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

Springsure Creek Coal Mine Project proposed by Springsure Creek Coal Pty Ltd

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

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Contents

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 Springsure Coal Mine Project proposed by Springsure Creek Coal Pty Ltd (hereafter SCC or the proponent), a wholly owned subsidiary of Bandanna Energy Limited. An application to prepare a voluntary EIS was granted by the former Department of Environment and Resource Management (DERM – now the Department of Environment and Heritage Protection) and the draft terms of reference (TOR) were advertised in February 2011. Following a period of public consultation, the TOR was finalised in June 2011.

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

The EP 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 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 environmental authority (EA), which would set out the operational environmental monitoring, management and reporting requirements for the mine. Section 7 makes recommendations for any further approvals required by the project.

Providing this EIS assessment report to the proponent completes the EIS process under the EP Act.

2 Project details

This section provides a broad summary of the proposed Springsure Creek Coal Mine Project (the proposed project hereafter) as outlined in the EIS (particularly, but not limited, to EIS Chapter 3).

2.1 Project description

The proposed project would be located approximately 47 kilometres (km) south-east of Emerald, in Central Queensland. The project area was defined in the EIS as the geographical boundaries of MLA 70486. MLA 70486 covers 10,736 hectares (ha) and lies within the exploration permit for coal (EPC) 891. The MLA is located in the Central Highlands Regional Council (CHRC) local government area.

The Springsure Creek Coal Mine Project, considered in this report, includes an underground mine, associated mining activities and mining infrastructure, but does not include either the transport infrastructure corridor or the train load-out facility, which would be required to move the product coal from the mine site to existing rail facilities. The transport and infrastructure corridor and train load-out facility would be assessed separately to the mine project.

The project would be located on and below land primarily used for cropping. The project area is situated within the western cropping zone, central protection area of the Strategic Cropping Land (SCL) trigger area. Assessment of the project is proceeding on the basis that an environmental authority application and related resource application for the project are excluded (with some limitations) from the permanent impact restriction applying under section 289 of the *Strategic Cropping Land Act 2011* (SCL Act). However, section 290 does apply to the project which applies certain specific protection conditions and also provides for other SCL protection conditions to be applied to the project as long as they are not inconsistent with conditions in section 290.

The closest operating mines to the project area are the Minerva Coal Mine (located approximately 45km to the west) and Blackwater Coal Mine (located approximately 50km to the east). Four petroleum leases, one petroleum pipeline licence and one exploration permit for petroleum either intersect or occur in the immediate vicinity of the project area. Twenty-two petroleum and coal seam gas (CSG) wells have been drilled within the underlying EPC 891; with 11 wells located within the project area.

2.1.1 Construction

Construction of the project would be subject to statutory approvals being in place and would consist of multiple infrastructure elements, including:

- a cut and cover (an access tunnel; constructed in a shallow trench and then covered over by backfilling and restoring the original ground)
- two drifts (sloping access tunnels) designed to transport mining infrastructure, personnel and product coal between the mine and surface
- a coal handling plant (CHP)
- a mine infrastructure area (MIA); including administration; a bathhouse; workshops; a warehouse; fuelling facilities; a rescue and emergency complex and a helipad
- several mine site dams; including dewatering dam, raw water dams and mine surface water management dams
- a potable water treatment plant (PWTP)
- a sewage treatment plant (STP)
- site access roads.

Construction of the CHP, MIA and associated above and below ground infrastructure would require pre-fabricated steelwork, building materials, bulk cement, concrete, plant and machinery. All construction equipment and machinery would be transported from Brisbane, Emerald, Rockhampton and Gladstone.

The main entrance to the mine site would be from the north of the MIA via Kilmore Road from a single secure point of entry (**Figure 1**).

2.1.2 Operation

The EIS outlined that thermal coal would be mined using the longwall method with an initial single underground longwall with a production capacity of 5.5 million tonnes per annum (Mtpa) commencing in 2016, and a second longwall that would increase production to 11Mtpa of product coal from 2020 (**Figure 2**). The operating life of the

mine would be approximately 40 years. The proposed mine would be accessed via both state and local government roads.

2.1.3 Workforce

The proposed project would employ a peak workforce of approximately 350 people during construction, 585 during operation and 40 during decommissioning. The EIS outlined that the construction workforce would be expected to reside in Springsure and Emerald until the proposed accommodation village has been completed.

It was estimated in the EIS that once the mine was operational 23% of workers would reside locally in Springsure or Emerald, 34% would be Drive-in Drive-out (DIDO) from elsewhere in Central Queensland, and 43% would be Fly-in Fly-out (FIFO) from outside Central Queensland. It was further stated that FIFO and DIDO workers would be accommodated in a dedicated workers' accommodation village to be constructed adjacent to the Gregory Highway located approximately 13km south of Emerald and 35km north-west of the mine site (as part of the off-lease infrastructure; and not part of this EIS assessment). This facility is subject to separate approval and is not subject to this assessment.

The EIS proposed that some site management, support staff and day maintenance crews would work on a five-days-on, two-days-off roster. The remaining workers would operate predominantly on 12-hour shifts. Most DIDO and FIFO employees and contractors would work on a seven-days-on, seven-days-off roster. The majority of workers residing in the workers accommodation village would be bussed from the accommodation village to the mine each day.

2.1.4 Transport

The proposed project access route would include the Gregory Highway, Glenorina Road, Wyntoon Road and Kilmore Road. These roads are currently utilised for heavy transport vehicles which service local industries and for local traffic. It was outlined in the EIS that during the construction and operational phases, road transport would be the predominant method for the transportation of materials and equipment to the project area.

The EIS proposed that construction workers who do not already reside locally would be accommodated in existing accommodation villages although no details were provided on these facilities. A bus would bring the workers from the accommodation village/s to the project site. During operation the majority of workers would also be transported by bus from the proposed new workers accommodation village (13km south of Emerald) to the project.

The EIS concluded that the proposed project would have a total heavy vehicle requirement of approximately 51,077 trucks over the anticipated 40-year life of the mine.

2.1.5 Waste

The EIS outlined that waste streams, such as non-regulated liquid, general, excavated, recyclable, metal, timber solid wastes and regulated wastes such as, sewage, tyres, oils, fuels, chemicals and batteries would be generated as part of the construction, operation and decommissioning phases. Professional contractors would be employed to manage waste removal, ensuring minimal waste disposal will occur on site. Waste rock, spoil/overburden and interburden would be used for construction of the MIA. The EIS stated that no tailings would be generated during the operational phase. A Sewage Treatment Plant (STP) would be located in the MIA to treat on-site sewage. The STP would be designed to produce Class A+ water effluent which would re-used for activities such as dust suppression, landscaping and possibly crops. Up to 1000 kilolitres (kL) of used wash water from the wash down areas would be recycled on-site per year. It was estimated in the EIS that the proposed project would produce a total of 1648 tonnes (t) (or 3615m^3) of waste per annum during construction and 6220t (= 6640 m^3) of waste per annum during the operational phase of the mine.

2.1.6 Energy

The EIS outlined that power requirements during the construction phase would be sourced from onsite generators located within the MIA until mains power is installed. The preferred power option for the proposed project would be a 132 kilovolt (kV) single circuit overhead line to connect from the existing Blackwater–Rolleston 132kV. The connection point would be immediately south-east of the proposed train load out facility and a 132kV transmission line would be located within the transportation infrastructure corridor and would be connected to the 132/11kV main substation at the MIA. The power supply would be subject to separate approvals under the *Sustainable Planning Act 2009* (SP Act), and is not assessed in the EIS.

2.1.7 Water supply and storage

An external supply of raw water would be required in order to provide water security and top-up water for mine operations during dry periods as during operations approximately 838 megalitres (ML) per annum of water would

be required during single longwall operations and 1247ML during dual longwall (maximum operational) capacity. The EIS outlined that a market assessment had been undertaken by the water broker Waterfind which identified the availability of water allocations for the proposed project from within the Nogoa–McKenzie River system. The proponent has purchased allocations and a connection study has been completed. Water infrastructure would include a pump station and a connecting pipeline to the project site. Pipeline and pump station approvals would be sought by separate approvals processes under the SP Act.

Four environmental dams, one mine water dam and one raw water dam are proposed on the project site. The proponent proposed a water management system that is based on no controlled discharges from these dams. However, the EIS also outlined that uncontrolled discharges to the surrounding waters could occur due to unusually high or extreme rainfall events.

2.1.8 Sewage

The EIS stated that sewage would be removed by tanker to an authorised wastewater treatment plant until the on-site STP had been constructed. The proposed STP would be located approximately 1200m south-west of the MIA. Sewage from the site ablutions would be collected from on-lease and piped to the STP by gravity feed and pumping. All sludge and grit produced from the STP would be routinely removed off-site by truck to be disposed of at an approved bio-solids facility. Treated wastewater would be discharged to a proposed 0.5ML effluent dam for storage until it was re-used on-site.

2.1.9 Rehabilitation and decommissioning

The EIS stated that final decommissioning would occur after some 40 years of mine life. The proposed underground mine would result in a total of 7050ha of land being subsided within the project area. Modelling predictions for the project indicated the level of subsidence at the soil surface would range from 1.2–2.2m. Longwall panels would be typically 300m wide and up to several kilometres long. Progressive rehabilitation and the allocation of adequate funds to ensure rehabilitation obligations would be met on mine closure, were commitments made by the proponent in EIS documentation.

SCC gave firm commitments that it would deliver rehabilitation strategies outlined in the EIS, having the following objectives:

- A landform having the same or very similar land-use capabilities and/or suitability as it had prior to disturbance, unless other beneficial land-uses were pre-determined and agreed with key stakeholders (i.e. post-mining land owners/managers and relevant regulators).
- Rehabilitation of all mine wastes and disturbed land so that it was self-sustaining, or of a condition where the maintenance requirements stable, safe and non-polluting – and consistent with the agreed post-mining land-use or uses.
- Maintenance of current and future ambient water quality, ensuring that the water quality of existing surface waters and aquifers would be retained at existing levels, would not degraded, would be acceptable for existing and future uses within and surrounding the site.

The EIS stated that an important aspect of the proposed project was to demonstrate that underground mining can coexist with existing agriculture, including cropping. The proponent stated its intention of having the Springsure Creek Agricultural Project (managed by Springsure Creek Agricultural Holdings Pty Ltd) working alongside the proposed underground mine.

2.2 Off-lease infrastructure

The project would require the following infrastructure outside of MLA 70486, namely:

- a transport and infrastructure corridor
- a train load-out facility
- a workers' accommodation village power infrastructure
- water supply.

This infrastructure will be assessed under relevant separate approval processes outside of the EIS process.

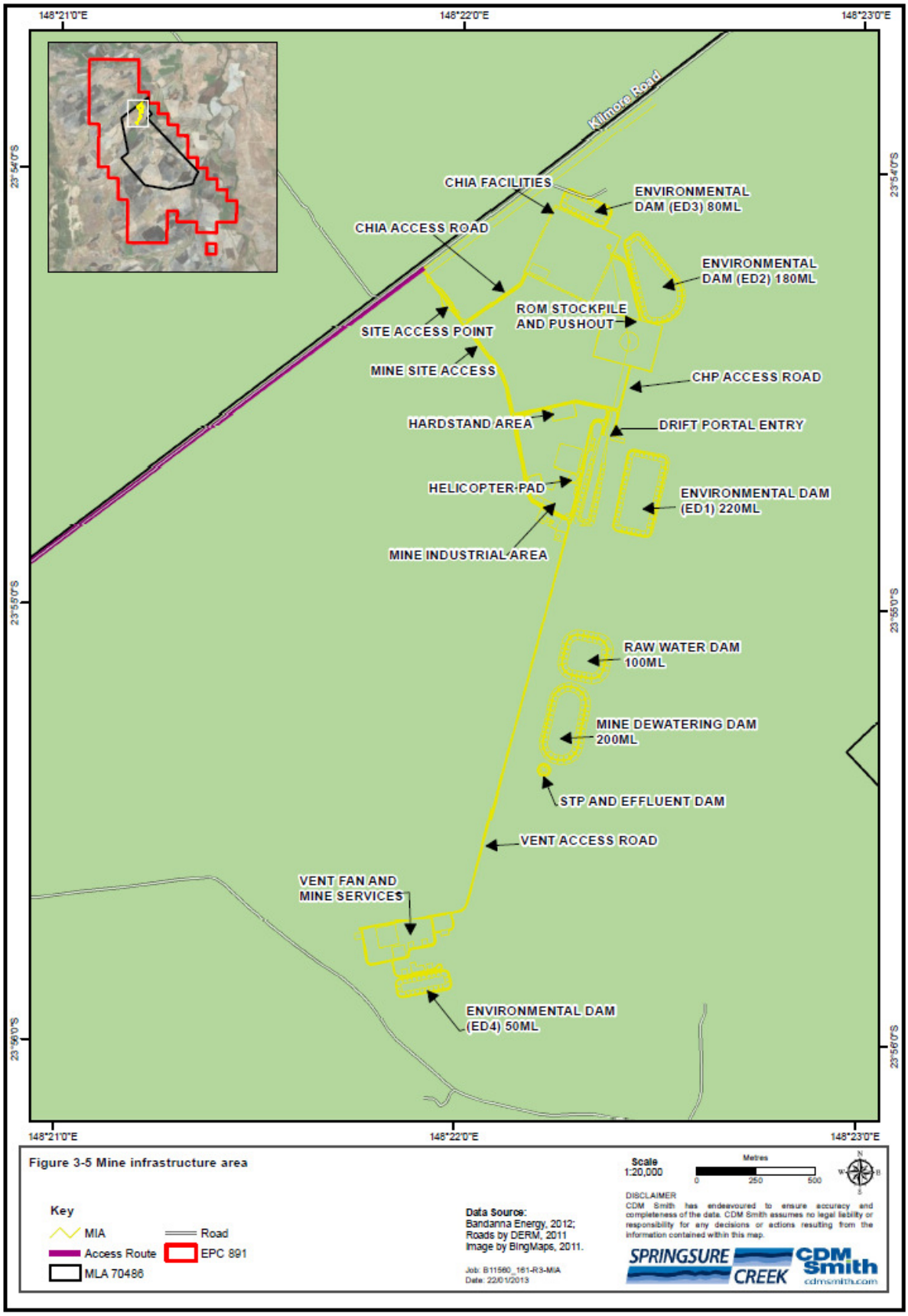

Figure 1 **Proposed mine layout**
(Figure reproduced from the EIS)

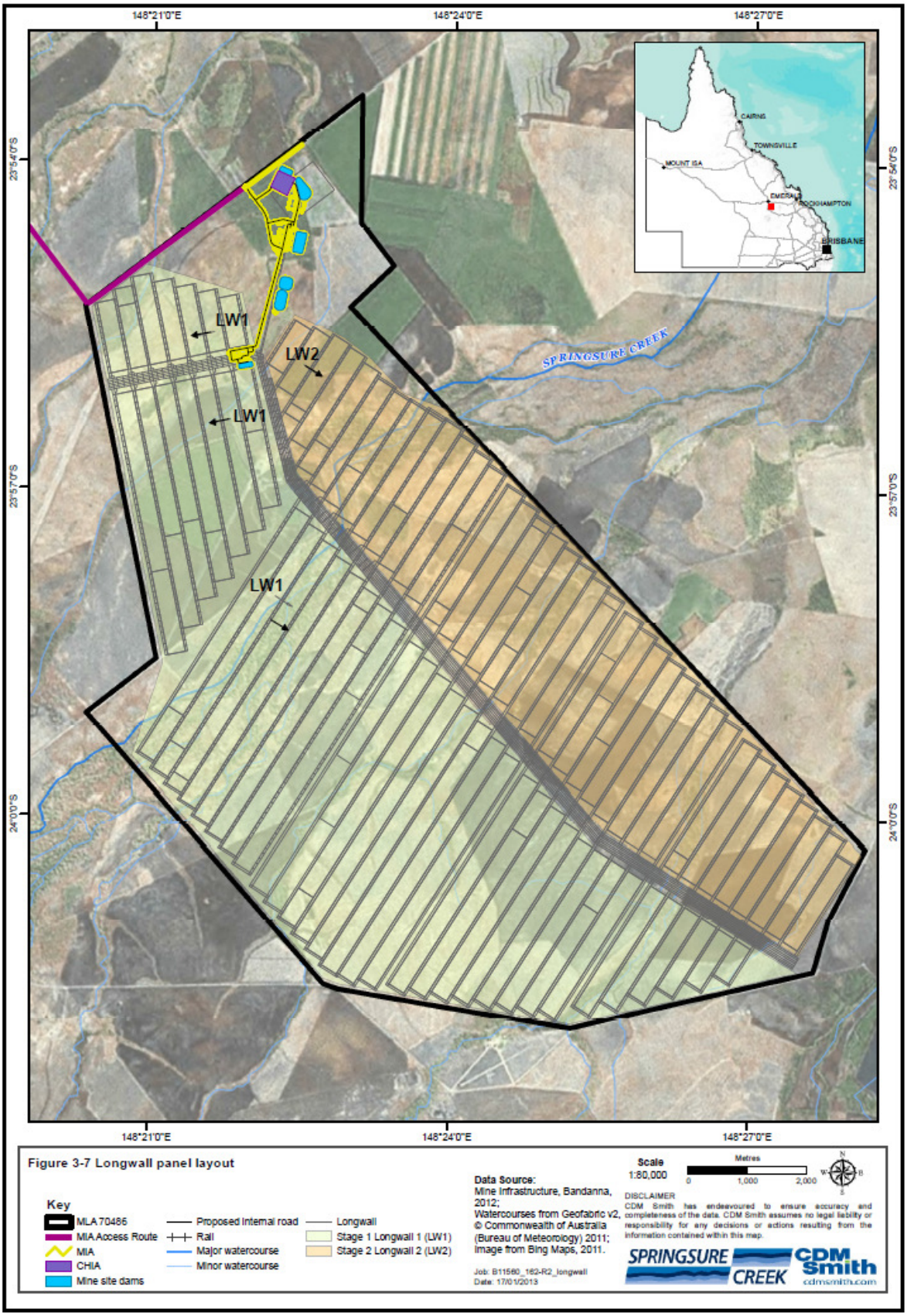

Figure 2 **Proposed longwall panel layout**
(Figure reproduced from the EIS)

3 The EIS process

3.1 Timeline of the EIS process

On 2 December 2010, an application was made by the proponent, Springsure Creek Coal Pty Ltd (SCC), under section 71 of the EP Act for the preparation of a voluntary EIS. The application was approved by the former DERM on 17 December 2010. However, the lodgement of the draft TOR was found to have been not properly made under the EP Act and the proponent required additional time to supply the necessary information. On 20 January 2011, the former DERM issued SCC with a notice under section 555 of the EP Act to provide the additional time required by the proponent and to allow DERM to determine whether the submitted draft TOR for the Springsure Creek Coal Mine Project was adequate for the purposes of the EIS to be achieved. The proponent provided the required information on 24 January 2011. DERM then issued a notice of publication of the draft TOR to the proponent on 16 February 2011. DERM placed a public notice (the TOR notice) announcing the start of the comment period for the draft TOR on its website on 18 February 2011, *The Central Queensland News* on 18 February 2011 and in *The Courier-Mail* on 19 February 2011. The comment period for the draft TOR commenced on Monday 21 February and extended to close of business on Friday 1 April 2011. As required, the proponent issued copies of the TOR notice to affected and interested persons.

DERM received 27 comments on the draft TOR within the public comment period. Two comments were 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 SCC on 15 April 2011. SCC provided a response to the comments and recommended changes to the draft TOR on 5 May 2011. DERM considered the response and all comments received on the draft TOR prior to issuing the final TOR on 2 June 2011.

SCC submitted the EIS to the Department of Environment and Heritage Protection (EHP) on 30 November 2012 for a decision on whether it could proceed to notification by the 15 January 2013. EHP reviewed the submitted EIS and provided comments to the proponent on 19 December 2012, in order to allow the proponent to amend the EIS to meet the TOR requirements. On 15 January 2013, the proponent requested an extension by agreement under section 13(b) Environmental Protection Regulation 2008, in order to allow extra time for the proponent to amend the EIS to adequately address the requirements of the TOR, and to allow time for the administering authority to consider the amended EIS. On 15 January 2013, EHP agreed to an extension until 1 February 2013.

On 1 February 2013, EHP received a revised EIS. EHP determined that the revised EIS substantially met the requirements of the TOR and decided on 1 February 2013 to allow the EIS to proceed to notification under s49(5) of the EP Act. The public notification and submission period was set at 30 business days, starting on Thursday 14 February 2013 and ending close of business on Thursday 27 March 2013.

EHP announced the start of the submission period for the EIS on its website on Friday 8 February 2013. SCC advertised the EIS notice on Saturday 9 February 2013 in *The Courier-Mail* and *The Australian* and on Wednesday 13 February 2013 in *The Central Queensland N*ews. The EIS was available for public comment from Thursday 14 February 2013, until the close of business on Thursday 27 March 2013. The proponent provided copies of the public notice to all affected and interested persons.

EHP received 48 submissions on the EIS within the submission period from state and local government agencies, from the public and/or residents and also other interested parties (public submitters hereafter). These submissions, together with a submission from EHP itself, were forwarded to the proponent on 10 April 2013. SCC was initially provided 20 business days to respond to the submissions and to make any necessary changes to the EIS.

Between 1 May 2013 and 21 June 2013, EHP agreed to two successive requests for extensions of time to allow the proponent to adequately respond to all of the submissions.

The proponent provided EHP with responses to the submissions and amendments to the EIS and EM Plan on 21 June 2013. The responses to individual submissions were then distributed to individual submitters, including government agencies and private submitters. The revised EIS and EM Plan were also made available on the proponent's web site.

On 19 July 2013, EHP considered the amended EIS and SCC's response to submissions and, after consulting with key regulatory agencies, decided that additional information was required before a decision could be made on whether the EIS should be allowed to proceed under section 56A of the EP Act. After discussion with the proponent, EHP used section 62 of the EP Act to request SCC to provide EHP with information addressing the outstanding matters that had been identified by EHP and key agencies. The decision period for section 56A was also extended, at SCC's request, to allow for SCC to provide this information. An amended EIS and response to outstanding issues were submitted to EHP by SCC on 13 August 2013. EHP was satisfied that these amendments contained the necessary information sought under the section 62 notice, and on 11 September 2013 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 25 September 2013.

On 24 October, EHP received a late submission from Landholder Services Pty Ltd. The reason for the late submission was stated as being that the landholders of three potentially affected properties had commissioned a report containing independent analysis of the predicted soil subsidence, and the impacts of that subsidence on cropping potential based on the original data used by the proponent. This report was also made available by SCC to Landholder Services (acting for the landholders) on 23 September 2013; followed by a meeting on 25 September 2013 between the two parties. The report provided to Landholder Services by SCC was subsequently analysed by Land Resource Assessment and Management Pty Ltd and this report was sent to EHP as part of the late submission. The late submission was accepted by EHP and forwarded to the proponent on 25 October 2013, in order to provide SCC with the opportunity to review and comment on the late submission, as for any submission on the EIS. SCC responded on 30 October 2013.

In the preparation of this report, consideration has been given to all submissions and comments received from members of the advisory body and other interested parties throughout the EIS process. This EIS assessment report will be provided to the proponent and made available on the department's website at www.ehp.qld.gov.au.

3.2 Approvals

Approvals required for this project fall under two broad categories:

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

The following section discusses the key approvals sought for the proposed project under the state's legislation (Table 1). Several other permits would need to be sought by the proponent with local authorities. These have not been included in this assessment report.

Table 1 Key approvals required for the Springsure Creek Coal Mine Project

Approval	Legislation [administering authority]	Detail
Commonwealth approval		
Approval to undertake an action that may impact on a matter of national environmental significance (MNES) nationally listed threatened species and ecological communities. This will be a separate process and not be linked to this EIS process. On 21 March 2011, the former Commonwealth Department of Sustainability, Environment, Water, Population and Communities (now the Commonwealth Department of Environment; DOE) determined the Springsure Creek Coal Mine Project to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999*. The controlling provisions are sections 18 and 18A (listed threatened species and communities) and sections 20 and 20A (listed migratory species).	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) [Commonwealth Department of the Environment]	The project is not subject to assessment of matters of national environmental significance by this EIS process under the Commonwealth/Queensland bilateral agreement.
Key state approvals		
Strategic Cropping Land (SCL) protection decision	*Strategic Cropping Land Act 2011* (SCL Act) [Department of Natural Resources and Mines; DNRM]	A SCL protection decision will be required before an EA and ML can be issued and mining could commence.

Approval	Legislation [administering authority]	Detail
Environmental authority (mining activities) (EA)	*Environmental Protection Act 1994* (EP Act) [Department of Environment and Heritage Protection; EHP]	EIS process completed. EHP requires amendments to the submitted EM Plan and outstanding action with regard to some matters (see sections 4 and 7) before an environmental authority can be drafted.
Species management programs Damage mitigation permits	*Nature Conservation Act 1992* (NC Act) Nature Conservation (Wildlife Management) Regulation 2006 (s332) [EHP]	Adequate management of the animal's population and habitat where clearing of vegetation or any other works occur that will potentially impact on vegetation which is the potential habitat for fauna.
Granting of the mining lease (ML)	*Mineral Resources Act 1989* (MR Act) [DNRM]	SCC lodged an application for a mining lease relating to the proposed project with the DNRM on 19 October 2012 (MLA 70486). After the SCL protection decision has been finalised and EHP has issued the EA to the proponent, DNRM would decide whether or not to grant ML 70486.
Water entitlements – to take or interfere with water Riverine protection permit Watercourse diversions	*Water Act 2000* (Water Act) Water Resource (Fitzroy Basin) Plan 2011 (Water Resource Plan) [DNRM]	SCC will need to consult DNRM on all matters concerning: • Approvals required prior to the take of water. • Riverine protection permit: Selectively clearing or disturbing vegetation, placing fill or excavating in a watercourse, as required for works associated with construction of haul roads, bridges and culverts. • Watercourse diversions: Taking or interfering with the flow of water, including from a watercourse or overland flow or groundwater.
Clearing of vegetation	*Vegetation Management Act 1999* (VM Act) [DNRM]	SCC will need to consult DNRM on all matters concerning clearing of listed 'endangered', 'of concern' or 'least concern' vegetation communities under the VM Act outside the MLA.
Waterway barrier permit	*Fisheries Act 1994* (Fisheries Act) [Department of Agriculture, Fisheries and Forestry; DAFF]	SCC will need to consult DAFF on all matters concerning potential impacts to fish movements including waterway barrier works, irrespective of their location with respect to the MLA.
Forestry products Quarry materials	*Forestry Act 1959* (Forestry Act) [DAFF]	SCC will need to consult DAFF on all matters concerning timber resources and quarry material outside the MLA but as part of the project.
Biosecurity management strategies, e.g. weed and pest management	*Land Protection (Pest and Stock Route Management) Act 2002* (LP Act) *Chemical Usage (Agricultural and Veterinary) Control Act 1988 (use controls) and Agricultural Chemicals Distribution Controls Act 1966*	SCC will need to consult DAFF on all matters concerning biosecurity management: • Species that are declared under the LP Act or declared under local government laws need to be identified and managed to guide best

Approval	Legislation [administering authority]	Detail
	Plant Protection Act 1989 [DAFF]	practice management and disposal of weeds. • The use of agricultural chemicals or other industrial chemicals would need to be managed to not adversely impact on human health. • Regulation of machinery contaminated with plant pests (e.g. insects) or disease (e.g. fungi) that have the ability to move to, or from, sensitive zones.
Various road improvement, rehabilitation, maintenance and road use management approvals over the life of the project	*Transport Infrastructure Act 1994* and *Transport Operations (Road Use Management) Act 1995* [Department of Transport and Main Roads; TMR]	SCC will need to consult with TMR on all matters concerning: • Road-use management plan • Road impacts assessments • Investigation of potential road safety hot spots • Apply for necessary permits for over-dimension loads and road corridor permits (approval for the access/driveway for the accommodation village and any improvements to the Gregory Hwy/ Glenorina Rd intersection), etc.
Cultural Heritage Management Plan (CHMP)	*Aboriginal Cultural Heritage Act 2003* [Department of Aboriginal and Torres Strait Islander and Multicultural Affairs; DATSIMA]	Cultural Heritage Management Plans with the Kairi and Karingbal People were approved by the Chief Executive in February 2012 and March 2012.
Reporting of Non-Indigenous Heritage	*Queensland Heritage Act 1992* [EHP]	Notification to EHP as soon as practical and include location and description of discovery.

The conduct of project activities within the MLA requires an EA under Chapter 5 of the EP Act. This approval will cover mining and the following activities listed as environmentally relevant activities (ERA) under Schedule 2 of the Environmental Protection Regulation 2008 that are directly associated with, or facilitate or support, the mining activities, including:

- ERA 8 – Chemical storage: Storage of more than 50t of chemicals of dangerous goods class 1 or C2 in containers of at least 10m^3.
- ERA 16 – Extractive and screening activities: Extracting, other than by dredging, a total of 5000t or more of material in a year.
- ERA 17 – Abrasive blasting: Extracting, other than by dredging, a total of 5000t or more of material in a year.
- ERA 21 – Motor vehicle workshop: Operation of workshop involving maintaining of mechanical components for a fleet of over 10 vehicles.
- ERA 31 – Mineral processing: Processing in a year 1000t or more of coke or mineral products.
- ERA 33 – Crushing, mining, grinding or screening: Crushing, grinding, milling or screening more than 5000t of material in a year.
- ERA 43 – Concrete batching: Producing 200t or more of concrete or concrete products per year.
- ERA 63 – Sewerage treatment: Operation of a sewerage treatment works with a total daily peak capacity of 21 equivalent persons (EP).

3.2.1 Other approvals associated with the project but not part of the EIS

The project would require the following infrastructure outside MLA 70486, namely:

- a transport and infrastructure corridor
- a train load-out facility
- a workers accommodation village
- power infrastructure
- water supply (pump station and connectivity pipeline).

This infrastructure was not part of the EIS assessment process and will be assessed under relevant separate processes.

3.2.2 Central Queensland Regional Plan

On 18 October 2013 the Queensland Government Gazette included notifications under section 64 of the SP Act of the making of the Central Queensland Regional Plan. The project is located within the area of the Central Queensland Regional Plan area and the MLA for the Springsure Creek Coal Mine Project lies within an area mapped as a Priority Agricultural Area in the plan.

The EP Act requires that the standard criteria (Schedule 3 EP Act) must be considered in preparing this assessment report. This includes consideration of 'any applicable Commonwealth, state or local government plans, standards, agreements or requirements'.

In terms of the applicability of the Central Queensland Regional Plan to this assessment, DSDIP (which administers the SP Act) has advised that:

- The Central Queensland regional plan has been finalised and took effect from the date of gazettal on 18 October 2013.
- The plan contains policies that will influence planning and development activities under the SP Act, including the preparation of local government planning schemes.
- The policies in the plan are also intended to influence decisions about resource activities. However, as regional plans are statutory instruments under SP Act, the policies are not currently required to be considered in the assessment of resource activities, including mining.
- These policies are also informing the development of a Regional Planning and Development Bill which is intended to be introduced to the Legislative Assembly before the end of 2013 to give legislative effect to important regional interests in a range of decision making. The proposed Bill would be likely to require resource activities authorised under resources Acts to consider and align with the land-use policies expressed in a new generation of regional plans.
- The proposed Bill would also enable the government to identify in a regulation other regional interests that resource activities would need to consider and align with.
- Co-existence criteria would be prepared to ensure the approval of any proposed resource development cannot materially impact or threaten the ongoing viability of a priority agricultural land-use identified as a regional interest through a regulation supporting the Regional Planning and Development Bill.

Once the Regional Planning and Development Bill is passed and enacted, future decisions in relation to mining activities associated with this project, including applications for an EA or amendment to an EA under the EP Act, would have to meet the requirements of the new Act and any subordinate legislation (including, for example, any finalised co-existence criteria).

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.

The EIS noted that two rounds of public consultation had been undertaken during development of the EIS:

- between February and May 2012
- between October and December 2012.

The EIS outlined that the proponent had consulted with landowners in the vicinity of the project area on a regular basis, from when exploration commenced in 2009, and had employed a full-time field liaison officer, based in Emerald, since late 2011. The EIS further stated that a number of meetings and discussions had been held with landholders regarding exploration activities, with limited consultation regarding the EIS.

The EIS noted that discussions with the Traditional Owners had occurred in 2011–12 and had culminated in the signing of Cultural Heritage Management Plans (CHMP) with the Kairi and Karingbal Peoples. The EIS reported that engagement between the proponent and traditional owners was ongoing.

A number of formal meetings and briefings had been held with government agencies and other stakeholders with the purpose of updating and briefing on progress with the proposed project, as well as for identifying and discussing potential impacts and options for addressing such impacts during the development of mitigation and management measures for inclusions in a social impact management plan (SIMP).

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.

- Department of Community Safety (DCS)
- Department of Energy and Water Supply (DEWS)
- Department of Housing and Public Works (DHPW)
- Department of Local Government (DLG)
- Department of Agriculture, Fisheries and Forestry (DAFF)
- Department of Transport and Main Roads (TMR)
- Queensland Health (QH)
- Queensland Police Service (QPS)
- Department of Natural Resources and Mines (DNRM)
- Department of Science, Information Technology, Innovation and the Arts (DSITIA)
- Department of National Parks, Recreation, Sport and Racing (NPRSR)
- Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA)
- Department of Tourism, Major Events, Small Business and the Commonwealth Games (DTESB)
- Skills Queensland
- Former Department of Employment, Economic Development and Innovation; now Department of State Development, Infrastructure and Planning (DSDIP)
- Former Department of Education and Training; now Department of Education, Training and Employment (DETE)
- Former Queensland Treasury; now Queensland Treasury and Trade (QTT)
- Central Highlands Regional Council (CHRC)
- Gladstone Regional Council (GRC)
- Rockhampton Regional Council (RRC)
- Road Accident Action Group Inc (RAAG)
- SunWater Limited
- Fitzroy Basin Association (FBA)
- Ergon Energy
- Capricorn Conservation Council (CCC)
- Mackay Conservation Group (MCG)

- Construction, Forestry, Mining & Energy Union
- QR National (now Aurizon).

Due to the change in the structure of government, (through a 'machinery of government' change), the names and roles of several Queensland Government departments changed on 3 April 2012 (refer to Appendix A).

As outlined above an advisory body briefing for the project was held in Brisbane on 14 February 2013. A field trip to inspect the project site was held on 4 March 2013 attended by representatives of the proponent, DAFF, DNRM, DSDIP and EHP, as well as the former Commonwealth Department of Sustainability, Environment, Water, Population and Communities, now Commonwealth Department of Environment.

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 Central Queensland News, The Australian* and on EHP (and former DERM) websites and the proponent's website.

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

- Former DERM website: www.derm.qld.gov.au
- EHP website: www.eph.qld.gov.au
- EHP (and former DERM) Referral Centre, 400 George Street, Brisbane
- EHP (and former DERM) Referral Centre, 99 Hospital Street, Emerald
- Springsure Creek Coal Pty Ltd's website: www.springsurecreekproject.com.au
- Emerald Public Library, 44 Borilla Street, Emerald
- Springsure Library, Eclipse Street, Springsure.

3.4 Matters considered in the EIS assessment report

Section 58 of the EP Act requires that an EIS assessment report must consider the following:

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

These matters are addressed in the following subsections.

3.4.1 The final TOR

The final TOR document was considered when preparing this EIS assessment report. While the final TOR were designed to address all major issues associated with the project and which needed 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 and comprised of:

- The submitted EIS that was made available for public submission.
- Amendments made to the submitted EIS received by EHP following public submissions and which was made available on SCC's website on 21 June 2013.
- Amendments made to the submitted EIS received by EHP following consultation with key agencies. This amended EIS version was also made available on SCC's website on 13 August 2013.

The EIS assessment report refers to the term "EIS" as the combined documents consisting of the submitted EIS

and EM Plan; the two amendments made to the submitted EIS and EM Plan; and any other documentation provided by the proponent (e.g. specialist reports).

3.4.3 EIS submissions

EHP accepted 48 submissions on the EIS, 20 from local and state agencies and 28 from private submitters, including non-government organisations. EHP also made its own submission on the EIS.

