



MARCH 2019 – QUARTERLY REPORT

ATHENA RESOURCES LIMITED

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CONTACTS

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Executive Director

PROJECTS

Byro Project (Athena 100%):

Industrial Minerals, Iron Ore,
Nickel-Copper-PGE's

SECURITIES

271 million Ordinary Shares

SHAREHOLDERS

Brilliant Glory	15.87%
Mr E Edwards	14.07%
Mr P Newcomb	5.69%
Mr D Webster	4.55%

BYRO INDUSTRIAL MINERALS MAGNETITE PROJECT

- **Fe1 Deposit – Mining Plan Approval work underway**
 - Drilling
 - Transport Corridor
 - Environmental
 - Water Supply
- **Market studies underway for the following uses of Byro Industrial Minerals Magnetite**
 - Dense Media Separation for Coal Washing
 - Ammonia and Gas to Liquid Fuel synthesis
 - Iron Powder Markets
 - Heavy Concrete



This PDF is bookmarked for ease of navigation

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Transport Corridor

The transport corridor for the Byro project includes several options through the development of the project contingent on output tonnage. The primary option within this study is based on an output tonnage of 1.2mtpa delivered to port, by road direct from the mine site to the Port of Geraldton.

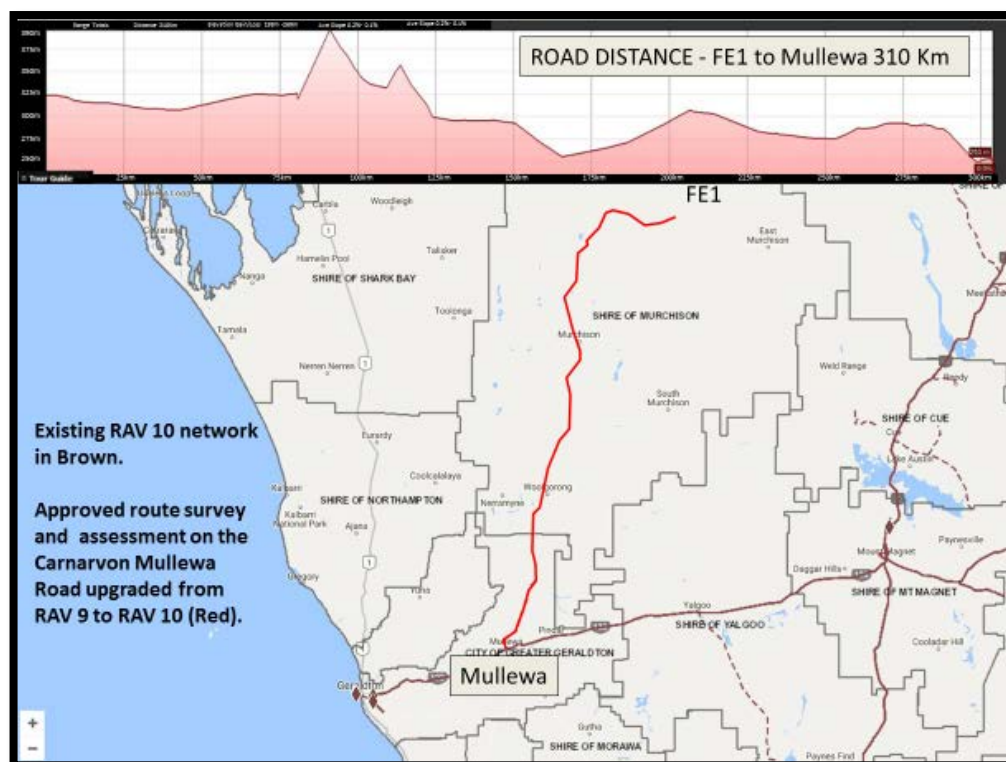
Both the Shires and Main Roads WA have been collectively involved with Athena Resources in the assessment of the corridor to accommodate for RAV Network 10, N10.3, TD5 & TDN5.3 access. The road network from the FE1 mine site to the Port of Geraldton has been deemed suitable and formally added to the RAV Network.

