



MINERALS EXPLORATION | INDUSTRIAL MINERALS | ENERGY RESOURCES | TENEMENTS MANAGEMENT

Exploration Licence 7430

REVIEW OF ENVIRONMENTAL FACTORS

FERNDALE COAL PROJECT EXPLORATION DRILLING PROPOSAL STAGE 1

**Project commissioned by
Loyal Coal Pty Ltd**

**Jeff Randell, BSc (Hons), MAIG
Technical Manager**

**Geos Mining
Wednesday, 31 March 2010**

Table of Contents

CONTACT INFORMATION	4
1. INTRODUCTION	5
1.1 LOCALITY	5
1.2 DESCRIPTION OF THE ACTIVITY	7
1.3 JUSTIFICATION OF THE ACTIVITY	10
1.4 EVALUATION OF ALTERNATIVES	10
2. PLANNING CONTEXT	10
2.1 LICENCES AND APPROVALS REQUIRED	10
2.2 ZONING	10
2.3 STAKEHOLDER CONSULTATION.....	11
3. EXISTING ENVIRONMENT.....	12
3.1 LANDFORMS AND GEOLOGY	13
3.2 CLIMATE.....	15
4. ENVIRONMENTAL IMPACTS AND MANAGEMENT.....	15
4.1 AIR	15
4.2 WATER	16
4.3 SOILS.....	17
4.4 NOISE AND VIBRATION	19
4.5 FLORA AND FAUNA.....	20
4.6 CHEMICAL AND HAZARDOUS SUBSTANCE MANAGEMENT	21
4.7 CONTAMINATED LAND.....	22
4.8 WASTE MINIMISATION AND MANAGEMENT	22
4.9 NATURAL RESOURCE USE.....	22
4.10 IMPACT ON THE COMMUNITY.....	23
4.11 VISUAL ASSESSMENT.....	23
4.12 HERITAGE	24
4.13 LAND USE	25
4.14 CUMULATIVE ENVIRONMENTAL IMPACTS	25
4.15 SUMMARY OF MITIGATION MEASURES	25
DUST.....	25
WATER	25
SOILS.....	25
NOISE.....	26
FAUNA/ FLORA.....	26
CHEMICAL AND HAZARDOUS MATERIALS	26
CONTAMINATED LAND.....	26
WASTE	27
IMPACT ON COMMUNITY.....	27
VISUAL ASSESSMENT	27
HERITAGE	27
LAND USE	27
5. REHABILITATION WORKS.....	27
6. SUMMARY OF IMPACTS AND CONCLUSIONS	28
7. REFERENCES	39

List of Photos

Photo 1: Typical view of EL7430.....	8
--------------------------------------	---

List of Figures

Figure 1: General site location	5
Figure 2: Landholding within EL7430 with proposed boreholes.....	6
Figure 3: EL7430 with proposed boreholes and existing infrastructure	9
Figure 4: Zoning E3 (red cross hatch) and proposed borehole locations.....	11
Figure 5: Google Earth image of EL7430	13
Figure 6: Geology of EL7430 showing Wollombi Coal Measures	14
Figure 7: Proposed Drill Sites showing topography	18
Figure 8: Proposed Drill Sites with 1000m buffers around buildings.....	19
Figure 9: Threatened Species Sightings in Relation to Proposed Drillholes ..	29

List of Tables

Table 1: Proposed borehole locations	7
Table 2: Major coal seams expected to occur within EL7430	15
Table 3: Risk Assessment of Proposed Programme and Mitigation	21
Table 4: Threatened Species Search Results.....	29
Table 5: Threatened Species, Threats and Recovery Plans.....	38

Disclaimer

While every effort has been made, within the time constraints of this assignment, to ensure the accuracy of this report, Geos Mining accepts no liability for any error or omission. Geos Mining can take no responsibility if the conclusions of this report are based on incomplete or misleading data.

Geos Mining and the authors are independent of Loyal Coal Pty Ltd and have no financial interests in Loyal Coal Pty Ltd or any associated companies. Geos Mining is being remunerated for this report on a standard fee for time basis, with no success incentives.

Contact Information

Applicant: Loyal Coal Pty Ltd
Address: c/- Geos Mining, Suite 301, 68 Alfred St, Milsons Point NSW
2061

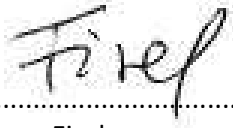
Phone: 02-99296868

Email: jrandell@mineralgeos.com

REF preparation: Jeff Randell, BSc (Hons), MAIG

Land Title: Exploration Licence 7430

Loyal Coal Pty Ltd warrants that the information contained in this document is a true and accurate statement.

Signed: Date: 29 March 2010
Andrew Firek,
Managing Director, Loyal Coal Pty Ltd

1. INTRODUCTION

Coalworks Limited through its subsidiary Yarrawa Coal Pty Ltd has joined the Monaro Coal consortium which won the Yarrawa EOI from the NSW Government tender process. The tenement was applied for in the name of Monaro Mining NL but was transferred to Monaro Coal Pty Ltd. Coalworks owns 90% of Loyal Coal Pty Ltd (formerly Monaro Coal Pty Ltd) and Loyal Coal is now the holder of EL7430. This Review of Environmental Factors (“REF”) has been prepared on behalf of Loyal Coal upon review of existing data and in general accordance with the Monaro Expression of Interest (“EOI”) and Coalworks EOI dated 21/11/2008.

Loyal Coal proposes to drill an initial 30 boreholes to evaluate coal throughout EL7430. The aim of this programme is to gather enough data to be able to estimate an Inferred/ Indicated Resource which is compliant with the JORC Code. Dependent upon the results of this programme, further boreholes may be proposed at a later date.

1.1 Locality

The Ferndale Project (previously known as Yarrawa Project) (EL7430) is located 6km SW of the town of Denman, which is approximately 30km SW of Muswellbrook and 53km W of Singleton (Figure 1) in the Hunter Valley of New South Wales. EL7430 comprises 3742 Ha and is covered by the Singleton S15601 1:250,000, Muswellbrook 9033 and Howes Valley 9032 1:100,000 topographic maps.

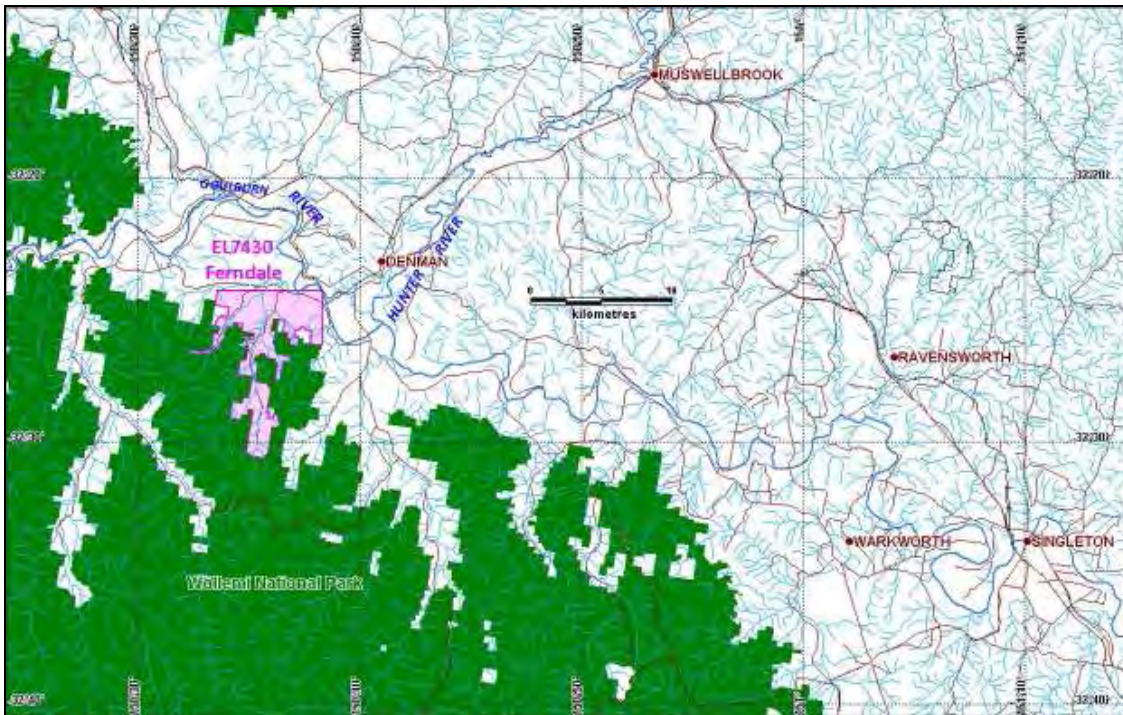


Figure 1: General site location

There are 139 land parcels of the Muswellbrook Local Government Area within EL7430 and a number of landowners are affected by the proposed drilling programme (Figure 2).

