Appendix A

GR083 AMALGAMATED REPORT

EXPLORATION HISTORY OF TITLES MA366, MA455 AND MA456

Title Holder: Mount Isa Mines Limited
Operator: McArthur River Mining Pty Ltd
Commodities: Zn & Pb
For the period 21 August 2017 – 20 August 2018

Bauhinia Downs 1:250,000 SE53-3
Borroloola and Glyde 1:100,000 6165 and 6164

Date, Version	12th of October 2017, GR083-018_2018_GA_Appendix A
Department, Area	Geology Department, McArthur River Mine
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1.0 General Exploration / Geology Overview

The following was compiled from technical reports available at the McArthur River Mine and represents a (most likely incomplete) historical summary of geological discussion and exploration south of HYC-McArthur River on MR581, EL597, RO581 (AN314) & AN366.

Detailed mapping compiled at 1inch-to-1mile (~1:19,200) and 1:5000 scale was carried out over much of RO581 by the Carpentaria Exploration Company during the 1960s and 1970s. This regional and detailed air photo mapping formed the basis of all further exploration south of HYC-McArthur River on the tenements of interest in this report. Exploration work conducted by CEC during the 1970s on MR581 and EL597 included regional (1 inch-to-1 mile; ~1:19,200) and detailed (1:5000) geological mapping, soil and stream geochemistry, geophysical surveys and drilling. Results highlighted the potential of Amelia and Coxco.

In the period 1990-1993 Mount Isa Mines explored AN314 (subsequently AN366), the 'Emu Fault Project', with renewed enthusiasm. The target of this exploration campaign was coarse-grained, vein and breccia-hosted lead-zinc and copper mineralisation associated with the 20km of prospective Emu Fault Zone covered by AN314 south of HYC.

In the year ending June 1991, this work included:

- A structural framework study of the McArthur Basin by Environmental Resources Analysis (ERA) Ltd of Dublin. This study used satellite Thematic Mapper imagery and airborne Magnetic data to formulate exploration concepts for AN314.
- Aerial photography was collected over AN314 for 1:25,000 scale geological interpretation.
- Additional detailed geological mapping (e.g., Wilkins, 1991) over prospects provided new insights into the geology and defined further exploration targets.
- 5370 soil samples concentrated along faults and areas previously not sampled were assayed for Pb, Zn and Cu. No significant new anomalies were outlined.
- Geoterrex Pty Ltd flew 1329km of airborne magnetics and GEOTEM across AN314 at a line spacing of 200m.
- Magnetics revealed little contrast in the dominantly dolomitic rock types but the GEOTEM provided valuable mapping data and outlined numerous low order conductors for evaluation.
- A 71km IP survey designed to locate coarse grained sulphide mineralisation was completed by Zonge Engineering across the major faults of the Emu Fault Zone. One hundred meter dipoles were used with data recorded to n=6. Numerous anomalies were defined but those drilled within resistive rocks were related to minor pyrite and no significant mineralisation was found.
- A total of 6500 metres of percussion and diamond drilling tested geochemical, geophysical, geological and conceptual targets throughout AN314. Apart from the Amelia Prospect, drilling failed to intersect significant mineralisation. Best results at Amelia were: 24m @ 2.17% Zn including 12m @ 4.06% Zn (hole 26RC in the weathered zone); 30m @ 2.31% Zn (hole 24RC straddling the weathered-fresh transition).

Expenditure for the first year of AN314 exploration was $1,572,430.

1.1 1991 Summary Geological Discussion

Lamont Grid (centred on Emu Fault Zone, Amelia Prospect south to southern end of AN456).

Sequence: Tooganinie Formation-Myrtle Shale-Mara Dolomite-'Coxco Dolomite' Member-'Reward' Dolomite-Lynott Formation.

- Karst surface on top of 'Coxco Dolomite' Member.
- Unconformity at base of 'Reward' ….. rapid facies and thickness (0-70m) changes …… lenticular beds of dolomite breccia, conglomerate, carbonaceous beds.
- Carbonaceous beds in lower 'Reward' were suggested as possible Barney Creek equivalents.
- Active tectonism during 'Reward'-times.
- Gentle folding with axes parallel to Emu Fault.
- Soil sampling identified anomalous Pb-Zn-Cu associated with the 'Coxco Dolomite'-'Reward' contact.
- No significant mineralisation identified.

Comment: *There was considerable discussion at Amelia whether 'Reward' included Barney and Reward-time deposition. Geochemical anomalism associated with the base of 'Reward' in the Coxco-Amelia region suggests that leakage fluid flow in the Emu Fault system of the same timing as HYC formation may be responsible.... see Geological Evaluation below. Note that subsequent work at Coxco suggested that sedimentary breccia-hosted mineralisation sitting immediately on top of the Coxco 'Cooley-type' brecciated dolomites were Barney Creek equivalents. The Pb isotope signature of the Coxco mineralisation is identical to that of HYC.*

Amelia Prospect

Sequence: Mara Dolomite-'Coxco Dolomite' (Mitchell Yard Dolomite-Teena Dolomite on 1972 CEC mapping) -'Reward' Dolomite-Lynott Formation (Hot Springs Member).

- Emu Fault strands show west-side-up movement.
- East-west Gap Fault active in Reward-time as shown by facies changes.
- Soils over the 'Coxco'-'Reward' contact zone are variable anomalous in Zn, lesser so in Pb and occasionally in Cu. West of the Lamont Fault anomalism is decreased.
- Drilling (PD Amelia 15-31, Amelia 6-7) identified weak mineralisation associated with the 'Coxco Dolomite' Member and basal 'Reward' Dolomite.
- No relationship between mineralisation and faulting demonstrated.

Comment: *Again considerable discussion about timing of mineralisation but the preferred model in 1991 was of late (Isan D2) fluids accessing via faults and brecciation and ponding within the Cooley breccias beneath a 'Reward' cap perhaps towards the crest of the Amelia anticline although no metal enhancement in anticlinal axes was demonstrated. More recent understanding at Coxco and in the Cooley breccias adjacent to HYC might suggest HYC-timed fluid leakage along the southern Emu Fault zone into localised thin Barney-time sedimentation and some fluid flow within synchronous Cooley-type brecciation. Active tectonism continued throughout Barney-time and began to settle in Reward-times.*

1.2 Period Ending June 1993

In the period ending June, 1993, the work on AN314 (replaced by AN366 on 8 June, 1992) included:

- Refinement of geological relationships along the Emu Fault Zone from the 1991 geophysics in an ongoing attempt to locate coarse-grained mineralisation;
- Further 1:5000 mapping and -80mesh soil sampling (1034 samples) at West Cattle Creek, south of Amelia Prospect along the Emu Fault;

A total of 1057 metres of RC and diamond drilling in 7 holes. These failed to intersect any significant sulphide mineralisation at Amelia Prospect, beneath the Lamont Copper anomaly, on the Lamont East Fault or south of Amelia Prospect at the West Cattle Creek prospect. The best result (at Amelia) was 6m @ 0.22%Zn, 0.41%Pb (Amelia 61DD from 116m). The economic potential of Amelia Prospect was considerably downgraded.

1.2.1 1993 Summary Geological Discussion

West Cattle Creek

Sequence: Masterton Sandstone (settlement Creek Volcanics)-Mallapunyah Formation-Amelia Dolomite-Tatoola Sandstone-Tooganinie Formation-Myrtle Shale-Mara Dolomite-Mitchell Yard Dolomite-Teena Dolomite-'Reward' Dolomite

- No Barney Creek equivalents identified.
- Northerly trending anticline, truncated to NE by the Emu Fault Zone.
- Weak ferruginous mineralisation associated with 1000m of fracturing along Emu Fault.
- No significant mineralisation located.

2.0 Coxco (AN366/MA366 North) Exploration History – Pre-1974 to August 2018

(Note: Section 2.1 to 2.7 is taken from Logan, R. 1997, MIMEX Technical Report No. 2854)

2.1 Pre-1974[1]

Drilling commenced at Cook's Prospect in 1912, when the McArthur River Exploration Company drilled four holes, Cook's Nos 1, 2, 3 and 4. During 1952-53 Australian Mining and Smelting Co Ltd completed holes AM&S Nos 4, 5, and 6, and sampled three shafts and two trenches.

Coxco1DD and 2DD were completed by Mount Isa Mines, in 1961.

In 1966, 77 vertical percussion holes tested the outcropping and sub-outcropping oxidised mineralisation between depths of 2.7 and 64.3 metres, reflecting the variable depth to the water table.

A 4 by 1.5 kilometre Gradient Array IP survey was completed around the Cook's and Cox's Prospects in 1971. Diamond holes Coxco3DD to 6DD tested the main anomaly, which was attributed to disseminated pyrite.

2.2 1974

Walker (1975) compiled historical data, geologically mapped, soil sampled and diamond drilled Coxco during 1974.

Twelve diamond holes, Coxco7DD to 18DD, were completed during 1974. Recovery in holes Coxco11DD and 18DD was virtually 100%. The remainder of the holes had low recoveries, due to cavities and/or alternating hard and soft bands.

Table 1 summarises Walker's resource estimates for the Cook's Prospect, based on the 1974 drilling. The mineralised zone extended between Coxco10DD, in the south, and Coxco14DD, in the north (Drawing 50581).

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[1] Extracted from Walker (1975) and Crabb (1996)

Table 1. Resource estimate (Walker, 1975)

Ore Classification	Tonnes	Zinc %	Lead %
Indicated Ore	4,088,400	2.55	0.45
Inferred Ore	2,898,600	2.54	0.46
Total	**6,987,000**	**2.55**	**0.45**
Oxidised (top 25 metres)	1,548,000	+2.55 ?	+0.45 ?

Walker (1975) recommended that the resource could be extended by drilling:

- 150 metres south of Coxco10DD,
- between Coxco16DD and Coxco18DD, on the western limb of the anticline,
- between Coxco18DD and the Coxco Fault, on the eastern limb of the anticline, and
- down the nose of the anticline, north of Coxco18DD.

In 1975 the mineralisation was considered (Walker, 1975) to occur within fractured and solution brecciated dolomite at an unconformity, immediately below the Cox's Shale. The dolomite was equated with the Cooley Dolomite.

The model was refined in 1978 (Walker et al, 1978), placing the mineralisation into a karst environment within the Mara and Reward Dolomites. The authors considered that the Cox's Shale was the Reward Dolomite, which was silicified and karsted during the Proterozoic.

2.3 1975

Two diamond holes were drilled during 1975 (Walker and Runnalls, 1976).

Coxco19DD tested down dip of Coxco18DD, along the nose of the north plunging anticline. It intersected an approximate true thickness of 29 metres of 2.2% zinc and 0.57% lead. The Cox's Shale was not intersected, suggesting that a cap rock is not an essential control on mineralisation.

Coxco20DD was collared on brecciated and silicified Cox's shale, 350 metres south of the southern boundary of Walker's 1975 resource estimate. Due to cavities it was abandoned at 22.8 metres.

2.3.1 Metallurgy Testing

A composite sample from Coxco18DD yielded very good results as shown below in Table 2 (Walker and Runnalls, 1976).

Table 2. 1976 metallurgical summary

	Head	First Cleaner Grade	Concentrate	Recovery
Zinc	2.35%	49.6%		86.2%
Lead	0.5%	33%		73.6%

2.4 1979

Dennis (1981) drilled three diamond holes, Coxco21DD to 23DD, during 1979. They tested extensions to the resource outlined by Walker (1975).

Coxco21DD was drilled on the eastern limb of the northern section of the anticline. The 52.1 metre interval from 86.7 metres averaged 0.63% zinc, including 6.7 metres at 1.23% zinc. Mineralisation was found to be hosted by dolomite breccia, dolomitic shale and massive siltstone.

Coxco22DD tested the western limb of the anticline, towards its northern end. It intersected mineralised massive dolomite from 150.3 metres. The 33.7 metre interval from 153 metres averaged 3.24% zinc and 0.94% lead.

Coxco23DD was drilled into outcropping silicified dolomite, about 600 metres south (8172047N) of Walker's 1975 resource estimate. It intersected dolomite-veined dololutites, dololutites with dolomite dykes and stromatolitic dololutites. Mineralisation was not intersected, and the hole was not assayed.

2.5 1991

Reverse circulation holes Coxco24RC and 25RC tested a chargeability anomaly 80 metres east of the Coxco mineralisation (Wilson and Harvey, 1992). The anomaly was due to pyrite within dolomite and dolosiltstone. Coxco mineralisation was intersected in the top of Coxco24RC, with 16 metres of 5.7% zinc and 12 metres of 3.29% lead from surface.

Coxco26RC was drilled about 1.3 kilometres west of Cox's. It targeted a chargeability anomaly, and intersected Masterton Sandstone and Settlement Creek Volcanics. Mineralisation was not intersected.

2.6 1995

A brief structural assessment of the Coxco and Amelia areas lead James (1995) to conclude that the Coxco mineralisation is the result of brecciation of brittle and competent dolomitic sediments, in response to movement within the Emu Fault zone. The breccia acted as a conduit for mineralising fluids and host for vein and stockwork mineralisation

2.7 1996

Rothery (1996a) concluded that the Coxco deposit is developed in a dilation zone above the intersection of the Coxco and Emu Faults. The zone is marked by massive silica and dolomite alteration, within a favourable horizon. Mineralisation is syndeformational, not synsedimentary as suggested by Walker (1975) and Walker et al (1978).

He concluded that potential is limited to the west by the Emu Fault, the east due to distance from the dilational zone, and to the north and south as the target gets progressively deeper. However, Rothery (1996b) recommended three 300 metre RC holes to test for structural repetitions at depth.

Using a simplistic approach Crabb (1996) estimated that Coxco contains 750,000 tonnes at 8.3% zinc, using a 5% zinc cut-off. This did not include oxidised material (? down to 25 metres). He concluded that the area had potential for 10 million tonnes averaging 3.5% zinc[2], using a 1% zinc cut-off.

Crabb (1996) recognised that Coxco zinc oxides did not represent feed for the current plant, using the current flow path. Furthermore, he considered that at least 5,000 metres of reverse circulation drilling were required to lift the drilling pattern to two holes per section, required to raise the reliability of a resource estimate.

Twelve reverse circulation holes, Coxco27RC to 38RC, were drilled by Rothery in 1996 (Rothery, 1996c; Logan, 1997). They were designed to outline the nature of the low grade resource detailed by Walker (1975).

Coxco27RC and 29RC were drilled on the north eastern limb of the anticline. They intersected the mineralised horizon, but mineralisation was generally less than 1% zinc.

Coxco28RC and 30RC were drilled immediately north of Walker's resource, north and south of Coxco16DD which intersected low grade zinc (Walker, 1975). Coxco28RC intersected less than 2% zinc, however Coxco30RC assayed 40 metres at 6.88% zinc and 0.6% lead.

Coxco31RC was designed to test continuity of the mineralised zone with Coxco12DD. It intersected 60 metres averaging 8.92% zinc and 1.89% lead from 42 metres.

Coxco32RC, 33RC, and 34RC were short re-drills of the 1966 open hole percussion program (Drawing 50583). Results are shown in

Table 3.

[2] Rothery (1996e) states that there is an error in Crabb's calculations and the grade should be 2.5% zinc, not 3.5% zinc.

Table 3. Comparison between 1996 and 1966 drilling.

1996 Reverse Circulation Drilling					1966 Open Hole Percussion Drilling				
Hole	**From**	**To**	**Zinc %**	**Lead %**	**Hole**	**From**	**To**	**Zinc %**	**Lead %**
Coxco32	-	-	-	-	CoxcoC12	0	8.23	16.74	2.7
	8	40	10.34	1.45		-	-	-	-
Coxco33	0	35	4.99	0.19	CoxcoL15	0	35	7.20	0.54
Coxco34	0	18	3.87	0.71	CoxcoS15	0	18	4.35	1.88
	18	40	0.23	0.07		18	40	1.58	0.33

Coxco35RC was collared next to Coxco8DD, to test the potential for a shallow resource, and to act as a possible pre-collar for deeper diamond drilling. It generally intersected less than 0.2% zinc.

Coxco36RC and 37RC were designed to extend the resource (Walker, 1975) southwards. Coxco36RC intersected 10 metres averaging 3.03% zinc, and Coxco37RC 6 metres grading 3.08% zinc.

Coxco38RC stepped 180 metres south of Coxco37RC. It intersected minor mineralisation, suggesting that there was potential to extend the resource south of Coxco37RC.

All the reverse circulation holes intersected Hot Spring Member, underlain by silica cap and dolomite breccia (Rothery, 1996c). This stratigraphic sequence and the positioning of the mineralisation was the same as that defined by Walker (1975) and Walker et al (1978).

There was a significant increase in zinc grade in the reverse circulation holes compared to the earlier diamond holes. For example, diamond hole 12DD assayed 57.7 metres at 1.92% zinc, compared with reverse circulation hole Coxco31RC which assayed 60 metres at 8.92% zinc. The difference in grade was believed to be due to the superior sample return of the reverse circulation drilling. However, Rothery (1996c) notes that below about 80 metres, when the pressure of the water column exceeded the air pressure, the samples were inundated with water and samples were of poor quality.

Rothery (1996d) estimated that there is a resource of 7.78 million tonnes grading 4.15% zinc and 1.06% lead, between Coxco10DD (8172650N) and Coxco30RC (8173140N). This estimate increased the strike length of Walker's 1975 estimate by 60 metres northwards, but retained the same southern boundary. He acknowledged that the calculations were simplistic and meant only as a guideline. In addition, he raised concerns about grade estimation, believing that the real grade could be between 5% and 10% zinc (Anderson, 1996; Rothery, 1996d).

Rothery (1996c) concluded that the 1996 drilling added confidence to the shallow resource potential, and probably extended the resource to the south (not included in his estimate above). Anderson (1996) recommended a follow-up drilling program to further test the open cut and underground potential of the prospect. The program comprised 1700 metres of reverse circulation drilling and 800 metres of deeper diamond drilling, for a total cost of $255,000.

2.8 Period Ended 4 June 2000

(from Lye, 2000).

Titleholders, Mount Isa Mines Limited (MIM), and operators, North Mining Limited, entered an agreement whereby North Mining Limited could earn 50% of MIM's interest in AN 366 and ANAs 455, 456 and 457 over 5 years. Work during the eighth year of tenure included gridding, relogging of MIM drill core, geological mapping, interpretation of historical geophysical data, and RC/diamond drilling at the Coxco prospect.

1:1000 Geological mapping (by David Selley) and relogging of 12 MIMEX diamond holes indicated potential for the addition of significant tonnage to the Coxco resource, especially along the Emu Fault to the north of previous drilling.

A total of two reverse circulation drill holes (for 62 metres), and three diamond drill holes (for 456.4 metres) were completed at Coxco, around the Cooks workings. This drilling by North Limited returned encouraging results, including 11 metres at 18.3 per cent zinc, 8.8 per cent lead, and 15.5 g/t silver. Detailed structural logging of diamond core by Mark Hinman provided information regarding the controls on mineralisation.

Compilation and reinterpretation of historical geophysical data produced targets for extensions of known mineralisation, and other areas of potential mineralisation. Geophysical data reviewed included 1990 Zonge Dipole Dipole Induced Polarisation data, 1991 Solo Time Domain Dipole Dipole Induced Polarisation data, and 1990 125Hz Geotem II Airborne Electromagnetic and Magnetic Survey data.

It was recommended that exploration activities during the ninth year of tenure include reverse circulation and diamond drilling at Coxco to confirm the structural controls on mineralisation, confirm the grade of the mineralisation, determine the extent of mineralisation, and test remaining geophysical, geochemical and geological targets. This work commenced on 2 June 2000. It was also recommended that all available data for the Amelia prospect be compiled, prior to a review and drill testing of the prospect.

2.9 Period Ended 4 June 2001

(from Carey, 2001).

The second year of the Coxco joint venture work program focussed on delineating any extensions to the shallow base metal oxide resource and underlying carbonate hosted, Zn-Pb-Ag sulphide mineralisation at Coxco.

A program of 43 reverse circulation drill holes (total 2642 metres), mostly along five east-west traverses at 25 metre spacings, were completed during June-July 2000. Drilling focussed on defining the continuity, grade and thickness of the shallow, high grade base metal oxide resource that extends north and south of the Cook's workings.

North's work suggested that the greatest potential is hosted at depth by tectonically fractured and breccia controlled, coarse grained sphalerite-galena-pyrite-marcasite mineralisation of the ?Teena Dolomite on the western limb of the north plunging Coxco Anticline. Additional, but limited corona and matrix style mineralisation is hosted by the overlying stratiform 'Barney' sedimentary breccia with a high grade oxide horizon significantly enriching the primary sulphide zones at shallow depths.

The partly silicified, 'Barney' sedimentary breccia lies at the unconformable contact of the dolostone sequence with the overlying siliclastic Lynott Formation. It varies significantly in thickness and composition over its strike length and can be traced from shallow, gravelly intercepts near Cook's workings, to deep drilling in the northern Coxco Anticline. It was postulated that the 'Barney' sedimentary breccia may increase in thickness northwards and on the flanks of the Coxco Anticline. The grade and distribution of the matrix and corona style mineralisation is highly erratic with the widest grade intercepts generally closest the Emu Fault. The relative timing of this mineralisation was still unclear, with some evidence supporting an early diagenetic phase. Poorly tested but deep level 'Barney' sedimentary breccia occurs in the northern Coxco Anticline near the Emu Fault zone, though the limited drilling at the time showed only patchy, weak mineralisation too deep to be an economically viable target. The increasingly silty composition of the dolomite package with a thickening of the 'Barney' sedimentary breccia northwards, was thought to be possibly indicative of a progression from shallow to a deepening basin setting. This compositional change may adversely reduce the degree of fracturing and brecciation, hence mineralisation potential, of the carbonate host package during brittle deformation.

The bulk of the primary sulphide mineralisation underlies the 'Barney' sedimentary breccia in late, steeply angled tectonic fracture and breccia zones of the algal laminated, stromatolitic ?Teena Dolomite. Previous workers also reported a minor, early stage palaeokarstic mineralised system with colloform sulphides lining solution cavities, though this was not widely documented by North's drilling. The shallow water, carbonate package has been extensively but variably redolomitised and contains rare silty dolomite interbeds that pinch out to the east. Structural analysis of oriented drill core indicated that linear zones of fracture and breccia hosted mineralisation occur at moderate to steep angles to the Emu Fault System. There is an asymmetrical zonation to the brittle deformation, with intense fracturing and brecciation commonly developed in the footwall of reverse controlling structures. North's drilling traverses clearly showed that the dolomite sequence generally becomes increasing mineralised closer to the north-south trending Emu Fault, which is the main fluid focussing structure of the region. Most holes often showed that the widest mineralised intervals are closest to the Lynott-'Barney' sedimentary breccia/?Teena contact and decrease down hole. This may be related to enhanced brecciation of the dolomite in high strain zones due to the competency contrast of the carbonate sequence and overlying siliclastics during deformation. It was suggested that localised brecciation is also likely to occur in the hinge zones of tightly folded dolomite, mapped in the north of the prospect. Prospective areas for further drilling should therefore target dolomite immediately east of the Emu Fault zone, especially where highly deformed. Considerable potential remained south of Cook's workings where there was only minor drilling of the 'Barney' sedimentary breccia or underlying fracture/breccia controlled mineralisation close to the Emu Fault zone. There was some suggestion that north of Cook's Fault is the more mineralised part of the system, though widely spaced core drilling with infill RC holes was required in the south to more adequately test this assumption.

It was found that the high grade, shallow base metal oxide resource is centred on the Cook's workings with extensions to the north and south. Secondary Zn-Pb significantly enriches the primary sulphide mineralisation hosted in the weathered 'Barney' sedimentary breccia and underlying dolomite package. This mixed oxide-sulphide high grade zone is at its thickest and shallowest at Cook's workings. The intense oxidation of sulphide mineralisation at shallow levels results in the dissolution of the host dolomite, which creates ideal sites for the deposition of secondary Pb-Zn minerals. Northwards, where the Lynott-'Barney' sedimentary breccia contact is at deeper levels and consequently less weathered, there is a reduction in oxide enrichment.

To the north of Cook's workings, a thin oxide rich horizon trending parallel and to the east of the 'Barney' sedimentary breccia has developed in clayey, strongly weathered fine-grained sandstones of the Cambrian Bukalara Sandstone. The oxide horizon decreases in grade and thins to the east, away from the oxidation of the dolomite hosted primary sulphides. It was recommended that further drilling was required to close off this oxide zone to the north, though the narrow widths and subeconomic grades were discouraging.

To the south of Cook's workings, the base metal oxide horizon extends for at least 600 metres, though grades are significantly lower than to the north. The extensive Zn-Pb soil anomalism that extends south past the Cox workings appears directly related to this shallow oxide enrichment. It was recommended that if further drilling was required, the program should be guided by the MIMEX soil results, though grades were likely to remain very low.

North's work demonstrated that further work was needed to test the validity of previous MIMEX drilling data before a meaningful resource could be recalculated. No new resource estimations were attempted, though it was recommended that this be completed. Based on North's results, it was recommended that any recalculations should consider using a higher SG of 2.9-3 g/cm3 for the sulphide mineralisation and recognise that the 1975 MIMEX core drilling may have underestimated and the 1996 RC drilling may have grossly overestimated the true grade of the Coxco resource. Major disparities in Pb-Zn grade were found to exist between adjacent North-MIMEX holes particularly through the shallow, mixed oxide-sulphide mineralisation. North's drilling showed that at depth, primary base metal sulphide grades were comparable between well recovered (triple tube) core and RC sampling but when testing shallow high grade oxide intervals, superior core drilling may be essential.

2.10 June 2001 to June 2002

(from letter to the Mining Registrar, from Damien Nihill, 2002).

The MIM/North Exploration Joint Venture was formally dissolved in November 2001 at which time management of this tenement passed back to MIM Exploration Pty Ltd. After an internal re-organisation, management passed to McArthur River Mining Pty Ltd (MRM), a subsidiary of Mount Isa Mines Ltd.

Mount Isa Mines Ltd. applied for a renewal of the above Authorisation with a variation in covenant in April 2002. This was argued in terms of the large expenditure reported between July 1999 and June 2001, and the fact that MRM expected to significantly reduce its cost of zinc production thereby making satellite deposits more attractive.

Expenditure for the year to June 5, 2002 was $6,900 and is itemised in Table 4. It covered administrative work, environmental field visits and tenement charges. No other significant work was undertaken during the year.

Table 4. Expenditure statement from AN366 June 2001-June 2002.

Activity	June 2000-2001	June 2001-2002
Geology	$19,575	-
Geochemistry	$7,000	-
Geophysics	$3,325	-
Drilling	$484,625	-
Tenement Charges	$0	$1440
Administration	$3,736	$3500
Rehabilitation	$13,105	$1960
Total	**$531,366**	**$6900**

2.11 June 2002 to June 2003

(from letter to the Mining Registrar, from Damien Nihill, 2003).