All government agencies that made submissions stating outstanding issues arising from their review of the EIS were asked to review and provide comments and recommendations any amendments made to the EIS relevant to their area of responsibility. This included comments on the adequacy or otherwise of the amended EIS chapters in addressing concerns raised in submissions. Letters were sent out to all private submitters advising them on the submission of the amended EIS together with the proponent's response to 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 key standard criteria considered for the assessment of the proposed project were:

- Any applicable environmental protection policy.
- Any applicable Commonwealth, state or local government plans, standards, agreements or requirements.
- Any applicable environmental impact study, assessment or report.
- The character, resilience and values of the receiving environment.
- All submissions made by the applicant and submitters.
- The public interest.
- Any applicable site management plan.
- Any relevant integrated environmental management system or proposed integrated environmental management system.
- Any other matter prescribed under a regulation.

3.4.5 Prescribed matters

Section 59 of the EP Act requires that an EIS assessment report must:

- Address the adequacy of the EIS in addressing the final terms of reference.
- Address the adequacy of any environmental management plan for the project.
- Make recommendations about the suitability of the project.
- Recommend any conditions on which any approval required for the project may be given.
- Contain another matter prescribed under a regulation.

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 10t of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
- Notifiable activity 23 – Metal treatment or coating: Treating or coating metal including, for example, anodising, galvanising, pickling, electroplating, heat treatment using cyanide compounds and spray painting using more than 5L of paint per week.

- Notifiable activity 24 – Mine wastes:
  - (a) Storing hazardous mine or exploration wastes, including, for example, tailings dams, overburden or waste rock dumps containing hazardous contaminants
  - (b) Mining or processing, minerals in a way that exposes faces, or releases groundwater, containing hazardous contaminants.
- Notifiable activity 29 – Petroleum products or oil storage: Storing petroleum products or oil.
- Notifiable activity 37 – Waste storage, treatment or disposal: Storing, treating, reprocessing or disposing regulated waste including operating a sewage treatment facility with on-site disposal facilities.

4 Adequacy of the EIS

This section of the EIS assessment report discusses in detail the adequacy of the EIS submitted by the proponent, taking into account key matters based on the subject headings for the TOR. Any outstanding issues are identified, and discussed in this section, as are the important environmental protection commitments made by the proponent in EIS documentation.

Specifically, each key matter (usually an EIS chapter) is discussed in the following manner:

- **Summary of the EIS findings:**
  This section provides a short summary of the main findings of each key issue, outlines potential impacts and proposed mitigation measures and/or management strategies. This summary is based on the most recent amendments made to the EIS (i.e. second amended EIS submitted to EHP on 13 August 2013).
- **Submissions on the EIS chapter:**
  Summary of key comments received during the EIS submission period.
- **Proponent's response to submissions:**
  Summary of the proponent's key responses to EIS submissions.
- **Adequacy of the EIS amendments and proponent's response:**
  Assessment on how the proponent responded to the EIS submissions and if amendments addressed the comments adequately. This assessment was based on the proponent's first amended EIS as submitted to EHP on 21 June 2013. All government agencies that made submissions stating 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. In some cases, the amended EIS and response to submissions did not completely address all of particular agencies' concerns. In such cases a summary of how key issues were identified, as well as the proponent's response and the amendment it proposed to the EIS, is provided in this section.
- **Conclusions and outstanding issues:**
  Summary of adequacy of the EIS chapter, including any outstanding issues identified during the EIS assessment process.
- **Proponent's commitments:**
  Summary of the proponent's environmental protection commitments in regards to each particular key issue.

4.1 Introduction

Chapter 1 of the EIS provided an overview of the project, its objectives and scope.

4.1.1 Adequacy of the EIS chapter

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

- incorrect or missing statements regarding legislation and other statutory documents/requirements
- SCC's community relations, or lack thereof, with landholders
- the potential future coal processing plant
- general comments on specific issues, such as land-use (these will be discussed in the relevant chapters below).

As a consequence of these comments, the proponent amended Chapter 1. Any reference to a coal processing plant was removed in the amended EIS as the proponent indicated that it would not be required as part of this project.

4.1.2 Conclusion

The amended EIS now suitably describes the regulatory approvals for the project and the relevant approvals processes. No outstanding issues remain.

4.2 Project need and alternatives

Chapter 2 of the EIS provided a broad overview of the justification for the project as well as feasible alternatives to the proposed project. Alternatives have been considered with regards to the principles of ecologically sustainable development.

Key project alternatives considered in the EIS included:

- not proceeding with the project
- mining methods
- longwall panel design
- mine support and infrastructure options.

It was concluded in the EIS that the project would provide local, state and national economic and social benefits. These are discussed in more detail in section 4.12 (Social values) and section 4.14 (Economy) of this EIS assessment report.

4.2.1 Adequacy of the EIS chapter

The EIS stated that a number of alternative project scenarios were considered during the project design process, in order to evaluate the main environmental and social advantages and disadvantages of each scenario. The EIS concluded that, if the project failed to proceed, jobs and business expansion opportunities would not be realised. The EIS outlined also the royalties and revenues this project would bring. However, the EIS did not quantify the potential consequences of a reduction in agricultural productivity (either temporary or permanent) associated with the proposed project going ahead. The argument for this approach was that the project would be designed such a way that the mining operations could coexist with existing agricultural land-uses and environmental values within the region. However, this tenet was disputed in several submissions on the EIS from affected land holders and referral agencies. In particular, the potential impacts of soil surface subsidence, arising as a consequence of underground mining, was commonly feared as being likely to have a substantial impact on agricultural productivity, due to soils becoming shallower, on land used for broadacre farming/cropping, as well as from localised ponding and soil erosion. It was argued that a change in land surface would impact detrimentally on existing, well-established agricultural practices in the vicinity of the mine site. These issues are discussed in further detail in section 4.5 (Land).

4.2.2 Conclusion and outstanding issues

Outstanding issues from the specialists reports provided in submissions concerning potential impacts of mining on agricultural productivity are discussed in the relevant sections of this EIS assessment report, particularly those matters relating to potential impacts of mining on agricultural productivity (section 4.5 Land).

4.3 Description of the project

Chapter 3 of the EIS provided a broad overview of the project, including 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. A description of the project is provided in section 2 of this EIS assessment report.

4.3.1 Adequacy of the EIS chapter

Several comments were received in submissions made on Chapter 3 of the EIS. However, as this chapter serves an overview of other more specialist chapters, these comments, where relevant, have been addressed in the relevant sections (e.g. water management, workforce management, rehabilitation).

4.3.2 Conclusion and outstanding issues

The proponent amended sections in Chapter 3. In a review of these amendments to the EIS, DNRM requested a more detailed vertical exaggeration of the undergound cross-sections for the mining project, which the proponent provided. Chapter 3 now adequately summarises the various components of the proposed project. No outstanding issues remain.

4.4 Climate

Chapter 4 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 underground mining and related infrastructure area (MIA).

4.4.1 Description of the climate—findings of the EIS

The EIS described the climatic data analysed from Springsure and Emerald Airport showed a distinct wet-season with the highest rainfall occurring during the summer months and drier periods predominating in the winter months. Mean temperatures range from approximately 20 - 34°C in summer and from 6 - 23°C in winter. Average monthly rainfall ranges in winter from as low as 13.6mm to summer highs of up to 110mm. Mean evaporation data for region was described as moderate with an average annual evaporation rate of 2000mm to 2400mm. Net water loss in the region was calculated as approximately 1500mm per year, indicating greater evaporation relative to rainfall. Relative humidity patterns indicated higher humidity in the mornings than afternoons. However, variation around the mean is nominal and equated to less than 15% throughout the year (average of 36-59%).

Primary wind direction was recorded as coming from the east and south-east. Average annual wind speeds ranged from 5.1km/h to 16.3km/h with the cooler winter and autumn months generally having lower wind speeds relative to the summer and spring months.

4.4.2 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.

4.4.2.1 Drought

The EIS identified that drought could adversely impacting the proposed project at some point throughout the life of the mine but can be minimised if water for the operation would be supplied from a reliable source. The proponent has proposed to deliver a water management system that would consider mine water planning during periods of drought and the ability of external water supplies to provide a continued water supply; including consideration of the volume, duration and intended use of water stored in supply dams over periods of drought and contingency plans should this supply cease. SCC has secured a water allocation from SunWater and that water would be pumped directly to the mine site.

4.4.2.2 Flooding

The EIS stated that flooding was not anticipated to adversely affect the proposed project, as the MIA would be developed above the Springsure Creek floodplain and modelling showed the MIA to be located above a 1 in 1000 average recurrence interval (ARI) flood event level. Local access roads would also be upgraded to a higher level of flood immunity than is currently the case. The mine push out capacity would be designed to allow for underground operation to continue, irrespective of any delays associated with transporting coal which may arise from excessive rainfall events.

The EIS outlined that detailed flood modelling and hydraulic design would be undertaken for all proposed mine infrastructure, including access roads. Minor and major flood events would be modelled and design of flow conveyance structures (such as culverts) would be undertaken to minimise upstream and downstream flooding of properties. Mitigation and management measures (e.g. drainage and erosion control devices) would also be developed, in order to minimise any impacts associated with erosion.

4.4.2.3 Severe Storms

Although severe storm events are known to occur in the region, the EIS concluded that severe storm activity would not result in significant impacts to mining operations as the bulk of operations would occur underground. The mine design and capacity would incorporate measures to minimise impacts associated with severe storms. The EIS noted that infrastructure would be built according to relevant industry codes.

4.4.2.4 Bushfires

Although the impact of bushfire was considered low for the proposed project, the EIS outlined that fire protection and response systems would be available on-site and all staff would be adequately trained in the correct usage of relevant equipment.

4.4.2.5 Climate change adaptation

The EIS summarised the current climate change projections based on Bureau of Meteorology (BoM, Queensland) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The most recent climate change projections for Central Queensland indicated that by 2030 the mean annual temperature would increase by approximately 1.0°C with little variation across the seasons and by 2.0°C by 2050. Extreme temperatures (days > 35°C) are projected to increase from 87 currently, to 110 by 2020 and 134 by 2050, when modelled for inland Barcaldine. Annual rainfall is projected to decrease by up to 20% under a high emission scenario and decrease by approximately 3% under a low emission scenario. The frequency or intensity of high rainfall events is likely to increase. Annual evapotranspiration is projected to increase by 3–4%, and up to 6% in autumn and winter. Annual

potential evapotranspiration is expected to increase by 9%, with a 12% increase in autumn. There is a projected southern shift in the primary regions of cyclone activity which could lead to greater cyclonic impact in the region.

The proponent conducted a risk assessment in order to determine the potential impact of climate change on the proposed project. As a consequence the EIS outlined several measures to mitigate potential climate change impacts. These included securing water resources, incorporating building standards to improved design to strengthen structures and suitable drainage, levees and erosion control devices. Overall, minimal to no impacts were anticipated in the EIS as a result of climate change.

4.4.3 Adequacy of the EIS chapter

4.4.3.1 Submissions on the EIS chapter

Several comments were received from private submitters regarding the climate chapter. In particular it was pointed out that the Springsure Creek and Comet River floodplains flood regularly, and that the proponent's classification of risk levels of 'low risk flooding' was therefore inappropriate. Other comments received related to flooding of road crossings across six major and six minor roads in the vicinity of the mine. Some submitters suggested that the proponent contact the Comet Sustainable Farming Association, in order to obtain a more accurate climate dataset for this sub-catchment region of the Comet River. The proponent agreed to do this.

4.4.3.2 Proponent's response to submissions

In its response, the proponent acknowledged the potential for severe weather events to occur in the area, including local flooding. However, the EIS response also noted that the risk assessment had been based on the frequency and consequence of particular events. The proponent further outlined that the MIA would be constructed so as to minimise impacts associated with severe storms. Furthermore, SCC did not anticipate that storm activity would result in significant impacts to mining operations as the bulk of operations would occur underground and mine push out capacity would be designed to account for stoppages.

Potential flooding in the Comet River floodplain would be considered during the assessment of the infrastructure corridor. It was also stated by the proponent that local access roads to the mine site would be upgraded to provide all weather access and a higher level of flood immunity than provided at present. While these roads would be sealed and drainage improved the proponent also noted that the roads would not be flood-proofed. However, the proponent committed to upgrading the access road to a suitable flood level (section 4.6 Traffic and transport). However, it is expected that some roads would become inundated and impassable in some storm events as currently occurs.

4.4.4 Conclusion and outstanding issues

As a consequence to the comments received during the EIS submission period, the proponent amended sections in Chapter 4. No significant outstanding issues remain.

4.4.5 Proponent's commitments

The proponent gave a commitment to undertaking detailed flood modelling and hydraulic design for all proposed mine infrastructure, including mine access roads.

4.5 Land

Chapter 5 of the EIS outlined the existing environmental values of the land area that may be affected by the project. These values included topography, geology, coal reserves, soils (including SCL), existing land-uses, and visual amenity of the area. The potential impacts of the proposed mining activities on the existing land characteristics and environmental values of the area were identified, as well as management measures to mitigate any potential impacts.

4.5.1 Description of land values—findings of the EIS

4.5.1.1 Existing environmental values

The landform of the project area was described in the EIS as being flat to gently undulating, ranging from between 170–200m AHD. Vegetation cover was described as being sparse, with the majority of vegetation found along the drainage lines and the flood plains.

The soil investigation carried out as part of the EIS assessment found that three soil types occur on the project area: vertesols, dermosols and chromosols. The assessment also found that soils in this area had been substantially improved, as indicated by the high levels of nitrogen and phosphorous present in the soil.

However, the EIS assessment also found that the existing harder subsoils act to reduce water infiltration. In terms of land-use suitability the EIS stated that 81% of the project area is currently suitable for dryland cropping. The EIS indicated that further 15% of the study area comprises deep clays associated with Springsure Creek, which would also be unsuitable for cropping due to its susceptibility to flooding. The EIS found that the remaining 4% of the project area comprised shallow earths and loams which are not suitable for dryland cropping. The unsuitability of these shallow loams to dryland cropping was considered in the EIS to be due to the limited availability of water within that part of the soil profile accessed by the roots of crops. The EIS also found that most of the project area would be suitable for grazing, with no major limitations to grazing use. The good quality agricultural land (GQAL) assessment undertaken for the EIS found form field survey results that the soils within the project area were of a higher quality than is reflected in soils mapping for the Bauhinia Shire Planning Scheme.

The proposed project is located within the Central Protection Area of SCL Regional Trigger Map C4 (Moranbah and Emerald Region). The EIS outlined that according to the trigger map approximately 8868ha of potential SCL would occur within the project area.

The EIS identified 44 homestead receptors within and immediately surrounding the project area that had a potential line of sight to the project. Of these, 26 homesteads were found, based on a combination of distance to and elevation measurements, as being unable to view the infrastructure within the MIA. Of the remaining 18 homestead receptors, five were found to have no view of the MIA and 13 were found to have minimal to broad views of the MIA. The only place, from which the proposed project could be viewed very broadly, was identified as being in the Minerva Hills National Park, approximately 35km to the south-west of the project area.

The EIS provided a brief overview of agriculture within and surrounding the project area. Dryland and irrigated cropping form the dominant agricultural land-use in the project area. The region supports both summer and winter crop rotations. Summer crops include sorghum, mung beans, corn, irrigated cotton, forage sorghum, sunflowers and a very small percentage of dryland cotton, amongst others, while winter crops include wheat, barley, chick peas and forage oats for grazing. Cotton has been grown on Den-Lo Park and the neighbouring Springton Property, but occurs predominantly in the Emerald region, associated with irrigated areas. Grazing constitutes approximately 20–25% of the project area and is carried out in areas less suited to cropping, due primarily to soil, drainage and landform characteristics.

4.5.1.2 Potential impacts and mitigation measures

Subsidence

The EIS described that the subsidence effect expressed at the surface, would generally occur in the form of a wave, which would move across the ground at approximately the same speed as the longwall face of the underground mine collapsed within the longwall panel. The EIS assessment predicted subsidence would progress at a rate of approximately 120m per week. The EIS noted that the excavation of each panel would create its own wave as the panels were mined in sequence. Subsidence associated with longwall mining was described as generally occurring in two phases:

- Active subsidence (phase 1, also known as the coal face advances).
- Residual subsidence (phase 2; also known as incremental subsidence after the coal face has stopped). The magnitude of residual subsidence usually consists of approximately 5–10% of the maximum subsidence, and is often likely less than that amount with very little residual settlement occurring after a year or so.

The updated subsidence assessment undertaken as part of the amended EIS predicted that subsidence would occur gradually over the life of the mine. A maximum of 100ha per year would be subsided during single longwall operations, while 200ha of land would be subsided per year when two longwalls were in operation. The level of subsidence was described in the EIS as depending on the depth of overburden and the thickness of the coal seam. The subsidence predictions indicated a subsidence depth ranging from 0.27m, for areas of shallower overburden depth, to 1.39m in areas of greatest overburden depth – and that the maximum depth of subsidence would be 2.2m. The greatest level of subsidence was anticipated to occur in the central section of the project area. The EIS documentation showed that no subsidence would occur beyond the project boundary (**Figure 3**).

The change in ground tilt associated with subsidence across the project area was predicted in the EIS as ranging up to 18mm/m or 1 degree along the cross section point A to point A' and 36mm/m or 2 degrees along the cross section point B to point B' (**Figure 4**). Tilt would occur at the edge and ends of longwall panels, with the greatest tilt occurring where subsidence is greatest. The levels in the centre of longwall panels were not predicted to change.

Surface tension cracks across the project area were identified as potential impacts due to subsidence. These cracks may open up while mining of the coal face is nearby and usually close up once the face has moved. However, the EIS identified that some cracks may remain for extended periods or permanently. The presence of cracks may alter hydrological properties of the surface by providing a pathway for fertilisers, pesticides and other contaminants into shallow aquifers.

Subsidence was also identified to have the potential to change the physical properties of soil. For example, bulk density and moisture content of soils could increase down the subsidence slope, from the top to the centre of the subsidence trough. An accumulation of salts could also occur, which could potentially affect plant germination and growth.

Limited information was provided in the EIS on the proposed management of subsidence and mitigation strategies. The EIS essentially referred to SCC's commitments to responsible resource recovery, with a focus on mitigating the potential impacts on surface waters and groundwater systems, and land-use functionality – as well as adverse effects on the environment and local communities due to mining activities. These would be carried out by preparing and implementing a subsidence management framework and subsidence management plans in consultation with the Agricultural Coexistence Research Committee, landholders and EHP.

Areas of natural vegetation would be managed through progressive rehabilitation and management with the aim to ensure that remnant vegetation would not adversely impacted by the proposed project. For land which is deemed to be SCL, the EIS stated that management would extend to all characteristics which are defined within the SCL Act. Ponding would be addressed by re-contouring and levelling the land surface to ensure that natural drainage channels are reinstated.

Land disturbance

The EIS stated that the proposed project has the potential to disturb land due to the construction of on-site access roads, coal stockpiles, water management facilities, excavation of underground mine entrance, storage of overburden and backfilling, subsidence, MIA and other mine infrastructure used during operational phase, rehabilitation activities; and through the direct disturbance or depletion of surface waterways and groundwater aquifers. However, it was concluded that the impacts resulting from each of these individual disturbance activities would not be irreversible.

The EIS estimated that the MIA would cover 60ha of land. An area of approximately 2.7ha would be excavated for the purpose of the cut and cover of the mine. For drifts (for a single longwall), a total volume of 86,000m^3 of material would be removed. It was estimated that during the life of the mine (40 years), the overburden volume of the cut and cover and drifts would accumulate to 526,000m^3.

Several mitigation measures were proposed in the EIS:

- Implementation of soil resistivity surveys (prior to construction and following completion of detailed design): High risk areas would be surveyed to record the salinity and to implement measures to avoid further significant salinisation.
- Land would be surveyed and pegged out prior to clearing to avoid areas of significance.
- Implementation of erosion and sediment control plans.
- Clearing of the minimum amount of vegetation required at any one time.
- Progressive rehabilitation of disturbed areas.
- Disturbed land would be returned to pre-existing vegetative, habitat condition, including cropping land, cattle grazing, or native habitat – and where appropriate, for farm dams and wetlands.
- An inventory of available soil would be maintained to ensure adequate soil materials were retained to enable the rehabilitation activities committed to in EIS documentation.

The EIS estimated that the MIA would require 290,000m^3 of good quality topsoil for successful rehabilitation. Based on soil studies carried out as part of the EIS, an excess of suitable topsoil and subsoil within this area was identified to completely rehabilitate the disturbance caused by the MIA.

SCL

The project area is located within the western cropping zone, central protection area of the potential SCL trigger area. SCC has lodged an application for a SCL protection decision with DNRM.

At this stage of the EIS assessment process, no final decision has been made by DNRM on whether the impacts would be considered temporary or permanent. Hence, the acceptability or otherwise of potential impacts on SCL cannot be determined in this EIS assessment report. However, it is noted that the mining activity cannot commence until a SCL protection decision has been made.

Land degradation and contamination

The EIS outlined that land degradation could result from land disturbance in the MIA, due to compaction and/or topsoil removal. In order to manage potential impacts the proponent committed to develop and implement management plans and procedures prior to the construction of the mine. Mitigation measures would include ripping and deep ploughing of compacted surfaces post-mining.

Contamination of land could occur through spillage of fuels and chemicals, stormwater runoff from stockpiles and the mining processing areas, the use of dust suppression waters on soils, windblown dust from stockpiles and the mine processing area, reject materials generated during coal extraction and processing that can contain elevated concentrations of heavy metals, low pH values and elevated salinity. Management and mitigation measures proposed in the EIS included: appropriate training of staff and contractors in procedures and emergency responses; providing appropriate storage areas; using suitable bunding; and implementing regular inspections.

Erosion and stability

The EIS stated that erosion would be controlled and minimised to an acceptable level by implementation of a range of erosion control measures to be outlined in an erosion and sediment control plan, including:

- Re-contouring and landscaping areas cleared for the construction of the MIA and not directly supporting infrastructure. No remnant vegetation would be cleared as part of the proposed project.
- Minimising subsoil exposure periods during construction by topsoil and surface stripping only when required.
- Directing runoff from exposed areas into sediment ponds and/ or away from creek systems minimising impacts.
- Implementing dust suppression methods (application of water) on stockpiles, roads and other exposed surfaces. All direct runoff from contaminated surfaces (stockpiles) would be re-directed into environmental dams.
- Re-contouring and re-vegetating subsided land and areas exposed during construction, and not used in operational phase
- Re-contouring and realigning impacted drainage lines and to restore current flow patterns.
- Placements of sediment traps, silt fences and stormwater management areas throughout the MIA. Clean water runoff would be harvested for operational use or directed back into the natural system (creeks), and MIA work surfaces runoff would be directed into environmental dams.

Topsoil management

The EIS outlined that the project area has an excess of suitable topsoil and subsoil to allow for complete rehabilitation of any disturbed areas. Furthermore, it noted that no requirement for soils from other areas off-site would be necessary, and that no net loss or change to top soil quality would be expected as a result of the proposed project.

The EIS proposed that in disturbed areas topsoils and subsoils would be stripped, handled and stored. Topsoil excavated during construction would be reinstated and/or used elsewhere. An inventory of available soils would also be maintained. The following topsoil management activities were proposed in EIS documentation:

- Contractors would be required to be in possession of a permit to work issued by SCC's site environmental manager prior to commencing the handling of any soils on-site.
- Prior to stripping all vegetation would be cleared progressively to the minimum area required.
- Stripping operations would be conducted in accordance with stripping plans and in situ soil conditions.
- Care would be taken to ensure soil moisture conditions are appropriate.
- Soil would be stockpiled until it is reused in areas outside the construction footprint and away from drainage lines.
- Topsoil stockpiles would be managed (correct height and length; slope gradient, timing; ripping and sowing of seeds; weed and pest control).
- Re-spreading would be managed (careful removal of soils; selective placement; appropriate spreading; contour ripping; reseeding; control of slope drainage; installation of collection drains and catch dams).

The EIS further outlined that topsoil management measures would be documented, monitored, regularly reviewed, and a running balance of top soil harvested (excavation) versus top soil used (rehabilitation) would be maintained.

Landscape character and visual amenity

The following are mitigation measures were proposed in EIS documentation in order to reduce visual impacts:

- Vegetate areas to create a visual screen from mining operations.
- Illumination within the project area during the night would be restricted to active work areas such as pits, dumps and infrastructure areas.
- Unnecessary lighting would be restricted and controlled to reduce light spill onto public places.

- Artificial lighting would be managed in accordance with Australian standards (including consideration of the location and orientation of lighting; selection and maintenance of luminaries) and in consultation with landholders and statutory agencies.

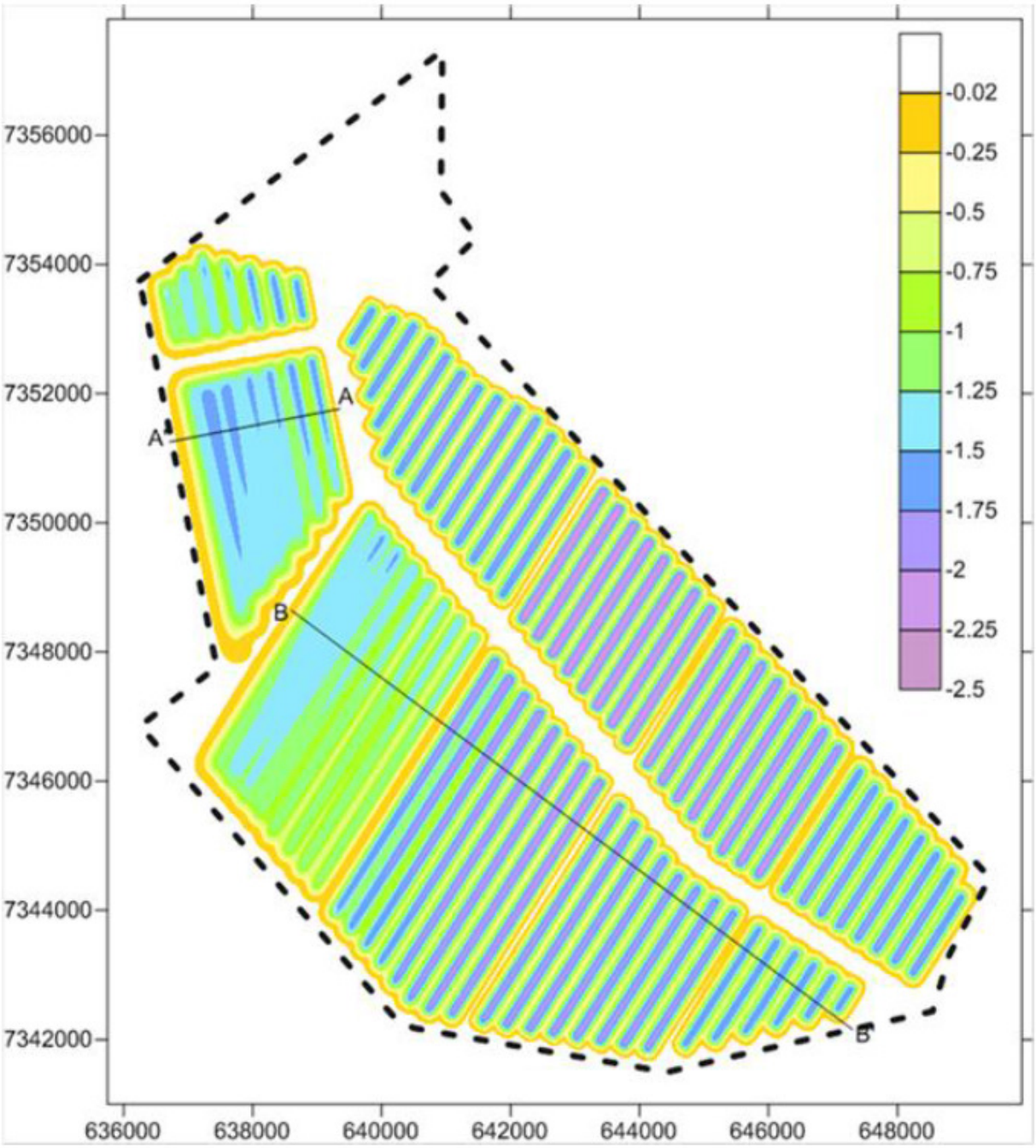

Figure 3 **Predicted subsidence contours across the MLA (units in metres). Figure shows unmitigated subsidence impacts.**
(Figure reproduced from the EIS)

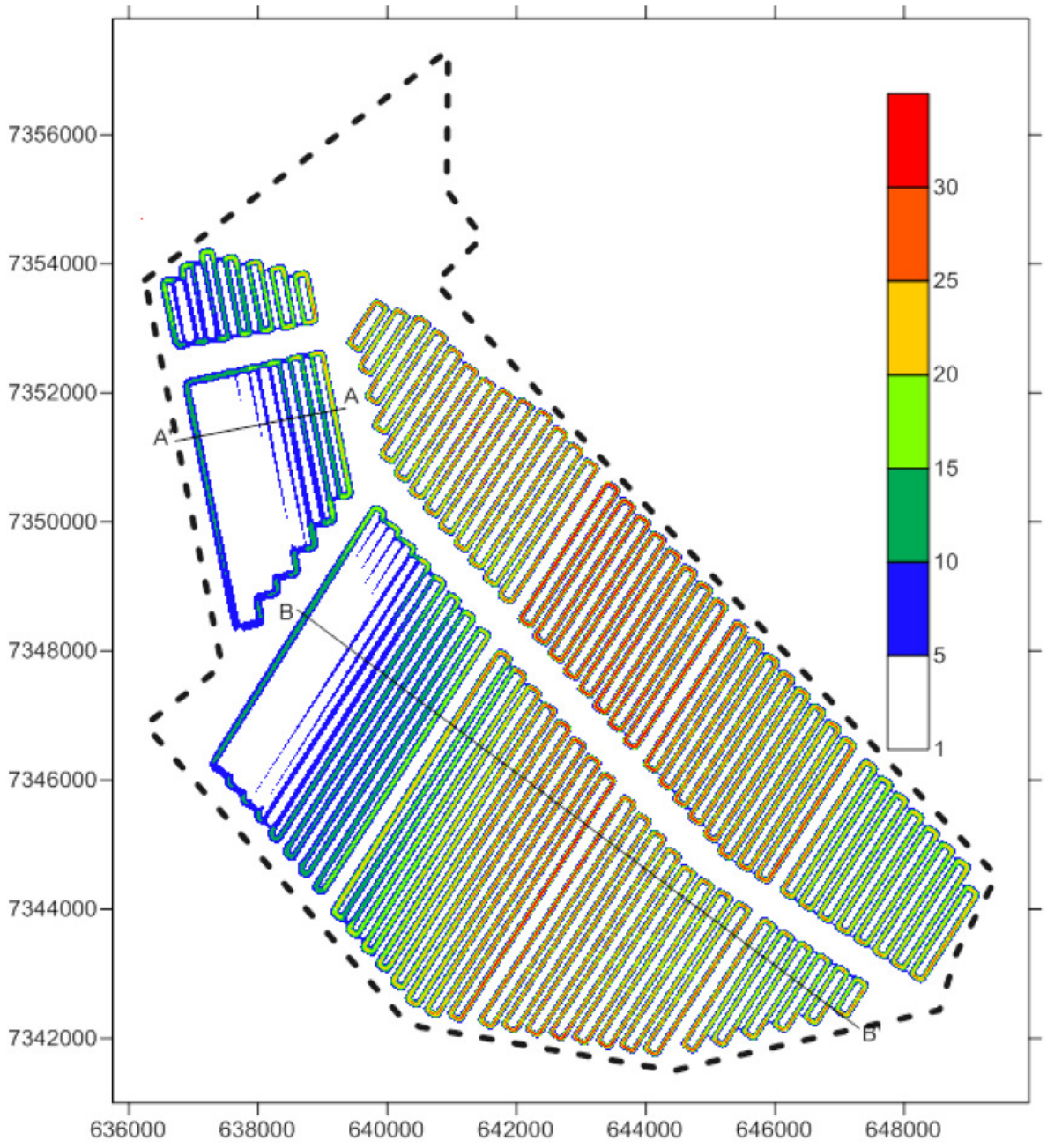

Figure 4 **Predicted tilt contours across the MLA (units in mm/m). Figure shows unmitigated subsidence impacts.**
(Figure reproduced from the EIS)

4.5.2 Assessment of the EIS chapter

4.5.2.1 Submissions on the EIS chapter

The land chapter (Chapter 5) attracted the majority of comments made in public and agency submissions on the EIS. The key concerns raised involved the assessment of soils and good quality agricultural land (GQAL); the impacts of soil surface subsidence; potential impacts on SCL; impacts on existing agricultural practices; land rehabilitation; and other, general issues. Due to the high number and similar nature concerns outlined in the public submissions, these key concerns were summarised where possible. Some submissions also expressed concern about the potential impacts of subsidence on ponding and in altering surface water flows. These issues are discussed in further detail in section 4.8 (Water) of this report.

Issues raised in submissions on land raised in submissions on the EIS included:

- Private submitters:
  - Soils/GQAL assessment:
    - Outlined inadequate soil sampling and incorrect GQAL classification.
    - Outlined that soils assessment was carried out on an area not covering the project area.
    - The EIS does not include quantitative data and maps of the pre- and post-mining land-use capability class and land-use suitability class.
  - SCL:
    - Expressed opposition in principle to mining on SCL.
    - Outlined that the SCL assessment was carried out in an area not covered by the project area.
    - Outlined considerable discrepancy regarding the area defined as non-SCL between the EIS and the actual current figures available and requested that the amended EIS must reassess the areas of SCL within the actual project area (MLA 70486) and not on a superseded mine plan.
    - Outlined that the EIS had failed to deal with changes in slope on SCL. Concerns were expressed that post-subsidence slopes would exceed 3% over a considerable area.
    - Outlined concerns that as a consequence of subsidence (e.g. major drainage issues, permanent cracks, slopes of >3%) the current SCL classified land may not able to be classed as SCL post-mining because of the change in slope, soil and other SCL parameters.
  - Subsidence:
    - Drew attention to the lack of proposed mitigation measures and the lack of a subsidence management framework, a subsidence management plan, or a sediment and erosion plan.
    - Noted that the impacts on crop yield and value of production were not considered for areas that would be removed from agricultural production during subsidence periods.
    - Expressed concern that subsidence modelling had been carried out using a superseded mine plan.
    - Outlined that the best estimate on subsidence predictions would not be acceptable without ground-truthing and independent verification of the EIS data. Hence, a detailed onsite assessment of subsidence predictions was requested.
    - Outlined inadequate representation of potential impacts, such as slope and tilt. For example, it was impossible to determine from the EIS whether the post-mining slope is no greater than 2.5% in total or, whether the post mining slope be the current slope plus up to an additional 2.5% slope. If the post mining slope is determined by the latter (i.e. current slope plus 2.5%), and the resulting slope is greater than 3%, the land would be considered ‘permanently alienated’ under SCL legislation.
    - Outlined that it would be impossible to flood irrigate with the amount of predicted subsidence (1.2–2.3m).
    - Outlined that as subsidence would progress, it would interfere with the operation of existing contour banks and other erosion or water control measures on land adjoining the subsidence.
    - Outlined possible changes in airflow caused by subsidence. Frost tends to settle in hollows and lower areas. Hence, subsidence would have a major effect on where frost occurs and how air flows on mining affected land. This would therefore impact future cropping and pasture production.
    - Outlined that the EIS did not adequately describe the impacts of short and long-term impacts subsidence on land-use systems, land resource values, agriculture and vegetation changes.

