Corporate office
EXPLORATION

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Anglo American Exploration Australia Pty. Ltd.
A.C.N. 006 195 982

Project Name:	The Lynd Project, Dido Dam.
Tenement Number/s:	EMP15915.
Tenement Operator:	Anglo American Exploration (Australia) Pty Ltd.
Tenement Holder:	Anglo American Exploration (Australia) Pty Ltd.
Report Number:	AAEA2012/32
Report Type:	Final Annual Report.
Report Title:	EMP15915 – Dido Dam, Final Annual Report for the period 30th October 2011 to 29th October 2012.
Report Period:	30th October 2011 to 29th October 2012.
Author/s:	Kylie Dixon.
Complied by:	Kylie Dixon.
Date of report:	November 2012.
1:250 000 map sheet/s:	Einasleigh (SE55-09).
1:100 000 map sheet/s:	Conjuboy (7,860).
Target Commodity:	Ni, Cu, PGE.
Keywords:	Geographical (Greenvale), Commodities (Ni, Cu, PGE) Ages (Proterozoic), Geolog ical Pr ovince (Georgetown Inlier, Tasman Orogenic Zone).
List of Assays:	Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Ga, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Pd, Pt, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn, Zr.

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Department of Natural Resources and Mines

SUMMARY

The tenement EPM15915, Dido Dam, is part of the Lynd Project and is located within the Georgetown Inlier, Queensland Australia. Anglo American Exploration Australia Pty Ltd (AAEA) was granted the Licence on 30th October 2007 for a period of five years.

AAEA is seeking to discover significant NiS deposits in the Lynd area using a variety of magmatic NiS related empirical criteria and models.

The tenement area consists dominantly of Cambrian to Ordovician metasediments intruded by a Silurian mafic complex with minor Quaternary cover. The targets are Voisey's Bay style NiS and the area has not seen NiS exploration. Anglo American has the rights to proprietary technology that we believe will be able to detect massive NiS at great depths.

Work completed in the fifth year of the tenement has been limited to a site visit to inspect the ground geophysics survey target areas identified from the Spectrem Airborne geophysical survey.

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1. INTRODUCTION

EPM15915, Dido Dam, is part of the Lynd Project, located approximately 30 km northwest of Greenvale and 220km northwest of Townsville. Access to the tenement is from Townsville via the Gregory Development Rd that links Charters Towers to the Lynd Junction and then various station tracks. The tenement is situated on the Einasleigh (SE55-09) 1:250,000 map sheet and the Conjuboy (7,860) 1:100,000 map sheet.

Anglo American Exploration Australia Pty Ltd (AAEA) was granted the tenement on 30th October 2007 for a period of five years. EPM15915 covers an area of approximately 94km^2 within the Georgetown Inlier.

This report summarises the exploration activities conducted on EPM15915, during the reporting period 30th October 2011 to 29th October 2012.

2. TENURE

The tenement EPM15915, was granted to AAEA on 30th October 2007 and originally consists of 57 graticule blocks. In August of 2010, 28 blocks were surrendered, leaving 29 blocks. The tenement details are in *Table 1* below and the tenement location plan is presented as *Figure 1*.

Table 1: Tenements Details

Tenement	**Holder**	**Date Granted**	**Expiry Date**	**Area Km^2**	**No Sub Blocks**
EPM15915	AAEA	30/10/2007	29/10/2012	94.2	29

Table 2 (below) and *Figure 2* details the 29 sub blocks that comprise the lease.

Table 2: Sub-blocks that comprise EPM15915.

1:1,000,000 Plan Name	**Primary Number**	**Graticular Section**	**No of Blocks**
Townsville	2457	j k n o p r s t u v w x	12
	2528	e j k n o p s t u w x y	12
	2529	a b f g l	5
		TOTAL	***29***

3. REGIONAL GEOLOGY

EPM15915, is part of the Lynd Project which is located in northeast Queensland along the Tasman Orogenic zone, on the south eastern margin of the predominantly Palaeoproterozoic to Early Mesoproterozoic Georgetown Inlier. At this location, Palaeoproterozoic rocks of the Georgetown inlier are in faulted contact with younger Ordovician to Carboniferous sediments of the Broken River Province further east (Fergusson et al., 2007). Recent work has replaced the western contact of the Tasman Orogenic zone from the Burdekin River Fault westward along the Lynd Mylonite Zone; the area between the two structural elements is named the Greenvale Province (Nishiya et al., 2003 and Fergusson et al., 2007).

The roughly N-S trending Balcooma Mylonite Zone and Nickel Mine Fault divide the Greenvale Province between the Lynd Mylonite Zone and the Burdekin River Fault further (Fergusson *et al.*, 2007). Early Palaeozoic metamorphic units and intrusions make up the majority of rocks in the Greenvale province (Whitnall *et al.*, 1991). The stratigraphy is younging towards the East from the Cambrian (486±5 to 477 ±6 Ma) Oasis Metamorphics and Lynwater complex west of the Balcooma Mylonite zone; the Ordovician (471±4 Ma) Balcooma Meta Volcanic Group and Silurian (431±7 Ma) Dido Tonalite East of the Balcooma Mylonite Zone (Whitnall *et al.*, 1991; Fergusson *et al.*, 2007). An increase in age is documented through the stratigraphy further east with the Ordovician Lugano Metamorphics, Cockiespring Tonalite, Eland Metavolcanics and Paddys Creek Phyllite west of the Nickel Mine Fault; through to the Cambrian Halls Reward Metamorphics located between the Nickel Mine Fault and the Burdekin River Fault (Fergusson *et al.*, 2007; Nishiya *et al.*, 2003).

The older units in the Greenvale province; Oasis Metamorphics, Lynwater Complex and Halls Reward Metamorphics, have been affected by amphibolite grade metamorphism related to the Cambrian Delamerian Orogeny (Fergusson *et al.*, 2007). Deposition of the Balcooma Volcanic group took place in a back-arc setting (Withnall *et al.*, 1991). Subsequent amphibolite grade metamorphism during the Silurian to Early Devonian deformed the Balcooma Volcanic Group (Withnall *et al.*, 1991). The emplacement of the Dido Tonalite is associated with this Silurian deformation event (Withnall *et al.*, 1991). Later deformation produced the predominantly N-S trending foliation found in the Greenvale Province (Fergusson *et al.*, 2007).

The rocks exposed in the central NNE-SSW trending axis on tenement EPM15915 are the Silurian Dido Tonalite (Withnall *et al.*, 1991). Several gabbroic intrusions of unknown age have been located within the Dido Tonalite and on the tenement EPM15646. Metasediments of the Lugano Metamorphics and Eland Metavolcanics are the most eastern exposed rocks on tenement EPM15646. However, lithological contacts are not exposed and the location of the western contact of the Dido Tonalite with the Balcooma Mylonite Zone is uncertain due to a significant amount of Tertiary cover in the area. The 250,000 scale government mapped geology is included as *Figure 3*.

4. PREVIOUS EXPLORATION

Summary

During the 2007 to 2008 field season, AAEA completed: a ground geophysics survey - Induced Polarisation (IP) and Resistivity data collected along one 1300m long line using a dipole length of 100m; the collection of 307 soils samples from 13 traverses from 600m x 200m spaced centres and 4 rock chip samples; 27 RAB drill holes for 647 metres were drilled with samples submitted for analysis for major elements including PGE's. There were several notable highlights from the drilling program that included: the presence of visible native copper in drill hole LYRB08-124; an intersection from LYRB08-123 of 29 m @ 212 ppm Cu, 123 ppm Ni, 25 ppb Pt and 32 ppb Pd from an mafic/ultramafic lithology; and an intersection from LYRB08-130 of 26m @ 26.9 wt.% FeO and 1.8 wt.% TiO2.

During the 2008 to 2009 field season, AAEA completed: a 1:50,000 scale geological data compilation, put together to gain an insight into the local geology and acquire an understanding of the dimensions and geological setting of the mafic intrusives from within the Lynd Project; a petrology study on rock chips from the RAB drilling from 2008 (end of hole samples) was completed and it was found that the basement geology was dominated by medium grained, foliated diorites and tonalites, most RAB holes contained chips of finer grained gabbros and metagabbros (amphibolites) which were interpreted as mafic dykes with rare ultramafic rocks consisting of wehrlites, pyroxenites and hornblendites.

A PhD study led by student Fiona Best under the supervision of Prof. Tony Crawford at CODES, University of Tasmania, was commissioned by AAEA in 2009 and incorporates rock chip and RAB drill samples collected from EPM15915 since 2007. The PhD research aims to determine the petrology, composition and age of the various mafic intrusions in tenements EPM15915, EPM15646, EPM 16070 and tenement application EPM18110 and their relationship with the Dido Tonalite and other intermediate-mafic-ultramafic intrusions across the broader southern Georgetown Inlier. This research is being used by AAEA to modify and enhance its exploration models for Ni-Cu-PGE mineralization in the Georgetown Inlier.

In 2009-2010, Spectrem Air Limited conducted an Airborne Electromagnetic (EM), Magnetics (TMI), DTM and Radiometric survey over the Lynd - Block 1 area. A total of 5,070 line km was surveyed for the whole of The Lynd - Block 1 area and approximately 1229 line km was surveyed within EPM15915.

In 2010-2011, exploration was limited to office based studies due to inclement weather conditions throughout the year thus rendering the tenement inaccessible. Activities included the interpretation and target generation of the Spectrem Airborne Geophysical survey and a project review.

4.1 Geophysics

IP Survey

Induced Polarisation (IP) and Resistivity data was collected using the dipole-dipole method along one line over the tenement. The line was 1300m long and read out to n=6 using a dipole length of 100m.

A moderately chargeable body was detected on EPM 15915.

Figure 5 shows the location of the IP survey line.

Aerial Geophysics – Spectrem Air Survey

In late 2009, Spectrem Air Limited conducted an Airborne Electromagnetic (EM), Magnetics (TMI), DTM and Radiometric survey over the Lynd - Block 1 area. A total of 5,070 line km was surveyed for the whole of The Lynd - Block 1 area and ~1229 line km was surveyed within EPM15915 (covering all of the tenement). The digital data, details of the survey, the system specifications, standard Spectrem Air data processing stream and an atlas of images are described and presented in Appendix 1.

Conductivity-depth images (CDI's) were generated for all the flight lines in the surveyed area. From these CDI's, the thickness of the cover was interpreted and reveal that the Lynd Block 1 survey area has cover thickness of 0 to 70m. In most areas, the cover is relatively thin (i.e. probably less than 20m). Within the tenement, there were some areas where the cover was up to 70m thick with conductance values as high as 14 siemens.

