Burdekin River Pipeline EA Amendment

Project Description

July 2014
preparing on behalf of
Evolution Mining - Mt Carlton Operations
Limitations of this Report

Client: Evolution Mining - Mt Carlton Operations

Prepared by Northern Resource Consultants (NRC)

This disclaimer brings the limitations of the investigations to the attention of the reader.

The information in this report is for the exclusive use of Evolution Mining - Mt Carlton Operations. Evolution Mining - Mt Carlton Operations is the only intended beneficiary of our work.

We cannot be held liable for third party reliance on this document. The information within this report could be different if the information upon which it is based is determined to be inaccurate or incomplete.

The results of work carried out by others may have been used in the preparation of this report. These results have been used in good faith, and we are not responsible for their accuracy.

This report has been formulated in the context of published guidelines, field observations, discussions with site personnel, and results of laboratory analyses.

NRC’s opinions in this document are subject to modification if additional information is obtained through further investigation, observations or analysis. They relate solely and exclusively to environmental management matters, and are based on the technical and practical experience of environmental scientists.

They are not presented as legal advice, nor do they represent decisions from the regulatory agencies charged with the administration of the relevant Acts.

Any advice, opinions or recommendations contained in this document should be read and relied upon only in the context of the document as a whole and are considered current as of the date of this document.
Contents

Executive Summary .................................................................................................................. 1

1. Background .......................................................................................................................... 2
   1.1 Project Location .............................................................................................................. 2
   1.2 Current Operations ........................................................................................................ 2
   1.3 Proposed Project Justification ...................................................................................... 3
   1.4 Project Alternatives ....................................................................................................... 4
   1.5 Details of the Proposed Pipeline ................................................................................... 4
   1.6 Tenement and Property Description ............................................................................. 7

2. Applicable Guidelines ......................................................................................................... 8

3. Environmentally Relevant and Notifiable Activities ......................................................... 9
   3.1 Environmentally Relevant Activities ......................................................................... 9
   3.2 Notifiable Activities ...................................................................................................... 9

Environmental Values .......................................................................................................... 10

1. Climate ............................................................................................................................... 10
   1.1 Seasonal Climate .......................................................................................................... 10
   1.2 Temperature and Rainfall ............................................................................................ 10
   1.3 Rainfall Intensity .......................................................................................................... 12
   1.4 Wind ............................................................................................................................ 13

2. Site Topography ................................................................................................................. 14

3. Geology ............................................................................................................................ 14
   3.1 Regional Geology ......................................................................................................... 14
   3.2 Local Geology and Mineralisation .............................................................................. 15

4. Hydrology .......................................................................................................................... 15
   4.1 Regional Hydrology ..................................................................................................... 15
   4.2 Shallow Groundwater Systems .................................................................................. 16

5. Native Title ......................................................................................................................... 16

Potential Impacts to Air ........................................................................................................ 17

1. Guidelines .......................................................................................................................... 17

2. Environmental Values ...................................................................................................... 17

3. Land Tenure ....................................................................................................................... 17
3. Creek Crossings

References

List of Tables

Table 1: Pipelines excerpt from Table A1 of EA EPML00982113
Table 2 Lot on plan for the underlying pastoral stations along the pipeline
Table 3 Sensitive receptors along the course of the proposed pipeline corridor
Table 4 Dust deposition data measured at MCO (AARC 2010)
Table 5 Schedule B, Table B2 (Ambient Air Quality Limits – Particulates and Depositional Dust) from the MCO EA EPML00982113
Table 6 Schedule F, Table F1 (Noise Limits) of EA EPML00982113
Table 7: Reproduction of Section 22, Division 2 of the RPI Act 2014

List of Figures

Figure 1: Side view of storage tank connected to riverbank pump
Figure 2: 75kL riverbank storage tank
Figure 3: Top-down view of the proposed 75kL storage tank connected to a pump
Figure 4 Monthly minimum and maximum temperatures for the MCO region (BOM, 2014)
Figure 5 Average monthly rainfall with 95% Confidence Intervals for the Mt Carlton region (BoM), comparative to 2012/2013 rainfall data (Jan - Feb 2014, Mar – Dec 2013)
Figure 6 Annual rainfall records from wet and dry seasons in the MCO region (BOM, 2014)
Figure 7 Return period of different rainfall events including 24-hour, 48-hour and 72-hour rainfall events for the MCO region (BOM, 2014)
Figure 8 Wind rose data from Collinsville Post Office station (#033013) at 9am and at 3pm (data collected from 1957-2010) (BOM, 2014)
Figure 9: Typical creek crossing design for the Burdekin River Pipeline
The Mt Carlton Operation (MCO) is a gold, silver and copper mining project in North Queensland. The mine has been in operation since early 2013. Water used in processing at the site is sourced from pit dewatering bores and from rainfall across the lease that is collected in the main site water dam (MSWD).

As part of MCO’s ongoing water supply strategy, a 400 ML raw water allocation has been secured from an adjoining landholder of the project. Through negotiations with the landholder of Strathalbyn Station, which lies due west of ML10343 and underlies MLA10375, MCO have arranged to utilise the landholder’s existing water allocation from the Burdekin River up to 400ML annually.

This EA Amendment application is for the construction and operation of a 225mm subterranean HDPE pipeline and associated pumping infrastructure, to carry river water from the Burdekin River to the MSWD at MCO for processing. The proposed pipeline will be approximately 39km long. Approximately 15km of that pipeline will follow the existing pipeline corridor that branches off ML10343 which hosts the King Creek substation power line and under which the raw water pipeline is also approved as an external water pipeline infrastructure corridor as per Schedule A of the site’s EA EPML00982113. The remaining 24km of pipeline that is the subject of this application for a mining lease will branch off from Johnny Cake Road and then follow the Strathalbyn Station Access Driveway across Strathalbyn Station to the Burdekin River.

The proposed mining lease will be 8m wide along the remaining 24km, comprising an additional 19.2ha of disturbance under the site’s EA. Utilisation of pumping infrastructure already in place at the Burdekin River is included in the agreement between MCO and the landholder, though MCO intend to upgrade some of the pumping equipment to ensure most effective performance and monitoring of water uptake.

The excavation of the pipeline corridor, laying of the piping and rehabilitation of the excavation trench is expected to take 18 weeks in total and will be carried out in stages to minimise the risk of environmental harm. The proposed activity is considered to have a relatively low risk of environmental harm given the linear nature of the disturbance, the decision to bury the pipeline to a depth of approximately 300mm and the intent to rehabilitate the pipeline trench progressively. The risks of environmental harm to air, noise, water and land from both construction and operation of the pipeline have been considered against EHP’s guidelines EM960, EM961, EM962 and EM963 accordingly and findings are included in this application to amend the EA.
Project Description

1. Background

Mount Carlton Operations (MCO) involves open pit gold, silver and copper mining of the deposit known as Silver Hill, located on mining lease ML10343 and MLA10375 in North Queensland. Construction at MCO began in 2010, with the site’s official commissioning in early 2013.

MCO operates in accordance with the conditions of Environmental Authority EPML00982113 (the EA), issued by the Department of Environment and Heritage Protection (EHP), dated 4 July 2014.

1.1 Project Location

MCO includes mining leases ML10343 and MLA10375 and is located 45km northwest of Collinsville, 80km southwest of Bowen and 150km southwest of Townsville, in North Queensland. A map of the site location is available in Appendix A of this report. The project is located within the Charters Towers mining region, approximately 25km west of the Burdekin River. Access to site is via Tondara Road leading from the Bruce Highway, just south of Gumlu.

The MCO project is relatively isolated in its location, with the closest town being Dalbeg, approximately 26km to the west of the project site. The local community and surrounding properties comprise pastoral stations.