At the time of reporting, a feasibility study into a zinc refinery at McArthur River Mine was underway. This was scheduled for completion in December 2003. It was proposed that a decision would be made about future work on AN366. It was proposed to maintain the minimum levels of expenditure for the following twelve months. It was proposed to spend $5,000.00 in tenement charges, general administration and environmental management.

Expenditure for the year to June 5, 2003 was $5,900 and is itemised in Table 5. It covered administrative work, environmental field visits and tenement charges. No other significant work was undertaken during the year.

Table 5. Expenditure statement for AN366 June 2002-June 2003.

Activity	June 2001-2002	June 2002-2003
Geology	-	-
Geochemistry	-	-
Geophysics	-	-
Drilling	-	-
Tenement Charges	$1440	$2880
Administration	$3500	$3020
Rehabilitation	$1960	-
Total	**$6900**	**$5900**

2.12 June 2004 to June 2005

(from AN366 Annual Report, Pevely, 2005).

A review of the Coxco dataset was undertaken in order to evaluate the open cut potential of the deposit for possible production of a low lead sintered concentrate which would result from the beneficiation of the Coxco ores. This zinc oxide sinter would be used in the proposed hydro-metallurgical Albion Process for the production of zinc metal on site, facilitating the neutralisation of leachate at the end of the Albion leach process to precipitate iron from solution.

The review involved importing all drill data, geological sections and plans and aerial photography into Vulcan 3D mining software to derive a robust 3D model of the geology and mineralisation, prior to resource block modelling of the interpreted mineralisation envelope.

Also, a consultant was engaged to undertake a geostatistical study of the Coxco data in order to obtain some idea of the range of continuity of the zinc mineralisation for block modelling parameters and further drillhole spacing and orientation.

This was the first time that the Coxco data underwent a rigorous statistical evaluation and was modelled in a 3-dimensional manner to create a resource estimation that includes all of the North Ltd Mining Ltd drilling data from 1999-2000. Work included:

- Archival North Ltd data was obtained on CD from both the Brisbane and Perth offices of RTZ.
- All available drillhole assay, collar and survey files from 1960-2000 were imported into Vulcan software as .csv files and checked against existing drillhole lists.
- Digital Terrain Models of aerial photography flown over the mine in 2001 were obtained from FugroSpatial in Brisbane and the Coxco area sheet imported into Vulcan as ASCII data.
- North Ltd AutoCAD drawing files of the surface geological mapping and 11 interpreted geological sections were converted to JPEG files and imported into Vulcan and their images registered onto triangulations of the surface DTM and northing slices respectively.
- Manual digitising of the AutoCAD northing sections to derive polygons for geological domaining and construction of major faults.
- Construction of triangulated solids of the geological domains and major faults.
- Plotting of 50m spaced 1:250 drillhole sections showing geology and zinc assays
- Interpretation of nominal +1% Zn zones from the drilling sections using known vein orientations.
- Wireframing of these zones and block modelling of the wireframes.
- Compositing of +1% Zn drillhole samples.
- External geostatistical study of zinc distribution of the Coxco data in order to obtain some idea of the range of continuity of the zinc mineralisation for block modelling parameters and further drillhole spacing and orientation. The conclusions from this study are reported in the Resource Modelling section.
- Interpolation of zinc, lead, and silver grades into blocks using indicator kriging techniques outlined in the above conclusions.
- Resource Modelling within the +1% Zn mineralisation envelopes to derive tonnes and grade for an indicated /inferred estimate oxide and fresh mineralisation.

2.12.1 2005 Conclusions and Recommendations

Previous and current resource calculations at Coxco show the deposit to be clearly too low grade to excite interest at current metal prices.

The main hurdles at Coxco are in understanding the complex juxtaposition of several styles of primary and secondary mineralisation, each with their own inherent complexity adjacent to the major transpressive Emu fault. Work completed by North Ltd has largely elucidated the orientation and frequency of the fracture and breccia-controlled mineralisation within the Teena Dolomite slump breccia and discounted the prospectivity of mineralisation within the Barney sedimentary breccias as they plunge northward parallel to the Coxco anticline.

Remaining interest must focus on defining the extent of known mineralisation with future drill design accommodating known control orientations of brecciation and veining. Further work at Coxco should entail the following:

- Selection of the high grade oxide/sulphide area B for systematic 20x20 pattern diamond drilling to further define the topography of the oxide blanket and provide additional close spaced data for variographic studies.
- The holes should be inclined towards AMG 110 to best assess the WNW-dipping breccia-hosted mineralisation while holes inclined towards AMG 300 would best assess veined volumes and extension direction within much of the vein network breccias (Hinman, 2000).
- If drilling is continued on AMG E-W sections for convenience, some south declined drilling would also be needed to assess the steep northerly component on dip on the WNW-dipping breccia hosted mineralisation to establish between-section continuity of mineralisation as well as assessing the grade and volume of veined material between breccia zones (Hinman, 2000).
- All drilling should be diamond HQ triple tube through the oxide blanket to maximise recovery in this zone.

2.13 June 2005 to June 2006

(from letter to the Mining Registrar, from Stephen Pevely, 2006).

The Coxco resource, whilst currently uneconomic due to low zinc grade (as described in the 2005 annual report), still remains a potentially important low-lead zinc resource for future mining and processing scenarios at McArthur River Mine. McArthur River Mining (MRM) continues to progress the study into the feasibility of utilising downstream processing and expanded mining operations through the Xstrata Albion metallurgical Process which may require low- lead Coxco ores as part of the beneficiation.

Expenditure for the year to June 5, 2006 was $10,500 and is itemised in Table 6. It covered administrative work, programme review, site visits for boundary rehabilitation and licence renewal fees. No other significant work was undertaken during the year lack of exploration capital arising from the dominance of the Open Pit Expansion project at McArthur River Mine.

Table 6. Expenditure statement for AN366 June 2005-June 2006

Activity	Cost ($)
Administration/Programme Review	2,500
Licence Renewal Fees	3,200
Site visit/ Boundary Rehabilitation	5,000
Total	**10,700**

2.14 June 2006 to June 2007

A decision was made during the period to focus 2007-2008 exploration activities solely on the Amelia Prospect. This decision was made given the large amount of research completed by previous workers on the Coxco Prospect (e.g. Logan, 1997; Pevely, 2005). In comparison, there is relatively little work completed on the Amelia Prospect, warranting further investigation of this highly prospective area.

2.15 June 2007 to June 2008

Due to the loss of Geoscientific staff early in 2008, coupled with the ongoing shortage of exploration geologists throughout 2008, no significant exploration was completed on either AN366 North or South during the the 2007-2008 reporting period.

Table 7. Estimated expenditure for 2008.

Activity	Estimated Cost ($)
Administration	1,500
Report Writing	1,000
Total	**2,500**

The covenant for 2008 was $15,000. A variation of covenant letter was included on the submittal of the Annual report.

2.16 June 2008 to June 2009

In the reporting year 2008-2009, work focussed on refining the geological block geometries utilising detailed drill section information gathered during the North Ltd drilling (1999-2001). This work was designed to aid additional drill targeting for a 2009-2010 diamond drilling programme. In addition, North Ltd detailed surface mapping (Selley, 1999) was registered to provide some surface constraint to fault, stratigraphic, base of oxidation and base of Cambrian Bukalara Sandstone 3D geometries. In detail:

- Nine sections were structurally re-interpreted.
- These nine sections were digitised and registered within the VULCAN Coxco model.
- Selley's (1999) interpretive map was draped on topography within the VULCAN Coxco model.
- Important surfaces were re-interpreted and triangulated using the new section and surface constraints.
    - The included: 3 strands of the Emu Fault Zone, the Coxco Fault, a NW-SE Fault that cuts the Emu Fault Zone just south of Cook's', the base of Barney Creek-Lynott Formations (top of 'Coxco Dolomite' Member), the base of oxidation and the base of the Cambrian Bukalara Sandstone.
- Detailed review of all the historic drilling results in the context of the new sub-surface geometries highlighted sections for infill and/or extension-to-depth drilling. Table 8 presents potential drill targets and the two highlighted targets on sections 2950N and 2775N chosen for 2009-2010 drilling.

Table 8. Potential Coxco diamond drilling targets.

Rank	Section	Target Position	Target RL	DDH meters
3	3100N	closer to Emu Fault	9900RL	
3	3050N	between Emu Fault and Coxco Fault	9900RL	
3	3000N	below DDH D92 intercept	9850RL	
3	**2950N**	**between Emu Fault and Coxco Fault**	**9900RL**	**~300**
2	2900N	between Emu Fault and Coxco Fault	9850RL	
1	2875N	above Coxco Fault intercept with Emu Fault	9850RL	
2	2800N	infill between 2 DDH's on section	9975RL	
3	**2775N**	**between Emu Fault and Coxco Fault**	**9975RL**	**~150**
2	2700N	at projected Coxco Fault	9975RL	

The 2950N and 2775N sections with the proposed diamond drill holes from the VULCAN model are presented below in Figure 1 and Figure 2.

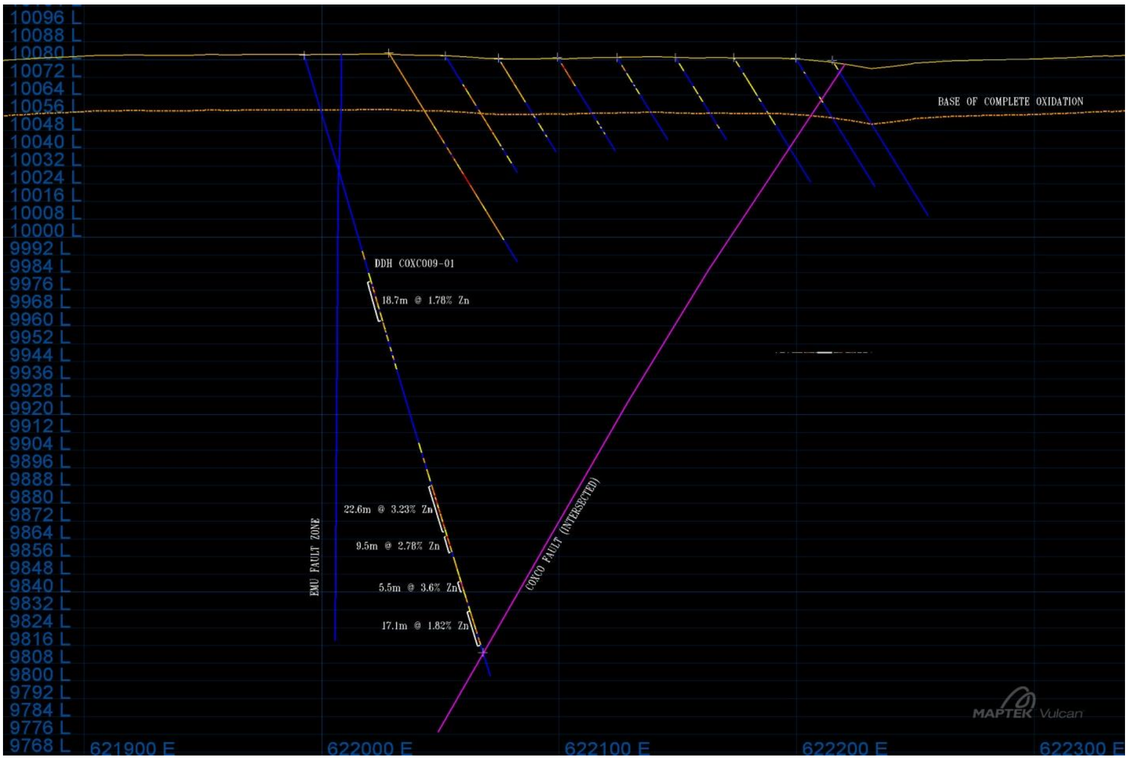

Figure 1. Section 2950N with proposed DDH Coxco2009-01.

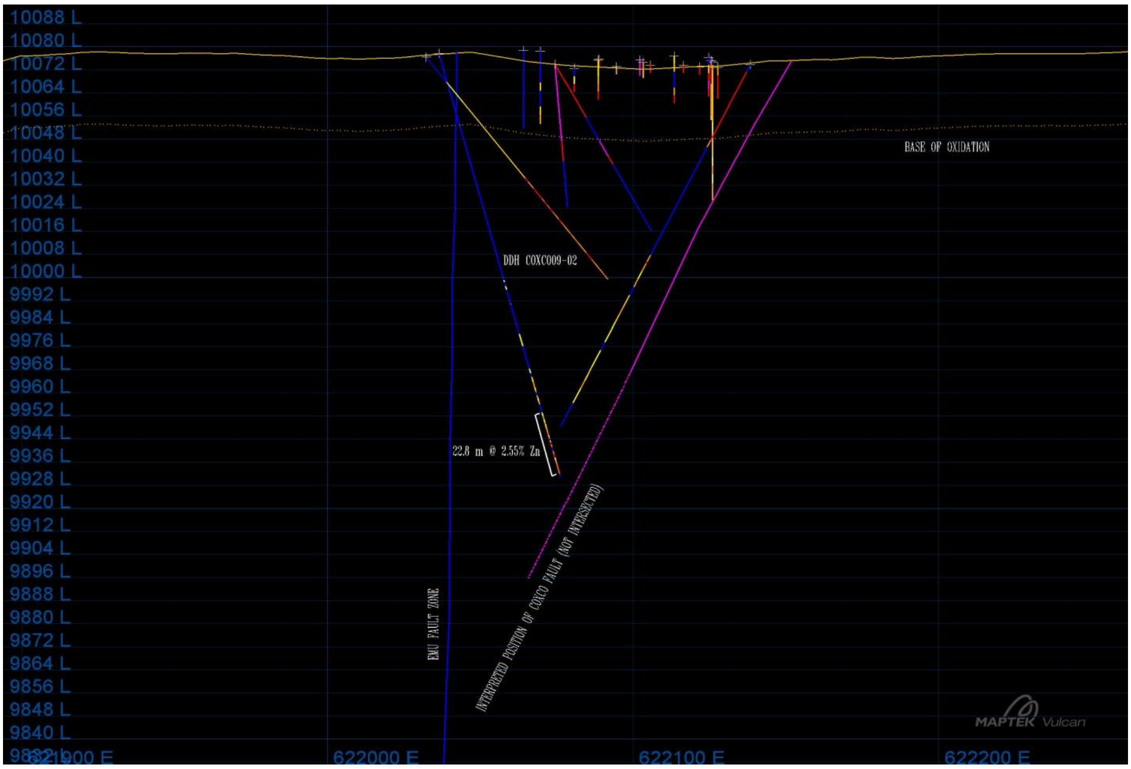

Figure 2. Section 2775N with proposed DDH Coxco2009-02.

2.17 June 2009 to June 2010

- Identification of old (1990's) vehicle access tracks to the east of the mine from satellite imagery (Google Earth).
- Conversion of lat/long waypoints of track into AMG and input to GPS.
- Re-flagging of old vehicle access track by Mine Surveyors using RTK (Real Time Kinetic) GPS.
- Re-establishment of this 10km of access track using a D10 dozer.
- Pegging of x2 diamond drill hole collars using RTK GPS.
- Digging of x2 drill sumps near site using mine site backhoe.
- Provision of water to sumps from the nearby PVC capped COXCOD40 with down hole submersible pump and power from hired generator.
- HQ and NQ diamond drilling totalling 442.9m (Table 3).
- Survey of completed collars with RTK GPS.
- Structural logging of oriented core.
- Core photography.
- Cutting, sampling and analysis of 275 core samples.
- Drill site rehabilitation.
- Consultant's structural report.
- Preparation of annual report.

Between July 22nd and 5th August 2009, May Drilling Pty. Ltd completed two diamond drill holes, Coxco09-01 and Coxco09-02 totalling 442.9m, aimed at testing targets identified in Table 9. 2009 drillhole collar data.

An experienced structural geologist, Dr Mark Hinman, who had previously worked on the Coxco prospect in the late 1990's with North Ltd, was engaged to supervise this drilling and to complete a detailed structural analysis of the oriented core.

The conclusions of his report (Hinman, 2009) are summarised below.

The aims of this drilling program, within a strictly defined budget were, therefore: (1) to extend resources into untested volumes of likely-significant mineralisation, (2) provide detailed structural logging on infill sections where adjacent sections were structurally well understood allowing attempts at between-section correlation, and (3) with additional high quality sample and assay data, to allow a further refinement of the deposit's variography, building towards a more robust resource estimation.

Table 9. 2009 drillhole collar data.

Hole No.	Easting (AMG)	Northing (AMG)	RL	Azimuth	Incl	Total Depth
Coxco09-01	621992.6	8172927.1	10081.9	085	-74	290.7
Coxco09-02	622036.4	8172786.4	10077.7	090	-75	152.5

2.17.1 2009 Summary of Results

Both drill holes intersected moderate-strongly mineralised intervals within the target Coxco Dolomite breccia complex (Figure 1 & Figure 2). Coxco09-02 was stopped in mineralisation before hitting the Coxco Fault target due to cost constraints. A total of 275 ½ NQ and HQ core samples were submitted to North

Australian Laboratories for analysis for Zn, Pb, Ag , Fe and Cu. A total of 20 1/4 core duplicates and 10 non-mineralised W-Fold Shale blanks were inserted into the sampling sequence for QA/QC.

Conclusions reached in 2009 were:

- Moderate to steep WNW-dipping control structures have been qualitatively confirmed to control the majority of the breccia hosted mineralisation within the 'Coxco Dolomite' at Coxco.
- Significant untested deeper potential exists within the Coxco Dolomite, in particular, for higher grade mineralisation, along the hypothesized shallowly north-plunging intersection of the Coxco Fault and Emu Fault Zone.
- Both 2009 MRM drill holes targeted deeper levels than had up till now been tested on each of their sections. Both holes returned qualitatively excellent mineralised intersections at depth with Coxco2009-02 terminated in mineralisation.
- Quantitative analysis of metal budgets associated with different fault orientations awaits assay results and should be reviewed with past North Ltd data when available.
- The structural analysis suggests that the Coxco Fault may wrap into an Emu orientation at its southern termination and it is suggested that it may in fact be the same structure as the third Emu Fault strand mapped to the south of Cook's.
- Mineralised breccias, breccia veins, vein networks and veining are asymmetrically zoned around controlling reverse faults or major fractures. These control structures were generated in a localized shortening regime generated within the constraining geometry of the eastern portion of a sinistrally transpressive, positive flower structure at Coxco. Fine fracturing and veining have Riedel geometries with respect to shear failure on the control faults within the 'Coxco Dolomite'. Variable vein orientations reflect inhomogeneous local shortening directions during ongoing deformation of the 'Coxco Dolomite'.
- The 2009 MRM drilling confirms that fracture vein orientations remain sub-parallel to past MIMEX AMG 060° and AMG E-W grid drilling. Although the veined mineralisation's contribution to the total metal budget may be small, a careful assessment of grade within the veined zones remains critical to any resource evaluation.
- The losses of high grade mineralisation to karsting at the oxide-sulphide interface may be significant. An assessment of the cavity network, and the detailed geometry of the oxide-sulphide interface, will be a necessary component of future resource estimates.
- VULCAN™ sections should be reworked to show the re-interpretation of the southern extension of the Coxco Fault in the Cook's area. The projected intersection of the curvilinear Coxco Fault and Emu Faults should be carefully modelled and targeted in future drilling.
- The orientations and correlations of mineralisation control faults should be re-interpreted on all North Ltd and MRM sections to reflect the higher confidences now placed on control structure orientations. 3-D correlations between sections should now be attempted in VULCAN™.
- North Ltd. drill core structure and lithological logs should be recast into MRM digital log format for incorporation into the VULCAN™ 3D model.
- When control structure geometries and their correlations have been resolved, a new statistical appraisal of the Coxco data should be undertaken to tighten understanding of the system's variography.
- Re-appraisal of the Geostatistics of the deposit with the additional 2009 drilling results to establish parameters for suitable non-linear methods of interpolating zinc grades in a structurally complex environment with a highly positively skewed grade distribution.
- Maximise sample support by drilling of minimum HQ size core accompanied by whole core analysis.

Table 10. Coxco drilling significant +1% Zn intersections extracted from drillhole data using the inter-select compositing utility in VULCAN™ software with waste absorption maximum length of 1.0m

Hole No.	From	To	Width (m)	% Zn
COXCO09-01	105.3	124	18.7	1.78
COXCO09-01	200.3	222.9	22.6	3.23
COXCO09-01	224	233.5	9.5	2.78
COXCO09-01	245.5	251	5.5	3.60
COXCO09-01	252.95	257.3	4.35	1.87
COXCO09-01	259.9	277	17.1	1.82
COXCO09-02	129.2	152	22.8	2.55

2.18 June 2010 to June 2011

Exploration activities were strongly affected by a critical technical staff shortage experienced during 2010/2011 that included the absence of a Senior Geologist. This resulted in the proposed diamond drilling programme being postponed until the MRM Geology Department could be adequately staffed.

2.19 June 2011 to June 2012

A drill rig mobilised to commence drilling the Coxco deposit during the latter part of 2011, was impacted by unfavourable weather conditions (early rain) resulting in impassable tracks cutting drill site access. Drilling activities were subsequently postponed until the 2012 field season. Exploration activities included:

- Review of historical drilling results, focusing on data from the 2009/2010 diamond drilling campaign.
- Review and prioritisation of targets generated from the 2009 Coxco report (Hinman, 2009).
- The design of two HQ3 diamond drill holes.
- Drill site access track surveyed and flagged by Mine Surveyors.
- Track re-established using a grader to enable light vehicle and drill rig access.
- Two diamond holes pegged and pad prep work initiated (Figure 3 & Figure 4).
- Potential bores, suitable for the provision of water for drilling requirements, identified and marked in the field.

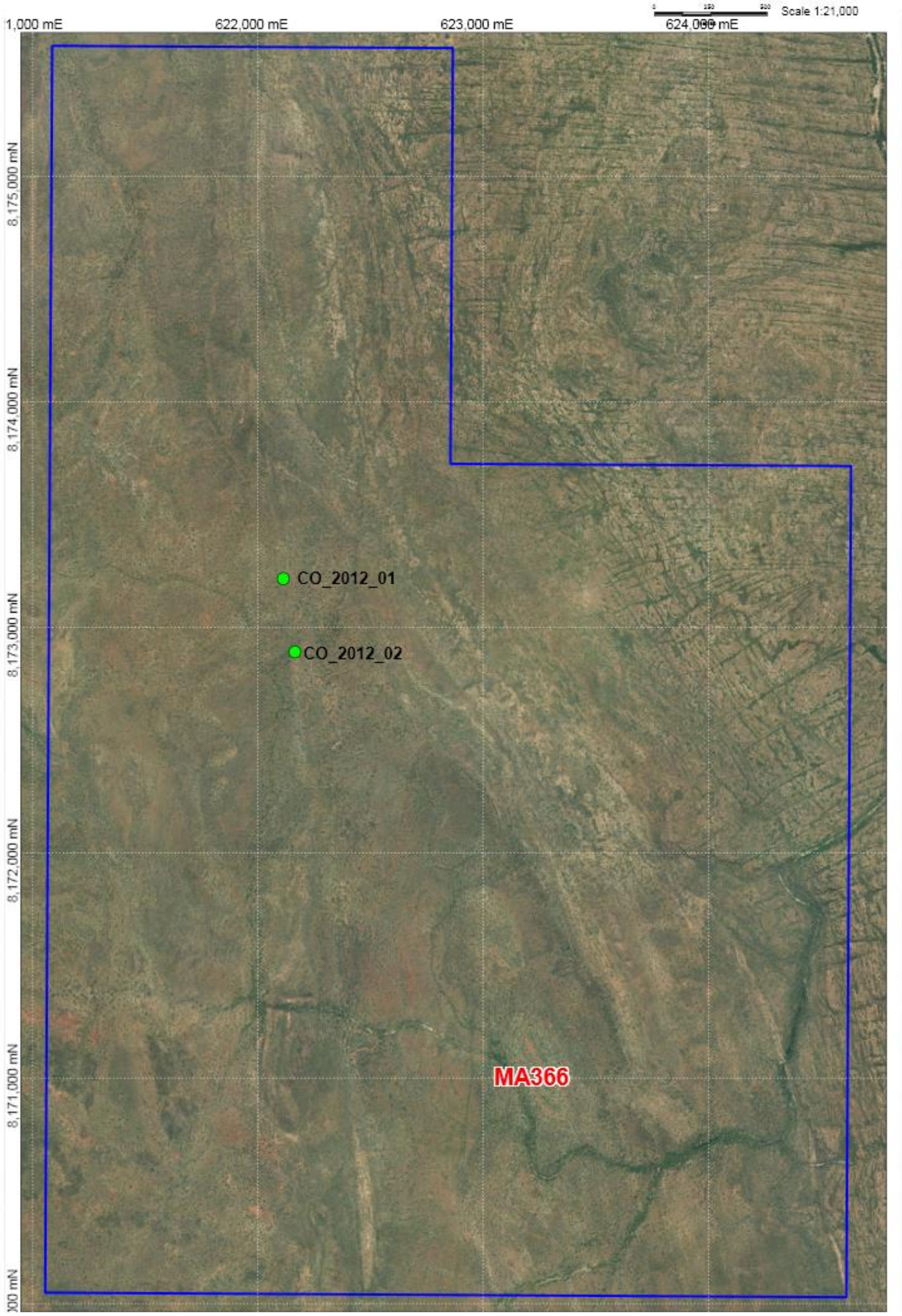

Figure 3. Coxco 2012 Drilling Programme – proposed collar locations overlaying MA366 lease boundary and 2007 aerial photography (MGA94). CO_2012_02 was not drilled.