The results of the survey highlighted a number of dipole features, identified in several EM channels on EPM 15915. These could be considered to be possible kimberlite or lamproite intrusions capable of hosting diamonds. The importance of these targets is given weight by the discovery by AAEA of three micro-diamonds in termite mound samples collected from tenement EPM15646 approximately four kilometres south of EPM15915 in 2009. Reports of alluvial micro-diamonds in the Georgetown Inlier have been made by previous prospectors in the region: Diamonds, diamond indicator minerals and a review of exploration for diamonds in Queensland, however a kimberlite source has never been located.

Interpretation of the bedrock geology in conjunction with the Spectrem survey data suggest that several low order AEM anomalies (Figure 6) may be associated with mafic-ultramafic intrusions or VHMS systems. The colour aeromagnetic image package showing the location of Spectrem AEM anomalies identified by scrutinising individual line data. Alpha-identification of some anomalies is shown (Figure 7) and are referred to in the text as Line 13350 and 13360 (Figures 8 and 9).

An explanation and discussion of how the AEM data was interpreted and how the anomalies (and details) were generated is attached in Appendix 1.

4.2 Geochemistry

Mapping, Soil and Rock Chip Sampling

A soil sampling program was conducted during June and October 2008. The program covered areas identified from field mapping, radiometric data and aeromagnetic images as being shallow-buried mafic intrusions. In total, 307 samples (including duplicates), from 13 traverses were collected and submitted for analysis (see Figure 5; digital data is in Appendix 3). Sample spacing for most of the program was conducted at 600m x 200m. The sampled terrain was generally flat to gently undulating (<9m slope). All soil samples were taken from depths ranging between 5 and 20cm. The lack of a well developed soil profile dismissed the need to target a specific soil horizon other than the near surface A horizon. All samples were homogenized in situ, and approximately 3 to 5 kg was sieved in the field for a <250 micron fraction. Samples were analysed at ACME Analytical Laboratories in Vancouver using the 1FMS (aqua regia) method, which reports 53 elements to sub ppm levels by ICP-MS.

Soil types and compositions vary across the tenement depending on depth to basement and proximity to the wide flood plains of the various drainages, including the Ten Mile Creek. The geochemical data from these soils do not reveal significant anomalism. The maximum Cu, Zn, Pb and Ni concentrations are 105, 50, 21 and 51 ppm respectively.

The geochemical results for assays received are attached in Appendix 3, and Figure 5 shows the locations of these samples.

Four rock chip samples were collected from EPM15915 (see Figure 4, Appendix 4). The sample numbers are AUX029896, AUX029897, AUX029898 and AUX029900. These samples were discovered as sub-cropping ironstone during the soil sampling program. The sub-cropping ironstone was found to be magnetite-dominated and can be traced along the surface for approximately 110m in a NE-SW direction. The samples were submitted for analysis using a four-acid digest for base and major elements and 30 gram fire assay for PGE's. The samples contain between 66.98 and 74.06 wt.% FeO, 4.24 and 5.57 wt.% TiO_2, approximately 3500ppm V and up to 64ppb Pt. Ni and Cu concentrations in these rocks are low, with maximum values being 183 ppm and 39 ppm respectively. A RAB drill hole into one of these outcrops did not support the continuation of high FeO grades at depths (see below).

4.3 Drilling

RAB Drilling

A programme of RAB drilling, comprising 27 drill holes for 647 metres, was completed during June 2008. The samples were submitted for analysis using a four-acid digest for base and major elements and 30 gram fire assay for PGE's. The geochemical digital data and logs are attached as Appendix 4 and the locations are included in Figure 10.

The RAB drilling revealed the presence of intermediate, mafic and ultramafic rock types within the Dido Tonalite Complex. All bottom of the hole samples were dispatched for petrological examination and results detailed in the next section. One notable highlight from this drilling program was the presence of visible native copper in drill hole LYRB08-124. However, geochemical results were only moderately encouraging with maximum Cu, Zn, Pb and Ni concentrations being 377, 187, 82 and 248 ppm respectively.

The best composite intersection of Ni-related mineralization was from drill hole LYRB08-123, which assayed 29 metres at 212 ppm Cu, 123 ppm Ni, 25 ppb Pt and 32 ppb Pd in a mafic/ultramafic lithology.

A drill hole into one of the iron-stone subcrops discussed in section 6.2 above (LYRB08-130) intersected 26m @ 26.9 wt.% FeO, 1.8 wt.% TiO2 and 1130 ppm V. Base metal anomalism in this drill hole was moderate and sporadic with maximum Cu, Ni and Pt values being 288 ppm, 129 ppm and 24 ppb respectively.

4.4 Petrology Study

A petrology study on rock chips from the 2008 RAB drilling program by F Best, a University of Tasmania (CODES) PHD candidate was completed. Representative rock chips from each of the 27 RAB holes (LYRB08-118 to 144) drilled at on EPM15915 were thin sectioned and studied.

"The basement geology of EPM15915, covered by the RAB holes, was found to be dominated by medium grained, foliated diorites and tonalites. Hornblende was the main mafic phase in both rock types and biotite is widespread but generally less abundant. Plagioclase was the dominant felsic phase in the diorites, with k-feldspar and quartz becoming more significant in the tonalites. It was common to observe gabbro, diorite and tonalite in individual RAB holes suggesting a close association and gradual transition between these rock types. Most RAB holes contained chips of finer grained gabbros and metagabbros (amphibolites) which are interpreted as mafic dykes. Rare ultramafic rocks consisting of wehrlites, pyroxenites and hornblendites were also observed in the drilled area. RAB chips composed entirely of opaques (magnetite) were associated with the pyroxenite." *(Best 2009).*

An overview of the main lithologies observed, the end of hole geology of each RAB hole and detailed petrology photographs are reported in Appendix 5.

Exploration work carried out on EPM1 5915, during the fifth year of the tenement has consisted of a site visit to inspect the ground geophysics survey target areas identified from the Spectrem Airborne geophysical survey (Figure 5).

In June 2012, a field visit was implemented to scout out the Lynd Project area before the geophysics crew was sent out to start the ground geophysics survey. It was determined that the country would be a difficult country to undertake the ground geophysics survey. An attempt was made in early July to start the ground geophysics survey but was abandoned due to excessive rain and ground flooding. The surveys were focused on tenements within the Lynd project that were not so inundated with rain. It is hope that the ground geophysics survey within the tenement will be completed at a later date pending ground conditions.

4.5 Geological Data Compilation - Mapping

The geology map of the Lynd project area was constructed during January 2009 on a 1:50,000 scale. The objective of the mapping was to get a better insight in the local geology and gain an understanding of the dimensions and geological setting of the mafic intrusives from within the Lynd Project. The mapping was compiled with the following datasets: AAEA aeromagnetic survey 1VD and RTP data; RTP open file aeromagnetic data; all geological data collected by AAEA during the course of the project; thin section analysis of all the drilling completed on the project and hand samples. The 1:25,000 scale geology map is presented as Figure 11.

5. EXPLORATION CONDUCTED

Exploration work carried out on EPM15915, during the fifth year of the tenement has consisted of a site visit to inspect the ground geophysics target areas identified from the Spectrem Airborne geophysical survey (Figure 5).

In June 2012, a field visit was implemented to scout out the Lynd Project area before the geophysics crew was sent out to start the ground geophysics survey. It was determined that the country would be a difficult country to undertake the ground geophysics survey. An attempt was made in early July to start the ground geophysical survey but was abandoned due to excessive rain and ground flooding. The surveys were focused on tenements within the Lynd project that were not so inundated with rain. It is hope that the ground geophysical survey within the tenement will be completed at a later date pending ground conditions.

6. CONCLUSION

During the fifth year of the tenement, exploration activities consisted of a site visit to inspect the ground geophysics survey target areas identified from the Spectrem Airborne geophysical survey.

7. REFERENCES

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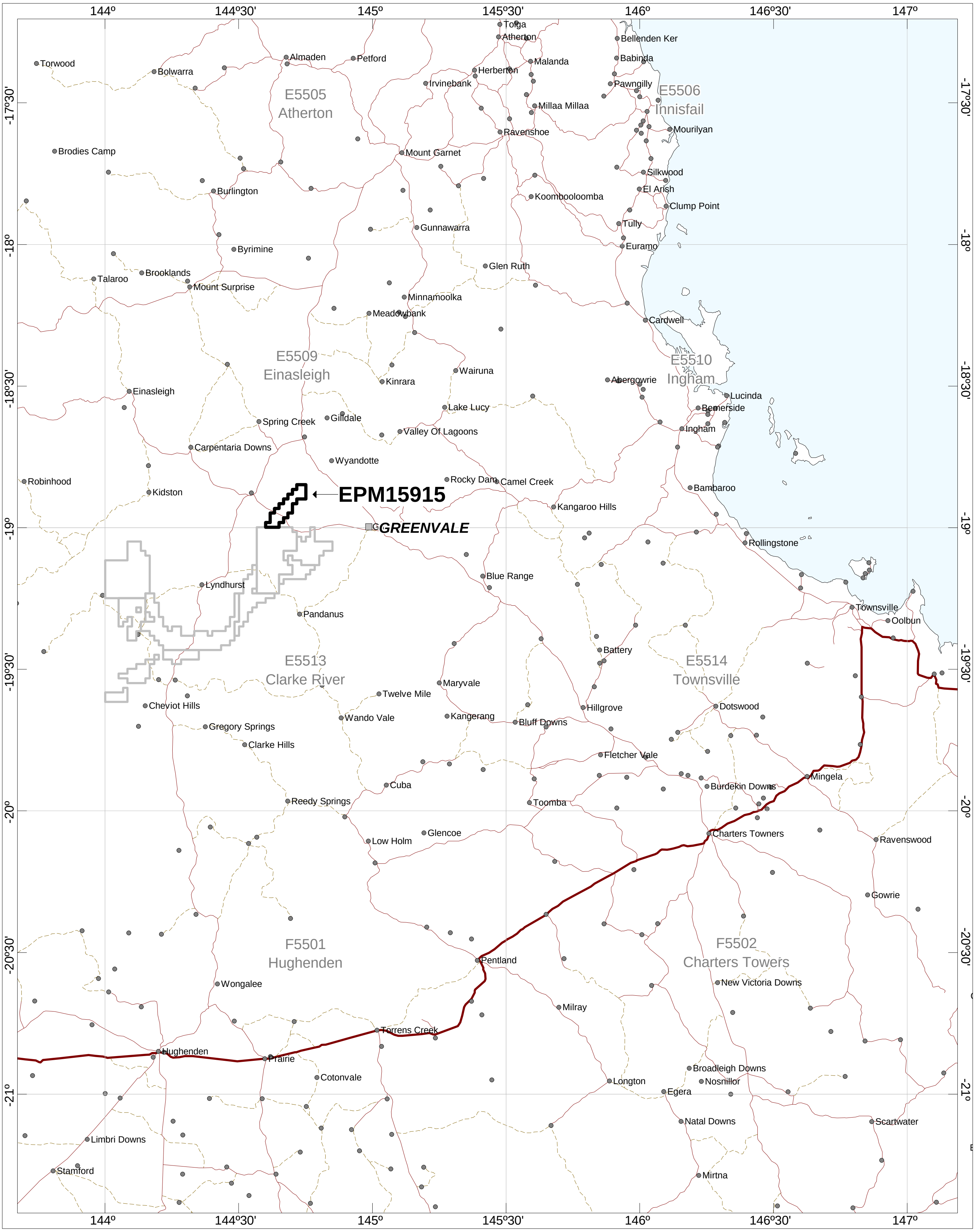
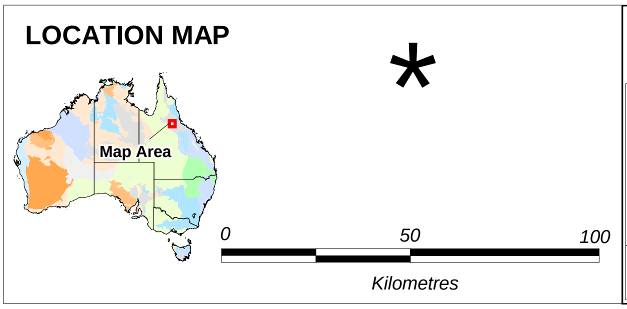
Withnall, I. W., Grimes, K. G. &. Department of Resource Industries Queensland, 1991., *Explanatory notes on the Einasleigh 1:250000 geological sheet* Brisbane Department of Resource Industries.





