



Taroborah Coal Project

Environmental Impact Statement

Executive Summary

Prepared for:
Shenhua International Group Pty Ltd



EXECUTIVE SUMMARY

Introduction

This Environmental Impact Statement has been prepared in accordance with Chapter 3, Part 1 of the *Environmental Protection Act 1994* as part of the development of the Taraborah Coal Project.

The Proponent of the Taraborah Coal Project is Shenhua International Group Pty Ltd, a Brisbane-based coal exploration and development company that is a subsidiary of the Henan Shenhua Group of China.

Project Justification and Benefits

The Project will contribute towards thermal coal production in the Bowen Basin (satisfying a projected increasing international demand for this product) and provide positive flow-on effects to the local and regional economy and community as a result. The Project will directly employ up to 150 people during the construction period and up to 350 people for mine operations during the main production period. Including construction, the mine life will be 21 years, followed by a decommissioning period of approximately 12 months. In addition, many more people will be employed in support industries and will be required for periodic maintenance tasks and special projects. Whilst the goal is to draw employees from the local population, it is recognised this will not be able to supply all of the skills and experience that will be required for the Project, and therefore, staff will also be recruited from across the Central Highlands, central Queensland and further afield, if required.

It is estimated that construction of the mine facilities and associated infrastructure will add \$852 million to Gross State Product, whilst mine operations will add \$3,826.5 million. The net financial benefits of the Taraborah Coal Project have been estimated at \$1,903 million.

Project Description

The Taraborah Coal Project is located in the Bowen Basin, Queensland, Australia, approximately 22 kilometres west of the town of Emerald, as shown in Project Location figure below. It is located entirely within the Central Highlands Regional Council local authority area. The Taraborah Coal Project Environmental Impact Statement study area comprises 5,195 hectares and is contained wholly within Mineral Development Licence 467 (7,966 hectares).

Project infrastructure and features include:

- In-pit and out-of-pit spoil dumps;
- Opencut pit;
- Underground mine workings;
- Coal Handling and Preparation Plant plus associated buildings;
- Site access and haul roads;
- Site offices, workshops and maintenance areas;
- Fuel, oil and chemical storage areas and vessels;



- Run of mine, product and topsoil stockpiles;
- Clean and dirty water management and drainage systems including sediment dams;
- Mine wastewater dam and Coal Preparation Plant water recycle dam;
- Potable water treatment facility for staff use and consumption;
- Visual amenity bunds;
- Sewage treatment plant;
- Overhead feeder power line;
- Electrical substation; and
- Radial stacker, train load-out system and rail balloon loop.

The Project layout is shown in Mine Infrastructure Layout figure below.

Construction

Project infrastructure that is required for both opencut and underground mining operations will be constructed over a period of approximately 18 months. Construction will be staged, with opencut mining operations being conducted concurrently with construction of the underground mine. Initially, the opencut mine and associated operational infrastructure will be established by 2018, with underground mining not expected to commence until 2022.

Operations

Resource Base

The proven and probable coal resource in the opencut and underground areas of the Project has been estimated at 202 Million tonnes. It is anticipated to mine up to 5.75 Million tonnes per annum of Run of Mine coal and 5.73 Million tonnes per annum of product coal at peak production between the years 2018 to 2038 of mine life.

Mining Method and Equipment

The Project will initially focus on opencut mining using truck and excavator methods, followed by underground longwall mining operations. The overburden and interburden that is encountered during opencut pit development will initially be disposed of in out-of-pit spoil dumps until such time the opencut pit progresses and adequate space becomes available for in-pit spoil disposal.

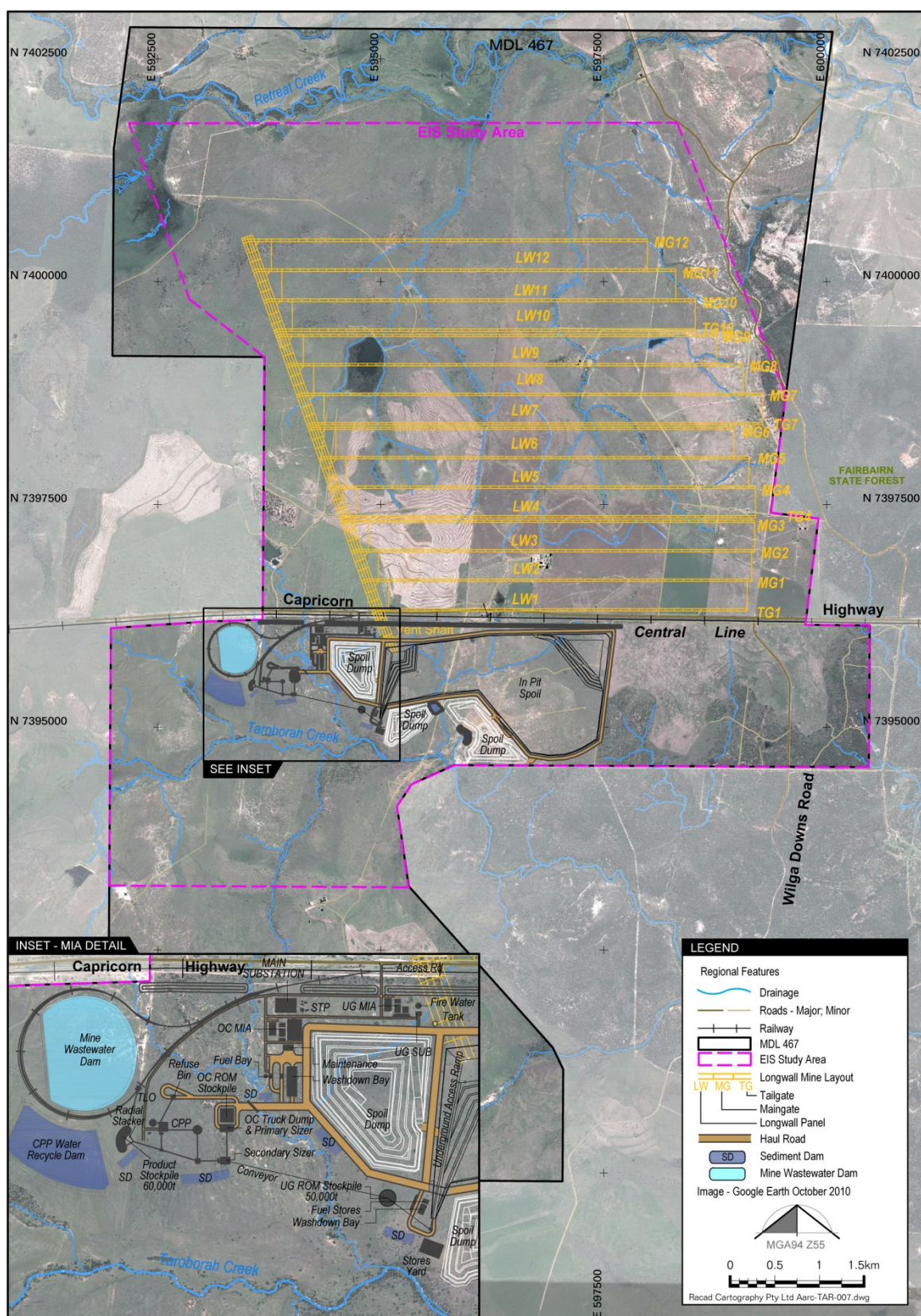
Opencut overburden extraction will be conducted via 550 tonne hydraulic excavators loading 190 tonne rear dump trucks. Once overburden has been removed, opencut coal mining will be undertaken with the assistance of 160 tonne hydraulic excavators and 90 tonne rear-dump trucks.

