29 September 2006). At the same time a future offset area was set aside as a bank for potential future offsets and as consequence of this future offset bank, the Newlands Nature Refuge was created.

More information is provided in section 4.19 – Biodiversity offset strategy of the EIS assessment report, including an outline of the Wollombi Offset Area in relation to the Newlands Nature Refuge, the MLAs and proposed open cut and underground operations (see also Figure 2 and **Error! Reference source not found.**).

2.4 Proposed mining operations

The Newlands Coal Extension Project would involve the development of thermal and coking coal resources in 3 new mining lease applications (MLA 10352, MLA 10361 and MLA 10362), covering 11,674ha. These MLA are located directly adjacent to the existing mining leases (Figure 3). The proposed extension would extend the life of the existing mine operations to 2038, with rehabilitation to be completed by 2042.

As the existing open cut and underground operations continue to progress, they would cross the boundary of the existing leases into the area of the proposed new mining leases (Figure 4). Mining activities within the proposed project area are the subject of this EIS, and approval for these is being sought through an amendment of the existing EA.

Mining would extend into the new lease areas following completion of, or in conjunction with, mining operations on the existing mining leases. The main components for this project would be:

- extension of the existing Eastern Creek pit onto the proposed mining leases, and the progressive development of 3 new open cut pits: Eastern Creek South; Eastern Creek East; and Eastern Creek West
- progressive and continued development of the Northern Underground mine to the east and south of the existing underground workings onto the proposed mining leases
- development of new haul roads from the new open cut pits to the existing Eastern Creek haul road
- staged establishment of new ROM coal pit stockpile areas for each of the new open cut pits
- extension of the existing 66 kilovolts (kV) reticulation system to provide power supply for the new open cut pits
- staged construction of stormwater drainage infrastructure, sediment dams and water transfer infrastructure (e.g. pipes and pumps)
- construction of hardstand areas and establishment of mobile, self-contained crib hut facilities
- progressive rehabilitation of waste rock dumps with a self-sustaining vegetation community as the proposed post-mining land form.

The principal seam mined would be the Upper Newlands seam. The total coal resources reported are estimated at 287Mt. It is estimated that a total of 92 million run of mine (ROM) tonnes of thermal and coking coal would be mined from the project area. The annual coal production would not exceed the current level of 10.5Mt per annum of product coal. Production would increase at the new mine sites over time as operations on the existing leases were scaled back.

Coal from the proposed open cut pits would be mined using the same conventional open cut methods as are currently employed at the existing mine. The initial depth of the overburden to the coal seam would vary between 10 and 80 metres (m) for open cut operations.

Coal would be mined from the proposed extended underground mine using the same longwall mining methods as are currently employed in the existing underground mine. Longwall mining would involve extracting rectangular panels of coal, typically 150–350 metres (m) wide.

Of the 11674ha, approximately 3184ha would be impacted by the project. Of these, 2284ha would be subject to disturbance as a result of open cut mining activities and their associated infrastructure. This disturbance would occur progressively as mining advanced within individual pits. Approximately 900ha would be subject to potential surface subsidence (surface cracking and/or ponding) as a result of underground mining activities.

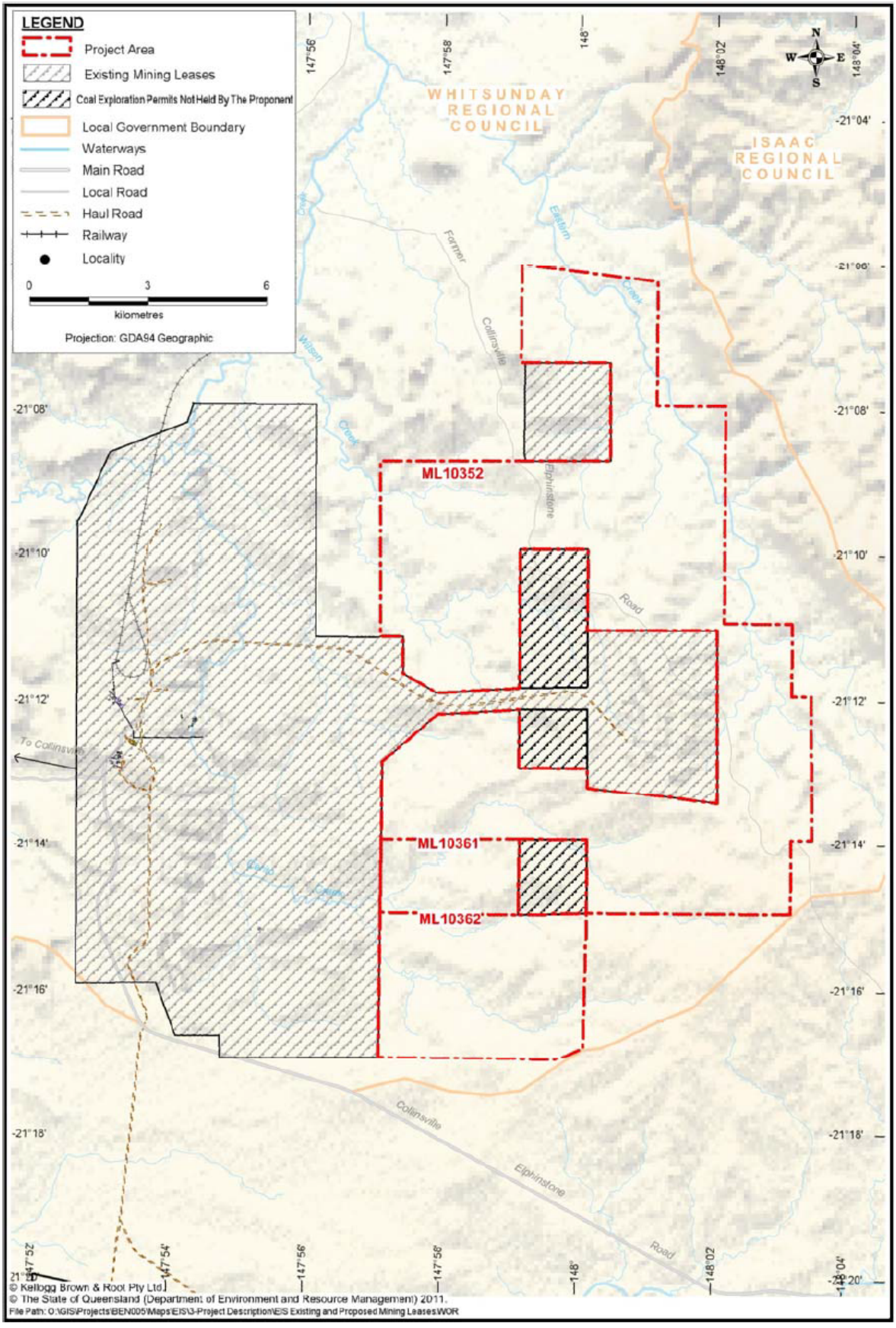

Figure 3 **Overview showing mining leases for the existing project and the proposed project**
(Figure reproduced from the EIS)

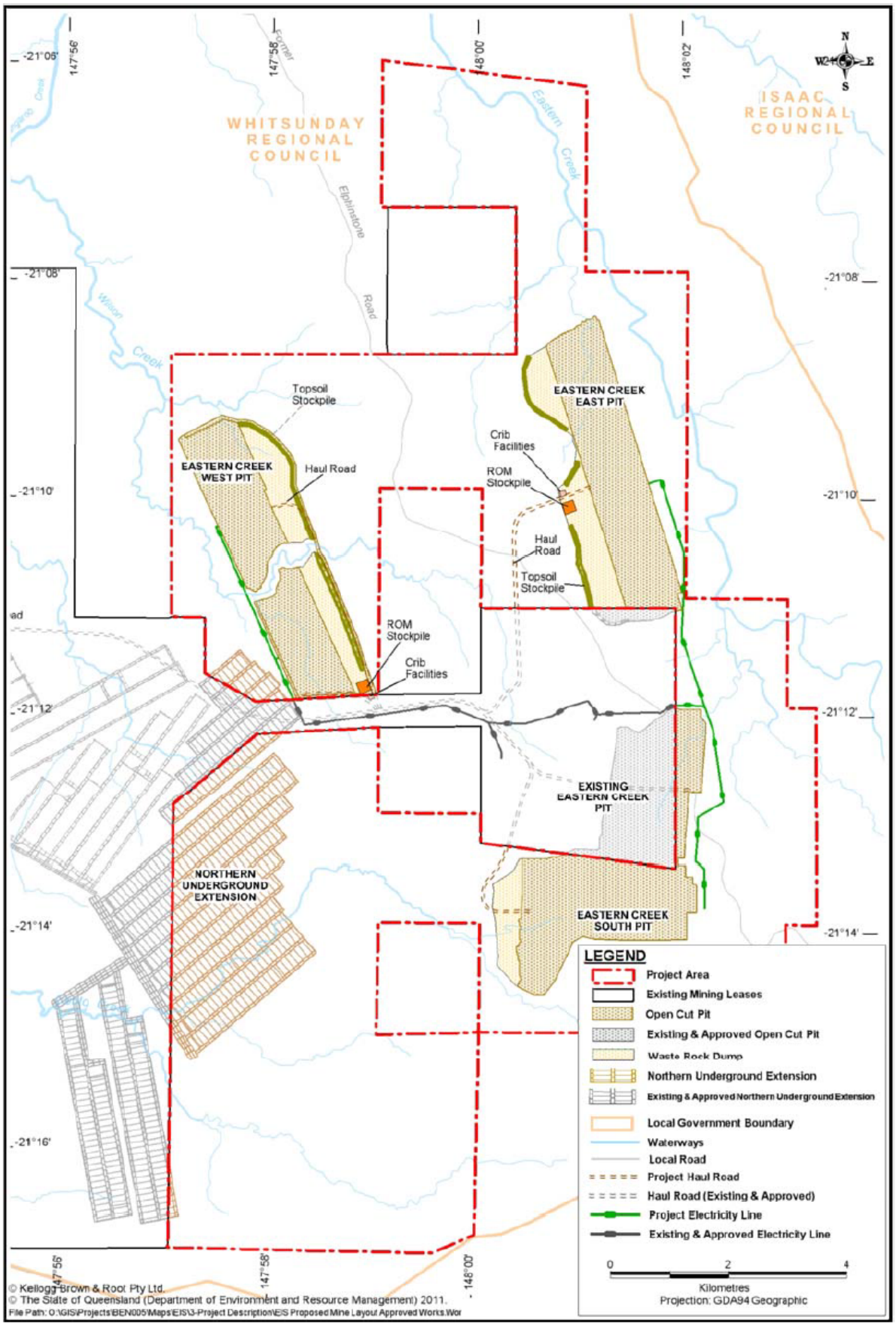

Figure 4 **Figure showing the project work assessed in the EIS**
(Figure reproduced from the EIS)

2.4.1 Construction

The proposed project would not involve a significant construction phase as it would use existing infrastructure from the current Newlands Coal mine, such as the CHPP, product handling facilities, office and workshop facilities, tailings and reject storage areas, landfill, air strip and power infrastructure. The underground mining operations would utilise existing mine entries, ROM stockpile areas and existing conveyor systems would be used for the transfer of coal to the CHPP.

The following construction activities would be required for the proposed project:

- Site preparation works, comprising fencing of mining areas and construction of access tracks.
- Clearing of vegetation from areas to be used as access tracks, pits, out-of-pit dumps and haul roads. Stripped topsoil from the construction phase would be stockpiled along the edge of waste rock dumps for later use in mine rehabilitation.
- Scraping and stockpiling of topsoil for later use in rehabilitation.
- Construction of sediment dams, stormwater drainage infrastructure and water transfer infrastructure (e.g. pipelines and pumps).
- Construction of haul roads for Eastern Creek South, Eastern Creek East and Eastern Creek West pits using waste rock material from initial box cuts for each pit.
- Construction of hardstand areas for coal stockpiling and associated support infrastructure.
- Extension of an existing 66kV overhead line from the existing Eastern Creek mine to Eastern Creek South, Eastern Creek East and Eastern Creek West pits.

Construction of supporting infrastructure for Eastern Creek South, Eastern Creek East and Eastern Creek West pits would commence approximately 12 months prior to the commencement of mining in these areas. Plant and would be sourced from the existing mine operations and there is no requirement for an additional construction workforce.

2.4.2 Operation

Open cut coal mining would commence in 2016 with the eastward progression of the existing Eastern Creek mine into the proposed mining areas. The initial box cut and pre-strip operations for the Eastern Creek South pit would commence prior to the depletion of reserves in the existing pit. This would allow the dragline and other equipment to be relocated following the completion of mining at the existing Eastern Creek mine. The box cut would be made at the western end of the Eastern Creek South pit and mining would progress in an easterly direction (Figure 5).

Coal mining would be scheduled to commence at the Eastern Creek East and Eastern Creek West pits around 2021 (Figure 5). Mining at each pit would be undertaken by a single dragline alternating with a truck and shovel operation.

With the exception of final voids, land disturbed by open cut mining would be progressively rehabilitated over the life of the project. Rehabilitated mine areas (waste rock dumps and final voids) would be unsuitable for grazing or agricultural purposes. Infrastructure areas (haul roads and powerlines) would be rehabilitated to their respective pre-mining land classes. Cattle grazing would continue in areas not directly required for mining.

The key impact from underground mining on land would be subsidence. Subsidence occurs as the strata overlying the coal seam collapses to fill the void generated by extracting the coal seam. This collapsing of the strata would propagate to the surface in the form of a depression (referred to as subsidence), resulting in surface cracking and/or ponding. The maximum predicted depth of these surface depressions is 2.6m. Surface cracking could also occur along panel edges, where the tensile strain between the original ground surface and the subsided area would be greatest.

Based on the EIS assessment and the record of experience at the existing mine, the effects of subsidence in the proposed project area would be relatively minor. Rehabilitation of subsided areas would be limited to those areas identified as presenting an unacceptable erosion or safety hazard, based on post-subsidence visual inspections. Remedial works required following the visual inspections would be targeted to minimise disturbance to vegetation and fauna habitat.

2.4.3 Workforce

The existing mine employs 1579 personnel. Of these, around 70% are employed directly by the mine proponent. A number of local and national companies provide the remainder of the personnel through a variety of contracting and sub-contracting agreements. A significant proportion of Xstrata Coal's existing workforce (approximately 80%) is accommodated in Glenden and the region surrounding the mine.

Construction and operation of the proposed project would be carried out by relocating the existing workforce from areas of the current operation to the new mining areas. A reduction in workforce numbers would occur at varying stages throughout the project life as components of the proposed project and the existing mine were completed. The first reduction would occur in 2024, once the underground mine development was complete. Further reductions would follow in 2026 at the completion of the underground mining operation and from 2034 onwards as the open cut pits were progressively decommissioned.

2.4.4 Transport

The rail loop servicing the existing mine would be utilised for the proposed project to transfer coal directly to the Abbot Point Bulk Coal Export terminal and the ship loading facility. No increase in the number of train movements to Abbot Point is proposed.

Road access to the project area would be through the existing mine from the Suttor Developmental Road via Collinsville–Elphinstone Road and Glenden. All plant and equipment required for the construction of support infrastructure would be sourced from the existing mine. No increase in traffic or road impact during the construction phase of the proposed project on either the Suttor Developmental Road or the Collinsville–Elphinstone Road is proposed.

Closure of the former Collinsville–Elphinstone Road (not the Collinsville–Elphinstone Road described above), which runs through the proposed project area, would occur as part of the existing mine's ongoing operations. Provisions would be made for those properties which would be affected.

2.4.5 Energy

The proposed project would involve the extension of thane existing 66kV overhead power line by approximately 10.5km. The extended power line would supply electricity for the operation of electric shovels and draglines at the new open cut pits. Average electricity consumption for the existing mine, including the underground operations would be 160–200 gigawatt (GW) hours per year and would not change substantially as a result of the proposed project.

2.4.6 Water supply and storage

Water inputs to the existing mine are sourced from:

- runoff from mine affected catchments
- groundwater inflow to pits and dewatering of the underground workings (4.4 million litres (ML) per day)
- harvesting overland flow from local undisturbed catchments (0.8ML per day)
- imported water from the Bowen River (the current allocation for the existing mine is 6.2ML per day; however, use is typically 2-3ML per day).

The EIS outlined that the water demand within the project area would be less than that for the existing operation because of the reduction in dust suppression requirements, which would be generally be met by water captured within the new open cut pits. In the event of prolonged drought, the proposed project would draw on water supplies from the existing mine, which could include Bowen River water allocations. However, in wet weather and average rainfall periods the project would be self-sufficient.

No additional demand for potable water would be generated over and above that already generated by the existing mine. No water storage or treatment of water for use by the site workforce is proposed.

2.4.7 Sewerage

Existing treatment facilities, located at the Eastern Creek mine, would continue to be used during the initial phases of the extension to the surface operations. There would be no change to these facilities as a result of the Project. Mobile crib huts would be located at the Eastern Creek South, Eastern Creek East and Eastern Creek West pits. Sewage from these facilities would be managed through the use of holding tanks and regular removal from the crib huts to the central sewerage treatment plant.

2.4.8 Accommodation and other infrastructure

No new or modified camps, townships, residential developments, technical workshops, or laboratories were proposed as part of the project.

2.4.9 Decommissioning

Decommissioning and final rehabilitation of the existing mine and the proposed project area would occur on a staged basis over several years. Final rehabilitation and decommissioning would be expected to take approximately 5 years after the cessation of mining operations.

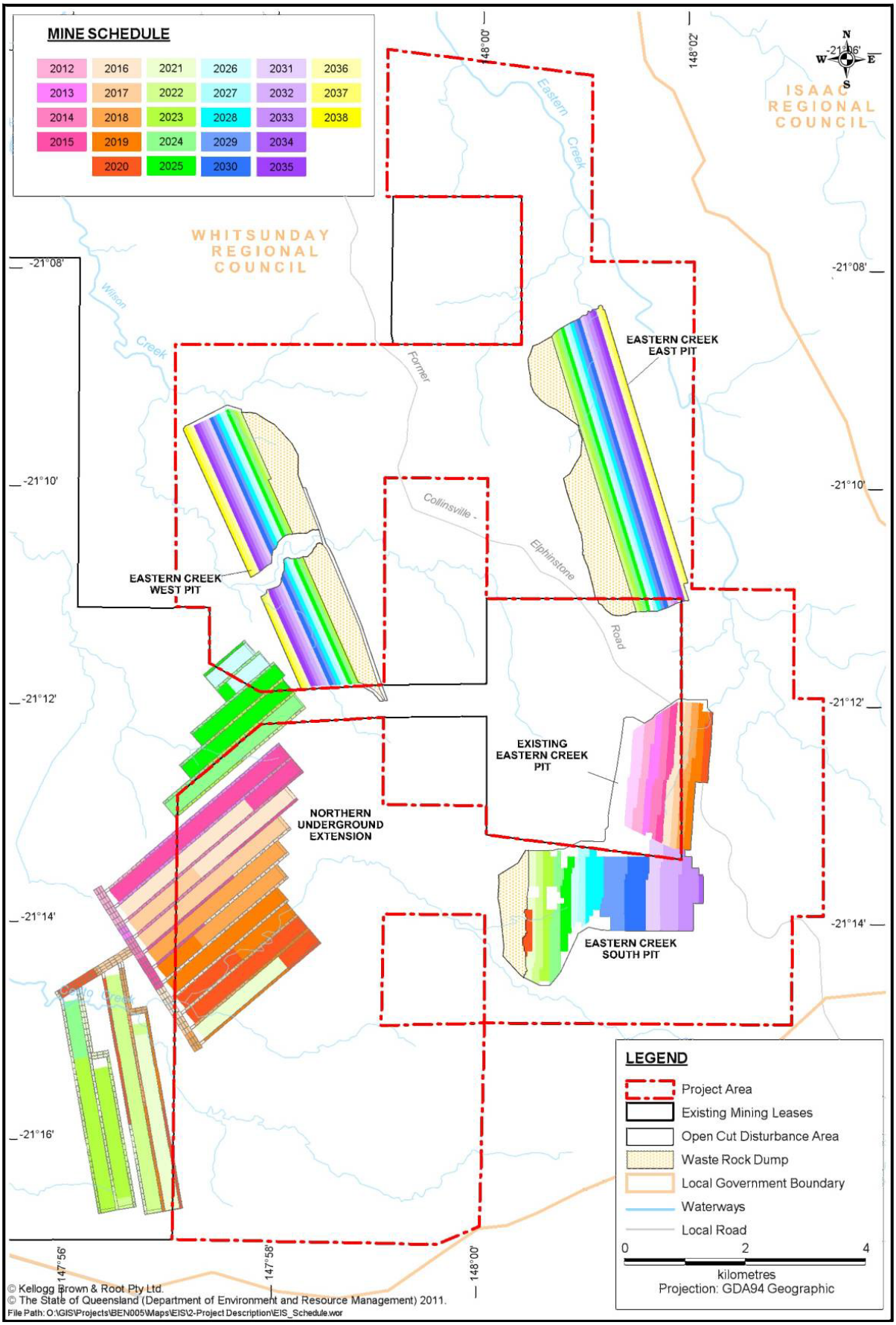

Figure 5 **Proposed mine schedule**
(Figure reproduced from the EIS)

3 The EIS process

3.1 Timeline of the EIS process

On 25 May 2010, an application was made by the proponent under section 238 of the EP Act for an amendment to the existing EA for the Newlands Coal Mine (the existing mine). Under section 246 of the EP Act it was determined that assessment of the Newlands Coal Extension Project would be by an EIS.

On 23 August 2011, the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) determined that the proposed project was a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions are sections 18 and 18A (listed threatened species and communities) and 20 and 20A (listed migratory species). The EP Act's EIS process has been accredited under An Agreement between the Commonwealth and the State of Queensland under Section 45 of the Environment Protection and Biodiversity Conservation Act 1999 Relating to Environmental Assessment (the bilateral agreement) for the purpose of the Commonwealth's assessment of the project under Part 8 of the EPBC Act.

Xstrata Coal submitted draft TOR for the EIS on 26 August 2011. The then Department of Environment and Resource Management (DERM) issued a notice of publication of the draft TOR to Xstrata Coal on 16 September 2011. DERM then placed a public notice (the TOR notice) announcing the start of the comment period for the draft TOR on its website on 19 September 2011, in *The Courier Mail* and *The Daily Mercury* (Mackay) on 17 September 2011, and *The Central Queensland News* and *The Miners Midweek* on 21 September 2011. The comment period for the draft TOR ran from Monday, 19 September 2011, till close of business on Friday, 28 October 2011. Xstrata Coal issued copies of the TOR notice to affected and interested persons.

The former DERM received comments on the draft TOR from 8 stakeholders within the public comment period. One comment was also received subsequent to the public submission period, which the chief executive accepted as being properly made. These comments, together with those provided by DERM, were forwarded to Xstrata Coal on 11 November 2011. On 7 December 2011, Xstrata Coal requested an extension of 5 business days to respond to the comments. On 8 December DERM agreed to extend the period to Friday 16 December 2011. The proponent provided a response to the comments and recommended changes to the draft TOR on 16 December 2011. DERM then considered that response and all comments received on the draft TOR, prior to issuing the final TOR on 23 January 2012.

Xstrata Coal submitted the EIS on 20 July 2012. The Department of Environment and Heritage Protection (EHP) then considered whether the EIS addressed the final TOR in an acceptable form. This decision was to be made by the 17 August 2012. EHP reviewed the submitted EIS and provided comments to proponent on 6 August 2012, in order to allow Xstrata Coal to amend EIS according to the TOR requirements.

DSEWPaC reviewed the EIS for any Matters of National Significance (MNES) and provided comments on 10 August 2012 to EHP which forwarded the comments to the proponent on the same day. DSEWPaC decided that the EIS did not contain an adequate assessment of the controlling provisions under the EPBC Act. On 16 August 2012 Xstrata Coal requested an extension, to 7 September 2012, in order to respond to EHP's and DSEWPaC's review comments. On 17 August 2012, EHP decided, under Section 13(b) of the Environmental Protection Regulation 2008, to extend the period of time under Section 49(2) of the EP Act to decide whether to allow the EIS to proceed.

On 23 August 2012 DSEWPaC received the amended EIS for a second review. DSEWPaC requested 10 further business days (bd) to review the amended EIS as per clause 15.3 of the bilateral agreement. On 24 August 2012 EHP received the amended EIS for a second review. On 4 September DSEWPaC forwarded the second adequacy review of the Matters of national environmental significance (MNES) chapter of the EIS. On 6 September 2012, EHP received Xstrata Coal's response to DSEWPaC's comments. As EHP considered that the revised EIS substantially met EHP's and DSEWPaC's requirements, EHP decided on 6 September 2012 to allow the EIS to proceed under s49(5) of the EP Act. The public notification and submission period was set at 30 business days, starting on Monday 17 September 2012, ending on close of business on Monday 29 October 2012.

EHP announced the start of the submission period for the EIS on its website on Friday 14 September 2012. Xstrata Coal advertised the EIS notice on Saturday 15 September 2012 in *The Courier-Mail*, *The Australian* and *The Daily Mercury*. The EIS was available for public comment from Monday 17 September 2012, until the close of business on Monday 29 October 2012. Xstrata Coal provided copies of the public notice to all affected and interested persons.

EHP received 20 submissions on the EIS within the submission period:

- 15 submissions from state government departments
- 1 submission from a Commonwealth Government department (DSEWPaC)

- 3 submissions from other interested parties
- 1 from the public and/or residents.

These submissions, together with a submission from EHP, were forwarded to Xstrata Coal on 8 November 2012 allowing the proponent to respond to the submissions within 20 business days.

Between 4 December 2012 and 11 January 2013, the proponent requested 2 successive extensions of time in order to respond to submissions. EHP agreed to each request by the proponent for additional time to respond to submissions.

The proponent provided the department with amendments to chapters 1, 4, 9, 11–15, 20 and the environmental management plan (EM Plan) of the EIS (hereafter 'amended chapters/EM Plan') on 28 February 2013. Copies of the response to submissions were then distributed to all government submitters, including EHP.

Following the review of the amended EIS chapters, EHP received advice from 12 agencies, some with outstanding issues. Following consultation with key agencies, it was determined that the amended EIS chapters and response to submissions were adequate.

On 28 March 2013, under section 56A of the EP Act, EHP decided that the submitted EIS could proceed to the preparation of the EIS assessment report. A notice of that decision was given to the proponent on 15 April 2013.

In the preparation of this report consideration has been given to submissions and information received throughout the EIS process. This EIS assessment report will be made available to the public on the EHP's website at www.ehp.qld.gov.au.

3.2 Approvals

Approvals for this project fall under 2 broad categories:

- On lease—activities that are contained within the mining tenure and are approved under the provisions of the *Minerals Resources Act 1989*.
- Off lease—activities that are not on the mining tenure and are approved under a combination of other legislation, including the *Sustainable Planning Act 2009* (SP Act).

The following section discusses the key approvals sought for the proposed project under the state's legislation.

3.2.1 Mineral Resources Act 1989

Xstrata Coal lodged applications for mining leases relating to the proposed Newlands Coal Extension Project with DEEDI on 17 May 2010 (MLA 10352) and on 8 April 2011 (MLA 10361 and MLA 10362).

3.2.2 Environmental Protection Act 1994

An amendment to the existing environmental authority held by Xstrata Coal and the NCA Joint Venture is required before the mining activities proposed commence.

The EA would need to cover the following activities that are directly associated with, or facilitate or support, the mining activities and which would (were they not conducted on a mining tenement) otherwise require approval under the EP Act as ERAs:

- ERA 8—Chemical storage
- ERA 29—Petroleum products or oil storage.

3.2.3 Water Act 2000

The *Water Act 2000* (Water Act) and Water Regulation 2002 (Water Regulation) are the state's legislative instruments for managing water and other resources, establishing a regulatory framework for providing water and related services and establishing water authorities.

Under section 79 of the Water Resource (Burdekin Basin) Plan, the taking of overland flow water is permitted to satisfy the requirements of an EA issued under the EP Act. The taking of overland flow water must not be more than that necessary to satisfy the requirements of the EA. The amended EA needed for the project would need to include provisions for the taking of overland flow.

No additional surface water allocations are being sought for the project.

The destruction of vegetation, excavation and placement of fill in a watercourse in the project area would normally require a permit under s266 of the Water Act, but this will be regulated through the EA.

The project proposes water course diversion of a small tributary of Eastern Creek a tributary of Wilson Creek that would be needed for open cut mining of the Eastern Creek East pit would be required. According to the EIS, DNRM has determined that both tributaries are watercourses under the Water Act. Approval would be required under the Water Act for these diversions.

Watercourses would be disturbed and diverted by the proposed mining operation. DNRM recommends that the proponent requests a watercourse determination by an authorised officer to determine whether an approval is needed under the Water Act.

3.2.4 Other approvals

Approvals are also required for the relocation of a section of the stock route on Colinta Holding under the *Land Protection (Pest and Stock Route Management) Act 2002*.

As the project will impact on an area of potential strategic cropping as identified in the trigger maps, the proponent will need to meet the requirements of the *Strategic Cropping Land Act 2011* before an EA can be issued.

Permits for the transport of oversize loads would be required under the *Transport Operations (Road Use Management) Act 1995* administered by the Department of Transport and Main Roads (TMR).

3.3 Consultation program

3.3.1 Public consultation

In addition to the statutory requirements for advertising the TOR and EIS notices and the mailing of the notices to interested and affected parties, the proponent undertook community consultation as part of the EIS process. This included consultation with affected and interested parties as defined by the EP Act, neighbouring landholders, local, Queensland and Australian government agencies, and Indigenous and community groups.

Xstrata Coal's community consultation was divided into 3 components:

- communication with affected and interested parties generally about the proposed project and the EIS process
- specific public consultation on the draft TOR aimed at identifying stakeholder issues in relation to the proposed project and ensuring that these issues were addressed through the EIS process
- social baseline study aimed at collecting data regarding social values in the communities potentially affected by the Project to provide the basis for the social impact assessment.

Several tools and activities were carried out for the 3 components of the community consultation, namely:

- Project email address (newlandscoalextension@xstratacoal.com.au): A generic email addressed was promoted on all communications material so stakeholders could contact the project team to provide feedback or make enquiries. The project team responded to all emails within 1 week. Two emails were received during the preparation of the EIS.
- Toll-free project hotline: A hotline was promoted on all communications material in order for the public to provide feedback or make enquiries. The project team responded to phone calls within 2 business days. Two phone calls were received during the preparation of the EIS.
- Project web page – information about the project was posted on Xstrata Coal's website www.xstratacoal.com/EN/Operations/Pages/NewlandsCoal.aspx.
- Project fact sheet: A fact sheet showing a project map, information about the project, the process for providing comment and contact details was distributed to affected and interested parties attached to a letter of introduction (as a letterbox drop), and made available on the project web page as a downloadable PDF.
- Letter of introduction (30 May 2011; 29 September 2011): Several letters were sent to interested and affected parties during the draft TOR and EIS process. It included contact details for further information, and the project fact sheet.
- Face-to-face meetings (17 March 2011; 11, 14 and 18 October 2011): Meetings were held with tenants within the lease area (affected parties) and the proponent's project team to discuss access requirements to undertake investigation works.
- Briefing of the Newlands Coal Stakeholder Engagement Group (31 March 2011): A briefing was set up to respond to social issues related to the existing mine, this group was briefed on the commencement of the EIS process.

- Social baseline study: A social baseline study was commissioned which incorporated a letter requesting community survey participation (28 November 2011), community survey, project newsletter, drop-in sessions in Glenden (7 December 2011) and stakeholder interviews (5–9 December 2011).

3.3.2 Advisory bodies

The administering authority invited the following organisations to assist in the assessment of the TOR and the EIS by participating as members of the advisory body for the project. Due to the change in the structure of government, ('machinery of government'), the names of several Queensland departments changed on 3 April 2012 (refer to Attachment A).

- Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)
- Department of Community Safety
- Department of Agriculture, Fisheries and Forestry
- Department of Housing and Public Works
- Department of Local Government
- Department of Transport and Main Roads
- Queensland Health
- Queensland Police Service
- Office of the Coordinator General
- Department of Natural Resources and Mines
- Department of Science, Information Technology, Innovation and the Arts
- Department of Energy and Water Supply
- Department of National Parks, Recreation, Sport and Racing
- Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
- Department of Tourism, Major Events, Small Business and the Commonwealth Games
- Skills Queensland
- Former Department of Employment, Economic Development and Innovation; now Department of State Development, Infrastructure and Planning
- Former Department of Education and Training; now Department of Education, Training and Employment
- Former Queensland Treasury; now Queensland Treasury and Trade
- Former Department of Communities
- Isaac Regional Council
- Whitsunday Regional Council
- SunWater Limited
- Road Accident Action Group Inc
- Fitzroy Basin Association
- Construction, Forestry, Mining and Energy Union, Mining and Energy Division, Qld District Branch.

An advisory body briefing for the project was held in Brisbane on 19 October 2012.

A field trip to inspect the project site was held on 25 and 26 October 2012 attended by representatives of the proponent, DSEWPaC and EHP.

3.3.3 Public notification

In accordance with the statutory requirements, public notifications of the of the draft TOR and EIS and public comment periods were made through notices in *The Courier-Mail, The Australian, The Central Queensland News, The Mackay Daily Mercury, The Miners Midweek* and on DERM/EHP's and Xstrata Coal's websites.

The draft TOR and EIS were placed on public display at the following locations during their respective public comment and submission periods:

- DERM's website: www.derm.qld.gov.au
- EHP's website: www.eph.qld.gov.au
- DERM/EHP Referral Centre, 400 George Street, Brisbane
- DERM/EHP Referral Centre, 22-30 Wood Street, Mackay
- DERM Referral Centre, 99 Hospital Street, Emerald
- Xstrata Coal Queensland, 123 Eagle Street, Brisbane
- Xstrata Coal's website: www.xstratacoalnewlandsproject.com.au
- Glenden Library, Isaac Regional Council, Glenden
- Department of Sustainability, Environment, Water, Population and Communities, Central Library, Parkes (ACT).

3.4 Matters considered in the EIS assessment report

As required under section 58 of the EP Act the EIS assessment report considered the following:

- the final TOR for the EIS
- the submitted EIS
- all properly made submissions and any other submissions accepted by the chief executive
- the standard criteria
- another matter prescribed under a regulation.

These matters are addressed in the following subsections.

3.4.1 The final TOR

The final TOR document issued on 23 January 2012 was considered when preparing this EIS assessment report. While the TOR were written to include all the major issues associated with the project that were required to be addressed in the EIS, they were not exhaustive, nor were they to be interpreted as excluding other matters from consideration.

Where matters outside of those listed in the final TOR were addressed in the EIS, those matters have been considered when preparing this EIS assessment report.

3.4.2 The submitted EIS

The submitted EIS was considered when preparing this report. The submitted EIS comprises:

- Newlands Coal Extension Project EIS that was made available for public submissions on 17 September 2012 until 29 October 2012.
- Newlands Coal Extension Project Environmental Impact Statement - Response to Submissions and Amended EIS Chapters" received by EHP on 28 February 2013. Amendments were made to chapters 1, 4, 9, 11–15, 20 and the EM Plan of the EIS. Additional information on subsidence monitoring of the existing operations was also provided by the proponent.

The EIS assessment report refers to the term 'EIS' as the combined document consisting of the submitted EIS (September 2012) and the amended chapters and EM Plan submitted in February 2012 and any other documentation provided by the proponent (e.g. specialist reports).

3.4.3 Properly made submissions

EHP accepted 20 submissions on the EIS. Within the submission period the department received submissions from:

- Department of Tourism, Major Events, Small Business and the Commonwealth Games (DTESB)
- Asia Pacific Strategy (Qld)
- Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA)

- Department of State Development, Infrastructure and Planning (DSDIP)
- Department of Housing and Public Works (DHPW)
- Department of Agriculture, Fisheries and Forestry (DAFF)
- Skills Queensland
- Department of Transport and Main Roads (TMR)
- Department of Community Safety (DCS)
- Queensland Rail National (QR)[1]
- Mackay Conservation Group
- Whitsunday Regional Council (WRC)
- Queensland Police Service (QPS)
- Department of Education, Training and Employment (DETE)
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)
- SunWater Limited
- Department of Natural Resources and Mines (DNRM)
- National Parks, Recreation, Sport and Racing (DNRSR)
- Department of Science, Information Technology, Innovation and the Arts (DSITIA)
- Hancock Coal Pty Ltd.

EHP also made its own submission on the EIS.

In December 2012 the proponent also received advice on the project from the Independent Expert Scientific Committee (IESC).

