M.I.M. EXPLORATION PTY LTD

TECHNICAL REPORT 2867

Title : **Enzyme Leach Survey ENZ6**
EPM 11226 - Mongoona Project

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Date : **January, 1998**

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IMPORTANT UPDATE - 2015
Typographic errors, page number references corrected,
QA graphs of Figures 2-4 regenerated , document bookmarked.
All Maps and Figure 1 regenerated and printed as .pdfs (using archived 1998 data)

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Map 44627	Fe on Landsat TM
Map 44628	V on Radiometrics
Map 44629	As on Landsat TM
Map 44630	Pb on Landsat TM
Map 44631	Zr on Landsat TM
Map 44632	Mn on Landsat TM
Map 44633	Mo on Landsat TM
Map 44634	Cl on Landsat TM

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The results of the Mongoona soil survey demonstrate the viability of the enzyme leach technique for exploring buried regional-scale structures and locating coherent, potentially drillable, geochemical targets. In particular:
   - two Cu targets located at the intersections of major basement structures are identified for priority follow-up; and
   - narrow enzyme leach Fe-Pb and Cl-Mo (As) anomalies on groups of adjacent sample lines appear to trace the inferred position of the buried Mongoona Fault.

2. Soil properties influence the degree to which some important metals are recovered by the enzyme leach. Specifically:
   - smectitic, cracking or 'black' soils have markedly lower leachable Mn and Co, and higher V, As, Mo, and perhaps Cu, contents than red, low-clay sandy soils; and
   - the fine fraction of gravels developed in areas of outcrop and colluvium have the lowest enzyme leachable V, As, Mo, and perhaps Cu, contents of all the 3 broad soil groups.

3. The detection of regolith controls on enzyme leach responses requires the systematic classification of soils at the time of sample collection; Landsat images provide a means of confirming and displaying such controls.

Recommendations

1. Follow-up the unusually extensive Cu anomaly of line 7708000mN by either infill enzyme leach soil sampling or the drilling of at least 2 holes into Proterozoic basement.

2. Drill at least two holes into the poly-metallic enzyme leach anomaly which is probably centred on the middle of the southernmost line of the grid (line 7669000mN).

3. Determine why the 3 main soil groups of the Mongoona grid respond differently to the enzyme leach for some metals; representative samples should be submitted for mineral-specific chemical analysis

Mongoona Soil Enzyme Leach Survey

Table1: Survey Specifications

Survey ID	ENZ6
Tenement	EPM11226
Survey Date	28 August - 2 September, 1997
Sample Despatch Advice	IS97KH02
Sample Type	200g of soil passing a ¼ mm stainless steel sieve with brass rim
Laboratory	Activation Actlabs, Ancaster, Ontario
Job Number	1990
Analytical Method	Standard enzyme leach for full suite, plus semi-quantitative Fe
Number of Samples	452
Number Sequence	MA43001-MA43454 (excluding MA43330-331)
ID/Number of Standards	ENZ1, 7 samples ISABM05, 2 samples
ID/Number of Duplicates	17, refer file ENZ6_QA
ID/Number of Replicates	17, refer file ENZ6_QA
Raw Assay File	ENZ6_enzleach
Modified Files	ENZ6_alldata and ENZ6_forMapInfo (with assay data, sample locations, field observations, QA samples) ENZ6_standards (results of standards) ENZ6_QA (results of duplicates and replicates)
Address of Files	M:\EstnAust\QLD\NWQ\MongoonaProject\Mongoona11226\EXCEL

Table 2: List of maps in this report (1:200 000)

Map Number	Content
44625	Soil Type of Landsat TM
44626	Cu on Total Magnetic Intensity
44627	Fe on Landsat TM
44628	V on Radiometrics
44629	As on Landsat TM
44630	Pb on Landsat TM
44631	Zr on Landsat TM
44632	Mn on Landsat TM
44633	Mo on Landsat TM
44634	Cl on Landsat TM

Metals plotted according to soil type

Table 3: List of maps for hanging storage (1:100 000)

Map Number	*Content*
44611	Soil Type of Landsat TM
44612	Cu on Landsat TM
44613	V on Landsat TM
44614	Mn on Landsat TM
44615	Cu on Landsat TM
44616	Cu on Radiometrics
44617	Mo on Radiometrics
44618	Br with interpreted faults
44619	As with interpreted faults
44620	Zr with interpreted faults
44621	Pb on Landsat TM
44622	Fe on Landsat TM
44623	Cl on Landsat TM
44624	Co on Landsat TM

Data is treated as one population. Copies of these maps are stored at the Star Gully and Brisbane offices.

INTRODUCTION

The Mongoona project soil grid is situated some 50 km west of Mount Isa and covers EPM 11226 and EPMA 11915 (refer Fig.1). Sampling and enzyme leach analysis of soils on the grid was designed to locate areas with potential for significant base-metals mineralisation beneath more than 50 m of alluvium and Cambrian sediments along the basin-controlling Mongoona Fault. The soil survey is identified as ENZ 6.

The grid consists of 29, east-west lines up to 10 km long and between 1 and 13 km apart (see Dwg. 44625). A line spacing of 1 km was favoured in 3 areas where the Mongoona Fault appears to truncate and possibly offset major NE-trending structures (refer to Dwg. 44626). Samples were collected at distances of between 200 and 1000 m on each line, and sent to ACTLABS in Canada for the determination of a large suite of elements using the enzyme leach method.

ENZ 6 represents a significant advance in our approach to geochemical exploration in covered regions using partial extraction techniques. Rather than attempting to produce immediate drill targets on a soil grid of restricted size, the Mongoona survey was designed to locate broad areas of chemical anomalism related to blind mineralisation on a regionally significant structure over a length of 70 km. Similar tactics are being applied in the Eastern Succession of the Mount Isa Inlier on our Mount Fort Constantine Joint Venture properties (*e.g.,* survey ENZ 4).

In detail, the Mongoona Fault is thought to be a transfer fault that was active during Cover Sequence 3 deposition, and the NE-trending structures transfer faults active during Cover Sequence 2 deposition. The intersections of these structures may have been major focii for basinal fluid flow and base-metal mineralisation (work of Mark Hinman during 1996).

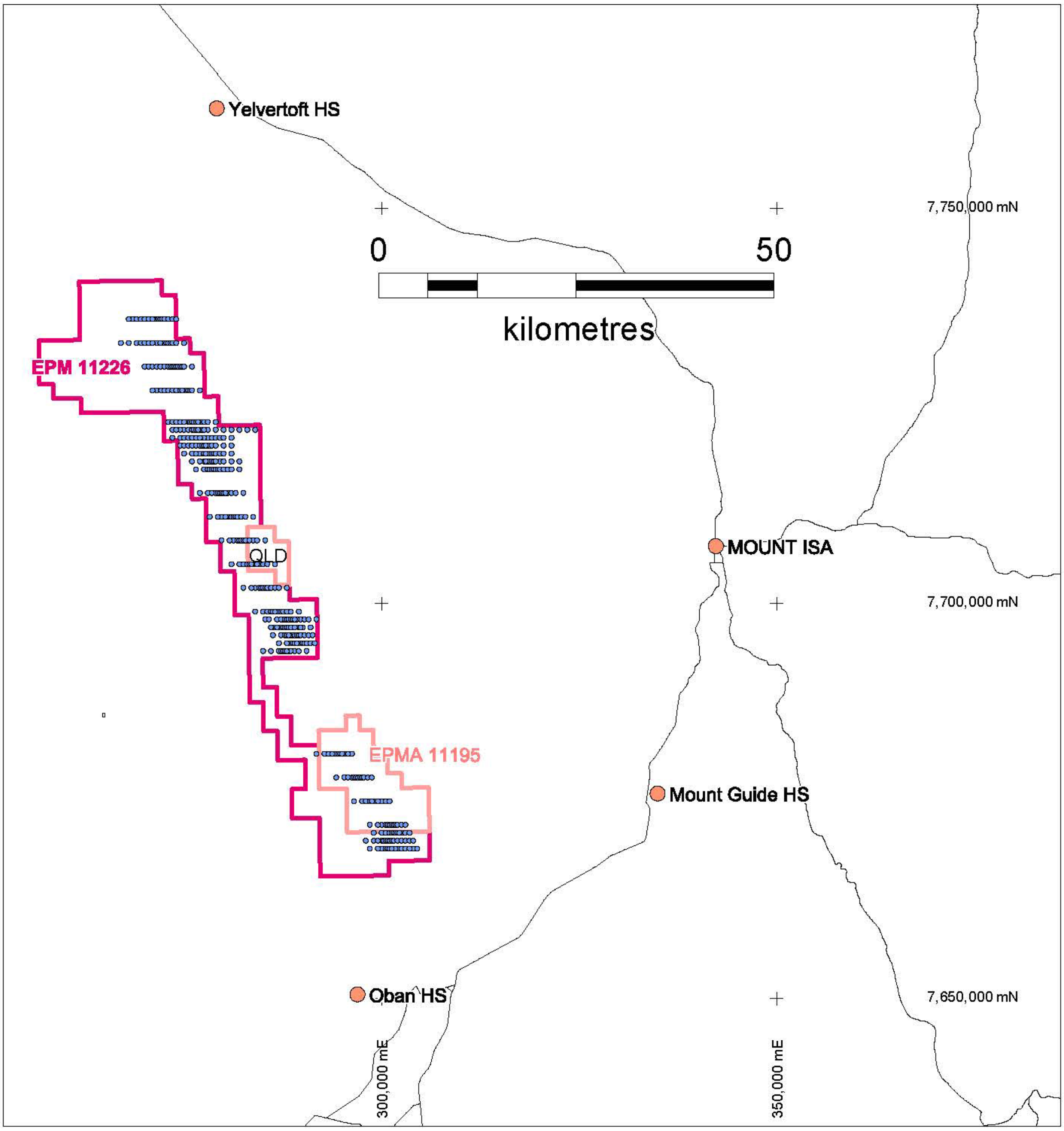


Figure 1

MIM Exploration Pty Ltd

Date: 20-11-97
Author: KWH
Office: Brisbane
Drawing:
Scale: 1:750 000
Projection: AMG 84, zone 54

Mongoona Project Grid ENZ6 Location

Soil enzyme leach sample lines and tenements

SAMPLING AND DESPATCH INSTRUCTIONS

The following instructions were provided to each team at the beginning of the sampling campaign.

At Every Station

Step1

Clear an area of about 75 x 75 cm of loose soil and grass. Sample within the cleared area at a depth of 15 to 20 cm; pounding of clods may be necessary before sieving.

Step2

Produce about 200g of soil sieved to -60# (-0.25mm).

Step 3

Use a plastic spoon to scoop about 50-75g into a small ziplock plastic bag (6cm of silt in a 14 cm long x 7 cm wide bag), include the two rip-off sample number tags, lock bag carefully, and number the outside of the bag.

Step 4

Record appropriate information about the sample site in the MIMEX sample book, especially the AMG coordinates, approximate sample weight, sampler's names and any distinguishing characteristics of the site (e.g., composition of soil, local vegetation, local topography).

At Every 25th Station

Step 1 *As above, but.....*

Sieve twice as much soil and produce everything in duplicate. The two 50g bags should be filled incrementally from the sieved stock to ensure between-sample homogeneity.

Step 2

Number one of the 50g samples in sequence from the last station and include *both* rip-off sample tags, as if this were a normal sample site.

Step 3

Mark the second 50g sample with the original number and the letters DUP or TEMP as it will be renumbered later (see Numbering Duplicates in the section on Sample Despatch). In the meantime place it in a larger bag specially reserved for duplicates.

Step 4

Record as a "duplicated sample" in the sample booklet, together with the usual site information.

Step 5

Dig another sample 4-10 metres away from the original excavation. Treat this as separate station by numbering the 50g sample in sequence from the number of the original excavation.

Step 6

Record the excavation as a "replicated site" in the sample booklet. Also record the coordinates, which will obviously be the same as those of the 'original' soil site 4-10m away. Sketch the relative positions of the 2 excavations if necessary (with distances).

At every 50th Station

Insert the MIMEX standard Enz1 into the number sequence (that is, identify the standard with an in-sequence MIMEX record number). Record as “Enz1 standard’’ in the sample booklet.

More on using the MIMEX standards

- As described above, insert a standard at every 50th location. Do this in the field. Remove each standard from its commercial packaging and pour into a normal sample bag.
- As described above, allocate an in-sequence sample number ticket to each bag of standard and write the name of each standard clearly on the appropriate sample record. Remember; do not bunch all of the standards numerically at the end of an assay batch. We do not want the laboratory to easily recognise our standards.
- If standards are not available in the field, then leave the appropriate sample record(s) blank for use when the standards are available. Do not send sample batches off to a laboratory without standards.
- Every batch of samples, irrespective of size, should have a minimum of 4 standards.

Other Important Instructions

1. Use a plastic, not metal, spoon to scoop the sieved material into the small sample packets; scratching of the pan with a metal spoon may result in contamination.
2. Clean the sieve between every excavation. Brush the outside of the sieves and their inner rims between sites (including the 1-in-50 duplicate sites); use a plastic- and firm-bristled brush. Do not brush the mesh on the inside of the sieve, as this will force grains through the mesh and distort it.
3. Keep the digging tools free of mud and clay.
4. Avoid other sources of contamination by not wearing metal and gold jewelry and not smoking whilst sampling (cigarette ash can contain traces of unspecified metals). Avoid touching the soil or sieved product if hands are smeared with sunscreen.
5. Keep the samples cool (shaded with air flow). Temperatures of in excess of 40°C are likely to degrade the samples and compromise the special analysis required for this survey.

<u>Preparation of samples for despatch to the laboratory</u>

Try to keep individual assay jobs to less than about 300 samples, because the laboratory cannot treat more than this amount without breaking the job into sub-batches. If this occurs, only the last sub-batch can be checked for analytical drift, as it will contain all the duplicates (step 2)

Step1

- Find an uncontaminated and sheltered site.
- Lay all of the samples out in numerical order.
- Check that all samples are present, including the temporarily numbered duplicates, and ensure that none of the bags are leaking or torn. Squeeze the air out of pressurised sample bags. Confirm that each sample can be easily identified from the outside - a competent laboratory will also go through this procedure.

Step 2 Renumbering duplicates

- Collect all of the temporarily numbered duplicates together and place them in order of their temporary numbers at the end of the sample rows.
- Number them in sequence from the last completed soil site and record each in the sample booklet as "duplicate of sample *original number*", where *"original number"* is the number written on the outside of the bag in which the duplicate sample was temporarily stored.
- Record the new, *duplicate number* in the sample record of the original sample. This step minimises the potential for sample mix-ups, and speeds up the entry of QA information into spreadsheets, SDAs or databases.

Step 3

- Pack the samples firmly in conveniently-handled sub-batches of say 50 samples (for protection).
- Arrange transport to to the laboratory so that the samples, or their containers, are not exposed to direct summer sunlight during storage and transport.
- Despatch the samples to ACTLABS in Canada. Sub-batch labels will facilitate efficient sorting at the lab.

DATA QUALITY

Standards

The enzyme leach standard Enz1 was prepared from red Tertiary sand in the overburden of the Ernest Henry deposit. It was inserted into the sample sequence of ENZ 6 at every 50th sample site (see previous section on sampling procedures). The assays for a selection of *oxidation* and *diffusion* suite elements from this and two earlier surveys are presented in Figures 2a, 2b and 2c (page 12-14)..

As expected, the degree of variation for a given metal between each sample of Enz1 is higher than would normally be acceptable for total digestions, and clearly some elements repeat less-well than others (*e.g.,* compare the Br and Cl bar plots of each survey, Fig.2a).

Figure 2 also highlights the problem of "calibration jumps" for some metals between analytical batches. For example, Cu values for the standard in the current survey are consistently half those obtained for the standard in the ENZ 1 survey (Fig.2b).

The plots of Figure 2 also provide a first-pass indication of possible within-job analytical drift. There is a suggestion of drift in the Cu assays of ENZ 6, for example (but see next section).

Duplicates

Sample duplicates and sample site repeats were prepared at every 25th sample location. In Figures 3a - 3d, the results for the 17 quality assurance sites are presented as a series of 3-bar clusters; the first bar of a cluster for a given element corresponds to the original sample, the second bar to the sample duplicate, and the third to the sample from the replicated excavation.

A scan of the original-duplicate pairs of each cluster indicates that some elements were subject to minor analytical drift, including:

- semi-quantitative Cl, though the discrepancy is not very systematic (Fig.3a, page 15);
- perhaps Co towards the end of the job (Fig.3b, page 16); and
- Cu in the early part of the job; note how the original samples of the first 4 clusters have lower values than their duplicates (Fig.3c, page 17).

Fortunately, the drift observed for the Cu of job ENZ 6 is not significant, and does not seem to affect samples from the southern 2/3 of the grid where all the significant anomalies occur. By contrast, considerable drift in Cu, As and other elements is observed in the original data of job ENZ 3 (Fig.4, page 18). The drift affects large blocks of samples from different parts of the grid. Thus, the block of samples affected by drift in Cu is not the same as that affected by drift in Br, for example. In this instance, the laboratory re-assayed the samples at no cost to MIMEX, and acknowledged inadequate machine maintenance as the culprit (*viz.,* salted-up mass spectrometer inlet cones).

Replicates (sample site repeats)

A scan of the first and third bars of each QA cluster in Figure 3 indicates that repeatability for a given element between excavations up to 5 metres apart is generally better than that between the drift-sensitive duplicates. The results for elements like Zr and U are particularly encouraging, as they tend to be fault-controlled and are unlikely to occur as coherent, multi-station anomalies.

Summary of Data Quality

The enzyme leach data of ENZ 6 does not appear to be compromised by serious within-job analytical drift. Sample site repeatability is satisfactory, indicating that multi-station anomalies are reproducible features. However, the results for the standard, Enz1, indicate that average yields, and therefore backgrounds and anomaly thresholds for a given element, cannot be directly compared with those of other enzyme leach surveys. Thus, a statistical approach is required to compare separate data sets.