Underground longwall mining operations will require the use of two continuous miners for panel development and one 300 metre wide longwall system for panel extraction (primary production). The continuous miners will run in conjunction with four cable shuttle cars, which haul the mined coal from the working face to the feeder / breaker at the panel conveyor boot-end.





Project Location



Workforce

The Project workforce is estimated at 150 workers during the construction period, increasing to approximately 350 in the peak production period.

All contractor and operational staff are expected to live in Emerald or the surrounding region, either permanently or in temporary accommodation whilst on roster. Transport to the mine from Emerald will be on a bus-in-bus-out basis via a local bus service, purposely contracted to service the Taraborah Coal Project's workforce needs.

Processing

Run of Mine (ROM) coal from the opencut pit will be transported via internal haul roads to the opencut stockpile area. Material will be either directly dumped into the primary crushing facility or stockpiled for later sizing. Following secondary sizing, the ROM material will be scanned and directed to either "wash" or "bypass" streams, based upon coal type and quality.

The wash stream coal will be delivered to the Coal Preparation Plant feed stockpile. Bypass coal will be conveyed directly to the product stockpile.

Underground ROM coal will be transported to the surface and stockpiled. This material will then be sent to the secondary sizer and undergo the same scanning and directing process as for the opencut ROM coal. As the underground ROM coal will be generally of export quality, only a small percentage is expected to be diverted to the wash stream.

Coarse and fine rejects from the Coal Preparation Plant will be dewatered and conveyed to a rejects storage bin for disposal in purpose built cells located in the spoil dumps.

Product Handling

Washed and bypassed product coal will be stockpiled via a radial stacking conveyor, creating up to two product stockpiles, before being transferred to a train load out conveyor. The train load out conveyor delivers coal to the train load out bin, which transfers product coal directly to rail wagons.

Up to approximately 5.73 Million tonnes per annum of product coal will be transported from the Project site via the Queensland Rail Central West and Aurizon Blackwater rail systems to the Wiggins Island Coal Export Terminal at Gladstone.

Infrastructure Requirements

Road

The Capricorn Highway is the primary road directly associated with the Project and functions as the main access to the site.

To accommodate deliveries and workforce vehicles, the Capricorn Highway will be upgraded as it approaches the entrance to the site. Upgrades will require the construction of a new T-junction, with deceleration and acceleration lanes to allowing traffic from the highway to safely enter and exit the site.



Rail

A train load out facility and rail loop will be constructed on the Project site in order to connect the mine to the Queensland Rail Central West rail system, which dissects the Project site and connects to the Aurizon Blackwater rail system at Nogo Junction (east of Emerald) which in turn continues eastward to the Port of Gladstone.

Several railway infrastructure upgrades will be required to facilitate the transport of product coal along this proposed route, including an upgrade of the track between Taroborah and Nogo Junction, bridge strengthening along the Taroborah / Nogo Junction route, track strengthening between Nogo Junction and Burngrove, and a major upgrade of the Nogo River bridge.

Railway infrastructure upgrades will be initiated following Project approval and will occur simultaneously with the construction phase between the years 2017 and 2018.

Port

The Project proponent has entered into discussions with the Wiggins Island Coal Export Terminal consortium in order to negotiate space at this port for coal stockpiling, handling and export. It is anticipated that the first batch of coal associated with the Project will arrive at this port in 2018 for export.

Energy

The anticipated energy requirements during the construction period are approximately 1 million kilowatt hours per annum, which will be provided by diesel-fuelled generators.

During operations, the projected installed electrical power demand for the Project has been estimated at 25 Megawatts for the opencut and underground operations combined. Energy shall be supplied from the Emerald sub-station, which will have sufficient capacity to accommodate the projected energy requirements following Ergon Energy's planned upgrade of the feeder line from Blackwater.

Necessary site infrastructure for the projected energy supply include a 66 kilovolt / 11kilovolt, 25 Megavolt Ampere substation to service the Coal Preparation Plant, MIA, opencut and underground mines.

Water Storage

Water make storage requirements on the Project site shall be met by utilising one regulated dam for the storage of groundwater inflow from the opencut pit and underground mine workings, and one regulated dam for the storage of recycled process water for the Coal Preparation Plant and catchment of site water runoff.

A site water balance was conducted in order to determine the appropriate storage requirements and sizing of regulated dams, which shall be constructed in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures* (2013) to accommodate the design storage (wet season containment) allowance.



Storm Water Management

Three protection bunds will be required during the initial stages of opencut production to prevent overland flows arising from storm events to enter the opencut pit and mine infrastructure area, two protecting the northern and eastern perimeter of the opencut pit and one west of the mine infrastructure area.

These protection bunds will be constructed to a nominal height of 0.5 m and will be designed to accommodate a 1 in 1,000 year peak flow event.

Sewage

During the initial stages of mine construction, portable toilets will be installed on site for the construction crew's use. The waste generated by these toilets will be removed from site and processed by a licensed waste management contractor.

During mine operations, a self-contained sewage treatment plant (STP) will be installed on the Project site that can accommodate the up to 200 equivalent persons expected to be on site on any given day. Treated effluent from the STP will be used for dust suppression or spray irrigated over a designated area to the west of the mine infrastructure area. The sludge waste generated by the STP will be removed from site and processed by a licensed waste management contractor.

Telecommunications

The main telecommunications infrastructure associated with the site is a single mode optical fibre cable (NextGen) running parallel with the Capricorn Highway and an underground telecommunications network (Telstra).

Areas of fibre optic and telecommunications cabling along the Capricorn Highway will be minimally affected by subsidence during the initial stages of underground mining. Relocation arrangements of telecommunication assets, if any, will be negotiated with Telstra and NextGen throughout the life of the mine.

Waste Management

Excavated Waste

Three out-of-pit spoil dumps will be utilised for the disposal of excavated waste until the opencut pit can accommodate in-pit spoil dumping.

Spoil Dumps

Spoil dumps will be constructed with a 1m deep base layer, incorporating a protective layer of foundation gravel, a clay liner, a protective layer of sand and gravel, and a drainage layer. Non Acid Forming overburden material will then be placed on top of this base layer as well as around the perimeter of the dumps, with Potentially Acid Forming (PAF) overburden material placed in the internal portions of the dumps. Spoil dump covers will then be employed to cap each spoil dump, which will be comprised of two capillary break layers either side of a clay liner. A non-woven geotextile will also be applied to the top of the capillary break in order to support vegetation growth.