All entities who made a submission on the EIS were notified and given access to the proponent's response to the submission and amendments made to the EIS. All government agencies that made submissions with outstanding issues arising from their review of the EIS were given the opportunity to review and provide comments on any amendments made to the EIS. This included comments on conditions that should apply to the project and on the adequacy or otherwise of the amended EIS chapters in addressing concerns raised in submissions.

3.4.4 The standard criteria

Section 58 of the EP Act requires that, among other matters, the standard criteria listed in schedule 3 of the EP Act must be considered when preparing the EIS assessment report.

The standard criteria under the EP Act are:

a) the principles of ecologically sustainable development as set out in the National Strategy for Ecologically Sustainable Development

b) any applicable environmental protection policy

c) any applicable Commonwealth, state or local government plans, standards, agreements or requirements

d) any applicable environmental impact study, assessment or report

e) the character, resilience and values of the receiving environment

f) all submissions made by the applicant and submitters

g) the best practice environmental management for activities under any relevant instrument, or proposed

[1] In December 2012 Queensland Rail National (QR National) became Aurizon

instrument, as follows—

i an environmental authority

ii a transitional environmental program

iii an environmental protection order

iv a disposal permit

v a development approval; and

h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument

i) the public interest

j) any applicable site management plan

k) any relevant integrated environmental management system or proposed integrated environmental management system; and

l) any other matter prescribed under a regulation.

m) The department has considered the standard criteria when assessing the project.

3.4.5 Prescribed matters

Section 58 of the EP Act requires that the following prescribed matters, under the Environmental Protection Regulation 2008, are considered when making an environmental management decision for this project:

- Section 51, matters to be considered for environmental management decisions
- Section 52, conditions to be considered for environmental management decisions
- Section 53, matters to be considered for decisions imposing monitoring conditions
- Section 55, release of water or waste to land
- Section 56, release of water, other than stormwater, to surface water
- Section 57, release of stormwater
- Section 60, activity involving storing or moving bulk material
- Section 62, activity involving acid-producing rock
- Section 64, activity involving indirect release of contaminants to groundwater.

3.4.6 Notifiable activities

Activities that have been determined as having the potential to cause land contamination, otherwise known as ‘notifiable activities’, are listed in Schedule 3 of the EP Act. Under section 371 of the EP Act, landowners have a duty to notify EHP where notifiable activities are being carried out on-site. Where a notifiable activity is being conducted, the property is listed on the Queensland Environment Management Register.

The EIS listed the following relevant notifiable activities under schedule 3 of the EP Act that would apply to the project:

- Notifiable activity 7—Chemical storage (other than petroleum products or oil under item 29) – Storing more than 10 t of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
- Notifiable activity 29—Petroleum products or oil storage – Storing petroleum products or oil

  a. in underground tanks with more than 200 L capacity

  b. in above ground tanks with:

  i for petroleum products or oil in class 3 in packaging groups 1 and 2 of the dangerous goods code–more than 2500 L capacity

  ii in packaging group 3 of the dangerous goods code, more than 5000 L capacity

  iii for petroleum products that are combustible liquids in Class C1 or C2 of Australian Standard AS

1940 'The storage and handling of flammable liquids', more than 25,000 L capacity.

3.5 Environment Protection and Biodiversity Conservation Act 1999

On 23 August 2011, the Commonwealth Department of Sustainability, Environment, Water, Population and Communities determined that the proposed project was a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions are sections 18 and 18A (listed threatened species and communities) and 20 and 20A (listed migratory species). The EP Act's EIS process has been accredited under An Agreement between the Commonwealth and the state of Queensland under Section 45 of the *Environment Protection and Biodiversity Conservation Act 1999* Relating to Environmental Assessment (the bilateral agreement) for the purpose of the Commonwealth's assessment of the project under Part 8 of the EPBC Act.

3.5.1 Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development

On 27 November 2012, the Commonwealth Environment and Water Minister announced membership of a new independent expert scientific committee (IESC) to provide advice on coal seam gas and large coal mining development. This committee was established under amendments to the EPBC Act and provides advice on the water-related impacts associated with coal seam gas and large coal mining activities.

On 30 November 2012 DSEWPaC referred the Newlands Coal Extension Project to the IESC. On the 5 December 2012 the IESC accepted the request and provided, on the 20 December 2012, advice on the project's proposed water balance model, its site water management plan and flood modelling report, and the sufficiency of comments on mitigation measures of proposed protection measures for riparian areas that may impact on the listed threatened species under the EPBC Act.

The IESC advised the following additional points:

- Further information relating to cumulative impacts to both surface water and ground water is recommended.
- Provision of a regional water balance as part of the Water Balance Model was necessary to understand fully the relationship of all water on site.
- Concern exists about the potential structural impact the long wall panels may have to the dam structure, resulting from subsidence.

The proponent addressed each of the issues raised by the IESC in their responses to submissions provided to EHP on 28 February 2013.

4 Adequacy of the EIS in addressing the final TOR

This section of the EIS assessment report details how the EIS addressed the TOR, the specific comments provided during the public consultation process on the EIS and departmental comments arising from amended EIS chapters. Table 1 lists the main subject headings of the TOR, notes whether the submitted EIS adequately addressed the matters described in the final TOR, highlights any remaining issues and outlines commitments made by the proponent.

Table 1 Summary of the adequacy of the submitted EIS in addressing the final TOR

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Introduction	Overview of the project, its objectives and scope. Outline of the necessary approvals and their assessment processes.	Adequate.
Project need and alternatives	Project justification and discussion of alternatives.	Adequate.

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Description of the project	Location of the project in the regional and local contexts. Description of the construction phase of the project. Description of the operational phase of the project. Product handling. Energy and fuel. Telecommunications. Infrastructure requirements. Waste management. Rehabilitation and decommissioning.	Adequate.
Climate	Climatic conditions at the site. Extreme weather events.	Adequate.
Land	Land tenure. Land use. Land use and suitability. Topography and geomorphology. Coal resources. Soils. GQAL. Strategic cropping land. Existing infrastructure. Contaminated land. Subsidence. Erosion and stability. Visual amenity and lightening.	Adequate. **Proponent's commitments:** • Subsidence management plan. • Stabilisation of disturbed areas. • Progressive revegetation and erosion and sediment control measures.
Transport	Transport impacts on: • road traffic • rail traffic • port and shipping • air traffic • stock routes • conveyors • environmental values • road safety management • fatigue management.	**Outstanding issues:** • Enforcement and compliance for road safety management. • Fatigue management. • Implementation of a road-use management plan. **Proponent's commitments:** • Updating the current fatigue management plan.

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Waste	Description of environmental values and potential impacts and mitigation measures regarding: • waste streams • waste management • potential hazards • decommissioning.	**Outstanding issues:** • Further information needed on waste management. **Proponent's commitments:** • Ongoing monitoring of surface runoff and leachate from material storage areas. • Ongoing water quality monitoring program for surface water and groundwater. • Revegetation and rehabilitation of waste rock and rejects. • Updating existing waste management plan. • Expansion of the existing waste management report.
Water	Description of environmental values and potential impacts and mitigation measures regarding: • surface water • groundwater • water supply and storage • mine water management.	**Outstanding issues:** • Several issues regarding surface and mine water management and monitoring. • Updating Groundwater management plan. **Proponent's commitments:** • Water monitoring plan. • Monitoring and evaluation program for creek diversions. • Rehabilitation of proposed diversions. • Water segregation. • Erosion and sediment control plan. • Progressive assessment of final voids.
Air quality	Description of environmental values and potential impacts and mitigation measures regarding: • dust • greenhouse gases • other air emissions.	Adequate. **Proponent's commitments:** • Dust management plan. • Ambient air monitoring program. • Mitigation measures for greenhouse gas emissions. • Annual greenhouse gas emissions review.
Noise and vibration	Description of environmental values and potential impacts and mitigation measures regarding: • noise at sensitive receptors. • noise impacts on wildlife. • vibration due to blasting.	Adequate. **Proponent's commitments:** • No night blasting after 8 pm and before 6 am. • Blast monitoring program. • Noise/vibration/airblast overpressure complaint mechanisms.

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Cultural heritage	Description of environmental values and potential impacts and mitigation measures regarding: • Indigenous cultural heritage. • Non-indigenous cultural heritage.	Adequate. **Proponent's commitments:** • Cultural Heritage Management Plan for Indigenous cultural heritage. • 'Stop' and 'report' process for non-indigenous cultural heritage.
Social values	Description of environmental values and potential impacts and mitigation measures regarding: • existing social values • impacts on local community, housing and services • contribution to local economy.	Adequate. **Proponent's commitments:** • Implementation of a social impact management plan. • Support of medical services and allied health services. • Support of support community infrastructure and services. • Provide employment and training. • Preparation of a conceptual mine closure plan.
Health and safety	Description of environmental values and potential impacts and mitigation measures regarding: • health risks • air emissions, noise and vibration • drinking water supply • hazardous substances and safety • wildlife hazards and heat • fatigue management.	**Outstanding issues:** • Fatigue management. **Proponent's commitments:** • Legislative requirements. • Integrated risk management plan. • Health and safety management plan, including a risk register. • Regular audits. • Emergency management plan, including emergency response procedures. • Development of a integrated risk management plan. • Conducting induction programs. • First aid and emergency response techniques training.
Economy	Assessment from national, state, regional and local perspectives of the direct and indirect economic benefits and impacts of the project.	Adequate. **Proponent's commitments:** • Sustainable development protocol.
Hazard and risk	Description of environmental values and potential impacts and mitigation measures regarding: • transportation, storage and use of hazardous substances • emergency response • risk analysis.	Adequate. **Proponent's commitments:** • Same commitments as outline under Health and safety.

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Ecology	Description of environmental values and potential impacts and mitigation measures regarding: • terrestrial and aquatic ecology • impact assessment • mitigation strategies • pest and weed management.	**Outstanding issues:** • Weed and pest management. **Proponent's commitments:** • Riparian vegetation management. • Compliance. • Environmental monitoring. • Limiting habitat loss. • Rehabilitation. • Weed and pest management. • Ponding, drainage and cracking management.
Matters of National Environmental Significance (under the EPBC Act)	Assessment of the relevant impacts of the project on the controlling provisions. MNES management plan.	**Outstanding issues:** • Inconsistencies in vegetation mapping. • Northern quoll expected to have moderate likelihood of occurrence. • MNES management plan. **Proponent's commitments:** • MNES management plan. • Limiting habitat loss. • Stockpiling. • Rehabilitation. • Weed and pest management. • Ponding, drainage and cracking management. • Management of stock densities.
Rehabilitation	Description of options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the project. Development of a rehabilitation strategy that would minimise the amount of land disturbed at any one time, and minimise the residual loss of land with ecological or productive value.	**Outstanding issues:** • Weed and pest management • Subsidence management during rehabilitation. **Proponent's commitments:** • Weed and pest management plan. • Subsidence management plan. • The rehabilitation strategies for open cut mining and subsidence. • Decommissioning strategies.

Matters included in the final TOR	Significant issues	Adequacy of EIS Outstanding issues Proponent's commitments and management plans
Offsets	Offsets proposed under State and Commonwealth legislation.	**Outstanding issues:** • Biodiversity offset strategy under EP Act outstanding. • Biodiversity offset strategy proposed by the proponent is pending on Commonwealth's offset requirements, and management plans. • Communications with DSEWPaC continue regarding a suitable offset strategy under both Acts.
Environmental management plan (EM Plan)	Setting out the framework for continuing management, mitigation and monitoring programs and provision for independent environmental auditing. Stating the proponent's environmental protection commitments in a way that allows them to be measured and audited.	Although the proponent has made some amendments to the EM Plan following the submission period, the amended EM Plan did not contain enough information to allow the administering authority to decide the application and appropriate conditions under section 203(1)(f) of the EP Act.

The following sections assess the adequacy of the submitted EIS in addressing the requirements of the final TOR. Each subsection discusses if any submissions were received on particular matters and how they were dealt within amendments made to the EIS. Where relevant, outstanding issues are also discussed, together with any environmental protection commitments made by the proponent.

4.1 Introduction

Chapter 1 of the EIS provided an overview of the project, its objectives and scope. Some minor comments were received regarding incorrect statement of legislation and other statutory documents. These comments were incorporated in the amended Chapter 1 and hence the EIS now adequately described the regulatory approvals for the project and approval processes.

4.2 Project need and alternatives

The EIS did not contain a dedicated chapter on project need and alternatives. Instead the need for the project and the social, economic and environmental benefits and costs, as well as the positive and negative impacts, mitigation measures and environmental commitments were discussed in several separate sections throughout the EIS. Chapter 3 of the EIS focused solely on project alternatives and included detailed discussions on a 'no development' alternative, alternative mining methods and alternative project design options.

In summary, the EIS stated that the existing mine currently has coal reserves that would allow the existing open cut and underground mining operations to run at full capacity until 2013. As resources in existing leases deplete, both open cut and underground mining operations would extend into the new mining leases from late 2013. In the absence of the resources in the new mining leases, mining operations at the existing mine would not be commercially viable after 2015 for the underground mine and after 2023 for open cut operations. This would result in the existing mine's closure. The EIS concluded that a mine closure would have significant impacts on the town of Glenden as it is the town's primary economic base. Glenden was constructed specifically to support the existing mine. It consists primarily of accommodation for employees of the proponent and commercial buildings used as retail outlets that provide goods and services for the daily support of the community. Closure of the mine would also result in the removal of annual contributions to the local community through employment opportunities, apprenticeship programs, support of local businesses and financial donations to local community groups and projects.

No comments were received during the public submission period on these matters and hence the EIS has addressed adequately the project's need and alternatives as outlined in the TOR.

4.3 Description of the project

Chapter 2 of the EIS provided a broad overview of the project, such as the location of the project in the regional and local contexts, description of the construction and construction phase of the project, product handling, as well as infrastructure, waste and rehabilitation and decommissioning. An overview of the project has been provided in section 2 of this EIS assessment report.

No comments were received during the public submission period on the project description and hence the EIS Chapter 2 was considered to have addressed the TOR adequately.

4.4 Climate

Chapter 5 of the EIS outlined the regional climate characteristics of the project area and surrounds, the potential impacts from climatic conditions and natural hazards on the proposed sand mining development and related infrastructure.

4.4.1 Adequacy of the EIS chapter

No comments were received during the public submission period on the project description and hence the EIS Chapter 5 addressed the TOR adequately.

A summary of the EIS findings on climate, the potential impacts and mitigation measures are summarised below.

4.4.2 Description of the climate – findings of the EIS

The EIS described the climatic conditions for the project area as sub-tropical with hot, wet, humid summers and cool, dry winters. Daily temperatures range from 22–34°C in summer and from 9–27°C in winter with the highest temperature recorded at 44°C. The region generally experiences 53 days per year when the temperature exceeds 30°C. The lowest recorded temperature was –1.1°C. The region experiences rainfall generally during from December to February with monthly rainfall ranging from 95–164 millimetres (mm). Rainfall during these months represents 70% of the annual total rainfall. Relative humidity has an annual average of 67%. Wind speed and direction recorded at a meteorological monitoring station at the existing mine show that winds predominantly blow from the east-north-east to south-east with approximately 99% of annual winds blowing <5 metre per second (m/s).

4.4.3 Extreme weather events – potential impacts and mitigation measures

The EIS identified the following extreme weather events with a potential to occur in the vicinity of the project:

4.4.3.1 Bushfire

The project area is classified as having a low to medium bushfire risk based on the existing bushfire risk mapping (Queensland Fire and Rescue Service). The EIS identified a number of localised higher risk areas to the east of the project area that are associated with the steep slopes of the Redcliffe Tableland which are classified as having a high bushfire risk. No assessment of the risk or mitigation measures was discussed in this chapter.

4.4.3.2 Earthquakes

The EIS identified 2 previous tremors that had been recorded in relatively close proximity to the project area (Geoscience Australia earthquake database). The first tremor registering 2.4 on the Richter scale occurred in January 1969 with an epicentre located approximately 25km to the north-east of the project area. In May 1992 the second tremor registering 2.2 on the Richter scale was recorded approximately 2km to the north of the project area.

The EIS concluded that there is minimal risk to the proposed project due to high magnitude earthquakes which could cause damage to mine related infrastructure.

4.4.3.3 Cyclones and flooding

The EIS identified 10 tropical cyclones that passed within 100km of the Project area between 1906 and 2011 but concluded that destructive winds associated with cyclones would pose a low risk to the project due to the distance to the coast (140km).

The EIS used the Bureau of Meteorology (BOM) flood history to assess information of key flood events in the vicinity of the project area. No records were found for the smaller waterways in the proposed project (Cerito, Wilson, Eastern and Rosella creeks). However, notable events were recorded for the Bowen River into which these smaller waterways eventually drain. These flood events were associated with cyclones. For example, widespread rainfall occurred in the region in December 2010 that lead to major flooding in the lower reaches of the Burdekin catchment. The rainfall was exceptional in terms of quantity rather than intensity with the main impact of the event being the accumulation of large runoff volumes in the working area of the existing mine.

The potential risk of flooding and heavy rainfall events to the proposed project were assessed in the surface water chapter and are summarised in this EIS assessment report in section 4.8.2 – Surface water.

4.4.3.4 Drought

The EIS used the existing long-term climate data at the Collinsville automatic weather station to identify the risk of drought for the proposed project. In total, 8 major drought periods were recorded since 1889. These were generally associated with El Nino conditions. The drought in the early part of the 2000s was particularly prolonged and severe.

The potential risk of drought to the proposed project was assessed in the surface water chapter and are summarised in this EIS assessment report in section 4.8.2 – Surface water.

4.4.3.5 Climate change adaptation

It was concluded in the EIS, that due to the relatively short life of the proposed project, impacts of climate change at the local level would be negligible. The EIS outlined adaptation strategies to mitigate against varying weather patterns and an increase in extreme weather events have been implemented as part of the design of the proposed project and included management of flood events (taking into account variable levels of rainfall and potential periods of drought), the design of diversions to cater for a 1000 year ARI event, the development of contingency measures to deal with excess water, the design of proposed water management system such that all dams can cater for a 1 in 20 annual exceedances probability wet season, and strategies to manage the impacts of prolonged drought on the mines water supply.

Furthermore, the EIS outlined that at a global level, Xstrata Coal has a comprehensive climate change strategy and a 5 year plan that is reviewed on an annual basis to drive continuous improvement across all its managed sites. The EIS stated that the proponent would adopt and implement the approaches to climate change which are contained within this strategy and plan for the life of the proposed project. Xstrata Coal would also incorporate the proposed project into the existing reporting required by the Australian Government's National Greenhouse and Energy Reporting System and the Australian Government Energy Efficiency Opportunities scheme.

4.5 Land

Chapter 6 of the EIS outlined the existing environment values of the land area that may be affected by the project. These values included the geology, coal reserves, landforms, soils, existing land uses, agricultural suitability and visual amenity of the area. The potential impacts of the proposed project on these land-based environmental values were assessed in this EIS chapter, including the objectives and practical measures for protecting or enhancing these values.

4.5.1 Assessment of the EIS chapter

4.5.1.1 Submissions on the EIS chapter

As part of the EIS assessment the following matters regarding environmental values of the land were raised in the submissions:

- DAFF:
  - Requested that the proponent would identify if any commercial forest products and quarry material as per *Forestry Act 1959* are required by the project and for the life of the project.
- DNRM:
  - Further discussions requested regarding impacts on potential strategic cropping land (SCL).
- EHP:
  - Requested information in the EIS and EM Plan on the likely impacts of subsidence including changes on watercourses/drainage lines which may have direct or indirect impacts on aquatic and terrestrial flora and fauna.

- WRC:
  - Requested further information regarding potential SCL, GQAL and landforms.
  - Requested that the EM Plan would contain a topsoil management plan and an erosion and sediment control plan.
  - Requested further information on the potential of waste rock to produce acid that could cause environmental damage.

4.5.1.2 Proponent's response to submissions

In response to DAFF's comments, the proponent advised that quarry materials are proposed to be utilised for mining activities only within the boundaries of each mining lease on which they have been obtained. This would be regulated under the *Mineral Resources Act 1989* and not considered to be an utilisation or production of quarry material under the *Forestry Act 1959*. The response further outlined that where there would there be a requirement to move such materials between mining leases, the volumes and nature of the material would be defined and a sales permit for state owned material, where relevant, would be obtained as required by the *Forestry Act 1959*.

Xstrata Coal has acknowledged the need to address SCL requirements for this project and will contact the SCL group in DNRM Mackay to discuss these requirements. However, the proponent also stated that the proposed project would not disturb any mapped potential SCL.

The proponent responded to EHP's comment regarding physical impacts of subsidence on watercourses that the EIS Chapter 6 (Land) provided a detailed assessment of these potential impacts and concluded that subsidence resulting from underground mining activities is therefore not expected to significantly impact on riparian or aquatic ecosystems within watercourses or drainage lines above underground mining areas.

In regards to the other comments made by WRC, the proponent responded that no land within the proposed project area is considered to have high quality soils or terrain suitable for permanent cropping. The proponent outlined that a topsoil management plan will be developed prior to project construction in line with current guidelines for the site. The EIS presented recommended topsoil stripping depths for all soil types in the EIS Chapter 6 (Land) Furthermore, the proponent outlined that the existing mine's erosion and sediment control plan will be updated to incorporate the project area and the need for this will be included in the EM Plan. Geochemical analysis of the waste rock and coal reject material were carried out before the EIS was submitted and found that the bulk of material is classified as non acid forming. The proponent further outlined that mitigating measures for the waste rock and tailings is the subject of the site tailings and rejects management strategy and would be integrated into the existing site management plans.

4.5.1.3 Adequacy of the EIS chapter

No changes have been made by the proponent to the submitted EIS Chapter 6 – Land in response to the submissions. EHP did not receive any further comments from the reviewing agencies in regards to these issues and it is concluded that the responses adequately addressed the comments.

A summary of the amended EIS describing the existing environment values of the land area that may be affected by the project is shown below.

4.5.2 Description of land values – findings of the EIS

The EIS identified the following land values and potential impacts for the proposed project area:

- Effectiveness of the proposed project in achieving the optimum utilisation of the mineral resources of the project area.
- Potential for the proposed project to affect existing and future land uses including grazing and cropping activities.
- Predictions of potential subsidence and the effect it will have on existing and future environmental values.
- Assessment of the possible contamination of land resulting from the proposed project.
- Assessment of likely erosion and stability effects for all disturbed areas associated with the proposed project.
- Impacts on visual amenity and lighting.

Potential impacts on key land values as well as mitigation measures to minimise these impacts are discussed below.

4.5.2.1 Resource utilisation and sterilisation

The EIS outlined that the project area would contain a total in-situ coal resource of 287mt, including areas where the seam thins and would not be economical under currently envisaged economic conditions. Thin coal thins and areas of faulting from proposed underground mining areas were excluded from the planned open-cut and underground mine operations. However, the EIS indicated that while these resources have been determined to be uneconomic at this time, given current and foreseeable market conditions and mining technologies they have been protected from sterilisation.

In terms of coal seam gas (CSG) the EIS outlined that the CSG content of coals seams generally increase with depth (>100m depth). Given that the maximum seam depths of the Eastern Creek East and West pits are approximately 60m, the EIS assessment found that no useful coal seam gas would be intersected during mining operations in these areas. However, while CSG would be intersected within the Eastern Creek South pit (mining of coals in up to 135m depth), the assessment found that the volume of gas in this area would not be commercially viable.

For safety reasons, gas drainage of all areas would be undertaken, where the in-situ gas content is above $3m^3/t$ of ROM coal. The EIS concluded that the quantity of this gas would be relatively small and because there are no utilisation or distribution facilities in the area the gas would be flared or released via ventilation fan.

4.5.2.2 Land disturbance

The EIS identified land disturbance and landform modification throughout the construction and operational phases of the proposed project. Approximately 2284ha of land would be disturbed as a result of open cut mining activities and supporting infrastructure. Another 900ha would be subject to subsidence and/or cracking as a result of proposed underground mining activities. At the end of the mine's life, 4 final voids with areas of approximately 99ha, 78ha, 38ha and 29ha would remain permanently.

Four permanent creek diversions would be necessary as part of this proposed project (Figure 6). These diversions are discussed in more detail in section 4.8 – Water. The EIS outlined that all tributaries would be maintained as permanent diversions. Each diversion would require approval from DNRM prior to their establishment. All diversions would be designed in accordance with approval conditions that would be provided by DNRM which would inform the design of each diversion in regards to the battering of banks, establishment of riparian vegetation and the creation of pool and riffle habitats.

4.5.2.3 Land use, land suitability and loss of good quality agricultural land

The EIS identified the project area suitable for grazing on native and improved pastures with some areas also suitable for intermittent cultivation (primarily for improved pasture establishment). However, the EIS found that no areas are suitable for permanent cropping. There is no strategic cropping land (SCL), as designated in existing potential SCL trigger maps within the area to be disturbed by the proposed project.

The EIS also outlined that disturbed areas, such as the waste rock dumps and the stockpile areas would be rehabilitated to Class 5 (unsuitable for grazing). Some of these areas (i.e. the surfaces of the waste rock dumps) would have soil conditions suitable for grazing (Class 4). However, due to the slope it would become inaccessible for cattle and hence grazing would be generally excluded from these areas. Infrastructure (i.e. powerlines and haul roads) would be returned their pre-mining land suitability of Class 4 (suitable for grazing). The EIS estimated a loss of grazing potential of around 213 head of stock as an average of the existing stocking rate for the area of impact. In terms of effects of this loss on grazing productivity in the local area, the Colinta Holdings run approximately 8000 head of cattle in the properties containing the existing mine. This loss this would represent approximately 2.5% of the grazing productivity of this land.

The EIS identified that 67ha of class B good quality agricultural land (GQAL) and 22ha of class C GQAL would be impacted by the proposed project but stated that the benefit of the project development to the community would outweigh the values lost through the alienation of GQAL.

4.5.2.4 Subsidence

The maximum area affected by mine subsidence was estimated in the EIS to be approximately 900ha. The maximum predicted subsidence ranges from 2.6m in the shallower northern area, to less than 2m in the deeper parts of the central underground mining area. The subsidence predicted over the inter-panel pillars would be up to 0.2m in the areas of cover less than 300m deep. Where the longwall extraction would be at depths greater than 300m, subsidence of more than 1m above the pillars would be expected due to yielding. Subsidence predictions were consistent with existing subsidence monitoring data obtained from the nearest longwall panels of the current mine operations

Tilt is the slope of subsided land over a given distance and is calculated by determining the change in subsidence (i.e. vertical change) between 2 points and dividing this by the distance between those points. The EIS assessment identified that post-mine surface slopes would become steeper in localised areas along the edges of the subsidence troughs. The maximum tilts or surface slopes predicted for the proposed project area post-mining range in magnitude between 7.5% in the shallower northern area and 1.5% in the deeper central area.

Tensile strain on the ground surface would result in subsidence related cracking of the surface in areas where longwall extraction was undertaken. The maximum tensile strain following longwall extraction has been predicted to be up to 18mm/m in the shallower northern area and up to 6mm/m in the deeper central area. The development of cracking is dependent on a range of factors including panel width, depth of cover, extraction thickness, overburden lithology and type of surficial deposits. The areas that would be of greatest risk are those located at the panel edges and where surface water flows would be concentrated. The area of proposed underground mining is dominated by black clay soils which crack, shrink and swell under natural conditions.

Over the extended underground area, the EIS assessment predicted that the majority of the cracking would be narrow and shallow due to the nature of the overlying strata above the coal seam. Deeper and wider cracking could also occur particularly where tensile strains are in excess of 5mm/m and the longwall mining area would be shallow. This could result in cracks up to 150mm wide in the shallower longwall areas to the north with potential crack depths of up to 15m. Over the deeper central panels crack widths less than 50mm were predicted.

It was further discussed in the EIS that these predictions are consistent with cracking observed above longwall panels at the existing mine. In natural and undisturbed landforms crack widths of up to 100mm were recorded. In contrast, where longwall mining currently occurs below areas where the surface is compacted or where the top soil profiles were removed (e.g. along haul roads), cracking of up to 200mm were recorded.

One of the key issues relating to subsidence identified in the EIS would be changes to the hydrogeological regime, where new cracks in the rock mass occur. These cracks can provide new flow paths in what is essentially impermeable rock. Water could enter an underground mine and/or be lost from an aquifer or surface water body if the fractured zone intersects the water body, or if there is a connection between the fractured zone and the surface cracking. The fractured zone can range from 6-30 times the extracted seam thickness depending on a range of factors such as overlying geology type, density and mining depth. It was concluded in the EIS that based on operations in the Bowen Basin and the literature, a 105m of rock head would be sufficient to prevent inflow events.

Subsidence impact assessment

Aquifer interference in the underground mining area

The EIS identified that fracturing could extend up to 120m above the coal seam. Hence, there would be the risk that in the shallower longwall blocks located in the north of the proposed longwall extraction area the Tertiary basalt aquifers could be breached, potentially opening up a pathway for groundwater loss. However, the EIS assessment concluded that the potential for this interaction would be low given that the Tertiary basalts are located approximately 100m above the proposed longwall panels in this area.

The EIS further stated that it would be possible that water contained within the basalts could migrate vertically through these cracks and enter the underground workings. This would result in occasional ingress of water into the underground mine as fractures are created. It was concluded in the EIS, that such inflows would be short lived due to the fact that the Tertiary basalts are relatively thin and disconnected. The impact of this potential dewatering of the Tertiary basalts as a result of vertical cracking was also assessed as part of the groundwater model for the project and found to be insignificant.

Interaction with surface hydrology

It was stated in the EIS that a direct connection from the surface to the mine workings (and hence loss of surface flows) could occur if the depth of cover is less than 135m (120m of fracturing and additional 15m of surface cracking). Areas with <135m of cover were found only in the top northern part of the extended underground operations at the head of the Wilson Creek catchment. The EIS concluded that in this area there would be a possibility of a direct connection established due to subsidence between surface and underground workings in the upper Wilson Creek catchment. As the catchment and hence flows in this area are relatively small, any impacts on flows in Wilson Creek would be insignificant. Any flow would be managed using routine measures such as pumping. The EIS further outlined that there are only ephemeral waterways in the remaining areas subject to underground mining. For example, Cerito Creek and its northern tributary traverse sections of the underground area but underground mining operations would occur at depths >200m. Where the afflux effects of the existing Cerito Creek Dam on the Cerito Creek exist, mining would be undertaken at depths of >350 metres and it is expected that surface waters during flood events would not interact with the underground workings.

Another possible effect of subsidence outlined in the EIS would be the retention of water in the alluvium, which could occur if the sediments are of suitably low permeability and the surface water is able to collect in new subsidence troughs without draining to the bedrock below. This could result in the creation of ponds within waterways such as Cerito Creek and its tributaries. Remedial earthworks would be undertaken to re-establish free drainage if necessary.

Waterway subsidence and destabilisation of banks

The EIS stated that destabilisation of waterway bed and banks could result from subsidence in a waterway system as the new, post-mining trough and ridge profile along the waterway could become geomorphologically unstable. After subsidence, waterways attempt to regain their original gradient and energy regime, which is generally achieved by eroding the creek bed and banks over chain pillars along with sedimentation infilling in subsidence troughs. This also has the effect of decreasing discharge of suspended sediment downstream of the subsidence region. Two hydraulic models were developed during the EIS assessment to investigate the impact of subsidence on the waterways within the extended underground mining area. This assessment concluded that the destabilisation and scour of the bed and banks of these creeks resulting from subsidence would be insignificant.

Mitigation and avoidance of potential surface cracking impacts

The existing mine currently manages the effects of surface cracking resulting from subsidence through the implementation of a subsidence management plan. Subsidence areas are detailed in the annual plan of operations and a monitoring regime is implemented to monitor the effects of subsidence. The proponent committed to expand the subsidence management plan to incorporate the proposed project area. The following mitigation measures were proposed:

- Disc ploughing of areas where cracks occur in order to break up the surface and close or fill cracks.
- Re-establishment of a natural vegetative cover.
- Management of land uses in affected areas appropriately, including the control of any grazing activities to ensure the rehabilitation is effectively established.

The EIS outlined that initial ripping (where surface cracking had occurred) is successfully implemented at the existing mine and experience showed, that no further remedial rehabilitation work is warranted. Due to the potential for disturbance to remnant vegetation and fauna habitat, rehabilitation works would be limited to those areas identified as presenting unacceptable erosion or safety hazard. In the event of remedial work being required in larger waterways such as Cerito Creek or the northern tributary, this could involve rock armouring and additional stabilisation works. The EIS stated that the remedial strategies implemented would be based on monitoring the performance of measures adopted at the current mine.

4.5.2.5 Land degradation and contamination

The EIS outlined that transport, storage and use of chemicals and hydrocarbons could pose a limited risk of contamination. Potential impacts would be mitigated though the implementation of procedures for the transport, handling and storage of hydrocarbons and chemicals, emergency spill response planning and employee training, similar to the procedures already in place at the existing mine.

It was concluded in the EIS that proposed mineral processing activities pose a limited risk of land contamination as coal processing, tailings and rejects would be managed through existing facilities. The proponent stated in the EIS that following completion of the operational and final rehabilitation measures, the project area would be rehabilitated to the point where it could be removed from the Environmental Management Register. As a consequence, the EIS concluded that a long-term site management plan for contamination would not be required.

4.5.2.6 Erosion and stability

Most land occurring on Tertiary basalt and associated colluvium on gently undulating to undulating slopes were classified in the EIS as having a low risk of erosion. However, the following areas have been identified susceptible to erosion:

- The Eastern Creek South pit area was identified to have a low to moderate erosion risk due to the predominance of low sloping landforms and stable soils derived mainly from basalt. Waterways could have a very high erosion susceptibility risk in this area. The eastern limit of this proposed pit area was also classified as a high risk area due to the steep slopes and soil types.
- The Eastern Creek East pit area was identified to have a moderate to high erosion risk due to the predominance of shallow texture soils. This area has also suffered significant erosion from current and previous grazing pressure.
- The Eastern Creek West pit area was identified to have a predominantly high to very high erosion risk due to significant areas of sodic texture contrast soils, with very shallow topsoil.

- Areas within the extended underground area were identified to have a low to moderate erosion risk. The effects of any subsidence on the potential incidence of erosion would have localised erosion effects.

The EIS assessment identified significant to severe existing sheet, bank and gully erosion in the project area due to existing and previous land management practices. It was concluded in the EIS, that most of the proposed mine development is located on land that has a moderate to high existing erosion risk.

Mitigation and avoidance of potential erosion impacts

The proponent committed to stabilise disturbed areas as quickly as practicable to limit erosion. Progressive revegetation as well as erosion and sediment control measures would be undertaken, including:

- Minimising the area of disturbance.
- Progressively rehabilitating available areas.
- Minimising water entry to disturbed areas.
- Treating water runoff in sediment traps and dams.
- Removing all temporary control measures after the disturbed site is stabilised.
- Establishing groundcover (native where possible) as soon as practicable.

4.5.2.7 Visual amenity and lighting

Potentially sensitive receptors identified in the EIS included passengers in vehicles travelling along Collinsville–Elphinstone Road and the residents of Suttor Creek North Homestead. The EIS stated that the visual panorama of motorists would consist of a rural landscape with the existing mine visible along certain sections of the road. The EIS concluded that the overall visual impact of the proposed project on road users would be insignificant when considering that any glimpses of the proposed project would be experienced travelling at speed and at right angles to the project area. Similarly, the EIS concluded visual impacts on residents of the homestead would be insignificant as the only visible part, the waste rock dump, would be rehabilitated and largely incorporated within the surrounding landscape elements. Hence, no mitigation measures were proposed in the EIS.

The proposed project would operate 24 hours per day and would therefore require artificial lighting. The EIS concluded that although a faint glow is expected to be visible during night time operations, stationary and vehicular lighting would not significantly impact on sensitive receptors due to the considerable separation distance. Hence, no mitigation measures were proposed in the EIS.

4.5.3 Conclusion and outstanding issues

The EIS chapter on land has no outstanding issues and hence has addressed the environmental values to land, potential impacts and mitigation measures, adequately.

4.5.4 Proponent's commitments

To minimise major impacts on the land, the proponent has committed to:

- Expansion of the existing subsidence management, including:
  - Disc ploughing of areas where cracks occur in order to break up the surface and close or fill cracks.
  - Re-establishment of a natural vegetative cover.
  - Management of land uses in affected areas appropriately, including the control of any grazing activities to ensure the rehabilitation is effectively established.
- Stabilisation of disturbed areas.
- Progressive revegetation and erosion and sediment control measures, including:
  - Minimising the area of disturbance.
  - Progressively rehabilitating available areas.
  - Minimising water entry to disturbed areas.
  - Treating water runoff in sediment traps and dams.
  - Removing all temporary control measures after the disturbed site is stabilised.
  - Establishing groundcover (native where possible) as soon as practicable.

