Initial Advice Statement

Dingo West Coal Mine Project

BANDANNA ENERGY

www.bandannaenergy.com.au

Bandanna Energy Limited

Table of Contents

List of Tables

List of Figures

1. Introduction

1.1 Background

Dingo West Coal Pty Ltd (the Proponent) proposes to develop the Dingo West Coal Mine (the Project). The Project site is located in central Queensland approximately 6 km west of Dingo and approximately 120 km to the east of Emerald (see **Figure 1**).

The Project involves the development and operation of a new open cut mine that will export pulverised coal injection (PCI) and high energy thermal coal to the international market via the existing Blackwater rail system and coal handling facilities and export terminal at Gladstone. Exploration to date has identified an inferred resource of 91.1 million tonnes (Mt) of coal (Bandanna Energy 2011 Annual Report) which will allow production of up to 1.4 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and approximately 1.0Mtpa of product coal for approximately 30 years. The Project is expected to commence in construction 2012 and continue for approximately 30 years.

The Project area, defined by the Mining Lease Application (MLA80180) covers 4,649.7ha. The Project area includes the mine, haul road and rail load out facility and is wholly located within MLA80180.

1.2 Proponent

The Project will be developed and operated by Dingo West Coal Pty Ltd, a wholly owned subsidiary of Bandanna Energy. Bandanna Energy is an Australian owned public company which listed on the Australian Securities Exchange's in 2008. Bandanna Energy has been in operation since 2008 and has over 1,400 million tonnes of JORC compliant Resources and Reserves (Bandanna Energy 2011 Annual Report).

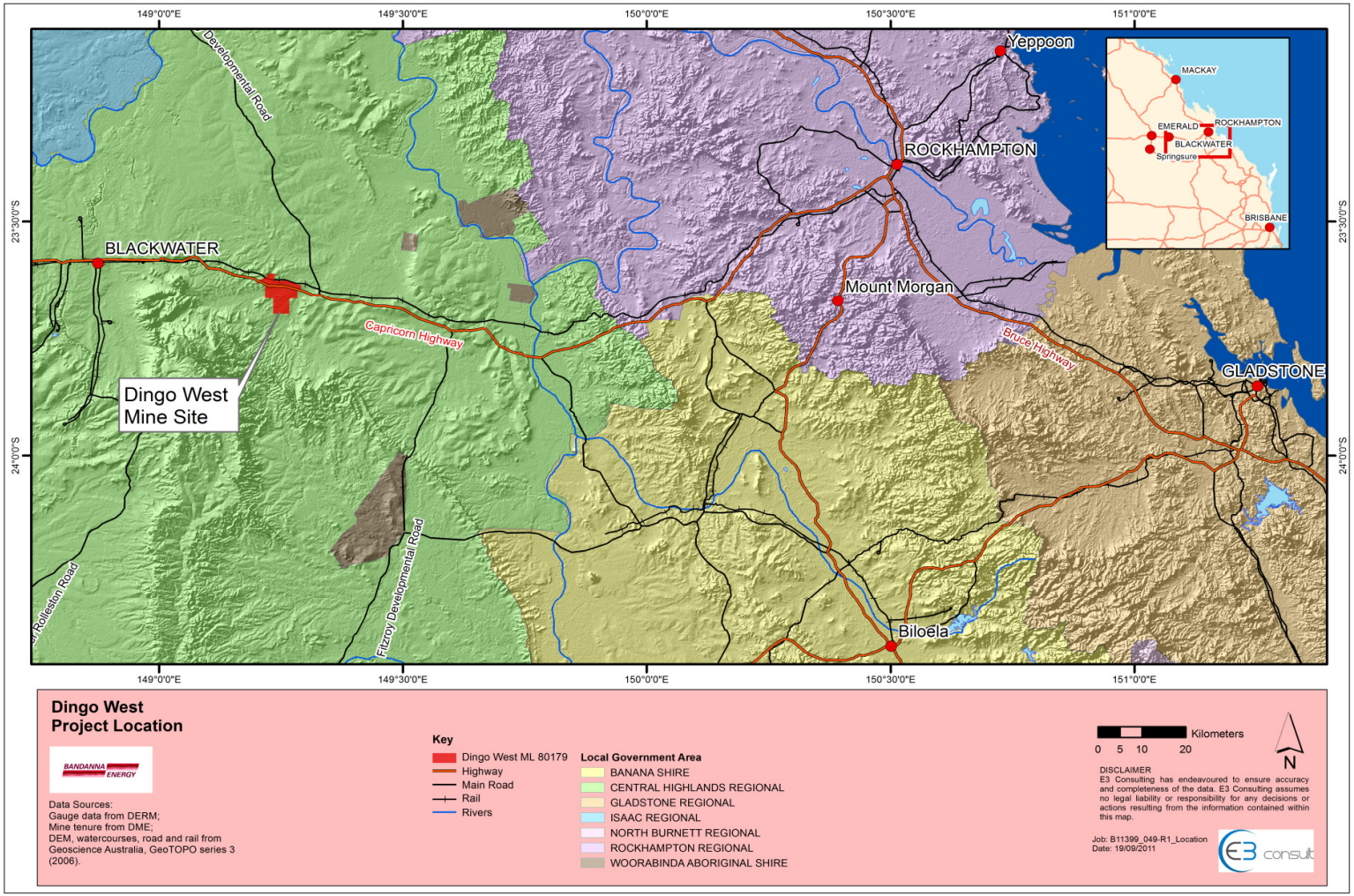
The contact details for Dingo West Coal are:

Dingo West Coal Pty Ltd
Level 12, 410 Queen Street
Brisbane Qld 4000.

1.3 Project Assessment

The Proponent is seeking to have the Dingo West project approved pursuant to the *Environmental Protection Act 1994* (EP Act) via an approved Environmental Impact Statement (EIS) and Environmental Authority (mining lease) (EA(ml)).

Figure 1. Project Location



Pursuant to the EP Act, activities that will, or have the potential to, release contaminants into the environment and which may cause environmental harm are defined as Environmentally Relevant Activities (ERA).

The Dingo West Coal Mine proposes to undertake the following ERAs:

- ERA 8 Chemical storage – storing gas, liquid or solid chemicals classified as dangerous goods in containers;
- ERA 15 Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour;
- ERA 18 Boilermaking or engineering – boilermaking, assembling, building or manufacturing a total of 200t or more of metal product a year;
- ERA 31 Mineral processing –processing in a year 1,000t 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 56 Regulated waste storage – operating a facility for receiving and storing regulated waste for more than 24 hours; and
- ERA 63 Sewage treatment – operating no-release works with a total daily peak design capacity of at least 21 equivalent persons (EP).

Under the SP Act, ERAs are exempt development for mining activities as defined under the MR Act. The EA sought is an integrated authority that allows for the carrying out of separate ERAs that are to be managed in an integrated manner. The EA is expected to provide approval conditions for each of the required ERAs.

A referral under the *Environment Protection and Biodiversity Conservation 1999* (EPBC Act) has been made to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) to determine if there are any controlling provisions for the project. The Project was declared "Not a Controlled Action if Undertaken in a Controlled manner" (EPBC Referral 2010/5775) by DSEWPaC based on the minimal impact the Project would have on Matters of National Environmental Significance (MNES).

1.4 Purpose of the Initial Advice Statement

The purpose of this Initial Advice Statement (IAS) is to provide sufficient information to the Queensland Government Department of Environment and Resource Management (DERM) to assist the proponents Mining Lease Application (MLA).

2. Project Description

2.1 Overview

The Project is located within one of the principal geological structural units of the Bowen Basin, the Dawson Fold Zone, which overlays part of the western extent of the Taroom Trough. The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill Formations, and is bound in the west by the Yarrabee Fault.

The Dingo West coal deposit contains the Aries, Castor, Pollux, Orion and Pisces seams of the Rangal Coal Measures. Recoverable coal with these seams will primarily come from within the Rangal Coal measures but also the Upper Burngrove formation. At present, the Dingo West Mine has an initial inferred raw, low-volatile thermal coal resource of 92.2Mt. However, this resource estimate will be confirmed during the upcoming future planned exploration program and the definitive feasibility study.

The coal is described as low-volatile bituminous coal with moderate ash, sulphur and phosphorus. Coal quality across the deposit is variable but typically indicative of a high specific energy thermal coal. It is considered that selective mining and blending and washing of many of the intersected seams would provide a potential PCI product. Current assumptions indicate the coal handling and preparation plant (CHPP) will wash part or all raw coal to a PCI Coal. Consideration will also be given to in-pit crushing to produce PCI and bypass the CHPP during the early stage of the mine operation.

Key features of the Project include:

- Development of a green field open cut coal mine within the proposed MLA80180;
- A mine life of approximately 30 years;
- Construction will include site access roads and haul roads, train load out (TLO) facility, CHPP, mine infrastructure area (MIA), construction of clean water dam and pit dewatering dam, flood protection levees particularly around infrastructure in close proximity to existing waterways, raw water and co-disposal/tailings dams (final tailings options will be determined during a detailed options analysis scheduled for Q1 2012) and mine surface water management systems;
- Mining to occur in three main pit areas: Pit one will be exclusively mined in the first 11 years. It is expected that concurrent mining will then follow in pits two and three for remainder of the mine life and this will be determined during the definitive feasibility study due for completion in 2012;
- Total ROM output is expected to remain relatively stable at approximately 1.4Mtpa for the life of the mine;
- 20 hours a day, seven days a week operation excavating to depths of 96m;
- The predominant mining method used will be blasting of overburden and overburden, interburden and coal removal using a combination of shovels, excavators, frontend loaders and trucks;
- Overburden and interburden will initially be used for construction activities with the remainder stored in an out-of-pit dump. Overburden and interburden generated past year one will be back-filled into the pit;
- Progressive rehabilitation of disturbed areas with minimal voids expected following mining activities;
- Development of a works accommodation camp designed to house up to a maximum of 220 persons during construction and 120 during operation; and
- Installation of a package potable water treatment plant and a sewage treatment plant.

Dingo West Coal will contract the mining operation to a mining contractor and the construction of the mining and associated infrastructure (e.g. CHPP, MIA, conveyors, accommodation camp). Dingo West Coal will maintain a management team to manage the construction and operation contractors.

2.2 The Resource

The Dingo West area is contained within the Dawson Fold Zone, which overlays part of western extent of the Taroom Trough (see **Figure 2**). The Dawson Fold Zone is located west of the Gogango Overfold Zone and east of Comet Ridge morphotectonic zone. To date Dingo West Coal has identified total resources of 91.1 million tonnes.

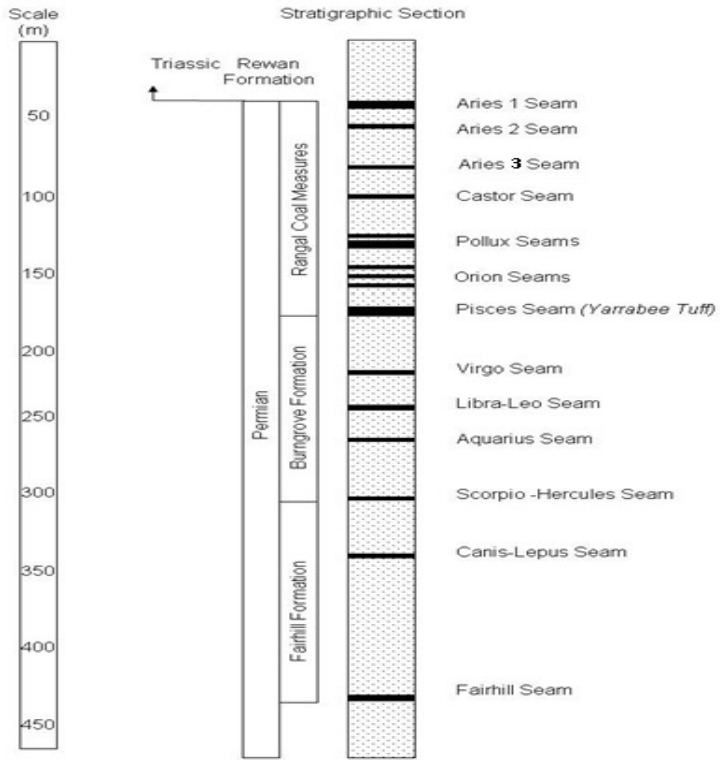
The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill formations, and is bound in the west by the Yarrabee fault. The hanging wall of the Yarrabee fault exhibits approximately 300 m of deformation to the west, on a series of shallowly ramping decollement surfaces.

The Yarrabee Fault defines the western boundary of MLA80180. The structural geology of the deposit is complex with isolated dips of up to 70^{o} having been observed in recent exploration core drilling.

The Dingo West coal deposit contains target seams within the Rangal Coal Measures, correlated with the Aries, Castor, Pollux, Orion and Pisces seams from the Blackwater area and Upper Burngrove Formation.

The deposit area is structurally complex with significant faulting (both minor and major) and folding occurring throughout the lease area. A significant proportion of the folding appears to be directly related to the major faulting (Yarrabee fault and other major faults) of the deposit area, with the exception of the more significant anticline structure in the south of the lease, which is responsible for a proportion of the faulting in that area.

Figure 2. Representative stratigraphic column for MLA80180



2.3 Land Tenure

The Project is situated in the rural zone of the CHRC – Duaringa Shire. The current Duaringa Shire Planning Scheme lists the agricultural land classification of the Project area as Class C2 – "Pasture land suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance". The land is typically used for low density cattle grazing with rural homesteads located on properties surrounding the Project area.

The mining lease area incorporates nine separate allotments comprising freehold, leasehold and state owned land. Land tenure and ownership details for these properties within the mining lease are shown in **Table 1**. **Figure 3** shows land tenures within and surrounding the Project area.

Table 1. Land tenure and ownership details

Real property description	Tenure	Primary land use
Lot 1 HT424	Freehold	Cattle breeding and fattening
Lot 2 HT138	Freehold	Cattle breeding and fattening
Lot 3 RP801280	Freehold	Cattle grazing and breeding
Lot 4 RP801280		
Lot 13 HT63	State Land	Reserved for cemetery
Lot 3 SP226576	Freehold	Cattle grazing and breeding
Lot 100 RP882349		
Lot 643 SP226575	State Land	Queensland rail easement

There are several coal and petroleum tenements within the immediate surrounding area of the wider MLA. Six Exploration Permits for Coal (including Bandanna Energy's current EPC 881) adjoin the Project area and two Petroleum Exploration Permits and one Petroleum Survey Licence intersect the current mining lease. Two existing gas exploration wells are located within the mining lease area; however, these do not interfere with the proposed mining operation. The future development objectives of coal seam gas (CSG) proponents are yet to be determined; however, future consultation will need to be undertaken by these proponents and Dingo West Coal. These tenements are shown in **Table 2**. Refer to **Figure 4** and **Figure 5** for spatial locations of coal and petroleum tenements respectively.

Figure 3. Land tenure

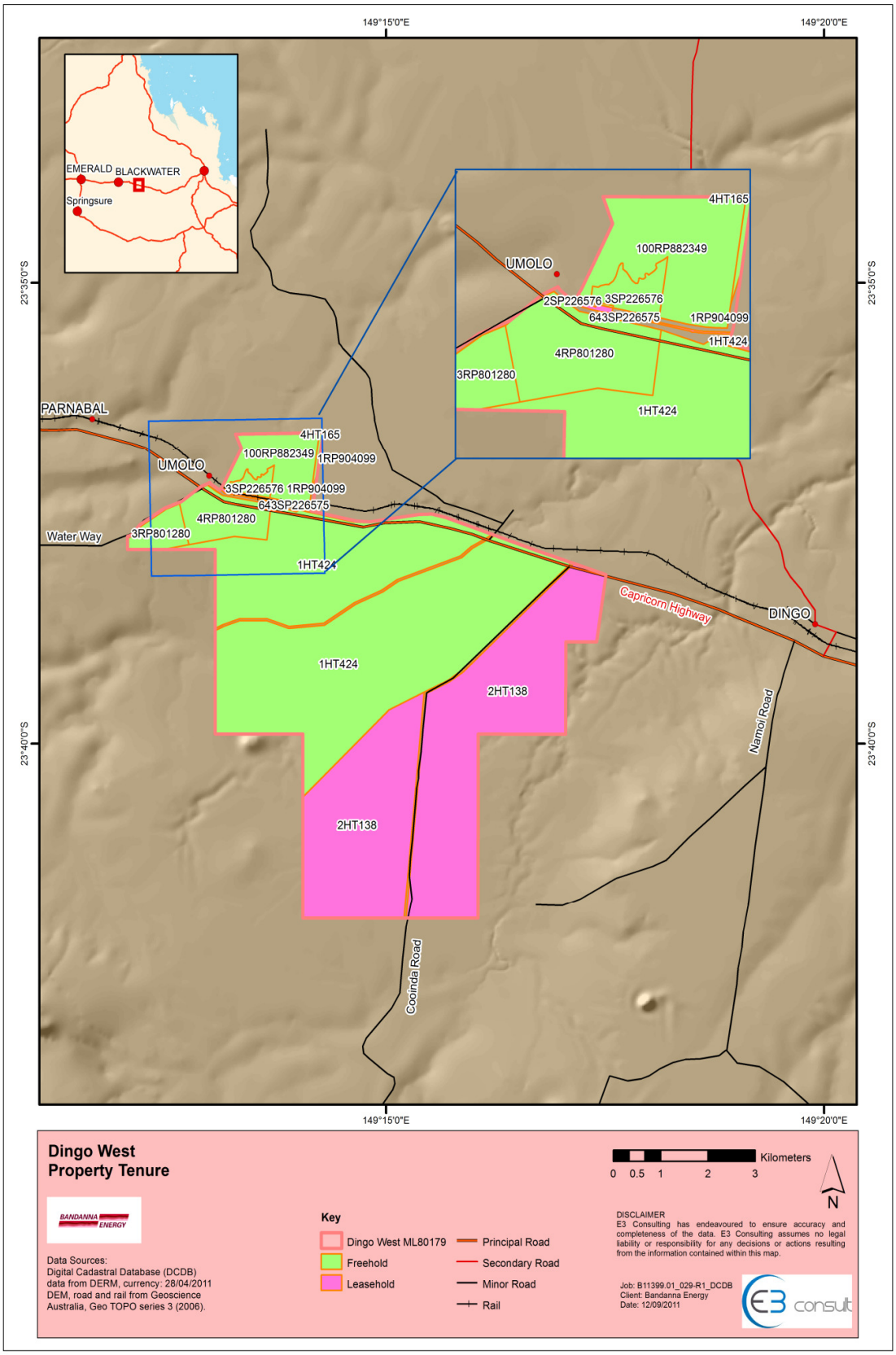


Figure 4. Coal tenements

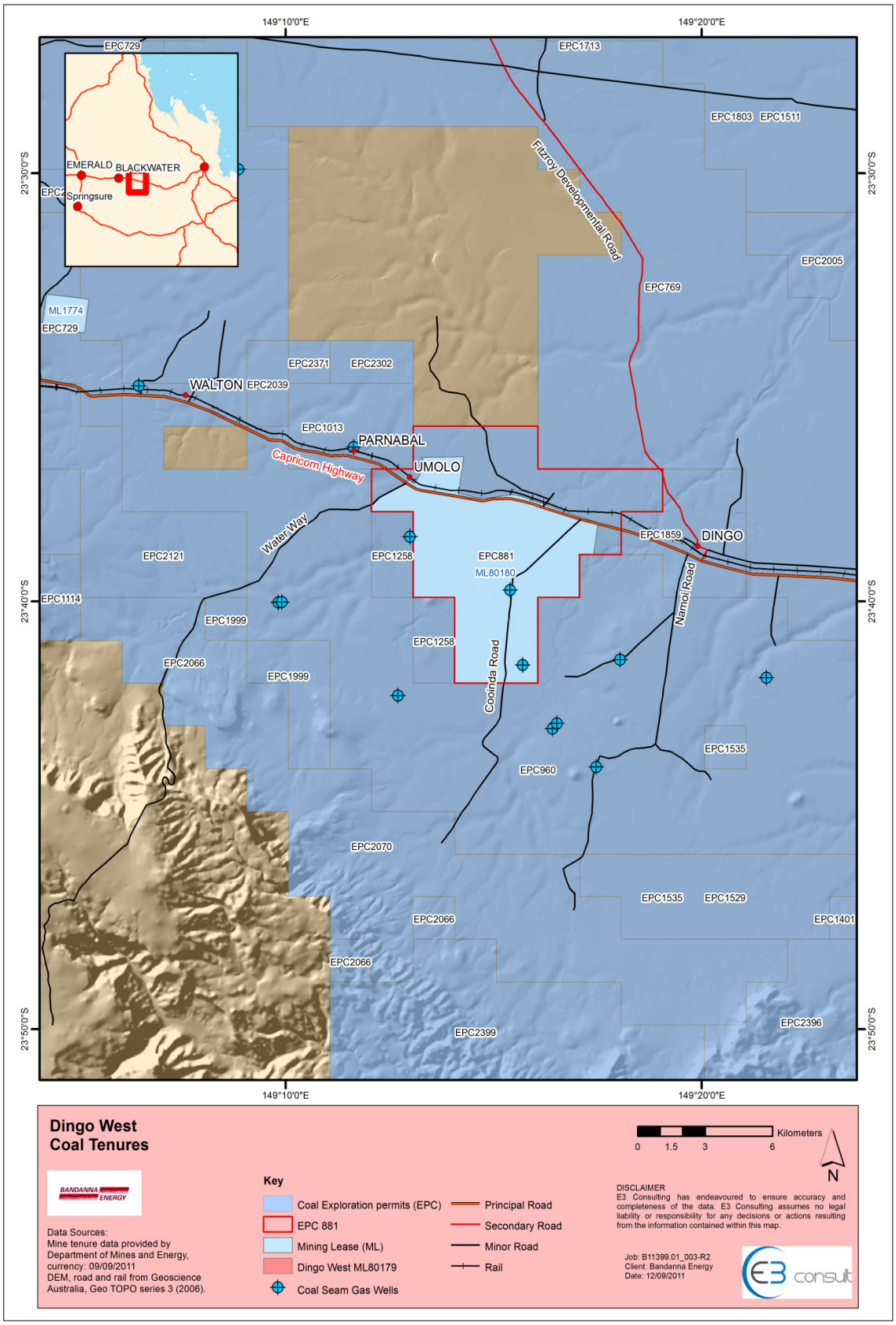


Figure 5. Petroleum tenements

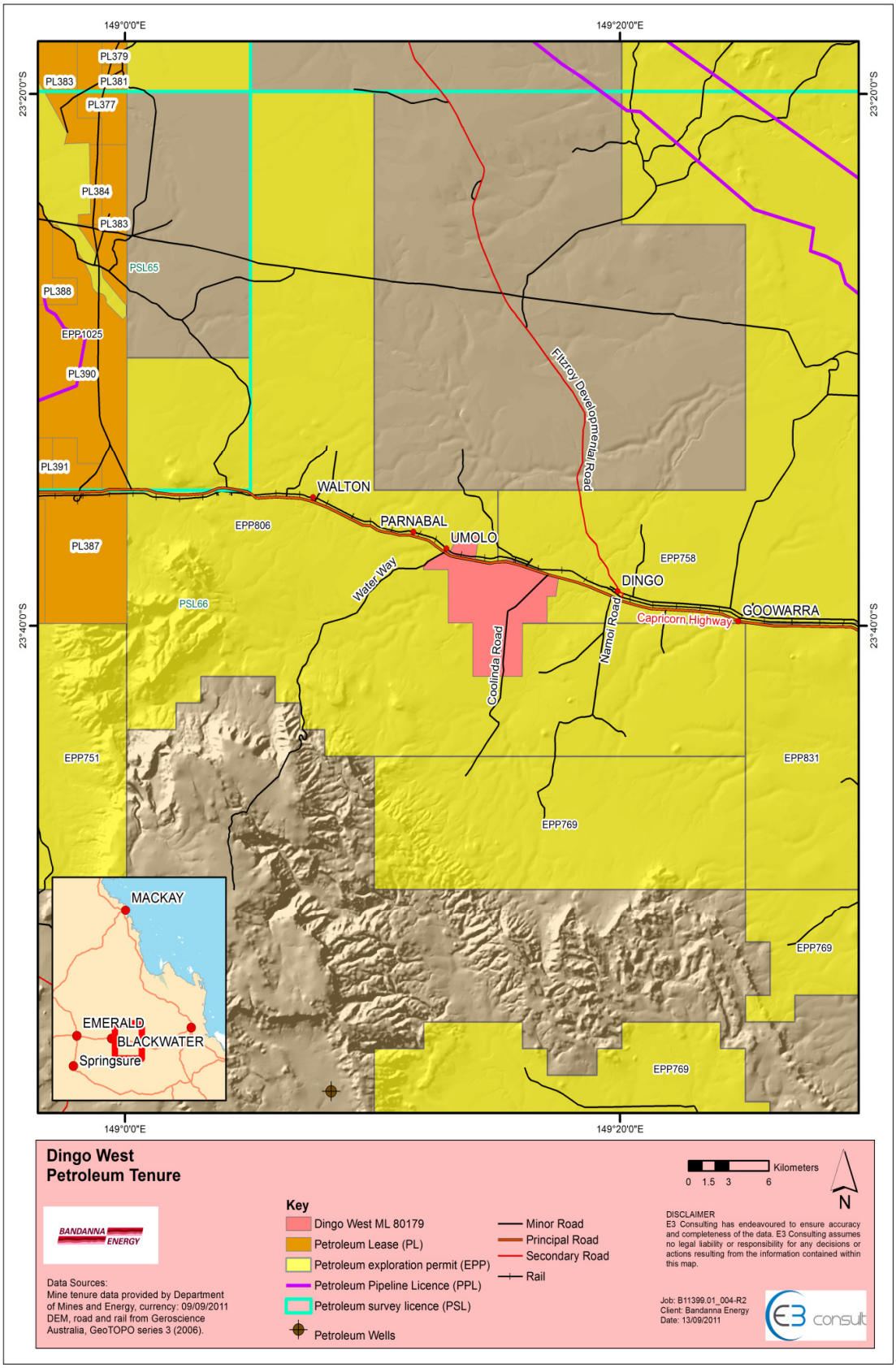

149°0'0"E
149°20'0"E
23°20'0"S
23°40'0"S
PL379
PL383
PL381
PL377
PL384
PL383
PSL65
PL388
EPP1025
PL390
PL391
PL387
EPP806
PSL66
WALTON
PARNABAL
UMOLO
DINGO
GOOWARRA
Capricorn Highway
Fitzroy Developmental Road
Water Way
Coolinda Road
Namoi Road
EPP758
EPP751
EPP831
EPP769
EPP769
EPP769
MACKAY
EMERALD
BLACKWATER
Springsure
Dingo West
Petroleum Tenure
Kilometers
0 1.5 3 6
N
Key
Dingo West ML 80179
Petroleum Lease (PL)
Petroleum exploration permit (EPP)
Petroleum Pipeline Licence (PPL)
Petroleum survey licence (PSL)
Petroleum Wells
Minor Road
Principal Road
Secondary Road
Rail
DISCLAIMER
E3 Consulting has endeavoured to ensure accuracy and completeness of the data. E3 Consulting assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.
Data Sources:
Mine tenure data provided by Department of Mines and Energy, currency: 09/09/2011
DEM, road and rail from Geroscience Australia, GeoTOPO series 3 (2006).
Job: B11399.01_004-R2
Client: Bandanna Energy
Date: 13/09/2011
E3 consult