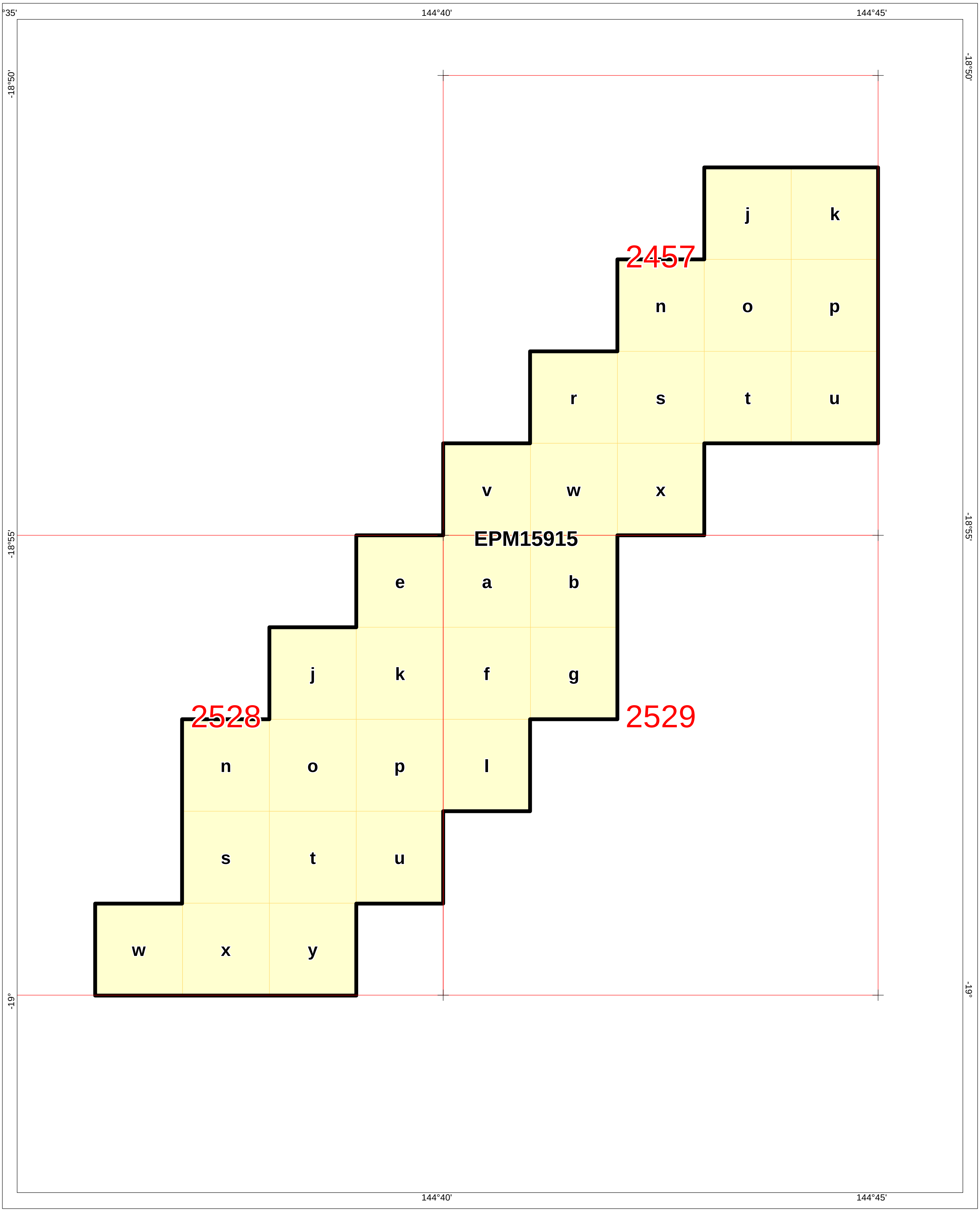
AngloAmerican

LYND PROJECT
EPM15915
TENEMENT LOCATION PLAN

PROJECT: LYND
REGION: GEORGETOWN

Figure 1
Plan: AUS_QLD_LYN_TN_12710_EPM15915.wor

AUTHOR: P Polito
COMPILED BY: C Lucy
DATE: 19/11/2009
PROJECTION: Long/Lat (WGS 84)
SCALE: 1:2,000,000



LOCATION MAP

*

0 2.5 5
kilometres

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LYND PROJECT
EPM15915
GRATICULAR TENEMENT PLAN

REGION: GEORGETOWN
PROJECT: LYND

Figure 2
PLAN: EPM15915_Fig2.wor

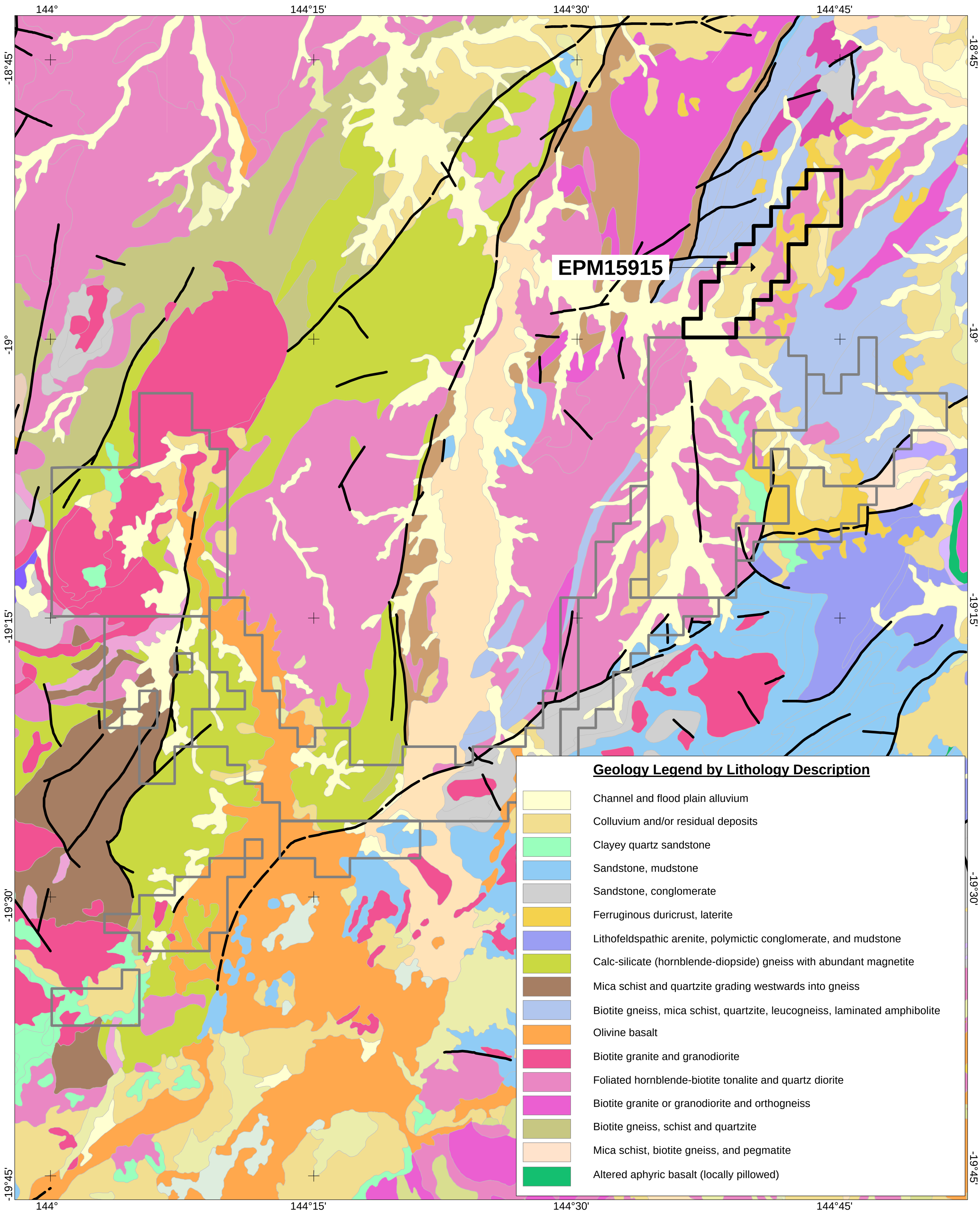
AUTHOR:
K Dixon

COMPILED BY:
C Lucy

DATE:
26/10/2011

PROJECTION:
Long/Lat (WGS 84)