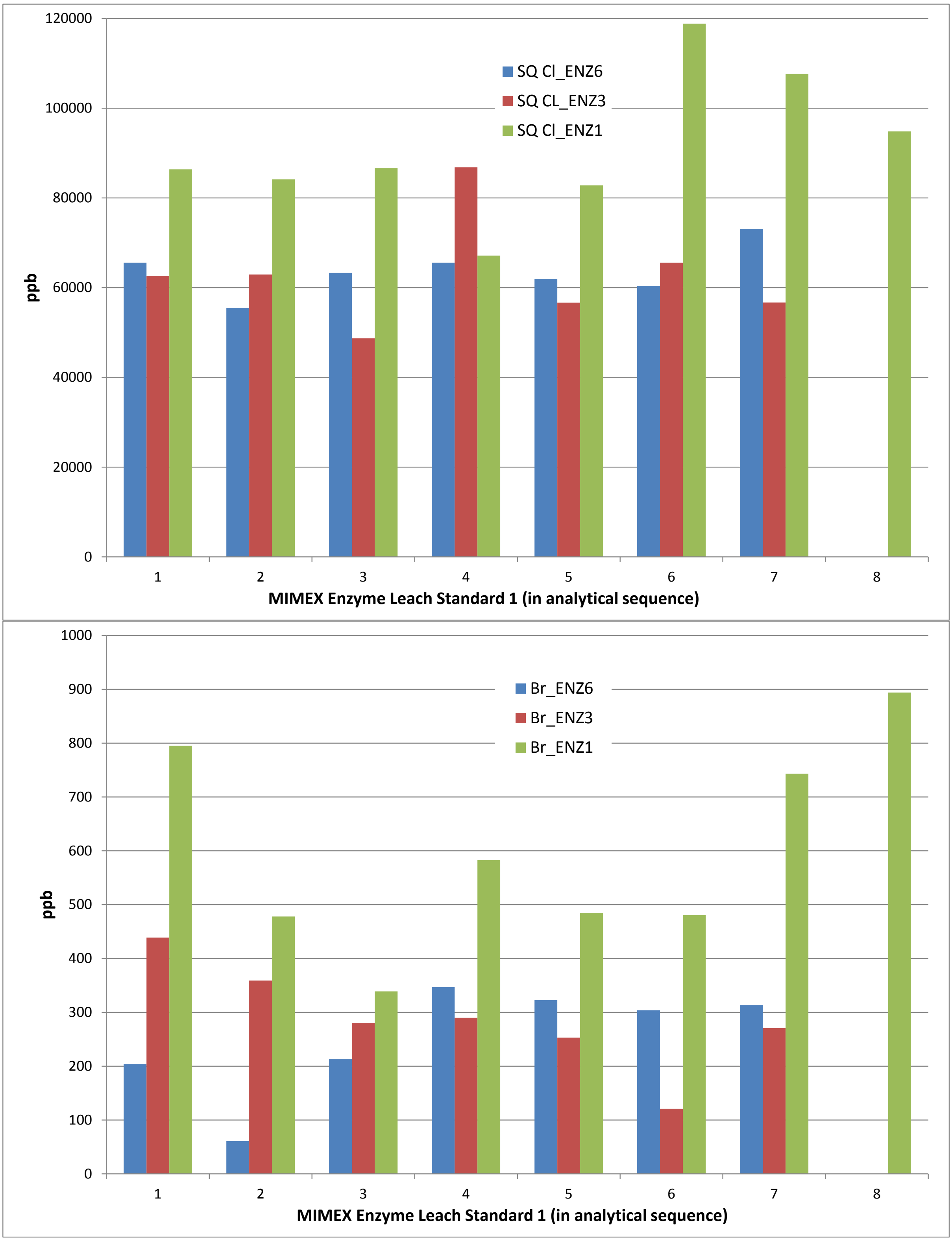


Figure 2A
Enzyme leach extraction values of Cl and Br for internal standard 'Enz1' in current survey (ENZ6) and earlier Cloncurry area surveys (ENZ1 and ENZ3)

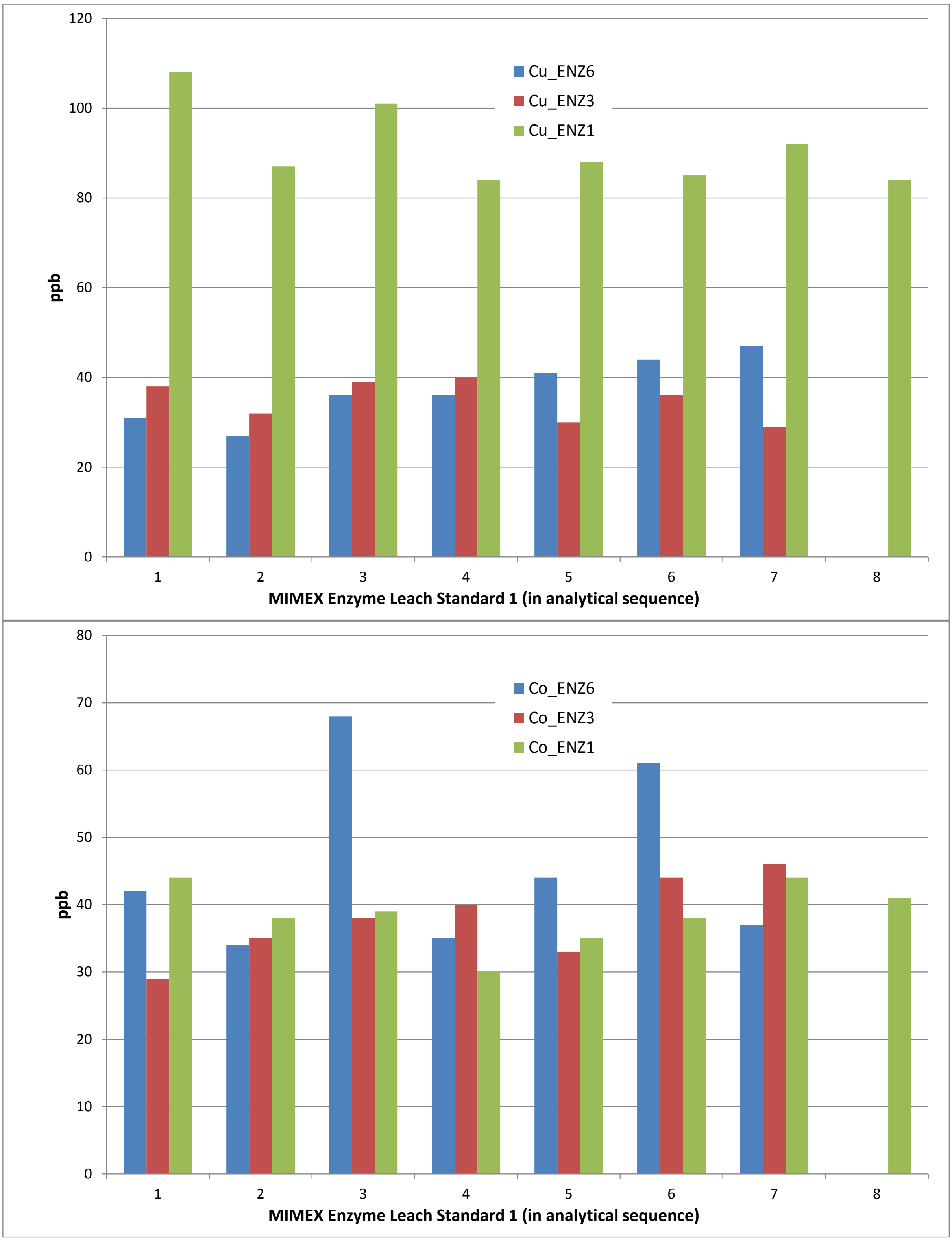


Figure 2B
Enzyme leach extraction values of Cu and Co for internal standard ‘Enz1’ in current survey (ENZ6) and earlier Cloncurry area surveys (ENZ1 and ENZ3)

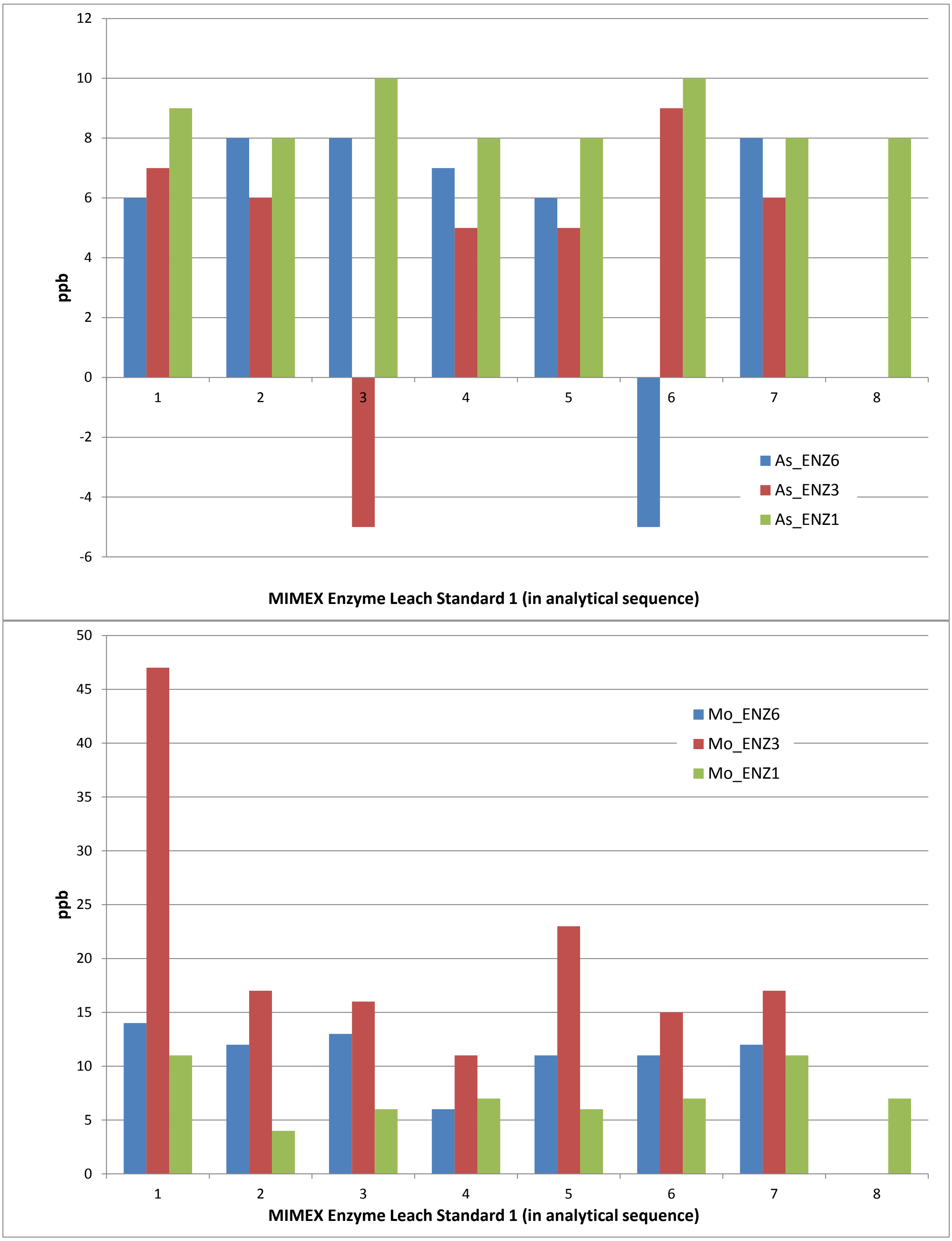
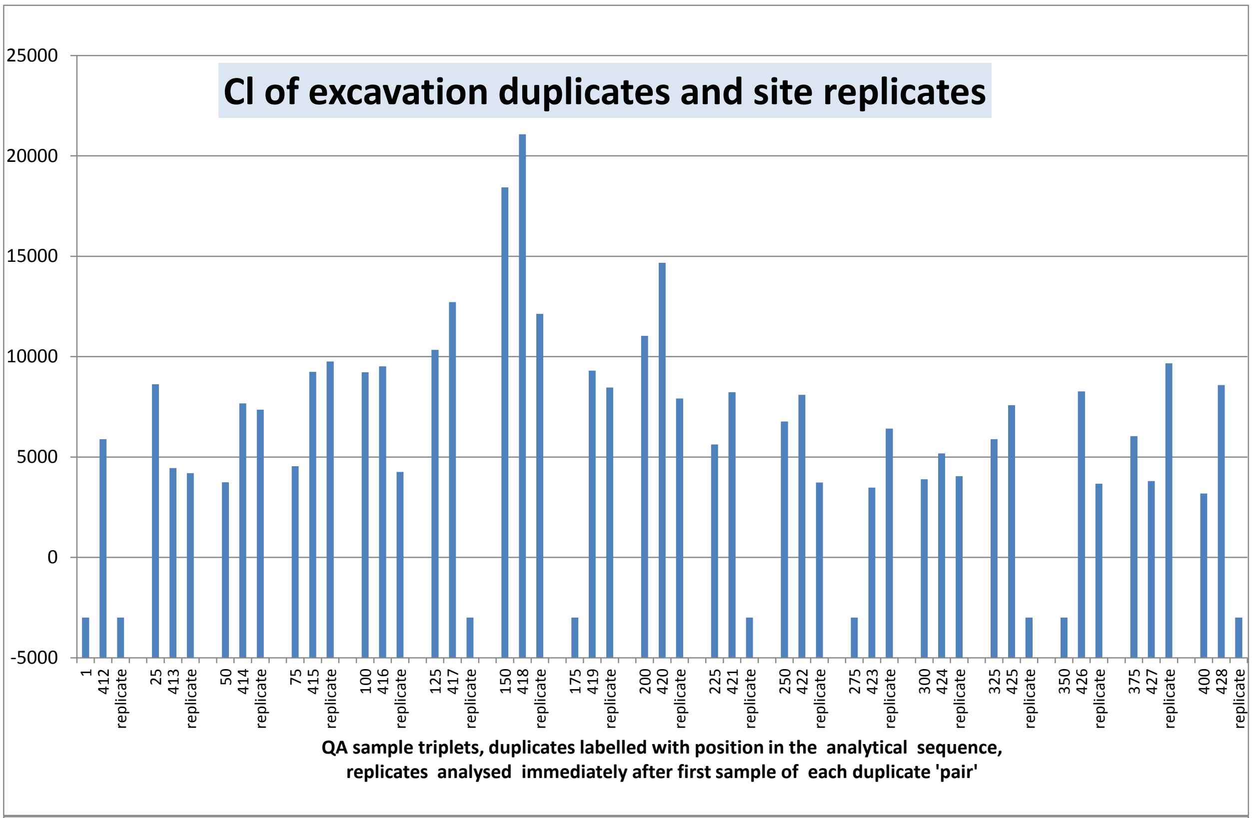


Figure 2C
Enzyme leach extraction values of As and Mo for internal standard 'Enz1' in current survey (ENZ6) and earlier Cloncurry area surveys (ENZ1 and ENZ3)



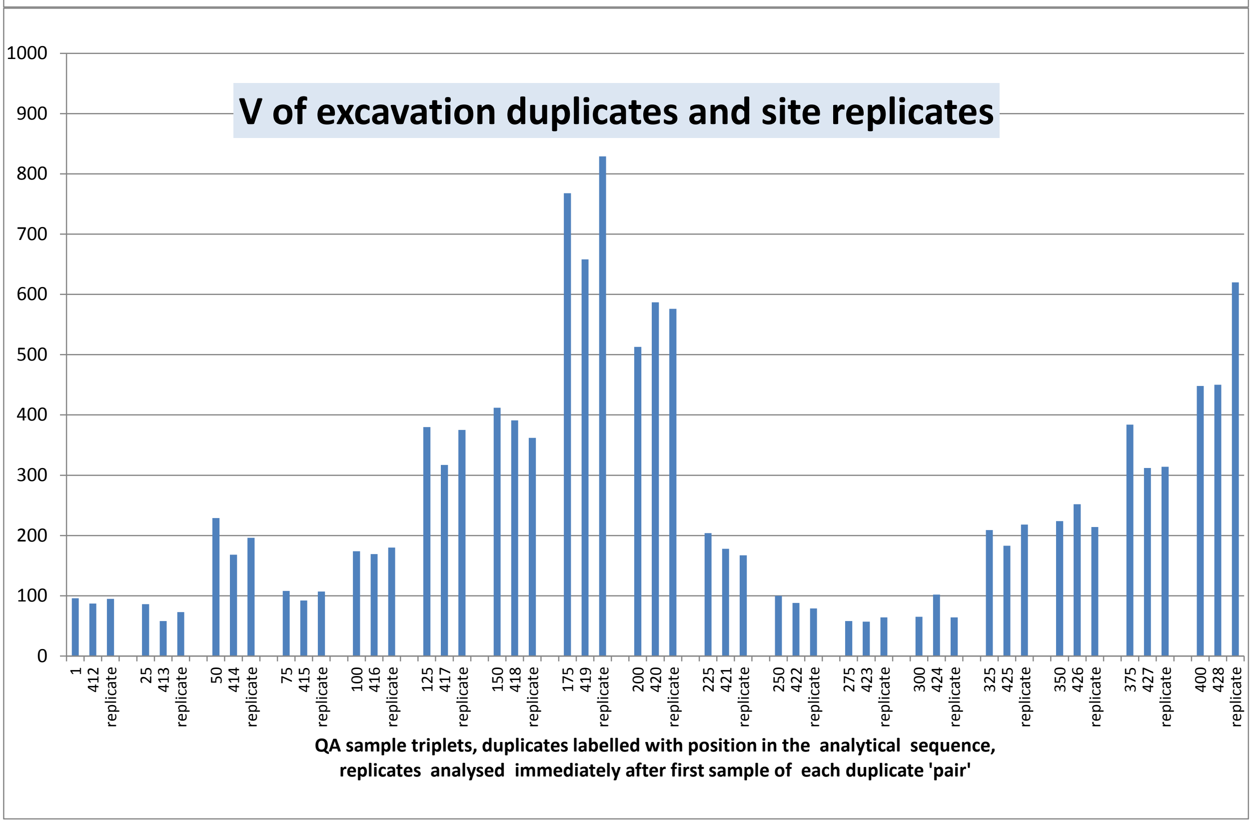
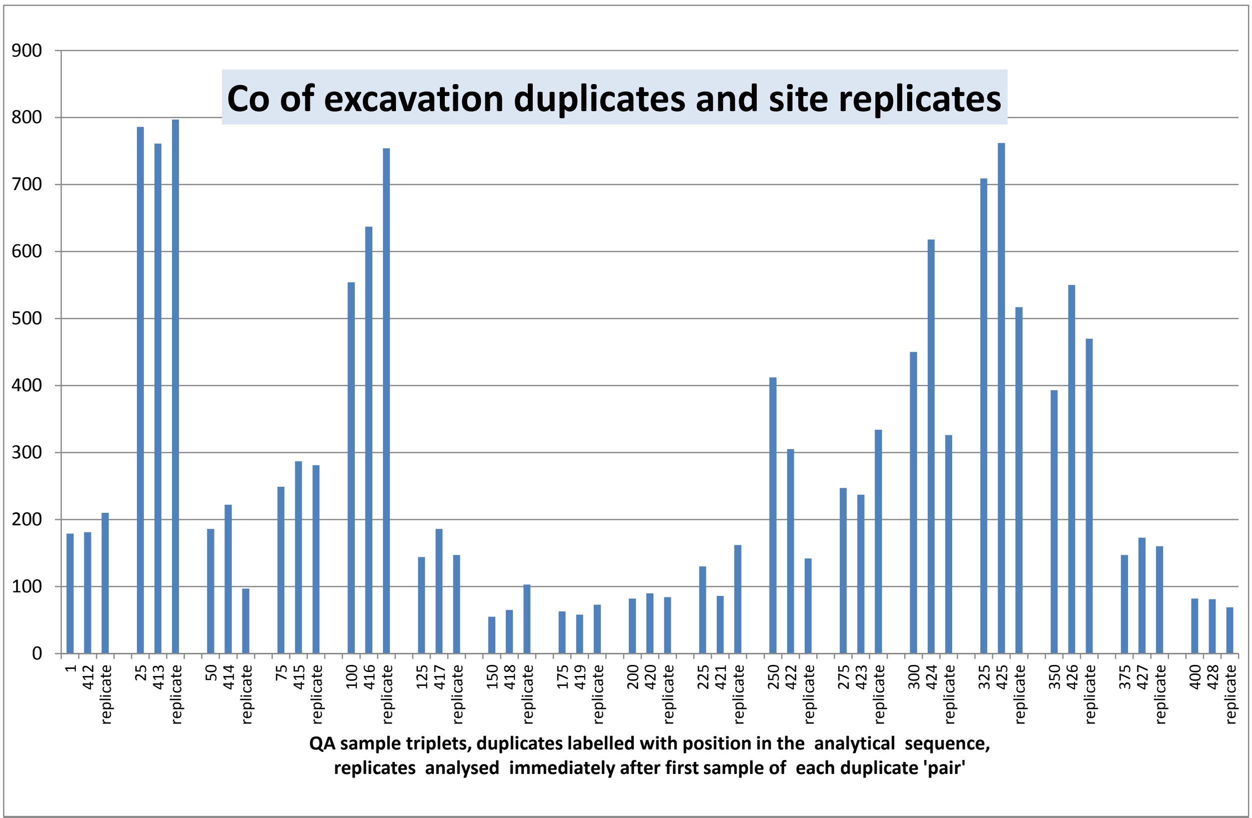