Table 2. Mining and petroleum tenements in the immediate vicinity of the mining lease

Tenure	Tenure holder	Granted	Expires
Coal			
EPC 1013	Argos Pty Ltd	3 October 2005	15 December 2011
EPC 1258	MCG Resources Pty Ltd	26 October 2008	21 October 2013
EPC 960	Argos Pty Ltd	30 May 2005	29 May 2011 (renewal lodged)
EPC 1859	Area Coal Pty Ltd	31 May 2011	30 May 2016
EPC 769	Capricorn Coal Pty Ltd	3 September 2002	2 September 2011
Petroleum			
PSL 66	BOW Energy Pty Ltd	12 May 2011	n/a
EPP 806 (ATP)	OME Resources Pty Ltd	30 April 2007	30 April 2019
EPP 758	OME Resources Pty Ltd	19 October 2004	31 October 2008 (renewal lodged)

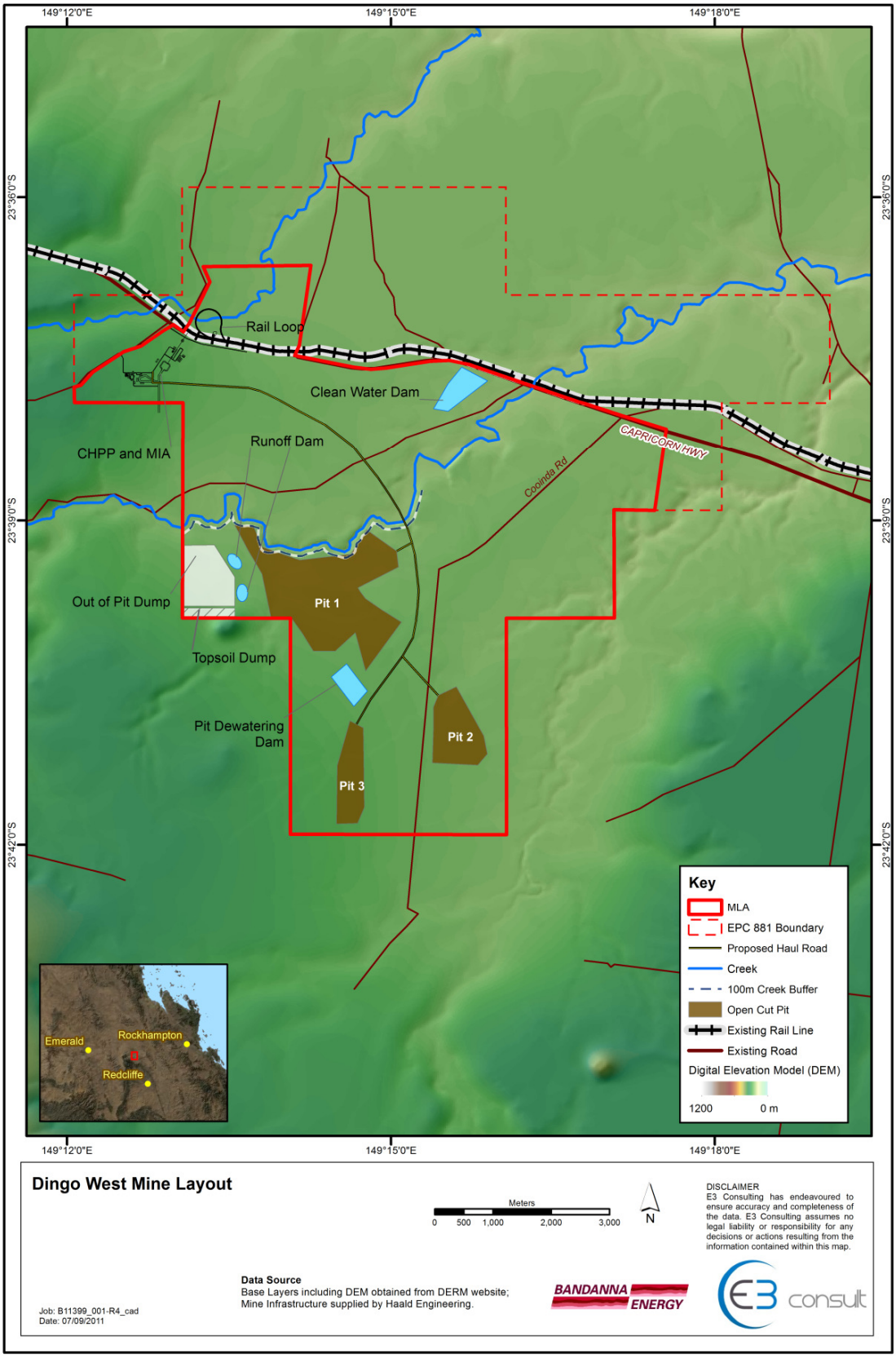
2.4 Mining Process

Margin rank analyses identified seven main areas of interest within the area of MLA80180. From these areas, three open cut pits in the southern portion of the MLA80180 area and wholly within the proposed mining lease, have been identified as the most probable locations based on a range of factors including coal seam thickness, quantity of overburden and interburden, cost of extraction and environmental considerations. Indicative locations of these pits are shown in **Figure 6**. These locations will be finalised following results from ongoing and future planned exploration drilling to be completed during the definitive feasibility study due for completion in 2012.

It is anticipated that mining will only be undertaken in these pit areas for the life of the mine – exploration drilling indicates that mining in the area to the north of pit one is unlikely due to poor resource recovery estimates. Pit one, which lies immediately to the south of Charlevue Creek, is expected to be mined exclusively for the first 11 years. Mining in the area of pits two and three is expected to commence following cessation of mining in pit one.

The relatively shallow depth of the targeted seams – pit depth range from 96m to 85.1m – and the coal seam cumulative thickness of 3.5m to 4.5m from the Pollux and above seams make the Dingo West area ideal for open cut mining. Seam depth and orientation have been used to develop a mining strip layout suitable for truck and shovel mining and is typically based on mining strips approximately 100m wide.

Figure 6. Mine layout


149°12'0"E
149°15'0"E
149°18'0"E
23°36'0"S
23°39'0"S
23°42'0"S
Rail Loop
Clean Water Dam
CHPP and MIA
Runoff Dam
CAPRICORN HWY
Coorada Rd
Out of Pit Dump
Pit 1
Topsoil Dump
Pit Dewatering Dam
Pit 2
Pit 3
Emerald
Rockhampton
Redcliffe
Key
MLA
EPC 881 Boundary
Proposed Haul Road
Creek
100m Creek Buffer
Open Cut Pit
Existing Rail Line
Existing Road
Digital Elevation Model (DEM)
1200
0 m
Dingo West Mine Layout
Meters
0 500 1,000 2,000 3,000
N
DISCLAIMER
E3 Consulting has endeavoured to ensure accuracy and completeness of the data. E3 Consulting assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.
Data Source
Base Layers including DEM obtained from DERM website;
Mine Infrastructure supplied by Haald Engineering.
Job: B11399_001-R4_cad
Date: 07/09/2011
BANDANNA ENERGY
E3 consult

Although pit one will be mined for at least 11 years, detailed production estimates have initially been undertaken for the first five years only. Mining schedules for the remainder of pit one and for pits two and three will be developed following completion of the current and future planned exploration operations. Production at Dingo West is unlikely to increase significantly beyond 1.4Mtpa of ROM coal due to the complex geological faulting which prohibits high tonnage outputs. An indicative mine schedule and strip plan for years 1-5 within pit one are provided in **Figure 7**.

Approximately 103 million bank cubic metres (Mbcm) of overburden and interburden will be generated during the first five years of operation ranging from 29Mbcm in year one to 14.8Mbcm in year three. It is the intention of Dingo West Coal to avoid where possible, the use of an out of pit dump and use overburden to construct haul roads, levees/bunds and infrastructure pads with excess overburden back-filled into the pit(s). Only excess outside of these activities will be stored in an out of pit dump. Production estimates for the corresponding period are provided in **Table 3**.

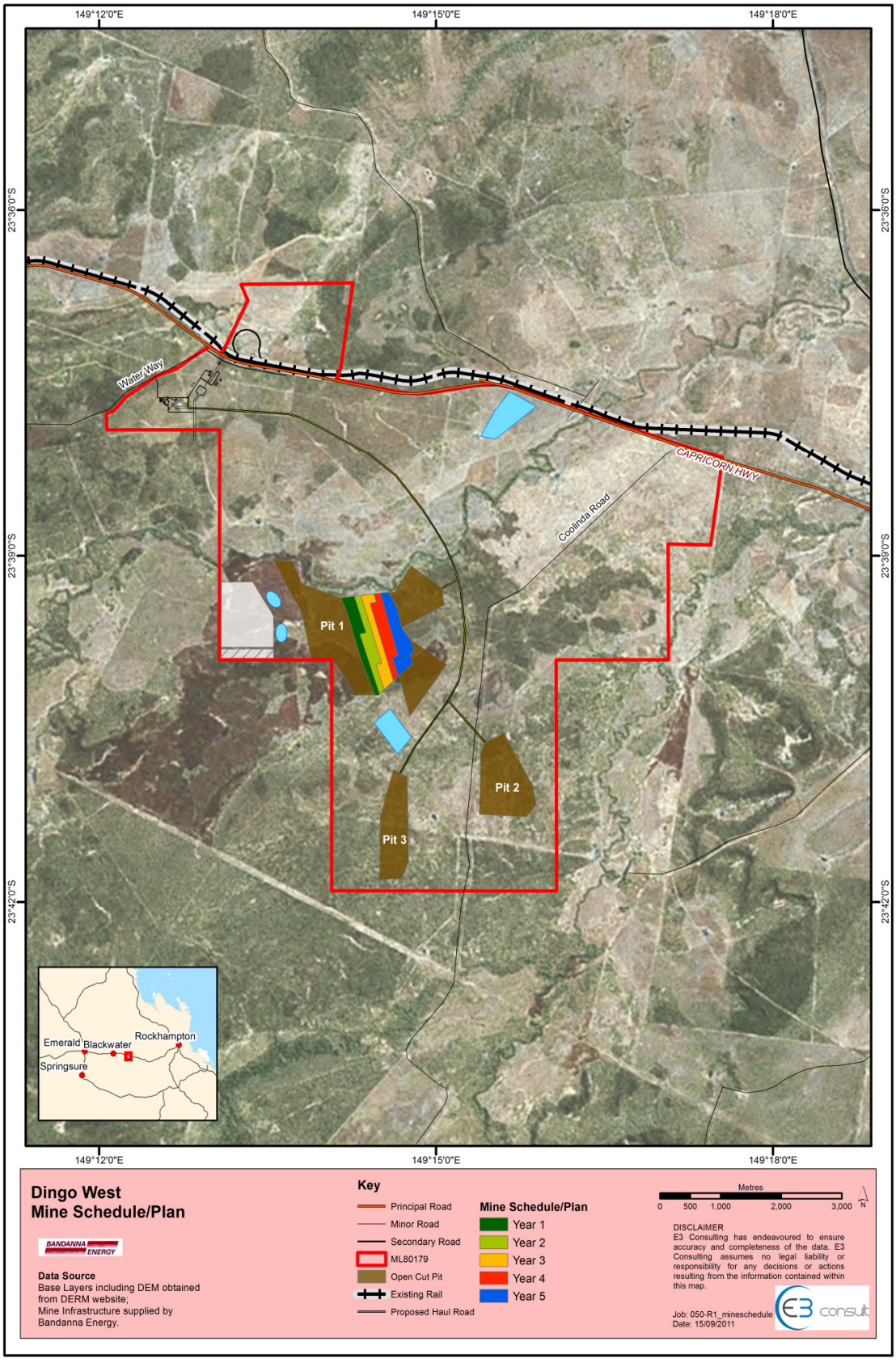
Table 3. Annualised schedule of production

Year	1	2	3	4	5
Total Waste (bcm)	29,004,860	16,331,424	14,879,126	18,526,696	24,338,529
ROM Coal (t)	1,430,000	1,430,000	1,430,000	1,430,000	1,430,000
Product Coal (t)	999,565	1,001,000	1,001,000	1,001,000	994,521
Pit Depth (m)	96.0	85.1	90.9	93.8	95.3

Main features of the mining sequence are outlined below:

- Vegetation clearing, topsoil stripping and stockpiling;
- Blasting of overburden. Blasting will be conducted between 9am and 3pm Monday to Friday and if required, 9am to 1pm on Saturdays. Blasting will not be undertaken on Sundays or public holidays;
- Removal of overburden by shovels, excavators and trucks;
- Extraction of coal by frontend loaders, excavators and trucks;
- Removal of interburden by shovels, excavators and trucks;
- Overburden and interburden disposal to the out-of-pit dump ;
- Delivery of ROM coal to the ROM stockpile adjacent to the CHPP using rear dump trucks;
- Transference of ROM coal to the CHPP for processing;
- ROM coal will be processed through the CHPP to produce PCI product coal;
- Coarse and fine rejects will be co-disposed in a co-disposal dam and returned to the mining void after drying;
- Product coal will be transported to the TLO via an over-road conveyor;
- Product coal will be transported to the port via rail for export; and

Figure 7. Mine schedule



- Water management including:
  - Supply and storage of raw water;
  - Potable water;
  - Sewage treatment;
  - Recycling of reject water for re-use in the CHPP;
  - Use of pit water for dust suppression;
  - Erosion and sediment control;
  - Flood protection;
  - Landform re-profiling and revegetation; and
  - Decommissioning and rehabilitation.

2.5 Mine Layout

The pits will be accessed by a purpose built coal haul road which will be used by both heavy and light vehicles. The main haul road extends in a south-east direction from the MIA and CHPP in the north-western section of the MLA to the pit locations in the southern section. The main haul road will be approximately 5km in length to pit one and constructed from compacted overburden material taken during the development and excavation of pit one.

It is expected the main haul road will also connect to pit two whereas access to pit three will be via a shorter additional road that branches off the main haul road. However, the final boundaries of these pits won't be finalised until Q2 2012. An indicative cumulative distance of the haul road from pit two to the MIA and CHPP is approximately 8km and approximately 2km further to pit three. Indicative pit and mining infrastructure locations are shown in **Figure 6**.

2.6 Coal Handling and Preparation Plant

The available in situ raw coal quality data suggests that the CHPP will wash the raw coal feed to a PCI product. A dense medium cyclone plant with spirals for fine coal treatment has been chosen, being typical of existing CHPPs treating similar coals. With Hardgrove Grindability Index (HGI) of 85, the raw coal is soft and additional fines will be generated during handling and sizing operations. Additional spirals will be required to process these fines. Coarse and fine rejects will be co-disposed and returned to the mining void after drying. Water drained from the co-disposal dam will be returned to the plant.

A thermal product can be produced by either bypassing the CHPP or washing all or part of the raw coal feed. The product conveyor tail end has been extended and a modulating flop gate installed to allow raw coal bypass. With only one stockpile and a single stacking conveyor, campaign washing of thermal coals from selected seams would be required to prevent contamination of PCI product on the stockpile.

With some seams exhibiting coking products, an additional rewash dense medium cyclone circuit would need to be installed to produce a coking coal and a PCI/thermal coal simultaneously. The existing product coal stacking conveyor will need to be replaced by two product conveyors feeding mobile stackers operating on two product stockpiles. A second reclaim tunnel, coal valves and reclaim conveyor will be installed to feed onto the existing product reclaim and TLO conveyor. The additional conveying and stacking equipment will negate the need to campaign wash when producing a thermal coal product.

2.6.1 Operating capacities

Initial throughput capacity of the CHPP is 1.4 Mtpa ROM coal. With a two shift, seven day roster and the plant producing for 20 hours per day for 50 weeks per year, the total operating hours annually is approximately 7,000 hours. This requires an average feed rate of 200tph (tonnes per hour).

A conservative CHPP name plate feed rate was chosen at 250tph for initial planning studies. This allows for regular maintenance and one campaign shutdown period for maintenance and repairs each year.

2.6.1.1 ROM receival

The ROM pad will be approximately 100m by 100m in size and has the capacity to store in excess of 10,000t of ROM coal with the ability to push out to 40,000t when the plant is shut down. A single front end loader will manage the coal supply from the stockpile to the ROM bin, while a dozer will be used to push coal out during the shutdown periods. This dozer will be taken from the existing mining fleet or the product coal stockpile.

2.6.1.2 Raw coal management

The ROM coal will pass through a grizzly at the top of the bin and onto a feeder breaker which will size the coal to ≤150mm. The feeder breaker will feed onto a conveyor on which the coal will be transported to the sizing tower and the surge bin. The feeder on the bin discharge will deliver coal to a secondary sizer followed by a tertiary sizer. The output of the tertiary sizer, sized to ≤50mm, will then be delivered to a flop gate which will direct coal to the CPP feed conveyor or the product coal conveyor. The required number of sizing stages will be finalised prior to construction.

2.6.1.3 Co-disposal

The prefeasibility study for the Dingo West plant has acknowledged that there are a number of options for disposal of tailings / rejects. These options will be further investigated during the Definitive Feasibility Study. Further coal washability testing will be undertaken to assist in the selection of the tailings / rejects management option.

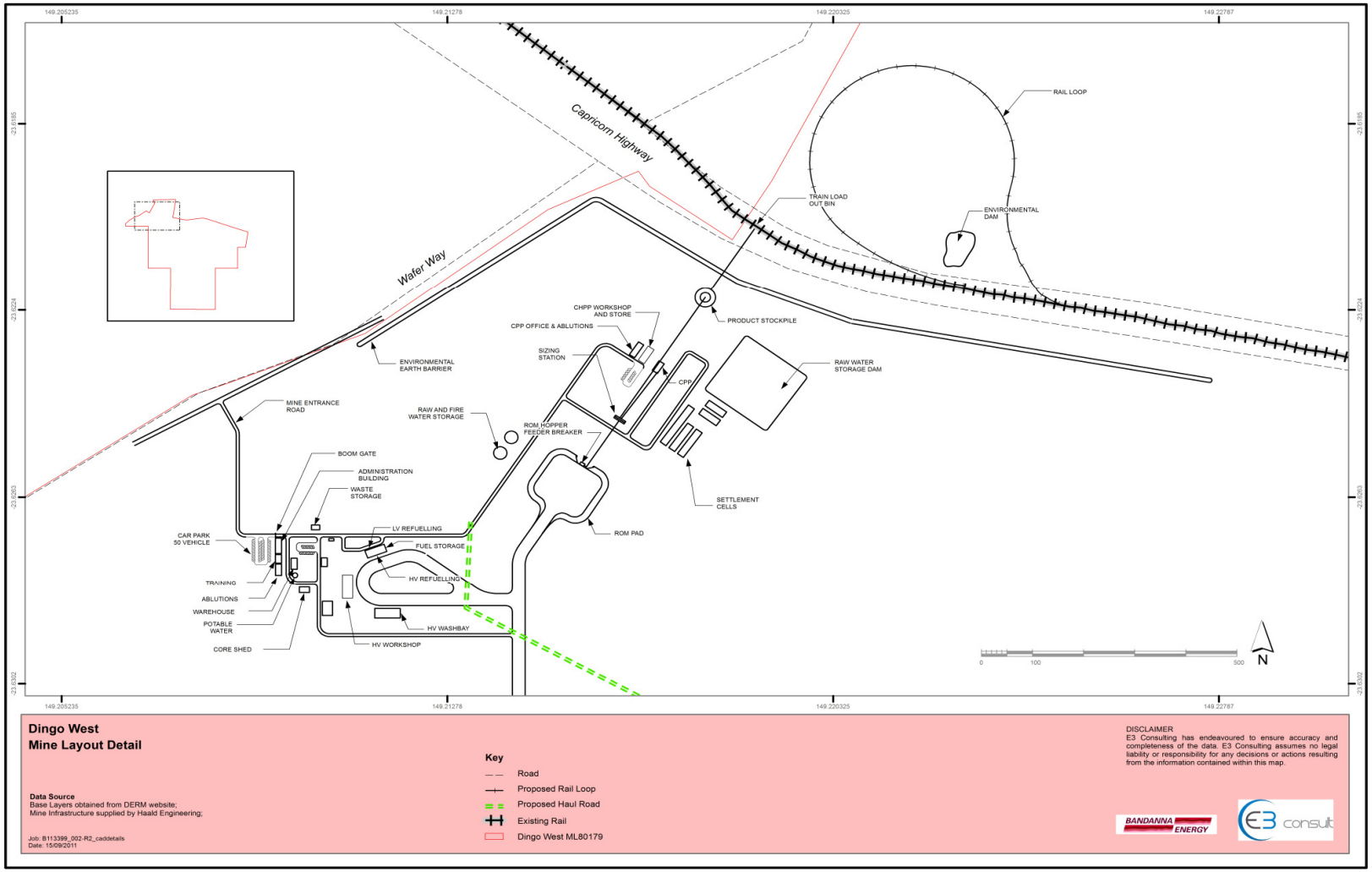
The preferred option based on expected coal washability data is to use co-disposal methods for rejects management. Coarse rejects from the plant (separated with the use dense medium cyclones and screens) will be stockpiled whilst fine rejects will be pumped to fine coal management cells (as shown on **Figure 8**). The fine coal management cells will allow for the solids to form a fines “beach” with water to be recovered through two settlement dams, a polishing dam and then returned to the plant for re-use. Bunds (refer to as the environmental earth barrier on **Figure 8**) will essentially surround the MIA, CHPP and the settlement cells and prohibit discharge from the cells to the wider receiving environment.

Coarse and fine rejects will then be co-disposed and returned to the mining void after drying.

