# Rio Tinto Exploration Pty. Limited

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A member of the Rio Tinto Group

## AN 366 "EMU FAULT ZONE"

## ANNUAL REPORT FOR THE PERIOD ENDED 4 June 2001

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**Exploration Report No. 24546**

## ABSTRACT

The Coxco JV project is located 10km kilometers southeast of the world class McArthur River Zn-Pb-Ag mine. The tenement package covers the carbonate hosted Coxco Zn-Pb deposit within highly prospective Proterozoic McArthur Group stratigraphy adjacent the north-south trending Emu Fault zone. Titleholders, Mount Isa Mines Limited (MIM), and operators, North Mining Limited, entered an agreement whereby North Mining Limited can earn 50% of MIM's interest in AN 366 and ANAs 455, 456 and 457 over 5 years. Exploration activities during the second year of the joint venture included 43 reverse circulation and 7 diamond core drill holes at the Coxco prospect.

The RC drilling program focussed on testing the continuity, grade and thickness of the base metal oxide resource north and south of Cook's working. The oxide horizon is dominated by smithsonite with variable cerrusite, hemimorphite and anglesite. It is best developed at Cook's workings and to the north where it significantly upgrades the primary base metal sulphide mineralisation hosted in the 'Barney' sedimentary breccia and underlying ?Teena Dolomite above the base of total oxidation. The oxide horizon thins out to the east into the intensely weathered Cambrian sandstones.

The stratiform 'Barney' sedimentary breccia was traced northwards from Cook's workings to deep under Lynott Formation siliclastics in the Coxco Anticline. It shows significant variation in thickness and composition along its strike length and may thicken to the north and on the flanks of the north plunging Coxco Anticline. The grade and distribution of the contained base metal sulphide mineralisation is highly erratic with the widest grade intercepts closest the Emu Fault. There appears to be only limited economic potential in targeting this stratiform type mineralisation at Coxco, though at shallow levels, there is significant oxide enrichment.

The underlying algal laminated, stromatolitic dolomite contains the more extensive tectonic fracture and breccia controlled, sphalerite-galena-pyrite-marcasite mineralisation. This structurally related, subeconomic mineralisation is commonly developed in the footwall of moderate to steeply angled, WNW dipping reverse controlling structures at moderate to high angles to the Emu Fault zone. Mineralisation typically decreases to the east, away from the Emu Fault zone and with depth, away from the partly silicifed, Lynott Formation – 'Barney' sedimentary breccia/?Teena Dolomite contact.

North's recent drilling questions the validity of some MIMEX drilling data and resource estimations. Significant disparities in Zn-Pb-Ag grades exist between North data and adjacent MIMEX core and RC data, especially through the mixed, high grade oxide-sulphide mineralisation. North's analytical results suggest RC drilling may be an unreliable sampling technique through these thick, base metal oxide-sulphide horizons. It may grossly under or overestimate true oxide grades and contaminate the underlying sulphide rich samples. High quality, well recovered core drilling may provide the most reliable sampling method if an accurate oxide resource is required for feasibility studies.

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# 1. INTRODUCTION

Titleholders, Mount Isa Mines Limited (MIM), and operators, North Mining Limited, entered an agreement whereby North Mining Limited can earn 50% of MIM's interest in AN 366 and ANAs 455, 456 and 457 over 5 years (Fig. 1). Work during the ninth year of tenure and the second year of the joint venture, included reverse circulation and diamond core drilling at the Coxco prospect. Rio Tinto Pty. Ltd. took over control of North Mining Limited during August 2000 and are submitting this report covering the 2000-2001 work program.

The Coxco JV project provided North Ltd. with the opportunity to explore for Pb-Zn mineralisation in a highly favorable structural-stratigraphic setting, south of the world class McArthur River mine. The tenements cover highly prospective carbonate sequences of the Proterozoic McArthur Group adjacent the Emu Fault, a regional growth structure and conduit for mineralising fluids. Initial detailed work by North Ltd. including geological re-mapping, reinterpretation of geophysics and relogging/structural analysis of drill core, provided a solid framework for the second year exploration program.

# 2. CONCLUSIONS AND RECOMMENDATIONS

The second year of the Coxco joint venture focussed on further targeting of the Zn-(Pb)-(Ag) mineralised system around the Cook's workings. North's work suggests 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. Encouragingly, 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 is 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 limited drilling to date shows 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, is 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 have 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 indicates 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 show 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 show 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. 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 remains south of Cook's workings where there is only minor drilling of the 'Barney' sedimentary breccia or underlying fracture/breccia controlled mineralisation close to the Emu Fault zone. There is 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 is required in the south to more adequately test this assumption.

The high grade, shallow base metal oxide resource is centered 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. Further drilling is required to close off this oxide zone to the north, though the narrow widths and subeconomic grades are 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. If further drilling is required, the program should be guided by the MIMEX soil results, though grades are likely to remain very low.

North's work demonstrates that further work is needed to test the validity of previous MIMEX drilling data before a meaningful resource can be recalculated. No new resource estimations have been attempted for this report though it is recommended that this be completed. Based on North's results to date, 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 underestimate and the 1996 RC drilling may grossly overestimate the true grade of the Coxco resource. Major disparities in Pb-Zn grade exist between adjacent North-MIMEX holes particularly through the shallow, mixed oxide-sulphide mineralisation. North's recent drilling shows that at depth, primary base metal sulphide grades are comparable between well recovered (triple tube) core and RC sampling but when testing shallow high grade oxide intervals, superior core drilling may be essential.

## 3. GEOLOGY

In addition to regional scale geologic mapping surveys by state and commonwealth agencies, the McArthur Basin and adjacent Mount Isa Basin have been the focus of a number of recent major Australian research projects (i.e. AMIRA, NABRE). This work, upon which the following brief summary is largely based, has greatly improved the structural, stratigraphic and sedimentological understanding of the region, which is host to most of the world's known Proterozoic sediment hosted Pb-Zn-Ag deposits.

The Coxco JV tenements cover unmetamorphosed and weakly deformed Proterozoic sedimentary sequences of the McArthur Basin. The basin is a broad intracratonic basin, which lies along the eastern edge of the North Australian craton (Plumb *et al*., 1980). The oldest units formed about 1725Ma and the stratigraphy can be subdivided into 4 major sedimentary sequences (McGoldrick and Bull, 1996) each separated by regional unconformities. The Palaeoproterozoic volcano-sedimentary and granitic basement succession is overlain by the sedimentary Tawallah, McArthur, Nathan and Roper Groups. The basal Tawallah Group comprises up to 4km of hematitic sandstones and rift tholeiites with minor evaporitic carbonates. The McArthur and Nathan Groups consists of evaporitic, shallow water carbonates with subordinate fine-grained shales, siltstones and sandstones. The Roper Group is comprised of cyclic marine shelf sandstones, siltstone and carbonaceous shales. The Proterozoic sequence is overlain by feldspathic sandstones of the Cambrian Bukalara Sandstone.

The McArthur Basin is comprised of a symmetrical arrangement of north-south trending fault zones flanked by less structurally dissected 'shelf' areas (McGoldrick and Bull, 1996). The central zone, known as the Batten Fault Zone, divides the Arnhem and Bauhinia shelves in the west and the Wearyan Shelf to the east. The Batten Fault Zone has been the focus for a number of recent detailed stratigraphic and tectonic studies as it contains the giant HYC deposit. The deposit is hosted in an anomalous thick sequence of deep water, carbonaceous, pyritic shales of the Barney Creek Formation, bounded to the east by the Emu Fault. This major regional structure has been interpreted as a growth fault active during sedimentation and is the main conduit for mineralising fluids in the region. The mineralised lenses are separated by interore sedimentary breccias sourced from erosion of nearby uplifted lithified pre-Barney Creek Formation stratigraphy. This cyclic sequence of breccias and ore is indicative of a long and protracted history of fault reactivation along the Emu Fault (Large *et al*., 1998).

The majority of the Pb-Zn-Ag occurances in the McArthur Basin are hosted by the carbonates and subordinate siliclastics of the McArthur Group. This includes the McArthur River (HYC) deposit, the world's largest known example of a stratiform, sediment hosted Zn-Pb-Ag deposit with a resource of 237Mt @ 9.2% Zn, 4.1% Pb, 41 g/t Ag (Gustafson and Williams, 1981) located in the southern part of the McArthur Basin. This major resource is currently being underground mined based on a smaller, higher grade resource of 103.7Mt @ 14.1% Zn, 6.4% Pb, 64 g/t Ag (Hinman, 1995). It is surrounded by a number of small discordant, but subeconomic MVT style Pb-Zn prospects including Coxco, Cooley and Ridge. A detailed account of the local geology and mineralisation at Coxco is comprehensively discussed by Walker *et al*., 1983.

## 4. PREVIOUS EXPLORATION

## 4.1. Previous exploration prior to current tenement (refer Lye, 2000)

The following summary of previous exploration at the Coxco prospect is extracted from Logan (1997).

**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.

Mount Isa Mines completed Coxco1DD and 2DD, 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, south and east of Cox's prospect, which was attributed to disseminated pyrite.

**1974 - Exploration**

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.

| 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? |

**Table 1: Resource Estimate (Walker, 1975)**

Walker (1975) recommended that drilling could extend the resource;

- 150 metres south of Coxco10DD,

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

?? 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.

**1975 - Exploration**

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.

**1979 - Exploration**

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. Dolomite breccia, dolomitic shale and massive siltstone host mineralisation.

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.

**1991 - Exploration**

Reverse circulation holes Coxco24RC and 25RC tested a chargeability anomaly 80 metres to the east of the Coxco mineralisation (Wilson and Harvey, 1992). The anomaly was due to pyrite within dolomite and dolosiltstone. Coxco style 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 south of Cox's. It targeted a chargeability anomaly, and intersected Masterton Sandstone and Settlement Creek Volcanics. No mineralisation was intersected.

**1995 - Exploration**

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.

**1996 - Exploration**

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 has 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.

Rothery drilled twelve reverse circulation holes, Coxco27RC to 38RC, 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 northeastern limb of the anticline. They intersected the mineralised horizon, but mineralisation is 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.

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[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.

Coxco32RC, 33RC, and 34RC were short re-drills of the 1966 open hole percussion program. Results are listed in Table 2.

| 1996 Reverse Circulation Drilling | | | | | 1966 Reverse Circulation 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 | 7.2 | 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 |

**Table 2: Comparison between 1996 and 1966 drilling.**

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 is potential to extend the resource south of Coxco37RC.

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

There is 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 that assayed 60 metres at 8.92% zinc. The difference in grade is 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 increases the strike length of Walker's 1975 estimate by 60 metres northwards, but retains the same southern boundary. He acknowledges that the calculations are simplistic and meant only as a guideline. In addition, he raises concerns about grade estimation, believing that the real grade could be between 5% and 10% zinc (Anderson, 1996; Rothery,1996d).

## 4.2. Previous exploration during current tenement

North's exploration activities during the first year of the joint venture (Lye, 2000), focussed on the Coxco resource and included:

?? **1:1000 Geological Mapping** (Appendix 1) of the Coxco area. An extensive 50*50m AMG grid was established using a differential GPS system to assist mapping and relocate old drill holes.

?? **Core Relogging** of 12 MIMEX diamond holes at Coxco to gain a further understanding of the potential stratigraphic and structural controls on the mineralisation

?? **Reprocessing of MIMEX geophysics** including a 1991 airborne GEOTEM survey and 1990 dipole-dipole IP survey.

?? **2 RC/ 3 Diamond core holes** were drilled to test the grade, mineralogy and controls on mineralisation around the Cook's workings.

# 5 EXPLORATION COMPLETED DURING REPORTING PERIOD

The second year 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.

## 5.1 Reverse Circulation Drilling

A program of 43 reverse circulation drill holes (total 2642 metres), mostly along five east-west traverses at 25 metre spacings, was completed at Coxco during June-July 2000 (Fig. 2, Table 3). 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. In the following results discussion, a 1% Zn or 1% Pb cutoff grade is used when discussing significant mineralisation.

One metre splits were sampled for analysis. Samples were sent to ALS for preparation (crushing and pulverising to -75#) with a hydrofluoric/nitric/perchloric acid digestion-hydrochloric acid leach (method IC587). Analysis was by ICPAES for Cu, Pb, Zn, As, Ag, Ca, Mg, Cd, Al, Co, Mg, K, Mn, Fe and Sr.

Drill logs and analytical data are presented in Appendix 2. Geological cross-sections are shown in Plans 1 to 5.

***Results***

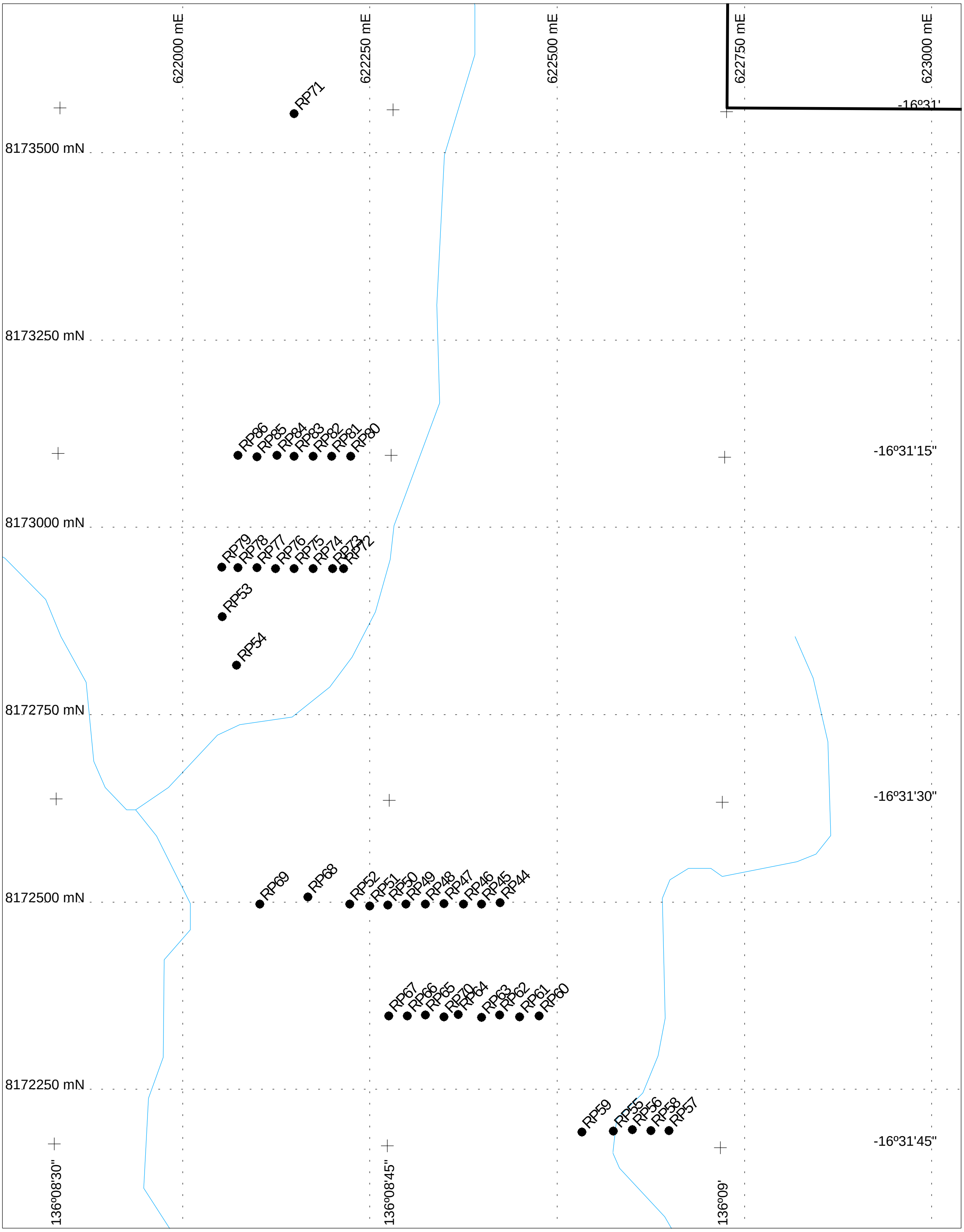
**SECTION 8173100N (Plan 1)**

Seven angled RC holes (**RP80** to **RP86**) and one angled cored hole (**D91**) were drilled along this northernmost traverse. On the eastern side of the traverse, drilling initially intersected thick, highly weathered brown-goethitic clay of the Cambrian Bukalara Sandstone unconformably overlying the interpreted Proterozoic ?Teena Dolomite (Hinman, 2001). The contact is well marked by thick cavities (max. 12m) with poor or no sample recovery. Drilling only just tested the underlying dolomite sequence beneath the unconformity. It was not an effective deep test for potentially structural related sulphide mineralisation associated with localised brecciation of competent dolomite in the hinge zone of the Coxco Anticline. Only patchy low level (<1%) coarse grained sulphide mineralisation was hosted in minor tectonic fractures and breccias (Table 4).