- Agriculture and rehabilitation:
  - Outlined that no possible erosion rates were given; no management techniques described; no erosion potential for each soil type listed; no erosion monitoring program detailed; no rehabilitation measures identified; no methods to prevent or control erosion specified; and no erosion and sediment control plan included in the draft EM Plan.
  - Outlined that the EIS did not adequately describe the existing agricultural land-use including cropping, crop rotations, zero-till and controlled traffic farming practices.
  - Outlined that an analysis of the loss of agricultural productivity resulting from the mine development should also be provided.
  - Outlined that the EIS does not identify or describe changes to water flow, erosion and consequential restrictions to farm machinery.
  - Outlined that land degradation (water ponding; classed as low risk) should be classed as high risk due that it would cause major problems to farming (i.e. water logging severely limits plant development, leaches nutrients out of root zones etc.).
  - Outlined that the proposed strategy in the EIS "*topsoil will not be stripped under wet conditions*" would cause problems with farming practices as farming projects have a timeline and can't wait for the topsoil to dry out for six months.
  - Requested further information on the local suppliers of topsoil and how to source additional topsoil in an area that has been identified as SCL without permanently alienating the donor site.
  - Requested that the EIS should clearly and fully describe the main components of the pre-mining land-use systems and accurately map their extent with a focus on features of those systems that are most prone to being impacted by the mining operation.
  - Outlined that the assessment of impact on the agricultural activities did not include detailed comparison of the ability, management inputs required and cost to farm before or after subsidence.
  - Requested to use existing EIS data to project forward over the lifetime of the project the number of years that currently cropped areas would be removed from production.
  - Outlined that the proposed project would have devastating consequences for these well-established farming systems, which have progressively invested in and adopted profitable and sustainable controlled-traffic zero-till farming with big wide machinery where soil conservation is achieved through well-planned and maintained broad based contour banks and retention of stubble as ground cover. This is a low-intensity erosion control system, appropriate to present land-use.
  - Outlined that subsidence would have major impacts as many cropping paddocks have had significant investment in drainage works, including contour banks, waterways, levee banks, laser and other levelling works, completed in them over the years to help reduce erosion and facilitate efficient disposal of runoff or overland flow water.
  - Outlined concerns regarding the proponent's ability to rehabilitate the land seeing the EIS contained inconsistency in regards to land categorisation.
  - Cotton Australia's expert report Risks and Impacts of Coal Mine Subsidence on Irrigation Areas concluded that subsidence of even 0.5m would have "*disastrous effects on irrigated cotton growing*". It was argued in the report that the key reason is that the "*cotton fields are laser graded to 1:1000 to 1:1500 slopes, hence a 0.5m depression across such an irrigation run would make it inoperable*". Other potential subsidence impacts outlined in this report included waterlogging, compaction, irregular ripening of the crop and increased salinization of soil.
- Other concerns:
  - Outlined that economic benefits should be weighed up against the destruction of the agricultural land.
  - Outlined concerns regarding the establishment of the Springsure Creek Agricultural Project Steering Committee as this committee has no local expertise.
  - Requested further information on irrigated areas and their associated water storage systems and operational needs. For example, the LRAM field inspection showed that the main storages (including those on Den-Lo Park) are gravity filled by a combination of overland flow and riparian flooding. Unless these features are properly described, there is no basis on which to describe the impacts.
  - Outlined the need to minimise lightning and the use of low pressure sodium vapour lightning to reduce light nuisance.

- CCC:
  - Outlined that the proponent should return land to a more stable, better management condition.
  - Outlined the need of weed management, particularly along the floodplains.
  - Outlined that dams could provide opportunities for combining wetland habitat restoration with sustainable grazing, with appropriate biodiversity fencing regimes.
  - Recommended that the proponent should be required to commence restoration of creek banks (width, species diversity, grazing withdrawal/management) prior to mining occurring to foster future remediation through natural processes.
- DAFF:
  - Outlined the need to consult with adjacent and regional landholders on uses of herbicides to ensure that appropriate risk management actions were implemented.
  - Outlined that the project should not result in a net loss to the production and economic return of the affected properties, particularly beyond the limits of the Den-Lo Park property.
  - Suggested that the EIS did not adequately address the full requirements of the TOR, in particular regarding existing land-uses, any productivity loss due to mine development, and how the mine would be designed to minimise the extent of disturbance to existing agricultural activities.
  - Requested further information on how the Agricultural Coexistence Research Committee would be appointed, its membership, function, reporting, disclosure requirements and accountabilities to ensure that the project develops and implements "*the most appropriate mitigation and rehabilitation strategies*" to protect the value of SCL affected by the proposed project.
  - Requested further information regarding on whether irrigated areas of Den-Lo Park are C1 and C2 pasture lands; as these areas are the most productive areas on the property.
  - Requested further information on the detailed scope and purpose of the subsidence management framework and subsidence management plan – including details on how the proposed project would make good any adverse impacts to the existing farming systems and agricultural productivity of agricultural lands, both within and outside the MLA.
  - Requested that the proponent commits to producing management plans and procedures prior to commencement of mining activities. It argued that these plans should be sufficiently binding and monitored to ensure that there was no degradation and/or contamination of existing agricultural land over the life of the project.
  - Outlined that the subsidence report did not address the downstream impacts to the Springton Irrigation System. In particular, arguing in particular that it did not address the effects on dryland farming country and how it could be mitigated.
- DNRM:
  - Requested that a soil survey be carried out across the entire mining tenure, in order to identify and characterise the soils and their properties in accordance with technical guidelines (the soil survey and subsequent land suitability assessment were inadequate).
  - Outlined that the SCL assessment included in the EIS was not consistent with the requirements of the SCL legislative framework and would need to be assessed in parallel with the EIS process.
  - Outlined that the subsidence predictions regarding the behaviour of the overlying basalts during subsidence events may be inaccurate based on assumptions made regarding the caving characteristics of the overlying basalts. Refer also to section 4.8 (Water).
  - Requested further information of the topsoil stripping depths for each soil type, following the completion of a soil and land suitability assessment.
  - Recommended that the amended EIS should comment on and discuss options regarding subsidence predictions and potential inaccuracies in modelling.
- FBA:
  - Requested further information on the proposed progressive rehabilitation of disturbed areas.

4.5.2.2 Proponent's response to submissions

The proponent's responses to the specific concerns raised by many landholders were broad and in some cases did not address the issues raised in great detail. Due to the complexity of the issues raised, and the fact that submissions raised many issues in common, these issues have been summarised below under the key issues identified in the submissions.

Soils/GQAL assessment

In terms to the comments made regarding the inadequacies of the soils and GQAL assessment in the EIS, the proponent responded that the original GQAL data had been sourced from the former DERM. However, subsequent to the EIS being prepared, a more detailed soils and land suitability survey had been undertaken on the MLA. The response further outlined that this soil sampling included a total of 176 observation sites and 76 detailed borehole descriptions. Mapping has been carried out at a scale of 1:50,000 as recommended by DNRM to provide an appropriate scale for investigation and mapping of study areas which may contain both potential cropping and grazing land. It further stated that management programs and plans for the project would ensure that the integrity of the soil surface and landscape characteristics would be maintained.

In response to DAFF's specific enquiry about the soil types on Den-Lo Park, the proponent responded that the soil survey had identified the land as being Class A or Class B GQAL, except for a portion of Class C3 in the north-western corner of the plot. The EIS was amended to include the latest soil surveys and data.

SCL

The proponent responded that all references to SCL had been checked and any inconsistencies had updated in the amendments to the EIS. As noted above, the proponent commissioned a detailed soil and land suitability survey for the MLA and indicated that those results would be used to determine SCL "suitabilities" for the area. For lands which were then deemed to be SCL, management would extend to all characteristics defined within the SCL Act. The proponent's response also stated that the assessment of the project under the SCL Act was being carried out in parallel to the EIS process. It was acknowledged by the proponent that, through this parallel process, additional SCL protection conditions may eventually be placed on the project. Based on the SCL protection decision, the proponent advised that it would refine the proposed management of impacts as set out within the environmental management framework described in the EIS, as the project progressed. This would include further development of the Springsure Creek agricultural plan. The proponent also stated that the amended EIS now presented conceptual mitigation measures relating to soils and land-use which demonstrated that the proposed project could coexist with the existing environment and land-uses.

Subsidence

In regard to the numerous comments regarding the inadequacy of the subsidence predication model, the proponent responded that the EIS was amended to provide for the following limitation: "*The modelling which has been undertaken to date represents a worst case scenario and as such provides the basis for determining impacts. All modelling approaches will have some element of inaccuracy, SCC has committed to basing management on worst case predictions, to insure the best outcomes. As such, the actual level of subsidence may be less significant than modelled and result in less severe impacts. Nevertheless the management approaches employed will be sufficient to mitigate these impacts and insure agricultural coexistence. These measures will be documented into the specific management plans developed for the Project.*"

In terms of the subsidence model being based on a superseded mining plan, the proponent stated that the superseded mining plan (MLA 70461) had a larger footprint that the current MLA 70486. That being the case, the proponent argued, subsidence predictions were based on an area much larger than the proposed mine footprint and hence were more conservative, which would enable the identification of potential impacts of subsidence beyond the mining boundary. The proponent further explained that the subsidence modelling had represented a worst-case scenario. SCC committed to basing management on worst-case predictions, in order to ensure the best possible outcomes. The proponent further argued that the actual level of subsidence may be less significant than modelled and result in less severe impacts.

SCC acknowledged in its response that progressive and predictable permanent subsidence would occur as a consequence of underground longwall mining. However, the proponent considered that subsidence would not result in serious and irreversible environmental damage. The proponent stated that potential impacts of subsidence would be managed in such a way that agricultural activities and agricultural yields would be maintained and even improved. The proponent argued that the continued use of land for agricultural activity, including cropping, is evident in areas throughout the world. Within Australia, ACARP research projects C1808 and C15013 demonstrated that agricultural productivity could be maintained on subsided land.

SCC further stated that the project would not permanently alienate any agricultural land located within the MLA. In regards to the comments made relating to final slopes (tilt), the proponent is committed to restoring the landscape so that it would meet all SCL criteria, including tilt/slope. The proponent's response also suggested that subsidence

for this project would be visible as a series of gentle, uneven undulations (of varying depths) across the project site. SCC noted that the length of subsided areas would depend upon the length of each longwall, with a predicted width of approximately 300m, with distances of between 40m–65m being retained between each subsided longwall.

In the case of land degradation, the proponent considered that ponding was not expected to increase significantly as a result of soil subsidence. SCC noted that the flood model used in the EIS had involved a "rain on grid" approach, whereby rainfall was applied to the entire MLA area and where natural topography dictated overland flow and ponding. Maximum values (water level, depth, velocity, shear stress, stream power and ponding) were determined and displayed via mapping. The proponent considered that the results for the unmitigated case assumed that all subsidence would occur simultaneously (worst case scenario). However, the proponent also indicated that ponding would be addressed by re-contouring and levelling the land surface to ensure that natural drainage channels were reinstated (refer to section 4.8 Water). In terms of a reduction in downstream flows, increasing sedimentation and creating permanent pools that may adversely affect vegetation; the proponent explained that ponding volumes are predicted to reduce over time as stream beds reach equilibrium through natural erosion and sedimentation processes. It argued that the extent of ponding post subsidence would not be significantly larger than what currently occurs. However, it was also stressed that these ponding estimates were based on unmitigated impacts. SCC also recognised that the contour bank system would need to be reinstated to suit the new landform. The proponent proposed a staged assessment as the project progresses, in order to analyse in finer detail the effects of any likely changes to overland flow and ponding regimes and subsequent effects on individual properties. SCC noted that this would include be likely to include effects on current soil management (including sediment and erosion controls), irrigation and general agricultural practises.

In terms of landholders' concerns regarding co-existence of subsidence and flood irrigation, the proponent noted in its response that, post-subsidence, the land would still be capable of being irrigated. However, the proponent also noted that alternative methods of irrigation would be utilised, (e.g. pivot irrigation), which would also be more water efficient.

In response to the comments concerning the lack of management plans, SCC noted that it was committed to further liaison/consultation with individual, affected property owners, in order to further understand and be able to mitigate potential effects on existing agricultural practises. SCC note that the management measures developed for the proposed project would be incorporated into the subsidence management plan, which would ensure that the integrity of the soil surface and landscape characteristics would be maintained, and would include measures for managing residual subsidence to minimise any detrimental impacts on agricultural practices. These plans would take into account farming practices at the time and would be periodically reviewed and updated.

In regards to comments made on risk assessment of subsidence, the proponent explained that, although the likelihood of subsidence was high, the overall consequence would be low, as impacts would not be permanent and debilitating to the area. On this basis, the overall assessment of the risk outlined in the EIS was 'medium'. Furthermore, it was argued that management measures would ensure that the land could continue to be utilised for agricultural purposes and that subsidence would not adversely impact on agricultural yields.

Agriculture and rehabilitation

The proponent stated that Chapter 5 was updated to include an agricultural impact assessment of current farming practices, cropping and the impacts of subsidence on these values based on understanding of existing farming practices ongoing in the project area.

In terms of short-term and long-term impacts on agricultural practices due to subsidence, the proponent stated that the majority of active subsidence would occur within a few days or weeks and residual subsidence would occur concurrently with active subsidence, and could possibly continue for up to two years (depending on the rate of mining). The proponent expected that farming operations would continue on the surface in areas where there was no mining directly underneath. However, the proponent also outlined that, where mining was taking place and where active subsidence would occur, farming operations would cease temporarily in those areas and would only recommence after initial subsidence had occurred. The proponent acknowledged that farming practices in areas where subsidence has occurred may need to be modified. SCC further stated that minimum or zero till farming could still be undertaken post subsidence. It argued that re-contouring and levelling of paddocks would be akin to laser levelling, which typically occurs on four- to five-year cycles. As such, SCC did not anticipate that subsidence would have a significantly detrimental impact on farming practices. However, the proponent did note that it would discuss this with landholders on a paddock by paddock and longwall by longwall basis, prior to commencing mining activities. SCC also drew attention to the benefits of the co-existence research and mining on Den-Lo Park, which it argued, would assist in developing management strategies to maintain existing agricultural productivity on subsided land. In areas where short term impacts associated with subsidence did result in reduced yields, SCC committed to enter into landholder agreements prior to any subsidence occurring.

SCC made it very clear that it is committed to ensuring that agriculture and mining can co-exist, and that the existing level of agricultural productivity of land impacted by underground mining would be retained or even improved. In particular, SCC drew attention to the establishment of the Agricultural Co-existence Research

Committee with the purpose to guide co-existence research aimed at:

- Maintaining natural resources and agricultural productivity during mining operations and enabling restoration of agricultural productivity on areas affected by mining activities including subsided areas.
- Understanding community expectations and identifying strategies to minimise adverse impacts and maximise the social and economic benefits of the mining investment.

SCC noted that members of the Agricultural Co-existence Research Committee had been selected based upon the broad range of skills and experience, with several of the members having a long association with Central Queensland. It indicated that the committee would also draw upon other local expertise, as required.

In regards to concerns expressed in submissions about the handling of topsoil, the proponent stated that the updated soil study has clearly identified that adequate topsoil was available within the project area, and that no additional topsoil would be need to be sourced from local suppliers. The proponent gave a commitment that it would prepare management plans which would outline how and when specified activities, including topsoil stripping, would be undertaken. Requirements in these plans would be specified to ensure compliance with environmental approval conditions and requirements under the SCL Act. SCC noted that the subsidence management plan and agricultural management plans would both consider yields and cropping practices. The proponent also outlined that the progress of longwall mining was predictable, and that paddock rotation practices could be tied into the longwall mining plan. This would ensure that longwall mining could occur so that it results in minimal impacts and would not result in yield reductions.

In the response to the comments in submissions about the lack of rehabilitation measures proposed in the EIS, the proponent gave a commitment that that management plans would be developed in consultation with affected landholders. However, the proponent also expressed the view that, with mining not scheduled to take place on some properties for a number of years, it would be premature in those cases to develop management plans based on current cropping regimes and farming practices and without the benefit of the co-existence research and experience of mining having taken place on Den-Lo Park.

Impacts on native vegetation were considered by the proponent to be minimal and manageable, as no native vegetation would be cleared as part of the proposed project (refer to section 4.16 Ecology). The proponent gave a commitment to developing and implementing rehabilitation activities that would provide a net benefit to the local flora and fauna and to the environment (especially in the area along Springsure Creek) in consultation with landowners. In the event of any vegetation dieback or loss, vegetation communities would be reinstated though proposed rehabilitation programs (see section 4.17 Rehabilitation and decommissioning) and offsets would also be considered (see section 4.18 Biodiversity offsets).

In regards to DAFF's comments on the need to consult with adjacent and regional landholders on the use of herbicides, the proponent responded that all chemicals used as part of the mining or agricultural operations would be controlled as in keeping with statutory requirements for hazardous materials management. All chemicals would be risk rated and subject to storage, use and disposal in accordance with the relevant materials safety data sheets (MSDS). Appropriate risk assessments and procedures would also be put in place for all chemicals use for the project.

Other concerns

In regards to the comments on the potential for increased frost in hollows created by subsidence, the proponent stated that the local terrain has been accounted for in the modelling and that the period of mining on Den-Lo Park would enable real-time monitoring of impacts and enable the development of appropriate responses.

In terms of weighing up economic benefits of mining versus agricultural production, the proponent responded that the EIS included mapping of existing land-use suitability for the entire MLA area. SCC noted that the project would be developed to ensure that land-use across the MLA would be maintained and agricultural production would continue well into the future. This was consistent with SCC's commitment to maintain or improve agricultural yields for areas directly impacted by the project.

SCC responded to concerns about the potential adverse impacts of lighting at the site, that three main types of lighting would be installed within the MIA. These would include stockpile lighting, street lighting (for internal roads) and gantry/walkway lighting. There would also be specialised lighting of the emergency area (only used as required). The requirement for lighting is primarily driven by safety to ensure potential hazards onsite are visible. The proponent further stated that although some homesteads would have a direct line of site to the MIA the impacts from lighting were assessed as not significant due to distances. Where possible, lighting required with the MIA would be directed to the area required minimising light spill into the surrounding environment and would be designed, installed, operated and maintained in accordance with Australian standards. This standard is intended to control the obtrusive effects of outdoor lighting. Lighting design in accordance with this standard would be undertaken at the detailed design stage, once an EA is granted.

Summary

In summary, in response to the comments received during the EIS submission period and the responses outlined above, the proponent amended the EIS and submitted it to EHP for review in June 2013.

4.5.2.3 Adequacy of the EIS amendments and proponent's response

In reviewing the abovementioned amendments to the EIS and the proponent's response, received by EHP in June 2013, DAFF and DNRM both outlined matters that they considered had not been fully addressed in EIS documentation. As a result of these outstanding issues, the proponent was issued with a Notice (refer to section 3.1 Timeline of the EIS process) requesting it to provide further information on these issues. The proponent responded to these comments and submitted an amendment of the EIS and a response to the outstanding issues to EHP in August 2013. EHP and key agencies, then reviewed the latest changes to the EIS and the proponent's responses. EHP further received four private submissions during the post-submission period; with some comments relating to land issues. These issues were addressed as part of the agencies' review. The overall post-submission assessment in relation to land is discussed in detail below.

DSDIP stated in its final review that it anticipated that the Priority Agricultural Area Policy position in the draft Central Queensland Regional Plan would be implemented through measures including amendments to the SCL Act and through approval processes such as EAs. These regulatory measures are expected to be given effect by the Regional Planning and Development Bill, once it is enacted.

DAFF compared the amended EIS and response to submissions against its earlier submission and noted that SCC had not completely addressed some of DAFF's concerns, including that:

- The proponent had not addressed DAFF's comment regarding the requirements of the TOR to describe existing land-uses, any productivity losses due to mine development and how the mine would be designed to minimise the extent of disturbance to existing agricultural activities. Instead SCC provided generalised descriptions of farm practices in the Central Highlands, but did not provide specific data on the project area.
- The proponent had not addressed DAFF's comment regarding an estimate of the costs and value of agricultural production that has been and continues to be generated annually from the project area. This should be done for a period of years so that seasonal variations can be averaged out.
- The proponent had committed to a co-existence between agriculture and mining activities but was silent on how this would be formally managed and delivered for the benefit of affected landholders. Furthermore, while the proponent was providing a process, through the Agricultural Research Co-existence Committee, by which rehabilitation and productivity enhancement measures could be developed, DAFF considered that a more substantive commitment to actions was also required.
- DAFF also argued that the EIS did not sufficiently recognise the important role of agricultural management plans, noting that these plans should also contain:
    - measures to ensure that productivity and economic returns would be maintained over the long-term
    - alternative strategies should the measures proposed to restore land and maintain productivity would not be successful.

  DAFF recommended that the proponent should commit to finalising these agricultural management plans quickly with all affected landholders.
- The EIS should commit to detailed planning for the rehabilitation of affected land, including:
    - addressing subsidence (including all earthworks and soil renovation procedures) on the infrastructure to control runoff on dryland area
    - distributing water to irrigated areas and the agronomic approaches that would be adopted to improve agricultural productivity.
- The EIS should provide updated subsidence modelling for all affected areas, including modelling of all affected agricultural areas outside of the MLA.
- The EIS did not address the outstanding issues regarding the legislation, management and disposal of weeds and pests, (biosecurity), pest and weed management.
- Commitments made in this chapter should be crossed referenced with an updated EIS Chapter 20 – Key Commitments.

DNRM noted that the subsidence modelling had not been updated following the EIS submissions period and that the modelling presented in the amended EIS was still based on the former MLA. Hence, DNRM requested that:

- A new subsidence model/plan must be presented showing the most up to date MLA boundary and mine plan

(longwall layout) and the surface expression of subsidence that is predicted relative to those.

- Interpretation of the surface drainage pattern that would be expected to exist post-subsidence, would be based on new subsidence modelling.

Furthermore, DNRM noted that the information provided in the amended EIS regarding the SCL status of the land still did not adequately address Schedule 1 of the SCL Act. However, DNRM also outlined that, while the EIS process does not provide any means of approval relating to SCL, a SCL protection decision would be required before any EA or ML could be issued. The SCL protection decision application for the Springsure Creek Coal Mine Project would be assessed in line with the requirements of the SCL Act.

In the review of the amended EIS and response to submissions, like DNRM, EHP outlined that the subsidence model was based on a superseded mine plan. EHP requested that the model be based on the existing MLA and that any potential environmental impacts associated with changes in hydrology should be addressed as part of the second amendments of the EIS.

EHP also received concerns from the public in regards to groundwater issues which paralleled DAFF, DNRM and EHP's concerns, including:

- Regarding permanent impacts and rehabilitation of SCL, including top soil rehabilitation on SCL.
- Impacts of subsidence on farming practices.
- The subsidence and flood modelling carried out on a superseded mine plan.
- Changes to overland flow due to subsidence.
- Incorrect assessment of impacts of subsidence on environmental values.
- The lack of a subsidence management plan and subsidence management framework.
- The lack of rehabilitation management plans and programs.
- The lack of information on how tilt would relate to the existing slope of the land.
- The lack of a full description of the pre-mining land-use systems, irrigation areas and their associated water storage systems.
- Likely success of the proposed co-existence proposal.

In August 2013, SCC responded by providing EHP with an amendment of the EIS and a response to abovementioned outstanding issues. DAFF and DNRM reviewed the documents and confirmed that most issues had been addressed satisfactorily. However, some outstanding issues remain which would still need to be addressed by the proponent.

In regards to SCL, DNRM expressed concerns about the methodology carried out for SCL assessment in the EIS, but accepted that this could be addressed separately through the SCL protection decision application and did not need to be resolved through the EIS assessment process.

EHP concluded that a subsidence management plan would be required as part of EM Plan approval process under the EP Act. The subsidence management plan was considered as being one of the key strategies for managing the proposed project and would form the basis of many subsequent management plans (rehabilitation, water, etc.) and approvals conditioning. Furthermore, EHP noted that the proponent (in liaison with DAFF and DNRM) would need to identify specific rehabilitation requirements in future approval conditions, in relation to acceptable post-mining land-uses. Rehabilitation objectives and completion criteria would also need to be determined and included as conditions of the EA.

On 24 October, EHP received a late submission from Landholder Services Pty Ltd with an independent analysis of the predicted subsidence levels and their impacts on cropping potential based on the original data used by the proponent. This data was made available by SCC and subsequently analysed by a third party. SCC's original data was then used to specifically investigate the effects of subsidence on slopes and the resultant impacts on:

- potential for continued cultivation using broadacre machinery
- altering SCS status
- surface run-off and ponding within paddocks.

The methodology was based on SCC's data but using a tanB=4 model (instead of SCC's analysis with tanB=2 model). The reason for this was explained that a value of 4 would be more representative of the Bowen Basin than SCC's model of a value of 2. A 3D analysis then used 17 cross-section profiles in selected location across the three properties from the TanB=4 digital elevation model along with cross-section profiles from the same location for the existing digital elevation model.

In summary, the report on "*The effect of longwall mining on cropping potential following subsidence at the proposed Springsure Creek Coal Mine*" found that:

- Information on post-subsidence slopes was available but not presented by the proponent.
- SCC's subsidence modelling did not adequately address differing subsidence and severity of slopes where longwall panels abut the areas of nil or negligible subsidence.
- The extent of panel frontage to the nil or negligible subside zones where the submitters believed that subsidence had not been adequately recognised, could be up to 117km along the subsidence boundary.
- Zones of nil or negligible subsidence were ignored in the EIS flood and ponding studies (e.g. the main underground roadways strip, and the outer eastern ends of all panels, which lie at roughly right angles to the flow, would substantially affect creek flows and overland flows in ways not recognised in the EIS).
- Slopes of excess of 3% would occur in many places throughout the subsided landform, which would downgrade the categorisation of SCL land to non-SCL land; while leaving the remaining SCL land fragmented.
- The steepness and variability of slopes were found to significantly interfere with use of wide machinery; hence impacting on the present efficient and financially viable cropping of the land.

The late submission was sent to the proponent on 25 October 2013, and on 30 October 2013 the proponent replied to EHP, arguing that the issues raised in the late submission were either without foundation or had already been adequately addressed in the revised EIS. The proponent did also responded to each of the key issues raised in the late submission and drew attention to the fact that the results presented in the late submissions were "non-mitigated scenarios". SCC re-affirmed that slopes in the subsided land abutting these nil or negligible subsidence areas would be steeper than the slopes in side-by-side panels, and that the mathematical parameter tanB=4 (representing tilt at the point of inflexion) best equates to known characteristics of subsidence in the Bowen Basin. However, the proponent also outlined that subsidence predictions would improve once site-specific data became available. SCC argued that, due to the nature of subsidence, an accurate prediction at a specific easting and northing was not possible. SCC argued further that the predictions in EIS documentation were sufficient for the assessment and management of subsidence impacts. It also argued that the term "accurate" should not be used in its scientific context when dealing with engineering equations.

The proponent further stated that the EIS did not provide a length of panel frontage or area of land affected by subsidence, but instead showed model plots of the area of land impacted which corresponded to the areas beneath which coal would be extracted by longwall operations. Furthermore, SCC noted that it intend applying management measures to all areas affected by subsidence, irrespective of the extent of impact (on a paddock by paddock and longwall panel by longwall panel basis). SCC pointed out that it did not consider subsidence to be continuous across the project area and that its subsidence modelling had been comprehensive in its consideration of variations in subsidence across the site as a result of coal extraction activities, including variations caused by pillars and main roadways.

SCC acknowledged that land subsidence would affect surface water flows within and across project area, including surface water infrastructure such as contour banks. However, the existing water management system is not considered to be optimal by SCC. It argued that, following subsidence the water management system would be restored with the aim of improving agricultural productivity at no additional cost to landholders. SCC also argued that this could be achieved given that existing landforms are already highly engineered. The EIS flood modelling results presented ponding at the end of the longwall panels to the southwest of the barrier pillars and mains. Flows across the barrier pillars and mains (as shown on some figures in the EIS) were representative of flood conditions where water overtops the edge of the barrier pillar and mains and flows along the existing downstream contours of the creeks. Substantial ponding was predicted to the northeast of the barrier pillars and mains where the greatest gradients would occur. Additional ponding was also shown to occur in the longwall panels adjacent to the chain pillars. Hence, SCC concluded that the EIS surface water studies were not flawed. With the implementation of appropriate drainage restoration measures, these impacts would be fully managed such that water flows across the site will not preclude agricultural activities.

The proponent acknowledged that subsidence above 'the main leader' and barrier pillars would be lower than that above chain pillars. However, SCC outlined that the purpose of the EIS was to focus its assessment on the worst-case impacts of subsidence within the mining lease at a large scale and to provide management measures appropriate to this. Attention was particularly given to the areas which would change as a result of subsidence. Differences in subsidence would occur above the mains, barrier pillars and chain pillars (e.g. EIS Figure 5-18) and hence, SCC concluded that there was no deficiency in the EIS based on the scope of risks discussed or the conceptual management measures proposed for these risks. SCC acknowledged that slopes would change within affected properties in the absence of mitigation. With mitigation measures provided; however, the shape and slope complexity of all cultivation paddocks would be restored or improved. SCC noted further in its response that the Landholder Services report discussed 17 locations of subsidence which would have steeper slopes than existing

post-mining. However, the proponent argued that there would be also locations which show shallower slopes and others with improvement son the existing slope post-mining, which were not discussed in the report.

Regarding the statement that slopes of excess of 3% would downgrade the categorisation of SCL land to non-SCL land while leaving the remaining SCL land fragmented, SCC acknowledges that slopes would change within affected properties in the absence of mitigation. However, with the mitigation measures proposed the shape and slope complexity of all cultivation paddocks would be restored or improved.

In terms of impacts of subsidence on the use of wide farm machinery, SCC noted that the existing cross-section profiles of existing surfaces presented in figures of the Landholder Services' report would preclude access by large farm machinery. However, SCC stated that it was very confident that it would be able to re-engineer the landform to enable the continuation of agricultural activities following subsidence. SCC also acknowledged that this would require extensive earthworks to re-profile the land. Proposed management measures would address longwall mining activities simultaneously with agricultural activities so that no impacts would occur on agriculture. SCC stated that the late submission made no statement on what earthworks would be required to restore the land. Hence, the proponent concluded that the report's conclusion that slopes would remain at >4% in all profiles, remained unsupported.

In regards to potential impacts on SCL due to subsidence, SCC acknowledged that subsidence would affect areas of SCL if no mitigation would be implemented. The proponent argued that the conclusions drawn in the report did not include mitigation or restoration measures on SCL proposed by SCC. The proponent further outlined that as part of the SCL protection decision SCC would be conditioned to implement appropriate restoration measures under the SCL Act and that SCC is certain that restoration of the land would be possible given that the existing landform is the product of agricultural engineering practices.

The proponent outlined further that the current landform contains slopes exceeding 4%, for example within contour banks or creeks, and that these would not technically be classified as SCL despite being included within the SCL trigger area based on DNRM mapping. Overall, SCC concluded that its proposed mining operation, inclusive of land restoration measures, would not result in any reduction of SCL within MLA 70486. Restoration measures would include consideration of farm layout, erosion control and the use of paddocks in the post-subsided landform. It concluded that measures to improve agriculture would enable the land to be farmed above its existing potential.

4.5.3 Conclusion and outstanding issues

While SCC outlined mitigation measures and stated that there would be minor impacts on agricultural practices due to subsidence post mitigation, SCC also stated that, due to the nature of subsidence, limited accurate predictions are possible. Although EHP acknowledges that the proponent incorporated information based on two ACARP research projects (C1808 and C15013), which demonstrate that agricultural productivity could be maintained on subsided land, these projects are not located on land having the same geology and landform as the proposed Springsure Creek Coal Mine Project. On the other hand, concerned landholders submitted to several Queensland Government departments a document published by Cotton Australia, *The risks and impacts of coal mine subsidence on irrigation areas* (Cotton Australia, May 2013) which concluded that subsidence of even 0.5m would have "*disastrous effects on irrigated cotton growing*". It was argued in Cotton Australia's report that the key reason against subsidence was that the "*cotton fields are laser graded to 1:1000 to 1:1500 slopes, hence a 0.5m depression across such an irrigation run would make it inoperable*". Other potential subsidence impacts outlined in Cotton Australia's report included waterlogging, compaction, irregular ripening of the crop and soil salinisation. Likewise, the subsidence report on "*The effect of longwall mining on cropping potential following subsidence at the proposed Springsure Creek Coal Mine*", based on SCC's original subsidence data, outlined that the steepness and variability of slopes which differed from SCC's EIS results.

Hence, with contradictory predictions and limited factual information about the impact of subsidence on agricultural land in the project area, EHP has formed the view that a detailed subsidence management plan is required as part of the EM Plan and EA assessment and approval process. The subsidence management plan is considered to be one of the key strategies for achieving sustainability for the proposed project and would form the basis of various management plans (e.g. rehabilitation, water management; etc.). EHP acknowledges the commitments made by the proponent in relation to managing potential impacts on land values due to subsidence, and that SCC has given commitments to providing the necessary management plans, prior commencement of mining. EHP further understands that each of these management plans would need to be updated to reflect current cropping regimes and farming practices; consideration of technological advancements in farming practices; and the benefit of the co-existence research and experience of mining having taken place on Den-Lo Park. However, without a proposed subsidence management plan for at least the first stages of mining (e.g. mining on Den-Lo Park), insufficient information is currently available for EHP and other key agencies to provide appropriate conditions for the operational phase of proposed project. A progressive approach to preparing the plan will allow continual review and improvement to ensure implementation of best practice over the life of the proposed mine. The subsidence management plan will also need to outline the extent, impact and proposed management strategies on how

subsidence will be managed, specifically in relation to commitments under the Springsure Creek Agricultural Project. DNRM also requested that the subsidence management plan will need to address the impacts of subsidence on watercourses and surrounding landscapes as per DNRM's draft guideline titled Watercourse Subsidence – Central Queensland Mining Industry.

In regards to the handling of topsoil, the proponent stated that the updated soil study had identified that adequate topsoil would be available within the project area and no additional topsoil would be required from local suppliers. However, very little information was provided in the EIS on where this topsoil would be taken within the project area and how this would affect agriculture in those areas. This is of importance, as most of the topsoil on the MLA would be located on SCL and would probably be classified as SCL soil. If that is the case, SCL topsoil management may be adequately conditioned through the application of relevant provisions of the SCL Act.

EHP believes that the proponent, in liaison with DAFF and DNRM, will need to identify specific rehabilitation outcomes for post-mining land-use and specific land-use criteria to which the proponent would be committing as a benchmark. Rehabilitation objectives and completion criteria, including topsoil management, will then need to be determined for development of draft EA conditions. Regardless of EHP's approval process, a SCL protection decision will be required before any EA and ML can be issued and mining could commence. The SCL protection decision application for the Springsure Creek Coal Mine Project will be assessed in line with the requirements of the SCL Act.

4.5.4 Proponent's commitments

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

- Co-existence between mining and agriculture.
- Maintaining or improving agricultural productivity on subsided land.
- Developing and funding an agricultural research program in the area specifically aimed at developing methods that ensure coexistence between mining and agriculture can occur.
- Appointment of an Agricultural Coexistence Research Committee.
- Implementation, monitoring and review of an agricultural plan.
- Implementation of landholder agreements.
- Implementation of management plans, such as:
    - subsidence management plan and subsidence management framework
    - topsoil and subsoil management
    - erosion and sediment control plan
    - pest and weed management plan
    - soil management plan
    - rehabilitation management plan
    - management plan to reduce the potential for contamination of land.

4.6 Traffic and transport

Chapter 6 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 Description of traffic and transport impacts—findings of the EIS

The EIS assessed potential impacts and risks of traffic and transport related activities associated with the proposed project. These included impacts associated with:

- increased traffic delays
- increased traffic incidents
- school bus activities
- public transports
- transportation of hazardous and dangerous goods

- local watercourses (waterways, dams and rivers) and hydrology
- stock routes
- flora and fauna.

The EIS stated that the proposed project would not result in significant increases to traffic related delays due to increased traffic. However, delays associated with road upgrades may occur on a short-term basis during the construction phase.

The assessment of existing traffic accidents carried out as part of the EIS indicated that the majority of accidents on the Gregory Highway were multi-vehicle collisions. The expected increase in traffic volume on the Gregory highway as a result of the proposed project was calculated as up to 6.1% during construction and up to 11.6% during operation that may result in additional accidents. Traffic on local sealed and unsealed roads would increase significantly, but the EIS stated that the increase in the absolute numbers of vehicles on local access roads would be relatively low with an estimated 300 to 400 vehicular trips per day. The proponent committed to improve safety on local roads by the upgrade of carriageways.

The EIS assessed impacts associated with school bus activity and concluded that the project would not be significantly impacted by the additional traffic associated by the proposed project. The EIS outlined that school start and end times do not correspond with the start and end of mine shifts. Furthermore, volumes of goods deliveries would be low and spread throughout the day. No impacts were further found on public transport systems in the area.

Road transport would be the primary mode for the movement of hazardous and dangerous goods including diesel fuel for mining equipment and vehicles. The EIS stated that transportation of hazardous and dangerous goods has the potential to increase the incidence of spills, fires or explosions.

Although vehicles travelling on unsealed roads would generate more dust than vehicles on paved roads the EIS concluded that dust generated from vehicle traffic on unsealed roads would not be significant. The proposed site access route external to the project area would cross a number of watercourses which would have the following impacts on watercourses and overland flows:

- Issues relating to the maintenance of water courses including excessive vegetation clearing around creeks, rivers and drainage lines, sediment runoff, storage of fuels and chemicals in improper areas.
- Issues relating to erosion control including bank and slope stability, sediment control measures, water discharge procedures, and increased turbidity of downstream water quality.
- Issues pertaining to flora and fauna management including excessive and unnecessary clearing, weed spread, and fauna death or injury due to improper works or clearing practices.

A development permit for operational works for taking or interfering with water under the Water Act; and/or a waterway barrier permit under the Fisheries Act may also be required as part of the approval process with DNRM and DAFF. The EIS stated that there would be no impacts on local dams, creeks or rivers in the vicinity of the project area as a result of increased traffic.