2.6.1.4 Product coal handling

Product coal from the CHPP and bypassed coal will be transported to the product stockpile. The stockpile will be a single conical stockpile with 20,000t free fall. The total capacity of the stockpile will be 50,000t using dozer push out.

Figure 8. Mine layout general arrangement



2.7 Product Coal Reclaim and Train Load Out

The product coal will be reclaimed by coal valves onto the reclaim conveyor located in a reclaim tunnel. The reclaim conveyor will transport coal to the TLO on the northern side of the Capricorn Highway. The TLO will be a flask loader incorporating a 300t surge bin with a 50t weigh bin for train loading. The reclaim and TLO system has an operating capacity of 4,250tph to ensure that a single 8,500t nominal capacity train can be filled within the two hour time frame specified by QR National Pty Ltd.

A typical TLO and general arrangement of this is provided in **Figure 9**, **Figure 10** and **Figure 8**.

Figure 9. Existing Blackwater reclaim conveyor – Capricorn Highway

Figure 10. Existing Blackwater train load out facility – Capricorn Highway

2.8 Mining Equipment

An indicative list of the equipment anticipated for mining is shown at **Table 4**. The number of equipment are based on the mine plan and proposed mining operations currently under consideration.

Table 4. Estimated construction equipment fleet

Type of Equipment	Indicative Number in Construction Fleet
Haul truck (180t)	5
Drill Rig	1
Front End loader	1
Tracked dozer	2
Excavator	1
Grader	1
Fuel Truck	1
Water Truck	1

2.9 Onsite Mine Infrastructure

This section outlines the anticipated locations, size and general specifications of all on-site infrastructure excluding mining pits, haul roads, CHPP and TLO.

Infrastructure within the site layout includes:

- Light vehicle roads including access roads and car parks;
- Water management including storage and reticulation of raw water, potable water, firewater, sewage, and drainage;
- Power and communications;
- MIA including administration, ablutions, workshops, stores, tanks and ancillary buildings and surrounds; and any fuelling, wash-down, and service bays; and
- Waste management including all waste handling, storage and disposal other than that generated by the mine or CHPP (spoil and rejects).

2.9.1 Light vehicle roads

Current estimates require approximately 2km of sealed, dual lane roads for access around the MIA and CHPP. Unpaved tracks for accessing remote infrastructure elements (e.g. dam pumps) will be identified and established during the construction phase of the project. It is envisaged that approximately 5km of tracks will be required.

2.9.2 Site water management

2.9.2.1 Water supply

Security of water supply is one of the biggest risks to the Dingo West project. The most probable solution for securing long-term water supplies is via an allocation from the water grid from the proposed SunWater pipeline to be constructed in 2013 that will run from Duaringa to Blackwater along the Capricorn Highway

(across the proposed mining lease area) that will be fed by treated CSG surplus water. Discussions with SunWater are ongoing and a 2 Gigalitre (Gl) to 3GI allocation from this pipeline, which is enough to cover the annual water usage expected, is likely to be available.

At present, underground water allocations are currently being examined for the Project. DERM activated a Moratorium on Water Usage from the Fitzroy Basin on 14 December 2010. This moratorium prevents the use of bore or creek water in the region unless the Project is declared significant under s.26 of the *State Development and Public Works Organisation Act 1971*. The Project is not declared significant under that Act.

Several options have been explored for top-up water during operation and possibly for construction as follows:

- Amend current irrigation permits to mining use. Medium priority allocations can be converted to high priority allocations at a rate of around one-third the allocation. A pipeline would need to be constructed from either the Mackenzie or Dawson River to take this allocation. However, these water allocations cannot be guaranteed during prolonged dry spells;
- Apply for underground water use and sink bores holes. However, as the Moratorium states that for the project must be declared significant by the State potential issues may arise. In addition, exploratory drilling will be required to determine if water is present to adequate levels;
- Contact existing mining companies in close proximity to Dingo West to seek permission to treat and pump excess water from their sites. All necessary legislative approvals would need to be obtained prior to pumping; and
- Capture and re-use as much on-site water as possible including:
    - Re-use of water recovered from fine and coarse rejects;
    - Capture and re-use of runoff water from the plant and MIA area;
    - Capture and re-use of runoff water from the out of pit dump; and
    - Dewatering of the pits will be sent to a dewatering dam for use as dust suppression water on the pit roads.

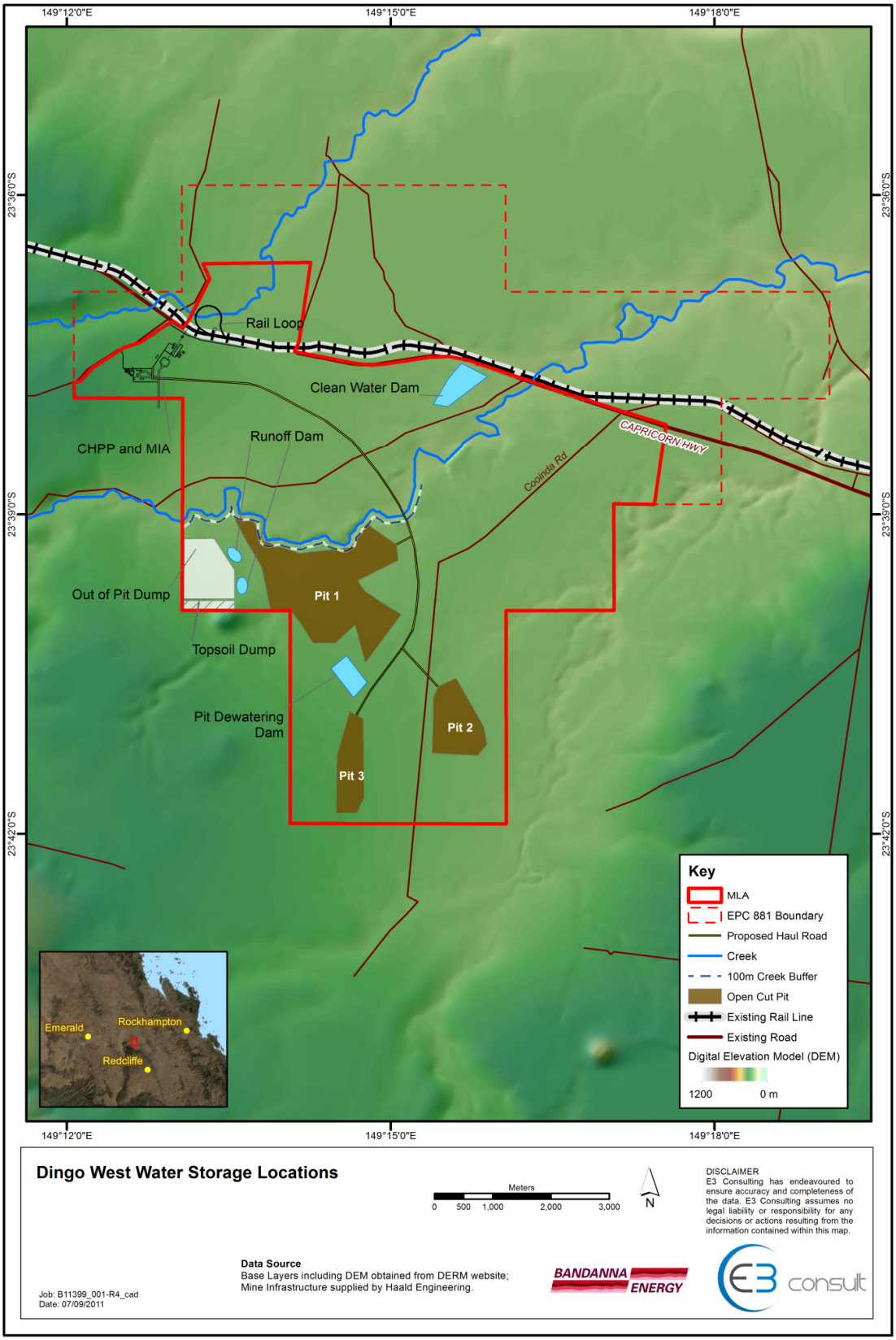
2.9.2.2 Water storage and drainage

The current mine layout has been designed to avoid any watercourse diversions and all dam locations and erosion and sediment control devices have been chosen to minimise potential runoff into receiving environments (refer to **Figure 11**).

A number of dams and associated drainage systems have been conceptually designed for the Dingo West Project as follows:

- A clean water dam supplied by overland flow will be located immediately west of Charlevue Creek and bounded by the Capricorn Highway to the north. Run-off in the undisturbed portion of the Project area to the west of Charlevue Creek and to the east of the MIA will be captured in this dam;
- Cut and fill contoured pads will be constructed at the MIA and CHPP, which will direct water flows to two runoff catchment dams. Water will then be directed from these dams to the settlement and polishing dams for use in the plant;
- The raw water dam of approximately 40 Ml is filled with water pumped from the clean water dam. Two 600,000l tanks will be installed at the MIA and filled with water from the raw water dam. Water from one of these tanks will be used exclusively for fire fighting;
- A mine de-watering dam will be located between the proposed first two pits on high ground to avoid inundation during floods. Water from this dam will be pumped into water trucks and used for pit and haul road dust suppression;

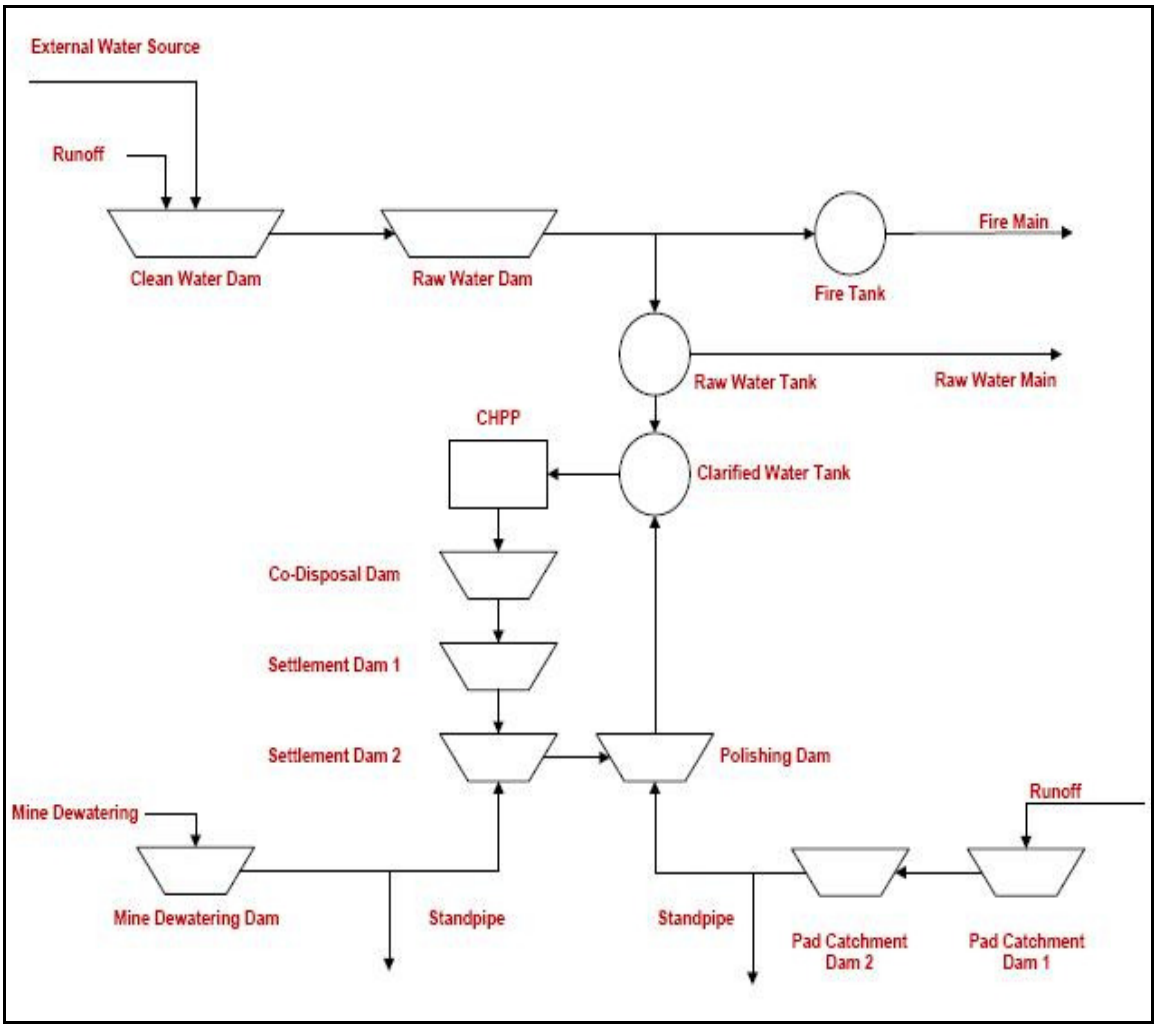
Figure 11. Water storages



- Out of pit spoil (if required) and topsoil stockpiles will be positioned near the pit(s) once mining begins. Where out of pit dumps are required, runoff control dams will be provided down slope of the dumps to intercept and contain stormwater runoff from the dumps. Stormwater runoff from out of pit dumps will be pumped back into the mine water management system for meeting site water demands;
- With pit one located adjacent to Charlevue Creek, a levee will be constructed to ensure the pit can remain safe from inundation (and hence avoid dewatering) during high rainfall events. As part of the definitive feasibility study a 1:1000 flood study will be conducted with designs developed to avoid inundation. The flood protection levee will be designed in accordance with the DERM *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. The mine flood study will be used to determine the levee height and flood velocities for design of suitable scour protection. The flood study will also assess the impacts of the flood protection levee on upstream and downstream flooding conditions and the need for compensatory channel earthworks to mitigate any adverse impacts on flooding conditions outside of the proposed mining lease; and
- A detailed water balance model will also be undertaken during the definitive feasibility study.

A preliminary site water flow is shown in **Figure 12** (potable water is not included in this diagram).

Figure 12. Site water flow block diagram



2.9.2.3 Potable water

Currently, the potable Water Treatment Plant (WTP) will be located at the proposed accommodation camp. Water will be trucked to a 200,000l tank positioned north of the main access road near at the MIA.

DERM have confirmed that a permit will be required for extracting groundwater for potable usage. However, approval applications for drinking and ablution usage should be a routine approval. In the event that underground flow is insufficient, discussions will be undertaken with one of the larger towns (Emerald or Rockhampton) water supply authority for purchasing potable water.

2.9.3 Mine Infrastructure Area

The MIA includes the following infrastructure:

- Administration and training facilities;
- Bathhouse;
- Communication facilities;
- Crib facilities;
- Drill core storage facilities;
- Equipment storage facilities;

- Fire fighting system;
- Fuel and lubrication facilities;
- Hazardous materials storage facilities;
- Laydown areas;
- Maintenance workshop;
- Medical facilities;
- Power facilities;
- Security office and boom gate;
- Sewage treatment plant;
- Temporary accommodation, services and offices;
- Vehicle wash down bays; and
- Waste station.

The MIA layout was selected to optimise traffic flows on the site and keep heavy vehicle/light vehicle interactions to a minimum, with logical separations around the fuel system and workshop areas.

2.9.4 Sewage treatment and disposal

The sewage treatment and disposal comprises collection, intermediate storage, and treatment capacity required to service the demands of the site and accommodation camp. The sewerage treatment plant (STP) for the Project will be located at the accommodation camp. Being outside of the proposed mining lease, the camp will require separate legislative approvals.

Sewage from the site ablutions will be collected from on-lease gravity collection storages and trucked to the STP. The plant will be sized to cater for the construction personnel load and specified to efficiently manage any turn-down required for the reduced operational demands. This approach will not place additional demand on the local council sewage treatment infrastructure.

2.9.5 Power supply

The power supply for the mine site will be provided by 415V, three-phase diesel generators, installed at the MIA and the CHPP.

2.9.5.1 MIA

The MIA Substation consists of two 300KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the MIA 415V Switchroom. The normal mode of operation for the generators is synchronised and connected to the load through a bus tie. However, they have been sized to provide redundancy with each generator capable of carrying the total load.

The generators are complete with their own diesel day tanks capable of holding sufficient diesel for a minimum of seven days operation on full load. The generators will be hired to minimise initial capital costs and the hire company will be responsible for all repairs and maintenance.

The MIA 415V Switchroom houses the main 415V Distribution Board. Sub-main circuits are distributed to each of the MIA buildings, service points and area lighting. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.5.2 CHPP

The CHPP area is serviced by two substations, one at raw coal area and the other at the CHPP. The raw coal substation consists of one 500KVA 415V diesel generator set mounted in a fully bunded area adjacent to the Raw Coal 415V Switchroom. The CHPP substation has three 500KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the CHPP 415V Switchroom. The normal mode of operation for the four generators is synchronised and connected to the load through bus ties with an interconnecting cable installed between the two substations. The generators have been sized to provide redundancy with three generators capable of carrying the total load.

Similar to the generators used at the MIS, each have their own diesel tanks capable of holding sufficient diesel for a minimum of seven days operation on full load.

The Switchrooms house the motor control centres (MCC), programmable logic controls (PLC) and instrumentation equipment, as well as the 415V Distribution Board which supply light and power. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.6 Communications

2.9.6.1 LAN and data communications

A Site LAN and temporary servers will be installed to service voice and data requirements during construction phase. A permanent air conditioned computer and communications room will be constructed as part of the administration building at the MIA. Equipment associated with all site communications such as the satellite system, radio system and servers for voice and data transmission will be installed here. An optical fibre (OF) backbone will be installed between this room and all offices, switch rooms and buildings at the MIA, CHPP and TLO. The CHPP SCADA control system will be interfaced by the OF backbone to provide a site wide control system with nodes at the control room, administration office and security office and gate, workshops and other authorised users as required. CCTV cameras at the security office and gate, the CHPP, TLO and ROM pad will be installed and connected to the LAN using the FO backbone cabling.

A computerised log on system, also connected to the LAN using the OF backbone, will be used by employees, contractors and visitors for recording personnel on site. This system is used for contractor management, fatigue management and identification of onsite personnel during emergency evacuations.

2.9.6.2 Radio communications

A digital trunked radio communication system (based on TETRA technology) will be installed in stages commencing with communications for the construction phase. This initial installation will provide coverage over the entire tenement, the township of Dingo, the accommodation camp site and the highway road access for response to calls for assistance when travelling to and from site.

The initial installation will consist of a 26m cyclonic concrete pole mast, located at the construction site, with easy access to the construction site LAN and mains power. An air conditioned relocatable building will house the electronic equipment with provision to install a microwave backbone radio LAN system at a later date when mining commences. This installation will be relocated to the MIA when construction is complete.

The second stage is an upgrade of the system to provide illumination of any working pit areas. A radio trailer with stabilised legs, a mast to ensure adequate coverage over the pit, and housing a TETRA base station will be positioned in the mining area to provide a full duplex microwave link backbone between the original site LAN at the MIA and the trailer. Power for the equipment will be provided by solar panels recharging a battery system. The system supports full duplex communications to provide full duplex private one on one and telephony calls and embraces IP technology and interfaces with the site LAN and fixed voice systems.

Further upgrades will be performed at a future date to encompass all Bandanna Energy mine sites in the region. Each site will operate individually, or for management and operational purposes, as a multi station, multi site wide area network.

2.9.6.3 Fixed voice communications

Fixed phones using IP telephony will be connected to the LAN for integration with the satellite and radio systems.

2.9.7 Maintenance workshops

The Project will require two maintenance workshop facilities. It is envisaged they will be low cost without fixed overhead cranes and will rely on hired mobile cranes as required as well as off-site maintenance for larger or more complex jobs.

2.9.7.1 CHPP workshop

The CHPP Workshop will be an 18 x 12m building with two small offices, a dual purpose crib room/meeting room with room for 10 employees, and toilets. Outside will be an area designed and bunded for lubricant and solvents storage both clean and dirty.

2.9.7.2 Heavy vehicle workshop

The Heavy Vehicle Workshop will be a 30 x 15 x 12m building with a floor capable of withstanding maintenance activities on mine trucks with an empty operating machine weight of 120 t. The building will contain two offices and a dual purpose crib room/meeting room large enough for 12 employees, and toilets.

2.9.8 First aid / medical room

The First Aid centre will be located in the administration building, occupying the northern end of the building with the security office. The centre will have suitable access from both east and west sides of the building for any medical supplies or persons that may require access in the case of an emergency. It will open onto the emergency vehicle park on the western side. It will be designed to have adequate space for a private examination room and a bathroom.

2.9.9 Bath house

It is proposed a bath house of 12 x 24m be included on site to cater for up to 40 employees. It will have a dirty side and a clean side with showers and toilets down the middle. A separate section for female staff will be included.

2.9.10Vehicle wash-down bays

Washdown bays for both heavy and light vehicles are required for cleaning prior to maintenance and for adequate cleaning and wash-down of vehicles and equipment before leaving site.

The heavy vehicle wash-down bay will be designed to allow 200t payload capacity mine trucks to be cleaned. Nominal dimensions will be 25 x 12m and it will contain a means of removing waste oil and reusing water. An oil-water parallel-plate separator system including storages for dirty and clean water will be installed and will be sized to strip vehicle wash-down effluent and oily-water sourced from other areas of the MIA, mine, CHPP and TLO.

The light vehicle wash-down bay will be designed to allow vehicles up to Toyota troop carrier size to be cleaned. Nominal dimensions will be 10 x 5m. This wash-down bay will contain a means of transferring the waste water to the heavy vehicle wash-down way for stripping using the installed oil-water separator facility.

2.9.11Fuel and lubricants installation

The fuel and lubricant bay will store and dispense diesel and lubricating oils and refuel heavy and light vehicles as well as mine service vehicles. The installation will be configured to store waste oils returned from servicing of mobile equipment prior to collection for disposal.

The bulk storage capacity for diesel fuel will be 300,000l which equates to five days supply. Estimates are based on three self-bunded storage tanks with pumping equipment capable of supplying separate light and heavy vehicle fuelling points. B-Double vehicles with an average load of 50,000l will deliver fuel to the installation. It is envisaged that local storages serving fixed diesel generating units at the camp and on site will be fuelled by the site mine service vehicle. Bulk storages and filling areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

Bulk lubricant delivery will be by road tanker with compartment sizes varying between 5,000l and 8,000l. Storage tanks have been sized for this requirement. Total lubricant consumption averages around 5,500l per week. Tanks and fill areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

2.9.12Waste station

A purpose-built waste station will be built consisting of a bunded concrete pad with concrete wing walls to allow segregation of dry waste types for collection. Waste will be kept in skips or bins for transfer and disposal off-lease. Waste storage and its disposal will be managed in accordance with DERM administered policies on Waste Management and the enabling Waste Regulations.

2.9.13Car parks

The main site car park will be adjacent to the administration building and be nominally 36 x 50m with 50 parking spaces with a sealed surface. Smaller vehicle parking bays will be located outside all MIA installations as required.

2.9.14Hazardous materials storage

Small volume hazardous materials (e.g. some adhesives, coatings, cleaners, etc.) will be kept in purpose-built containment cupboards in accordance with the relevant material safety data sheets (MSDS) and statutory requirements. Purpose-built containment cupboards will be located in the vicinity of the workshops and stores they serve.

Larger volume hazardous materials will be managed according to their respective MSDS and in line with current industry standards. The design for the fuel and lubricant installation will incorporate all necessary aspects for the safe storage and delivery of diesel and oils. Other hazardous items, such as any radioactive metering products, will be managed in accordance with industry guidelines and manufacturers' recommendations.

2.9.15Drill core storage

All core analysis will be performed off site. On site storage will be in an enclosed shed with a concrete floor and forklift access to store the drill cores as they are produced. If required, this shed will also be used to store product samples from the CHPP before they are taken off site for analysis.

2.9.16Crib facilities

Crib facilities similar to current mine practice will be included in the administration building, CHPP Office, HV (heavy vehicle) Workshop and Mine Office.

2.9.17Gate

The mine site will have a boom gate situated at the security office on the northern end of the administration building controlling access to the mine, CHPP, TLO and key MIA elements. This will be the only point of access to the site.

2.9.18Security office

The purpose of the security office is to control access of personnel and vehicles to operational areas. The security office will be a single office located at the northern end of the Administration Building.

2.9.19Mine store

A warehouse with laydown yard will house mining consumables and spares. The warehouse will consist of a lockable shed of 12 x 12m with a concrete floor and lighting with a 50 x 50m yard attached.