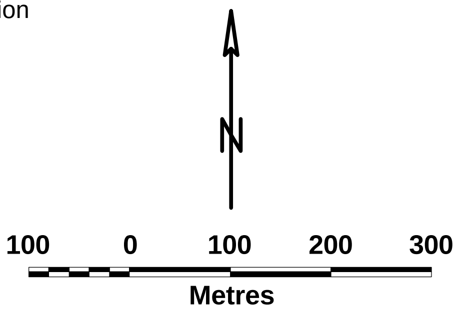
## TABLE 3 – Coxco JV RC Drill Holes

| HOLE | AMG | AMG | INCLINATION | AZIMUTH | DEPTH |
|---|---|---|---|---|---|
| | East | North | ( ?) | (AMG Grid ?) | (m) |
| RP44 | 622424 | 8172499 | -90 | 0 | 41 |
| RP45 | 622399 | 8172497 | -90 | 0 | 41 |
| RP46 | 622375 | 8172497 | -90 | 0 | 53 |
| RP47 | 622349 | 8172498 | -90 | 0 | 89 |
| RP48 | 622324 | 8172497 | -90 | 0 | 53 |
| RP49 | 622298 | 8172497 | -90 | 0 | 90 |
| RP50 | 622274 | 8172496 | -90 | 0 | 46 |
| RP51 | 622250 | 8172495 | -90 | 0 | 31 |
| RP52 | 622223 | 8172497 | -90 | 0 | 37 |
| RP53 | 622053 | 8172881 | -75 | 84 | 47 |
| RP54 | 622072 | 8172816 | -60 | 90 | 78 |
| RP55 | 622575 | 8172194 | -90 | 0 | 35 |
| RP56 | 622600 | 8172196 | -90 | 0 | 29 |
| RP57 | 622649 | 8172195 | -90 | 0 | 29 |
| RP58 | 622625 | 8172195 | -90 | 0 | 109 |
| RP59 | 622533 | 8172193 | -60 | 90 | 60 |
| RP60 | 622476 | 8172348 | -90 | 0 | 43 |
| RP61 | 622450 | 8172347 | -90 | 0 | 57 |
| RP62 | 622423 | 8172349 | -90 | 0 | 55 |
| RP63 | 622399 | 8172346 | -90 | 0 | 37 |
| RP64 | 622368 | 8172350 | -90 | 0 | 49 |
| RP65 | 622324 | 8172349 | -90 | 0 | 43 |
| RP66 | 622300 | 8172348 | -90 | 0 | 55 |
| RP67 | 622275 | 8172348 | -90 | 0 | 67 |
| RP68 | 622167 | 8172507 | -90 | 0 | 61 |
| RP69 | 622103 | 8172497 | -90 | 0 | 109 |
| RP70 | 622349 | 8172347 | -90 | 0 | 139 |
| RP71 | 622149 | 8173552 | -60 | 265 | 181 |
| RP72 | 622215 | 8172945 | -60 | 90 | 81 |
| RP73 | 622200 | 8172945 | -60 | 90 | 67 |
| RP74 | 622174 | 8172945 | -60 | 90 | 65 |
| RP75 | 622149 | 8172945 | -60 | 90 | 43 |
| RP76 | 622124 | 8172945 | -60 | 90 | 43 |
| RP77 | 622099 | 8172946 | -60 | 90 | 49 |
| RP78 | 622074 | 8172946 | -60 | 90 | 49 |
| RP79 | 622052 | 8172947 | -60 | 90 | 61 |
| RP80 | 622224 | 8173095 | -60 | 90 | 55 |
| RP81 | 622199 | 8173095 | -60 | 90 | 55 |
| RP82 | 622174 | 8173095 | -60 | 90 | 55 |
| RP83 | 622149 | 8173095 | -60 | 90 | 60 |
| RP84 | 622126 | 8173096 | -60 | 90 | 61 |
| RP85 | 622099 | 8173094 | -60 | 90 | 61 |
| RP86 | 622074 | 8173096 | -60 | 90 | 73 |

An unexplained Zn-Pb-As-Ag-Cu anomaly occurs in clayey sandstone above a large cavity on the easternmost hole **RP80**. The anomalism decreases in magnitude along the




● Drillhole location




**RIO TINTO EXPLORATION PTY. LIMITED**

## AN366 Coxco 1

# Drillhole Locations

| | | | |
|---|---|---|---|
| **Author :** | G. Rheinberger | **Ref :** | SE5303 Bauhinia Downs |
| **Drawn :** | I. Hubbard | **File Ref :** | . |
| **Date :** | 23-10-2001 | **Report No :** | 24546 |
| **Scale :** | 1:7500 | **Plan No :** | Fig 2 |

unconformity to the west, suggesting a possible untested source to the east such as leakage from a mineralised regional fault (i.e. Coxco Fault) or the eastern flank of 'Barney' sedimentary breccia.

On the western side of the traverse, North's cored holes **D91** & **D41** were collared in leached siltstones/fine sands overlying basal pyritic, ?carbonaceous siltstones (?Caranbirini Member) of the Lynott Formation. In **D91**, the stratiform 'Barney' sedimentary breccia (Hinman, 2000) was poorly recovered during drilling with only the upper clayey, gravel portion successfully cored. Adjacent hole **D41** also contained large cavities in the strongly weathered 'Barney' sedimentary breccia but reportedly consisted of upward coarsening cycles of goethitic clay, gravels, siltstone and dolomite clasts (Lye, 2000). The 'Barney' sedimentary breccia appears more gravelly with abundant siltstone/sandstone and less dolomite clasts compared with the interpreted same stratiform unit further north in **D90** and **D93a**. Collophane was also identified by petrology and XRD analysis (Lye, 2000) in a sandy cycle of the 'Barney' sedimentary breccia. The abundance of phosphate minerals in the Coxco stratigraphy remains largely unknown as they were difficult to recognised. If specific phosphate rich horizons exist, such as the 'Barney' sedimentary breccia, stratigraphic correlations between drill holes across the prospect may be possible.

It is interpreted that the RC drilling to the west of the cored holes, did not intersect the 'Barney' sedimentary breccia due to erosion by the Cambrian unconformity. Drilling did intersect a flat lying base metal oxide horizon, hosted in goethitic clay and fine-grained sandstone. Holes **RP84** to **RP86** shows secondary Zn (best 9m @ 3.29% Zn) gradually decreases in thickness and grade to the east, presumably away from the oxidation of dolomite hosted primary sulphides. The 'Barney' sedimentary breccia and underlying dolomite hosted sulphide mineralisation above the base of total oxidation is also likely to contain significant oxide enrichment.

The underlying mottled buff, light grey dolomite package is interpreted as a dolomite cemented, slump breccia based on drill core (Hinman, 1999) and surface mapping (Appendix 1). Only rare silty dolomite interbeds, typically consisting of parallel silt wisps and laminations, occur at depth in the algal laminated, stromatolitic dolomite sequence. These thin beds can be tentatively correlated with similar silty units in cored holes to the north and south. The silty intervals appear to pinch out to the east, towards the Coxco Anticline fold axis. The dolomite becomes less algal laminated or stromatolitic with depth but becomes coarser grained.

High Zn-(Pb)-(Ag) grades continue beneath the 'Barney' sedimentary breccia in tectonically fractured and brecciated dolomite. Extensive low grade sulphide mineralisation was intersected throughout the westernmost hole **D91** (best 28m @ 2.48% Zn), the upper part of **D41** and at depth in **RP86** (best 11m @ 1.58% Zn). Petrology and XRD analysis confirms that smithsonite is the most common secondary Zn carbonate and occurs at depth in cavities well below the base of total oxidation. Galena typically rims the sphalerite grains with pyrite, commonly associated with late stage marcasite, only rarely intergrown with the base metal sulphides. Primary sulphide mineralisation in **RP68** remains open at depth although discouraging results from adjacent **D41** suggests there is little further potential. Though there was no effective deep drilling into the hinge of the Coxco Anticline, it appears that primary Zn-Pb mineralisation may decrease to the east along the traverse. This may be related to decreasing brittle deformation away from the Emu Fault zone.

There is a close association of high Cd levels with the primary Zn-(Pb)-(Ag) mineralisation. It is suggested that this may be a useful tool in differentiating between primary and oxide dominant intercepts. Narrow galena rich intervals are also typically closely associated with high Ag. Anomalous As levels correlate well with strongly pyritic intervals.

## TABLE 4 – Coxco JV RC Holes
## Summary Results

| HOLE | DEPTH | Significant Mineralisation (>2m @ 1% Zn-Pb cutoff) |
|---|---|---|
| RP48 | 4-6m | 2m @ 1.3% Zn |
| | 18-20m | 2m @ 1.6% Zn |
| | 21-23m | 2m @ 1.5% Zn |
| RP49 | 3-10m | 7m @ 1.6% Zn |
| | 30-38m | 8m @ 1.7% Zn |
| | 40-55m | 15m @ 6.9% Zn (incl. 8m @ 11.2% Zn, 7 g/t Ag)<br>note: 7m @ 7.5% Pb from 40m |
| | 62-64m | 2m @ 1.2% Zn |
| | 77-80m | 3m @ 1.5% Zn |
| RP50 | 5-13m | 8m @ 1.2% Zn |
| | 16-19m | 3m @ 2.1% Zn |
| RP51 | 19-22m | 3m @ 1.3% Zn |
| RP52 | 22-27m | 5m @ 2.2% Zn |
| RP53 | 42-47m | 5m @ 1.5% Zn, 2.4 g/t Ag<br>note: 2m @ 2.3% Pb from 43m |
| RP54 | 13-77m | 62m @ 4.1% (excl. 2m in cavities)<br>note: 12m @ 7.2% Pb, 13 g/t Ag from 13-25m |
| RP60 | 7-14m | 7m @ 1.2% Zn, 2.2 g/t Ag |
| RP64 | 17-19m | 2m @ 1.1% Zn |
| RP68 | 39-44m | 5m @ 1.3% Zn, 3.4 g/t Ag |
| RP70 | 14-20m | 6m @ 1.1% Zn, 2.1 g/t Ag (excl. 4m cavity at 20m) |
| | 111-113m | 2m @ 1.7% Zn |
| RP76 | 4-7m | 3m @ 1.9% Zn |
| RP77 | 3-14m | 11m @ 4.3% Zn |
| RP78 | 2-22m | 20m @ 1.8% Zn |
| RP79 | 16-46m | 28m @ 2.7% Zn (excl. 2m cavity)<br>note: 2m @ 3% Pb, 4 g/t Ag from 21m |
| RP80 | 29-34m | 5m @ 1.1% Zn, 2.8 g/t Ag |
| RP81 | 25-27m | 2m @ 1.1% Zn |
| | 45-47m | 2m @ 1.2% Zn |
| RP84 | 19-26m | 7m @ 1.6% Zn |
| RP85 | 24-31m | 7m @ 4.0% Zn |
| | 38-42m | 4m @ 1.2% Zn |
| RP86 | 30-39m | 9m @ 2.2% Zn, 2.2 g/t Ag |
| | 50-52m | 2m @ 1.9% Zn |
| | 57-62m | 5m @ 2.1% Zn<br>note: 3m @ 1.6% Pb, 2.7 g/t Ag from 58m |
| | 64-66m | 2m @ 1.2% Zn |
| | 70-73m | 3m @ 2.9% Zn |

Note that most zinc grades in North's **D41** are significantly lower than in adjacent MIMEX hole **Coxco30RC**. This may be partly due to poor core recovery (i.e. cavities) in **D41**, but more likely, there was a sample contamination problem with the MIMEX drilling. A further comparison of North's-MIMEX drilling is discussed in detail below.

**SECTION 8172950N (Plan 2)**

Eight angled holes (**RP72** to **RP79**) were drilled along this section, immediately north of Cook's workings. The main target was the shallow, base metal oxide resource, intersected in nearby MIMEX holes (**Coxco12DD**, **Coxco31RC**) and North core holes (**D40, D88, D89**).

On the eastern side of the traverse, drilling intersected thick brown clay of the Cambrian Bukalara Sandstone unconformably overlying the Proterozoic ?Teena Dolomite. The light grey-white dolomites are only weakly fractured/brecciated with patchy low level sulphide mineralisation.

The easternmost hole **RP72** targeted an interpreted major fault at depth, possibly the NE trending Cooks Fault. Drilling intersected thick goethitic clay and brecciated dolomite at 68-75metres containing only elevated Zn (max. 2820ppm). Note that 2 small, unexplained Cu anomalies (max. 3460ppm) were also identified only in **RP72** which may be leakage from another structure to the east.

On the western side of the traverse, RC drilling intersected leached siltstones and sandstones of the Lynott Formation, overlying gravelly 'Barney' sedimentary breccia and the underlying ?Teena dolomites. Note that in core hole **D92** to the north, the 'Barney' sedimentary breccia was not intersected, though a thin wedge was reportedly logged in adjacent MIMEX hole **Coxco17DD**. This demonstrates the significant thickness variation of the 'Barney' sedimentary breccia along its strike length. In **D92**, the underlying algal laminated, stromatolitic dolomite sequence contained patchy, weakly mineralised (<1% Zn) ?tectonic fracturing/breccias with massive pyrite and separate rare massive galena veining between 116-139m. At 161m, an extensive strongly fractured zone in the hanging wall of a major fault zone returned a promising 36m @ 3.91% Zn. Fault gouge at 195m contained high grade Zn (max. 14% Zn), though sample recovery was poor. The footwall was only weakly mineralised (<1% Zn). Hole **D92** ended in a poorly mineralised, rehealed, complex breccia. The dolomite sequence contained very rare silty dolomite interbeds, which differs from the dolomite package in core holes **D90** to the north, and **D89** to the south.