Figure 3A
Enzyme leach extraction values of Cl and V for sample excavation duplicates and the site replicate at each QA site (every 25th sample along line)



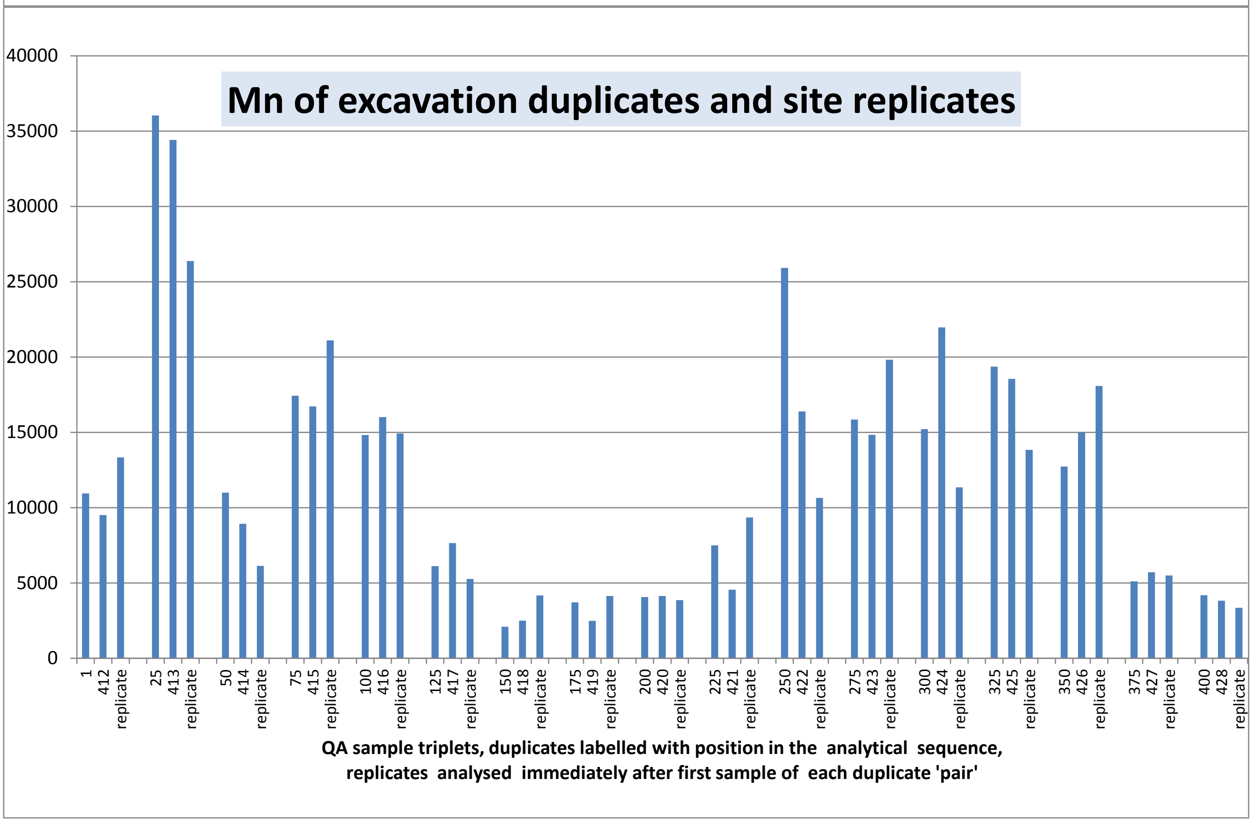
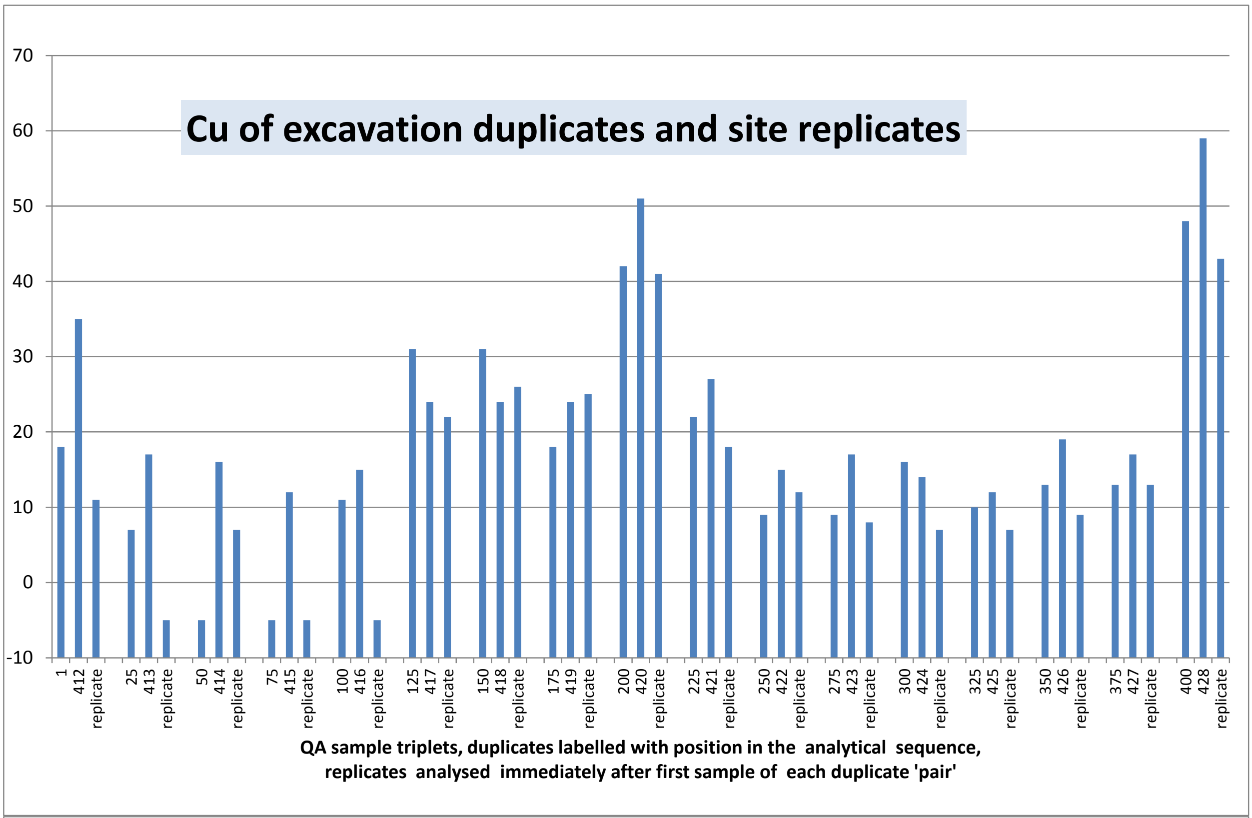


Figure 3B
Enzyme leach extraction values of Co and Mn for sample excavation duplicates and the site replicate at each QA site (every 25th sample along line)



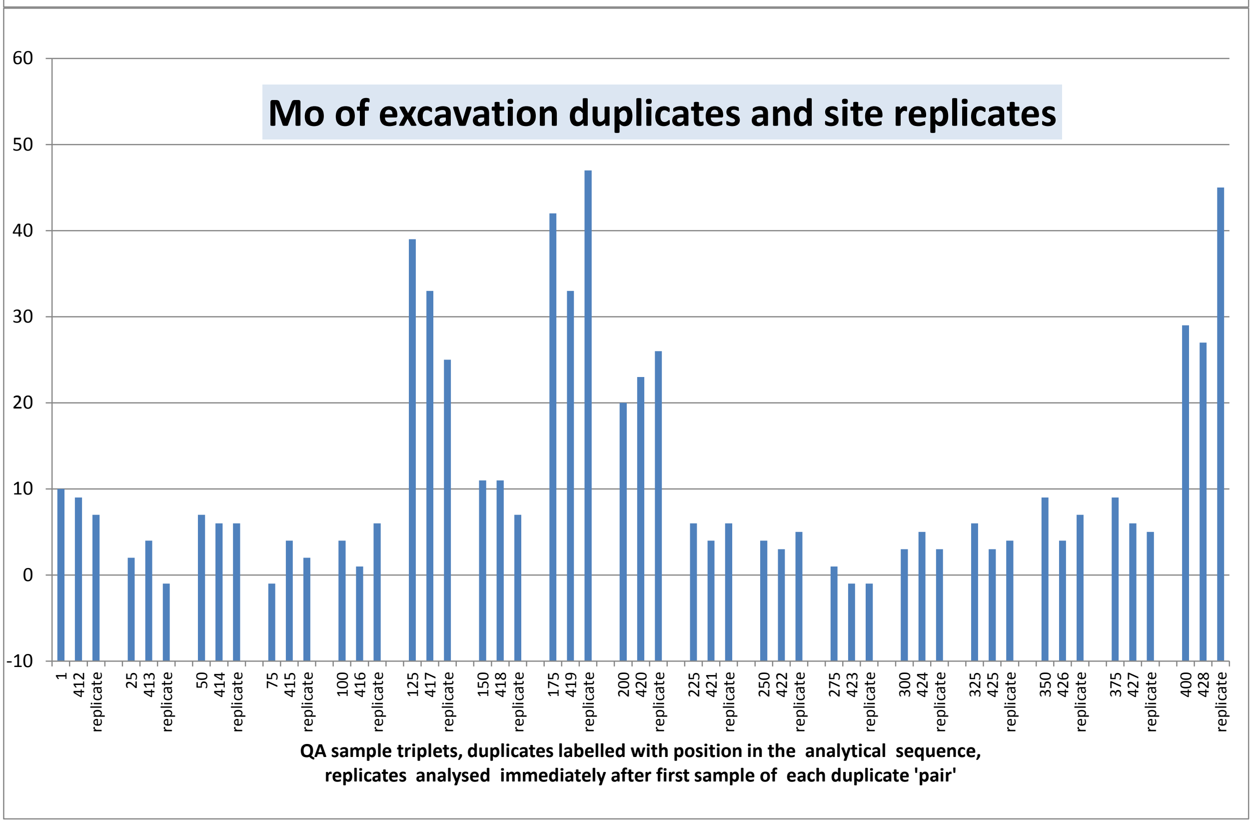
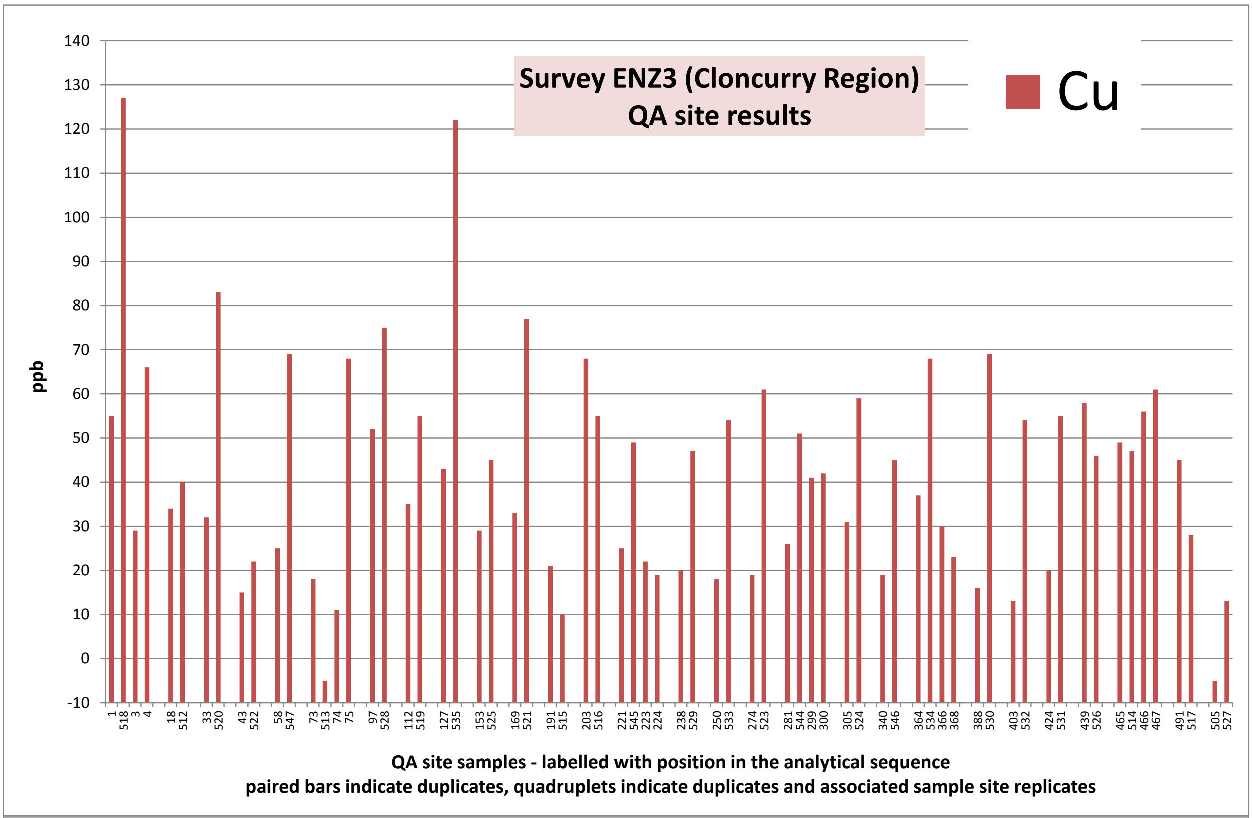


Figure 3C
Enzyme leach extraction values of Cu and Mo for sample excavation duplicates and the site replicate at each QA site (every 25th sample along line)



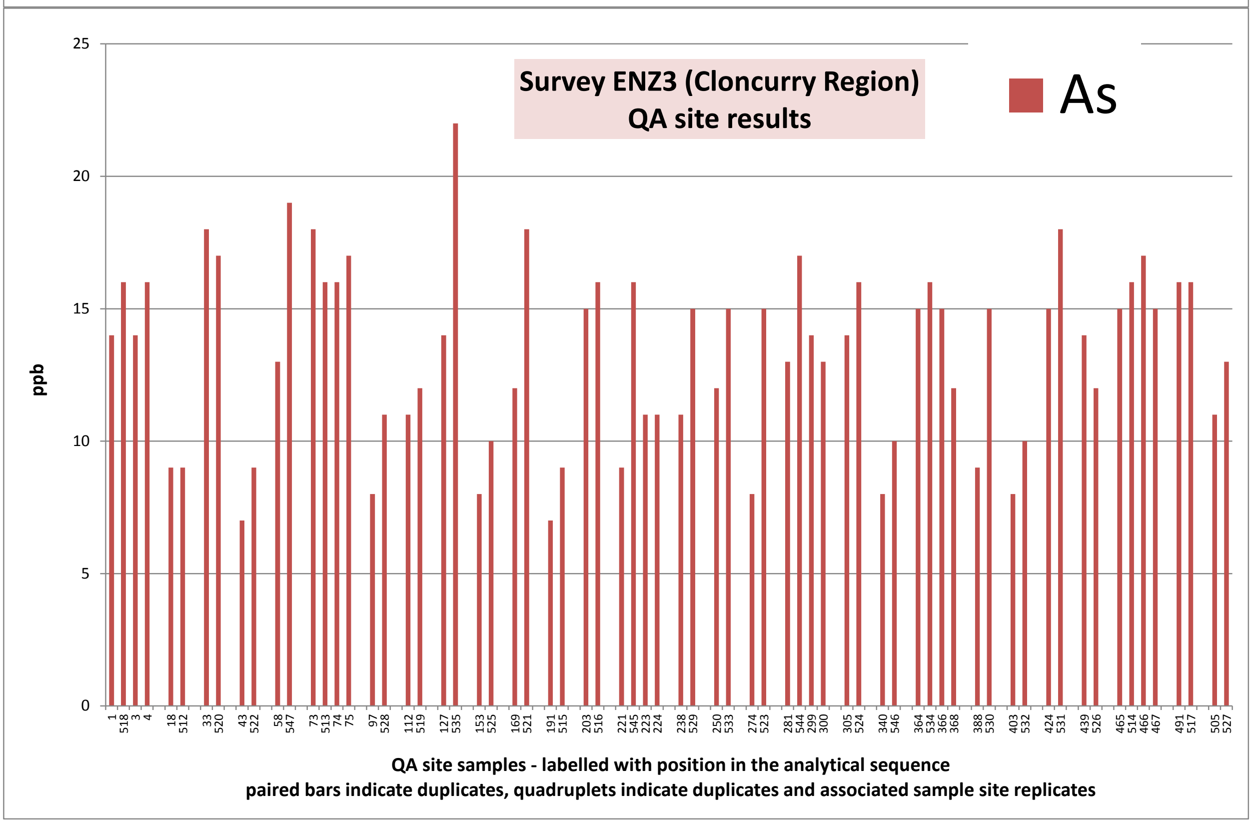


Figure 4
Enzyme Leach extraction values of Cu and As for sample intra-excavation duplicates and replicated excavations at each QA site; note that duplicates were all analysed at the end of the batch (randomised order)

GEOMORPHOLOGY, SOILS AND TM SIGNATURES

The area covered by the ENZ6 grid can be divided into 3 landscapes, each of which has a distinctive satellite TM signature that reflects the dominant soil type, the nature of the vegetation community, and the landscape's general geomorphological character.

Black Soil Plain

Black soil plains are characterised by extensive grass-covered, treeless flats with very slight gradients to major E-W trending drainages. They are mantled by grey-brown smectitic cracking soils, the clay matrix of which cements laminated silty sands of alluvial origin. These are classic “black soil plains” and commonly have a hummocky micro-relief (*i.e.*, gilgai). A dispersed lag of rounded and reddened chalcedonic silica and quartz pebbles is a common feature, with similar clasts observed within the black soil itself. The cracking black soil can be described as stony at some locations, particularly in swaley flow zones and within about 500m of major creeks.