2.9.20Laydown areas

Future design will allocate suitable space in specified locations as laydown areas.

2.9.21Administration building

The administration building will be located at the eastern side of the MIA car park. Nominal dimensions are 32 x 12m. This single storey building will contain a reception area, four offices, a meeting room, a kitchenette, rest rooms, the first-aid room and the security office.

2.9.22Training room

The training room will be nominally 18 x 12m, designed to seat 40 personnel and located south of the administration building.

2.9.23Fire fighting systems

Installations that require specialised fire fighting systems, such as the fuel and lubricants bay, will have a proprietary system incorporated into their design. A water cart will be included in the mining contractor's fleet fitted with a water monitor, foam generator and fire extinguishers to fight fires that may ignite in the Mine, MIA, CHPP or on haul roads.

The CHPP and MIA will have the aforementioned 600,000l fire water tank and associated pumping and reticulation systems.

2.9.24Temporary services

Principal temporary services required will include power, potable water, ablutions and communications. For the temporary site office and works:

- Power will be supplied by diesel generators with diesel fuel being delivered by local contractor. A suitably sized diesel tank serving the needs of generator day tanks and vehicle refuelling will be located on lease;
- Potable water will be stored in a suitably sized tank served by a pump and replenished from a local council facility by contract; and
- Mobile phones will be used for communication utilising existing networks.

2.9.25Temporary accommodation

Temporary accommodation will be required for personnel performing initial site works. It is envisaged that the administration centre during initial works will be located close to the homestead (Red Rock Camp) nearest the proposed rail loop. Several portable buildings are already located at Red Rock Camp but in the event additional buildings are required, these will be located adjacent to the existing accommodation facilities.

Temporary offices and work spaces will be managed using demountable buildings located between the proposed sites of the MIA and CHPP.

2.9.26Rail spur and loop

The preferred balloon loop location is located immediately north of the Capricorn Highway opposite the CHPP as shown in **Figure 8**. The proposed loop is 600m in diameter and a minimum 4km in length.

2.9.27Existing infrastructure

The only existing infrastructure associated with the Project is the Blackwater Railway System and the Capricorn Highway. On 5 September 2011, Bandanna Energy entered into the Wiggins Island Rail Project (WIRP) agreement with QR Network Pty Ltd. This agreement ensures construction of the necessary rail infrastructure and connection for source mines of the Stage 1 WICET project and provides Bandanna Energy with capacity to export Dingo West coal to either WICET or the existing RG Tanna export facility.

2.10 Offsite Mine Infrastructure

The following infrastructure described below is either not contained within the proposed mining lease or will be delivered to the site via an outside source and include:

- Logistics and transport;
- Off-lease communications infrastructure;
- Off-lease power infrastructure;
- Off-lease roads that influence or are influenced by the proposed site;
- Potable water plant;
- Sewerage treatment plant;
- The export facility; and
- Workforce accommodation.

2.10.1Roads

Off-lease roads include the turnoff requirements from the Capricorn Highway into Charlevue Road (also referred to as Water Way) and the turnoff requirements from Charlevue Road onto the lease and the upgrade of 600m of Charlevue Road between the two turnoffs.

Development approvals will be required from the CHRC for the Charlevue Road/Water Way upgrade and turnoff onto the proposed mining lease and from Queensland's Department of Transport and Main Roads (DTMR) for any upgrades required for the Capricorn Highway turnoff into Charlevue Road/Water Way or the turnoff into Cooinda Road.

2.10.2Communications

A leased remote satellite terminal will be installed at the mine site to provide telecommunications access, voice, data and messaging services via the Iridium satellite network. Seamless connectivity will be provided for the mine site radio and communication systems.

A similar leased remote satellite terminal will be installed at the camp. Seamless connectivity will be provided with the camp's distributed communications and data system which is being delivered as part of the camp contracted package.

2.10.3Potable water

All potable water will be supplied, under licence, from treated underground water. A WTP will be located in the accommodation camp and supply both the accommodation camp and operational requirements. Operational requirements will be transported by road for storage at the MIA.

2.10.4Sewage

A STP will be located at the camp and will process both camp sewage and sewage from the mining lease. Sewage from the lease will be transported by road to the camp STP for treatment. The liquid waste discharged from the STP will be Class A+ recycled water, suitable for general surface irrigation of plants and gardens and dust suppression.

2.10.5Workforce accommodation

A camp to accommodate construction, operations and occasional contract and visitor personnel will be located in the vicinity of the Dingo Township. The camp will be sized to accommodate up to a maximum 220 temporary construction personnel and up to 120 operations personnel.

The camp will utilise diesel generators for power supply and will have its own potable water treatment plant and sewerage treatment plant. Personnel will be bussed between camp and site at shift commencement and completion.

The camp will be constructed to a high level of amenity to enhance its appeal to suitability skilled personnel for the mine, given the level of competing construction and operations activity in Queensland and locally. The camp will be operated by a specialist camp supplier and a "take or pay" agreement established for numbers of man-nights occupied during the construction and operation phases

The camp infrastructure will be supplied, constructed and managed as a single package and will include:

- All catering and cleaning services;
- An all-weather assembly point;
- BBQ areas;
- Current accommodation standards being offered in the industry / region;
- Dining Room;
- Fire fighting capability;
- Games room;
- Gymnasium;
- Potable water treatment plant;
- Power supplied by generating sets;
- Security infrastructure;
- Sewage treatment plant;
- Shop covering basic personal needs;
- Single person accommodation units; and

- Smoking areas.

2.10.6Export facility

It is anticipated that Dingo West coal will be exported via the WICET, which is located to the west of the existing RG Tanna Coal Terminal in Gladstone Harbour and is due for completion in 2014. WICET Pty Ltd is owned and currently being developed by a consortium of 16 coal companies including Bandanna Energy and Bandanna Energy has secured an initial 4.0Mtpa allocation that can be filled from any of its proposed mining projects, including Dingo West. Discussions have also been undertaken with Gladstone Ports Corporation (GPC) in regard to utilising the existing RG Tanna terminal as an export avenue for Dingo West coal.

2.11 Activities Potentially Causing Environmental Harm

Mining operations have the potential to cause environmental harm unless effective management programs are developed and implemented to mitigate, remediate and rehabilitate the associated impacts. Activities associated with the construction and operation of the Dingo West mine include:

- Vegetation and topsoil removal;
- Earthmoving associated with construction and development of surface facilities;
- Drilling and blasting;
- Removing and relocating overburden;
- Extracting, transporting, stockpiling and loading coal for rail transport; and
- Operation of surface facilities:
    - Administration offices;
    - Workshop and warehouse;
    - Fuel facilities;
    - Laydown pads and vehicle wash facilities;
    - Mine water supply and storage and wastewater treatment system; and
    - Diesel powered generators.

2.12 Rehabilitation and Decommissioning

Remediation, decommissioning and closure activities will be a part of the overall rehabilitation strategy for the Project. Rehabilitation will be used to achieve multiple environmental objectives where possible, including for water and sewage management, enhancement of habitat for biodiversity, carbon offsets and increasing landscape resilience to drought and flooding.

The Project area will be progressively rehabilitated during operations and, upon decommissioning; the area will be returned to a condition that it:

- Is safe for humans and wildlife, as far as is practical;
- Is non polluting of surface or ground water;
- Is stable and not prone to subsidence, slippage, or erosion;
- Is suitable for low intensity cattle grazing where practical; and
- Enhances the environment for native species and communities.

On the completion of mining, pit voids, tailings dumps, dams and other infrastructure will be treated as follows:

- Pit voids will be backfilled where possible, with the slope of the remaining void reduced to 1 in 6 (>17%) to reduce risk of slope failure, and competent rock armouring used where there are stability risks;
- Waste rock piles will be contoured to low relief to conform with the surrounding landscape, covered with topsoil and organic material where possible, and revegetated;
- Mine roads will either be left for use of subsequent land holders or deep ripped and rehabilitated;
- Water storage dams will be retained if requested by subsequent land holders and approved by regulators; otherwise the dam walls will be breached and the area rehabilitated;
- All buildings, plant including the CHPP, and equipment will be removed and surfaces rehabilitated; and
- Concrete pads will be broken up and covered with benign spoil and topsoil, and then revegetated.

2.13 Workforce

The Project is expected to employ approximately 220 employees during construction and 120 employees during operations.

It is expected that the Project workforce will include a combination of personnel that live locally and a fly-in / fly-out contingent where vacancies cannot be filled by local personnel.

Options for transporting the workforce to and from the site are currently being considered. The most likely method will be transporting the workforce to the site via coaches from Emerald and Blackwater. It is expected that Senior management will drive to and from the site daily by car.

2.14 Native Title

Native Title is extinguished over the subject land; however, at present; there is an unregistered native title claim over the Project area by the Kangoulu People.

3. Existing Environment and Potential Impacts

The following sections summarise the existing environment within the proposed study area.

3.1 Climate

Climate data was sourced from several of the closest Bureau of Meteorology (BOM) weather stations in order to obtain a meaningful representation of the climatic conditions within and surrounding Project area. The main data sources were the weather stations at the Blackwater Water Treatment Plant (station # 035290; 23.60 °S, 148.87 °E; elevation 187m) located approximately 40km to the west of the Project and the Baralaba Post Office (station # 039004; 24.18 °S, 149.81 °E; elevation 100m) approximately 80km to the south-east. The Dingo West Post Office recording station only provided rainfall data. However, this data was considered given the data spans 115 years (1896 – 2010) and the close proximity of this station to the Project area.

Climate data from the BOM weather stations are provided in **Table 5**, **Table 6** and **Table 7**. Data from Blackwater and Baralaba show the mean values calculated from the historical data for rainfall, temperature, relative humidity and wind speed. Only mean monthly rainfall data is shown for the Dingo Post Office.

Table 5. Rainfall data from the Dingo Post Office (1896 - 2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	111.9	109.1	73.8	37.0	33.8	35.9	27.2	21.8	24.5	46.5	64.0	103.3

Source: Climate data from Dingo Post Office (BoM, 2011a).

Table 6. Climate data from Blackwater to the west of the Project area (1995 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	68.2	22.4	34.1	65	45	11.4	n/a
February	78.8	22.3	33.3	66	48	12.4	n/a
March	30.5	20.8	32.6	63	41	11.2	n/a
April	28.6	17.9	29.9	60	41	9	n/a
May	21.4	13.1	26.5	59	39	8.1	n/a
June	42.1	10.7	23.6	66	45	7.7	n/a
July	15.1	8.5	23.4	63	37	7.1	n/a
August	25.9	10.6	24.9	60	35	10.6	n/a
September	19.3	14.1	29	55	30	11.1	n/a
October	61.6	17.8	31.7	58	33	12.6	n/a
November	66.3	19.5	32.4	58	37	11.8	n/a
December	79.5	21.6	34.1	61	39	10.9	n/a
Annual	**542.8**	**16.6**	**29.6**	**61**	**39**	**10.3**	n/a

Source: Climate data from the Blackwater Water Treatment Plant weather station (BoM, 2011b).

Table 7. Climate data from Baralaba to south-east of the Project area (1926 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	92.9	21.4	34.3	65	43	7	7.7
February	115.8	21.2	33.4	69	46	6.9	7.8
March	72.9	19.4	32.6	67	41	7.1	7.6
April	45.1	16	30.4	67	42	7.5	7.6
May	41.8	12.3	26.6	69	42	7.2	7.4
June	34.7	8.9	23.6	74	46	7.1	8.2
July	28.8	7.4	23.1	70	40	7.2	8.5
August	21.8	8.7	25.2	66	38	6.9	8
September	25.9	11.9	28.4	62	34	8.2	8.6
October	55.4	15.6	31.2	60	35	8.5	8.5
November	76.9	18.4	32.8	60	38	7.9	7.8
December	103.9	20.3	34.1	62	40	7.9	8.1
Annual	**715.8**	**15.1**	**29.6**	**66**	**40**	**7.5**	**8**

Source: Climate data from the Baralaba Post Office (BoM, 2011c).

3.1.1 Rainfall and evaporation

Historical climate data, particularly from the Dingo and Baralaba stations, shows there is a distinct wet-season with the highest rainfall occurring during the summer months with drier periods predominating in the winter months. Rainfall appears to decrease significantly at Blackwater where mean summer rainfall is approximately 40mm/month lower than at Dingo which is only 40km to the east. Average monthly rainfall ranged from lows in winter of 15.1mm to 21.8mm to highs in summer of 79.5mm to 115.8mm. Annual mean rainfall is relatively high and ranges from 542.8mm in Blackwater to 715.8mm in Baralaba.

Initial assessments indicate that total annual evaporation for the Project area is approximately 2,000 – 2,400mm. This equates to approximately three to four times the average annual rainfall for the area.

3.1.2 Air temperature

Temperature in Central Queensland is characteristic of a sub-tropical climate, with cool winters and hot summers. Similar minimum and maximum temperatures are evident at both Blackwater and Baralaba with the coolest temperatures recorded in July and the warmest in January. Mean minimum and maximum temperatures ranged from 7.4°C to 8.5°C and 21.4°C to 22.4°C in winter and 23.1°C to 23.4°C and 34.1°C to 34.3°C in summer.

3.1.3 Humidity

Relative humidity patterns are similar for both Blackwater and Baralaba and reach their highest levels in late summer (February) and their lowest levels in late winter/early spring (September, October and November). Comparison between 9am and 3pm humidity levels indicates mornings are typically more humid than afternoons (refer to **Table 6** and **Table 7**).

3.1.4 Wind conditions

Wind conditions measured at Blackwater and Baralaba represent mean wind speed and direction data obtained over the last 15 years at Blackwater and 35 years at Baralaba. Wind direction is somewhat similar at both locations with the primary wind direction coming from the east at Blackwater and the south and southeast at Baralaba (**Figure 13, Figure 14** and **Figure 15**). As shown in **Table 6** and **Table 7**, the average morning and afternoon wind speed from Baralaba were similar in magnitude. Morning wind speeds at Blackwater however, were significantly higher relative Baralaba (note: afternoon wind conditions at Blackwater were unavailable).

Average annual wind speeds ranged from 7.5km/h to 10.3km/h depending on location and time of day. The cooler winter and autumn months generally had lower wind speeds relative to the summer and spring months and this was irrespective of location or time of day (refer to **Table 6** and **Table 7**).

Figure 13. Annual 9am wind rose for the Blackwater Water Treatment Plant weather station (BOM, 2011d)

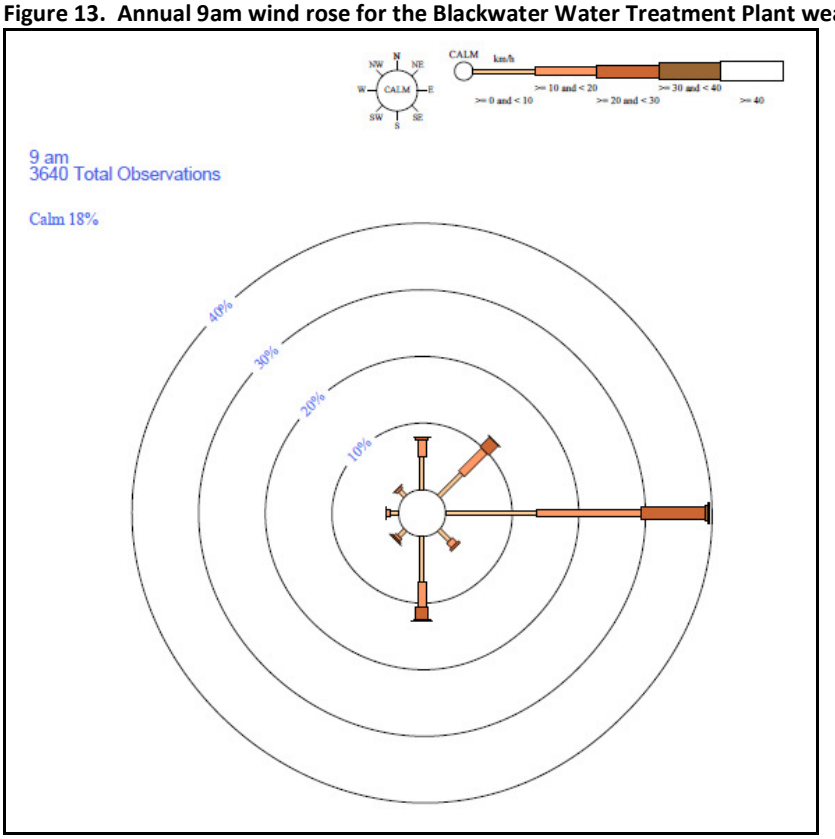


Figure 14. Annual 9am wind rose for the Baralaba Post Office weather station (BOM, 2011e)

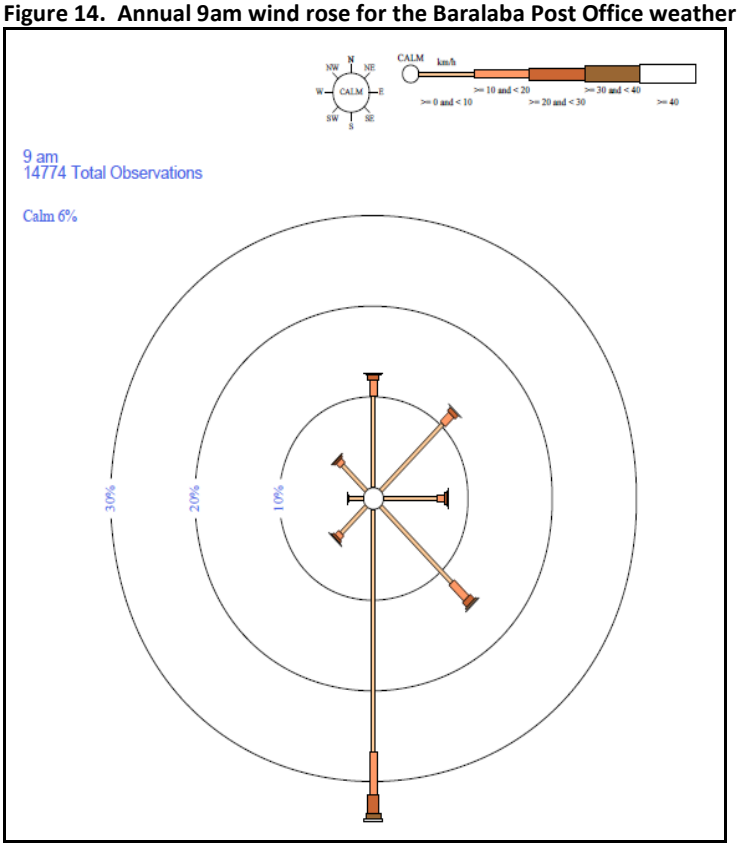
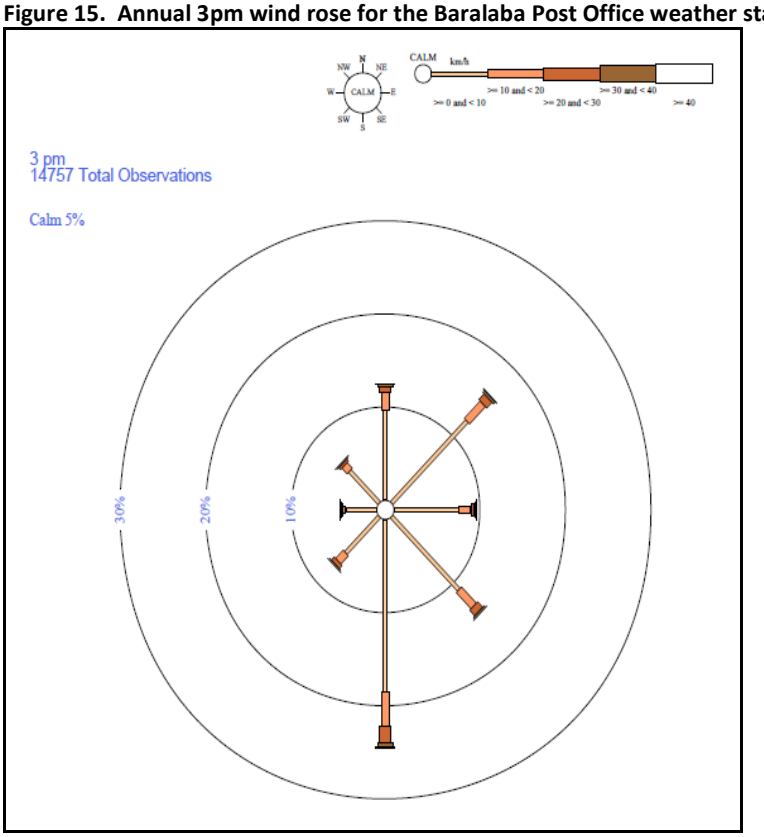


Figure 15. Annual 3pm wind rose for the Baralaba Post Office weather station (BOM, 2011f)



3.1.5 Natural or induced hazards in the region

3.1.5.1 Storms

Severe thunderstorms cause more damage than any other natural hazard in Australia and can result in flash flooding, large hailstones and destructive wind gusts (Emergency Management in Australia (EMA), 2011). In Queensland, the most severe storms occur between September and March and coincide with increased solar energy (EMA, 2011).

The average number of lightning strikes per km^2 per year for the Project area is approximately two as shown in **Figure 16**. The average number of days per year that thunder was recorded within the Project area is approximately 20 (see **Figure 17**). Severe storms are generally confined to small localised areas and primarily occur along the coast.

Hence, the potential for severe storms to occur within the Project area is considered to be low.

Figure 16. Average annual lightning strikes (BOM 2011g)

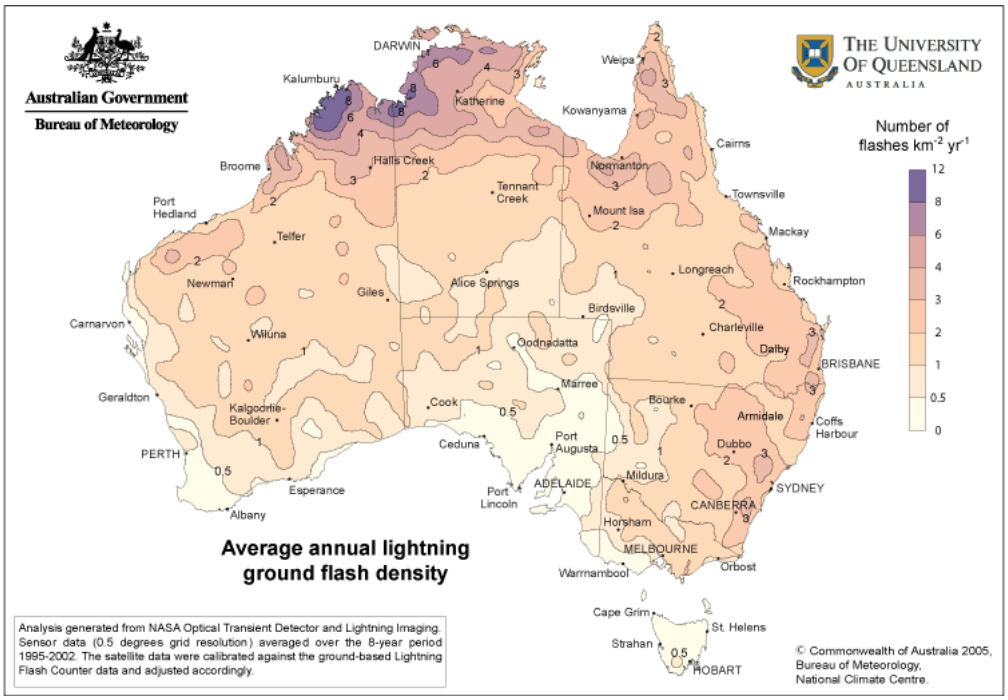
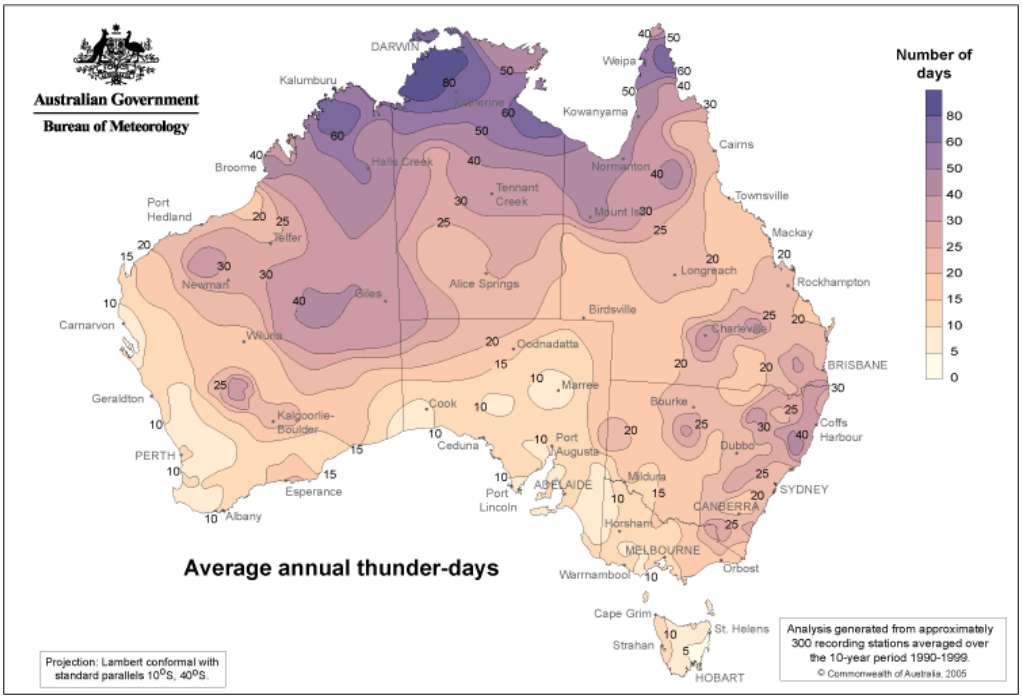


Figure 17. Average annual thunder days (BOM, 2011h)



3.1.5.2 Cyclones

Tropical cyclones in Queensland primarily occur in the northern part of the state between November and April. However, cyclones have occurred along the southeast Queensland coast and tracked inland where they subsequently reduce in intensity.