Along the RC traverse, the 'Barney' sedimentary breccia was intersected only in **RP79** and adjacent MIMEX hole **Coxco15DD**. It was only partly tested due to poor sample recovery through the clayey ?dolomite, minor gravels and cavities. Mineralisation appears dominated by high ?secondary Zn in **RP79** (10m @ 2.53% Zn from 16 metres) that extends to the west in **Coxco15DD** (7.4m @ 2.6% Zn, 8g/t Ag)**.** The underlying fractured/brecciated dolomite sequence contains broad sulphide mineralisation in **RP68** and **RP69** (best of 18m @ 2% Zn from 28 metres) that extends west into **Coxco15DD** (up to 35.7m @ 3% Zn from 48.9m) with associated Pb (8m @ 2.75%) and Ag (max. 19ppm).. Mineralisation decreases with depth from the siliclastic Lynott – 'Barney' sedimentary breccia unconformity.

The base metal oxide horizon, hosted in brown clayey ?sandstone, was intersected in holes **RP78**, **RP77**. **RP76** and **RP75**. This shallow, flat lying body decreases in thickness and grade to the east, away from the 'Barney' sedimentary breccia and fractured dolomite hosted sulphide mineralisation. The oxide was thickest in **RP77** with 11m @ 4.29% Zn, but thins to 3m @ 5.75% in adjacent hole **RP66,** only 25 metres away.

**SECTIONS 8172500N (Plan 3)**

Eleven vertical holes (**RP44** to **RP52**, **RP68**, **RP69**) were drilled along this section, south of the Cook's workings. In addition to testing for the shallow southward extensions to the oxide resource, it targeted a coincident Zn (max. 3700ppm) – Pb (max. 2500ppm) soil anomaly and very strong chargeability high (IP Anomaly 7 – refer Lye, 2000). It is noted that the broad, coherent Zn-Pb soil anomalism extends from the Cooks workings to well south of the Cox's workings.

Drilling on the eastern side of the traverse intersected patchy, tectonically fractured and brecciated dolomite at depth. A strongly pyritic breccia zone was intersected in **RP45** and extends west into the bottom of **RP46**. Primary sulphide mineralisation was generally patchy and low level with the exception of a high-grade Zn intercept in **RP49** of 25m @ 4.75% Zn (incl. 8m @ 11.2% Zn, 6.28% Pb, 7g/t Ag) from 30 metres. Drilling in adjacent hole **RP48** may have intersected an extension to this mineralised zone (5m @ 1.38% Zn), but there is still limited potential for deeper drilling on either side. This high grade mineralisation and the strongly pyritic zones are the likely source of the strong IP response.

On the western side of the traverse, hole **RP69** was collared in and tested the leached sandstones of the Proterozoic Masterton Sandstone at depth to the west of the Emu Fault. No encouraging mineralisation was intercepted. Adjacent hole **RP68** intersected fine grained, leached sandstone overlying basal pyritic siltstones (?Caranbirini Member) of the Lynott Formation. The unconformity contact with the underlying fractured ?Teena dolomites is marked by a thin sandy, gravel unit. It was not possible to confidently recognise the 'Barney' sedimentary breccia from the RC chips. A silty dolomite interval may occur near the end of the hole which may tentatively correlate this stratigraphy with that of cored hole **D87** to the north. Note that the Lynott-dolomite contact in **D87** was ferruginous, vuggy and siliceous dolomite with possible underlying ?sedimentary breccia and silty dolomite interbeds from 80.9-102.3m (M. Carey, unpub. data). At depth the dolomite sequence appears to be poorly mineralised. There is some suggestion that the 'Barney' sedimentary breccia does not exist south of Cook's working or **D87** (Hinman, 2000) and that north of Cook's Fault is the more mineralised part of the Coxco system (Hinman, 2001). Further drilling is needed to confirm this as drill hole coverage south of Cook's workings and adjacent the Emu Fault zone is very poor.

Of note in hole **RP68** is a discrete Sr anomaly (max. 401ppm) at 13-15m in fine grained sediments of the Lynott Formation. This may correlate with a Sr anomaly (max. 387ppm) in similar rocks at 60m in **D87** to the north. Further detailed statistical analysis of the multielement drill hole analytical dataset is strongly recommended as it may identify subtle lithological variations in the Coxco stratigraphy, initially noted after the 1999 drilling program (Appendix 3).

Patchy mineralisation in **D87** is hosted in tectonically fractured/brecciated dolomite and decreases with depth (best 6m @ 1.4% Zn from 126m). Interesting, the dolomite sequence closest to the Lynott-?Teena unconformity is not strongly mineralised as commonly noted in most nearby holes. This maybe due, in part, to poorly mineralised, thick silty beds and minor ?sedimentary breccias near the top of the dolomite package. To the east of **D87**, MIMEX hole **Coxco10DD** intersected significant dolomite hosted mineralisation underlying the Lynott contact (22.7m @ 2.84% from 39.9m) and at the end of hole (10.8m @ 3.04% Zn from 123.3m). Relogging of these 2 adjacent holes to correlate stratigraphy and mineralised intervals is recommended.

On the RC traverse, MIMEX hole **Coxco36RC** reportedly intersected extensive primary Zn mineralisation open at depth (best 15m @ 2.47% Zn from 65 metres). Adjacent shallow North RC holes did not adequately test this zone due to difficult drilling through cavities. Encouraging mineralisation in adjacent hole **RP52** (5m @ 2.2% Zn) above a cavity and in hole **RP68** (6m @ 1.32% Zn) confirm the area is weakly mineralised, though grades are unlikely to be economic. This zone remains a valid target for a deep angled hole.

A small flat lying body of possible Zn oxide (i.e weak Cd) was intersected in **RP48** to **RP50** with a best intercept of 8m @ 1.17% Zn. The oxide horizon is hosted in a thick clay unit, possibly derived from silicified breccia that has been extensively mapped nearby.

Of note is a unusual Cu anomaly (max. 1280ppm) at the top of **RP50** in the clay zone. The anomaly weakens to the west and may be related to a major structure nearby.

**SECTION 8172350N (Plan 4)**

Nine vertical holes (**RP60** to **RP67**, **RP70**) were drilled along the traverse, which is approximately halfway between the Cook's and Cox's workings. The target was the shallow oxide horizon, a coincident Zn (max. 1910ppm) – Pb (max. 1480ppm) soil anomaly and a broad chargeability high (IP Anomaly 10).

On the eastern side of the traverse, drilling intersected the brown clay, possibly derived from the Cambrian Bukalara Sandstone (i.e low Ca/Mg). The clay contains high background Zn levels and increases in grade to the east where **RP60** intercepted 7m @ 1.16% Zn from 2 metres. This shallow Zn oxide is the obvious source of the broad Zn-Pb soil anomalism that extends further east for at least 100m. Followup shallow drilling may be warranted to close off the oxide horizon, though grades will likely remain very low. The underlying light grey-white, ?stromatolitic dolomite shows only patchy, low level primary Zn-Pb mineralisation and pyritic zones at depth.

On the western side of the traverse, drilling intersected an unusual brecciated sequence of clay, silicified and leached ?dolomite overlying silty dolomite and fresh dolomite at depth. The silicified 'breccia', reportedly ?tectonic in origin, has been mapped to the south and as far north as the western side of the Cook's workings. At depth, holes **RP67** to **RP64** intersected a string of leached, friable intervals or cavities at the base of the intensely altered dolomite 'breccia'. There is a major change in silica alteration and brecciation with depth across the cavities. Adjacent holes **RP70** and **RP64**, also show high As associated with the easternmost large cavities. This may be indicative of dolomite dissolution after oxidation of massive pyrite, possible along a major structure. Note that in northern drill sections, a similar string of cavities is often associated with major unconformities. The altered 'breccia' unit appears to thin to the east and was not identified in **RP63**. Mineralisation within the 'breccia' complex is patchy and low level (<1% Zn). Low grade ?secondary Zn occurs just above the basal cavities in adjacent holes **RP64** and **RP70**.

The underlying weakly leached dolomite and silty dolomite show only rare quartz veining and patchy silica alteration. The dark grey, ?pyritic silty dolomite, consisting of fine parallel silt wisps and laminations, is thickest in the westernmost hole **RP67** and thins out to the east. Only patchy, low grade primary mineralisation (max. 2.2% Zn) was intercepted in the fractured/brecciated dolomite, though the RC drilling was not an effective deep test of the dolomite sequence. Most North RC holes only tested just beneath the altered 'breccia' zone though **RP70** (T.D. 139m) was drilled to test a chargeability anomaly at depth. No obvious large sulphide source was intersected to explain the IP anomaly. Nearby MIM hole **Coxco37RC** (TD 92m) tested deeper beneath the same altered 'breccia' and intersected significant mineralisation (best 24m @ 1.89% Zn from 65 meters) closer to the Emu Fault Zone. Further to the south MIMEX cored hole **Coxco20DD** (TD 22.8m) was abandoned early due to cavities and **Coxco23DD** (TD 98.4m) was collared in silicified dolomite but reportedly failed to intersect any encouraging mineralisation.

**SECTION 8172200N (Plan 5)**

Five holes (**RP57** to **RP59**) were drilled along this section northeast of the Cox's workings, across an extensive coincident Zn (max. 3200ppm) – Pb (max. 6700ppm) soil anomaly. Drilling intersected shallow brown clays in adjacent holes **RP59** and **RP55** on the western side of the traverse, overlying algal laminated, ?stromatolitic dolomite at depth. The brown clays contained elevated Zn-Pb (best 17m @ 0.6% Zn) and are the obvious source of the soil anomalism that extends further to the west and at least 400m south. Further shallow drilling if required should be guided by the anomalous soil results, though grades are likely to be very low. MIMEX partially drill tested this soil anomalism to the south during the 1960-1970's whilst targeting IP anomalies. Results were reportedly discouraging.

The dolomite sequence at depth was only weakly fractured and poorly mineralised. Hole **RP55** intersected a small isolated Cu anomaly (max. 0.69%) at 12-15m that may be structurally related.

**COXCORP71**

This deep RC drill hole (TD 181m) was collared in siliclastics of the upper Lynott Formation on the eastern limb of the Coxco Anticline. It targeted a chargeability high (IP Anomaly 36) which was interpreted to be a shallow, upthrusted fault block containing mineralised 'Barney' sedimentary breccia and underlying tectonically fractured dolomite.

Drilling intersected a ?northeast dipping sequence of dolomitic siltstones and fine-grain sandstones, increasingly pyritic at depth. The hole did not intersect the underlying dolomite package. The same siliclastic sequence was drilled in core hole **D93a**, collared to the northwest. The pyritic siltstone may be the source of the IP anomaly, but contains only elevated background Zn (max. 1120ppm) and is not a prospective target.

**COXCORP53/COXCORP54**

A major concern in the Coxco resource estimations by Walker (1975), Crabb (1996) and Rothery (1996) has been the uncertainty of true Zn-Pb grades due to poor sample recoveries through cavities and significant disparities in analytical results between previous major MIMEX drilling programs. An initial assessment of these matters by North was addressed by the 1999 drilling (Lye, 2000) which compared 3 well recovered cored holes with previous MIMEX core and RC drilling. The initial report (refer Appendix 3) suggests that the recent, highly encouraging 1996 MIMEX RC drilling may have grossly overestimated the true grade of the Coxco resource.

Additional brief comments to this initial work are discussed below. A comparison of North core hole **D40** and MIMEX **Coxco31RC** shows that the Pb-Zn RC data is consistently higher than the equivalent cored intervals. Primary Pb results in the tectonised dolomite were typically 0.5-1.5% higher with a significant mineralised zone (15m @ 4.6% Pb from

52m) only partly confirmed by the core drilling (3m @ 2.4% Pb from 62m). Interesting, high Ag (5m @ 17.2 g/t Ag from 59m) associated with the Pb zone in the MIMEX drilling was not reproduced by the North DDH results. There is a major discrepancy in Zn grades (60m @ 8.9% Zn from 42m) with specific RC intervals typically returning 2-5% Zn more than in the equivalent cored intervals (60m @ 3.1% Zn from 38m). A number of very high grade zones at depth (>20% Zn) were not reproducible by DDH sampling and may be a MIMEX data handling error. North did however reportedly re-analysed a number of these high grade intercepts which returned similar results (refer internal North June Monthly Report), but this data was unavailable at the time of writing this report.

North hole **D41** and MIMEX **Coxco32RC** holes were collared 17m apart but converge at depth on section. A comparison of the DDH sampling with the high grade oxide interval in **Coxco32RC** (5m @ 25% Zn, 1.6% Pb, 4.6 g/t Ag from 40m) is inconclusive due to poor core recoveries. Minor recovered core for the same interval, returned up to only 11% Zn and rare 1.1.% Pb, 3.7g/t Ag. These incomplete DDH Zn results are well below very high MIMEX grades (max. 46.9% Zn), suggesting another possible MIMEX data problem. At depth in **Coxco32RC,** another encouraging Zn (5m @ 9.3% Zn from 70m), Pb (9m @ 1.3% Pb from 71m) intercept could not be reproduced by the DDH (5m @ 0.8% Zn, max Pb 3530ppm) which intersected strongly broken, bleached dolomite, indicative of a possible nearby cavity.

A recommendation from the initial North/MIMEX comparative study suggested that cored holes **D40** and **D42** be twinned with new RC holes **RP53** and **RP54** respectively, for a more detailed comparison of specific intervals between the 2 sampling methods. Hole **RP53** (TD 47m) was aborted due to unstable hole conditions after intersecting the gravelly 'Barney' sedimentary breccia. Lead results for both holes are generally of low tenor with the exception of a small zone in **RP53** (2m @ 2.3% Pb from 43m) that was not reproduced in **D40** (2m @ 0.2% Pb from 43m). Zinc grades in the oxide zone were higher in **D40** (9m @ 2.7% Zn from 38m incl. 4m @ 3.7% Zn from 38m) than in **RP53** (9m @ 1.1% Zn from 38m incl. 4m @ 0.6% Zn from 38m).

Hole **RP54** (TD 78m) reached target depth (Table 5) with downhole Pb-Zn-Ag profiles provided in Appendix 4. It shows that primary Pb-Ag grades from the tectonised dolomite sequence at depth are similar between the 2 sampling methods. Higher primary grades of 1-2% Zn were returned from the RC sampling compared to the equivalent cored intervals. Such a small discrepancy is unlikely to have a significant impact on any resource estimations.

In the high grade, mixed oxide-sulphide mineralisation, underneath the Lynott-dolomite unconformity, broad Pb-Ag grades are similar despite large differences on a specific sample to sample comparison. Zinc grades are significantly higher in the DDH (9.4m @ 18% Zn from 15m) compared to the RC sampling (11m @ 8.8% Zn from 14m). Poor RC sample recovery was reported through this oxide horizon, which will explain the significant grade discrepancy between the 2 holes. This suggests that North RC sampling may sometimes be unreliable in testing high-grade oxide zones. This has important implications for recalculating the oxide resource if previous, poorly recovered MIMEX RC data can significantly underestimated the true grade. This conclusion, based on only twinned holes **D42** and **RP54**, does not support the earlier comparative assessment of the North DDH and MIMEX RC/DDH data (Appendix 3). It found the Pb-Zn grades in the quality North core holes were higher than in the poorly recovered MIMEX core holes, but significantly lower than the MIMEX RC drilling.