Rejects

Both coarse and fine rejects will be disposed of in purpose-designed cells located within the spoil dumps. These cells will include a clay liner and eventual clay capping to prevent the ingress of air and seepage of water. The outer faces of the rejects cell will be constructed with non-acid forming waste material, preferentially with acid neutralising capacity. The inclusion of crushed limestone to provide further acid neutralising capacity will be employed as necessary.

Mine Consumables

A Waste Management Plan will be developed in order to manage the potential health and environmental risks associated with the generation, handling, storage and disposal of waste during both mine construction and operations.

In addition to the management of excavated waste and rejects, the Waste Management Plan will include the handling and disposal of mine related consumables waste such as batteries, scrap metal, building materials, waste oils and tyres. Waste will be managed in accordance with the waste management hierarchy, which moves from the most preferred (avoidance) to the least preferred (treatment and disposal) management methods.

Waste Characterisation

It was determined through geochemical analysis that 66.6 percent of the overburden and interburden material represented by samples that have been tested to date are likely to exhibit non-acid forming properties, whilst the remainder of this material (33.3 percent) exhibits potentially acid forming properties.

The coarse and fine rejects samples obtained from the coal seams were considered to possess a high risk of acid mine drainage production (potentially acid forming material) within a short time period following oxidation, resulting in a low pH eluate with high metal and metalloid concentrations.

Samples of Run of Mine coal obtained from the coal seams were also classified as potentially acid forming materials with rapid oxidation properties.

The following metals were found to leach from potentially acid forming samples from the coal seams when acidic conditions developed within these samples (pH 2.2 to 4.4): Aluminium, Cobalt, Chromium, Copper, Iron, Manganese, Nickel, Sulphate, and Zinc and at pH values of three or less, slightly elevated Boron and elevated Arsenic, Uranium and Thorium were encountered.

Rehabilitation and Decommissioning

A progressive approach to rehabilitation will be employed on the Taraborah Coal Project site. Rehabilitation objectives aim to deliver a post-mining site that can be used for low-intensity cattle grazing and broadacre dryland cropping.

Final Voids

The opencut voids will be left in a stable and safe condition by erecting a safety bund around the void and / or fencing. The main purpose of this bund wall is to stop humans and livestock from gaining access to the final void. In addition, the geotechnical stability of the final void will be assessed by a suitably qualified geotechnical engineer.



Hydrogeochemical modelling of the water quality over time as the final pit voids fill with groundwater and rainfall indicates the water quality will be neutral (non-acidic) throughout the course of filling, with saline levels increasing gradually over time to brackish levels due to the concentrating effect of evaporation. Levels of heavy metals is predicted to be minimal.

Dams

The water contained within regulated dams will either be drained or allowed to evaporate. The remaining void will then be filled with benign material in order to cover residual sediments in each dam. These dam areas will then be re-contoured to shed surface water, compacted to minimise erosion, covered with topsoil and re-seeded with native flora.

The water contained in sediment dams (which are not required by the post-mine landholder) will be drained / evaporated, the dam walls will be pushed over to cover the residual sediments and the surface of each dam, ripped and seeded.

If the mine water management infrastructure is not removed from site and/or remediated, but rather, is left in place for the subsequent landowner, then capture of overland flow post mine operation will need to comply with the provisions of the Water Act 2000 and the Water Resources (Fitzroy Basin) Plan 2011.

Infrastructure

All infrastructure will be removed from the Project site unless written agreements have been obtained from landowners to retain particular items of infrastructure following mine closure.

Once infrastructure is removed, these areas will be re-contoured, ripped and revegetated. A contaminated land assessment will be conducted in areas where potentially contaminating activities have been conducted and any soil contamination which is encountered will be removed from site by a licensed waste management contractor.

Spoil Dumps

The final landform of rehabilitated in-pit spoil dumps will consist of topsoiled, gently undulating slopes, which have been contoured to replicate pre-mine drainage patterns and then revegetated with local species. On completion of in-pit dumping, those areas of the dump which exist below the final post-mining groundwater levels will not be revegetated, but re-contoured and engineered with limestone and non-acid forming / acid neutralising capacity material to minimise the release of contaminants into groundwater.

Out-of-pit spoil dumps will be progressively rehabilitated by re-contouring the outer slope with benign waste rock followed by topsoiling and revegetating the landform with native plant species.

Rehabilitation Monitoring and Maintenance

Following completion of the proposed rehabilitation works, an annual program of rehabilitation monitoring will be undertaken until such time that the EA is surrendered. Measurable rehabilitation indicators and domain-specific completion criteria have been developed for each specific mine-domain. Indicators will be monitored in accordance with the rehabilitation monitoring program and assessed against completion criteria to determine the success of rehabilitation.

Rehabilitation maintenance activities including failure mitigation will be employed on site until the site



reaches its success criteria, in order to ensure that rehabilitation is self-sustaining.

Climate

Local and Regional Climate

Data collected from the closest Australian Bureau of Meteorology Weather Stations indicate rainfall is highly seasonal, with the dry season peaking between July and September and the wet season peaking from January through to February. Mean annual rainfall indicative of the Taraborah Coal Project site is approximately 650 millimetres.

The data indicates that July is the coolest month of the year with temperatures ranging from 6.9 to 22.4 degrees Celsius. The warmest month of the year is December with a mean maximum temperature of 34.8 degrees Celsius.

Climate Adaptation

An assessment of the potential medium and long-term impacts of both climate change and adverse weather conditions upon Project construction, operations and decommissioning was conducted. It is considered that extreme weather conditions which arise as a result of general circulation patterns (La Niña) are likely to pose more of a risk than the longer-term effects of climate change. An adaptive approach to the design of the Project will be undertaken in order to ensure that climate-related risks such as variations in water availability or flood impact are effectively managed.

Topography and Geology

The Project site is comprised of undulating alluvial plains and gently undulating rises and low hills, mainly of basaltic and sedimentary parent materials. The site is primarily agricultural land, whose elevation ranges from approximately 200 - 280 metres Australian Height Datum.

In terms of local geology, the site is located on the western extent of the Denison Trough. This area is covered by a considerable thickness of Lower Permian sediments that are unconformably overlain by Tertiary sediments.

Permian coal seams are encountered at shallow depths in the southern area of the lease and deepen towards the north. These seams are composed of a sandstone / coal sequence, with the regionally extensive Aldebaran Sandstones directly overlying the coal seams.

Land

Eight soil management units were identified within the Project site, based on both field and laboratory data. The soil management units identified include the Orion / Jimbaroo, Adelong, Adelong / College, Rolleston / Glengallan, College / Lascelles, Glengallan, Glen Idol and Jimbaroo soil types.

Land Suitability

The pre-mining land suitability for the Project site was assessed on the basis of the physical, chemical and nutritional characteristics of the soils. Soil management units have been classified based on their suitability for beef cattle grazing and rainfed broadacre cropping and have been assigned land suitability classes ranging from Class 1 (negligible limitations) to Class 5 (extreme limitations).