4.6 Transport

Chapter 7 of the EIS described the proposed use of existing infrastructure to transport materials, products or wastes to and from the project site as well as potential impacts and mitigation measures associated with transport.

4.6.1 Assessment of the EIS chapter

4.6.1.1 Submissions on the EIS chapter

As part of the EIS assessment the following matters were raised in the submissions:

- TMR:
  - Further information was requested on measures to mitigate coal loss and coal dust emissions arising from coal transport (according to the QR National coal dust management plan) updating the EM Plan.
  - Requested further traffic and transport data in a standard format.
- QPS:
  - Requested an assessment of traffic issues that are relevant to emergency services (QFRS, QAS, and QPS) to ensure that risks and mitigation measures pertaining to traffic safety, crash recovery, traffic management and enforcement are considered beyond the scope of the TMR guidelines. This should include a special section on traffic safety, includes identifying and assessing traffic risk.
  - Requested that the traffic management plan is supported by the QPS (both Northern and Central regions).
  - Hazards and risk management should include the fatal four (speeding, drink and drug driving, failing to wear seat belts and driving whilst tired).
  - The need to develop an engagement strategy and form a road safety alliance to inform the community and project personnel (including contractors) to a level of unified ownership and engagement in regard to road safety.
  - While significant attention has been paid to natural disasters and accidents, the EIS has not addressed deliberate disruptive activity or intentional incident (protest or terror) either at the project site or along the rail transportation link to Abbott Point.
- QR National (now Aurizon):
  - Identified that the EIS does not show the full extent of QR National's rail network.
- WRC:
  - Concerns that increased amount of traffic may result in a decrease in safety for all road users.

4.6.1.2 Proponent's response to submissions

As a response to the comments made by TMR the proponent responded that the impacts associated with coal dust transport is the responsibility of the rail line operators. However, the proponent understands that QR National (Aurizon) is in the process of implementing a coal dust management plan across the Queensland rail network which will include the Newlands rail line. The proponent further commented that the QR National Coal Dust Management Plan would be implemented at the Newlands Coal rail load-out facility. This would include use of coal wagon veneering systems and associated support systems. The EIS was also updated to reflect expansions to the QR National's railway network. The EM Plan has been updated to include the dust deposition generated by loss of coal and coal dust emissions during rail haulage of coal to the port.

The proponent responded to QPS comments that as part of the finalised traffic assessment (to be confirmed during the design phase), the proponent would compile further specific traffic data and assessment to inform relevant emergency services. Where specific risks are identified, mitigation pertaining to traffic safety, crash recovery, traffic management and enforcement would be developed in consultation with the relevant emergency services and would include a subsection detailing risk management and process. Any issues arising from the amendments to the existing road network would be outlined within an updated traffic management plan for the proposed project and would be carried out in consultation with TMR, QPS and other relevant stakeholders. The proponent further stated that it is not the purpose of the EIS to address the management of impacts from deliberate disruptive acts. As part of the overall health and safety management of the site, the proponent outlined that traffic management already forms part of the existing working arrangements for staff. The proponent will amend the existing health and safety workplace arrangements to incorporate road use management and address traffic safety around the site. The proponent further stated that as part of this, any issues arising from the amendments to the existing road network will be outlined within an updated traffic management plan for the revised site and its operations and will be carried out in consultation with the local community, the council and the TMR where required.

Regarding QR National's (Aurizon's) request to include expansions to the QR National's railway network, the proponent updated figures in the executive summary and the main body of the EIS

The proponent responded regarding concerns of increased traffic raised by QPS and WRC that the proposed construction and operation of the proposed project would not increase traffic as no requirement for significant additional workforce personnel. Hence, no changes were made to the fatigue management plan.

4.6.1.3 Adequacy of the EIS chapter

The EIS Chapter 7 – Transport was not changed as result of the comments made. The changes made by the proponent involved, as stated above, changes to the EM Plan and to figures in other EIS chapters, such as the executive summary.

In a review of the amended EIS, EHP received further comments from TMR and QPS regarding insufficient enforcement and compliance for road safety management and fatigue management, as well as the need of a road-use management plan (see section 4.6.3 – Conclusion and outstanding issues and section 4.13 – Health and safety). Outstanding issues will need to be addressed as part of the project approval process.

4.6.2 Description of traffic impacts – findings of the EIS

4.6.2.1 Potential impacts on road traffic

The EIS outlined that the proposed project would not involve a significant construction phase, and hence would not result in a significant change of heavy vehicle and light vehicle traffic movements on the state-controlled road network and local government roads.

While the EIS stated that the continued use of roads for both light and heavy vehicles would be managed through the implementation of the existing mine's fatigue management plan, QPS commented that this is insufficient to assist QPS or other services to determine measures for enforcement and compliance for road safety management. Hence, QPS requested continued involvement with the proponent with regards to traffic management, especially regarding fatigue management.

4.6.2.2 Potential impacts on environmental values

The EIS outlined that the proposed project would not result in increased levels of dust, noise or vibration which could impact on human health or ecological values above the existing impacts.

4.6.2.3 Potential impacts on stock routes

Two stock routes were identified in EHP's database. However, these are classified as 'unused'. This means that they have the potential to be used for grazing or localised stock movements but are not used for long distance movement of stock. The section of one of the stock routes contained within Colinta Holding's property would need to be relocated as a result of the existing mine operations.

4.6.2.4 Potential impacts on rail, port and air transport

The NCA Joint Venture has an existing rail contract for usage of the system for 14.5mt/annum combined from the existing mine and Xstrata Coal's Collinsville operation. The proposed project would not increase the volume above the existing arrangements but would require an extension of this haulage contract beyond its current renewal date.

The EIS outlined that with an average train capacity of 5000 tonnes, approximately 2100 train movements per year are currently generated from the existing mine to Abbot Point. The establishment of the Northern Missing Link rail line between Goonyella and the existing mine would result in a much greater number of train movements along this section of line. In an attempt to improve rail efficiencies, larger train sizes of up to 6900t would be introduced into this rail network. This would result in a decrease in the number of train movements servicing the existing mine, to around 1550 per year.

It was predicted in the EIS that the level of train movements would further decrease after 2024 when the underground operations start to wind down and decrease even further from 2034 as open cut operation start to wind down. It is therefore considered in the EIS that there would be no additional impacts on the rail network attributable to the proposed extension. The EIS concluded that no additional impacts are expected beyond what already exists. Hence, the proposed extension would not result in increased impacts on environmental values resulting from dust, noise and vibration.

The EIS further outlined that the proposed project would not result in an increase in annual shipping movements, and therefore would not impact further on the port infrastructure or capacity beyond what already exists.

The existing mine does not operate as a fly in/fly out operation and would continue to be the case during the life of the proposed project. As such, the extension would not impact on commercial aviation in the region. The airstrip located at the existing mine, it is only used for private aircraft and emergency movement of personnel.

4.6.2.5 Conveyers

The EIS outlined that the proposed underground mining process would require a series of new conveyors to run along the full length of each longwall panel and facilitate the transport of coal to the surface. However, from the surface the extension would utilise the existing surface conveyors (located within existing mine area) to transfer the underground coal to the CHPP. Hence, it was concluded in the EIS, that there would be no additional impacts associated with the construction or operation of conveyers.

4.6.2.6 Cumulative impacts

The proposed Byerwen Coal Project would be located directly to the west of the existing mine. Hence, the EIS outlined that traffic levels on roads may increase and with it the potential of cumulative effects, especially within the local area. However, it was concluded in the EIS, that at the time of compiling this report, there was insufficient information available about the characteristics of, or the timeframe for this development to enable an assessment of cumulative impacts on traffic.

4.6.3 Conclusion and outstanding issues

As part of the review of the amended EIS and the response to submissions, EHP received comments from 2 departments:

- TMR:
  - Requested that the proponent must complete a road-use management plan (RMP) no later than 6 months prior to the commencement of any significant project construction works:
    - The RMP must be prepared for all uses of state-controlled roads for each phase of the project, in consultation with the regional office contact and in accordance with TMR's Guide to Preparing a Road Use Management Plan. The RMP must summarise:
      - latest traffic generation (vehicle numbers/routes etc.)
      - fatigue counter measures
      - updated impact mitigation strategies both 'hard' infrastructure, and 'soft' (such as road safety strategies—dealing with worker/driver fatigue), and any other necessary improvements or contributions towards road maintenance and so on.
  - The RMP must be approved by TMR prior to its implementation and prior to commencement of the development project construction traffic.
- QPS:
  - Stated that the proponent's response does not assist the QPS or other services to determine measures for enforcement and compliance for road safety management.
  - Welcomes continued involvement with the proponent with regards to traffic management, especially regarding fatigue management.
  - The fatigue management of all persons, particularly when leaving the site for home (whole of journey – before and after) remains a significant concern for QPS and the safety of all persons on the roads.
  - Concerns regarding road safety due to the "cumulative effect of the mining industry" on the road network. QPS recommended that ongoing consultation occurs with the QPS to mitigate the "cumulative effect" of the large number projects in the Bowen Basin area.

These outstanding issues identified by TMR and QPS would need to be addressed as part of the approval process.

4.6.4 Proponent's commitments

To minimise impacts through transportation on environmental values as well as road safety, the proponent has committed to:

- Update the current fatigue management plan.

4.7 Waste

Chapter 8 of the EIS described the inventory of all wastes to be generated by the project during the construction, operational and decommissioning phases of the project. It also described the existing environment values that may be affected by the project's wastes.

4.7.1 Assessment of the EIS chapter

4.7.1.1 Submissions on the EIS chapter

As part of the EIS assessment the following matters were raised in the submissions:

- DAFF:
  - The proponent must detail the actions to be taken to ensure that onsite landfill of putrescibles and organic (food) waste is inaccessible to declared pest animals (e.g. pig proof exclusion fencing and secure bins). Any exclusion fencing must be secure and regularly maintained to ensure that waste would not be accessible to declared pest animals.
- EHP:
  - Requested information on the adequacy of the current landfill and sewage treatment facilities for the proposed operations.

4.7.1.2 Proponent's response to the submission

The proponent responded to the comment made by DAFF that general waste management for the site is managed under the existing mine's waste management plan which would be amended to include the proposed extension. The proponent stated that because there would be no increase in the rate of waste production the existing disposal methods can be maintained. An assessment of the landfill facility has concluded that there is adequate volume available for this to continue for the life of the project and that deposited waste must be covered with earthen material or other dense and incombustible alternative material, at frequent intervals, to minimise exposure of waste to vermin and pests.

As a response to EHP's comments the proponent stated that the landfill operation is part of the existing mine and is not the subject of the EIS. Currently all waste for disposal is managed within the Ramp 7 dump at Newlands Main Deposit. The majority of regulated wastes are transported from site for disposal at appropriate locations. Approximately 120t of general waste is generated across the Newlands Main Deposit and Suttor Creek leases on a monthly basis. Approximately 40t of general waste produced at the Collinsville operations is transported to the Newlands Coal Project landfill for disposal. The current waste management practices of the existing mine would be expanded to incorporate the proposed project demand; however, the proponent stated, the project would not alter the amount or intensity of waste produced.

In terms of sewage, the proponent responded that the sewage treatment plant is also not the subject of the EIS. The current sewage treatment plant is located downstream from the former construction camp site within the existing mine lease area. The sewage treatment plant has been operating for the past 30 years, in that time it has been maintained and improved to ensure it is capable of processing all waste at the existing mine. All effluent released from the treatment plant is monitored regularly and only water that has met the water quality criteria under the current EA can be discharged and used for irrigation.

4.7.1.3 Adequacy of the EIS chapter

The EIS Chapter 7 – Waste was not changed following the submissions. However, in a review of the response of the proponent as well as the amended EIS, EHP commented that despite that the proposed project would utilise existing infrastructure, such as landfill and sewage, this infrastructure forms part of the proposal and hence falls within the scope of the EIS and needs to be addressed within the EM Plan. As part of the approval process, further information would be required to finalise draft EA conditions. This should be provided in the amended EM Plan.

4.7.2 Description of waste – findings of the EIS

4.7.2.1 Mining wastes – potential impacts and mitigation measures

Waste rock

The EIS identified that the largest waste by volume and mass associated with the proposed project would be waste rock as a result of overburden removal from the 3 open cut pits with a total of 970 million bank cubic metres of waste rock.

The results of the geochemical assessment carried out as part of the EIS indicated that all the waste rock material tested would be non-acid forming and would have a high factor of safety with respect to potential acid generation. Most waste rock materials assessed had acid buffering capacity, which would be sufficient to buffer the any acidity that could be generated from these materials. Overall, from an acid–base perspective, the waste rock material can be regarded as a non-acid forming unit containing excess neutralising capacity.

Total metal concentrations in waste rock samples were well below the applied National Environmental Protection Council and Health-based Investigation Level guideline values. Hence, the EIS concluded that the waste rock materials would not present a significant risk to the environment and in particular for revegetation/rehabilitation activities with respect to total metal concentrations in solids.

Static and kinetic leach column test results indicated that initial and ongoing surface runoff or seepage from waste rock would be pH neutral to alkaline. The dominant major soluble cation was sodium and the dominant major soluble anions were bicarbonate, carbonate, chloride and sulfate. The concentration of all of these ions in runoff and seepage would decrease over time as salts are leached from the system. The geochemistry assessment results suggested that surface runoff and seepage from waste rock and coal reject materials would contain relatively low concentrations of other major ions, such as dissolved calcium and magnesium, which may influence the sodicity of these materials. The salinity of surface runoff and seepage from waste rock materials is expected to be low. The EIS stated that ongoing monitoring of surface runoff and leachate from material storage areas would be carried to confirm that the salinity level of runoff.

The EIS assessment further concluded that concentration of soluble sulfate in surface runoff and seepage would be low. Evapo-concentration effects may cause higher than predicted sulfate levels to occur at surface water control facilities, although this occurrence will be indicated by increased salinity levels. Most trace metals in waste rock were identified in the EIS as sparingly soluble at the predicted neutral to alkaline pH of surface runoff or seepage. Dissolved concentrations are expected to be low compared to the applied water quality guideline criteria for livestock drinking. The concentration of soluble metals in runoff and seepage from waste rock dumps is would remain within applied water quality guideline criteria and would be therefore unlikely to present any significant environmental risks for on-site or downstream water quality. The proponent committed to ongoing water quality monitoring program for surface water and groundwater.

The geochemistry assessment identified that the risk of the waste rock producing acid and environmental impacts as a result of acid mine drainage is insignificant. Hence, it was concluded in the EIS, that there would be no need for selective handling of specific geological units during the mining process. On the other hand, it was outlined in the EIS that waste rock would be alkaline and sodic, making it prone to dispersion and erosion if not appropriately managed. Hence, the EIS stated that during the rehabilitation process, materials with high sodicity or salinity would be covered with competent material and topsoil to reduce any deleterious effects on the receiving environment through leaching and maintain the stability of the rehabilitated landform (see section 4.18 – Rehabilitation).

Rejects

The reject materials produced after coal is being processed are divided into coarse rejects and tailings (very fine rejects). The total mass of rejects calculated in the EIS would be 18.1mt over the life of the mine, including 12.7mt of coarse rejects mass (dry weight) and 5.4mt of tailings mass (dry weight). However, when combined with the existing mine, a combined total of 20.1 million tonnes (dry) of tailings and 48.7 million tonnes (dry) of coarse rejects would be generated. The assessment concluded that the majority of the coal reject material tested is non-acid forming and has a high factor of safety with respect to potential acid generation. The bulk coal reject material was hence classified in the EIS as non-acid forming with excess acid neutralising capacity.

The EIS outlined that tailings and rejects would be placed within existing open cut voids within the existing operations. It was concluded that this would avoid the need for above-ground storage structures, would reduce the environmental and safety risks associated with dam construction and operation, and would minimise the footprint of the mining disturbance. This approach is currently undertaken by the existing mine.

According to the EIS the tailings would be discharged as slurry (60% water by volume) via large diameter polyethylene pipes to a tailings facility within an existing void. Within the void, tailings would be placed within cells which allows rotation between cells and promotes desiccation and drying. Once the tailings cells have dried, a cap of at least 5m of benign overburden material is applied and contoured to achieve the ponding and drainage requirements for the final landform. The contoured landform would then be covered with a minimum of 30cm of topsoil and seeded with native vegetation. Rejects would be taken by truck and deposited within an existing void. Within the void the rejects would be contoured to fully utilise the available space and create the desired final landform. Rehabilitation of the rejects emplacement area would involve the covering of the final landform with at least 1m of benign overburden material and the application of durable rock mulch on sloping surfaces. At least 30cm of topsoil will also be applied and seeded with native vegetation (see section 4.18 – Rehabilitation).

4.7.2.2 Other wastes – potential impacts and mitigation measures

The EIS stated that wastes other than mining wastes that are likely to be generated by the proposed project would include solid waste, liquid waste and regulated waste. A waste management system would be implemented in accordance with the existing waste management plan of the current operation. Waste monitoring and auditing is currently undertaken at the existing mine with a monthly waste management report provided by the waste contractor. This report details the volumes of each waste, management methods and disposal option adopted (against waste management criteria). This report would be expanded to include waste generated by the proposed project.

It was stated in the EIS that decommissioning of existing infrastructure and mine would be in accordance with the mine's existing decommissioning and rehabilitation plan. The infrastructure for the proposed project would be decommissioned as follows:

- Mine roads would be rehabilitated or left behind for use as farm roads, if requested by the landowner.
- Water dams would remain if required by the subsequent landowner and approved by regulators; otherwise, they will be breached and rehabilitated, restoring the natural drainage patterns.
- Waterways would be maintained and rehabilitated with native tree and grass species.
- Any buildings, plant and equipment would be removed and the surface rehabilitated.
- Concrete pads would be broken up and covered with benign spoil, topsoiled and revegetated.

4.7.3 Conclusion and outstanding issues

EHP is concerned that the information provided in the EIS did not adequately address issues regarding the EM Plan for waste. Although the proposed project would utilise existing the infrastructure, such as landfill and sewage, this infrastructure forms part of the proposal and hence falls within the scope of the EIS and should have been addressed in more detail and hence, as part of the approval process, further information would be required to finalise EA conditions.

4.7.4 Proponent's commitments

To minimise impacts through waste on environmental values, the proponent has committed to:

- Ongoing monitoring of surface runoff and leachate from material storage areas.
- Ongoing water quality monitoring program for surface water and groundwater.
- Revegetation and rehabilitation of waste rock and rejects.
- Updating existing waste management plan.
- Expansion of the existing waste management report.

4.8 Water

EIS Chapter 9 (Surface water), Chapter 10 (Groundwater) and Chapter 11 (Mine water) described the existing resources and environmental values of water that may be affected by the project.

The impact assessment of surface water considered changes to the hydrological regime, flooding and surface drainage caused by the proposed open cut mining and underground operations. The groundwater chapter described the hydrogeological regime in the project area and provided an assessment of the potential impact of the project on this regime while the mine water chapter provided details of the proposed approach to mine water management for the project.

4.8.1 Assessment of the EIS chapters on surface water, groundwater and mine water

4.8.1.1 Submissions on the EIS chapters on water

The water chapters attracted the majority of comments received during the submission period. These were as follows:

- DAFF:
  - The proponent should liaise with downstream neighbours to negotiate the provision of water to enable reuse of mine water.

- DNRM:
  - Requested watercourse determination for watercourses on the project area that are yet to be determined by an authorised officer under the Water Act.
  - Commented on the incorrect description of matters under the Water Act (water licences, updating state planning policies, capture of overland flow, riverine protection permit, etc).
  - Specific issues identified with the proposed diversions of tributaries.
  - Identified major issues regarded the proposed temporary storing of water within Dam C3. The Eastern Creek East Pit would intercept a declared watercourse (Tributary A) and as such would require a water licence. DNRM considered the temporary option of storing water within Dam C3 and pumping captured flow around the open cut pit as unacceptable. An alternate diversion option would need to be considered that satisfies the requirements of the department.
  - Further information requested on the groundwater conceptual model, stream geomorphology assessment results, recharge rates, hydraulic impacts on subsidence, overtopping final voids.
  - Recommendation to amend the current subsidence management plan that addresses the impacts on all watercourses and surrounding landscape in accordance with the draft guideline Watercourse Subsidence – Central Queensland Mining Industry.
- DSITIA:
  - Requested further information on the impacts of the expansion on volumes of TSF associated water produced, stored and subsequently released and any potential impacts on receiving waters.
  - Requested a revised design and implementation of the water quality impact assessment, which would ensure that sufficient data from non-mine affected waterways (such as a site upstream of all influence of release points on Kangaroo Creek) is incorporated in order to define background water quality for consideration in subsequent conditioning.
  - Requested a revised water quality assessment for ambient water quality parameters as not all parameters of potential relevance to coal mines were included.
  - Requested further information on potential impacts of the additional releases of mine-affected water as proposed in Chapter 11 on downstream environmental values in order to satisfy the requirements of the TOR.
  - Requested a revised water quality monitoring program in order to include fluoride, arsenic, cadmium, cobalt, and copper.
  - Requested further information on the proposed EA conditions outlined in Schedule C – Water, including but not limited to conditions that require the design and implementation of a receiving environment monitoring program (REMP) and receiving environment flow triggers (EC) for each receiving waterway, such as Eastern Creek and Wilson Creek.
- Hancock Coal Pty Ltd
  - Requested more specific information as the proposed mine would be 21km from the Wollombi homestead in regards to:
    - assessment of potential noise and dust impacts to the Wollombi homestead (magnitude of impact, cumulative impacts from a combination of existing and proposed activities). The proponent established an agreement in 2006 with Wollombi homestead to install a wind direction device to monitor blast pressures and vibration from an existing mine.
  - Further information was also requested, in order to facilitate assessment of the potential for the interrelated and cumulative impacts of the proposed railway that would pass through Wollombi property and near the proposed Newlands Coal Extension Project.
- EHP:
  - Required the assessment of the likelihood of settlement or cracking of the Cerito Creek Dam embankment due to underground mining; and determination of the consequences of cracking and if it occurred and how it would be managed.
  - Requested further information on how the risk of failure through overtopping of Dam C3 or integrity issues with the dam would be managed as the proposed project description indicated that rather than diverting tributary water from the upper catchment of Tributary A, water would be pumped around the pit into the downstream section of the watercourse.

  - Requested further information on the position and the area of watercourse affected by both direct clearing of riparian habitat and re-establishment of the diversion, any changes in of flow as a result of diversion, any proposed impacts on state significant biodiversity values and any proposed impacts on terrestrial fauna and flora species.

- IESC:
  - Had concerns over the limited information provided in relation to cumulative impacts both on water resources and MNES (e.g. the proposed project is located within the Bowen Broken River Catchment, upstream from the proposed Drake Coal Mine, and consideration should be given to the potential cumulative impacts on water resources and water dependent ecological communities in this catchment).
  - Advised that improvements on the proposed site water balance; which predicts a peak water demand in 2030 of approximately 2.4 million litres a day, could be made to assist with the interpretation of the model.
  - Outlined that the proponent had not provided a regional water balance, as part of their water balance model, with particular emphasis on cumulative impacts of the existing mine and the mine extension.
  - Required additional information on the fluxes between groundwater systems and/or interaction with surface water systems in order to determine impacts to riparian ecosystems.
  - Outlined that the water management plan discussed water balance and water release scenarios for 6 proposed discharge points but did not include discharge triggers or information relating to the quality or quantity of discharge/received water.
  - Considered the proposed 3 monitoring points for the receiving waterways as being inadequate, as individual discharge points would not be monitored.
  - Outlined that subsidence has the potential to structurally affect the Cerito Creek Dam structure. It was noted that the dam wall is within the immediate vicinity of the longwall panels which may be impacted by cracks in the shallower longwall areas (depending on a range of factors). An assessment of the scale and extent of this potential impact does not appear to have been provided, and would need to include:
    - further options to mitigate against potential subsidence induced impacts on the structure of the Cerito Creek Dam
    - validation on the assumption that wet clays present in the overburden will swell to stop leakage.
  - Proposed backfilling of mining voids as being environmental best practice.
- WRC
  - Requested evidence that Wilson Creek is not a water body under the Water Act.
  - Requested creek construction designs and plans of all proposed diversions including the dimensions of all water bodies.
  - Requested further information on the diversion of tributaries, including erosion and sediment control plan for the likely collapse of stream banks and discharged sediment
  - Requested further information on mine dam management, including salinity and mosquito born diseases.
  - Requested further information on mitigation measures and construction methods for haul road crossings of waterways.

4.8.1.2 Proponent's response to submissions

The management concept for Eastern Creek East pit has been modified since publication of the EIS as a result of potential conflicts with the Burdekin Basin Resource Operations Plan and DERM (2011) guidelines for Watercourse Diversions – Central Queensland Mining Industry. The proponent has also reviewed the resource evaluation and resource estimates for the Eastern Creek East pit. The coal thickness and coal quality in the north western portion of the pit is now deemed to be poorer than originally modelled. As a consequence, the design now includes a free draining diversion of Tributary A (upper tributary of the East Creek) instead of the originally proposed pump out-arrangement. This new diversion of Tributary A has since been reviewed by DNRM and DNRM is satisfied that there is sufficient information in the updated report to demonstrate that the diversion of Tributary A can be constructed to meet engineering requirements and relevant regulatory guidelines.

In response to IESC's comments the proponent provided an overview on the current and proposed mining development within the region and outlined that the current environmental releases into the Burdekin Basin would not increase as a result of the extension. Furthermore it was said that although the number and location of discharge points may change over time, the proposed combined discharge rate and quality entering the system would be maintained at current rates. This is because the workings at the existing mine would be progressively rehabilitated and decommissioned as the extension is developed.

The proponent further responded with a summary table listing all water inputs and outputs for the proposed peak consumption year in 2030, showing the likely water flows under a range of rainfall conditions. In response to IESC's request for a regional water balance, the proponent responded that the Water Act provides detailed water planning process in Queensland, especially the water resource plan for the Burdekin Basin (2007) and the Resource operations plan (2009), that allow for the allocation of water, sharing of water, trading of water allocations and provide measures to protect the health of water resources within the basin (Broken Bowen water supply scheme). The proponent outlined that it is not possible to develop a quantitative regional or catchment scale water balance as there is limited information available in the public domain in regards to water release, water take and water transfer of all potential industries and users within the region. However, the proponent summarised pre and post development discharges from the project area (determined through the government water planning process). The result indicated that the proposed project would not adversely affect the water balance within the basin. Furthermore, groundwater inputs were incorporated into the mine water balance.

The groundwater model showed that 3 gigalitres (GL) of groundwater would be intercepted by the project, but the project would result in a net increase in discharge primarily due to changes in catchment composition during mining. In terms of controlled release conditions, the proponent stated that these were developed based on the existing mine EA. An analysis of the water balance looking at the proportion of discharged water and the frequency of releases based on the proposed release conditions confirmed that the proposed project could operate under the existing EA release criteria. In terms of the IESC concerns with the adequacy of 3 monitoring points the proponent replied that the water management plan included 3 downstream compliance points, 1 for each creek into which discharges from the project could occur. The downstream compliance points are located below a mixing zone which would provide an opportunity to utilise dilution in the receiving waterway, while ensuring that the water quality in the receiving waterway would be maintained within a range experienced in the natural environment. Monitoring of locations upstream is currently conducted as part of the monitoring program for the existing mine. The proponent also stated that given that the project occurs at the headwaters of both Cerito Creek and Wilson Creek it would not be possible to collect an upstream surface water sample for these systems.

The proponent also responded to DSITIA's comments. In regards to the production of water in tailings, the proponent outlined that tailings production for the proposed extension would be similar to the existing mine of 14ML per day. 9.6ML per day of water would be either lost to evaporation or would report to the decant pond and be available for make-up to the system. It further said that the current tailings management system is a closed circuit and operates with a water deficit. Hence, there would be no releases of water associated with the tailings management circuit. The proponent concluded that the CHPP water balance including water sources would also be similar. The proponent further stated that a raw environmental monitoring database was provided to EHP in 2012 and Xstrata considered that it was not necessary to revisit the assessment for these waterways as part of the EIS. However, this issue remains unresolved and would need further assessment as part of the approval process. See section 4.8.5 – Conclusion and outstanding issues.

The proponent further outlined that the EIS analysis was undertaken for Suttor River, Kangaroo Creek and Wilson Creek, as these waterways are currently affected by the existing mine. Eastern Creek was not covered in this analysis as a regional analysis of Rosella Creek catchment undertaken in 2011 was used as the basis for setting a downstream compliance electrical conductivity for Eastern Creek (2250µS/cm). The Queensland wetland mapping database was consulted but no palustrine or lacustrine wetlands were listed within the proposed project area. In regards to potential impacts within Rosella Creek catchment resulting from sediment and contaminant mobilisation, the EIS investigations found that changes in hydrology and hydraulics and changes in salt loads are expected to be minor due to proposed management and mitigation strategies. The proponent proposed that conditions regarding mine waste water management would consist of a single amended EA, incorporating the project area into the regional ecosystem management plan for the existing mine, with the conditions relating to regional ecosystem management plan design and implementation.

In respect to Hancock Coal's comment on cumulative impacts from dust and air to the Wollombi homestead the proponent outlined that air and dust impacts from the proposed mine extension would not impact on the Wollombi homestead. The EIS noise assessment found that noise levels would be at background levels approximately 8km from the mine site. The EIS air modelling also showed that air quality levels would remain at background levels at this homestead location with no impact from the proposed mine extension. The proponent further stated that impacts from the proposed Hancock GVK rail line on the Wollombi homestead were considered in the Hancock EIS where rail noise and air quality levels from were expected to meet targets at all identified sensitive receptors.

In regards to EHP's and IESC's comments on the structural integrity of the Cerito Creek Dam wall, the proponent responded that the structural impacts to the Cerito Creek Dam wall is outside the scope of this EIS as it is located outside of the project area within the existing mining lease and would be subject to subsidence associated with the existing approved underground mining operations. However, the proponent stated that the structural integrity of all structures would be assessed in accordance with the existing mines operational management procedures through out the mine life.

In response to comments made by WRC, the proponent stated that the design of road crossings over drainage features would be prepared during the detailed design phase, nearer to the time of requiring the crossings. General construction measures would be undertaken to minimise disturbance and erosion risks.

In the response to DAFF's comment, the proponent stated that the water used on the current operation is recycled and reused across the site and managed in such a manner that it is not used offsite. Hence, the proponent concluded, there is no reused water being utilised downstream and there would no proposed changes in water management from the proposed extension.

As a consequence these submissions and the proponent's response to these submissions, the water chapters on surface water and mine water were substantially amended while no changes were made to the groundwater chapter.

The main environmental issues in regards to surface water, groundwater and mine water management are summarised below.

4.8.1.3 Adequacy of the EIS chapters

DNRM, DSITIA and EHP reviewed the amended EIS chapters, as well as the proponent's response and commented on remaining outstanding issues relating to surface and mine water management which would need to be addressed as part of the approval process (refer to section 4.8.5 – Conclusion and outstanding issues). DNRM also reviewed the responses of the proponent in regards to the IESC's comments (where matters are dealt under the Water Act) and regarded the response as adequate.

4.8.2 Description of surface water values – findings of the EIS

4.8.2.1 Existing environmental values – surface water

The amended Chapter 9 (Surface Water) described the environmental values as defined by Queensland's Environmental Protection (Water) Policy 2009 (EPP(Water)) and the Water Resource (Burdekin Basin) Plan 2007. The environmental values identified for the proposed project were 'aquatic ecosystem protection', 'recreation (visual)', 'agriculture', 'industrial use' and 'protection of cultural and spiritual values'.

Cerito Creek Dam, is located upstream of the existing mine. The EIS outlined that the primary function of the dam is to act as a flow control measure to prevent overtopping of the existing Cerito Creek diversion. It is not used for water supply purposes to the existing mine. The dam wall is sited immediately downstream of the proposed underground mine extension. The EIS stated that the inundation extent of the dam when full covers an area of approximately 310ha and extends over the footprint of the proposed underground mine extension. Cerito Creek Dam has a capacity of 17,000ML at full supply level. Cerito Creek Dam is described in the Queensland's wetland mapping data as a lacustrine wetland. The amended EIS Chapter 9 outlined that the ecosystem value of the dam is diminished because of its operation as a flood mitigation structure. However, in the ecology section this dam is described as providing habitat for a range of aquatic and migratory species (see section 4.16).

The EIS outlined that the water quality data was assessed for the Rosella Creek sub-catchment over the period 2003–2006 and 2006–2011. The EIS identified relative high levels of salinity in the catchment with a range of electrical conductivity from 433-4762µS/cm. This was attributed in the EIS to groundwater intrusions and/or the natural soil and geology characteristics of the area that transport sediment and salts during periods of rain. The range for pH was between 8.0 and 8.5. Turbidity levels were high with 130 nephelometric turbidity units (NTU) which were identified in the EIS as typical for Rosella Creek sub-catchment in the wet season. The presence and concentration of metals within the Rosella Creek sub-catchment was identified as within the norm of the ANZECC Guidelines trigger values, with the exception of the total aluminium median (680µg/L) which was significantly higher than the ANZECC trigger value of 55µg/L. The EIS stated that this would be most likely attributable to the surrounding geology, where soils with naturally high aluminium concentrations were mobilised by erosion and entered the surface water column during flow events.

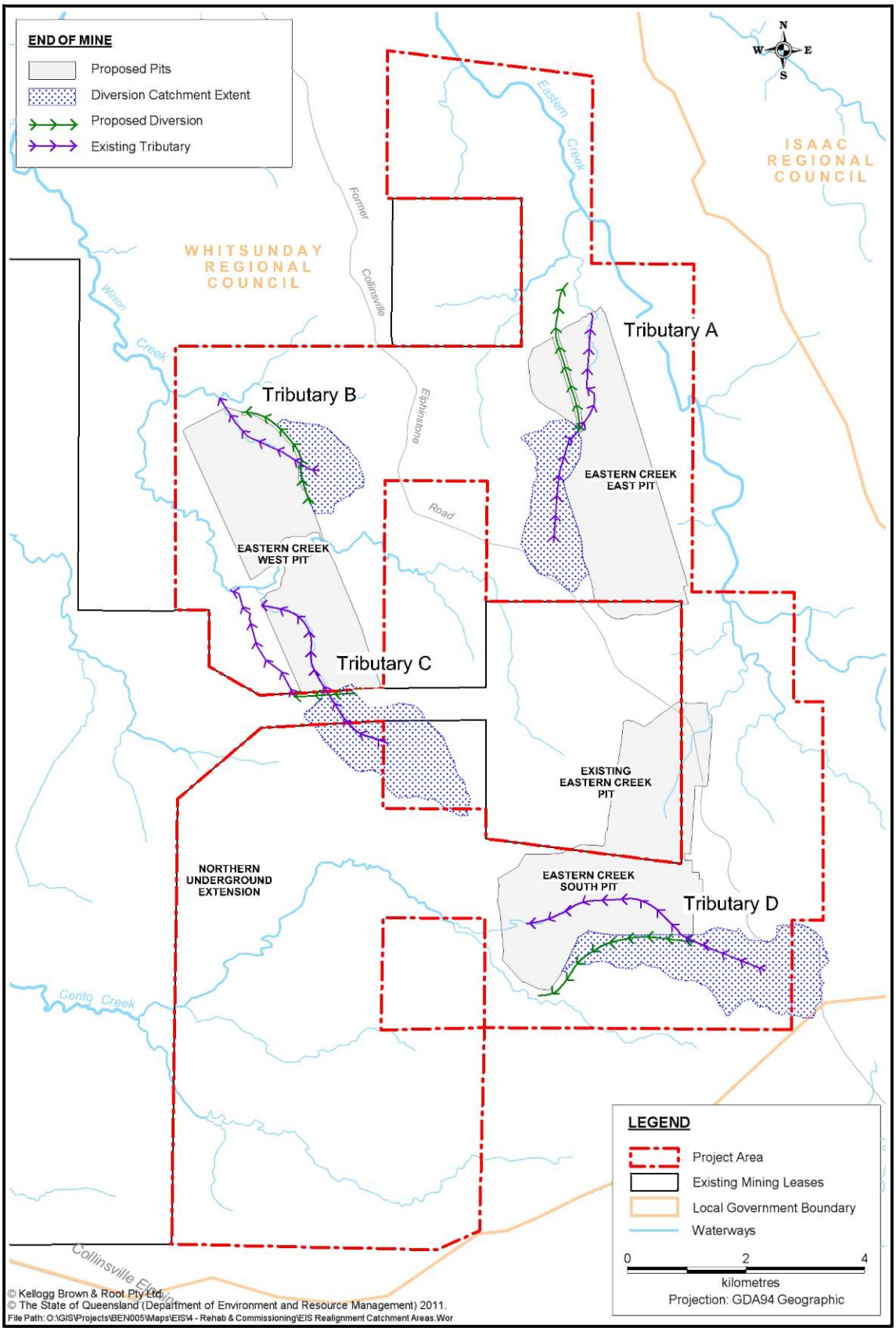

Figure 6 **Waterways and proposed diversions**
(Figure reproduced from the EIS)

4.8.2.2 Potential impacts and mitigation – surface water

Water usage and supply

The EIS outlined that major water demands for the existing mine would include dust suppression, CHPP (coal washing), truck wash and industrial usage, miscellaneous usage such as wash down and cleaning, crib facilities etc. Water inputs to the existing operation include the runoff from mine affected catchments, groundwater inflow to pits and dewatering of the underground workings (4.4ML/day), local undisturbed catchments (0.8ML/day) and imported water from the Bowen River (allocation 6.2ML/day, although use is typically 2–3ML/day). This demand would be met by water captured within the new open cut pits or from groundwater derived from the extension of the underground mine.