The black soil plains have a distinctive pale blue-grey, smooth-textured Landsat TM signature (*i.e.,* relatively high albedo). Local pale yellow areas with a reticulate or ribbed texture correspond to sandier equivalents in the overbanks of major creeks, gullied areas and ephemeral flow zones. The breakdown of black soil to sand in eroding areas demonstrates how black soil develops on and within the clastic sand substrate, as it does in the Cloncurry region.

Refer to Drawing 44625 for sample locations defined by soil type on a Landsat TM backdrop.

Sandy Plains and Pediments

Sandy plains and pediments are characterised by horizontal to gently inclined (<1% slope) flats mantled by red-orange to red-brown sandy soils. The soils are quartz rich, locally pebbly, friable and relatively clay-poor. A thin, scattered lag of subangular quartz pebbles on an otherwise smooth pavement is common. Low bushes and kerosene grass covered much of the landscape at the time of the survey (turpentine, pea bush, conker berry, acacia). Clumps of 3 to 8m high trees occur sporadically throughout the scrub (gidgee, mulga, snappy gums and carbine gums).

The sandy soils, described in the field as either sand or silty sand, appear to have developed in older alluvium and sheet-flood sands eroded from the retreating low-hills landscape (next section). Slightly elevated areas within a few hundred metres of outcrop can be reasonably classified as pediment. Subcrop occurs locally in these areas on broad knolls (relief <3m).

The Landsat TM signature of this landscape is dominated by dark brown-reds and a speckled texture. Cross-cutting and sinuous ENE-trending zones with a pale brown signature comprise sands with poor soil development, and correspond to old over-bank deposits of Mingera, Yaringa and Big Toby Creeks.

Low Hills

This landscape subdivision applies to areas of rounded hills with up to 30m of relief. A mantling of angular siliceous talus is common beneath local Proterozoic outcrop ridges, otherwise the regolith is best described as colluvial gravel and sand, giving way downslope to sandy plains. The gravels have a red-brown fine sand or silty sand matrix, and are vegetated sparsely by grasses, spinifex and 3-5m high snappy gums.

Subcropping and outcropping areas of this landscape unit have a distinctive mottled, dark brown to mid-grey, Landsat TM signature.

INFLUENCE OF SOIL TYPE ON ENZYME LEACH RESPONSE

A geologist in each of the three 2 man sample crews was responsible for the recording of field observations. After 1 or 2 days sampling, a simple soil classification scheme was agreed upon and applied without change throughout the rest of the survey. Consistency of observation and recording facilitated further simplification of the classification scheme after some first pass data analysis (Table 4).

Table 4: Soil Type Classification Scheme

Field Classification	Intermediate classification for statistical analysis	# of Samples	Final classification used for maps
Black soil	Black soil	66	Black soil
silty sand	sand (silt)	227	Sandy soil
sand loam	sand	59	
silty (gravel) sandy gravel	gravel (sand)	61	Gravel
gravel	gravel	13	

This approach enabled us to break down all subsequent analyses of the data on the basis of soil type. For the first time, we were able to rigorously test whether soil properties influence the degree to which different metals are extracted by the enzyme leach.

High Dependence on Soil Type

The metals with leachabilities that display a clear dependence on soil type include:

- **Mn, Co** - systematically low in black soil samples (refer to Fig.5 of page 23 and Map 44632); and
- **V** - high in black soil, and distinctly higher in sandy soil samples than gravel samples (Fig.6 of page 24 and Map 44628).

Moderate Dependence on Soil Type

Slighter weaker, though easily discernible and quantifiable dependencies on soil type are demonstrated by:

- **Mo, As** - similar patterns to V, though the differences are not as well pronounced (Figs. 6 and 7; Maps 44629 and 44633);
- **Fe** - slightly elevated median value in black soils, and correspondingly lower median value in gravel relative to sandy soil. Distinct lack of values above the 90th percentile in gravel compared to sandy soil (Fig. 7 and Map 44627); and

- **Cu** - distribution pattern is transitional to those of Fe and Mo-As. Note how a discrepancy between the mean and median Cu values distinguishes black soil Cu from black soil Mo, As, V, Co and Mn (Fig.8, page 26, and Map 44626), suggesting the possibility of statistically significant Cu anomalies.

Independent of Soil Type

A notable lack of dependency on soil type is demonstrated by:

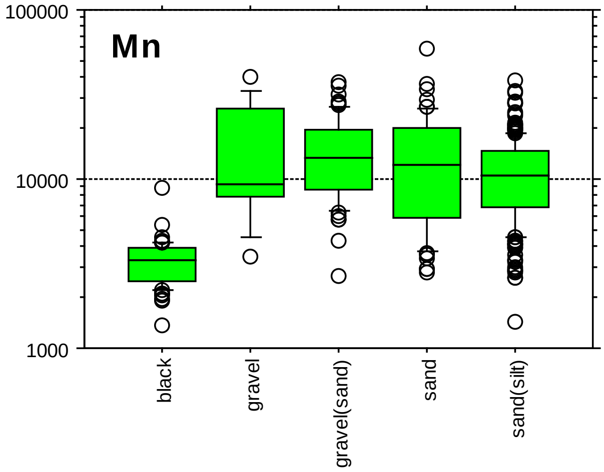
- **Zn** - although a lack of anomalous values beyond the 75th and 90th percentiles is noted for gravel samples (Fig.8);
- **Pb, Zr** - although the black soil Zr median value is slightly elevated, perhaps in response to Fe analytical interference (Fig.9, page 27, and Maps 44630 and 44631, respectively); and
- **Br, Cl, and U** - species normally associated with the so-called *oxidation suite* (Fig.10, page.28 and 1:100000 Maps 44618 and 44623).

Summary

Gravel has consistently lower enzyme leachable Fe and V contents than black soil and sandy soil. Black soil samples are distinguished by low extractable Mn and Co and consistently elevated V, As, Mo and, to a lesser degree Cu. These differences are discussed later in the context of metal-Mn relationships.

Significant exceptions to the above patterns are samples from southernmost 4 lines of the grid. Though classified as sand, these samples share some of the distinctive features of black soil; viz elevated Fe, Mo, As, V and relatively depleted Mn and Co.

Box Plot
Grouping Variable(s): Soil Type
Inclusion criteria: Criteria 1 from ENZ6.SVD



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Mn, Total	11163.228	7818.076	426	1369.000	59493.000	0	9735.000
Mn, black	3329.545	1045.906	66	1369.000	8775.000	0	3310.500
Mn, gravel	15766.308	11752.628	13	3492.000	40663.000	0	9275.000
Mn, gravel(sand)	15152.557	8055.878	61	2645.000	37630.000	0	13466.000
Mn, sand	14131.610	10466.825	59	2798.000	59493.000	0	12048.000
Mn, sand(silt)	11333.709	6015.281	227	1450.000	38102.000	0	10544.000

Box Plot
Grouping Variable(s): Soil Type
Inclusion criteria: Criteria 1 from ENZ6.SVD

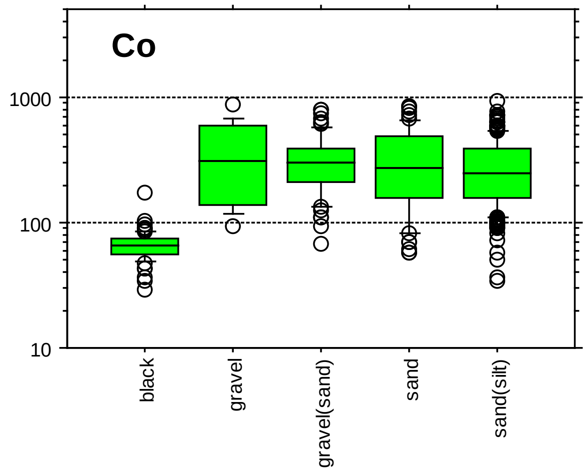


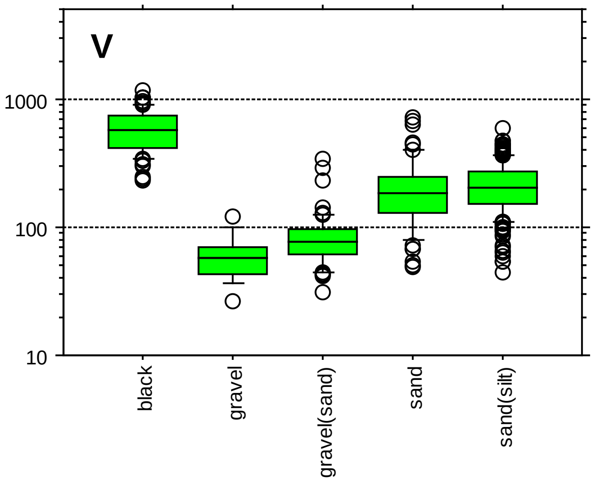
Fig.5

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Co, Total	267.880	188.003	426	29.000	917.000	0	226.000
Co, black	66.955	20.084	66	29.000	175.000	0	64.500
Co, gravel	364.231	249.608	13	92.000	869.000	0	305.000
Co, gravel(sand)	322.607	168.961	61	67.000	797.000	0	302.000
Co, sand	330.407	222.252	59	58.000	856.000	0	271.000
Co, sand(silt)	289.824	167.782	227	34.000	917.000	0	249.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997

Box Plot
Grouping Variable(s): Soil Type
Inclusion criteria: Criteria 1 from ENZ6.SVD



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
V, Total	252.115	198.351	426	26.000	1171.000	0	195.000
V, black	597.758	215.875	66	228.000	1171.000	0	578.500
V, gravel	61.077	25.128	13	26.000	120.000	0	57.000
V, gravel(sand)	86.967	52.665	61	31.000	339.000	0	76.000
V, sand	214.000	139.565	59	49.000	709.000	0	183.000
V, sand(silt)	216.846	93.997	227	44.000	593.000	0	202.000

Box Plot
Grouping Variable(s): Soil Type
Inclusion criteria: Criteria 1 from ENZ6.SVD

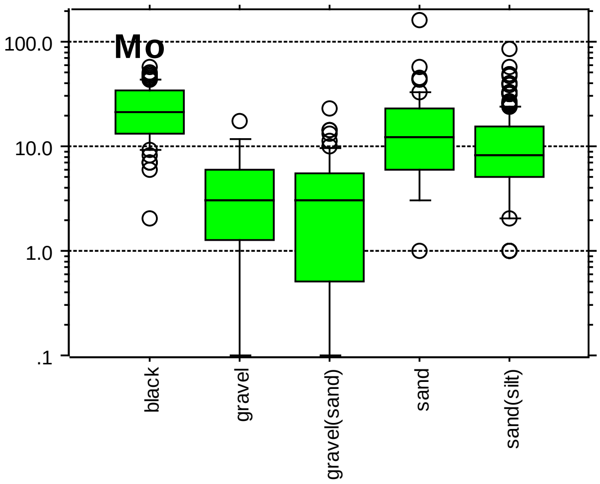
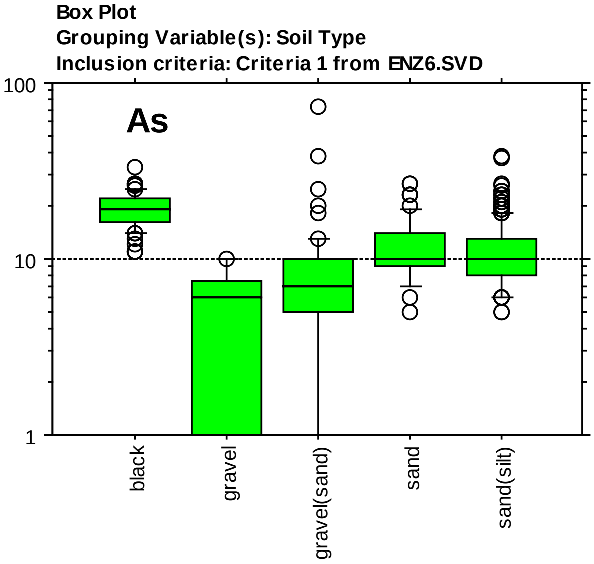


Fig.6

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Mo, Total	12.641	14.108	426	-1.000	158.000	0	9.000
Mo, black	23.894	12.995	66	2.000	57.000	0	21.000
Mo, gravel	4.462	5.093	13	-1.000	17.000	0	3.000
Mo, gravel(sand)	3.836	4.677	61	-1.000	23.000	0	3.000
Mo, sand	17.254	22.522	59	-1.000	158.000	0	12.000
Mo, sand(silt)	11.004	10.880	227	-1.000	85.000	0	8.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
As, Total	11.516	7.844	426	-5.000	73.000	0	11.000
As, black	19.242	4.239	66	11.000	33.000	0	19.000
As, gravel	3.538	6.132	13	-5.000	10.000	0	6.000
As, gravel(sand)	7.607	11.612	61	-5.000	73.000	0	7.000
As, sand	11.322	6.271	59	-5.000	27.000	0	10.000
As, sand(silt)	10.828	6.079	227	-5.000	38.000	0	10.000

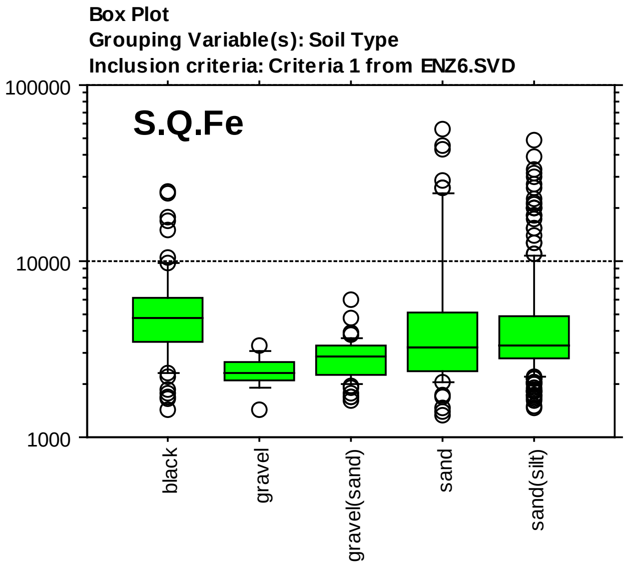
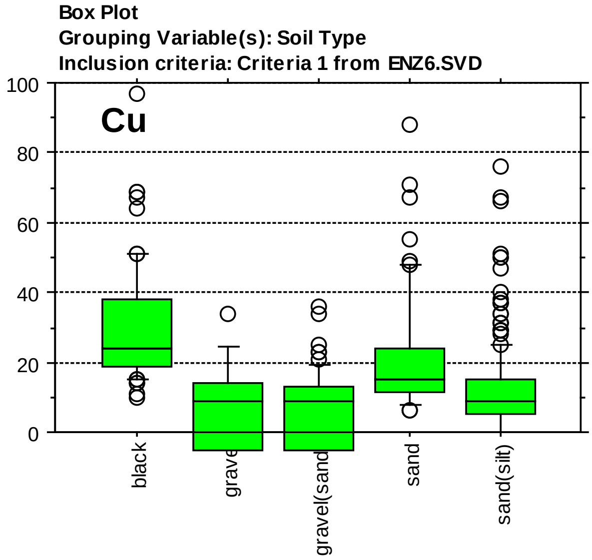


Fig.7

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
S.Q.Fe, Total	5349.054	6699.343	426	1321.000	55838.000	0	3276.000
S.Q.Fe, black	5907.667	4618.124	66	1425.000	24784.000	0	4706.000
S.Q.Fe, gravel	2394.462	484.276	13	1448.000	3335.000	0	2334.000
S.Q.Fe, gravel(sand)	2878.607	781.847	61	1611.000	6010.000	0	2904.000
S.Q.Fe, sand	7240.271	11306.828	59	1321.000	55838.000	0	3213.000
S.Q.Fe, sand(silt)	5528.159	6486.578	227	1452.000	49140.000	0	3333.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Cu, Total	14.559	16.140	426	-5.000	97.000	0	12.000
Cu, black	29.879	16.604	66	10.000	97.000	0	24.000
Cu, gravel	8.308	11.707	13	-5.000	34.000	0	9.000
Cu, gravel(sand)	7.820	9.708	61	-5.000	36.000	0	9.000
Cu, sand	20.814	18.023	59	-5.000	88.000	0	15.000
Cu, sand(silt)	10.648	13.648	227	-5.000	76.000	0	9.000

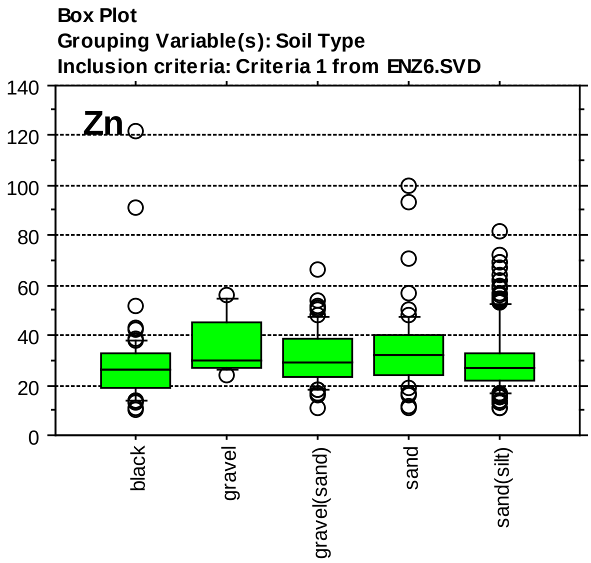
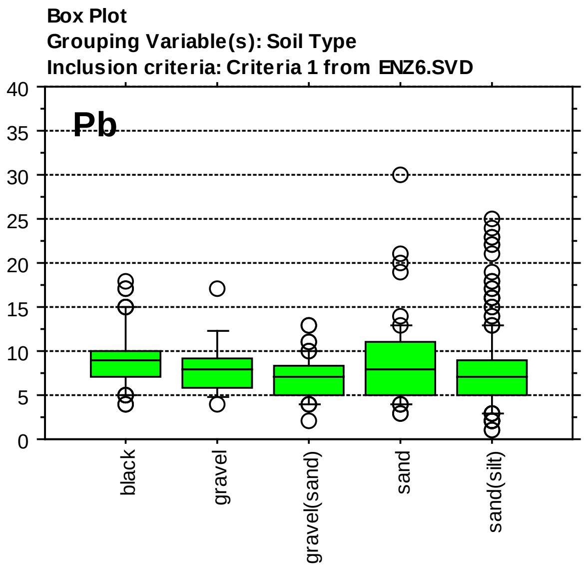


Fig.8

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Zn, Total	30.610	13.993	426	-10.000	122.000	0	27.000
Zn, black	27.985	17.225	66	-10.000	122.000	0	26.500
Zn, gravel	35.538	11.392	13	24.000	56.000	0	30.000
Zn, gravel(sand)	31.607	11.179	61	11.000	66.000	0	29.000
Zn, sand	34.288	15.960	59	11.000	100.000	0	32.000
Zn, sand(silt)	29.868	13.027	227	11.000	82.000	0	27.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Pb, Total	7.915	4.192	426	-1.000	30.000	0	7.000
Pb, black	9.167	3.326	66	4.000	18.000	0	9.000
Pb, gravel	8.231	3.370	13	4.000	17.000	0	8.000
Pb, gravel(sand)	7.082	2.283	61	2.000	13.000	0	7.000
Pb, sand	8.678	4.953	59	3.000	30.000	0	8.000
Pb, sand(silt)	7.559	4.545	227	-1.000	25.000	0	7.000