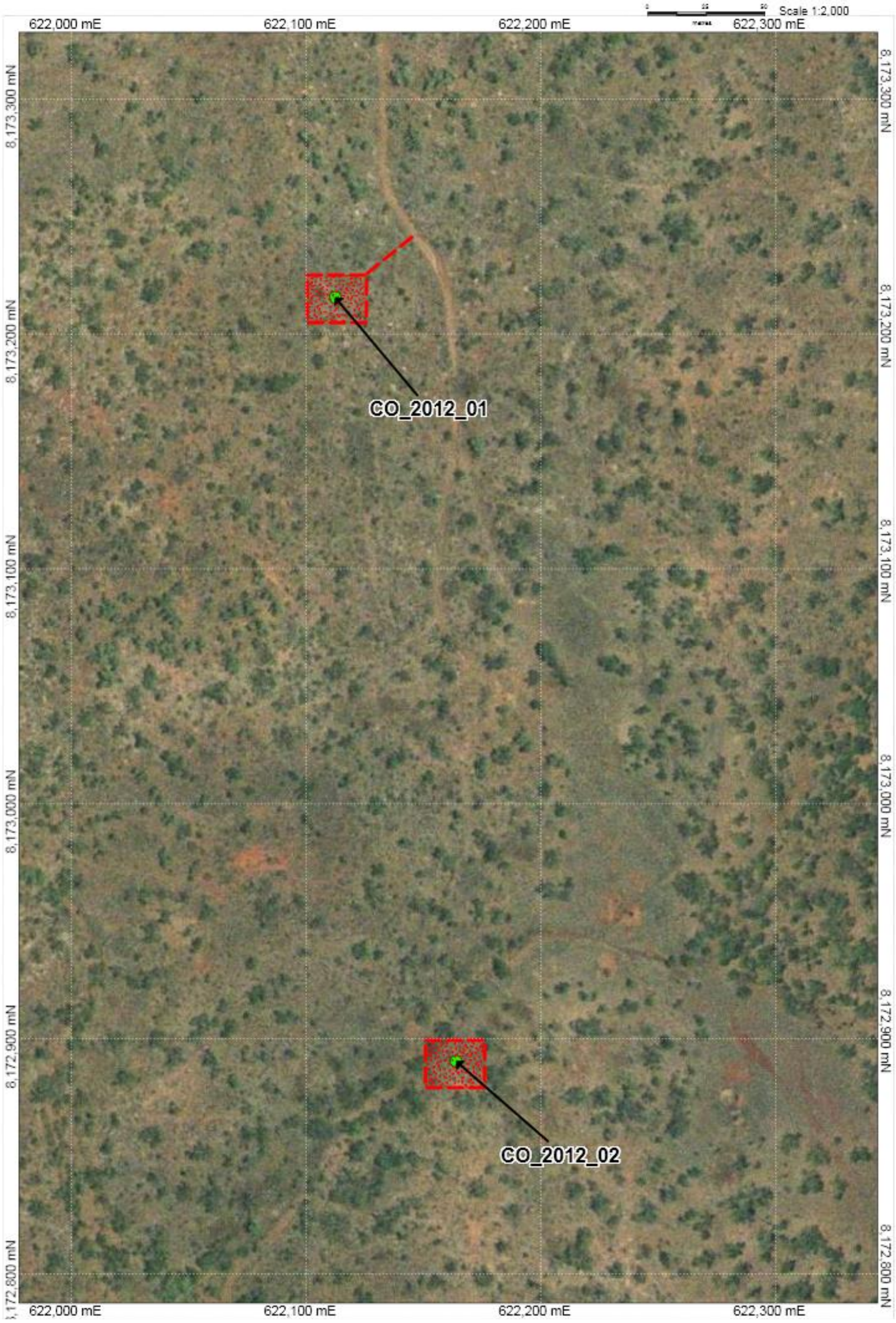

Figure 4. Coxco 2012 Drilling Program illustrating drill site clearing requirements overlaying 2007 aerial photography (MGA94). CO_2012_02 was not drilled.

2.20 June 2012 to June 2013

One HQ3/NQ2 diamond drill hole, targeting high grade, breccia and vein hosted Zn-Pb mineralisation within the Coxco Dolomite breccia complex, was drilled to 340 metres final depth. HQ3 core was recovered to 149.62 metres and NQ2 core from 149.62 metres to final depth of 340 metres. It was necessary to case the HQ3 hole at 149.62 metres and continue drilling NQ2 due to the high risk of losing the drill string in heavily broken ground.

The intent of the drilling program was to provide detailed structural logging data on the northern extents of known coarse grained mineralisation, to investigate 'along strike' correlation and better understand geological control. It is anticipated the additional data will assist in further developing our understanding of the system's variography, leading to a more robust resource estimate.

HQ3 and NQ2 core was sampled at one metre intervals or shorter when confined by geological boundaries. The hole was terminated after intersecting the Coxco Fault and encountering 'barren' dolomitic shales.

Weak to moderate breccia and vein-hosted mineralisation was logged within the interval 105 – 328 metres (Figure 5 & Figure 6).

Figure 5. CO_2012_01 (114.50 – 118.20 metres).

Figure 6. CO_2012_01 (118.20 – 121.60 metres).

2.21 June 2013 to June 2014

Sampling and geochemical analysis were completed on the drill hole drilled during the previous reporting period. Samples were taken at one metre intervals unless major geological contacts were defined. Analytical data was appended to the exploration database as well as modelled in Vulcan. Subsequent interpretations were made comparing intersections logged from previous drilling programs. Major intersects from the 2012 drilling program are shown in Table 11.

Table 11. Major intersects of anomalous zinc in the CO_2012_01 drillhole.

Depth From (m)	Intersect	Sub-intersect	Zn (%)	Pb (%)	Ag (ppm)
107.13	17.87m		4.33	0.79	2.27
115		1m	15.45	5.77	8.4
120		2m	11	2.17	5.2
93	6m		3.1	.31	3.2
205	7m		2.24	.11	0.68
194	5.5m		2.55	0.22	1.06

It was noted that anomalous zinc intersects from CO_2012_01 did not appear to correspond with existing 1%Zn shells (Figure 7). In addition, there are no other drill holes at depth in the immediate vicinity, making redefinition of >1%Zn shells and overall update of resource estimate difficult.

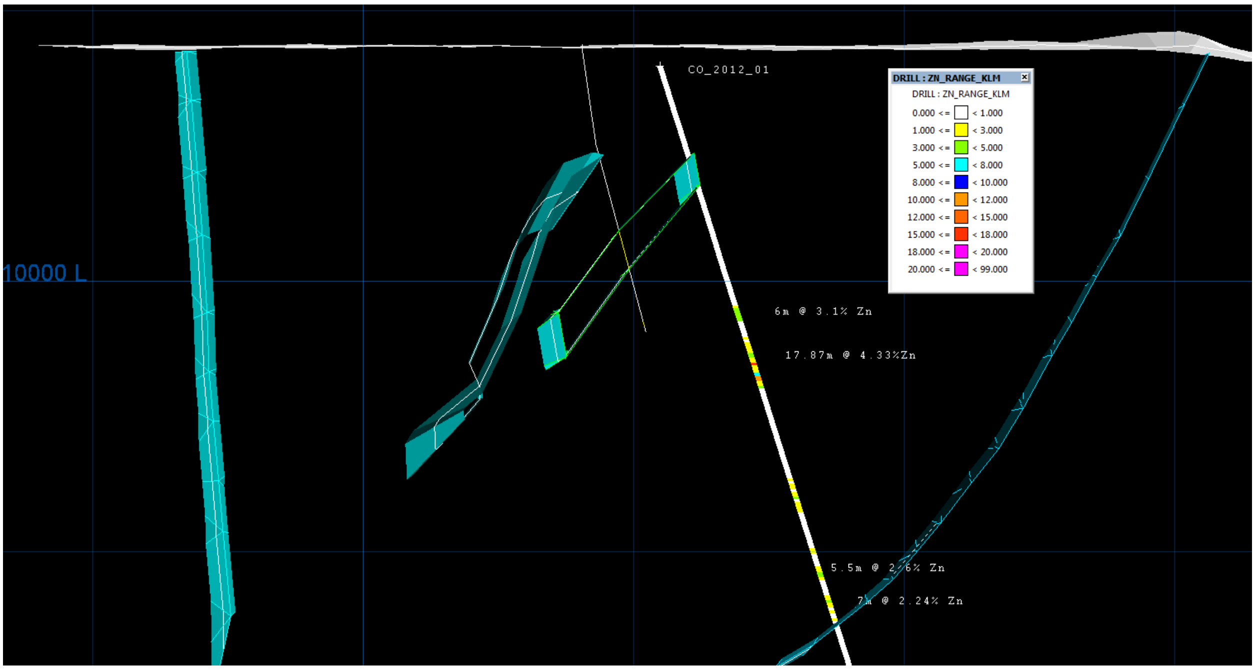

Figure 7. Cross section of CO_2012_01 at 3210N; modelled with Zn >1% shells are also modelled along with Cook's fault in the east and Emu Fault in the west.

2.22 August 2014 to August 2015

A request was made to the Department of Mines and Energy on 26th November 2014, for the addition of MA366 to the amalgamated reporting group GR083. This was subsequently granted on 1st June 2015. As such, the reporting period for MA366 has been extended to 20th August 2015.

There were no exploration activities on MA366 North during the 2014/2015 period.

2.23 August 2015 to August 2016

A new resource model for the Coxco deposit was generated for this reporting period and included the following updates:

- Reinterpreted geological and mineralised wireframes using Leapfrog; and
- An updated Ordinary Kriged estimate to include assay results from the 2012 drilling.

Mineralisation wireframes were generated using the interval selection method in Leapfrog which is shown below in Figure 8. This, coupled with the vein modelling tool allowed for easy manipulation and interpretation of the hangingwall and footwall surfaces, but also the clipping of merging or bifurcating lenses (Figure 9).

While 6 individual lenses were modelled (A to F), only 3 (A, B and C) were estimated in the block model as the other 3 zones are only weakly mineralised (Figure 10).

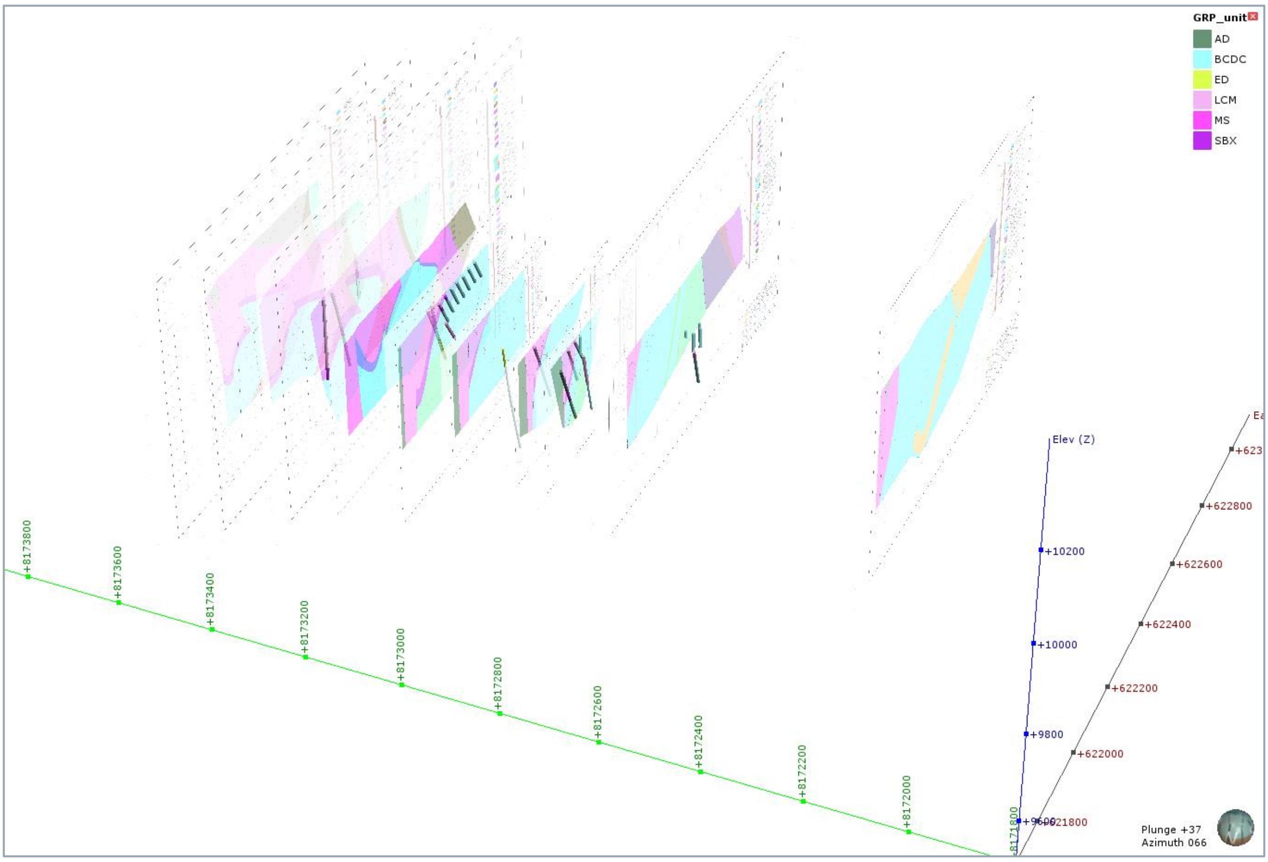

Figure 8. Cross sections used for building the Coxco 2016 model.

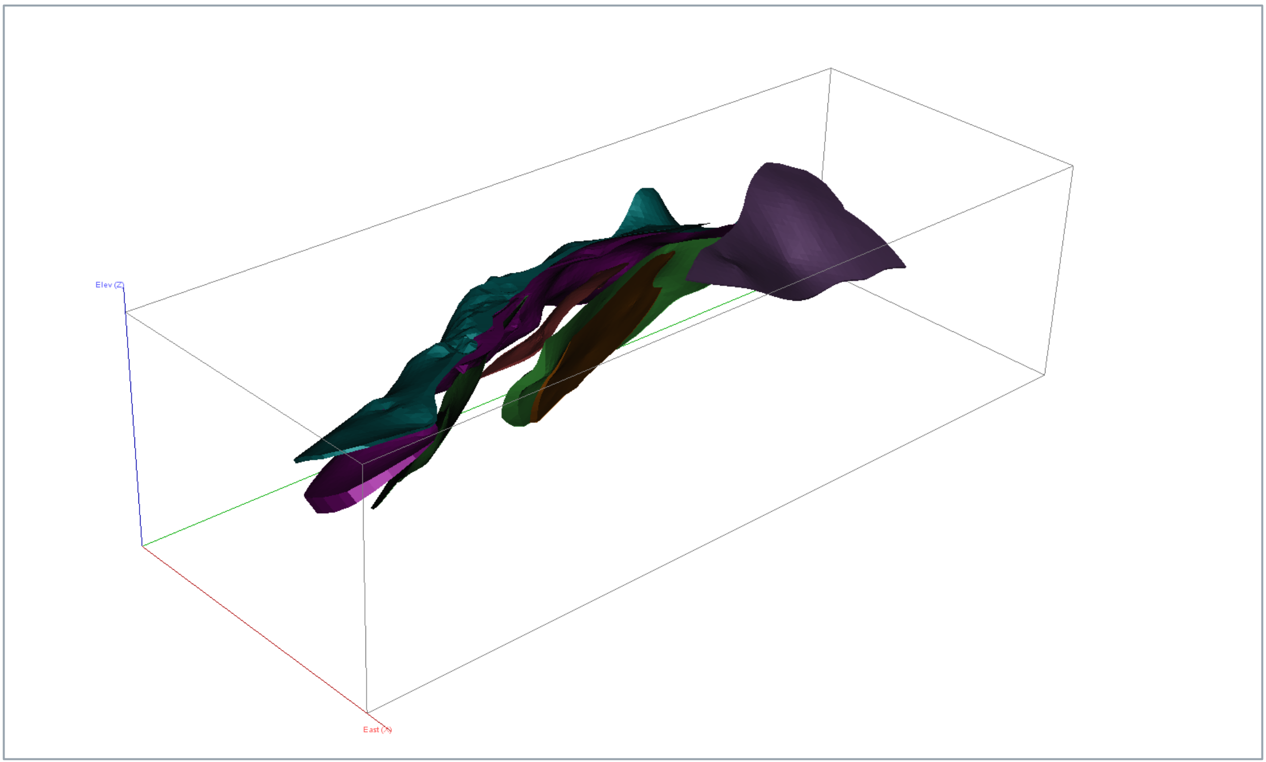

Figure 9. Mineralised lenses A to F.

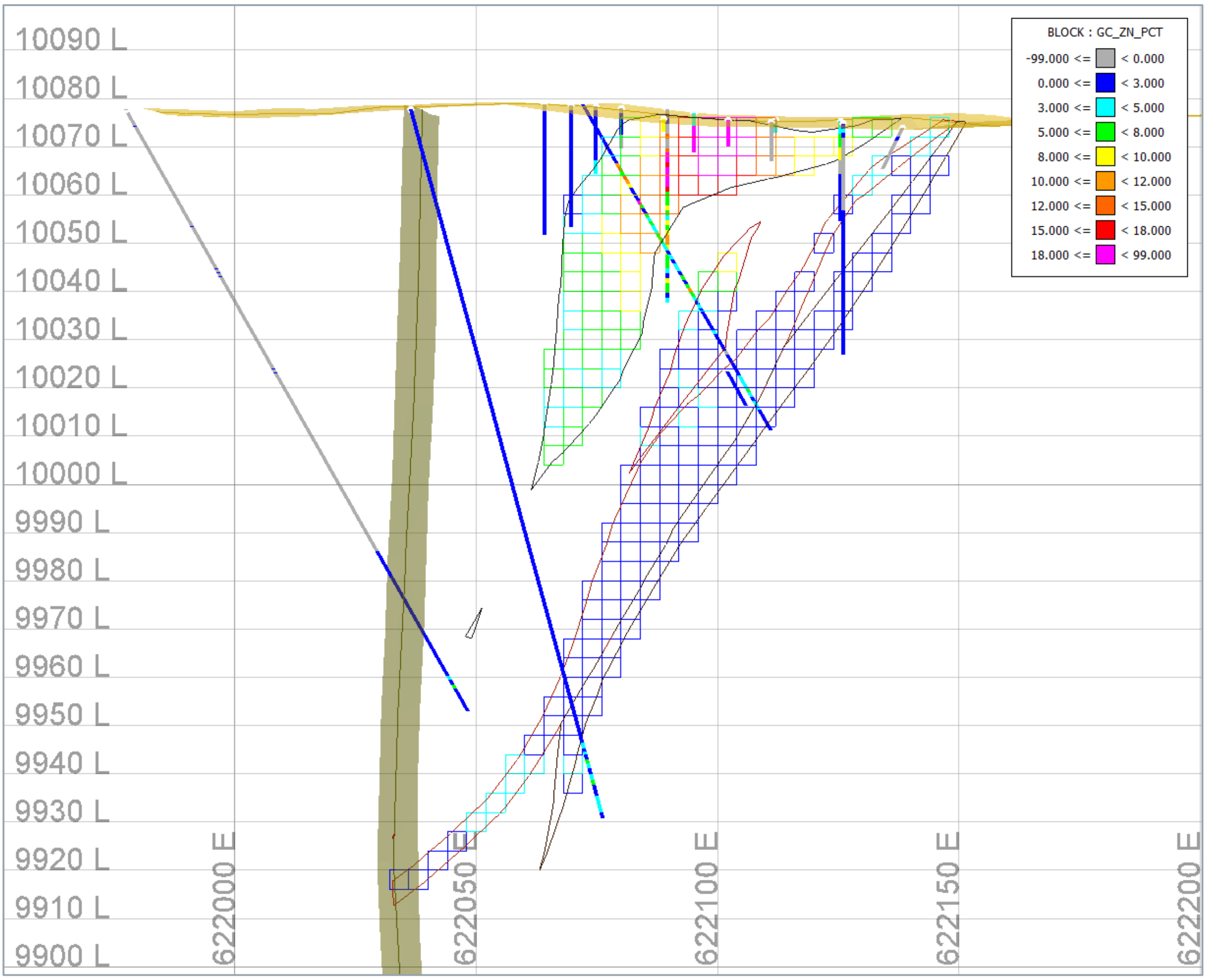

Figure 10. Cross-section 8172800mN looking north of the Coxco 2016 block estimates against drill holes.

Results from RC samples were not used in the estimation due to the variability and uncertainty of the assayed grades, as outlined in the 2005 annual report (Pevely, 2005). The report outlined potential underestimation in the oxide zone and a slight over estimation in the primary zone. This was attributed to the following:

- Unfavourable RC drilling orientation (drilling sub-parallel to narrow, high grade structures);
- Downhole RC sample contamination by very high grade, oxidised, supergene mineralisation;
- Poor recovery of wet and dry samples when drilling through cavities; and
- Highly variable grade distribution in the cavernous, intensely weathered oxide zone.

The Coxco 2016 Mineral Resource is summarised below in Table 12 and Table 13 using a cut-off grade of 2.5% Zn. It must be noted that the Mineral Resource is unconstrained and that further work would be needed to assess the true recoverable Mineral Resource using a series of optimised pit shells and geometallurgical test work.

Due to the lack of density data, all blocks which satisfy the criteria for a Measured Resource were downgraded to Indicated.

Table 12. Coxco 2016 Mineral Resource using a cut-off grade of 2.5% Zn.

Resource Category	Tonnes (Mt)	Zn %	Pb %	Ag ppm
Indicated	3.3	4.32	0.88	2.60
Inferred	2.2	3.71	0.66	3.08
Total	**5.5**	**4.08**	**0.77**	**2.79**

Table 13. Coxco 2016 Indicated Resource by material type using a cut-off grade of 2.5% Zn.

Material Type	Tonnes (Mt)	Zn %	Pb %	Ag ppm
Oxides	0.7	5.81	1.80	0.63
Primary	2.6	3.92	0.64	3.13
Total	**3.3**	**4.32**	**0.88**	**2.60**

Figure 11 below represents the grade tonnage curve for oxide and primary resources.

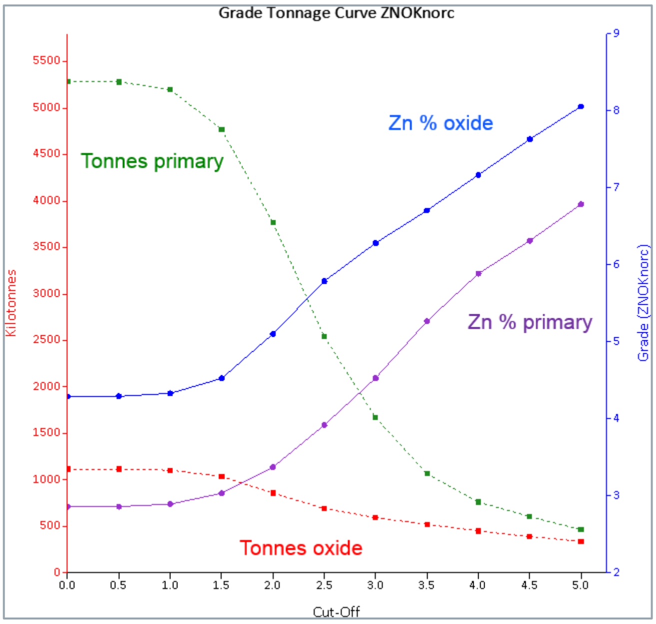

Figure 11. Grade tonnage curve for all resource categories.

Other work completed for this reporting period included:

- The collection of 12 rock chip samples.

2.24 August 2016 to August 2017

A soil sampling campaign was completed on MA366 which amounted to 167 samples, shown in Figure 12 below. This targeted the old line of workings and surrounding area. Only residual paleo-surfaces were sampled.

Peak sample results included 304ppm Cu, 653ppm Pb and 2130 Zn with anomalous results returned for a 1.7km trend running N-S from the Coxco workings. A thematic map of returned results is shown in Figure 13. below.

Results of the XRD samples sent off to ALS laboratories in Brisbane were received during the reporting period an a comprehensive report by a consultant geologist was completed – See Elliston, A 2017.

Acquisition of high resolution satellite imagery from Geoimage was also undertaken during the reporting period and is shown in Figure 12 below.

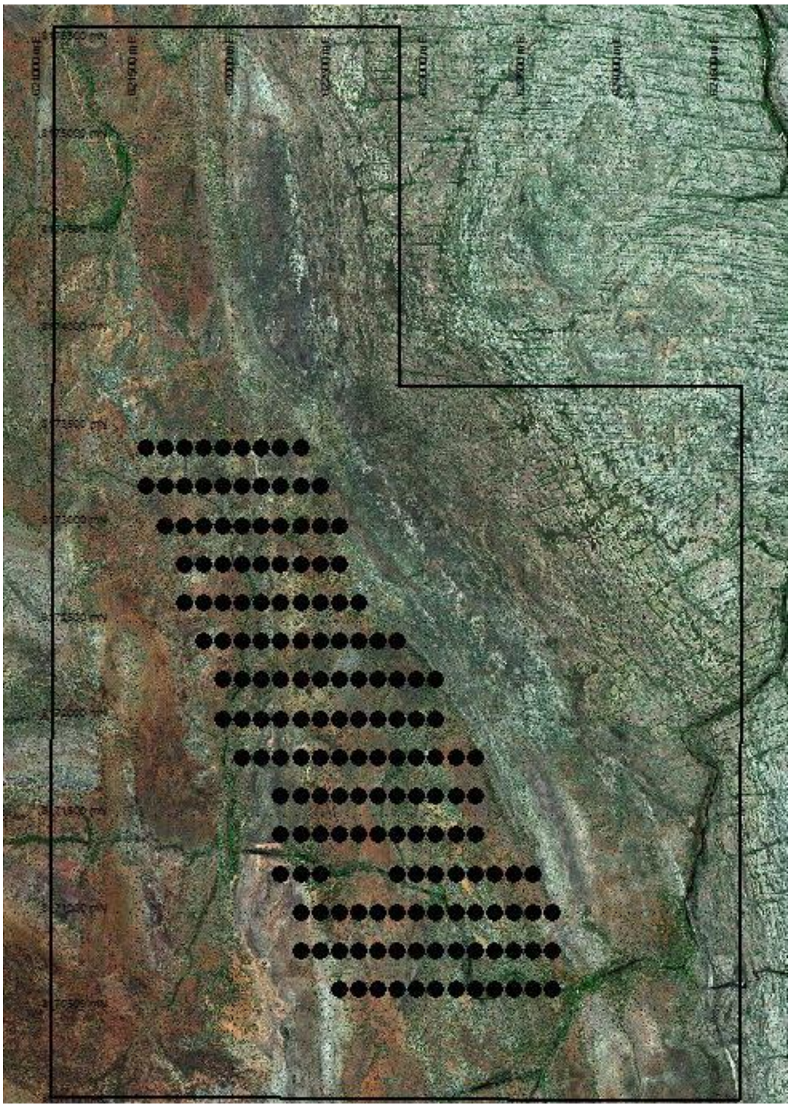

Figure 12. Coxco soil grid in relation to MA366 North with new high resolution imagery.