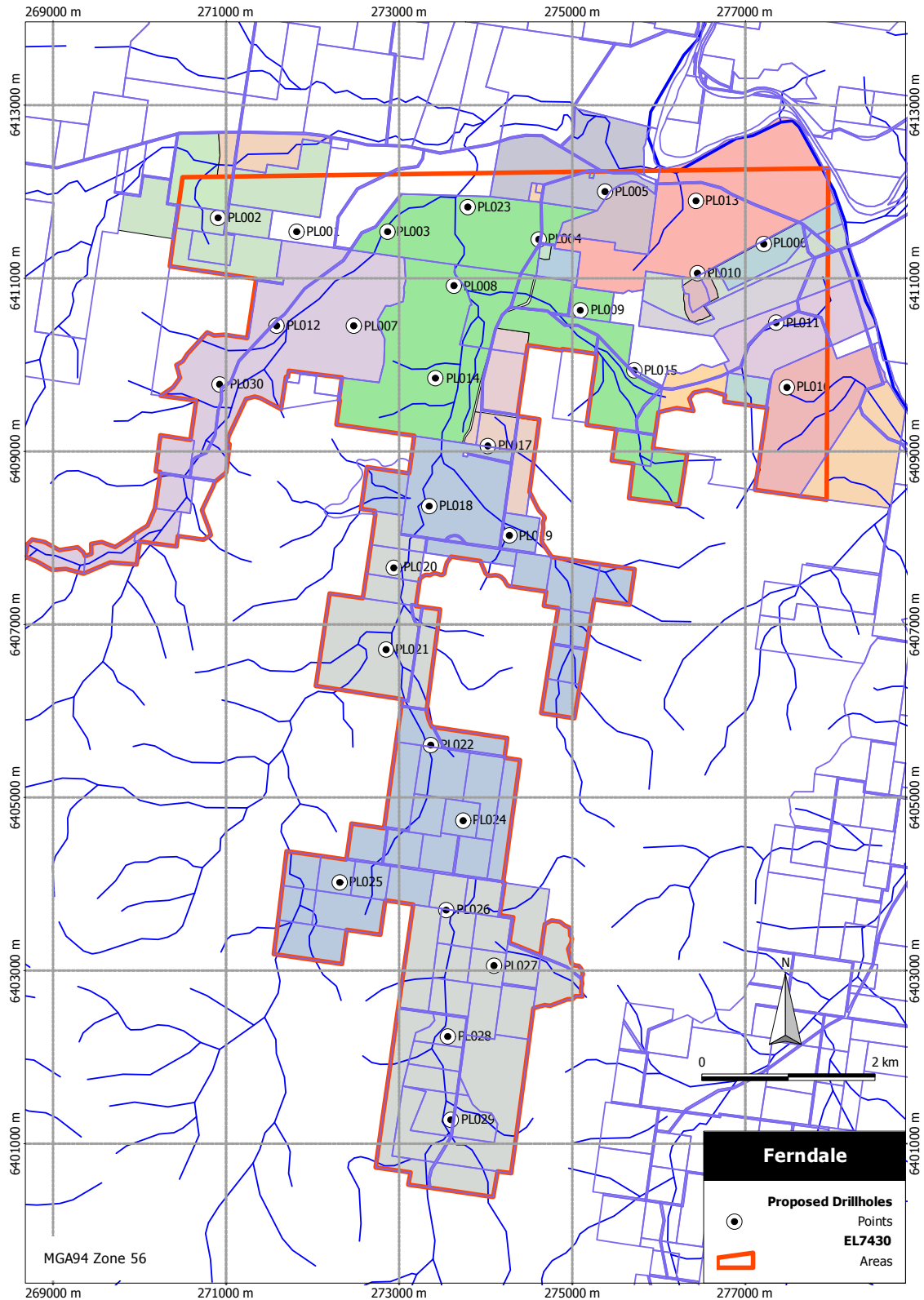


Figure 2: Landholding within EL7430 with proposed boreholes.

Note: Colour shading indicates property boundaries.

1.2 Description of the activity

The aim of the Stage 1 drilling programme is to define the depth, thickness and quality of the Newcastle Coal Measures (“NCM”) in EL7430 such that an Inferred/ Indicated Resource which is compliant with the JORC Code can be estimated.

1.2.1 DRILLING

Stage one of exploration drilling comprises 30 boreholes located throughout the licence. The approximate positions of the proposed boreholes are presented in Table 1 and shown on Figure 2. The positions may require adjustment due to cultural or other factors, though changes will be minimised where possible.

Planned Borehole	Easting (MGA94 Zone 56)	Northing (MGA94 Zone 56)	Planned Borehole	Easting (MGA94 Zone 56)	Northing (MGA94 Zone 56)
1	271814.2	6411538	16	277479.1	6409742
2	270900.4	6411701	17	274026.8	6409063
3	272860.6	6411540	18	273347.4	6408368
4	274603.3	6411453	19	274271.7	6408020
5	275382.1	6412001	20	272936.6	6407657
6	277215.2	6411399	21	272841.8	6406709
7	272475.2	6410446	22	273363.2	6405602
8	273630.9	6410914	23	273796.6	6411823
9	275101.2	6410627	24	273742.4	6404733
10	276449.8	6411056	25	272305.5	6404021
11	277352.7	6410485	26	273545.7	6403701
12	271583.7	6410450	27	274100.5	6403051
13	276428.4	6411891	28	273562.4	6402240
14	273427.2	6409842	29	273600.7	6401269
15	275716.9	6409931	30	270925.2	6409769

Table 1: Proposed borehole locations

Stage one comprises thirty (30) HQ (core diameter 61mm) partly cored holes drilled to a nominal depth of 500m below ground surface to identify any economic coal measures within EL7430.

The area is being used for agriculture (Photo 1). Unsealed public roads occur throughout the drilling area. Access to drill sites generally will require minimal track work. Any track work would involve a backhoe using a blade to remove the vegetation (grass) and any minor undulation, rocks and debris. Each drill site will be cleared (approx. 20m x 20m pad) where necessary. Excavated material will be separated into topsoil and subsoil, if applicable. If any vegetation is present it will be avoided where possible.

The maximum area of clearing for the 30 drill sites is 1.2ha but as indicated, most of the area is gently sloping, cleared land requiring minimal site preparation. In addition, Loyal

Coal commits to leave no more than 10 holes open at any one time. Hole sealing and rehabilitation will be carried in campaigns to achieve this. Clearing for protection from bush fire is likely not to be required although each site will be assessed at the time of drill preparation.



Photo 1: Typical view of EL7430

It is envisioned that drilling would be conducted over a 11 hour day generally 7am to 6pm, including weekends where the landowner has specifically approved such hours. If this permission is not granted, drilling will be limited to 7am to 6pm on weekdays, 8am to 1pm on Saturdays and no drilling on Sundays, or as agreed by the particular landowner. Drilling crew and site staff will be accommodated in a motel in Muswellbrook, located approximately 30km NE of the site. Access to the site is from Yarrawa Road (sealed) onto farm tracks (unsealed). Daily commutes would be in 4x4 vehicles. The rig and associated trucks would only be on the public roads for approximately 2 days during mobilisation to site and demobilisation from site. A water truck may be required to make one or more daily trips on public roads dependant on local access to water (see water source below).

Some minor track preparation will be required from existing farm tracks but almost all will be through and along the edges of cropping/ grazing paddocks. Figure 3 shows the location of all proposed holes in relation to vegetation (heavy/ light), existing tracks, homesteads and dams. It can be seen that all drill holes will be collared in open areas which are represented by either cropped or grazing land. Some holes are located adjacent to heavy bush but all are in close proximity to existing tracks with hole PL019 being the furthest

away (~1km). Access to this and other similar sites will be possible without the construction of any tracks; rather, fence lines and any minor farm tracks will be utilised.