Drought

The EIS stated that in the event of prolonged drought, the project would draw on the available SunWater allocation to Xstrata Coal which was deemed as sufficient to meet any additional water requirements for the project. The available SunWater allocation to Xstrata Coal is 2820ML/year for its mining and town facilities. The water balance analysis used in the EIS indicated that in wet and average rainfall periods the demand from external sources would be negligible (which would equal less than 3% of the proposed water demand).

4.8.2.3 Proposed watercourse diversions

The EIS outlined that the proposed project would require 4 diversions of watercourses as part of progressive mine development (Figure 6):

Tributary A – Eastern Creek minor tributary (Eastern Creek East pit):

A watercourse diversion of a tributary of Eastern Creek would be required because the proposed Eastern Creek East pit would intersect the flow path. During mining a dam would be located on Tributary A from which runoff would be collected and pumped around the open cut footprint. It was anticipated in the EIS that disturbance of the tributary would commence around 2020 and the reinstated tributary would receive catchment runoff after around 2038.

Tributary B – Wilson Creek minor tributary (Eastern Creek West – northern pit):

The diversion of a tributary of Wilson Creek would be required because the proposed northern pit of Eastern Creek West would intersect the flow path. It was proposed in the EIS that this tributary would be diverted along the base of the proposed out-of-pit waste rock dump. This diversion would not be required before 2020.

Tributary C – Wilson Creek minor tributary (Eastern Creek West – southern pit):

The diversion of another tributary of Wilson Creek would be required because the proposed southern pit of Eastern Creek West would intersect the flow path. The EIS proposed that this tributary would be diverted to an existing tributary to the west of its current flow path. This diversion would not be required until 2026.

Tributary D – Upper Cerito Creek minor tributary (Eastern Creek South pit):

The diversion of an upper Cerito Creek tributary would be required because the proposed Eastern Creek South pit would intersect the flow path. The EIS proposed that this tributary would be diverted along the edge of the proposed pit and waste rock dump. This diversion would not be required until 2020.

All tributaries (A–D) would be maintained as permanent diversions. Each diversion would require approval from DNRM prior to their establishment. All diversions would be designed in accordance with approval conditions that would be provided by DNRM which would inform the design of each diversion in regards to the battering of banks, establishment of riparian vegetation and the creation of pool and riffle habitats.

In the review of the amended EIS, DNRM recommended that the proposed condition C27 in the EM Plan (regarding destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring) should be amended (refer to section 5.1).

Flooding assessment of the proposed open cut pits and subsidence areas

A hydrological analysis was undertaken by the proponent to estimate flood flows along each of the waterways potentially affected by the project. The hydrology and hydraulics of Eastern Creek, Wilson Creek and Cerito Creek in the vicinity of the proposed project were assessed. Flooding impacts were expressed in terms of increases to flood levels (afflux), changes to the extent of inundation and changes in channel and overland flow velocity.

The modelling results indicated that the affluxes would be restricted to several localised areas, and are of a very low order. Velocity impacts tend to be localised in constricted points and in the underground mining subsidence areas. The results showed that while there is a measurable change (with respect to existing conditions) the relative increase is small and it does not suggest a significant additional widespread scour risk.

The potential impacts due to the proposed project were summarised as follows:

Eastern Creek – Reduction in the Eastern Creek flood levels due to Eastern Creek East pit intersecting small gullies flowing to Eastern Creek. There would be no backwater effects to the waste rock dump or residual void areas as they would be located outside of the banks of the Eastern Creek main channel. However, an encroachment into small tributaries that drain to Eastern Creek was predicted.

Wilson Creek – Wilson Creek would traverse the Eastern Creek West pit. A corridor is proposed to avoid the need for a diversion; and hence no impact on Wilson Creek in the vicinity of the Eastern Creek West pit was predicted. There would be a minor increase in flows in gullies as a result of the diversion of a tributary intersected by the proposed pit. Two tributaries of Wilson Creek would require a diversion to prevent stormwater runoff entering the mine pits (Tributary B and C).

Upper Cerito Creek – Cerito Creek would flow across the footprint of the proposed underground mining area. Subsidence has the potential to cause localised ponding and alter the natural overland drainage pattern. Hence, the assessment predicted an increased of water levels and flow velocities due to a proposed diversion (Tributary D). No impact on adjacent land holders due to flows being contained within the waterway was predicted.

The Cerito Creek Dam subsided area – Minimal impact on the waterway since the majority of this area would be covered by the existing Cerito Creek Dam. Outside the dam inundation extent minor ponding in overbank areas would be expected, but these would comprise shallow and isolated pools generally less than 0.5m and were predicted to be short-lived. Most depth increases were predicted to occur at low points in the terrain, mainly around the drainage features.

The EIS outlined that the proposed development may obstruct flow paths for local stormwater runoff. These potential impacts on local runoff would be addressed in the design of stormwater management infrastructure on the site.

4.8.3 Description of groundwater values – findings of the EIS

4.8.3.1 Existing environmental values – groundwater

The EIS Chapter 10 – Groundwater was not amended following the public submission period as the proponent considered it had adequately addressed the TOR.

The EIS described that the groundwater flow would be most likely through the gravels in the bed of the creeks, and removed by evaporation and evapotranspiration as there was no permanent base flow in the creeks. The groundwater model concluded that this lack of significant aquifer discharge via base flow in the creeks, and the brackish to saline nature of the groundwater would suggest that the volume of groundwater recharge entering the aquifers would be very low. This was considered as typical for semi-arid areas in Central Queensland. Significant recharge of the groundwater systems in Central Queensland usually only occur after prolonged rainfall events. The groundwater levels in the project area ranged from 230–330m AHD. The groundwater flows were found to be in a general easterly to north-easterly direction in the project area, reflecting the topography and alignment of the surface drainage network.

The groundwater assessment carried out as part of the EIS resulted in a wide range of groundwater quality from fresh to highly saline. The data from the exploration drill holes indicated brackish salinity levels of 1000–3000 mg/L. However, the assessment found that the tertiary basalts and basal sands of the shallow alluvium would contain the best quality groundwater with higher salinity expected in the coal seams at deeper depths.

4.8.3.2 Potential impacts and mitigation – groundwater

Impact on environmental values

The EIS concluded that no groundwater dependent ecosystems in the project area would be impacted by the proposed project. Furthermore, the EIS outlined that the coal seams are very deep and while the radius of influence of depressurisation of the coal seams would extend outwards from the project area, it would not intercept any sensitive aquifers or ecosystems.

The only environmental value identified for groundwater was for industrial use, and this value would not be impacted by the proposed project.

Drawdown in groundwater levels during the life of the mine

The EIS found that the low permeability of the Triassic and Permian units would confine the extent of drawdown to the areas around the immediate vicinity of the pits. The drawdown in the coal seams would be slightly more extensive than in the overlying strata, but would be generally confined to within 1km of the highwall.

Following commencement of mining in the Eastern Creek South pit, the drawdown in the upper layer would propagate through Tertiary units in a north-westerly direction, and then would terminate abruptly at the limit of the formation. This area is also characterised by the presence of Tertiary basal sands underlying the basalt cap. The Triassic Rewan formation is absent in this area, which normally acts as a semi-impervious layer over the Permian sediments. The coal seams were found to be relatively shallow in this area, all of which contribute to increased transmissivity and drawdown. It was anticipated in the EIS that the dewatering of the project area would develop rapidly and continually and would be likely responsible for increased inflows to the Eastern Creek South pit when compared with the other proposed open cut pits.

Drawdown in the coal seam associated with the underground mine was found to be similar to the open cut pits, being generally confined to within 1km of the underground mining footprints.

Impact on bores

The EIS outlined that there would be potential for water levels in 3 registered groundwater bores (RN60466, RN60467 and RN17269) to be impacted by the proposed project. These bores are located within the zone of impact at the western side of the Eastern Creek South pit. Furthermore, a third bore (RN17269) which is located approximately 1.1km from the south-western corner of the proposed Eastern Creek South pit, had a predicted drawdown of <1m but the EIS concluded that it would be unlikely to be distinguishable from natural fluctuations or impact on the yield.

Impact on surface water

EIS assessments predicted a small area of drawdown to develop in the overburden layer between the northern and southern pits of Eastern Creek West which would reach 6.5m by the end of mining. This drawdown would extend across the drainage path of the upper reaches of Wilson Creek. It further predicted a potential for flow from surface water to groundwater across this area. However, it was concluded in the EIS, that the flow losses would not be significant, as no disturbance is proposed to the banks of the creek or creek bed between the 2 pits. Furthermore, the mine plan has been designed to ensure the proposed disturbance footprint does not encroach on the 1000 year ARI flood extent of Wilson Creek.

Groundwater contamination

Geochemistry assessments of the overburden and reject material found that the bulk overburden and coal reject materials are classified as non-acid forming, which would have excess acid buffering capacity, and a high factor of safety with respect to potential for acid generation. The surface runoff and seepage from waste rock and coal reject materials generated would be pH neutral to alkaline and show relatively low levels of salinity following surface exposure. Furthermore the assessment found that the concentration of total metals in overburden and coal reject would be well below applied guideline criteria for soils and unlikely to present any environmental issues associated with rehabilitation and final land use.

Water extract tests indicated that the concentration of soluble trace metals and major ions in runoff and seepage from waste rock and coal reject would remain within applied water quality guideline criteria and would be unlikely to present any significant environmental risks for on-site or downstream water quality. Based on the geochemistry assessment data it was found that it would be unlikely that leachate generated from these materials would adversely impact on regional groundwater quality. This is supported by observations from the existing mine which is in a very similar geological setting and has not identified any adverse groundwater quality issues.

Impact of subsidence on groundwater

Subsidence predictions carried out during the EIS assessment estimated the height of connective fracturing following coal extraction using site specific data from the existing underground, as well as from analysis of the pillar/roof/floor system. The depth of cover above the longwall panels would range from 80–420m, with most of the proposed panels deeper than 135m below surface. Fracturing was predicted to extend up to 120m above the seam, and the shallower longwall blocks likely to breach the Tertiary basalts, potentially opening up a pathway for groundwater loss.

The EIS assessment conceived it possible that water contained within the basalts could migrate vertically through these cracks and enter the underground workings. This could result in occasional gushes into the underground mine as fractures were created and intersected. However, the EIS outlined that such inflows would be short lived because the Tertiary basalts are relatively thin and disconnected. The groundwater model used in the EIS predicted the drawdown in the aquifer created by subsidence to be insignificant as a result of vertical cracking.

Groundwater monitoring plan

The groundwater monitoring program proposed in the EIS was based on the existing mine which monitors every 6 month for groundwater levels and water quality at 19 sites. Measurements would include pH, electrical conductivity, total dissolved salts, major cations and anions, major and minor trace elements, iron, aluminium, silver, arsenic, mercury, antimony, molybdenum, selenium and total petroleum hydrocarbons. This existing program is proposed to be expanded to include the extension area and would involve establishing 10 new open standpipe groundwater monitoring bores which would allow for measurement of water levels in the shallow alluvial and basalt aquifers. All open standpipe monitoring bores would be equipped with water level pressure sensors and data loggers for continuous monitoring of water levels.

In the review of the amended EIS, DNRM recommended that it be consulted over the development of a groundwater monitoring plan prior to the commencement of mining and that appropriate conditions for the EA should be developed in consultation with EHP (refer to section 4.8.5 – Conclusion and outstanding issues).

4.8.4 Description of mine water management – findings of the EIS

Chapter 11 – Mine water management was amended following comments made during the EIS submission period. The following sections outline the approach of the mine water management for the proposed project which would involve segregation of catchment types to minimise the mine-affected water inventory. However, the amended version still has outstanding matters which would need to be addressed during the approval process. These outstanding issues are discussed further below in section 4.8.5 – Conclusion and outstanding issues.

4.8.4.1 Management of proposed diversions

The EIS outlined that diversions are required when catchment runoff enters proposed mining areas, such as waste rock dumps or open cut pits. Four diversions are required, namely Tributary A-D (Figure 6). These sections of tributary would be close to the head of their subcatchments, and the corresponding diversions would therefore receive low flows. The EIS predicted peak flows of not more than $30m^3$ per second under rainfall conditions of up to a 100 year ARI. A monitoring and evaluation program would be developed. The EIS outlined that diversions have been designed to cater for a 1000 year ARI event. The low flow channel (active channel) is sized to nominally contain a 5 year ARI event, which is the typical capacity of the low flow channel in the existing tributaries.

The EIS outlined that the design objective for diversions would be to establish new waterways that appear and function as natural features in the landscape, largely indistinguishable from the pre-existing natural waterways. The intent is that new channels should reach an equilibrium state as soon as possible. The proposed adopted design principles for the diversions outlined in the EIS would include:

- Long-term geomorphic stability as soon as possible (with a channel bank batter slope of 1:3 (v:h)).
- Diversion bed grade would be similar to that of the natural waterways, which would be achieved by designing sufficient length and cross-sectional area and incorporating meanders of adequate geometry where appropriate.
- Capacity of the receiving waterways to carry the additional flows without causing stream power or velocity problems.
- Mimicking pre-development natural channel form and hydraulic characteristics.
- Advance construction of each diversion to allow vegetation to establish prior to use – Revegetation would be achieved with native grasses, locally occurring (endemic) trees and shrub species to protect against erosion and manage sediment control.
- Hydraulic characteristics are to fall within commonly accepted thresholds for velocity, bed shear and stream power.
- Selection of competent rock armouring materials necessary for channel construction, catering for both high and low flow conditions.

According to the EIS, geotechnical studies have not yet been carried out so the proposed design is based on general assumptions for the likely materials. Detailed geotechnical investigations would be undertaken by the proponent prior to implementation. Decisions regarding final landform contouring, drainage and diversion sizing would be made during detailed design on the basis of further geomorphic, geotechnical, hydraulic and topographic information to be collected at that time.

Hydraulic models were used in the EIS to assess the additional flow and the effect of flooding on diversions. During this assessment it was found that Tributary A and B would have no changes to flow or velocity in this section of the receiving waterways. Tributary C and D would have an increase in flood levels and flow velocities due to the additional flow. Rock armour protection to the bed and banks were proposed in order to increase the scour threshold and reduce the risk of erosion, especially in locations where there are constrictions or steeper gradients.

The proposed diversions to watercourses would require an authorisation by DNRM under the Water Act for a water licence to interfere with the flow of water.

4.8.4.2 Mine water management

The EIS proposed that water would be segregated based on quality in order to maximise opportunities for water reuse, minimise the mine water inventory and minimise changes to the hydrological regime (e.g. by allowing clean water to pass around the disturbed areas). Controlled blending of different water types would also be carried out in order to dilute saline water. Several mitigation measures were proposed in the EIS:

- Mine-affected water would not be released due to elevated salinity.
- Sediment-affected water would be captured from areas that drain rehabilitated waste rock dumps, access roads and lay-down areas and would pass through sedimentation dams prior to release to the environment, once the applicable sediment concentrations were satisfied.
- Runoff from undisturbed catchments upstream of the mining area would be diverted around the disturbed area and released directly to the environment.

The EIS stated that the proposed project would require a total 13 dams which would be established prior to disturbance of the catchment, and decommissioned (or retained for future landholders) when the disturbed catchment has been rehabilitated.

An erosion and sediment control plan was proposed in the EIS to mitigate potential impacts. The measures proposed included limiting disturbed areas, minimising the number of passes by heavy earth moving equipment, implementing sediment limitation devices, constructing bunds to restrict flow velocities, limiting vegetation clearing work during heavy rainfall, adopting stormwater controls and upstream treatment, revegetating and implementing dust suppression. The EIS also outlined that a water quality monitoring program would be implemented for the life of the proposed project.

EHP reviewed the proposed mine water management. The information provided in the EIS is based on the mine water management of the current operation. However, there is insufficient assimilative capacity in receiving waters to receive discharged mine affected water. Hence, mine water management for the proposed extension project is an outstanding issue and would need to be addressed further as part of the amended EM Plan. These comments are in line with comments received from DSITIA also outlined several outstanding issues regarding mine water management and monitoring. Comments received on these matters are summarised in section 4.8.5 – Conclusion and outstanding issues.

4.8.4.3 Post-closure water management for final voids

The EIS assessed the expected lake formation, water levels and water quality within the proposed 4 final voids: 2 associated with Eastern Creek West pit, and 1 each for Eastern Creek East pit and Eastern Creek South pit.

The preliminary assessments provided in the EIS showed that the final void would not have adverse impacts on the regional groundwater systems. The EIS; however, outlined some uncertainty associated with the key factors affecting pit lake formation, such as contributing catchment area, groundwater inflows and evaporative losses.

The EIS outlined further that as part of Newland Coal's current mining closure planning process, a progressive assessment of the final land form would be undertaken. This would include progressively updating the design of the final void, water levels and water quality information. If the risks of spill are found to be higher than predicted, the following contingency measures were proposed to mitigate impacts:

- Re-contouring of the final void floor elevations to improve evaporation from the void.
- Re-contouring of the rehabilitated area to minimise rainfall runoff volumes emanating at the pit void.
- Construction of levees to raise spill points.
- Reconfiguring the final void strategy to encourage release from the void and minimise the accumulation of saline water.

4.8.5 Conclusion and outstanding issues

While the existing resources and environmental values of water that may be affected by the project were described in the EIS, a number of outstanding issues remain. In particular water quality and resource indicators for measuring environmental values, and objectives that would protect the identified values were not appropriately described and hence do not adequately address the TOR. As part of the review of the proponent's response to submission and the amended EIS chapters, concerns were raised by several government agencies. These are summarised below.

DNRM recommended that a groundwater monitoring plan would need to be supported by DNRM prior to the commencement of mining and that appropriate conditions for the EA is developed in consultation with EHP and that condition C27 (regarding destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring) should be amended (see section 5.1 – EM Plan Outstanding issues).

DSITIA commented that the amendments made for the EIS did not address their specific recommendations. Of major concern was how the data was interrogated and analysed, e.g. pooling water quality data from mine affected sites (impacted sites) with un-impacted sites in a way that does not sufficiently describe the receiving environment and precludes an accurate assessment of the potential impacts from the proposed extension to water quality and aquatic ecosystem health. As a consequence, it was difficult for DSITIA to determine if monitoring data would be able to determine any deviation from the baseline condition (where the baseline condition is the water quality prior to mining impacts and, where possible, minimally impacted from anthropogenic activities in the manner of reference sites as defined in the Queensland Water Quality Guidelines (QWQGs)). Other comments made included:

- Missing information on baseline monitoring of the receiving environment (specifically regarding whether sites are impacted or not by mining activities).
- Missing information on the flow at the time of sampling (to ascertain flow salinity relationships).
- An understanding of the local relationships between salinity and flow that would inform the process of setting appropriate EA discharge rates and water quality limits.
- Insufficient information to describe the surface water receiving environment and appropriate identification of potential impacts to surface water environmental values (EVs) as required in the TOR.
- That the proponent refers to water quality data submitted to EHP in 2012, but this data was unavailable.
- That the EA conditions proposed by DSITIA during the EIS process were not included.
- Lack of understanding regarding aspects of water quality monitoring and how collected information can be applied to various interpretation processes.
- Mis-alignment between the proposed EA conditions and the model water conditions for coal mines in the Fitzroy basin (these model conditions provide useful conceptual aspects and processes which could be readily applied to the current proposal).

As a consequence of these outstanding issues, DSITIA recommended the following:

- Monitoring data would need to be re-assessed, taking the expansion into consideration.
- The current EA water conditions are based on a number of unknown factors (as outlined above) and as a consequence, the proposed water management may potentially pose a high risk to downstream environmental values, including aquatic ecosystem health.

The concerns outlined by DSITIA are supported by EHP. The EIS referred to the current environmental monitoring database that was provided to EHP in 2012; however, a comprehensive dataset has not been provided to EHP containing all updated monitoring data for the full assessment. This makes the assessment of all water monitoring points and potential impacts difficult. Furthermore, the proposed extension is a different application with different release points; hence the 2012 data may not be relevant for the proposed project and would need to be updated. Other concerns raised by EHP included:

- The proponent would need to provide a water balance model which demonstrates how the site would be operating within the proposed design configuration without having unauthorised releases.
- The current mine water management is not working well and proposed surface water management arrangements are based on the existing EA for the existing mine. Experience from this existing mine shows that there is insufficient assimilative capacity in receiving waters to receive mine affected water. This is an outstanding issue and would need to be addressed as part of the draft EA conditions (see section 5.1 – EM Plan Outstanding issues).

4.8.6 Proponent's commitments

In order to minimise impacts on the water resources and environmental values of water that may be affected by the project the proponent has committed to implement:

- Water management plan.
- Water monitoring for groundwater, surface and mine water.
- Monitoring and evaluation program for the 4 creek diversions (Tributary A-D).

- Rehabilitation of proposed diversions and other disturbed areas with native grasses, locally occurring (endemic) trees and shrub species to protect against erosion and manage sediment control.
- Water segregation.
- Erosion and sediment control plan.
- Progressive assessment of the final land form, including final voids.

4.9 Air quality

Chapter 12 of the EIS described the existing air environment and any environmental values that may be affected by the project.

4.9.1 Assessment of the EIS chapter

4.9.1.1 Submissions on the EIS chapter

Comments were received relating to clarifications sought or errors encountered in the text and hence do not need to be outlined further. Another comment was in relation to the rates on predicted annual average dust deposition. These rates outlined in the EIS chapter cannot be assessed against the department's monthly nuisance dust goal. Hence, EHP recommended that these figures should be replaced with monthly figures from the air quality assessment in Appendix L.

4.9.1.2 Proponent's response to submissions

The proponent responded that upon review of the EIS some of the figures found in Chapter 12 (figures 12.10 and 12.11) could not be directly assessed against the EHP recommended monthly averaged nuisance guideline for dust deposition rates as these figures assessed dust deposition rates averaged annually against the New South Wales' Office of Environmental Health objectives. Hence, other figures have been included in the amended EIS to rectify this issue.

4.9.1.3 Adequacy of the EIS chapter

The amended Chapter 12 – Air addressed the requirements under the TOR and no outstanding issues remain.

4.9.2 Description of air quality – findings of the EIS

The EIS outlined the primary potential impact on the existing air quality environment would be dust generation associated with open cut mining operations. Construction activities associated with the proposed project were described in the EIS to be minimal as the CHPP and associated infrastructure are already in operation as part of the existing mine. Hence, it was concluded that dust generation associated with a small amount of earthworks associated with the construction of haul roads and crib facilities would be minor compared with normal mining operations and therefore have minimal dust generation potential.

The EIS assessment found that transport of ROM coal from the pits to the CHPP would be a major potential source of dust. Other key contributors would include:

- Excavation and transfer of ROM coal and overburden within active mine pits.
- Haulage of waste rock on proposed haul roads.
- Wind erosion, overburden transfer and handling from waste rock dumps.
- Wind erosion and coal handling from ROM and product stockpiles.

Dust management

The EIS outlined that the following dust mitigation measures were incorporated into the air quality assessment modelling:

- Reduction of wheel generated dust due to dust suppression watering on haul roads.
- Reduction of wind erosion from fully rehabilitated land.
- Reduction of wind erosion from partially rehabilitated land.

The modelling results indicated that these measures would ensure that there would be no significant impacts at any of the sensitive receptor locations. The EIS stated that air quality objectives would be achieved, monitored and audited through the implementation of a dust management plan and the continuation and extension of the ambient air monitoring program currently operating at the existing mine. It was concluded in the EIS, that these measures would enable the proposed project to manage and track long-term trends and reduce dust emissions as far as is practicably possible to avoid any significant impacts at any of the sensitive receptor locations and maintain the environmental values in the region.

The dust management plan proposed in the EIS would include:

- A complaints registry and resolution protocol.
- Grading and watering of hauls roads.
- Maintenance of safe and efficient vehicle speeds on haul roads and secondary roads.
- Limiting the amount of cleared area, particularly during construction.
- Progressive rehabilitation.
- Continued monitoring of dust deposition in the project region.
- Continued monitoring of meteorological variables that may contribute to adverse dust conditions for some operations (i.e. high winds on stockpiles).

The EIS further outlined that the existing dust mitigation measures and the development of a dust management plan would continue to keep ambient dust levels well below the air quality objectives during the development and operation of the proposed project.

Air quality

The results of the air modelling undertaken in the EIS showed that the proposed project would not have a significant effect on the existing air quality environment and would be unlikely to cause adverse impacts at the nearest sensitive receptors. Compliance with the relevant air quality objectives would be also achieved at all residential sensitive receptors for all modelling parameters. Predicted ground-level concentrations of PM_{10}, were found to be below air quality objectives. Predicted emissions of $PM_{2.5}$, TSP and dust deposition would also be well below compliance levels.

Greenhouse gases

An assessment of greenhouse gas emissions for the proposed project was undertaken for the worst case year of the Project (2026 when coal extraction is planned to be the highest). The worst case volume of greenhouse gas estimated to be produced by the proposed project would 560,715t CO_2 equivalent per annum (in 2026). This would constitute 0.11% of the Australian total and 0.001% of the world total per year greenhouse gas emissions.

If the worst case annual greenhouse gas emissions are conservatively applied for the life of the proposed project (26 years) this would result in 14.6mt CO_2 equivalent for the life of the project. Of the total emissions, fugitive emissions released from the underground mine, fuel and electricity consumption was identified in the EIS as the largest sources of greenhouse gas emissions. In comparison, operations associated with flaring and explosives would generate very little CO_2 equivalents. However, the EIS did not discuss methane as part of greenhouse gas emissions despite that methane is a more potent greenhouse gas than CO_2.

The EIS identified several mitigation measures to target the main sources of greenhouse gas emissions:

- Improving the efficiency of site transport, procurement of fuel efficient equipment and maintaining equipment in good working order to minimise fuel usage.
- Exploring opportunities to reduce energy consumption by increasing efficiency of coal processing and other treatment processes that have intensive electricity usage.
- Reducing fugitive methane emissions by adopting proven and economically viable technologies to reduce the discharge of methane.
- Adopting appropriate land use strategies on site, where appropriate, to develop carbon sinks.
- Improve gas drainage techniques so that a higher proportion of the coal seam methane can be converted to carbon dioxide.

The proponent committed, as part of its annual business planning process to monitor changes of life of mine greenhouse gas emissions due to altered scheduling and planning variances occurring throughout the year. The proponent further outlined that they would consider all reasonable and feasible opportunities to mitigate greenhouse gas emissions through operational changes, including:

- Capturing methane for energy production where possible.
- Using renewable energy for processing where viable.
- Investing in research to progress carbon capture and storage technology with a focus on carbon dioxide emitted from coal-fired power plants.
- Improving energy and greenhouse gas emission data to identify opportunities for improvement.

Cumulative impacts

It was concluded in the EIS, that due to the significant distance between the proposed project and other existing operations such as Hail Creek Mine and North Goonyella (approximately 40 to 50km away) no cumulative effects on air quality would occur. On the other hand it was said in the EIS that the proposed Byerwen Coal Project located adjacent to the western boundary of the existing mine could result in cumulative impacts to sensitive receptors; however, at the time of compiling the EIS, there was insufficient information available regarding the characteristics of, or timeframe for this development to enable an assessment of cumulative air quality impacts.

4.9.3 Conclusion and outstanding issues

Although the EIS chapter on Air has addressed adequately the TOR, EHP recommends the inclusion of methane in the mine's annual greenhouse gas emissions review as part of Xstrata Coal's annual business planning process.

4.9.4 Proponent's commitments

In order to minimise impacts on air quality in the project site the proponent has committed to:

- Implementation of a dust management plan which would include:
  - Complaints registry and resolution protocol.
  - Grading and watering of hauls roads.
  - Maintenance of safe and efficient vehicle speeds on haul roads and secondary roads.
  - Limiting the amount of cleared area, particularly during construction.
  - Progressive rehabilitation.
  - Continued monitoring of dust deposition in the project region.
  - Continued monitoring of meteorological variables that may contribute to adverse dust conditions for some operations (i.e. high winds on stockpiles).
- Continuation and extension of the ambient air monitoring program.
- Mitigation measures for greenhouse gas emissions.
- Annual greenhouse gas emissions review.

4.10 Noise and vibration

Chapter 13 of the EIS described the existing environmental values that may be affected by noise and vibration from the project.

4.10.1 Assessment of the EIS chapter

4.10.1.1 Submissions on the EIS chapter

During the submission period, the chapter on noise and vibration received the following comments:

- EHP:
  - Requested further information on the potential impacts on endangered species due to elevated noise exposure of the proposed Eastern Creek East pit activities to the nearby national park.
  - Requested the inclusion of EPP(Noise) third primary considerations ('Quality of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystem').
  - The EIS did not provide information on seasonal variations of noise and vibration monitoring and in which season the measurements were made.
  - Requested the supply of the Specialist Noise Report mentioned in Volume 2.

- WRC
    - Cumulative noise and vibration levels could not be considered properly due to a lack of relevant information.

4.10.1.2 Proponent's response to submissions

In response to EHP's comment on cumulative noise and vibration impacts on endangered species in the nearby national park, the proponent stated that cumulative noise impacts as a result of the existing mine and the project operating simultaneously are not expected to result in exceedances of the guideline noise levels adopted in the EIS for any of the sensitive receptors.

In regards to the request on further seasonal sampling information the proponent stated that the values detailed in the EIS have been extrapolated from the existing mine's EM Plan. These values are based on background studies of typical noise sources which during the measurement period included insects, wind, dogs barking, intermittent road traffic, agricultural machinery and activities, and mining activities from Newlands main deposit. The raw data on which the noise and vibration EIS assessment was based derived from the background noise prior to the development of the Wollombi and Suttor Creek deposits from 1998–99.

In response to WPC's comments the proponent outlined that cumulative noise impacts as a result of the existing mine and the proposed project operating simultaneously are not expected to result in exceedances of the noise levels. The proponent further stated that the existing mine operation already has a number of measures in place to ensure that noise, airblast overpressure and vibration impacts are maintained at a practical minimum.

4.10.1.3 Adequacy of the EIS chapter

As a consequence to the abovementioned comments, the only change to the EIS chapter on noise and vibration was the inclusion of EPP (Noise) third comment. Although the EIS chapter on noise and vibration has addressed adequately the TOR, EHP recommends that noise levels would be monitored in the Newlands Nature Refuge as part of the biodiversity offset strategy.

4.10.2 Description of noise and vibration – findings of the EIS

Residential receptors

The results of the EIS assessment on noise predictions indicated that the health and wellbeing of residents living near the proposed project would not be affected. The results indicated that the noise generated by the proposed project would not exceed of any of the noise level criteria developed for the receptors. The remaining activities associated with the proposed project (i.e. coal handling facilities, vehicle movements, ventilation fans), would be located outside the project area and would not increase from the current noise and vibration levels. The EIS stated however that, particularly during dry, cool winter months, light prevailing winds and temperature inversions, would have the potential to increase noise dispersion and hence would increase perceived noise levels at sensitive receptors above threshold levels. The EIS outlined that due to the attenuating effects of the intervening topography, perceived noise levels would not compromise the acoustic qualities suitable for the wellbeing of individual sensitive receptors.

Low frequency noise

According to the EIS the main sources of low frequency noise for the proposed project would be the CHPP and ventilation fans associated with the underground mining operation. As both infrastructures are in operation on the existing mine, the EIS concluded that no changes in the current noise levels are anticipated.

Complains mechanism

The EIS outlined in the event of a formal noise complaint, the complaint would be investigated to determine the source of the nuisance noise. Where appropriate, monitoring would be conducted at the affected residence. Complaints would be entered onto a register which would contain details of noise complaints and corrective actions implemented. Options could include acoustic bunds, revegetation of ridgelines or acoustic treatment of residences.

Excessive noise nuisance for ecological receptors

The EIS outlined 2 ecological receptors as potentially being impacted by the proposed project, namely the Homevale National Park and a proposed National Park located to the east of the project area. It was concluded that the potential impacts on endangered fauna species would be insignificant.

However, the EIS failed to incorporate the existing Newlands Nature Refuge in its noise assessment, despite the refuge being located within the current mine and on the south-western border of the proposed project. EHP recommends that noise levels would be monitored in the Newlands Nature Refuge as part of the biodiversity offset strategy.

Excessive ground vibration

The EIS identified the blasting of overburden as the primary source of vibration. Experience with vibration management at the existing mine and other Queensland mines, has shown that acceptable vibration displacement levels as per the standard can be achieved at a distance of 1-1.5km. Hence, the EIS concluded that all vibration-sensitive receptors are more than 8km from anticipated blasting operations and thus would not be affected by ground vibration.

Mitigation measures

The EIS outlined the following mitigation measures for noise, airblast overpressure and vibration impacts based on measures already in place for the current mine:

- No night blasting after 8pm and before 6am. This would minimise the likelihood of any enhancement of noise and overpressure experienced due to temperature inversions.
- A blast monitoring program would be implemented to ensure that potential blast impacts would be minimised and feedback on explosive charge size and sequence timing would be compiled to optimise the blast event outcomes while minimising vibration and overpressure.
- Any formal complaints would be investigated to determine the specific circumstances that related to airblast overpressure/vibration resulting in the compliant. Where appropriate, monitoring would be conducted at the affected residence. A register would be established to contain details of any noise complains and corrective actions taken relating to the complaint.

Cumulative impacts

The EIS outlined that background noise and vibration in the vicinity of the proposed project is confined to environmental sources (vegetation, insect and bird life), residential sources, farming activities (farm vehicles, cars, transport) and the existing mine. Cumulative noise impacts as a result of the existing mine and the proposed project are not expected to result in exceedances of the guideline noise levels adopted in this assessment at any of the sensitive receptors. It was concluded in the EIS, that due to the distance, the 2 noise sources would not physically interact.

The proposed Byerwen Coal Project is proposed to be located adjacent to the western boundary of the existing mine. The Byerwen Coal Project could result in cumulative noise levels exceeding guideline levels at a number of the sensitive receptors. However, at the time of compiling the EIS, there was insufficient information available regarding the characteristics of, or the timeframe for this development, to enable an assessment of cumulative impacts.

4.10.3 Conclusion and outstanding issues

Although the EIS chapter on noise and vibration has addressed adequately the TOR, little information was given on where and how the noise levels would be monitored as part of the proposed operations. This would need to be clarified during the preparation of the draft EA. EHP further recommends that noise levels would be monitored in the Newlands Nature Refuge as part of the biodiversity offset strategy.

4.10.4 Proponent's commitments

In order to minimise impacts on noise and vibration the proponent has committed to:

- No night blasting after 8pm and before 6am.
- A blast monitoring program.
- Noise/vibration/airblast overpressure complaint management mechanisms.

4.11 Cultural heritage

Chapter 16 of the EIS described the cultural (Indigenous and Non-Indigenous) heritage and any cultural heritage values that may be affected by the project. Under section 86 of the *Aboriginal Cultural Heritage Act 2003*, an Indigenous cultural heritage plan is being prepared by the proponent in accordance with the requirements of Part 7 of that Act.

4.11.1 Assessment of the EIS chapter

4.11.1.1 Submissions and adequacy of the EIS chapter

No comments were received as part of the EIS public submission and hence the TOR for cultural heritage has

been adequately addressed.