The average number of cyclones per year that have the potential to occur in the Project area is 0.2 as shown in **Figure 18**. As shown on **Figure 19**, over the last 105 years only four cyclones have been recorded within 100km of Emerald and one within 50km (cyclone Una) as outline below:

- Tropical cyclone un-named (#4): February 1911 (red line);
- Tropical cyclone un-named (#1): January 1913 (blue line);
- Tropical cyclone un-named (#3): January - February 1934 (green line); and
- Tropical cyclone Una: December 1973 (pink line);

The Project area's inland location and the low probability for cyclones to develop in the area suggest that the potential for the Project to be directly impacted by cyclones and cyclonic conditions is low. However, indirect impacts such as flooding are more likley to impact the Project.

Figure 18. Average number of cyclones per year (BOM 2011i)

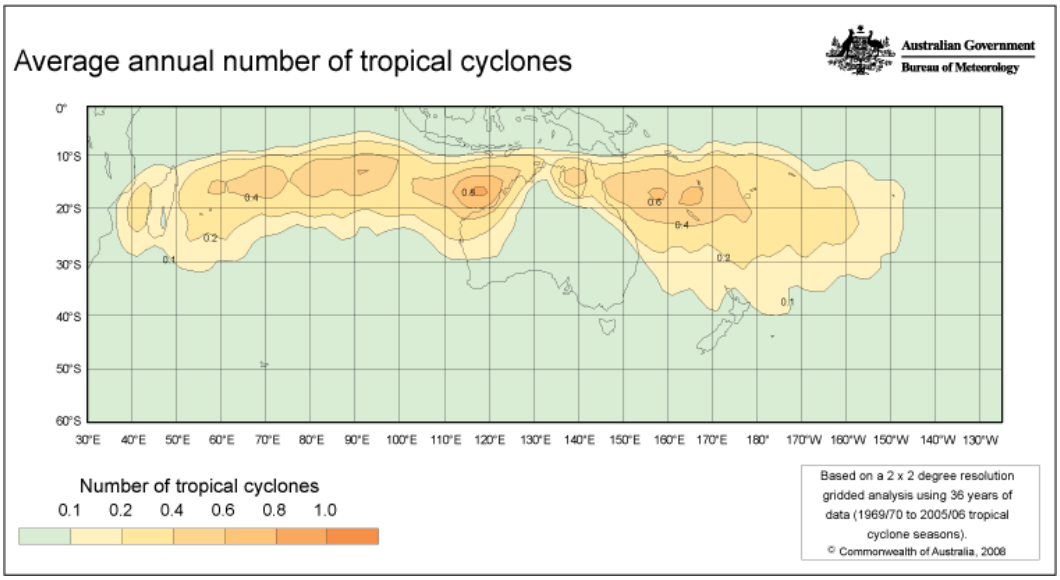
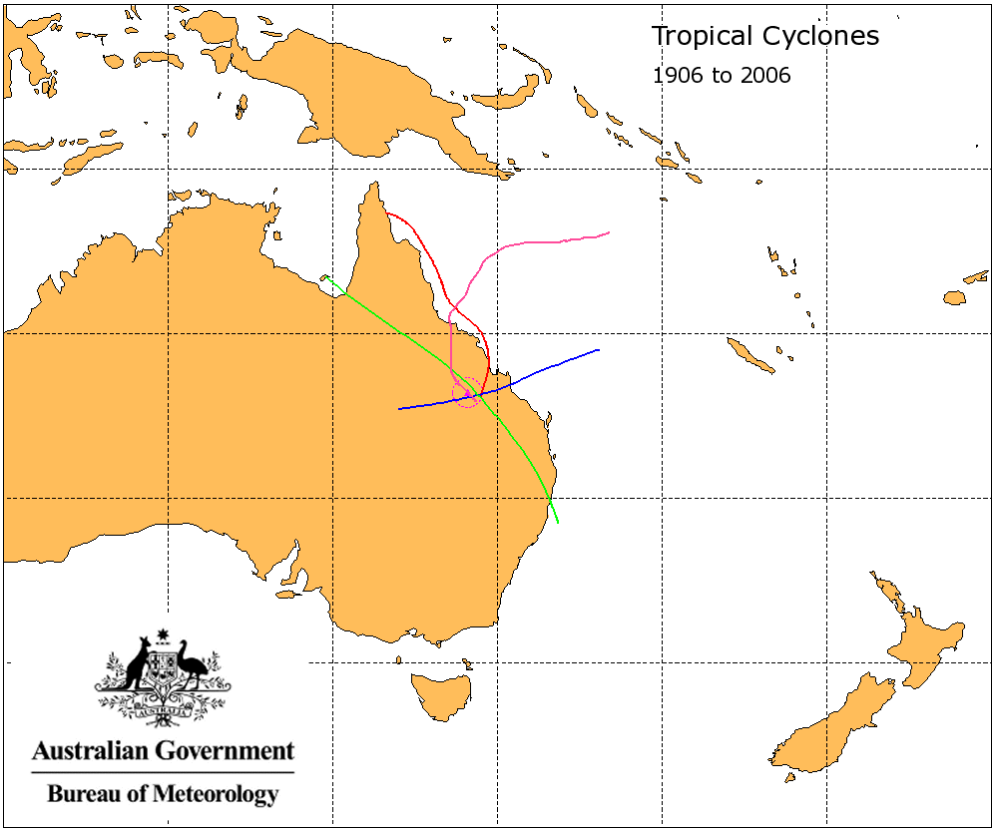


Figure 19. Occurrences of tropical cyclones within 100km of Emerald between 1906 and 2006 (BOM, 2011j)



3.1.5.3 Floods

The Project area has a localised catchment area of approximately 640km² that is located within the Isaac Connors Mackenzie subregion of the Fitzroy River Basin. Three tributaries of the Mackenzie River traverse the

Project area. All three are ephemeral and generally only flow following high rainfall events that primarily occur from November to March.

During the extreme rainfall events of late 2010 to early 2011, the Central Highlands region received significant rainfall that resulted in widespread major flooding within all major river catchments including the Comet, Isaac, Mackenzie and Fitzroy Rivers. During this time there were four main flood events. However, flooding within the Project area was localised and primarily restricted to riparian zones and topographical depressions.

Although the Fitzroy River catchment has the potential for severe flooding, the potential for flooding in the Project area is considered relatively low due to the Project being located in the upper reaches of the catchment and the small catchment size of the Project area.

3.1.5.4 Bushfires

A review of the Queensland Fire and Rescue Services bushfire risk mapping for the Central Highlands indicates that the project site is located in a low to medium area of bushfire risk. In addition, the Duaringa Shire Planning Scheme Bushfire Prone Land overlay map shows the proposed MLA occurs primarily in an area of Low Bushfire Severity with small areas of Moderate Bushfire Severity interspersed throughout the MLA.

The risk of bushfires occurring during the life of the Project is moderate. All efforts will be undertaken to firstly, minimise the potential for a bushfire to occur and secondly, manage bushfires via specific management procedures that will be outlined in the Emergency Management and Response Plan. This Plan will be developed in association with the Construction and Operations Environmental Management Plans.

3.1.5.5 Landslips

Topography of the Project area is flat to very gently undulating and is characterised by very long slope lengths and gradients of generally less than 5%. These factors in concert with the meandering drainage lines suggest the landscape within the Project area is geologically stable. As such, no landslips have been recorded in the project area within the last 60 years (Geoscience Australia (GA) 2011a) and landslip risks in the future are considered low.

3.1.5.6 Earthquakes

Australia is typically considered to be a tectonically stable continent (GA, 2011b). Nevertheless between 1977 and 2000, 110 earthquakes per year on average have been recorded by the Queensland seismic network (Earth Systems Science Computational Centre (ESSCC), 2011). Most however, are of very low magnitude. Over the last century, there have been 17 earthquakes of magnitude six or greater including one in Central Queensland in 1918 that caused property damage in Rockhampton (ESSCC, 2011).

Only one minor earthquake has occurred within the wider Project area in the last 60 years. The estimated epicentre of the earthquake was located approximately 30km to the northeast of Dingo. No damage or disturbance was recorded from the 2.7 magnitude earthquake.

As the area is considered geologically stable, it is unlikely that an earthquake of a magnitude that could adversely impact the Project would occur.

3.1.5.7 Droughts

In July 2011, no areas of Queensland were drought declared which contrasts significantly with the same period in 2007 when over 60% of the State was drought declared (DEEDI, 2011). Heavy rains between late 2009 and early 2011 contributed to 2010 being Queensland's wettest year on record (BOM, 2011k).

Due to Australia's location under the sub-tropical belt of high pressure, low and variable rainfall is the norm. Queensland is particularly vulnerable to this variability and several severe droughts have occurred in the last 20 years (DEEDI, 2011). The risk of drought impacting the Project is moderate to high but can be minimised if raw water for the operation is supplied from a reliable and sustainable source.

3.1.6 Potential impacts and mitigation measures

The climatic conditions of the Project area are typical of locations within Central Queensland and are not significantly different from the other regional locations of Blackwater and Baralaba.

Based on historical data, average annual rainfall for the Project area is moderate and impacts from normal rainfall patterns are likely to be low. Severe storms events may however, adversely affect the Project and impact on pit operations, water management systems including dams waste, containment systems and soil erosion.

The potential for excessive wind and cyclonic events to occur is low and unlikely to be a risk for the Project. However, other natural hazards including bushfires have the potential to adversely impact the Project. An Emergency Management and Response Plan will be developed to address all foreseeable site-specific risks including bushfires, earthquakes, droughts and floods.

3.2 Land Resources

3.2.1 Soils

The underlying geology of the proposed Dingo West mine lease area is dominated by conglomerate sandstone and clay, lithic and feldspathic sandstone, and alluvium. The predominant soil types within the proposed Dingo West mine lease area are Kandosols and Sodosols.

Sodosols are soils with a strong texture contrast between the A horizon and sodic B horizon within the soil profile. The B horizon is the layer of soil within a soil profile with characteristics different to the surface layer (A Horizon). An abrupt textural change occurs at the B horizon in which most of the upper part of the B2 horizon is sodic and not strongly acidic. Sodosols have a high percentage of exchangeable sodium and are prone to dispersion and erosion. These soils are predominantly red, brown, yellow, grey or black in the B horizon and may have hardpans or calcrete. Sodosols also exist in predominantly flat to undulating topography and on alluvial and colluvial sediments.

Mapped landscape units within the MLA indicate that the dominant soils are sandy to loamy surfaced duplex soils and areas of Loamy red and yellow earths. This supports the dominant soils mapping.

3.2.2 Topography

The topography of the Project area reflects the mapped landscape units being flat to gently undulating and is intersected by the Charlevue, Springton and Stanley Creeks. The topography is classified as:

- Ub68 – gently undulating lands; and
- SI7 – very gently undulating or level alluvial plains.

3.2.3 Land Suitability

The entire area of the Project site is mapped as GQAL **Class C2 Pasture Land.**

The four class system that is described by DPI/DHLGP (1993) identifies **Class C** Agricultural Land as pasture land, being land suitable for improved or native pastures but with limitations which preclude continuous cultivation for crop production. The Duaringa Shire Planning Scheme divides the Agricultural Land Class C further, as follows:

- **Class C1:** Pasture Land - Suitable for grazing high quality pastures, either sown pastures where ground disturbance is possible for pasture establishment or native pastures on higher fertility soils;

- **Class C2:** Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance; and
- **Class C3:** Pasture Land - Suitable for light grazing of native pastures in accessible areas, otherwise very steep land more suited to forestry, conservation or catchment protection.

For the Project area, the above is interpreted to mean that some areas may tolerate short-term cultivation for improved pasture and forage crop establishment. Other areas are primarily suited to grazing of native pastures, with or without the addition of improved pasture species without ground disturbance. Elsewhere, the land is suited to restricted light grazing of native pastures in accessible areas, otherwise very steep hilly lands more suited for forestry, conservation or catchment protection.

3.2.3.1 Land use

The existing land use at within the Project area is classed as livestock grazing, as shown in **Figure 20**. This reflects the predominant land uses in the vicinity of the Duaringa Shire. In addition, protected areas and forestry occur within 10km to the Project site. The Project is also in the vicinity of Dingo and as such, various land uses including residential, manufacturing and commercial services exist in close proximity (see **Figure 21**). Major transport corridors including the Capricorn Highway, the Blackwater coal rail line and stock routes (along these transport corridors) intersect the Project area directly North of the proposed mine infrastructure area.

3.2.3.2 Land use suitability

The Land Use Suitability guidelines (DME, 1995) provide advice on the applicability and use of land suitability assessment techniques to determine pre-mining land suitability and post-mining land use potential. The objectives of the guidelines are to achieve acceptable post-mining disturbance land use suitability and/or capability through the use of appropriate land resource assessment techniques at the pre-mining stage.

Existing land suitability studies indicate the Project area is broadly composed of three types of land resource areas (1:500,000 scale) (Shields *et al*. 1991). The land at the Project site is predominately suitable for grazing, though areas suitable for irrigated and rainfed cropping also exist (see **Table 8**).

Table 8. Land suitability within the Project site

Land Resource Area[1]	Major Agricultural management Units	Land Suitability
Alluvial Plains (1)	Dee, Retro, Callide, Dawson	Rainfed cropping, irrigated cropping, grazing
Mixed Brigalow Plains (2)	Rolleston, Greycliffe, Oombabeer, Mungabunda	Rainfed cropping, grazing and limited irrigated cropping
Eucalypt Duplex Uplands (5)	Rhyddings, Dawes	Grazing

The mapped dominant soil types within and surrounding the Project area are presented in **Figure 22**, and confirm the dominant presence in the proposed mining lease of Kandosols, while Sodosols are present along the northern and southern boundaries of the extended Project area. Field observations have verified the presence of Kandosols, Chromosols and Sodosols within and surrounding the Project area.

Characteristics for each of the three soil types are as described in the Australian Natural Resources Atlas (DSEWPaC, 2007), and are summarised in **Table 9**.

Figure 20. Existing landuse

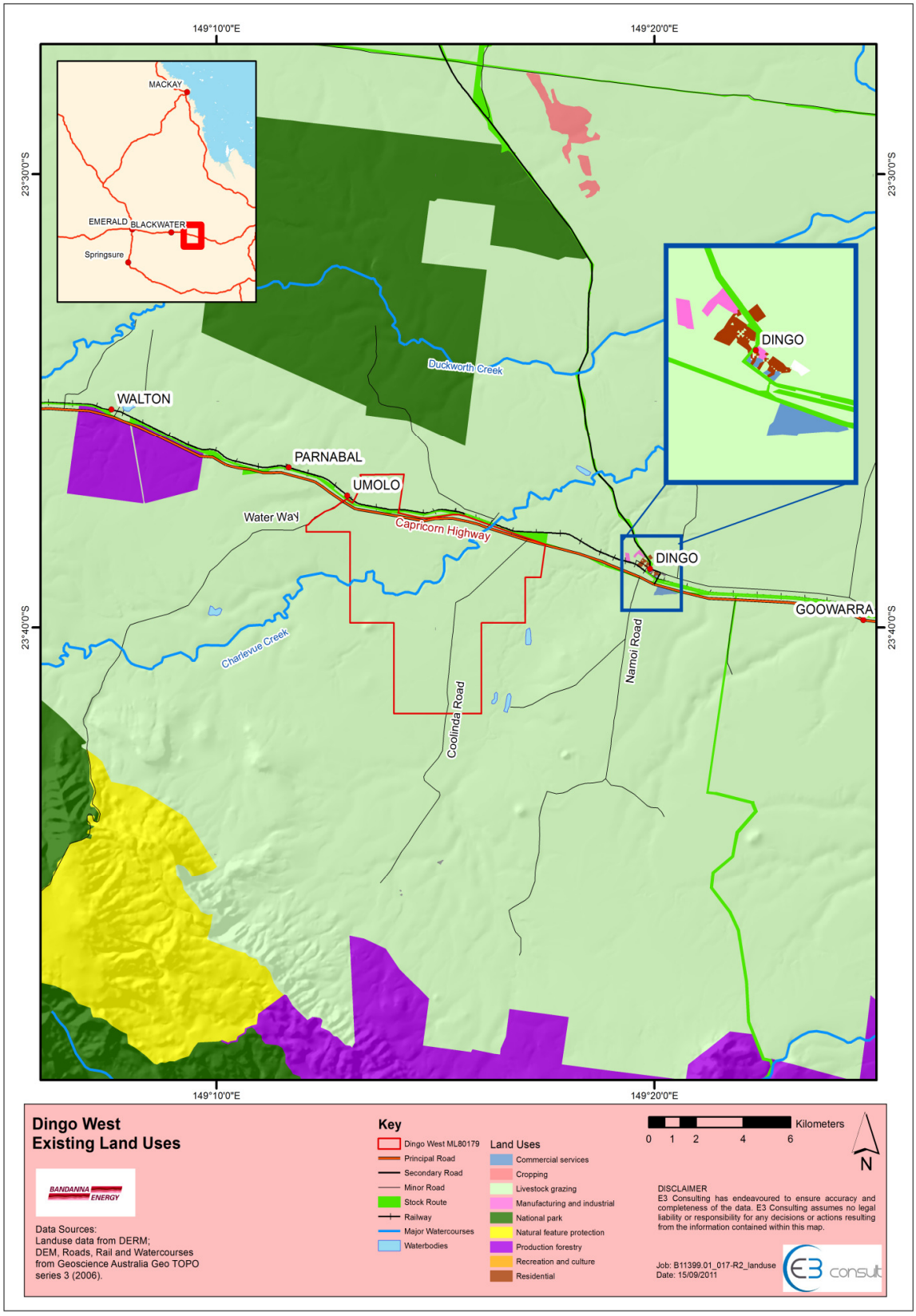


Figure 21. Land use infrastructure

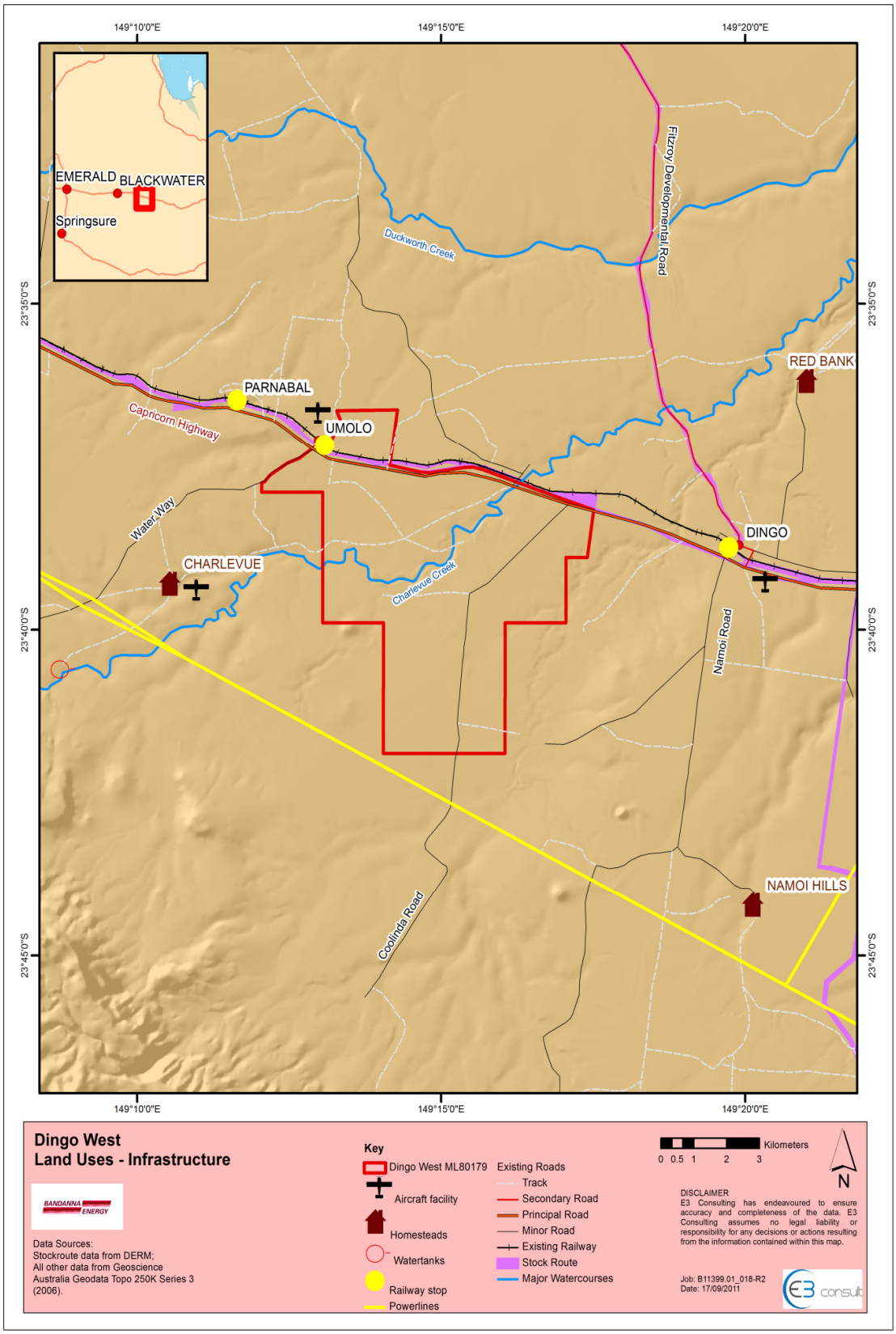


Figure 22. Mapped dominant soils

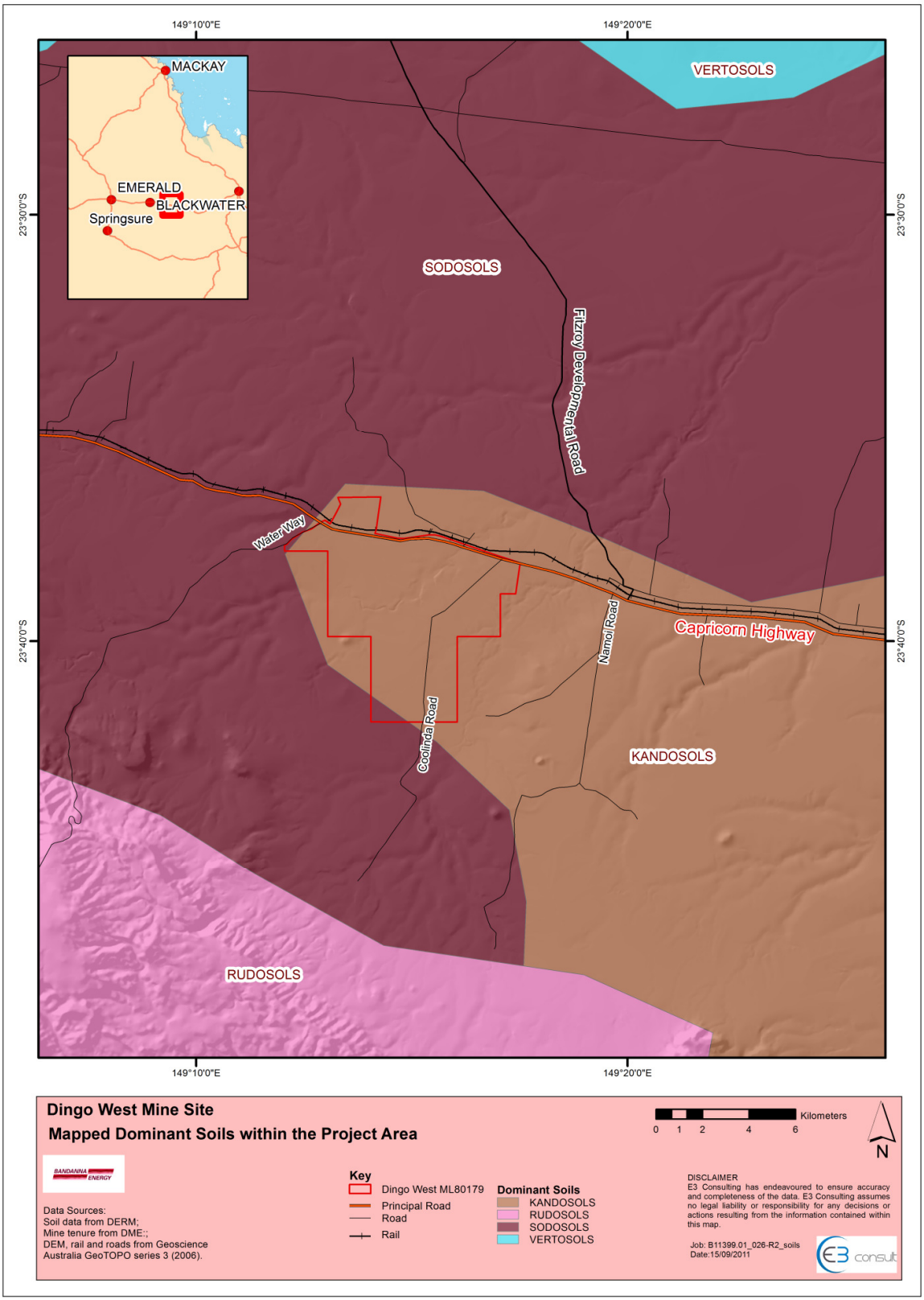

149°10'0"E
149°20'0"E
23°30'0"S
23°40'0"S
MACKAY
EMERALD
BLACKWATER
Springsure
VERTOSOLS
SODOSOLS
KANDOSOLS
RUDOSOLS
Fitzroy Developmental Road
Water Way
Capricorn Highway
Namoi Road
Coolinda Road
Dingo West Mine Site
Mapped Dominant Soils within the Project Area
Kilometers
0 1 2 4 6
N
Key
Dingo West ML80179
Principal Road
Road
Rail
Dominant Soils
KANDOSOLS
RUDOSOLS
SODOSOLS
VERTOSOLS
Data Sources:
Soil data from DERM;
Mine tenure from DME:;
DEM, rail and roads from Geoscience Australia GeoTOPO series 3 (2006).
DISCLAIMER
E3 Consulting has endeavoured to ensure accuracy and completeness of the data. E3 Consulting assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.
Job: B11399.01_026-R2_soils
Date:15/09/2011