The following conclusions were derived from the pre-mining land suitability assessment:

- Suitability for beef cattle grazing is mostly limited by nutrient deficiencies, soil pH, flooding and erosion. The Orion / Jimbaroo, Adelong, Adelong / College, College / Lascelles and Glen Idol soil management units are considered to be suitable land areas for grazing with moderate limitations (Class 3). The Rolleston / Glengallan and Jimbaroo soil management units are considered Class 4 land as it is marginal land with severe limitations, whilst the Glengallan soil management unit has been classified as Class 5 land which is unsuitable land with extreme limitations to grazing;
- Notwithstanding the classification derived from this assessment, grazing within the Central Highlands is most often limited by rainfall trends. Grazing as a land use is more suitable and carrying capacities higher in wetter years associated with climatic La Niña events;
- Rainfed broadacre cropping is mainly limited by the plant available water content for crop growth. Plant available water content is impacted by subsoil constraints such as sodicity, salinity, and extremely alkaline pH. Overall, the Orion / Jimbaroo, Adelong / College, and College / Lascelles soil management units were considered suitable for cropping with moderate limitations. The Adelong, Rolleston / Glengallan and Glen Idol soil management units were considered to be marginal land with severe limitations, whilst, the Glengallan and Jimbaroo SMUs were assessed to be unsuitable land with extreme limitations; and
- Notwithstanding the assessment, cropping in the Central Highlands can be severely limited by rainfall. Soils that possess subsoil constraints cannot fully take advantage of this rainfall due to the limited plant rooting depths associated with these constraints.

Good Quality Agricultural Land

The quality of agricultural land within the Taraborah Coal Project boundary was assessed. The majority of land was found to be comprised of Class A (crop land) agricultural land, which is land suitable for current and potential crops and having limitations to production ranging from none up to moderate levels. Soil management units classified as Class A agricultural land contained soils that were considered to have Class 3 suitability (moderate limitations) to support broadacre cropping and improved pastures for beef cattle production. In addition, significant areas of Class C1, Class C2 and Class C3 agricultural land were also recorded (based upon sandstones of the Aldebaran formation), which facilitate native pasture production and light grazing land uses. The agricultural land assessment did not identify any Class B (limited crop land) land on the site.

Strategic Cropping Area

The presence of Strategic Cropping Area on the Project site was assessed via an initial review of the Strategic Cropping Land trigger maps, followed by validation assessments through the use of field observations and soil sampling, including soil morphological characteristics and soil physiochemical properties that were determined by laboratory analysis of sampled soil material.

The results of this review found that approximately 2,050 hectares of the Project site is currently mapped as Strategic Cropping Area, whilst the area of proposed, validated Strategic Cropping Area following assessment is 1,766 hectares.

In total, the Project may impact up to 936 hectares of Strategic Cropping Area. The large majority of this impact will arise from subsidence due to underground mining, with only 106 hectares of Strategic Cropping Area disturbed by surface activities. No Strategic Cropping Area that has been cultivated in



at least the past 14 years will be disturbed by opencut mining or placement of surface infrastructure.

Mitigation of disturbed Strategic Cropping Area will be undertaken by replacement of topsoil within the landscape. This means that prior to the installation of mine infrastructure, stripping of recommended levels of topsoil and other surface materials, plus storage of this material will be undertaken.

Land Contamination

A preliminary site investigation was undertaken to determine background (pre-mining) contamination on the Taraborah Coal Project site.

Several sources of potential contamination were identified including a livestock dip and hydrocarbon storages at a number of homesteads. The livestock dip was found to be buried to a depth of approximately 4 metres below ground level and does not lie within the proposed disturbance area, therefore, the risks of contaminants impacting the local environment and human health are considered to be very low. In addition, during the assessment, decaying chemical drums and un-bunded fuel storage tanks were observed at homesteads; however, no visual evidence of significant dispensing spills was evident.

In addition, two fibro properties were observed on the Taraborah Coal Project site, which were built with asbestos fibre re-enforced cement sheeting.

Land Use and Character

The Taraborah Coal Project site is predominantly used for low intensity cattle grazing on native and improved pastures and broadacre dryland cropping with vegetation found in sporadic patches across the majority of the site.

Most of the landscape character modifications which have occurred are in the form of broad scale clearing associated with the cattle grazing and broadacre cropping as well as the necessary built structures, access roads and stock tracks that are required to facilitate these activities.

Land Disturbance

The majority of significant land disturbance associated with the Taraborah Coal Project will be related to the establishment of surface facilities and the operation of the opencut mine. The construction and opencut operational phases of the Project necessitate the disturbance of approximately 496 hectares of grazing land and natural habitat within the opencut and surface facilities area. Approximately 2,071 hectares of land will be minimally disturbed from mine subsidence.

All land disturbances on the Project will be rehabilitated either progressively if possible, or on decommissioning. However, two final voids will remain following mine cessation with a bund constructed around each void in order to prevent water ingress and limit stock access.

Subsidence

Subsidence prediction was conducted for the underground mine component, using Surface Deformation Prediction Software based on the digitised mine plan and cover depth contours.

In the central and southern areas associated with underground mining, subsidence is predicted to reach a maximum of approximately 1.9 metres. Modelled subsidence in the northern section is



predicted to reach a maximum of approximately 1.4 metres.

Surface tension over the chain pillars separating the longwall blocks is expected to result in surface cracking, extending approximately 35 metres either side of the chain pillar centreline. Cracks with a maximum width of 0.2 – 0.3 metres and maximum depth of 5 metres are considered a worst case scenario. Rehabilitation of these tensile cracks will be required and will consist of remedial earthworks and sealants if required.

Compressive strains over the central area of the longwall panels are anticipated to occur. Such compression may manifest as humping on the surface, although this humping will likely be minor due to the weak nature of the unconsolidated surface materials. Where humping occurs, minor remedial earthworks will be undertaken.

Subtle alterations to the site's drainage profile are also predicted to occur as a result of subsidence. Assessment to quantify the post-mining impacts of subsidence on drainage indicate that average ponding of 53ML per annum may result if subsidence is left unmitigated, which is 6% of the total estimated annual rainfall run-off in the impacted underground mining area and only 0.1% of annual rainfall run-off for the Retreat Creek catchment. Subsidence management strategies will be implemented to mitigate these limited impacts to surface drainage and sensitive surface features.

Visual Amenity

The assessment of visual amenity values, or defining the impact of visual change, is typically a subjective process. Generally it is expected that the higher the proportion of human-made features, the less appealing the view. Variation in vegetation type also provides a significant visual influence. The more diverse or 'green' the landscape, the more visually appealing it usually becomes.

Although the majority of vegetation is sparse due to historic land uses, buffers do exist and surround various extents of the Project site. Predominately, topography and vegetation provide the greatest buffers south and west of the site, whilst other residences located near the northern extents and outside the Mineral Development License boundary are buffered by topography and distance.