4.11.2 Description of the cultural heritage – findings of the EIS

Indigenous cultural heritage

The EIS outlined that the project area is composed of land traditionally occupied by the Birri People. As required under the *Aboriginal Cultural Heritage Act 2003*, a Cultural Heritage Management Plan was negotiated with the Birri People for all of Xstrata Coal's operations affecting land traditionally occupied by the Birri People. The Cultural Heritage Management Plan was approved by the Queensland Government on 5 October 2010.

Non-indigenous cultural heritage

Field searches identified the grave of the locality's original settler Archibald Fergusson in the project area. This grave is located in the road reserve near the present Byerwen Homestead. Byerwen Homestead is located to the north of the project area and the grave site would not be disturbed. No other non-indigenous cultural heritage sites were found during the EIS surveys.

4.11.3 Conclusion and outstanding issues

The proponent has addressed cultural heritage adequately and no outstanding issues remain.

4.11.4 Proponent's commitments

In order to minimise impacts on Indigenous and non-Indigenous heritage the proponent has committed to the following:

- Cultural Heritage Management Plan for Indigenous cultural heritage.
- 'Stop' and 'report' process for non-indigenous cultural heritage.

4.12 Social values

Chapter 17 of the EIS discussed the potential impacts on existing social values in the communities surrounding the project area.

4.12.1 Assessment of the EIS chapter

4.12.1.1 Submissions on the EIS chapter

As part of the EIS assessment the following matters were raised in the submissions:

- DETE:
  - Requested a workforce management plan as a part of the Social Impact Management Plan (SIMP).
  - Requested that the stakeholder list to include DETE, DATSIMA and Skills Queensland.
  - Requested more information in the draft SIMP to assess strategies for marginalized groups and link them to targets that would result in greater representation of the groups in the workforce.
  - Recommended that the draft SIMP for this project would need to be strengthened in the areas of long-term employment, skills, workplace management plan, employment and training strategies for marginalised groups.
- DSDIP – Social Impact Unit:
  - Recommended that although the TOR did not include a requirement for the development of a workforce management plan, skills planning for the project could be reconciled against the objectives of the workforce management plan as outlined by Skills Queensland, and that an dialogue be established with Skills Queensland aimed at maximising local employment opportunities for future employee turnover in the mine workforce.
  - The Mackay, Isaac and Whitsunday Regional Plan were not stated as a statutory document and would need to be addressed as such within the EIS.
- Skills Queensland:
  - Further information on workforce occupation breakdown required.
  - Suggested a commitment in a workforce management plan that outlines the proponent's future workforce

planning.

4.12.1.2 Proponent's response to submissions

In regards to comments made by all submitters in regards to a workforce management plan, the proponent responded that the completion of a workforce management plan was not a requirement of the TOR and has therefore not been included in the EIS.

In response to DETE's comments, the proponent stated that it is an equal opportunity employer and opportunities of employment are given on a merit base which includes Aboriginal Affairs Guiding Principles, an apprenticeship programme offered to local communities, school based traineeship for local communities, bursary for local children, and part-time/flexible work arrangements for women.

In regards to DSDIP's comments the proponent responded that the completion of a workforce management plan was not a requirement of the TOR and has therefore not been included in the EIS. However, Xstrata Coal responded that they are committed to the goal of sustainable development and actively upholding its Sustainable Development Policies and Standards. There are currently a number of existing programs that raise the awareness of mining related careers, which help to facilitate training and education opportunities for Glenden and the wider region. Furthermore the reference to Mackay, Isaac and Whitsunday Regional Plan was updated in the relevant sections of the EIS Chapter 1 – Relevant plans and approval frameworks.

The proponent responded that they will take into consideration the recommendation put forward by Skills Queensland, but in the meantime will continue to address skill shortages through the provision of ongoing support for industry education and training in Queensland, as well as support for the local education facilities in Glenden.

4.12.1.3 Adequacy of the EIS chapter

No changes to the EIS Chapter 17 were made. However, Chapter 1 – Introduction was amended to incorporate the Mackay, Isaac and Whitsunday Regional Plan. No further comments were received as part of the review of the amended EIS and the proponent's response and hence, the terms of reference for social values has been adequately addressed.

4.12.2 Description of social values – findings of the EIS

In summary, the EIS outlined that the proposed project would be carried out on land wholly controlled by the Xstrata Coal and would not result in the physical displacement of any private residents. The existing mine continues to be the primary economic base for the township of Glenden. Xstrata Coal already makes a significant contribution to the provision of community infrastructure and services, which will be discontinued following mine closure. As such, the EIS concluded, the extension of the existing mine life would have a positive impact on the Glenden community.

The EIS assessment outlined that the existing workforce of 1579 personnel would be adequate to resource the proposed project. There would be no additional transport operations required for the proposed mine workforce. A reduction in workforce numbers is anticipated at varying stages throughout the project life as components of the project and existing mine are completed. As part of the mine closure plan, social impacts on Glenden would be assessed and incorporated into Newlands Coal Mine Closure Plan.

Potential impacts and mitigation measures

The EIS outlined that no significant additional social impacts would be expected as the size of the existing mine's workforce would remain the same. Housing availability would not be affected as a result of the proposed project.

The EIS further stated that while medical facilities are facing a chronic undersupply elsewhere in the region, Glenden has access to a full-time doctor and a full-time dentist through the support of the Xstrata Coal. These services are generally viewed as adequate by the Glenden community.

The EIS identified; however, that the existing pressure on police, ambulance, State Emergency Service and mental health services is expected to continue. Other services, such as education and childcare services are currently perceived by the community as adequate but it was stated in the EIS that this would require ongoing monitoring to ensure they could continue to meet the needs of the Glenden community and surrounding residents.

Mine closure

The EIS discussed that Glenden was build specifically to service the existing mine, and hence would be vulnerable to mine closure. The EIS assessment found that up to 95% of the Glenden population is either directly or indirectly connected with the mine. Mine closure would almost totally remove local employment opportunities for town residents, and would pose a significant challenge to the viability of the town. Xstrata Coal has developed a conceptual mine closure plan in 2007 which would be reviewed prior to the mine closure date. The conceptual mine closure planning would be formalised into a detailed mine closure plan 5 years prior to the proposed closure.

Cumulative impacts

The EIS concluded that Glenden, as a 'one-mine' town would not experience any cumulative social impacts associated with the proposed project other than described above. However, the development of the proposed Byerwen Coal Project may require an estimated construction workforce of up to 500 people and an operational workforce of approximately 1000 people over the life of the Byerwen mine. The proponent (QCoal) of the proposed Byerwen Coal Project envisaged that the construction and operational workforces may be accommodated in surrounding local townships such as Glenden and Collinsville. However, the EIS was unable to assess cumulative impacts on housing and accommodation as there was inadequate information available. Xstrata Coal committed to engage with QCoal as required and has had preliminary discussions with QCoal in relation to future housing and accommodation supply in Glenden.

4.12.3 Conclusion and outstanding issues

The proponent has addressed the social impact assessment adequately and no outstanding issues remain.

4.12.4 Proponent's commitments

In order to minimise impacts on social values arising from the project the proponent has committed to continue to contribute to and support the community infrastructure and services for the life of the proposed project, including:

- Implementation of a SIMP.
- Support of medical services and allied health services in Glenden in corporation with Queensland Health.
- Support of community infrastructure and services
- Support of emergency services and safety.
- Providing employment and training.
- Providing a conceptual mine closure plan.

4.13 Health and safety

Chapter 18 of the EIS described the existing community values for public health and safety that would be affected by the project.

4.13.1 Assessment of the EIS chapter

4.13.1.1 Submissions on the EIS chapter

As part of the EIS assessment the following matters were raised in the submissions:

- DCS, including QFRS and QAS:
  - Noted that should hazardous materials be stored in bulk, provisions in the SPP1/03 must be followed.
  - Outlined that the proponent will need to comply with relevant Queensland statutory legislation and will need to implement safety and health management systems so as to mitigate hazard and risk; as well as safety management plans and emergency response procedures in consultation with state and regional emergency service providers.
  - Outlined that the proponent will need to provide an adequate level of training to staff in compliance with the *Fire and Rescue Service Act 1990.*
  - QFRS requests to be engaged to provide advice on the design of the fire systems to be installed.
  - Implementation of a fatigue management plan to address the issue of fatigued workers driving immediately after completion of their shifts.
  - Requirement of mitigation strategies around the provision of emergency care, ongoing consultation and information around the project status and emergency access to ensure a timely and appropriate Queensland Ambulance Service (QAS) response.
- TMR:
  - Additional information with relation to the project's fatigue management plan.

- WRC:
  - Requested an emergency evacuation and management plan for cases of extreme rainfall events as a precaution
  - Requested that stagnant water bodies are to be covered to prevent the breeding of insects.

It must be noted, that a number of issues raised in submissions for this chapter (i.e. fatigue management) have also been identified for the EIS chapter on transport (see section 4.6.1.1). Hence, some of the responses discussed below also relate back to earlier comments.

4.13.1.2 Proponent's response to submissions

In response to DCS', TMR's and (earlier on) QPS' comments, the proponent outlined that fatigue management forms part of the existing health and safety policies and plans at the current site and hence would continue to be applied for the proposed mine extension and were therefore not discussed in the EIS.

Xstrata Coal responded that they would continue to consult with QAS. In respect to storing hazardous materials in bulk, the proponent responded that controls used at the existing mine for dangerous goods and hazardous substances would be extended to include the project area and that all relevant safety requirements would be addressed with regards to SPP1/03. Furthermore, the proponent acknowledged that the existing operations comply with relevant Queensland statutory legislation and has strategies implemented to mitigate hazard and risk. Hence, Chapter 20 has been amended to include some additions and minor amendments to identify changes to legislation.

In regards to WRC's request on including extreme rainfall events into an evacuation and management plan the proponent responded that the existing mine has an emergency management plan in operation which covers all aspects of emergency management for all foreseeable emergencies, including but not limited to fire, flood, landslide and explosions.

4.13.1.3 Adequacy of the EIS chapter

As a consequence of the submissions, the EIS chapter on health and safety was amended. In a review of the amended EIS and the responses provided by the proponent, both TMR and QPS noted that Xstrata Coal would need to continue to involve both departments in managing fatigue management.

4.13.2 Description of health and safety – findings of the EIS

The EIS identified potential hazards for the operational and decommissioning phases of the proposed project, based on possible impacts on personnel and surrounding loss of control of people and machinery to create potentially hazardous situations. These hazards have the potential to occur at any time throughout the life of the proposed project. The assessment looked into potential incident scenarios, including the potential consequence risk and the likelihood of occurrence, and scored them in accordance with a risk assessment matrix. The EIS also outlined that the proposed project would adopt a dynamic integrated approach to risk management of the operations throughout the life of the mine, recognising the hazards at all points in the operations and how these are controlled. The proponent deems a risk register as an important component of the existing mine's health and safety management plan that would ensure that risks are kept to as low a level as reasonably practicable. As such the proponent would update the existing mine's risk register to incorporate any risks specific to the proposed project. The risk register would be maintained on site and reviewed annually or when a significant operational change takes place for the proposed project or as a result of an incident.

The EIS concluded that with the mitigation measures in place no residual risks remain that would exceed accepted levels for coal mining operations. The proponent committed that based on final detailed design and mine operating plans, a rigorous, more specific evaluation of hazards associated with the proposed project would be undertaken prior to the commencement of the construction phase and again prior to the start-up of the operational phase. New and alternative hazard and risk measures would be evaluated, tested and measured as part of continuous improvement strategies required in the safety and health management system.

4.13.3 Conclusion and outstanding issues

Other than continuing discussions on appropriate fatigue management between the proponent and QPS, TMR and DCS (refer to section 4.6.3), no outstanding issues remain on health and safety, hence the EIS has adequately addressed the TOR.

4.13.4 Proponent's commitments

In order to maintain healthy and safe environment the proponent committed to a range of measures, including but not limited to:

- Legislative requirements.
- Integrated risk management plan.
- Health and safety management plan, including a risk register.
- Regular audits.
- Emergency management plan, including emergency response procedures
- Development of an integrated risk management plan.
- Conducting induction programs.
- First aid and emergency response techniques training.

4.14 Economy

Chapter 19 of the EIS described the existing local, regional or national economies that may be affected by the project.

4.14.1 Assessment of the EIS chapter

4.14.1.1 Submissions on the EIS chapter

As part of the EIS assessment 1 submission was received with the following issue:

- Private submitter:
  - Past econometric studies performed by Asia Pacific Strategy suggest Queensland mines having minority Japanese equity participants have dumped higher ash prime coking coal into Asia Pacific markets to gain or maintain market share.

4.14.1.2 Proponent's response to submissions

As a response to the private submitter the proponent outlined that contract negotiations for specific commodity markets within specific areas of the economy are not considered to be a requirement of the TOR and have not been discussed as part of the EIS.

4.14.1.3 Adequacy of the EIS chapter

The EIS chapter on economy has adequately addressed the TOR and no outstanding issues remain.

4.14.2 Description of the economy – findings of the EIS

The EIS outlined that the existing Newlands mine contributes approximately $150m per annum in wages to the regional economy, $38 million to the state and national economies and contributes $280 million per annum to the state and national economies in royalties, taxes and other charges. The township of Glenden was constructed in 1983 specifically to support operations at the existing Newlands mine. Approximately 80% of the mine's existing workforce is accommodated in Glenden and surrounding area. The EIS outlined that 92% of residential housing in Glenden is owned and managed by Xstrata Coal and leased to mine employees on a subsidised rental basis.

Potential impacts on agriculture

The EIS estimated a loss of grazing potential of around 213 head of stock as an average existing stocking rate for the area of impact. In terms of effects of this loss on grazing productivity in the local area, the Colinta Holdings run approximately 8000 head of cattle in the properties containing the existing mine. This loss this would represent approximately 2.5% of the grazing productivity of this land. The EIS also identified that 67ha of class B good quality agricultural land (GQAL) and 22ha of class C GQAL would be impacted by the proposed project but stated that the benefit of the project development to the community would outweigh the values lost through the alienation of GQAL.

Other potential impacts

The EIS identified that the proposed project would result in the loss of approximately 1940ha of remnant vegetation. While the proponent has committed to environmental offsets and progressive rehabilitation, some ecosystem services would be lost, such as reduction in the regulation of water quality, cultural services (e.g. the loss of recreational opportunities) and supporting services (e.g. the loss of productivity that results from disturbance of natural processes such as soil formation, photosynthesis and nutrient cycling).

Other economic costs associated with the proposed project were related to greenhouse gas emissions and impacts on social cohesion due to the longer-term pressure on facilities and services in Glenden and the surrounding region.

Mine closure

The EIS stated that the mine closure (proposed for 2038) would impact on employment opportunities in the region. However, the proponent also outlined that planning to mitigate these impacts has commenced as part of the existing operation's conceptual mine closure plan. More detailed strategies would be developed and implemented by the proponent in the 5 years prior to the anticipated mine closure.

4.14.3 Conclusion and outstanding issues

The proponent has addressed the TOR in regards to the economy adequately and no outstanding issues remain on this topic.

4.14.4 Proponent's commitments

The following commitment was made in addition to commitments outlined in other sections of the EIS.

- Sustainable development protocol to promote sustainable community development outside of mining.

4.15 Hazard and risk

Chapter 20 of the EIS described the potential hazards and risk to people and property that may be associated with the project.

4.15.1 Assessment of the EIS chapter

4.15.1.1 Submissions on the EIS chapter

As part of the EIS assessment 1 submission was received with the following issue:

- QR National (now Aurizon)
  - Identified that the rail corridor as being linked to 'Queensland Rail'. The below and above rail elements of corridor are owned and operated by QR National and not Queensland Rail. Queensland Rail is a separate entity.

4.15.1.2 Proponent's response to submissions

In response to QR National's comments, the proponent stated that the project consists of a proposed extension to the existing coal mining operations at the existing mine and would not include an expansion of rail operations.

4.15.1.3 Adequacy of the EIS chapter

In response to the comments listed above, the chapter has been updated. No further comments were provided as part of the amended EIS review and hence, this chapter has now been adequately addressed.

4.15.2 Description of the hazards and risks – findings of the EIS

Potential hazards and risks

The proponent acknowledged that the process of risk management for an operational project would require ongoing monitoring of the tasks, controls and human elements to ensure that changes in the work or work environment would trigger a review of the adequacy of the controls. The assessment made in the EIS based it on the existing mine's operations.

The EIS identified potential hazards for the operational and decommissioning phases of the proposed project based on possible impacts on personnel and surrounding loss of control of people and machinery to create potentially hazardous situations. The EIS concluded that with the mitigation measures in place no residual risk remain that would exceed accepted levels for coal mining operations.

Emergency management plan

The proponent would reassess and update the existing mine's emergency management plan. The emergency management plan would consist of a component of the existing safety and health management system and the environmental management system. The proponent also committed to regular audits and regular testing of critical elements (e.g. evacuation, emergency power and remote alarm systems). In case of emergencies, neighbouring properties would be notified.

The emergency management plan would be prepared in consultation with affected and interested stakeholders, including DCS and the emergency services groups:

- Queensland Ambulance Service (Glenden).
- Queensland Police Service (Glenden).
- Queensland Fire and Rescue Service (Glenden).
- Queensland Fire and Rescue Service (Mackay Area).
- State Emergency Services (Glenden).

Integrated risk management plan

Prior to the commencement of proposed project works the proponent would develop an integrated risk management plan which incorporates the whole of the life of the project, including construction, operation and decommissioning phases. The integrated risk management plan would be based on the emergency management plan and would include:

- operational hazard analysis
- regular hazard audits
- fire safety, emergencies.

Dangerous goods and hazardous substances transport storage and use

The EIS outlined that the proposed project would require the use of a number of hazardous substances during the initial mine development and operation phases. It was concluded in the EIS, that it would be unlikely that any new hazardous substances would be introduced that are not already used and managed at the existing mine.

4.15.3 Conclusion and outstanding issues

In response to the comments listed above, the chapter has been updated. This chapter has now been adequately addressed.

4.15.4 Proponent's commitments

The commitments outlined by the proponent are the same as stated in section 4.13.4 – Health and safety.

4.16 Ecology

Chapter 14 of the EIS described the existing ecological values that may be affected by the project. It also addressed ecological values in terms of terrestrial ecosystems, and their interaction, biological diversity, the existing integrity of ecological processes, including habitats of listed threatened or near threatened species and the integrity of landscapes and places, including wilderness and similar natural places. The EIS further assessed potential impacts on the ecological values of the area arising from the construction, operation and decommissioning of the project.

4.16.1 Assessment of the EIS chapter on ecology

4.16.1.1 Submissions on the EIS chapter

As part of the EIS submission period the following comments were raised in the submissions:

- DAFF:
  - The need to establish partnerships with key stakeholders (such as the local government authority) to achieve a collaborative and landscape scale approach in the prevention and management of pest animals and diseases.
  - Requested a pressed specimen of fireweed to be sent to the Queensland Herbarium for the purpose of plant identification. The proponent must provide distribution maps showing the location and density of infestations. This will aid the proponent with its weed management strategies.
  - The proponent should consult with Fisheries Queensland during the design stage for any in relation to all waterway diversions, levee designs, culvert or bed level crossings, rock armouring, or all and any other works within a waterway as defined under the *Fisheries Act 1994*.
  - Two annual surveys followed by 4 yearly surveys may be insufficient to survey the weed parthenium. In favourable conditions, parthenium may flower more than annually. DAFF recommended twice annual survey until no further infestations of the listed species occur.
  - Treatment and effective management of any new infestations should be included in the management approaches for pest species.
  - The statement that vehicle wash-down facilities for vehicles entering and leaving declared weed zones does not provide enough detail about the proposed management practices.
- DNRM
  - Incomplete discussion on wetlands and lacustrine ecosystems; inadequacy of stygofaunal sampling and groundwater dependent ecosystems
- EHP:
  - Requested that all references to the conservation status of Regional Ecosystems (RE) include the conservation status under the *Vegetation Management Act 1999* (VM Act class) and the EP Act (Biodiversity status).
  - Requested a series of suitably scaled figures outlining ground-truthed REs shown as endangered, of concern and least concern/not of concern as listed under the VM Act and EP Act.
  - Requested an adequate description of the quality, structural integrity and species composition of the regrowth brigalow for the project area.
  - Requested the exact extent and size of the brigalow community (regrowth and remnant brigalow) that would be impacted through the proposed underground mine operations.
  - Requested evidence that the community proposed as offsets within the Newlands Refuge Area would not be impacted by the proposed underground mine through subsidence, cracking and prolonged inundation.
  - Requested a representation of existing vegetation communities within the Newlands Nature Refuge and Wollombi Brigalow Offset Area.
  - Sought inclusion of the northern quoll to the list of threatened fauna (MNES) potentially occurring in the project area. The likelihood of the species occurring in areas to be disturbed by the project or otherwise impacted should be discussed. If impacts on the species are likely as a result of the project, they would need to be discussed, mitigated and offset.
  - Requested sufficient information in the EIS and EM Plan on the likely impacts of subsidence including changes on watercourses/drainage lines which may have direct or indirect impacts on aquatic and terrestrial flora and fauna.
  - Requested further information on site specific impacts of potential inundation on threatened REs, such as brigalow and semi-evergreen vine thickets, including figures which show the areas of prolonged inundation superimposed over existing REs.
  - Requested further information on the proposed pest species management in the EIS/EM Plan.

- Requested further information on the position and the area of watercourse affected by both direct clearing of riparian habitat and re-establishment of the diversion, any changes in of flow as a result of diversion, any proposed impacts on state significant biodiversity values and any proposed impacts on terrestrial fauna and flora species.
- Requested further information on the likelihood of occurrence of the ornamental snake and on sampling of stygofauna

- MCC:
  - Raised concerns issue associated with the proposed underground mining which is to occur beneath the Newlands Nature Refuge.
  - Incomplete biodiversity assessment of the project area.
  - Concerns regarding impacts on waterways.

WRC:

- Concerns regarding Cerito Dam's wetland and how it will be protected from environmental degradation.
- Lack of details or mitigation measures for fauna injury and mortality resulting from clearing of vegetation for construction, and increased traffic.

4.16.1.2 Proponent's response to submissions

In regards to DAFF's comments, the proponent updated the requested information in the relevant chapters and EM Plan.

As a result of EHP's request to update the conservation status of REs under the VM Act and EP Act the proponent updated all tables and figures in Chapter 14, including some in the EM Plan. In regards to the description of remnant and regrowth brigalow the proponent responded that while this information was provided as part of the specialist report – Appendix M (Terrestrial flora assessment) it now has been included in the amended Chapter 14 (Ecology). The project area contained approximately 154ha of high value regrowth brigalow (RE 11.9.5). Most of the regrowth was found in the south-western portion of the project area and within the Newlands Nature Refuge. Approximately 42ha of remnant brigalow and 11ha of brigalow regrowth were located above the underground mine. A discussion on potential impacts of subsidence on vegetation has been provided by the proponent and is discussed in detail further below as well as in the MNES section (section 4.17.5.1). While the proponent provided information on ground-truthed vegetation communities within the Newlands Nature Refuge, no information was put forward regarding the existing vegetation communities within the Wollombi Brigalow Offset Area as the proponent considered it outside of the project area and beyond the scope of the EIS. An assessment of the physical impacts of subsidence on watercourses and the landscape was carried out in EIS Chapter 6 – Land (section 4.5), where it was concluded that that physical impacts of subsidence on watercourses would be insignificant. Hence, the proponent concluded, subsidence resulting from underground mining activities would not significantly impact on riparian or aquatic ecosystems within watercourses or drainage lines above underground mining areas. In regards to the response to the northern quoll, refer to the MNES chapter (section 4.17.5.3) comments. The proponent also responded in detail regarding to EHP's comments regarding impacts of diverted watercourses. The response is summarised in more detail in section 4.8 of this EIS assessment report.

In regards to WRC's request on wetland information the proponent responded that in a recent site visit ecologists visited the area mapped by EHP as potential wetlands and assessed the potential for wetlands to be present. The ecologists concluded that no wetlands or springs were observed, and the vegetation was seen to be predominantly open woodland and therefore considered unlikely to be groundwater dependent. Eastern Creek was not flowing at the time of their site visit. The proponent further stated that the stygofaunal sampling was undertaken by suitably qualified personnel over 2 separate sampling events. The locations of the sample bores were selected taking into account the range of geological, hydrogeological and topographical features within the existing mine and project area. Consideration was also given to selecting bores which were likely to have intersected a geological sequence with potential for stygofauna to exist. It was acknowledged that stygofauna are known to exist within saline environments and that stygofauna sampling was undertaken in a range of aquifer types, including saline environment. However, no stygofauna was located at any of the sample locations.

In response to MCC, the proponent stated that under the current Newlands Nature Refuge agreement between the proponent and state and Commonwealth governments underground mining is permitted within the bounds of the Nature Refuge and the Wollombi Brigalow offset area. For further information refer to section 4.19.2 – Existing offset areas. The proponent also responded to MCC's other comments that flora surveys and subsequent ground truth mapping were performed by qualified botanists, whilst fauna surveys were performed by experienced ecologists sourced from both consultancies and the Central Queensland University. Impacts on waterways were discussed in the EIS Chapter 14 (Ecology).

In regards to the concerns raised regarding the existing Cerito Creek Dam, the proponent outlined that this dam is an anthropogenic structure that was established to mitigate the potential impacts of flooding upon the existing mine and its presence is important for the efficient operation of the mine. Hence, the ecology at the dam has changed from a woodland and riparian woodland to a permanent wetland that fluctuates in capacity in response to seasonal influxes of water. This has resulted in a die-off of some trees that were unable to withstand the annual inundation associated with seasonally fluctuating water levels. The proponent outlined that the creation of a wetland has in turn facilitated habitat for wetland flora species, a range of wetland bird species and for local amphibian species. Xstrata Coal further stated that the Cerito Creek Dam would continue to operate as per its intended function (flood mitigation structure) and as such the current ecological values of the created wetland habitat would be retained over time. The proponent also outlined that mitigation measures to prevent fauna injury or mortality during vegetation clearing and traffic movement have been included in the amended EM Plan.

4.16.1.3 Adequacy of the EIS chapter on ecology

While the majority of the amended EIS chapter was assessed as adequate, some outstanding issues relating to ecology remain. These issues are discussed in the relevant subsections below and are also summarised in section 4.17.6 – Conclusion and outstanding issues. DAFF advised that, based on the amended EIS, the existing weed and pest management plan for the existing mine would need to be updated and improved for the proposed extension. These outstanding issues would need to be addressed during the project approval process.

4.16.2 Description of ecology – findings of the EIS

A desktop study was conducted by ecologists to obtain information on the distribution of species and ecological communities. Special attention was given towards listed communities and flora and fauna species under State legislation, such as the *Vegetation Management Act 1999* (VM Act) and the *Nature Conservation Act 1992* (NC Act). This information was then used by the ecologists to refine the field methodology in order to target potentially occurring communities and species during field surveys, including listed species and communities.

The EIS confirmed that the project has the potential to impact on a number of listed threatened flora and fauna species and vegetation communities were either found on-site or have the potential to occur on-site. These are summarised below. A discussion on potential impacts and proposed mitigation measures based on the EIS chapter follows.

4.16.2.1 Vegetation communities

EIS survey findings

The following field surveys were undertaken by botanists to verify the REs mapping for the project area as well as to identify listed threatened flora species or their potential habitats.

The following vegetation and flora surveys were conducted:

- Quaternary and secondary site assessments (open cut areas): 16–22 May 2011.
- Quaternary and secondary site assessments (open cut and underground areas): 4–19 August 2011.
- Field assessment to inform offset strategy: 21–28 October 2012; 27 November–3 December 2012.
- Targeted survey for king blue-grass and finger panic grass: 18–19 April 2011; 21–28 October 2012; 27 November–3 December 2012.

The EIS outlined that of the 20 REs originally mapped by EHP, 17 were recorded at present during field surveys. Two vegetation communities (RE 11.3.7 and RE 11.9.7), not previously mapped for the project area, were also recorded on-site resulting in a total of 19 different REs present within the project area (

Table 2). This included 3 listed threatened ecological communities (TECs) under the EPBC Act:

- Brigalow (*Acacia harpophylla* dominant and co-dominant)
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar bioregions
- Natural grasslands of the Queensland Central Highlands and Northern Fitzroy Basin.

However, while the assessment for EPBC listed vegetation communities are separately discussed in the MNES section (see section 4.17), they have been mentioned here for completeness and cross-referencing.

Table 2 Regional Ecosystems ground-truthed in the project area

Regional ecosystem	Description	VM Act class[1]	Biodiversity status[2]	Corres-ponding TEC[3]	Total area on project site (ha)	Area to be cleared (ha)
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	Endangered	Brigalow	97	15
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains	Of concern	Of concern	-	2	2
11.3.7*	*Corymbia spp.* woodland on alluvial plains	Least concern	Of concern	-	122	-
11.3.10	*Eucalyptus brownii* woodland on alluvial plains	Least concern	No concern at present	-	3	1
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	-	348	38
11.5.2	*Eucalyptus crebra, Corymbia spp.* with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present	-	3	-
11.5.15	Semi-evergreen vine thicket on Cainozoic sand plains/remnant surfaces	Least concern	Endangered	semi-evergreen vine thickets	2	-
11.5.16	*Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains/remnant surfaces	Endangered	Endangered	Brigalow	11	-
11.8.5	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Least concern	No concern at present	-	2632	244
11.8.11	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Of concern	Of concern	Natural grasslands	14	-
11.8.13	Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks; lowlands	Endangered	Endangered	semi-evergreen vine thickets	209	53
11.9.2	*Eucalyptus melanophloia* ± *E. orgadophila* woodland on fine-grained sedimentary rocks	Least concern	No concern at present	-	863	164
11.9.3	*Dichanthium* spp., *Astrebla* spp. grassland on finegrained sedimentary rocks	Least concern	No concern at present	Natural grasslands	30	-
11.9.4a	Semi-evergreen vine thicket or *Acacia harpophylla* with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks	Of concern	Endangered	semi-evergreen vine thickets	7	4

Regional ecosystem	Description	VM Act class[1]	Biodiversity status[2]	Corres-ponding TEC[3]	Total area on project site (ha)	Area to be cleared (ha)
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered Brigalow	Brigalow	844	189
11.9.7*	*Eucalyptus populnea, Eremophila mitchellii* shrubby woodland on finegrained sedimentary rocks	Of concern	Of concern	-	25	-
11.9.9	*Eucalyptus crebra* woodland on fine-grained sedimentary rocks	Least concern	No concern at present	-	4486	1179
11.9.10	*Acacia harpophylla, Eucalyptus populnea* open forest on fine-grained sedimentary rocks	Of concern	Endangered	-	76	51
11.10.4a	*Eucalyptus decorticans, Lysicarpus angustifolius +/- Eucalyptus* spp., *Corymbia* spp., Acacia spp. woodland on coarse-grained sedimentary rocks	Least concern	No concern at present	-	3	-

[1]VM Act class - Conservation status under the VM Act
[2]Biodiversity status - Conservation status under the EP Act
[3]TEC – Threatened ecological community under the EPBC Act
* RE types not currently mapped under EHP version 6.1 mapping for the project area.

4.16.2.2 Flora

Eight listed threatened flora species under the NC Act were identified in the specialist report (Appendix N – Ecology) through initial desktop assessments as potentially occurring in the project area based on known habitat associations of these species and an assessment of the likelihood of occurrence:

- King blue-grass (*Dichanthium queenslandicum*), vulnerable.
- *Acacia ramiflora*, vulnerable.
- *Croton magneticus*, vulnerable.
- Black Ironbox (*Eucalyptus raveretiana*), vulnerable.
- *Polianthion minutiflorum*, vulnerable.
- *Ozothamnus eriocephalus*, vulnerable.
- Finger panic grass (*Digitaria porrecta*), near threatened.
- Native Frangipani (*Cerbera dumicola*), near threatened.

Field surveys were conducted to verify the occurrence of these 8 flora species in the project area. The timing of the terrestrial flora surveys have been stated above in section 4.16.2.1. Targeted field surveys for listed threatened flora species were carried out in potential habitats for listed threatened flora species. Additional surveys carried out in October-December 2012, after the EIS was initially submitted, were undertaken to specifically include more detailed investigations within the Newlands Nature Refuge area.

EIS survey findings

Two listed threatened species were found to be present in the project area, namely the:

- King blue-grass (vulnerable) – 5 populations found in the southern part of the Newland Nature Refuge.
- Finger panic grass (near threatened) – 1 population found in the southern part of the Newland Nature Refuge.

These populations were discovered opportunistically during separate offset assessment of the Newlands Nature Refuge during the October–December 2012 surveys. The areas where these species where found were not part of earlier targeted grass surveys as they were either located outside of the project area or a significant distance from the open cut disturbance footprint. The EIS concluded that although potential habitat for these 2 listed threatened grass species was present within the project area, no other populations were found. Other blue-grass species were

identified on site, namely the Queensland blue-grass (*Dichanthium sericeum*) or *D. aristatum*, neither of these are listed as threatened under the NC Act.

No other NC Act listed threatened flora species was found during targeted field surveys within the proposed disturbance areas of the project and the EIS concluded that the likelihood of occurrence of the other listed threatened flora species is low.

4.16.2.3 Fauna

Eight listed threatened fauna species under the NC Act were identified in the specialist report (Appendix N – Ecology) through initial desktop assessments as potentially occurring in the project area based on known habitat associations of these species and an assessment of the likelihood of occurrence. During the assessment of the EIS, EHP identified that the conservation status of some of the fauna species listed below were incorrectly stated in the specialist report (using outdated conservation status). The NC Act status have been updated as part of this EIS assessment report to reflect the conservation status at the time of the EIS process:

- Star finch (*Neochmia ruficauda ruficauda*), endangered.
- Black-throated finch, white-rumped subspecies (*Poephila cincta cincta*), endangered.
- Red goshawk (*Erythrotriorchis radiatus*), endangered.
- Squatter pigeon, southern subspecies (*Geophaps scripta scripta*), vulnerable.
- Australian painted snipe (*Rostratula australis*), vulnerable.
- Little pied bat (*Chalinolobus dwyeri*), vulnerable.
- Yakka skink (*Egernia rugosa*), vulnerable.
- Brigalow scaly foot (*Paradelma orientalis*), vulnerable.
- Ornamental snake (*Denisonia maculata*), vulnerable.
- Black-necked stork (Ephippiorhynchus asiaticus), near threatened.
- Australian cotton pygmy-goose (*Nettapus coromandelianus*), near threatened.

EIS survey findings

General and targeted field searches for listed threatened fauna species under the NC Act were conducted between 2008 and 2011:

- 1–5 September 2008 (dry season); 28 November–3 December 2008 (wet season).
- 15–29 September 2007; 1–13 April 2008 (late wet season).
- 6–17 May 2011 (late wet season).

The EIS stated that the combined survey efforts resulted in a total of over 200 survey hours over 41 days within a broad range of habitats, and included Elliott traps, pitfall traps, snake funnel traps, possum (mawbey) traps, diurnal bird survey, diurnal herpetofauna ground (and scan of upper section of trees) search, spotlighting on foot and by vehicle, bat call detection, targeted searches, call playback, opportunistic sightings, inferential evidence (e.g. scats, nests, tracks).

A total of 191 terrestrial vertebrate fauna species were recorded during several field surveys, including 11 amphibians, 43 reptiles, 102 birds and 35 mammal species. Five introduced fauna species were also recorded during the various field surveys.

Two species of conservation significance were recorded within the project area:

- Squatter pigeon, vulnerable.
- Little pied bat, vulnerable.

Squatter pigeons were recorded in relatively low numbers from mountain coolibah woodland habitats and narrow-leaved ironbark habitats in the project area. Both habitat types were widespread across the project area with the availability of water likely to be the primary limiting factor in terms of the distribution of squatter pigeon across the site. This species was most abundant in the area directly south of the existing Eastern Creek pit.

Echolocation recordings confirmed the presence of the little pied bat at a number of sites across the range of woodland habitat types (except semi-evergreen vine thickets) which occur in the project area. The little pied bat is known to roost in small colonies in sites such as caves, mines, rocky outcrops and, occasionally, in abandoned buildings and in hollow-bearing trees. The EIS regarded hollow-bearing trees as the most likely roosting habitat for little pied bat in the project area.

Echidnas, listed as special least concern (iconic species) were recorded in low numbers in the south within brigalow and riparian habitats and in the Newlands Nature Refuge Area. Other iconic fauna species, such as the platypus and the koala, were not recorded in the project area and suitable habitat for these species was deemed as not present in the project area.

The remaining NC Act listed threatened species listed above were not recorded during fauna surveys; however, the EIS concluded that these species have a low to moderate likelihood to occur within the project area.