A secondary stock route is located within the mine transportation route along the Gregory Highway. Other stock routes are also located along Glenorina Road and Milroy Downs Road. None of the stock routes would be impacted by the proposed project and no impacts would be made to water points or any other stock-route related infrastructure including watering facilities and holding yards.

In terms of fauna and flora the EIS outlined that that the proposed increased traffic movements would not have a significant impact as the area is mainly cleared and does not support extensive fauna populations. However, the EIS acknowledged that direct mortality of native fauna may occur as a result of vehicle collision and potential changes in habitat resulting from subsidence. It is anticipated that, of these, vehicle collisions would pose the most significant risk to native fauna, particularly on the existing koala population. These impacts are further discussed in section 4.16 (Ecology).

4.6.1.1 Mitigation and management of traffic and transport related activities

Mitigation measures proposed in the EIS for potential impacts on the local and state controlled road networks included:

- Limiting external traffic and upgrading local roads.
- Implementation of road use management strategies (RUMP).
- Upgrading the Gregory Highway intersections with the accommodation village access and Glenorina Road as required by TMR.

- Upgrading the access route (including Glenorina Road) and associated intersections to withstand a 1 in 50 year flood.
- Possible monetary contributions of roads in consultation with TMR and CHRC.

A draft RUMP was provided in the amended EIS as part of the mitigation and management strategies which would be finalised in consultation with key stakeholders and will have three main objectives:

- to minimise the impact on the efficiency of the state controlled roads
- to ensure safe operation of vehicles on-site and off-site
- to minimise traffic-related complaints and incidents.

The EIS outlined that the final RUMP would need to be implemented by the workforce and contractors delivering goods to or removing goods from the site. This would include discouraging staff and contractors from using local and state controlled roads which do not form part of the access route and reducing road use. The plan would also provide a monitoring and reporting process a set of criteria for corrective actions as required by DAFF.

The proponent also committed to a road safety audit that would be undertaken during the design stage of this upgrade in order to identify further requirements including:

- provisions for school bus stops
- warning signage where required
- posted and design speed limits
- geometric road design
- provisions at bridges and culverts
- provisions for recreational cyclists.

Several submissions were received regarding potential impacts on the school bus route and general safety concerns for school children during pick-up and drop-off times. The proponent responded by stating that it would consider providing more formalised bus facilities, including shelters, traffic signage, bus turnaround areas and sealed bus stopping areas clear of carriageways should the local road or highway traffic volumes increase significantly. Furthermore, heavy vehicle movements would not be scheduled during school bus pick-up or drop-off times.

The proponent also committed to a traffic management plan (TMP) that would be prepared in accordance with relevant legislation requirements prior to the commencement of construction. The plan would be developed in conjunction with key stakeholders including QPS, DTMR and CHRC and include procedures for all mine related traffic, including oversize loads. Other management strategies proposed by the proponent included general road safety and fatigue management strategies. This would include over dimension vehicle management. Mitigation measures proposed for the protection of waterways and ecology included erosion and sediment control measures, flora and fauna management measures and the management of water quality.

4.6.1.2 Cumulative impacts

Key projects in the region were considered as part of the cumulative impact assessment in the EIS, including major mining projects which would impact on the road network at approximately the same time as the proposed project. The proposed Arcturus Coal Mine which would be located directly west of the proposed Springsure Creek Coal Mine Project and has not been included in this assessment as the proponent, SCC, has put the project on hold. The proponent; however, indicated that a transport assessment would be undertaken and cumulative impacts would be assessed should the Arcturus project go ahead in the future.

The EIS assessment found that the proposed project would account for approximately 15.3% of all impacts on the road network. Once large infrastructure and other resource projects are factored in, the proposed project would likely account for less than 10% of all road impacts in the region. Based on a 40-year development and operation cycle the cumulative impacts would be contributing to an increase of 2000 vehicular trips per day on the whole network but especially on sections of the Capricorn Highway and Gregory Highway with more than 1000 vehicles per day, particularly in the vicinity of Emerald. The EIS concluded that while these highways have spare capacity to cater for these increases in the short term, design and planning may need to consider long term provisions for overtaking lanes between Gindie and Emerald, as well as between Emerald and Blackwater/Rockhampton; increased maintenance budgets; and increased structural capacity for future pavements.

4.6.2 Assessment of the EIS chapter

4.6.2.1 Submissions on the EIS chapter

As part of the EIS assessment the following main issues were raised in the submissions from private submitters and government agencies. Matters raised in submissions included:

- Private submitters:
  - A range of concerns have been raised in several submissions, including the following:
    - increased traffic on local roads
    - impacts on road conditions
    - impacts of floods on roads
    - impacts on school bus route (e.g. safety and increase of traffic)
    - impacts on farming and farming equipment during harvesting
    - impacts of movement of stock/stock crossings
    - increase of noise and air background levels
    - lack of a road user management plan (RUMP)
    - existing stock routes not adequately described.
- DCS:
  - Requested the development and implementation of a traffic management plan for construction, operation and decommissioning periods of this project.
  - Recommended that the emergency management plan would need to include a consistent and structured response to each type of emergency incident including natural disasters. It is recommended that QFRS would be involved in the formulation of this plan.
  - Requested a detailed traffic management plan for construction, operation and decommissioning periods.
  - Requested further information on any diversions, restrictions, limitations on road infrastructure that may impact on the delivery of ambulance operations from ambulance stations.
- EHP:
  - Requested a separate air emissions inventory of any off-site activities directly associated with the project, including fugitive emissions such as from rail or road transport of product and/or waste.
- QPS:
  - Noted the movement of excess dimensional (ED) vehicles as a significant traffic movement and safety issue. QPS would be the final approval agency, with ED loads requiring permit processing capabilities and the requirement for police escorts.
  - Requested the proponent to develop a transport schedule/plan and delivery timetable.
  - Asked to be included as a key stakeholder in the development of traffic management plans.
- QTT:
  - Requested that cumulative traffic impacts should be considered and referenced in more detail as the proposed project is one of several major projects proposed within the Central Highlands region.
  - Outlined that the proponent would bear all costs and risks associated with road upgrades and the ongoing maintenance of these upgrades.
  - Outlined that traffic flows should not be negatively impacted by the mining activities and that any work required to the existing road network as a result the new projects would be at the proponent/s cost and risk.
- TMR:
  - Requested that cumulative traffic impacts should be considered all aspects of traffic generation for the mine to be assessed and addressed, irrespective of whether subject to subsequent approvals.
  - Requested that opportunities to minimise the impacts of associated freight tasks on regional roads and safety and amenity to other road users should be explored, insufficiencies be identified and rail to be investigated as an option.

- Outlined the lack or deficiencies in the road impact assessment (RIA), the risk assessment in the EIS and the lack of a RUMP.
- Outlined the need for flag-lighting at access intersections from the Gregory Highway to the accommodation village or at Glenorina Rd for night drivers.

4.6.2.2 Proponent's response to submissions

In response to the many comments made in the submissions the proponent contended that opportunities would be investigated to minimise impacts to the community, including the feasibility of using rail for major freight deliveries, seeking viable and safe solutions where possible with regards to transportation of goods and the development of a draft road use management plan (RUMP). A draft RUMP, based on TMR's requirements, was provided as part of the amended EIS and the proponent committed in its response to finalise the RUMP in consultation with key stakeholders (local and state government agencies and the local community). The proponent committed to review and periodically update the RUMP during the design process, construction and operations.

The proponent committed it would develop (in consultation with QFRS) an emergency response plan for the life of the project (construction, operation and decommissioning) which would provide a response to each emergency type and identify resources that are available onsite to combat any major incident. A helipad for emergency evacuation is now included as part of the MIA. The definition of risk levels were updated in the EIS.

Road safety was considered to be an important issue raised in several submissions. In its response the proponent stated that the local agricultural community is considered as a key stakeholder in the design of local road upgrades, and hence it would engage with representatives of the local community, CHRC, TMR and the local School Bus Committee in developing the design of road upgrades. The proponent further stated that strategies for communication would be developed in consultation with the local community and be included in the community engagement plan. SCC committed to engage with the CHRC and TMR to determine appropriate works to be undertaken on local and state roads, and any ongoing maintenance agreements associated with those. The amended EIS was also updated to include the stock route along the Glenorina Road and to Milroy Downs Road.

Cumulative traffic impacts were subsequently assessed in the amended EIS based on information from existing projects. The proponent also stated that any potential cumulative effects and an off-site emissions inventory resulting from the mine, infrastructure corridor, and train load out facility would be considered as part of the separate assessment for the infrastructure corridor and train load out facility.

4.6.2.3 Adequacy of the EIS amendments and proponent's response

As a result of the comments the EIS has been amended to incorporate many of the comments made in submissions. The proponent also stated in its response that it would continue to consult with TMR and other key stakeholders to address the requirement of the RUMP and other outstanding issues (such as road upgrades, mitigation of damage to state and local roads).

In the review of the amended EIS, TMR outlined that further consultation is required post-EIS regarding a number of issues that were not addressed in sufficient detail in amendments to the EIS. These are discussed in more detail below.

4.6.3 Conclusion and outstanding issues

The amended Chapter 6 (Traffic and transport) sufficiently addressed the TOR requirements.

TMR outlined outstanding issues which will need to be addressed by SCC. These include:

- Safety and efficiency of the state controlled road network due to the increased traffic from the development.
- Mitigation of impacts on the state controlled network due to increased traffic volumes from the development.

TMR requested that once further information is available on the final design of the project, the proponent will be required to undertake a review of the road impact assessment and provide an update on safety improvement works, rehabilitation and maintenance costs prior undertaking any construction works. Other outstanding issues included road impact mitigation strategies.

TMR further requested that fatigue management and other road safety issues that are road-use management issues should be best documented in the RUMP. TMR recommended that any strategies that were dealt with in the SIMP should also be summarised and cross-referenced in the RUMP (and *vice versa*).

While TMR acknowledged the commitments made by SCC in the EIS, TMR recommended the following commitments to be included:

- Upgrading local roads.

- Upgrading the state controlled road access at the accommodation village and intersection of Gregory Hwy with Glenorina Rd.
- Developing traffic management plans (TMPs) for the abovementioned state controlled road works.
- Finalising the RUMP.
- Ensuring that oversize/over-dimension issues are managed as required under the *Transport Operations (Road Use Management) Act 1995.*
- Revising the road impact assessment with pre-construction traffic numbers if changed significantly.
- Ensuring that any increased road safety risk would include level crossings.

4.6.4 Proponent's commitments

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

- Implementation of a RUMP and a TMP.
- Improving safety on local roads with the upgrades of carriageways.
- Upgrading the access route from the Gregory Highway to provide suitable flood immunity.
- Implementation of a road safety audit.
- Considering more formalised bus facilities, including shelters, traffic signage, bus turnaround areas and sealed bus stopping areas clear of carriageways should the local road or highway traffic volumes increase significantly.
- No heavy vehicle movements scheduled during school bus pick-up or drop-off times.
- Road safety management strategies.
- Fatigue management.
- Erosion and sediment control measures.
- Flora and fauna management.
- Management of water quality.

4.7 Waste

Chapter 7 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 Description of waste—findings of the EIS

The EIS outlined a waste inventory and potential disposal options for waste streams. Commitments were made to regularly review and update the waste inventory following detailed design and during the project construction and operational phases.

The EIS indicated that the predominant waste streams during construction would include:

- Waste generated from construction: General building waste, excess concrete, ferrous and nonferrous metal off-cuts and surplus electrical cable, waste packing.
- Liquid waste: Black water (sewage), grey water (waste water generated from areas such as bathhouses and kitchens) grease trap waste, recyclables and general domestic waste including food scraps. The black and grey water would be treated on-site.
- Waste rock: Waste rock generated during the construction phase would be reused where possible around the site, including for the construction of roads and dams.

Initial works prior to construction commencing would be to establish environmental management measures to contain works within the MIA so that risk of emissions to the surrounding area is reduced. All waste would be managed as per state and Commonwealth government regulation, policy and legislation.

During operations a STP would be located in the MIA. No demand on the local council sewerage treatment infrastructure was anticipated in the EIS. The EIS outlined that all recycled water effluent would be temporarily

stored in an effluent pond before being re-used for activities such as dust suppression and irrigation of MIA landscaping and crops (pending on water quality as per the Public Health Regulation 2005). All sludge would be removed off-site by a licensed contractor to a licensed disposal facility.

The EIS stated that all ROM coal would be transported off-site and exported without the need for beneficiation. Beneficiation is required when other ores are extracted unintentionally with the coal, thus diluting the coal quality. The proposed coal mining method removes the need to build and operate coal beneficiation infrastructure such as a coal processing plant. During operations mining methods would be continually monitored to ensure little or no coal dilution occurs during the extraction process.

The EIS outlined that regulated wastes would be produced throughout the lifetime of the project and would include batteries, contaminated soils, hazardous chemicals used in maintenance, oil interceptor sludge, tyres, etc. All regulated waste would be managed in accordance with relevant legislation. A licensed contractor would be responsible for transporting regulated waste off-site to a licensed waste station that accepts regulated waste.

Prior to decommissioning, the proponent would prepare a mine closure and rehabilitation plan, including an assessment on the volume and types of waste generated during decommissioning. The plan would be based on best practice management and would be formulated in line with the waste management plan. A hazardous materials survey and contaminated land assessment would also be undertaken prior to decommissioning of infrastructure to allow the effective management, disposal and removal of hazardous materials. Areas with the highest potential for environmental contamination would also be assessed.

4.7.1.1 Potential impacts and mitigation measures

The EIS stated that wastes generated by the proposed project could have the potential to impact upon environmental values if they are not appropriately managed, including impacts on air quality, water (surface and groundwater) quality, soil quality and the visual amenity of the project area and the surrounding environment. The EIS outlined several mitigation strategies to avoid potential impacts, including the implementation of a waste management strategy, waste avoidance, waste re-use and recycling (comprising of waste separation and storage and off-site waste disposal) and ecologically sustainable development (ESD) through the EM Plan, which includes a waste management plan. The waste management plan would include:

- Description of the management and control of construction and operational activities to ensure that all parties involved are aware of their environmental obligations in relation to waste management.
- All waste-related environmental aspects and impacts for each phase of the project.
- Best management practice and mitigation measures into all project activities and to consider sustainable management principles and opportunities where appropriate.
- All local, state and Commonwealth regulations in relation to the handling, processing, recycling, transport and dumping of all waste streams which may be generated.

The EIS stated that waste monitoring and auditing would be regularly undertaken and reviewed as the project progresses. SCC also committed to carry out waste management to minimise impacts on local community resources by liaising with CHRC and other relevant groups to determine existing capacities and accepted waste types of their landfills, by sourcing waste businesses which employ sustainable waste management practices and by working with local businesses so that they can take advantage of opportunities for re-use and recycling.

4.7.2 Assessment of the EIS chapter

4.7.2.1 Submissions on the EIS chapter

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

- Private submitters:
  - Lack of a waste management plan.
  - There has been no discussion of the spoil dumps within the EIS and they are not shown on the MIA plan within the EIS.
  - Lack of addressing excavated waste.
  - Concerns regarding reject handling, storage and stockpiling.
  - Concerns regarding the use of overburden material within the SCL protection area.
- DAFF:
  - Outlined requirements on waste vegetation and pest management to ensure weed and pest species do not

increase.

4.7.2.2 Proponent's response to submissions

The proponent responded to the comments made in submissions on waste matters that all management plans, including the waste management plan, would be prepared prior to construction of the mine. The waste management plan would address local, state and Commonwealth regulations concerning the handling, processing, recycling, transport and dumping of all waste streams which may be generated. Furthermore, SCC would liaise with CHRC to formalise an appropriate waste removal strategy.

In relation to the concerns regarding the mine overburden, the proponent stated that any storage of overburden from extraction of the cut and cover and the drift would be located within the MIA. All overburden would be re-used onsite for the construction of roads within the project area and there would be no long-term storage of overburden. Furthermore, the project would not require tailings or tailings storage facilities. The proposed project is based on the assumption that no rejects would be generated. The MIA would be treated as a contained area, including providing appropriate drainage and fencing that would minimise the risk of emissions to land, air or water. The proponent also stated that no impacts would be expected on SCL outside the MIA as a result of overburden material.

The proponent committed to undertake a weed survey but did not specify when this would be carried out. A pest and weed management plan would be prepared and would include a framework for managing weeds and pest species, including the management of mulching onsite as well as outlining potential risks to biodiversity, cropping and human health. The details of pest management would be developed and implemented before construction commences in consultation with DAFF.

4.7.2.3 Adequacy of the EIS amendments and proponent's response

While the EIS Chapter 7 (Waste management) was amended following the EIS submissions, DAFF still had some concerns regarding appropriate mulch management. DAFF recommended that management methods for mulching of green waste, species that are declared under the LP Act or declared under local government laws would need to be identified in the survey to guide best practice management and disposal of weeds.

The proponent subsequently updated the relevant section in the second amendment of the EIS in August 2013. No further comments were received as part of the amended EIS review.

4.7.3 Conclusion and outstanding issues

As a consequence to the comments received during the EIS submission period, the proponent amended sections in Chapter 7. No outstanding issues remain.

4.7.4 Proponent's commitments

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

- Waste management plan.
- Reduction, reuse and recycling.
- Waste monitoring and auditing.
- Implementing a pest and weed management plan.
- Conducting a weed survey.
- Undertaking a hazardous materials survey and contaminated land assessment prior to decommissioning.
- Appropriate wastewater design and management.
- Waste monitoring, reporting and auditing.

4.8 Water

Chapter 8 of the EIS described the environmental values of surface water resources that may be affected by the proposed project. This included description of existing water quality conditions for surface waters upstream, downstream and within the project area, and potential changes to the hydrological regime, flooding and surface drainage caused by the underground mining. Chapter 8 also discussed potential impacts of the proposed project on the existing water quality environmental values and outlined mitigation measures. Chapter 8 also outlined the mine water management and monitoring.

Chapter 9 of the EIS described the groundwater resources within and surrounding the project area as well as

predicted changes to the existing groundwater regime, potential impacts on groundwater resources in response to the proposed underground coal mine and proposed mitigation measures.

4.8.1 Description of surface water and mine affected water management—findings of the EIS

4.8.1.1 Existing environmental values—surface water

The EIS Chapter 8 (Surface water) described existing environmental values relating to the proposed project. The EIS outlined that the project area is located in the Comet River sub-basin located within headwaters of the Fitzroy River basin. The main western tributaries of the Comet River include the Sandhurst, Springsure, Minerva, Meteor and Orion Creeks which all flow in a south to north direction. The project area contains six waterways; the main waterway is Springsure Creek. The Springsure Creek catchment originates in the south-west near Springsure. Springsure Creek discharges into the Comet River, the Mackenzie River followed by the Fitzroy River and ultimately discharges into the Coral Sea at Keppel Bay, south of Rockhampton. The Comet River, Springsure Creek and associated tributaries were described as ephemeral, with flow occurring following episodic rainfall events. Two of the three unnamed creeks located within the MLA are not considered to be watercourses under the Water Act. Five existing farm dams found on the project area are classified as (artificial) wetlands and a riverine wetland as a wetland management area under Queensland's wetland mapping.

Background water quality was measured and reported in the EIS. Turbidity exceeded the water quality objectives (WQOs) at seven of the 10 sample sites. The EIS concluded that high turbidity levels and total suspended solids (TSS) during the survey period were likely to be the result of the heavy rainfall during the survey period and the high flow rates within the watercourses in and around the site. In terms of EC, eight of the monitoring sites exceeded the guideline's conductivity values for base and high flows. High EC values were explained as a result of irrigation, soils, fertiliser use or from rising water tables. The latter was supported by the groundwater assessment which found that the salinity in groundwater was higher than the normal range for freshwater in the area. All but one of the monitoring sites was found to be within acceptable pH limits. The study also found relatively high levels of in-stream nutrients and measures of productivity (chlorophyll a) which are typical of watercourses in agricultural areas. WQO trigger levels for heavy metals were exceeded at some sites. The EIS considered the high levels of heavy metals in the water as a result of naturally occurring heavy metals within rocks and soils from the surrounding environment entering the catchment through surface water runoff during period of high flow.

4.8.1.2 Management of mine affected water

The EIS outlined that the proposed project would require approximately 838ML of water per annum during single longwall operations, while 1,247 ML per annum would be required during dual longwall (maximum production) operations. An external supply of raw water would be required in order to provide water security and top up water to mine operations during dry periods. The EIS outlined that a market assessment was undertaken by the water broker Waterfind which identified the availability of water allocations for the proposed project from within the Nogoa–McKenzie River system. The proponent has purchased these allocations and a connection study has been completed. A pump station and connecting pipeline would be required. Pipeline and pump station approvals would be sought under a separate approvals process under the SP Act.

Four environmental dams, one mine water dam and one raw water dam are proposed for this project. The proponent proposed a water management system that is based on no controlled discharges from these dams.

4.8.1.3 Potential impacts—surface water and mine affected water

It was concluded in the EIS that the following main construction activities could impact on surface water environmental values:

- Excavations and earthmoving including topsoil removal and stockpiling, for the construction of mine infrastructure including site access roads, cut and cover and drifts, dams, CHP and MIA. This may potentially lead to erosion and sedimentation, deterioration of water quality, and changes to water flows.
- The use of fuels and chemicals for vehicles and construction equipment, potentially resulting in water contamination as a result of spills, leaks, or other uncontrolled releases.

Operational impacts could occur through:

- Altered catchment conditions and subsidence on the hydrology of waterways and drainage lines due to excavations, buildings and infrastructure, water harvesting (dams), and potential subsidence.
- Stormwater runoff, erosion and contaminants from the CHP and MIA areas.

The proponent carried out a flood assessment for the project area in order to define the existing flood behaviour and to assess any potential impacts to the MIA and operations. The results of the EIS assessment showed that the

location of MIA is above the 1000-year ARI flood plain and therefore the MIA is predicted to be immune to the 100 and 1000-year ARI floods, respectively.

The subsidence flood modelling was amended following submissions that it be modelled on the existing MLA. The results of the updated modelling showed pillar subsidence would range from 0.27m for areas of shallower overburden depths to 1.39m at the greatest overburden depth. In another section the EIS concluded that longwall mining would result in the surface depression of up to 2.2m, depending on seam thickness and depth below ground. Tilt would occur at the edge and ends of longwall panels, with the greatest tilt occurring where subsidence was greatest in the centre of the mining lease. Levels in the centre of longwall panels are not predicted to change. Maximum tilt is expected to be 36mm/m (2 degrees). No subsidence would occur outside of the MLA boundary.

The EIS assessed potential hydrological impacts resulting from subsidence with the existing hydrological environment and compared it to the unmitigated case, assuming all subsidence within the MLA would occur simultaneously. The assessment found that in the absence of any mitigation or management, while post-subsidence flood levels would not differ significantly, the most noticeable effects would occur on local drainage. This would be due to the formation of preferential flow paths along the subsided longwall panels, particularly during larger flooding events such as a 100-year ARI event. Although the area of waterway catchments would remain relatively unaltered, local overland flows would be concentrated along the subsidence troughs. The EIS found that this could cause localised erosion where the newly formed flow paths would enter existing waterways. Overland flows were also found to increase as a result of subsidence impacting on one of the dam walls. However, the EIS also outlined that, overall, there would be only minor changes to the existing flood plain. This was explained in the EIS that minor flood events would be more noticeable to flood extents and peak flows downstream of the project area during minor flood events because water flow and volume is not sufficient to flow through subsided troughs and, as such, water is captured within these troughs.

The EIS further compared existing surface water ponding to predicted subsidence levels. The model took into account the worst case scenarios without mitigation and based on an intense rainfall event that would fill depressions in the landscape. The modelling method also assumed no water loss due to seepage. The results presented in the EIS showed that currently minimal surface water ponding occurs except where existing farm dams are located to harvest that water. Post-subsidence ponding (with no mitigation measures) would occur at up to 1m in depth and would be mostly located within the subsided longwall panels. The EIS further stated that ponding would be more noticeable in lower lying areas, especially along the existing drainage lines and waterways. In terms of drainage, the EIS found that subsidence would have some impacts on site drainage but overall it would be similar to pre-subsidence drainage. The EIS concluded that impacts associated with increased ponding and hydrology, would not significantly impact agricultural productions.

The EIS assessment further investigated erosion and sedimentation in terms of velocity, shear stress and stream power and found that post-subsidence (with no mitigation measures) estimated values for these parameters for the two- and 50-year ARI events would remain within EHP guidelines. It was concluded in the EIS that any changes to these parameters post-subsidence would not significantly impact on the project area's hydraulic function. However, the EIS also found that there would be a potential for erosion and sedimentation particularly within subsided troughs and where waterways are generally parallel to the longwall panels. The EIS concluded further that sedimentation would be localised and would not significantly impact on sediment loads downstream.

Peak flood flows were compared in the EIS assessment at downstream locations for the existing and post-subsidence cases (with no mitigation measures). The results of the modelling indicated that unmitigated subsidence would generally reduce peak flows at the downstream boundary of the project area, due to water being retained in the subsided longwall panels. It was found that low flow event flow reductions were proportionally greater due to the ponded volume of water created by subsidence being a larger fraction of the catchment runoff volume. Flow rates at Springsure Creek would remain relatively unchanged, irrespective of flood event size. Station Creek, un-named creeks 2 and 3 would have reduced peak flows (velocities) downstream while un-named creek 1 would increase in flow due to predicted subsidence of the dam wall at Dam 2. The EIS also outlined that, compared to the results of modelling based on the previous mining lease area, the updated results showed a smaller difference in peak flood flows due to the reduced extent of the current MLA.

The EIS noted that no direct works involving stream diversions or flood protection levees were proposed for any of these six waterways.

In terms of cumulative impacts, the EIS outlined that the proposed project would not result in any significant cumulative impacts due to mining on environmental values (EVs) and WQOs as no other mines operational or proposed within the Comet River sub-catchment. SCC holds EPC 1221 immediately south of the project area, where the Arcturus Coal Mine Project is proposed. The proponent outlined that should this project proceed, cumulative impacts from both the Springsure and Arcturus mines would be addressed in the EIS documentation for the Arcturus Coal Mine Project.

4.8.1.4 Mitigation and management measures—surface water

Erosion and sediment control

The proponent outlined that an erosion and sediment control plan would be developed for the proposed project detailing control measures to be implemented, construction details, dimensions, materials used, expected outcomes and the staging of erosion and sediment control once construction is complete. Proposed control measures for erosion and sediment control would include but would not be limited to:

- Sediment fences along the down slope sides for any disturbed areas experiencing runoff.
- Site drainage that will divert all clean water runoff around disturbed areas.
- Environmental dams to collect runoff from disturbed areas.
- Avoiding and minimising earthmoving activities during intense rainfall events.
- Erosion control devices in diversion drains.
- Limiting construction works to the minimal amount of land required for operation.
- Dust suppression, including watering of roads and stockpiles.
- Monitoring sedimentation in channels as a part of the subsidence management plan.

Mine affected water management—pollutants and contaminants control

General management measures were proposed by the proponent in order to minimise the risk of pollutants and contaminants entering local waterways:

- Spill control materials, including booms and absorbent material, at all on-site at refuelling facilities to mitigating spillage into the surrounding waters.
- All refuelling facilities and the storage and handling of oil and chemicals would comply with relevant Australian standards.
- Establishing procedures for safe and effective fuel, oil and chemical storage and handling:
    - Storing these materials within roofed, bunded areas, having a storage capacity of 100% of the largest vessel and 10% of the second largest vessel.
    - Bunding would have floors and walls that are lined with an impermeable material to prevent leaching and spills.
- Marked wash-down areas for plant and equipment to prevent contaminated water from leaching into soils or flowing into nearby watercourses.

The EIS stated that environmental dams would be constructed to capture runoff from disturbed areas in order to minimise potential erosion and sedimentation impacts. Four environmental dams were proposed (**Figure 1**) which would collect water from the MIA, the coal stockpile and the vent fan area and store contaminated rainfall runoff across the site. It was further proposed that this water would be used to supplement the demands for stockpile dust suppression. A mine water dam would also be constructed as a central storage for the containment of underground mine water during both construction of the drift and dewatering of the longwall panels, as well as for containment of contaminated water transferred from environmental dams. A preliminary dam hazard assessment was undertaken as part of the EIS to identify the hydraulic requirements for the proposed dams, in order to show compliance with regulatory requirements.

The water balance model outlined in the EIS identified that operational demands for water would exceed the annual expected volume of water collected by the environmental dams in each year of operation of the mine. Water allocation would therefore need to be purchased from the Nogoa–McKenzie River system. The EIS stated that the environmental dams would be managed so that the dams would always have sufficient storage capacity for the capture of runoff available at the commencement of each wet season. A water management system was developed by the proponent to mitigate any adverse impacts on the water quality of nearby water resources and mine productivity. The EIS outlined that, while the water management system was based on a no release scenario, uncontrolled discharges to the surrounding receiving waters could still occur during extreme rainfall events. These discharges would be via a release point from each dam. SCC outlined that the inclusion of this measure would assist it to operate the dams in such a way that the available storage volume at the start of each wet season (1 November) would be able to contain the runoff from the entire four month-long wet season (in accordance with the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams; EHP 2012).

EHP notes that further negotiations are needed between EHP and the proponent in order to develop appropriated draft EA conditions for water management – including in relation to water quality release regimes and monitoring

trigger limits. EHP accepted SCC's overall approach that the proposed mine site would be managed with:

- A risk-based design process for regulated dams, which in a rainfall event higher than the design criteria would result in uncontrolled release over properly designed spillways.
- Controlled releases of dam water in line with existing model mine conditions, to allow for additional control of dam water levels.

However, to support the management practices outlined above, some outstanding matters must be resolved for the development of draft EA conditions. DSITIA reviewed the second amendment of the EIS (as submitted to EHP in August 2013) and concluded that important water quality and receiving water flow information was still missing that would be required to design an acceptable regime for the release of mine-affected water so as to prevent deterioration of receiving water environmental values. DSITIA recommended that mine-affected water release rates stipulated in EAs are best informed by monitoring of water quality in the receiving environment at different flow rates, and undertaking dilution modelling (informed by mine affected water quality) under different stream flow and mine affected water release scenarios. Further information will be required from the proponent and further discussions will be need between EHP and SCC in relation to draft EA conditions – including in relation to receiving environment stream flows and proposed appropriate mine affected water release parameters (including flow criteria, release rate and contaminate limits). Further monitoring may also be required to inform the development of EA quality discharge limits and appropriate EA monitoring trigger parameters for the EA.

Water management plan and water monitoring

The proponent committed to preparing a water quality management plan which would include:

- Developing water quality criteria with trigger values
- Monitoring and visual inspection of construction areas and surrounding waters
- Monitoring physical and chemical water quality up and down stream of work sites and at any discharge outlets and in all mine-affected water dams on site
- Data of locally derived WQOs to be recorded in an electronic format
- A response mechanism (including monitoring) if trigger levels are exceeded.

The EIS also proposed water monitoring programs for environmental dams, mine-affected water dams, discharge locations and locations both upstream and downstream of the project area. In addition the EIS outlined that ongoing monitoring would be undertaken at identified sample locations in order to assess water quality and subsidence impacts on surface water flows. The proponent gave a commitment that it would investigate and rectify any detrimental impacts due to the mining activities – including by undertaking repairs, introducing changes in work procedures, and/or changes to site infrastructure or the equipment used.

Subsidence impact mitigation and monitoring

SCC has given commitments to developing subsidence management plans, in order to prepare manage, rehabilitate and/or remediate subsided areas. The EIS outlined that as subsidence would be a staged process, an adaptive approach to manage impacts on subsidence would be undertaken, including ongoing monitoring and mitigation measures, such as:

- Ponding within waterways that may be reduced by excavation through the pillar areas of longwall panels, especially for minor waterways where magnitude of flows may not be great enough to facilitate natural erosion processes.
- Bank stabilisation where pillar zones could be eroded naturally or excavated, and where new flow paths enter waterway by reshaping stream banks and bank revegetation to mitigation of bank instability.
- Drainage or lowering of dam water levels before predicted subsidence to ensure potential outflows from damaged dam walls would be minimised.
- Reinstatement and repair of dam walls and overland flows may be necessary to make dams safe to operate following subsidence.
- Scour protection or revegetation may be required where channelisation along longwall panels causes erosion.

SCC also gave commitment that it would consult with DAFF when designing and implementing any in-stream works outside of the MLA.

The EIS outlined that a subsidence monitoring program would be developed in order to assess the effectiveness of mitigation measures, and to provide triggers for action, in the event that further mitigation measures were required.

This would include annual photographic surveys, GPS mapping and a photographic assessment of any surface

cracking (cracks >50mm) post-flood assessments and aerial surveys during each dry season. The proponent also committed to implementing a stream restoration program if significant erosion and sedimentation was found to be occurring at rates that are not sustainable in the stream systems or in the event that pooled areas are not decreasing between aerial surveys.

The EIS outlined a staged assessment (as the project mine plan progresses through design refinements) in order to analyse in greater detail the effects of any likely changes to overland flow, ponding regimes and subsequent effects on individual properties associated with soil subsidence. Assessment would also continue ahead of operations to investigate the effects of longwall extraction. This would be on a paddock by paddock basis and would include likely effects on current soil management (including sediment and erosion controls), irrigation and general agricultural practises. As previously outlined, the proponent would undertake additional consultation with individual affected property owners, in order to enhance understanding and successful mitigation of mining impacts on existing agricultural practises.

While no complete subsidence management plan was submitted to EHP as part of the EIS assessment process, EHP considers that a detailed subsidence management plan be prepared and submitted to EHP as part of the EM Plan approval process (refer to section 4.8.4 Conclusions and outstanding issues).

4.8.2 Description of groundwater values—findings of the EIS

4.8.2.1 Existing environmental values—groundwater

The EIS identified two groundwater flow systems within the project area:

- A shallow groundwater system that describes local groundwater flow at the water table. The shallow system comprises the alluvium and basalt and locally the Rewan Formation and Bandanna Formation to the west, southwest and south.
- A deep groundwater system that describes regional groundwater flow at depth within the Rewan Formation and Bandanna Formation.

The EIS outlined that episodic rainfall and runoff events, especially those that would cause flooding along the creeks, are likely to supply recharge to the water table via the alluvium through induced flow. It was concluded that during these periods the creeks would function as a 'losing' stream. While direct recharge to the water table via rainfall infiltration was seen as likely to occur everywhere across the project area, the rate of infiltration along the watercourses may be higher. It was further concluded that the ephemeral nature of the watercourses and the depth of groundwater, suggested that groundwater contribution to creeks/base flow in the project area would be likely infrequent and limited to periods of very high rainfall. However, during longer, dryer periods, evapotranspiration by fringing vegetation was considered to be likely to be the major cause of discharge from the regional groundwater system.

The EIS did not identify groundwater-dependant ecosystems (GDEs) in the project area based on the GDE Atlas. However, several zones have been identified as areas with high potential to support groundwater dependent vegetation. The zone identified in the EIS as being of most relevance would be the alluvium along Springsure Creek, where the creek passes from south-west to north-east across the footprint of the proposed mine area. Vegetation within this part of the riparian zone ranges in density and condition, but is known to possess a deep and extensive rooting system, adapted to surviving prolonged periods of water stress brought by low rainfall (e.g. forest/river red gum and poplar box vegetation).

The EIS stated that groundwater in the project area is routinely used for agricultural supply for stock watering and irrigation. A number of land parcels within the project area have licences to abstract groundwater for agricultural use. It was concluded in the EIS that sufficient groundwater resources occur in the area to meet the current abstraction demands. No industrial users of groundwater have been identified in the area. No known springs or groundwater seeps were identified in the area that would be of significance to Indigenous peoples or to have other cultural heritage.

Groundwater chemistry

The environmental protection (water) policy 2009 (EPP (Water)) identifies EVs and WQOs for groundwater within the Comet River Sub-catchment basin, which falls within the overarching Fitzroy River Catchment. The WQOs, which set out management intent and objectives and which are applicable to all waters in the Comet River Sub-basin, have been incorporated into the EIS assessment by the proponent.

A groundwater water quality assessment was carried out during the EIS. The quality of groundwater in the project area was found to be related to groundwater zones such as the sodic sequence (zone 31 – Sandhurst) and two alluvial sequences (zones 13 – Phillips-Fairbairn-Meteor and 43 – Lower Comet) which also displayed differing water types based on electrical conductivity. Zone 13 is classified as non-saline to moderately saline water, suitable for human consumption, irrigation and stock watering. Zone 31 is slight to moderately saline, suitable for

irrigation and stock watering and zone 43 is moderate to highly saline and is partly suitable for those purposes.