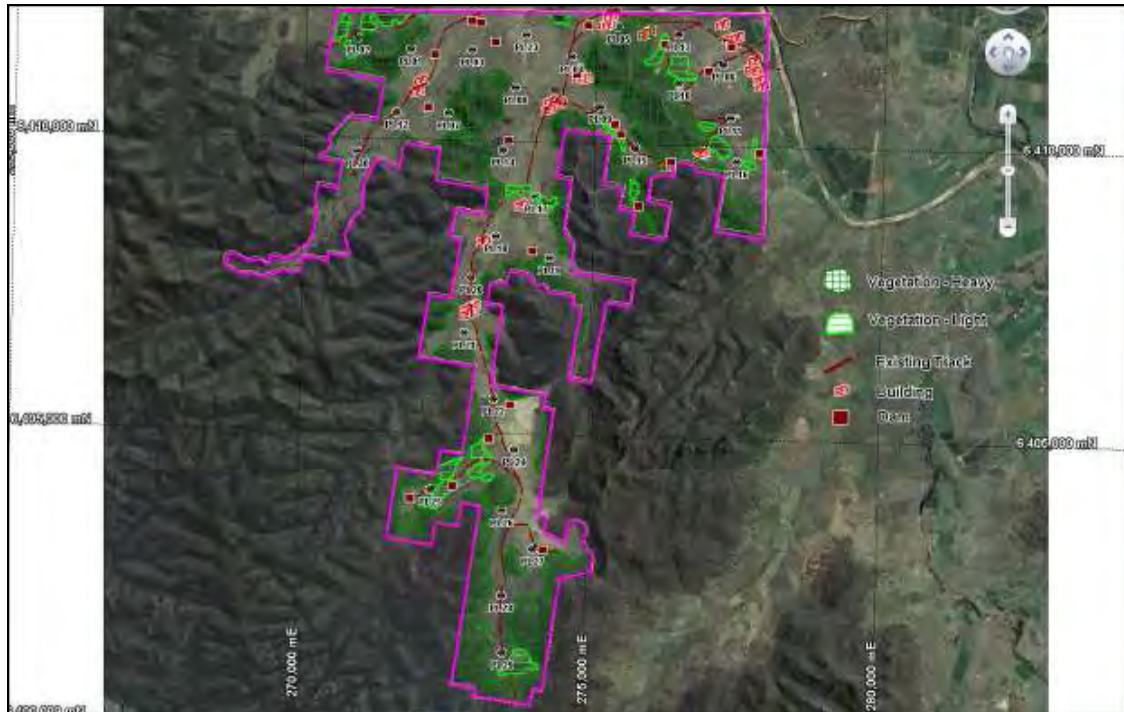


Figure 3: EL7430 with proposed boreholes and existing infrastructure

Drilling will commence on approval of this REF and is expected to take approximately 220 days, including subsequent geophysical logging.

Mitigation measures applied in regard to the drilling include:

- Site disturbance will be kept to a minimum as most drill sites are located within paddocks or adjacent to unsealed roads and fence lines.
- Existing tracks will be used wherever possible to access the drill sites. In other cases, temporary tracks will be formed across cleared paddocks
- No trees will be cut in this project.
- Fauna will be unharmed and no domestic animals will be brought on site.
- Garbage bins will be provided and littering will not be allowed.
- Any water extracted as well as drilling fluid medium will not be discharged into creeks but contained in portable tanks.
- Drillholes will be grouted and capped (see Section 5) and drill sites rehabilitated progressively with no more than 10 holes left open at any one time.

1.3 Justification of the Activity

Drilling to obtain representative samples that can be analysed is the only method applicable to be able to satisfy the requirements of the JORC Code which will enable an Inferred/ Indicated Resource to be estimated. On the basis of this resource estimate, further drilling may be justified to upgrade the resource category to a point where a feasibility study may be completed to determine the economic viability of the project.

1.4 Evaluation of Alternatives

The only method of testing for subsurface existence and quality of coal seam is to drill exploration holes aimed at intersecting overburden formations and the coal bearing sequences. Surface mapping, seismic reflection and other forms of geophysical exploration are only able to provide an interpretative view of geological parameters and the discovery of coal relies on drilling.

Drilling of these holes is part of the DII-Minerals approved commitment work program for EL7430, as detailed in the Monaro and Coalworks tenders.

2. Planning Context

2.1 Licences and Approvals Required

This proposal satisfies the definition of an activity under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for which a REF is required for determination by the determining authority, the Department of Industry and Investment.

The State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 allows development for the purposes of mineral exploration to be carried out without consent, subject to certain exemptions.

Loyal Coal Pty Ltd is the registered holder of EL7430 and under the terms of this authority, has the right to all the conditions and provisions contained in the Mining Act 1992. One such condition is the agreement for access to land covered by the authority. The proposed programme has been discussed with some affected landowners and others are being contacted. Access agreements will be negotiated as appropriate.

Under Section 5A of the EP&A Act, consideration must be given to the effect on threatened species, populations or ecological communities or their habitats by way of the 'seven part' test.

Loyal Coal Pty Ltd is also required to consult the register of Critical Habitat under the requirements of the Threatened Species Conservation Act 1995.

2.2 Zoning

The proposed drilling area is located in the Muswellbrook LGA and as most of the land is zoned as rural, the application of SEPP 2007 overrides any zoning controls. However, some lots within the tenement are zoned 'E3 Environmental Management' in which all industry is

prohibited (Figure 4). Access to these areas may require special consent from the Muswellbrook Shire Council.

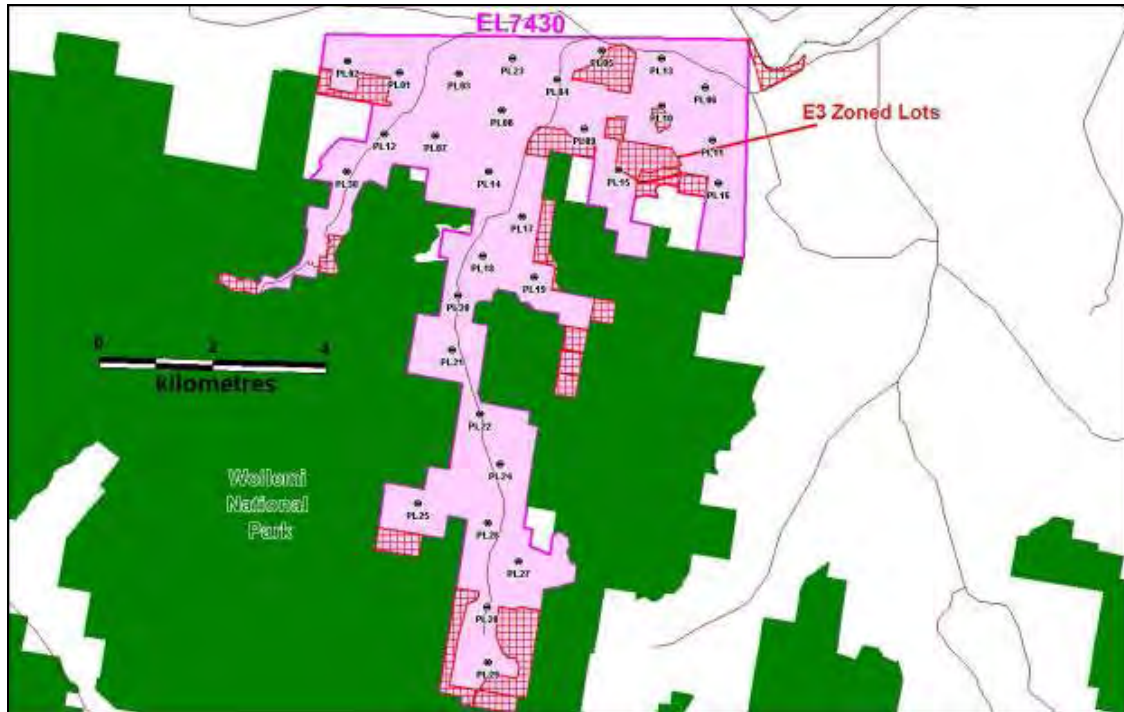


Figure 4: Zoning E3 (red cross hatch) and proposed borehole locations

2.3 Stakeholder Consultation

Key stakeholders relevant to the proposed drilling include:

Department of Industry and Investment – as the licence has only just been granted very little previous exploration has been completed by the current titleholders.

Department of Water and Energy – no discussions have been held with the regional hydrologist pending a requirement to obtain permits for new piezos and pump bores that may be required.

Muswellbrook Shire Council - as the licence has only just been granted no contact with the council has yet been made.

Landowners– most landholders have been informed of the project and others are being contacted currently.

NSW Aboriginal Land Council – all exploration will be conducted on either freehold land or road reserve. The local aboriginal body will be contacted to carry out site clearances prior to commencement of drilling.

Community - ongoing community consultation is planned and will continue as the project develops.

General public – Coalworks has not made any public announcements concerning this project.

3. Existing Environment

The Ferndale Project EL7430 occurs within the Sydney Basin bioregion (Hunter Sub Region) and is part of the Hunter/ Central Rivers Catchment Management Board (CMB) area. This bioregion is dominated by rolling hills, wide valleys, with a meandering river system on a wide flood plain. Sandstone plateaux adjacent to into wide valleys with sandy alluvial fill dominate the area around Yarrawa. The project is adjacent to the northern margin of the Wollemi National Park (Figure 5).

The proposed disturbance area is located primarily in the catchment of Kings (Yarrawa) Creek and extends into the catchment of the Goulburn River. The Goulburn River joins the Hunter River approximately 10kms downstream. The proposed drilling programme will disturb a minor proportion of the Yarrawa Creek catchment and is unlikely to impact channel stability.



Figure 5: Google Earth image of EL7430

3.1 Landforms and Geology

The land within the northern portion of EL7430 is flat to gently sloping agricultural land with occasional hills up to approximately 150m elevation punctuating the landscape. The land is currently used for horse studing and cattle farming on numerous private farms. Vegetation is scarce on the flats with bushland prevalent on the hills within the Wollemi National Park.

The geology of the Yarra area is predominantly sedimentary with younger Triassic sediments forming the hilltops overlying the Permian coal bearing sediments. The valley flats are comprised of Quaternary to recent alluvial sediments. The main coal seams in the Yarra area are within the Permian Wittingham and Wollombi Coal Measures (Table 2, Figure 6). Loyal Coal's primary target will be low to medium ash seams in the Wittingham Coal Measures. Seams within the overlying Wollombi Coal Measures are typically high ash and exist at shallow (open-pittable) depths in the northeast of the area.