4.16.2.4 Aquatic flora and fauna

Aquatic flora and fauna values were assessed in the EIS from a combination of aquatic habitat assessments and macroinvertebrate sampling:

- Aquatic habitat assessments were carried out using a modified version of the physical assessment protocols and field data sheets presented in the Australian River Assessment System (AusRivAS) Physical Assessment Protocol. This included assessments of habitat type, substrate character and cover, water level and flow and riparian cover.
- Macroinvertebrate sampling were undertaken between 2006 and 2011 as part of the in-stream monitoring program for the existing mine.

No fish surveys were undertaken as part of these assessments due to the absence of permanent fish habitats in the ephemeral waterways found in the project area. These ephemeral creeks are dry for a significant part of the year.

EIS survey findings

The waterways in the project area were described in the EIS as typical of small waterways in Central Queensland. These ephemeral waterways receive flowing water during short periods. The EIS outlined that the water quality in waterways in the region was significantly influenced by the physical characteristics of the surrounding catchment, such as the physico-chemical properties of soils, the evapo-concentration that goes with the water level receding phase in ephemeral systems and the surrounding agricultural land uses. The waterways in the project area were characterised by sandy substrates and were naturally slightly alkaline and contained higher electrical conductivity values than other similar waterways in the region. However, the EIS concluded that metals concentrations were found to be below the regional averages or present in a non-bioavailable form, and hence would have a limited influence on the health of aquatic ecosystems.

Floristic diversity in the waterways of project area was found to be relatively poor, with a very limited presence of aquatic macrophytes. This reflects the temporary nature of the affected waterways.

The macroinvertebrate assemblages in the project area were found to be typical of ephemeral waterways in Central Queensland with insects belonging the dominant orders Diptera (flies, mosquitoes, midges), Hemiptera (true bugs) and Coleoptera (beetles and weevils). A total of 73 different families were collected with the majority being generalists that are resilient to stressful conditions. The EIS concluded that this trait makes these generalists suited for surviving in the variable and sometimes harsh conditions associated with ephemeral waterway environments.

The EIS concluded that given the location of the waterways in the far upstream reaches of their catchments and the nature of the biota (i.e. dominated by macroinvertebrate taxa adapted to highly variable environmental conditions), waterway realignments would not pose any significant long-term impacts on any significant aquatic flora and fauna populations. The provision of microhabitats (e.g. fringing riparian vegetation, large in-stream woody debris) in realigned and/or reinstated waterways, as part of mine rehabilitation, would partially offset the direct loss of aquatic habitats in areas disturbed by mining. The EIS further outlined that changes in waterways due to altered flow rates and/or bed and bank instability and scouring would also be unlikely to cause any impacts over and above what already occurs naturally while impacts related to uncontrolled releases of mine water as a result of extreme weather events would not have long-term impacts on macroinvertebrate communities. The EIS found that controlled releases of mine water would not result in significant changes to water quality with associated implications for aquatic habitats.

4.16.2.5 Stygofauna

Annual stygofauna surveys were conducted for the existing mine since December 2008 to comply with the existing EA. The stygofauna monitoring program was conducted on 6 groundwater bores in and adjacent to the project area.

EIS survey findings

No stygofauna were found from any of the bores sampled. The EIS concluded that the absence of stygofauna could be due that these microorganisms are known to prefer shallow alluvial aquifers (<10m below ground level) where electrical conductivity is less than 1500µS/cm, although aquifers to a depth of 30m and electronic conductivity values < 5000µS/cm may be tolerated. Significant stygofauna communities have most commonly been associated with alluvial aquifers, particularly where the aquifers have been connected to rivers that flow for most of the year.

The sampled aquifers within the project area contained ephemeral waterways which are dry for a significant part of the year. These aquifers generally have values outside the preferred ranges for stygofauna and it was considered in the EIS as unlikely that they will yield significant stygofauna communities. However, the EIS also stated that while the presence of stygofauna in unconsolidated sediments of creeks (particularly in tertiary basalts around Cerito Creek) cannot be ruled out, the absence of stygofauna is most probably due to the lack of a large alluvial aquifer connected to a river with permanent flow.

4.16.3 Potential impacts and mitigation measures

4.16.3.1 Potential impacts on vegetation communities

The EIS stated that the proposed project would result in a total area of surface disturbance of approximately 3184ha. Approximately 2284ha of vegetation would be subject to clearing for open cut mining activities and their associated infrastructure (i.e. haul roads, power supply, water management infrastructure); 1940ha of this would be remnant vegetation. A further 900ha of the project area would be subject to potential surface subsidence and/or ponding >1m (Table 3) which would include 11ha of high value brigalow regrowth. Of the 1940ha remnant vegetation, 389ha are listed as endangered and 68ha are listed as of concern under the EP Act (biodiversity status) (Table 4). Approximately 336ha of remnant riparian vegetation would be cleared due to open cut mining activities. The majority of the vegetation to be cleared (1894ha) is classified as of no concern as present.

The EIS identified the following potential impacts on vegetation communities as part of this project:

- Altered vegetation composition as a result of subsidence related ponding and/or changes to soil drainage characteristics in subsided areas. Subsidence would have the potential to exacerbate existing areas of ponding or cause new areas of ponding to develop. Approximately 52ha of remnant vegetation in the project area may experience a change in ponding depth of >1m in subsided areas.
- Disturbance from the targeted rehabilitation of surface cracks caused by surface subsidence.
- Altered vegetation composition as a result of ponding and/or changes to soil drainage characteristics in subsided areas.
- Additional impacts associated with vegetation clearing to establish small vehicle access tracks for ongoing general site maintenance and weed control, the establishment of temporary access tracks to enable geotechnical investigations and exploratory drilling or to establish and maintain fence lines or agricultural pipelines and water troughs.

Table 3 Clearing and disturbance of vegetation as part of the proposed open cut and underground operations – remnant and non-remnant vegetation

	Area within project area (ha)	To be cleared in open cut operations (ha)	Disturbance area – underground operations	
			Potential surface cracking (ha)	Potential ponding >1m depth (ha)
Remnant vegetation	9777	1940	359	52
Non-remnant vegetation	1897	344	541	848
Total vegetation	**11,674**	**2284**	**900**	

Table 4 Clearing and disturbance of vegetation as part of the proposed open cut and underground operations – biodiversity status (EP Act)

Biodiversity status (EP Act)	To be cleared in open cut operations (ha)	Disturbance area – underground operations		Total (ha)
		Potential surface cracking (ha)	Potential ponding >1m depth (ha)	
Endangered	312	57	20	**389**
Of concern	40	12	16	**68**
No concern at present	1588	290	16	**1894**
Total	**1940**	**359**	**52**	**2351**

Impacts of subsidence on vegetation communities

The EIS concluded that changes in topography would occur where the ground would be subsided as the underground panels collapsed after underground mining. The depth of potential subsidence within the project area would range from 2.6m in the shallower coal seam (approximately 100–150m under the ground surface in the northern area of the underground mine), to <2m in the deeper coal seam (>300m under the ground surface in the central underground mining area).

It was concluded in the EIS, that the underground mining would be underneath an area of undulating and sloping terrain and while changes in surface level occur as a consequence of subsidence, the undulating and sloping nature of the site would continue to be free draining with no change to the overall natural drainage pattern of the area. This is because if an area affected by subsidence is predominately flat there would be a higher risk that depressions in the landform would result in areas of ponding as the lack of relief makes it less likely that ponded water can drain. Areas in the proposed project area which would be subject to ponding have been identified through an assessment which uses a hydraulic model to look at the post subsidence landform after a theoretical very large rainfall. However, the EIS outlined that ponding would be dependent on a number of variables, such as the volume of rainfall, the hydraulic conductivity of the soil, the evaporation rate in the days before and after the rainfall, the take up of water by vegetation, existing soil saturation and volume of rainfall in the upper catchment.

The location of the majority of change to ponding (post-subsidence) is predicted to be limited to the areas which already undergo periodic inundation such as Cerito Creek and the Cerito Creek Dam inundation area. The EIS stated that the vegetation communities which exist in these areas are already adapted to seasonal inundation and are unlikely to be affected by changes to the depth of ponding. The vegetation communities within these areas predominately include bulrushes, sedges and couch grasses which are known to be tolerant of periodic inundation.

In the undulating terrain away from the main creek and dam inundation area, the prediction tool used in the EIS showed small dispersed areas where a change to the theoretical potential to pond water is predicted. The EIS concluded that ponding would be experienced in these areas when rainfall is heavy enough to generate local runoff sufficient to accumulate as a pond of water, and such ponds would only persist while further rainfall is sufficient to overcome the losses from evaporation with a predicted theoretical maximum ponding depth of <1m. This depth was seen in the EIS as being unlikely to impact on existing vegetation communities.

Impacts on the Newlands Nature Refuge and Wollombi Brigalow offset areas

The EIS outlined that approximately 690ha in the Newlands Nature Refuge and 30ha in the Wollombi offset area would be located in the area of potential subsidence associated with underground mining.

This area affected by subsidence within the Newlands Nature Refuge contains regrowth brigalow woodland and remnant eucalypt woodland. This area would be subject to surface cracking as a result of subsidence. The proponent submitted a review of subsidence monitoring results collected over the past 15 years in the project area as part of DSEWPaC's submission (see section 4.17.5.1). In this review, the proponent concluded that the assessment of the monitoring data demonstrated no observed impact upon vegetation (stress and dieback) as a result of subsidence, surface cracking or ponding within the Newlands Nature Refuge as a result of subsidence. This conclusion was supported in this report by a series of photos comparing historical aerial imagery with recent on ground photo records that depicted an increase in vegetation cover from 1999 to 2012 over the subsided areas within the Newlands Nature Refuge. Parts of this area would also be subject to additional ponding, especially in areas already periodically inundated by the Cerito Creek dam.

Impacts on vegetation communities through watercourse diversions

The Project would remove existing watercourses as part of progressive mine development. Four diversions would be required for the Project:

- Tributary A – Eastern Creek tributary (Eastern Creek East pit)
- Tributary B – Wilson Creek tributary (Eastern Creek West – northern pit)
- Tributary C – Wilson Creek tributary (Eastern Creek West – southern pit)
- Tributary D – Upper Cerito Creek tributary (Eastern Creek South pit).

The EIS stated that these watercourse diversions would result in residual impacts upon endangered riparian brigalow woodland (RE 11.3.1) and riparian habitats that support threatened or migratory species, such as the satin flycatcher, squatter pigeon and rainbow bee-eater. In the assessment of potential impacts, the EIS stated that the immediate loss of these habitats is not considered significant to local fauna populations that have adapted to the seasonal variations of water availability that is associated with these ephemeral streams and due to the availability of like habitats across the Project area and wider locality.

All tributaries would remain as permanent diversions. Each diversion would require approvals from DNRM prior to their establishment and would be designed in accordance with approval conditions that will be provided by DNRM on a case by case basis. These conditions will inform the design of each diversion in regards to the battering of banks, establishment of riparian vegetation and the creation of pool and riffle habitats. While the establishment of the latter would provide some habitat to fauna, the proponent acknowledged that this does not immediately compensate the residual impacts associated with the removal of sections of existing tributaries. Therefore, the residual impacts would need to be offset (refer to section 4.18 – Biodiversity offset strategies).

4.16.3.2 Mitigation measures proposed for vegetation communities

Clearing for the establishment of open cut pits and supporting infrastructure would result in the loss of approximately 2284ha of vegetation: 1940ha of remnant vegetation, 11ha of high value brigalow regrowth, 389ha of endangered and 68ha of 'of concern' REs under the EP Act. The majority of this clearing would occur in the Eastern Creek West pit footprint and Eastern Creek South pit footprint. The EIS outlined that clearing would be minimised where possible outside of the open cut mining areas. For example clearing of endangered and of concern REs to gain access for remediation of tension cracking in subsided areas would be avoided wherever possible and minimised by:

- locating haul roads and electricity infrastructure in cleared areas or non-remnant vegetation to avoid clearing in listed threatened REs
- clearly marking areas to be cleared to avoid unnecessary loss of endangered and of concern REs
- progressive rehabilitation of mined areas using endemic species characteristic of the original ecosystems wherever possible.

However, the EIS also outlined that residual impacts on listed threatened REs would remain after the implementation of the proposed mitigation and management strategies and hence would need to be offset by securing areas of remnant and regrowth vegetation outside the areas of disturbance. The regrowth vegetation contained in these secured areas would be managed over the life of the project to improve their condition towards remnant status. The proposed offset strategy is discussed in section 4.18 – Biodiversity offset strategy.

4.16.3.3 Potential impacts on flora and fauna

The main impacts on terrestrial flora and fauna values according to the EIS would be the reduction of available habitat (approximately 1940ha) associated with the clearing of remnant native vegetation from open cut pits and infrastructure areas, including:

- Altered vegetation composition as a result of ponding and/or changes to soil drainage characteristics in subsided areas.
- Additional vegetation clearing due to establishment of small vehicle access tracks for ongoing general site maintenance and weed control, geotechnical investigations and exploratory drilling or to establish and maintain fence lines or agricultural pipelines and water troughs.
- A reduction in the overall patch size of contiguous vegetation, resulting in reduced connectivity between habitats and the creation of relatively large areas devoid of habitats (i.e. open cut footprints).
- The loss of microhabitats, such as tree hollows and fallen logs, which are likely to supply breeding and sheltering resources for hollow-dependent fauna species.

- Reduced faunal diversity in disturbed areas and greater competition from pest fauna species adapted to colonising disturbed environments.
- Siltation of riparian vegetation or infilling of depressions in waterways, which may result in seasonal water holes becoming even more transitory.
- Disturbance effects relating to noise and dust, vibration from blasting, lighting and general activity generated by various mining activities.
- Wastes such as cleared vegetation, waste rock from open cut pits and wastewater.

The EIS concluded that provided the mitigation measures are implemented, most of the impacts of the project on terrestrial flora and fauna values are predicted to be minor or negligible.

4.16.3.4 Mitigation measures proposed for flora and fauna

Strategies proposed in the EIS to ensure impacts on remnant vegetation in the project area are minimised include:

- Clearly marking areas to be cleared and establishing machinery exclusion zones to avoid unnecessary loss of remnant vegetation, in particular and of concern REs.
- Where practical undertaking directional felling to avoid unnecessary impacts upon vegetation that is to be retained in exclusion zones.
- Undertaking progressive rehabilitation of mined areas over the life of the project, to re-establish self-sustaining vegetation communities over mined areas as soon as practical.
- Wherever possible, using species characteristic of the original ecosystems in rehabilitation.
- Regular monitoring of rehabilitated areas to ensure the rehabilitation undertaken is successful. Where rehabilitation is not performing, additional management measures would be undertaken.
- Utilise existing access tracks for monitoring or exploration purposes. Where new access tracks are required alignments would be designed to avoid remnant vegetation as much as possible.
- Reinstatement of lost terrestrial fauna habitats, as a result of progressive mine development.

Species specific mitigation measures are discussed in the MNES section below.

4.16.4 Weed and pest management

The EIS concluded that disturbance associated with the project may create environments where exotic plant species could potentially flourish and out-compete native plant species. No extensive weed infestations were observed during field surveys. However, the following small infestations of class 2 declared plants under the *Land Protection (Pest and Stock Route Management) Act 2002* were identified:

- parthenium (*Parthenium hysterop*horus)
- tree pear (*Opuntia tomentosa*)
- mother of millions (*Bryophyllum* sp.)
- fireweed (*Senecio madagascariensis*)
- rubber vine (*Cryptostegia grandiflora*) also declared a Weed of National Significance under the Australian Government.

The harrisia cactus (*Harrisia martini*) was not observed in the project area.

Class 2 declared pest fauna species under the *Land Protection (Pest and Stock Route Management) Act 2002* were recorded in relatively low numbers in the project area, namely the:

- feral pig (*Sus scrofa*)
- feral cat (*Felis catu*s)
- dingo (*Canis familiaris*)
- European rabbit (*Oryctolagus cuniculus*).

Other, non-declared pest species, such as the cane toad (*Bufo marinus*), house mouse (*Mus musculus*) and black rat (*Rattus rattus*), were also recorded from the project area. It is likely that the abundance of cane toads is higher in the warmer, wetter summer months.

The EIS concluded that disturbance associated with the project may create environments where exotic plant species could potentially flourish and out-compete native plant species. However, weed management undertaken for the project would be integrated with the management measures already established at the existing mine. The EIS outlined that pest animal management would be integrated with the management measures already established at the existing mine.

In the review of the amended EIS chapters and EM Plan, DAFF outlined that the proposed weed management plan has not been amended as requested during the submission period. DAFF hence requested further changes to be made in an amended EM Plan.

4.16.5 Conclusion and outstanding issues

Overall, the amended EIS Chapter 14 – Ecology had adequately addressed the TOR. However a few outstanding issues remain which will need to be addressed as part of the approval process.

In a further review of the amended EIS, DAFF stated that the proposed weed management plan has not been amended as identified in the EIS submission. The weed EM Plan will need to include:

- plant pest and diseases management
- the establishment of a watching brief for any developments about pests of plants or diseases of plants that may become regulated
- mapping of location and density of infestation of all declared weed species on the project area in order to inform weed management and risk mitigation actions.

The existing weed and pest management plan for the existing mine would need to be updated and improved for the proposed extension.

4.16.6 Proponent's commitments

The proponent has committed to several mitigation strategies involving riparian vegetation, pest management plan, compliance and environmental monitoring. These are outlined below.

- Riparian vegetation:
  - Modifying the Eastern Creek West pit to accommodate flood flows associated with Wilson Creek, thereby avoiding direct impacts on riparian vegetation associated with the tributary that flows through this pit.
  - Maintaining buffers along waterways where possible.
  - Designing linear infrastructure (e.g. haul roads, electricity infrastructure) to limit the number of crossings of waterways.
  - Restricting disturbance of riparian vegetation to that necessary for the works.
  - Replacing original vegetation communities along realigned or re-established waterways at Eastern Creek East pit, (Eastern Creek tributary), Eastern Creek West pit (Wilson Creek tributary) and Eastern Creek South pit (Cerito Creek tributary) through planting endemic species that are characteristic of the original riparian vegetation communities to be impacted.
- Pest management plan:
  - The existing pest management plan will be extended to incorporate the project area.
  - Focusing on controlling potentially increasing numbers of pests as a result of increased water availability, particularly feral pigs.
  - Establishment of a partnership with Whitsunday Regional Council to work collaboratively at a landscape scale to control and prevent the spread of pest animals and diseases during mining operations.
  - Control and eradication of pest plants, invertebrate animals, fungi, viruses and diseases in compliance with the *Plant Protection Act 1989* (and other pest management regulations).
  - The use of vehicle wash-down facilities for vehicles entering and leaving declared weed zones:
    - vehicles, machinery and construction materials are free from pest matter and disease
    - inspection regimes are conducted by trained officers
    - clean-down bays are located appropriately and away from waterways and gullies
    - staff and operators will be adequately trained in clean-down and weed identification.

- Compliance:
  - Ensuring that construction and amendment to waterways complies with all relevant legislation both within and outside the mining lease including relevant Department of Agriculture Fisheries and Forestry policies and is in consultation with relevant agencies
  - Provisions of fish passages and equal or enhanced habitat values and mimicking existing low flow channels to promote fish passage and replace any lost habitat.
- Environmental monitoring:
  - Implementation of bi-annual surveys to ensure that all potential infested species are recorded
  - Details of surveys will be recorded and data will be updated to note ongoing occurrence of infested species.

4.17 Matters of national environmental significance

4.17.1 Introduction

This section of the EIS assessment report addresses the requirements of the Queensland Government's assessment as specified by Schedule 1 of the bilateral agreement between the Commonwealth and the State of Queensland relating to environmental assessment and section 40(g)(ii) of the EP Act.

It should be noted that DSEWPaC's comments relate to the evaluation of potential impacts and adequacy of information with respect to matters of national environmental significance (MNES) during preparation of this report and do not represent EHP's assessment of the impacts of the actions. Hence, this section of the EIS assessment report provides an evaluation of the potential impacts of the project on the controlling provisions under the EPBC Act, as determined by DSEWPaC.

The following documents have been taken into account during the assessment process of MNES:

- Chapter 15 of the submitted EIS which went public on 17 September 2012.
- Amended Chapter 15 submitted to EHP on 28 February 2013.
- Submitted and consequently amended Chapter 14 (Ecology).
- Specialists' reports in Volume 2 of the EIS (Appendix M – Terrestrial Flora Assessment; Appendix N – Ecology Report).

This section of the EIS assessment report outlines the EIS assessment of MNES under the EPBC Act. Offset requirements under the EPBC Act will be addressed separately in section 4.18 – Biodiversity offset strategy.

4.17.2 Controlling provisions

On 23 August 2011, DSEWPaC determined that the proposed project was a controlled action under the EPBC Act. The controlling provisions are sections 18 and 18A (listed threatened species and communities) and 20 and 20A (listed migratory species). The EP Act's EIS process has been accredited under An Agreement between the Commonwealth and the state of Queensland under Section 45 of the *Environment Protection and Biodiversity Conservation Act 1999* Relating to Environmental Assessment (the bilateral agreement) for the purpose of the Commonwealth's assessment of the project under Part 8 of the EPBC Act.

Under the terms of the bilateral agreement between the Commonwealth and Queensland governments, the EIS of the Newlands Coal Extension Project was required to address both state and Commonwealth Government matters. The controlled actions may be considered for approval under section 133 of the EBPC Act once the Commonwealth Environment Minister has received this EIS assessment report from EHP.

4.17.3 Assessment of the EIS chapter on MNES

4.17.3.1 Submissions on the EIS chapter

As part of the EIS assessment process the following matters were raised in the submission provided by DSEWPaC. These comments are summarised below:

- The MNES chapter did not provide enough information about the project and its relevant impacts on the controlling provisions as required in the TOR and Schedule 4 of the EPBC regulations. For example, further information was requested in regards to the existing infrastructure that would be utilised as part of the extension. The EIS did not clearly delineate between existing and proposed mine activity, including:
  - existing and proposed mines (underground and open cut) and all infrastructure/roads

  - existing offset for the Wollombi operations (i.e. EPBC 2005/2015)
  - proposed offset area.
- Further information required regarding the proponent's environmental record.
- Potential impacts on MNES associated with all the proposed activities have not been fully assessed. Outstanding issues included:
  - Unclear statements provided to DSEWPaC regarding which figures are referred to when the proponent states "shown on all relevant figures, included in calculations of area of impact and described in relevant sections".
  - Insufficient information on potential impacts on MNES regarding proposed water management and electrical infrastructure, internal haul roads and waste rock dumps.
  - Insufficient discussion regarding evidence about why the proponent states that subsidence and long wall extraction of underground mining will have relatively 'minor' impacts, noting it appears to be located below/near a large percentage of the Newlands Nature Refuge.
- More information required on avoidance, mitigation and management measures and how they will prevent, minimise or compensate for the relevant impacts on each MNES.
- Further information on the potential impacts of subsidence and ponding required, such as:
  - lessons and observations of ponding that has occurred with the existing mine
  - the amount of disturbance in hectares (e.g. the amount of clearing as a result of open cut mining) and a list of vegetation communities affected
  - the time frame when surface cracking would be assessed and what criteria would be used to determine if remediation would be required, including clarification what constitutes "high erosion risk" or "safety concern"
  - the 13 onsite dams in terms of surface water and its possible impacts on listed migratory species potentially occurring on site and
  - existing MNES vegetation communities and its dependency on ground water (e.g. brigalow, natural grassland and the semi-evergreen vine thickets).
- In relation to flora and fauna surveys conducted as part of the EIS, DSEWPaC commented on the following outstanding issues:
  - Additional targeted survey work would be required to verify the occurrence of the finger panic grass and king blue grass within the survey area. The king bluegrass has been confirmed in an area within the project area in field surveys following the EIS submission (October 2012).
  - The distribution of fauna surveys within the project area remained inadequate in order to determine potential impacts on MNES across this area.
  - Inadequate species specific survey methodologies and information was provided in the EIS for a range of MNES species, including EPBC listed birds, reptiles, amphibians and mammals. These species were considered potentially occurring on the project area but were not addressed adequately in the ecological assessment in the EIS.
- The management of the cane toad would need to be included in the pest management plan, as the cane toad was deemed likely to be opportunistic and prone to move from the areas identified to other site as mining operations expand.
- The EIS chapter on MNES indicated that incorrect species survey methodology had been used for some EPBC listed threatened species. Whilst some of DSEWPaC survey guidelines apply to the entire group (e.g. frogs), other EPBC listed species have individual survey methodology recommendations (e.g. red goshawk). Furthermore, DSEWPaC commented that if the recommended survey effort/methodology would be unable to verify the occurrence of a particular EPBC listed species, DSEWPaC would require additional species specific targeted field surveys for each of these species in order to make an informed assessment of potential impacts. The EPBC listed species in question were the red goshawk, squatter pigeon, star finch, black-throated finch (southern), Eungella day fog, northern quoll and the yakka skink.

EHP had 1 comment in regards to the northern quoll:

- Inclusion of the northern quoll to the list of threatened fauna potentially occurring in the project area. The likelihood of the species occurring in areas to be disturbed by the project or otherwise impacted should be discussed. If impacts on the species are likely as a result of the project, they would need to be discussed, mitigated and offset.

4.17.3.2 Proponent's response to submissions

The proponent addressed many of the issues identified by DSEWPaC in an amended EIS chapter submitted as part of the response by the proponent to public and agency submissions. This included a summary of an assessment of past environmental impacts due to subsidence on ecological communities at the existing underground mine. This assessment was used as a basis to predict subsidence within the Newlands Nature Refuge as requested by DSEWPaC. The desktop assessment involved a review of existing subsidence monitoring data, areal imagery before and after the area subsided and on-the-ground photos of vegetation that is located above past underground mining activities where subsidence occurred (refer to section 4.17.5.1 of this assessment report where the implications of this review for the project are discussed).

As requested by DSEWPAC, additional targeted surveys for king bluegrass and finger panic grass were conducted between October and December 2012. Neither species was found outside the localised area within the Newlands Nature Refuge identified for in October 2012.

In regards to the northern quoll the proponent responded that while it is acknowledged that the northern quoll exists on the on Redcliffe Tablelands, the EIS "assessment determined that the species has a low likelihood of occurrence due to the species' habitat requirements, movement patterns and the threats caused by cane toads. Therefore it was concluded than an "increasing to a moderate likelihood of occurrence is not considered appropriate."

4.17.3.3 Adequacy of the EIS chapter on MNES

DSEWPaC's advised that the amended EIS chapter on MNES substantially addressed most the concerns raised by DSEWPaC. There are, however, some relatively minor outstanding matters that would need to be addressed before a final approval could be given. These outstanding issues are discussed in the relevant subsections of this report and are also summarised in section 4.17.6.

4.17.4 Description of MNES values – findings of the EIS

This section of the EIS assessment report summarises the proponent's assessments of MNES values, potential impacts on MNES and proposed mitigation measures outlined in the amended EIS Chapter 15. However, the EIS assessment report took also into consideration information provided in other chapters, such as Chapter 14 (Ecology) and the specialists' reports in the appendix of the EIS (Appendix M – Terrestrial Flora Assessment; Appendix N – Ecology Report) and DSEWPaC's comments provided in October 2012 and February 2013.

The proponent determined the presence or likelihood of any MNES in the vicinity of the project area through database searches and field surveys. The EPBC's online Protected Matters Search Tool was used in the EIS to determine whether MNES are likely to occur in the project area. Targeted field surveys were subsequently conducted by the proponent in order to verify species identified in this list and any other potentially EPBC listed species and communities identified through other database searches (e.g. EHP's Wildlife Online).

If EPBC listed species or communities are present or are likely to be present, an assessment of the level of impact needs was made. Assessments of significance was undertaken by addressing the EPBC Guidelines for Significance for the protection category of the species[2].

The EIS confirmed that the project has the potential to impact on MNES as a number of EPBC Act listed threatened flora and fauna species and vegetation communities were either found on-site or have the potential to occur on-site. These are summarised below. A discussion on potential impacts and proposed mitigation measures based on the EIS chapter follows.

[2]Department of the Environment, Water, Heritage and the Arts 2009. Matters of National Environmental Significance. Significant impact guidelines 1.1. *Environment Protection and Biodiversity Conservation Act 1999.*

4.17.4.1 Vegetation communities

The EIS summarised the field surveys that were undertaken to verify threatened ecological community mapping for the project area as well as to identify EPBC listed threatened flora species or their potential habitats. Vegetation communities in Queensland that are listed under the EPBC Act are presented through the Queensland RE vegetation classification system as defined under the VM Act. The following vegetation and flora surveys were conducted:

- Targeted survey for king blue-grass and finger panic grass: 18–19 April 2011; 21–28 October 2012; 27 November–3 December 2012.
- Quaternary and secondary site assessments (open cut areas): 16–22 May 2011.
- Quaternary and secondary site assessments (open cut and underground areas): 4–19 August 2011.
- Field assessment to inform offset strategy: 21–28 October 2012; 27 November–3 December 2012.

The EPBC protected matters report listed 3 listed threatened ecological communities (TECs) that are likely to occur within the locality of the project area. These 3 TECs were consequently confirmed during field surveys in the project area:

- Brigalow (*Acacia harpophylla* dominant and co-dominant).
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar bioregions.
- Natural grasslands of the Queensland Central Highlands and Northern Fitzroy Basin.

The corresponding REs, their conservation status under the EPBC Act, the total area present on the project site and the area to be cleared/impacted are summarised in Table 5.

Table 5 EPBC-listed threatened ecological communities present in the project area (RE types, EPBC status, total area present, area to be cleared and/or impacted by subsidence

TEC[1]	Corresponding RE[2]	Description	EPBC Act status[3]	Total area on project site (ha)	Area to be cleared (ha)	Area impacted by subsidence (ha)
Brigalow	11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	97	15	-
	11.5.16	*Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains/remnant surfaces	Endangered	11	-	-
	11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	844	189	19 (ponding)
semi-evergreen vine thickets	11.5.15	Semi-evergreen vine thicket on Cainozoic sand plains/remnant surfaces	Endangered	2	-	15 (surface cracking incl. <1ha ponding)
	11.8.13	Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks; lowlands	Endangered	209	53	
	11.9.4a	Semi-evergreen vine thicket or *Acacia harpophylla* with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks	Endangered	7	4	
Natural grass-lands	11.8.11	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Endangered	14	-	<1ha (surface cracking)
	11.9.3	*Dichanthium* spp.*, Astrebla* spp. grassland on finegrained sedimentary rocks	Endangered	30	-	

[1]TEC – Threatened ecological community.
[2]RE – Regional ecosystems under the VM Act.
[3]EPBC Act status – Conservation status under the EPBC Act.

4.17.4.2 Flora

The EPBC protected matters report listed 5 EPBC threatened plant species that are likely to occur within the locality of the project area:

- Finger panic grass (*Digitaria porrecta*), endangered.
- Marlborough blue (*Cycas ophiolitica*), endangered.
- King blue-grass (*Dichanthium queenslandicum*), vulnerable.
- Black ironbox (*Eucalyptus raveretiana*), vulnerable.
- *Leucopogon cuspidatus*, vulnerable.

A further 4 EPBC listed threatened flora species were identified by DSEWPaC in their review of the EIS as potentially occurring within the project area:

- *Acacia ramiflora*, vulnerable.
- *Croton magneticus*, vulnerable.
- *Ozothamnus eriocephalus*, vulnerable.
- *Polianthion minutiflorum*, vulnerable.

The timing of the terrestrial flora surveys used to generate the data on listed species present on the site as reported in the EIS is described in section 4.17.4.1 of this report. It included targeted field surveys for listed threatened flora species that were carried out in potential habitats for listed threatened flora species. Additional surveys were carried out in October–December 2012, after the EIS was initially submitted. These surveys were undertaken to specifically include more detailed investigations within the Newlands Nature Refuge area.

Two EPBC listed threatened species were found to be present in the project area, namely the:

- Finger panic grass (endangered) – 1 population found in the southern part of the Newland Nature Refuge.
- King blue-grass (vulnerable) – 5 populations found in the southern part of the Newland Nature Refuge.

These populations were discovered opportunistically during separate offset assessment of the Newlands Nature Refuge during the October–December 2012 surveys. The areas where these species where found were not part of earlier targeted grass surveys as they were either located outside of the project area or a significant distance from the open cut disturbance footprint. The EIS concluded that although potential habitat for these 2 listed threatened grass species was present within the project area, no other populations were found. Other blue-grass species were identified on site, namely the Queensland blue-grass (*Dichanthium sericeum*) or *D. aristatum*, neither of these are listed as threatened under the EPBC Act.

No other EPBC listed threatened flora species was found during targeted field surveys within the proposed disturbance areas of the project and the EIS concluded that the likelihood of occurrence of the other listed threatened flora species is low.

4.17.4.3 Fauna

The EPBC protected matters report listed a number of EPBC listed fauna species are likely to occur within the locality of the project area:

- Northern quoll (*Dasyurus hallucatus*), endangered.
- Star finch (eastern), star finch (southern) (*Neochmia ruficauda ruficauda*), endangered.
- Black-throated finch (southern) (*Poephila cincta cincta*), endangered.
- Red goshawk (*Erythrotriorchis radiatus*), vulnerable.
- Squatter pigeon (southern) (*Geophaps scripta scripta*), vulnerable.
- Australian painted snipe (*Rostratula australis*), vulnerable.
- Yakka skink (*Egernia rugosa*), vulnerable.
- Fork-tailed swift (*Apus pacificus*), migratory marine and marine.
- Great egret, white egret (*Ardea alba*), migratory marine, migratory wetland and marine.
- Cattle egret (*Ardea ibis*), migratory marine, migratory wetland and marine.
- White-bellied sea-eagle (*Haliaeetus leucogaster*), migratory terrestrial and marine.

- White-throated needletail (*Hirundapus caudacutus*) , migratory terrestrial and marine.
- Barn swallow (*Hirundo rustica*), migratory terrestrial and marine.
- Rainbow bee-eater (*Merops ornatus*), migratory terrestrial and marine.
- Black-faced monarch (*Monarcha melanopsis*), migratory terrestrial and marine.
- Satin flycatcher (*Myiagra cyanoleuca*), migratory terrestrial and marine.
- Latham's snipe, Japanese snipe (*Gallinago hardwickii*), migratory wetland and marine.
- Australian cotton pygmy-goose (*Nettapus coromandelianus albipennis*), migratory wetland and marine.
- Painted snipe (*Rostratula benghalensis* s. lat.), migratory wetland and marine.
- Magpie goose (Anseranas semipalmata), marine.

Five additional EPBC listed fauna species were included as potentially occurring within the project area based on DSEWPaC's review of the EIS and the occurrence of these species in areas surrounding the project area:

- Eungella day frog (*Taudactylus eungellensis*), endangered.
- Brigalow scaly foot (*Paradelma orientalis*), vulnerable.
- Ornamental snake (*Denisonia maculate*), vulnerable.
- Rufous fantail (*Rhipidura rufifrons*), migratory marine.
- Spectacled monarch (*Monarcha trivirgatus*), marine and migratory.

General and targeted field searches for listed EPBC fauna species were conducted between 2008 and 2011:

- 1–5 September 2008 (dry season); 28 November – 3 December 2008 (wet season).
- 15–29 September 2007; 1–13 April 2008 (late wet season).
- 6–17 May 2011 (late wet season).

The EIS stated that the combined survey efforts resulted in a total of over 200 survey hours over 41 days within a broad range of habitats, and techniques used included Elliott traps, pitfall traps, snake funnel traps, possum (Mawbey) traps, diurnal bird survey, diurnal herpetofauna ground (and scan of upper section of trees) search, spotlighting on foot and by vehicle, bat call detection, targeted searches, call playback, opportunistic sightings, inferential evidence (e.g. scats, nests, tracks), as required by the EPBC survey guidelines (see http://www.environment.gov.au/epbc/publications/index.html).

The following EPBC listed fauna species were found to be present within the project area:

- Squatter pigeon (vulnerable) – found in mountain coolibah open woodland and narrow-leaved ironbark open woodland
- Satin flycatcher (migratory terrestrial and marine) – found in tall open woodlands on the Cerito Creek alluvial floodplain
- Rainbow bee-eater (migratory terrestrial and marine) – found in brigalow woodland, narrow-leaved ironbark open woodland; riparian habitats and semi-evergreen vine thickets
- White-bellied sea-eagle (migratory terrestrial and marine) – found foraging over the existing Newlands and Wollombi mine operations, but not over the proposed project area.

The remaining EPBC listed threatened and migratory fauna species listed above were not recorded during fauna surveys; however, the EIS concluded that these species have a low to moderate likelihood to occur within the project area.