1.2 Current Operations

MCO is a wholly owned subsidiary of Evolution Mining. Mining production of gold, silver and copper is via two open cut pits: V2 and A39, utilising conventional drill and blast, load and haul methodologies. Currently only the V2 pit is being mined. In December 2013, the resource within open pit V2 was estimated as being 11.4 million tonnes (Mt) at 2.5 grams per tonne (g/t) gold, 22g/t silver and 0.27% copper, while the open pit A39 was estimated as being 0.9Mt at 197g/t silver and 0.33% copper. While the reserve within open pit V2 was estimated as being 7.3Mt at 3.0g/t gold, 22g/t silver and 0.28% copper, while the open pit A39 was estimated as being 0.67Mt at 209g/t silver and 0.38% copper.

Forecasted mining life is 12 years. The project comprises gold, silver and copper primarily as copper arsenic sulfides (enargite), silver arsenic sulfides (tetrahedrite/polybasite) and some native gold (within pyrite).

Associated key infrastructure elements at MCO include:

- Mining pits and temporary stockpiles,
- Soil storage and future clay borrow pit areas,
- Processing plant,
- Waste rock dump (WRD),
- Tailings storage facility (TSF),
- Electrical power supply lines,
- Water supply dams,
- Stormwater dams and drains,
- Workshops and offices,
- Accommodation village,
- Fuel and reagent storage facilities, and
- Haul and access roads.

1.3 Proposed Project Justification

This application to amend the site’s EA describes the construction and subsequent operation components of a raw water transfer pipeline from the Burdekin River to MCO. The project will be referred to as the Burdekin River Pipeline Project. On acceptance and approval of this application, the corridor will be covered by a mining lease that will be included within MCO’s existing EA.

Existing water requirements at the mine are satisfied by groundwater supply bores designed to keep the pits dewatered, and rainfall capture that is stored in the main site water dam (MSWD).

A constant water supply is crucial to operational success at the site, especially in times of limited rainfall. Limited rainfall on the site is typically experienced during dry season months from April to November, but limited rainfall has also been experienced at the site over a number of consecutive wet seasons, resulting in water storage on site below desirable levels. In the period from July 2013 to June 2014, MCO received approximately 592.6mm of rainfall, which is considerably lower than the historical annual rainfall average for the project area of 718.8mm.

Evolution Mining has entered into an agreement with the landholder of Strathalbyn station to acquire the rights to extract water from the Burdekin River within that landholder’s existing allocation. With pumping occurring 365 days per year, the annual extraction of water would be 400ML per year, the maximum allowable take (CPC Engineering 2013).

The potential environmental impact of the extraction of the landholder’s water allocation on the Burdekin River has already been modelled and assessed by Sunwater. Given this extraction is already modelled, assessed and licenced, this EA Amendment intends to address the potential impacts of the construction and operation of the water pipeline and pumping infrastructure and will not touch upon the impacts of extracting water from the Burdekin River.
1.4 Project Alternatives

In the course of pre-planning for this project, a number of alternative means to supply water for processing at site were investigated.

Evolution Mining commissioned Sunwater to provide an options study for water access around the region of the Mt Carlton mine. The result of the options study was a pipeline from the Burdekin River to the site, using a route 10km shorter than the route proposed for this project. When assessed, the Sunwater pipeline route demonstrated a fire risk for the De Salis property. There was limited road access to the proposed corridor and construction would have required vegetation clearing over the entirety of the route.

The potential to access groundwater from pit dewatering has also been investigated, and modelling is ongoing.

Other solutions investigated included the damming of Herbert Creek, and also construction of a large dam to which floodwaters would be pumped from the Bogie River during high flow events. These options would require major earthworks but a lower capital outlay than the proposed pipeline solution.

The current proposed Burdekin River Pipeline option was chosen because:

- The proposed route is highly accessible for construction vehicles,
- The route alongside existing access tracks minimises ground disturbance,
- The water allocation from the Burdekin River is already approved,
- The proposed route uses previously disturbed areas, which minimises the risk of cultural heritage and environmental impacts.

1.5 Details of the Proposed Pipeline

The proposed route of the pipeline will track from the MCO’s MSWD, south west along the MCO power line corridor to MLA10375. The pipeline will then proceed northwest along Johnny Cake Road, where it branches off and meets the Burdekin River on the pastoral station, Strathalbyn. The pipeline will follow existing access roads for its length. This pipeline will be subterranean and approximately 39km in length from the MSWD to the Burdekin River.

Approximately 15km of the linear stretch of the pipeline is already covered by MLA10375, which includes MCO’s power line infrastructure corridor. Beyond that MLA, this application is for an additional mining lease of approximately 24km to stretch from the end of the power line mining lease to the Burdekin River.

The pipeline infrastructure that falls within the power line corridor is already authorised and identified with the site’s EA, in schedule A, Table A1 (Authorised Mining Activities), reproduced within this report as Table 1, as follows:
Table 1: Pipelines excerpt from Table A1 of EA EPML00982113

<table>
<thead>
<tr>
<th>MINE DOMAIN</th>
<th>MINE FEATURE NAME</th>
<th>LOCATION</th>
<th>MAXIMUM DISTURBANCE AREA (HA)</th>
<th>CONSTRAINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipelines</td>
<td>External Water Pipeline (Infrastructure Corridor)</td>
<td>549290, 552960, 553090, 554320, 555390, 556940</td>
<td>7747840, 7751590, 7754520, 7756000, 7756050, 7757160</td>
<td>13.43</td>
</tr>
</tbody>
</table>

The mining lease being applied for to facilitate the additional 24km of pipeline corridor will be 8m wide. This is an additional mining lease area of approximately 19.2 hectares. The proposed route of the remaining stretch of the pipeline corridor is provided in Appendix A of this report.

The construction of the entire 39km length of the pipeline corridor is envisaged to take approximately 18 weeks.

The pipeline itself will be 225mm HDPE piping with hose joins which will mostly be butt welded, with some electro fused joins on parts of the pipeline. Dependent on the fill excavated from the trench, there may be a requirement to use some bedding sand when laying the HDPE pipe.

The pipe will be laid directly into the excavated trench, with bedding sand if required, to a depth of approximately 300mm. The trench will be promptly backfilled, graded and reseeded after the pipe is laid. This is intended to keep environmental disturbance to a minimum.

Where the pipeline is expected to traverse a waterway or drainage channel, concrete stumps will be bedded in on either side of the waterway and the pipeline will be suspended across the waterway using a wire rope suspension system anchored in the concrete stumps.

At Strathalbyn Station, the pipeline will connect into an existing pumping infrastructure area formerly utilised by the landholder and upgraded by MCO. The pumping infrastructure will comprise a two-part infrastructure solution with river extraction pumps and bank-based pumps working in tandem. The extraction pumps will be Sakuragawa UCF-2206 model heavy duty dewatering pumps. Two of these pumps will sit on a pontoon structure over the river, sucking water from the surface of the river. A water storage tank will be connected to the riverbank pumps, and concept designs of same are presented in Figure 1, Figure 2 and Figure 3.
Figure 1: Side view of storage tank connected to riverbank pump

Figure 2: 75kL riverbank storage tank
The extraction pipes have a mesh aperture to ensure only small suspended solids enter the pumping infrastructure. The riverbank pumps will be Stalker 80x50 – 315 CRI/CRI/SS model pumps.