SCALE:
1 : 100,000



LOCATION MAP

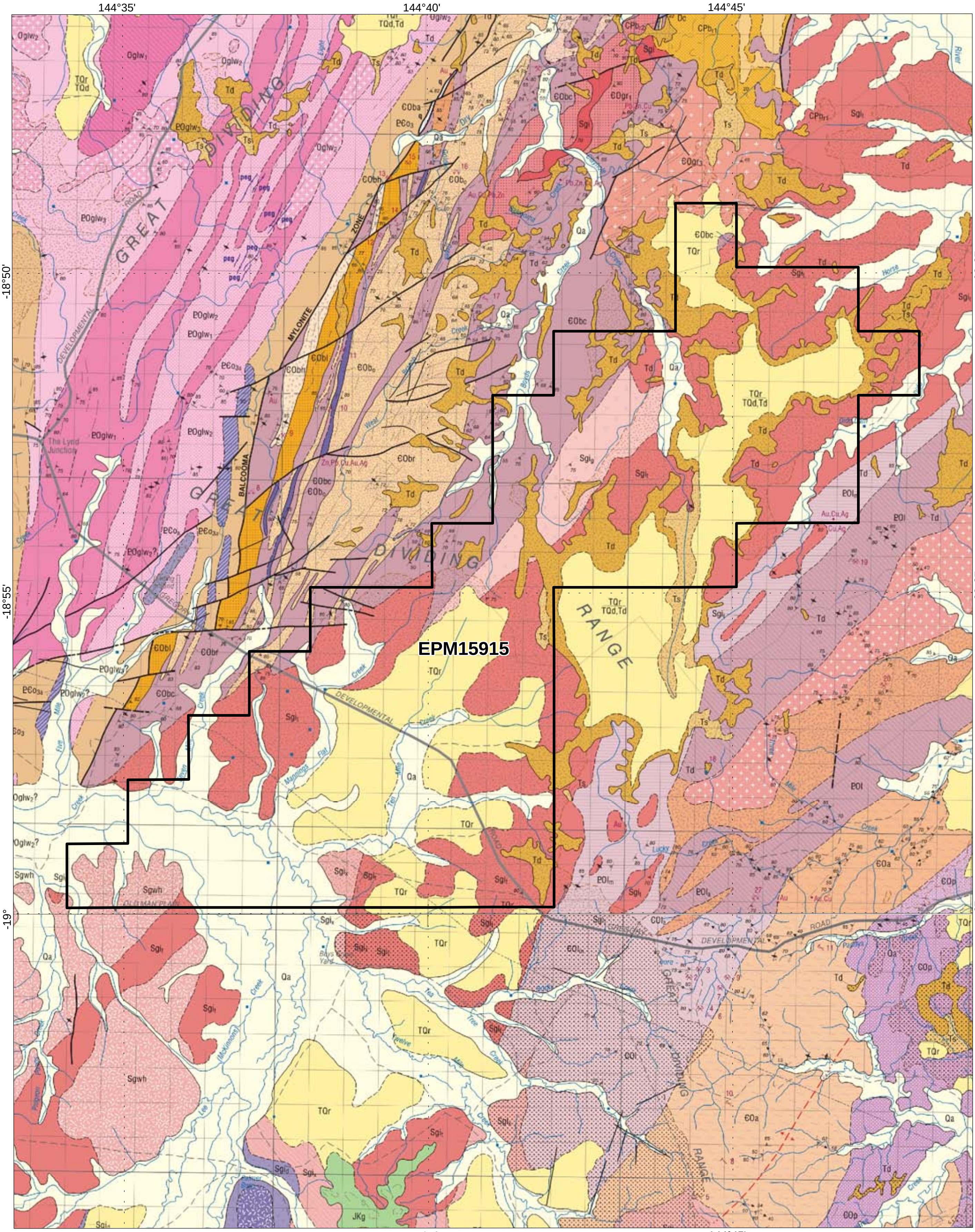
0 10 20
kilometres

AngloAmerican

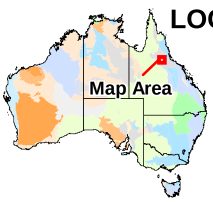
LYND PROJECT
EPM15915
REGIONAL GEOLOGY

REGION: GEORGETOWN	Figure 3
PROJECT: LYND	PLAN: AUS_QLD_LYN_GE_13177.wor

AUTHOR: K Dixon
COMPILED BY: C Lucy
DATE: 26/10/2011
PROJECTION: Long/Lat (WGS 84)
SCALE: 1:500,000



LOCATION MAP



0 4 8
kilometres

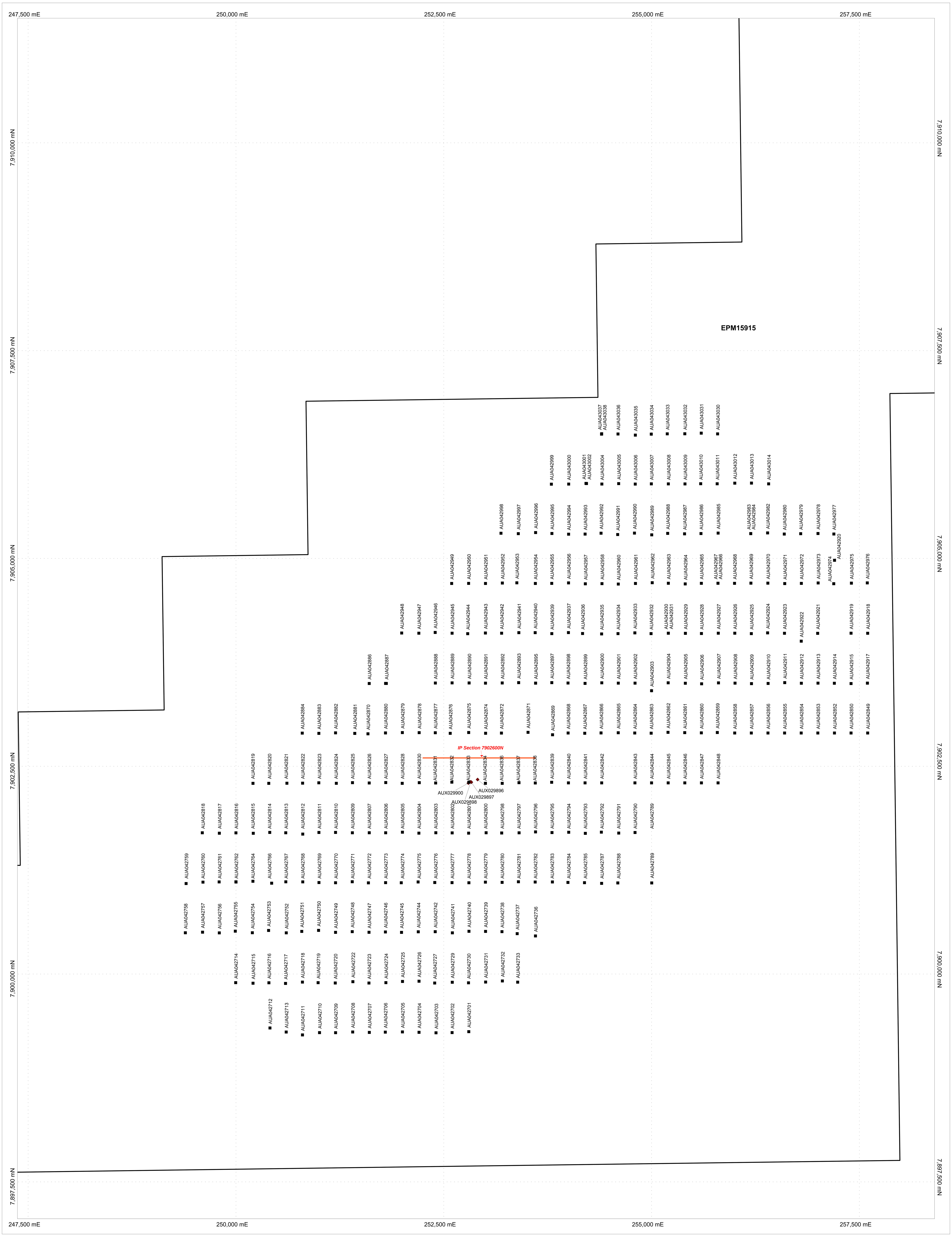
AngloAmerican

LYND PROJECT
EPM15915
SURFACE GEOLOGY

REGION: GEORGETOWN
PROJECT: LYND

Figure 4
PLAN: AUS_QLD_LYN_GE_13088.wor

AUTHOR: K Dixon
COMPILED BY: C Lucy
DATE: 17/08/2010
PROJECTION: Long/Lat (WGS 8
SCALE: 1:150,000



LOCATION MAP

0 500 1,000
metres

Legend

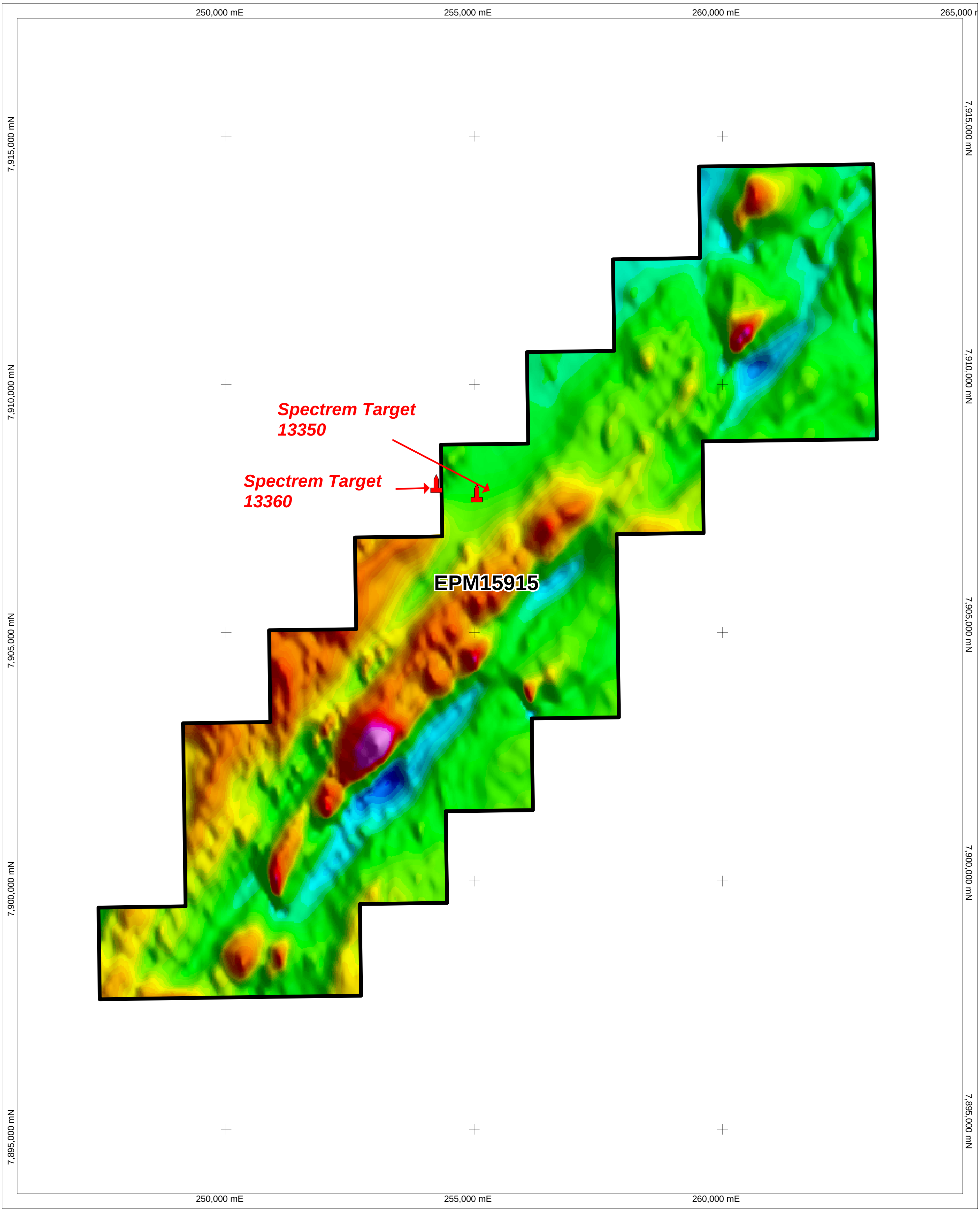
- Soil Sample
- Rock Sample
- IP Survey Line

