MLN1122 Annual Technical Report

05 JAN 2016 – 04 JAN 2017

Title Holder: Mount Isa Mines Limited

Operator: McArthur River Mining Pty Ltd

Commodities: Zn & Pb

Bauhinia Downs 1:250,000 SE53-3

Borroloola and Glyde 1:100,000 6165 and 6164

Date	7th of February, 2017
Department, Area	McArthur River Mine Technical Services, Geology Department
Prepared by	Edward Morris (Mine Geologist)

Abstract

The McArthur River mine is one of the world's largest zinc, lead and silver mines, situated about 70 kilometres southwest of Borroloola, near the Gulf of Carpentaria in the Northern Territory. It is operated by McArthur River Mining (MRM), a subsidiary of the Swiss mining company Glencore.

Although discovered in the 1950s, when it was originally named the HYC ("Here's Your Chance") deposit, mining operations did not commence until 1995. Initially an underground operation, the mine was converted to open-cut in 2006.

MLN1122 was granted in 1993. It encompasses MLN1121 which contains the main open pit area of the McArthur River Mine.

During the reporting period, two exploratory programs were completed. This included a geophysical survey using Electrical Resistivity Imaging (ERI) as well as a drilling program. The aims of the ERI survey were to:

- Define key geological structures influencing groundwater pathways; and,
- Identify drill targets to define these structures further.

The drilling program aimed at:

- Identifying targets of potential high groundwater transport as defined by the ERI Survey; and,
- Instrument installation.

The ERI survey identified two targets for drilling which were drilled during the 2016 reporting period. These drillholes identified faulted structures throughout MLN1122.

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Location

The McArthur River Mine is located 70 kilometres south west of the township of Borroloola in the Gulf Region of the Northern Territory, approximately midway between Darwin and Mount Isa (Figure 1).

Figure 1: McArthur River Mine site location (Grenfell, 2012)

The mine site is contained within five contiguous leases (MLN1121, MLN1122, MLN1123, MLN1124 & MLN1125), located on McArthur River Station Pastoral Lease. The bulk of the mine's infrastructure is located on Barney Hill, on the western end of MLN1122. The layouts of the McArthur River Mine site leases are shown in Figure 2.