A comparison with a nearby vertical MIMEX RC hole **Coxco31RC** is more difficult to relate on a specific sample to sample basis with the angled North holes **D42** and **RP54**. It should be noted in section plan, that the drill hole traces converge at depth where more meaningful sample comparisons can be made. Background Pb levels in **Coxco31RC,** through the tectonised dolomite at depth are broadly similar to the North RC/DDH results, though a discrete mineralised zone (4m @ 3.2% Pb from 26m) was not identified by the North drilling. Zinc analytical results show the MIMEX RC drilling returned higher grades (3 - 8.5% Zn) than projected North core intervals. Such a significant grade disparity may not solely be related to sampling problems. The primary sulphides in the upper portion of **Coxco31RC** are likely to be significantly enriched with secondary Pb-Zn due to their higher level in the weathering profile. There is also likely to be contamination downhole from the shallow, high grade oxide zone at the top of the **Coxco31RC**. At depth, in the less oxidised dolomite, the disparity in Zn grades in all three holes is less significant at less than1-2% Zn.

The Pb grades in the high grade oxide zone are significantly lower in **Coxco31RC** (10m @ 2.7% Pb from 9m) than in projected North drilling (**D42**: 9.4m @ 8.8% Pb from 15m; **RP54**: 11m @ 7.8% Pb from 14m). The Zn oxide grade in **Coxco31RC** (9m @ 19% Zn from 8m) compares favorably with the projected North DDH (9.4m @ 18% Zn from 15m) intervals but not with the North RC drilling (11m @ 8.8% Zn from 14m). This finding contradicts conclusions drawn from the North **D42**-**RP54** comparison, that RC drilling may grossly underestimate the secondary Zn intercepts. It should be noted that the **Coxco31RC** Zn oxide intercept is approximately 10 metres east of the North Zn oxide intercepts and is thus not an exact specific sample to sample comparison. It appears that until further drill hole 'twinning', RC sampling, especially where poorly recovered, may be considered unreliable in determining the 'true' grade of the oxide resource.

## TABLE 5 – D42 & RP54 Grade Comparison

| HOLE | COMMENTS |
|---|---|
| Pb | - In RP54, consistently higher Pb levels than in D42, especially in high grade zone (14-26m) at Lynott-Dolomite unconformity.<br>- in D42, Pb levels typically more spiky than RP54<br>- in high grade zone, both methods show spiky Pb levels with significant differences over the same sample intervals (eg. 19-20m 2.8% Pb in RP54 compared with 36% Pb in RP54)<br>- overall high grade zone is of similar grade in both holes (eg. in D42 9.4m @ 8.8% Pb from 15-26m excl. missing core 20.8-22.4m dropped in hole, in RP54 11m @ 7.8% Pb from 14-25m excl. 1m cavity at 25-26m).<br>- At depth in the tectonised, mineralised dolomite sequence, typically <0.1%Pb difference in Pb levels between 2 sampling methods. Note that immediately underlying high grade zone (15-26m), typically 0.1-0.2% Pb levels higher in RP54 compared to D42. |

| | | |
|---|---|---|
| Zn | - in RP54, consistently higher Zn levels in strongly weathered, unmineralised Lynott Formation.<br>- in D42, high grade zone at unconformity contains significantly higher Zn levels (eg. in D42 9.4m @ 18% Zn from 15-26m excl. missing core 20.8-22.4m dropped in hole, in RP54 11m @ 8.8% Zn from 14-25m excl. 1m cavity at 25-26m).<br>- At depth in the tectonised, primary sulphide mineralised dolomite sequence, mostly higher Zn grades sampled in RP54 compared to D42. Typically 1-2% Zn difference in grades between 2 sampling methods. |
| Ag | - Due to low Ag levels, both RC and DDH data is spiky<br>- in high grade zone (15-26m), both methods show spiky Ag levels with significant differences over the same sample intervals (eg. 15-16m 2.2 g/t Ag in RP54 compared with 51 g/t Ag in D42)<br>- overall high grade zone is of similar grade in both holes (eg. in D42 9.4m @ 16.3 g/t Ag from 15-26m excl. missing core 20.8-22.4m dropped in hole, in RP54 11m @ 14.1 g/t Ag from 14-25m excl. 1m cavity at 25-26m). |

## 5.2 Diamond Core Drilling

Seven diamond core holes (total 1470.8 metres) were drilled during 2000 (Table 6). The principal aims of the drilling where to provide a greater understanding of the continuity, grade and thickness of the ‘Barney’ sedimentary breccia and underlying tectonic fracture/breccia controlled sulphide mineralisation, to further refine the Coxco stratigraphy and to locate further extensions to the mineralised system.

One metre, continous half core splits were sampled for analysis. Samples were sent to ALS for preparation (crushing and pulverising to -75#) with a hydrofluoric/nitric/perchloric acid digestion-hydrochloric acid leach (method IC587). Analysis was by ICPAES for Cu, Pb, Zn, As, Ag, Ca, Mg, Cd, Al, Co, Mg, K, Mn, Fe and Sr.

The DDH analytical data and RQD’s are presented in Appendix 5. Core photos are not provided with this report but are available from Rio Tinto Exploration Pty. Ltd. in digital format. Drill logs of holes **D87** to **D92** are included with the detailed structural analysis report in Appendix 6. The **D93a** drill log is presented in Appendix 7. Geologic sections are provided in Plans 6 to 10.

***Results***

The main conclusions and recommendations from the Hinman GeoSolutions comprehensive structural report (Appendix 6) were:

?? *Further Oriented Diamond Drilling has confirmed that fracture and breccia-hosted mineralisation within the dolomite complex at Coxco is intimately associated with moderate to steep WNW-dipping reverse faults which lie at moderate to high angles to the Emu Fault Zone. Mineralised breccias, vein networks and veining are asymmetrically zoned around controlling reverse faults or major fractures within this dolomite breccia complex.*

?? *The extent of strong tectonic brecciation with systematic and coherent structural components within the dolomite complex beneath the ‘Barney’ Sedimentary*

*Breccias at Coxco has been largely defined. Strong brecciation appears to be limited to the area north of Cooks Fault to approximately 817 3200N. To the north of this zone, brecciation density and structural coherence declines considerably. To the south of Cooks Fault, the density of brecciation is very low although structural style and orientations appear to be maintained on the tested section.*

?? *Grades within the tectonic breccias drilled in the 2000 program have not reached the expectations suggested by the 1999 program.*

?? *Further work on the facies systematics, architectural control and grade distribution of the 'Barney' sedimentary breccias may be warranted to fully realise the stratiform potential. This would be largely dependant on what the geology and results in Coxco **D93** suggest. Increasing thicknesses to the north (suggested by isopachs, Hinman, 1999a) off a 'Barney'-time 'high' or 'upwarp' around Cooks and possible basin deepening northward with an increase in organic-rich finer sediments would significantly boost the stratiform potential*

?? *On section 817 3105N an untested volume exists between Coxco **D90** and the Emu Fault Zone where brecciation (and mineralisation) may be expected to more intense.*

## HOLE D93A

Hole **D93a** was collared in the bleached siliclastics of the Hot Springs Member, an upper unit of the Proterozoic Lynott Formation in the northern part of the Coxco Anticline. This northernmost hole is a deep test of the prospective 'Barney' sedimentary breccia which is believed to be highly analogous with the Barney Creek Formation sedimentary breccias at the HYC deposit (Hinman, 2000).

# TABLE 6 – Coxco JV Diamond Drill Holes

| HOLE | AMG East | AMG North | INCLINATION ( ?) | AZIMUTH (AMG Grid?) | PreCollar Depth (m) | TOTAL DEPTH (m) | TARGET |
|---|---|---|---|---|---|---|---|
| D87 | 621998 | 8172620 | -65 | 90 | - | 204.4 | Test southern extensions to oxide zone; determine influence of Cooks Fault on mineralisation. |
| D88 | 622095 | 8172880 | -60 | 90 | - | 120.4 | Test along strike continuity of mineralisation. |
| D89 | 622010 | 8172880 | -75 | 90 | 59.8 | 236.9 | Test along strike continuity of mineralisation between the Emu Fault and COXCO40. |
| D90 | 622020 | 8173290 | -70 | 90 | 72.2 | 221.5 | Test chargeability high east of mineralised SBx in COXCOD22. |
| D91 | 622000 | 8173105 | -70 | 90 | 48.5 | 204.2 | Test for SBx and underlying mineralised breccia between COXCO41 and the Emu Fault |
| D92 | 621992 | 8173000 | -70 | 90 | 48 | 222.5 | Infill hole between COXCO40-41 and behind COXCO17; |
| D93 | 621957 | 8173650 | -70 | 195 | 72 | 105 | Deep test of ‘Barney’ SBx – aborted hole |
| D93a | 621957 | 8173656 | -70 | 184 | - | 441.4 | Deep test of ‘Barney’ SBx. |

The initial **D93** RC precollar with a diamond tail (TD 105m), swung unsatisfactory westwards early in the drilling and was aborted. A second adjacent hole, **D93a**, was cored from the surface to a total depth of 441.4 meters. The core was very poorly oriented and as a consequence, no reliable bedding or structural measurements were recorded. In summary, the following sequence was intersected:

0 – 93.44m: massive and thickly bedded white, fine grained sandstone of the *Lynott Formation*; minor thin 1-2 cm thick lithic interbeds; minor silt wisps/laminations rich intervals; leached/oxidised (0-63m)

93.44 – 144.74m: white, fine grained sandstone; minor silty sandstone interbeds, commonly thick cm bedding; bedding is contorted – higher depositional energy?

144.74 – 178.5m: silty sandstone with abundant fine parallel silt wisps/laminations; minor thick sandstone beds; rare grey siltstone beds with fine pyrite laminae; rare subrounded cm sandstone clasts

178.5 – 193.25m: dark grey, parallel laminated to thinly bedded siltstone; rare pyrite laminae; minor <50cm sandstone beds

193.25 – 215m: interbedded fine grained sandstone and minor siltstone; minor lithic beds, intervals of contorted bedding

215 - 267m: dark grey parallel laminated pyritic siltstone with minor cm sandstone interbeds decreasing uphole; parallel vfg greenish pyrite laminae

267 – 308.75m: silty sandstone; abundant fine parallel silt wisps/laminations; rare weakly pyritic siltstone beds; minor cm sandstone intervals; rare <1cm gravel-lithic beds with buck qtz clasts,

308.75 - 324.5m: *Top of ?Teena Dolomite*; complex series of sedimentary breccias and silty dolomite; dolomite clasts; rare siliceous and dolomite horizons; partly mineralised with sph-gal-py fractures – especially in top of unit; contact sedimentary breccia composed of mm clasts in grey silt with minor buck quartz.

324.5 – 339.5m: mostly silty dolomite with parallel dark grey silt wisps and laminations; lesser thin algal laminated dolomite horizons; rare thin lithic beds; v. poorly mineralised

339.5 – 348.8m: mottled cream-grey, algal laminated, stromatolitic dolomite; strong redolomitisation overprint; rare lithic beds; poorly mineralised

348.8 -363.1m: silty dolomite; abundant parallel dark grey silty wisps/laminations; rare large (<10cm) dolomite clasts; more silty towards base, rare thin fining up lithic horizons; v. poorly mineralised

339.5 – 348.8m: mottled cream-grey, algal laminated, stromatolitic dolomite; strong redolomitisation overprint; rare lithic beds; poorly mineralised

348.8 -363.1m: silty dolomite; abundant parallel dark grey silty wisps/laminations; rare large (<10cm) dolomite clasts; more silty towards base, rare thin fining up lithic horizons; v. poorly mineralised

## TABLE 7 - Coxco JV Diamond Hole Summary Results

| HOLE | DEPTH | Significant Mineralisation (>2m @ 1%Zn-Pb cutoff) |
|---|---|---|
| D87 | 91-96m | 5m @ 1.6% Zn |
| | 104-106m | 2m @ 1.6% Zn |
| | 113-115m | 2m @ 1.2% Zn |
| | 126-132m | 6m @ 1.4% Zn |
| | 152-156m | 4m @ 1.1% Zn |
| D88 | 2-11m | 9m @ 8.9% Zn (excl. 2m cavity from 11m)<br>note: 4m @ 1.6% Pb from 4m |
| | 15-18m | 3m @ 1.4% Zn |
| | 20-22m | 2m @ 2.5% Zn |
| D89 | 74.1-82.7m | 8.6m @ 1.5% Zn (only 1 sample - cavities) |
| | 97.9-113m | 15.1m @ 3.1% Zn<br>note: 2m @ 1.36% Pb from 102m |
| | 122-134m | 12m @ 1.4% Zn |
| | 190-207m | 17m @ 2.8% Zn |
| D90 | 103.5-111m | 7.5m @ 4.4% Zn (incl. small cavities)<br>note: 2.5m @ 1.12% Pb from 105.5m (only 1 sample) |
| | 144-147m | 3m @ 1.3% Zn |
| D91 | 79-83m | 4m @ 5.7% Zn, 1.17% Pb (only 1 sample - core loss) |
| | 85-89m | 4m @ 2.3% Zn |
| | 91-94m | 3m @ 1.8% Zn |
| | 97-100m | 3m @ 2.3% Zn |
| | 108-116m | 8m @ 3.3% Zn |
| | 118-126m | 8m @ 3.6% Zn |
| | 128-136m | 8m @ 1.5% Zn |
| | 155-159m | 4m @ 1.3% Zn |
| | 161-163m | 2m @ 1.2% Zn<br>note: 2m @ 1.29% Pb from 162m |
| | 167-175m | 8m @ 1.4% Zn |
| D92 | 74.5-81m | 6.5m @ 1.8% Zn (3 samples only-cavities) |
| | 115-118m | 3m @ 1.4% Zn, 4.7 g/t Ag |
| | 161-198m | 37m @ 3% Zn (incl. small cavities) |
| | 202-207m | 5m @ 1.9% Zn |
| | 216-218m | 2m @ 1.2% Zn |
| D93a | 311-319m | 8m @ 2.2% Zn, 3.5 g/t Ag |
| | 330-332m | 2m @ 1.1% Zn |
| | 398-400m | 2m @ 3.8% Zn, 2.48% Pb, 4.5 g/t Ag |
| | 409-423m | 14m @ 1.7% Zn |
| | 438-441.4m | 3.4m @ 1.4% Zn |

363.1 – 370.95m: blue-grey stromatolitic dolomite; weakly mineralised, rare dark grey silty dolomite and lithic interbeds; weak pyrite veining

370.95 – 378.65m: interbedded dark grey laminated silty dolomite and sedimentary breccias; v. poorly mineralised

378.65 – 400m: mottled cream-light grey dolomite; strongly redolomitisation overprint; rare stromatolites; patchy tectonic breccia zones; strong pyrite fracture veining; rare massive py-sph-gal veins; major fault at 379m

400 – 401.5m: Breccia – chaotic mm to cm dolomite clasts grading upwards; strong pyrite in matrix

401.4 – 409.17m: interbedded dark grey, laminated silty dolomite and lesser thin dolomite horizons; common dolomite clasts (max. 5cm); clasts show earlier brecciation; rare ?slumped bedding.

409.17m – 433.85m: tectonic breccia zone of mottled dolomite, strong redolomitisation overprint of clasts; patchy massive pyrite breccia matrix.

433.85m - 441.4m (EOH): mottled/stripped cream-brown-light grey dolomite, redolomitisation overprint; weak to strongly fractured; strong pyritic fracture breccias, weakly mineralised.

Drilling confirmed the northward continuity of the stratiform 'Barney' sedimentary breccia under an increasing thickness of siliclastic Lynott Formation. A comparison of the dolomite sequence in hole **D93a** with **D90** (TD 221.5m), collared further to the south, shows possible thicker intervals of the 'Barney' sedimentary breccia and underlying silty dolomite further north. This may be indicative of a basin deepening northwards at Coxco (Hinman, 2001).