1.6 Tenement and Property Description

The proposed pipeline corridor covers approximately 39 linear kilometres as it tracks from the MSWD at MCO to the Burdekin River pumping station at Strathalbyn. Along this distance the corridor traverses two pastoral holdings: Strathbogie Station, which also underlies the MCO mining lease, and Strathalbyn Station. The lot on plan numbers for these stations are provided in Table 2. A cadastre map of the stations traversed by the pipeline corridor is included in Appendix A of this report.
Table 2 Lot on plan for the underlying pastoral stations along the pipeline

<table>
<thead>
<tr>
<th>STATION</th>
<th>LOT ON PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strathbogie Station</td>
<td>4899 SB7665</td>
</tr>
<tr>
<td>Strathalbyn Station</td>
<td>7 SB730 507 SP17655</td>
</tr>
</tbody>
</table>

2. Applicable Guidelines

Mining activities described in the Environmental Protection Act 1994 (Qld) (the EPA 1994) require mining operations to consider the potential impact of their proposed activities on the receiving environment and downstream environmental values, including impacts to air quality, land quality, water quality, associated noise impacts, management and disposal of wastes, and impacts to the surrounding community. Where potential risks or impacts are identified, approval conditions are set in an EA to ensure the activity is appropriately managed to minimise or prevent environmental harm.

Mining activities with the potential to impact on environmental values must conduct assessments that meet the following EHP guidelines.

- EM960 Application requirements for activities with impacts to Air
- EM961 Application requirements for activities with impacts to Land
- EM962 Application requirements for activities with impacts to Noise
- EM963 Application requirements for activities with impacts to Water
- EM964 Application requirements for activities with impacts to Waste

This application to amend an EA aligns with current EHP Application Guidelines for activities with impacts to Air, Land, Noise, Water and Waste. This application comprises:

- A Project Description (this report), which includes information addressing the guideline requirements for potential impacts to Air, Noise and Waste, as this project is considered to have a minimal risk of impacting environmental values for air or noise, and will not generate waste.
- A response to EM961 Application Guideline for Projects with Impacts to Land, including technical appendices as follow:
  - A Flora and Fauna Technical Report
  - A Soil and Land Use Technical Report
- A response to EM963 Application Guideline for Projects with Impacts to Water
3. Environmentally Relevant and Notifiable Activities

3.1 Environmentally Relevant Activities

Environmentally Relevant activities (ERAs) include prescribed ERAs or resource activities, which includes mining. While the proposed pipeline corridor will not be utilised for mining activities, the operation of the pipeline and pumping station is to supply MCO with water to allow continuation of mining operations. Upon acceptance by EHP, this corridor will be covered by a mining lease that is regulated by the site’s EA.

3.2 Notifiable Activities

Activities identified as likely to cause environmental harm through land contamination are outlined in Schedule 3 of the EPA 1994 and considered notifiable. No mining operations or other activities likely to cause environmental harm through land contamination will be occurring on the proposed mining lease, so there are no notifiable activities involved in this application.
Environmental Values

1. Climate

1.1 Seasonal Climate

Climate information for MCO has been sourced from the Bureau of Meteorology (BoM) website, utilising climate data from the weather station at Collinsville Post Office (033013), located approximately 45km southwest of the project.

1.2 Temperature and Rainfall

Temperatures surrounding MCO range from 11°C in winter (June) to 44°C in summer (January; Figure 1). The Mt Carlton region receives on average 712.7mm of rain per year, with the majority of this rain falling during wet season months, November to April (Figure 4).

High intensity rainfall often occurs during wet season months due to the presence of rain troughs and cyclonic depressions, which form off the northeast coast of Queensland and progress inland (Bureau of Meteorology, 2014).

![Monthly Temperatures 1956 - 2014](image)

Figure 4 Monthly minimum and maximum temperatures for the MCO region (BOM, 2014)
Inter-annual rainfall is highly variable with a maximum annual rainfall of 1583.6mm in 1956 and minimum annual rainfall of 282.8mm in 1969. Rainfall above 1184.4mm falls in the 95th percentile and below 394.6mm falls in the 5th percentile. It is important to note that the maximum annual rainfall is more than double the average annual rainfall, indicating that extreme isolated events occur in some years. These extreme events are likely the product of depressions, cyclonic events or other extreme meteorological conditions.
1.3 Rainfall Intensity

Rainfall Intensity-Frequency-Duration (IFD) statistics obtained from the Bureau of Meteorology for the MCO region are displayed below in Figure 7 (BOM, 2014). This information describes the likelihood of a rainfall event occurring at a given level of intensity and duration. For example, a one in one hundred year rainfall event (0.01 AEP), would result in approximately 386.6mm of rain (mean of 32.2mm/hr for 24 hours). To date there have been no recorded 24 hour rainfall events greater than 386.6mm at MCO.
1.4 Wind

Wind rose data is measured at the Collinsville Post Office (station 033013) and shown at 9am and 3pm (Figure 8). Winds in the region are predominantly from the south in the morning (9am) and northeast in the afternoons (3pm; Figure 8). Morning winds are calmer at <10km/h approximately 29% of the time and increasing in frequency in the afternoon to 10 -20km/h and calm only 15% of the time (Figure 8).

Figure 7 Return period of different rainfall events including 24-hour, 48-hour and 72-hour rainfall events for the MCO region (BOM, 2014)
2. Site Topography

The MCO mining lease area consists of gently undulating land interspersed with hills up to a height of approximately 250m. Outside of the mining lease, steep hills rise to a height of 350m. A topography map of the site and surrounds is included in Appendix A of this document.

3. Geology

3.1 Regional Geology

The MCO project area is located along the northern margins of the Permian Bowen Basin. In a study conducted in 2010, Mining One identified that a basal unit, the Lizzie Creek Volcanics, is a sequence of intermediate to felsic volcanics which hosts the four Silver Hill deposits and several prospects in the area.

The Lizzie Creek Volcanics are almost flat-dipping, up to 10° dip, and unconformably overlie the Lower Carboniferous Glen Alpine Adamellite, which outcrops to the north and dips at approximately 20° to 25° to the south beneath the volcanic sequence. The contact with the granite / adamellite includes a significant amount of buried topography. The volcanics are intruded by several east-west trending andesite dykes.

To the south, the Lizzie Creek Volcanics are overlain by the Permo-Triassic Mt Windsor Rhyolite / Trachyte which form higher topography. The four deposits and various prospects lie around the northern margin of this topography and also conform to structural trends. (Mining One, 2009).
3.2 Local Geology and Mineralisation

In their feasibility study of 2009, Mining One Consultants identified that the Silver Hill geology broadly comprises:

- The basal Glen Alpine adamellite (granite), overlain by
- Felsic to intermediate volcanics, then by feldspathic tuffs, overlain by
- The Silver Hill target horizon, which comprises felsic volcanic breccias and volcaniclastics with lesser flow-banded rhyodacites, overlain by
- A polymict volcanic breccia, overlain by
- A sequence of andesitic volcanics, overlain by
- A sequence of shales, sandstones and fine-grained volcanic lacustrine sediments.

The mineralisation at Silver Hill is hosted within the rhyodacitic volcanics and volcaniclastics, and therefore is a gently dipping broadly stratiform orebody. Mineralisation is associated with intense silica alteration which has masked much of the original rock fabric and structure, and has generally produced a very hard crystalline rock. Late sulfide introduction and associated fracturing resulted in veining, crackle veins, microveive and disseminated sulfides. The mineralisation is a high-sulfidation style with complex copper and silver mineralogy. High-grade zones occur in association with east-west striking and steep northerly dipping stockworks (Mining One, 2009).

4. Hydrology

4.1 Regional Hydrology

The chosen route of the pipeline traverses a number of creeks and drainage features along the path from the MSWD to the Burdekin River. From where the pipeline corridor follows the existing mining lease from the MSWD to the King Creek substation, this area is predominantly flat and not prone to flooding.

From the King Creek substation to the Burdekin River, the pipeline corridor follows an access road. The pipeline will traverse the same water courses traversed by the road.