Transport

A Transport Impact Assessment was conducted for the Project in order to identify the potential impacts of the Taraborah Coal Project on the current condition of the associated transport networks.

Road Impact Assessment

According to the *Guidelines for Assessment of Road Impacts of Development* (Department of Transport and Main Roads 2006) road impacts associated with a development, are considered significant if the development generates an increase in traffic on State Controlled Roads exceeding 5% of existing levels.

Results of the road impact assessment indicate that there are no road segments that will experience generally more than a one percent increase in traffic during construction, opencut or underground mining, which is not considered significant as mentioned above.

A stock route running northward from Lake Maraboon to the Capricorn Highway will need to be relocated approximately 3km to the west in order to accommodate the planned opencut pit and mine surface infrastructure.



Pavement Impact Assessment

A preliminary Pavement Impact Assessment was undertaken to quantify the potential pavement degradation caused by heavy vehicle movements associated with the Taraborah Coal Project.

Results indicate there are no segments of road that will experience percentage increases considered significant under the *Guidelines for Assessment of Road Impacts of Development* during construction, opencut or underground mining.

Local Roads

As selected road base and fill materials are proposed to be sourced from the Sapphire area, construction phase traffic will impact the local road network (managed by Central Highlands Regional Council) along a section of the Anakie – Sapphire Road, which intersects the Capricorn Highway to the west of the Taraborah Coal Project.

Rail Impacts and Mitigation

Rail traffic along the Central West and Aurizon Blackwater railway systems is planned to increase by up to an additional three trains in each direction (a total of six train movements per day). The Australian Level Crossing Assessment Model (ALCAM) was used to assess the current and projected safety of all public level crossings on the Government supported non-commercial rail network in Queensland utilised by the Project. The assessment included 14 crossings (including pedestrian) that will be associated with rail traffic for the Project as it utilises the existing QR Central West railway system from Nogo Junction (263.3 km) westwards through Emerald to approximately the St Helen's Road Level Crossing (287.7 km), totalling a distance of 24.4 km. The Blackwater railway system was not assessed under ALCAM, as it is a privately managed, commercial railway.

The ALCAM develops a reference score that is used to provide an indicative assessment of the risk relative to a collision hazard. Following the application of proposed mitigation efforts, all train crossings were determined to be well within acceptable safety limits.

The impact on traffic movements at the three level crossings as a result of the coal train movements was assessed through simulation modelling for both present (year 2014) traffic volumes and assumed future (year 2024) traffic volumes. The modelling indicates the increased delays from congestion resulting from train movements during peak morning and evening traffic conditions will be moderate, whilst the increased delays during the planned off-peak operation of the trains will be minimal.

Airport

It has been estimated that the Taraborah Coal Project workforce movements will require approximately 100 return flights between Brisbane and Emerald per annum via a Dash 8 or similar capacity aircraft.

The Emerald Airport Master Plan tender, which indicates the anticipated capacity required to service fly-in-fly-out operations, will be incorporated into future planning for this facility. Therefore, the demand created as a result of the Taraborah Coal Project should not negatively impact on other users of Emerald airport or the facility itself.



Water Resources

Surface Water Hydrology

The primary drainage systems contained within the Project area include those associated with Retreat Creek and Taroborah Creek; refer to the Mine Infrastructure Layout figure for location details of these creeks.

Surface Water Impacts

Catchment characteristics in the northern portion of the Project area will be modified by land subsidence, including limited increases in topography undulation, which potentially affects two communities, a Lacustrine system (irrigation dam) and a vegetation community of Silver-leaved Ironbark Open Woodland (regional ecosystem 11.3.6).

The catchment regime in the southern portion of the Project area will be modified by infrastructure development (modifications in catchment runoff characteristics) and opencut pit development (removal of land surface). The opencut pit and out-of-pit spoil dumps in the south of the site will remove five, relatively minor surface water drainage lines that feed into Taroborah Creek. Surface water that currently flows into these drainage lines from north of the Capricorn Highway will be redirected around the disturbance area, prior to interaction, and into the creek.

Any creek scouring, ponding, tension cracks and / or alterations to surface water flows which arise due to subsidence will be mitigated via remedial actions such as the sealing of tension cracks and removal of surface water flow barriers.

Ongoing monitoring of land subsidence will be undertaken and further remedial works will be conducted where necessary, including the installation of sediment dams and modification of drainage profiles in order to control the flow of surface water along contributing drainage pathways.

Water Supply and Management

The Project water supply will be sourced from the necessary dewatering of groundwater inflows that will be required in order to permit safe opencut and underground mining operations as well as rain water that falls within the surface areas of the mine infrastructure and opencut pit.

The management of both surface water and groundwater on the Project site has been developed in order to separate clean water (water which has not come into contact with mine disturbance areas) from site water (potentially contaminated by mine activities) using two separate water management circuits.

The clean water circuit comprises several clean water diversion drains designed to contain a 1 in 1,000 year peak flow event and pit protection bunds to intercept water before it enters the opencut pit. This clean water will then be directed to discharge into the local drainage lines unaffected by the mine that flow into Taroborah Creek.

The site water management circuit includes two regulated dams which store recovered process water from the Coal Processing Plant, site water, catchment runoff and water from both the opencut pit (as required) and the underground mine workings. Seven sediment dams, designed to hold 0.1 Annual Exceedance Probability, are proposed to capture overland flow and two pit sumps collect and store pit water before water is transferred to a regulated dam for recycling back through the process water circuit. Three site water drains will also be constructed around the out-of-pit spoil dumps in order to collect runoff from these dumps for deposition into the sediment dams. The site water collection



drains have been designed to contain a 100 year Annual Reoccurrence Interval, critical duration event.

Chemical analysis of surface water and sediment samples at reference, midstream and downstream sampling locations will be undertaken on a quarterly basis, to ensure the effective management of potentially contaminated site water within the water management system.

Flood Modelling

Flood modelling of Taroborah Creek under a 1000 year rainfall event indicated that flooding was largely uncontained and overflows exist to the north towards the mine infrastructure area. The flood modelling results have influenced the layout of the Project's mine infrastructure in order to minimise the risk of infrastructure flooding during the life of the Project.

Land subsidence which will occur in the north of the Project site is not anticipated to have a significant impact upon the flood behaviour and flow patterns of Retreat Creek.

Groundwater

Twenty-two existing groundwater bores were identified within 10 km of the Taroborah Coal Project site that are currently in use, with the main use being for stock and domestic purposes. Five are located within the Taroborah Coal Project site boundary, nine are within 5 kilometres and eight are located between 5 and 10 kilometres from the site.

Three different hydrogeological systems are found within the Project area; the Permian Alderbaran Sandstone, Tertiary Basalt and Alluvium.

The main source of groundwater within the Project area is from the Aldebaran Sandstone. In contrast, the main source of groundwater outside the Project area is from the Tertiary basalt.

Groundwater Quality

Groundwater quality results indicate that groundwater is slightly brackish to brackish across each aquifer, and alluvial groundwater is generally fresher, with lower anion / cation concentrations. The coal seams and Aldebaran Sandstone samples collected from the northern end of the Taroborah Coal Project area generally record moderate concentrations of Sodium, Magnesium and Chloride.