Table 9. Typical characteristics of the three soil types identified in the Project area

Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Kandosol	Moderate to High (150-350 mm) less in shallower soils (<1.5m)	Most are well drained	Well aerated	There are few restrictions to root growth	Severe on slopes in high intensity rainfall areas	Usually low in nitrogen and phosphorus	Uncommon	Surface soil subject to crusting and hard setting
Sodosol	Moderate to very low depending on the thickness of the A horizon.	Imperfectly drained. Soil may remain saturated for several weeks. Sandy surface soils are commonly water repellent	Poor aeration in the A2 horizon.	Dense clay subsoil may restrict roots	High when exposed by cultivation or over grazing. Sandy surface soils are subject to wind erosion and dispersive subsoils are prone to gully erosion.	Low organic matter. Most likely to be deficient in phosphorus, nitrogen, copper and zinc.	Moderate salinity in the lower subsoil horizons and possible boron toxicity.	Wide variation but good for loose, soft surfaces ranging to poor for hard setting surfaces

Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Chromosol	Storage varies greatly but usually adequate and between 100 - 200 mm	Imperfectly to well drained but the B horizons can be an impediment	Generally adequate although temporary saturation can occur in bleached A2 horizons if present	Main restrictions are caused by strong and dense B horizons and structurally degraded surface layers	Low to moderate depending on slope but increasing with degradation of the A horizons. Susceptible to surface slaking upon rapid wetting, resulting in hard setting if organic matter is low	Low contents of phosphorus and nitrogen with good responses to fertilizer	Boron in areas of Western Australia, South Australia and Victoria. Less commonly, aluminium associated with induced acidification	Degraded, hard setting surfaces have poor workability but this can usually be overcome with increased organic matter

3.3 Surface Water

Three main creek systems intersect the Project area and are a potential source of drinking water for stock and local wildlife (see **Figure 23**). They also provide habitat for native flora and fauna, and may provide farmers with irrigation water for surrounding vegetation in dry areas. It is unlikely that water from the creeks would be a major source of water for farmers as they are ephemeral and as such would not provide a reliable, year round water source. A significant amount of the waterways were observed to be dry during the June 2011 surveying period, even though the Central Queensland region was subjected to a heavy rainfall period and significant flooding during the first quarter of 2011.

3.3.1 Charlevue Creek

Charlevue Creek is a major watercourse that runs in a north-easterly direction through the middle of the proposed mine lease. It originates south-west of the Project area at an elevation of 760m and joins with Springton Creek approximately 10km the north-east of the Project area. Although water was present within the Creek during site investigations in June 2011, no running water was observed and all water was restricted to isolated pools. Riparian vegetation was highly disturbed, and in some cases nonexistent. A high abundance of non native plants were present on the upper and fallen trees and debris was common. Pit one will border a section of Charlevue Creek, but will not physically change the location of the watercourse or its features. Charlevue Creek is an ephemeral creek with deeply incised banks that depends heavily on consistent rainfall for flow.

3.3.2 Springton Creek

Springton Creek originates at an elevation (above sea level) of 139m and ends at 62.3m at the confluence with Charlevue Creek. Springton Creek bisects the south easterly section of the Project area, flowing in a north easterly direction. On-site investigations in June of 2011 identified Springton Creek as the only Creek system containing flowing water. However, it is likely this Creek system is ephemeral and the higher water levels most probably due to unseasonably high level of rainfall that the region received in previous months (December 2010-March 2011). Similar to the other Creeks, significant bank erosion was evident and the upper banks were dominated by native riparian vegetation.

3.3.3 Stanley Creek

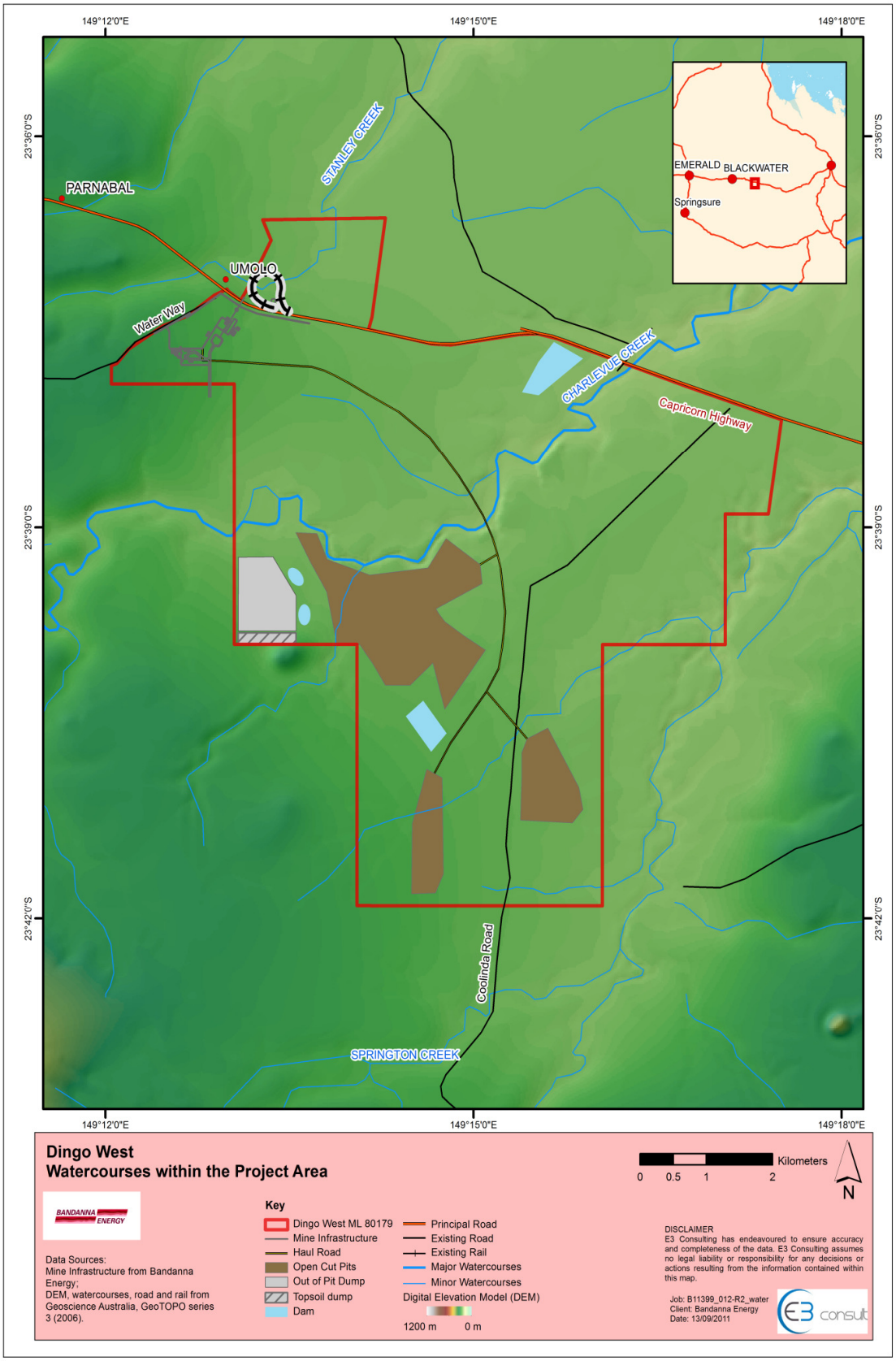
Stanley Creek is a small creek system bisecting the north westerly corner of the site and flows in a north easterly direction to the confluence of Duckworth Creek approximately 20km downstream. Similar to the other watercourses in the Project area, Stanley Creek is an ephemeral system that intermittently flows following high rainfall events. This creek system is heavily eroded with significant bank scouring and the majority of this creek system was completely dry during the June 2011 sampling period.

3.3.4 Hydrology

The Project area has a contributing catchment area of approximately 640km^2 predominantly associated with Charlevue Creek. All the major and minor waterways influencing the area are described as ephemeral and generally only flow during intense or prolonged periods of rainfall.

The minimum elevation (above sea level) at the catchment outlet is approximately 100m with an average slope through the majority of the mid to lower catchment of 0.67%. Steeper catchments located in the upper highlands have catchment slopes of approximately 4.1%.

Figure 23. Watercourses



3.3.5 Potential Impacts to Surface Water Environmental Values

According to the EPP (Water), the surface water environmental values that may potentially be impacted as a result of the Project include the:

- Biological integrity of the water course;
- Suitability of the water for agricultural uses;
- Suitability of the water for supply as drinking water;
- Suitability of the water for recreational use;
- Suitability of the water for industrial use; and
- Cultural and spiritual values.

The Project has the potential to impact on the water quality of Stanley, Charlevue and Springton Creeks through the following interactions:

- Potential contamination of surface water and/or sediment from:
    - Runoff or seepage from stockpiles (soil, rock, ore, other sediment that may contain concentrated levels of metals or other contaminants) areas cleared of vegetation or tailings;
    - Overflows from dams or flooding of pits;
    - Construction of a haul road crossing over Charlevue Creek;
    - Run-off and spills associated with mining activities and hydrocarbon/ chemical storage areas;
    - Accidental release of effluent (from workers camp or mine infrastructure) and grey water; and
    - Sediment laden run-off from disturbed surfaces.
- Altered flow regime or catchment hydrology due to infrastructure requirements or stream diversions.

3.4 Groundwater

The Project is located within the Bowen Basin in Central Queensland. The groundwater flow directions within the Bowen basin are likely to loosely follow topographic gradients and generally flow from west to east. The aquifer lithology underlying the area is dominated by sedimentary strata including sandstone, shale, and conglomerates. Bore yields are typically low (<5 L/s), and range in salinity from 1,500 – 5,000 mg/L Total Dissolved Ions. These waters can be considered generally suitable for stock water and irrigation purposes, albeit saline in areas.

The proponent will undertake detailed studies and modeling to define the groundwater at the site as part of the EIS and the detailed feasibility assessment. These studies will look at the baseline environment and various options for the mine development. This will assist the proponent in predicting potential localised and regional impacts to current and potential groundwater users. In addition the detailed assessments will be used to develop mitigation measures to minimize potential impacts associated with groundwater extraction associated with mine development and operations.

3.4.1 Potential Impacts to Groundwater

Mining will occur below the regional water table and it will be necessary to dewater the mine in advance of operations to allow mining to occur safely to the intended depth. Mine dewatering will be required for geotechnical reasons (i.e. to depressurise behind the pit walls and below the floor of the mine, to prevent

slope failure and floor heave) and for operational reasons (to prevent uncontrolled inflows to the mine, which would result in wet digging, equipment wear, and potential safety issues).

Mine dewatering has the potential to impact on:

- Groundwater levels;
- Groundwater flow direction;
- Groundwater chemistry; and
- Recharge and discharge mechanisms.

Detailed field investigations and numerical baseline groundwater modelling will be undertaken to assess the long-term groundwater impacts of the operation.

3.5 Nature Conservation

3.5.1 Flora

The Project area is located in the Isaac-Comet Downs subregion, which is one of 13 subregions of the Brigalow Belt North bioregion that covers an area of 59,824 km^2. Vegetation within the Isaac-Comet Downs subregion includes woodlands and open forest characterised by species including, Brigalow *(Acacia harpophylla*), Bendee *(A. Catenulate*) or Lancewood (*A. Shirleyi*), Narrow-leaved Ironbark *(Eucalyptus crebra),* Blackbutt *(E. Cambageana*) and Coolabah *(E. Coolabah*). Large sections of the Brigalow Belt North bioregion have been cleared of remnant native vegetation for grazing, agriculture and mining. Remaining vegetation is generally confined to rockier hilly areas, linear strips of roadside vegetation and riparian vegetation and relatively small isolated remnants.

Typical land use in the wider area includes mining and agriculture. Several dams have been previously constructed within the area to supply water for irrigation, urban, stock and industrial uses. Native vegetation has been disturbed by agricultural and mining activities over the past 150 years resulting in a highly fragmented landscape with large expanses of cleared land separating vegetation patches.

Vegetation within the proposed ML is representative of the wider Isaac-Comet Downs subregion and comprises heavily disturbed habitats that have previously undergone significant clearing for agricultural pastures and for cattle production. Remaining vegetation is heavily fragmented and generally associated with rocky outcrops and alluvial floodplains associated with Charlevue Creek, Springton Creek and their tributaries and have limited ecological values due to fragmentation and edge effects.

3.5.2 Regional Ecosystems

The northern portion of the Project area has been largely cleared for grazing. The central and southern portion of the Project area still contains fragmented areas of relatively undisturbed remnant vegetation.

Current RE Mapping (Version 6, November 2009) identified six Regional Ecosystems (REs) within the project area including two Endangered communities and one Of Concern community spread over three main land zone types in (refer to **Table 10** and **Figure 24**). A number of these REs comprise mixed polygons and are not located in isolated patches of single REs due to the dispersed nature of descriptor species inhibiting clear polygon delineations.

Table 10. Currently mapped regional ecosystems within the Project area

RE code	RE description	VM Act status	EPA Biodiversity status	EPBC Act status
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	Endangered	Endangered	Endangered
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	Of concern	Of concern	Not listed
11.3.25	*E. tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	Not listed
11.5.2	*E. crebra*, *Corymbia* spp., with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present	Not listed
11.5.9b	*E. crebra* and other *Eucalyptus* spp. and Corymbia spp. woodland on Cainozoic sand plains/remnant surfaces. Plateaus and broad crests	Least concern	No concern at present	Not listed
11.7.2	*Acacia* spp. woodland on lateritic duricrust. Scarp retreat zone	Least concern	No concern at present	Not listed

3.5.3 Regulated regrowth

In 2009, regulated regrowth laws came into effect under the *Vegetation Management Act 2009* (VM Act) that protects regulated regrowth vegetation which is defined as native vegetation that has been previously cleared but is less mature than remnant vegetation. Four small areas of high value Endangered regrowth occur within the Project area as identified on DERMs regrowth vegetation mapping, version 2 (November, 2009). None of these areas; however, occur within the proposed MLA.

3.5.4 Environmentally sensitive areas

Environmentally sensitive area (ESA) mapping of the wider MLA area identified three ESA within the broader study area. One Category 'A' ESA (National Park) and one Category C ESA (Nature refuge) occur to the north and outside of the proposed ML boundary. One category B ESA (Endangered RE) is mapped within the ML boundary and includes two small areas, one in the northern portion and one linear strip to the north of Charlevue Creek (refer to **Figure 25**).

Preliminary field surveys did not identify any unmapped areas likely to be considered ESAs.

3.5.5 Essential habitat

Essential Habitat under the VM Act is remnant RE vegetation that an 'endangered', 'vulnerable', 'rare' or 'near threatened' fauna species is known to inhabit. Current RE mapping did not identify any essential habitat as occurring within the Project area.

Figure 24. Regional Ecosystems within and surrounding the project area

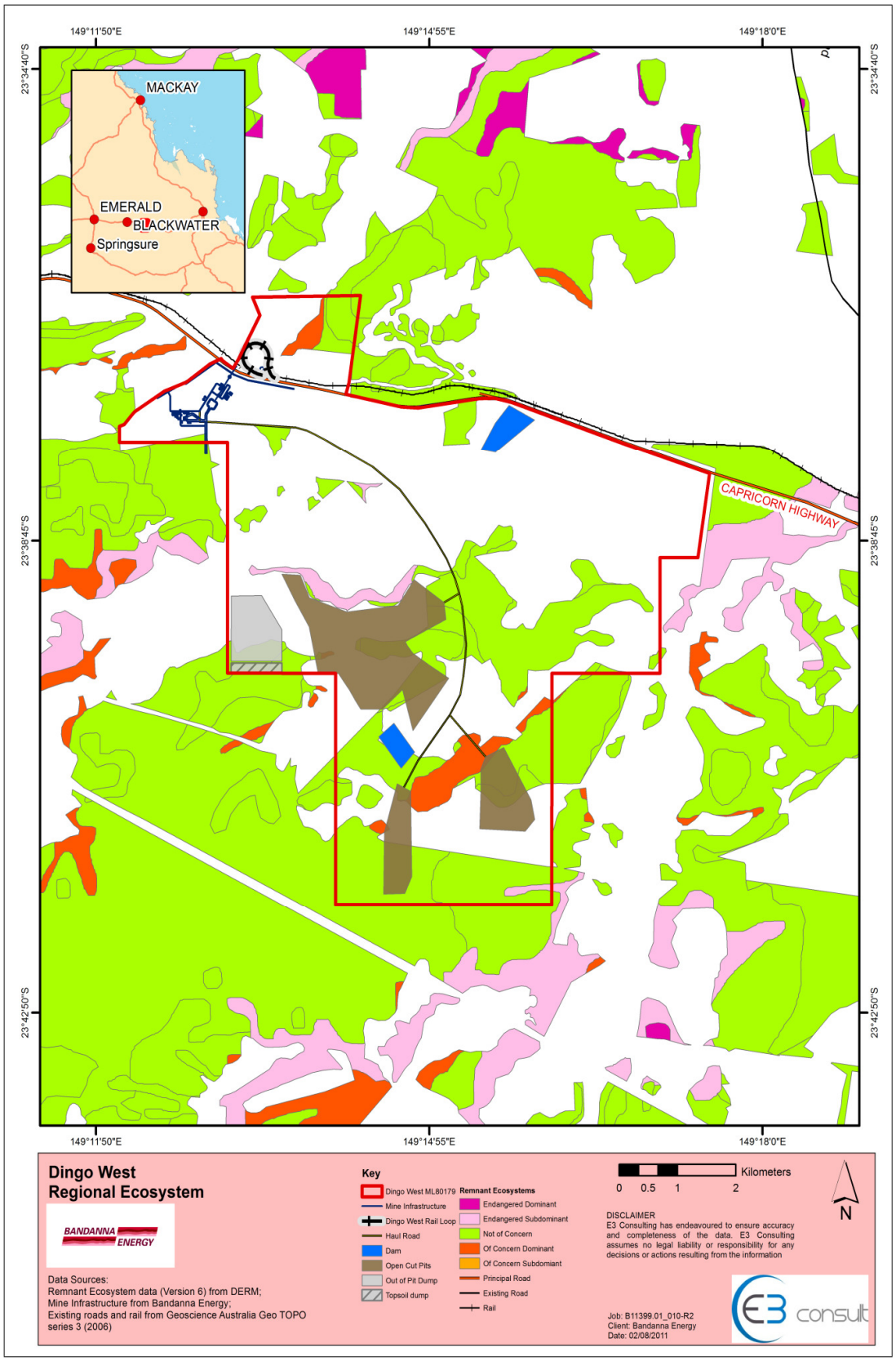
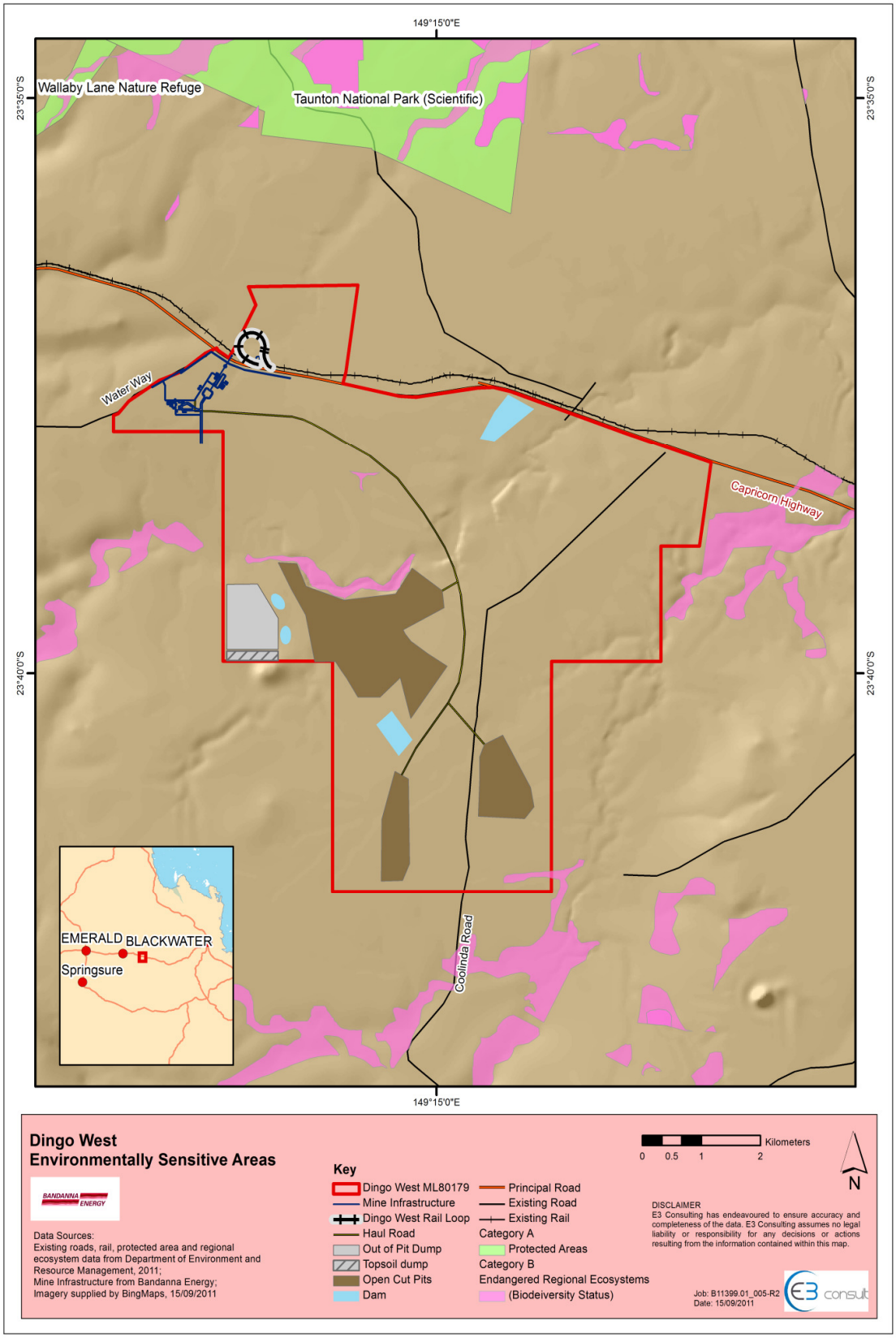


Figure 25. Environmentally Sensitive Areas within the Project area



3.5.6 Protected species and Threatened Ecological Communities

Searches of the EPBC Act protected matters and DERMs Wildlife Online databases were conducted around the Project area. Searches revealed three Threatened Ecological Communities and four plant species as potentially occurring within a 10km radius of the Project area (refer to **Table 11** and **Table 12**).