There is one low lying area of potential flooding mapped along the route of the pipeline corridor. However, given the pipeline itself will be buried, the risk of temporary flooding across areas of the pipeline corridor in the wet season is not considered to pose a risk of environmental harm through interference with the operation of the pipeline.
4.2 Shallow Groundwater Systems

There are known shallow fractured groundwater aquifers underlying the MCO region. A shallow fractured groundwater aquifer expresses into King Creek in areas of low relief during dry season months, creating perennial pools. This interaction with shallow groundwater aquifers may allow for persistence of perennial pools in waterways along the path of the pipeline; however, this will not interfere with the operation of the pipeline and construction of the pipeline will have no environmental impacts on the mechanics of this surface to groundwater interaction. The potential impacts of the project on water are further addressed in the Guideline Response to EM963 – Application Requirements for Activities with Impacts to Water accompanying this EA amendment application.

5. Native Title

The MCO project area is located within the traditional homelands of the Birri People. The Birri People have a registered Native Title claim over the project (Claim No. QUD6244/98) and have an existing Indigenous Land Use Agreement for mineral exploration. A comprehensive field survey was carried out over the main MCO mining lease and across the corresponding power line corridor in 2004, and a total of 93 Aboriginal cultural heritage sites and values were recorded. These findings included stone artefact scatters, isolated artefact finds, scarred trees and a large (andesite) rock platform with axe grinding grooves.

Due to its previous anthropogenic land use, the MCO site maintains cultural heritage significance for indigenous people and communities for social, spiritual and historical reasons. Indigenous people must be effectively involved in decisions affecting their heritage, and in managing places meaningful to them. Land managers must respect the rights of indigenous people to make decisions about their own heritage.
Potential Impacts to Air

1. Guidelines

This section of the application to amend an EA aligns with EHP’s guidelines for Application Requirements for Activities with Impacts to Air (EM960). Environment impacts of air emissions associated with environmentally relevant activities in Queensland are regulated under the EPA 1994 and subordinate legislation including:

- Environmental Protection Regulation 2008
- Environmental Protection (Air) Policy 2008 (EPP (Air)).

2. Environmental Values

Under the EPP (Air), the following environmental values are listed to be enhanced or protected:

- The qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems.
- The qualities of the air environment that are conducive to human health and wellbeing.
- The qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property.
- The qualities of the air environment that are conducive to protecting agricultural use of the environment.

3. Land Tenure

3.1 Sensitive Receptors

MCO is a relatively isolated mining project. The closest townships are:

- Dalbeg – approximately 25km to the west of the mining lease,
- Collinsville – approximately 45km to the southeast of the mining lease,
- Gumlu – approximately 45km to the north northeast of the mining lease,
- Bowen – approximately 80km to the northeast of the mining lease.
The land surrounding the existing and proposed mining lease areas is used as low intensity cattle grazing land for beef cattle. There are a number of large beef cattle properties surrounding the lease, including Strathalbyn station, which is the underlying property of the proposed mining lease. Other stations surrounding the proposed lease include King Creek station, Desmond station, Johnny Cake station, Mt Wickham station, Spring Creek station, Strathmore station and Table Top station.

The nearest inhabited residences to the proposed mining lease and the coordinates of the locations of these sensitive receptors from the proposed pipeline corridor mining lease are outlined in Table 3. A map of these sensitive receptors is included in Appendix A of this report.

Table 3  Sensitive receptors along the course of the proposed pipeline corridor.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>EASTING</th>
<th>NORTHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt Carlton Mining camp</td>
<td>558483</td>
<td>7759214</td>
</tr>
<tr>
<td>Johnny Cake station homestead</td>
<td>541415</td>
<td>7741615</td>
</tr>
<tr>
<td>Desmond station homestead</td>
<td>540878</td>
<td>7742790</td>
</tr>
<tr>
<td>Table Top station homestead</td>
<td>559047</td>
<td>7749114</td>
</tr>
<tr>
<td>Mt Wickham station homestead</td>
<td>545572</td>
<td>7737648</td>
</tr>
<tr>
<td>Spring Creek station homestead</td>
<td>550678</td>
<td>7727403</td>
</tr>
<tr>
<td>King Creek station homestead</td>
<td>532327</td>
<td>7754306</td>
</tr>
<tr>
<td>Strathalbyn station homestead</td>
<td>533912</td>
<td>7759037</td>
</tr>
<tr>
<td>Strathmore station homestead</td>
<td>565463</td>
<td>7733105</td>
</tr>
<tr>
<td>De Salis station homestead</td>
<td>548254</td>
<td>7770890</td>
</tr>
<tr>
<td>Strathbogie station homestead</td>
<td>562650</td>
<td>7766794</td>
</tr>
<tr>
<td>Castleview station homestead</td>
<td>566567</td>
<td>7770249</td>
</tr>
<tr>
<td>Etonvale station homestead</td>
<td>581070</td>
<td>7764607</td>
</tr>
<tr>
<td>Glenalpine station homestead</td>
<td>583151</td>
<td>7758016</td>
</tr>
<tr>
<td>Curringa station (north) homestead</td>
<td>584218</td>
<td>7739495</td>
</tr>
</tbody>
</table>

As shown in Table 3, a number of sensitive receptors exist in the regional surrounds of the MCO mining lease and the proposed 8m wide mining lease for the pipeline corridor. The 14 homesteads and the mining camp included in Table 3 exist within a 40km radius of MCO. The homesteads vary in their proximity to the length of the pipeline corridor, but for the most part they are at least 10km from the nearest stretch of the pipeline.

The notable exception is Strathalbyn Station homestead, where the pipeline is set to originate from the proximity of the landholder’s existing pumping station. However, the Strathalbyn Station homestead hosts an existing pumping station and the landholder has been involved in full
consultation regarding this proposed project. The landholder is aware of potential impacts to the homestead from the proposed project and will remain in open communication with MCO regarding same.

4. Regional and Local Topography

In a regional context, MCO is located within the Lower Burdekin sub-catchment of the Burdekin River catchment. The Lower Burdekin Basin is relatively small (~ 9,292 sq km) and covers around 7% of the Burdekin Water Quality Improvement Plan (BWQIP) region. Common to most of the BQWIP basins, land use is dominated by grazing on native pastures. However, in contrast to the other Basins, approximately 12% of the land area is used for intensive agriculture (mostly irrigated sugar production), while around 9% is set aside for conservation and minimal use (NQ Dry Tropics, 2009).

The Lower Burdekin sub-catchment occupies eight per cent of the total Burdekin River catchment area. It is dominated by the Burdekin River, but also includes several other major waterways such as the Bogie River, Millaroo Creek and Expedition Pass Creek.

Locally, the MCO project is situated within the lower reaches of Herbert Creek catchment. Most of the land on the project site slopes gently towards Herbert Creek. The proposed mining lease runs from flat land into gently sloping landscape, through a low-lying potential flood plain area and on to the Burdekin River. The proposed width of the mining lease for the pipeline corridor is 8m.

There are no mining activities or surface water containment facilities proposed for the pipeline corridor mining lease. No release of affected water will be leaving the proposed mining lease. In the unlikely event of a leak in the pipeline, the water released will be clean river water. Leaks will be detectable through monitoring the flow and performance of the pumping equipment. In the event that monitoring of flow and performance of the pumping equipment suggests the possibility of a leak, an inspection of the pipeline corridor will be undertaken to check for areas of surface expression.

The simple construction of the pipeline should allow for prompt rectification of any leaks. The release of clean water at the site of a leak is unlikely to have a negative environmental impact on the receiving environment.