Three rounds of groundwater sampling events were conducted to collect baseline groundwater quality data. Eleven registered bores were sampled during the first round of sampling in December 2011. Of these, six registered bores were re-sampled and three additional monitoring bores were sampled in November 2012. In May 2013, four unregistered bores were sampled and one registered bore was re-sampled. All groundwater samples were submitted for laboratory analyses for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), major ions and total dissolved solids (TDS). Water quality parameters including pH, EC, dissolved oxygen (DO), reduction and oxidation potential (redox) and temperature, were also measured in-situ during field sampling events. The drinking water guidelines are based on palatability. Concentrations of TDS detected in the groundwater samples showed that five had TDS concentrations that corresponded to 'unpalatable' classification, including a monitoring bore installed in the Bandanna formation. Concentrations of arsenic, cadmium, chromium, lead and mercury were below the adopted investigation limits in all samples collected. However, zinc, copper and nickel levels were exceeded in a number of samples taken from the tertiary basalt. The seemingly elevated concentrations of these metals were discussed by the proponent as being likely to be naturally occurring.

4.8.2.2 Potential impacts and proposed mitigation and management measures—groundwater

Potential impacts on groundwater

It was predicted in the EIS that groundwater levels in basalt rock within the project area would stabilise within approximately 50 years, but overall groundwater levels would be modified compared to pre-mining water levels due to the permanently increased hydraulic conductivity in the fractured area of these rock layers. For example, at some locations the predicted post-mining water levels in the basalts would be higher than their pre-mining levels, as the water level stabilised to a new dynamic equilibrium due to modified/enhanced hydrogeological properties. Overall however, groundwater levels in the basalt were predicted to stabilise within approximately 200 years.

The EIS contained inconsistencies in describing the potential drawdown on registered bores. One section of Chapter 9 the EIS described how the largest drawdown would occur in bore RN 57357 (located in the south of the project area), with a drawdown 2.5m within 10 years of the commencement of mining. The maximum drawdown at this bore would stabilise at 2.6m, 20 years after the commencement of mining. In a later section of Chapter 9 it was noted that largest drawdown in bore RN 57357 would be 4m. Overall, the results presented in the EIS showed a reduction in the saturation thickness of the basalt rock layer of between 0 and 14%. Impacts on groundwater dependent ecosystems (GDEs) due to the drawdown of groundwater were predicted to be small, based on changes in the predicted evapotranspiration rates across the mining area.

The impacts of subsided longwall panels on surface water identified that some surface water flow would be redirected and retained above subsided longwall panels, thereby reducing peak flows beyond the boundary of the project area. As a result, the EIS predicted that the distribution of induced flow/recharge to the water table would change. Recharge rates may also increase locally due to increased ponding depth and cracking of the stream bed.

Another potential impact identified in the EIS was the drawdown of the water table within the mine area due to the lowering of the soil surface, as the water held in pore spaces was brought down with the strata. The proponent described how undulation in the ground surface due to mining would cause an undulation in the water table itself (albeit subdued) resulting in groundwater flowing towards 'low points'. Potential effects identified include the depression of the water table in the mine area could become depressed, at least temporarily, irrespective of connectivity established between the basalt and the underground mine. This effect would be expected to be most pronounced after the mining of the first longwall panel, causing an initial drop into the water table. However, the EIS also outlined that the regional effect over the longer term was expected to be small and would be likely masked by the much greater natural variability of the water table elevations due to rainfall and induced flow.

The EIS also discussed possible impacts on groundwater chemistry due to various mechanisms, such as:

- Leakage of water from the basalt to the underlying hydrostratigraphic units (HSUs) due to fracturing and associated increase in water-rock interaction along flow paths.
- Mixing of groundwater of different HSUs, due to downward leakage from the basalt to the underlying HSUs and horizontal flow from a progressively broader area within the basalt during recovery.
- Enhanced connection between surface water and groundwater and associated mixing of two waters.

Several mining activities were identified in the EIS as having the potential to impact on groundwater conditions and environmental values in the absence of suitable mitigation. These include dewatering during excavations for the construction of the cut and cover and drifts, spillages of fuels, oils and chemicals, dewatering of the coal seam during mining and altering of hydrogeological properties in aquifers due to subsidence form mining longwall panels. The groundwater drawdown in the basalt layer and the time of maximum drawdown is shown in **Figure 5**. No significant, unmanageable cumulative impacts on groundwater were identified in the EIS.

No significant cumulative impacts on groundwater were identified in the EIS.

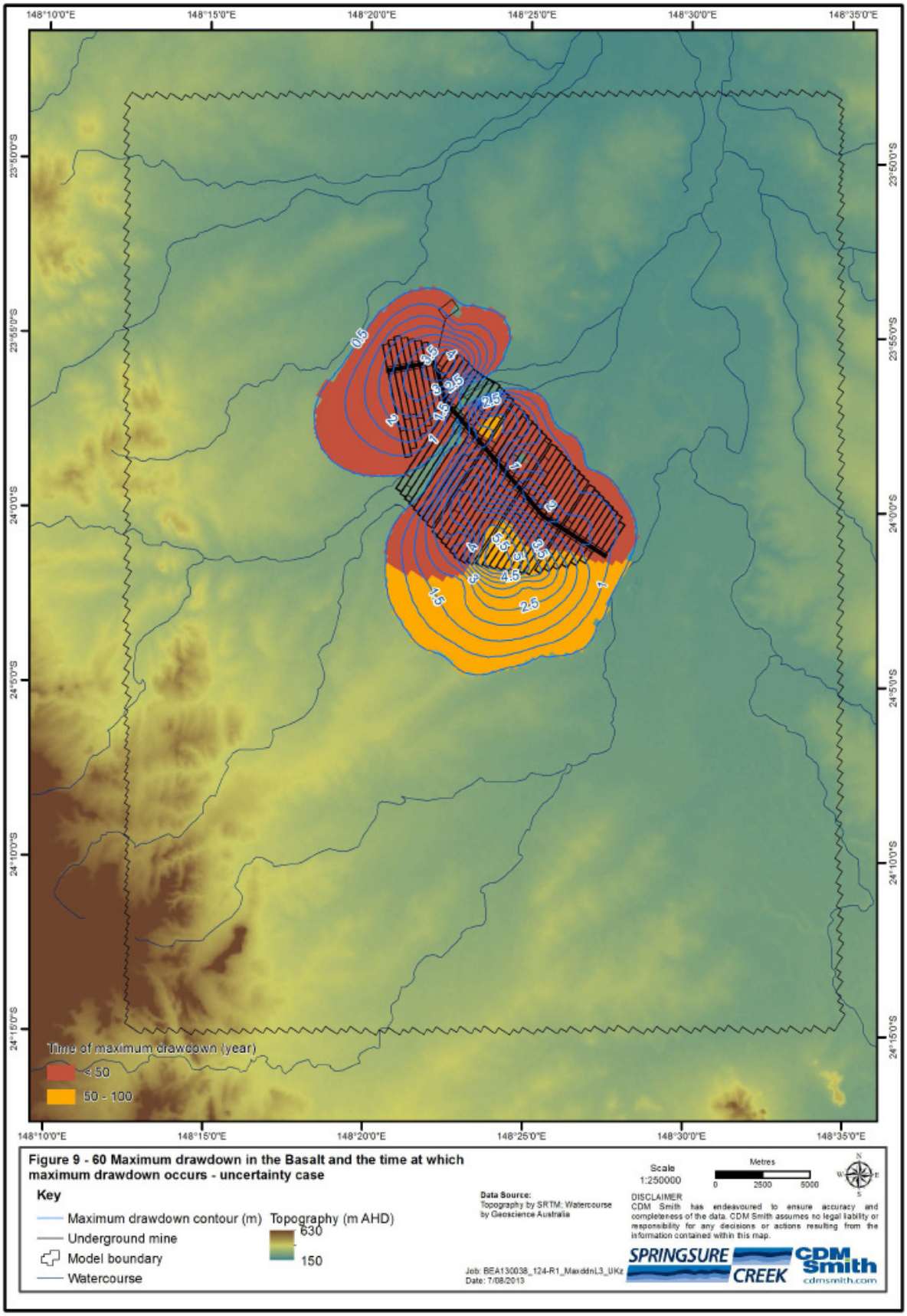

Figure 5 **Maximum drawdown in the basalt at the time at which maximum drawdown occurs (uncertainty case)**
(Figure reproduced from the EIS)

Proposed mitigation and management measures

SCC committed to preparing and implementing a groundwater monitoring and management plan. The EIS outlined that the magnitude of potential groundwater impacts would depend on a number of factors and in particular, the level of subsidence experienced. The proponent outlined that the groundwater monitoring and management plan would therefore be closely linked with the subsidence management plan and would include measures to mitigate or remediate impacts, as well as a monitoring program to facilitate the management of those impacts.

SCC stated that the groundwater monitoring and management plan would include:

- Monitoring of drawdown and depressurisation impacts.
- Mine affected water inflow monitoring.
- Impact verification between predicted and observed groundwater changes.
- Groundwater monitoring (levels and quality) from bores located in the basalt, Rewan Formation and Bandanna Formation. Monitoring would take place within the predicted impact zone and regionally to monitor seasonal variation.
- Groundwater control systems during construction to limit groundwater entering excavations and as a consequence, cross contamination of aquifers.
- Adaptive management of drawdown though impact trigger levels (groundwater levels and water quality levels). In the event of unacceptable drawdowns, the EIS identified mitigation measures such as modifying the dimension of longwall panels, the order of mining of panels, the installation of bulkheads (i.e. water retention devices), and/or grout injection.
- Potential relocation of groundwater bores within the project areas which are located in less than 40m of saturated thickness of the basalt and where deepening of these bores may not be possible. SCC committed that in the event that groundwater bores would be damaged due to mining activities, SCC will maintain supply of water as agreed with the landholder.
- Potential impacts on GDEs would be managed progressively during the life of the mine as it is linked to subsidence and drawdown impacts.
- Reporting of monitoring data.

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

4.8.3.1 Submissions on the EIS chapters on water

The water chapters (Chapter 8 Surface water and Chapter 9 Groundwater) attracted the second most number of comments after the land chapter. Many of the comments related to water issues also overlap with issues raised in section 4.5 (Land), such as impacts of subsidence on SCL.

The key concerns identified in submissions on the EIS concerning water were as follows:

- Private submitters raised concerns in relation to:
  - inadequate surface water assessment
  - impacts due to the diversion of surface water
  - topsoil stripping/erosion due to changes in surface water flows
  - changes to surface water flow
  - increased ponding (impacts on SCL and residential houses)
  - downstream impacts
  - impacts as a consequence of subsidence
  - lack of proposed mitigation measures, including sediment and erosion control
  - impacts on water quality /contamination
  - lack of flood assessment
  - impacts on water quantity
  - lowering of the groundwater table

  - impacts on bores and springs for farming (crops and cattle)
  - securing water supply / make good agreements
  - recharge of aquifers
  - unreliable modelling of hydrology
  - lack of monitoring (groundwater and surface water)
  - impacts involving interactions between groundwater and surface water.
- CCC:
  - Outlined the lack of flooding and surface water flows analysis and planning for land management (cropping and grazing) during and post-mining periods.
  - Outlined the lack of information on the potential impacts of groundwater changes natural systems and water users.
- CHRC
  - Requested discussions with CHRC to clarify risks to CHRC infrastructure and town water supplies.
  - Requested further information on mitigation measures to ensure accessibility of water during times of limited water supply and on alternative water supplies.
  - Requested further information on the specify responsiveness of monitoring system and how impacts will be mitigated, particularly in case of sudden loss of water supply.
- DAFF:
  - Outlined the requirements under the Fisheries Act for both permanent and temporary works in relation to waterway diversions, levee designs, culvert or bed level crossings, rock armouring, adequately providing for fish passage, and equal or enhanced habitat values and habitat complexity.
  - Outlined that, in its view, the EIS had failed to describe existing cross-country flows and hydrology. For example, it must be assumed that with longwall panels running approximately parallel to the water flows, water would be diverted away from our dams and storages and in any case the catchments would be broken up and fragmented so that less water is captured.
- DCS
  - Recommended compliance with State Planning Policy 1/03 (Mitigating the Adverse Impacts of Flood, Bushfire and Landslide).
- DEWS:
  - Requested further information on the potential impacts due to reduced water availability and reliability.
  - Requested further information on potential implications resulting from any subsidence and cone of depression along Springsure Creek, in terms of water supply availability and reliability for existing downstream surface water users.
  - Requested further information on ‘post operations’ risk associated with the upward movement of saline water once the old coal seam area re-fills, which would impact the quality of bores in the basalt and other formations, and potentially with surface waters once connection is made with any ponded water.
  - Clarification on the total water usage in the immediate project area.
- DNRM:
  - Requested further information on the dependence of vegetation on groundwater.
  - Requested further information on water harvesting (catchment, requirements of storages, etc.).
  - Requested further information on the connection between the aquifers and the surface geology.
  - Requested a geological cross section across the project area.
  - Requested information on the groundwater contours for each of the main aquifers.
  - Outlined legislative requirements relevant to the take of groundwater in the project area needed updating.
  - Requested further information on the interpretation of recharge to the basalt, to support likely recharge via the basalt outcrop in addition to recharge via the alluvial deposits.

- Requested further information on the modelled connectivity between the basalt and the coal measures.
- Requested further information on domestic purposes from groundwater sources and details of all licensed groundwater users in the project area.
- Requested accurate and detailed data in relation to estimated water use, water quality and aquifer details.
- Outlined that the proponent must ensure that all features within the proposed project area have been determined by an authorised officer under the Water Act to identify relevant regulatory provisions for each of the features.
- Requested further information on the potential of long-term cross contamination of aquifers from subsidence, including permanent change in the hydrogeological character of aquifers; change in the interactions between surface water and groundwater; change in the interactions between different aquifers (e.g. the alluvium and the basalt and damage to bores).
- Sought further clarification on groundwater monitoring in relation to:
  - lack of monitoring of groundwater in the alluvium in combustion with the basalt
  - lack of information on bores used as primary calibration targets
  - bores used in the EIS investigations and requested further monitoring from a representative network of groundwater bores
  - existing aquifers and where in situ water quality measurements were taken from
  - the hydro census and requested further information on the location and details of all bores that may be impacted by mining operations
  - grid data used to derive model layers and distribution of associated hydrostratigraphic units.
- Based on the outstanding groundwater matters listed above, DNRM requested an amended groundwater model that would be based on the collection of significantly more data that better represents the various aquifers that are present; and provides better spatial coverage of the model area. Any updated model should be reviewed by an independent groundwater consultant with demonstrated modelling experience.
- Outlined the requirements of the subsidence management plan to address impacts of subsidence on watercourses and surrounding landscapes as per DNRM's draft guideline titled Watercourse Subsidence – Central Queensland Mining Industry.

- DSITIA:
  - Lack of water quality assessment in terms of on-site water management, in particular inconsistent description of water management on site and discharge practices.
  - Lack of baseline water quality assessments on downstream sites and dams.
  - Baseline water quality assessment to include all indicators as outlined in DNRM's Model water conditions for coal mines in the Fitzroy basin.
  - Electrical conductivity (EC): More data collected over a longer period of time and representative of various seasons and conditions would be required if the proponent wish to establish locally relevant water quality objectives for EC.
  - Lack of discussion on potential impacts to aquatic ecosystem from reduced stream flow volumes.
  - Inconsistencies in relation to management of overburden stockpiles and stormwater management.
  - General water management strategy: Concerns regarding the proposed water management of controlling excess water by using uncontrolled discharges.
- EHP:
  - Requested further information on the project design and any changes to hydrological flows in regards to wetlands of high ecological significance and an impact assessment on how potential impacts would be avoided, mitigated or offset.

4.8.3.2 Proponent's response to submissions

Surface water

In response to comments made on the project's potential impacts on stream flows, the proponent responded that stream flow impacts were evident both within and downstream of the subsidence area, but the assessment in the EIS found that there would be no significant residual impacts if mitigation measures were implemented. As mining

would cause depressurisation at depth, flow would be 'downward'. No rebound of saline water would occur within accessible aquifers used by the community. However, the proponent also stated that groundwater at depth may become locally desalinated as a result of leakage and mixing of less saline water from shallower depths.

The proponent outlined that the diversion of surface water around the MIA and other areas would be achieved by realigning existing contour drains to avoid any potential for contamination from mining activities. The volume of water into the watercourse would be reduced by the volume of rainfall generated runoff from the MIA area.

In response to public comments about potential impacts on surface water flow, potential changes in the quantity and characteristics of surface water and overland flows were modelled in the EIS. The results of this modelling showed that any changes in flows would be relatively small at the scale of the Springsure Creek catchment. However, the proponent acknowledged that changes at smaller catchment scales, namely those comprising tributaries within the project area itself, would be relatively larger but would be confined in spatial extent.

In relation to DAFF's comments, the chapter on surface water was updated by SCC to include DAFF's requirements under the Fisheries Act. All flood modelling and any required mitigation would now also be consistent with the outcomes of the state planning policy for mitigation the adverse impacts of flood, bushfire and landslide (SPP1/03; June 2003).

It is noted that SCC is committed to developing subsidence management plans, agricultural management plans, erosion sediment control plans and vegetation management plans prior to construction of the proposed project. These plans would include measures for the management and mitigation of impacts on stream beds, water flows and ponding. Specifically, SCC outlined that a detailed surface water monitoring plan is being developed to provide a comprehensive baseline to be used in the preparation of these management plans. These would include staged subsidence management plans that would account for changes to watercourses, include changes on a 'paddock by paddock and longwall panel by longwall panel' basis, include existing natural and man-made features within its operating area, and would outline overland flow and stream flow monitoring. A water quality management plan would be implemented prior to the commencement of construction in consultation with CHRC to clarify risks to infrastructure and town water supplies. Once risks have been identified then mitigation measures would be developed. The water quality management plan would also assess the possibility/feasibility of recycled and not potable water sources.

In relation to the submissions query on the flooding risk assessment, the proponent stated that the assessment was based on the frequency and consequence of particular events. While SCC acknowledged that severe events occurred in the region, their relative frequency was significantly lower than many other regions throughout Queensland.

Mine affected water management

While SCC stated that based upon the water management modelling undertaken to inform the mine site water management strategy, it is not anticipated that there would be uncontrolled water discharges from the site; but there may be rare occurrences where an uncontrolled discharge would be necessary.

Groundwater

In response to submissions the EIS was amended to include a number of matters. Additional hydrological data, groundwater level, aquifer properties and water quality data were collected from properties and groundwater infrastructure maps were updated. Based on this data, both the hydrogeological conceptual model and the numerical model were updated. The proponent presented in the amended EIS a revised groundwater report together with mitigation and monitoring strategies. The EIS concluded that the proposed project would not impact on the quantity or quality of groundwater in existing bores. SCC is committed to implementing a groundwater monitoring program to monitor the impacts of mining activity on groundwater and proactively address any potential impacts. should they arise – such as relocating or to deepen affected bores along with modifications to any other water infrastructure (such as pipes and pumps) to ensure ongoing water supply. In addition, the proponent committed to seek compensation agreements with landholders regarding impacts as a result of mining, including impacts on groundwater infrastructure.

The proponent stated that modelling the impacts of surface cracking on the recharge of aquifers was very difficult. SCC stated that because the increased recharge is a mechanism that would enhance the recovery of water levels, it was removed from the modelling of groundwater impacts. In terms of any fracturing of the basalt, the base case model used in the EIS included the assumption that the fractured zone would extend into the base of the basalt in parts of the mine area. The proponent stated that, based on local experience, the fracturing of basalt would be unlikely due to the depth of the seam and the geology of the project area. The EIS stated that no groundwater-dependant ecosystems (GDEs) had been listed in the GDE Atlas for the project area. However, field investigations identified several areas as having a high potential to support groundwater dependent vegetation.

The proponent, in its response to submitters, committed to undertaking additional groundwater extraction and use data as part of its ongoing and future monitoring. The proponent noted that the subsidence management plan

would include surface cracking and mitigation measures to minimise water losses associated with surface cracking. A groundwater management plan would also be developed in consultation with relevant regulatory authorities and landholders. The proponent further stated that a staged assessment would be undertaken, as the project progresses, to analyse in finer detail the effects of any likely changes to overland flow and ponding regimes and subsequent effects on individual properties, including likely effects on current soil management (including sediment and erosion controls), irrigation and general agricultural practises. The proponent committed to consultation with affected property owners to further mitigate potential impacts on current agricultural practices.

As a consequence to the comments received during the EIS submission period, the proponent amended the EIS and submitted it to EHP for review in June 2013.

4.8.3.3 Adequacy of the EIS amendments and proponent's response

In the review of the abovementioned amendments made to the EIS and the proponent's response received by EHP in June 2013, DNRM, DSITIA and EHP outlined matters that were not adequately addressed in relation to groundwater, surface water and mine affected water management. As a result of the outstanding issues, the proponent was issued with an information request (refer to section 3.1 Timeline of the EIS process) to provide further information on these outstanding matters. The proponent responded to these comments and submitted a second amendment of the EIS and a response to the latest outstanding issues to EHP in August 2013. EHP, in consultation with the key agencies, then reviewed the latest amendments to the EIS and the proponent's response. EHP further received four private submissions during the post-submission period; with some comments relating to water issues. These have been addressed as part of the agencies' review. The overall post-submission assessment in regards to surface water, mine affected water and groundwater is discussed in detail below.

Surface water and mine affected water management

DSITIA and EHP outlined that two key issues were not addressed appropriately in the amended EIS submitted to EHP in June 2013:

- Inconsistencies in the proposed mine affected water management.
- Insufficient information on water quality parameters and water quality objectives (WQOs).

In particular, the water management on site and the discharge practices were still inconsistent in the amended EIS and EM Plan. In some parts the EIS proposed a non-release scenario, while in others uncontrolled discharges were a necessary part of water management on site. Of importance here were that mine dewatering water (from groundwater inflows) would be stored in dams with a potential for uncontrolled discharge. There is also a risk of infiltration of contaminants from dams to the unconfined water table (where it exists). The other issue identified was the lack of information on water quality parameters and WQOs for receiving waterways.

Specifically, EHP requested that the following information be provided:

- That the inconsistencies on water management on site and discharge practices would be addressed in the EIS and EM Plan.
- That a list of additional water quality parameters collected in the February 2013 survey should be provided.
- That a list of WQOs outlined in the amended EIS should be updated to include all WQOs.
- That water conditions proposed should reflect Fitzroy Model Water conditions and their requirements.
- That where any new data should be incorporated with data already collected and compared for comparative analysis i.e. the EM Plan should reflect sufficient data to meet conditions and if not, should otherwise be justified.
- That the water chapter and EM Plan should be revised to show compliance with acceptable water conditions.
- That the subsidence model would be based on the existing MLA and any potential environmental impacts associated with changes in hydrology would need to be addressed (refer to DNRM's comments below). This point has also been raised by private submitters.

In August 2013, SCC responded by providing EHP with an amendment of the EIS and a response to abovementioned outstanding issues. Following discussions with EHP and DSITIA, the option to include controlled releases from regulated dams (mine affected water) as part of the project has been accepted by SCC. As a result, the EIS was amended and the EM Plan was updated to include model conditions for end of pipe discharges, in addition to provisions for uncontrolled over the spillway releases that were already included.

EHP accepted SCC's approach that the mine site would be managed with:

- risk-based design process for regulated dams, which in a rainfall event higher than the design criteria will result in uncontrolled release over spillways

- controlled releases of dam water in line with model mine conditions to allow for additional control of dam water levels.

However, to support the above management practices some outstanding matters remain. DSITIA reviewed the EIS (as submitted to EHP in August 2013 following a request for additional information on water, land and other matters) and concluded that important water quality information was required to propose an acceptable rate of mine affected water release and rate of stream flow discharge for controlled releases that will not result in deterioration of the environmental values of the receiving waters (Springsure Creek). DSITIA recommended that the release rates for mine affected water are best informed by monitoring of water quality in the receiving environment at different flow rates, and require dilution modelling under different stream flow and mine affected water release scenarios. Further information would be required from the proponent and negotiations would need to be conducted between EHP and SCC on the details of draft conditions, including receiving environment stream flows and proposed appropriate mine affected water release parameters (including flow criteria, release rate and contaminate limits). Further monitoring may also be required to inform decisions on these limits as well as to determine appropriate monitoring trigger limits for the EA.

In terms of water quality parameters, DSITIA outlined that no updates have been provided by the proponent in regards to the recommendations provided in June 2013, namely that a list of additional water quality parameters should be included in the February 2013 survey information outlined in Section 8.4.3.2 of the amened EIS. DSITIA commented that while an extended suite of water quality parameters were analysed using the February 2013 samples, the proponent did not provide a clear list of what these additional parameters consisted of. This is important as this data would form the basis for the proposed water quality sampling program and would be used to develop site-specific trigger values for the proposed project (as part of the approvals process). DSITIA recommended that future descriptions of all water quality monitoring should be clear and concise and list all water quality parameters and associated metadata, especially if parameters monitored vary between surveys.

In addressing outstanding WQOs for receiving waterways, the proponent outlined that these had been included already in the EIS submitted in June 2013 and after discussions with DSITIA; the proponent concluded that no further action was required. In a full review DSITIA stated that while all WQOs for metals were now included, the origin of some of these WQOs were still unclear. The review of the EIS identified that the WQOs outlined in the EIS for copper, cobalt, lead, selenium, uranium and vanadium were still inconsistent with the Australian and New Zealand guidelines for fresh and marine water quality (ANZECC & ARMCANZ 2000; Volume 1) and would require further investigation and negotiation prior to final assessment of the approval process. DSITIA further recommended that future data comparison should be included to the data collected in 2011 and 2012 for comparison to support future water conditions and to observe any changes that could occur at these sites over time. This would be particularly important for those sites expected to be affected by subsidence (i.e. impacts such as erosion and scouring that may be observed over time). Furthermore, while EHP acknowledges the commitments made by the proponent in relation to subsidence management, EHP requires a draft subsidence management plan as part of the EM Plan.

Groundwater

Although an independent, peer reviewing body reviewed the updated groundwater model, DNRM considered that SCC's responses to DNRM's groundwater related issues in its submission on the EIS did not fully address the issues raised. DNRM identified several outstanding key issues:

- Incomplete strata details of newly drilled bores.
- Inadequate use of calibrated model to assess vertical hydraulic conductivity (permeability) for the Rewan Formation.
- future groundwater model updates would need to address the suitability of existing model boundary conditions and application of recharge and evapotranspiration in order to more accurately simulate local hydrogeological conditions.
- Clarification on the extent of faulting in regard to Rewan Formation and potential to effect existing modelled impact predictions.
- local project area cross-sections require greater vertical exaggeration in order to be interpreted correctly.
- regarding groundwater dependent ecosystems (GDEs):
    - clarification on impacts of drawdown on GDEs
    - mitigation strategies to be outlined
    - commitments required in case of fracture-related drawdown impacts.
    - further information regarding monitoring methods, triggers and commitments about mitigation and remediation for subsidence-related impacts on GDEs, especially fracture-related drawdown impacts.

- Inadequate sampling for stygofauna and inconsistency between the ecology and groundwater chapters in the EIS regarding the presence of alluvial aquifers (refer to section 4.16 Ecology).
- The modelling of subsidence over the mine area as presented in the EIS was based on an old mine plan designed to fit within the boundaries of the then MLA which has since been changed. DNRM requested:
    - That a new subsidence model/plan must be presented showing the most up to date MLA boundary and mine plan (longwall layout) and the surface expression of subsidence that is predicted relative to those.
    - Further interpretation of the surface drainage pattern that is expected to exist post-subsidence based on new subsidence modelling.
- Outstanding issues in the strategy controls as outlined in the EM Plan:
    - Lack of commitments of the proponent's proposal of adaptive management in regards to monitoring groundwater impacts (e.g. trigger levels, unclear groundwater management plan etc.).
    - The discussion about adaptive fracture-related drawdown management would require commitments about the drawdown impact mitigation strategies. In this regard DNRM requested information where mitigation measures for fracture-related drawdown impacts have been successfully implemented and what the trigger levels would be for the measures to be implemented.
    - DNRM requested commitments from the proponent in regards to:
        - Agreements, prior to mining commencing, with those landowners predicted to be directly impacted by the proposed project and with others as additional information indicating impacts or potential impacts, becomes available.
        - Replacements of diminished groundwater with the same quantity and quality or better.

Public submissions about to groundwater management issues were consistent with DNRM's concerns, namely:

- Lack of information on impacts of subsidence on overland flow.
- In relation to the groundwater monitoring: Insufficient data, modelling, mitigation and proposed monitoring strategy.
- Inadequate risk assessment of the potential of cross contamination.
- Concerns regarding the fracturing of the Rewan seam and the tertiary basalt would provide connectivity for ground water to drain into the coal seam, therefore dewatering the tertiary basalt which is the main source of groundwater for landholders.

In August 2013, SCC responded by providing EHP with further amendments to the EIS and a response to the abovementioned outstanding issues. DNRM reviewed the documents and confirmed that most issues had been addressed satisfactorily. However, several outstanding issues remain which would need to be addressed by the proponent through commitments to implementing the following adaptive management requirements:

- The use of the previous worst case scenario (using a vertical hydraulic conductivity for the Rewan formation of 1x10-5m/day and 200m of fracturing height) is supported by DNRM as a preliminary 'base' case on which to predict impacts. It is accepted that the actual height of fracturing is likely to be less, but this scenario is supported as an appropriate preliminary conservative model run on which to base potential impacts.
- DNRM supports the proponent's commitment to develop an adaptive approach as part of the groundwater monitoring and management plan.
- The uncertainty of the vertical hydraulic conductivity of the Rewan formation appears to be one of the more difficult challenges of this assessment, and DNRM acknowledged SCC's intent to carry out further work, including field work, to assist in developing an improved understanding of this parameter.
- While DNRM accepted the existing model and the model scenario (as outlined above) as an acceptable preliminary tool for estimating impacts, it would also require additional work on vertical hydraulic conductivity in the Rewan formation, before an application for a dewatering water licence was made. Should the new information indicate higher vertical hydraulic conductivities than were adopted in current modelling, the licence application would need to include information from an adjusted groundwater model incorporating the new data.

In summary, while most outstanding issues had been addressed in the EIS (including amended versions), outstanding issues remain for surface water, groundwater and management of mine affected water. These were outlined above and are summarised below.

4.8.4 Conclusion and outstanding issues

The EIS outlined mitigation measures and outlined that there would be minor impacts on agricultural practices due to changes in surface water and groundwater as a result of underground mining. On the other hand, the Cotton Australia report concluded that subsidence of even as little as 0.5m would have potentially detrimental impacts on production – such as through waterlogging, compaction, irregular ripening of the crop and soil salinisation.

With limited factual information available and opposing predictions, EHP agrees with DNRM that an adaptive approach is needed as part of the future approval process. Furthermore, no water quality monitoring program and no subsidence management plan were provided as part of the EM Plan, although both are essential for a variety of subsequent management plans. EHP acknowledges the commitments made by the proponent in relation to managing potential impacts on surface water and groundwater due to subsidence. SCC also committed to provide the necessary management plans prior commencing of mining. However, without a proposed water quality monitoring program and a subsidence management plan, and continued evaluation and monitoring of the vertical hydraulic conductivity for the Rewan formation, little information is available for EHP and other key agencies to provide appropriate conditions for the proposed project. A robust water quality monitoring program and a subsidence management plan will need to be provided to EHP as part of the EM Plan assessment and EA approvals process. DNRM also outlined that further work on the vertical hydraulic conductivity for the Rewan formation is required before an application for a dewatering water licence was made.

The specific outstanding issues in regards to water management are as follows:

Surface water and mine affected water management

In terms of water quality management and monitoring, it is noted that further information is needed to allow EA conditions to be drafted for a water quality release regime that would ensure protection of downstream environmental values. Based on advice from DSITIA, EHP accepts that further monitoring is likely to be required to enable development of suitable EA discharge quality requirements and to determine appropriate monitoring 'trigger' limits for the EA. Additional water quality information will also be required to derive acceptable rates of mine-affected water release and the rates of stream dilution required. In particular release rates for mine-affected water should be based on actual ambient water quality monitoring data collected at different stream flow rates. Additional dilution modelling, using mine-affected water quality data under different stream flows and mine-affected water release scenarios, will be required as part of the EM Plan assessment and EA approval process.

A detailed subsidence management plan must also be provided to EHP by the proponent prior to EM Plan approval, in order to address issues such as, but not limited to, management of changes in surface hydrology due underground mining impacts. EHP acknowledges that an adaptive approach is needed in order to incorporate actual information arising from the first years of underground mining.

Groundwater

DNRM advised that than an adaptive management approach will be needed in order to address the outstanding groundwater issues. These requirements have been forwarded to the proponent and included:

- An adaptive approach of the groundwater monitoring and management plan.
- Further evaluation and continued monitoring of the vertical hydraulic conductivity for the Rewan formation due to its uncertainty. SCC has indicated to carry out further work, including field work, to assist in developing an improved understanding of this parameter. DNRM would require this additional work before an application for a dewatering water licence would be made.
- Should the new information indicate higher vertical hydraulic conductivities than have been adopted in current modelling, the licence application would need to include information from an adjusted groundwater model incorporating this additional data.
- The discussion about adaptive fracture-related drawdown management requires commitments about the drawdown impact mitigation strategies. DNRM requested information where mitigation measures for fracture-related drawdown impacts have been successfully implemented and what the trigger levels would be for the measures to be implemented.
- Commitments from the proponent in regards to the take of groundwater, such as:
    - Agreements, prior to mining commencing, with those landowners predicted to be directly impacted by the proposed project and with others as additional information indicating impacts or potential impacts becomes available.
    - Replacements of diminished groundwater with the same quantity and quality or better.

Environmental management plan

In regards to the EM Plan, DNRM requested that the following commitments be included:

- The development of a groundwater monitoring program and commit to submit this program to the administering authority for approval before the commencement of dewatering.
- Update/recalibration of the groundwater model on a regular basis as more data becomes available.
- Further information on environmental values of groundwater, including temporary impacts on deeply-rooted vegetation.
- The subsidence management plan will need to address the impacts of subsidence on watercourses and surrounding landscapes as per DNRM's draft guideline titled Watercourse Subsidence – Central Queensland Mining Industry.

4.8.5 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 implementing:

- Plans for the management and mitigation of detrimental impacts on stream beds, water flows and ponding (e.g. in subsidence management plans, agricultural management plans, erosion sediment control plans and vegetation management plan).
- Staged assessment of the impacts of subsidence on water connectivity and flows (i.e. analysis of likely changes to overland flow and ponding regimes and evaluation of the success or failure of introduced mitigation measures).
- Surface water management systems and plans.
- A water quality management plan.
- A stormwater management plan.
- Appropriate design and management of surface water systems.
- A water quality monitoring program.
- Erosion and sediment control plan.
- A subsidence management plan.
- Further work on groundwater (including field work), especially in regards to the vertical hydraulic conductivity for the Rewan formation.
- Groundwater monitoring and management plan.
- Groundwater monitoring program to monitor the impacts of mining activity on groundwater and proactively address any potential impacts.
- Water impact reporting.
- Landholder engagement and agreements.
- Rehabilitation of impacted groundwater bores, drainage lines, watercourses, sediments, and dams.

4.9 Air quality

Chapter 10 of the EIS described the existing air environment and any environmental values that may be affected by the project.

4.9.1 Description of air quality—findings of the EIS

The objective for the air quality impact assessment as part of the EIS was to assess:

- the dispersion and concentration of dust (particulate matter; PM) and potential for odour emissions
- emissions of the greenhouse gases (GHG), carbon dioxide (CO_2) and methane (CH_4).

The amended EIS identified 25 sensitive receptors (homesteads) with four of these occurring within the project area. In addition, other sensitive receptors were located within the project area including good quality agricultural land (GQAL) and endangered regional ecosystems (RE).

The EIS outlined that background concentration levels of fine particulate matter (PM) were measured as part of the air quality impact assessment. Monitoring was conducted for PM_{10} for a period of eight days and the daily averages derived for comparison to long-term monitoring conducted by EHP in similar locations. Air quality modelling was also undertaken for the construction and the operational phases in order to predict total suspended particulate (TSP), PM_{10}, $PM_{2.5}$, and dust deposition concentrations at sensitive receptors during the two project phases. The EIS outlined that information presented showed results for the nearest receivers in every direction as they would be likely to receive the greatest potential impact.