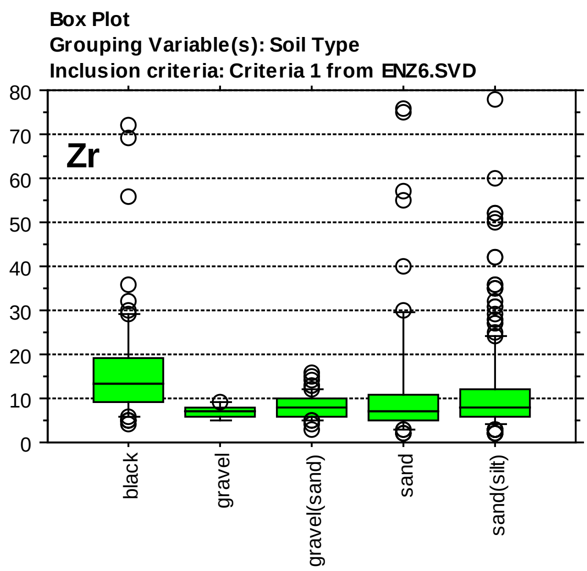
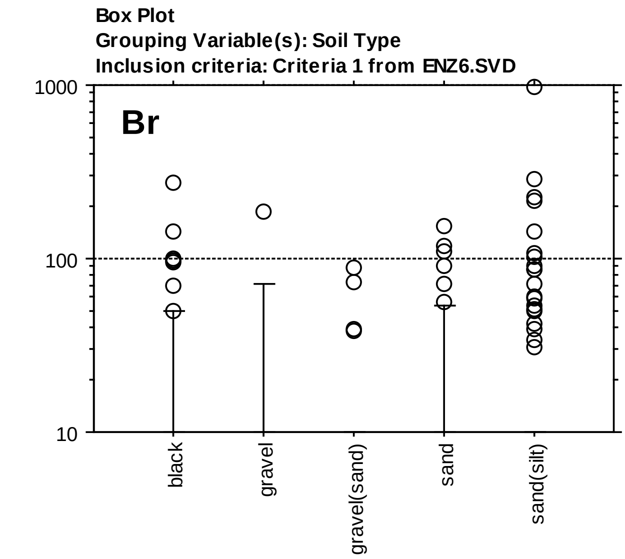


Fig.9

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Zr, Total	11.758	11.487	426	2.000	78.000	0	8.000
Zr, black	16.939	12.986	66	4.000	72.000	0	13.500
Zr, gravel	6.923	1.441	13	5.000	9.000	0	7.000
Zr, gravel(sand)	8.279	2.835	61	3.000	16.000	0	8.000
Zr, sand	12.644	16.246	59	2.000	76.000	0	7.000
Zr, sand(silt)	11.233	10.803	227	2.000	78.000	0	8.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997



	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
Br, Total	-14.941	63.379	426	-30.000	965.000	0	-30.000
Br, black	-10.106	52.493	66	-30.000	272.000	0	-30.000
Br, gravel	-7.846	61.355	13	-30.000	185.000	0	-30.000
Br, gravel(sand)	-24.098	23.180	61	-30.000	89.000	0	-30.000
Br, sand	-12.102	43.086	59	-30.000	153.000	0	-30.000
Br, sand(silt)	-15.031	76.863	227	-30.000	965.000	0	-30.000

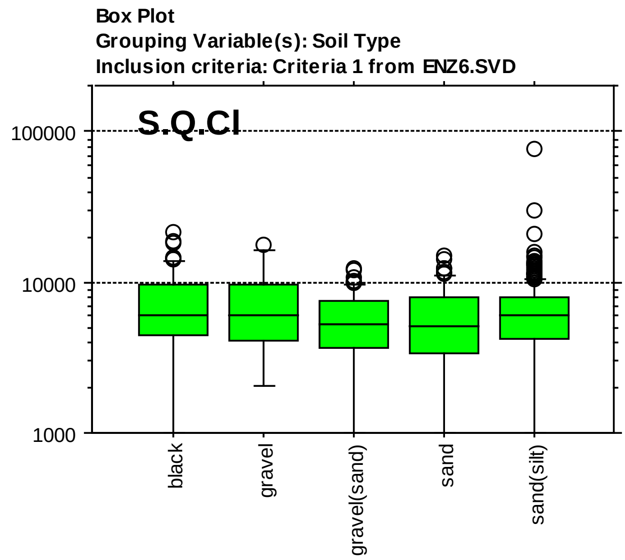


Fig.10

	Mean	Std. Dev.	Count	Minimum	Maximum	# Missing	Median
S.Q.Cl, Total	5751.150	5850.928	426	-3000.000	75323.000	0	5884.500
S.Q.Cl, black	6360.348	5572.785	66	-3000.000	21405.000	0	6056.000
S.Q.Cl, gravel	7073.923	5368.577	13	-3000.000	17459.000	0	5946.000
S.Q.Cl, gravel(sand)	4577.803	4354.423	61	-3000.000	12424.000	0	5278.000
S.Q.Cl, sand	5014.814	4608.641	59	-3000.000	14892.000	0	5065.000
S.Q.Cl, sand(silt)	6004.960	6530.152	227	-3000.000	75323.000	0	6068.000

Summary Statistics of soil enzyme leached metal (in ppb)

Mongoona Project, grid ENZ6, Sept.1997

ANALYTICAL INTERFERENCE EFFECTS

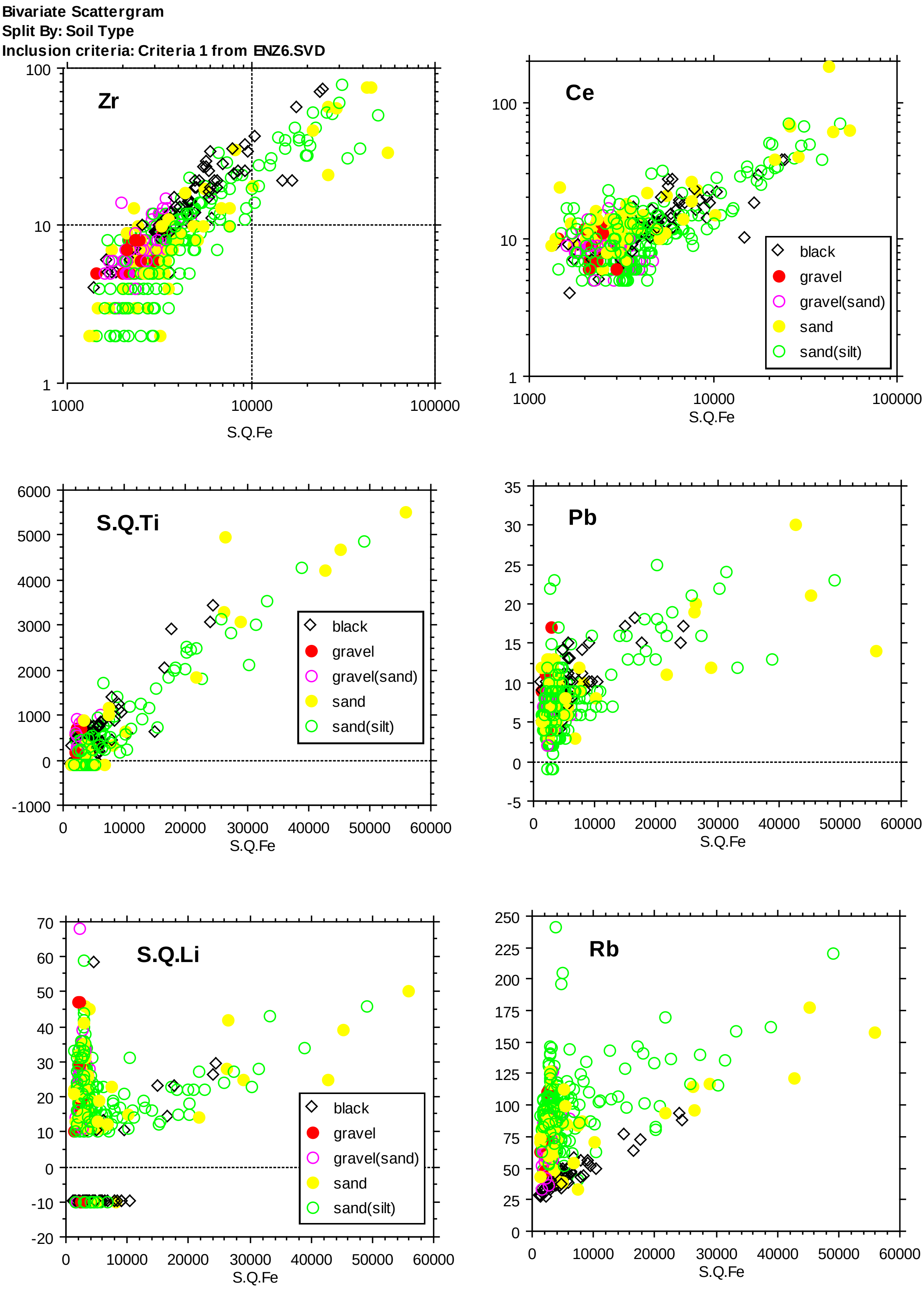
Strong correlations are noted between semi-quantitatively measured Fe and high field-strength elements such as Ti, Zr and Ce (refer first 3 plots of Figure 11, page 30). A weaker, though probably significant, correlation is also observed between Pb and Fe (also Fig.11).

Similar correlations are present in many of our enzyme leach datasets, irrespective of soil type and country of origin. They were also noted in the enzyme leach data of soils and regolith materials investigated as part of AMIRA Project P409 (Butt *et al.*, 1997).

After discussing the correlations with Dr. Robert Clark, Manager of Enzyme Actlabs, it seems likely that interferences within the sample plasma during mass spectrometric analysis are responsible. However, Dr Clark is adamant that a simple Fe-interference effect is unlikely, and the problem is probably caused by the formation of unspecified polyatomic charged species in the plasma which mimic the behaviour of ionised metal atoms (*e.g.*, Ti-oxide 'interfering' with Cu and Zn). The occurrence of both Fe-independent and Fe-controlled trends in the Li, Rb, V, Pb and Cu plots of Figures 11 and 12 suggest that the problem does not extend to the transition metals and the alkali earth groups of elements.

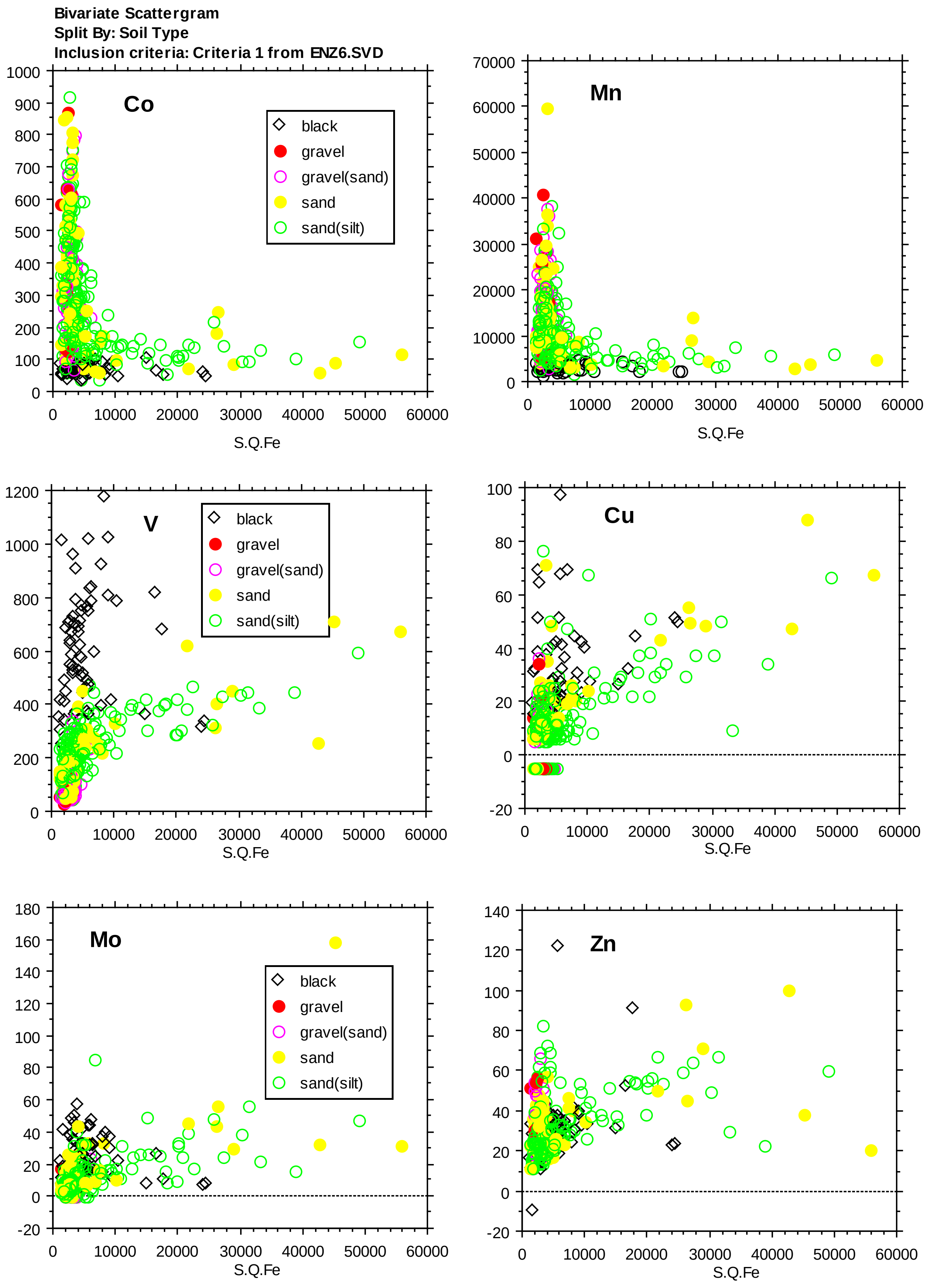
Some elements, such as Cu, may also be sensitive to minor fluctuations or drift in plasma temperature during a day's operation. ACTLABS is apparently developing quality control procedures and software to measure and counter such an effect.

Clearly, great care is required when evaluating anomalies in metals subject to possible analytical interferences. Attention is drawn in particular to Zr and Pb, as they are regarded as potential indicators of buried major structures and orebody-intersecting faults. There is good evidence that this is indeed the case with this survey because Fe anomalous samples consistently plot near to, or on, structures interpreted from the aeromagnetics data (see later section on the identification of anomalies).



Enzyme Leachable Metal vs Fe (in ppb)
Mongoona Project, grid ENZ6, Sept. 1997

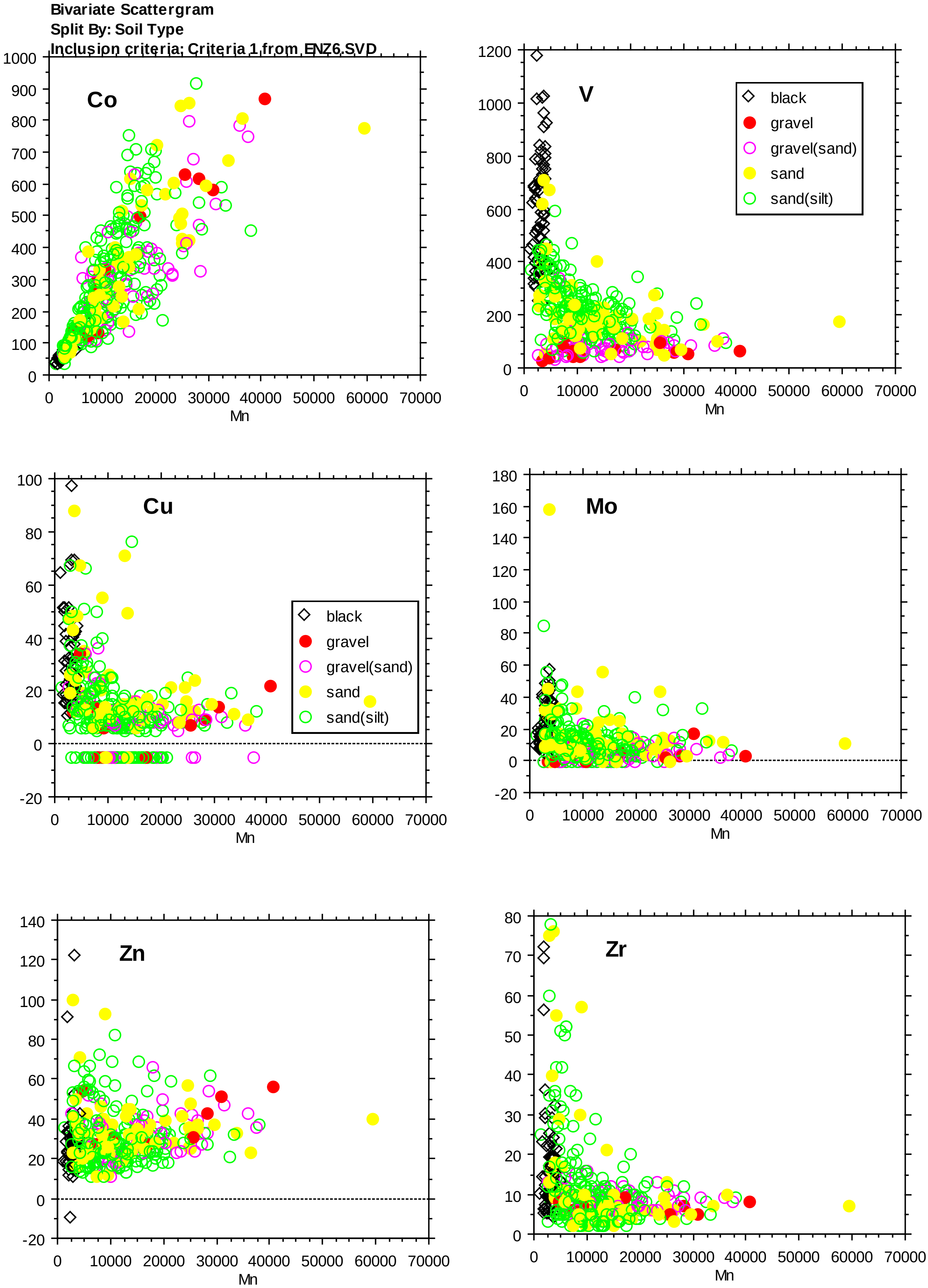
Fig.11



Enzyme Leached Metal vs Fe (in ppb)