Unit	Seam	Thickness (m)	Estimated Depth (m)
Wollombi	Great Northern	0.5 – 3.5	<100m
Wollombi	Fassiferen	0.5 – 4	<150m
Wollombi	Abbey Green	0.5 – 3.5	80 - 180m
Upper Wittingham	Whybrow	1.5 – 4.5	150– 250m
Upper Wittingham	Wambo	0.5 – 2.5	170– 250m
Upper Wittingham	Whynot	1 – 4	200– 300m
Upper Wittingham	Blakefield	0.5 – 2.5	200– 320m
Middle Wittingham	Piercefield	0.5 – 3.5	380 ->500m
Middle Wittingham	Vaux	2 – 4	400 ->500m
Middle Wittingham	Bayswater	2 – 9	400 ->500m

Table 2: Major coal seams expected to occur within EL7430

3.2 Climate

The Denman area experiences mild winters and warm wet summers. Mean temperatures range from approximately 10.6° C to 25.2° C. Annual mean rainfall is 640.2 mm, with the maximum of 76.9 mm occurring throughout the year. The heaviest rainfalls usually occur during December, January and February (Elders , 2009).

Plant growth is most likely vigorous in summer but can occur all year round, although germination may be limited to the period from spring to early autumn.

4. Environmental Impacts and Management

4.1 Air

There are two potential impacts on air quality from the operations and these are related to dust emission from use of dirt access roads and dust and exhaust emissions generated by the drilling operations.

4.1.1 MITIGATION MEASURES

Exhaust emissions from the drilling rig and associated plant should not lead to significant deterioration of air conditions on or adjacent to the site. Should any plant or machinery begin to emit large black diesel smoke operations will cease until the plant can be repaired.

Depending on road and weather conditions, the dust generated by the mobilisation of the drilling and ancillary equipment to and from a location would be small to moderate. Given the small number of vehicle movements over the program, the mobilisation of rig equipment to and from the locations is not expected to have more impact than the normal road movements within the district, and is not believed to present a significant environmental impact. A speed limit of 30km/hr would be issued as a guideline for driving on dirt roads to reduce dust generation during hot dry and windy conditions.

The majority of the drilling being conducted will be diamond drilling which produces no dust. However the installation of a precollar and casing may involve using an air driven percussion method. Minor amounts of dust may be produced before a diverter can be installed to contain the dust. Water may be injected as an alternative method.

4.2 Water

The proposed disturbance area is located primarily in the catchment of Kings (Yarrawa) Creek and extends into the catchment of the Goulburn River. The Goulburn River joins the Hunter River approximately 10kms downstream. The proposed drilling programme will disturb a minor proportion of the Yarrawa Creek catchment and is unlikely to impact channel stability.

4.2.1 MITIGATION MEASURES

All meteoric water will be directed around the location through proper drainage so that water does not flow from adjacent areas onto the location or from the location onto adjacent areas. Drill sites will not be sited closer than 150m to any watercourse to mitigate any potential from flooding and therefore contaminating the watercourse.

All liquid waste and cuttings resulting from drilling and completion operations will be collected in appropriate liquid and solid waste containers and will be moved and disposed of after the operations. The drilling mud will be mixtures of water and bentonite and no particular mitigation activity is planned. Drilling fluids are composed of natural ingredients, mainly bentonite which is not classified as a hazardous material. Bentonite is not considered a pollutant of aquifers as it will tend to seal around the hole rather than infiltrate into the aquifer.

A portable tank will be used for drill mud circulation and pits will not be constructed. Dams or bores located in the vicinity of each hole will be utilised for the estimated 10 m³ of drilling fluids required. Approval will be sought from the landholder before drilling for access to water from dams or bores located close to the location. Should landholders not

provide access then the water may have to be obtained from public supplies and trucked to site.

During the drilling programme subsurface waters and multiple aquifers are anticipated and procedures adopted will be as provided for in “EDG01 Borehole Sealing Requirements on Land: Coal Exploration”. All intersected potential aquifers intersected will be sealed down to the next aquitard by an approved grouting mixture and records will be kept of depths, hole diameter and grouting method. At completion of each hole, all casing will be removed, where possible and each hole will be grouted to surface or to 15m above the top aquifer. The final grouting will be depth tested to ensure that all aquifers are sealed.

4.3 Soils

Within EL7430 the main soil types are most likely to be clay and loam soils associated with the alluvial plains of the Hunter Valley in addition to sandy soils and scree from the Narrabeen Sandstone plateaus.

For the proposed drilling programme some site preparation may be required due to the slope of the local topography (Figure 7). However, all sites are on gentle slopes within grazing land and any disturbance will be minimal. No trees will be cut.

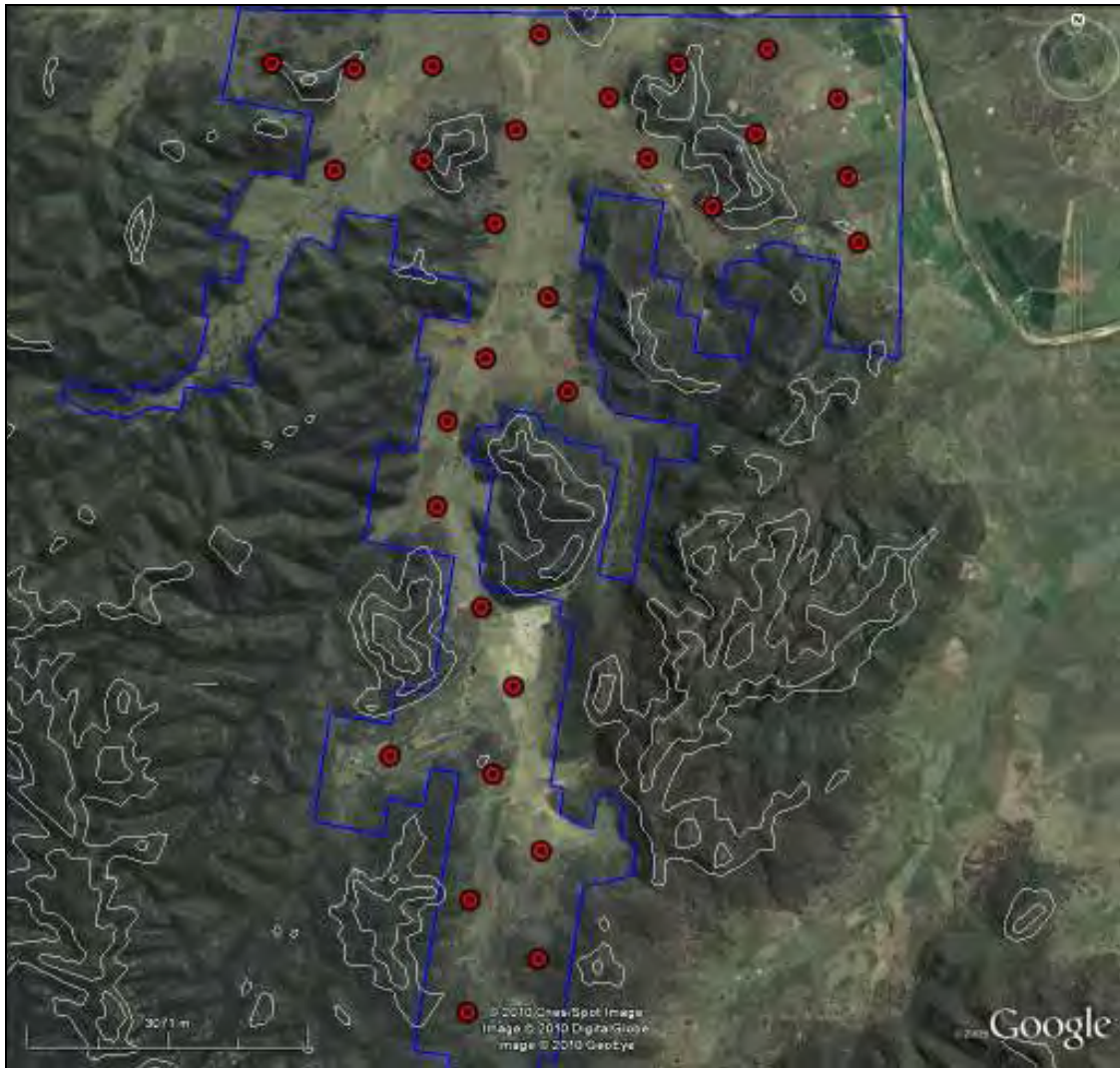


Figure 7: Proposed Drill Sites showing topography

4.3.1 MITIGATION MEASURES

At the completion of the drilling operations, the drillholes will be plugged and abandonment procedures will be implemented.

The site rehabilitation process will include:

- replacement of stockpiled topsoil
- return of natural/previous land contours
- reseeding if required in consultation with landholders

All sites will be inspected by the geologist in charge following rehabilitation to ensure that all rehabilitation work has been completed successfully. Any necessary remediation will be carried out promptly following this inspection.