5. Air Quality

5.1 Ambient Air Quality

The ambient air quality for the region is considered relatively good, with acceptable levels of pollutants for the majority of time. Air quality of the region is largely influenced by bushfires and controlled burning, where localised and short term degradation of the air quality occurs due to smoke and dust (ASK 2010).
5.2 Dust Deposition

MCO is located within a rural environment and background dust levels are typical of those in rural areas. Ambient dust deposition levels were determined by AARC during the application period for ML10343 (AARC 2010). Based on the dust deposition data, an average background deposition rate of 1.1g/m²/month is assumed for the area based on data recorded from April to August 2010 (refer to Table 4).

<table>
<thead>
<tr>
<th>DATE</th>
<th>DUST DEPOSITION MEASUREMENT – TOTAL SOLIDS G/M²/MONTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>D1</td>
</tr>
<tr>
<td>April – May</td>
<td>1.3</td>
</tr>
<tr>
<td>May – June</td>
<td>1.3</td>
</tr>
<tr>
<td>June – July</td>
<td>1.3</td>
</tr>
<tr>
<td>July – August</td>
<td>0.7</td>
</tr>
<tr>
<td>Overall Average</td>
<td></td>
</tr>
</tbody>
</table>

6. Potential Impacts to Air Quality

6.1 Construction

Construction of the entire 39km length of the pipeline corridor is envisaged to take 18 weeks. Given the linear nature of the pipeline, construction activity will shift in proximity to each of the sensitive receptors, and is likely to be in closest proximity for only a short period of time while the pipeline is being laid in that area.

The potential impacts to air quality from the construction phase of the pipeline include:

- Dust generation through excavation disturbance,
- Road dust from machinery using the access roads the pipeline is intended to run alongside,
- Exhaust emissions from construction machinery including carbon monoxide (CO), minor quantities of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), Volatile Organic Carbons (VOC) and PM₁₀ from vehicles operating on the proposed mining lease during construction.

Construction phase machinery is likely to include:

- 1 x grader
- 1 x dozer
- 1 x excavator
- 1 x light vehicle for site access

6.2 Operation

Exhaust Emissions

The pipeline itself will not deliver any emissions to air during its operational period. The potential impacts to air quality that may come from the operation of the associated pumping infrastructure are as follows:

- Exhaust emissions from pumping machinery,

- Exhaust emissions from light vehicles, including carbon monoxide (CO), minor quantities of sulfur dioxide (SO$_2$), nitrogen dioxide (NO$_2$), Volatile Organic Carbons (VOC) and PM$_{10}$ from light vehicles operating on the proposed mining lease during routine inspections of the pipeline corridor and/or pumping station.

Odour

Operation of the underground pipeline on the proposed mining lease is not expected to emit any odours. Odour impacts to sensitive receivers will not occur. Operation of the pumping infrastructure at the Burdekin River is not considered to emit odours. While river sediment has potential to be odorous, the pumping pontoon system is designed to ensure pumps take water from the surface of the river without disturbing the river bed.

Dust

The operation of the pumping infrastructure and underground pipeline will not emit any dust. Land exposed during the construction of this infrastructure will be promptly revegetated and the pumping infrastructure will be erected on a concrete surface, limiting dust emissions from the area.

The main source of dust in the area would be from light vehicles along the access roads where the pipeline will be buried. The impact of dust generated by a routine inspection light vehicle from MCO along the pipeline corridor will be minor and not considered likely to impact on the aesthetics of the receiving air quality environment.

Gaseous Emissions

The main source of gaseous emissions from the proposed pipeline corridor would be from working light vehicles utilising the area for maintenance purposes. These emissions would be minor and cannot be considered to have a major impact on the aesthetics of the environment.
Visibility Reducing Particles and Light

No visibility reducing particles or light will be emitted from the operation of the pumping infrastructure and subterranean pipeline. As a result, this is not likely to impact on the aesthetics of the environment.

Air Dispersion Modelling

As this activity is unlikely to have a high impact to air quality it is not feasible to conduct air dispersion modelling.

7. Mitigation of Potential Impacts to Air Quality

7.1 Construction

In order to mitigate the potential impacts to air quality from construction, the following steps will be taken:

- All construction machinery will be maintained and operated as per the manufacturer’s instructions.

- Construction activity will adhere to the program for continuous improvement for the management of dust resulting from mining activities, as per condition B3 of EA EPML00982113, which states “The holder of this environmental authority must implement and maintain dust control procedures and measures that incorporate a program for continuous improvement for the management of dust resulting from the mining activities”.

- This will include activities such as the progressive excavation and backfill of each section of the pipeline trench followed by grading and reseeding to reduce dust,

- Use of water for dust suppression if considered necessary.

- Emissions during construction activity will also remain within the limits for ambient air quality for particulates and depositional dust as outlined in Schedule B, Table B2 of the EA, reproduced in this document in Table 5.

Table 5 Schedule B, Table B2 (Ambient Air Quality Limits – Particulates and Depositional Dust) from the MCO EA EPML00982113

<table>
<thead>
<tr>
<th>CONTAMINANT</th>
<th>LIMIT TYPE</th>
<th>AIR QUALITY LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulates (PM$_{10}$ fraction)</td>
<td>24 hour average</td>
<td>50 µg/m$^3$</td>
</tr>
<tr>
<td>Total suspended particles</td>
<td>Annual mean</td>
<td>90 µg/m$^3$</td>
</tr>
<tr>
<td>CONTAMINANT</td>
<td>LIMIT TYPE</td>
<td>AIR QUALITY LIMIT</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Arsenic and its compounds measured as the total metal content in PM$_{10}$</td>
<td>Annual mean</td>
<td>6 ng/m$^3$</td>
</tr>
<tr>
<td>Cadmium and its compounds measured as the total metal content in PM$_{10}$</td>
<td>Annual mean</td>
<td>5 ng/m$^3$</td>
</tr>
<tr>
<td>Manganese and its compounds measured as the total metal content in PM$_{10}$</td>
<td>Annual mean</td>
<td>160 ng/m$^3$</td>
</tr>
<tr>
<td>Nickel and its compounds measured as the total metal content in PM$_{10}$</td>
<td>Annual mean</td>
<td>20 ng/m$^3$</td>
</tr>
<tr>
<td>Vanadium and its compounds measured as the total metal content in PM$_{10}$</td>
<td>24 hours</td>
<td>1.1 µg/m$^3$</td>
</tr>
<tr>
<td>Lead and its compounds measured as the total metal content in PM$_{10}$</td>
<td>Annual mean</td>
<td>0.5 µg/m$^3$</td>
</tr>
<tr>
<td>Dust deposition as total insoluble solids</td>
<td>Monthly concentration</td>
<td>4 g/m$^2$/month</td>
</tr>
</tbody>
</table>

### 7.2 Operation

Due to the very limited impact to air quality proposed by the operation of the Burdekin River pumping infrastructure and pipeline, complex management practices are not considered necessary for this application. All pumping equipment will be operated and maintained as per the manufacturer’s instructions. Routine maintenance inspections will be conducted as appropriate. This is considered to be sufficient to ensure the operation of the pumping infrastructure does not impact air quality. In the event that a complaint is lodged, an investigation into the source of the air quality issue will be undertaken in a timely manner.
Potential Impacts to Noise

1. Guidelines

This section of the application aligns with EHP’s guidelines for application requirements for activities with noise impacts (EM962). Environmental impacts of noise emissions in Queensland are regulated under the EPA 1994 and subordinate legislation including:

- Environmental Protection Regulation 2008
- Environmental Protection (Noise) Policy 2008 (EPP (Noise)).

2. Environmental Values Relating to Noise

Environmental values relevant to noise impacts include public amenity, public safety and ecological health. Environmental values prescribes under the EPP (Noise) 2008 include:

- The qualities of the acoustic environment that are conducive to protecting the health and biodiversity of the ecosystem,
- The qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following:
  - Sleep,
  - Study or learn,
  - Be involved in recreation, including relaxation and conservation.
  - The qualities of the acoustic environment that are conducive to protecting the amenity of the community.