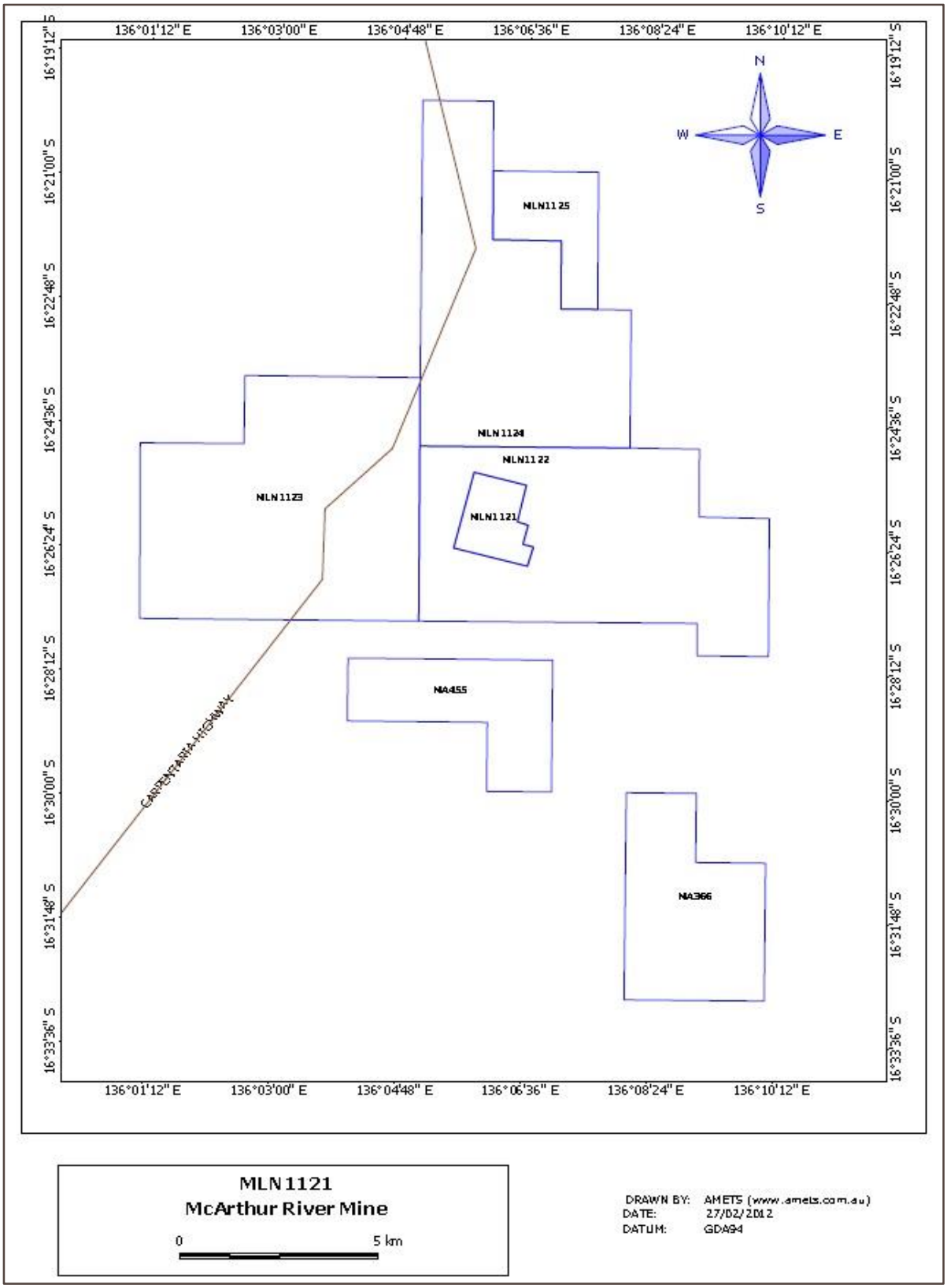

Figure 2: McArthur River Mining mineral leases (Grenfell, 2012)

Table 1: McArthur River Mining mineral leases (Grenfell, 2012)

Lease Type	Name	Lease Number	Owner	Date Granted	Expiry Date
MLN	HYC	MLN1121	McArthur River Mine	5/01/1993	4/01/2043
MLN	GLYDE	MLN1122	McArthur River Mine	5/01/1993	4/01/2043
MLN	BUFFALO	MLN1123	McArthur River Mine	5/01/1993	4/01/2043
MLN	EMU	MLN1124	McArthur River Mine	5/01/1993	4/01/2043
MLN	EMU EAST	MLN1125	McArthur River Mine	5/01/1993	4/01/2043
MLN	BING BONG PORT	MLN1126	McArthur River Mine	5/01/1993	4/01/2043

The orebody, named Here's Your Chance (HYC) on MLN1121, was discovered by Mount Isa Mines Limited geologists in 1955, however development did not commence until 1995. This gap in time between the deposit's discovery and development resulted from the unusual structure and extensive faulting of the orebodies and the extremely fine-grained nature of the ore, which combined to make commercial exploitation of the resource unfeasible for many years. A number of technological advancements in mining, ore treatment and concentrate transport, were necessary before the project could proceed on an economic basis.

A small decline and pilot plant were constructed on site in 1975, with the consequent preparation of a feasibility study and environmental report in 1979. In addition to poor recovery rates, no market existed at that time for the low-grade lead and zinc concentrates produced by the pilot plant. Subsequent metallurgical developments in fine grinding technology and the emergence of a market for high-grade bulk concentrate for use by smelters using the Imperial Smelting Process (ISP) technique resulted in the deposit becoming a viable project to go into production.

Construction of the project commenced in 1994, with the first shipment of concentrate loaded in mid-1995. In 2005, MRM announced its intention to convert the underground Zn-Pb mine to an open pit operation to enable the mine to continue production. Approval from the NT Government was granted in 2006 and a test pit was developed and later expanded. In March 2007, MRM announced an AUD50 million expansion of its concentrator to increase its capacity from an annual throughput of 1.8 million tonnes of ore to 2.5 million tonnes.