Construction phase

Dust deposition modelling indicated that the Springton Homestead would receive the highest concentrations during the construction phase due to its proximity (3km) to the MIA. In the EIS it was concluded that even with the close proximity, the predicted levels at all sensitive receptors would be low and well within the relevant air quality objectives. The maximum concentrations of pollutants associated with vehicle and generator emissions and deposition of metals were also assessed. These results showed that the impacts from vehicle and generator exhaust pollutants during this phase would be minimal and would comply with all the relevant criteria. Deposition rates of metals during the construction phase were also considered minimal and would comply with all the relevant criteria at all sensitive receptors.

Operational phase

The EIS outlined that during the operational phase coal would be transported from the drift into a sizer before it would be stockpiled above the surface. The most significant dust would be produced from the sizer during transfer of coal to and from the stockpile and from vehicle movements. The air quality modelling indicated that the greatest impacts would occur at the Springton Homestead and Den-Lo Park which would be located between 3km south-east and 3.8km south of the MIA mine access shaft. The air quality assessment showed that predicted levels at the nearest six sensitive receptors to the mine operation activities would be well below the relevant criteria. The maximum off-site impacts for the pollutants associated with vehicle emissions and deposition of metals and the results showed that the impacts from vehicle exhaust pollutants during this phase would be minimal and would comply with all the relevant criteria at all sensitive receptors. Likewise, deposition rates of metals would be minimal and comply with all the relevant criteria for all sensitive receptors.

The EIS further outlined additional analysis in order to determine typical dust levels rather than peak levels experienced at nearby homesteads over the life of the mine. Analysis was undertaken for each year of operation according to the variable production rates and showed that the level of dust experienced at each of the six nearest homesteads would be very low compared to the criteria. The assessment found that dust levels would be dominated by the typical background sources rather than any contribution from mine operations.

For the two nearest homesteads, Springton and Den-Lo Park, the following conclusions were drawn in the EIS:

- 70% of the time, dust levels would not exceed the average background level.
- 90% of the time, dust levels generated by the proposed project would be less than 15% of the average background level.
- Less than 10% of the time dust levels would be above the average background level but still significantly below the criteria.

Odour

The proposed mining activities could release gases along with methane (which is odourless), and other gases which could involve odours that are perceptible to humans in close proximity to the release sites. The EIS stated that the coal in the underground mine would have a mean methane content of approximately 2–3.5m^3/t of coal. The EIS concluded that degassing or flaring of methane would not be required and that the risk of generating unpleasant odours would be low. Nevertheless, the proponent committed to monitor odour during operations and to put in place mitigation measures.

4.9.1.1 Potential impacts and proposed mitigation and management measures—air quality

The proponent committed to undertaking best practice air quality management at all times and the following mitigation measures would be implemented in accordance with the EPP (Air) hierarchy, such as avoid (use technology that avoids emissions); recycle (reuse emissions for other industrial processes); minimise (treat emissions before disposal); and manage (source of emissions should be located to minimise impacts). SCC also committed to develop an air quality management plan prior to construction which would be in place for the life of the mine. In addition to monitoring, a site contact number would be provided to sensitive receptors to facilitate lodgement of complaints about air quality, and a complaints register would be maintained.

Overall, several air quality mitigation measures were outlined in the EIS for the construction and the operational phases. These included, but were not limited, to:

- Restriction of project activities to the minimal amount of land required for the proposed project.
- Speed restrictions for light and heavy vehicles.
- Covering truck loads.
- Maintenance and operation of machinery and vehicles in order to minimise exhaust emissions.
- Transporting materials on sealed roads where possible.
- Water or dust suppression.
- Education of the workforce personnel.
- Placement of soil stockpiles in areas protected from the wind and away from homesteads
- Stabilising worked areas as soon as possible after earthworks have been completed (e.g. revegetation, paving, mulch).

4.9.1.2 Greenhouse gas emissions (GHG)

The overall GHG emissions [carbon dioxide equivalent (CO_2-e)] from the construction of the mine were estimated at 268.5kt CO_2-e with diesel and electricity consumption the highest emission source. Emissions during the operation phase would be considerably greater with an anticipated total of 16,776kt CO_2-e. The total GHG emissions were estimated at 17,044.5kt CO_2-e. In comparison to the total annual GHG emissions for Australia and Queensland the estimated annual operating emissions associated with the 40-year lifetime of the proposed project would be 0.4261Mt which would equate between 0.078% of the national and 0.42% of the state inventories for the energy sector.

The proponent committed to a GHG abatement strategy that would be developed and implemented prior to construction activities. The EIS outlined that in accordance with the Commonwealth's *Energy Efficiency Opportunities Act 2006,* SCC would undertake an assessment of energy efficiency opportunities and implement the most cost effective measures. No opportunities for further offsetting of GHG gas emissions through indirect means were identified in the EIS, but the proponent would continue to assess the energy efficiency opportunities and estimate GHG emissions associated with the proposed project. The EIS further outlined that the proponent would calculate annual GHG emissions as required under Commonwealth's *National Greenhouse Energy Reporting Act 2007* and the Energy Efficiency Opportunities program, as well as future carbon price mechanisms.

4.9.2 Assessment of the EIS chapter

4.9.2.1 Submissions on the EIS chapter

Chapter 10 (Air quality) received several comments during the submission period. Key concerns were as follows:

- Private submitters raised concerns in relation to:
  - Impacts on air quality.
  - Impacts of air pollution on affected landholders, agriculture and on children's health.
  - Inadequate baseline monitoring (e.g. incorrect locations and duration).
  - Inadequate modelling.
  - Not all sensitive receptors included in the studies.
  - Impacts on koala populations.
- EHP:
  - Requested a separate air emissions inventory of any offsite activities directly associated with the project, including fugitive emissions such as from rail or road transport of product or waste.
  - Outlined that PM_{10} monitoring involved an incorrect monitor.
  - Requested an update of the EM Plan in order to comply with Australian standard and compliance monitoring.
  - Requested that an air quality management plan should be developed and approved before the project commences.
  - Requested locations of monitoring sites to be upwind of the prevailing winds.
  - Stipulated that where PM_{10} monitoring is to be undertaken for compliance reporting purposes, the monitor used must be acceptable to EHP.

4.9.2.2 Proponent's response to submissions

In regards to missing or incorrect sensitive receptor locations, the proponent outlined in the amended EIS that all sensitive receptors were now considered, and that data, relevant tables and figures were updated. SCC further stated that it understands the impact that dust can have on agriculture, properties and water. SCC conducted additional baseline dust monitoring after the EIS was released for public comments. The updated assessment report was subsequently included in the specialist report and Chapter 10 of the amended EIS. The proponent concluded that the air quality modelling undertaken found that no sensitive receptors would experience any adverse impact in air quality as a direct result of the mining operations, and that mitigation measures would be implemented to control dust and the release of fine particulate matter. SCC outlined that the air quality modelling indicated that the greatest impacts would occur at the Springton Homestead and Den-Lo Park which are approximately 3km south-east and 3.8km south of the MIA mine access shaft respectively. Predicted levels at the nearest six sensitive receptors to the mine operation activities would be well below the relevant criteria. Furthermore, an air quality management plan would specify sites for long-term air quality measurements during construction and operation. The proponent outlined that as part of the long term monitoring 'real time' measurements would ensure that any exceedances would be immediately realised and acted upon.

In regards to EHP comments on the EIS, the proponent indicated that it had addressed all outstanding issues identified during the EIS submission process. SCC committed to developing an air quality management plan prior to construction that would include air quality objectives, potential impact management measures and reporting, and adaptive response procedures.

4.9.2.3 Adequacy of the EIS amendments and proponent's response

The proponent subsequently updated the relevant section in the EIS. No further comments were received as part of the amended EIS review.

4.9.3 Conclusion and outstanding issues

As part of the approvals process, the proponent will need to develop a proposed air quality monitoring program and air quality management plan, which will need to demonstrate the ability to meet and implement appropriate mitigation measures to ensure that air emissions will be consistent those set in EHP's model mining conditions (version 4). That section of the EM Plan dealing with air quality issues would need to include sufficient information to allow for the development of EA conditions for air.

4.9.4 Proponent's commitments

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

- An air quality management plan.
- Minimising the generation of dust and emissions.
- Management and monitoring of air quality.
- Consultation and engagement.
- GHG management, including a GHG abatement strategy.

4.10 Noise and vibration

The EIS Chapter 11 (Noise and vibration) described the existing environmental values that may be affected by noise and vibration from the project.

4.10.1 Description of noise and vibration—findings of the EIS

The amended EIS identified 25 sensitive receptors (homesteads) with four of these occurring within the project area. Sensitive receptors located at Springsure, including a hospital, a school, places of worship and dwellings, would not be impacted by noise and vibration generated by the proposed project due to its distance (37km).

The EIS outlined that blasting would be the only activity considered to have the potential to result in ground vibration effects over significant distances and overpressure effects. Blasting would occur during the construction and operation of the mine and only during daytime hours.

Background noise monitoring was undertaken as part of the noise assessment in order to quantify the existing environmental ambient noise within and surrounding the project area and to determine noise limits for the proposed project. The EIS also presented an environmental noise model of the project area and surrounding environment in order to predict noise propagation associated with the proposed activities.

The results in the EIS showed that conservative predictions of unmitigated construction phase noise levels at each sensitive receptor would comply with the night-time criteria of 28dB. The assessment; however, also stated that, if unmitigated, operational phase noise levels would exceed the criteria at the two closest sensitive receptors, Springton Homestead and Den-Lo Park Homestead. Predicted noise levels for the operation of the mine would be low and adverse health effects on sensitive receptors would not be expected. The EIS outlined mitigation measures to further reduce the predicted noise levels and minimise the risk of adverse noise impacts. No impacts were found on fauna due to the lack of available habitat and the distance between the project activities and suitable fauna habitat. The EIS further found that low frequency noise levels did not exceed the low frequency noise criteria of 50dB (linear) at any of the assessed sensitive receptors. No low frequency noise impacts were predicted on any receptors. The EIS also outlined that the proposed project would not contribute to the existing high levels of LA_{max} recorded in the project area during baseline noise surveys.

4.10.1.1 Potential impacts and proposed mitigation and management measures—noise and vibration

The EIS outlined that ground vibration, airblast overpressure, and potential flyrock from blasting would be controlled to acceptable levels at the identified receptor locations using current blasting practices. The proponent committed to implement a routine noise and blast emission monitoring program during the construction and operation phases. The EIS outlined that monitoring activities would be undertaken at selected locations at Springton and Den-Lo Park homesteads, where noise emissions were predicted to be exceeded during the operational phase. Feedback would be used to measure the success of mitigation measures and determine if further corrective actions would be required.

It was also stated in the EIS that SCC would develop a complaints procedure to respond to any complaints about noise made by local community members or stakeholders. The complaints procedure would outline the process to be undertaken when handling complaints.

The following control measures were outlined in the EIS to mitigate potential impacts due to blasting, overpressure and flyrock:

- Conducting real time noise monitoring.
- Blasting to occur at specific times.
- Consultation with surrounding landholders would be undertaken to develop protocols for notification of blasts.
- On-site monitoring of noise and vibration.
- Establishment of an exclusion zone for people and livestock around each blast site prior blasting.

Other mitigation and management measures outlined in the EIS included, but were not limited to, minimising traffic and vehicle noises, enclosing significant noise sources, using temporary structures or screens, and directing noise away from noise-sensitive areas.

4.10.2 Assessment of the EIS chapter

4.10.2.1 Submissions on the EIS chapter

The chapter on noise and vibration received the following comments:

- Private submitters raised concerns in relation to:
  - Impacts on impacts of noise on affected landholders.
  - Impacts of noise on wildlife/koalas.
  - Health impacts on children.
  - Inadequate modelling.
  - Not all sensitive receptors were included in studies.
  - Complaints management (or the lack thereof).
  - Require notification prior blasting.
  - Noise impacts of mine ventilation shaft not assessed.
- EHP:
  - Outlined several deficiencies in the monitoring (insect noise, missing winter data, missing expected variation in level of the rating background noise levels).
  - Outlined that the LA_{max} presented in the EIS exceeded acceptable noise criteria and requested further

information why the background noise levels were so high. EHP requested a revised noise chapter and EM Plan to show compliance with acceptable noise levels and mitigation measures.

4.10.2.2 Proponent's response to submissions

Following the receipt of submissions on the EIS, noise impacts assessment on any sensitive receptors that had been overlooked were updated and included in the amended EIS. SCC further outlined it is committed to developing and maintaining a strong workforce that adheres to all site policies and requirements. Requirements relating to the unnecessary revving of engines and reversing would be included in site managements plans. The proponent further committed to ensuring compliance with the highest standards and being responsive to community concerns. This would include identifying potential issues before they arose through proactive management. Where unforseen issues did arise, SCC would aim to respond to those without undue delay. Furthermore, SCC outlined that a communications plan would be developed which will include protocols for notifying nearby landholders of any activities such as blasting. This plan would be developed in consultation with the landholders to ensure the methods of communication are suitable.

The proponent replied to concerns regarding the noise monitoring regime that long-term monitors would be installed prior project commencement and monitoring would be undertaken well in advance to develop a baseline for noise over a much longer period. Pending landholder permission, the proponent also intends to carry out additional baseline monitoring at all sensitive receptors ahead of construction and operation commencing in order to further establish existing conditions against which any impacts could be identified. Furthermore, the proponent stated that monitoring activities would be undertaken at selected locations at Springton and Den-Lo Park homesteads, where noise emissions have been predicted to be exceeded during the operational phase. In regards to noise impacts from the ventilation shaft, the consultant replied to EHP that noise from the ventilation shaft would not be heard beyond 200m and the construction would be restricted to day time. No blasting would be necessary for construction of the tunnel and shaft.

In terms of noise impacts on wildlife, the proponent stated that the main source of noise from the project would be generated from the MIA which would be located at least 300m away from the nearest fauna habitat. The noise assessment in the EIS found that that due to the low expected noise levels and the general lack of suitable habitat for fauna within or close to the MIA, no significant impacts from noise would occur on terrestrial fauna.

In response to EHP's comments above, the proponent replied that a noise monitoring had been carried out during May 2013 to capture winter noise levels and, subsequently, Chapter 11 and the specialist report had been updated to include these results. In response to the exceeded LA_{max} the proponent responded that the measured LA_{max} were recorded at baseline noise monitoring locations within road reserves and that these high levels of LA_{max} would most likely be representative of daily vehicle movements during the early morning (at monitoring sites adjacent to roads), in addition to the movement of farm machinery and, during the summer, bird and insect noise. The proponent further commented that these noises would occur at a large distance to the sensitive receptors and any intrusive noise from the mine would be highly unlikely to contribute to LA_{max} conditions at the mine site.

4.10.2.3 Adequacy of the EIS amendments and proponent's response

While the proponent amended the EIS following the EIS submissions, a noise management strategy would be required as part of the EM Plan and would need to be addressed as part of the EA assessment and approval process. This would incorporate compliance with acceptable noise levels and mitigation measures.

4.10.3 Conclusion and outstanding issues

As part of the approvals process, the proponent will need to develop a noise management strategy. In particular, EHP was concerned that the existing, pre-mining background noise (LA_{max}) levels were exceeding criteria without any concrete evidence why that occurred. The noise management strategy will need to demonstrate the ability to meet and implement appropriate mitigation measures to ensure noise emissions will be consistent with model mining conditions (version 4). This needs to be demonstrated in the EM Plan. The EIS stated that cumulative impacts would be considered and cumulative impacts need to be assessed when preparing the draft EA.

4.10.4 Proponent's commitments

In order to minimise impacts on noise and vibration the proponent has given a commitment to:

- Restricting blasting to day-time only.
- A noise and blast emission monitoring program.
- A noise management plan.
- Several management practices.

- Noise and vibration complaint mechanisms.
- Community engagement.

4.11 Cultural heritage

Chapter 13 of the EIS described the cultural (Indigenous and Non-Indigenous) heritage and any cultural heritage values that may be affected by the project. Under s86 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 Description of the cultural heritage—findings of the EIS

Indigenous cultural heritage

Two cultural heritage management plans (CHMPs) were negotiated with the two Aboriginal parties as identified by the Karingbal Traditional People Aboriginal Corporation representing the Karingbal People and with the Aboriginal parties as identified by the Yumba Burin Heritage representing the Kairi People. The CHMPs for the Karingbal People and Kairi People were approved by the Queensland Government in April 2012 and February 2012, respectively.

Several Indigenous cultural heritage sites that were identified through registry searches were confirmed by previous exploration activities. Hence, as ongoing activities could potentially impact these values, the following mitigation measures have been proposed in the EIS:

- Comprehensive cultural heritage surveys.
- Establishment of a Cultural Heritage Committee between each party and SCC.
- Cultural heritage awareness training of all personnel undertaking mining activities, with the training program developed in consultation with, and delivered by, representatives of the Karingbal and Kairi Peoples.
- Monitoring of the effectiveness of the mitigation and management measures.
- Provision of employment opportunities associated with the proposed project to the Karingbal and Kairi Peoples.
- Taking of reasonable steps to maximise business opportunities for Karingbal and Kairi Peoples in relation to the proposed project.

Non-Indigenous cultural heritage

The EIS outlined that while no current non-Indigenous cultural heritage sites were identified during the registry searches, field investigations identified a range of non-Indigenous cultural sites including; homesteads, sheds, dams and tanks, roads and bridges and windmills. The majority of these sites were established relatively recent when the district changed from predominantly pastoral activities to cropping (i.e. during the past 50 years). Two of these potentially historical places were found in the project area during field surveys; namely farm house remnants on the northern boundary and the Cowley homestead on the banks of Springsure Creek to the west of the MLA.

In order to mitigate any potential impacts on non-Indigenous cultural heritage, a historic heritage management plan (HHMP) would be developed prior to construction and would include:

- Strategies for mitigating, managing and protecting identified historical cultural heritage values during all phases of the mine life.
- A ‘stop’ and ‘report’ process whereby if any unrecorded items or sites of possible cultural heritage significance are found, work will cease and the find will be reported.
- Procedures for collecting any artefact material, including appropriate storage and conservation.
- Processes for reporting the discovery of any archaeological artefact not previously identified.
- Provision for regular communication between the mine management team and property owners.
- Training or awareness programs for staff.

4.11.2 Assessment of the EIS chapter

4.11.2.1 Submissions and adequacy of the EIS chapter

Two comments were received as part of the EIS public submission regarding minor issues (reference to legislation and the Queensland British Food Corporation) which have been adequately addressed. The amended EIS chapter now adequately addresses the TOR.

4.11.3 Conclusion and outstanding issues

The proponent has addressed the TOR in regards to 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:

- Management plans (Cultural Heritage Management Plan (CHMP); Heritage Management Plan (HHMP); Historical Heritage Management Plan (HHMP); including a 'top' and 'report' process).
- Management procedures such as corrective actions, monitoring and cultural heritage field surveys prior to any construction.

4.12 Social values

Chapter 14 of the EIS discussed the potential impacts on existing social values in the communities surrounding the project area. A draft SIMP (Chapter 19) was also developed as part of the EIS to help facilitate active participation by impacted communities and local authorities in the identification and management of social impacts throughout the life of the mine.

4.12.1 Description of social values—findings of the EIS

The EIS concluded that development of the proposed project would create employment and business opportunities throughout Queensland but particularly in the Central Highlands. For the community of Springsure, the EIS predicted economic benefits in regards to increased business activities. However, the EIS also identified adverse social impacts, such as rising accommodation costs, particularly in Springsure, skill shortages, higher living costs, and an increase in demand for emergency services (as a result of increased traffic). In addition, directly impacted property owners would be affected at times with an increase in dust, noise, vibration and/or reduced visual amenity.

While the EIS outlined that the majority of workers would be drive-in/drive-out (DIDO) or fly-in/fly-out (FIFO), one quarter of the operational workforce would reside in the local area. This would contribute to higher income levels and population growth, without putting unnecessary demand on existing infrastructure and services. This would be especially the case as the EIS anticipated that the increase of local residents would occur over a 10-year period. This was considered in the EIS as having less impact on house price or availability.

A draft SIMP (Chapter 19) was also developed as part of the EIS process to help facilitate active participation by impacted communities and local authorities in the identification and management of social impacts throughout the life of the mine. The draft SIMP would assist SCC in meeting corporate social responsibility commitments.

4.12.1.1 Potential social impacts and proposed mitigation and management measures

A range of mitigation strategies were proposed in the EIS to help increase the positive social impacts and minimise the negative social impacts. The draft SIMP outlined in the EIS (in Chapter 19) included the overarching objective of contributing to the economic and social development of the local region, in line with regional planning objectives.

The following seven key mitigation strategies were proposed in the SIMP:

- Employment and training: Preference would be given to local skilled employees, followed by Central Highlands, Central Queensland, the rest of Queensland, and elsewhere in Australia. Other strategies outlined included short work roster, appropriate workforce accommodation to encourage female employees, and a training program to ensure workers are adequately skilled.
- Procurement: Preferences for regional goods and services and local contractors.
- Workforce accommodation: All staff would be provided with the option of living in the local area. Furthermore, a fully catered motel-style village would be constructed approximately 13km south of Emerald for FIFO and DIDO employees and contractors. The accommodation village would offer a high level of amenity, which would contribute to a healthy workforce.
- Agricultural production: SCC aims to provide permanent yield increases across any properties directly impacted by its mining operations. This would be achieved by increasing the area of irrigated farmland, where practical, and seeking specialist inputs to enhance farm management practices.
- Community contributions: The proponent would work with the CHRC to provide financial support for local organisations and events.

- Environmental management: Mitigation measures would be implemented to minimise the impact of dust, noise and vibration on residents living in the vicinity of the mine, and to manage subsidence.
- Community engagement: Implementation of a community engagement plan to ensure that stakeholders have access to relevant information, are able to voice their concerns and suggestions in relation to the project and its impacts, and participate as valued partners in the development and operation of the mine.

4.12.2 Assessment of the EIS chapter

4.12.2.1 Submissions on the EIS chapter

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

- Private submitters outlined:
  - doubts on co-existence between agriculture and mining.
  - incorrect statements regarding employment and populations growth.
  - concerns with FIFO/DIDO arrangements.
  - that EIS contained incorrect description of agricultural practices and mining impacts.
  - that not all affected landholders were consulted and overall community consultation is lacking.
  - the potential impacts of mining on skilled labour.
  - the inadequate assessment of actual impacts on agricultural businesses.
  - inadequate SIMP in particular addressing landholder concerns.
  - fears of increased crime and trespassing.
- CHRC:
  - Outlined the need in the SIMP to include a local buy program that is promoted and established during the early stages of the project.
  - At the accommodation village, encourage integration into community activity and local spend through provision of regular transport to towns to do shopping, recreation, sport, travel (airport), medical appointments as well as promoting healthy lifestyles for workers.
  - Outlined that a communications strategy should be developed to keep the region informed of the project's developments.
  - Requested a local industry participation action plan in order to establish a local supplier register of pre-qualified businesses; liaising with CHRC and the Industry Capability Network to run workshops or one-on-one support for businesses.
- DAFF:
  - Requested that the SIMP to include a landholder engagement strategies to address concerns over potential adverse impacts from the underground mine and haulage road. More clarification is sought on how the consultation with landholders would be carried out.
- DATSIMA:
  - Encourages SCC to condition contractors responsible for the construction stage to have an Aboriginal and Torres Strait Islander cultural capability training and an Aboriginal and Torres Strait Islander employment program as part of strategies to recruit and retain Aboriginal and Torres Strait Islander employees.
- DCS:
  - Requested that the Queensland Ambulance Service (QAS) would take part in the consultative working group.
  - Requested that management strategies, housing initiatives and commitments would include addressing consequences of limited accommodation availability and affordability for local residents and emergency service personnel.
- DETE and Skills Qld:
  - Requested ongoing consultation to discuss KPIs and targets for inclusive employment strategies and reporting against them; and to identify in more detail the workforce profile of the project and skilling and employment needs/opportunities.

- DHPW:
  - Requested that the SIMP would include details on how local accommodation would be sourced in Emerald and Springsure given the tight rental market and any strategies to support employees that are seeking to relocate to the area.
  - Requested that strategies are outlined how impacts on local housing affordability would be managed
- DSDIP (including SIAU):
  - Outlined that the SIMP did not adequately address impacts on housing (e.g. property values, rental prices, availability).
  - Recommended the construction on houses to mitigate operational worker housing impacts.
  - Requested that the proposed action plan for mitigation housing impacts should incorporate process and performance measures to ensure that volume and timing of additional housing can be provided at reasonable costs to workers.
  - Outlined that DSDIP/Queensland Government should be included as a key stakeholder in the SIMP.
- QPS:
  - Outlined impacts on police and emergency service workers due to increased housing stocks and rentals.
  - Requested that consideration be given to the provision of a joint emergency services precinct in any land, housing development or proposals put before the CHRC by the proponent.
  - Outlined that out-dated crime rates were used in the EIS assessment and stated, based on experience, that mining activities create significant impacts on policing services, which would require an upgrade of staffing.
  - QPS requests ongoing consultation with the proponent during the SIMP process and development of behaviour management plans/code of conduct for the proposed work camp.

4.12.2.2 Proponent's response to submissions

In regards to comments made by private submitters regarding their doubt that mining can co-exist with agriculture, the proponent responded that it is committed to the co-existence of agriculture and mining. SCC is seeking conditions of approval to include the requirement to prove co-existence while maintaining or improving agricultural productivity. The proponent also stated that in cooperation with the Independent Agricultural Co-existence Research Committee and with longwall mining being undertaken on Den-Lo Park for the first five years, considerable data would be available to analyse the actual impacts and prove co-existence before mining would continue underneath other properties. The proponent also stated in its response that if it was unable to demonstrate co-existence, it would not be able to proceed beyond the boundaries of the Den-Lo Park property. SCC further outlined management strategies such as seeking cooperation with landholders on an individual basis to develop surface management plans for each paddock. These plans would outline the impacts of mining, how they were to be managed, including any considerations in the lead up to mining taking place. In response to DAFF's comment, SCC outlined that further information regarding stakeholder engagement was included in the SIMP and that discussions are ongoing with directly affected and nearby landholders.

In response to the concerns on impacts to the local community, the proponent outlined that it is committed to making a positive contribution to the local community by providing support to local events. The proponent also stated that the community engagement had been sought through individual meetings, public information sessions, and compensation discussions and through developing constructive relationships within the local community. The proponent outlined that mitigation strategies would be used to manage the potential for skill shortages and higher costs, including stakeholder engagement, housing and accommodation strategies and workforce management (recruitment, education and training actions). In terms of DATSIMA's request to incorporate Indigenous employment program, SCC responded that Aboriginal and Torres Strait Islander recruitment and training would be incorporated into its programs. Furthermore, SCC outlined that a draft local content strategy was developed and key stakeholders would be consulted as the strategy develops. The engagement of local businesses to provide health and fitness services would also be considered as part of workforce planning.

In regards to state departmental concerns regarding housing availability and affordability, the proponent outlined that it would continue to monitor the housing market and work with stakeholders to develop relevant strategies to respond to local housing demands. The response further stated that subsequent to the EIS being submitted the housing market in the Central Highlands experienced significant change corresponding to a decline in activity in the resources sector. The proponent stated that it would be premature to construct houses at a time when the current housing market in the Central Highlands is able to accommodate growth.

The proponent further committed to support employees wanting to relocate to the area with appropriate management strategies. However, the proponent would participate in planning forums or being part of an

affordable housing trust or similar should such an initiative commence in the Central Highlands. As such, DSDIP and DHPW were included as key stakeholders to involve in this action.

In terms of managing social impacts outlined by DCS, QPS, DETE and Skills Qld, the proponent responded that SCC would continue to engage with these state departments in the development of the SIMP, workforce management plan, employment strategies and the development for strategies to encourage positive workforce behaviour, workforce health and wellbeing, as well as emergency response procedures. Furthermore, SCC would continue to engage with all stakeholders in refining the SIMP, actions and performance measures, or key performance indicators.

4.12.2.3 Adequacy of the EIS amendments and proponent's response

Amendments to the EIS Chapter 14 were made following EIS public submissions. A few comments were received as part of the review of the amended EIS which would need to be addressed by the proponent prior commencement of the proposed project. These are outlined below.

4.12.3 Conclusion and outstanding issues

The proponent has addressed the social impact assessment adequately and no outstanding issues remain as part of the EIS assessment process. However, in the review of the amended EIS, EHP received the following recommendations from other Queensland government agencies. This report recommends that these outstanding matters be addressed prior to the project proceeding.

DATSIMA recommended the following conditions with the aim of increasing Aboriginal and Torres Strait Island employment:

- The proponent will require Aboriginal and Torres Strait Islander recruitment and training strategies and targets be included in construction phase contractors' recruitment and training programs. Also, the proponent will require that construction contractors report on Aboriginal and Torres Strait Islander employment as part of the reporting required for the project's local employment policy.
- The proponent will include Aboriginal and Torres Strait Islander employment targets in the not-yet-developed workforce management plan (for the operations and decommissioning stages of the project).

DSDIP commented that SCC is to continue to monitor the housing and rental markets in Springsure and Emerald along with the wider Central Highlands Region in order to determine appropriate response in consultation with key stakeholders.

TMR recommended that the proposed fatigue management and other road safety issues that are road-use management issues should be best documented in the RUMP. Hence, fatigue management strategies that were dealt with in the SIMP should also be summarised and cross-referenced in the RUMP.

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:

- Social impact Management Plan.
- Stakeholder and community engagement strategy.
- Stakeholder and community engagement plan.
- Complaints procedure.
- Stakeholder database.
- Workforce management plan.
- Safe and healthy environment for workers along with opportunities for enhanced health and wellbeing.
- Strategy for housing and accommodation.
- Development of a code of conduct.
- Education and training program.
- Workforce induction program.
- Fatigue management policy.

- Monitoring and reporting procedure.
- Collaborative working environment with government agencies.

4.13 Health and safety

Chapter 15 of the EIS described the existing community values for public health and safety that would be affected by the project.

4.13.1 Description of health and safety—findings of the EIS

The EIS outlined that, due to the separation distance between the MIA, the nearest sensitive receptor and the communities of Springsure and Emerald, adverse health and safety impacts associated with mining operations were ranked low.

As part of the management and mitigation strategies SCC committed to prepare and implement a safety and health management system (SHMS) that would include risk management elements and practices to ensure the safety of workers, contractors and the community and that would to ensure compliance with the relevant legislation. The EIS further outlined that the SHMS would be integrated with the environmental management system (EMS) and would include specific operating procedures that incorporate organisational structures, planning activities, responsibilities, site practices, procedures, processes, and identify resources required for the development, implementation, review and maintenance of the safety and health policy. In particular, the following areas would be included:

- Safety management plans as part of the general contractor requirements.
- Safety training for all employees and visitors (e.g. site inductions, training packages, meetings, etc.).
- Internal and external communications (e.g. health and safety meetings; implementing a stakeholder and community engagement plan, safety management plan).
- Implementation of an emergency response plan (ERP) in consultation with government agencies. The ERP will form a critical component of the SHMS, and would cover the following points:
  - Release of dangerous goods
  - Fire or explosion
  - Traffic collisions (off-site and on-site)
  - Flooding
  - Sewage treatment failure
  - Bushfire
  - On-site death or injury
  - Information on landing sites (helipad) for rescue helicopters in case of emergency situations, including landing zone, flight paths, lighting, wind sock and any other relevant information
  - Contact details for relevant state emergency services
  - Provision of an on-site contact for state emergency services to contact in the event of an emergency situation
  - Provisions for a QAS paramedic to service the site.
- A public complaint resolution in accordance with the stakeholder and community engagement plan.
- Monitoring, inspection and reporting of safety performance
- Continual improvement through regular reviews, audits and inspections.

Other mitigation measures outlined in the EIS contained general health and safety control mitigation measures to minimise adverse impacts to local residents and the community. Proposed measures included minimisation of dust and odour generation; noise and vibration control; surface water and groundwater management; waste management; transport and dangerous goods management; as well as fatigue management. These have been discussed in more detail in the various sections in this EIS assessment report. Other mitigation measures outlined included an alcohol management plan and a pest and weed management plan, including mosquitoes and biting midges control.

The EIS outlined that the success of the mitigation measures would be monitored with the following performance indicators:

- Air quality objectives and associated monitoring as described in EIS Chapter 10 (Air quality).
- Surface water quality objectives and associated monitoring as described in EIS Chapter 8 (Surface water).
- Acoustic objectives and associated monitoring as described in EIS Chapter 11 (Noise and vibration).
- No increase in the population of pests as a result of on-site activities as described in EIS Chapter 12 (Ecology).
- No incidents of fire or emergency as a result of on-site operations.

The EIS concluded that with the work management and mitigation strategies in place, residual impacts would be well within acceptable limits and are not likely to significantly add to existing impacts from other mines in the area, particularly the Rolleston and Minerva mines.

4.13.2 Assessment of the EIS chapter

4.13.2.1 Submissions on the EIS chapter

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

- Private submitters raised concerns in relation to:
  - Not all sensitive receptors were included in studies.
- DCS:
  - Requested consultation with QAS in relation to provision of a paramedic service on the site.
  - Requested that possible landing site for both the rescue helicopter service and fixed wing aircraft services should be identified.
  - Requested further information on the fatigue management policy both in relation to on roster shifts and pre/post shift.

4.13.2.2 Proponent's response to submissions

In response to the public submitters all sensitive receptors were included in the EIS. In regards to DCS' comments, the proponent stated that SCC would consult with QAS in relation to the provision of a paramedic service on the site. Furthermore, a helipad for emergency use would be included in the MIA and would be designed and constructed to comply with all relevant regulations. However, no provisions would be made for a fixed wing aircraft service. In relation to the fatigue management policies SCC stated that fatigue management would be outlined in the workforce management plan and detailed in the safety and health management system. This plan would be finalised prior to construction of the mine. Furthermore, the proponent stated that fatigue management would also be incorporated as part of the RUMP and traffic management plan.

4.13.2.3 Adequacy of the EIS amendments and proponent's response

The proponent subsequently updated the relevant section in the EIS. No further comments were received as part of the amended EIS review.

4.13.3 Conclusion

As a consequence to the comments received during the EIS submission period, the proponent amended sections in Chapter 15. No outstanding issues remain.

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:

- Implementation of a SHMS.
- Providing and maintaining a safe and healthy workplace.
- Providing responsible and effective safety leadership across all areas.
- Ensuring appropriate training to employees
- Providing a safe system of work.
- Providing an emergency management plan.
- Working collaboratively with emergency services agencies.

- Recording accidents involving employees and/or contractors.
- Annual monitoring workforce participation in emergency services volunteer groups and report.

4.14 Economy

Chapter 16 of the EIS described the existing local, regional or national economies that may be affected positively or negatively by the project.

4.14.1 Description of the economy—findings of the EIS

The EIS identified several short and long-term beneficial and adverse impacts associated with the project.

Potential beneficial impacts identified in the EIS included:

- Economic growth in the region and Queensland through direct and flow-on activities.
- Support for local businesses and supply chains.
- Employment opportunities and job creation.
- Skills development (skills transfer and on-the-job skills development).
- Increased household incomes.
- Population growth through additional demand for labour.
- Increased returns on properties.
- Upgrades on infrastructure.
- Additional government revenues.
- Direct equity investment opportunities (through proponent's publically-listed company).
- Improved social infrastructure (e.g. parks/ housing/ school donations).

Potential adverse impacts identified in the EIS included:

- Competition for labour.
- Labour shortages and increased cost of labour.
- Labour and skills draw-down on some local businesses and industries.
- Impacts on existing land-uses (particularly agriculture).
- Impacts on property prices/ costs of purchasing or renting.
- Infrastructure capacity constraints.
- Additional costs to government (e.g. road maintenance, provision of additional infrastructure).
- Impacts of exchange rates on exporting industries.

Overall, the proposed project would provide additional revenues of approximately $81.8 million per annum to the Queensland Government and approximately $172.8 million per annum to the Australian Government. Direct and flow-on employment would likely result in an increase in the temporary and permanent population within the general area, creating additional demand for housing. Rental prices, property values and sales prices in the local area (e.g. Springsure, Emerald), could increase at a rate above normal price growth. However, the EIS also found that despite this negative impact on demand, real estate agents in the general area reported minimal negative impact on actual sales values as a result of previous mining developments in the region.

The EIS further found that concurrent development of a number of major resources, industrial and infrastructure projects in the region would result in additional economic stimulus, providing increased demand for goods and services within the regional economy, greater support for business expansion and local supply chain development, increased job opportunities and boost in business, consumer and investor confidence. However, the EIS also outlined that this would also exacerbate the adverse impacts, especially in regards to draw-down on business, deepening skills shortages, escalating costs of production, and upward pressure on property prices as a result of increased temporary and resident population.