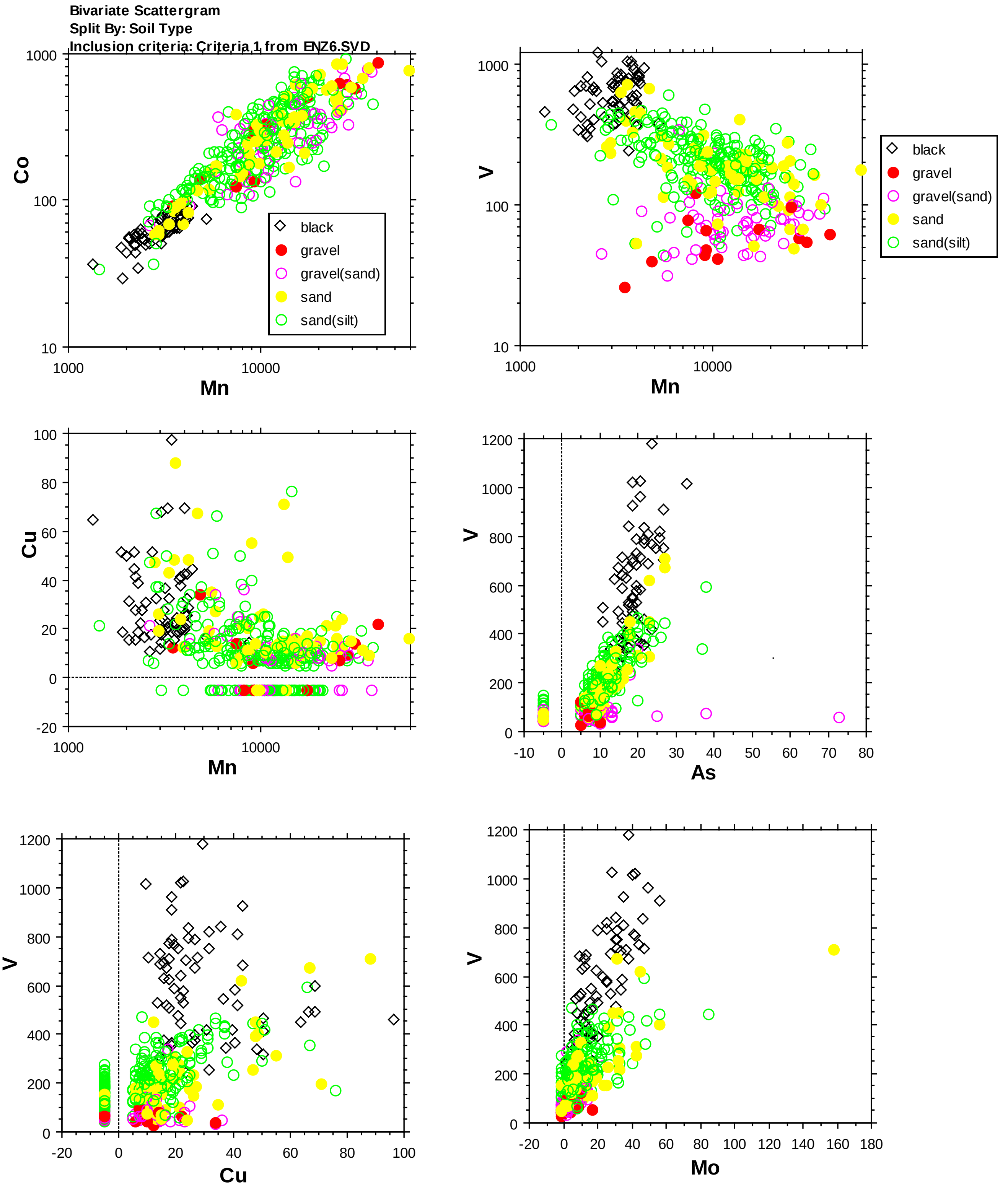
Mongoona Project, grid ENZ6, Sept. 1997)

Fig.12



Enzyme Leachable Metal vs Mn (in ppb)
Mongoona Project, grid ENZ6, Sept. 1997

Fig.13



Enzyme Leachable Metal vs Mn (in ppb)
Mongoona Project, grid ENZ6, Sept. 1997

Fig.14

SIGNIFICANT METAL ASSOCIATIONS

Co - Mn

A consistent positive linear correlation is observed between Co and Mn for all soil types (Fig.13, page 32). As discussed earlier, maximum and minimum abundances occur in gravel and black soil samples, respectively. This association is emphasised in the equivalent log-log plot of Figure 14 (pg.33). The strong co-linearity of Mn and Co suggests that the same mineral phase(s) control extractable Co and Mn in all 3 soil types.

V, As, Mo, (Cu) - Mn

V, As and Mo in black and sandy soil samples display a clear negative hyperbolic relationship to Mn (Fig.13). On the equivalent log-log plot the relationship is negative linear (Fig.14). A similar pattern is observed for As and Mo in gravel samples, but by contrast, the V-Mn association in gravel is weakly positive linear (Figs.13 and 14).

Evidently, the mineral(s) which control leachable Co in all soil types also control V in the gravels. By contrast, V, and also As and Mo, are preferentially accessible to the enzyme leach in black soil, less so in sandy soils, and least accessible in the ¼ mm fraction of gravels developed in the vicinity of outcrop.

The distinctive hyperbolic metal-Mn trend cannot be a result of the simple physical mixing of two soil *end members* (*viz.,* black soil and red sandy soil). Such a trend is more likely to be the result of the *process* by which black soil develops from an alluvial sand precursor, and which is expressed mineralogically by an increasing abundance of cation exchangeable clay or perhaps soluble salt in the transition from sand to well-developed black soil.

IDENTIFICATION OF ANOMALIES

A series of 1:200000 scale maps at the back of this report display the enzyme leach results for several metals according to soil type. Readers are referred to the 1:100000 series if a comparison with unclassified data is required (see Table 3, page 4). Plotting by soil type sharpened spatially coherent anomalies in metals such as Cu and As, and filtered out soil-induced artifacts, especially in the case of V.

Backdrops for the geochemical data include images of Landsat TM, aeromagnetic and radiometric data.

Copper (Map 44626)

- A seven station anomaly is situated in the middle of the grid, within black soil, on line 7708000mN. The aeromagnetics image indicates that this 3 km wide feature is bisected by the Mongoona Fault, and is located on a major ENE-trending discontinuity in the total magnetic intensity pattern. It is rated as a high priority target.

  A follow-up enzyme leach survey consisting of three or four, 200 metre-spaced lines with a 100m sample spacing may delineate more restricted, possibly offline drill targets, perhaps in combination with geophysical testing to pinpoint significant structures (gravity or ground magnetics). Alternatively, we could test the anomaly immediately for evidence of buried copper mineralisation with two, possibly three drill holes.

- A cluster of Cu-anomalous gravel samples occurs between lines 7695000 and 7697000mN. Here, outcropping weathered and folded Gunpowder Formation rocks form an elongate belt of low hills in a major, hook-shaped bend in Yaringa Creek. The exposed shale is oxidised (blood red-coloured). Patches of earthy hematite/goethite occurs amongst small outcrops on the main hill crest.

  Given that this area is also situated at the intersection of the Mongoona Fault and a major discontinuity in the magnetics pattern (NE-trending), it is recommended that we rock chip the hill for base metals and check the results of historical drilling.

- A 4 station, discontinuous enzyme leach Cu anomaly is situated on the southern-most line of the grid (7669000mN). The Mongoona Fault at this location appears to break-up into at least 3 structures southward, and there is a suggestion in the magnetics image of folding in the vicinity of the fault splays. Three out of the four samples are also Mo, As, V, Fe and Pb-anomalous, suggesting relatively shallow, structurally controlled sources.

  As discussed earlier, the sandy soils of this area have a multi-element enzyme leach response distinct from sands on the rest of the grid. They are also located on a major NE-trending magnetics discontinuity (see Geomag map 14428 and Target map 14521, Brisbane Office Library). Accordingly, it is ranked as a high priortiy target, and can probably be tested by drilling without additional enzyme leach sampling.

Other, single station, Cu anomalies are located mostly in the vicinity of interpreted structures. They are not recommended for immediate follow-up, but need to be examined in the context of other available information (geophysical, previous drilling *etc.*).

Iron (Map44627)

- One or two-station Fe anomalies occur on 7 out of the 11 northernmost lines very near, or on, the interpreted position of the Mongoona Fault. This feature is best demonstrated in the group of 7 lines which straddle a transition from red sandy soil to black soil between 7717000 and 7723000mN.

- Fe-anomalous samples in the southern part of the grid also occur mostly in the vicinity of interpreted faults. For example, on the 3 southernmost lines they occur on Geomag linears (refer to Map 44626 for a clearer display of Geomag linears). Enzyme leachable Fe therefore seems to locally trace buried structures, with or without metals that signal possible buried mineralisation (*e.g.*, Cu, As, Mo) .

Vanadium (Map 44628)

A group of V-anomalous samples on the 3 southern-most lines are also As- and Mo-anomalous. The close spatial association of *oxidation suite* V-As-Mo and *diffusion suite* Cu in this area is consistent with a relatively shallow, structurally confined source or sources.

Arsenic (Map 44629)

See above comments, but note also a group of 5 contiguous low As-samples on the eastern half of the Cu anomaly on line 7708000mN. It could indicate the focus of an electrochemical cell, as Mo is also depleted here.

Lead (Map 44630)

The most noteworthy features of enzyme leach Pb pattern are a correspondence with As-anomalous samples on the 3 southern-most lines (as discussed in the Cu section) and a more general correspondence with Fe-anomalous samples.

Zirconium (Map44631)

See comments for Pb, but also note a statistically significant correspondence of samples with elevated Zr values in the vicinity of Mongoona Fault and lesser structures interpreted from the first derivative of the total magnetic intensity data (*i.e.*, the Geomag linears). Significantly, not all these samples are equally Fe-anomalous, suggesting that Zr values do not simply track Fe analyses due to analytical interference effects.

Molybdenum (Map44633)

Apart from the previously described anomalism on the 3 southernmost lines, there is an intriguing tendency for Mo-anomalous samples elsewhere on the grid (red and yellow symbols) to be disposed peripherally and somewhat symmetrically about the Mongoona Fault (though not on a line-by-line basis).

Chlorine (Map 44634)

As for Mo, although there is an even stronger case for gross control of Cl anomalies by major structures. Note, for example, the symmetrical patterns on the 3 northernmost lines, and the centrality of Cl anomalies on the 7 lines between 7717000 and 7723000mN. This is the same area where *other* sand and black soil samples are Fe-anomalous along the Mongoona Fault.

The combined evidence for accumulation of both *oxidation* suite elements (Cl, Mo, As) and *diffusion* suite metals in soils above the Mongoona Fault, and consequently for the existence of buried, fault-focussed electrochemical cells is very compelling.

DISCUSSION

The three most extensive enzyme leach anomalies of ENZ 6 are situated where major NE-trending structures are truncated by the NNW-trending Mongoona Fault. The Mongoona Fault itself seems to be traceable at the surface by narrow, 1 or 2 station, and sometimes complementary, anomalies in *diffusion* and *oxidation* suite elements. In the case of the southern and central anomalies recommended for follow-up as Cu targets, alluvium and Cambrian sediment cover probably exceeds thicknesses of 50m and 150m, respectively. Thus, the survey shows how coherent geochemical anomalies in transported cover and buried, regional-scale structures can be resolved by regional-scale grids.

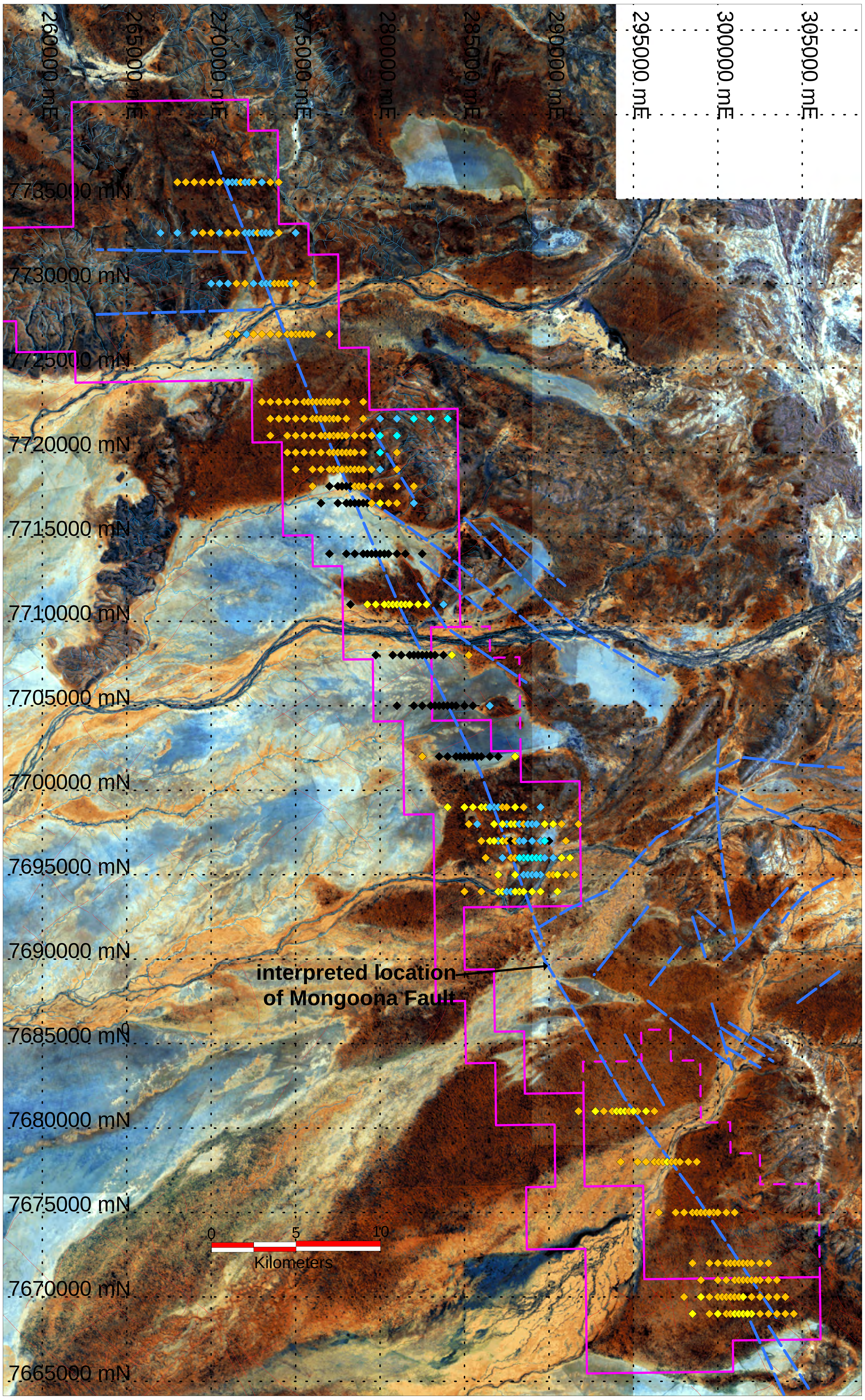
The basis for a regional approach to enzyme leach surveys is now firmly established. It is supported by documented, in-house field trials (*e.g.,*Hannan, 1996), the results of ENZ 6, and recent surveys in the Cloncurry region (ENZ 1, 3 and 4).

ENZ 6 also provides a clear example of how soil properties influence the leachability of several important metals, including V, As, Mo, Mn, and possibly Cu. Accordingly, the value of consistent field observations and TM imagery to the recognition and demarcation of different soil types has been demonstrated.

REFERENCES

Butt, C.R.M. and 10 others, 1997, Geochemical exploration in areas of transported overburden, Yilgarn Craton and environs, Western Australia: Final Report of CRCLEME-AMIRA Project 409; 2 volumes, MIMEX Brisbane library code BAM.P409 1997.Feb.

Hannan, K.W., 1996, Summary of MIMEX enzyme leach field trials: MIMEX Technical Memorandum 1996/062; 4 pp.



ENZ6_by Soil_Type

◆ black	(66)
◆ gravel	(13)
◆ gravel(sand)	(61)
◆ sand	(59)
◆ sand(silt)	(227)

Structures

Interpreted from aeromagnetics (TMI-Ian Garsed)

From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226

Date: 08-01-98

Author: KWH

Office: Brisbane

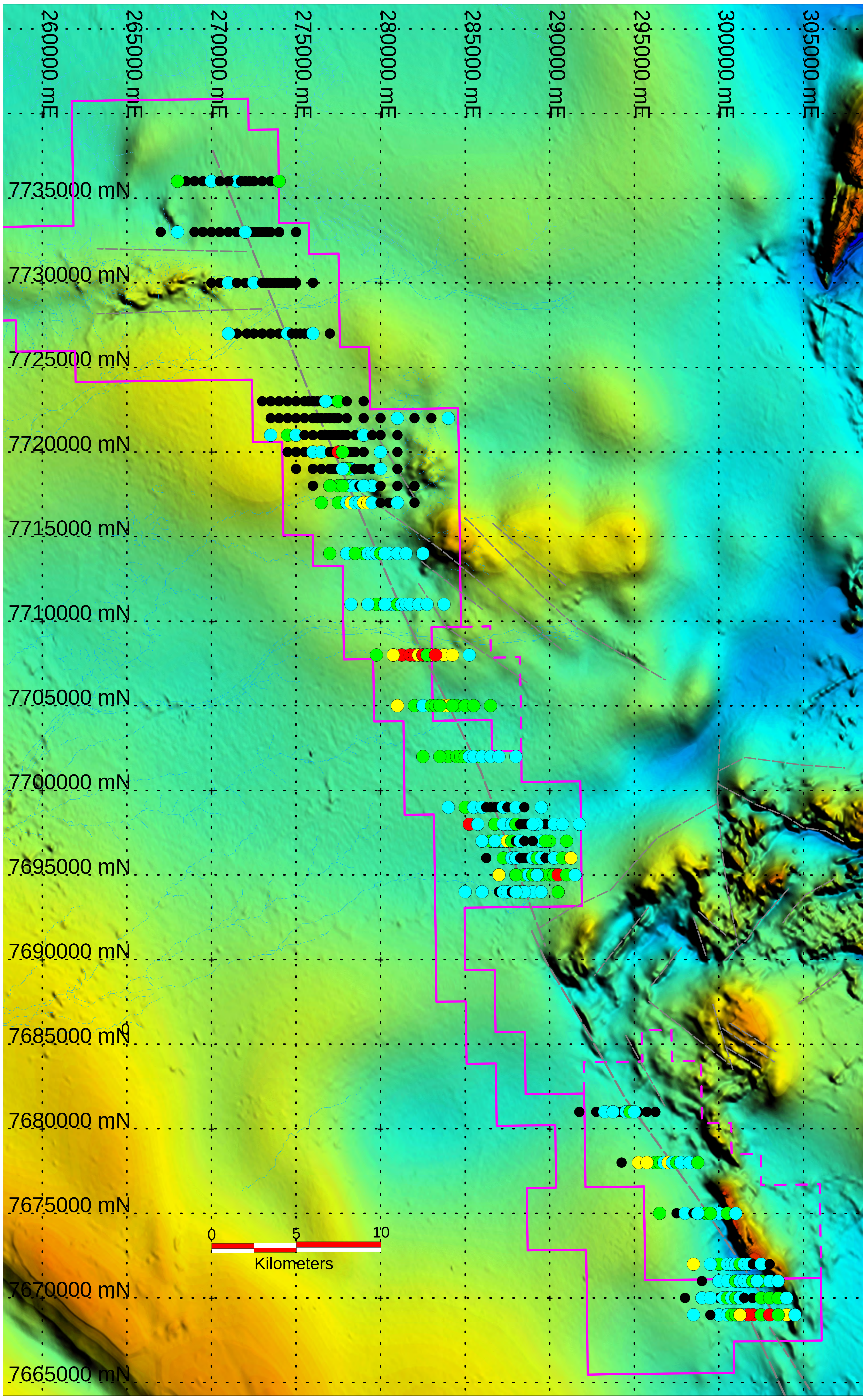
Drawing: 44625

Scale: 1:200000

Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6

Soil type at each sample site plotted on Landsat TM 123 (RGB)