On 17 December 2008, a decision by the Full Bench of the Australian Federal Court invalidated the original approach granted for the MRM expansion due to a procedural error by the Federal Government. As a result, all mining and civil works were suspended. MRM resubmitted its application to the Federal Environment Minister shortly after this judgement and on 22 January, the Minister gave preliminary conditional approval for the expansion subject to a 10-day consultation period. Stockpiled ore was processed at the site while mining was suspended but was depleted by 23 January at which time the operation was placed into care and

maintenance. On 20 February, the Minister approved MRM's open pit development and operations and mining recommenced.

In March 2011, Xstrata Zinc announced it was investigating an integrated development plan involving its European and Canadian smelters to increase capacity at MRM. The plan would secure the long-term future of the operation in the face of a decline in the traditional international markets for the bulk zinc-lead concentrate produced by the mine.

The MRM Phase 3 Development Project proposes increasing capacity from 2.5 million tonnes of ore per annum to 5.5 million tonnes and increasing production from 360,000 dry metric tonnes to 800,000 dry metric tonnes per annum.

A draft Environmental Impact Statement was lodged in January 2012 followed by a Supplementary EIS in May 2012. On 17 July 2012, the Northern Territory Government released an environmental assessment report which recommended the project can be managed without unacceptable environmental impacts and could proceed subject to commitments on seven operational issues being enforced under an approved Mining Management Plan.

Geology

The McArthur Basin comprises Carpentarian and Adelaidean rocks extending from the Alligator River in the Northern Territory to the Queensland border including the greater part of Arnhem Land and the Gulf of Carpentaria drainage region.

The sediment hosted stratiform HYC deposit has similarities with ore-bodies at Mount Isa and Hilton in Queensland. It is about 1.5km long and 1.0km wide with an average thickness of 55m.

The sediment hosted stratiform HYC deposit occurs near the base of the HYC pyritic shale member, within the Middle Proterozoic McArthur Group. The member comprises a sequence of inter-bedded pyritic bituminous dolomitic siltstones, sedimentary breccias and volcanic tuffs.

The HYC deposit has been folded and eroded along its western margin, which is covered with 30m of soil. This western margin contains the Hinge ore zone, which is sub-vertical with a strike length of 1.0km and vertical height of 200m. The northern margins inter-finger with sedimentary breccias and the southern margin grades into thinned nodular barren pyritic siltstone. On the eastern margin the ore-body thickens and is folded to form the Fold Zone, which has a strike length of over 600m. The southeastern corner is down faulted 110m by the northeastern trending Woyzbun Fault.

Climate

The climate of the McArthur River region is tropical monsoonal, with a pronounced wet season between December and March and generally dry conditions for the remainder of the year, although a build-up to the wet season with some rain often occurs during November.

Mean annual rainfall for the mine site is 715mm with the area around the port at Bing Bong receiving a mean annual total of 1040mm. Mean annual evaporation varies from 3,000mm at the mine site to around 2,300mm at the coast. Average daily minimum and maximum temperatures for McArthur River are 12°C to 29°C in June whilst in December they range from 25°C to 38°C.

Winds during the dry season blow predominantly from the southeast to south in the morning and change to blow from the east to northeast in the afternoon. During the wet season, there is no predominant wind direction in the morning, whilst in the afternoon, winds predominate from the north to east. McArthur River has more calm observations than those in coastal locations (Draft Environmental Impact Statement 1992) (DEIS1992).

Extreme events include cyclones, floods, droughts and fire. Cyclones are an annual threat to coastal areas in the Gulf region. The McArthur River Minesite is outside the cyclone risk area but is affected by the tropical low pressure systems that can result in flooding. Flooding is an annual risk at McArthur River. Gross departures from the normal annual cycle are possible.