3. Potential Impacts to Noise

The potential impacts to noise from the construction and operation of the proposed Burdekin River Pipeline will come from:

- Construction noise during the excavation of the pipeline trench,
3.1 Construction

The environmental objective of constructing the pipeline along the proposed mining lease will be to minimally disturb and promptly rehabilitate the disturbance area, in a way that protects the environmental values of the acoustic environment. This environmental objective will be met through aligning with the EHP impact to noise guidelines by ensuring the machinery used in construction has been properly maintained and operates only within acceptable construction hours of 7am – 6pm, Monday to Saturday. Construction of the entire pipeline is expected to take a maximum of 18 weeks, and given the linear nature of the pipeline, construction activity in closest proximity to each of the individual sensitive receptors will last for a far shorter timeframe.

3.2 Operation

During operation, the length of the subterranean pipeline will be undetectable and will have no impacts to noise.

The pipeline pumping station will co-locate at the landholder’s existing pumping station at the Burdekin River. The pumping infrastructure is envisaged to operate on a continuous 24 hour basis with approximately 90% utilisation throughout the year. The pumping station is a two-part infrastructure solution with river extraction pumps and bank-based pumps working in tandem. The extraction pumps will be Sakuragawa UCF-2206 model heavy duty dewatering pumps. Two of these pumps will sit on a pontoon structure over the river, sucking water from the surface of the river. The riverbank pumps will be Stalker 80x50 – 315 CRI/CRI/SS model pumps.

Given there is already pumping infrastructure in this location which has been owned and operated by the landholder in the past, the upgraded infrastructure is not envisaged to create environmental impacts to noise that would exceed the criteria as described in the EPP (Noise) 2008.

4. Mitigation of Potential Noise Impacts

4.1 Construction

In order to mitigate potential impacts to noise from construction activity, the following steps will be taken:

- Construction activity will be limited to a time period from 7am-6pm, Monday to Saturday, as per noise limits set out in Table F1 of Schedule F of the site’s EA (reproduced in Table 6 of this report),
- All construction machinery will be properly maintained and operated.
4.2 Operation

In order to mitigate potential impacts to noise from operational activity, the following steps will be taken:

- All pumping equipment will be installed, operated and maintained as per the manufacturer’s instructions,

- Noise levels from pumping will adhere to the limits outlined in schedule F of the site’s EA, and specifically those included in Table F1 – Noise Limits (reproduced in Table 6 of this report).

- As per schedule F2 of the EA, in the event of receipt by the regulator of a complaint that is neither frivolous nor vexatious regarding noise generated in conducting the licenced activity, MCO will take action to ensure that it is no longer an unreasonable noise.

- In the event that the proponent receives a direct noise complaint regarding noise generated during operation of the pumping station, the proponent will record the complaint on the site’s in-house complaints register and initiate investigation into the complaint within 48 hours of receipt.

Table 6 Schedule F, Table F1 (Noise Limits) of EA EPML00982113

<table>
<thead>
<tr>
<th>Noise Level dB(A) measured as:</th>
<th>SENSITIVE OR COMMERCIAL PLACE</th>
<th>Monday to Saturday</th>
<th>Sundays and Public Holidays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>7am to 6pm</td>
<td>6pm to 10pm</td>
</tr>
<tr>
<td>LA10, adj, 10 mins</td>
<td>BG + 5dB</td>
<td>BG + 5dB</td>
<td>BG + 3dB</td>
</tr>
<tr>
<td>LA1, adj, 10 mins</td>
<td>BG + 10dB</td>
<td>BG + 10dB</td>
<td>BG + 5dB</td>
</tr>
</tbody>
</table>
Potential Impacts to Land

1. Overview

The full extent of the proposed project’s potential to impact on environmental values for land are addressed in the response to the guideline *EM961: Application Guidelines for Projects with Impacts to Land*, which accompanies this application. Environmental impacts to land associated with environmentally relevant activities in Queensland are regulated under the EPA1994 and subordinate legislation including the Environmental Protection Regulation 2008. Impacts to land may also occur through notifiable activities, if occurring on the proposed land. No notifiable activities, as outlined in Schedule 3 of the EPA 1994, will be occurring on the proposed mining lease.

In summary, the proposed Burdekin River Pipeline project comprises applying for a mining lease of approximately 24km in length from the boundary of the King Creek substation to the Burdekin River. This lease will connect to MLA10375 which in turn abuts ML10343, the central mining lease to the MCO. The lease will be 8m wide, and the total area of the proposed lease will be approximately 19.2ha.

2. Soil and Land Suitability

2.1 Soil and Land Use

A full description of the soil types along the route of the Burdekin River Pipeline is included in a technical Soil and Land Use appendix that accompanies the response to the guideline *EM961: Application Guidelines for Projects with Impacts to Land*, which forms part of this application.

In order to ascertain the potential impacts of the project on the soil and land use of the region, desktop, field and laboratory assessments were conducted across the proposed pipeline area to provide a thorough assessment of the soil characteristics present. The field sampling effort was governed by density for test pits outlined in the *Australian Soil and Land Survey Handbook* (Gunn et al. 1988). A number of soil test pits were sampled along the proposed pipeline and the results from two survey sites were laboratory assessed. The physical and chemical characteristics of these soils allow an indication of the soil variation and an assessment of the soil’s potential to pose any management issues during construction.

Overall, results of the desktop study, field assessment and laboratory analysis show that sodicity is the primary characteristic of soil samples from test pits SS04 and SS11. This sodicity is shown to increase with depth in both soil sample locations. Sodic soils can pose potential construction problems as their clay fraction rapidly disperses on contact with water, making soils unstable and erosion prone (McKenzie et. al., 2004). However, given the pipeline excavation depth is estimated at 300mm and the trench will be promptly backfilled, the sodicity of the soil along the pipeline route is not considered to pose a risk of environmental harm during construction of the pipeline.
Using classification contained in McKenzie et al. (2004), fertility status of both soil samples is moderate with SS04 and SS11 containing suitable nutrient concentrations; however, SS04 contains slightly lower fertility status as potassium availability is low and the organic carbon content is considered small. In order to retain nutrient concentrations, soil will be stockpiled and redistributed promptly during the construction of the pipeline. This is considered to be the best approach to maximise the potential for reseeding from within the seed bank of the excavated soil. The lower soil fertility demonstrated by SS04 may indicate the potential for low soil fertility regions to exist along the proposed area for pipeline construction.

2.2 Revegetation

The construction of the pipeline is envisaged to complete before the onset of the wet season. With the intention being to excavate, lay the pipeline, backfill and grade the refilled trench promptly, revegetation of the disturbed area is expected to take place from within germination the seed bank of the soil without the requirement for additional reseeding or the application of fertilisers.

Revegetation of the pipeline disturbance is expected to progress through natural processes during the wet season 2014/15, and a progress inspection should be conducted by the proponent at the end of the wet season in 2015 to ensure the pipeline area has returned to vegetated condition.

2.3 Erosion and Sediment Control

The risk for erosion caused by the sodicity and additional characteristics of the soil will be managed through prompt backfilling and grading after the pipe is laid to minimise environmental disturbance. This methodology limits the soil’s exposure to erosional forces by completing the pipeline construction in intervals which allow the full completion of a single length of the pipeline at a time before constructing the next length.

Watercourse erosion is also limited by constructing the pipeline along existing access roads, negating the need for land/vegetation clearance. Where the pipeline is expected to traverse a waterway or drainage channel, concrete stumps will be bedded in on either side of the waterway above the riparian areas and the pipeline will be suspended across the waterway using wire rope, preventing any direct impacts to the stream.

An Erosion and Sediment Control Plan will be developed for implementation during project phases.