ANGLO AMERICAN

REGION: GEORGETOWN
PROJECT: LYND
DRAWING No: AUS_QLD_LYN_GC_12935.wor

AUTHOR: P Polito
COMPILED BY: C Lucy
DATE: 06/11/2008
PROJECTION: GDA94 MGA Zone 55
SCALE: 1:20,000

Figure 5
LYND PROJECT
EPM 15915
SAMPLE & IP LOCATION PLAN



LOCATION MAP

0 2.5 5
kilometres

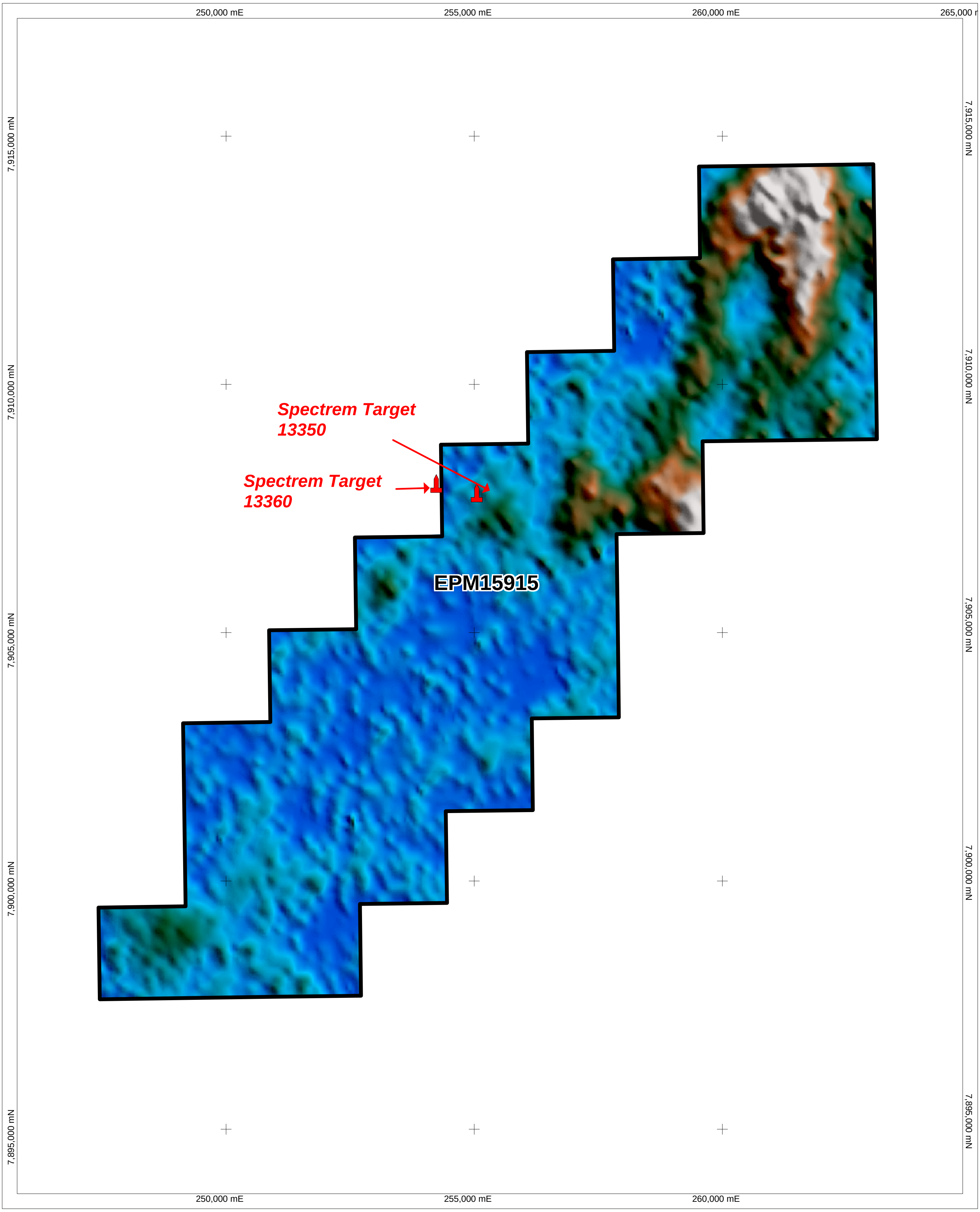
AngloAmerican

LYND PROJECT
Spectrem Airborne Geophysics Survey
Lynd Area 2 - EPM15915
TMI With EM Targets

REGION: GEORGETOWN
PROJECT: LYND

Figure 6
PLAN: AUS_QLD_LYN_GP_13187_Mag.wor

AUTHOR: K Dixon
COMPILED BY: C Lucy
DATE: 26/10/2011
PROJECTION: GDA94 Zone 55
SCALE: 1 : 100,000



LOCATION MAP

0 2.5 5
kilometres

AngloAmerican

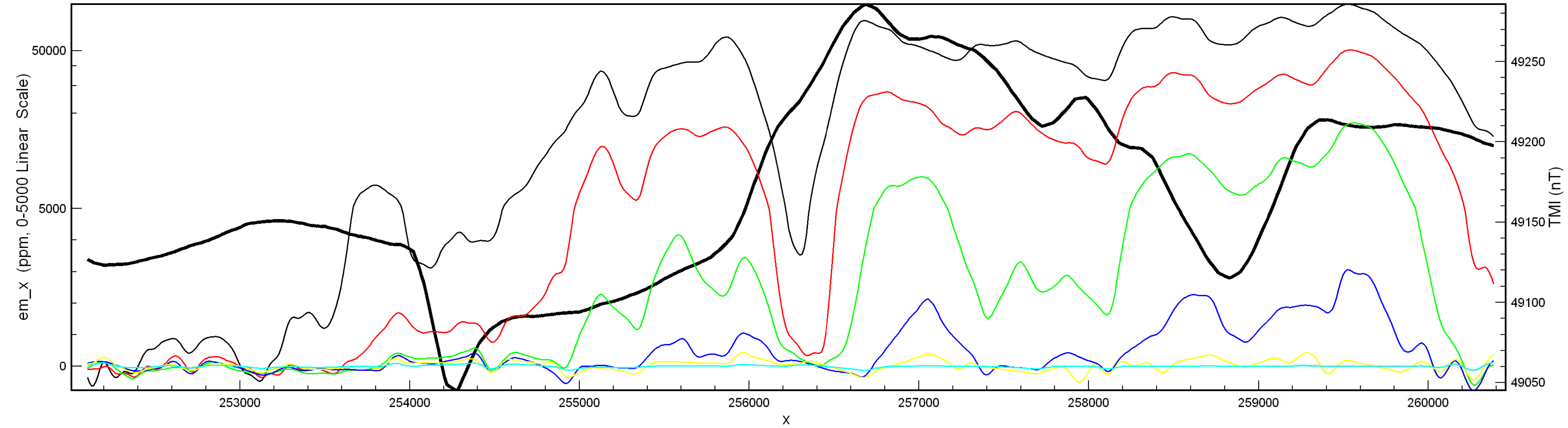
LYND PROJECT
Spectrem Airborne Geophysics Survey
Lynd Area 2 - EPM15915
Cover Thickness With EM Targets

REGION: GEORGETOWN
PROJECT: LYND
Figure 7
PLAN: AUS_QLD_LYN_GP_13187_Cov.wor

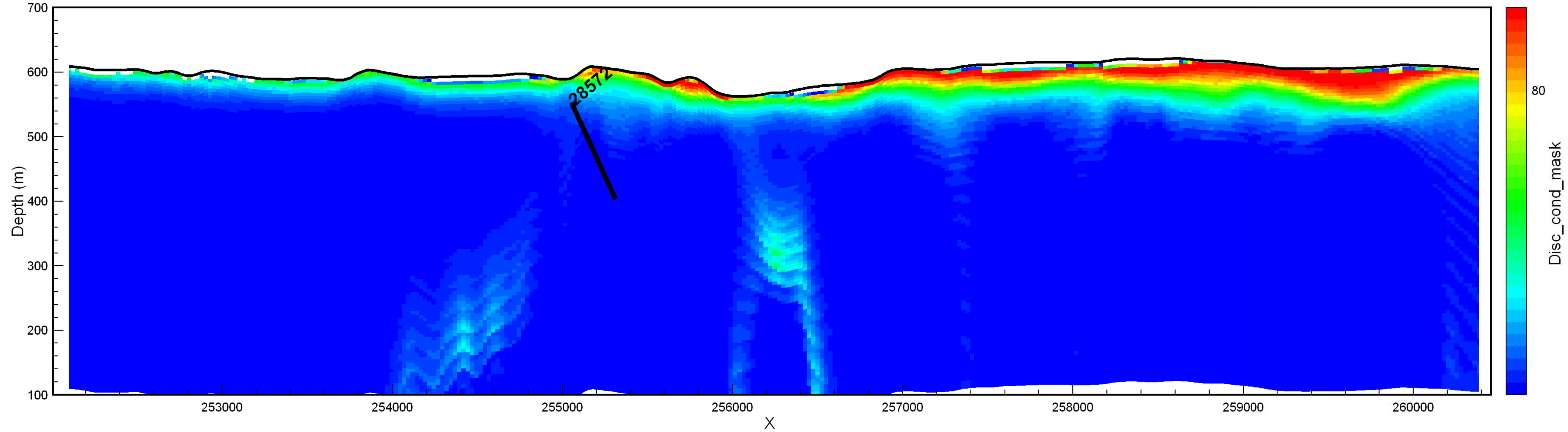
AUTHOR: K Dixon
COMPILED BY: C Lucy
DATE: 26/10/2011
PROJECTION: GDA94 Zone 55
SCALE: 1 : 100,000