Groundwater Impacts and Mitigation

Groundwater modelling indicates the following anticipated drawdown levels are likely to be experienced by the associated aquifers:

- Drawdown within alluvium could extend up to 3.5 kilometres east (downstream);
- Drawdown within the Tertiary basalt could extend up to 3 kilometres south; and
- The Aldebaran sandstone drawdown could extend up to 3.5 kilometres east.

Based on this drawdown modelling, only water bores within the Mineral Development Licence 467 boundaries are projected to be significantly impacted (drawdown greater than 2m). Further, ecological field investigations indicate only deep-rooted vegetation (such as the Eucalypt trees which form the dominant canopy) may potentially be affected by groundwater drawdowns.



Groundwater Recovery

Groundwater recovery was modelled and the results indicated that groundwater levels within the area recover to approximately 75 percent of pre-mining levels within 100 years following cessation of mining; however, groundwater levels will not reach 90 percent of pre-mining levels for approximately 300 years following active mining.

Groundwater Monitoring

Initially, a 24-month sampling program will be undertaken for the collection of baseline data to improve the understanding of the groundwater interactions and quality characteristics associated with the Taraborah Coal Project area. Monitoring will continue during operations to identify any abnormalities and provide further refinement of model predictions and direction for any corrective measures necessary.

Air

Dust

The incremental air quality impacts due to Project mining operations have been assessed via a prediction of the ground-level concentrations of dust and dust deposition rates at identified sensitive receptors during Years 2 and 5 of operations. These years were selected as they represent scenarios that are likely to contribute most to dust levels at the closest sensitive receptors. In conducting the assessment, worst-case background dust levels were assumed.

Results of this assessment indicate that up to seven sensitive receptors located within 10 kilometres of the Mineral Development License 467 boundary are projected to be more than moderately affected by increases in dust levels as a result of normal opencut mining operations under certain weather conditions. Four of these receptors occur within Mineral Development License 467, whilst the remaining potentially affected receptors are located outside the Project boundary. Two of these receptors lie approximately 5 kilometres west of the mining operations and one other is located approximately 8 kilometres to the south of the mining operations.

Dust mitigation measures will include the provision of windbreaks, on-site traffic speed restrictions, watering of stockpiles, revegetation of disturbed areas, continuous real-time monitoring of meteorological conditions and dust conditions at sensitive receptors.

In addition, an Air Quality Management Plan shall be developed which will implement additional mitigation measures when weather conditions become adverse. These mitigation measures include reducing activity rates, covering operational equipment or temporarily ceasing operations if absolutely necessary.

Greenhouse Gases

A greenhouse gas assessment was conducted in order to consider the potential impact of the Taraborah Coal Project upon the global climate system in terms of the Project's contribution to net greenhouse gas emissions. The data indicates that emissions from electricity consumption are expected to have the greatest contribution to the total greenhouse gas emissions from the Project. Gases emitted from diesel combustion are the next largest contributor. Very limited fugitive emissions and blasting emissions make up for the remainder of emissions. Fugitive emissions occur during the mining process due to the fracturing of coal seams. Direct measurement methods will be implemented for reporting greenhouse gas production during mine operations.



Based on Australian Government emission factors, The greenhouse gas emissions directly produced by the Taraborah Coal Project from mining operations and consumption of electricity over the 21 year project life would be 1.53 Million tonnes equivalent carbon dioxide to the atmosphere. Peak annual direct production of greenhouse gasses is estimated at 0.09 Million tonnes equivalent carbon dioxide emissions. For illustration purposes, based on Australian Government emission factors for 2011, this would equate to 0.02 percent of Australia's estimated domestic emissions in 2011.

A combination of direct (energy conservation) and indirect (mine planning) strategies has been developed to minimise the Project's contribution to Australia's domestic emissions of greenhouse gases. In addition, a Greenhouse Gas Reduction Management Plan will be developed for the Project that will include reporting and auditing procedures with the objective of achieving continual improvement in greenhouse gas emissions.

Noise and Vibration

Noise

In order to quantify potential noise impacts from the Taraborah Coal Project, noise modelling was undertaken. The model was configured to run with neutral and adverse meteorological conditions and included terrain data for the Project site. The predictions of the model are based on a typical worst-case operating scenario (Year 3 noise contributions) and the assessment determined that the major noise items associated with noise criteria exceedances are generally the mobile equipment (trucks and dozers).

In total, four sensitive receptors are predicted to exceed either the day and evening or night-time noise criteria; three during neutral meteorological conditions and four during adverse conditions. All affected sensitive receptors are located within the Mineral Development License, with the worst affected receptor located approximately 200 metres north of the opencut pit exceeding the night-time noise criteria of 35 A-weighted decibels by 18 A-weighted decibels under adverse climatic conditions.

No receivers are predicted to experience noise levels which exceed the proposed external low frequency noise limit, and the Queensland Rail noise criteria are predicted to be met at approximately 60 metres or more from the railway lines along the route from the mine to the export terminal, under all meteorological conditions.

Noise Mitigation

To reduce the predicted worst-case noise impacts at the four sensitive receptors, noise mitigation measures will be implemented where appropriate and shall include alternative arrangements with property holders including property purchases, attenuation of mining equipment (fixed and mobile plant), alternative (quieter) mining methods; and implementation of a noise monitoring program.

Blast Vibration and Airblast Overpressure

Blasting will be required during opencut mining and it was determined that the vibration velocity criterion established from EcoAccess Guideline *Noise and Vibration from Blasting* could be exceeded at distances less than 600 metres from the blast. Airblast criteria is expected to be exceeded at a distance of approximately 1 kilometre or less. One sensitive receiver which is located 200 metres north of the proposed opencut pit is expected to be within the blast impact zone.

In addition, one other sensitive receptor will also be potentially affected from airblast in Years 4 to 7 as it is located 1 kilometre to the north of the pit limit. Blast parameters will be specifically designed to



ensure that airblast criteria are met at this location.

Nature Conservation

The ecological value of the Taraborah Coal Project site was assessed during several terrestrial and aquatic surveys which identified the types of flora, fauna, habitat values and other features of particular environmental value pertaining to the site.

A review of government provided Environmentally Sensitive Area mapping revealed that the Project site does not contain conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage or historic areas, national estates, world heritage listings, sites listed by international treaties or agreements or areas of cultural significance relating to biodiversity and scientific reserves.

Terrestrial Flora

A total of 205 flora species were identified within and immediately adjacent to the Taraborah Coal Project site. No species of conservation significance as listed by the *Nature Conservation Act 1992* or the *Environmental Protection and Biodiversity Conservation Act 1999* were recorded.

Thirteen vegetation communities were identified on the Taraborah Coal Project site during the field surveys. Seven of these communities were classed as remnant vegetation as defined in the *Vegetation Management Act 1999* and three communities are Endangered under the *Vegetation Management Act 1999* and the *Environmental Protection and Biodiversity Conservation Act 1999*.