4.4 Noise and Vibration

The proposed programme will generate noise as a result of:

- drilling activity
- movement of trucks and vehicles

All equipment used for mobilisation and powering of the drilling rig uses mufflers on the prime movers. The muffling of the engines combined with the distance from habitation (>300m) and towns and the limited duration of the drilling and completion of operations is unlikely to create any significant noise impacts for residents.

4.4.1 MITIGATION MEASURES

It is not anticipated that there will be any significant noise impacts for residents in the area, however the following measures will be undertaken:

- identification of all potentially affected rural residences (Figure 8) within 1000m of the drill sites
- notification of all affected residences and other parties in advance of the activities commencing. Consultation with each affected landholder will be carried out to determine any limitations on hours of operation or any concerns with regard to current operations.
- noise and vibration monitoring will be undertaken subject to the nature of any expressed and written concerns and according to NSW Environment, Climate Change and Water guidelines.

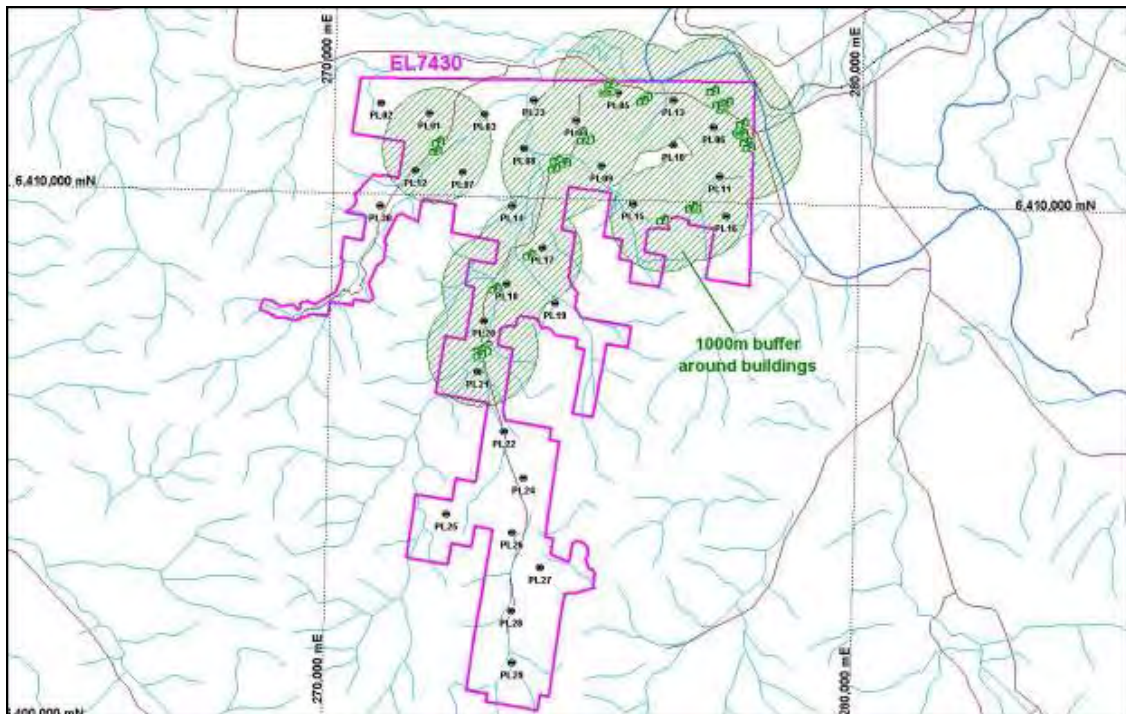


Figure 8: Proposed Drill Sites with 1000m buffers around buildings

4.5 Flora and Fauna

The Ferndale EL7430 is located approximately 5km south of the Manobalai Nature Reserve and the hills forming the boundaries of the licence are bush covered and recognised habitats for native flora and fauna.

A number of searches have been carried out (see Section 6 for details):

- A search of the Department of Environment and Conservation Atlas of NSW Wildlife to determine which threatened flora and fauna listed under the Threatened Species Conservation Act 1995 have been recorded in the area. The results indicate that 7 faunal species (5 avian and 2 mammals) and 1 floral species are listed as either vulnerable or endangered.
- A search of the Department of Environment, Water, Heritage and the Arts website to determine whether any nationally listed threatened species are likely to occur within the project area. This also included world heritage properties, national heritage places and wetlands of international significance. A number of threatened species are listed and these habitats have been accurately located to determine any impact on the project area.
- Obtaining the list of Endangered Ecological Communities using the Department of Environment and Climate Change web site. The list includes those known and protected to occur within the Hunter/ Central Rivers CMA and Hunter Sub-region. There are 13 identified Endangered Ecological Communities within the Hunter Sub Region of which only 3 may be considered relevant to the Ferndale Project Area.
- Compilation of the list of potentially threatened aquatic species through the NSW Fisheries web site. There are 6 endangered species and 2 vulnerable species recognised within the freshwater environment within the region but none are considered relevant to the Ferndale Project area.

4.5.1 MITIGATION MEASURES

The likelihood of disturbing actual or potential habitat associated with species sighted in the area is low because the scale of clearing occurring locally and the presence of remnant vegetation suitable for habitation by birds and mammals. Drillhole sites will be laid out to avoid disturbance to undisturbed remnant vegetation. Reconnaissance will be carried out prior to commencing drilling to confirm this and to ensure there will be no disturbances to habitats. Section 6 discusses additional mitigation measures.

There is a potential for the introduction of weeds and pests to the area via the entry of vehicles and other equipment. This possibility will be minimised by:

- All vehicles and plant will be washed down prior to entry to the exploration area to remove all soils and organic matter
- Reconnaissance of all proposed drill sites to identify any weeds present
- Determination of any additional measures to be taken, including the wash down of vehicles between drill sites.

In assessing the impact of the proposed programmes in relation to Part 5A of the Environmental Planning and Assessment Act 1979, Table 3 sets out a summary of the criteria and their assessment. Section 6 qualifies this summary in more detail.

Assessment factor	Fauna	Flora
A. Proposed Programme		
Adverse effect (risk of extinction) on threatened species	Minimal risk	Minimal risk
Adverse effect (risk of extinction) on endangered population	Minimal risk	Minimal risk
Adverse effect (risk of extinction) on endangered ecological community	Minimal risk	Minimal risk
Habitat likely to be removed, modified, fragmented either due to programme or in longer term	No risk	Minimal risk
B. Proposed Mitigation		
Likelihood of adverse effect on habitat	Nil	Nil
Consistent with actions of a recovery plan ¹	Yes	Yes
Part of a key threatening process ²	No	No

Table 3: Risk Assessment of Proposed Programme and Mitigation

4.6 Chemical and Hazardous Substance Management

Protection of the surface and subsurface environment is an important consideration in drilling activities. In the case of subsurface waters and aquifers, the holes will be backfilled with proper grout sealing the base and the top of the aquifer. The drilling fluid is composed of natural ingredients mainly bentonite which is not classified as hazardous material. Bentonite is not considered a pollutant of aquifers as it will tend to seal around the hole rather than infiltrate into the aquifer.

4.6.1 MITIGATION MEASURES

Petroleum products and small amounts of chemical additives will be required to be kept on site. Diesel will generally be stored in an approximately 1000L fuel trailer and dispensed via electric or manual pump to minimise the chance of spills. All chemicals and hazardous

¹ See Part 4 of the Threatened Species Conservation Act 1995

² See Schedule 3 of the Threatened Species Conservation Act 1995

substances will be stored together in one location on the site. This should minimise the area of impacted soil should any of the substances leak. MSDS sheets will be held on site by the contractor. All handling and storage of chemical and hazardous substances will be in accordance with NSW and Commonwealth regulations.

Punctured hydraulic hoses are common whilst drilling. Upon noticing the punctured hose drilling operations will cease so as to minimise the spill of hydrocarbons. Impacted soils will be removed from site and disposed to an appropriate licensed facility.

4.7 Contaminated Land

The only potential pollutants on the site will be engine fuels and oils which are monitored regularly. Drilling additives acceptable for use are biodegradable or inert and the stabilisation/weight additive is a widely used farm fertiliser.

4.7.1 MITIGATION MEASURES

At each drilling site, strict environmental procedures will cover the recirculation of drilling fluids, provision of spill kits, constant monitoring of all activities and subsequent rehabilitation of the site.

Any spills of fuel or oil will be treated by removal of any contaminated soil and either treated on site (with the landowner's approval) or transported to a registered treatment facility. Spills will be reported in accordance with regulatory and licensing requirements.

Vehicles will be checked regularly for oil leaks.

4.8 Waste Minimisation and Management

Staff will be housed at accommodation in nearby towns.

Each drill site will create solid and liquid waste during drilling eg drill cuttings, drilling fluids and this will require treatment and/ or disposal.