The EIS assessment identified a number of mitigation measures to minimise any negative impacts. These included:

- To assist minimising skills shortages in the construction and mining industries in Queensland, SCC would

develop the local/regional skills base to support the mining industry and assist existing local business retain skills and back-fill vacated positions. SCC committed to develop a workforce management plan outlining training and recruiting strategies and undertake annual reviews of contractor usage of skills development and training programs.

- SCC committed to provide opportunities for local business to secure supply contracts for the proposed project. SCC, in collaboration with Council, economic development organisations, Industry Capability Network (ICN), Queensland Government and the existing mining supply chain, intents to inform local business of the goods and services required of the proposed project, service provision opportunities and compliance requirements of business to secure contracts. SCC would progressively monitor the local industry participation plan as outlined in the SIMP.
- In order to minimise disruption of agricultural practices, SCC proposed to:
  - Continue to develop a Springsure Creek Agricultural Plan (outlined in the draft SIMP).
  - Avoid disturbance of areas designated as SCL wherever possible.
  - Where possible, lease back land within the project area that is not required for mining activity or buffer areas to enable agricultural production to continue on this land.
  - Progressively rehabilitate land in the project area as it is no longer used and/or required for mining activities.
  - Rehabilitate disturbed land to the extent practical, including re-vegetation and landscape restoration consistent with requirements for SCL.
- To minimise impacts on the local property market, SCC proposed to:
  - Develop a housing and accommodation strategy, and commit to using a workforce accommodation village to accommodate FIFO/DIDO workforce.
  - Investigate options to provide private housing for those employees who choose to migrate permanently to the region and purchase housing in a local township (e.g. Springsure and Emerald).
  - Liaise with residential construction industry bodies and local council to inform industry and the local council of residential needs and encourage third party residential development.
  - Liaise with other project proponents in the local area regarding potential to combine housing strategies and thereby reduce impacts, as well as the potential to collaboratively provide basic services to support increased population.
  - Liaise with real estate agents regarding availability of rental accommodation and impacts on property prices of workers living within the community.

4.14.2 Assessment of the EIS chapter

4.14.2.1 Submissions on the EIS chapter

As part of the EIS assessment the following comments were received:

- Private submitter outlined:
  - Concerns regarding viability of farming and reduced land values due to mining.
  - The lack of a cost-benefit analysis of the project including all impacts.
  - That impacts resulting from land removed from cropping, even for some time, were not considered.
  - The lack of addressing impacts from subsidence on land, changes of groundwater and surface water that could have impacts on agricultural productivity.
  - That the potential of skilled labour shortage in agriculture and business were not addressed.
- CHRC:
  - Outlined the need to establish a local buy program.
- DAFF:
  - Requested an estimate of the value of production that has been and continues to be generated annually from the project area. Alternatively, a project benchmark or baseline should be established from which the commitment to permanently increase agricultural yields can be assessed.
  - Outlined that the Springsure Creek Agricultural Plan should commit to coexistence with exiting agriculture

land-uses, including aims to minimise disruptions and mitigate adverse impacts to agricultural activities, and to increase production yields on affected properties.

- DCS:
  - Requested support of communication technology in the area.

4.14.2.2 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 were not part of the EIS. However, SCC committed to maintaining or increasing agricultural productivity on properties directly affected by the mine and as such is not proposing to cease farming activities or cause impacts that result in landholders not being able to farm. The proponent outlined that any disruptions to active agricultural activity on areas impacted by mining would be limited to the actual area currently being subsided and the area immediately adjacent. The proponent further outlined that farming operations would continue on the surface in areas where there is no direct mining underneath. However, where mining would take place and the active subsidence would occur, farming operations would likely cease in those areas and recommence after the initial subsidence has occurred. The proponent also acknowledged that farming practices in areas where subsidence would occur may change. In these cases, the proponent would discuss these with landholders on a paddock by paddock and longwall by longwall basis prior to the mining activity taking place.

In response to the concerns regarding reduced land values the proponent responded that the Economic Report included in the appendix of the EIS stated that the construction and operation of the proposed project would have likely negative impacts on the demand for rural land in the immediate vicinity of the project but despite this the report also stated that real estate agents in the area reported minimal negative impact on actual sales values as a result of previous mining developments in the region. SCC stated that decreased property values due to co-existing land would be restricted to those landholders directly affected by mine site infrastructure and that compensation agreements would be negotiated.

In regards to DAFF's comments, the proponent outlined that the Agricultural Co-existence Research Committee is currently developing a methodology to benchmark and measure the value of land within the project area. Once developed, data would be initially gathered on Den-Lo Park where mining is proposed to take place for the first five years. With the agreement of other landholders, data would also be gathered on other directly affected properties to develop a robust baseline for each property and paddock. SCC highlighted that it is committed to maintaining or increasing agricultural productivity on properties directly affected by the mine. Hence, the aim of the independent Agricultural Co-existence Research Committee is to research co-existence between mining and agriculture; including maintaining natural resources and agricultural productivity during mining operations and enabling restoration of agricultural productivity on areas affected by mining activities including subsided areas.

The proponent responded that DCS would be advised of the proposed communication system at the appropriate time; including opportunities for the QAS communications network to be expanded as part of SCC's network. The proponent further outlined that a draft local content strategy has been prepared and as the development of the strategy continues government agencies would be consulted.

4.14.2.3 Adequacy of the EIS amendments and proponent's response

As a consequence to the comments received during the EIS submission period, the proponent amended the EIS and submitted it to EHP for review in June 2013. In comments on the amended EIS and the proponent's response, DAFF and some public submitters stated that the amended EIS still lacked important information on estimate of the costs and value of agricultural production as well as on the proposed co-existence between mining and agriculture.

Specifically, DAFF requested the following information:

- Baseline data on production (e.g. productivity, costing, modelling, outcomes).
- Considering economic returns to affected properties.
- Agricultural land-use protection.
- Reducing uncertainty to affected landholders.
- Impact assessment should include avoidance, mitigation, compensation strategies.
- Clearly defining intentions and timelines.
- Commitments from the proponent that strategies on subsidence and related impacts to farming systems and financial modelling identified during the first five years on Den-Lo Park would be identified before other properties would be impacted.

- Statement outlining what would be done if the results do not meet expectations.
- Commitments on how to proceed if material impacts are realised by landholders and how to protect landholders from legacy issues after the mine operations ceased (e.g. rehabilitation strategies).
- Provide information on:
  - details on how costs and impacts would be captured and reviewed
  - agricultural management plans for the management of productivity, cropping practices and farming systems.
- Commitments to provide updated subsidence modelling to all potentially affected properties.

In response to DAFF's comments, the proponent discussed the abovementioned issues with DAFF during several meetings and responded in the amendment of the EIS (August 2013). In its response to the concerns regarding agricultural productivity, SCC outlined that the Agricultural Co-existence Research Committee would guide a coexistence research program that would include:

- Setting the research framework, questions and program.
- Developing criteria for selecting research providers.
- Receiving quarterly updates (progress reports/results) from the researchers.
- Timing of the research.
- Dissemination of research findings to relevant stakeholders.

The proponent also stated that the Agricultural Co-existence Research Committee prepared a draft co-existence research plan and provided it to directly affected landholders and DAFF for comment.

SCC highlighted that one of the committee's research projects is to define the term 'agricultural productivity'. Once a definition has been developed, SCC would consult with relevant government agencies on the definition. After the definition of productivity has been finalised, a baseline data would be collected, monitored and reported prior to mining commencing and across the life of the proposed project (but subject to commercial confidentiality).

In regards to the concerns regarding co-existence between mining and agriculture, the proponent has now included a co-existence policy in Chapter 1 of the amended EIS. The policy's objective is "*to mine natural resources in a way that provides an economic return for shareholders while maintaining and improving agricultural productivity on operating farming properties that are directly impacted by our mining projects*". The co-existence policy further outlined SCC's commitments to:

- Establishing and funding mine projects including the development of project specific agricultural plans.
- Involving landholders and other land-use stakeholders in the development and implementation of the project specific agricultural plans, with consideration given to the definition of productivity, the scope of productivity targets and productivity base lines with a view to no net loss of agricultural productivity.
- Complying with the regulatory operating conditions as they relate to productivity.

SCC also amended other chapters of the EIS, including Chapter 20 (Key commitments), to agricultural productivity and SCL, soils and land management.

In regards to the other concerns stated by DAFF, SCC outlined that the operators of Den-Lo Park would continue to undertake farming on the property with the aim of maintaining or increasing agricultural production over the life of the mine, and to ensure the successful coexistence of underground mining and agriculture. The management of impacts on Den-Lo Park would be informed by the research undertaken by the committee. The Den-Lo Park outcomes would then form the basis of ongoing discussions with stakeholders (landholders and government regulators). SCC would enter compensation agreements with landholders as part of the MLA process under the Mineral Resources Act.

In August 2013 DAFF reviewed the twice amended EIS and the proponent's response and advised EHP that no outstanding issues remain. The Proponent had adequately acknowledged and identified approaches to resolve DAFF's concerns. On this basis, DAFF advised "*that the proponent's undertakings, through commitments and processes as detailed in the amended EIS and associated materials, are acceptable to DAFF for the consideration of this project*."

4.14.3 Conclusion and outstanding issues

The EIS assessment process identified two key issues, namely potential impacts on agricultural productivity due to the proposed project and concerns regarding the co-existence between mining and agriculture. DAFF stated that the proponent adequately acknowledged and identified approaches to resolve these issues. However, these

proposed approaches will need to be addressed in relevant approval applications following the EIS process.

4.14.4 Proponent's commitments

The following commitments were made in addition to commitments outlined in other sections of the EIS. These include commitments outlined in the co-existence policy in Chapter 1 and key commitments outlined in Chapter 20:

- Establishing and funding mine projects including the development of project specific agricultural plans.
- Involving landholders and other land-use stakeholders in the development and implementation of the project specific agricultural plans, with consideration given to the definition of productivity, the scope of productivity targets and productivity base lines with a view to no net loss of agricultural productivity.
- Complying with the regulatory operating conditions as they relate to productivity.

Other commitments made by SCC to mitigate potential negative impacts were discussed above.

4.15 Hazard and risk

Chapter 17 of the EIS described the potential hazards and risk to people and property that may be associated with the project.

4.15.1 Summary of potential hazards and risks—findings of the EIS

A preliminary hazard analysis (PHA) was undertaken in the EIS to assess the potential impacts and risks of natural and induced emergency situations, counter disaster and rescue procedures as a result of the proposed project on resources, including forests, water reserves, state and local government controlled roads, places of residence and recreational areas. The EIS outlined that the emphasis of the PHA was on preventing or minimising hazardous incidents on-site, which may result in significant on-site or off-site consequences. The PHA identified that the baseline safety and health risk profile for the construction and operational phases varied from low to high. However, the EIS also stated, that once mitigation measures were applied, the residual risk scores were reduced to 'low' or 'medium'.

The EIS identified the following hazards with a 'medium' residual risks level during the construction phase:

- Traffic collisions due to increased traffic as a result of the proposed project.
- Exposure to high voltage or contact with electrified wires.
- Failure of the Emergency Response System (ERS). The impact of such a failure could result in off-site harm if the ERS does not contain the emergency within the Project boundaries (e.g. an on-site fire results in an off-site bushfire).
- Cumulative strain on emergency services.
- Exposing the Queensland Government to claims as a result of an on-site incident (e.g. the nearest public roads may be at risk to an on-site incident).

The EIS identified the following hazards with a 'medium' residual risks level during the operational phase:

- Traffic collisions due to increased traffic.
- Fire in coal stockpiles and CHP.
- Respirable dust from coal stockpiles.
- Pillar or roof collapse underground.
- Exposing the Queensland Government to claims as a result of an on-site incident.
- Exposure to high voltage or contact with electrified wires.
- Failure of ERS.
- Warehouse (magazine) explosion and blasting.
- Subsidence.

The EIS outlined that hazards and risks would be managed through an integrated risk management plan for the construction and operational phases. The integrated risk management would be prepared prior to the commencement of construction and would include:

- Operational hazard analysis.

- Regular hazard audits.
- Fire safety and emergency.
- Response plans, including counter disaster rescue procedures.
- Qualitative risk assessment.
- Construction safety.

While the EIS Chapter 17 outlined a summary of potential hazards and risks, the proposed mitigation measures for specific areas (e.g. traffic, waste, water, air, etc.) were discussed in each of the specific chapters.

It was concluded in Chapter 17 that the overall risks to community receptors, environmental sensitive receptors and state- and local government-controlled roads were acceptable. However, the EIS also stated that further documented action plans may be required for those hazards with a residual risk of 'medium'. SCC committed to revise the PHA prior to construction, in accordance with industry best practice. The review would reassess and develop risk mitigation strategies.

The EIS did not undertake a risk assessment for the rehabilitation phase of the proposed project as the final design landform would be subject to landholder negotiations and government obligations. Furthermore, the proponent outlined that new technologies and innovations arising throughout the project's operational life (approximately 40 years) would alter current baseline risk assessment results. SCC committed to completing a detailed risk assessment considering risks to safety and health associated with the decommissioning phase.

4.15.2 Assessment of the EIS chapter

4.15.2.1 Submissions on the EIS chapter

As part of the EIS assessment the following comments were received:

- DCS:
  - Recommended that details on specific emergency response elements and procedures be also included in the emergency response plan/SHMS in relation to flood and bushfire hazards as part of the draft EM Plan (i.e. proposed access road access for emergency vehicles and alternative escape routes from the project site during flood and bushfire events).
  - Recommended that the proposed emergency response plan and emergency complex be developed in liaison with Queensland Fire and Rescue Service (QFRS).
  - Given that the project area is to have external water supply, it is recommended that the water management system should specify measures to ensure sufficient water supply is available on site for fire-fighting purposes.
  - Outlined that hazard analysis and risk assessment should be undertaken in accordance with AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines and HB203:2006 Environmental Risk Management Principles and Processes.
  - Recommended the development of safety management plans and emergency response procedures in consultation with state and regional emergency service providers as well as providing adequate levels of training to staff who would be tasked with emergency management activities.
  - Requested that a copy of the hazards and risk assessment be provided to QAS; including access and evacuation maps for accommodation camps or villages.
  - Requested notification of planned exercises, either practical or tabletop, for attendance and participation by the QAS.
- QPS:
  - Recommended the development of a security plan in consultation with QPS.
  - Recommended that, in incidents which would trigger a QPS investigation, the proponent should include crime scene preservation requirements in any response plans in relation to incidents, particularly those involving death.
  - QPS requested involvement in the development of response plans and requires protocols included for QPS notification of incidents, particularly those relevant to the *Coroners Act 2003* and the *Police Powers and Responsibilities Act 2000*.
- TMR:

- Outlined the need for flag-lighting at access intersections from the Gregory Highway to the accommodation village or at Glenorina Road for night drivers.

4.15.2.2 Proponent's response to submissions

In response to the comments made above, the proponent addressed the concerns and updated the relevant sections of the EIS and EM Plan. The proponent also stated that fire water demand had been already accounted for within the EIS water balance model. SCC outlined that the requested emergency response elements and procedures would be included in the emergency response plan and EM Plan. The emergency response plan would be created in consultation with state and regional emergency service providers and would include requirements regarding training for relevant staff.

The proponent would also provide all emergency providers with evacuation maps for camps/villages prior to construction and operation and these would form part of the emergency response plan; including provisions for crime scene preservation requirements in relevant response plans for any criminal activities undertaken on site that would trigger a QPS investigation. Furthermore, the risk assessment relating to security risk within the EIS was revised to better reflect the risk of unauthorised entry on site. In regards to lighting at the Gregory Highway intersections with the accommodation village access and Glenorina Road, the proponent stated that it would be considered.

4.15.2.3 Adequacy of the EIS amendments and proponent's response

The proponent subsequently updated the relevant section in the EIS. No further comments were received as part of the amended EIS review.

4.15.3 Conclusion and outstanding issues

As a consequence to the comments received during the EIS submission period, the proponent amended sections in Chapter 17. No outstanding issues remain.

4.15.4 Proponent's commitments

The commitments outlined by the proponent are the similar as stated in section 4.13.4 (Health and safety), and include:

- Implementation of a safety and health management system (SHMS).
- Implementation of an emergency response plan (ERP) as part of the SHMS.
- Implementation of an emergency management plan.
- Implementation of a PHA.
- Implementation of a safety management system.
- Development of a safety data sheet register.
- Providing and maintaining a safe and healthy workplace.
- Providing responsible and effective safety leadership across all areas.
- Ensuring appropriate training to employees.
- Providing a safe system of work.
- Working collaboratively with emergency services agencies.
- Recording accidents involving employees and/or contractors.
- Annual monitoring workforce participation in emergency services volunteer groups and report.
- Monitoring of hazardous goods storage.

4.16 Ecology

Chapter 12 of the EIS described the existing ecological values that may be affected by the project.

4.16.1 Description of ecology—findings of the EIS

4.16.1.1 Terrestrial ecology

The project area was described in the EIS as representative of the wider region and landscape with more than 80% of the project area cleared and currently mapped as non-remnant. Remnant vegetation within the project area was largely confined to creek/river systems and drainage lines, and was generally observed to be highly disturbed with the ground layer often dominated by the exotic buffel grass.

Field surveys carried out as part of the EIS assessment identified several inconsistencies between the existing regional ecosystem (RE) mapping and ground-truthed vegetation communities. The EIS outlined that, for example, much of the extant vegetation community along Springsure Creek is currently mapped as composite REs containing the endangered Brigalow community RE 11.3.1. However, ground-truthing identified that Brigalow was absent from much of this area. As a consequence, the area of endangered vegetation within the project area was reduced by over 700ha. The changes between the certified map and ground-truthed data are shown in Table 2 below. SCC committed to submit a PMAV to amend the current RE mapping of the vegetation communities along Springsure Creek to the ground-truthed mapping.

Table 2 Ground-truthed regional ecosystems in the project area (adapted from the EIS)

Regional Ecosystem	Description	VM Act Class[1]	Biodiversity status[2]	Total area as per EHP map (ha)	Total area on project site (ground-truthed; ha)
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	Endangered	66.67	54.89
11.3.1/11.3.3	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus coolabah* woodland on alluvial plains	Endangered	Endangered	45.56	2.78
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	Of concern	Of concern	118.36	626.55
11.3.3/11.3.1	*Eucalyptus coolabah* woodland on alluvial plains / *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains.	Endangered	Endangered	995.63	211.61
11.3.3/11.3.1/ 11.3.25	*Eucalyptus coolabah* woodland on alluvial plains/ *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains/ *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Endangered	Endangered	8.15	0.46
11.3.3/ 11.3.25	*Eucalyptus coolabah* woodland on alluvial plains / *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Of concern	No information provided in EIS	N/A	7.69
11.4.2/11.4.9	*Eucalyptus populnea* or *E. melanophloia* on cainozoic clay plains / *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on cainozoic	Endangered	Endangered	0.43	0.43

Regional Ecosystem	Description	VM Act Class[1]	Biodiversity status[2]	Total area as per EHP map (ha)	Total area on project site (ground-truthed; ha)
	clay plains				
11.4.9	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on cainozoic clay plains	Endangered	Endangered	17.55	11.24
11.8.5	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Least concern	No concern at present	112.03	112.58
11.8.5/11.8.11	*Eucalyptus orgadophila* open woodland on cainozoic igneous rocks/ *Dichanthium sericeum* grassland on Cainozoic igneous rocks	Of concern	Of concern	67.29	27.86
11.8.11/11.8.5	*Dichanthium sericeum* grassland on Cainozoic igneous rocks/ *Eucalyptus orgadophila* open woodland on cainozoic igneous rocks	Of concern	Of concern	163.45	204.15
11.8.11	*Dichanthium sericeum* grassland on cainozoic igneous rocks	Of concern	Of concern	24.24	24.24

[1]VM Act Class - Conservation status under the VM Act
[2]Biodiversity status - Conservation status under the EP Act

The EIS stated that no listed threatened flora species under the NC Act were found during field surveys. However, a number of species were considered with the potential to occur, namely king bluegrass (*Dichanthium queenslandicum*), ooline (*Cadellia pentastylis*), finger panic grass (*Digitaria porrecta*), *Desmodium macrocarpum, Sannantha brachypoda, Wahlenbergia islensis* and *Cymbonotus maidenii*. Ninety-seven introduced weed species were identified with seven of these being classified as Class 2 under LP Act, and five are also declared as weeds of national significance (WoNS).

A total of 185 terrestrial vertebrate species were found during the field surveys, including 11 frog, 15 reptile, 134 bird and 25 mammal species. Of these, four species are listed as threatened under the NC Act:

- black-necked stork (*Ephippiorhynchus asiaticus*) – near threatened
- short-beaked echidna (*Tachyglossus aculeatus*) – special least concern
- koala (*Phascolarctos cinereus*) – special least concern
- little pied bat (*Chalinolobus picatus*) – near threatened.

One fauna species, the ornamental snake (*Denisonia maculata;* vulnerable), was considered in the EIS as likely to occur given the habitat remaining in the project area and surrounds. The EIS further outlined that the ecologists approached the predicted occurrence of conservation significant fauna species using a conservative approach. As such, analysis of impact has been based on the assumption that significant fauna species which may exist in the study area are present unless evidence to the contrary exists. As a consequence, an additional 22 listed species under the NC Act were considered as likely, or have potential to occur within the study area.

Field surveys identified 6 introduced terrestrial vertebrate species: cane toads (*Rhinella marina*), cats (*Felis catus*), house mice (*Mus musculus*), brown hares (*Lepus capensis*), rabbits (*Oryctolagus cuniculus*), and dingos (*Canis lupus dingo*). Three of these species (rabbit, feral cat and dingo) are declared Class 2 pest species under the LP Act. Another two Class 2 pest species, the red fox (*Vulpes vulpes*) and the feral pig (*Sus scrofa*), were considered, in the EIS, as likely to occur but were not observed during field surveys. The EIS further also identified spur-throated locust (*Austracris guttulosa*) plagues to occur in the Central Highlands.

4.16.1.2 Aquatic ecology

The EIS described the aquatic habitats as being heavily impacted by current land-uses. Water quality in all survey sites was found to be poor as a result of extensive vegetation clearing and nutrient inputs. Macroinvertebrate assemblages within survey sites were representative of highly impacted and degraded aquatic systems. Field surveys recorded the smart weed (*Persicaria attenuata*) and common rush (*Juncus usitatus*) as the only aquatic plant species within the study area. No listed threatened macrophytes or declared pests under either state or local laws were recorded. Nine species of fish were recorded during field surveys, of which eight are common to the wider Springsure Creek area. No listed threatened aquatic fauna species (fish or turtles) were recorded and the introduced mosquito fish (*Gambusia holbrooki*) was the only exotic species to be caught during field surveys. It was concluded in the EIS that water conductivity had the greatest influence on species diversity, followed by several other water quality factors and canopy cover. Macroinvertebrates caught during field surveys included the river prawn (*Macrobrachium* sp.), the freshwater shrimp (*Paratya* sp.) and the native freshwater yabbie (*Cherax* sp.). The introduced red claw crayfish was recorded only at the tributary flowing into West Dam.

No stygofauna were found in 13 samples from the three different aquifers that were assessed for their presence.

4.16.1.3 Potential impacts and mitigation measures

The EIS identified mitigation measures in order to minimise impacts from the proposed project to terrestrial flora and fauna communities within and surrounding the project area. No vegetation would be cleared as part of constructing the infrastructure. The MIA location would be constructed away from areas of remnant vegetation and other ecological values so that indirect impacts such as dust and noise would not be significant.

Specifically, the EIS outlined the following potential impacts on these ecological values through the following activities:

- Topsoil stripping.
- Construction of above ground buildings and facilities.
- Day and night time operation of coal mining activities.
- Stockpiling and transportation of coal resource.
- Subsidence resulting from coal mining activities.
- General transportation movements.

Of these potential impacts, subsidence was identified in the EIS as the most significant. Mitigation measures outlined included management of surface drainage flows, the development and adherence of erosion sediment control measures, re-contouring, revegetation, and rehabilitation were required.

Disturbance to remnant and regrowth vegetation, habitat connectivity and water flows

The EIS outlined that the construction of the MIA would not result in loss of remnant or regrowth vegetation as the MIA would be located on a cleared area. The closest area of remnant vegetation is located approximately 750m from the nearest above ground infrastructure (service road) and more than 1.5km from coal stockpiles, mine entrance and mine service buildings.

The EIS; however, outlined the potential for remnant vegetation to be adversely impacted by the effects of subsidence including vegetation dieback from the effects of ponding or soil cracking. Surface cracks may remain for extended periods or permanently. The presence of cracks may alter hydrological properties of the surface by providing a pathway for fertilisers, pesticides and other contaminants into shallow alluvial aquifers associated with creek lines. It was stated in the EIS, that although the project area contains swelling clay soils that naturally expand and contract with precipitation, surface cracking could occur. Hence, remediation techniques may be implemented by the proponent to mitigate surface cracks, which may include clearing of remnant vegetation. However, it was also stated that clearing of riparian vegetation to remediate surface cracking would be avoided, where possible, by using a different technique (i.e. infilling of cracking using excavators).

The environmental management strategy of the EIS outlined the following mitigation measures:

- All above ground infrastructure would be located in previously cleared areas to avoid direct clearing and impacts to vegetation and habitat.
- Vegetation located adjacent to the project area: Construction works would be appropriately marked to avoid unnecessary clearing/vegetation damage.
- Monitoring of vegetation health in remnant vegetation.

If impacts would be identified, the following adaptive management program was proposed in the EIS:

- Redirection of surface and stormwater runoff in the event that proposed surface water management system does not capture all contaminated water streams.
- The re-contouring of subsided land to reinstate natural water flows and minimise impacts of erosion or sediment build up.
- A revegetation program in the unlikely event that underground mining activities result in vegetation dieback.
- Modification to dust suppression systems to minimise any unforseen impacts of dust on adjacent vegetation communities.
- SCC further outlined the possibility to implement rehabilitation works along creek in order to increase habitat area and landscape connectivity in the local area (in cooperation of the local landowners).

The EIS identified that habitat connectivity could be impacted as a result of road infrastructure. However, fauna movement across the MIA was seen as unlikely for most species due to the cleared nature of the farmland. Nevertheless, potential impacts on larger, more mobile species were identified and would be mitigated through the construction and installation of fauna underpasses along roads that intersect with fauna corridors, should fauna mortality occur through collision with vehicles.

In the event that connectivity and water flow along creek systems would be impacted by subsidence the following measures to reinstate flow rates and direction will be initiated:

- Surface re-contouring to reinstate catchment flows throughout catchments.
- Installation of sediment deposition traps and structures within subsided areas.

Direct fauna mortality

The EIS identified that direct fauna mortality during construction would not be significant. However, the EIS also stated that vehicle collisions pose a threat to a number of species, including koalas and echidnas. Mitigation measures proposed included:

- Prior to any vegetation disturbance, a trained ecologist or other qualified environmental specialist would be on site to remove fauna. Construction areas that pose a risk to fauna would be fenced off where practical.
- Fauna crossing signs would warn drivers of areas utilised by fauna populations.
- Implementing appropriate speed limits.
- Monitoring wildlife road collision incidents to help remediate ‘high risk’ collision areas and set conditions for attending to injured native wildlife.
- Installing fauna barriers and underpasses along roads that intersect with known fauna corridors (barriers and crossings to reduce vehicle collisions with slow moving and less agile species, such as koalas).
- No domestic animals would be allowed on-site.
- Installation of nest boxes adjacent to areas to be cleared.

Dust and noise impacts

Potential impacts from dust and noise on fauna and flora were not identified as significant in the EIS. In order to mitigate any potential impacts, the following mitigation measures were proposed:

- All areas which have the potential to give rise to airborne dust such as unsealed roads, tracks and coal stockpiles would be wetted down regularly using water from environmental dams.
- Implementing speed limits.
- Areas stripped of topsoil for construction of the MIA would be rehabilitated as soon as practicable.
- Maintaining all equipment used on site in accordance with manufacturers specifications.

Weed and pest management

Weeds and pests, including spur-throated locusts, were identified as one of the most significant threats to flora and fauna within the project area. Although the EIS identified that most habitats contained high proportions of introduced plant species, particularly in the understoreys, the weed and pest management would be an important and integral part of proposed site management activities. A weed and pest management plan would be developed prior to construction and would include:

- Implementation of sediment control mechanisms to minimise the risk of weed seed washing into waterways.
- Implement control strategies as per DAFF’s and other relevant state and local government biosecurity

management strategies.

- All machinery brought to site must be certified weed free.
- Pre-construction weed mapping would be undertaken to accurately determine the extent of weeds and pests.
- Vehicle wash down procedures.
- Minimising the use of off-road vehicle movements.
- On-site waste disposal strategies (particularly for food wastes) to be employed that will not encourage the presence of pest fauna.
- Strategies for the storage of construction and operation materials/equipment to be employed that will not encourage the presence of resident pest fauna.
- Regular on-site inspections of site infrastructure/equipment for resident pest fauna and establishment of register for pest sightings.
- Monitoring and weed and pest inspections particularly in responses to reported outbreaks or from complaints or adjacent property owners.

Ongoing monitoring program

The proponent committed to an ecological monitoring program that would assess ecological, wetland and stream health, and the effects of subsidence on these. This monitoring program would commence before the start of mine construction activities to determine baseline environmental values. It was proposed in the EIS that throughout mine construction and operation phases, flora, fauna, wetland and stream health monitoring would be conducted bi-annually to include both wet and dry season characteristics. Riparian health and subsidence monitoring would be conducted at least annually throughout construction, operation and decommissioning to identify subsidence and monitor for subsidence related impacts to environmental values.

4.16.2 Assessment of the EIS chapter on ecology

4.16.2.1 Submissions on the EIS chapter

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

- Private submitters:
  - Outlined concerns about the wellbeing (traffic, noise, air and light impacts) and safety of native animals, especially the local koala population.
  - Outlined the lack of flora and fauna surveys and data.
  - Outlined concerns regarding impacts on remnant vegetation and possible dieback due to subsidence/ponding, especially along Springsure Creek.
  - Outlined impacts on riparian vegetation along Springsure Creek due to remedial clearing (ripping) to mitigate cracking.
- CCC:
  - Requested more detailed statement on vegetation management and the enhancement of habitat connectivity.
  - Outlined that it would be in the interest of SCC if early (pre-mining) effort is made to improve the diversity and stability while at the same time demonstrating sound management of agricultural enterprise.
  - Requested further information on methods on vegetation restoration through direct intervention, encouragement of natural seeding and strategic management of stock grazing/ grazing exclusion.
  - Requested greater examination on water management issues and developing operational and rehabilitation practices to contribute to a net gain in regional biodiversity and habitat connectivity.
  - Requested more information on how appropriate offsets could be negotiated, secured with a realistic tenure or covenant and eventually transferred to a form of long-term state tenure or secure private ownership.
- DAFF:
  - Outlined the requirements under the Fisheries Act in regards to directly or indirectly increase water velocities within waterways or waterway diversions to a level that would prevent fish movement through a structure outside the MLA.

  - Requested further information whether commercial quantities of privately-owned (freehold land) forest products would be used.
  - The EIS should include a management strategy for pest animals. This should be cross-linked to the EM Plan.
  - Requested further information on the potential impact and management strategies in regards to migratory and spur-throated locusts that can damage cropping areas. The EIS should describe how this potential risk would be managed in accordance with local and regional priorities. Any process should be developed in collaboration with state and local authorities to enable aerial control work. This should be cross-linked to the EM Plan.
  - EIS should outline the actions to be taken to prevent pest animal species increasing in number as a result of the proposed project. Consideration should also be given to how materials, equipment, structures and waste (including putrescibles) associated with the construction and operations of the mine and related infrastructure would be managed to ensure pest species do not increase.

- DNRM:
  - Requested to correctly reflect the legislative requirements of the VM Act.
  - Requested a property map of assessable vegetation (PMAV) mapping to reflect the ground-truthed mapping conducted within the project area in order to amend the certified mapped regional ecosystems (RE).
  - Outlined inadequate stygofauna sampling and requested to sample the quaternary alluvium for stygofauna.
  - Requested further information on potential impacts on groundwater dependent ecosystems (GDE; refer to section 4.8).
- EHP:
  - Outlined the requirements under the NC Act.
  - Outlined the need for further flora and fauna surveys within the MLA.
  - Outlined that the project design and any changes to hydrological flows should be designed and managed to ensure that the wetland of high ecological significance can maintain ecological functions before, during and after mine operation. An impact assessment would need to be carried out which would state how potential impacts would be avoided, mitigated or offset.
  - Requested further 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.
  - Residual long-term impacts on state significant biodiversity values (SSBV) resulting from direct subsidence impacts and managing subsidence would need to be fully assessed. If mitigation of impacts would not be possible, an offsets strategy should be prepared.

4.16.2.2 Proponent's response to submissions

In response to the concerns that wildlife would be impacted by the proposed project, the proponent outlined that in addition to the mitigation measures to reduce the risk of fauna mortality, SCC would develop policies and procedures for all staff using local roads, including awareness of the presence of local fauna and what to do in the event of an incident. The proponent also outlined that due to the distance between the main source of noise and the fauna habitat, no significant impacts from noise would occur on terrestrial fauna. In regards to impacts on vegetation due to ripping, SCC noted that ripping is one of many mitigation measures proposed.

Several comments were received regarding insufficient flora and fauna surveys. In response to these, the proponent carried out additional fauna surveys from 31 May–5 June 2013. However, SCC also outlined that while the new data had no effect on the assessment of the potential presence of listed fauna species in the EIS, the precautionary principle was applied when addressing the potential presence of threatened species.

In regards to CCC's comments the proponent responded that a detailed vegetation management plan including any restoration works would be part of the EM Plan. However, the EIS was amended to state that "*SCC will also investigate the potential for carrying out rehabilitation works along creek lines in the Project area and surrounds. This would have the effect of increasing both habitat area and landscape connectivity in the local area. However, this can only be carried out in consultation and with the cooperation of the local landowners*." According to the proponent, this would have the effect of increasing both habitat area and landscape connectivity in the local area. However, this would be carried out in consultation and with the cooperation of the local landowners.

In regards to potential impacts on the existing koala population along Springsure Creek, the proponent stated that a specific species management plan would be developed for the koala. Furthermore, SCC reported that Central

Queensland University is currently conducting a trial of koala habitat restoration in the Springsure Region in conjunction with funding by Xstrata Coal. SCC stated it would investigate opportunities to assist with this project.

In terms of DAFF's comments on fish movement in Springsure Creek and pest management, the proponent included a commitment that water velocities would not be increased to a level which would prevent fish movement through a structure outside the MLA. Furthermore, a pest and weed management plan would be developed within the EM Plan, which would include a framework for managing weeds and pest species; including potential risks to biodiversity, cropping and human health. SCC also stated that details of the pest management would be developed and implemented before construction commences through consultation with DAFF.

As a result of DNRM's comments in regards to GDEs and stygofauna, sections in the groundwater chapter have been amended. The proponent further stated that PMAV map would be submitted to amend the current RE mapping to reflect the ground-truthed mapping conducted within the project area in due course.

In regards to EHP's comments, the proponent stated that the ecology chapter has been reworded to more closely align with the provisions of the NC Act and to address ecological impacts as a result of watercourse subsidence. Impacts on were based on the physical impacts discussed in the surface water chapter and would be managed according to the Central Queensland Mining Industry Guideline for watercourse subsidence.

Regarding the comments made in respect to offset requirements, the proponent stated that offsets would only be required in the event that mitigation measures do not prove sufficient to prevent habitat loss or decline in values. No remnant/regrowth vegetation would be cleared for construction. The proponent outlined that potential indirect impacts on vegetation, such as dieback or loss (due to mining activities, particularly subsidence), would be monitored and if necessary mitigated. SCC further stated that in these events, rehabilitation programs would provide a means to reinstate the vegetation community. If these measures show that impacts on vegetation cannot be mitigated, offsets would then be provided. SCC further stated that it is not anticipated that offsets would be required as the impacts to vegetation associated with the proposed project are considered manageable. The rehabilitation activities proposed in the EIS would be in place solely to provide a net benefit to the local flora and fauna communities and environment. However, as a result of the comments received, the EIS was expanded to set out the process of developing, approving and implementing an offsets strategy, should such measures be found to be required. Offsets for potential impacts on downstream vegetation communities were also now included (refer to section 4.18 Biodiversity offsets).

4.16.2.3 Adequacy of the EIS amendments and proponent's response

In the review of the abovementioned amendments made to the EIS and the proponent's response received by EHP in June 2013, DNRM outlined matters that were not adequately addressed in relation to GDEs and stygofauna.