Lynd Block 1 Spectrem Data & Anomalies on CDI's L13350

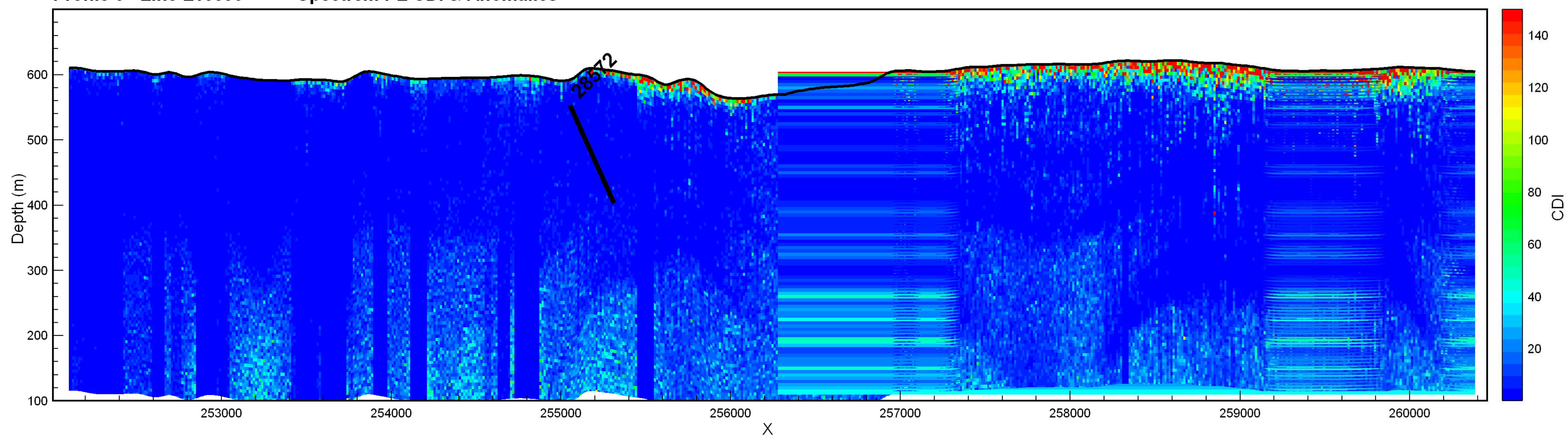
Profile 1 Line L13350 >>> - Spectrem EM-X, Channel 4-9 an TMI (Thick Black Line)



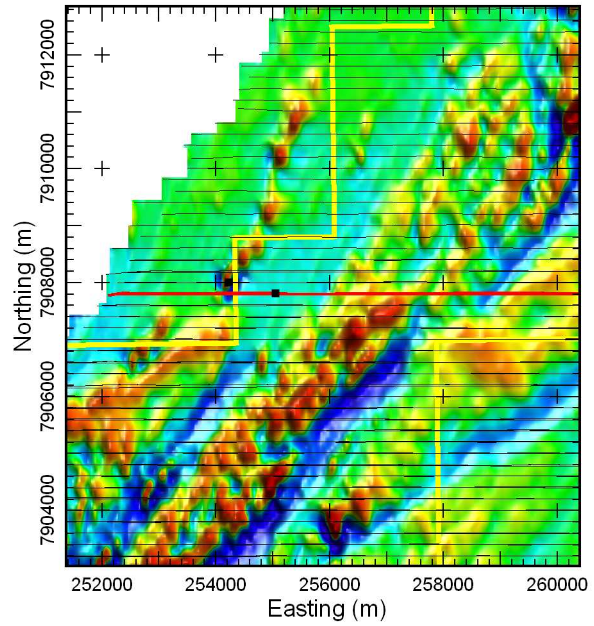
Profile 2 Line L13350 >>> - EMFlow CDI & Anomalies



Profile 3 Line L13350 >>> - Spectrem PL CDI & Anomalies



TMI - VD



Late-Time Z-Component Tau

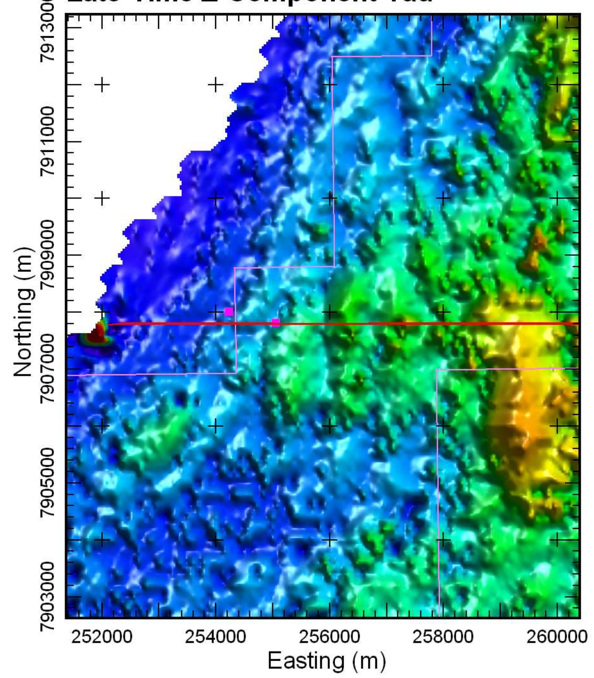


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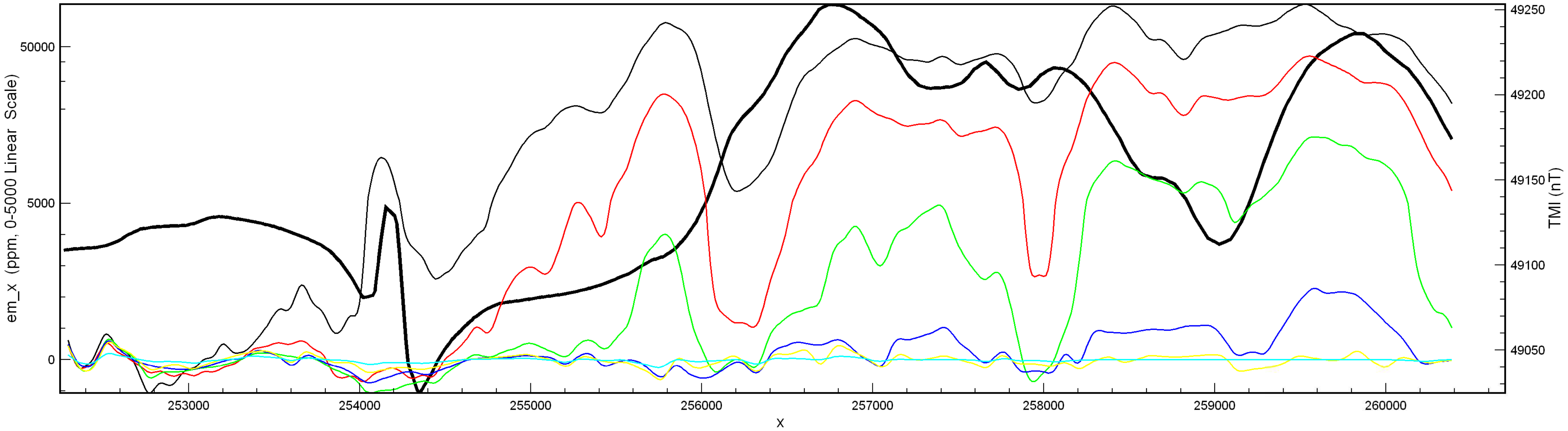
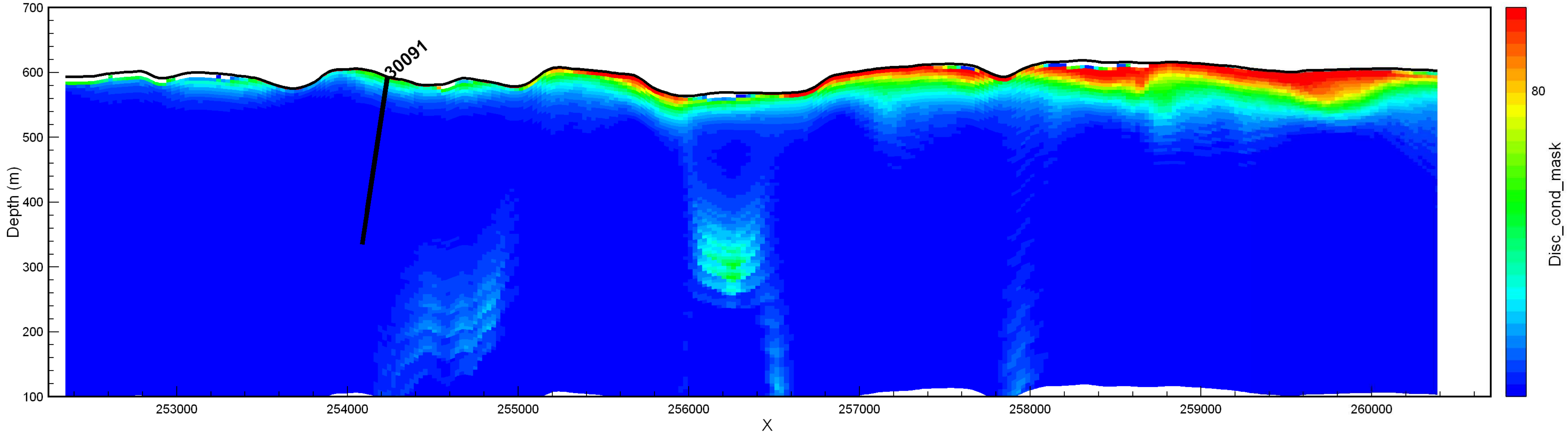
Figure 8

Lynd Block 1 Spectrem Data & Anomalies on CDI's L13360

Profile 1 Line L13360 <<< - Spectrem EM-X, Channel 4-9 an TMI (Thick Black Line)