Several areas mapped as Natural Grassland REs are now dominated by buffel grass and, generally, are no longer considered to be representative of the mapped RE. However, for the purpose of this Assessment, an area of EHP-mapped natural grassland that coincides with the proposed opencut pit and infrastructure area will be considered 'Potential Natural Grassland'. This approach has been adopted to account for potential impacts to this area prior to further ground-truthing to determine its current presence on the Project site. Consequently, this area is classified as Of Concern under the VM Act and EHP Biodiversity Status, and Endangered under the EPBC Act.

Terrestrial Fauna

A total of 124 vertebrate fauna species were positively identified within the survey area on the Taraborah Coal Project site. This comprised seven amphibians (one introduced), eight reptiles, 81 birds and 23 mammals, of which six are introduced.

No amphibians or reptiles of conservation significance were identified on the site; however, one mammal species of conservation significance, the Little Pied Bat (*Chalinolobus picatus*) was positively recorded and is listed as Near Threatened under the *Nature Conservation Act 1992*.

In addition, three species - the Cattle Egret (*Ardea ibis*), Latham's Snipe (*Gallinago hardwickii*) and Glossy Ibis (*Plegadis falcinellus*) - are listed as Migratory and Marine under the *Environmental Protection and Biodiversity Conservation Act 1999* and were identified during terrestrial and / or aquatic surveys on the site.

Aquatic Biology

The habitat of aquatic sites was assessed during field surveys using habitat assessment scores in accordance with Australian River Assessment Scheme methodology. From the surveys it was found that overall the aquatic environments of the study area are in good condition with most sites



considered relatively good habitat, generally providing several within-channel habitat types and stable and well-vegetated banks.

A total of six fish, five amphibian and six reptile species were identified in association with the riparian communities on the Project site, in addition to 47 macro-invertebrate taxa.

Of the macro-invertebrate taxa identified during the aquatic surveys, 40 were used to compute a Stream Invertebrate Grade Number – Average Level score for each sampling site. The assessment indicated that all dry season sampling sites have high salinity or nutrient levels, whilst during the wet season the majority of sites sampled indicated urban, industrial, or agricultural pollution. It was determined that most aquatic survey sites exhibited elevated nutrient levels and disturbance from cattle grazing.

Potential Impacts and Mitigation

Potential impacts as a result of the Project site upon native flora and fauna include edge effects and disturbance of Endangered Brigalow Woodland, potential harm to fauna species, loss of habitat, an increase in competition by pest fauna species, introduction of additional weed species and groundwater reductions potentially impacting deep-rooted Eucalypt trees.

Approximately three hectares of remnant vegetation cover is expected to be disturbed during the life of the mine, with the remaining disturbance area (approximately 494 hectares) associated with non-remnant and potential natural grassland.

In addition, land subsidence from underground mining may impact approximately 33 hectares of ephemeral aquatic habitat located above the underground mining footprint and modify the existing drainage profile causing ponding.

Measures to minimise the impacts on native flora and fauna include the inspection of habitat areas that could be impacted to determine whether any fauna is present (including specific searches for the Near Threatened Little Pied Bat), appropriate sediment and erosion control, minimising vegetation clearance and clearly delineating clearance areas. Progressive rehabilitation will also be undertaken to restore native vegetation and potential habitat for native species during operations.

Strategies to minimise the impacts on aquatic habitats include the management of surface water runoff, effective erosion and sediment controls and the implementation of a water and sediment quality monitoring programme.

Land subsidence will be managed via a Subsidence Management Plan and include strategies such as minor remedial earthworks to re-establish free drainage and repair surface cracks and the use of sealants to repair these cracks where necessary.

Environmental Offsets

An environmental offset strategy has been developed for the Taraborah Coal Project in order to mitigate Project impacts upon Matters of State Environmental Significance and Matters of National Environmental Significance.

Offset obligations have been determined by calculating the area of residual impact that is unable to be otherwise avoided or mitigated for the Project. The area of residual impact will be subject to ecological equivalence assessment in order to determine the exact offset ratio to be applied.



Matters of State Environmental Significance relevant to the Project which will require offsetting include *Vegetation Management Act 1999* listed Endangered or Of Concern Regional Ecosystems, Regional Ecosystems with a designated buffer zone of remnant watercourses and a *Nature Conservation (Wildlife Management) Regulation 2006* listed fauna species.

Matters of National Environmental Significance relevant to the Taroborah Coal Project that will require offsetting include two ecological communities, Brigalow (*Acacia harpophylla* dominant and co-dominant) and natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin. The total area of residual impact on these ecological communities will be up to 147.89 hectares.

A desk top assessment identified sufficient offset land exists within the Brigalow Belt Bioregion, in which the Project is situated, with potentially 544,819 hectares available.

Following agreement of the Biodiversity Offset Strategy, an Offset Delivery Plan will be developed and quarterly reports shall be submitted on the progress of locating and legally securing an offset property.

Cultural Heritage

Non-Indigenous Cultural Heritage

A non-indigenous cultural heritage study was undertaken of the known and historical cultural and landscape heritage values associated with the Taroborah Coal Project area. This study incorporated a desktop assessment of heritage values in the region, together with a physical archaeological investigation of the area potentially affected.

In total, seven non-Indigenous cultural heritage sites were located within the Project area during the survey including Iona and St Helens Stations which are mid - 20th century developments. Other properties and residences within the Project area date to the late 20th century or early 21st century. Several of the properties are vacant without residency.

These sites have been considered and assessed in terms of their associations with pastoral development, stock routes, and early communication networks and were determined to have non-essential, low significance, but they do fulfil a functional role. One site, however, Taroborah Siding has been assessed as having some significance sufficient to warrant further research and recording, should its integrity be affected by the Project in the future.

No sites were considered to exceed the threshold for local, State or National significance.

A desktop assessment of archaeological heritage potential of the Project area identified an early 20th century school site, but this could not be located via a physical archaeological investigation. This site is considered to have moderate potential for archaeological remains in the form of subsurface assemblages, postholes, dumps or privies.

The cultural heritage assessment concluded that the Project area has generally low potential to contain further sites and places of archaeological significance and any archaeological remains would be unlikely to be significant as they would not likely contribute to already existing knowledge about these types of sites and settlement patterns.

Cultural heritage sites will be managed via a Historic Heritage Management Plan which describes the processes for mitigating, managing and protecting identified historical cultural heritage values and



processes for reporting any archaeological artefact not previously identified.

Indigenous Cultural Heritage

Desktop searches of registers and databases were conducted to identify potential sites of indigenous heritage significance within the Taraborah Coal Project area and although no sites were listed on the Queensland Heritage Register for the area, the *Department of Aboriginal and Torres Strait Islander and Multicultural Affairs* register and database identified nine sites within Mineral Development License 467. However, it was determined that no impacts will be experienced by any of these nine sites, since they are located 4.5 kilometres south of the mining disturbance.