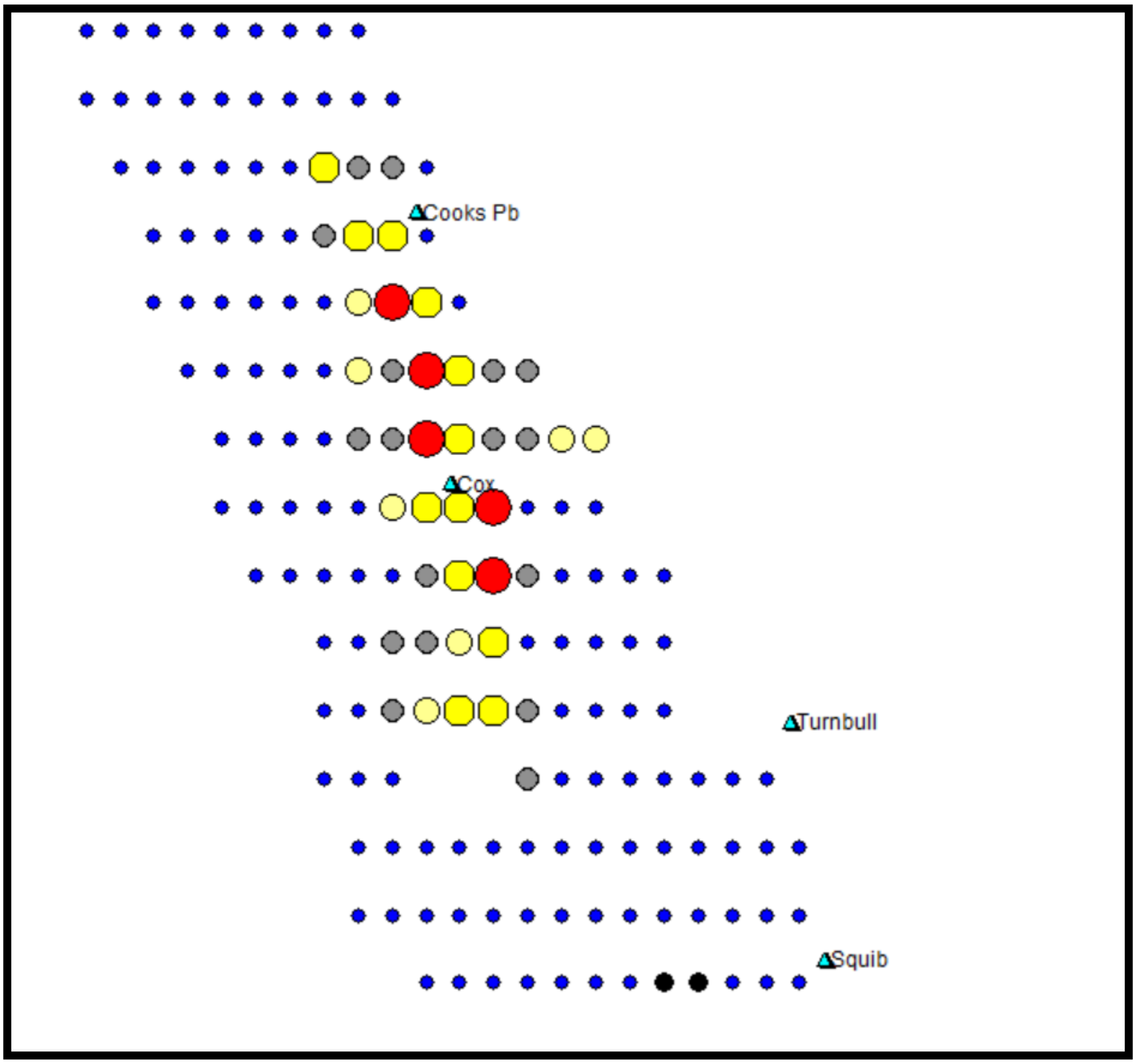

Figure 13. MA366 Thematic map showing Zn results from the 2016/17 soil sampling program.

2.25 August 2017 to August 2018

The scheduled Portable Electro-magnetic survey for MA366 was not completed due to the company senior geophysicist determining the data compiled in the previous working year was not of acceptable quality to warrant the continuation of the program.

Recovery of historical geophysical data was completed and data was processed and used for the production of geophysical maps and images. Reconnaissance and familiarisation of the tenement was carried out for the benefit of graduate geologists. The main access road to the tenement was graded, which had not been carried out for 6 years.

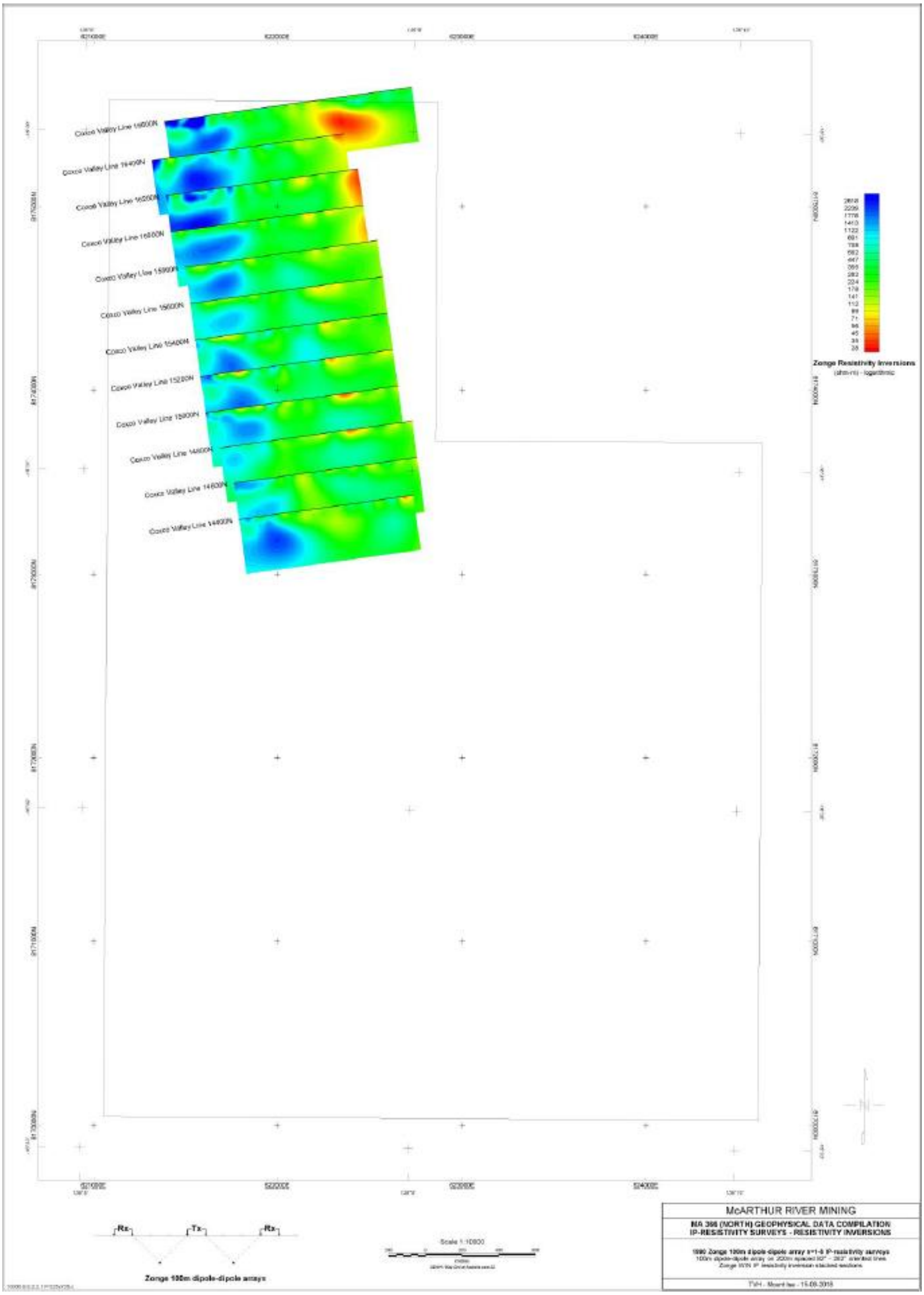

Figure 14. MA366 (North) stacked resistivity inversions

3.0 Amelia (AN366/MA366 South) Exploration History – Pre-1974 to August 2018

(Note: Sections 3.1 to 3.7 modified from McIntyre, D.M., 2007, AN366 Annual Report 2007).

The Amelia Prospect has had an active exploration history, dating back to its initial identification in 1957. A summary of changes to the tenement coverage for the Amelia area are given in Section 3.1.

3.1 Tenement History

Since the 1950's the Amelia Prospect area has been covered by numerous tenement and exploration lease agreements of vastly varying sizes. A summary of the history of tenement coverage including the Amelia area is presented in Table 14. (NOTE: During the 1980's and 1990's the Amelia area was covered by Mining Reserve 581 and Reservation Order (RO) 581, preventing other companies from seeking ground within the area).

Table 14. Historic tenements covering the current Amelia Prospect area.

Tenement Name	Year Granted	Year Ceased	Area (km^2)
AP510	1957	1962	6178
AP597	1972	1977	1260
AP983	1962	1963	>15000
AP1748	1967	1968	8945
AP3319	1971	1972	3998
AN314	1980's	1992	Unknown
AN366	1992	-	16

3.2 Pre-1974 Exploration

The Amelia Prospect anomaly was first identified via a regional stream sediment sampling program during the 1957 field season. This survey recorded anomalous base metal values of 1200ppm Zn, 1000ppm Pb and 800ppm Cu from over the Amelia area. Prospecting over the extent of the anomaly recorded the presence of vein hosted base metal mineralisation within dolomitic lithologies in the Amelia area (Wilkin – Smith, 1972).

In 1971 a grid based soil sampling program defined the extent of the anomaly, with a follow up induced polarisation survey enabling the definition of the first drilling targets within the prospect (Wilkin – Smith, 1972).

Wilkin - Smith et al. (1972) conducted 1:5000 scale lithological mapping over the Amelia Prospect, with the area covered by the Amelia South 1:5000 map sheet.

This mapping formed part of a larger mapping program focused along the strike extent of the north – south trending Emu Fault system, and produced 19 separate map sheets of varying detail.

3.3 1990's

Wilkins (1991) remapped the Amelia Prospect and produced a detailed 1:5000 scale interpreted surface geological map, strongly focussed on deciphering the complex structural history of the prospect. The surface structural data gathered for this investigation is of exceptional quality, but Wilkins was limited in the construction of cross sections due to a lack of detailed structural data at depth.

James (1995) expanded on the mapping of Wilkins (1991) by producing a series of detailed cross sections spaced at 200m along Amelia local grid northings. Diamond drilling completed post 1991 provided James with data on the nature of structural controls at depth below the Amelia Prospect. This enabled the construction of interpreted cross sections, utilising the surface outcrop and structural data of Wilkins (1991), and drilling data acquired from recent drilling campaigns.

Detailed structural investigations conducted in the 5 years prior to 1996 defined areas of high potential for mineralisation within the Amelia Prospect. These areas are associated with the intersection of second and third generation structural features, namely the intersection of the Gap Fault with the Lamont and Casey Fault Zones.

Between the disbanding of Mount Isa Mines Exploration division in September 1996, and the 2006-2007 reporting period, minimal exploration work was conducted on the Amelia Prospect.

3.4 June 2006 to June 2007

The work completed on the Amelia Prospect during the 2006-2007 reporting period is summarised below.

Table 15. Work completed during the 2006/2007 reporting period.

Task	Days	Cost ($)
Literature Research	7.5	3,750
Data compilation and reporting	2.5	1,250
Field reconnaissance	2.5	1,250
Vulcan modelling	5.5	2,750
Total	**18**	**9,000**

3.4.1 Literature Research

A review of the MRM near mine exploration archive revealed a lack of data relating to the Amelia Prospect. This prompted a search of the Minerals and Energy Information Centre (MEIC) archive, which revealed a large amount of historical exploration data covering the Amelia area, dating back to 1957. The last significant reports accessed from the MEIC archive dated to the mid 1970's, meaning that known Mount Isa Mining Exploration (MIMEX) division reports from the 1990's were yet to be located.

It was discovered that data collected by MIMEX was relocated to the Xstrata Copper Exploration archive in Mount Isa. A trip to this archive facility resulted in the collection of a large amount of data relating to the most recent drilling in the Amelia Prospect.

3.4.2 Field Reconnaissance

Three days of field reconnaissance were conducted over the Amelia Prospect, with the first day spent defining tenement boundaries and checking the accessibility of tracks across the Amelia Prospect. The following two days were spent conducting several east – west traverses across the Emu Fault Zone. The intention of this exercise was to gain an understanding of the main lithologies within the structurally complex prospect, along with recognizing any surface expression of mineralisation and major fault zones.

3.4.3 Vulcan Modelling

The construction of a 3D geological model of the Amelia Prospect was based on geological data gathered from the various archived literature sources. This data was collated and assessed to determine its suitability for use in model construction, with the most useful data sourced from the structural investigations of Wilkins (1991) and James (1995).

Previous exploration activities were conducted over a localised grid system. The nature of this local grid system relative to AMG or local mine grid systems was not known, so it was necessary to construct a localised Vulcan grid system relative to the Amelia grid coverage. It was proposed that survey work in the coming months would aim to determine the relation of the Amelia local grid to the AMG grid system by surveying steel base line pegs still visible in the Amelia Prospect. The Amelia Vulcan workspace would then be translated into the AMG grid system, enabling any future AMG registered exploration results to be easily integrated into the model.

The process used to produce the Amelia Prospect geological model is described below:

- The establishment of a new Vulcan workspace with grid setup reflecting the Amelia Prospect local grid.
- Drilling data was collated and inputted into .csv format for importing into the ISIS database function of Vulcan.
- Separate .csv database files for drill hole assays, collar co-ordinates, down hole surveys and geological logs were imported into the Vulcan ISIS database system.
- Surface structural mapping digitised into Vulcan, with individual layers designated for geology and fault traces (sourced from Wilkins, 1991). Careful management and separation of data into separate Vulcan layers assisted in the modelling process.
- Cross sections were digitised to corresponding northings utilising dip, azimuth and drill hole correlations (sourced from James, 1995).
- Geological interpretation was completed on the digitised data, resulting in the construction of a comprehensive 3D model from all available data.
- 3D geometrical shapes applied to define the limitations of known mineralisation, with these shapes being extrapolated to encompass the intersection of complex structural features known to host mineralisation at depth.

3.4.4 2007 Recommendations

It was proposed that $15K of work to be completed in the 2007/2008 period would include:

- Survey work to register the Amelia Prospect local grid baseline into the AMG datum.
- Transformation of the Amelia local grid into the AMG datum.
- Transformation of the Amelia Vulcan workspace into an AMG co-ordinate grid system.
- Further delineation and selection of drilling targets within the highly prospective structure controlled zones.
- Ground truthing and accessibility checks of proposed drill targets.

3.5 June 2007 to June 2008

See Section 2.15. Due to the loss of Geoscientific staff early in 2008, coupled with the ongoing shortage of exploration geologists throughout 2008, no significant exploration was completed on either AN366 North or South during the 2007-2008 reporting period.

3.5.1 Proposed Work For 2009

It was proposed that the exploration focus remain on defining the extent of known mineralisation within the more prospective Coxco lease AN366 North, with drill design accommodating known control orientations of brecciation and veining.

3.6 2009 to 2014

A 2009 tenement evaluation of the Amelia Area (AN457, AN366 South, AN456) conducted (Pevely & Hinman 2009) concluded that:

- Given (1) the thoroughness of the exploration effort by CEC and MIM Exploration on the Amelia and adjacent prospect areas over many decades, (2) the lack of this exploration's success, and (3) the consistency of the low order geochemical anomalism of the area with the geological model described in the section above, the residual potential in the Amelia Prospect and the adjacent areas is considered to be very low. The observation that the low order geochemical anomalism in the area is directly associated with likely Barney-time 'Coxco' fracturing, brecciation and karsting of pre-Barney dolomitic lithologies and their overlying, poorly developed, heterogeneous sediments suggests that (1) no thick HYC-type accumulations of reduced Barney Creek sediments were deposited in the Amelia region, and (2) fluid flow this far south of HYC along the Emu Fault Zone was minimal.
- The potential for discovery of significant coarse breccia-hosted or fine grained HYC-style base metal mineralisation in the Amelia Prospect region is very low.

No further work was conducted at Amelia (AN366 South) until the 2014 field season.

3.7 August 2014 to August 2015

A request was made to the Department of Mines and Energy on 26th November 2014, for the addition of MA366 to the amalgamated reporting group GR083. This was subsequently granted on 1st June 2015. As such, the reporting period for MA366 has been extended to 20th August 2015.

Exploration activities during the period were dominated by geochemical surface sampling. Sample sites were located via handheld GPS. A mattock was used to dig down to the B soil horizon and a ~1kg sample was collected through a -2mm sieve. Topography, material type, colour and relevant comments were recorded. A total of 916 assays were returned from 855 soil samples, 4 rock chip samples, 39 duplicates and 18 standards. These were collected from MA366 South (Amelia only), MA455 and MA456. Samples were analysed as per Table 16 below.

Table 16. Elements analysed & analytical methods.

Proprietary Code	Analysis Method	Sample Decomposition	Elements Analysed
ME-ICP41	ICP-AES	Nitric Aqua Regia Digestion	Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Hg, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Sc, Sr, Th, Ti, Tl, U, V, W, Zn

Assay results have been appended to the regional exploration database and are included in the metadata files.

The historic (1971) soil samples taken at Amelia were considered, and new sample points were designed along east-west lines in areas not previously targeted. A total of 498 assays were returned, including 463 soil samples, 4 rock chip samples, 22 duplicates and 9 standards.

Tabulated below are a summary of statistics for the 2014-2015 MA366 soil assays.

Table 17. Summary of Cu, Pb and Zn statistics (assays in ppm), 2014-2015 MA366 Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	463	1	1,585	27,157	58.65	15	1,584	26,997.41	164.31
Pb	ppm	463	2	7,620	59,894	129.64	13	7,618	354,196.21	595.14
Zn	ppm	463	3	13,100	96,418	208.70	13	13,098	717,441.73	847.02

A sub-set of the historic soils data (comprising 1151 samples) from within the Amelia lease boundaries was created and appended to the recent 381 samples. Statistics for the 1971 data set and the combined data set are summarised in Table 18 and Table 19 respectively.

Table 18. Summary of Cu, Pb and Zn statistics (assays in ppm), historic (1971) Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	1,151	2	640	49,919	43.37	26	638	4,202.40	64.83
Pb	ppm	1,151	4	2,674	68,354	59.39	21	2,670	41,618.47	204.01
Zn	ppm	1,151	1	33,600	239,531	208.11	32	33,599	1,210,754.01	1,100.34

Table 19. Summary of Cu, Pb and Zn statistics (assays in ppm), Total MA366 Soil Samples

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	1,532	1	1,585	66,589	43.47	24	1,584	7,437.84	86.24
Pb	ppm	1,532	2	7,620	99,425	64.90	19	7,618	88,947.44	298.24
Zn	ppm	1,532	1	33,600	293,776	191.76	24	33,599	1,061,557.78	1,030.32

Figure 15, Figure 16 and Figure 17 illustrate Cu, Pb and Zn distribution in soils respectively, across MA366 Amelia and MA456 Amelia South. All available soils data in the local area are displayed here to better capture the metal distribution across these southern tenements. Note that much of the historic soils data is now outside current lease boundaries.

During the course of the soils program, four rock chip samples were taken from MA455. Full assay tables are included in the metadata files. A summary of results are tabulated in Table 20.

Table 20. MA366 Rock Chip Assays.

Sample	Easting (MGA94)	Northing (MGA 94)	Zone	Ag (ppm)	As (ppm)	Ca (%)	Cu (ppm)	Fe (%)	Mg (%)	Pb (ppm)	Tl (ppm)	Zn (ppm)
MA366001R	622,870	8,161,225	53	-0.2	-2	0.02	132	0.71	0.03	-2	-10	-2
MA366002R	626,100	8,160,600	53	-0.2	-2	0.03	3	1.85	0.11	-2	-10	8
MA366003R	626,000	8,160,800	53	-0.2	-2	0.04	4	0.85	0.05	-2	-10	3
MA366004R	625,790	8,161,200	53	-0.2	-2	0.01	5	0.93	0.02	-2	-10	3

During the current reporting period, other work included:

- Two reconnaissance field trips to Amelia in an attempt to obtain GPS co-ordinates of existing grid pegs or other known points. One of the last recommendations made at Amelia in 2007 was to register the Amelia Prospect local grid baseline into the AMG datum. It was hoped that existing grid pegs would enable a transformation of the grid, but the pegged local grid is in a state of disrepair and were not able to be utilised at this stage.
- During these field trips, MRM geologists spent additional time traversing the tenement in order to become familiar with local lithology's.
- Efforts continued to collate historic data from Amelia and Coxco. Most of the original Amelia drill hole logs have now been located along with other unpublished reports and internal company memos relating to the tenements. The mapping reports of Wilkin-Smith et al. (1972) and Wilkins 1991 have also been located and maps scanned in for future referencing.
- Work also progressed on the Coxco geological model, with modelling of geological contacts and dominant structural features digitised in Vulcan.

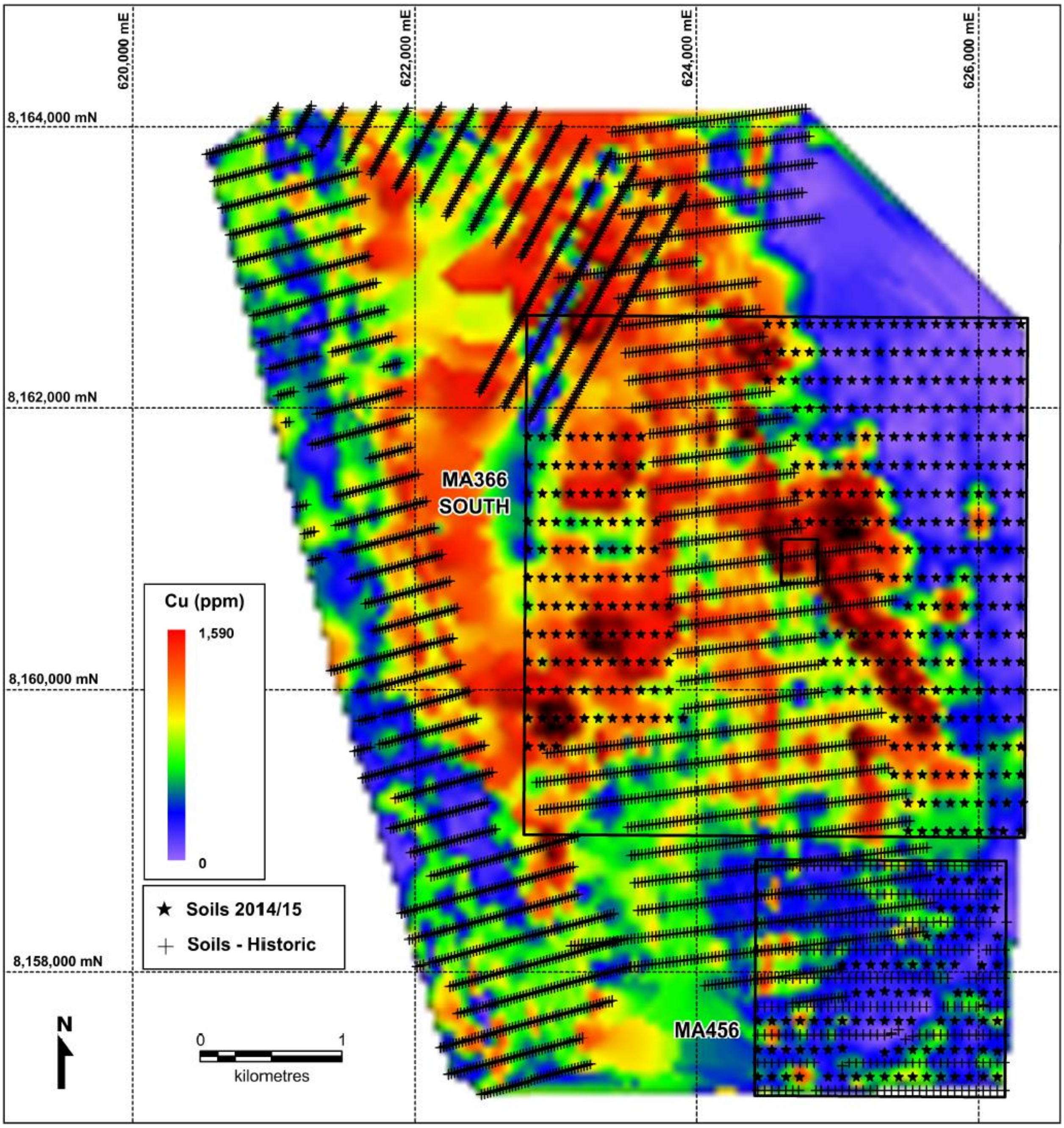

Figure 15. Representation of Cu distribution across the Amelia area, using all available soils data (MGA94).

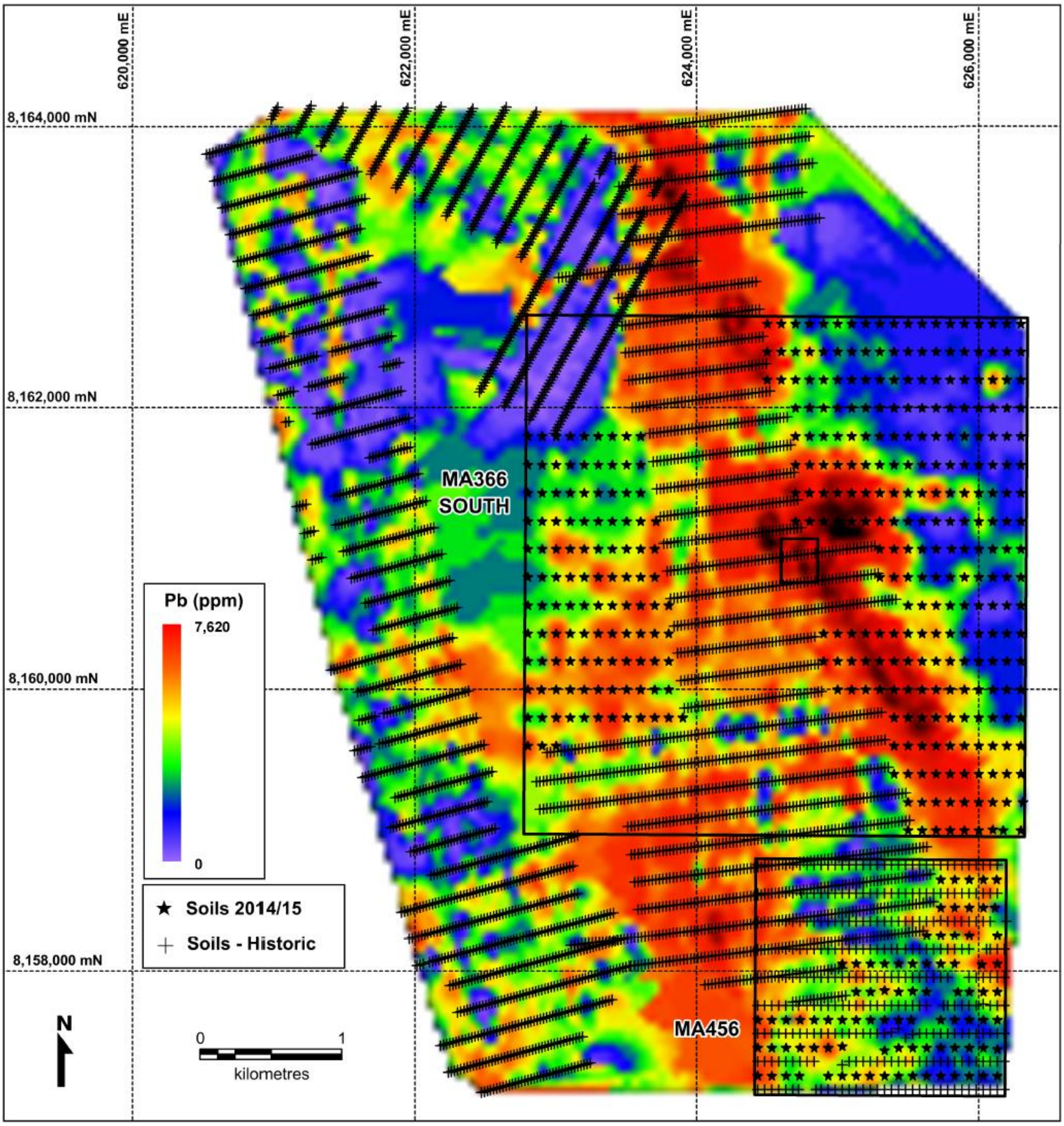

Figure 16. Representation of Pb distribution across the Amelia area, using all available soils data (MGA94).