The largest section of road within the road corridor is the Carnarvon Mullewa Road, extending through the Shire of Murchison and continues south from Murchison Shire boundary to the City of Greater Geraldton, until intersecting with the Mt Magnet Geraldton Road at Mullewa.

The Carnarvon Mullewa Road is currently managed by the two Shires; Shire of Murchison and City of Greater Geraldton and the Mt Magnet Geraldton Road is managed by Main Roads WA.

Athena Resources is working with the two Shires responsible for the Carnarvon Mullewa Road, developing a management and maintenance plan.

RAV-Network Corridor



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Environment

A detailed level 2 flora survey was carried out for FE1 during October/November 2018. The survey was completed for the development of the FE1 mining proposal in accordance with the Guidelines for Mining Proposals in Western Australia. The final report has been received.

The survey was designed to examine and retrieve data necessary to assess impacts to flora and vegetation in accordance with the Environmental Protection Authority (EPA) Technical Guidance, Flora and Vegetation Surveys for Environmental Impact Assessment, December 2016 (guidance document):

In conclusion, the area was extensively surveyed. Seven vegetation types were mapped of which Hardpan Mulga Shrubland was the most common.

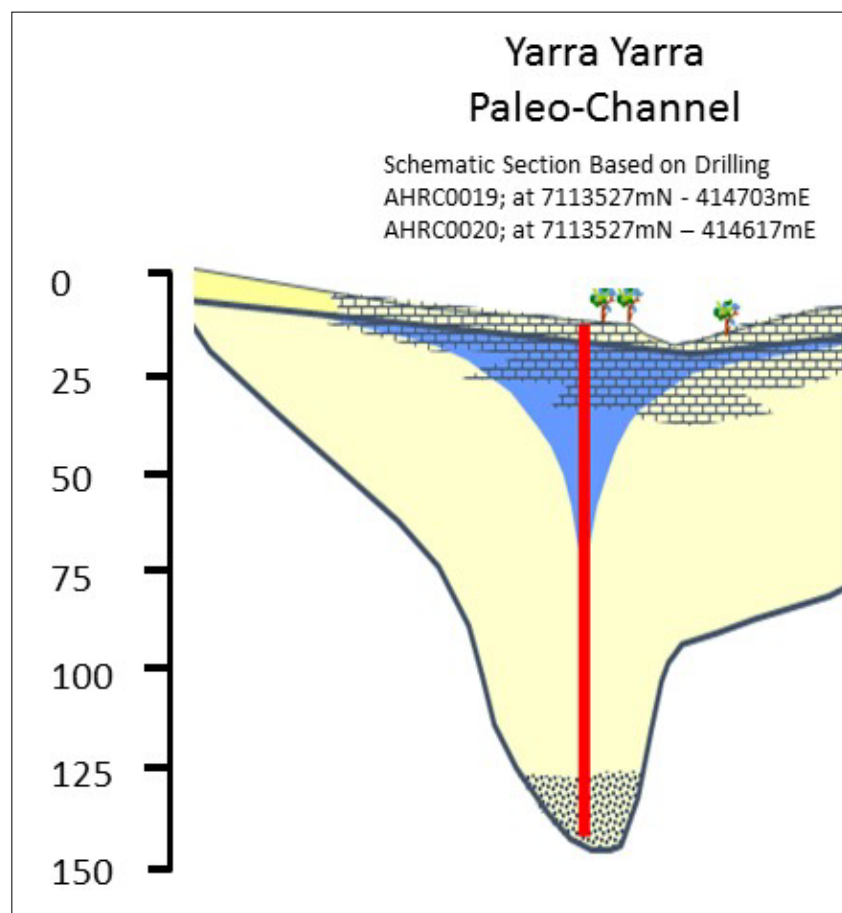
The following recommendations were made to protect and enhance the conservation and botanical values in the Fe1 Project area:

- Ground disturbance and clearing of vegetation should be limited to that which is essential for the development of the project.
- Where possible, maintain existing drainage systems, e.g. do not allow roads etc. to disrupt or divert historic flow patterns.
- Retain and stockpile cleared vegetation for use in the later rehabilitation of disturbed areas. The value of the soil and vegetation matter that may be sourced from clearing operations for use in future rehabilitation work cannot be overestimated in this environment. It is important to note however, that stockpiled topsoil needs to be maintained with some degree of vegetation cover to retain the viability of micro-organisms essential for the growth and survival of most plant species.
- Apply weed control measures.
- Whilst acknowledging the severity of the existing land degradation and difficulties imposed on any rehabilitation programmes carried out in conjunction with overlapping pastoral activities in such arid areas, consideration should be given to the possibility of harvesting local native seed for future rehabilitation opportunistically and prior to any clearing being carried out. The unpalatable and therefore abundant Limestone Wattle (*Acacia sclerosperma*) and the various Cassias (*Senna sp*), inhabiting the Creek line Shrubland vegetation type, produce an abundance of hard coated seed which should be an essential component of any seed mix used in future rehabilitation programmes.
- Further multivariate analysis needs to be carried out to evaluate the potential for Priority Ecological Community (PEC) being replicated within the survey area.
- A supplementary survey be carried out during the optimum time period recommended in the EPA Technical Guidance statement, 6-8 weeks post-wet season (March – June), to rescore existing quadrats to capture data on ephemerals not recorded in this survey and install additional monitoring quadrats along Yarra Yarra Creek to determine the potential for groundwater dependent plant species to exist and be impacted by development.

Water Supply Desk Top Study

The Yarra Yarra Paleo Channel Bore Field:

Two holes using reverse circulation drilling within the Yarra Yarra Paleo Channel confirm a significant quantity of water to a base of channel at depth of 157m. A Desk Top Study has been completed on the potential of the channel to supply water for the project using reviewed drilling, airborne TDEM data, 100yr rainfall data sets and pastoral water bore data. The outcome of the study was sufficiently positive to proceed to planning water mass balance investigations and the planning and design of a 2 bore, bore field. This work is currently incomplete and is a requirement for completion of a feasibility study, mining proposal and prior to the preparation and submission of a H3 Hydrogeological Report with 5C license application.



The makeup water requirement for the FE1 project is 0.6 gigalitres per annum. Desktop review and drilling to date has identified the Yarra Yarra paleo channel as a likely water source for the project.

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Potable Water:

Reverse osmosis will be used to prepare drinking water from the bore field. Two holes have been drilled in the Yarra Yarra paleochannel to test the depth of the paleo channel to 150m and make preliminary tests on the water quality. Bore water is currently extracted from the Yarra Yarra paleochannel from shallow depths for human and stock consumption.

Water Supply:

Supply will be from a 2 bore field 4km southeast from the mining area within the Yarra Yarra paleo channel. Three sets of 200TXD288-81 synchronous self-priming water pumps will be required for supply to the mine processing facilities, of which two sets for operation and one set for standby.

Project Water:

The total water usage is 50,294m³/d. The volume of fresh water and backwater for mineral processing are both 4,500m³/d, the domestic water consumption is 50m³/d, and circulating water volume and other water consumption is 744m³/d.

Back water:

A backwater pond with capacity of 10,000m³ and a fresh water pond with capacity of 1,500m³ are designed to be built to reserve water for mineral processing production and fire protection.

Production Drainage:

Production drainage is to be collected and recycled via return water from the tailings pond, plant runoff and pit dewatering. Initial suspended particle removal will be by settlement. The final stage of treatment by filtration and ph. adjustment.

Wastewater:

Domestic drainage of wastewater and domestic grey wastewater has been calculated at 45m³/d. All wastewater can be processed in septic systems for solid waste breakdown with fluid discharge into a settlement pond then to a standard leach system.

MARKETS AND PRODUCT REQUIREMENT

Bulk Coal Wash Market

The much sought after coarse grained high grade magnetite concentrate is primarily used for dense medium separation in coal washing mineral preparation.

Magnetite is suited to coal washing due to its:

- High density; and
- Ability to be recovered via magnetic separation for recycling and reuse.