Table 11. Listed plant species potentially occurring in the Project area

Botanical name	Scientific name	Status	
		NC Act	EPBC Act
Solanum adenophorum	-	Endangered	-
Solanum elachophyllum	-	Endangered	-
Dichanthium setosum	-	Near threatened	-
Cadellia pentastylis	Ooline	Vulnerable	Vulnerable

Table 12. Listed TECs potentially occurring in the Project area

TEC	Status	Potential to occur
Brigalow (*Acacia harpophylla* dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	Endangered	Community may occur within area
Weeping Myall Wetlands	Endangered	Community likely to occur within area

3.5.7 Fauna

Database searches returned 55 conservation significant fauna species within a 100km radius of the Project area. These species are comprised of 18 listed as Endangered or Vulnerable under the EPBC Act (16 of which are also listed as Endangered or Vulnerable under the *Nature Conservation Act 1992* (NC Act), 28 additional species listed as Endangered, Vulnerable or Near Threatened under the NC Act, and 11 species listed as Migratory under the EPBC Act (one Migratory species also listed as Near Threatened).

Field surveys identified 178 species at the study area; six of these species are of conservation significance or are migratory. These species included the Great Egret (*Ardea alba*) (migratory), Cattle Egret (*Bubulcus ibis*) (migratory), Squatter Pigeon (*Geophaps scripta scripta*) (listed under the EPBC Act and NC Act), Rainbow Bee-eater (*Merops ornatus*) (migratory), White-throated Needletail (*Hirundapus caudacutus*) (migratory) and Little Pied Bat (*Chalinolobus picatus*) (listed under the NC Act).

Species comments and details of relevant EPBC and/or NC Act status is detailed in **Table 13**.

Table 13. Conservation significant and Migratory Fauna recorded within the study area

Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
Great Egret	*Ardea alba*	M	S	This wide-spread and common species was observed utilising flooded pastures and waterways. The proposed actions will not remove any significant or critical wetland habitats, and there is no breeding colony in the study area. It has ability to move large distances and the local landscape provides a range of suitable habitats, many of which are outside of the disturbance area. Overall there is little to no potential for any significant impact on this species from proposed actions.
Cattle Egret	*Ardea ibis*	M	S	This introduced and common species was recorded in low numbers in association with domestic stock. There is no breeding colony in the study area. There is no potential for significant impact on this species or its long term security in the local landscape.
Squatter Pigeon	*Geophaps scripta scripta*	V	V	A relatively common resident in the study area. The Squatter Pigeon occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It also occurs in sown grasslands with scattered remnant trees, disturbed habitats (i.e. around stockyards, along roads and railways, and around settlements) and acacia growth, and remains relatively common in heavily-grazed country north of the Tropic of Capricorn, particularly in habitats located close to permanent water. The proposed actions will remove some habitat and result in increased threats (increased vehicular movements), but are not expected to have a significant impact on the survival of the species in the local landscape.
Rainbow Bee-eater	*Merops ornatus*	M	-	A common visitor to the study area. This common and widespread aerial insectivore is unlikely to be reliant or dependant on habitats within the study area. The species may use some of the study area for breeding, particularly eroded creek banks, and detailed surveys over seasons would be required to establish the actual level of presence and its habitat partitioning. Overall, the proposed actions are not expected to have a significant impact on the species or its occurrence in the local landscape.
White-throated Needletail	*Hirundapus caudacutus*	M	-	A wide-ranging aerial insectivore. The proposed actions will not have a significant impact on this species or its ability to traverse the landscape.
Little Pied Bat	*Chalinolobus*	-	NT	Occurs in dry habitats including open forests, woodland, mulga woodlands, chenopod scrublands, *Callitris*

Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
	picatus			forest, mallee and notophyll vine forest gullies, particularly in riparian areas. Roosts in caves, tunnels, disused buildings and tree hollows (Hall and Richards, 1979). The proposed actions will remove some potential habitat for the species. However, the proposed disturbance area is small relative to the availability of potential habitat in the broader landscape, so no significant impact on the long-term survival of the species is expected.

M = Migratory; V = Vulnerable; NT = Near Threatened; S = Of Special Concern.

In addition to the observed species, an additional 17 conservation significant species listed as Endangered or Vulnerable under the EPBC Act (all of which are also listed under the NC Act), eight Migratory Species (seven listed as special least concern and one as near threatened under the NC Act) and 25 species listed solely under the NC Act may potentially occur within the study area. However, based on habitat preferences and previous sightings, the potential for these species to occur in the Project area is low.

3.5.8 Exotic fauna species

The EPBC protected matters search identified five terrestrial feral animals as having the potential to occur within the Project area. Field assessments identified eight introduced fauna species within the Project area. Of these, three are declared as a Class 2 pest species under the *Land Protections (Pest and Stock Route Management) Act 2002* (LP Act):

- Dingo (*Canis lupus dingo*);
- Feral cat (*Felis catus*); and
- Rabbit (*Oryctolagus cuniculus*).

3.5.9 Great Barrier Reef Wetlands

No Great Barrier Reef wetlands are located within the Project area. Therefore the Temporary State Planning Policy for wetlands is not relevant to future activities associated with the Dingo West Mine.

3.5.10Potential Impacts

The majority of the Project area has been heavily fragmented and highly disturbed by historical agricultural activities. These impacts can be seen across much of the project area which is dominated by Buffel Grass (*Cenchrus ciliaris*) interspersed with scattered patches of remnant and regrowth vegetation.

Without appropriate mitigation measures the proposed mining activities have potential impacts including the generation of dust, noise and light, introduction of weed species, wildlife mortality through collisions with vehicles, accidental release of pollutants and inadvertent clearing for temporary facilities or lay down areas storage.

3.5.10.1 EPBC listed TECs

No TECs are located within the proposed mine footprint area, as such no impacts to TECs are expected from construction and operation of the mine. Due to the high level of disturbance associated with agricultural activities it is unlikely that any TECs are present within the wider landscape surrounding the Project area. The proposed mining activity is not expected to impact any TECs.

3.5.10.2 REs

The proposed mine footprint, which includes open cut pits, water management dams, haul routes and other supporting infrastructure is located where possible, within disturbed areas of the Project area. Clearing of remnant vegetation has been limited to approximately 90ha and the majority of these areas are severely impacted by grazing and weed infestation and having limited habitat value.

Table 14 outlines the RE types within the Project area, their quantities based on current DERM RE mapping and an estimate of the amount of each RE that will be cleared for the Project. Note that the majority of clearing is located in the southern section of the Project area and associated with the open cut pit areas and the haul road (exact clearing quantities won't be known until detail design).

The amount of remnant vegetation to be cleared for the proposed mining activities is a small proportion of what will remain in the wider area and demonstrates the mining activities will have minimal impact on REs in

the wider Project area and region. Thus, cumulative impacts on clearing from this Project are expected to be low.

Table 14. Regional ecosystem to be cleared within ML

RE	Total area within the MLA (ha)	Total area within a 10km radius of the MLA (ha)	Area cleared for propose mine (ha)
11.5.2 (Least Concern)	141.6	1,073,583	16.2 (<0.01%)
11.7.2 (Least Concern)	442.8	6563.7	63.6 (0.97%)
11.3.25/11.3.1 (Of Concern/Endangered)	46.3	442	0.0 (0%)
11.5.2/11.5.9b (Least Concern)	432.3	4123.9	120.0 (2.9%)
11.3.2/11.3.25 (Of Concern)	103.1	681.6	4.9 (0.7%)

Note: The extents of REs are based on current DERM mapping and in the case of 11.3.1 (Brigalow) is a significant overestimate based on observations made during flora surveys. Areas within brackets are the percentage of the RE within a 10km radius of the MLA to be cleared as a result of from the proposed mine infrastructure.

3.5.10.3 Threatened flora species

No listed species were observed during field surveys and no habitat for threatened flora species listed under the EPBC Act or NC Act was encountered during field assessments. Therefore impacts to threatened flora species is expected to be low.

3.5.10.4 General impacts on flora

Weed abundance was found to vary greatly throughout the Project area with some areas presenting low weed infestations 5-10% to other areas with moderate to high levels 70-90%.

Six environmental weeds classified as class two under the LP Act were identified. A class 2 pest is one that has, or could have a substantial adverse economic, environmental or social impact. Landowners are required to take reasonable step to keep land free of Class 2 pests.

Mining activities may increase weed abundance through earthworks, movement of soil and attachment of seed to vehicles and machinery. The proposed activities have the potential to disperse weeds into areas of remnant vegetation where weed species are currently limited. A detailed weed management plan will be developed with the aim of minimising dispersal but also reducing overall weed abundance.

Edge effects refer to disturbance associated with an edge or boundary between retained vegetated habitats and cleared areas such as mining areas or infrastructure. Effects could include loss of soil moisture, increased wind, dust and noise impacts, changes to species composition and abundance, increased predation and competition and particularly increased weed invasion.

The vegetation on site is already highly fragmented and will already be subject to significant edge effects. Therefore, it is unlikely that the Project would significantly increase the overall extent of edge effect in the area.

Management measures such as fences and vegetation health monitoring programs will be employed during construction and operations to minimise the potential for impacts to occur to high.

3.5.10.5 Impacts on fauna values

The Project is likely to remove some habitat and result in increased threats through increased vehicular movements. However the threatened fauna observed are bird and bat species, all of which are all highly

mobile and often observed foraging around disturbed areas adjoining road and rail lines. Overall the mining operation is unlikely to have a significant impact on this species or its long term presence in the local landscape.

No wetlands or large permanent water bodies exist within the Project area. The waterways (creeks) within the area are situated in the upper catchment and are therefore ephemeral and only flow during intense periods of rainfall, which is primarily constrained to the wet season. These waterways rapidly drain following rain events leaving limited areas of standing water within the landscape.

Furthermore, the proposed mine footprint will not result in the disturbance of large areas of permanent or semi-permanent water. The small water bodies such as farm dams present within the vicinity of the Project area provide limited habitat value to significant populations of migratory wetland species. Due to the limited availability of large permanent water bodies within the area and little to no disturbance to existing water sources, the potential impact to migratory species is considered as low.

3.5.10.6 Impacts on fauna values

Eight introduced terrestrial vertebrate species were recorded within the Project area, three of which are declared as Class two under the LP Act. The proposed mining activities are not expected to result in an increase in exotic fauna within the region. However, a pest management plan will be developed as part of the overarching construction management plan.

Artificial lighting has the potential to alter foraging regimes of some nocturnal native mammals and birds and potentially make some species more vulnerable to predation. Artificial lighting could impact local fauna; however the potential impacts are not expected to be major.

Dust and emission generated from mining vehicles and equipment used during the construction stage and operation is expected to be low. However, if not properly managed may impact both flora and fauna within the Project area. Sediment runoff into water bodies also has the potential to adversely impact water quality which may in turn, impact fauna.

Clearing and disturbance of remnant vegetation can lead to increased fragmentation, reduction in habitat connectivity and overall habitat value. These actions have the potential to place increased stress on fauna species, particularly those that are less mobile and/or tolerant of disturbance. The mine footprint is primarily located within areas which have undergone extensive clearing and/or disturbance from current agricultural practices. In addition, vegetation to be cleared is generally of limited habitat value and is unlikely to support significant populations of conservation significant species.

Barrier effects occur when a particular species is unwilling or unable to travel between fragmented habitats. Barrier effects can reduce genetic continuity within populations, effectively reducing its population size. Fencing, road infrastructure and areas largely cleared of vegetation associated with the mining has the potential to increase barrier effects. It is anticipated that more mobile species within the project area such as birds and some mammals species will be less impacted by barrier effects relative to species that are less mobile, habitat specialists or vulnerable to predation.

3.6 Noise

The area within and surrounding the Project is rural with the primary sources of noise and vibration being:

- Traffic travelling on the nearby State and local government roads;
- Coal trains travelling along the Blackwater rail system;
- Cattle;
- Farm activities; and

- Natural influences such as vegetation and native fauna.

3.6.1 Sensitive receptors

The proposed mine lease area incorporates land from nine separate land owners. Sixteen sensitive receptor locations surrounding the Project have been identified as representative of sensitive receptors within the area as shown in **Figure 26** and outlined in **Table 15**.

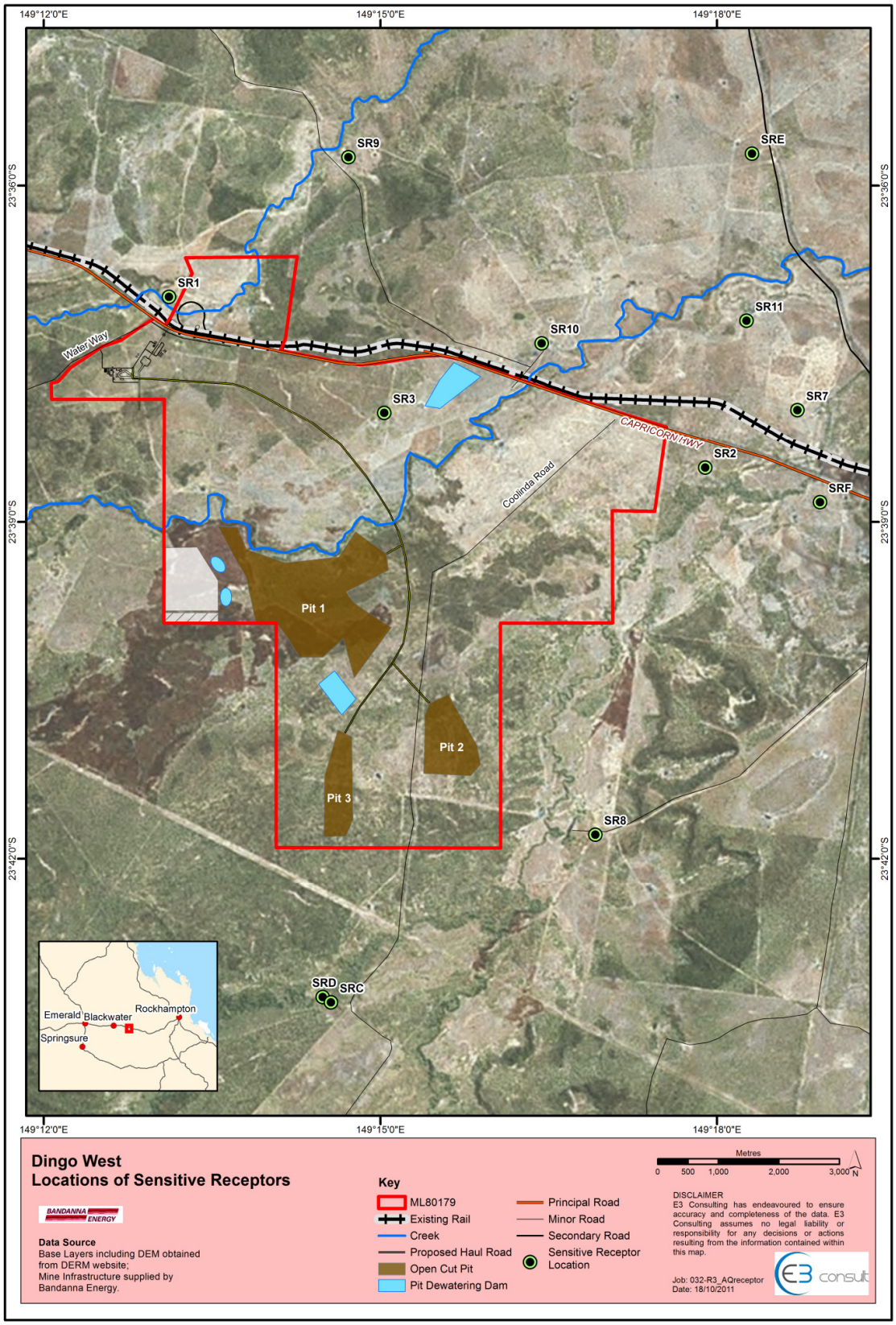
Table 15. Sensitive receptor locations within wider project area

Receptor	Location	
	Easting	Northing
SR 1	726355 m E	7386472 m S
SR 2	734439 m E	7383529 m S
SR 3	729588 m E	7384516 m S
SR 4	726371 m E	7385357 m S
SR 6	722416 m E	7384929 m S
SR 7	735853 m E	7384462 m S
SR 8	732679 m E	7377517 m S
SR 9	729114 m E	7388722 m S
SR 10	731994 m E	7385622 m S
SR 11	735106 m E	7385943 m S
SR A	721950 m E	7382119 m S
SR B	721379 m E	7386912 m S
SR C	728629 m E	7374813 m S
SR D	728504 m E	7374904 m S
SR E	735234 m E	7388685 m S
SR F	736170 m E	7382929 m S

Note: SR4-6 and SRA-B are not shown on Figure 26 due to their distance from the MLA area.

It is not expected that noise from the construction or operational phases will adversely affect the property owners in the vicinity of the mine or the Dingo township. Notwithstanding, a baseline noise assessment will be conducted as part of the EIS process. The results of the baseline assessment will be used to develop noise mitigation strategies and to form conditions in EA(ml).

Figure 26. Sensitive receptors



3.7 Air Quality

Similar to noise, impacts to air quality generated by the project are expected to minimal. Regional air quality is typically influenced by grazing activities and climatic conditions. The construction and operation of the mine will result in dust emissions. Mine site emissions typically occur from mobile equipment movements, topsoil stripping, blasting activities, coal stockpiles and waste disposal stockpiles.

It is not expected that air quality in the region will be adversely affected by the construction and operation of the mine. A baseline air quality assessment will be conducted as part of the EM Plan process. The results of the baseline assessment will be used to develop air quality mitigation strategies and to form conditions in EA(ml). Mitigation measures that will be considered include the use of water trucks for road watering, progressive rehabilitation, water sprays on crushers and conveyor transfer points.

3.8 Waste Management

Construction and operation activities associated within the project will increase the volume of waste materials from the project area. Waste materials have the potential to impact the receiving environment through contaminating soil, habitat and water resources, in addition to having the potential to harm or injure neighbouring communities and fauna and flora species.

While waste produced during the construction phase will be of a relatively short duration (in comparison to the operational phase of the project), waste will continue to be produced during the operation and decommissioning phases of the Project. The management of wastes generated by the project will be addressed in the EIS. The EIS will identify controls, which target the reduction of generated wastes and ensure that onsite wastes do not enter the environment and minimise subsequent impacts.

To manage project related waste in accordance with Government Policies, the following measures will be put in place:

- A waste management strategy will be developed along with processes and procedures that form a suitable environmental management framework allowing the incorporation of waste management into daily operations and will develop efficient practices throughout the lifecycle of the project. These principles will ensure early identification of anticipated waste streams and quantities, and allow effective implementation of appropriate management and mitigation measures to reduce the potential for impacts to occur;
- Generated waste will be managed and disposed of by licenced contractors in accordance with the waste's classification i.e. regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) will be tracked and recorded prior to being removed from site; and
- A proactive rather than reactive approach to waste generation and minimisation will assist in reducing the volume of waste generated due to the project.

3.8.1 Potential Impacts

Wastes generated by the Project have the potential to impact on surface water and groundwater, quality, air quality, visual amenity and soil quality and visual amenity of Project area and the surrounding environment if they are not managed appropriately. Sensitive receptors including rural residences and ecological sensitive areas within and adjacent to the Project area could be negatively impacted if waste streams were to enter waterways and groundwater systems and migrate off-site. Likewise, air emissions have the potential to impact both on and off-site sensitive receptors.

Potential impacts from uncontrolled discharges of poor waste management practices during the construction and operation phases included:

- Decreased air quality in the form of odours and airborne contaminants;
- Contamination of soil land and impacts to current and existing land use practices;
- Contamination of surface or groundwater;
- Direct impacts to flora and/or fauna;
- Impacts to natural habitats and thus, indirectly impacting flora and/or fauna;
- Increased fire hazards and reduced visual amenity due to untidy or poorly managed waste storage;
- Increased pressure on existing waste infrastructure;
- Introduction and/or dispersal of pests and weed species;
- Anthropogenic and ecological health and hygiene issues, such as increased prevalence of pests, abundance in mosquito breeding areas and animal entanglement; and
- Reduction in visual amenity for surrounding community.

Waste will be managed to avoid negative impacts on the health and wellbeing of people and the ecological and ecosystems processes and both on and off-site.

3.9 Safety and Health

A Safety and Health Management System will be established for the project to ensure all activities that potentially have an impact on safety and health are carried out in a manner that complies with:

- Relevant legislation, standards and codes of practice; and
- Bandanna Energy standards.

Typical hazards expected at a mine site such as this one include:

- Fuel spills – spills and leaks during storage or handling;
- Transport – traffic accidents that may resulting in injury to workers, damage to vehicles or spillage of hazardous substances;
- Heavy machinery - the use of heavy machinery that may result in injury to workers and damage to equipment;
- Hazardous materials / substances / chemicals - the storage, handling and may result in spills and leaks;
- Adverse weather - undertake activities in adverse weather conditions such as cyclones, storms, winds or heat that may result in equipment damage or injury;
- Working at heights - injury associated with falls from heights and material falling from height;
- Confined space entry, excavation and trenching - injuries associated with working in confined spaces; slips, trips and falls - through every day construction activities;
- Dust exposure - exposure to long term dust (that may contain hazardous materials) resulting in injury or making the work place hazardous;
- Excessive noise exposure - impacts to hearing from prolonged noise exposure;

- Spontaneous combustion of coal stockpile -resulting in a fire risk at the site that may lead to injury or loss of life;
- Undertaking underground mining operations - resulting in injury through working in a highly energized and potentially gaseous work environment;
- Blasting and vibration - that may lead to injury to personnel or serious damage to equipment; and
- Electrical work - electrocution, injury and fires which may damage or cause injures to personnel and equipment.

The lead construction contractor will implement a Safety and Health Management System (SHMS) that is consistent with the principals required by Dingo West Coal and fully complies with legislative obligations. A site specific construction safety and health management plan, work instructions, and permits to work will be completed prior to construction works commencing.

3.10 Visual Impacts

The project will include infrastructure that will be clearly visible from the road. In particular, the product coal stockpile, reclaim conveyor, trainload out facility and balloon loop will be clearly visible to users of the Capricorn Highway. The proposed rail infrastructure will be of similar nature to that used at the Yarrabee Siding. Where practicable, screening will be utilised to mitigate the adverse impacts to the aesthetic value of the area. Conversely, the proponent will consult with the CHRC in regard to designing observation platforms and interpretive signage that may be utilized as tourist vantage locations.

Due to the setback distance from the Capricorn Highway and the presence of screening vegetation in the road reserve, it is unlikely the mine and infrastructure area will create an adverse impact. Notwithstanding, the proponent will assess the need for additional roadside screening. Should additional screening be required, endemic tree species will be used and this will have an additional benefit of increasing endemic habitat and offsetting greenhouse gas emissions associated with the project.