2.4 Strategic Cropping Land

Strategic Cropping Land (SCL) is defined as land that is, or is likely to be, highly suitable for cropping because of a combination of the land’s soil, climate and landscape features. SCL is highly valued and protected by legislation in Queensland. The Queensland government has compiled trigger maps for SCL in the state to assist in the identification and preservation of SCL and prevent the loss of SCL to development.
As of July 2014, the protection of Strategic Cropping Land in Queensland falls under the Regional Planning Interests Act 2014 (RPI 2014). The proposed pipeline corridor intersects an area of mapped potential strategic cropping land (SCL) along the 24km route from the King Creek substation to the Burdekin River. A map detailing that intersection is included in Appendix A of this report.

The area of mapped potential SCL is just over 10.2ha, and the intersection of the pipeline lease with the mapped potential SCL is minimal, taking place across the southern boundary of the mapped area.

Under Division 2, Section 22 of the RPI Act 2014, the proposed project is not considered to pose an impact to SCL, based on exemptions outlined in the Act as follows:

Table 7: Reproduction of Section 22, Division 2 of the RPI Act 2014

Division 2 Exempt resource activities

22 Exemption – agreement of land owner

(1) This section applies if the authority holder for a resource activity is not the owner of the land (the land owner).

(2) The resource activity is an exempt resource activity for a priority agricultural area or area that is in the strategic cropping area if—

(a) either—

(i) if a conduct and compensation agreement requirement applies to the authority holder under a resource Act—

(A) the land owner and the authority holder are parties to a conduct and compensation agreement under the resource Act, other than because of the order of a court; and

(B) the authority holder has complied with the requirement; or

(ii) the land owner has voluntarily entered into a written agreement with the authority holder and the carrying out of the activity is consistent with the agreement; and

(b) the activity is not likely to have a significant impact on the priority agricultural area or area that is in the strategic cropping area; and

(c) the activity is not likely to have an impact on land owned by a person other than the land owner.

(3) For subsection (2)(c), a resource activity has an impact on land if the activity has an impact on—
Under Section 22 (2)(a)(ii) of the RPI Act 2014, in the case of the Burdekin River Pipeline project, the landholder has voluntarily entered into a written agreement with MCO, the authority holder, regarding the acquisition of the landholder’s water licence. The carrying out of the pipeline construction and operation activities are consistent with that agreement. The interaction between this proposed project and mapped potential SCL will subsequently not be referred to DSDIP as it is considered to be exempt under the RPI Act 2014.

3. Flora and Fauna

3.1 Impacts to General Matters of State Environmental Significance

Full details of potential impacts to flora and fauna species are addressed in the Flora and Fauna Technical Report included as an appendix of the response to the guideline EM961: Application Guidelines for Projects with Impacts to Land, which accompanies this application. The following sections provide a summary of potential impacts to Matters of State Environmental Significance (MSES).

Connectivity

Based on field observations and vegetation mapping, the habitat connectivity of the area around the proposed Burdekin River Pipeline is generally high, with large, continuous areas of eucalypt woodland. Some of the riparian vegetation is partially fragmented due to disturbance from cattle grazing and weed infestation.

The existing corridors and roads dissect areas of remnant vegetation, but the given the open nature of the surrounding habitat, it is unlikely that these corridors have a significant impact on the value of connectivity. Much of the pipeline will be constructed within existing clearings for other linear infrastructure. Movement of fauna and other factors affecting biodiversity (such as genetic flow) in the area are unlikely to be any further impacted by the negligible loss of habitat associated with the construction phase of the proposed pipeline.

It is unlikely that the function of this value will be compromised at any scale, and as such, biodiversity offsets for this value are not required under the QEOP.

Essential Habitat

The nearest area of Essential Habitat mapped under the VMA is approximately 15km southeast of the study area. This area of essential habitat is associated with a record of the Squatter
Pigeon (southern), but given the substantial distance (>15km) from all mapped areas of essential habitat, the proposed pipeline corridor is unlikely to have any impact on these areas. Further details on potential impacts to the Squatter Pigeon are discussed below.

Vegetation Communities

Wherever possible the pipeline corridor has been located in areas where the vegetation communities present have already been cleared for existing linear infrastructure. Any disturbance to remnant vegetation will involve very minimal clearing on the edge of existing corridors.

All remnant vegetation communities observed within the study area have a least concern status and are common in the local area and throughout the region. Vegetation assessments included a 50m buffer surrounding the proposed pipeline corridor to ensure that all communities within close proximity to the proposed pipeline were considered. No REs with a higher conservation status were present within this buffer area.

The RE code and status of the communities observed does not equate to an ESA or MSES, and therefore no environmental offsets are required under the QEOP for disturbance to these communities.

Watercourses, Riparian Vegetation and Wetlands

The proposed pipeline corridor crosses a number of first and second order streams along the proposed route, as well as the more significant King Creek, which is a fourth order stream. The proposed route utilises areas of existing disturbance from other linear infrastructure and at the location of all crossing there are previously cleared areas that can be utilised to minimise disturbance to remnant riparian vegetation.

Given the prevalence of low stream order watercourses in the area, it is not possible to avoid intersecting these watercourses. However, the use of previously disturbed areas will significantly reduce impacts to remnant riparian vegetation. Where any additional clearing is required, it will be restricted to less than 10 metres width. On the basis of this approach, significant impacts to remnant riparian vegetation will be avoided. The construction and operation of the proposed pipeline route will not result in increased fragmentation of any regional ecosystems, it will not cause a substantial change in the species composition or ecological function of any regional ecosystems.

There are no mapped referrable wetlands in close proximity to the proposed pipeline corridor, with the nearest of these occurring over 1.5 kilometres north of the proposed route. There is one area mapped as a vegetation management wetland containing RE 11.3.27 near where the pipeline meets the Burdekin River. At this location the proposed pipeline follows an existing powerline and access road route, where there is existing disturbance to this RE. Vegetation clearing, exotic plant species invasion and construction of the road and a small dam have significantly modified the vegetation composition and hydrology of the area. Consequently, the area within the existing corridor is considered as non-remnant vegetation with very low, if any, wetland values. The construction of the pipeline within this existing corridor will not cause a significant modification to any wetland area or the hydrological regime of any wetland. The
habitat and lifecycle of native species that may be dependent on any wetlands in the surrounding area will not be affected.

One of the most significant threats to biodiversity in the riparian zones and wetland areas is the existing prevalence of invasive pest plant species, including several declared class 2 species. To reduce the further spread of these species, careful pest plant control measures will need to be implemented particularly during, and shortly after, the construction phase for the proposed pipeline. Further details of pest plant management strategies are provided in the response to the guideline *EM961: Application Guidelines for Projects with Impacts to Land*, which accompanies this application.

### 3.2 Potential Impacts to Conservation Significant Species

**Black Ironbox - *Eucalyptus raveretiana***

Black Ironbox (*Eucalyptus raveretiana*) is listed as vulnerable under the EPBC Act and the NC Act. As discussed previously it is present in varying densities along the banks of King Creek where the proposed pipeline crossing is located, as well as along the banks of some smaller tributaries at that location.

The prevalence of Black Ironbox along King Creek is such that following the course of the existing disturbance presented by the access road provides the best opportunity to avoid impacts to this species. All Black Ironbox individuals at this location are mature trees that occur between the top of banks of the watercourse, mostly along the margins of the stream bed.

The proposed method for constructing the pipeline across the watercourse at this location is to embed concrete stumps on either side of the waterway and suspend the pipeline across the watercourse using a wire rope suspension system anchored in the concrete stumps. The concrete stumps will be located outside the top of bank on each side of the watercourse.