4.8.1 MITIGATION MEASURES

All waste generated in the drilling sites will be collected and disposed of at the approved local council sites. Water based drilling fluids are contained within portable tanks on site to be later removed and treated as general waste. Domestic waste will be regularly collected in appropriate bins and in order to not attract vermin will be disposed of in a licensed waste management facility.

4.9 Natural Resource Use

The only demand on resources will be water for use in the preparation of drilling fluid. The quantity of water is estimated to be around 10,000 litres per drillhole. Water required will be obtained from local dams or bore holes approved by local landowners and/or the Muswellbrook Shire Council.

Any electricity requirements will be obtained from on-site generation.

4.9.1 MITIGATION MEASURES

No mitigation measures are required on the resource use.

4.10 Impact on the Community

The nearest community to the drilling sites is the township of Denman located approximately 6km NE of the closest proposed drill sites. There are no dwellings close to (within 300m) the drilling sites. Loyal Coal commits to ensuring that all drill holes are collared more than 300m from any dwelling, except as agreed by the landowner in writing. The proposed drilling program, which will be operated only during the day, will have minimal aural and visual impact.

4.10.1 MITIGATION MEASURES

Prior to the commencement of drilling, landowners will be consulted and advised of the planned activities. Any requests for rescheduling will be accommodated where possible. Immediate neighbours will also be advised of the impending programmes.

Access roads will be maintained in a condition satisfactory to the DII and landowners and where unfenced roads are present, all staff and contractors will be advised of the hazards associated.

Loyal Coal will set up a local community liaison programme to keep local stakeholders informed of programmes completed within EL7430.

The erection of temporary fencing around the drilling sites will avoid the potential for injury to livestock. In addition a cleared buffer will be maintained outside the drilling pad to maintain an effective barrier against bushfire. Liaison with the local rural fire service will be maintained and a fire control pump and hoses kept on site. Open fires will be prohibited and any necessary hot work procedures will be in place.

4.11 Visual Assessment

The regional landscape is dominated by wide vistas of flat lying rural properties to the north with scattered pastoral infrastructure such as bores, tanks, dams, fences, roads and homesteads. To the south, the imposing cliffs of the Wollemi National Park dominate the vista. The proposed drilling sites are visible from the nearest residences and some sites are close to public roads and other farm infrastructure.

The drilling period at each site is expected to average 7 days and all sites will be maintained in a tidy appearance during the drilling period and after the operation the sites will be rehabilitated.

It is anticipated that there will be minimal visual impact as a result of the proposed programmes.

4.11.1 MITIGATION MEASURES

Loyal Coal will monitor the appearance of all sites and respond quickly to any concerns or complaints from the general public or landholders.

4.12 Heritage

The Ferndale exploration drillholes are located on farm lands and grazing lands. The proposed sites possess no known special attributes in connection with aesthetic, anthropological, archaeological, architectural, cultural, scientific, social or other special values.

4.12.1 ABORIGINAL HERITAGE

An assessment of the existing information relating to the Aboriginal cultural heritage of the project area was undertaken and included a search of the NSW State Heritage Register and Inventory, the Australian Heritage Database, the Register of the National Estate and the Singleton and Muswellbrook Council LEP. No Indigenous Protected Areas have been recorded and no indigenous sites have been recorded in these databases within the project area.

4.12.2. OTHER CULTURAL HERITAGE

A search of European heritage sites did not indicate any listed occurrences within the project area although 14 records are located within the vicinity of the township of Denman (within 6kms of the project area).

4.12.3 MITIGATION MEASURES

While agricultural activities may have masked evidence of unrecorded artefacts, pre-drilling inspections will be carried out by Loyal Coal and representatives of the local Aboriginal community. A pedestrian foot survey will be required to identify and record all cultural heritage sites and relics within the proposed project site. DEC Site Cards will be completed as documentary evidence. Predictive modelling will be used to establish a theoretical model for site location and distribution within the project area. An impact assessment and identification of management and mitigation measures will also be required.

An assessment of potentially significant landscapes, based primarily upon topography will be undertaken. Landscapes with high potential for containing Aboriginal sites include riparian corridors, spur crests and cliff lines.

If a potential heritage site is located, work will cease at this location and a 100m buffer zone cordoned off. The relevant Local Aboriginal Land Council and DECC will be contacted and an appropriate plan developed to preserve the site.

4.13 Land Use

The proposed programmes will be carried out on properties which are used for cropping, horse studs and cattle grazing. Access compensation agreements have not been finalised with the affected landowners but cordial relations have been established and will be maintained as a matter of priority. All drill sites will be rehabilitated in accordance with agreed procedures.

4.13.1 MITIGATION MEASURES

Regular consultation with landowners and the broader community will be maintained to keep stakeholders informed and to attend to any queries or concerns.

Written access compensation agreements will be completed prior to any exploration commencing on the ground.

4.14 Cumulative Environmental Impacts

Due to the short duration of the drilling program and the strict controls conducted by the operator, no cumulative environmental impact is anticipated as a consequence of the drilling.

4.15 Summary of Mitigation Measures

Mitigation measures will include but not be limited to:

Dust

- suppression using a water cart,
- speed limits imposed when passing homesteads or on tracks

Water

- meteoric water directed around each drill site
- drill sites not constructed within 150m of any natural stream or watercourse.
- liquid waste and cuttings from drilling dried and buried (if permitted by landowner) or removed and disposed of responsibly.
- portable tanks will be utilised to contain all fluids.

Soils

- drillholes plugged and abandonment procedures implemented (Section 5)

The site rehabilitation process will include:

- replacement of stockpiled topsoil

- return of natural/previous land contours
- reseeding if required in consultation with landholders
- removal of any imported soil
- sites inspected following rehabilitation and any necessary remediation carried out promptly following this inspection.

Noise

- identification of all potentially affected noise recipients within 1000m of proposed sites
- notification of all affected residences and other parties in advance of the activities commencing
- agreement in regard to working hours, especially on weekends

Fauna/ Flora

- drillhole sites laid out to avoid disturbance to undisturbed remnant vegetation or faunal habitats
- vehicles and plant washed down prior to entry to the exploration area
- reconnaissance of all proposed drill sites to identify any weeds present

Chemical and Hazardous Materials

- determination of any additional measures to be taken
- Material Safety Data Sheets (MSDS) held by each contractor on site
- chemicals and any hazardous substances kept to the minimum
- transport, storage and handling of these substances in accordance with relevant NSW and/or Commonwealth legislation.

Contaminated Land

- strict environmental controls in force
- fuels and chemicals stored in temporary containment areas (bunds)
- spill kit available on site
- spills of fuel or oil treated by removal of any contaminated soil and either treated on site or transported to a registered treatment facility
- spills over 20L to be reported in accordance with regulatory and licensing requirements
- vehicles checked regularly for oil leaks.

Waste

- waste collected and disposed of at the approved local council sites
- water based drilling fluids contained within portable tanks and later removed and treated as general waste
- domestic waste regularly collected in appropriate bins and disposed of in a licensed waste management facility
- Recyclable waste will be separated for recycling where possible.

Impact on Community

- landowners consulted and advised of the planned activities
- immediate neighbours will also be advised of the impending programmes
- access roads maintained in a condition satisfactory to the DPI and landowners.

Visual Assessment

- appearance of all sites monitored
- concerns or complaints from the general public promptly attended to.

Heritage

- pre-drilling inspections carried out by relevant Aboriginal land council representatives
- If a potential heritage site is located, work will cease at this location and a 100m buffer zone cordoned off
- relevant Local Aboriginal Land Council and DECC contacted and appropriate plan developed to preserve the site.

Land Use

- regular consultation with landowners and the broader community.

5. Rehabilitation Works

Drillholes will be rehabilitated progressively with no more than 10 holes left open at any one time. There are two stages of rehabilitating drillholes, due to the requirement to keep holes open for geophysical logging. Where possible, holes are logged immediately after drilling is completed, and Stage 1 is then omitted.

Stage 1 - Holes Open:

- 80 to 100mm screw type PVC casing is placed down the hole
- PVC is left protruding above the surface
- surface around the hole will be tidied, and left in a safe condition.
- hole is geophysically logged within two weeks of completion of drilling

Stage 2 - Holes Backfilled

- Screw type PVC retrieved
- hole grouted to designated levels (cement with 5% bentonite, SG ~1.4). Holes will be backfilled to at least 1m above the top of any coal seam or any aquifer. Volumes will be calculated and the volume of grout placed down the hole will be recorded
- sand infilled to top of hole
- cement cap placed at least 0.5m below surface and below the level of ploughing
- surface around the hole will be restored, including backfilling any sumps.

Upon completion of the boreholes they will be grouted from the surface to prevent any chance of contamination of aquifers from overlying aquifers or the surface. Material accumulated in the tanks will be either left to evaporate dry or removed by vacuum and transported for appropriate disposal at a licensed facility. Any windrowed topsoil will be spread back over the pads and access tracks and seeded.

6. Summary of Impacts and Conclusions

Drilling of the proposed holes is an essential programme to determine the magnitude of any Inferred Resource which in turn will permit further drilling that potentially will enable pre-feasibility studies to be completed. Subsequent exploitation of any resources will increase the state's reserves and revenue and provide impetus for future exploration in the region.