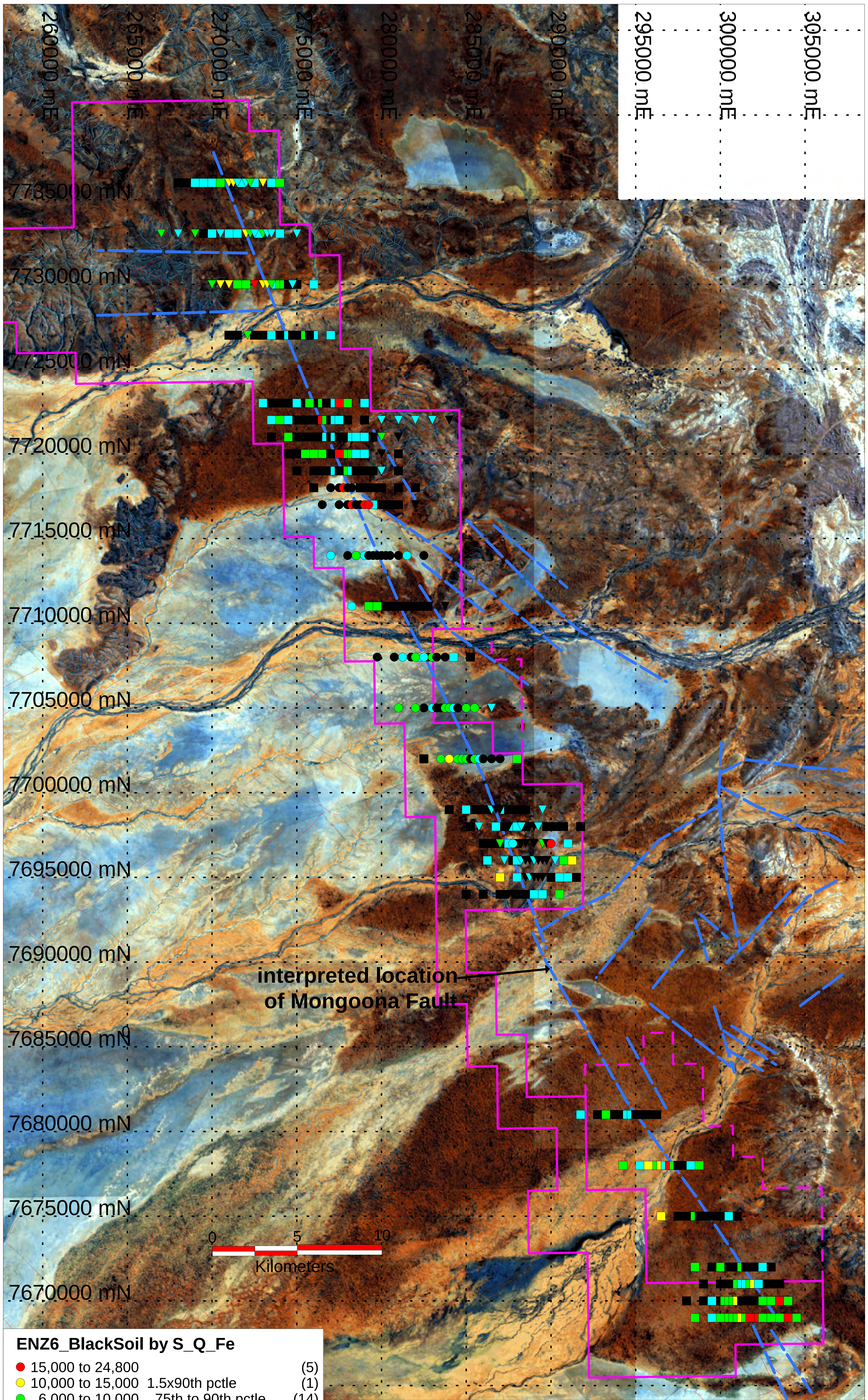
ENZ6 by Cu

- 60 to 97 (11)
- 40 to 60 (24)
- 20 to 40 (86)
- 10 to 20 (145)
- -5 to 10 (177)

MIM Exploration Pty Ltd

EPM: 11226	**Mongoona Project** **Grid ENZ6** **Cu in ppb**
Date: 20-11-97	
Author: KWH	
Office: Brisbane	
Drawing: 44626	
Scale: 1:200000	Projection: AMG 84, zone 54

Enzyme Leach Soil Assays (ppb)
Total Mag Intensity backdrop



ENZ6_BlackSoil by S_Q_Fe

15,000 to 24,800		(5)
10,000 to 15,000	1.5x90th pctle	(1)
6,000 to 10,000	75th to 90th pctle	(14)
4,700 to 6,000	median to 75th pctle	(13)
1,400 to 4,700	to median	(33)

ENZ6_Gravel by S_Q_Fe

5,250 to 6,010	(1)
3,500 to 5,250	(8)
3,200 to 3,500	(12)
2,500 to 3,200	(26)
1,440 to 2,500	(27)

ENZ6_Sandysoil by S_Q_Fe

30,000 to 55,900	(8)
20,000 to 30,000	(11)
4,800 to 20,000	(55)
3,300 to 4,800	(69)
1,300 to 3,300	(143)

Structures

Interpreted from aeromagnetics (TMI-Ian Garsed)

From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226

Date: 08-01-98

Author: KWH

Office: Brisbane

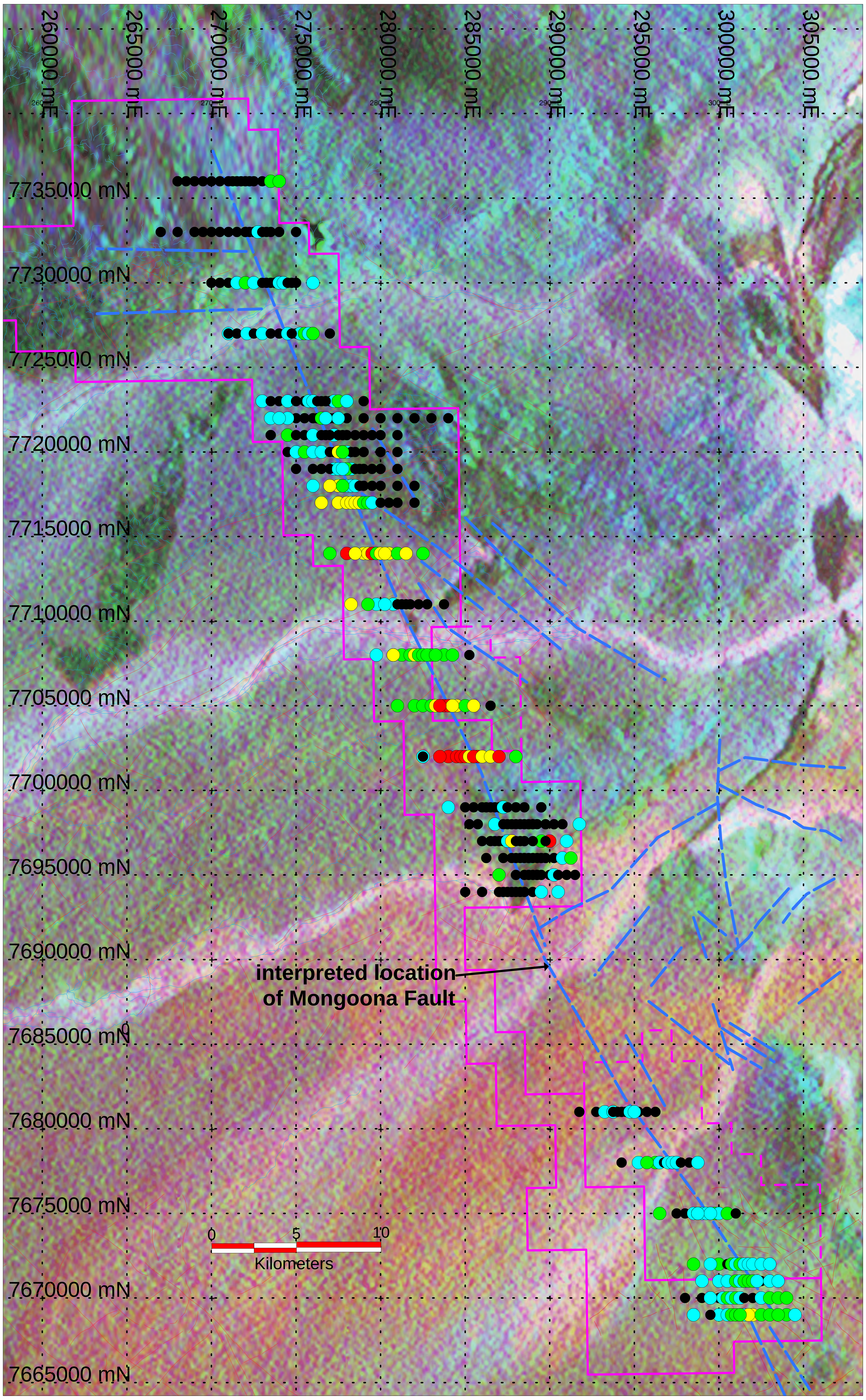
Drawing: 44627

Scale: 1:200000

Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
Fe (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6 by V

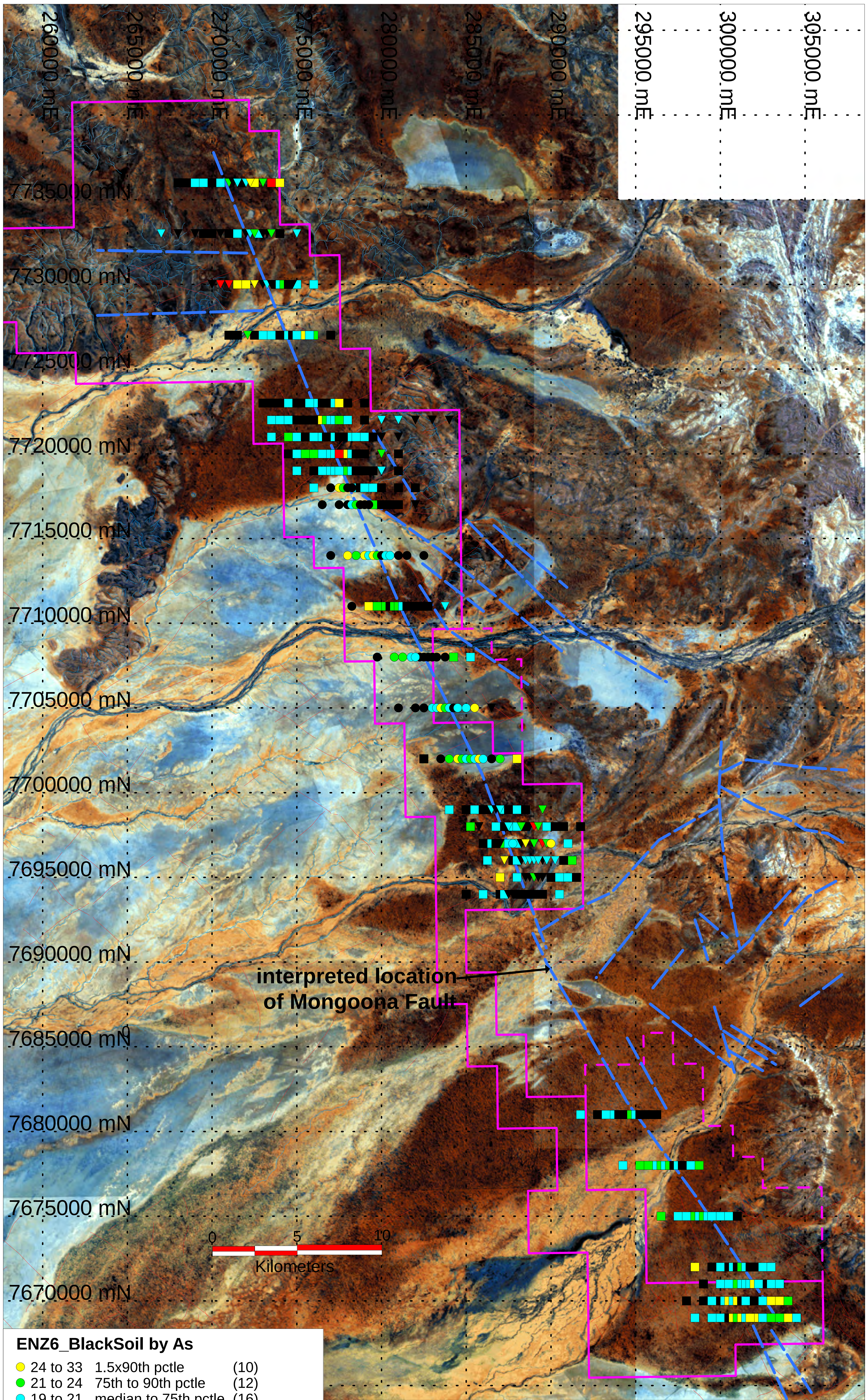
- 750 to 1,180 (16)
- 500 to 750 (32)
- 300 to 500 (69)
- 200 to 300 (96)
- 20 to 200 (230)

MIM Exploration Pty Ltd

EPM: 11226
Date: 20-11-97
Author: KWH
Office: Brisbane
Drawing: 44628
Scale: 1:100000 Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
V in ppb

Enzyme Leach Soil Assays (ppb)
On Radiometrics (RGB=KThU)



ENZ6_BlackSoil by As

- 24 to 33 1.5x90th pctle (10)
- 21 to 24 75th to 90th pctle (12)
- 19 to 21 median to 75th pctle (16)
- 11 to 19 to median (28)

ENZ6_Gravel by As

- 20 to 73 (4)
- 13 to 20 (5)
- 10 to 13 (12)
- 7 to 10 (20)
- -5 to 7 (33)

ENZ6_Sandysoil by As

- 30 to 38 (2)
- 19 to 30 (23)
- 14 to 19 (38)
- 10 to 14 (115)
- -5 to 10 (108)

Structures

- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226

Date: 08-01-98

Author: KWH

Office: Brisbane

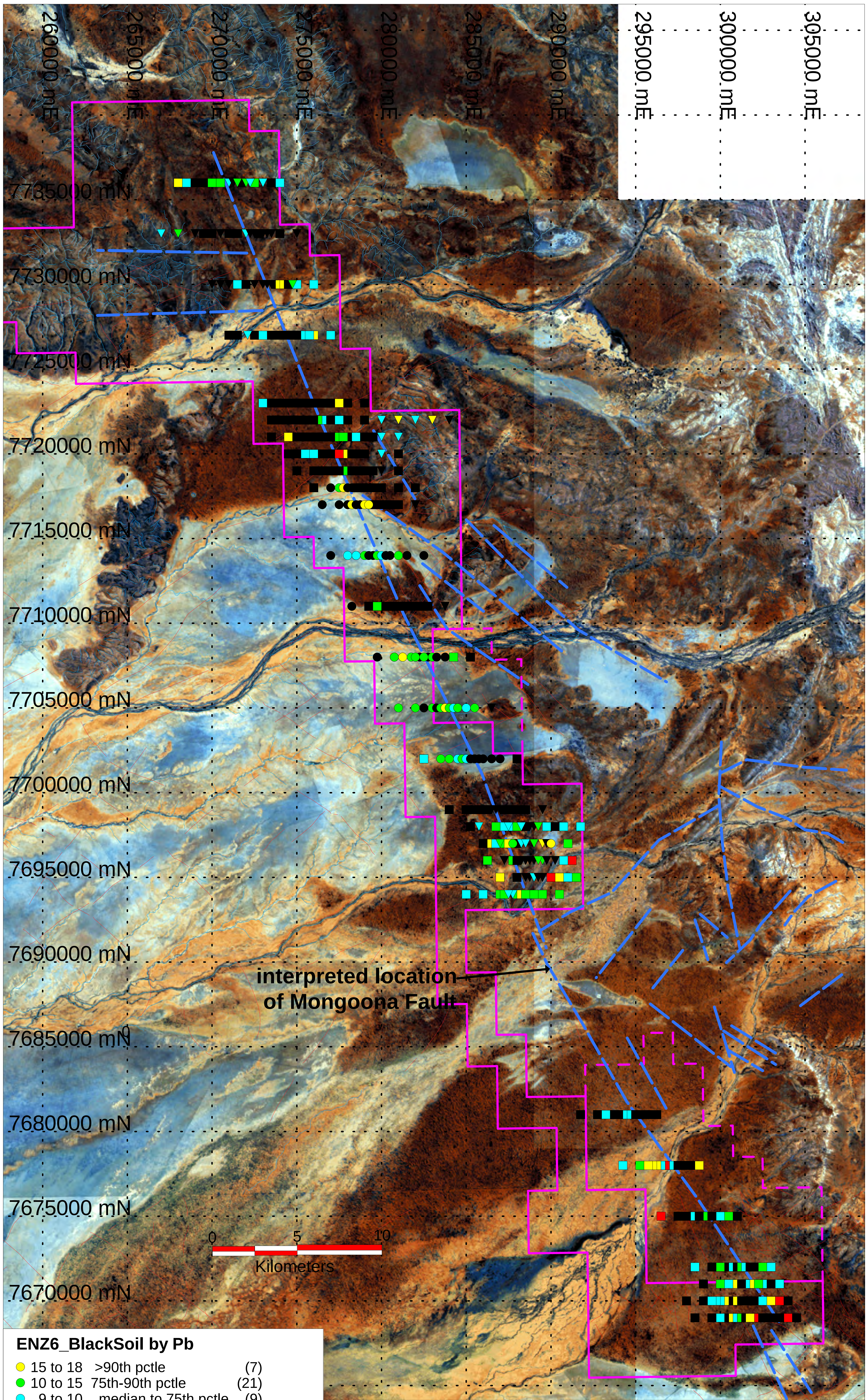
Drawing: 44629

Scale: 1:200000

Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
As (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6_BlackSoil by Pb

- 15 to 18 >90th pctle (7)
- 10 to 15 75th-90th pctle (21)
- 9 to 10 median to 75th pctle (9)
- 4 to 9 to median (29)

ENZ6_Gravel by Pb

- 13 to 17 (3)
- 10 to 13 (9)
- 8 to 10 (20)
- 2 to 8 (42)

ENZ6_Sandysoil by Pb

- 20 to 30 (10)
- 13 to 20 (24)
- 10 to 13 (35)
- 8 to 10 (55)
- -1 to 8 (162)