Overall, disturbance to all Black Ironbox trees can be avoided and impacts to Black Ironbox habitat will be extremely minimal. It is unlikely that there will be a significant impact on this species because the proposed development will not:

- Lead to a long term decrease in the size of the population,
- Reduce the area of occupancy of the species,
- Cause further fragmentation to the existing population,
- Reduce gene flow among populations or disrupt the reproductive output,
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Although all Black Ironbox trees can be avoided by design, there are some management strategies that should be implemented in order to ensure that direct impacts are avoided:

- The pipeline mining lease and authorised disturbance areas should be clearly marked to ensure disturbance is restricted to these areas only.
- All Black Ironbox trees within 20 metres of the mining lease should be clearly marked with flagging tape to identify their presence and ensure they are not disturbed.

- Project inductions and toolbox meetings should include:
  - Information on the significance of this species, including its protection under State and Commonwealth legislation,
  - Details of where it is known to occur within the project area,
  - Measures that have been undertaken to signify its presence within the project area (e.g. flagging tape).

Squatter Pigeon (Southern) – *Geophaps scripta scripta*

The southern subspecies of the Squatter Pigeon (*Geophaps scripta scripta*) is listed as vulnerable under the EPBC Act and the NC Act. The Squatter Pigeon (southern) was observed at four locations along the proposed corridor, and in all cases, individuals were observed on the ground either by the side of the access road amongst pasture grasses or beside a farm dam near the existing ML for the power line corridor. Suitable foraging habitat for this species is abundant in the study area and throughout the broader area.

Given the reasonably small scale and temporary nature of the disturbance, and the fact that existing areas of disturbance will be utilised for most of the proposed pipeline route, it is unlikely that this minimal disturbance to potentially suitable habitat will have a significant impact on the Squatter Pigeon (southern). Indeed, there are vast areas of similar habitat present in the surrounding area.

The greatest threat to the Squatter Pigeon as a result of the proposed development is interaction with vehicles due to increased traffic volumes along the access roads during construction. The following controls will be implemented to minimise the likelihood of death or injury from vehicle strike:

- Site inductions or toolbox meetings will include information about sensitive aspects of the environment in which personnel are working, including the risk of injury or death to Squatter Pigeons from vehicles.

- Due to the ground dwelling nature of the species, all vehicles will remain on existing access tracks and roads wherever possible.

- Clearing works will be carried out in a sequential manner that allows fauna to escape to natural areas away from construction works.

- Speed limits will be implemented as appropriate for the condition of the roads and access tracks on site. A limit of 50km/hr is recommended for well-developed access roads and a limit of 20km/hr is recommended within 200m of the dam where Squatter Pigeons have been regularly observed.
With the aforementioned controls in place to minimise the threat from interaction with vehicles, it is considered unlikely that there will be a significant impact to the Squatter Pigeon (southern) as a result of the proposed project. Impacts to the species habitat will be of a relatively small scale and temporary nature and it is unlikely that the project will result in a long term decrease in the size of the population or reduce the area of occupancy for the species.

### 3.3 Pest Species

Pest plant species are prevalent along the route of the proposed pipeline, particularly in riparian areas. Several species that are common along the route are declared class 2 species under the Land Protection (Pest and Stock Route Management) Act 2002 and are listed as Weeds of National Significance. The prevalence of these weeds in some riparian zones, such as along the Burdekin River and King Creek, represents a significant threat to local biodiversity. Whilst the disturbance width of the proposed pipeline corridor will be reasonable narrow, careful management will be required to avoid spreading these invasive species to other locations along the route. Details of proposed pest plant management strategies are provided in the response to the guideline EM961: Application Guidelines for Projects with Impacts to Land, which accompanies this application.

The use of existing linear infrastructure corridors will significantly reduce any additional fragmentation of the landscape. The construction and operation of the proposed pipeline is not expected to significantly modify the landscape in any way that would increase the occurrence of pest animal species or the threat they represent to local biodiversity values.
Potential Impacts to Water

1. Overview

The pipeline project is located within the Bogie River sub-catchment and the Burdekin River (below dam) sub-catchment. The pipeline will traverse 11 creeks, suspended from wire rope to minimise impacts to each waterway. The pipeline is positioned to avoid any impact to surrounding wetlands of importance and wild rivers. The creeks located in the pipeline project area are ephemeral, however, they can have groundwater expressions during the dry season.

2. Protection of Environmental Values

Environmental values of surface water and groundwater in the area include aquatic ecosystems, irrigation, stock watering, human consumption, primary recreation, secondary recreation, visual recreation, drinking water and cultural and spiritual values (NQ Dry Tropics3 2009, AGE 2010).

The risk of impact to environmental values from the construction and operation of the pipeline project comes from potential erosion, sediment loading, changes to creek flow, unplanned leaks or discharges from equipment and disturbance of recreational activity posed by construction along the pipeline corridor or water extraction at the Burdekin River. There will be no impacts to cultural and spiritual water values.

Potential impacts will be mitigated or managed to protect the environmental values of the Bogie River and Burdekin River sub-catchments. MCO will continue to operate under the current approved REMP, Water Management Plans and Erosion and Sediment Control Plan.

Rehabilitation of the site will be promptly undertaken after construction, in accordance with the current approved Plan of Operations and Rehabilitation Plan. Rehabilitation of the pipeline area may include respreading topsoil and grading to allow re-stabilisation of soils and germination from within the existing seed bank and to minimise erosion and sediment from entering the watercourses within the project area.

Full details of the potential impacts to environmental values for water posed by the proposed project are included in the Response to the Application Guideline for Projects with Impacts to Water, included as part of this EA Amendment application.

3. Creek Crossings

The proposed pipeline crosses a total of 20 creeks. The creek crossings involve the installation of concrete plinths with wire rope strung between them, from which the pipeline will be suspended. These plinths will be set back from the riparian zones in each case, and will have...
sufficient height to ensure the pipeline sits above the flood level of the creek. A preliminary sketch of the design of the proposed creek crossings is visible in Figure 9.

Figure 9: Typical creek crossing design for the Burdekin River Pipeline.
References


Appendix summary

Appendix A  Burdekin River Pipeline Maps

List of maps in this appendix:
Site Location
Land Tenure and Cadastre
Topography and Hydrology
Flood Prone Overlay
Sensitive Receptor Locations
Strategic Cropping Land
Appendix A

Burdekin River Pipeline Maps
MOUNT CARLTON OPERATIONS

BURDEKIN WATER PIPELINE
EA AMENDMENT

LAND TENURE AND CADASTRE

Legend
- Mine Lease
- Towns
- Roads
- Burdekin River
- Proposed Infrastructure
- Proposed Pipeline

Land Tenure and Cadastral Boundaries
- Freehold
- Lands Lease

Notes:
- Mine Lease boundary extracted from ml.shp, State of Queensland 2014.
- Towns from IQ_OLD_PLACE_NAMES_GAZETTEER.shp, State of Queensland.
- Roads from ROAD_NETWORK_Highway and ROAD_NETWORK_MainRoad, State of Queensland.
- Burdekin River extracted from: IQ_VM_WATERCOURSE_MAP_100K_250K.shp, State of Queensland.
- Proposed pipeline sourced from client (28524-02301.dwg).
- Imagery sourced through ArcGIS Basemaps.

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 15/09/2014
Scale: 1:100,000 at A3

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
Total area of mapped potential SCL: 10.5 ha
Narrowest band of SCL: < 25 m
Area of mapped SCL intersected by pipeline and buffer: 2.34 ha

Notes:
Land Tenure and Cadastre from IQ_QLD_CADASTRETENURE_DCDB_CUR <Whitsunday Regional Council, 2014>.
Aerial imagery from ArcGIS basemaps.

Legend
- SCL mapped inside pipeline buffer
- Pipeline with a 50m buffer
- Trigger Map: Strategic Cropping Land
- Cadastre

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 7/07/2014