3.11 Cultural and European Heritage

3.11.1Cultural Heritage

Database searches identified no registered Aboriginal cultural heritage sites within the Project area. With the exception of field surveys associated with exploration activities, specific Indigenous cultural heritage field surveys for the Project have not been conducted. Although the survey reports are confidential in nature (and cannot be published with this current document), the field surveys have identified potential cultural heritage material in the vicinity of the Project area. Sites identified have included isolated artifacts and a stone artifact scatter.

Several cultural heritage studies have been previously conducted in the broader Project area to assess the presence of cultural heritage artifacts. Many recent surveys have been undertaken as per EIS requirements associated with coal mining projects in the region including:

- A comprehensive survey of both Indigenous European cultural heritage within the Bowen Basin (Scott L'Oste-Brown, Luke Godwin and Carl Porter, 1998);
- Cultural heritage study undertaken for the Coppabella mine (2001);
- Archaeological assessment undertaken for the Moorvale West mine (2006);and
- Surveys undertaken for the Washpool Coal mine (2011).

These studies indicate that stone artifacts - both as scatters and isolated finds - are the most common items found of cultural heritage significance; however scarred trees have also been located. Generally these sites have been identified around creeks and watercourses.

A detailed Indigenous cultural heritage field survey of the Project area will be undertaken in accordance with the requirements of the forthcoming Cultural Heritage Management Plan (CHMP) and prior to the commencement of works.

3.11.2European Heritage

No areas containing European cultural heritage significance were identified from the desktop review of both the Commonwealth and National Heritage Register and Queensland Heritage Registers. Three sites of European cultural heritage significance were identified within in the wider surrounding region and all sites are a significant distance from the Project area:

- Dawson Valley Colliery (former) approximately 80km's south-east from the Project;
- Lilyvale Stand Monument approximately 90km's away north-west from the Project; and
- Tieri War Memorial approximately 100km's north-west from the Project.

Several small graveyards believed to be of local families exist within the Project area at Lot 2 RP904099 and Lot 3 SP226576. Historic artifacts such as gravesites are protected under the provisions of QH Act and the graves are also protected under the provisions of *The Coroner's Act 2003*. In addition, Part 9 of the QH Act outlines provisions for the discovery of archaeological artifacts including strict penalties for not reporting the discovery of artifacts of potential state significance.

Further investigation of the gravesites will be undertaken during the EIS

3.12 Socio – Economics

The resource sector is the main employer in the immediate area of the proposed mine, with a number of mines already operating in the area. The majority of employees are expected to come from the nearby towns of Dingo, Blackwater and Emerald. A workers camp will be located within the mine to cater for employees, particularly those workers that utilize FIFO.

The Dingo West Project will positively contribute to the local and regional areas with increased direct employment opportunities and indirect opportunities through the ongoing requirement for services and support.

The Dingo West project will require the hiring of between 220 and 120 full time employees during the construction and operational phases respectively. Given the small scale of the project, and considering the majority of employees will be local it is not expected that adverse social impacts will arise from the Project. A Social Impact Management Strategy will be developed as part of the EIS process.

3.13 Traffic and Transportation

Transport and traffic issues associated with the project will include the transport of heavy and oversize loads, plant and equipment, construction materials and camp accommodation, together with workforce movements. The Capricorn Highway will be the major road utilised to transport materials to the project area; however, Local Authority roads will also be utilised to gain site access through the life of the mine.

At this stage of the project design, no estimates are available for the likely number and type of transport trips required for the project. Procedures for the movement and transport of vehicles and personnel during the construction and operation of the mine will be prepared to ensure that these traffic movements do not cause

unnecessary damage to local or regional roads. Traffic movement on regional and local roads will be minimised where practicable and restricted in areas of high sensitivity where practical.

The ability of the existing infrastructure in the region to meet project transport needs will be examined as part of future project design activities.

4. Cumulative Impacts

At present, there are 15 coal mining projects that are either proposed or are currently operating within an approximate 40km radius of the Project (see **Figure 27**).

4.1 Impacts to environmental values

4.1.1 Land resources

The Project will result in the loss of approximately 34.8ha of Class C2 GQAL defined as "Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance". The Project area is used exclusively for cattle grazing rather than cropping due to existing soil quality and much of the Project area will revert to cattle grazing post-mining.

The cumulative effects of these operations will impact primarily on the percentage of GQAL and grazing land in the region. However, the soils within the Project area and the surrounding landscape are generally not regarded as high quality GQAL. Nevertheless, impacts associated with the loss of grazing land can be effectively addressed through consultation with tenure holders to ensure, where practicable, minimal disturbance to land outside of the mining footprint whilst maintaining safe and efficient operation and progressive rehabilitation of the Project. Impacts can further be reduced through effective consultation with regard to the timing and removal or relocation of existing property infrastructure such as fences, gates, dams and irrigation systems within the mine footprint.

4.1.2 Visual amenity

The Project site, while generally flat, is partially bisected by low ridge lines running south west to north east. In addition, areas of remnant vegetation remain within and surrounding the Project area and are mainly confined to riparian zones, roadsides and isolated patches. The natural variations in topography and the presence of native vegetation will assist in screening the various aspects of the proposed mining operation from the public view.

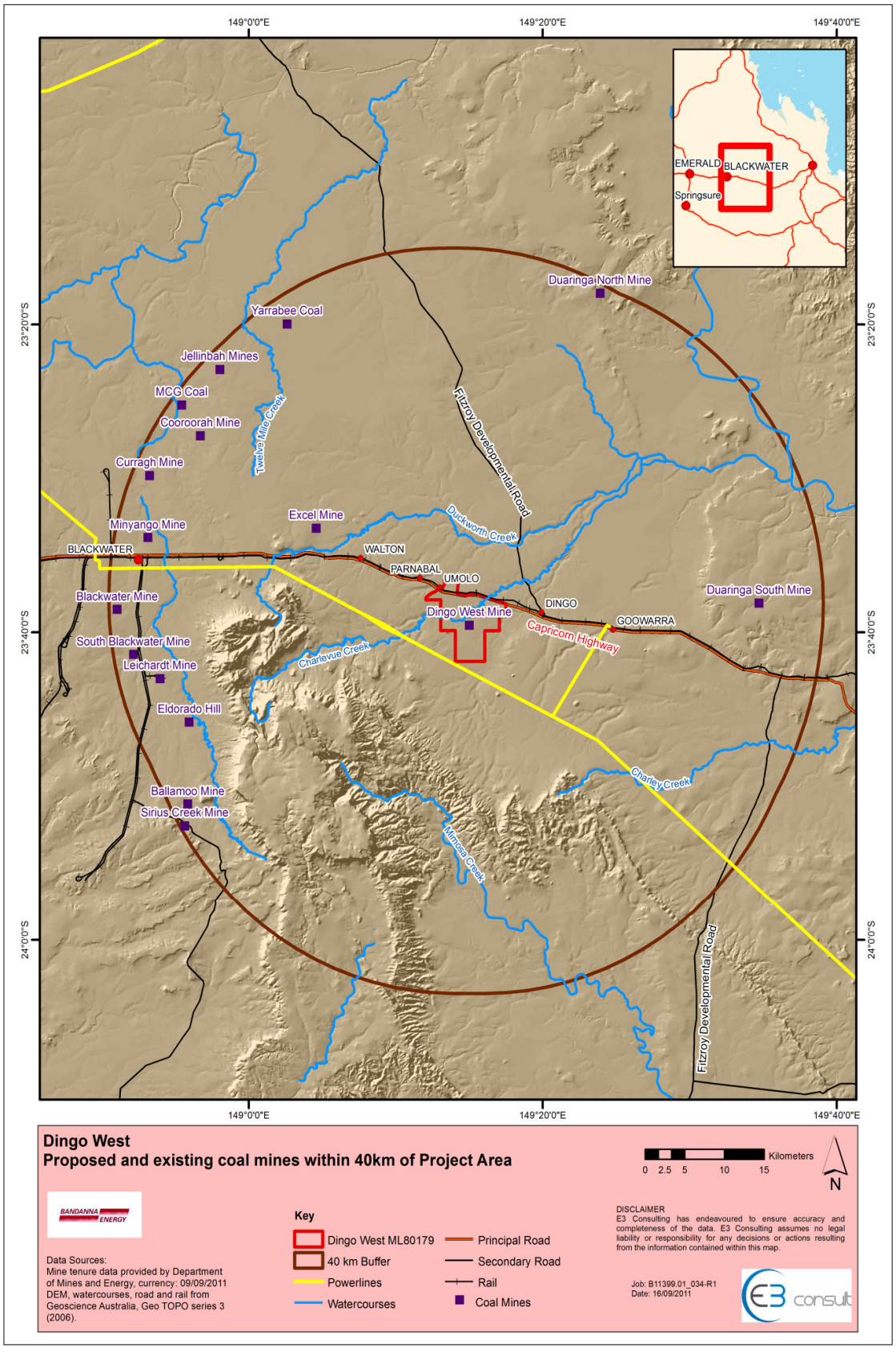
Where two or more project sites reside within the same locality, direct cumulative impacts may be experienced where both projects are visible from the same view point and indirect cumulative impacts may occur from incidental sightings of multiple mines such as through the use of the major transportation routes (e.g. the Capricorn Highway). No existing mines occur within the immediate vicinity of the Projects view shed. As such, direct cumulative impacts resulting from views of multiple mines within the local landscape or projects will not occur.

Although the over-road conveyor, rail loop and loaders will provide the main source of visual impacts along the Capricorn Highway, these structures are not uncommon in the region. While local impacts may result from these structures, regional impacts are expected to be low given their existing presence along the Capricorn Highway to the west.

4.1.3 Nature conservation

Broad-scale vegetation clearing has occurred in the Brigalow Belt Bioregion for many decades. Compared to clearing for agricultural purposes, mining projects have resulted in relatively smaller clearing footprints. In addition, from an Australia wide perspective, mining projects have contributed relatively minor roles to overall plant extinctions with the loss of only a single species attributed to mining (Lindenmayer, 2007).

Figure 27. Coal Mining Projects within the direct vicinity of the Project



Recognising the extent of historical clearing, Dingo West Coal has carefully considered locating infrastructure to either avoid or minimise clearing of remnant vegetation, particularly vegetation listed under Commonwealth and State legislation. Where clearing cannot be avoided, the overall impact footprint has been reduced.

The Project will result in the clearing of approximately 204.7h of remnant vegetation which represents less than 1% (approximately 0.53%) of the entire vegetation extent within a 10km buffer zone around the Project. Importantly, the Project will not adversely impact on the Brigalow TEC which has historically been heavily cleared throughout the wider Brigalow Belt. The remainder of the Projects' footprint comprises grasslands dominated by the introduced Buffel grass.

Significant remnant vegetation will be retained within the proposed mining lease area which has been maximised from re-arranging key infrastructure such as the haul road, dams and the CHPP and MIA to avoid, where possible remnant vegetation, particularly currently mapped Endangered REs. Minimising clearing also has the co-benefit of minimising adverse impacts to fauna species from removal of breeding habitat. As such, the Project is not expected to contribute to either localised or regional cumulative impacts and will not, directly or indirectly, impact negatively on any threatened fauna or flora species.

4.1.4 Surface water resources

Construction and ongoing operation of the mine has the potential to impact on existing watercourses in the region and similar activities associated with other existing and proposed projects are also likely to contribute to impacts on creek systems. These activities have the potential to result in cumulative impacts on the Mackenzie and Fitzroy River systems downstream of the mine areas.

Although local creek systems in the vicinity of each project ultimately flow into the Mackenzie River, the Project is located in an isolated local catchment. It is the intention of Dingo West Coal to retain water on-site and not discharge to receiving environments, hence further reducing the potential contribution to negative impacts downstream. Dingo West Coal has committed to multiple mitigation and control strategies pertaining to the control of dirty water from the mine, the diversion of clean water around disturbed areas and appropriately engineered designs for creek crossings that would effectively result in little to no impact outside of the immediate mine footprint on receiving environments. It is expected that other mining projects in the area will implement similar management regimes. Where the construction and ongoing operation of all projects are undertaken in accordance with similar management and control measures, the cumulative impacts to the Mackenzie and Fitzroy River systems would be low.

4.1.5 Groundwater Water Resources

Preliminary groundwater impacts were assessed through preliminary numerical modelling of groundwater drawdown and pit inflows resulting from mining activates. Modelling predicted drawdown would equate to 9.3m to 2.0m below current water levels and could be up to 5m at distances of up to 4km from the Project area. However the drawdown is likely to be low as water levels will still be accessible from adjacent bores. In addition, the existing groundwater has limited uses due to high salinity levels.

Although groundwater will be impacted to some degree throughout the development and operation of the respective coal mines the impacts are likely to be restricted to localised impacts which with suitable implementation of proposed management measures will be reduced to negligible levels.

The distance (approximately 30 – 40km) between the Project and existing and/or future proposed mines is unlikely to result in cumulative impacts of drawdown on local water tables. However, this impact will be determined in part by pit designs and production levels of new mining projects.

4.1.6 Air quality

The primary potential source of air emissions at Dingo West are ground-level particulate matter and dust deposition. Air emissions during the construction phase of the mine site will be primarily dust related from clearing of vegetation and topsoil stripping, excavation works, blasting, transportation movements, and construction activities. Cumulative air quality impacts may result from increased dust generation from the mining operations in the localised area, and also dust generated from the increased rail movements in the region.

Existing air quality levels and potential impacts have undergone preliminary assessment through predictive modelling based on existing background conditions at Red Rock Camp, the sensitive receptor closet to the TLO, MIA and CHPP. Numerical modelling predicted that dust concentrations and PM_{10} are unlikely to exceed the ambient air quality goals in the EPP (Air).

Although the project will lead to some increase in dust, particulate matter and emissions over and above those already generated by existing sources, the air quality assessment predicts cumulative ground level concentrations (those generated by the proposed mining activities plus existing background levels). Hence, the assessment is in effect, a cumulative assessment. Further, the nearest operating mine is approximately 25km to the west near Blackwater. Therefore, the lack of mining activities in the vicinity of the Project, coupled with the cumulative ground level concentrations for PM_{10} and dust deposition not exceeding DERM trigger criteria levels indicates the Project is unlikely to result in adverse cumulative impacts.

4.1.7 GHG Emissions

Total GHG Emissions for mining activities undertaken at Dingo West for the life of operations are estimated to be approximately 1,193,606 t CO_2-e. Transport fuel during operations is the largest contributor at 664,072 t CO_2-e, with open cut mining (306,000 t CO_2-e) and power generation (190,836 t CO_2-e) the next largest contributors.

The Project can most effectively reduce its emissions through improvements in energy efficiency and Dingo West Coal will explore options for cost-effective low-emission energy sources and technological, operational, and behavioural options for energy efficiency such as the potential use of biodiesel in generators and vehicles, and real-time monitoring of vehicle fuel-use efficiency. In addition to mandatory reporting under NGERS and the EEO Program, Dingo West Coal is committed to undertaking ongoing internal measurements and monitoring of emissions to identify sources with the greatest potential for emissions reductions. This may include offsetting emissions via carbon sequestrations and specific rehabilitation practices.

As GHG emissions are measured on a local, regional, national and international scale, cumulative impacts are likely to occur. However, compared to other larger mining operations in the region, Dingo West Coals overall contribution to world emissions is minimal.

4.1.8 Noise and vibration

Preliminary noise monitoring was undertaken to quantify the existing ambient noise environment within and surrounding the Project area and was used to determine noise limits for the Project. Modelling predicted that noise levels would likely be exceeded at five nearby receptors with the highest exceedence at Red Rock Camp. In contrast, sleep disturbance criteria was not exceeded at any of the receptors and localised impacts from blasting activities were also predicted to be minimal. The distal location of existing and proposed mining projects to Dingo West suggests cumulative noise and vibration impacts from these mines will not occur. Noise and vibration resulting from transport and export of coal from the Project will be the responsibility of QR National and WICET Pty Ltd. and are likely to be localised.

Dingo West Coal will examine mining operations with the aim of reducing noise and vibration emissions and resulting impacts to nearby dwellings. Where noise attenuation and vibration and air blast modification are

impractical, Dingo West Coal will consult with the affected property to negotiate favourable management outcomes.

4.1.9 Waste management

General wastes such excess spoils and vegetative media during construction, operation wastes, and hazardous wastes will ultimately increase the volume and diversity of wastes disposed of at both a local and regional scale. Although waste produced during the construction works will be of relatively short duration, waste will continue to be produced during the operation and decommissioning phases of the Project. To minimise potential waste related impact, the management, disposal and transportation of all waste material will be undertaken in accordance with the EP Regulation (Waste) and the EPP (Waste).

Despite an overall increase in waste, cumulative impacts of waste generation and disposal are considered to be relatively minor due to the implementation of best practice protocols and a responsible waste management approach. This will ensure the potential for harm to the environment and human health is minimised, and where possible, avoided completely.

4.1.10Traffic and transport

The Project will result in increased traffic during both the construction and operation phases and are therefore, likely to result in some cumulative impacts. Although a formal traffic assessment has yet to be undertaken, larger projects in the wider area that used similar transport options to that expected at Dingo West were unlikely to generate significant adverse traffic impacts.

Any potential impacts are anticipated to peak during construction. These impacts are expected to be temporary and can be effectively managed through the implementation of appropriate mitigation works and management plans. It is likely that the additional construction traffic can be adequately accommodated in the existing state controlled road network. However, some disruption to traffic during minor intersection works will occur.

By generally limiting construction traffic to well define transport corridors and the purpose built internal service road, transport and traffic impacts can be more easily managed and mitigated. To further minimise traffic impacts on the Capricorn Highway from the construction of new intersections, the main access to MIA and CHPP has been located at a point on Charlevue Road / Water Way, approximately 600m from the Capricorn Highway intersection.

4.1.11Cultural heritage

No registered Indigenous or European cultural heritage will be impacted by the planned mine development. However, there may be impacts on some cultural heritage material within the Project area. Any impacts to Indigenous cultural heritage values can be effectively mitigated by conducting dedicated field surveys by the relevant Aboriginal party as agreed in the CHMP implementing mitigation measures in accordance with approved CHMP.

Impact mitigation measures that may be required include avoiding certain highly sensitive areas, carrying out more field investigations including sub-surface testing, recovering datable occupation material, and collecting and relocating cultural heritage items.

Similarly, dedicated field surveys will be undertaken prior to construction to identify any unrecorded European cultural heritage values. Any identified values will be managed in accordance with the QH Act and a European Cultural Heritage Management Plan (that will be developed prior to construction).

4.1.12Social impact assessment

The preliminary social impact assessment determined that while the Project in isolation is unlikely to have a significant adverse impact on the local community, the continued expansion of mining in the region may result larger cumulative impacts.

While the issues outlined may be intensified by the Project, none of the issues are likely to be unmanageable. However, proponents of proposed resource development projects, key stakeholder and local and State governments will need to avoid and minimise potential significant social impacts to surrounding communities.

4.1.13Economic impact assessment

Queensland is Australia's largest coal exporter accounting for approximately 56% of coal produced and in the 2009/10 financial year, Queensland exported 183 Mt of coal to worldwide markets. In the financial year ending 30 June 2010, coal contributed significantly to the State economy by providing 88% of mining royalties which equated to $1.8 billion in revenue. The cumulative economic impacts of the Project are positive and include increased export income, royalties and employment that will provide significant benefits the wider community.

4.1.14Conclusion

Cumulative impacts on environmental, social and built values have been collectively assessed for the Project. The most significant potential impacts to existing environmental values are associated with surface water, groundwater, noise, traffic and transport and the loss of Indigenous and European cultural heritage artefacts. Dingo West Coal will manage and off-set these impacts by implementing the mitigation measures outlined for each environmental value. **Table 16** below provides a summary of the likely impact of each environmental value discussed above.

Table 16. Cumulative impact summary

Environmental Value	Likely Impact
Land	Low
Visual Assessment	Low
Terrestrial Ecology	Low - Medium
Groundwater Resource	Medium
Surface Water Resource	Medium
Air Quality and Green House Gases	Low
Noise and Vibration	Low - Medium
Waste	Low
Traffic and Transport	Low - Medium
Indigenous Heritage	Low - Medium
Non-Indigenous Heritage	Low - Medium
Social Impact Assessment	Low - Medium
Economic Impact Assessment	Low

5. Stakeholder Engagement

Dingo West Coal is committed to a consultation program as part of the project approvals process, which provides opportunities for active community involvement and education through an inclusive program.

The public consultation process would identify broad issues of concern to local community and interest groups at all stages including project planning, construction, commissioning, operations and final decommissioning.

The public consultation program would include public meetings, interest group meetings, production of regular summary information and updates and other consultation mechanisms for encouraging and facilitating active public consultation. A list of affected persons and interested stakeholders would be developed.

The key objectives of the developed consultation program will be to:

- Inform the different interest groups about the project proposal;
- Seek an understanding of interest group concerns about the proposal;
- Explain the environmental impact assessment process and indicate how public input might influence the final recommendations for the project;
- Provide an understanding of the regulatory approval process;
- Seek local information and input into the project; and
- Provide the community with a sense of ownership in the project.

6. References

Bureau of Meteorology (2011a). Climate data for the Dingo Post Office [Online]. Available: http://www.bom.gov.au/climate [2011, August]

Bureau of Meteorology (2011b). Climate data for Blackwater Treatment Plant [Online]. Available: http://www.bom.gov.au/climate/averages/tables/cw_035290.shtml [2011, August]

Bureau of Meteorology (2011c). Climate data for Baralaba Post Office [Online]. Available: http://www.bom.gov.au/climate/averages/tables/cw_039004.shtml [2011, August]

Bureau of Meteorology (2011d). Annual 9am wind rose for the Blackwater Water Treatment Plant weather station [Online]. Available: http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.035290.9am.pdf [2011, August]

Bureau of Meteorology (2011e). Annual 9am wind rose for the Baralaba Post Office weather station [Online]. Available: http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.039004.9am.pdf [2011, August]

Bureau of Meteorology (2011f). Annual 3pm wind rose for the Baralaba Post Office weather station [Online]. Available: http://www.bom.gov.au/clim_data/cdio/tables/pdf/windrose/IDCJCM0021.039004.3pm.pdf [2011, August]

Bureau of Meteorology (2011g). Average annual lightning strikes [Online]. Available: http://www.bom.gov.au/jsp/ncc/climate_averages/thunder-lightning/index.jsp?maptype=otdg [2011, August]

Bureau of Meteorology (2011h). Average annual thunder days [Online]. Available: http://www.bom.gov.au/jsp/ncc/climate_averages/thunder-lightning/index.jsp [2011, August]

Bureau of Meteorology (2011i). Average number of cyclones per year [Online]. Available: http://www.bom.gov.au/jsp/ncc/climate_averages/tropical-cyclones/index.jsp [2011, August]

Bureau of Meteorology (2011j).Occurrences of tropical cyclones within 100km of tropical cyclones between 1906 and 2006 [Online]. Available: http://www.bom.gov.au [2011, August]

Bureau of Meteorology (2011k). Annual Climate Summary for Queensland [Online]. Available: http://www.bom.gov.au/climate/current/annual/qld/summary.shtml [2011, August]

Department of Employment, Economic Development and Innovation (2011). Queensland Drought situation [Online]. Available: www.deedi.qld.gov.au [2011, August]

Department of Minerals and Energy (1995). Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland. Queensland Mining Council. Queensland Department of Primary Industries Queensland Department of Environment and Heritage and University of Queensland

Department of Primary Industries and Department of Housing, Local Government and Planning (1993). Planning Guidelines: The Identification of Good Quality Agricultural Land

Department of Sustainability, Environment, Water, Population and Communities (2007). The Australian Natural Resources Atlas

Earth Systems Science Computational Centre (2011). Earthquake information for Queensland, Australia [Online]. Available: http://www.quakes.uq.edu.au/html/quake_info/OZ_QLD_info.html [2011, August]

Emergency Management in Australia 2011. Severe Thunderstorms: Facts, Warnings, Protection [Online]. Available: http://www.ema.gov.au [2011, August]

Geoscience Australia (2011a). Landslide [Online]. Available: http://www.ga.gov.au/hazards/landslide.html [2011, August]

Geoscience Australia (2011b). Earthquake Basics [Online]. Available: http://www.ga.gov.au/hazards/earthquakes/earthquake-basics.html [2011, August]

Lindenmayer DB (2007). On Borrowed Time: Australia's Environmental Crisis and what we must do about it. CSIRO Publishing and Penguin, Melbourne

Shields, PG., Gillespie, RL. & Cannon, RS. (1991). Dawson / Callide Districts Field Manual, in (JA. Elsol ed.) Land Management Manual Dawson / Callide Districts, Queensland Department of Primary Industries Training Series QE91003