Physiography and Hydrology

The mine site is situated adjacent to the McArthur River, in the middle reaches of the river's catchment, between the confluences of the Kilgour and Glyde Rivers. The catchment area of the river above the mine site is approximately 10,000km^2. The 100 year average recurrence interval (ARI) flood level at the mine site is 39.5 meters. All major infrastructure on the site is located above this level. With the exception of some spring fed tributaries, most of the flow of the McArthur River comes from wet season rains. The river ceases to flow in some dry seasons, and most stretches, particularly in the vicinity of the mine area, can dry to a series of large isolated pools. During the wet season the river can become extremely turbid when in flood. Flow data for the McArthur River in terms of ARI is 7,250 (m^3/s) for 1 in 100 year event (RL 40 m), whilst 1,000 (m^3/s) for 1 in 2 year event (DEIS, 1992).

The main creek systems which bound the tailings and mine site, are Barney and Surprise Creeks. Barney Creek has a catchment area of 600km^2 at the mine site. The creeks are dry throughout most of the year. This is particularly the case for Surprise Creek, which has a catchment size of only 85km^2, and normally flows for only a few days each wet season.

McArthur River mine site has two main aquifers in the immediate vicinity, the alluvial aquifer and the lower fault aquifer. The alluvial aquifer is readily linked to the McArthur River and contains good quality fresh water. The faults in the dolomite and shales contain groundwater that is linked to the alluvial aquifer in part.

The dominant relief is low escarpments, plateaux and ridges, with limestone or dolomite rocks of Paleozoic age or older in the western part of the McArthur River catchment upstream of the project site, and sandstone and conglomerate rocks in the eastern sub- catchments, including the Kilgour and Glyde Rivers.

The tailings storage facility is located adjacent to the Carpentaria Highway. This structure stands approximately 10 meters high over 83 hectares. Current disturbance for McArthur River Mining Leases totals 455 hectares, which represents 3.5% of mining lease area.

Land Use

Land use is predominantly cattle grazing on large pastoral properties and the occasional mining activity. Encompassing all mining leases is McArthur River Station, which is 100% owned by Colinta Holdings, an MIM Holdings subsidiary. Other regional pastoral enterprises are owned by private persons, companies, and Aboriginal groups.

McArthur River Station stocks approximately 10,000 head of cattle over 8,000 square kilometers, utilising approximately one third of the area for grazing. Cattle have been excluded from the Barney Hill mining and processing areas.

McArthur River Mine is located in one of the more sparsely populated areas of Northern Australia. Populations of townships fluctuate with people leaving outstations in the wet season.

Activities Undertaken During 2016-2017

Geophysical (ERI) Survey

During July and August an Electrical Resistivity Imaging (ERI) survey was completed around the Northern Overburden Emplacement Facility (NOEF) and Tailings Storage Facility (TSF).

Consulting company GHD completed the survey using a FlashRES_UNIVERSAL 61 channel resistivity meter. Data collected was then interpreted using Geosoft software. The projects aims were to:

- Identify key geological structures influencing groundwater transport focussing on previously mapped faults; and,
- Define drill targets for the upcoming drill program.

The ERI survey completed eleven survey lines across MLN 1122 as displayed in Figure 3 below. Resultant 2D inversions are available in the submitted report with the accompanying documents.