Two Native Title determinations have been submitted to the National Native Title Tribunal as follows:

- The Bidjara #7 People applied for a Native Title determination, which was registered in January 2013; and
- A second Native Title determination was registered with the Tribunal by the Western Kangoulu People in June 2013.

Throughout the Project exploration and investigation process, consultation has been undertaken with the Western Kangoulu Aboriginal Party through the use of mitigation works agreements. Management measures contained within these agreements range from systematic surveying, recording, collection and removal of identified Aboriginal cultural heritage items from proposed disturbance areas to other mitigation methods, including avoidance and total protection.

During the various Aboriginal cultural heritage surveys undertaken to clear access tracks and drill pads ahead of exploration, no sites of high significance have been identified, although there remain two areas of artefact scatter and three stone quarry sites in the mine development area that will require full mitigation.

In accordance with Part 7 of the *Aboriginal Cultural Heritage Act 2003*, a Cultural Heritage Management Plan is currently being negotiated for the Project between Shenhua International Group Pty Ltd and the Cultural Heritage Body for the purpose of mitigating potential indigenous cultural heritage impacts.

Social

A Social Impact Assessment was undertaken to identify the key values to the community and potential constraints on community housing, business and enterprise, in addition to infrastructure and community services.

It was determined during the assessment that the community has diversified with expanding mining and construction industries developing in the area, which can create social, cultural and employment challenges. A number of landholders that will be impacted by Project activities have experienced years of rural hardship and periods of prolonged drought, so the prospect of sharing their land and groundwater supply with a mining operation is of concern. In addition, stakeholders have expressed concerns that the region could experience a loss of identity if people move from traditional industries to mining, as a result of higher mining salaries.

A Social Impact Management Plan has been developed to mitigate social impacts. The establishment of a Community Consultative Committee shall monitor and address cumulative impacts from mining and expansion and will also be required to develop mitigations for key impacts such as demographic



changes relating to skills shortages for non-resources businesses.

The Taroborah Coal Project will work together with the Central Highlands Regional Council to ensure that housing in Emerald remains affordable and shall implement a comprehensive employee and contractor induction process that comprises social impact management objectives and how to meet them as well strict policies in order to manage any instances of social misconduct.

The Project intends to use ongoing stakeholder consultation, including face-to-face consultation with directly affected landholders and broader community information sessions, in order to engage the community, with the aim of providing information about key developments and timelines associated with the Project.

Health and Safety

The Project has the potential to impact on the health and safety of the community through emissions sources (air and noise), land contamination, disease vector provision, transport safety and contamination that may be carried downstream via surface water runoff.

The health, safety and community values of the region will be protected from potentially adverse impacts associated with the Project through practical measures, designed to not only protect the community but also enhance community values and health.

Nominated quantitative standards and indicators have been selected to enhance and protect the existing environmental values associated with the site including water quality standards, air quality criteria and noise and vibration criteria and limits. Standards and indicators will be achieved through effective planning / monitoring and ensuring that data is collated and interpreted in a meaningful way.

Transport impacts will be mitigated via mine access upgrades from the Capricorn Highway and workforce driver fatigue will be minimised via the establishment of a bus in, bus out transport system.

Propagation of disease vectors shall be managed by an effective water management system, minimising the standing time of water captured in regulated dams, reducing the risk of midge / mosquito propagation and man-vector-pathogen contact.

Water recycled through the Sewage Treatment Plant will be treated to achieve Class A effluent quality in accordance with the *Queensland Water Recycling Guidelines* (2005) and potable water will be produced on-site and be assessed against the *Australian Drinking Water Guidelines* (Natural Resource Management Ministerial Council 2011).

Upon cessation of mining, the Project site will be assessed by a suitably qualified professional in accordance with the *Guideline for Contaminated Land Professionals* (Department of Environment and Heritage Protection 2012), and land will be remediated where required.

Throughout operations, open lines of communication will be kept, facilitating quick and efficient notification during an emergency. Emergency response procedures will also be developed to reduce the risk to the workforce and surrounding community.

Economy

The national, state, regional and local perspectives of the direct and indirect economic benefits and impacts of the Taroborah Coal Project were analysed.



A range of economic and regional development strategies for the Central Highlands region have been developed. The purpose of many of these strategies is to manage the economic development in the region to ensure it is able to benefit to the greatest extent possible from the regional economic growth that is occurring as a result of the development of energy resources.

Economic analysis showed that moving from grazing (the current land use) to coal mining produces a significant increase in the value of economic output, consistent with economic and regional development strategies.

The estimated net economic benefit from the Project to the Australian economy in present value terms, when taking into account both positive and adverse factors is \$1,911 million, whereas this same benefit for the alternative land use of low intensity cattle grazing and broadacre dryland cropping for the area that will be impacted is estimated at \$ 0.5 million.

Central to community concerns, however, is the impact that mining activities will have upon housing markets, causing increases in housing prices, housing rents and land values. This impact on housing prices is a cumulative impact of all the projects in the region.

Community involvement through consultation will ensure that such potential negative impact (should it arise in the future) is addressed and the economic benefits experienced by the local community continue during this time. It is anticipated the Project will contribute significantly to community objectives by generating income and employment in the Central Highlands region (particularly in the operational phase of the Project).

Hazard and Risk

The potential hazards and risks to people and property associated with the Taraborah Coal Project were assessed by applying the principles of risk analysis for a Preliminary Hazard Analysis, in accordance with *Risk Management Standard 4360:2004* (Standards Australia / Standards New Zealand 2004) and *Handbook 203:2006 Environmental Risk Management Principals and Processes* (Standards Australia / Standards New Zealand 2006). This hazard analysis encompassed each phase of the Project (construction, operation and decommissioning).

Initially, the likelihood and associated consequence value was determined for each of the hazards associated with the Project, in order to qualify the level of risk associated with each event.

Prior to the application of control strategies, 19 hazards were assigned an extreme risk rating, 51 hazards were assigned a high risk rating and 10 hazards were assigned a medium risk rating.

Following the application of control strategies, all extreme risks were eliminated and many other risk categories were reduced. The remaining residual risk categories associated with the hazards identified on the Project include two high risks, 29 medium risks and 57 low risks.

Hazards associated with a high risk level included operation of vehicles, machinery and equipment and the dismantling and removal of infrastructure due to the consequences of possible serious injury or death. Whilst the likelihood of these events is relatively low, the risks are nonetheless considered high due to the serious consequences if they were to occur.

The hazards associated with a medium risk level included coal / waste loading, spoil dumps, rejects disposal, regulated dams, flooding, ignition sources, cyclones and interaction with wildlife. The consequences of these risks are associated with land, surface and groundwater water contamination,



odour nuisance and loss of flora and fauna.

Dangerous goods will also be stored on the Project site and will be stored in accordance with the relevant Australian Standards in order to prevent a hazardous chemical spill or emergency event, thereby reducing the risk to people and property.

Independent hazard audits will be conducted to identify previously unrecognised hazards and early recognition of below-standard performance in areas such as management controls and the maintenance and testing of equipment.