4.17.5 Potential impacts and mitigation measures

4.17.5.1 Vegetation communities

Potential impacts on listed threatened ecological communities

The EIS stated that the proposed project would result in a total area of surface disturbance of approximately 3184ha. This included approximately 2284ha of vegetation that would be subject to clearing for open cut mining activities and their associated infrastructure (i.e. haul roads, power supply, water management infrastructure). The project would require clearing of a total of 204ha of endangered EPBC listed brigalow and 57ha of endangered EPBC listed semi-evergreen vine thickets. The EIS stated that approximately 900ha of the project area would be subject to potential surface subsidence and/or ponding of >1m (Table 3), including 19ha of EPBC listed brigalow communities and 15ha of EPBC listed semi-evergreen vine thickets (Table 5). No EPBC listed natural grasslands would be cleared as part of the proposed project. The EIS included an assessment of significance for MNES was carried out for TECs.

The EIS outlined that potential changes due to subsidence and/or ponding could include:

- Altered vegetation composition as a result of subsidence related ponding and/or changes to soil drainage characteristics in subsided areas. Subsidence would have the potential to exacerbate existing areas of ponding or cause new areas of ponding to develop.
- Disturbance from the targeted rehabilitation of surface cracks caused by surface subsidence.

The EIS stated that these surface cracks in subsided areas would be remediated by means of re-grading the affected area in subsided areas assessed as a high erosion risk. This would be determined based on soil type, vegetation cover and localised topography, or where cracks pose a safety concern to personnel or may endanger fauna (determined based on the extent of the crack and its proximity to areas would be scheduled once mining in an area has been completed).

As part of DSEWPaC's comments made in its submission on the EIS, the proponent undertook an assessment of past environmental impacts at the existing underground mine on ecological communities due to subsidence. This assessment was used as a basis to predict the impacts of subsidence within the Newlands Nature Refuge as requested by DSEWPaC. The desktop assessment involved review of an existing subsidence monitoring data, areal imagery before and after the area subsided and on-the-ground photos of vegetation that is located above past underground mining activities where subsidence occurred. The proponent replied in their response to the DSEWPaC's comments that in some isolated areas, changes to surface levels as a result of subsidence may result in additional ponding within the landscape following rainfall sufficient to generate runoff. However, the proponent concluded that the depth of ponding outlined in the EIS was the theoretical maximum derived from predicted changes to ground surface level. It did not incorporate the volume of rainfall, the hydraulic conductivity of the soil, the evaporation rate in the days before and after the rainfall, the take up of water by vegetation, existing soil saturation and volume of rainfall in the upper catchment. Hence, it was concluded that it would take a high rainfall event to generate ponds of the maximum depth described in EIS model. In the EIS it was stated that the vegetation in the proposed subsided area are deep rooted, which would aid in infiltration and evapotranspiration and hence would be tolerant of small scale changes to temporary ponding of water after rainfall. This conclusion was supported by the subsidence monitoring results collected over 15 years that showed no observed impact upon vegetation (stress and dieback) as a result of subsidence, surface cracking or ponding. Hence, the proponent concluded that the surface effects observed in the existing operational area of the Nature Refuge would be similar in the proposed project area due to similar geology and existing ecological communities.

Based on the review of existing subsidence monitoring data and the subsidence modelling, the EIS concluded that 19ha of EPBC listed brigalow community (RE 11.9.5) would be impacted by ponding to depth >1m. The EIS stated that this community located in areas already periodically inundated by the existing Cerito Creek Dam. Hence, the vegetation communities which persist under the existing conditions could adapt to seasonal inundation and are unlikely to be affected by the change in the inundation depth predicted in the EIS. Therefore, the EIS concluded that ponding associated with underground mining would not result in a significant change to these brigalow communities. In addition, the EIS identified 15ha of semi-evergreen vine thickets located within the predicted subsidence area which may be subject to surface cracking. Of the 15ha, <1ha may also be affected by ponding. These potential indirect impacts were deemed by the proponent as minor and hence not considered to have any significant adverse effect on the semi-evergreen vine thickets. Less than 1ha of the EPBC listed natural grasslands would be present in the area which would have the potential to be affected by subsidence-related tension cracking. The EIS concluded that remedial work, if required, would be considered as a minor indirect impact as the natural grassland species communities would recover to its pre-disturbance condition.

The EIS further looked into potential impacts on groundwater dependent vegetation communities. It concluded that the only community likely to occur on alluvial plains adjacent to creek lines that could be considered a groundwater dependant ecosystem would be RE 11.3.1 (*Acacia harpophylla* and/or *Casuarina cristata* open forest). However, the EIS stated that the dominant species recorded within this RE 11.3.1 included brigalow, wilga (*Geijera parviflora*), Moreton Bay ash (*Corymbia tessellaris*) and gooya (*Owenia acidula*) which also occurred on more elevated land away from groundwater and hence this RE in the project area could not be defined as a groundwater dependent ecosystem.

Mitigation measures proposed for listed threatened ecological communities

Several avoidance and mitigation measures were proposed in the EIS for TECs, including the avoidance of unnecessary clearing of listed threatened vegetation communities, such as alignment of roads and electricity supply lines to avoid unnecessary clearing, delineation of areas to be cleared, machinery exclusion zones, separate stockpiling of brigalow and semi-evergreen vine thickets topsoils and subsoils, and the establishment of self-sustaining vegetation communities. These commitments are outlined in section 4.17.7 – Proponent's commitments.

Despite these proposed mitigation measures, substantial impact on TECs would occur through the clearing of 204ha of endangered brigalow and 57ha of endangered semi-evergreen vine thickets. The proponent committed to extend the existing Newlands Biodiversity and Land Management Plan to the project area, and to provide offsets in accordance with draft EPBC Act Policy Statement (see section 4.18 – Biodiversity offset strategy). The proponent proposed that the rehabilitation and assisted regeneration of regrowth brigalow in the proposed offset area (the Newlands Nature Refuge) would compensate direct, indirect and cumulative impacts on EPBC listed brigalow and semi-evergreen vine thickets.

4.17.5.2 Flora

Potential impacts and mitigation measures

The EIS deemed that of the 9 EPBC listed flora species potentially occurring on the project area, impacts would only occur on 2 listed grass species found to be present in the project area, namely the finger panic grass (endangered) and the king blue-grass (vulnerable). A summary of potential impacts and proposed mitigation measures for each of the 2 flora species found to be present on site is shown below.

Finger panic grass – recorded south of the project area

The EIS concluded that suitable habitat for the finger panic grass is present in areas of mountain coolibah woodland on basaltic geology in the southern parts of the project area. Only 1 population of finger panic grass was recorded on the southern border of the Newlands Nature Refuge, which lies outside of the proposed project area and would hence not be impacted by the project. The following potential threats were identified to populations of finger panic grass:

- Direct clearing of potential habitat (RE 11.3.4, 11.3.25 and 11.8.5) for open cut mining activities.
- Possible minor disturbances of potential habitat (RE 11.3.25 and 11.9.2), associated with the rehabilitation of tension cracking in subsided areas.
- Ponding changes of greater >1m in areas that are located away from the existing Cerito Creek Dam, which may cause periodic inundation within potential habitat (RE 11.3.25).

As part of the EIS, an assessment of significance for MNES was carried out for this species. The EIS concluded that given the long grazing history in the area, and the dominance of buffel grass (*Cenchrus ciliaris*) and parthenium weed (*Parthenium hysterophorus*) in areas of suitable habitat, it would be unlikely that the project area would support a population of finger panic grass or would provide suitable habitats critical to the survival of the species. The main known threats to finger panic grass would include clearing and habitat fragmentation; fire; trampling and grazing by livestock; physical disturbance by machinery; urban expansion and competition from introduced grasses.

To minimise impacts the proponent proposed mitigation measures, such as avoiding unnecessary loss of remnant vegetation, weed management, monitoring for significant changes to local drainage regimes, preventing ponding away from waterways, and allowing natural regeneration of disturbed areas (section 4.17.7 – Proponent's commitments). The EIS concluded that with the proposed mitigation measures in place, no notable indirect impacts or significant residual impacts on the finger panic grass would be expected to occur as a result of the project.

King blue-grass – recorded south of the project area

The EIS concluded that suitable habitat for the king's blue-grass was found in the southern parts of the project area. Only 4 population of king blue-grass were recorded on the southern border of the Newlands Nature Refuge, which lie outside of the proposed project area and would hence not be impacted by the project. The following potential threats were identified to populations of king blue-grass:

- Direct clearing of potential habitat (RE 11.3.4, 11.3.25, 11.8.5 and 11.9.2) for open cut mining activities.
- Possible minor disturbances of potential habitat (RE 11.3.25), associated with the rehabilitation of tension cracking in subsided areas.
- Ponding changes of >1m in areas that are located away from the existing Cerito Creek Dam, which may cause periodic inundation within potential king-blue Grass habitat (RE 11.3.25 and 11.9.2) after rainfall.

As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that grazing pressure within the project area has resulted in the species decline, primarily due to livestock selectively grazing the highly palatable perennial king blue-grass in preference to other native and exotic grass species. Introduced, invasive and less palatable buffel grass along with other grass species are now dominating the grassy woodlands of the project area which outcompete native species, such as the king blue-grass. The fencing which surrounds the Newlands Nature Refuge has meant that grazing has been excluded from the area allowing king blue-grass populations to persist.

The EIS considered that the main threatening processes are likely be similar to those for finger panic grass, and include clearing and habitat fragmentation, fire, trampling and grazing by livestock, physical disturbance by machinery, urban expansion and possibly competition from introduced grasses such as buffel grass. However, measures would put in place to mitigate potential impacts from mining activities, such as avoiding unnecessary loss of remnant vegetation, weed management, monitoring for significant changes to local drainage regimes, preventing ponding away from waterways, and allowing natural regeneration of disturbed areas (section 4.17.7 – Proponent's commitments). The EIS concluded that with the proposed mitigation measures in place, no notable indirect impacts or significant residual impacts on the king blue-grass would be expected to occur as a result of the project.

4.17.5.3 Fauna

Potential impacts and mitigation measures

The EIS concluded that of the 25 EPBC listed fauna species potentially occurring on the project area, impacts would only occur on 3 species found within the project area, namely the squatter pigeon (vulnerable), the satin flycatcher and the rainbow bee-eater (both migratory terrestrial and marine). The white-bellied sea-eagle, which was found foraging over the existing Newlands and Wollombi mine operations, was deemed to have no impacts due to its common abundance in Central Queensland and more suitable and intact wetland habitats in the northern half of the brigalow belt bioregion. Although not recorded in the project area, 1 species which is listed as endangered (black-throated finch), 4 species listed as vulnerable (ornamental snake, yakka skink, brigalow scaly-foot, and red goshawk) and 7 migratory species (black-faced monarch, spectacled monarch, rufous fantail, cattle egret, magpie goose, white-throated needletail, and barn swallow) have the potential to occur in the project area.

A summary of potential impacts for each of the EPBC listed fauna species occurring or potentially occurring on the project area is shown below.

Squatter pigeon – recorded within project area

The squatter pigeon (vulnerable) was found in the project area in mountain coolibah open woodland and narrow-leaved ironbark open woodland. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that the project would reduce the amount of available habitat for the species within the locality and would as a result reduce the abundance of foraging, breeding and sheltering resources and may lead to an increase of competition for breeding and foraging resources in the short-to-medium term. However, the EIS also concluded that this would be unlikely to result in a population decline because the squatter pigeon is a mobile and locally nomadic species, and individuals are expected to relocate into adjacent habitats.

Measures of avoidance and mitigation have been developed in the EIS and EM Plan to reduce the extent of impact on the squatter pigeon and/or its habitats. Mitigation and management measures that would be implemented to reduce the disturbance to the habitat potentially utilised by this species incorporate mitigation measures, such as progressive rehabilitation of mined areas, maintaining low intensity cattle grazing in the southern parts of the project area where it may enhance habitat values for the squatter pigeon and the black-throated finch, limit clearing to that required for the proposed works and pest animal control (section 4.17.7 – Proponent's commitments).

The EIS concluded that even with the mitigation measures in place, the residual impact on the squatter pigeon would result in the reduction of approx 546ha of high value available habitat for this species through clearing. In order to offset these residual impacts the proponent committed to incorporate measures to protect and enhance habitat values for the squatter pigeon into a specific management plan for MNES and provide an offset area which appropriately compensates for the values of the habitat lost. The proposed offset area is to be provided in the Newlands Nature Refuge, which contains viable habitats for the species. Identification of suitable areas for this offset will also include targeting habitats which most closely mimic habitats preferred by this species. The offset strategy is described in more detail in section 4.18 – Biodiversity offset strategy).

Satin flycatcher – recorded within project area

The satin flycatcher (migratory terrestrial and marine) was recorded from tall open woodlands on the Cerito Creek alluvial floodplain in the south of the project area. Most riparian areas across the project area were identified in the EIS to provide suitable habitat for this species and suitable habitat is also abundant across the region. Threats to this species include the clearing and logging of forests in south-eastern Australia, and hence the loss of mature forests. Satin flycatchers are largely absent from regrowth forests. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that loss of riparian habitat from tributaries within the project area would result in the localised loss of foraging and nesting sites; however, this would not result in modification, destruction or isolation of an area of important habitat. High quality riparian habitats for this species occur immediately outside the areas affected by mining.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the satin flycatcher, such as limiting clearing where possible and avoiding of clearing suitable riparian habitat immediately adjacent to the proposed project along Eastern Creek (section 4.17.7 – Proponent's commitments). The EIS concluded that the level of impact upon the present satin flycatcher population and/or its habitats would not be significant.

Rainbow bee-eater – recorded within project area

The rainbow bee-eater (migratory terrestrial and marine) was found in brigalow woodland, narrow-leaved ironbark open woodland; riparian habitats and semi-evergreen vine thickets communities. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS stated that most vegetated/bushland areas would provide suitable foraging habitat for this species; however, suitable nest sites would be limited due to the nature of riparian soils in the project area. The proposed project would result in the loss of riparian habitat along small tributaries within, and hence the localised loss of foraging and nesting sites. However, this would not result in modification, destruction or isolation of an area of important habitat as it was deemed that high quality riparian habitats for rainbow bee-eater occurs immediately outside the areas affected by mining.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the rainbow bee-eater, such a limiting clearing where possible and avoiding of clearing suitable riparian habitat immediately adjacent to the proposed project along Eastern Creek (section 4.17.7 – Proponent's commitments). The EIS concluded that the level of impact upon the present rainbow bee-eater population and/or its habitats would not be significant.

White-bellied sea-eagle – recorded immediately adjacent to project area

The white-bellied sea-eagle (migratory terrestrial and marine) was reported to be found foraging over the existing Newlands and Wollombi mine operations, but not over the proposed project area. No assessment of significance for MNES was presented in the EIS. The EIS; however, concluded that the white-bellied sea-eagle is common in Central Queensland and would not be impacted by the project due to the abundance of more suitable intact wetland habitats in the northern half of the Brigalow Belt Bioregion. No mitigation measures were proposed as part of the EIS or EM Plan.

Black-throated finch – moderate likelihood of occurrence

The black-throated finch (endangered) was not found within the project area. The EIS considered that the project area contains potential habitat for this species. As part of the EIS, an assessment of significance for MNES was carried out for this species. The EIS concluded that the project would result in the clearing of woodland, riparian and wattle shrubland vegetation communities, which constitute potential habitat for the species. Known threats include the direct loss of habitat through vegetation clearance for open cut mining activities, haul roads and other linear infrastructure, and cumulative impacts associated with other mining and coal seam gas projects, and agricultural land within the species known distribution.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the black-throated finch: limiting clearing, progressive rehabilitation of mined areas and maintaining low intensity cattle grazing in the southern parts of the project area (see section 4.17.7 – Proponent's commitments). The EIS concluded that it is unlikely that the project would have any significant adverse effect on this species.

Ornamental snake – moderate likelihood of occurrence; recorded immediately adjacent to project area

The ornamental snake (vulnerable) was not recorded in the project area but has been previously recorded in gilgai formations within the existing Newlands operations but outside the project area. The ornamental snake prefers woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions with brigalow-gilgai cracking clay soils. These habitats provide dry season refugia for this species and an abundance of its main prey species (frogs) during the wet season. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded, that while brigalow vegetation communities are present on the project area, no gilgai mounds and depressions and hence critical habitat were identified in the project area.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the ornamental snake: limiting clearing, where practical have a suitably qualified spotter-catcher available when clearing vegetation in habitats that are favoured by the species (i.e. cracking clay soils, riparian zones and brigalow) and progressive rehabilitation of mined areas (see section 4.17.7 – Proponent's commitments). The EIS concluded that impact upon individuals or a population of the ornamental snake and/or habitats that could be potentially utilised by this species is unlikely.

Yakka skink – moderate likelihood of occurrence

The yakka skink (vulnerable) was not recorded in the project area, although suitable habitat exists. The yakka skink is known to occur in open dry sclerophyll forest, woodland and scrub. The main threat to this species is habitat reduction and degradation. The yakka skink occurs in the brigalow belt bioregion, which has been modified through agricultural and urban development. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that the clearing of riparian areas and large areas of RE 11.9.9 would impact on potential breeding and foraging habitat for this species. However, the EIS stated that potential habitat exists adjacent to areas to be disturbed by mining.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the yakka snake: limiting clearing, where practical have a suitably qualified spotter-catcher available when clearing vegetation in habitats that are favoured by the species (i.e. cracking clay soils, riparian zones and brigalow), progressive rehabilitation of mined areas and selective relocation of suitable trees and logs from the surface of open cut pits for use as microhabitats in areas of rehabilitation (see section 4.17.7 – Proponent's commitments). The EIS concluded that impacts upon individuals or a population of the yakka skink and/or habitats that could be potentially utilised by this species is unlikely.

Brigalow scaly-foot – moderate likelihood of occurrence

The brigalow scaly-foot (vulnerable) was not recorded within the project area. The brigalow scaly-foot occurs mostly within the brigalow belt south bioregion, but its distribution is highly fragmented as a large proportion of potential habitat has been cleared throughout the species' range. The main threat to the brigalow scaly-foot is vegetation clearance. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that the clearing of riparian areas and large areas of RE 11.9.9 would impact on potential breeding and foraging habitat for this species. However, the EIS stated that potential habitat exists adjacent to areas to be disturbed by mining.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the brigalow scaly-foot, such a limiting clearing, where practical have a suitably qualified spotter-catcher available when clearing vegetation in habitats that are favoured by the species (i.e. cracking clay soils, riparian zones and brigalow), progressive rehabilitation of mined areas and selective relocation of suitable trees and logs from the surface of open cut pits for use as microhabitats in areas of rehabilitation (section 4.17.7 – Proponent's commitments). The EIS concluded that the project would not result in any significant detrimental impacts upon the species and/or its potential habitats.

Red Goshawk – moderate likelihood of occurrence

Red goshawks (vulnerable) were not recorded in the project area. However, the EIS stated that this species may occur sporadically as part of its large home range. The red goshawk occurs in coastal and sub-coastal areas in wooded and forested lands as well as riverine forests of tropical and warm-temperate Australia. Habitat loss is the biggest threat to this species. As part of the EIS an assessment of significance for MNES was carried out for this species. The EIS concluded that the project area is unlikely to support an important population of red goshawks and that the biodiversity offset area proposed for this project would provide a safe haven for the species over the long term.

The following management measures were proposed in the EIS and EM Plan to reduce the risk of potential impacts on the red goshawks, such a limiting clearing, retaining riparian habitats close to water and progressive rehabilitation of mined areas (section 4.17.7 – Proponent's commitments). The EIS concluded that given the mobility and range of this species, and the presence of more suitable habitat near by, the proposed project would not result in any substantial adverse effect for this species.

Northern quoll –stated as low in the EIS, but should be upgraded to moderate likelihood of occurrence

The northern quoll (endangered) has not been recorded from the project site. This species is known to occupy a variety of habitats across its current range including rocky areas, eucalypt forest and woodlands, shrublands and grasslands. Habitat usually requires some form of rocky area or structurally diverse woodland or forest for denning/shelter purposes with surrounding vegetated habitats used for foraging and dispersal. No assessment of significance for MNES was presented in the EIS. The EIS; however, concluded that the northern quoll may periodically occur in the eastern extent of the project area as part of a larger home range but more favourable habitat would be found in Eastern Creek and the Redcliffe escarpment areas further to the east of the proposed project. Hence, the species was classified as low likelihood of occurrence.

In its review of the amended Chapter 15 (MNES), DSEWPaC commented that the northern quoll is likely to occur in the project area as it was recorded in the nearby national park and the proposed project area has suitable habitat. Survey guidelines[3] for this species recommend that 'failure to detect [the northern quoll] should not be considered indicative of its absence.' Hence, DSEWPaC concluded, that the likelihood of occurrence in the EIS assessment should be changed from 'low' to 'moderate'. SEWPaC recommended appropriate mitigation strategies be included as part of the EA and final EM Plan, including a monitoring regime that may include use of motion sensitive cameras during the appropriate months to determine presence of the species. EHP also commented that there is the potential for the northern quoll to occur on the project site as it has been recorded within 2km of the project area and the project area contains suitable quoll habitat and recommended further surveys (refer to section 4.17.6 – Conclusion and outstanding issues).

Other EPBC listed fauna species

The following species EPBC listed species were deemed as not being impacted by the proposed project. Hence, no assessment of significance was carried out and no mitigation measures have been proposed for these species. The following section provides an overview of the proponent's assessment of the likelihood these species occurring within the project area.

Star finch – low likelihood of occurrence

The EIS outlined that the star finch (endangered) has not been recorded south of Cape York for some years and was not recorded from the project area. This species has been classified as low likely to occur as the lack of permanent surface water would be unfavourable for this species.

Australian painted snipe – low likelihood of occurrence

The EIS outlined that the Australian painted snipe (vulnerable) was not recorded from the project area and would not expected to occur due to the absence of permanent wetlands.

Fork-tailed swift – low likelihood of occurrence

The EIS outlined that the fork-tailed swift (migratory marine and marine) uses shallows of rivers, freshwater wetlands, sewage ponds, and large farm dams. This species has been classified as low likely to occur as it permanent water is generally absent from the project area.

Cattle Egret – moderate likelihood of occurrence

The EIS outlined that the cattle egret (migratory marine, migratory wetland and marine) occurs in grasslands, woodlands and wetlands and is not common in arid areas. This species has been classified as moderate likely to occur as it has been previously recorded from the surrounding area and may occur periodically as a vagrant.

[3]DSEWPaC 2011. Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.

Great egret – moderate likelihood of occurrence

The EIS outlined that the great egret (migratory marine, migratory wetland and marine) was not recorded in the project area. However, known habitat includes stock paddocks, pastures and croplands. This species has been classified as moderate likely to occur as it has been previously recorded from the surrounding area and may occur periodically as a vagrant.

Magpie goose – moderate likelihood of occurrence

The EIS outlined that the Magpie goose (marine) is still relatively common in the Australian northern tropics. It is found mainly found in shallow wetlands with dense growth of rushes or sedges. It occupies aquatic or terrestrial habitats with activities centred on wetlands, mainly on river floodplains and large shallow wetlands formed by run-off. This species has been classified as moderate likely to occur as suitable wetland habitats exists within the project area but may only occur seasonally as a vagrant.

Latham's snipe – low likelihood of occurrence

The EIS outlined that the Latham's snipe (migratory wetland and marine) is a locally common summer migrant which uses shallow wetlands with tussocks or wet parts of paddocks. This species has been classified as low likely to occur as suitable habitat is generally absent.

White-throated needletail – moderate likelihood of occurrence

The EIS outlined that the white-throated needletail (migratory terrestrial and marine) is an almost exclusively aerial summer migrant to northern Australia which uses aerial space over open country. This species has been classified as moderate likely to occur as suitable habitat exists but may only temporarily occur as a seasonal migrant.

Barn swallow – moderate likelihood of occurrence

The EIS outlined that the white-throated needletail (migratory terrestrial and marine) is a summer migrant to northern Australia most likely found in open spaces such as farmlands near wetlands and settlements. This species has been classified as moderate likely to occur; however, suitable habitat is generally absent.

Black-faced monarch – moderate likelihood of occurrence

The EIS outlined that the black-faced monarch (migratory terrestrial and marine) is a resident in north-eastern Australia and uses denser eucalypt forests and woodlands in spring/autumn during summer migration to coastal south-eastern Australia. This species has been classified as moderate likely to occur as suitable habitat is present.

Spectacled Monarch – low likelihood of occurrence

The EIS outlined that the spectacled monarch (migratory and marine) is found in rainforest, mangroves and moist gullies of dense eucalypt forest. This species has been classified as low likelihood to occur as suitable habitat is absent.

Australian cotton pygmy-goose – low likelihood of occurrence

The EIS outlined that the Australian cotton pygmy-goose (migratory wetland and marine) is found in deep freshwater swamps, lagoons, dams with water-lilies and semi-emergent water plants. This species has been classified as low likely to occur as suitable permanent wetlands are generally absent and the species may only occur periodically as a vagrant.

Rufous Fantail – low likelihood of occurrence

The EIS outlined that the rufous fantail (migratory marine) occurs in coastal and near coastal districts of northern and eastern Australia tropical rainforest and monsoon rainforests. This species has been classified as low likely to occur as suitable habitat is generally absent and the species may only occur periodically as a vagrant.

Painted Snipe – low likelihood of occurrence

The EIS outlined that the painted snipe (migratory wetland and marine) is a summer migrant to northern Queensland which is known to frequent shallow inland wetlands, wetter areas, tea-tree scrub and open timber. This species has been classified as low likely to occur as suitable habitat is generally absent and the species may only occur periodically as a vagrant.

Eungella Day Frog – no likelihood of occurrence

The EIS outlined that the Eungella day frog (endangered) is only found in rocky rainforest and wet sclerophyll forest streams, of which none are present in the project area. A total of 151 hours of frog surveys were conducted and as such meets the requirements of EPBC guidelines' survey effort for this species. The Eungella day frog was not one of the 11 frog species recorded.

4.17.5.4 Onsite dams as potential habitat for migratory species

As a response to DSEWPaC's comments on the submitted EIS regarding the existing onsite dams and their potential to provide habitat to EPBC listed species, the amended chapter 15 of the EIS included an extra section on this matter.

The EIS stated that the project will require a total of 13 dams as water management structures, comprised of 3 types of dams, 4 clean water dams, 6 sediment dams and 5 mine water dams. Dams would be established prior to disturbance of the catchment in which they lie, and decommissioned (or retained for future landholders) when the disturbed catchment has been rehabilitated.

Although the 13 dams would be man-made dams and would not provide natural wetland habitats, they could provide habitat values for migratory wetland bird species. However, the EIS stated that mine-affected and sediment-affected dams would have elevated and/or variable salinity levels and would have a certain degree of turbidity. Clean water dams would collect surface water runoff and as such would contain low salinity and turbidity levels. Hence, the EIS deemed the clean water dams as potential habitat values for migratory wetland birds and amphibians and would provide significant watering points for other terrestrial fauna groups.

Furthermore, the EIS considered that the Cerito Creek Dam and mine dams from the existing operations would also provide viable foraging, roosting and breeding habitat resources for migratory wetland birds over the next 20-30 years. Therefore, the proponent concluded, the construction of these dams is likely to benefit migratory wetland birds and other faunal groups.

4.17.6 Conclusion and outstanding issues

While the majority of the concerns raised by DSEWPaC during the review of the submitted EIS have been addressed in the amended EIS chapter (as summarised above), DSEWPaC noted several outstanding issues not addressed by the amended EIS. These outstanding issues will need to be appropriately conditioned during approval process and addressed by the proponent before the project would be approved.

DSEWPaC outlined some minor and several priority items which would need to be updated as part of the approval process. The outstanding priority issues are:

- Discrepancies in the vegetation mapping in text and figures provided in the MNES chapter (EIS Chapter 15) and between vegetation mapping provided in Chapter 14 (Ecology) and Chapter 15. DSEWPaC noted that final adjustments and consistent information will be required in order determine the final offset arrangements.
- Ensuring appropriate management and governance arrangements are in place for Newlands Nature Refuge for the proposed offset area.
- The proponent's discussion of impacts of subsidence to MNES was deemed to have limited scientific robustness. DSEWPaC stated that, according to the ponding assessment provided in the surface water chapter, (EIS Chapter 9) ponding in the Cerito Creek Dam area has the potential to exceed 3m in depth with direct rainfall. As the dam is located in the proposed offset area of the Newlands Nature Refuge and the proposed additional ponding would impact on MNES, such as brigalow and semi-evergreen vine thickets communities, DSEWPaC recommended this area should be excluded from the proposed offset area.
- The northern quoll is likely to occur in the project area as it was recorded in the nearby national park and the proposed project area has suitable habitat. Survey guidelines[4] for this species recommend that 'failure to detect [the northern quoll] should not be considered indicative of its absence.' Hence, the likelihood of occurrence in the EIS assessment should be changed from 'low' to 'moderate'. SEWPaC recommended appropriate mitigation strategies be included as part of the EA and EM Plan, including a monitoring regime that may include use of motion sensitive cameras during the appropriate months to detect the presence of this species.

[4]DSEWPaC 2011. Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.

- DSEWPaC considered that survey data must be appropriately referenced and survey results for each species should be included in the discussion paragraphs under each species. However, the amended EIS only partially addresses this requirement. For example, survey results have been combined into one table so that it is not possible to analyse individual survey effort for each of the EPBC listed species. Details of survey methods and effort for each species targeted should be provided.

EHP also commented that there is the potential for the northern quoll to occur on the project site as it has been recorded within 2km of the project area and the project area contains suitable quoll habitat. Hence, EHP recommended:

- Further surveys required consistent with Commonwealth survey guidelines (i.e. including the use of remote cameras)
- If the species would be encountered, it would need to be discussed, mitigated and potentially offset (as the quoll has not been incorporated in the impact assessment by the proponent).

4.17.7 Proponent's commitments

In order to preserve, enhance MNES values and avoid unnecessary impacts, the proponent committed to several mitigation measures.

- Preparation of an MNES management plan.
- Limiting habitat loss:
  - Alignment of haul roads and electricity supply lines, where possible, in order to avoid impacting on patches of endangered threatened ecological communities.
  - Limit clearing to that required for the proposed works.
  - Clearly marking areas to be cleared to avoid accidental clearing of surrounding vegetation.
  - Avoid threatened ecological communities when undertaking remedial works.
  - Establish machinery exclusion zones in order to avoid unnecessary loss of remnant vegetation, particularly endangered and of concern vegetation communities.
  - Avoid clearing of suitable riparian habitat for the satin flycatcher and the rainbow bee-eater immediately adjacent to the project (along Eastern Creek).
  - To have a suitably qualified spotter-catcher available when clearing vegetation in habitats that are favoured by the ornamental snake and the yakka skink (i.e. cracking clay soils, riparian zones and brigalow).
  - Retain riparian habitats close to water where possible.
- Stockpiling:
  - Separate stockpiling of brigalow and semi-evergreen vine thickets topsoils and subsoils for use in rehabilitation.
- Rehabilitation:
  - Rehabilitation of mined brigalow and semi-evergreen vine thickets with self-sustaining vegetation communities using locally endemic species characteristic of each relevant ecosystems and monitor for weed invasion.
  - Allow natural regeneration of disturbed grassland areas and monitor for weed invasion.
  - Targeted rehabilitation of erosion risk areas.
  - Where possible establish suitable habitats for listed EPBC species that mimic those preferred by the species.
  - Progressive rehabilitation of mined areas.
  - Where practical, selective relocation of suitable trees and logs from the surface of open cut pits for use as microhabitats in areas of rehabilitation for listed reptiles.
- Weed and pest management:
  - Control weed invasion through the implementation of the existing mine's Pest Management Plan, local management practice and/or Department of Agriculture, Fisheries and Forestry Pest Fact Sheets.
  - Pest animal control to minimise impacts of predation.

- Ponding, drainage and cracking management:
  - Visual inspections to identify significant changes to local drainage regimes.
  - Regrade minor areas to prevent ponding away from waterways.
  - Visual inspection to identify surface cracking in areas susceptible to erosion.
- Managing stock densities:
  - Low-intensity grazing management in the southern parts of the project area where it may enhance habitats for the squatter pigeon and the black-throated finch
  - Continuation of low-intensity grazing management in areas of suitable habitat outside mine footprint.

4.18 Rehabilitation and decommissioning

Chapter 4 of the EIS described the options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the proposed project, the means of decommissioning and outlined the rehabilitation and decommissioning phases of the proposed project in terms of land disturbance, rehabilitation and decommissioning goals, outcomes and strategies.

4.18.1 Assessment of the EIS chapter

4.18.1.1 Submissions on the EIS chapter

Chapter 4 received several comments from the following submitters during the EIS submission period. Some of these comments related to the EM Plan but were outlined here, where relevant, for completeness:

- DAFF – including Biosecurity Queensland:
  - Requested that Chapter 4 and EM Plan would include a statement that no declared plant species would be present on the rehabilitated landforms.
  - Outlined that the proponent must ensure that vegetation waste spread on rehabilitated areas would not contain declared pest matter, particularly reproductive matter.
  - Requested that rehabilitation success criteria should contain success indicators and completion criteria to ensure there are no declared plant species on the rehabilitated landform.
  - Requested that treatment and effective management of any new infestations should be included in the management approaches for pest species.
  - Recommended that Biosecurity Queensland Annual Pest Distribution Survey data and predictive pest maps should be used in ascertaining the presence of declared species in the project site and surrounding areas.
  - The proponent must advise how compliance under the provisions of the *Plant Protection Act 1989* (and associated regulations) would be managed.
  - Outlined that the specific rehabilitation goals for the mine did not include goals for the prevention and control of declared pests and disease. The proponent should ensure that the post project landform would not contain any declared pest species.
  - Requested that the proponent must ensure that vegetation waste spread on rehabilitated areas would not contain declared pest matter, particularly reproductive matter.
  - Requested that the rehabilitation success criteria should contain success indicators and completion criteria to ensure there are no declared plant species on the rehabilitated landform.
  - Outlined that the statement in the EM Plan that vehicle wash-down facilities for vehicles entering and leaving declared weed zones did not provide enough detail about the proposed management practices.
  - Outlined that the EM Plan does not provide clear guidelines or strategies to show how numbers of pest animals will not increase as a result of the proposed project, or for the prevention of introduction of pest species not currently present. DAFF recommended that the EM Plan must describe the management strategies to be implemented to ensure that numbers of pest animals do not increase as a result of the project.

- WRC:
  - Requested a void management plan discussing the criteria to be applied in the design and rehabilitation of final voids having regard to geophysical aspects, sealing of strata, water accumulation and safety issues including rehabilitation measures
  - Outlined that once rehabilitation has commenced, the holder of the environmental authority must conduct an annual rehabilitation monitoring program
  - Requested a revegetation plan, a weed and feral animal management plan, flora and fauna management plans, stormwater and other management plans.

4.18.1.2 Proponent's response to submissions

In response to DAFF's comments the proponent updated the requested information in the relevant section of Chapter 4. However, the proponent stated that the EM Plan was not updated as it already states that "declared plant control may last a number of years and will be monitored annually at the establishment phase and every 4 years during the sustainability phase of the rehabilitation program. The objective is to prevent the re-colonisation or invasion of declared plants in areas subject to land rehabilitation." In regards to the compliance with the *Plant Protection Act 1989* the proponent stated that the control and eradication of pest plants, invertebrate animals, fungi, viruses and diseases is considered critical to ongoing site management and is a key part of the overall long term sustainable management of the site and the surrounding region and would be managed through the implementation of the existing mine's current pest management plan. The proponent noted DAFF's request that the post project landform would not contain any declared pest species and no vegetation waste spread on rehabilitated areas, but no clear commitments were outlined in the EIS or EM Plan. In response to the request that rehabilitation success criteria should contain success indicators and completion criteria to ensure there are no declared plant species on the rehabilitated landform the proponent updated the relevant sections in Chapter 14 and EM Plan. The EM Plan was also updated to include the requested information on the vehicle wash-down facilities. The proponent also stated that the EM Plan has been updated to include 'declared pest species exclusion' as a success criterion for rehabilitation.

As a result to WRC's comments, the proponent responded that the cessation of mining the residual voids would be prepared to address public safety and prevent land animal entry. The final plan for the residual voids would be developed as part of the final decommissioning plan that, under the Xstrata Sustainable Development policy, is required to be available 5 years prior to cessation of mining. The proponent further noted the requirement of the annual rehabilitation monitoring program. Their response further outlined the existing mine already has management plans for in all areas, including but not limited to revegetation, weed and feral animal management, flora and fauna management and stormwater.