Hole **D90** targeted a chargeability high (IP Anomaly 33) possibly hosted in 'Barney' sedimentary breccia between MIMEX holes **Coxco22DD** on the western flank of the Coxco Anticline and **Coxco21DD** on the eastern flank. Drilling intersected a reduced thickness of 'Barney' sedimentary breccia closer to the Coxco Anticline axis. A poorly Zn-Pb mineralised, but strongly pyritic tectonic fracture/breccia zone at depth (approx. 164m) is the probable source of the IP anomaly. A number of other untested IP anomalies near **D90** and **D93a** may be similar unprospective pyritic breccia zones at depth.

The Lynott-'Barney' sedimentary breccia contact in **D93a** was marked by a thin upper cycle of mm size dolomite and buck quartz clasts. Interestingly, a Sr anomaly hosted in the upper 'Barney' sedimentary breccia was highlighted in both **D93a** (max. 167ppm) and **D90** (max. 82ppm). This may potentially be useful, particularly when RC drilling, if this geochemical anomaly correlates the same stratigraphic breccia horizon between drill holes across the prospect.

Mineralisation of the 'Barney' sedimentary breccia in both **D93a** (8m @ 2.23% Zn, 3.5g/t Ag) and **D90** (8.5m @ 3.97% Zn, 1.8 g/t Ag) is close to the Lynott contact. The bulk of the 'Barney' sedimentary breccia and underlying silty dolomite is very poorly mineralised. The increasing silt composition of the dolomite package northwards may lower its competency and reduce the potential for brittle fracture and breccia controlled mineralisation. However if sufficient organic rich sediment was deposited basinward to the north, adjacent the Emu Fault, then this may significantly boost the stratiform potential of the area (Hinman, 2001).

To the west of **D90**, closer to the Emu Fault in the hinge of a syncline, the 'Barney' sedimentary breccia is thicker and very well mineralised as tested by MIMEX hole **Coxco22DD** (33.7m @ 3.24% Zn, 5.6g/t Ag incl. 6.8m @ 1.8% Pb). Further testing to the north of **D90** and west of **D93**, close to the Emu Fault, is potentially prospective, though expensive deep drilling costs and patchy, low grades will downgrade the area.

Hole **D93a** was generally only weakly mineralised at depth except for a major tectonic breccia zone at 409m (14m @ 1.17% Zn) and at 398m (2m @ 2.48% Pb, 3.83% Zn, 4.5g/t Ag). The fractured dolomite became more pyritic at depth, similar to **D90**, but Zn-Pb grades remained low.

# 6 EXPLORATION PROGRAM AND BUDGET FOR NEXT REPORTING PERIOD

The Coxco joint venture between Mount Isa Mines Ltd. and North Mining Ltd (now Rio Tinto Exploration Pty. Ltd) was terminated in June 2001. The expenditure for the second year of the joint venture is presented in Appendix 8. Any future exploration program and budget is to be determined by Mount Isa Mines Ltd.

# 7 REHABILITATION

Environmental disturbance was kept to a minimum by North's exploration activities. An initial environmental review (North Rpt QB00/05s) to identify and document areas of previous exploration disturbance prior to the current joint venture project within AN 366 was completed in August 1999.

Where possible, North Ltd used existing tracks and avoided any surface disturbance. New tracks, drill pads and sumps were required for the 2000-2001 drilling programs but these were carefully planned and where possible, simply clearing of dead vegetation with only minor surface disturbance was successfully used. Wherever possible, large trees were avoided by the dozing activities, creek crossings were carefully planned to minimize erosion and the top soil was carefully stockpiled for later rehabilitation.

A rehabilitation program was completed in September-October 2000. Details are listed below.

*Project Description*

All exploration activities were conducted with minimal disturbance. Earthworks were contained to drill site preparation and track construction (< 1 km ). Most access to drill sites was on existing tracks or cross country travel.

No Environmental Management plans are in effect over AN 366.

In compliance with the Code of Practice, North Limited during the period from August 1999 to October 2000 has completed the final rehabilitation of all drill sites and access tracks. All the work programmes completed over the area were of minimal environmental disturbance.

Drill site rehabilitation consisted of the removal of all rubbish. Drillchips were either removed from site or buried, hole collars were cut of below ground level, capped and cemented to level with original surface with a metal identification tag set in the cement cap and a dirt mound placed around cement cap. All drill sites were recontoured and ripped.

All poly pipe used for supplying water to drill sites has been rolled up and removed.

Access tracks have had the side rills broken-down, whoaboys and other erosion controls have been put in place.

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## 9 KEYWORDS

McArthur Basin, HYC Deposit, Coxco Deposit, Cook’s workings, Teena Dolomite, ‘Barney’ sedimentary breccia

## 10 LOCALITY

AN 366 “Emu Fault Zone” is located approximately 55 kilometers south-southwest of Borroloola in the Northern Territory (10 kilometres south of the McArthur River Mine).

Access to AN 366 is gained initially via the Carpentaria Highway, and the McArthur River Mine access road, then by a series of mine roads; station and previous exploration access tracks.

AN 366 is situated over a leasehold pastoral property held by Mount Isa Mines. The area is in the open woodlands with a ground cover of grasses and spinifex. The topography varies from steep ridges to undulating hills.

The climate is semi-arid to sub-humid tropical, comprising a long dry winter and a short summer wet season with an average rainfall of 500 - 800 mm during December to March. Summer maximum temperatures often exceed 40°C and winter minima can be below 5°C.

AN 366, comprising 70 blocks, was granted to Mount Isa Mines Limited on 8 June 1992 for a period of two years. It was reduced to 35 blocks on 8 June 1993 and 18 blocks on 8 June 1994. A waiver from reduction was obtained for the third year, but it was reduced to 9 blocks on 8 June 1996. The nine blocks, which currently comprise AN 366, and were subject to exploration activities during the eighth year of tenure, are as follows:

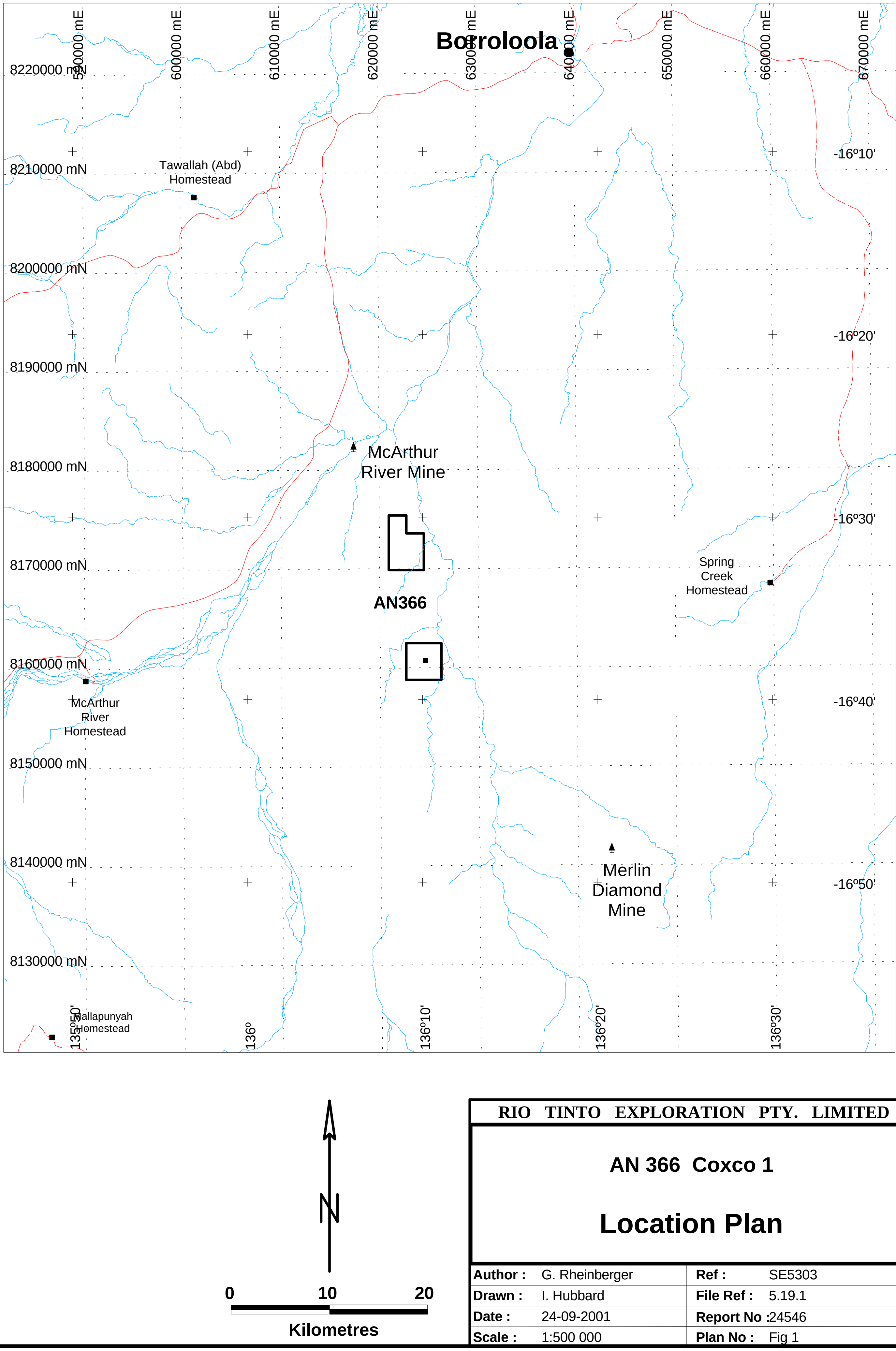
| 1:1 000 000 | Block No | Units |
|---|---|---|
| Newcastle Waters | 482 | d, j, k, o, p |
| Newcastle Waters | 554 | p, u |
| Newcastle Waters | 555 | l, q |

**Table 8. Graticular Units of AN 366**

Mount Isa Mines Limited (MIM) and North Mining Limited entered a joint venture agreement whereby North Mining Limited can earn 50% of MIM's interest in AN 366 over 5 years.

## 11 DESCRIPTOR

This report contains details of exploration completed on AN 366 for the 12 month period to June 2001. Activities included RC and diamond drilling.

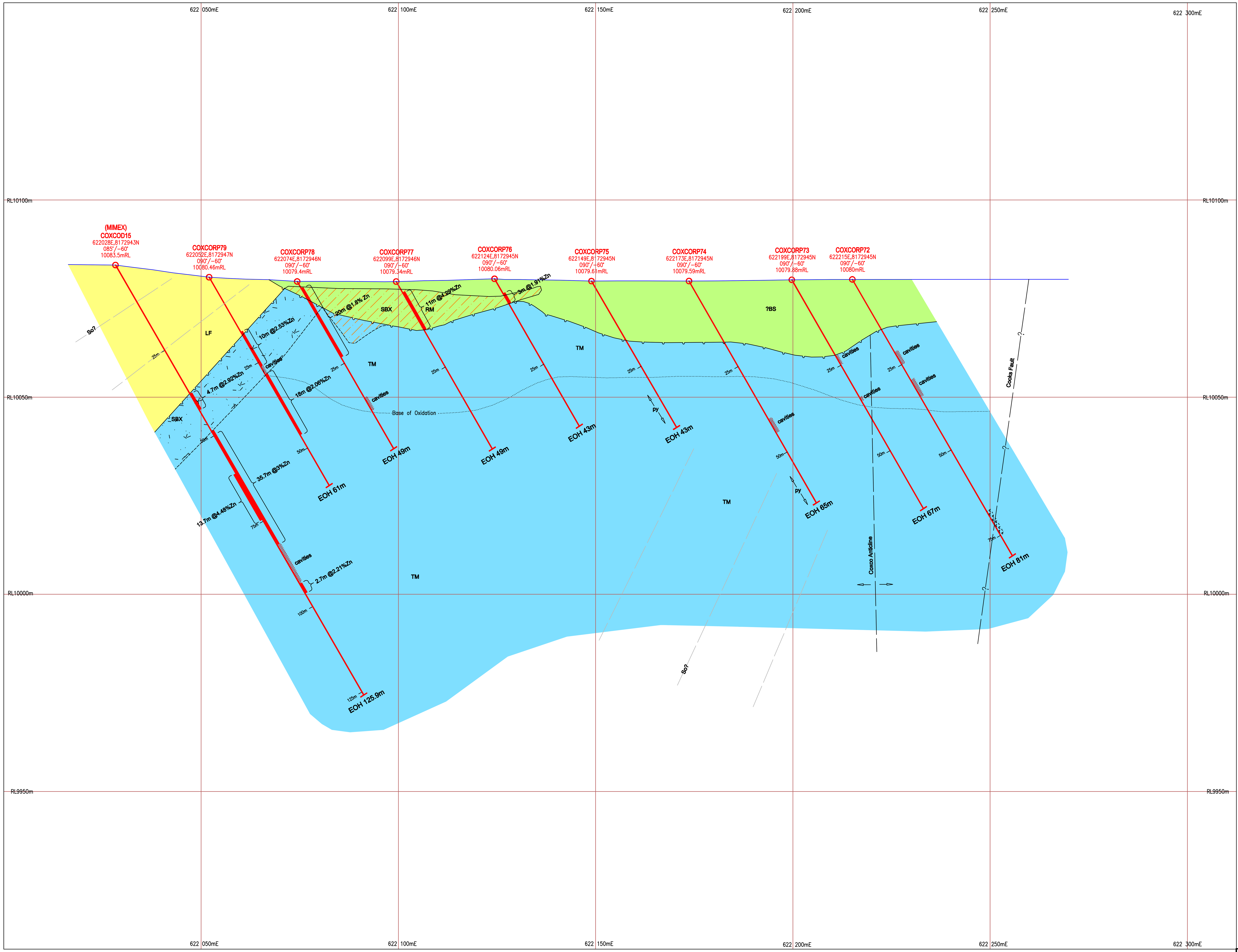



**RIO TINTO EXPLORATION PTY. LIMITED**

## AN 366 Coxco 1

# Location Plan

| | | | |
|---|---|---|---|
| **Author :** | G. Rheinberger | **Ref :** | SE5303 |
| **Drawn :** | I. Hubbard | **File Ref :** | 5.19.1 |
| **Date :** | 24-09-2001 | **Report No :** | 24546 |
| **Scale :** | 1:500 000 | **Plan No :** | Fig 1 |




## REFERENCE

| | | |
|---|---|---|
| Cambrian | BS | Bukalara Sandstone – strongly weathered, brown clay |
| | LF | Lynott Formation – strongly oxidised, typically geothitic dolomitic siltstone; strongly leached; rare faint parallel laminations. |
| Proterozoic | TM | 'Barney' Sedimentary Breccia – Clayey + Gravel, partly cavities; ?dolomite clasts<br>?Teena/Mara Dolomite – light grey/white dololutite/dolarenite; typically massive with rare brown algal laminations; weak–moderate leached above BOCO; widespread re–dolomitisation alteration. |
| | | Zn oxide zone. |
| | | Fault |
| | | Lithological boundary |
| | | Uncomformity |
| | | Cavities (poor/no sample) |
| | | Significant Zn–Pb mineralisation (ie >2m @ 1%Zn or 1%Pb cut off) |
| | py | Strongly pyritic |