Structures

- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

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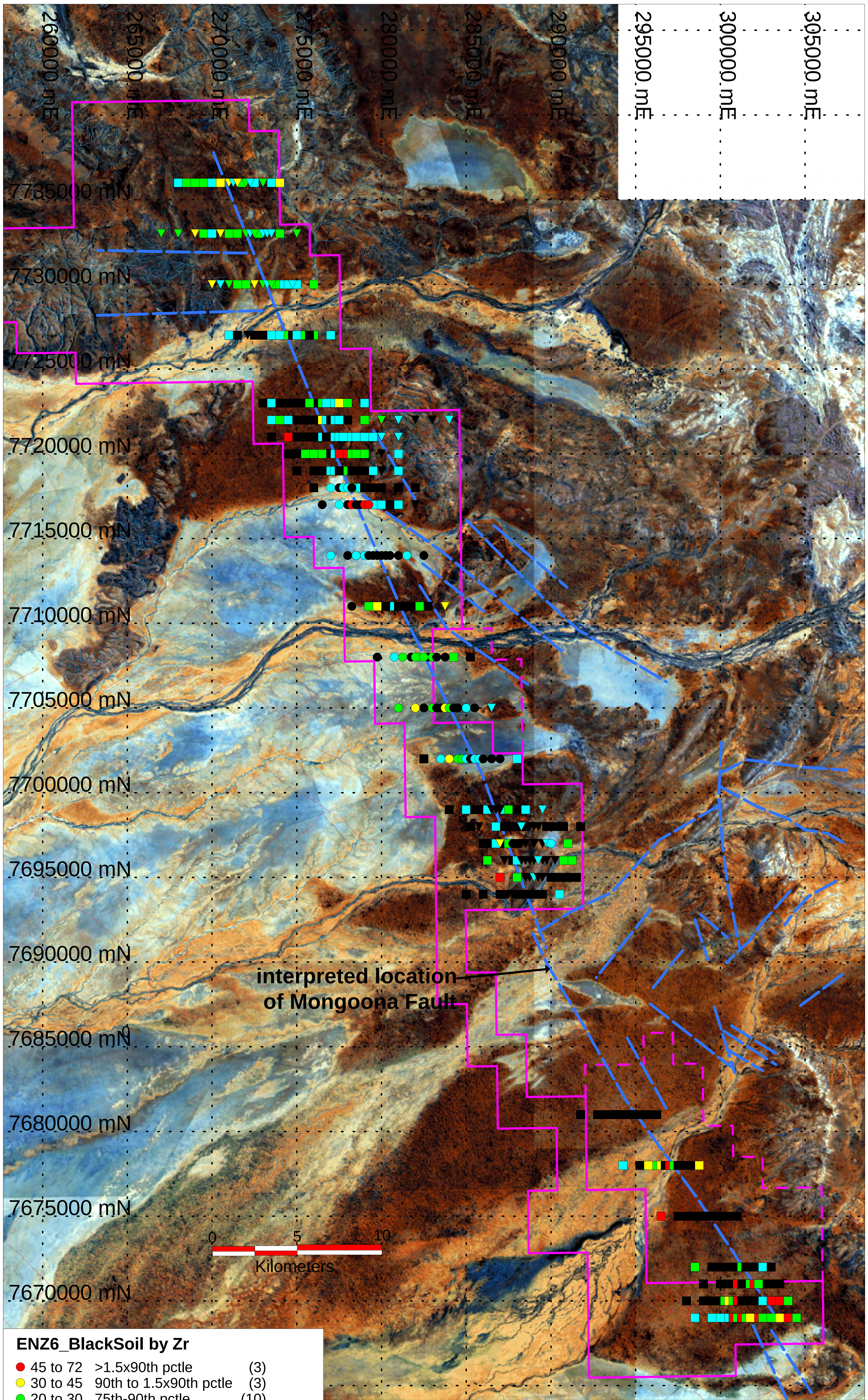
EPM: 11226
Date: 08-01-98
Author: KWH
Office: Brisbane
Drawing: 44630
Scale: 1:200000
Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
Pb (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6_BlackSoil by Zr

- 45 to 72 >1.5x90th pctle (3)
- 30 to 45 90th to 1.5x90th pctle (3)
- 20 to 30 75th-90th pctle (10)
- 14 to 20 median to 75th pctle (17)
- 4 to 14 < median (33)

ENZ6_Gravel by Zr

- 12 to 18 (8)
- 10 to 12 (11)
- 8 to 10 (20)
- 3 to 8 (35)

ENZ6_Sandysoil by Zr

- 33 to 78 (18)
- 25 to 33 (11)
- 11 to 25 (57)
- 8 to 11 (63)
- 2 to 8 (137)

Structures

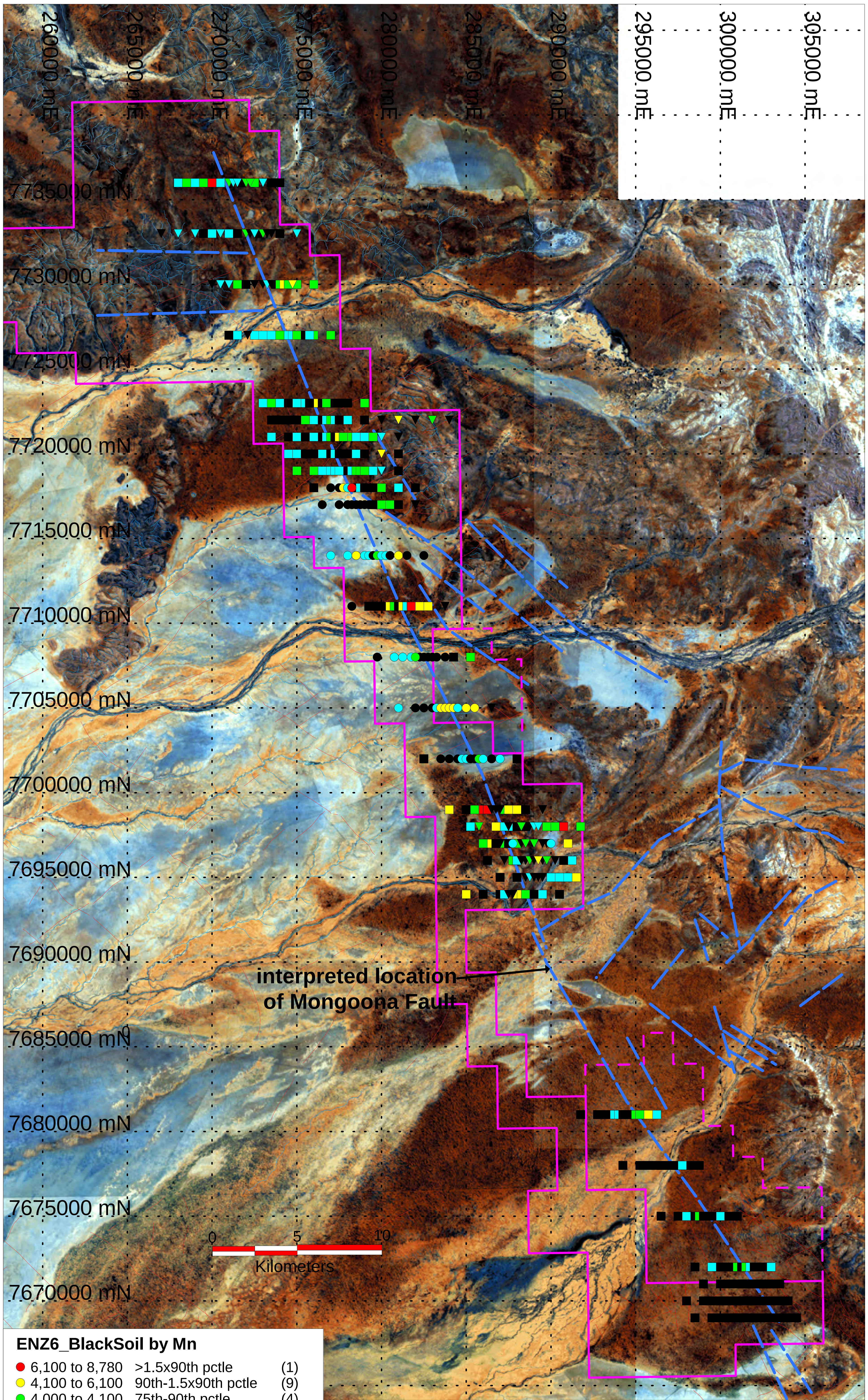
- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226
Date: 08-01-98
Author: KWH
Office: Brisbane
Drawing: 44631
Scale: 1:200000
Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
Zr (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6_BlackSoil by Mn

● 6,100 to 8,780	>1.5x90th pctle	(1)
● 4,100 to 6,100	90th-1.5x90th pctle	(9)
● 4,000 to 4,100	75th-90th pctle	(4)
● 3,300 to 4,000	median to 75th pctle	(20)
● 1,360 to 3,300	to median	(32)

ENZ6_Gravel by Mn

- ▼ 30,000 to 40,700 (5)
- ▼ 20,000 to 30,000 (13)
- ▼ 13,000 to 20,000 (18)
- ▼ 2,600 to 13,000 (38)

ENZ6_Sandysoil by Mn

- ■ 33,000 to 59,500 (5)
- ■ 22,000 to 33,000 (18)
- ■ 15,000 to 22,000 (50)
- ■ 11,000 to 15,000 (63)
- ■ 1,400 to 11,000 (150)

Structures

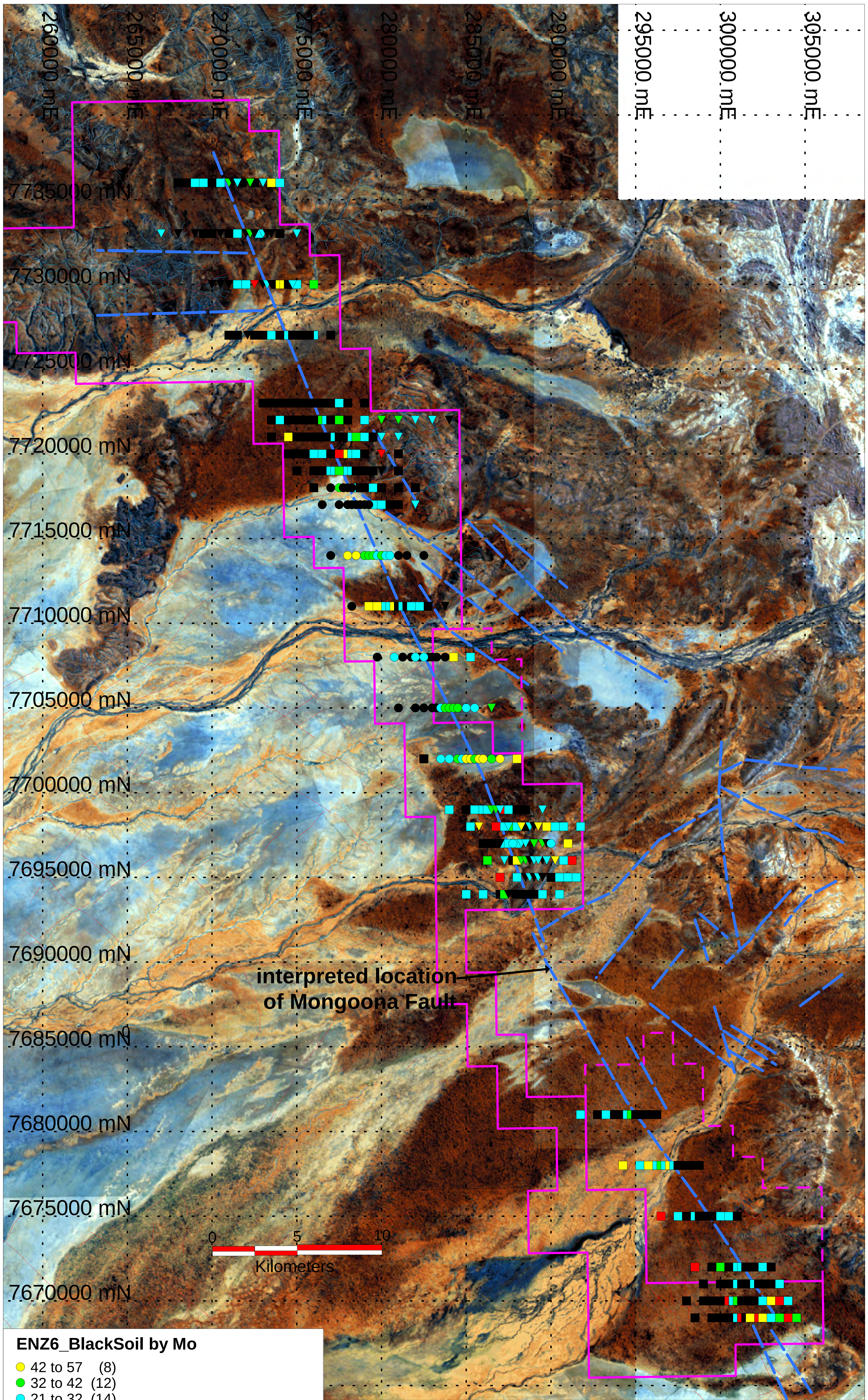
- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226
Date: 08-01-98
Author: KWH
Office: Brisbane
Drawing: 44632
Scale: 1:200000
Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
Mn (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6_BlackSoil by Mo

- 42 to 57 (8)
- 32 to 42 (12)
- 21 to 32 (14)
- 2 to 21 (32)

ENZ6_Gravel by Mo

- 17 to 23 >1.5x90th pctle (2)
- 11 to 17 90th to 1.5x90th pctle (4)
- 6 to 11 75th-90th pctle (12)
- 3 to 6 median to 75th pctle (26)
- -1 to 3 to median (30)

ENZ6_Sandysoil by Mo

- 38 to 158 (13)
- 25 to 38 (21)
- 18 to 25 (16)
- 10 to 18 (85)
- -1 to 10 (151)

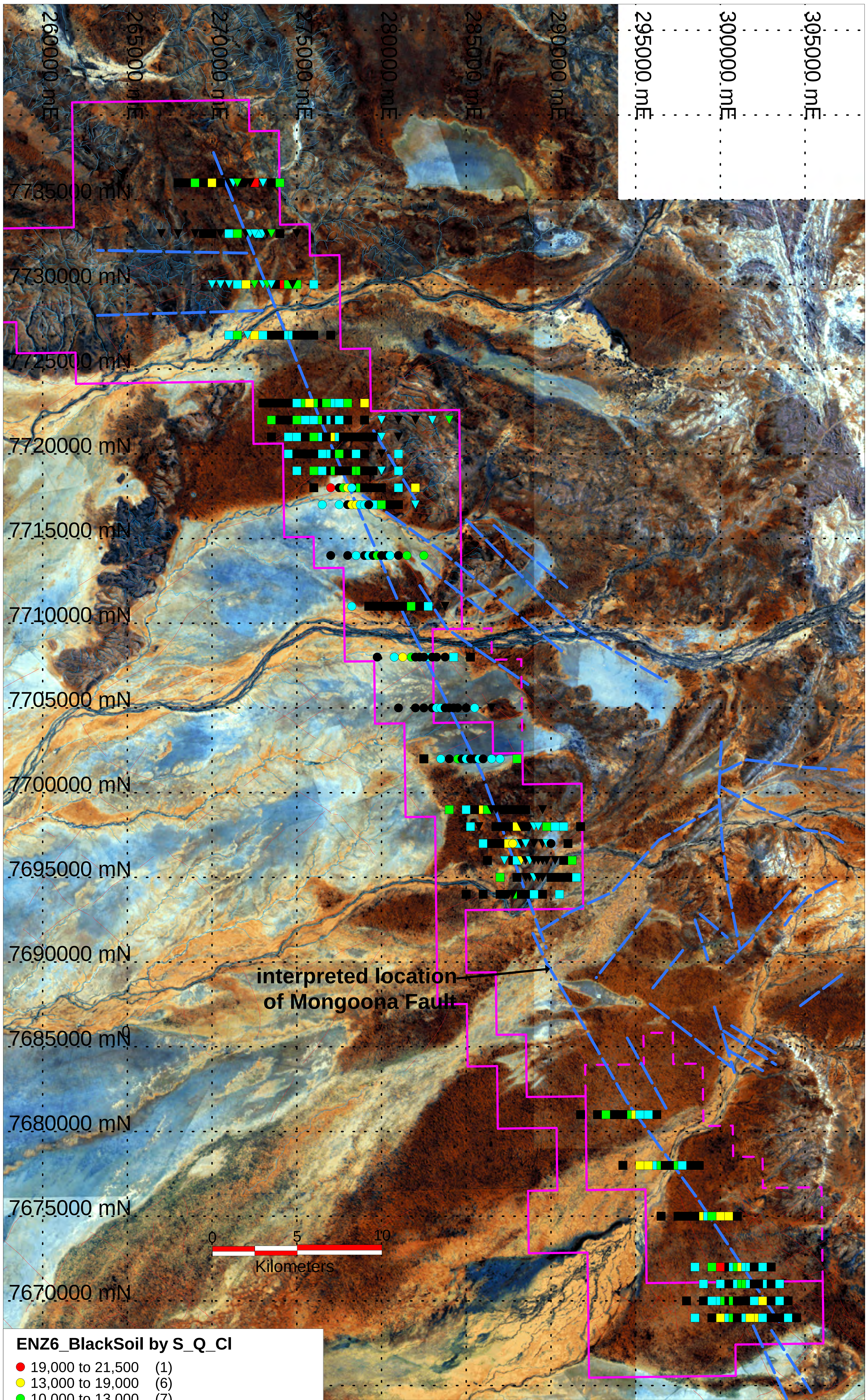
Structures

- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226	**Mongoona Project**
Date: 08-01-98	**Grid ENZ6**
Author: KWH	**Mo (by soil type)**
Office: Brisbane	
Drawing: 44633	
Scale: 1:200000	Projection: AMG 84, zone 54

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)



ENZ6_BlackSoil by S_Q_Cl

- 19,000 to 21,500 (1)
- 13,000 to 19,000 (6)
- 10,000 to 13,000 (7)
- 6,000 to 10,000 (19)
- -3,000 to 6,000 (33)

ENZ6_Gravel by S_Q_Cl

- 16,000 to 17,500 (1)
- 10,000 to 16,000 (5)
- 6,000 to 10,000 (25)
- -3,000 to 6,000 (43)

ENZ6_Sandysoil by S_Q_Cl

- 17,000 to 75,400 (3)
- 11,000 to 17,000 (23)
- 8,000 to 11,000 (43)
- 6,100 to 8,000 (68)
- -3,000 to 6,100 (149)

Structures

- Interpreted from aeromagnetics (TMI-Ian Garsed)
- From Geomag interpretation (MIMEX/World Geoscience)

MIM Exploration Pty Ltd

EPM: 11226
Date: 08-01-98
Author: KWH
Office: Brisbane
Drawing: 44634
Scale: 1:200000
Projection: AMG 84, zone 54

Mongoona Project
Grid ENZ6
Cl (by soil type)

Soil enzyme leach response in ppb on Landsat TM 123 (RGB)