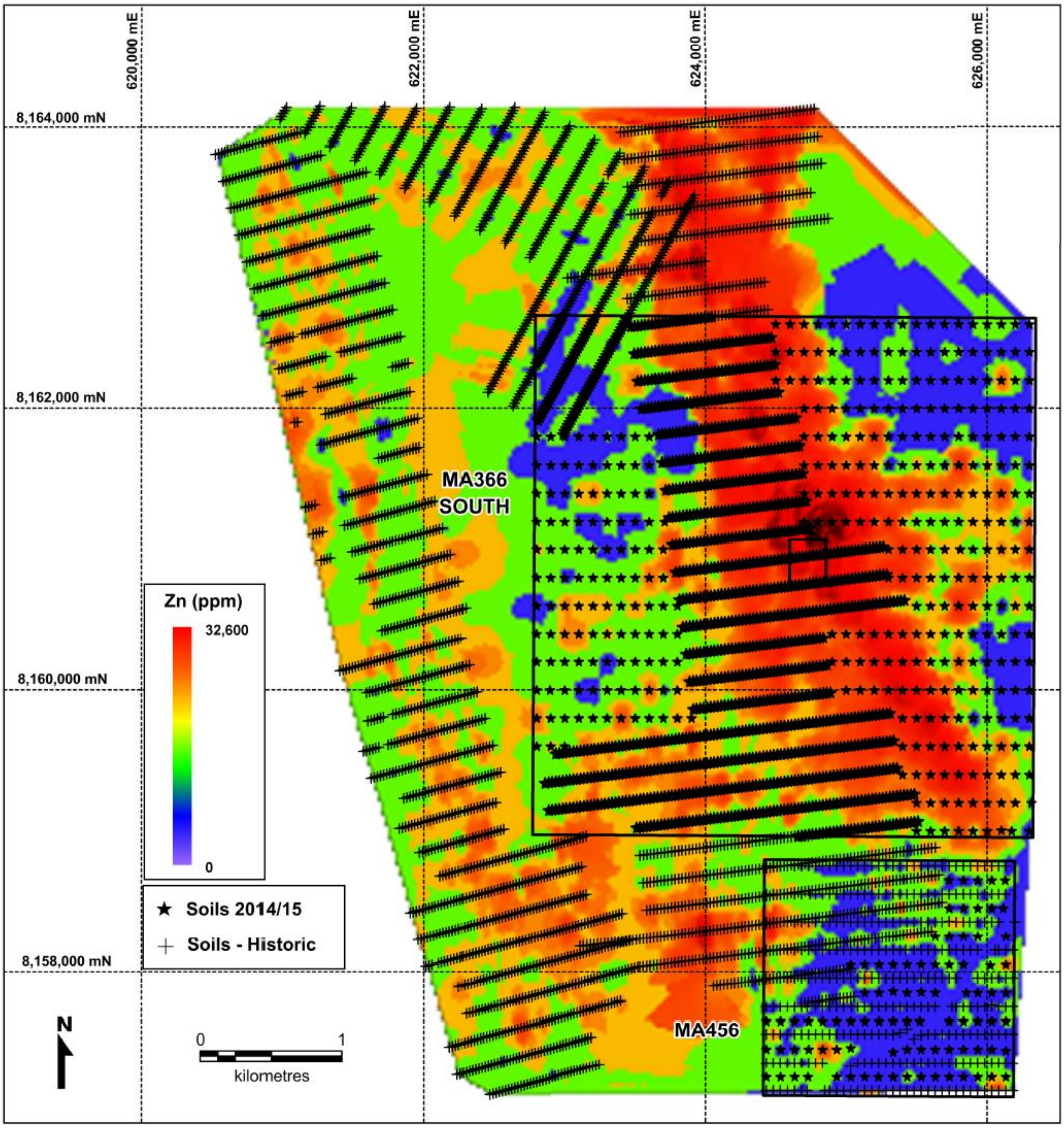

Figure 17. Representation of Zn distribution across the Amelia area, using all available soils data (MGA94).

3.7.1 Discussion

No significant assays were returned from the four rock samples. However, the soils data clearly highlights the NW-SE trending Emu Fault Zone. This supports the well documented belief that the fault was the major conduit for mineralising fluids in the district during Barney Creek time. An historic Zn-in-soils value of 3.36% (to the NE of the 'hole' in the Amelia lease) was backed up by a nearby value of 1.31% in the recent sampling campaign. A maximum Pb value of 0.76% was returned from the same area. This is consistent with visible surface mineralisation which has previously recognised at Amelia. The recent data has essentially closed the soil anomaly off to the East of the Emu Fault and provides further definition of the surface anomaly recognised in 1971. In terms of intensity, the surface geochemistry at Amelia is of more interest than those returned from MA455 and MA456. The most recent sampling (assays pending) will help to further define the higher grade areas where further work may be warranted.

3.8 August 2015 to August 2016

Eighty-two soil samples from the 2014/2015 reporting period were returned from Australian Laboratory Services (ALS) Brisbane which covered infill areas of previous sampling campaigns.

The results confirmed the elevated concentrations of Zn, Pb and Cu and showed large variability in grades across the sampled areas. Table 21 below summarises the basic statistics of the results.

Table 21. Basic statistics from the 2015 soils program.

	Count	Min	Max	Mean	Variance	STD	CoV
Zn (ppm)	82	5	24,400	812	8,068,243	2,840	3.50
Pb (ppm)	82	4	10,700	482	2,174,484	1,475	3.06
Cu (ppm)	82	2	1,450	128	67,501	260	2.03

With exception to the returned assay results above, there were no exploration activities on MA366 South during the 2015/2016 period. See Section 2.23 for MA366 North exploration activities.

3.9 August 2016 to August 2017

Field work for this period was focussed on MA366 North (Coxco)

3.10 August 2017 to August 2018

The scheduled Portable Electro-magnetic survey for MA366 was not completed due to the company senior geophysicist determining the data compiled in the previous working year was not of acceptable quality to warrant the continuation of the program.

Recovery of historical geophysical data was completed and data was processed and used for the production of geophysical maps and images. Supporting historical survey data was also recovered from MA366 South, which involved field work to locate and record baseline points for the grids associated with the geophysical data.

Reconnaissance and familiarisation of the tenement was carried out for the benefit of graduate geologists. The main access road to the tenement was graded, which had not been carried out for 6 years.

4.0 Coxco Valley (AN455/MA455) and Amelia South (AN456/MA456) Exploration History – Pre-1974 to August 2018

4.1 Tenement History

(from McIntyre, 2007).

The ground covered by Authorisations Northern (AN) 455, 456 and 457 was formerly part of the MIM held AN366, but was relinquished in 1996 under statutory relinquishment requirements. The relinquished ground was then reapplied for by MIM as separate Authorisations, under identical legislative conditions as an Exploration Lease. Although the first application was lodged by Mount Isa Mines in mid-1996, hurdles in the application process meant the tenements were not formerly granted until August 2006.

4.2 June 2006 to June 2007

(from McIntyre, 2007).

During the first year of tenure, work completed on AN455, 456 and 457 was a tenement review and literature research, and field reconnaissance:

A review of the MRM near mine exploration archive revealed a lack of data relating to the ground covered by AN 455, 456 and 457, ground formerly covered as part of AN 366. A search of the Minerals and Energy Information Centre (MEIC) archive revealed a large amount of historical exploration data covering the Amelia and Coxco Valley areas, dating back to 1957. The last significant reports accessed from the MEIC archive dated to the mid 1970's, suggesting that known Mount Isa Mining Exploration (MIMEX) division reports from the early 1990's were yet to be located.

It was discovered that data collected by MIMEX over AN 455, 456 and 457 was relocated to the Xstrata Copper Exploration archive in Mount Isa. A trip to the facility unearthed geological data and established the exploration history of the three areas. As AN 455, 456 and 457 were formerly part of AN 366 the literature research conducted on AN 366 benefited the understanding of the exploration history of the newly granted tenements.

One complete day of field reconnaissance was completed for each of the three tenement areas. The field area covered by AN455 is topographically subdued and covered by a thick sequence of black soil, with sparse dolomitic outcrop restricted to small hills and ridges. The physiographic features of AN 456 and 457 are markedly different from AN455, as both tenements cover ground along the Emu Fault Zone. The EFZ is marked by a prominent uplifted scarp of tectonised basal dolomite with interbedded dolosiltstone lithologies.

4.3 June 2007 to June 2008

(from Pevely, 2008).

The departure of the MRM Technical Services department's only field geologist in early 2008 and the loss of other critical geological staff caused the proposed programme outlined in the 1st annual report to be scaled back. Recruitment for suitably qualified personnel continued throughout the 2008 field season without success, so the scope of intended exploration during the 2008 field season was never realised.

A day was spent with a hand held GPS in establishing the corner lease boundaries of all three AN's and an overview of the work required for 2009 was undertaken.

Lease administration activities included the payment of licence fees, report writing and additional literature research/topographic and geological base map purchases.

4.4 June 2008 to June 2009

(from Pevely, 2009).

The ongoing critical shortages of Geoscientific staff throughout 2008 prevented the realisation of the proposed 2008 exploration programme. The additional obstacles of the sudden downturn in commodity prices in late November (which alone threatened to close the mine and which radically reduced 2009 budget expenditure across the site) and the temporary closure of the mine from 17th December to 20th February due to the Federal High Court's decision to uphold the Northern Land Council's claim against the project expansion, have continued to impact on MRM's ability to meet expenditure commitments outside of exploration work conducted on AN366 during 2009.

4.4.1 2009 Tenement Evaluation

A 2009 tenement evaluation of Coxco Valley (AN455) conducted (Pevely & Hinman, 2009) concluded that:

<u>Coxco Valley (AN 455)</u>

The simplified geology (seen in GR083-09_2015_GA, Figure 7) suggests that some parts of the southern 3 graticule blocks of AN 455 cover lower Umbolooga Subgroup Formations of the Masterton Dome in the Western Fault Block. These would be considered to be unprospective. The portion of these blocks centred on the Emu Fault Zone have been mapped as upper Umbolooga Subgroup including Teena Dolomite and should be reviewed for Cooley-style and possible Ridge onlap-style mineralisation. The northern 3 graticule blocks of AN 455 overly McArthur River floodplain in an area of limited outcrop where Barney Creek could (theoretically) be present. No relevant mapping or drilling data was immediately available for review but should be sought.

Amelia South (AN 456)

See Section 3.6.

4.5 June 2009 to June 2010

(from Grenfell, 2010).

A continuation of lack of resources from critical technical staff resulted in no expenditure on AN's 455, 456 and 457 over the 2009/2010 reporting period, resulting in a nil report.

As per the Department of Resources recommendations for one-minute block reductions using the change from AGD66 to the GDA94 datum (file ref MT0010/0249), 4 blocks remained for AN455 and one block for AN456 (as per GR083-09_2015_GA, Figures 4 & 5)

4.6 June 2010 to June 2011

(from Grenfell, 2011).

A proposed exploration programme was prepared to target the coarse grained, vein and breccia hosted lead-zinc and copper mineralisation associated with the prospective Emu Fault, which is located to the east of AN 455 and directly intersects AN 456. Unfortunately, due to critical technical staff shortages at the McArthur River Mine, this exploration programme was postponed resulting in a nil report.

4.7 August 2011 to August 2012

MRM suffered from a severe lack of technical staff during the majority of the 2011/'12 reporting period. MRM employed the services of a geological consultant (familiar with the metallogenic setting of the lease area) to complete a desk-based, data recovery compilation of all historical CEC and MIMEX open file reports and other readily available data, enabling historical exploration to be properly documented and understood.

However, strong recruitment late in the reporting period enabled exploration activities on MA's 455-456 to proceed. Six rock chip samples were collected from areas of interest during field reconnaissance mapping programs (Table 22).

Table 22. Rock Chip samples taken from MA455 during 2011/2 reporting period.

Sample Number	Sample Type	Sample ID	Zone	MGA94_East	MGA94_North
MA455_1	Rock Chip	33481	53	616,370	8,178,294
MA455_2	Rock Chip	33485	53	616,347	8,178,288
MA455_3	Rock Chip	33480	53	616,331	8,178,289
MA455_4	Rock Chip	33479	53	616,306	8,178,285
MA455_5	Rock Chip	33487	53	616,369	8,178,286
MA455_6	Rock Chip	33488	53	616,396	8,178,324

Analysis results for rock chip samples indicated concentrations of lead and zinc were of low interest. Key trace element concentrations (including Thallium) were also of low interest. Ca and Mg concentrations were in line with a dolomitic shale lithology. Results are summarized in Table 23. It was reported that results for MA455_6 were likely lost either in transit or during the sample preparation process.

Table 23. Selection of results from MA455 outcrop samples.

Sample ID	Ag(ppm)	As (ppm)	Ca (ppm)	Mg (ppm)	Tl (ppm)	Pb (ppm)	Zn (ppm)
33481	<0.5	14	19.1	4.53	<10	20	191
33485	<0.5	8	16.3	10.25	<10	18	443
33480	<0.5	<5	18.2	11.3	<10	18	21
33479	<0.5	13	1.16	0.46	<10	13	44
33487	<0.5	12	10.95	6.45	<10	23	36
33488	NR	NR	NR	NR	NR	NR	NR

4.8 August 2012 to August 2013

A soil sampling program was completed over the two tenements. This was completed at 200m line spacing's and 50m sample spacing's (Figure 18 and Figure 19).

Sample sites were located via handheld GPS. A mattock was used to dig down to the B soil horizon and a 1kg sample was collected through a -2mm sieve. Each sample site was noted for its topography, sample material type, colour and texture and if bedrock was easily reached. This produced 335 samples from MA456 and 601 samples from MA455. Rock chip and stream sediment samples were also taken where applicable. Two rock chip samples were taken from MA456, six rock chip samples from MA455 and seven stream sediment samples were also taken from MA455.

The aim of the program was to target anomalous areas of high Zn, Pb and Tl with a view to targeting areas for future exploration studies.

Due to the timing of the soil sampling program analytical results from the program were not available for the 2012-2013 reporting period.

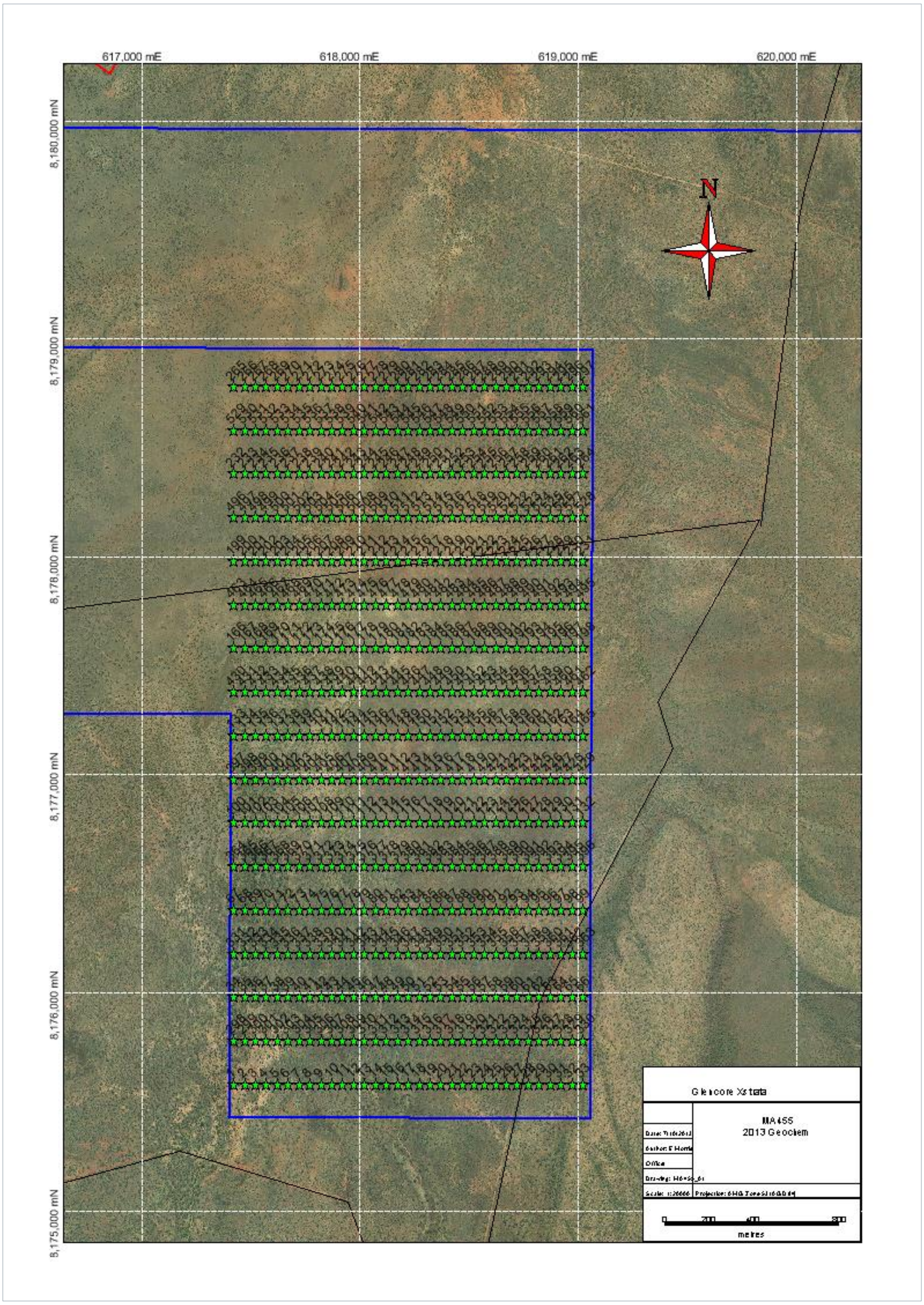

Figure 18. Sample locations for MA455 2013 soil sample program.

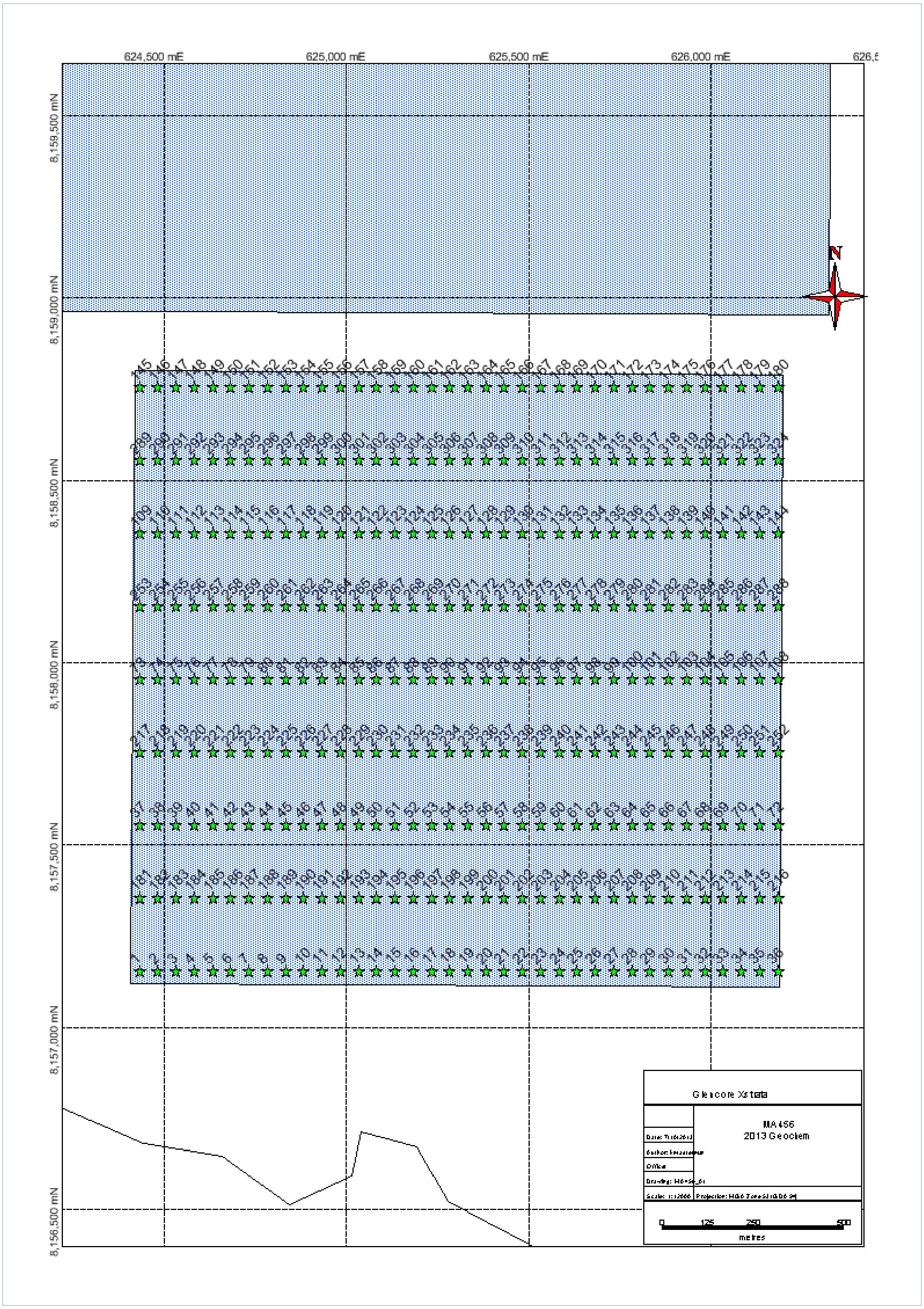

Figure 19. Sample locations for MA456 2013 soil sample program.

4.9 August 2013 to August 2014

Laboratory analyses of the 2013 soil sampling program were completed and results received and processed. Samples were analysed as per Table 24.

Table 24. Elements analysed

Proprietary Code	Analysis Method	Sample Decomposition	Elements Analysed
ME-ICP41	ICP-AES	Nitric Aqua Regia Digestion	Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Hg, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Sc, Sr, Th, Ti, Tl, U, V, W, Zn

Assay results were appended to the regional exploration database and are included in the metadata files. Results were not encouraging, with no significant anomalies identified. However, the data highlighted anomalous zones of interest which provided a focus for additional infill sampling which was completed towards the end of the reporting period. A primary aim for this geochemical work was to enable target generation for future RAB/aircore drilling.

4.9.1 MA455 Coxco Valley: 2013 Soil Geochemistry Results

A total of 601 soil assays from MA455 were received (including 27 duplicates and 12 standards). Figure 20, Figure 21 and Figure 22 illustrate the Zn, Pb and Cu in soils respectively. Generally speaking, similar distributions are seen in all three metals. Broad, weak anomalism is evident in all three in the northwest and along the western margin of the sampled area (Figure 20 illustrates this best). This was not considered significant as it was thought to be related to the deposition of alluvial soils along Bull Creek which runs through MA455 to the north-northeast and into McArthur River. Other, more discrete but well-defined anomalies occur in the southeast and eastern parts of the sampled area. Field reconnaissance suggested that these are associated with outcropping variably bedded, brecciated or massive dolomitic units and lesser fine-grained sandstone units of the Umbolooga subgroup. They have a shallow, generally westerly dip and strike south-southwest to north-northeast. The strike is mirrored by the weak anomalism (see Figure 20, Figure 21 & Figure 22), being most apparent in the Cu data. The weak anomalism appears to relate spatially to rocks within the Western Fault Block, with the Western Fault interpreted as passing through the easterly parts of MA455. Detailed mapping may help to confirm this. In the far south-eastern corner of MA455, a prominent outcrop of well-bedded Masterton Sandstone occurs. No anomalism was detected in this unit.

Tabulated below are a summary of statistics for the MA455 soil assays.

Table 25. Summary of Zn, Pb and Cu statistics (assays in ppm), MA455 Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Zn	ppm	562	<2	45	5,917	10.66	7	43	77.89	8.83
Pb	ppm	562	<2	42	6,210	11.09	11	40	32.96	5.74
Cu	ppm	562	<1	125	9,165	16.31	16.5	124	89.76	9.47

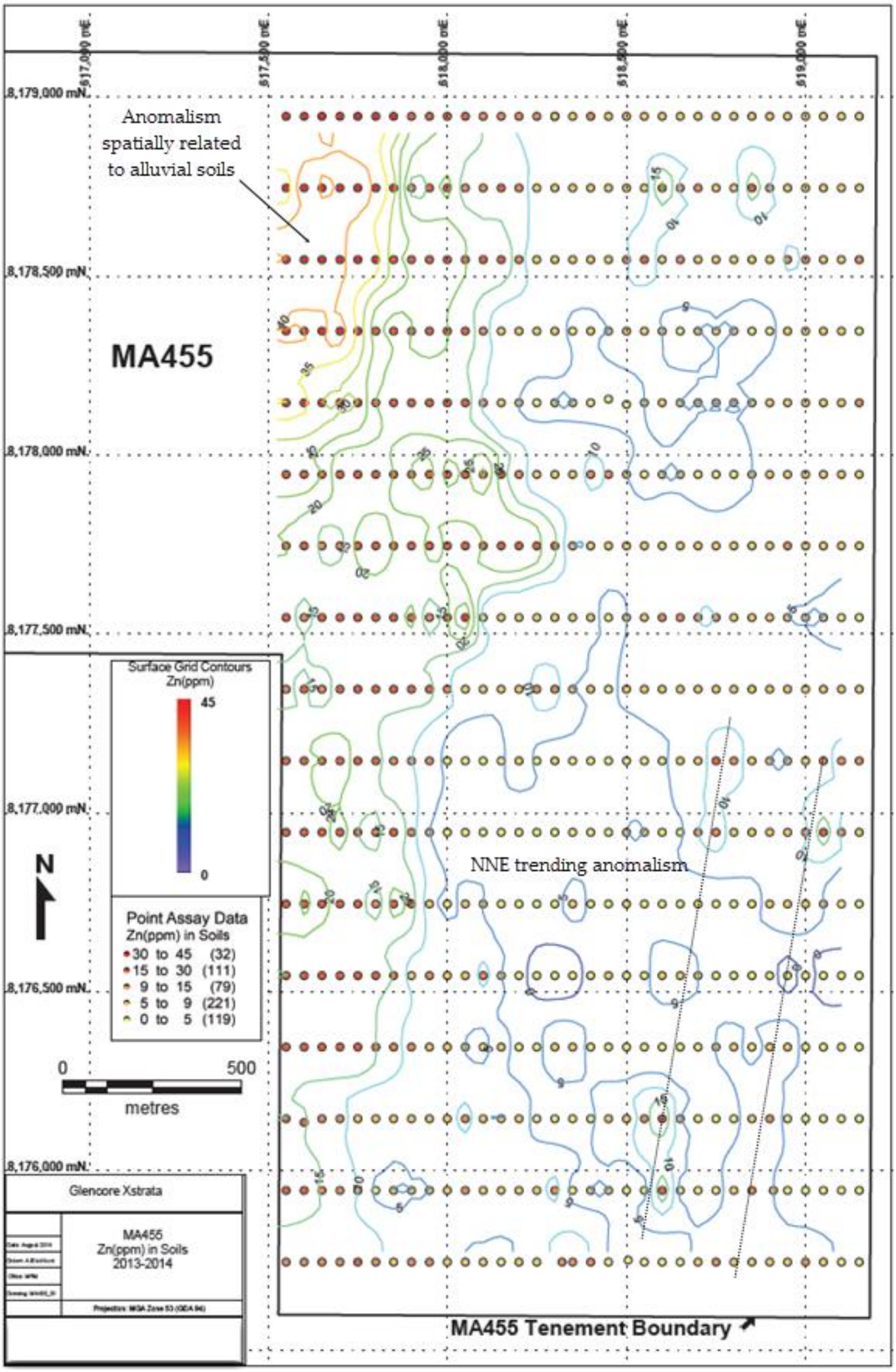

Figure 20. MA455 Zn(ppm) in Soils 2013-2014.