NORTH
BRISBANE

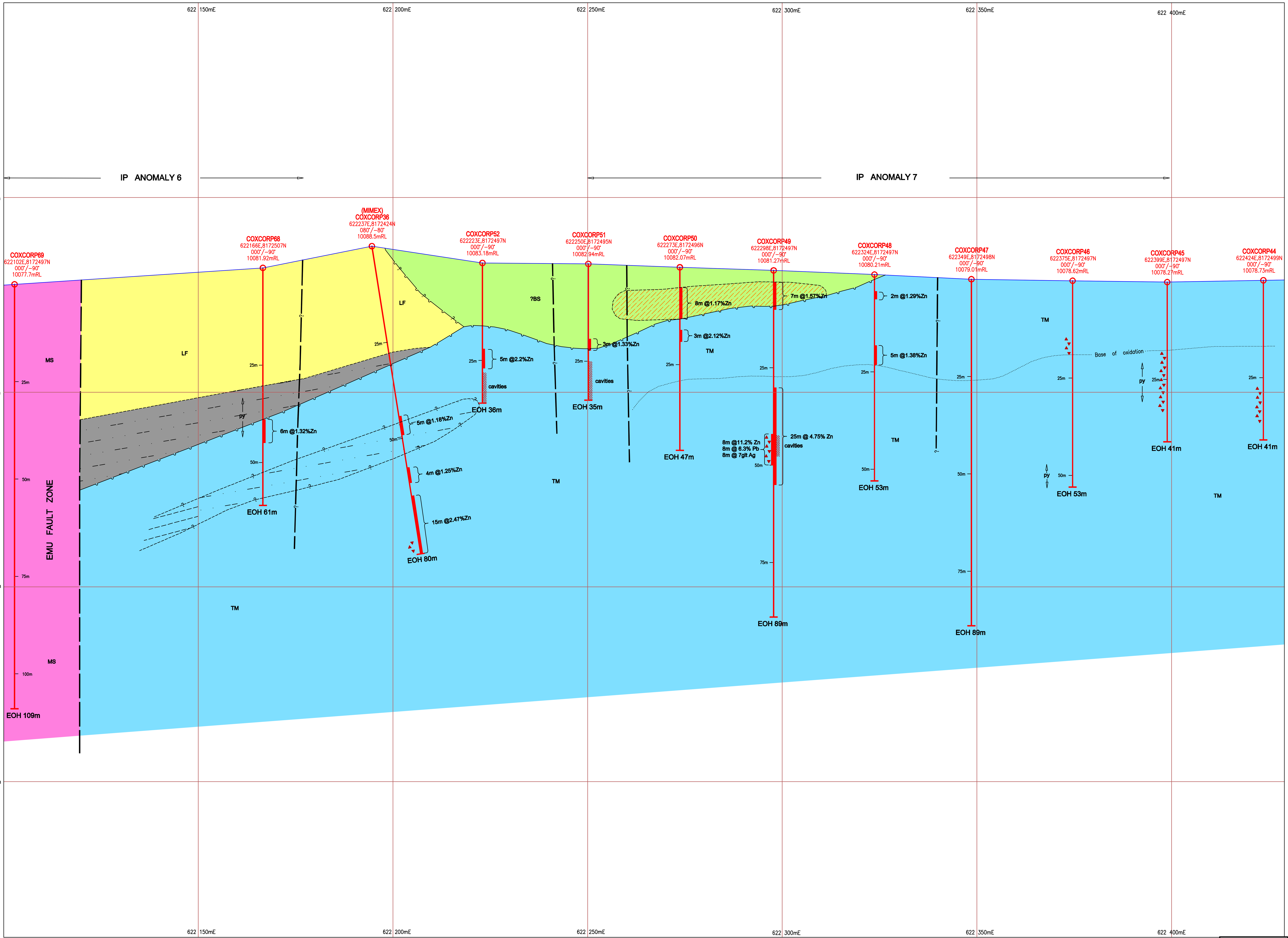
**NORTH LIMITED**
A.C.N. 005 233 689

SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

| | |
|---|---|
| Map Ref. | BAUHINIA DOWNS SE53-03 |
| Tenement. | |
| Geo. | M.C. |
| Drawn | N.P/C.R |
| Checked | |
| Date | 1-9-01 |
| Job No. | |

# COXCO PROJECT
# CROSS-SECTION 8 172 950mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP1.dwg | Plan No. 2 |
|---|---|---|---|---|---|---|




## REFERENCE

| | | |
|---|---|---|
| Cambrian | BS | Bukalara Sandstone – brown clay |
| Proterozoic | LF | Lynott Formation – strongly oxidised, typically geothitic dolomitic siltstone; strongly leached; rare faint parallel laminations, common liesegang rings. |
| | | pyritic, ?carbonaceous siltstone |
| | TM | ?Teena/Mara Dolomite – light grey/white dololutite/dolarenite; typically massive with rare brown algal laminations; weak–moderate leached above BOCO; widespread re–dolomitisation alteration. |
| | | Silty dolomite interbeds. |
| | MS | Masterton Sandstone – strongly weathered, interbedded fine to medium grained sandstone and minor siltstone, leached. |
| | | Zn oxide zone. |
| | | Fault |
| | | Lithological boundary |
| | | Uncomformity |
| | | Tectonic breccias |
| | | Cavities (poor/no sample) |
| | | Significant Zn–Pb mineralisation (ie >2m @ 1% Zn or 1% Pb cut off) |
| | py | Strongly pyritic |

NORTH BRISBANE

**NORTH LIMITED**
A.C.N. 005 233 689

SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

Map Ref. BAUHINIA DOWNS SE53-03

Tenement.

| | |
|---|---|
| Geo. | M.C. |
| Drawn | N.P/C.R |
| Checked | |
| Date | 1-9-01 |
| Job No. | |

# COXCO PROJECT
# CROSS-SECTION 8 172 500mN

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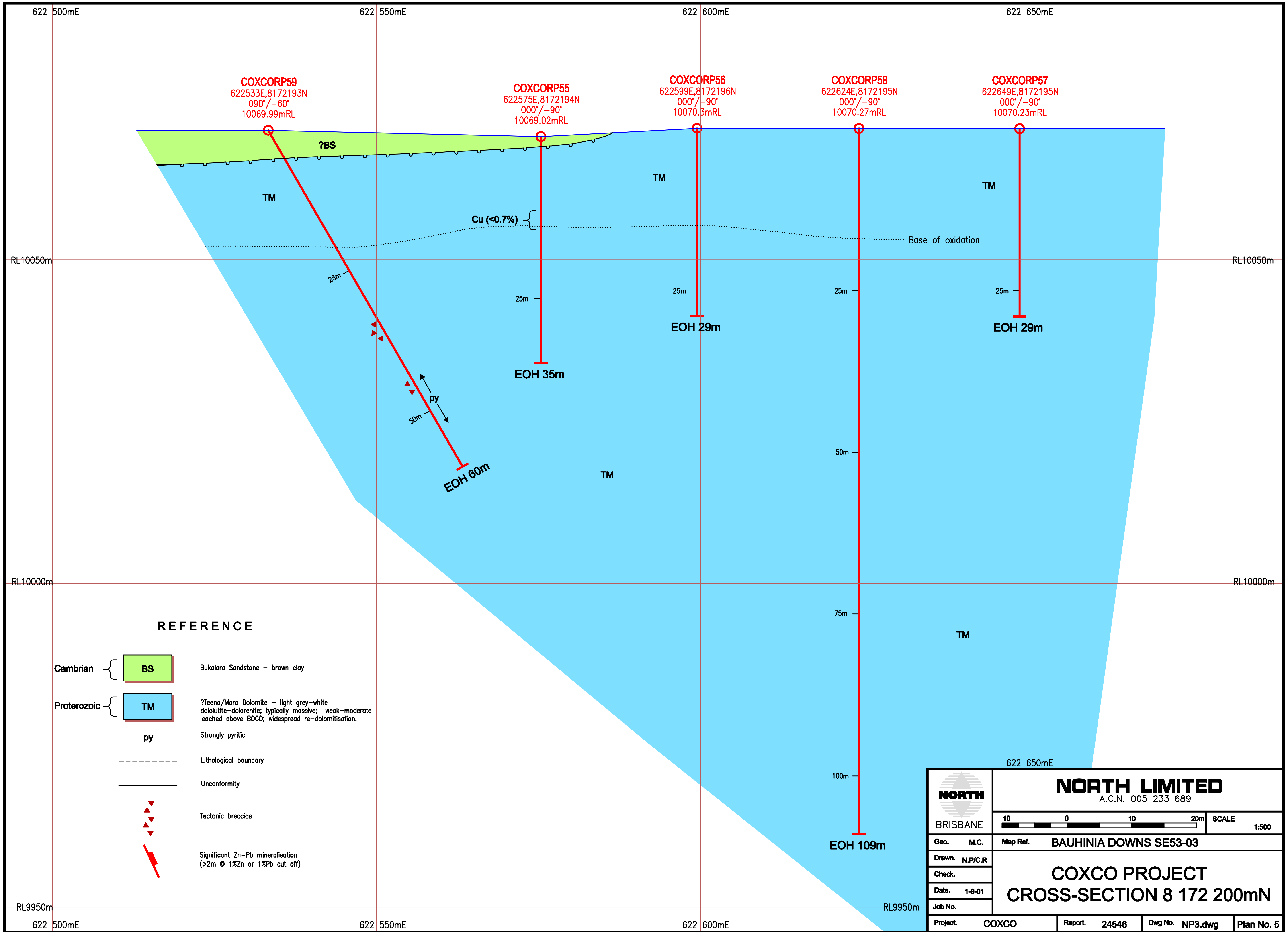
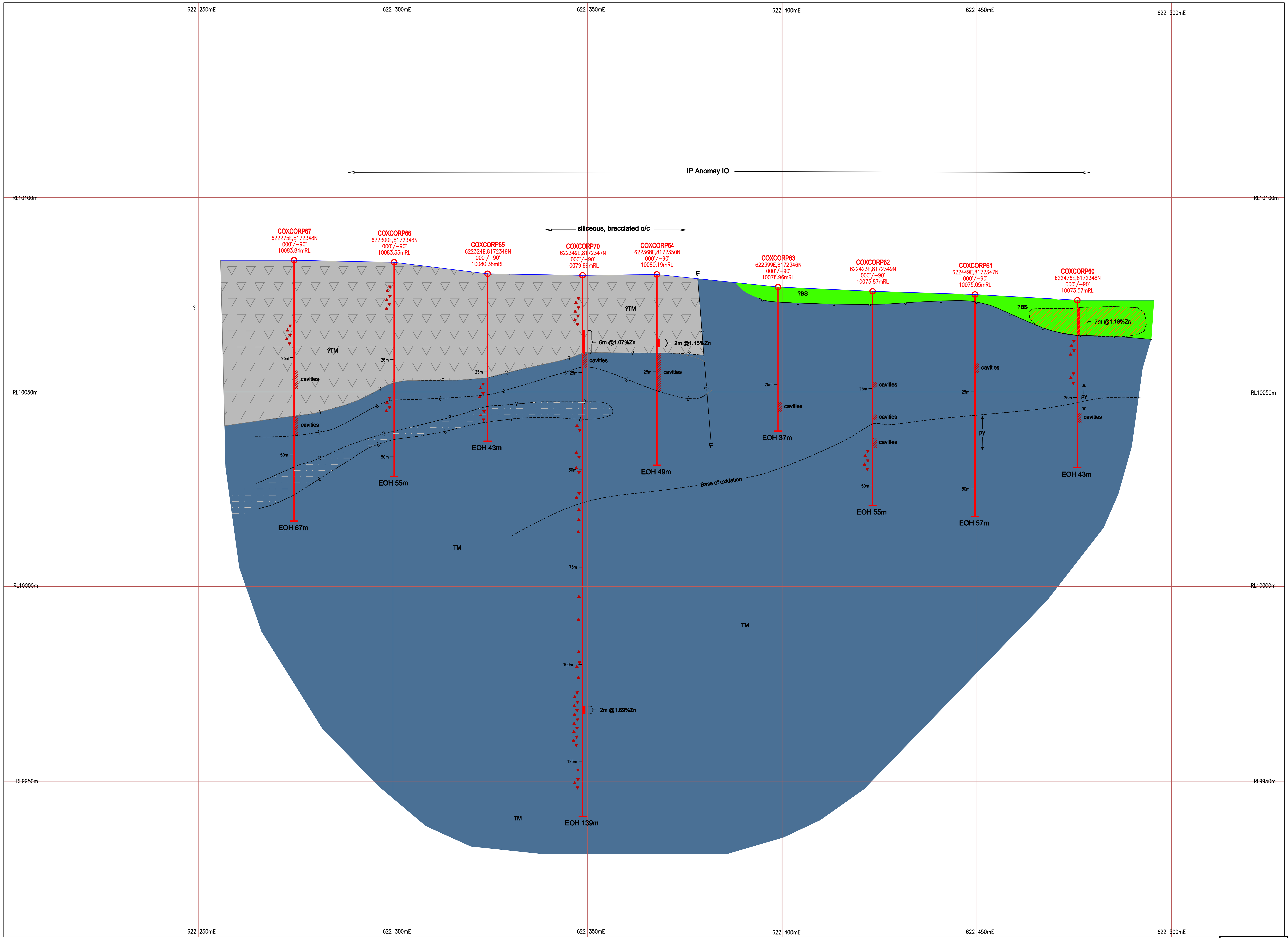


622 500mE
622 550mE
622 600mE
622 650mE
COXCORP59
622533E,8172193N
090°/–60°
10069.99mRL
COXCORP55
622575E,8172194N
000°/–90°
10069.02mRL
COXCORP56
622599E,8172196N
000°/–90°
10070.3mRL
COXCORP58
622624E,8172195N
000°/–90°
10070.27mRL
COXCORP57
622649E,8172195N
000°/–90°
10070.23mRL
?BS
TM
Cu (<0.7%)
Base of oxidation
RL10050m
RL10000m
RL9950m
25m
50m
75m
100m
py
EOH 60m
EOH 35m
EOH 29m
EOH 29m
EOH 109m
REFERENCE
Cambrian
BS
Bukalara Sandstone – brown clay
Proterozoic
TM
?Teena/Mara Dolomite – light grey-white dololutite-dolarenite; typically massive; weak-moderate leached above BOCO; widespread re-dolomitisation.
py
Strongly pyritic
Lithological boundary
Unconformity
Tectonic breccias
Significant Zn-Pb mineralisation (>2m @ 1%Zn or 1%Pb cut off)
NORTH
BRISBANE
NORTH LIMITED
A.C.N. 005 233 689
10 0 10 20m
SCALE 1:500
Geo. M.C.
Map Ref. BAUHINIA DOWNS SE53-03
Drawn. N.P/C.R
Check.
Date. 1-9-01
Job No.
COXCO PROJECT
CROSS-SECTION 8 172 200mN
Project. COXCO
Report. 24546
Dwg No. NP3.dwg
Plan No. 5




## REFERENCE

Cambrian — BS — Bukalara Sandstone - brown clay

Proterozoic — TM —
- 'Breccia' - origin uncertain, complex series of white and ferrugerous clay, variable silicification over ?Dolermite, mnr sandstone?
- ?Teena/Mara Dolomite - light grey-white dololutite/dolarenite; typically massive; weak-moderate leached above BOCO; widespread re-dolomitisation alteration.
- Silty dolomite, fine dark grey silt wisps/laminations

Zn oxide zone.