Profile 2 Line L13360 <<< - EMFlow CDI & Anomalies



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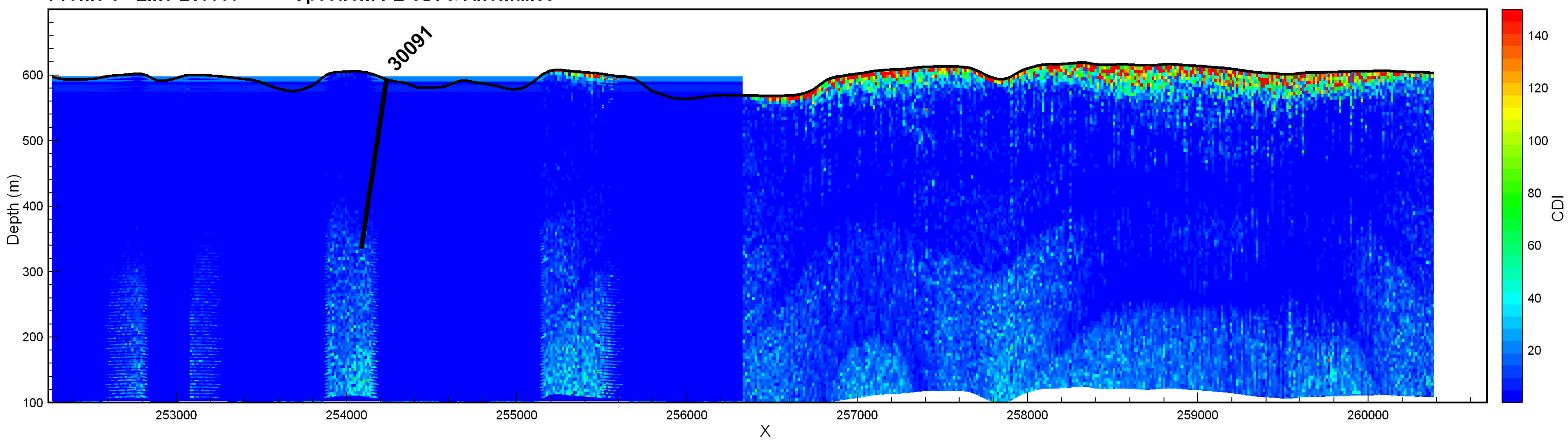

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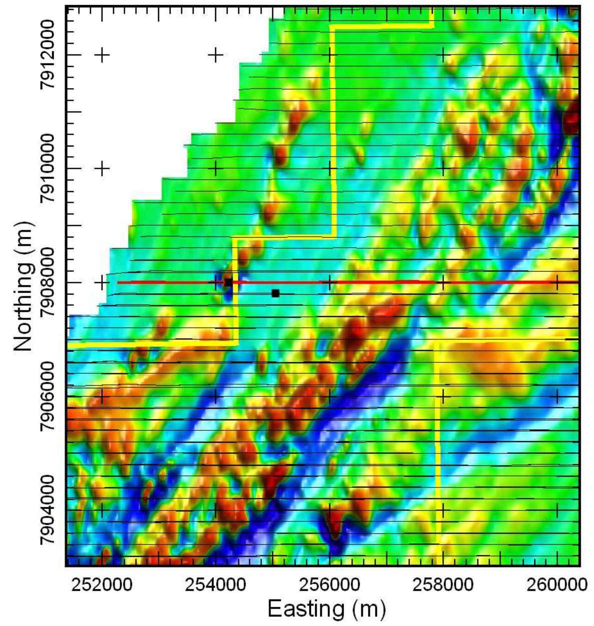


Late-Time Z-Component Tau

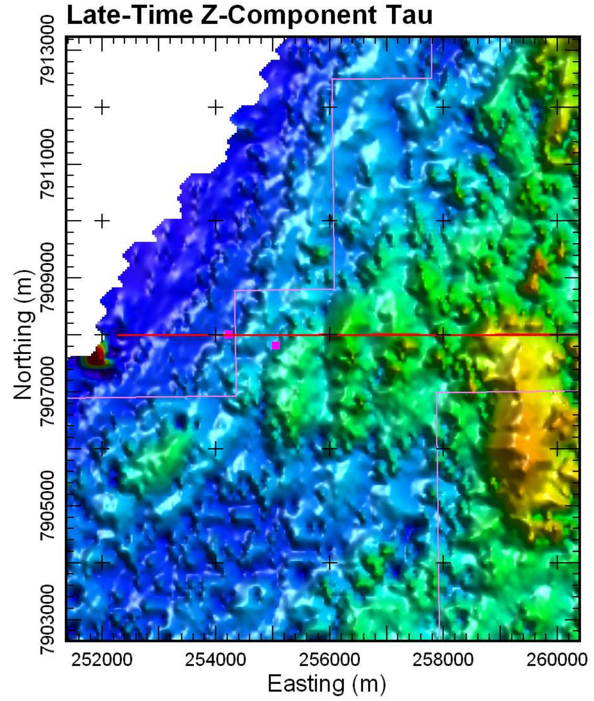
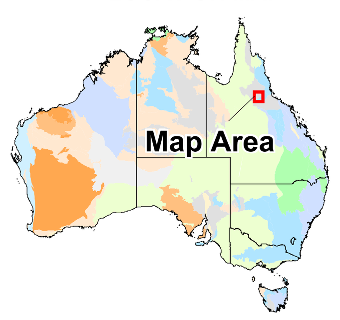


Figure 9

AngloAmerican

LOCATION MAP



N W E S

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ANGLO AMERICAN

REGION: GEORGETOWN
PROJECT: LYND
DRAWING No: AUS_QLD_LYN_GC_12936.wor

AUTHOR: P Polito
COMPILED BY: C Lucy
DATE: 06/11/2008
PROJECTION: GDA94 MGA Zone 55
SCALE: 1:10,000

Figure 10
LYND PROJECT
EPM 15915
RAB DRILL HOLE LOCATION PLAN

Figure 11

LYND PROJECT EPM15915
INTERPRETED GEOLOGY

APPENDIX 1
SPECTREM AERIAL GEOPHYSICS

APPENDIX 2
AAEA LOGGING CODES

ROCK TYPES:

Weathering Product & Transported / Superficial Deposits (prefix L…)

LAL	Alluvium	LST	Silt
LCO	Colluvium	LSD	Sand
LSO	Soil	LGR	Gravel
LSCR	Scree	LSCO	Conglomerate
LLO	Loess	LGO	Gossan
LCY	Clay (produced by weathering or by alteration, include interp. of parent lithology in Rock 2)	LGYP	Gypsum / gypsiferous sediment (associated with salt lake systems)
LFE	Ferricrete (arid / desert environments *NOT* laterite)	LSIC	Silcrete (arid / desert environments)
LAT	Lateritic duricrust (general)	LCC	Calcrete (arid / desert environments)

Sediments (prefix S…)

S	Sediment (undifferentiated)	SOC	Coal - "organic" sediments
SB	Black shale / carbonaceous (graphitic) sediments	SLC	Carbonate (undifferentiated or "dirty limestones")
SU	Mudstones (general - includes slate & shale)	SLD	Dolomite - if "dirty" add descriptor (eg: sandy, silty…)
ST	Siltstone (general)	SLL	Limestone - if "dirty" add descriptor (eg: sandy, silty…)
SD	Sandstones / quartz-rich sediments	SLM	Marl
SQZ	Quartzite (metamorphic)	SEV	Evapourites - gypsiferous
SA	Arenites (general)	SC	Conglomerates (general)
SAF	Arkosic arenites (>50% feldspathic / lithic fragments & 0-15% silty / clayey matrix)	SCM	Monomict / oligomict conglomerates
SAL	Lithic arenites (>50% rock / lithic fragments & 0-15% silty / clayey matrix)	SCP	Polymict conglomerates
SGW	Greywacke (15-75% silty / clayey matrix)	SFE	Ferruginous sediments -*not BIF*
SMF	Mass flow / debris flow		

Cherts (prefix C…)

C	Chert (undifferentiated)	CJ	Jaspilitic chert
CB	Barite-bearing cherts (eg: in VHMS systems)	CL	White and grey / black banded cherts
CIF	BIF: Banded Iron Formation	CM	Cherts - massive

Felsic Volcanics (prefix F…)

F	Felsic volcanic (undifferentiated)	FD	Rhyodacite
FR	Rhyolite (plutonic equivalent: granite)	FT	Trachyte (plutonic equivalent: syenite)
FVA	Felsic pyroclastic or volcaniclastic: ash / fine tuff (grain size <0.1mm)	FVG	Felsic pyroclastic or volcaniclastic agglomerate / breccia / lapilli tuff (grain size >4mm)
FVT	Felsic pyroclastic or volcaniclastic: tuff / sandstone (grain size 0.1-4mm)	FVB	Felsic pyroclastic or volcaniclastic: bomb breccia / agglomerate (grain size >32mm)

Intermediate Volcanics (prefix A…)

A	Intermediate volcanics (undifferentiated)		
AA	Andesite (plutonic equivalent: diorite)	AB	Basaltic-andesite
AT	Latite / Trachy-andesite (plutonic equivalent: monzonite)	AD	Dacite (plutonic equivalent: granodiorite)
AVA	Intermediate pyroclastic or volcaniclastic: ash / fine tuff (grain size <0.1mm)	AVG	Intermediate pyroclastic or volcaniclastic agglomerate / breccia / lapilli tuff (grain size >4mm)
AVB	Intermediate pyroclastic or volcaniclastic: bomb breccia / agglomerate (grain size >32mm)	AVT	Intermediate pyroclastic or volcaniclastic: tuff / sandstone (grain size 0.1-4mm)

ROCK TYPES (cont'd):

Mafic Volcanics (prefix B…)			
B	Mafic volcanics (undifferentiated)		
BA	Andesitic-basalt	BT	Basalt
BP	Plagioclase-phyric basalt	BB	Amphibole-phyric basalt
BK	Komatiitic basalt / High-Mg basalt (generally in Archaean terranes)	BOP	Picrite (olivine-basalt)
BVA	Mafic pyroclastic or volcaniclastic: ash / fine tuff (grain size <0.1mm)	BVG	Mafic pyroclastic or volcaniclastic agglomerate / breccia / lapilli tuff (grain size >4mm)
BVT	Mafic pyroclastic or volcaniclastic: tuff / sandstone (grain size 0.1-4mm)	BVB	Mafic pyroclastic or volcaniclastic: bomb breccia / agglomerate (grain size >32mm)

Komatiites (prefix K…)			
K	Komatiite / ultramafic volcanics (undiff.)	KS	Komatiite, spinifex textured
KAC	Komatiite, adcumulate	KMC	Komatiite, mesocumulate
KOC	Komatiite, orthocumulate		