Groundwater dependent ecosystems

In regards to GDE, DNRM stated that according to the National Atlas of Groundwater Dependent Ecosystems, a high potential for groundwater interaction exists in a significant portion of the project area. The EIS stated that the predicted maximum drawdown of 0.5m (which would be permanent) would be comparable to natural system variability. However, DNRM is concerned regarding this assumption as no evidence was provided to prove this assumption. If fractures propagate into the basalt there may be significant effects on the deeply rooted components of GDEs. There is no evidence to suggest that these potential GDEs can survive a drought coincident with a permanent drawdown of 0.5m. Hence, DNRM requested to change the wording in the EIS to account for the uncertainty.

Stygofauna

DNRM noted that the ecology report of the EIS stated that the majority of stygofauna that have been collected to date have been in alluvial aquifers, but that alluvial aquifers do not occur in the study area. Furthermore, the EIS outlined that stygofauna sampling may have been inadequate.

In DNRM's first submission, it requested that the ecology chapter should be amended to make it consistent with the groundwater report. This has not been done. Furthermore, the original EIS stated that bores were purged prior to sampling. DNRM pointed out that this was inconsistent with WA Guidance No.54 and 54a. In response the proponent has simply stated that bores were not purged prior to sampling. It appears that the stygofaunal sampling was carried out during groundwater quality assessment. It is standard procedure to purge bores before sampling for water quality. This then raises the question of whether bores were sampled adequately for water quality, if they were not purged. The best way of establishing how sampling was carried out is through reference to the consultant's report, which was not provided as a technical appendix to the EIS. Hence, DNRM outlined that the EM Plan should include a commitment that monitoring bores to be established in the alluvium will be sampled for stygofauna in a manner consistent with the WA Guidance No.54 and 54a. Furthermore, DNRM further advised that it is still unclear how the statement from SCC that "*bores at the top of the basalt will enable the monitoring of alluvium*" will work in practice. Further advice on methodology for monitoring groundwater in the alluvium and basalt will be required to DNRM when the application under the Water Act is submitted.

4.16.3 Conclusion and outstanding issues

As a consequence to the comments received during the EIS submission period, the proponent amended sections in Chapter 12. However, as the presence of stygofauna has not been assessed adequately, the EM Plan would need to include commitments that monitoring bores would be established in the alluvium and sampled for stygofauna in a manner consistent with the WA Guidance No.54 and 54a. Furthermore, DNRM requires advice on methodology for monitoring groundwater in the alluvium and basalt required when the application under the Water Act is submitted. Potential impacts on GDE due to underground mining would also need to be addressed as part of the biodiversity offset strategy. Refer to sections 4.17 (Rehabilitation) and 4.18 (Biodiversity offset strategy) for more information.

4.16.4 Proponent's commitments

In order to minimise impacts on the natural environment and to protect environmental values the proponent has committed to several mitigation strategies involving riparian vegetation, pest management plan, compliance and environmental monitoring. These are outlined further below.

- Implementation of management plans, including:
  - A significant species management plan (SSMP) for wetland birds, the echidna, the koala, the ornamental snake and the little pied bat.
  - Management plans in regards to impacts to habitat connectivity due to subsidence of Springsure Creek.
  - Weed and pest management plan.
- Management strategies in regards to:
  - Weed and pest management.
  - Vegetation management.
  - Possible cooperation with the koala habitat restoration program through Central Queensland University.
  - GDEs.
  - Flora and fauna corridors.
- Environmental monitoring:
  - Bi-annual ecological monitoring program.
  - Vegetation monitoring and revegetation program.
- Rehabilitation and offsets.

4.17 Rehabilitation and decommissioning

The EIS did not contain a dedicated chapter on rehabilitation and decommissioning. Instead these were discussed in parts in most chapters, but especially in Chapters 3 (Project description), 5 (Land), 12 (Ecology) and 18 (Draft EM Plan). A summary of all rehabilitation commitments were outlined in Chapter 18 (Key commitments).

4.17.1 Description of rehabilitation and decommissioning—findings of the EIS

4.17.1.1 Rehabilitation during construction and operation

It was stated in the EIS that the proposed project would not be decommissioned for approximately 40 years or following depletion of the target coal resource. During the life of the mine progressive rehabilitation would be carried out as operations progress and staged treatments would be applied as soon as areas become available. All infrastructure would be removed at completion of mining. The future of on-site access tracks would be determined in consultation with the landowners and managers, as some of these may be beneficial to future land-use or to access rehabilitated sites. SCC committed in the EIS to return disturbed land back to pre-existing vegetative and habitat condition, including cropping land, cattle grazing, or native habitat.

During construction, and where appropriate, farm dams, wetlands, grassed and cropped areas cleared for the construction of the MIA and not directly supporting infrastructure would be re-contoured and landscaped once construction is complete in order to minimise erosion impacts. Progressive rehabilitation program would be employed throughout the project life to reduce disturbance to the environment. The proponent also committed to develop a pest and weed management plan to manage pests and weeds in accordance with the requirements of the LP Act and/or any local government requirements.

Rehabilitation of mine wastes and disturbed land would be carried out so that it would become self-sustaining or to a condition where the maintenance requirements are safe and consistent with an agreed post-mining land-use. The EIS further stated that rehabilitation of waterways would be achieved by maintaining current and future water quality leaving existing waterways and aquifers with water quality and quantity levels that are not degraded and that are acceptable for existing and future users within or surrounding the site.

Although the EIS concluded that no direct impacts on remnant vegetation or key fauna habitat would occur, the EIS also outlined that should any impacts occur on these habitats, rehabilitation would be facilitated through the environmental management procedures, such as pest, weed and fire management programs. Habitat features such as nest hollows and boxes and ground litter would be provided in areas managed for habitat rehabilitation.

4.17.1.2 Rehabilitation of subsided land

The EIS identified subsidence as the most significant impacts resulting from the proposed project. The proposed agricultural plan would be used by SCC as an overarching document to guide the development of land directly impacted by subsidence and would provide for the delivery of the most appropriate mitigation and rehabilitation strategies for cropping land.

The following generic progressive rehabilitation measures to mitigate subsidence impacts were proposed in the EIS:

- The establishment of a rehabilitation plan in accordance EHP guidelines.
- Subsidence would be managed progressively and involve contour ripping and re-contouring of landscape to reinstate natural water flows within catchment.
- Subsidence crack remediation would include:
  - 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.

  Surface cracks would be managed progressively and continually monitored. Initially, management would be based on shallow ripping. However, in the event that surface cracks reappear after two treatments, a deeper ripping and excavation program may be utilised.
- Sediment traps and flow modification devices (natural debris) would be utilised within subsided creek systems to reinstate surface bed topography.
- Ponding management would include the re-establishment of free drainage in areas of excessive ponding by excavating small drainage channels.
- In the event that remnant vegetation would be impacted, a revegetation program would be initiated using species representative of the RE impacted. Revegetated land would be surveyed periodically to quantify success of rehabilitation works.

4.17.1.3 Soil management

The EIS outlined that topsoil would be removed from the area of the initial cut to access the underground drifts and would be used for the construction of dams, internal access roads and footings for the MIA buildings. Hence, the EIS concluded that no storage of topsoil would remain from this area.

Soil studies undertaken as part of the EIS identified that the volumes of topsoil and subsoil available from within the project's disturbance area would exceed expected soil volume requirements for complete rehabilitation. Topsoils and subsoils would be stripped, handled and stored following industry practice to prevent excessive soil deterioration. SCC would also maintain an inventory of available soils to ensure adequate materials would be available for planned rehabilitation activities.

The proposed soil management outlined in the EIS would entitle the following management measures in regards to stripping, stockpiling and re-spreading of soil:

- Stripping
  - Prior to stripping all vegetation would be cleared progressively to the minimum area required for works at any time.
  - Training of earthmoving plant operators and supervises.
  - Care will be taken to ensure soil moisture conditions are appropriate.

- Stockpiling
  - Soil would be stockpiled until it is reused and away from drainage lines.
  - Drainage would be diverted around stockpiles and maintained to ensure proper functioning.
  - Topsoil stockpiles would be formed in low mounds with a 1:4 slope gradient.
  - Long term stockpiles (>6 months) would be deep ripped and sown with local grass seed-stock and legumes in order to keep the soil healthy and maintain biological activity.
  - Weed and pest species establishment in stockpiles would be monitored and controlled.
- Re-spreading
  - Careful removal of soils from stockpiles to minimise structural degradation.
  - Selective placement of more erodible soils on flatter areas and not on steeper slopes to minimise erosion.
  - Spread of soil in even layers at a thickness appropriate for the intended land-use.
  - Contour ripping to encourage rainfall infiltration and minimise runoff.
  - Reseeding as soon possible after respreading to establish vegetation cover.
  - Installation of slope drainage control to limit slope lengths and runoff velocities.
  - Installation of collection drains and catch dams to collect runoff and remove suspended sediment.

4.17.1.4 Decommissioning

The overall project's closure objectives stated in the EIS would be legacy of a post-mining site that would be physically safe to human and animals, geotechnically stable, non-polluting and capable of sustaining agreed land-uses. These goals would be also consistent with the principles of Ecologically Sustainable Development (ESD) as required by the EP Act. SCC stated that it would ensure that adequate funds would be available to fulfil obligations and commitments for decommissioning and rehabilitation.

The EIS outlined that an environmental management strategy and plan of operations would outline in detail the criteria and performance indicators that would demonstrate that the proposed decommissioning and rehabilitation strategies were undertaken successfully and that the desired outcomes had been accomplished. Outcomes and criteria would be reviewed and revised as necessary during the closure planning process, taking into consideration:

- The results of trials and investigations.
- Changes in mine planning.
- Feedback from stakeholders.

Prior to decommissioning the proponent would prepare a mine closure and rehabilitation plan, including an assessment on the volume and types of waste generated during decommissioning. The plan would be based on best practice management and would be formulated in line with the waste management plan. A hazardous materials survey and contaminated land assessment would also be undertaken prior to decommissioning of infrastructure to allow the effective management, disposal and removal of hazardous materials. Areas with the highest potential for environmental contamination would also be assessed.

The rehabilitation outcomes for disturbed (i.e. post-mining) land, as outlined in the EIS, would consist of:

- A final landform that would be stable and not subject to ongoing slumping, subsidence or erosion which would result in the agreed post-mining landform not being achieved. Topography and surface drainage would be consistent with and complimentary to the overall landform.
- Suitable species of vegetation (sown/planted and established to achieve the nominated post-mine land-uses).
- Minimising the potential for water and wind induced erosion, including the likelihood of environmental impacts being caused by the release of dust.
- The potential for contaminated land (where mining land is to be returned to livestock production) would be suitable for grazing and would not have the potential to cause harm.
- Soil physical, chemical and biological properties would be appropriate to support the target land-use.
- Natural vegetation in rehabilitated areas would have equivalent values and functions as surrounding natural ecosystems and habitats.
- The water quality of any residual water bodies would be suitable for the nominated use and would not have the

potential to cause environmental harm.

The post-mining options for water storage dams outlined in the EIS included that dams that would not be required for use by the post-mine land holder or for nature conservation would be decommissioned and in-filled to ground level and either revegetated or returned to agricultural production. Dams that would be retained for nature conservation would be dewatered and any saline sediment or sludge would be excavated, treated and disposed of in an appropriate manner according to sediment quality, assuming in situ management is not appropriate.

4.17.2 Assessment of the EIS chapter

4.17.2.1 Submissions on the EIS chapter

The topic rehabilitation and decommissioning in the EIS received several comments from the following submitters during the EIS submission period. Some of these comments have been addressed as part of the land chapter (rehabilitation of subsided land) and ecology chapter (rehabilitation of remnant vegetation).

- Private submitters
  - Outlined that the rehabilitation measures proposed contradict farming/cropping needs (i.e. scour protection and revegetation).
  - Requested further information on rehabilitation of subsided Springsure Creek.
  - Outlined that the EIS did describe options for rehabilitating cropping land and methods how rehabilitation of cropping land would be achieved.
  - Outlined the lack of management plans.
  - Described that surface inseam drainage would require 2–3 pads per hectare, with sumps and one or two vertical risers that intersect the hole. This disturbance of this has not been described in SCC's description of rehabilitation and decommissioning.
  - The EIS did not address goaf drainage and impacts due to drilling and compaction of soils by machinery.
  - Outlined that rehabilitation of SCL has never been achieved in Australia.
  - Outlined the use of local seeds.
  - Questioned the proposed topsoil management.
  - Outlined that no possible erosion rates were given; no management techniques described; no erosion potential for each soil type listed, no erosion monitoring program detailed, no rehabilitation measures identified, no methods to prevent or control erosion specified, and no erosion and sediment control plan included in the draft EM Plan.
  - Outlined that the proposed strategy in the EIS "*topsoil will not be stripped under wet conditions*" would cause problems with farming practices as farming projects have a timeline and can't wait for the topsoil to dry out for six months.
  - Outlined concerns regarding the proponent's ability to rehabilitate the land seeing the EIS contained inconsistency in regards to land categorisation.
- CCC:
  - Recommended that rehabilitation practices should contribute to a net gain in regional biodiversity and habitat connectivity, especially in regards to the project's capacity to aid landscape-wide improvements with respect to historical degradation.
- DAFF:
  - Outlined concerns over the use of mulching vegetation for reuse on-site during rehabilitation (i.e. the importance of weed and pest management as part of rehabilitation).
  - The EIS should commit to detailed planning for the rehabilitation of affected land, including addressing subsidence (including all earthworks and soil renovation procedures); the infrastructure to control runoff on dryland area; and distributing water to irrigated areas and the agronomic approaches that would be adopted to improve agricultural productivity.
- EHP:
  - Requested that the EM Plan must identify the rehabilitation schedule for the initial period of progressive rehabilitation, as well as specific rehabilitation criteria to meet the objectives already identified in the EIS and EM Plan.

- FBA:
  - Requested actions that would be undertaken by SCC to achieve the rehabilitation and decommissioning outcomes described in the EIS.
  - Outlined that seeds for revegetation should be sourced from endemic species of local provenance to ensure the area being rehabilitated reflects, as closely as possible, the surrounding vegetation.
  - Requested description of actions that would be undertaken to achieve the rehabilitation of disturbed areas in regards to subsidence mitigation.

4.17.2.2 Proponent's response to submissions

In response to the landholder's comments on the lack of describing options for rehabilitation of cropping land, subsidence, cracking and goaf drainage, the proponent responded that it is "*inappropriate to develop management plans prematurely without adequate information. For example, with mining not scheduled to take place on some properties for a number of years it is inappropriate to develop management plans based on current cropping regimes and farming practices, and without consideration of technological advancements in farming practices and the benefit of the co-existence research and experience of mining having taken place on Den-Lo Park.*"

Impacts to vegetation were considered manageable by the proponent as no native vegetation would be cleared as part of the proposed project. The proponent stated that it is committed to provide a net benefit to the local flora and fauna communities and environment by improving vegetation communities along Springsure creek; with the effect of increasing habitat area and landscape connectivity in the local area. This would be carried out in consultation with landowners. In the event of vegetation dieback loss of remnant vegetation, the proponent stated that rehabilitation programs would provide a means to reinstate the vegetation community. The proponent also stated that the EIS has been amended to provide for planting using species of local provenance within the overall rehabilitation framework.

As a result of DAFF's request to consider weed management as part of mulching, the EIS was updated to reflect this. Furthermore, SCC committed to a weed survey and a pest and weed management plan which would guide the management of mulching on-site.

In regards to EHP's comments, SCC replied that the rehabilitation schedule would be as per the mine plan. Rehabilitation would be immediate and progressive following each longwall that is extracted and included as part of decommissioning works. Management plans would be developed prior to construction and operations and would be designed to maintain the ecological integrity of the individual areas which may be impacted. Long-term management options and offsets would be detailed in the rehabilitation plan, periodically reviewed and revised over time as new information becomes available that alter the predicted impacts.

As a consequence to the comments received during the EIS submission period, the proponent amended the EIS and submitted it to EHP for review in June 2013.

4.17.2.3 Adequacy of the EIS amendments and proponent's response

As a consequence of these submissions, sections relating to rehabilitation in the amended EIS were revised. DAFF still had some concerns regarding appropriate mulch management (refer to section 4.7.2.3) and recommended that management methods for mulching of green waste, species that are declared under the LP Act or declared under local government laws would need to be identified in the survey to guide best practice management and disposal of weeds.

The proponent subsequently updated the relevant section in the second amendment of the EIS in August 2013. No further comments were received as part of the amended EIS review.

4.17.3 Conclusion and outstanding issues

The discussion on topsoil management in the EIS was restricted mainly on the usage of soil due to the construction of the infrastructure (MIA and roads). However, a discussion on the potential use of topsoil to remediate impacts of subsidence on SCL was not sufficiently discussed in the EIS. As outlined in section 4.5.3 (Land) very little information was provided in the EIS on where this topsoil would be taken within the project area and how this would affect agriculture on areas where the topsoil was taken. This is of importance, as the majority of the topsoil on the MLA would be located on SCL and would probably be classified as SCL soil. As such, SCL topsoil management may be conditioned through the protection decision under the SCL Act.

EHP requires that the proponent, in liaison with DAFF and DNRM, identify specific rehabilitation outcomes for post-mining land-use and specific land-use criteria to which the proponent would be committing as a benchmark. Rehabilitation objectives and completion criteria, including topsoil management, will need to be determined for development of the draft EA conditions and provided in an amended EM Plan.

4.17.4 Proponent's commitments

In order to fulfil the rehabilitation commitments, the proponent proposed to implement the following key commitments:

- A landform with the same or similar land-use capabilities and/or suitability it had prior to the disturbance, unless other beneficial land-uses are pre-determined and agreed with key stakeholders (i.e. post-mining land owners/managers and relevant regulators).
- Rehabilitation of mine wastes and disturbed land so that it is self-sustaining or to a condition where the maintenance requirements are safe and consistent with an agreed post-mining land-use.
- Development of a rehabilitation plan.
- Implementation of a progressive rehabilitation program.
- Implementation of a weed and pest management plan.
- Development of an environmental management strategy and plan of operations.
- Development of a decommissioning and closure plan throughout operation of the mine.

Land management

- Development of rehabilitation actions for each domain or landform (to be incorporated into the plan of operations).
- Implementation of an agricultural plan:
  - As an overarching document to guide the development of land directly impacted by subsidence.
  - Delivering appropriate mitigation and rehabilitation strategies for cropping land (determined through consultation with landholders and statutory agencies).
  - Regular audits of the agricultural plan to determine whether rehabilitation were in accordance with EA conditions.
- The Agricultural Coexistence Research Committee would inform on the most appropriate mitigation and rehabilitation strategies for cropping land.
- Topsoil and subsoils management, including monitoring, auditing and maintaining a running balance of top soil harvested (excavation) versus top soil used (rehabilitation).

Subsidence rehabilitation

- The subsidence management framework as part of ongoing rehabilitation objectives and commitments (including rehabilitation or remedial subsidence management practices).
- Subsided land and areas exposed during construction and not used in operational phase would be re-contoured and re-vegetated.
- Impacted drainage lines and watercourses would be re-contoured and re-aligned where necessary to restore current flow patterns.
- Ponding would be addressed by re-contouring and levelling the land surface to ensure that natural drainage channels are reinstated.
- Areas of natural vegetation would be managed through progressive rehabilitation and management.
- A revegetation program would be developed in the event that subsidence leads to dieback of vegetation communities. The program would be designed to maintain species diversity and ecological functioning of the subsided areas.

Water and dam management

- In the event that groundwater bores of local residences are impacted from dewatering activities, to the extent that the bore was unusable, SCC committed to re-installing new bores to service the property.
- Any landholder bores located in areas of significant drawdown, which result in an inability or reduction in access to groundwater volumes, would be deepened or replaced.
- Implementation of a stream rehabilitation program in areas of significant erosion and sedimentation rates.
- In the event that connectivity and water flow along creek systems would be impacted by subsidence the following measures would be carried out:

  - Impacted drainage lines and watercourses would be re-contoured and re-aligned where necessary to restore current flow patterns.
  - Sediment capture traps and structures would be installed within creek beds which have been impacted by subsidence. These measures would be designed to aid creek bed structures to redevelop to pre-impact state.
- All erosion control structures for channelling or dispersing water would be functional, stable and safe. Geotechnical assessment shows that all retained erosion control structures are functional, stable and safe.
- Implementation of a restoration program where significant erosion and sedimentation would occur.
- Dams not required for use by the post-mine landowner or for nature conservation would be decommissioned and in-filled to ground level and either revegetated or returned to agricultural production.
- Dams to be retained for nature conservation purposes would be dewatered and any saline sediment or sludge would be excavated, treated and disposed of in an appropriate manner.
- All dam structures remaining in place would be stable and safe for humans, wildlife and stock. An audit would be undertaken to confirm the structural stability and safety of remaining dam structures.

Infrastructure rehabilitation

- The future of on-site access tracks would be determined in consultation with the landowners and managers, as some of these may be beneficial to future land-use.
- SCC would enter into formal agreements regarding the upgrade, maintenance and rehabilitation of the access to the mine site, particularly the last 10km of Wyntoon Road.
- Drifts would be sealed and closed to ensure no access or future risk of subsidence.
- Grassed and cropped areas cleared for the construction of the MIA and not directly supporting infrastructure would be re-contoured and landscaped once construction is complete in order to minimise erosion impacts.
- As part of mine closure planning, SCC would engage with CHRC to discuss any potential future use for the accommodation village.

Waste management

- Implementation of a waste management plan to manage the remaining waste on the project site in the final phase.
- A hazardous materials survey and contaminated land assessment would be undertaken prior to decommissioning of infrastructure for potential environmental contamination at high risk areas (e.g. workshop, chemical and fuel storage and transfer area; MIA; CHP; dams and stockpiles).

4.18 Biodiversity offsets

The EIS did not contain a dedicated chapter on SCC's biodiversity offset strategy. Instead, the offset strategy was included in the EIS Chapter 12 (Ecology).

4.18.1 Proposed biodiversity offset strategy

The EIS described that potential impacts of the proposed mining activity were assessed in ecological investigations using ecological equivalence methodology to identify biodiversity values. The following SSBVs were identified for the project area:

- Six endangered REs (four comprising composite polygons)
- Five of concern REs (three comprising composite polygons)
- High value regrowth containing endangered REs
- High value regrowth containing of concern REs
- Remnant vegetation along watercourses
- Connectivity vegetation
- Threatened species habitat.

The EIS concluded that although a range of SSBVs occur in the project area, none of these would be directly impacted as the above-ground infrastructure would be located on land that has already been cleared of remnant

vegetation and no remnant vegetation would be cleared within the project area.

However, the EIS identified the potential for future subsidence impacts from underground mining to the 'of concern' and 'endangered' REs, potential koala habitat along Springsure Creek and downstream riparian vegetation communities. Other impacts identified included changed hydrology leading to ponding resulting in tree dieback, and also potential re-contouring or ripping associated with remediation efforts causing impacts to vegetation.

The EIS estimated that the maximum area of potential indirect impact taking the worst-case scenario (i.e. all remnant vegetation within the project area) would be 1317.62ha. However, the EIS concluded that with appropriate mitigation measures, including a detailed, staged monitoring program, no residual impact would remain. However, in the case of irreversible impacts on SSBVs due to subsidence or remediation activities these permanent and adverse impacts to habitat would be offset.

Potential indirect impact of subsidence on remnant vegetation and Springsure Creek (including associated downstream vegetation communities) would be monitored through the life of the project. Similarly, should subsidence and subsequent vegetation/habitat degradation be detected, the proponent proposed the following mitigation measures and offsets:

- The use of ecological equivalence assessment methodologies to quantify potential offset requirements.
- The identification of potential offset areas that occur on land owned by the proponent and on neighbouring properties.
- Consultation with state and Commonwealth agencies to secure offsets.
- Identification of the potential for alternative biodiversity offset strategies such as offset transfers or payments as described under criteria B1 within the QBOP.
- Preparing a biodiversity offset management plan that would include:
    - rehabilitation and planting requirements
    - ongoing monitoring and maintenance
    - weed and pest management
    - fire management
    - flood management.

An overarching strategy was proposed, incorporating the requirements of the Commonwealth's Offset Policy Statement, as well as any offsets required for the interrelated components that were not assessed as part of this EIS.

Biodiversity offset strategy and management plan

The EIS outlined SCC's biodiversity offset strategy was prepared in accordance with the QBOP. This strategy was set out to offset any residual impacts that are unable to be avoided or reduced through design, mitigation and environmental management. The aim of the offsets strategy and management plan would be to provide an overall net environmental gain and would provide solutions that:

- Will protect against or repair residual impacts to matters of Commonwealth and state environmental significance.
- Relate specifically to the matter (for example, species or their habitat) being impacted.
- Seek to ensure that the health, diversity and productivity of the environment are maintained or enhanced.
- Will include key steps for development and implementation:
    - Step 1: Identifying and quantifying residual project impacts.
    - Step 2: Identification of applicable offset requirements to address residual project impacts.
    - Step 3: Smart consolidated approach to meeting offset requirements—finalisation of draft strategy.
    - Step 4: Relevant agency input and approval of offsets strategy.
    - Step 5: Implementation of offsets strategy.
    - Step 6: Ongoing monitoring of offsets strategy.

Throughout each of these steps, consultation would be undertaken with key stakeholders including state and Commonwealth government departments and interested community groups.

Potential offset activities

SCC proposed to achieve a synergistic habitat and conservation benefits including:

- Vegetation rehabilitation: Management and monitoring approach for vegetation patches in an effort to increase the overall coverage and connectivity of such communities in the immediate vicinity of the project area and locally.
- Weed and pest management.
- Nest hollows: Installing artificial nest hollows to offset any loss of hollow-dwelling habitats for birds, bats, gliders, etc.
- Offsetting greenhouse gas emissions: Evaluating the best way in which habitat offsets and revegetation could be integrated with carbon sequestration.

SCC also committed to investigate other programs being conducted locally, regionally and nationally to determine if it could provide information (such as ongoing monitoring data), research assistance, in order to get a higher net benefit for the environment through indirect offsets.

4.18.2 Assessment of the proposed biodiversity offset strategy

4.18.2.1 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.

- Private submitters:
  - Questioned if mitigation strategies were a viable option why was the need for offsets of remnant vegetation values proposed.
  - Outlined the need to mitigate and offset potential impacts on vegetation due to ponding (killing trees and degrading the ecosystem).
- CCC:
  - Requested further information on how appropriate offsets would be negotiated, secured and transferred to a form of long-term state tenure or secure private ownership.
  - Outlined that early and continuous restoration work on fragmented endangered habitat should be a requirement of offset conditions.
- DNRM:
  - Outlined possible Vegetation Management Offsets (Offset Policy) as part of the PVMP.
- EHP:
  - Outlined that residual long-term impacts on state significant biodiversity values (SSBV; including impacts on GDE) resulting from direct subsidence impacts, managing subsidence and altered groundwater, would need to be fully assessed. If mitigation of impacts would not be possible, an offsets strategy would need to be prepared, consistent with Queensland's Biodiversity Offset Policy 2011 (QBOP).
  - Requested commitments in the subsidence management framework to managing potential residual long-term impacts from subsidence on biodiversity. Any remedial works or commitments made in the EM Plan would need to ensure that impacts of subsidence on biodiversity values will not be worsened. Where impacts on SSBV cannot be avoided, an offset strategy would need to be provided.
  - Requested offsets that must be provided for the permanent loss (take) of near threatened, vulnerable and endangered plants to achieve an equivalent or better overall outcome at a regional scale in accordance with the QBOP.
  - Requested that the project design and any changes to hydrological flows should be designed and managed to ensure that the wetland of high ecological significance can maintain ecological functions before, during and after mine operation. An impact assessment would need to be carried out which would state how potential impacts would be avoided, mitigated or offset.

4.18.2.2 Proponent's response to submissions

In regards to the comments made above, the proponent stated that no offsets would be required as no remnant vegetation would be impacted. Rehabilitation activities proposed by the proponent would only be undertaken to provide a net benefit to the local flora and fauna communities and environment. However, in the event of vegetation

dieback or loss the proponent would provide a rehabilitation program to reinstate the vegetation community. Offsets would only be provided if mitigation measures do not prove sufficient to prevent habitat loss or decline in values. However, the proponent outlined that the biodiversity offsets strategy in the amended EIS was expanded to set out the process of developing and implementing an offsets strategy, should such measures be required. This included offsets for potential impacts on downstream vegetation communities. SCC noted DNRM's comments and committed to a PMAV and the relevant policy for the delivery of vegetation management offsets.

In response to the comments made on impacts due to ponding, the proponent responded that the outlined proposed impacts outlined in the EIS were unmitigated impacts. Mitigation measures would be implemented to reduce these risks. Hence, the proponent amended the EIS to provide further clarification.

In regards to CCC's comments, the proponent stated that several management plans (subsidence management plans, species management plans, significant species management plans and vegetation management plans) would be developed prior to construction. These plans would detail how management and mitigation of stream beds and vegetated areas would be carried out to ensure impacts would be mitigated and or rehabilitated; as well as maintaining the ecological integrity of the individual areas. SCC further replied that it intended improving vegetation communities where possible in consultation with landowners, DNRM and EHP. Long-term management options and offsets would be detailed in the rehabilitation plan, periodically reviewed and revised over time as new information becomes available that alter the predicted impacts.

4.18.2.3 Adequacy of the EIS amendments and proponent's response

As a consequence of these submissions, sections relating to offsets were amended in the EIS and resubmitted. No further comments were made in regards to offsets in the agency review.

EHP accepted SCC's strategy to observe if the proposed project would have any impacts on any SSBVs; including GDE. However, should impacts occur on any of these biodiversity values after mitigation measures were applied, SCC would need to offset these impacts. This would need to be conditioned as part of the approvals process (see below).

4.18.3 Conclusion and outstanding issues

Although EHP acknowledged that potential impacts on SSBVs (including GDE) are difficult to predict, underground mining has the potential to impact on biodiversity due to subsidence impacts and changed groundwater conditions. Other mining impacts, such as vegetation clearing and impacts due to noise, dust, air and traffic, could also occur. For example, remedial vegetation clearing may be necessary along creek lines or remnant vegetation to rectify cracking impacts. EHP further notes that the identified SSBVs in the EIS did not include listed threatened species. The biodiversity offset strategy for the project must include all potential impacts on biodiversity values.

A biodiversity offset strategy will need to be prepared as part of the approvals process and will need to be finalised before commencement of construction and operations. As part of this offset strategy, ecological assessments will need to be carried out prior to construction such that values for the potentially impacted communities and SSBVS are known. Due to the uncertainty of the residual effects from subsidence, the strategy could propose to stage offsets over the 40-year life of the proposed project, whereby a 'worst-case' scenario of SSBVs potentially impacted by the proposed project are included in a QBOP-compliant offset strategy.

5 Adequacy of the environmental management plan

The draft EM Plan developed through this EIS process has included input from EHP, other Queensland Government departments, 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 water management, subsidence management, auditable commitments and many other unresolved issues. 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 requirements, 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 development of 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.

6 Recommendations about the suitability of the project

In this EIS process the detailed information compiled by SCC about the environmental values of the proposed Springsure Creek Coal Mine Project (including the MIA), 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 complied with the terms of reference 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 under each section of this EIS assessment report. This report requires that these outstanding matters be addressed prior to the project proceeding.

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. This assists the administering authority prepare a draft EA for a project. The submitted draft EM Plan for the proposed Springsure Creek Coal Mine 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 discussed throughout this report, but should include the following major issues:

- **SCL and subsidence management:** SCC in liaison with DAFF and DNRM will need to identify specific rehabilitation outcomes for post-mining land-use and specific land-use criteria to which SCC will be committing as a benchmark. Rehabilitation objectives and completion criteria, including topsoil management, will need to be determined for development of the draft EA conditions. Regardless of EHP's approval process, a SCL protection decision would be required before any EA and ML can be issued and mining could commence. The SCL protection decision application for the Springsure Creek Coal Mine Project would be assessed in line with the requirements of the SCL Act (refer to sections 4.5.3 and 4.17.3).
- **Traffic and road use management:** SCC will need to revise the RUMP if there are any material changes in estimated project traffic; finalise the RUMP including any further investigations of potential road safety hot-spots on the network from project traffic; and apply for necessary permits for over-dimension loads and road corridor permits (refer to section 4.6.3).
- **Water quality monitoring program:** Further information will be required from the proponent and negotiation conducted between EHP and SCC on the details of draft conditions, including the water quality release. Further monitoring may be required to inform decisions on these limits as well as to determine appropriate monitoring trigger limits for the EA (refer to section 4.8.4).
- **Groundwater monitoring program:** SCC will need to prepare a groundwater management strategy that will clearly articulate how the proposal for an adaptive management will be developed and implemented prior to construction and mining activities taking place. Evaluation and continued monitoring of the vertical hydraulic conductivity will also need to be continued for the Rewan formation (refer to section 4.8.4).
- **Air quality:** The proposed air quality monitoring program and air quality management plan will need to demonstrate the ability to meet and implement appropriate mitigation measures to ensure air emissions will be in line with the model mining conditions (version 4). This needs to be demonstrated in the EM Plan to determine relevant standards for the development of the EA (refer to section 4.9.3).
- **Noise and vibration:** The noise management strategy will need to demonstrate the ability to meet and implement appropriate mitigation measures to ensure noise emissions will be in line with the model mining conditions (version 4). This needs to be demonstrated in the EM Plan to determine relevant standards for the development of the EA. The EIS stated that cumulative impacts would be considered and cumulative impacts need to be assessed when preparing the draft EA (refer to section 4.10.3).
- **Social values:** SCC will need to include Aboriginal and Torres Strait Islander recruitment, training and employment strategies. SCC is to continue to monitor the housing and rental markets and will need to include fatigue management and other road safety issues in the SIMP (refer to section 4.12.3).
- **Co-existence:** The EIS assessment process identified two key issues, namely potential impacts on agricultural productivity due to the proposed project and co-existence between mining and agriculture. While the proponent

has acknowledged and identified approaches to resolve these issues, proposed approaches will need to be addressed subsequent to the EIS assessment process (refer to section 4.14.3). Once the Regional Planning and Development Bill is passed and enacted, future decisions in relation to mining activities proposed with this project, including applications for an EA or amendment to an EA under the EP Act, would have to meet the requirements of the new Act and any subordinate legislation (including, for example, any finalised co-existence criteria).

- **Ecology:** The EM Plan would need to include commitments that monitoring bores would be established in the alluvium and sampled for stygofauna in a manner consistent with the WA Guidance No.54 and 54a. Furthermore, DNRM requires advice on methodology for monitoring groundwater in the alluvium and basalt required when the application under the Water Act is submitted (refer to section 4.16.3).
- **Biodiversity offset strategy:** Ecological assessments will need to be carried out prior to construction such that values for the potentially impacted communities are known. Due to the uncertainty of the residual effects from subsidence, the strategy could propose to stage offsets over the 40-year life of the project, whereby a 'worst-case' scenario of state values potentially impacted by the project are included in a QBOP-compliant offset strategy (refer to section 4.18.3).
- **EM Plan:** As identified throughout the EIS assessment report, several management documents will need to be prepared during the EM Plan approvals process and/or prior construction. The EM Plan will need to demonstrate the ability to meet and implement appropriate mitigation measures in line with the model mining conditions (version 4). This will include, but is not limited, to the following documents:
    - Subsidence management plan (required as part of the EM Plan approvals process).
    - Water quality monitoring program: To develop trigger values, measure and derive local WQOs, water quality parameters and estimation of local stream flow (required as part of the EM Plan approvals process).
    - Water management plan.
    - Groundwater management plan—in consultation with Agriculture Co-existence Research Committee, landholders and relevant government departments.
    - Ongoing air quality monitoring program and air quality management plan.
    - Noise and vibration management strategy including real-time monitoring program (blasting).
    - Stormwater management plan.
    - Construction environmental management plan.
    - Erosion and sediment and control plan.
    - Receiving environment management program.
    - Biodiversity offset strategy and ecological assessment.

Additional or revised conditions relating to all matters described above will be developed once a finalised EM Plan has been submitted that substantially addresses the matters identified in Section 5 and 7 of this report. Conditions will be developed by the delegate in EHP central region in consultation with SCC 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 EM Plan being completed to address those outstanding environmental management and rehabilitation issues identified in the report, and that any subsequent EA for the project would be conditioned to suitably implement the specific environmental protection commitments set out in the EIS 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 Springsure Creek Coal Pty Ltd.

Lindsay Delzoppo	7 November 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 (No4) 2012, Queensland Government.