Fault

Lithological boundary

Uncomformity

Tectonic breccias

Cavities (poor/no sample)

Significant Zn-Pb mineralisation (ie >2m @ 1%Zn or 1%Pb cut off)

py — Strongly pyritic

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SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

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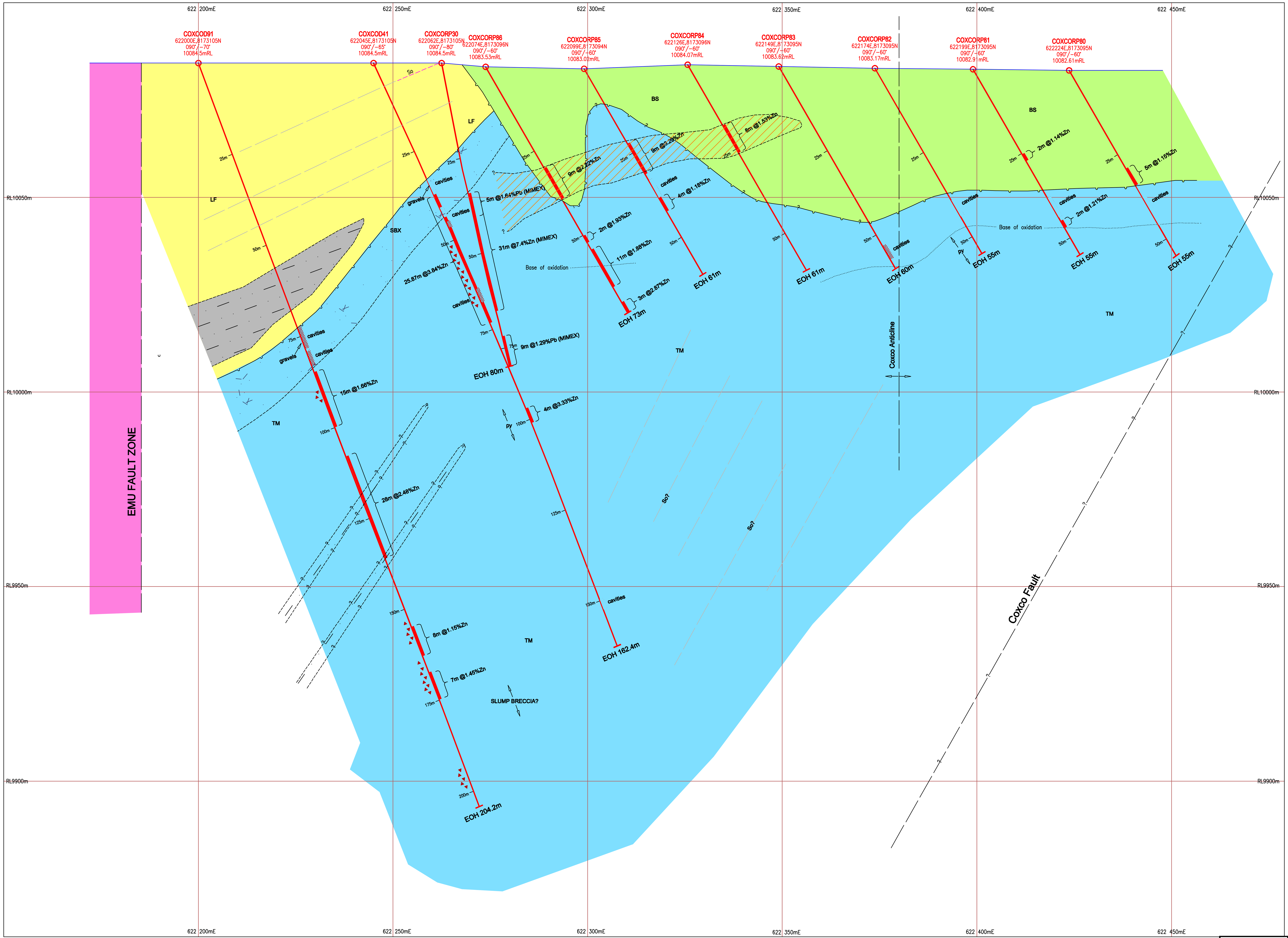
|---|---|
| Map Ref. | BAUHINIA DOWNS SE53-03 |
| Tenement. | |
| Geo. | M.C. |
| Drawn | N.P/C.R |
| Checked | |
| Date | 1-9-01 |
| Job No. | |

## COXCO PROJECT
## CROSS-SECTION 8 172 350mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP4.dwg | Plan No. 4 |
|---|---|---|---|---|---|---|




## REFERENCE

| | | |
|---|---|---|
| Cambrian | BS | Bukalara Sandstone – strongly weathered, fine–med grained, clayey. |
| Proterozoic | LF | Lynott Formation – strongly oxidised, typically geothitic dolomitic siltstone; strongly leached; rare faint parallel laminations, common liesegang rings. |
| | | pyritic, ?carbonaceous siltstone |
| | RM | 'Barney' sedimentary breccia – clay, gravel, siltstone + dolomite clasts |
| | | ?Teena/Mara Dolomite – light grey/white dololutite/dolarenite; typically massive with rare brown algal laminations; weak–moderate leached above BOCO; widespread re–dolomitisation alteration. |
| | | Silty dolomite interbeds. |
| | | Masterton sandstone |
| | | Zn oxide rich zone. |
| | | Fault |
| | | Lithological boundary |
| | | Uncomformity |
| | | Tectonic breccias |
| | | Cavities (poor/no sample) |
| | | Significant Zn–Pb mineralisation (ie >2m @ 1%Zn or 1%Pb cut off) |
| | py | Strongly pyritic |

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SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

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| Map Ref. | BAUHINIA DOWNS SE53-03 | | |
| Geo. | M.C. | Tenement. | |
| Drawn | N.P/C.R | | |
| Checked | | | |
| Date | 1-9-01 | | |
| Job No. | | | |

# COXCO PROJECT
# CROSS-SECTION 8 173 100mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP5.dwg | Plan No. 1 |
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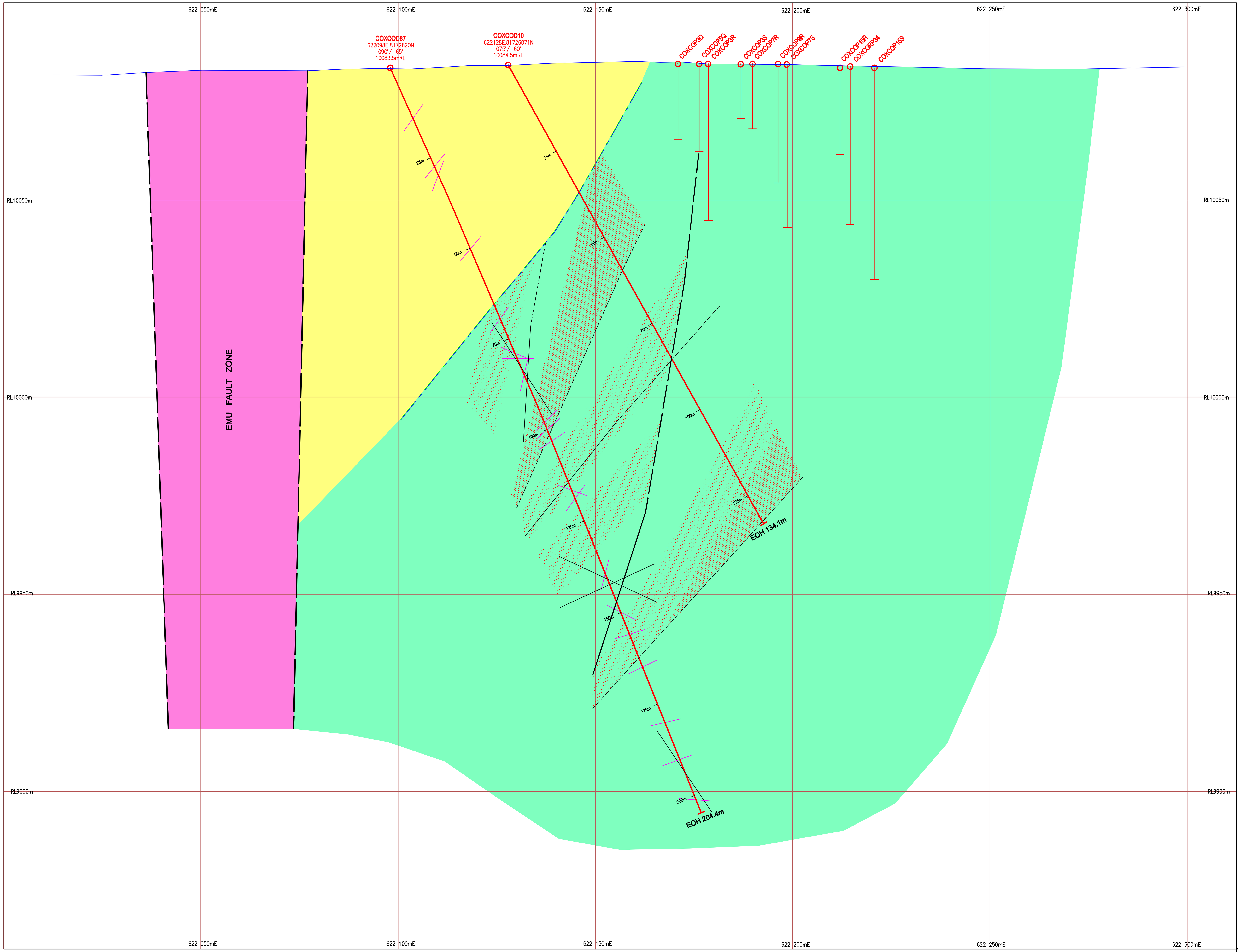


Major fault

Apparent dip of mineralisation-control fault / major fracture

Apparent dip of bedding

Strong tectonic breccia (TBX)
– Vein network breccias (Vn Bx) – Vein mineralisation

Weak tectonic breccia (TBX)
– Vein mineralisation

Base of Lynott Formation = top of "Barney" sedimentary breccias

"Barney" sedimentary breccia with matrix mineralisation

Base of "Barney" sedimentary breccias = top of "Teena" dolomite slump breccia pile and "Mara Dolomite"

*STRATIGRAPHY THROUGH "TEENA" SLUMP BRECCIA PILE INTO COHERENTLY BEDDED "TEENA" AND/OR "MARA DOLOMITE" ± STROMATOLITES HAS NOT BEEN SHOWN. SEE SUMMARY LITHOLOGS IN REPORT FOR DETAIL.*
*Mark Hinman, Hinman Geo Solutions.*

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SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

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| Map Ref. | BAUHINIA DOWNS SD53-03 |
| Tenement. | |
| Geo. | M.C.H. |
| Drawn | N.A.P. |
| Checked | |
| Date | 17-01-01 |
| Job No. | |

COXCO PROJECT
STRUCTURAL INTERPRETATION
CROSS-SECTION 8 172 620mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP6.dwg | Plan No. 6 |
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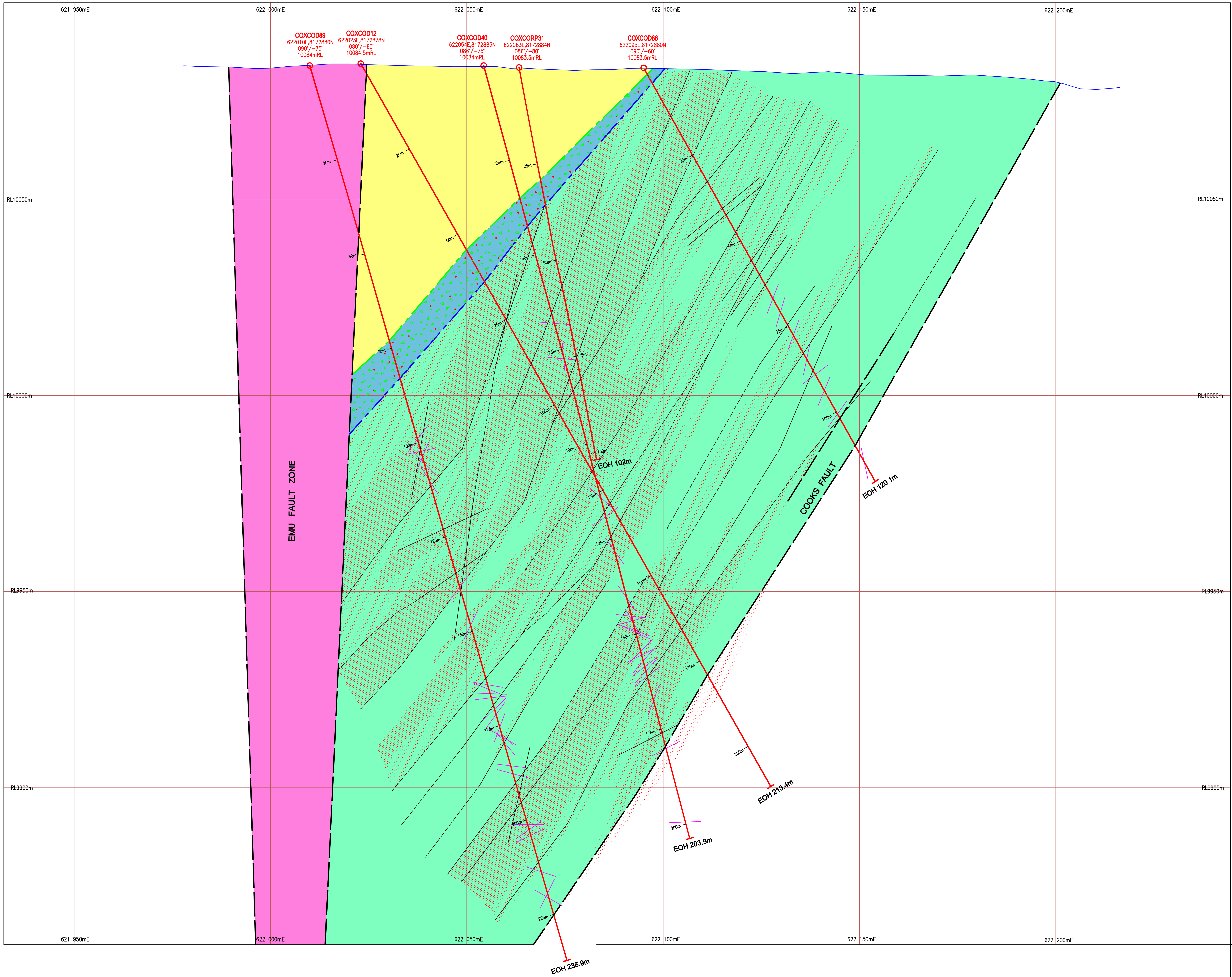


Major fault

Apparent dip of mineralisation-control fault / major fracture

Apparent dip of bedding

Strong tectonic breccia (TBX)
– Vein network breccias (Vn Bx) – Vein mineralisation

Weak tectonic breccia (TBX)
– Vein mineralisation

Base of Lynott Formation = top of "Barney" sedimentary breccias

"Barney" sedimentary breccia with matrix mineralisation

Base of "Barney" sedimentary breccias = top of "Teena" dolomite slump breccia pile and "Mara Dolomite"

*STRATIGRAPHY THROUGH "TEENA" SLUMP BRECCIA PILE INTO COHERENTLY BEDDED "TEENA" AND/OR "MARA DOLOMITE" ± STROMATOLITES HAS NOT BEEN SHOWN. SEE SUMMARY LITHOLOGS IN REPORT FOR DETAIL.*
*Mark Hinman, Hinman Geo Solutions.*