4.18.1.3 Adequacy of the EIS chapter

As a consequence of these submissions, sections relating to rehabilitation in the amended EIS were revised by the proponent. However, in a review of the amended EIS and the proponent's response, DAFF and EHP commented on some outstanding issues relating to rehabilitation. These outstanding issues concerning weed and pest management as well as subsidence rehabilitation would need to be addressed as part of the amendments of the EM Plan (section 4.18.3 – Conclusions and outstanding issues).

4.18.2 Description of rehabilitation and decommissioning – findings of the EIS

4.18.2.1 Land disturbances and proposed rehabilitation strategies

The EIS outlined that the proposed project would impact on approximately 2284ha of disturbed land resulting from progressive open cut mining activities and supporting infrastructure and approximately 900ha which may potentially be subject to subsidence (surface cracking and/or ponding) as a result of underground mining activities.

With the exception of final voids and infrastructure areas such as haul roads, ROM stockpile areas, hardstand areas, water management structures and dams, the post-mining land use for most areas disturbed by open cut mining operations would be rehabilitated with self-sustaining flora and fauna habitats. It was further stated that final voids would be secured and remain after mining operations have ceased. These would be demonstrated to be geotechnically stable and non-polluting. Infrastructure areas would also be ripped, topsoil added and seeded to re-establish the pre-mining land use in these areas. The proponent outlined that they will negotiate with the landholders if infrastructure items would be considered to be an asset to the post-mining landholder (such as small dams, sheds, roads, etc.) and hence would be retained. In areas not affected by open cut mining, the post-mining land use would continue remain unchanged from its current us for grazing.

The geochemistry assessment identified that the risk of the waste rock producing acid and environmental impacts as a result of acid mine drainage is insignificant. Hence, it was concluded in the EIS, that there would be no need for selective handling of specific geological units during the mining process. On the other hand, it was outlined in the EIS that waste rock would be alkaline and sodic, making it prone to dispersion and erosion if not appropriately managed. Hence, the EIS stated that during the rehabilitation process, materials with high sodicity or salinity would be covered with competent material and topsoil to reduce any deleterious effects on the receiving environment through leaching and maintain the stability of the rehabilitated landform.

The final landform proposed in the EIS for areas disturbed by open cut mining would consist of rehabilitated waste rock dumps comprising a series of internally draining cells. These cells would contain low, stable batters with up to 30% slope. Batter slopes external to the cells which extend to the natural ground would contain more gentle slopes (up to 15%). Waste rock dump areas would be contoured such that runoff is captured within internally draining cells to minimise erosion and enhance soil development and water retention for the self-sustaining vegetation. The EIS further outlined that while most of the area of these rehabilitated landforms (i.e. the surfaces of the waste rock dumps) would have slope and soil conditions suitable for grazing, these areas would be generally inaccessible (surrounded by slopes) for cattle and as such it is proposed that grazing is generally excluded in preference to the establishment of native vegetation.

According to the EIS the tailings would be discharged as slurry (60% water by volume) via large diameter polyethylene pipes to a tailings facility within an existing void. Within the void, tailings would be placed within cells which allows rotation between cells and promotes desiccation and drying. Once the tailings cells have dried, a cap of at least 5m of benign overburden material would be applied and contoured to achieve the ponding and drainage requirements for the final landform. The contoured landform would then be covered with a minimum of 30cm of topsoil and seeded with native vegetation. Rejects would be taken by truck and deposited within an existing void. Within the void the rejects would be contoured to fully utilise the available space and create the desired final landform. Rehabilitation of the rejects emplacement area would involve the covering of the final landform with at least 1m of benign overburden material and the application of durable rock mulch on sloping surfaces. At least 30cm of topsoil would also be applied and seeded with native vegetation.

At the end of the mine's life, 4 final voids with areas of approximately 99ha, 78ha, 38ha and 29ha would remain permanently. Residual voids would be prepared to address public safety and prevent land animal entry. The final plans for the residual voids would be addressed as part of Xstrata Coal's Sustainable Development policy 5 years prior to cessation of mining. The water balance of the residual voids carried out for the EIS indicated that the voids would become permanent groundwater sinks, but there would be no danger of them overtopping. The final slope angle for the high wall would be determined following a geotechnical assessment of the highwall geology. As part of this final design, the high wall would be blasted to a lower angle to provide a higher degree of safety and improve long term stability.

The EIS stated that at the completion of mining, all saleable coal in stockpile areas would be removed, the areas would be graded to the desired landform, topsoil added and revegetated to a self-sustaining vegetation community suitable for grazing to meet the post mining land-use.

In terms of the proposed 4 diversions, the EIS indicated that the channels would remain permanently diverted, with the exception of the Eastern Creek tributary. This tributary would be reinstated close to its original drainage path through the rehabilitated Eastern Creek East waste rock dump. The channel would be properly armoured to maintain pre-development hydraulic conditions, such as stream length, channel profile, velocity and shear.

Rehabilitation strategies – open cut mining areas

The proponent stated that they would update the existing mine rehabilitation protocols to include the proposed extension. The rehabilitation strategies would consist of:

- Landform design and development (implementation of practical landform designs to prevent erosion and establish final landform stability).
- Topsoil and cleared vegetation management (pre-mining preparation such as topsoil salvage, following stockpiling and cleared vegetation management strategies).
- Erosion control (implementation of erosion control measures).
- Progressive rehabilitation and revegetation (ongoing rehabilitation of disturbed areas, using rehabilitation procedures appropriate to the type of disturbance).
- Ongoing rehabilitation maintenance and monitoring (a rehabilitation monitoring program to assess the success of rehabilitation, including a corrective action program to address areas of failed rehabilitation).
- Implementation of rehabilitation success criteria (recognition of reaching the required rehabilitation success criteria).

Rehabilitation strategies – underground mining subsidence areas

The EIS stated that the current rehabilitation strategies used for the management of subsidence of the existing mine would be updated for the proposed underground operations. The EIS outlined that remediation of surface cracking would result in vegetation and soil disturbance associated with access and movement of equipment. The areas that would be at greatest risk of surface cracking were identified in the EIS as being those located at the panel edges and where surface water flows are concentrated. The area of proposed underground mining is dominated by black clay soils which crack, shrink and swell under natural conditions. Remedial actions for these soils would include a simple regrading of affected areas. However, the EIS also stated that, due to the potential for disturbance to remnant vegetation and fauna habitat, rehabilitation works would be limited to those areas identified as presenting unacceptable erosion or safety hazard to personnel or wildlife. Remedial work outlined in the EIS for the larger waterways such as Cerito Creek or its northern tributary would involve rock armouring and additional stabilisation works.

The selection of remedial strategies would be based on monitoring of performance of measures adopted at the existing mine as part of the subsidence management plan. Remedial work would comprise:

- Subsidence crack remediation:
  - Disc ploughing of areas where cracks occur in order to break up the surface and close or fill cracks.
  - Re-establishment of a natural vegetative cover management of land uses in affected areas appropriately, including the control of any grazing activities.
- Ponding:
  - Re-establishment of free drainage in areas of excessive ponding by excavating small drainage channels.

4.18.2.2 Decommissioning

According to the EIS, all underground mine entries would be permanently sealed at mine closure. Mine surface infrastructure areas would be decommissioned and rehabilitated in accordance with Xstrata Coal mine closure standards which will be adopted by the proponent for the proposed project.

Decommissioning and final rehabilitation of the existing mine and the proposed project, would occur on a staged basis over a number of years. The EIS stated that on the completion of mining, the following treatments would be undertaken:

- A contaminated site survey would be carried out to identify the need for any additional contaminated land management to be undertaken.
- Mine roads would be rehabilitated or left behind for use as farm roads, if requested by the landowner.
- Water dams would remain if required by the landowner and approved by regulators. Otherwise, they would be breached and rehabilitated, restoring the natural drainage patterns.
- Any buildings, plant and equipment would be removed and the surface rehabilitated.
- Concrete pads will be broken up and covered with benign waste rock, topsoiled and revegetated. Concrete will be buried or removed from site.

4.18.3 Conclusion and outstanding issues

While the amended EIS incorporated most of the comments identified during the submission period, several issues are outstanding.

DAFF reviewed the amended EIS and EM Plan and the proponent's response to DAFF's submission and stated that there are still outstanding issues in regards to weed management. These would need to be addressed as part of the revised EM Plan during the project approval process. Issues to be resolved would include:

- EM Plan will need to address plant pest and disease prevention and management.
- Establishment of a watching brief for any developments about pests of plants or diseases of plants that may become regulated.
- Mapping of location and density of infestation of all declared weed species on project area to inform weed management and risk mitigation actions.

EHP also commented that the amended EIS did not adequately address the department's original EIS comments regarding subsidence management during rehabilitation. Hence, the following issues would need to be addressed as part of the EM Plan review process:

- The EM Plan must detail the management and rehabilitation of subsidence. Reference to the proposed subsidence management plan must be given and an outline how subsidence and rehabilitation would be managed to achieve nominated outcomes.

4.18.4 Proponent's commitments

In order to fulfil the rehabilitation commitments, the proponent proposed to:

- Weed and pest management plan.
- Subsidence management plan.
- The rehabilitation strategies for open cut mining areas would include:
  - Land-form design and development.
  - Topsoil and cleared vegetation management.
  - Erosion control.
  - Progressive rehabilitation and revegetation.
  - Ongoing rehabilitation maintenance and monitoring.
  - Implementation of rehabilitation success criteria (recognition of reaching the required rehabilitation success criteria).
- The rehabilitation strategies for subsidence would include:
  - Subsidence crack remediation:
    - Disc ploughing of areas where cracks occur in order to break up the surface and close or fill cracks.
    - Re-establishment of a natural vegetative cover management of land uses in affected areas appropriately, including the control of any grazing activities.
  - Ponding:
    - Re-establishment of free drainage in areas of excessive ponding by excavating small drainage channels.
- Decommissioning strategies:
  - Contaminated site investigation.
  - Rehabilitation of mine roads.
  - Water dams would remain if required by the landowner and approved by regulators. Otherwise, they would be breached and rehabilitated, restoring the natural drainage patterns.
  - Removal of buildings, plant and equipment and rehabilitation of the surface.
  - Removal of concrete pads and rehabilitation.

4.19 Biodiversity offset strategy

4.19.1 Introduction

Offsets, under the EPBC Act, are defined as measures that compensate for the residual adverse impacts of an action on the MNES. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act[5].

[5]DSEWPaC 2012. *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy, October 2012.

Offsets under the EP Act are designed to increase the long-term protection and viability of the state's biodiversity where residual impacts from a development, on an area possessing state significant biodiversity values (SSBVs), cannot be avoided[6]. The Queensland Government Environmental Offsets Policy (QGEOP) sets principles for environmental offsets in Queensland. All State Government offsets policies must comply with the principles of the QGEOP.

Environmental impacts under both Acts must first be avoided, then minimised, before offsets are considered for any remaining impact. Where DSEWPaC requires an offset for an activity that is a 'controlled action' under the EPBC Act, an additional offset for the purpose of the Queensland Biodiversity Offset Policy (BOP) is not necessary where the same state significant biodiversity values are being impacted. However, where this is the case, the offset provided must achieve the same (or greater) outcomes for the values impacted as what would be required by the BOP. Where SSBV differ to MNES, these will need to be offset under the EP Act.

4.19.2 Existing offset areas

As part of Xstrata Coal's operations, the existing Newlands Coal Mine manages an offset area (the Woolombi Offset Area). This area was created because the mine was required to offset the loss of 260ha of remnant brigalow woodland protected under the EPBC Act which was to be cleared as part of the Wollombi mine development. This Wollombi Offset Area was the primary offset for clearing at the Wollombi mine in accordance with the approval under the EPBC Act (EPBC 2005/2015; issued 29 September 2006).

At the same time a future offset area was set aside at as a bank for potential future offsets and as consequence of this future offset bank, the Newlands Nature Refuge was created. The Newlands Nature Refuge was established over an area of approximately 4363ha through a Conservation Agreement between the State of Queensland and Colinta Holdings Pty Ltd for the Establishment of Newlands Nature Refuge in June 2007. This area contains a mix of remnant and regrowth vegetation communities, including regrowth brigalow woodland and semi-evergreen vine thickets. **Error! Reference source not found.** shows the location of the Wollombi Offset Area in relation to the Newlands Nature Refuge, the MLAs and proposed open cut and underground operations.

In accordance with the conservation agreement, the Newlands Nature Refuge is managed to conserve its significant natural and cultural resources including the protection of:

- Listed threatened vegetation communities:
  - RE 11.3.1 (brigalow, endangered under the EP Act and EPBC Act).
  - RE 11.9.1 (brigalow, endangered under the EP Act and EPBC Act).
  - RE 11.9.5 (brigalow, endangered under the EP Act and EPBC Act).
  - RE 11.5.15 (semi-evergreen vine thickets, endangered under the EP Act and EPBC Act).
- Regenerating areas of brigalow woodland which have previously been cleared (brigalow regrowth).
- Suitable habitat for rare and/or threatened species including squatter pigeon, little pied bat, brigalow scaly-foot and red goshawk, all of which either occur, or have the potential to occur, in the project area.

In accordance with the agreed management conditions for the Newlands Nature Refuge, underground mining activities or exploration necessary for the purpose of defining underground resource extents are the only mining-related activities to be undertaken within the Newlands Nature Refuge. As such, the Newlands Nature Refuge contains tracks for exploration and to access small temporary flare wells.

[6]DERM 2011. Queensland Biodiversity Offset Policy (Version 1), October 2011.

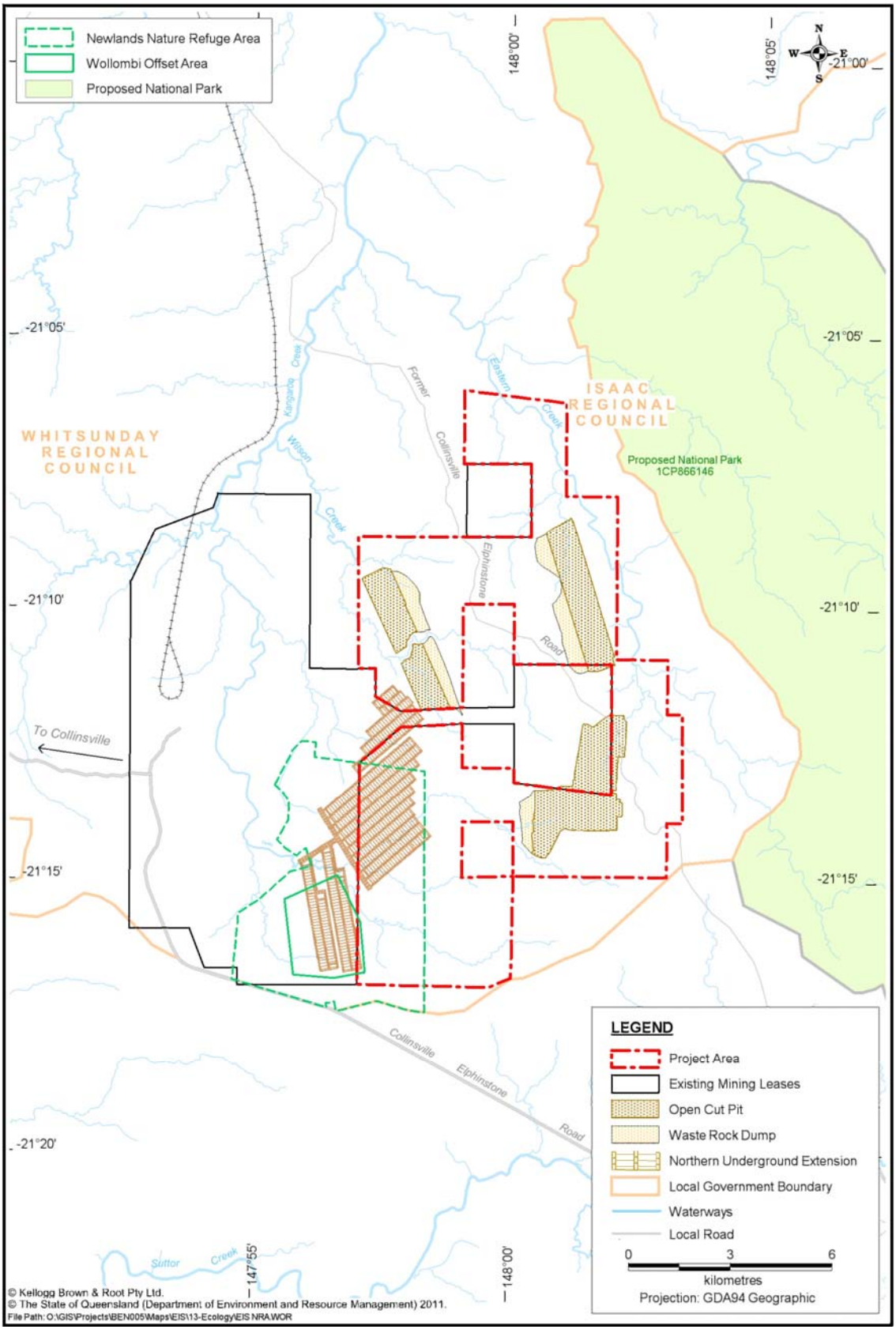

Figure 7 **Figure showing the Newlands Nature Refuge and the Woolombi Offset Area in relation to the proposed open cut and underground operations.**
(Figure reproduced from the EIS)

4.19.3 Assessment of the proposed biodiversity offset strategy

The submitted EIS did not provide a separate chapter on offsets. Instead offset proposals were described in the MNES chapter, section 15.9 (EIS Chapter 15) for MNES and in the ecology chapter, section 14.6.10 (EIS Chapter 14) for SSBVs.

4.19.3.1 Submissions on the proposed biodiversity offset strategy

Several submissions were received during the public consultation period on the proposed offset proposal. These are summarised below.

- DSEWPaC:
  - More detailed explanation required regarding the proposed 'compensation' offsets for any residual impacts to MNES. For example, how will the existing Newlands Biodiversity and Land Management Plan and Conservation Agreement be extended and for how long? What governance arrangements exist and/or will be put in place to ensure sound and increased commitment and management of the Nature Refuge? It is understood the survey ground-truthing will inform 'residual impacts' to the project.
  - Information about proposed offsets, and how they will compensate for the adverse residual impacts of the action on MNES is inadequate:
    - Offsets are measures to compensate for environmental impacts that cannot be adequately reduced through avoidance or mitigation. The MNES Chapter must include a detailed discussion of plans to offset any residual impacts of the proposal on MNES. The proposed offset strategy must address any residual impacts on each matter of national environmental significance individually.
  - SEWPaC noted that the proposed offsets under the EPBC Act will need to address the EPBC Act Environmental Offsets Policy (October 2012), including (but not limited to) information on ongoing viability of protected matters, delivering of overall conservation outcomes, offsets must match the quality of impacted habitat and a minimum of 90% must be direct offsets.
  - Mapping must be provided for the threatened ecological communities (TECs) in the Wollombi Offset area and the western section of the proposed offset area (the existing Newlands Nature Refuge). This mapping needs to be completed to enable DSEWPaC the opportunity to consider whether the proposed project offset meets the EPBC Act Environmental Offsets Policy.
- EHP:
  - The proposed offset strategy was not sufficient. Offsets must be provided for impacts on all SSBVs, in accordance with the BOP. Further information was requested on:
    - Vegetation communities in the Newlands Nature Refuge and Wollombi Brigalow Offset Area.
    - Potential impacts of underground mining on the proposed offset area.
    - Proposed diversions of watercourses. As these are listed as SSBV, they would need to be discussed in the biodiversity offset strategy.
    - Proposed exploration activities and quarrying activities outlined in the EM Plan. However, no indication of disturbance areas was presented nor whether these activities would cause impacts to SSBVs.
    - Noise impacts on the Newlands Nature Refuge could have detrimental impacts on fauna in the offset area and may need to be mitigated.
- MCC:
  - Opposed to the mining underneath the existing Newlands Nature Refuge
  - EIS does not show how offsets and other mitigation efforts would work
  - Insufficient information in EIS regarding gains in biodiversity or even the minimum standard of no net loss in biodiversity.
- WRC:
  - The proponent should have included as part of the EIS offset in accordance with the BOP and the EPBC Act Offsets Policy.

4.19.3.2 Proponent's response to submissions

As a response to these comments the proponent undertook additional field surveys in late spring/early summer 2012 (21–28 October and 27 November – 3 December 2012) to collect further data for the amended offset strategy. Furthermore, additional information on SSBVs and other issues identified in the submissions was provided in the amended EIS Chapters 14 and 15.

This additional information included an assessment of potential impacts on watercourses as part of the proposed project in the amended EIS Chapter 14 (Ecology). The EIS outlined that mitigation measure would include the re-instatement of lost terrestrial fauna habitats, and acknowledged that this does not immediately compensate the residual impacts associated with the removal of sections of existing tributaries. Therefore, the residual impacts would need to be offset. The EIS noted, that the proposed offset area (Newlands Nature Refuge) contains watercourses that provide the same, if not better, ecological value than the watercourses to be diverted and as such, would in part, compensate the residual impacts associated with the removal of sections of existing tributaries. The EIS further outlined on how long-term management measures for the watercourse diversions and the proposed offset area would be incorporated into and managed under the whole of mine EM Plan.

A summary of the preliminary biodiversity offset strategy put forward by Xstrata Coal is shown below. However, it must be emphasised that the proponent is still in negotiations with DSEWPaC and EHP in order to finalise the offsets under State and Commonwealth legislation. Hence, the following section provides an overview of the proposed offsets and not a comprehensive analysis of the required offsets under state and Commonwealth legislations.

4.19.4 Biodiversity offset strategy

The EIS proposed to develop a biodiversity offsets strategy which would include consideration of:

- offset requirements under the Queensland Government's Biodiversity Offsets Policy
- offset requirements under the then draft EPBC Act Offset Policy Statement (EPBC Act 1999 Environmental Offsets Policy, October 2012)
- the utilisation of the existing biodiversity offsets bank available within the Newlands Nature Refuge area.

The EIS proposed biodiversity offsets strategy would provide direct land-based offsets for listed threatened vegetation communities (predominantly brigalow and semi-evergreen vine thickets communities) within the project area. The offset strategy developed by the proponent would be based on the ground-truthed vegetation mapping developed for the EIS, the condition and values identified in areas to be disturbed (residual impacts after mitigation measures were proposed) and compared with the available bank within the Newlands Nature Refuge. The EIS concluded that the strategy would be finalised prior to the commencement of physical works within the project area.

4.19.4.1 Offsets proposed under the EPBC Act

The EIS outlined that the proponent considered the existing Newlands Nature Refuge to be used as suitable offset for impacts on MNES. The impacts of MNES due to the proposed project, the mitigation measures proposed and the residual impacts have been discussed in section 4.17 (MNES). Table 6 summarises the residual impacts resulting on each MNES (TECs and the squatter pigeon) and the proposed offsets for each of the MNES.

Table 6 Residual impacts on MNES and proposed offsets

MNES	Residual impacts	Proposed offset
TEC	The project would result in the clearing of: • 204ha of endangered brigalow • 57ha of endangered semi-evergreen vine thickets.	640ha of remnant/regrowth brigalow and 75ha of remnant/regrowth semi-evergreen vine thickets is available within the Newlands Nature Refuge.
Squatter pigeon	The project works would result in the reduction of approx 546ha of high value available habitat for this species through clearing (mountain coolibah woodland habitats in proximity to water.). The areas considered to represent a residual impact are those of higher value to and actively utilised by this species.	1740ha of high value squatter pigeon habitat is available within the Newlands Nature Refuge.

4.19.4.2 Offsets proposed under the BOP

No offsets under the BOP were proposed as part of the EIS, other than the Newlands Nature Refuge would be used to offset any residual impacts on SSBVs. However, the EIS stated that offset requirements under the BOP would be assessed by demonstrating ecological equivalence between the impact areas and offset areas. Once the strategy has been finalised appropriate management measures would be developed to meet the requirements of the policy.

4.19.5 Subsidence impacts in the Newlands Nature Refuge and Wollombi Brigalow Offset areas

The EIS outlined that approximately 690ha of the Newlands Nature Refuge and 30ha of the Wollombi Offset Area would be located in the area of potential subsidence associated with underground mining.

The area that would be affected by subsidence contains regrowth brigalow woodland and remnant eucalypt woodland and would be subject to surface cracking as a result of subsidence. However, the EIS concluded that disturbance of vegetation communities due to surface cracking or associated remediation activities would be minimal (refer to section 4.17.5.1). Parts of this area would also be subject to additional ponding. However, this would only occur in areas already periodically inundated by the Cerito Creek Dam.

4.19.6 Conclusion and outstanding issues

EHP acknowledged that the proponent would be willing propose suitable offsets prior finalisation of the project EA. However, additional information is required to finalise a biodiversity offset strategy under the EP Act, including information on residual impacts on SSBVs, potential noise impacts on fauna in the Newlands Nature Refuge, and how Xstrata Coal intents to offset these. Negotiations with the proponent would be necessary to finalise the offset strategy and offset conditions as part of the approval process.

DSEWPaC reviewed the proposed offset strategy proposed under the EPBC Act and noted several outstanding issues not addressed by the proponent in the amended EIS. Outstanding issues will need to be conditioned during approval process and addressed by the proponent before the offset strategy can be finalised and the proposed project would receive project approval under the EPBC Act. Outstanding issues under the EPBC Act include:

- Discrepancies in the vegetation mapping in text and figures provided in the MNES chapter (EIS Chapter 15) and between vegetation mapping provided in Chapter 14 (Ecology) and Chapter 15. DSEWPaC noted that final adjustments and consistent information will be required for the final offset arrangements.
- DSEWPaC noted that the size of remnant brigalow available in the Newlands Nature Refuge for offsetting is 157ha, whereas the total requirement for an offset would be 204ha, leaving a shortfall of 47ha.
- The proponent's discussion of impacts due to subsidence on MNES was considered to have limited scientific robustness. DSEWPaC stated that according to the ponding assessment provided in the surface water chapter (EIS Chapter 9) ponding in the Cerito Creek Dam area has the potential to exceed 3m depth with direct rainfall. As the dam is located directly in the proposed offset area of the Newlands Nature Refuge and the proposed additional ponding would impact on MNES, such as brigalow and semi-evergreen vine thickets communities, DSEWPaC recommended for this area to be excluded from the proposed offset area (19ha brigalow and 1ha semi-evergreen vine thickets).
- The northern quoll is likely to occur in the project area, as it was recorded in the nearby national park and the proposed project area has suitable habitat. Survey guidelines[7] for this species recommend that 'failure to detect [the northern quoll] should not be considered indicative of its absence.' Hence, the likelihood of occurrence in the EIS assessment should be changed from 'low' to 'moderate'. SEWPaC recommended appropriate mitigation strategies be included as part of the EA and EM Plan, including a monitoring regime that may include use of motion sensitive cameras during the appropriate months.

[7]DSEWPaC 2011. Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.

- DSEWPaC noted that the EPBC offset policy requires that "for impacts on habitat for threatened species and threatened ecological communities, any direct offset must meet, as a minimum, the quality of the habitat at the impact site. Where a proposed offset site has a lower quality, than the impact site, the offset must be managed and resourced over a defined period of time so that the quality is improved to meet the quality of the original". The Offset Strategy including governance arrangements still needs to be finalised.
- DSEWPaC requested timely negotiation of suitable offsets to comply with the EPBC Act's offset policy for Brigalow, semi-evergreen vine thicket and the squatter pigeon habitat.

5 Adequacy of the environmental management plan

The environmental management plan (EM Plan) developed through this EIS process has included input from EHP, other state government departments, the commonwealth, local organisations, industry and the public. Throughout the EIS process, the proponent was advised of a range of deficiencies in the EM Plan, those matters have been progressively improved to the extent required for the EIS process. This assessment report has identified several outstanding matters that would need to be addressed before the EM Plan is finalised, such as surface water management, subsidence management, auditable environmental commitments and other unresolved matters. Although the proponent has made some amendments to the EM Plan following the submission period, the amended EM Plan did not contain enough information to allow the administering authority to decide the application and appropriate conditions under section 203(1)(f) of the EP Act.

The amended EM Plan as submitted with the EIS should be revised according to the recommendations and proponent's commitments outlined in this report. A revised EM Plan would be required prior to the department considering the granting of an EA and formulation of the full set of associated draft EA conditions. Further guidance on the content of an EM Plan is available at section 203 of the EP Act and in departmental guidelines.

5.1 Outstanding issues

While the EIS addressed most matters under the TOR, the EM Plan would need to be updated to include comments made by several departments, including EHP. These outstanding issues are briefly outlined below:

- DAFF:
  - Requested to amend the proposed condition C27. This condition relates to activities within watercourses, including the destruction of native vegetation, excavation of filling within a watercourse. Any such works may also impact fish passage, and as such should include consideration of Waterway Barrier Works Development Approvals as part of the Fish Habitat Management Operational Policy.
  - The proposed weed management plan has not been amended as identified in the EIS submission. The proposed weed EM Plan will need to include plant pest and diseases management, the establishment of a watching brief for any developments about pests of plants or diseases of plants that may become regulated and mapping of location and density of infestation of all declared weed species on project area to inform weed management and risk mitigation actions.
  - The proponent should advise how compliance under the provisions of the *Plant Protection Act 1989* (and associated regulations) would be managed.
  - Outlined that the specific rehabilitation goals for the mine did not include goals for the prevention and control of declared pests and disease. The proponent should ensure that the post project landform would not contain any declared pest species.
  - Requested that the proponent ensure that vegetation waste spread on rehabilitated areas does not contain declared pest matter, particularly reproductive matter.
  - Requested that the weed management plan include monitoring to identify any new infestations and address the treatment and effective management of any new infestations.
  - Requested that the proponent establish partnerships with key stakeholders (such as local government) to achieve a collaborative landscape scale approach in the prevention and management of pest animals and diseases.

- Outlined that the statement in the EM Plan that vehicle wash-down facilities for vehicles entering and leaving declared weed zones did not provide sufficient details about the proposed management practices. DAFF recommended that, along with the provision and use of clean down facilities, the following actions be recommended:
  - Clean down regimes need to ensure that vehicles, machinery and construction materials are free from pest matter and disease carrying material.
  - Clean-down bays should be located appropriately and away from waterways and gullies.
  - Staff and operators are adequately trained in clean-down and weed identification.
- Outlined that the EM Plan does not provide clear guidelines or strategies to show how numbers of pest animals will not increase as a result of the proposed project, or for the prevention of introduction of pest species not currently present. DAFF recommended that the EM Plan include a description of the management strategies to be implemented to ensure that numbers of pest animals do not increase as a result of the project. Including of:
  - How pest animals would be managed around residential quarters, temporary camps, waste tips and other areas.
  - The actions (such as regularly maintained exclusion fencing, secure bins) to be taken to ensure that rubbish and other potential food sources are inaccessible to pest animals.
  - The actions to be used for the control of pest animals (i.e. trapping, baiting, pig proof exclusion fencing, monitoring).
  - The actions to be taken for the control of pest animals to prevent their movement within or out of the project area.
  - Outlined that the proposed condition F8 (rehabilitation monitoring program) should provide success indicators and completion criteria to ensure that there are no declared pests present or are under active management on the rehabilitated landform.
  - Recommended mapping of location and density of infestation of all declared weed species on project area to inform weed management and risk mitigation actions.

- DNRM:
  - Recommended an amendment of proposed condition C27 the destruction of vegetation, excavation and placement of fill in a watercourse should be carried out under the Guideline - activities in a watercourse, lake or spring associated with a resource activity or mining operations (version 3), or with a riverine protection permit under the Water Act.
  - C27 should read:
    Destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Mines “Guideline - activities in a watercourse, lake or spring associated with a resource activity or mining operations (version 3)”, or alternatively, in accordance with a Riverine Protection Permit under the Water Act 2000.
- DSEWPaC:
  - SEWPaC recommended appropriate mitigation strategies be included for the northern quoll as part of the EA and EM Plan, including a monitoring regime that may include use of motion sensitive cameras during the appropriate months.

EHP:

- EHP’s main concern for the proposed project is the proposed mine water and surface water management:
  - The proponent is advised to provide a water balance model – which demonstrates how the site would operate within proposed design specifications without having unauthorised releases
  - Current mine water management is not working well and proposed surface water management is based on the current approach: there is currently insufficient assimilative capacity in receiving waters to receive further mine affected water.
- Existing water quality monitoring data not provided.
- Clarification on usage of existing infrastructure (e.g. landfill, sewage, tailing dams, etc) that would be used as part of the proposal and would need to be addressed in the EM Plan.

- Correct dust sampling timeframe.
- Management and rehabilitation management of subsidence in a subsidence management plan (e.g. outcomes and achievements).
- Lack of information regarding some of the existing underground panels.
- Insufficient EM Plan (more detailed goals, objectives, indicators, completion criteria, etc).
- Insufficient information on existing levee.
- Insufficient information on tenure details.

EHP also commented that the amended EIS did not adequately address the department's original EIS comments regarding subsidence management during mine rehabilitation. EHP advised that the EM Plan should detail the management and rehabilitation of subsidence. This must reference the proposed subsidence management plan and outline how subsidence and rehabilitation would be managed to achieve nominated rehabiliation outcomes.

6 Recommendations about the suitability of the project

In this EIS process the detailed information compiled by Xstrata Coal about the environmental values of the proposed Newlands Coal Extension Project and associated infrastructure, and the potential impacts on those values from project activities, has been scrutinised by representatives of state and local government, industry and members of the public through an open, public review process. The proponent has also met the EIS process requirements including notification, responding to comments and submissions as required by Chapter 3 of the EP Act.

The EIS has substantially and adequately complied with the TOR and has outlined a range of mitigation measures to avoid or minimise environmental impacts. While the majority of issues were covered satisfactorily in the EIS and in the proponent's responses to the submissions and revised documents, a number of issues have not been fully resolved. These have been clearly outlined in the relevant sections of this EIS assessment report.

7 Recommendations for conditions for any approval

Section 202 of the EP Act states that a purpose of the EM Plan is to propose environmental protection commitments to help the administering authority prepare a draft EA for a project. The submitted EM Plan for the Newlands Coal Extension Project contained a number of general and specific commitments or conditions that are broadly acceptable to EHP. Some conditions were revised in the EIS assessment process and some additional conditions were recommended. Section 59 of Act requires that this EIS assessment report 'recommends conditions on which any approval required for the project may be given'. Matters for which either new or revised conditions should be developed were identified throughout this report, but should include the following major issues:

- Amended management actions as identified in this report.
- Appropriate mitigation strategies for the northern quoll.
- Biodiversity offset strategy.

Additional or revised conditions relating to these matters will be developed once a finalised EM Plan has been submitted that substantially addresses the matters identified in Part 5 of this report. Conditions will be developed by the delegate in EHP central region in consultation with Xstrata Coal and EHP and other state government department technical staff.

8 Suitability of the project

EHP has considered the submitted EIS, all submissions and the EP Act standard criteria. The project is assessed as being suitable on the basis of the Environmental Management Plan being completed and any subsequent EA, being conditioned suitably to implement the specific environmental protection commitments set out in the EIS documentation and as described in this report. Consequently, the project is considered suitable to proceed to the next stage of the approval process noting that the recommendations of this EIS assessment report should be fully implemented.

9 Approved by

The EIS process is completed when this EIS assessment report is approved by the delegate for the chief executive and given to Xstrata Coal Queensland Pty Ltd.

Lindsay Delzoppo	28 May 2013
Signature	Date

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Appendix A: A Summary of changes to Queensland Government departments

Former Departments	New department(s) (as of 3 April 2012)[1]
Department of Employment, Economic Development and Innovation	Department of State Development, Infrastructure and Planning Queensland Treasury and Trade Department of Agriculture, Fisheries and Forestry Department of Water Supply
Department of Environment and Resource Management	Department of Environment and Heritage Protection Department of Natural Resources and Mines Department of Energy and Water Supply Department of Science, Information Technology, Innovation and the Arts Department of National Parks, Recreation, Sport and Racing
Department of Education and Training	Department of Education, Training and Employment
Department of Local Government and Planning	Department of Local Government, Community Recovery and Resilience)
Department of Communities	Department of Communities, Child Safety and Disability Services
Department of Public Works	Department of Housing and Public Works
No changes: Department of Transport and Main Roads Department of Community Safety Queensland Police Service Queensland Health	
New departments:	Department of Housing and Public Works Department of Aboriginal and Torres Strait Islander and Multicultural Affairs Tourism, Major Events, Small Business and the Commonwealth Games

[1]Based on The Public Service Departmental Arrangements Notice (No1) 2012, Queensland Government.