The dense medium separation process used in most coal washing and magnetic separation plants requires a suspension of magnetite in water. Magnetite for coal washing must be of overall high purity and be devoid of contaminants, such as hematite, sulphides or other minerals.

Magnetite is reasonably durable (and therefore does not readily break down), and is chemically stable during coal washing and magnetic separation. It is also non-fouling, which means that even if small amounts become incorporated with washed products, subsequent treatment stages will not be adversely affected.

Athena propose to target the following markets for its coal washing product.

China

China produces domestically (2018) 3.66 billion tonnes of coal of which 51% is prepared coal and 55% of the prepared coal uses dense medium. This would require approximately 4.5 million tonnes of magnetite.

Prices quoted in China for magnetite suitable for coal washing (CIF Geraldton) range from CNY 970/t to CNY 1,050/t or (A\$194.96 – A\$211.03)

India

India produces domestically (2018) 0.716 billion tonnes of coal of which 50% is prepared coal and 80% of the prepared coal uses dense medium. This would require approximately 1.4 million tonnes of magnetite.

Mr R K Sachdev, President of the Coal Preparation Society of India remarked as follows: "In India more and more wash plants are coming up albeit gradually. Some 10 to 12 coal washery tenders are already in the pipeline.

In case of thermal coal washing requirement being limited to 34% ash content in clean coal, most wash plants are jig based. However, some washeries which are processing thermal coal to lower ash content say 26 to 28% ash content are using heavy medium circuits, both

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cyclones and baths. They are generally, barring a couple of serious players, buying locally marketed Magnetite. Serious players like Tata Steel are importing.

In case of coking coal some 8 to 10 new washeries are to be set up in coming few years in addition to major revamping of existing 16 odd coking coal washeries. These will definitely require high grade magnetite, because of favourable cost- benefits of higher cleans recovery expected from these plants. Currently there a couple of local Indian suppliers of magnetite. But quality and cost are always an issue.

Lately, washery operators have come to realize the cost and benefits of using better quality magnetite rather than using cheaper local product having poor quality magnetite.”

Imported coal wash Magnetite is quoted at between US\$150- US\$180 CIF, India or A\$211 – A\$254

Australia

In 2018 Australia exported 203 Million tonnes of thermal (energy) coal and 179 Mt of metallurgical (steel-making) coal. This represents about 75% of coal produced. The other 25% is thermal coal for power stations.

The coal produced will require approximately 500,000 tonnes of magnetite. Tasmania Mines/ Kara project supplies approximately 200,000 tonnes. The balance is currently imported from Brazil, Chile and South Africa.

Tasmania Mines in their 2016 Annual Report lodged with ASX (now delisted) reported sales into NSW of Dense Medium Magnetite of 193,627 tonnes for revenue of \$40.6M (A\$210). The current price is estimated at about A\$250/t.

Indonesia

Indonesia produces (2018) 0.528 billion tonnes of coal of which 0.413 billion tonnes are exported to India, China, Japan and South Korea. The exported coal would require coal washing. This is a new and expanding market and one that Athena will also target.

Magnetite in Dense Media Separation

Heavy media gravity separation means separating products with different densities. Magnetite is used to produce dense medium slurry for coal washing (as above), mineral processing and recycling of metals and plastics.

Magnetite in Ammonia and Gas to Liquid Fuel Synthesis Markets

The catalyst market carries one of the highest demands on purity and as such pays high premiums to acknowledge the cost of maintaining a high standard. The Byro FE1 magnetite product meets all requirements for raw material intake for production of iron catalysts for the synthesis of ammonia and Gas to Liquid fuels.

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Iron Powder Markets

The Byro Fe1 SPFe and HPFe magnetite products meet all requirements for a raw material additive for powder metal alloy production. The magnetite products are required to be further processed for final consumption as a powder metal by reduction to produce Fe. The two major uses of iron powder are:

3D Printing (Additive manufacturing)

3D Printing or Additive manufacturing is a process of creating a three-dimensional object from a digital file. It is called additive because it generally involves building up thin layers of material, one by one. The technology can produce complex shapes that are not possible with traditional casting and machining methods, or subtractive techniques.