Consultation with landowners is ongoing and is an essential part of identification of any additional impacts of this drilling. The proposed drilling activities and potential environmental impacts are common to previous drilling programmes by Coalworks and other companies in the Hunter Valley area. It is considered that any potential impacts can be successfully mitigated by carrying out the management strategies outlined in this document.

Part 5A of the EP&A Act (1979) lists seven factors to be considered and this assessment has concluded that:

Subsection (2) (a) "in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, "

- A search of the Department of Environment and Conservation Atlas of NSW Wildlife to determine which threatened flora and fauna listed under the Threatened Species Conservation Act 1995 have been recorded in the area. The results indicate that 7 faunal species (5 avian and 2 mammals) and 1 floral species are listed as either vulnerable or endangered and have been sighted in the area (Table 4 and Figure 9).

* Exotic (non-native) species						
Plants	Map	Scientific Name	Common Name	Legal Status	Count	Info
Rhamnaceae	<input type="checkbox"/>	Pomaderris queenslandica	Scant Pomaderris	E1	1	

* Exotic (non-native) species						
Aves	Map	Scientific Name	Common Name	Legal Status	Count	Info
Cacatuidae	<input type="checkbox"/>	Calyptorhynchus lathami	Glossy Black-Cockatoo	V	2	
Estrildidae	<input type="checkbox"/>	Stagonopleura guttata	Diamond Firetail	V	2	
Meliphagidae	<input type="checkbox"/>	Xanthomyza phrygia	Regent Honeyeater	E1	2	
Pomatostomidae	<input type="checkbox"/>	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	1	
Psittacidae	<input type="checkbox"/>	Glossopsitta pusilla	Little Lorikeet	V	1	

Mammalia	Map	Scientific Name	Common Name	Legal Status	Count	Info
Dasyuridae	<input type="checkbox"/>	Dasyurus maculatus	Spotted-tailed Quoll	V	2	
Phascolarctidae	<input type="checkbox"/>	Phascolarctos cinereus	Koala	V	1	

Table 4: Threatened Species Search Results



Figure 9: Threatened Species Sightings in Relation to Proposed Drillholes

Scant Pomaderris is a medium-sized shrub 2 - 3m tall. It is widely scattered but not common in north-east NSW and in Queensland. It is only known from a few locations on the New England Tablelands and North West Slopes, including near Torrington and Coolatai, and also from several locations on the NSW north coast. It is found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out in open areas away from its habitat. The species will not be placed at risk of extinction as it is widespread throughout NSW.

The Glossy Black-cockatoo is a dusky brown to black cockatoo with a massive, bulbous bill and a broad, red band through the tail. The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. The cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species occur. The bird feeds almost exclusively on the seeds of several species of she-oak and is dependent on large hollow-bearing eucalypts for nest sites.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out in open areas and at least 200m from the boundary of the Wollemi National Park. The drilling will not impact on stands of she-oak which are favoured habitat and feed. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it is widespread throughout eastern Australia.

The Diamond Firetail is a most striking finch with a bright red bill, and red eyes and rump. Flight is low and direct, with slight undulations. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. This species has a scattered distribution over the rest of NSW and is also found in the Australian Capital Territory, Queensland, Victoria and South Australia. The species occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. It is found in grassy eucalypt woodlands, riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. It feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). The birds roost in dense shrubs or in smaller nests built especially for roosting and it has been recorded in some towns and near farm houses.

The proposed drilling programme may impinge on both the habitat and feeding routines of any colonies present in the area but no more so than any agricultural equipment. Drill sites are compact areas (<400m²), each site is no closer than 800m from another and each site will be in use for only several weeks. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it is widespread throughout eastern Australia.

The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy

and mainly confined to the two main breeding areas and surrounding fragmented woodlands. The species is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. The bird is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. When nectar is scarce lerp and honeydew comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. A shrubby understorey is an important source of insects and nesting material.

The proposed drilling programme will not affect the life cycle of this species as drilling will not be carried out near its key breeding areas but in open areas away from its habitat. The species will not be placed at risk of extinction as a result of this programme.

The Grey-crowned Babbler is the largest of the four Australian babbler, reaching to 30 cm long. Its distinctive bill is scimitar-shaped, long and heavy. The Grey-crowned Babbler is found throughout large parts of northern Australia and in south-eastern Australia. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Hay. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. The bird inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. They feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out in open areas away from stands of trees. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it occurs in a number of locations throughout eastern Australia.

The Little Lorikeet is an endemic Australian parrot; the body is bright green in colour and the head is green with red forehead and throat patches that do not extend behind the eye. The distribution of the Little Lorikeet extends from just north of Cairns, around the east coast of Australia, to Adelaide. In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range. They mostly occur in dry, open eucalypt forests and woodlands and have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out in open areas away from stands of trees. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it occurs in a number of locations throughout eastern Australia.

The Spotted-tailed Quoll is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. It has rich-rust to dark-brown fur above,

with irregular white spots on the back and tail, and a pale belly. The spotted tail distinguishes it from all other Australian mammals, including other quoll species. The Spotted-tailed Quoll is now found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. The animal is mostly nocturnal, spends most of the time on the ground, although also an excellent climber and may raid possum and glider dens and prey on roosting birds. It has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. They consume a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl. They usually traverse their ranges along densely vegetated creek lines.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out during daylight hours in open areas away from open forests and any den sites. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it occurs in a number of locations throughout eastern Australia.

The Koala is an arboreal marsupial with fur ranging from grey to brown above, and is white below. It spends most of its time in trees and has long, sharp claws, adapted for climbing. The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the western region. Koalas inhabit eucalypt woodlands and forests, feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species. They are inactive for most of the day, feeding and moving mostly at night. They spend most of their time in trees, but will descend and traverse open ground to move between trees.

The proposed drilling programme will not affect the life cycle of this species as drilling will be carried out during daylight hours in open areas generally away from eucalypt trees. The species is listed as vulnerable only in NSW and will not be placed at risk of extinction as it occurs in a number of locations throughout eastern Australia.

- There are 6 endangered species and 2 vulnerable species recognised within the freshwater environment in the region but none within the tenement area which overlies ephemeral streams only.

Subsection (2) (b) “in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,”

- There are 4 endangered populations within the Hunter CMA Sub-Region, of which 3 are floral communities:

The Pine Donkey Orchid population in the Muswellbrook LGA is at the eastern limit of the geographic range of the species. All other populations of the species are located west of the Great Dividing Range. It is found in sclerophyll vegetation on flats or small

rises, on a range of substrates including sandy or loamy soils derived from granite, porphyry, laterite or alluvium.

The population of River Red Gum in the Hunter is unique in NSW being the only one to occur in a coastal catchment. The Hunter community is dominant in distinct riparian and floodplain vegetation types and has been recorded in the Muswellbrook LGA.

The Weeping Myall occurs as a disjunct population of fewer than 1000 individuals that occurs in the Hunter Valley on the western slopes and western plains. The stand at Jerrys Plains (approximately 15kms east of the Ferndale Project) is part of the community which is listed under Commonwealth legislation as a "Critically Endangered Ecological Community".

The Emu population in the NSW North Coast Bioregion is known or predicted to occur in the Hunter Sub-region within open forest, woodland and open farmland.

The proposed drilling programme is unlikely to affect the life cycle of any of these populations as it will not involve surface disturbance to any vegetated areas and will be confined to previously cleared areas. It is considered that the programme will not result in any risk to these populations.

Subsection (2) (c) “in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,”

- There are 13 identified Endangered Ecological Communities within the Hunter Sub Region of which 3 may be considered relevant to the Ferndale Project Area.

The Hunter Lowland Redgum Forest is an open forest which characterises the gentle slopes of depressions and drainage flats on the Hunter Valley floor. The mid-storey is open and characterised by sparse shrubs while ground cover typically comprises grasses and herbs. It occurs from Muswellbrook to the Lower Hunter in the Sydney Basin and North Coast bioregions and less than 500 ha of the community remains. The community occurs on the Permian sediments of the Hunter Valley floor but much of the remaining community is disturbed and fragmented.

The Lower Hunter Spotted Gum - Ironbark Forest is dominated by Spotted Gum and Broad-leaved Ironbark Eucalyptus while the understorey is marked by prickly shrubs. In an undisturbed condition the structure of the community is typically open forest. If thinning has occurred, it may take the form of woodland or a dense thicket of saplings, depending on post-disturbance regeneration. The community is restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley but outliers are also present on the eastern escarpment of

Pokolbin and Corrabare State Forests on Narrabeen Sandstone. As such it is probably outside the Ferndale Project area but does occur principally on sandstone substrates which dominate the adjacent Wollemi National Park.