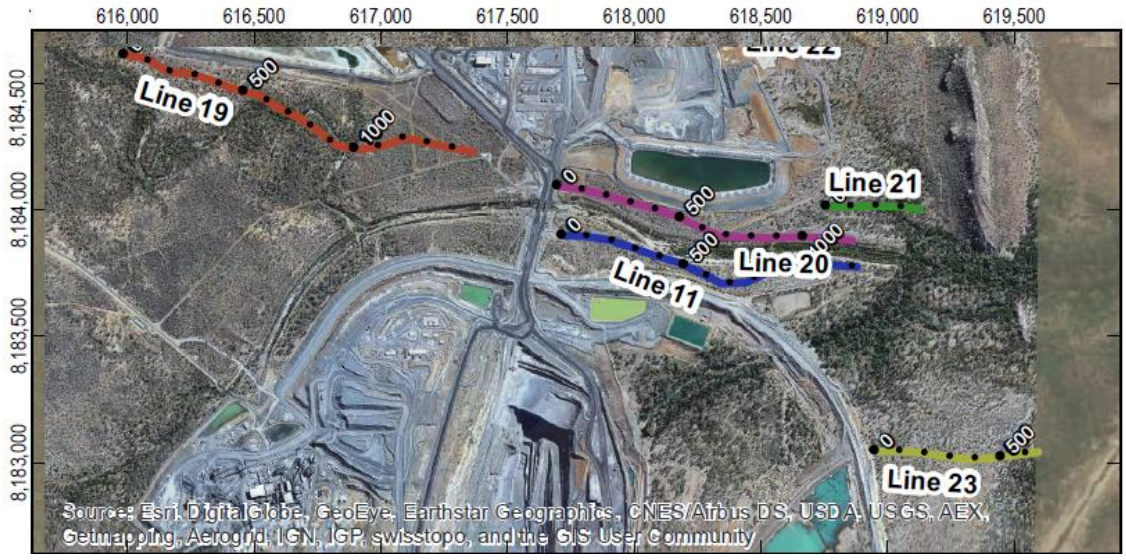

Figure 3: ERI Lines taken on MLN 1122, from Anderson. 2012

Results highlighted areas of potential fluid pathways, from this two investigatory drill holes on MLN1122 were defined.

Drilling

A site wide drilling program was completed in December 2016. The program encompassed MLN1121, MLN1122, MLN1123 and MLN1124 with its main aim focussed around determining ground water flow structures as well as installation of monitoring equipment.

Nine reverse circulation (310 metres) and two diamond drill holes (222.95 metres) were completed on MLN1122 during the reporting period.

Table 2 below outlines location of holes drilled on MLN1122. Figure 4 shows locations throughout the Mine Lease.

Table 2: Drill holes completed on MLN1122

Hole ID	Drill Method	Easting (m)	Northing (m)	RL	Total Depth	Purpose
E12/83/16A	RC	615952	8181830	38	30	Piezometer installation
E12/83/16B	RC	615953	8181825	38	15	Piezometer installation
I34/94/16A	RC	620132	8183746	30	30	Piezometer installation
I34/94/16B	RC	620126	8183749	30	15	Piezometer installation
J35/64/16B	Diamond	618774	8184106	28	122.95	ERI anomaly
J36/58/16	RC	617154	8184279	34	50	Piezometer installation
J34/49/16	Diamond	618751	8184069	28	100	ERI anomaly
K39/49/16	RC	616150	8184593	37	50	Piezometer installation
H29/44/16	RC	619332	8183500	31	25	Hydro testing
G22/18/16	RC	619009	8182850	33	45	Hydro testing
J36/25/16	RC	617524	8184239	37	50	Hydro testing