Iron Powder Press-and-Sinter and Metal Injection Moulding

The predominant market for Press/Sinter structural Powder Metallurgy parts is the automotive sector. On average across all geographical regions, around 80% of all Powder Metallurgy structural components are for automotive applications.

Supply of raw magnetite for powder metal alloys and components market is estimated to be worth more than Au\$6 billion by 2020.

Water Filtration

Sand and gravel bed filters used by many municipal water treatment plants can realize benefits by using heavier aggregates in the sand bed.

The heavier specific gravity of magnetite aggregates allow a more aggressive backwash in the cleaning phase without loss of product, and because magnetite is magnetic it can be easily scavenged back from waste water streams for reuse.

Heavy Concrete

When used as the aggregate portion of a concrete mix, magnetite increases the density of the concrete to twice that of standard concrete. This so called "heavy concrete" has become a common building material in nuclear plants as well as (in brick form) for the mitigation of radiation in x-ray facilities. Beyond that, however, heavy concrete is used to make counter weights and as thermal mass in heat storage situations. The most common and growing use is in the design and building of passive solar collection in domestic housing. Still in its infancy, this application has grown out of the search for more efficient heat retention beyond that offered by standard concrete.

The denser the material, the greater its thermal retention properties, and heavy concrete offers twice the mass in the same volume as standard concrete. Being just as strong and flexible as standard concrete, it can be used in the very same applications and offer substantially improved thermal characteristics.

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The use of heavy concrete in nuclear power plants is dependent on new plant contracts and old plant repairs. It does not represent a stable consumption but can be an important add-in market in the short term.

The most stable use currently is in the production of counter weights for everything from washing machines to pipeline anchors to crane counterweights.

ABOUT ATHENA RESOURCES LIMITED

Athena Resources Limited (ASX:AHN), which is based in Perth was listed on the ASX in 2006 and currently has 271 million shares on issue. Athena owns a 100% interest in the Byro Project through its subsidiaries Complex Exploration and Byro Exploration where it is exploring for copper, nickel, PGE's and iron ore. Figure 2 below, shows the current tenement holdings.

Regional Project Location



Yours faithfully

Ed Edwards
Executive Director
ATHENA RESOURCES LIMITED
30 April 2019

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INTERESTS IN MINING TENEMENTS

Athena Resources Limited 100%	Tenement Type
Byro Exploration	E – Exploration License
E09/1507	
E09/1552	
E09/1637	
E09/1781	
E09/1938	
Byro Project Mining	M - Mining Lease
M09/166	
M09/168	

Cautionary Notes

Forward Looking Statements

This announcement contains certain statements that may constitute “forward looking statements”. Such statements are only predictions and are subject to inherent risks and uncertainties, which could cause actual values, results, performance achievements to differ materially from those expressed, implied or projected in any forward-looking statements. Drilling to date supports aspects of the estimates in this report which were published earlier this year. The quantity and grade reported is conceptual in nature. There has been sufficient exploration to define a mineral resource and further exploration is warranted to improve understanding and reduce uncertainty about this body.

JORC Code Compliance Statement

Some of the information contained in this announcement is historic data that have not been updated to comply with the 2012 JORC Code. The information referred to in the announcement was prepared and first disclosed under the JORC Code 2004 edition. It has not been updated since to comply with the JORC Code 2012 edition on the basis that the information has not materially changed since it was last reported.

Competent Persons Statement and Disclosure

The information included in the quarterly report was compiled by Mr Liam Kelly, an employee of Athena Resources Limited. Mr Kelly is a Member of the Australasian Institute of Mining and Metallurgy and has sufficient relevant experience in the styles of mineralisation and deposit styles under consideration to qualify as a Competent Person as defined in “The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 Edition)”. Mr Kelly consents to the inclusion of the information in the announcement in the context and format in which it appears, and that the historical information was compliant with the relevant JORC Code, 2004 Edition, and new information announced in this report is compliant with the JORC Code 2012 Edition.

Mr Kelly is an employee of Athena Resources Ltd and currently holds securities in the company.