The Box-Gum Woodland is an open woodland community which contains a high diversity of plant species and a range of mammal, bird, reptile, frog and invertebrate fauna species. Intact stands that contain diverse upper and mid-storeys and ground layers are rare. The community occurs in the tablelands and western slopes of NSW and is characterised by the presence of White Box, Yellow Box and/or Blakely's Red Gum. Sites that retain only a grassy ground layer and with few or no trees remaining are important for rehabilitation, and to rebuild connections between sites of better quality. Retention of remnants is important as they contribute to productive farming systems (stock shelter, seed sources, sustainable grazing and water-table and salinity control).

The proposed drilling programme is unlikely to affect any of these communities as there will be no disturbance of native vegetation and therefore no change to the ecological communities, if present in the region.

Subsection (2) (d) “in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality, “

- It is not considered that the habitats of any of the threatened species, populations or ecological communities mentioned above will be affected by the proposed drilling programme for the same reasons as given above i.e. the programme will be conducted on land already cleared, there will be no significant disturbance of vegetation, site preparation is minimal and limited to 400m^2. Moreover, track preparation will be minimal as sites are close to existing farm tracks.

Subsection (2) (e) “whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),”

- There are no habitats listed on the Critical Habitat Register that are relevant to the Ferndale Project area.

Subsection (2) (f) “whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,”

- Table 5 shows the summarised published threats and recovery plans for each of the threatened species, populations and ecological communities with appropriate comments in relation to the proposed drilling programme.

Threatened Species (TS)/ Population (Pop)/ Ecological Community (EC)	Threatening Process	Recovery Plan	Drilling Consistent with Recovery or Threat Abatement Plans
Scant Pomaderris (TS)	<ul style="list-style-type: none"> • Roads and timber harvesting • Weeds • Clearing habitats • Fire 	<ul style="list-style-type: none"> • Protect known populations • Weed control • Forest protection • Seed collection 	<ul style="list-style-type: none"> • Access to drill sites is along existing tracks or through cleared paddocks • Vehicles are washed down prior to entry
Black Cockatoo (TS)	<ul style="list-style-type: none"> • Habitat reduction • Loss of tree hollows • Fire • Bird smuggling 	<ul style="list-style-type: none"> • Reduce impact of burning • Protect hollow-bearing trees for nest sites (fencing key sites) • Retain and protect areas of native forest and woodland containing she-oaks (voluntary conservation) • Establish forested corridors (restoration) • Report suspected illegal bird trapping 	<ul style="list-style-type: none"> • Drilling sites will not impinge on forested areas but in open cleared paddocks. • Existing tracks will be used predominantly; in other cases tracks will be across/ along fence lines
Diamond Firetail (TS)	<ul style="list-style-type: none"> • Land clearing • Poor regeneration of forests • Weeds • Destruction ground/ mid-storey vegetation • Native animal predation • Isolated populations 	<ul style="list-style-type: none"> • Species search in development proposals • Retain dead timber • Reduce domestic stock grazing • Weed control • Protect woodland, forests • Reconnect habitat fragments • Annual monitoring 	<ul style="list-style-type: none"> • There will be no site clearing within forested areas • Each drill site will occupy an area of <400m² • Vehicles will be washed down prior to entry onto land

Loyal Coal Pty Ltd
Review of Environmental Factors for Ferndale Project EL7430

Threatened Species (TS)/ Population (Pop)/ Ecological Community (EC)	Threatening Process	Recovery Plan	Drilling Consistent with Recovery or Threat Abatement Plans
Regent Honeyeater (TS)	<ul style="list-style-type: none"> • Fragmented habitat • Overgrazing • Removal of 'resource' trees • Native bird predation 	<ul style="list-style-type: none"> • Maintain captive population • Landholder communication • Minimise large tree removal • Tree replanting • Monitoring, research 	<ul style="list-style-type: none"> • Large (or any) trees will not be removed
Grey-crowned Babbler (TS)	<ul style="list-style-type: none"> • Clearing woodland remnants • Heavy grazing • Removal of woody debris • Nest predation 	<ul style="list-style-type: none"> • Retention of existing woodland • Retention of dead timber • Fencing of remnant timber stands • Increase community awareness • Monitoring, research 	<ul style="list-style-type: none"> • The drilling will not impact on existing trees nor will there be any substantial removal of dead timber
Little Lorikeet (TS)	<ul style="list-style-type: none"> • No data available 	<ul style="list-style-type: none"> • No data available 	
Spotted Quoll (TS)	<ul style="list-style-type: none"> • Habitat fragmentation • Accidental poisoning • Introduced predators 	<ul style="list-style-type: none"> • Feral animal control • Liaison with DECC for baiting • Retention of large forested areas 	<ul style="list-style-type: none"> • Coalworks supports feral animal control • Domestic animals are not permitted on drill sites
Koala (TS)	<ul style="list-style-type: none"> • Loss of habitat • Feral animal predation • Fire • Road kills 	<ul style="list-style-type: none"> • Feral animal control • Fuel reduction burns • Identify road kill blackspots • Population protection • Revegetation 	<ul style="list-style-type: none"> • Coalworks supports feral animal control • Domestic animals are not permitted on drill sites

Loyal Coal Pty Ltd
Review of Environmental Factors for Ferndale Project EL7430

Threatened Species (TS)/ Population (Pop)/ Ecological Community (EC)	Threatening Process	Recovery Plan	Drilling Consistent with Recovery or Threat Abatement Plans
Pine Donkey Orchid (Pop)	<ul style="list-style-type: none"> • Weed invasion • Habitat modification • Land clearing 	<ul style="list-style-type: none"> • Regeneration studies • Limit land clearing in areas of known occurrence 	<ul style="list-style-type: none"> • Vehicles will be washed down • No clearing of trees will occur
River Red Gum (Pop)	<ul style="list-style-type: none"> • Planting of non-local provenance types • Cropping, grazing • Hydrological changes • Dieback, clearing 	<ul style="list-style-type: none"> • Controlled grazing • Habitat protection • Landowner communication • Weed control • Habitat rehabilitation 	<ul style="list-style-type: none"> • All drilling operations will not impact on tree stands nor involve destruction of any habitat
Weeping Myall (Pop)	<ul style="list-style-type: none"> • Known sites on private or non-conservation land • Small examples on roadsides 	<ul style="list-style-type: none"> • Controlled grazing • Protection of roadside plants • Habitat protection • Landholder communication 	<ul style="list-style-type: none"> • No cutting of live trees will be carried out as all drilling is in cleared land
Emu (Pop)	<ul style="list-style-type: none"> • Local extinction • Habitat fragmentation • Feral animal predation • Road kills • Deliberate killing 	<ul style="list-style-type: none"> • Feral animal control • Habitat protection 	<ul style="list-style-type: none"> • Domestic animals and firearms not permitted on site
Hunter Lowland Redgum Forest (EC)	<ul style="list-style-type: none"> • Habitat loss and degradation • Fire 	<ul style="list-style-type: none"> • Fence remnant examples • Weed control • Protect current stands 	<ul style="list-style-type: none"> • No trees will be cut • Vehicles will be washed down • No open fires on site

Threatened Species (TS)/ Population (Pop)/ Ecological Community (EC)	Threatening Process	Recovery Plan	Drilling Consistent with Recovery or Threat Abatement Plans
Lower Hunter Spotted Gum - Ironbark Forest (EC)	<ul style="list-style-type: none"> • Urban clearing • Fire • Weeds • Coal mining 	<ul style="list-style-type: none"> • Community consultation • Habitat protection • Fencing of remnants • Weed control 	<ul style="list-style-type: none"> • Forest and remnants probably outside project area
Box-Gum Woodland (EC)	<ul style="list-style-type: none"> • Fragmentation of remnants • Heavy grazing • Firewood harvesting • Feral animal invasion 	<ul style="list-style-type: none"> • Feral animal control • Prohibition of firewood collection • Fencing or markers 	<ul style="list-style-type: none"> • No substantial clearing of vegetation either living or dead

Table 5: Threatened Species, Threats and Recovery Plans

Based on the comments in Table 6 it is considered that the proposed drilling programme will not interfere with the objectives of any recovery plan or threat abatement plan.

Subsection (2) (g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

- Again, with reference to Table 5 it is considered that the proposed drilling programme will not constitute, be part of or affect the impact of a key threatening process.

By implementing the strategies outlined in this document:

- Dust generation will be limited to specific times of day and will not impact the visual or air quality unduly
- Water quality is not expected to be compromised by the drilling operations
- Rehabilitation of drill sites will effectively result in minimal evidence of the drilling having been completed
- The potential noise impacts will be short term but monitored in consultation with landowners
- Impact on fauna and flora will be minimal and the potential introduction of weeds will be mitigated by vehicle wash downs
- The adverse effect on land use and the local community will be short term and minimal whilst there may be a significant commercial gain for the broader community should the project proceed to development
- Impact on heritage values will be avoided where practicable
- There will be no significant cumulative environmental impacts.

7. References

NSW Government BioNet system web site, <http://www.bionet.nsw.gov.au>
[Elders Weather web site, http://www.eldersweather.com.au/climate.jsp?lt=site&lc=61086](http://www.eldersweather.com.au/climate.jsp?lt=site&lc=61086)
Geoscience Australia, 1:250000 Geology of NSW