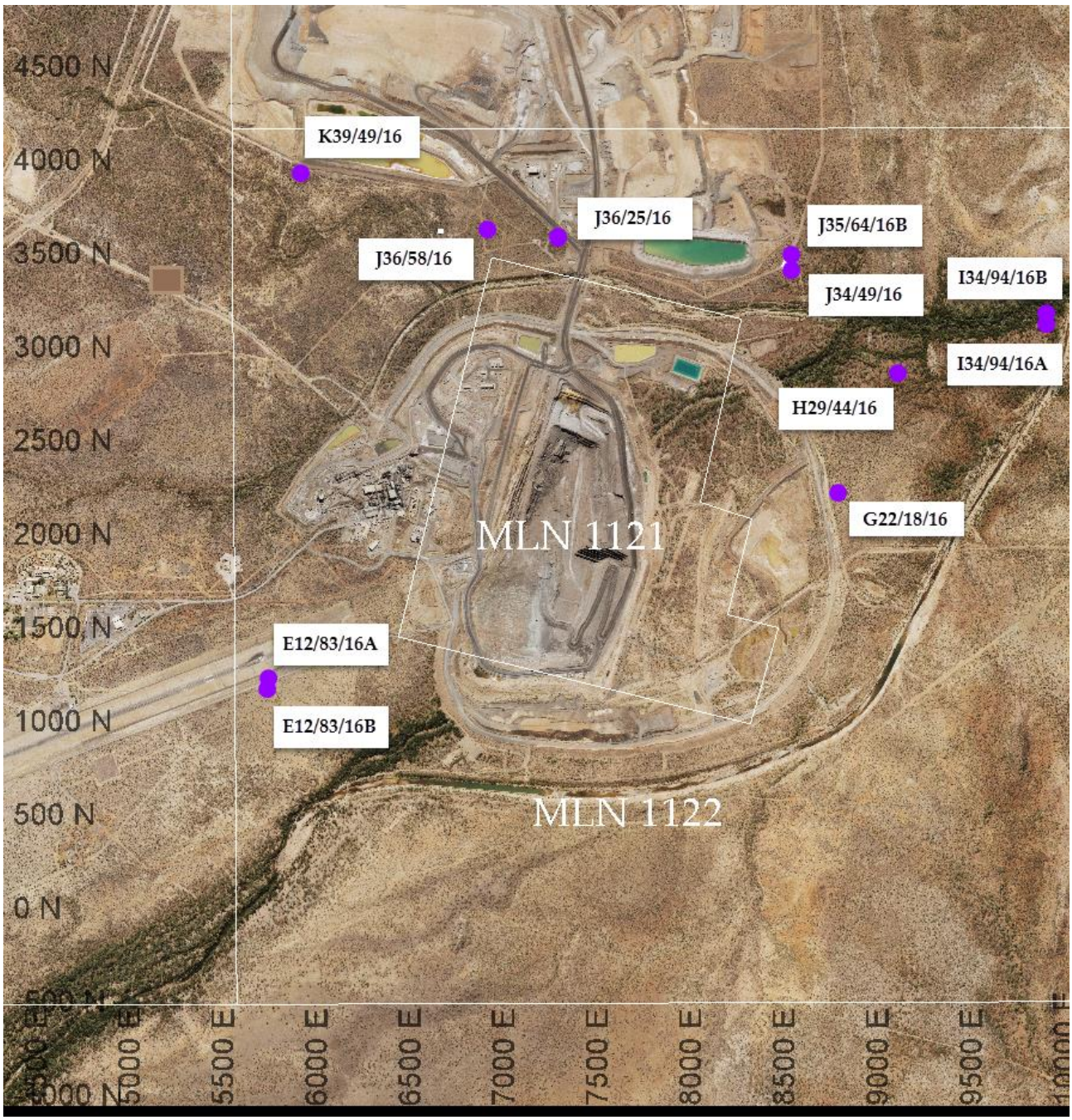

Figure 4: Drill hole locations on MLN1122 (in mine grid).

All holes were geologically logged and data imported to the site geological database. Holes designed for hydrogeological testing were successfully completed with instruments being installed.

No geochemical analysis was completed on the holes as the information was not required.

Conclusion

In addition to normal mining operations two exploratory programs were completed on MLN1122. This included:

- ERI survey to define groundwater pathways;
- Diamond drilling to further define potential fluid pathways; and,
- RC program for waste characterisation and piezometer installation.

The ERI survey identified two major structures across the lease which were subsequently drilled.

The drill program completed 310 metres of RC drilling and 222.95 metres of diamond drilling. All holes were geologically logged and uploaded to the site Geology Database. All instrumentation as successfully installed.

No further exploratory work is planned for the upcoming reporting period.

References

Anderson, M, (2016). Seepage Pathway Investigation, Internal Consultant Report, GHD, 40p.

Grenfell, K, (2012). MLN1121 Annual Technical Report, Statutory Government Report, McArthur River Mining, 17p.

Post Office Box 437· Borroloola · Northern Territory 0854 · Australia
34a Bishop Street · Darwin · Northern Territory 0820 · Australia
Tel +61 8 8975 8179 · Fax +61 8 8795 8170 · Web www.mcarthurrivermine.com.au

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McArthur River Mining Pty Ltd ABN 90 008 167 815