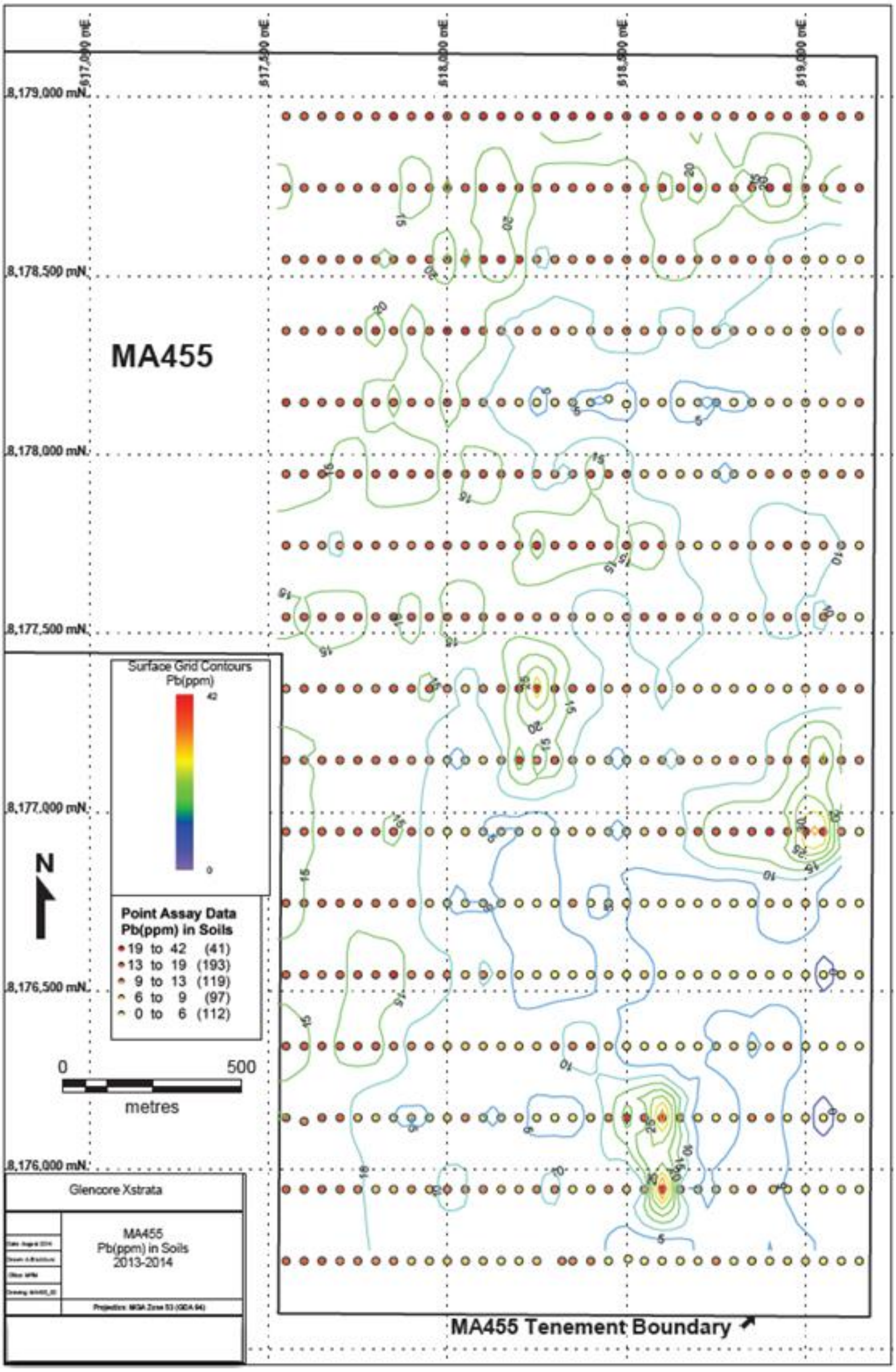

Figure 21. MA455 Pb(ppm) in Soils 2013-2014.

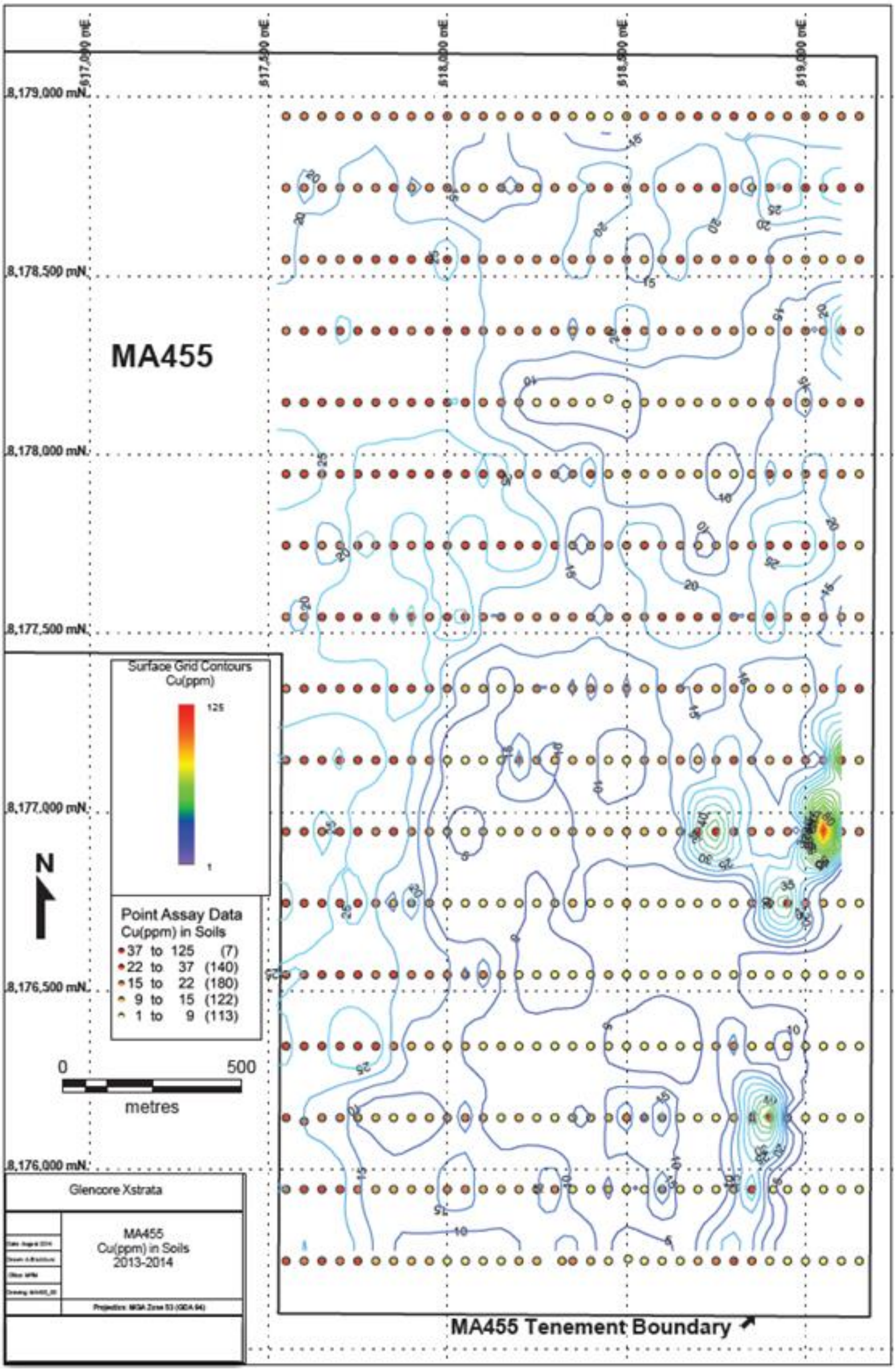

Figure 22. MA455 Cu(ppm) in Soils 2013-2014.

4.9.2 MA455 Coxco Valley: 2013 Rock Chip & Stream Sediment Geochemistry Results

During the course of the soils program, six rock chip samples and seven stream sediment samples were taken from MA455. Locations of these samples are shown in Figure 16. Full assay tables are included in the metadata files. A summary of results are tabulated in Table 25 & Table 26 below.

Table 26. MA455 Rock Chip Assays.

Sample	Easting (MGA94)	Northing (MGA 94)	Zone	Ag (ppm)	As (ppm)	Ca (%)	Cu (ppm)	Fe (%)	Mg (%)	Pb (ppm)	Tl (ppm)	Zn (ppm)
MA455054R	618,400	8,178,950	53	<0.2	0.09	5	<10	50	<0.5	<2	4.41	<0.5
MA455124R	618,305	8,177,320	53	<0.2	0.1	6	<10	40	<0.5	<2	8.5	<0.5
MA455204R	618,800	8,175,750	53	<0.2	0.55	32	<10	510	0.5	7	0.06	<0.5
MA455285R	619,050	8,176,950	53	<0.2	0.05	53	<10	230	<0.5	7	0.31	<0.5
MA455286R	619,000	8,176,950	53	<0.2	0.23	55	<10	520	<0.5	8	0.06	<0.5
MA455531R	619,100	8,178,350	53	<0.2	0.11	22	<10	90	<0.5	3	0.34	<0.5

Table 27. MA455 Stream Sediment Sample Assays

Sample	Easting (MGA94)	Northing (MGA 94)	Zone	Ag (ppm)	As (ppm)	Ca (%)	Cu (ppm)	Fe (%)	Mg (%)	Pb (ppm)	Tl (ppm)	Zn (ppm)
MA455024S	618,065	8,178,135	53	<0.2	1.07	16	10	330	1.1	<2	0.09	<0.5
MA455043S	617,895	8,178,950	53	<0.2	1.5	22	10	1700	1.5	<2	0.61	<0.5
MA455094S	618,030	8,178,570	53	<0.2	1.95	20	10	1140	1.7	<2	0.58	<0.5
MA455193S	618,300	8,175,750	53	<0.2	1.67	10	20	670	1.6	<2	0.29	<0.5
MA455246S	617,615	8,176,150	53	<0.2	1.46	30	20	660	1.8	<2	0.33	<0.5
MA455251S	617,680	8,176,550	53	<0.2	1.6	25	30	640	1.8	<2	0.19	<0.5
MA455313S	617,710	8,176,950	53	<0.2	1.3	9	10	410	1.3	<2	0.82	<0.5

No significant assays were returned from these thirteen samples.

4.9.3 MA456 Amelia South: 2013 Soil Geochemistry Results

A total of 335 soil assays from MA456 were received (including 16 duplicates and 6 standards). Figure 23, Figure 24 and Figure 25 show Zn, Pb and Cu in soils respectively. As was the case at MA455, assays were all very low. Generally speaking, the weak anomalies that do exist are spatially associated with areas of outcrop.

Tabulated below are a summary of statistics for the MA456 soil assays.

Table 28. Summary of Zn, Pb and Cu statistics (assays in ppm), MA456 Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Zn	ppm	313	2	72	2,219	7.16	5	70	65.38	8.09
Pb	ppm	313	2	86	4,535	14.49	11	84	125.19	11.19
Cu	ppm	313	1	78	2,880	9.20	8	77	21.02	7.14

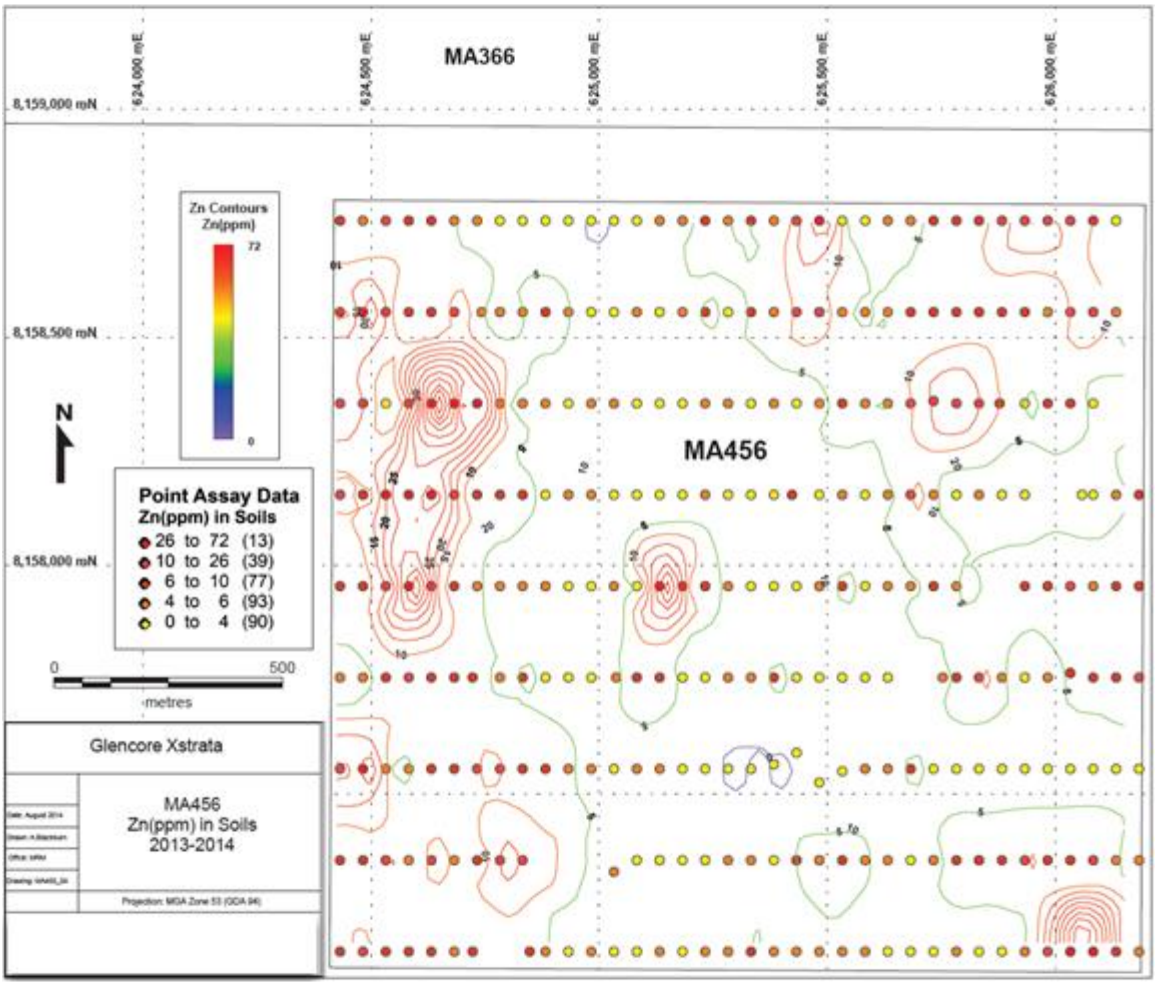

Figure 23. MA456 Zn(ppm) in Soils 2013-2014.

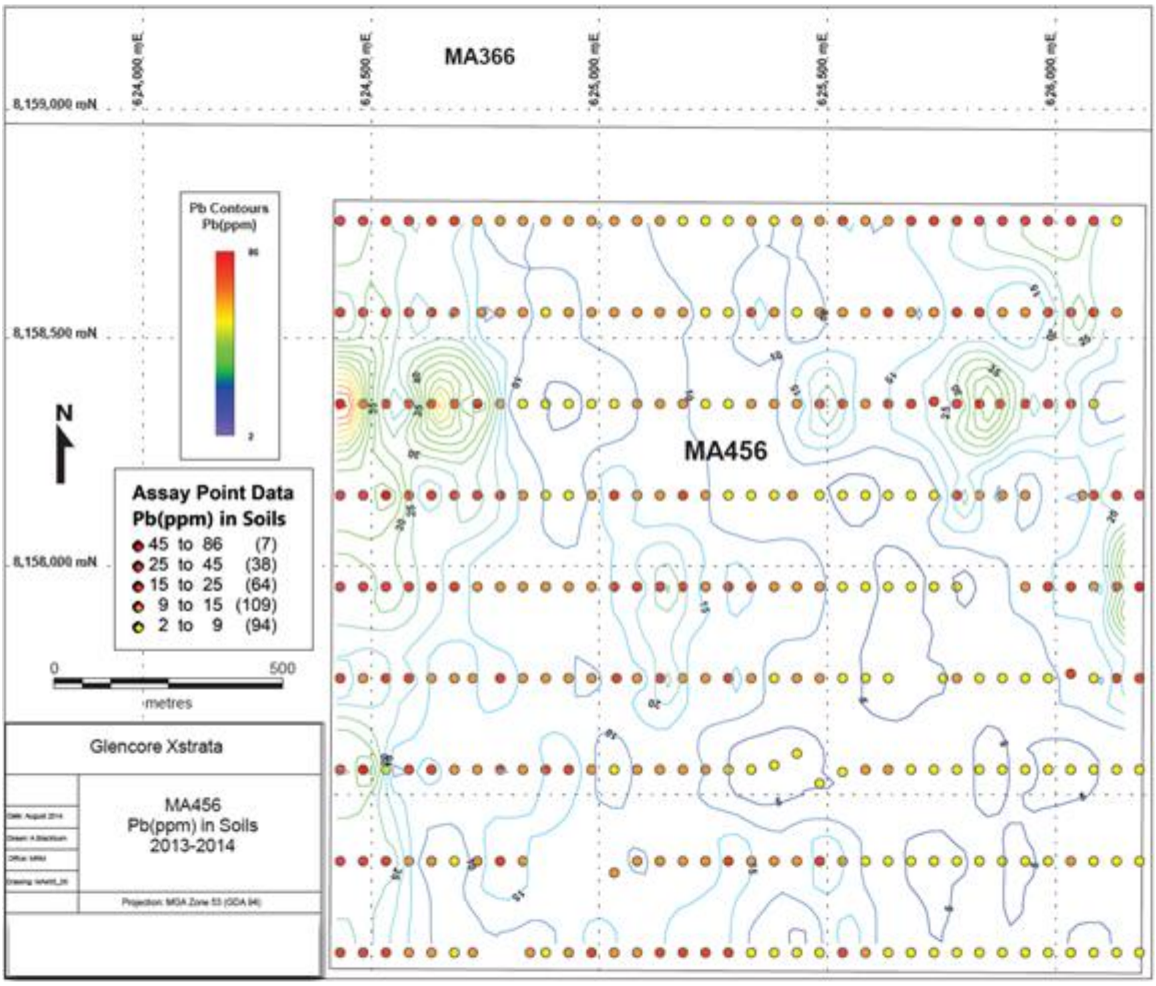

Figure 24. MA456 Pb(ppm) in Soils 2013-2014.

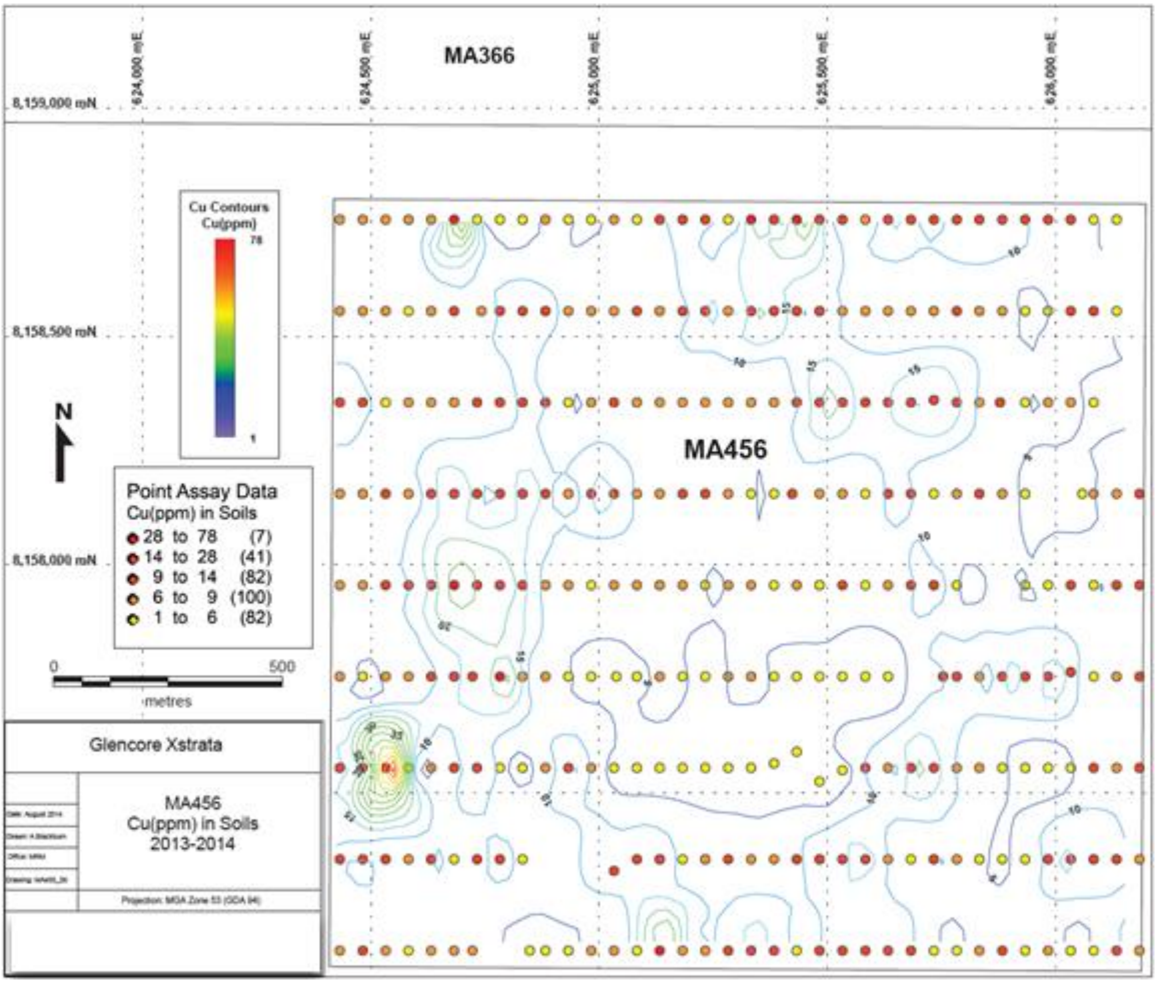

Figure 25. MA456 Cu(ppm) in Soils 2013-2014..

4.9.4 MA456 Amelia South: 2013 Rock Chip Geochemistry Results

During the course of the soils program, two rock chip samples were taken from MA456. Locations of these samples are shown in Figure 24. A summary of results are tabulated below.

Table 29. MA456 Rock Chip Assays.

Sample	Easting (MGA94)	Northing (MGA 94)	Zone	Ag (ppm)	As (ppm)	Ca (%)	Cu (ppm)	Fe (%)	Mg (%)	Pb (ppm)	Tl (ppm)	Zn (ppm)
MA456115R	624,640	8,157,945	53	<0.2	0.19	74	<10	90	<0.5	<2	14.3	<0.5
MA456116R	624,675	8,157,955	53	0.2	0.5	2480	<10	370	9.3	<2	0.12	<0.5

Sample MA456116R displays some elevated As, Cu and Pb values in comparison to the soil samples taken in the vicinity.

4.9.5 MA455 Coxco Valley: Historic Drilling Data

Data for three percussion holes drilled within the current MA455 boundary was discovered during the ongoing review of historic exploration data. Collar positions can be seen in Figure 26 with hole collar details captured in Table 30. The three holes were drilled towards the east, and in a group with collars approximately 30m apart. These holes were recorded as having being drilled in 1991, but the actual date of drilling was uncertain. No significant assays were returned. The geological logging for these holes was not located.

Table 30. MA455 Historic Percussion Hole Details.

Hole ID	Type	Easting	Northing	RL	Grid	Zone	EOH Depth	Azimuth	Dip	Drilling Start
COXCORP1MAST	RP	618,834	8,176,344	10,100	MGA94	53	102	95	-60	01/01/1991
COXCORP1MAST	RP	618,865	8,176,344	10,100	MGA94	53	30	94	-60	01/01/1991
COXCORP1MAST	RP	618,846	8,176,313	10,100	MGA94	53	94	98	-62	01/01/1991

4.9.6 MA455 Coxco Valley: 2014 Infill Soil Sampling Program

In order to better define the NNE trending anomalies on MA455, a targeted infill soil sampling program was completed. 158 samples (including 8 Duplicates & 4 Standards) were collected along west-east infill lines on a 100m spacing, mainly focussed on areas of interest east of the alluvial soils (see Figure 26).

Sample sites were located via handheld GPS. A mattock was used to dig down to the B soil horizon and a 1kg sample was collected through a -2mm sieve. Topography, material type, colour and relevant comments were recorded. Assays were pending at the time of reporting.