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SCALE 1:500
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AUSTRALIAN MAP GRID ZONE 53

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| Map Ref. | BAUHINIA DOWNS SD53-03 |
| Tenement. | |
| Geo. | M.C.H. |
| Drawn | N.A.P. |
| Checked | |
| Date | 19-01-01 |
| Job No. | |

COXCO PROJECT
STRUCTURAL INTERPRETATION
CROSS-SECTION 8 172 880mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP7.dwg | Plan No. 7 |
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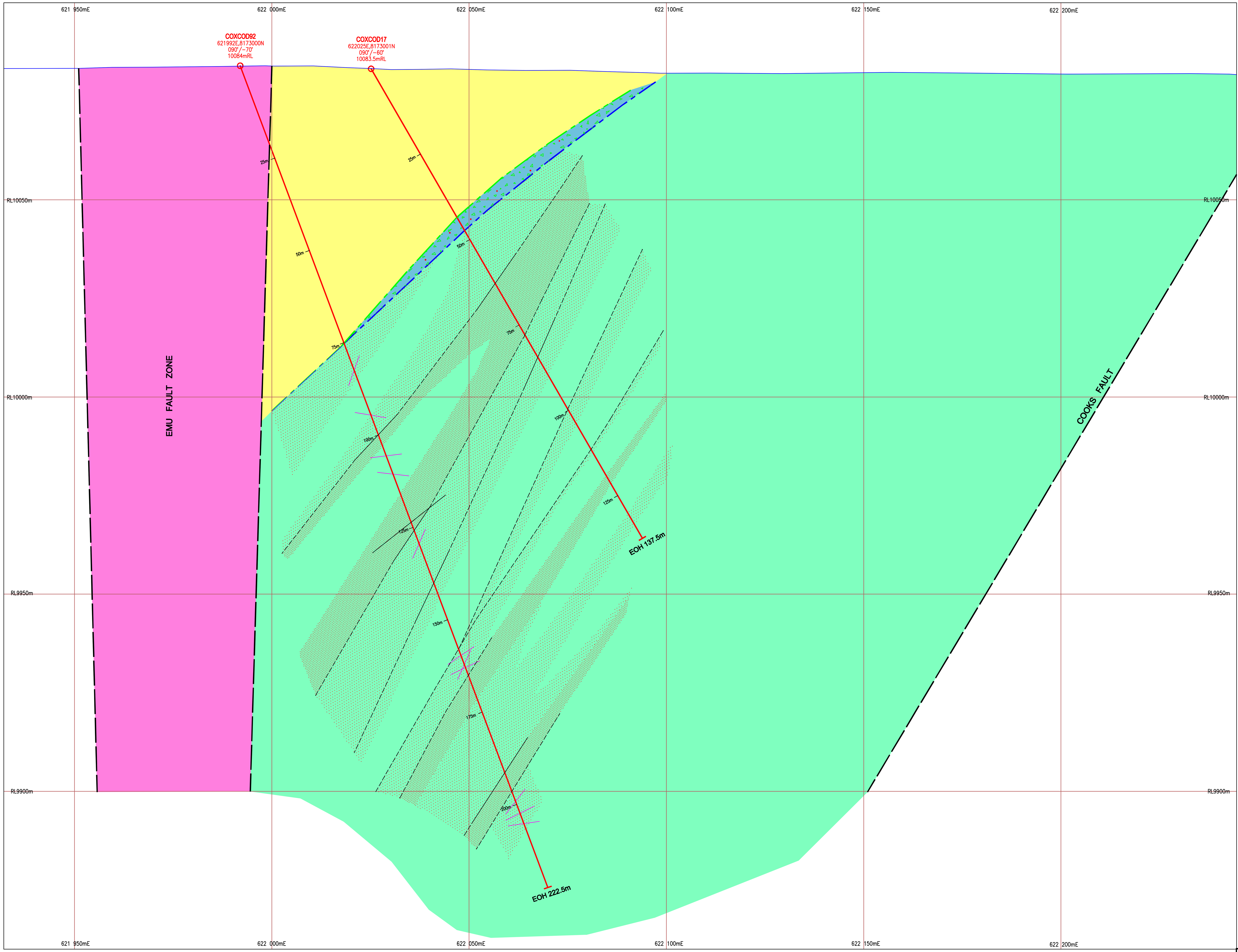


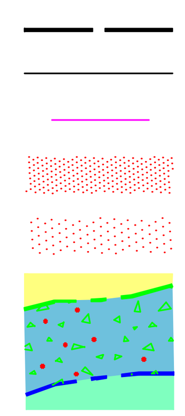


*STRATIGRAPHY THROUGH "TEENA" SLUMP BRECCIA PILE INTO COHERENTLY BEDDED "TEENA" AND/OR "MARA DOLOMITE" ± STROMATOLITES HAS NOT BEEN SHOWN. SEE SUMMARY LITHOLOGS IN REPORT FOR DETAIL.*
*Mark Hinman, Hinman Geo Solutions.*

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SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

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| Geo. | M.C.H. | Map Ref. | BAUHINIA DOWNS SD53-03 |
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| Checked | | | |
| Date | 16-01-01 | | |
| Job No. | | | |

COXCO PROJECT
STRUCTURAL INTERPRETATION
CROSS-SECTION 8 173 000mN

| Project | COXCO | Report No. | 24546 | Dwg No. | NP8.dwg | Plan No. 10 |
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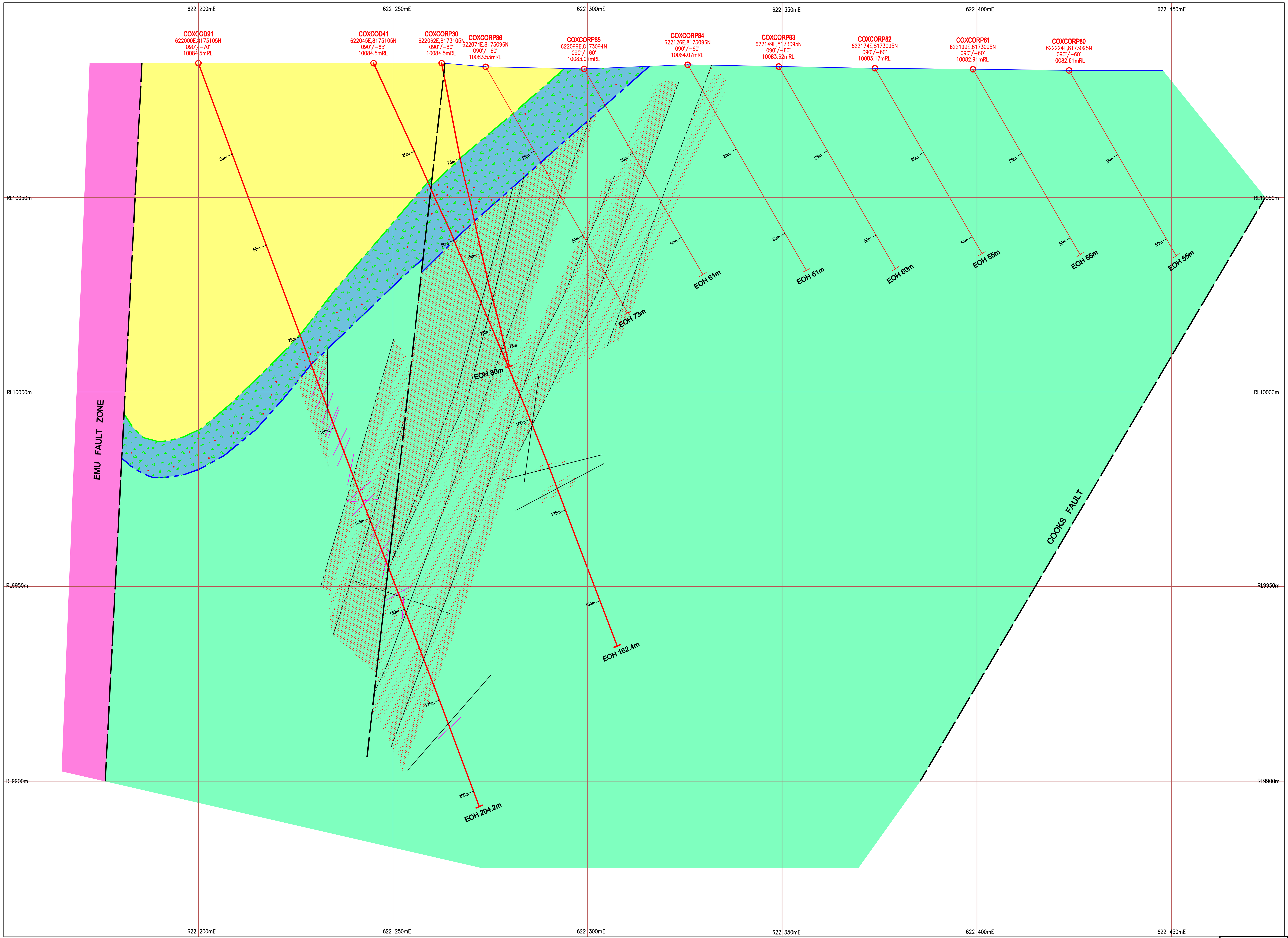


Major fault

Apparent dip of mineralisation–control fault / major fracture

Apparent dip of bedding

Strong tectonic breccia (TBX)
– Vein network breccias (Vn Bx) – Vein mineralisation

Weak tectonic breccia (TBX)
– Vein mineralisation

Base of Lynott Formation = top of "Barney" sedimentary breccias

"Barney" sedimentary breccia with matrix mineralisation

Base of "Barney" sedimentary breccias = top of "Teena" dolomite slump breccia pile and "Mara Dolomite"

*STRATIGRAPHY THROUGH "TEENA" SLUMP BRECCIA PILE INTO COHERENTLY BEDDED "TEENA" AND/OR "MARA DOLOMITE" ± STROMATOLITES HAS NOT BEEN SHOWN. SEE SUMMARY LITHOLOGS IN REPORT FOR DETAIL.*
*Mark Hinman, Hinman Geo Solutions.*

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SCALE 1:500
10 0 10 20 30 40 50m
AUSTRALIAN MAP GRID ZONE 53

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| Geo. | M.C.H. | Map Ref. | BAUHINIA DOWNS SD53-03 |
| Drawn | N.A.P. | Tenement. | |
| Checked | | | |
| Date | 18-01-01 | | |
| Job No. | | | |

COXCO PROJECT
STRUCTURAL INTERPRETATION
CROSS-SECTION 8 173 105mN

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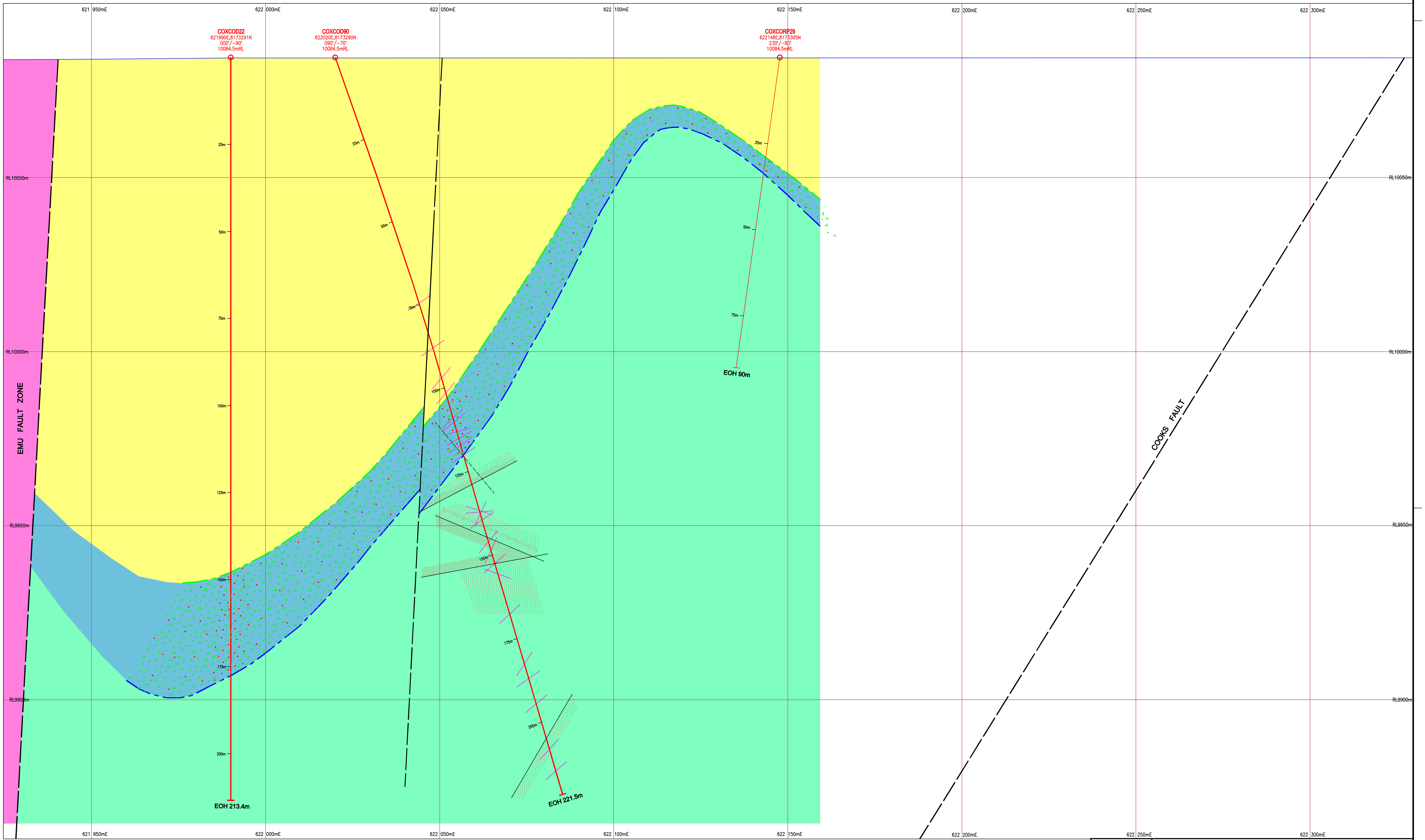
| Project | COXCO | Report No. | 24546 | Dwg No. | NP9.dwg | Plan No. 9 |




Major fault

Apparent dip of mineralisation–control fault / major fracture

Apparent dip of bedding

Strong tectonic breccia (TBX)
– Vein network breccias (Vn Bx) – Vein mineralisation

Weak tectonic breccia (TBX)
– Vein mineralisation

Base of Lynott Formation = top of "Barney" sedimentary breccias

"Barney" sedimentary breccia with matrix mineralisation

Base of "Barney" sedimentary breccias = top of "Teena" dolomite slump breccia pile and "Mara Dolomite"

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NORTH BRISBANE

SCALE 1:500

AUSTRALIAN MAP GRID ZONE 53

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|---|---|---|---|
| Map Ref. | BAUHINIA DOWNS SD53-03 | | |
| Geo. | M.C.H. | Tenement. | |
| Drawn | N.A.P. | | |
| Checked | | | |
| Date | 18-01-01 | | |
| Job No. | | | |
| Project | COXCO | Report No. | 24546 |
| Dwg No. | NP10 | Plan No. 8 | |

## COXCO PROJECT
## STRUCTURAL INTERPRETATION
## CROSS-SECTION 8 173 290mN