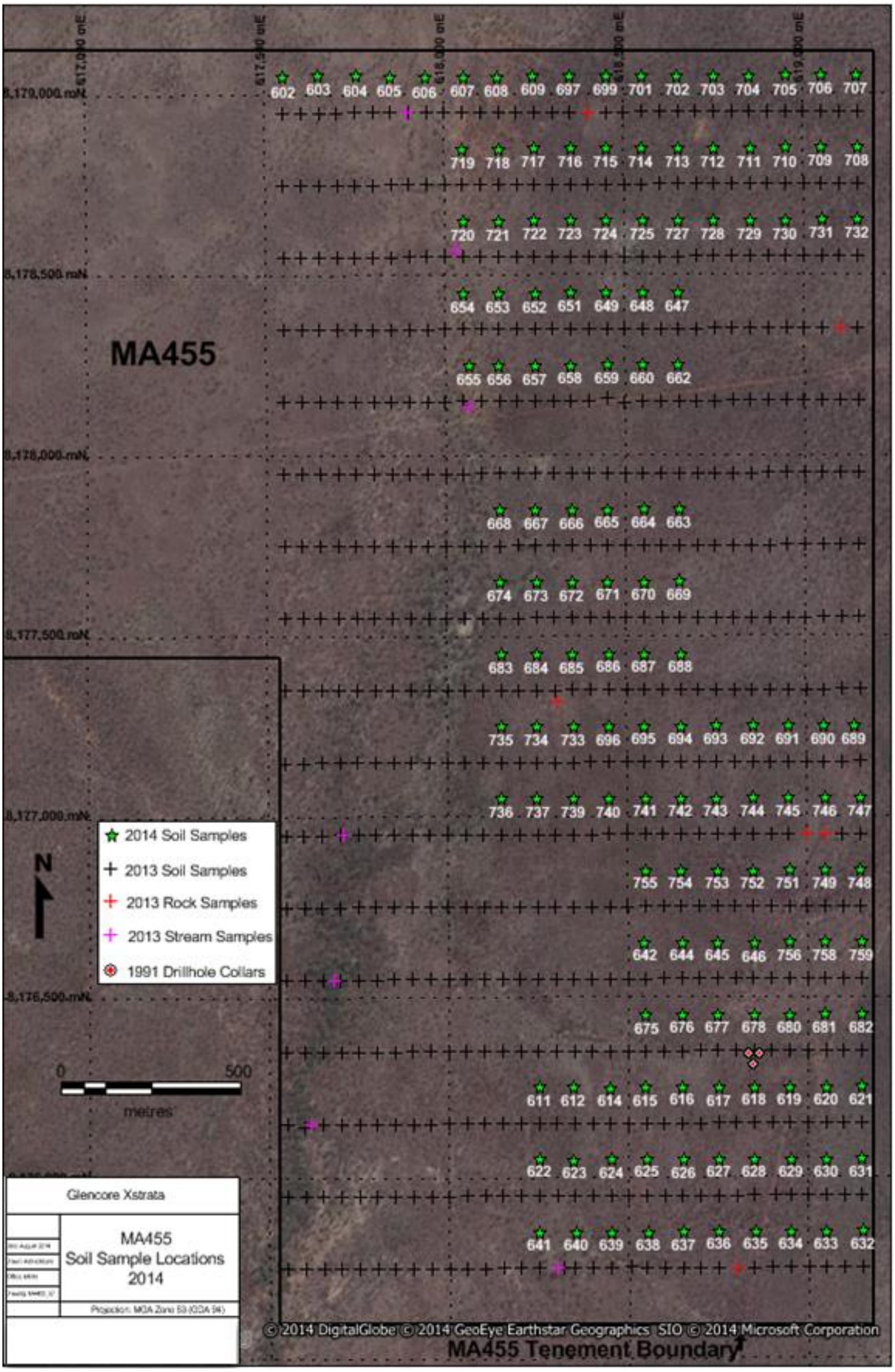

Figure 26. MA455 Sample Locations.

4.9.7 MA456 Amelia South: 2014 Infill Soil Sampling Program

In the early stages of the 2014 infill soil sampling program, some pre-2000 soil geochemistry data was discovered during MRM's ongoing historic data compilation project. These are shown in Figure 27. In conjunction with the 2013 soils, this data provides good coverage across the north-western parts of MA456. The infill soil sampling program was therefore reduced to cover just the remainder of the lease, to provide more complete coverage in those areas. 93 samples (including 5 Duplicates & 2 Standards) were collected along west-east infill lines and on a 100m spacing (see Figure 27).

Sample sites were located via handheld GPS. A mattock was used to dig down to the B soil horizon and a 1kg sample was collected through a -2mm sieve. Topography, material type, colour and relevant comments were recorded. Seven planned samples were unable to be collected due to the large creek running to the north-east through the lease. Assays are pending at the time of writing and will be reported in the forthcoming period.

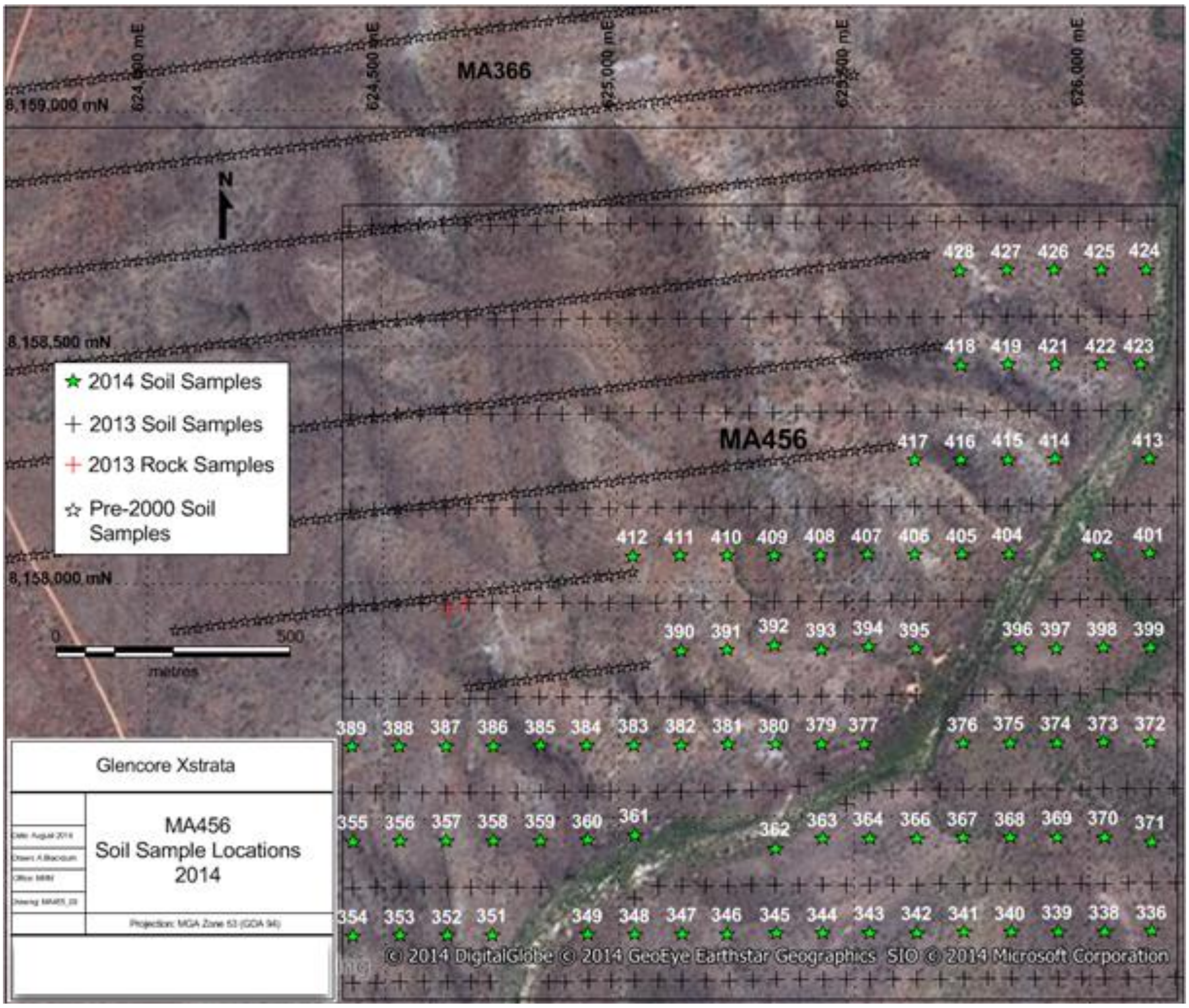

Figure 27. MA456 Soil Sample Locations 2014.

4.10 August 2014 to August 2015

A request was made to the Department of Mines and Energy on 26th November 2014, for the addition of MA366 to the amalgamated reporting group GR083. This was subsequently granted on 1st June 2015. As such, the reporting period for MA366 has been extended to 20th August 2015.

Exploration activities during the period were dominated by geochemical surface sampling. Sample sites were located via handheld GPS. A mattock was used to dig down to the B soil horizon and a ~1kg sample was collected through a -2mm sieve. Topography, material type, colour and relevant comments were recorded. A total of 916 assays were returned from 855 soil samples, 4 rock chip samples, 39 duplicates and 18 standards. These were collected from MA366 South (Amelia only), MA455 and MA456.

4.10.1 MA455 Exploration

On the MA455 lease, a total of 325 assays were returned from 306 soil samples, 12 duplicates and 7 standards. These sample points were designed along east-west lines in areas of interest, which were highlighted and discussed during the 2013-2014 period.

Assays have been added to the previous year's data and modelled using MapInfo software.

Tabulated below are a summary of statistics for all MA455 soil assays returned during the last two years.

Table 31. Summary of Cu, Pb and Zn statistics (assays in ppm), MA455 returned assays 2013-2015.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	708	1	132	11,459	16.19	16	131	107.15	10.35
Pb	ppm	708	2	79	8,057	11.38	11	77	47.17	6.87
Zn	ppm	708	2	45	7,063	9.98	7	43	71.22	8.44

Figure 29, Figure 30 and Figure 31 illustrate Cu, Pb and Zn distribution in soils at MA455 respectively.

During the current reporting period, other work included:

- A reconnaissance field trip to MA455 with a view to becoming familiar with the western blocks of the lease and to inspect potential sites and access routes for possible future drilling.
- During the above field trip, it was discovered that more outcrop exists along the southern parts of the western blocks of MA455 than was previously thought, and a decision was made to extend the soil sampling programme across these areas. A total of 160 soil geochem samples were collected from this area.

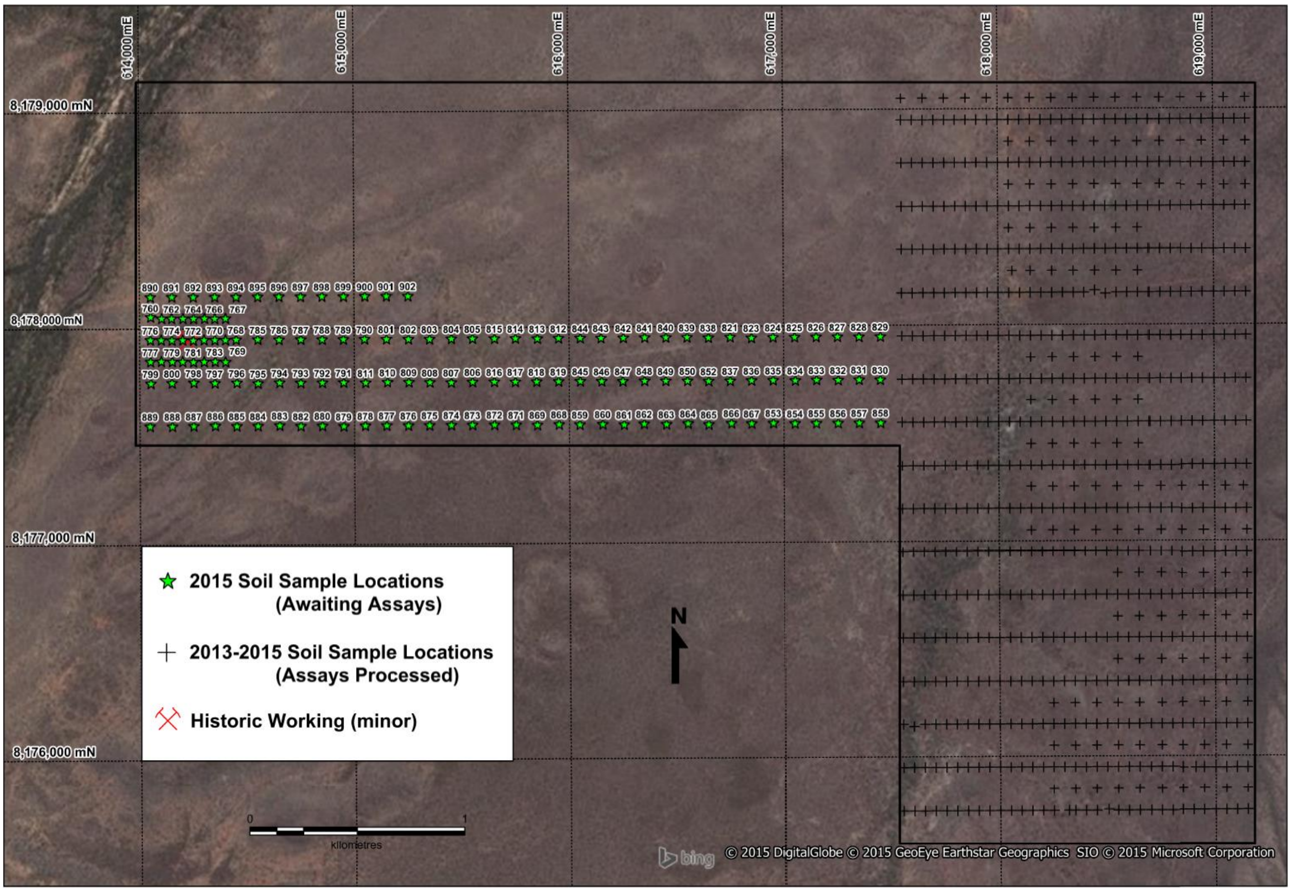

Figure 28. Location of 2015 MA455 soil samples, assays pending (MGA94).

4.10.2 MA455 Discussion

Recent returned assays have confirmed the existence of weak NNE trending anomalies, which have previously been discussed by Morris & Blackburn (2014). It appears to generally correspond with outcrop. It must be kept in mind that statistically, these assays are very low, with the highest Zn value being just 45ppm. The colour in the soils maps in Figure 29, Figure 30 and Figure 31 tend to be exaggerated by the low range of values. Even at such low values, the soil assays have highlighted trends which may assist with targeting any future exploration work in these areas.

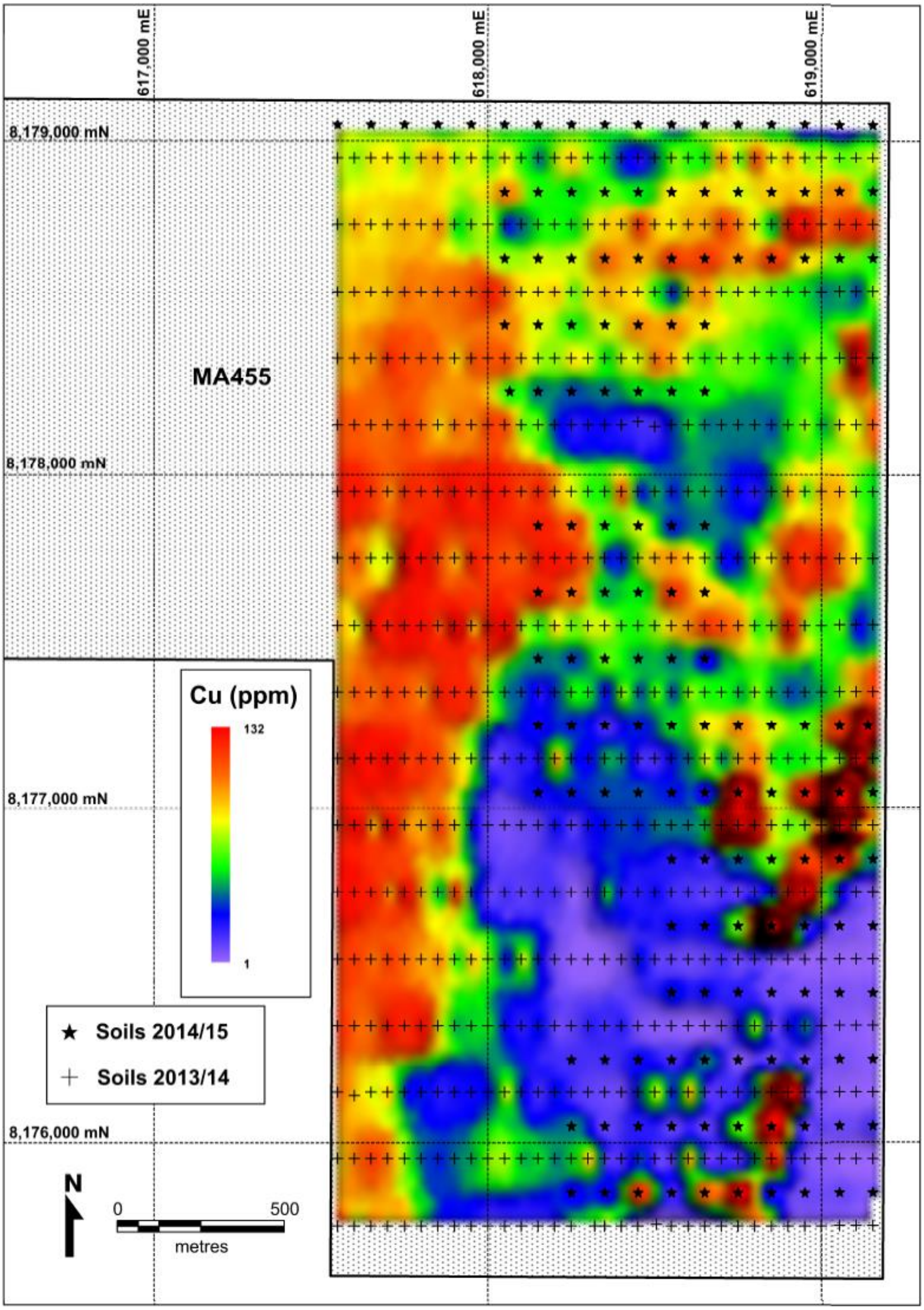

Figure 29. Representation of Cu distribution across MA455 (MGA94).

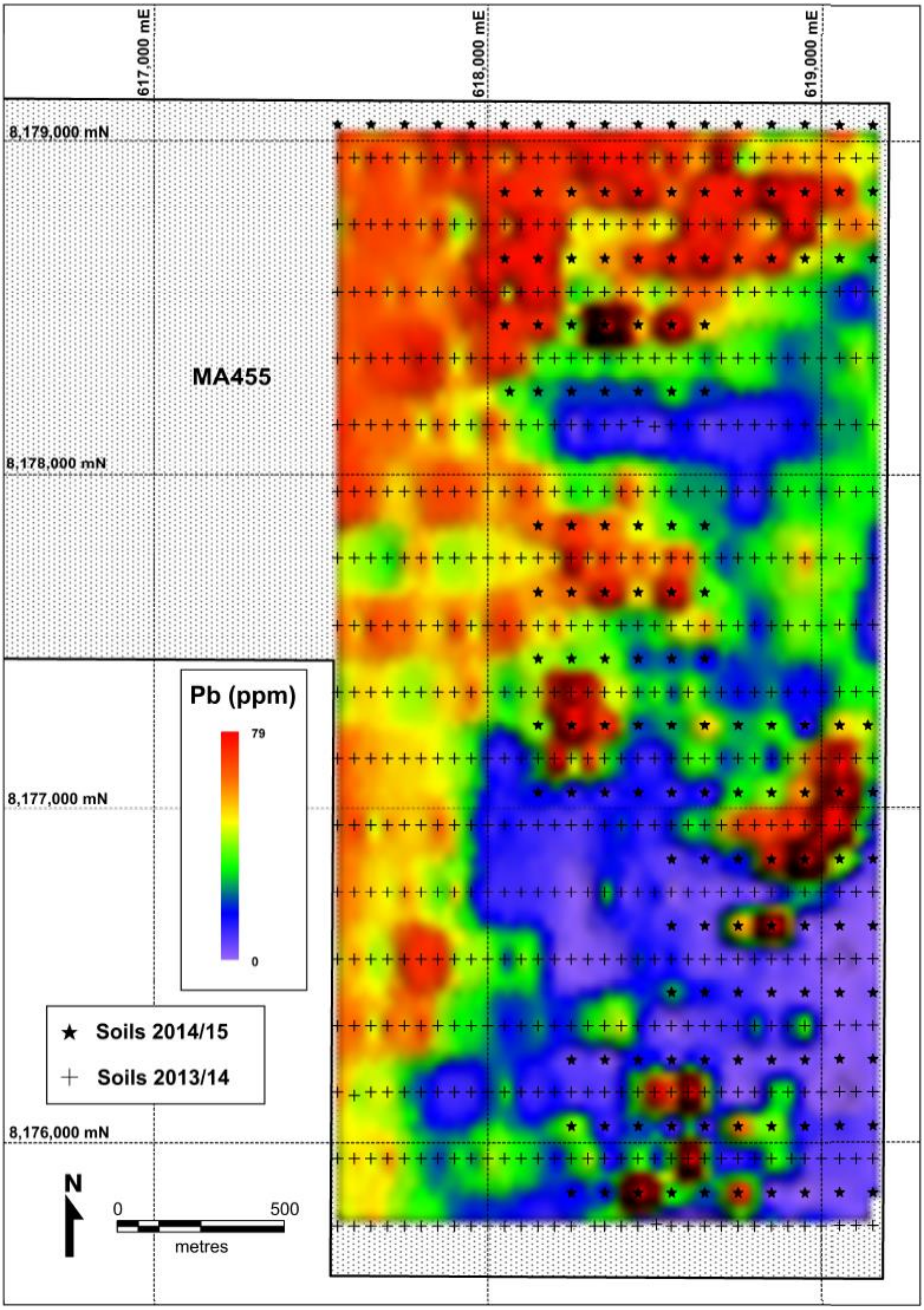

Figure 30. Representation of Pb distribution across MA455 (MGA94).

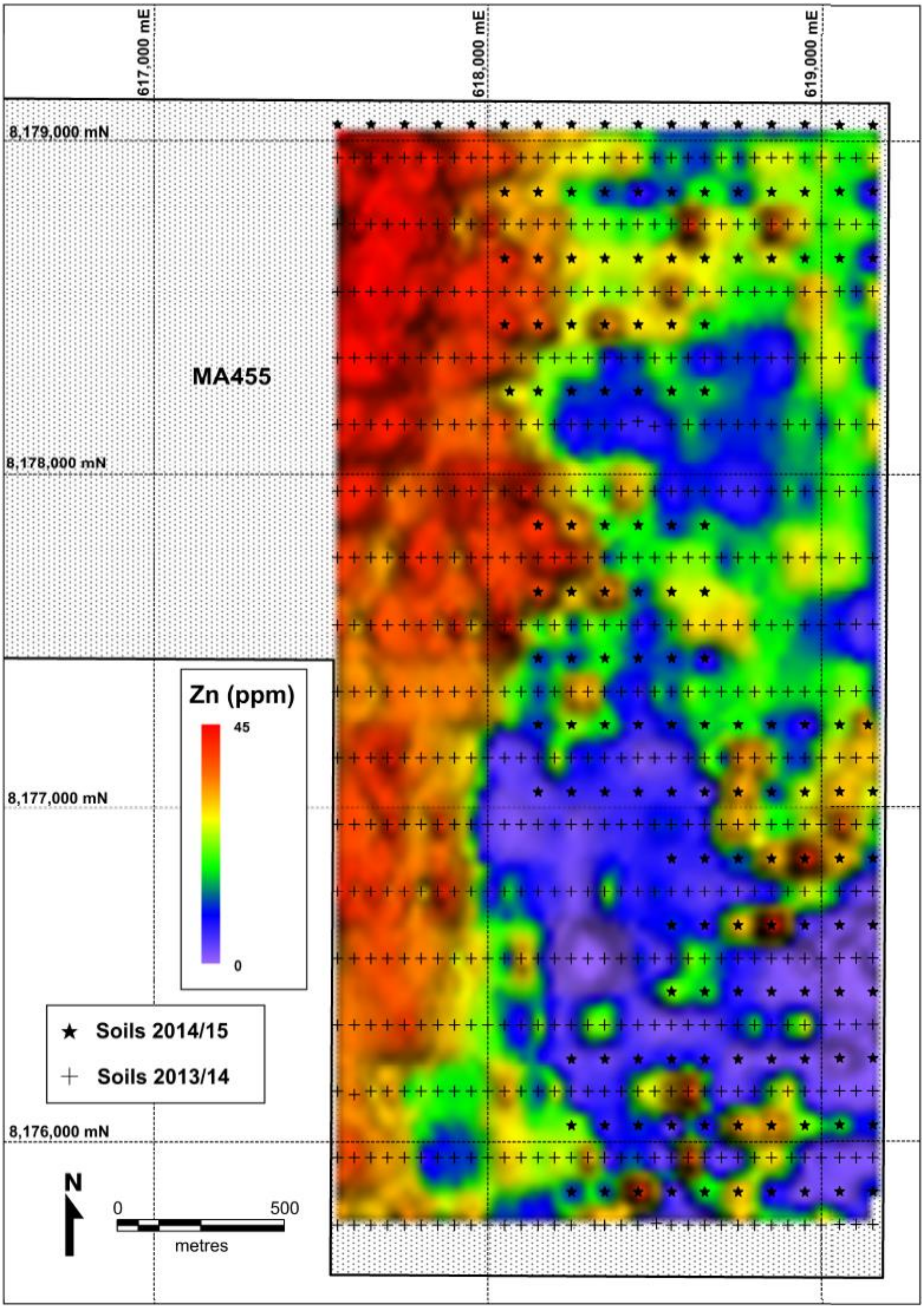

Figure 31. Representation of Zn distribution across MA455 (MGA94).

4.10.3 MA456 Exploration

A total of 93 assays were returned during this period, including 86 soil samples, 5 duplicates and 2 standards. These have been appended to the 2013-2014 data set and statistics for this data set are tabulated below.

Table 32. Summary of Cu, Pb and Zn statistics (assays in ppm), 2013-2015 MA456 Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	399	1	78	3,720	9.32	8	77	58.79	7.67
Pb	ppm	399	2	123	5,783	14.49	11	121	145.92	12.08
Zn	ppm	399	2	72	2,730	6.84	5	70	62.39	7.90

A sub-set of the historic soils data (comprising 209 samples) from within the current MA456 lease boundary was created and appended to the recent 399 samples. Statistics for the 1971 data set and the combined data set are summarised in Table 33 and Table 34 respectively:

Table 33. Summary of Cu, Pb and Zn statistics (assays in ppm), historic (1971) Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	209	0	139	2,792	13.36	10	139	226.70	15.06
Pb	ppm	209	0	97	2,631	12.59	8	97	154.70	12.44
Zn	ppm	209	0	600	3,423	16.38	10	600	2,215.90	47.07

Table 34. Summary of Cu, Pb and Zn statistics (assays in ppm), Total MA456 Soil Samples.

Field	Unit	Count	Min	Max	Sum	Mean	Median	Range	Variance	SD
Cu	ppm	608	0	139	5,512	10.71	8	139	119.89	10.95
Pb	ppm	608	0	123	8,414	13.84	10	123	149.50	12.23
Zn	ppm	608	0	600	6,153	10.12	6	600	820.77	28.65

To better place MA456 into context, the soils data have been included with MA366 Amelia, seen in Figure 15, Figure 16 and Figure 17. These illustrate Cu, Pb and Zn distribution in soils respectively, across MA366 Amelia and MA456 Amelia South. All available soils data in the local area are displayed here to better capture the metal distribution across these southern tenements. Note that much of the historic soils data is now outside current lease boundaries.

4.10.4 MA456 Discussion

The recent soils data from MA456 did not highlight any significant anomalies. It can be seen that anomalism related to the Emu Fault in Amelia does not continue onto the MA456 lease. The soils data seem to suggest that mineralising fluids moving through the fault did not infiltrate rocks south of the southern boundary of MA366. When seen in context with Amelia to the north, the prospectivity of MA456 appears diminished.

4.11 August 2015 to August 2016

4.11.1 MA455 Exploration

Results from 158 soil samples collected from the last reporting period were returned from ALS. These samples were collected from within the cover sequence towards the western limit of the tenement as shown in below in Figure 29.

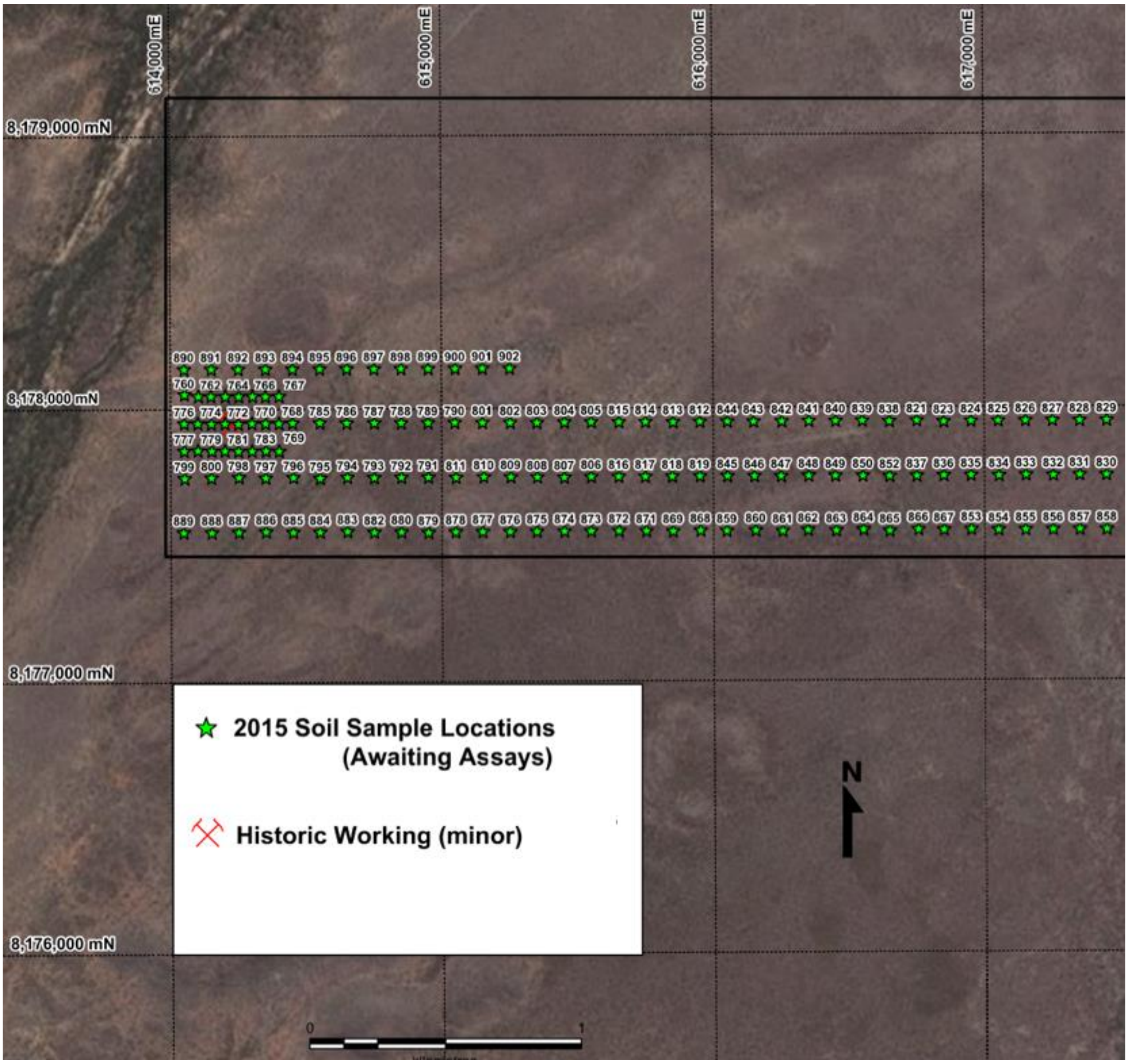

Figure 32. Sample points for late 2015 sampling program.

Sample MA4550798 was the only sample to show elevated concentrations of base metals (3,640ppm Pb). This sample was located near the old mine workings towards the western limit of the tenement. Table 35 below summarises the basic statistics of results from sampling completed for the 2015 period.

Table 35. Basic statistics for samples returned for MA455.

	Count	Min	Max	Mean	Variance	STD	CoV
Zn (ppm)	158	6	584	47	4,110	64	1.36
Pb (ppm)	158	8	3,640	58	84,185	291	5.02
Cu (ppm)	158	5	87	16	96	10	0.63

Overall, the results show there to be no evidence of elevated base metals, however, this is likely due to the fact that samples were taken from the cover sequence which is not indicative of bedrock geochemistry.

Work completed for this reporting period include the following:

- The collection of 5 rock chip samples; and
- Additional field trips to assess the following:
  - Tenement access; and
  - Suitability for EM survey.

4.11.2 MA456 Exploration

This reporting period saw the Graduate and Project Geologist become familiarised with the tenement through a number of field trips which assessed the following:

- Tenement access;
- Suitability for EM survey; and
- For safety reasons, logging the location of old mine shafts.

4.12 August 2016 to August 2017

4.12.1 MA455 Exploration.

During the reporting period, the following activities were carried out on MA455:

- The collection of 49 soil samples over the Walshy's Prospect in the western extremities of the tenement. This was conducted as infill from the previous 2015 soil campaign and assisted with mapping the immediate area;
- Geological mapping of Walshy's Prospect and surrounds;
- A portable Electro-Magnetic survey was partially completed before instrument malfunction; and,
- Acquisition of high resolution imagery of the tenement from Geoimage, as used in Figure 33. below.

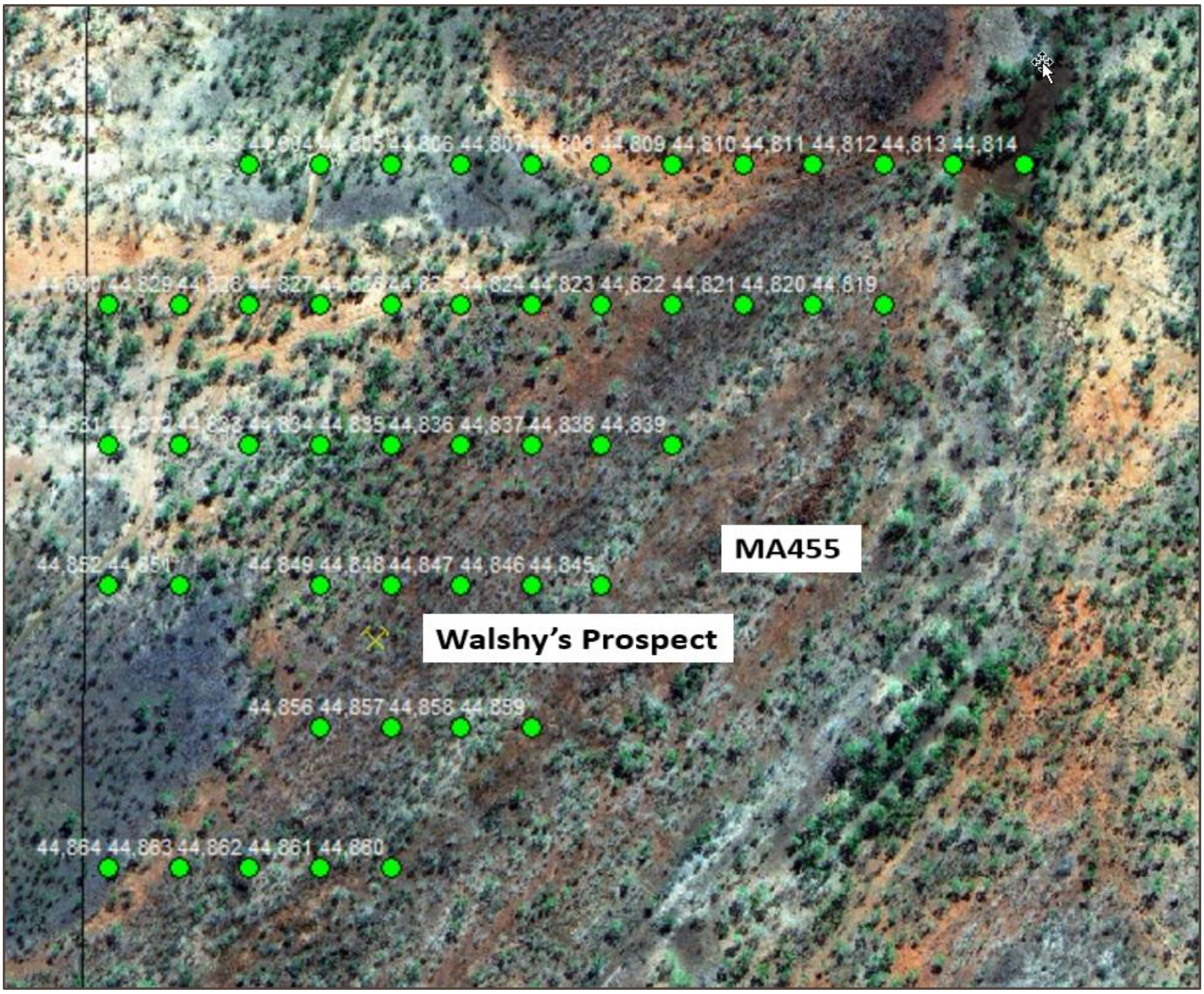

Figure 33. MA455 Soil grid with high resolution imagery

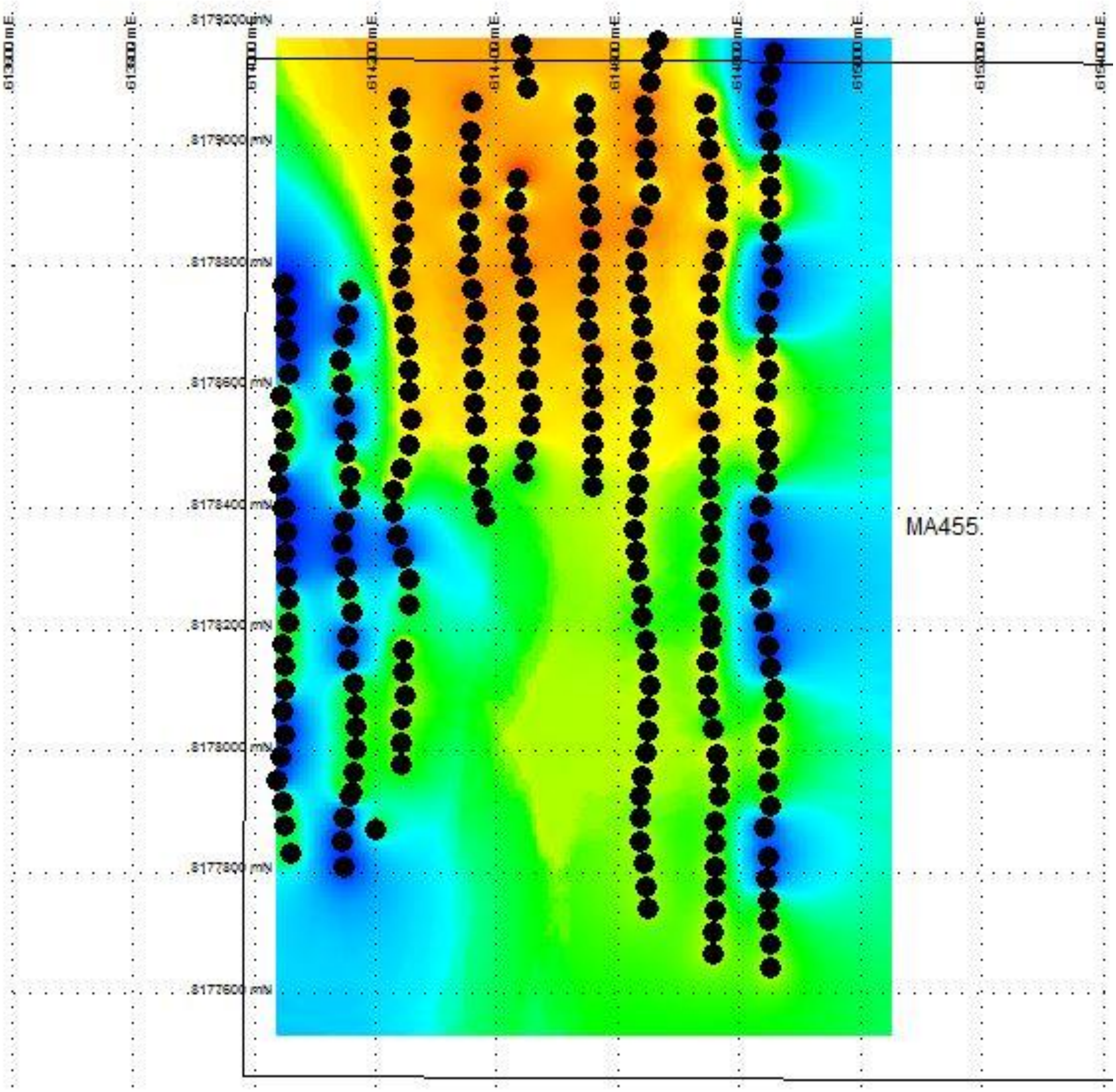

Figure 34. Raw EM conductivity data completed on MA455.

4.12.2 MA456 Exploration

Due to instrument failure, the only work completed on MA456 was the acquisition of the high resolution imagery

Figure 35. below).

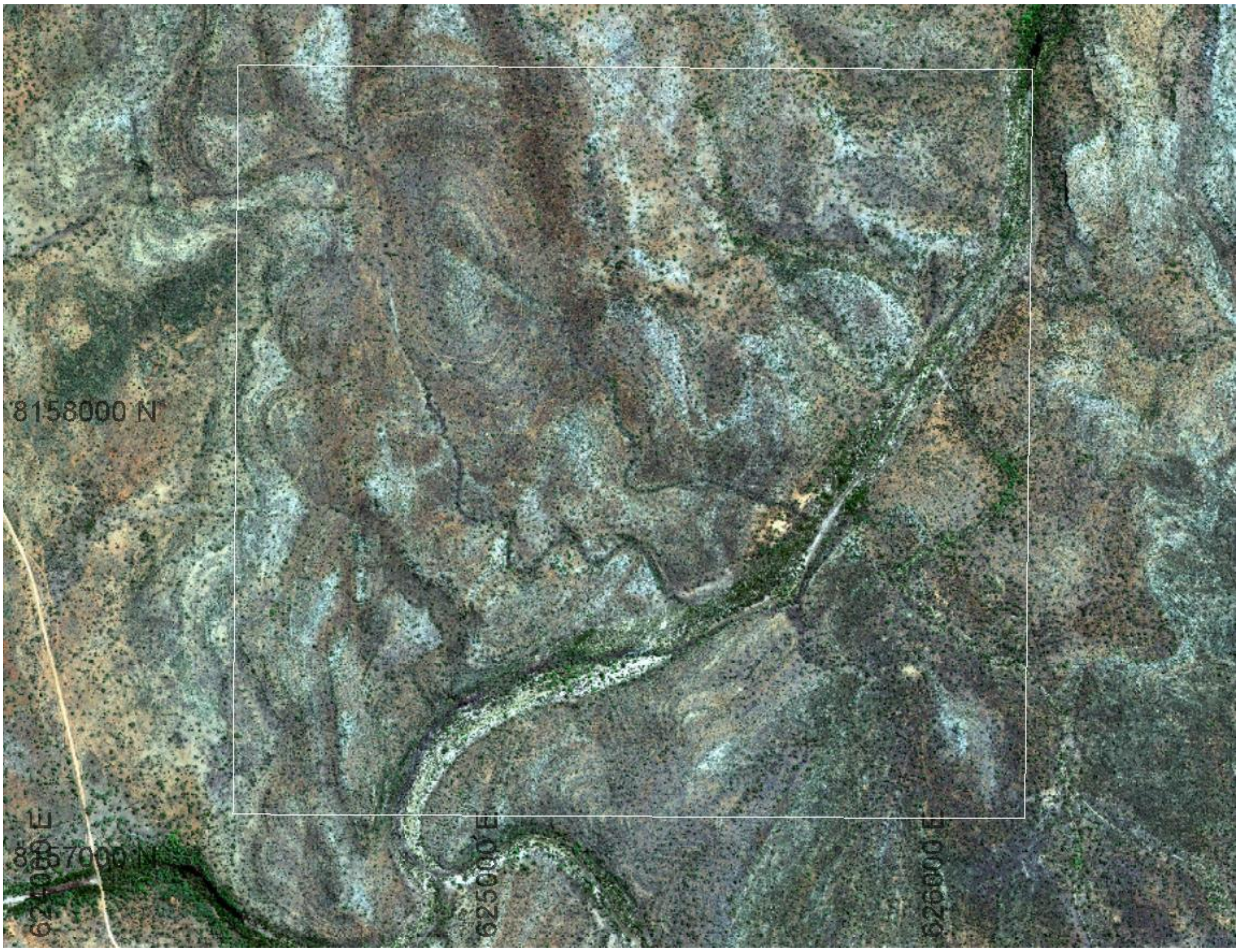

Figure 35. Boundary of MA456 overlain on new high resolution image supplied by Geoimage.

4.13 August 2017 to August 2018

4.13.1 MA455 and MA456 Exploration

The scheduled Portable Electro-magnetic survey for both tenements was not completed due to the company senior geophysicist determining the data compiled in the previous working year was not of acceptable quality to warrant the continuation of the program.

Recovery of historical geophysical data was completed and data was processed and used for the production of geophysical maps and images.

Reconnaissance and familiarisation of the tenement was carried out for the benefit of graduate geologists. Main access roads to MA455 were graded, which had not been carried out for 6 years.

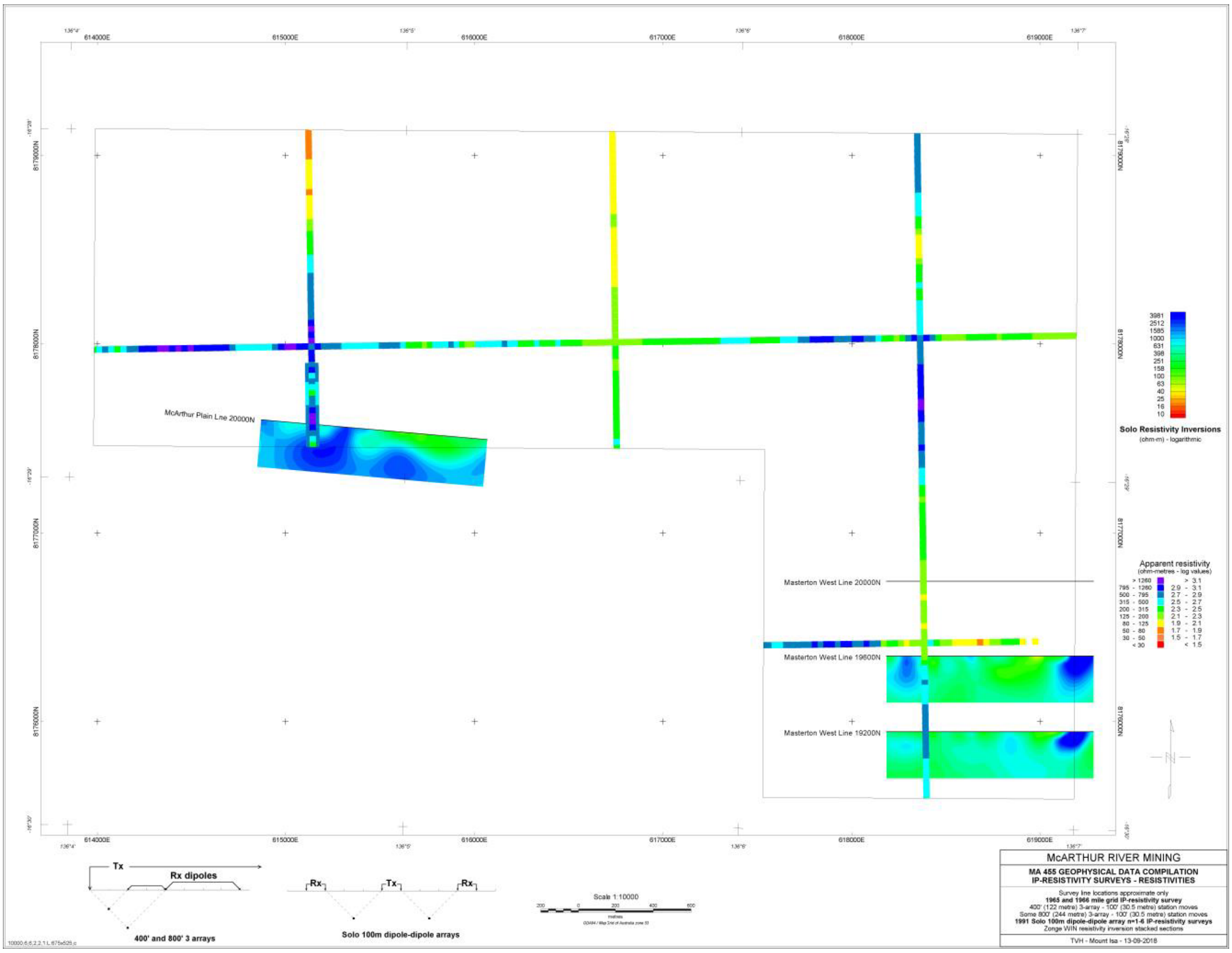

Figure 36. MA455 IP-resistivity survey.

5.0 References

Anderson, J., 1996, Coxco - Thoughts on potential and Work Program: Internal MIM Exploration Memorandum, dated August 8, 1996.

Crabb, D. M., 1996, Coxco and Amelia Mineralisation Emu Fault Zone: Internal MIM Exploration Memorandum, dated April 3, 1996.

Crabb, D. M., 1996, Coxco and Amelia Mineralisation Emu Fault Zone: Internal MIM Exploration Memorandum, dated April 3, 1996.

Dennis, R. W., 1981, MR581 - Biennial Report for the 2 Years Ending December 31, 1980: Carpentaria Exploration Company Pty Ltd, Technical Report 887.

Elliston, A. L., 2017, Summary for ALS report - Analysis of Exploration Samples – Preliminary Report.

Grenfell, K., 2010, Group Technical Report on the Authorisation Northern Licences AN455, 456 & 457: MRM Annual Report 2010.

Grenfell, K., 2011, Nil Group Report on the Authorisation Northern Licences AN455, 456 & 457: MRM Annual Report 2011.

Hinman, M.C., 1999. Coxco Potential. GeoSolutions Report to North Limited. Aug-Sept, 1999.

Hinman, M.C., 2000. Coxco – Orientated Diamond Drilling, Coxco 40, 41 & 42. October-November 1999. GeoSolutions Report to North Limited, February, 2000.

Hinman, M.C., 2001. Coxco – Orientated Diamond Drilling, Coxco D87, D88, D89, D90, D91 & D92. August-October 2000. Hinman GeoSolutions Report to North Limited

James, B. A., 1995, Amelia and Coxco Prospects Structural Study: Internal MIM Exploration Memorandum, 1995/022.

Logan, R., 1997, Authority No. 366 "Emu Fault Zone", Northern Territory - Fifth Annual Report for the Year Ended June 7, 1997; MIM Exploration Pty Ltd, Technical Report 2838.

Logan, R., 1997, Authority No. 366 "Emu Fault Zone", Northern Territory – Coxco Prospect - Review; MIM Exploration Pty Ltd, Internal Technical Report 2854.

Lye, A.N.C., 2000, AN 366 "Emu Fault Zone”, Annual Report for the Period Ending 4th June 2000; North Ltd. Report No. QB00/23s.

McIntyre, D.M., 2007, 15th Annual Report on the Evaluation of AN366 – “Emu Fault Zone”; MRM Annual Report 2007.

McIntyre, D.M., 2007, 1st Annual Report on the Evaluation of AN455, 456 & 457; MRM Annual Report 2007.

Pevely, S.G., 2005, 13th annual report on the evaluation of Coxco Lease AN366 – “Emu Fault Zone”: McArthur River Mining, Xstrata Zinc.

Pevely, S.G., 2008, 2nd annual report on the evaluation of AN455, 456 & 457: MRM Annual Report 2008.

Pevely, S.G., 2009, 3rd annual report on the evaluation of AN455, 456 & 457: MRM Annual Report 2009.

Pevely, S.G., Hinman, M., 2009, Third Annual/Relinquishment/Consultant Report Period Ending 21st August 2009: McArthur River Mining, Xstrata Zinc.

Rothery, E., 1996a, The Coxco Deposit as an Intersection Dilation Zone: Internal MIM Exploration Memorandum, dated May 2, 1996.

Rothery, E., 1996b, Deep Potential at the Coxco Deposit - a Drill Proposal: Internal MIM Exploration Memorandum, dated May 28, 1996.

Rothery, E., 1996c, June Report: Internal MIM Exploration Monthly Report: dated June 30, 1996.

Rothery, E., 1996d, First Pass Coxco Geological Resource Estimate: Internal MIM Exploration Memorandum, dated August 15,1996.

Rothery, E., 1996e, Coxco Prospect Update: Internal MIM Exploration Memorandum, dated June 2,1996.

Walker, R., 1975, Progress Report - Coxco Valley Exploration 1974 (Exploration Licence NO. 597 - Amelia Spring, McArthur - Northern Territory): Carpentaria Exploration Company Pty Ltd, Technical Report 554.

Walker, R. N., Gulson, B. and Smith, J., 1978, The Coxco Deposit - A Proterozoic Mississippi Valley-Type Deposit in the McArthur River District, Northern Territory, Australia: Econ Geol V.78 pp214-249.

Walker, R. N., and Runnalls, N., 1976, Emu Fault Zone Report, 1975 McArthur District, N.T.: Carpentaria Exploration Company Pty Ltd, Technical Report 648.

Wilkin – Smith, T., 1972, Report on Emu Fault Zone Mapping – Amelia Area: Carpentaria Exploration Company Pty. Ltd, Technical Report # 381, 22 p.

Wilkins, C., 1991, Structural analysis and zinc stockwork evaluation – Amelia Prospect: MIM Exploration Pty. Ltd, consultants report, 9 p.

Wilson, R. D. M. and Harvey, T. H., 1992, RO581 : AN314 Emu Fault Zone, Annual Report Ended June 7, 1992: MIM Exploration Pty Ltd Technical Report 1590.

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