Granitoids / Felsic-Intermediate Intrusions (prefix G…)			
G	Granitoid (undifferentiated)	GMZ	Monzonite (<5% quartz / "quartz-poor" granite - volcanic equivalent: latite / trachy-andesite)
GDI	Diorite (<5% quartz / plagioclase rich - volcanic equivalent: andesite)	GMZQ	Quartz-Monzonite (5%-20% quartz / "quartz-poor" granite - volcanic equivalent: latite / trachy-andesite)
GDIQ	Quartz-Diorite (5%-20% quartz / plagioclase rich - volcanic equivalent: andesite)	GQ	Quartz-rich granitoid (>60% quartz)
GGD	Granodiorite (volcanic equivalent: dacite)	GSY	Syenite (volcanic equivalent: trachyte)
GGR	Granite (volcanic equivalent: rhyolite)	GTO	Tonalite (>20% quartz / plagioclase-rich)
GK	Alkali-feldpsar granite ("pink" granite)		

Minor Porphyry / "Other" Intrusives (prefix P…)			
PF	Felsic intrusive (undifferentiated)	PI	Intermediate porphyry (undiff.)
PFF	Felsic porphyry, feldspar dominant / feldspar-phyric	PIA	Andesitic porphyry (keratophyre) *NOT* andesite lava
PFQ	Felsic porphyry, quartz dominant / quartz-phyric	PID	Dacitic porphyry (quartz keratophyre) *NOT* dacite lava
PAP	Aplite	PL	Lamprophyre (undifferentiated)
PEG	Pegmatite	PLA	Lamprophyre, amphibole dominant
PGF	Pegmatite, feldspar-rich	PLB	Lamprophyre, phlogopite / biotite dominant
PGQ	Pegmatite, quartz-rich	PLX	Lamprophyre, pyroxene dominant
PCB	Carbonatite	PK	Kimberlite (undifferentiated)

Mafic Intrusives (prefix D…)			
D	Mafic intrusives (undifferentiated)		
DD	Dolerite	DDQ	Quartz dolerite
DG	Gabbro (*NO* olivine, <10% opx)	DHB	Hornblendite (>50% hornblende)
DGL	Leucogabbro (plag >>olivine & pyx)	DN	Norite (opx bearing, <10% cpx)
DGM	Melagabbro (olivine & pyx >>plag)	DNL	Leuconorite (plag >>olivine & pyx)
DGN	Gabbronorite (cpx & opx bearing)	DNM	Melanorite (olivine & pyx >>plag)
DGNL	Leucogabbronorite (plag >>olivine & pyx)	DNO	Olivine Norite (olivine & opx bearing *NO* cpx)
DGNM	Melagabbronorite (olivine & pyx >>plag)	DAN	Anorthosite (>90% plag, <10% olivine & pyx)
DGNO	Olivine Gabbronorite (olivine, cpx & opx bearing)	DT	Troctolite (olivine & plag nearing *NO* pyroxene)
DGO	Olivine gabbro (olivine bearing *NO* cpx)	DTL	Leucotroctolite (plag >>olivine & pyx)
DGQ	Quartz gabbro	DTM	Melatroctolite (olivine & pyx >>plag)

ROCK TYPES (cont'd):

Ultramafic Rocks (prefix U…)

U	Ultramafic (undifferentiated)	US	Serpentinised ultramafic (primary texture destroyed)
UPX	Pyroxenite (>50% pyroxene, <40%olivine, *NO* plagioclase)	USC	Serpentinite, chlorite dominated
UCPX	Clinopyroxenite (<40% olivine, cpx present, *NO* opx & *NO* plagioclase)	USM	Serpentinite, tremolite dominated
UOPX	Orthopyroxenite (<40% olivine, opx present, *NO* cpx & *NO* plagioclase)	UST	Serpentinite, talc dominated
UWB	Websterite (opx & cpx, *NO* olivine & *NO* plagioclase)	UDU	Dunite (>90% olivine, *NO* plagioclase)
UWBO	Olivine Websterite (opx & cpx, olivine present & *NO* plagioclase)	UPD	Peridotite; undiff (40-90% olivine, *NO* plagioclase)
ULZ	Lherzolite (>40% olivine, both opx & cpx present, *NO* plagioclase)	UHZ	Harzburgite (>40% olivine, opx present, *NO* cpx & *NO* plagioclase)
UWL	Wehrlite (>40% olivine, cpx present, *NO* opx & *NO* plagioclase)		

High-Grade Metamorphic / Gneissic Rocks (prefix M…)

MA	Amphibolite (undifferentiated)	MMB	Marble
MAC	Amphibolite, actinolite dominated	MMG	Migmatite / migmatitic gneiss
MAN	Amphibolite, anthophyllite dominated	MPE	Pelite (f.g. - c.g. aluminosilicate m'mic minerals). Use Key Mineral fields
MBMG	Banded magnetic / magnetite gneiss (eg: after Archaean BIF)	MPH	Phyllite (f.g. micaceous rock). *NOTE:* schist codes may be more appropriate.
MBDG	Banded gneiss	MPP	Psephite (original conglomerate)
MCH	Charnockite	MPS	Psammite (original sandstone)
MCS	Calc-silicate gneiss	MPX	Amphibolite, pyroxene dominated (high-grade)
MEC	Eclogite	MQF	Quartzo-feldspathic gneiss / felsic gneiss
MGN	Gneiss (undifferentiated)	MSZ	Schist, use Key Mineral fields
MGR	Granulite	MTR	Amphibolite, tremolite dominated
MHB	Amphibolite, hornblende dominated	MUGN	Ultramafic gneiss
MITG	Intermediate gniess	MXC	Clinopyroxene-plagioclase rocks (high-grade)
MLT	L-tectonite (use Key Mineral fields)	MXO	Orthopyroxne-plagioclase rocks (high-grade)
MMAG	Mafic gneiss		

Mylonites / Cataclasites

MCTC	Cataclasite (undifferentiated), use Key Mineral Fields	MYL	Mylonite (undifferentiated), use Key Mineral Fields

MASSIVE SULPHIDES (>50% / >20cm of core)	Use KEY MINERAL FIELDS for additional / subordinate sulphide species	SEMI-MASSIVE SULPHIDES (>20% / >20cm of core)	Use KEY MINERAL FIELDS for additional / subordinate sulphide species and lithic clast types in breccias
$$	Massive Sulphides, undifferentiated	$S	Semi-massive sulphides, undifferentiated
$AS	Arsenopyrite-rich massive sulphide	$SAS	Arsenopyrite-rich semi-massive sulphide
$BO	Bornite-rich massive sulphide	$SBO	Bornite-rich semi-massive sulphide
$CH	Chalcocite-rich massive sulphide	$SCH	Chalcocite-rich semi-massive sulphide
$CP	Chalcopyrite-rich massive sulphide	$SCP	Chalcopyrite-rich semi-massive sulphide
$CR	Chromite / Chromitite (ie: PGE)	$SCR	Semi-massive Chromite / Chromitite
$GA	Galena-rich massive sulphide	$SGA	Galena-rich semi-massive sulphide
$ML	Millerite-rich massive sulphide	$SML	Millerite-rich semi-massive sulphide
$PN	Pentlandite-rich massive sulphide	$SPN	Pentlandite-rich semi-massive sulphide
$PO	Pyrrhotite-rich massive sulphide	$SPO	Pyrrhotite-rich semi-massive sulphide
$PY	Pyrite-rich massive sulphide	$SPY	Pyrite-rich semi-massive sulphide
$SP	Sphaleriteite-rich massive sulphide	$SSP	Sphaleriteite-rich semi-massive sulphide

ROCK TYPES (cont'd):

Breccias (prefix X…) Use TEXTURE CODES to describe clasts (composition, shape etc…)			
X	Breccia (undifferentiated)	XHY	Hydrothermal breccia (must have clear evidence of vein phases), use Key Mineral fields to describe important vein mineral phases.
XHE	Hematite-rich breccia (IOCG systems), use Key Mineral fields to describe other important minerals or clast types	XMT	Magnetite-rich breccia (IOCG systems), also use Key Mineral fields to describe other important minerals
XIN	Intrusive breccia (near margins of intrusion), use texture codes to describe clasts, use Rock 2 to describe composition of intrusive unit.	XVO	Eruptive volcanic breccia (eg: on margins of breccia pipe / diatreme)

Iron Ore Mineralisation (prefix I…)			
ICI	pisolitic channel iron deposit	IMH	massive hematite (eg: total replacement of BIF in BID systems)
IDI	dedrital iron deposit	IMM	massive magnetite (eg: total replacement of BIF)
IMG	massive geothite, undiff (eg: total replacement of BIF in BID systems)	ISMG	semi-massive geothite, undiff (eg: partial replacement of BI in BID systems)
IMGO	massive geothite, ochrous (soft, friable ores in BID systems)	ISMH	semi-massive hematite (eg: partial replacement of BIF in BID systems)
IMGV	massive geothite, vitreous / siliceous (hard, non-friable ores in BID systems)	ISMM	semi-massive magnetite (eg: partial replacement of BIF)

Other			
STOPE	Void / stope	NS	No sample / core loss
TAZ	Total alteration zone - not possible to determine original roc type: used as a *LAST RESORT*, must always indicate "bes guess" as to the original rock type	FLT	Fault - only to be used in *EXTREMELY* broken ground with near complete destruction of rock mass (eg: fault gouge): used as a LAST RESORT only if the mylonite / cataclasite codes are not applicable
QZV	Quartz vein (use Key Minerals to describe important minerals other than quartz).	VN	Vein, not quartz-rich (use Key Minerals to describe vein minerals & see vein description)

ROCK TEXTURES:

General Terms / Textures			
CLY	clayey (eg: as a descriptor in weathered /altered rocks)	BX	breccia / brecciated (structural, hydrothermal or volcanic - clasts should be angular)
SLT	silty (eg: as a descriptor for a dirty limestone)	IND	indurated / "hardpanised" (for surficial materials)
SND	sandy (eg: as a descriptor for a dirty limestone)	JNT	jointed (only for strongly joint fractured rocks)
QZ	quartzose / quartz-rich (as in sediment)	FR	fractured
GRV	gravel / gravelly (eg: as a descriptor for colluvium)	MLD	milled, for clasts in volcanic breccias (gas-streaming) or effusive veins (often associated with vein sediment)
PIS	pisolite / pisolitic	SPT	spotted
GOE	goethite / goethitic (eg: for oxidised rocks)	WD	wood / organic clasts or fragments
HEM	hematite / hematitic (eg: for oxidised rocks)	BND	banded (can be used in volcanic, metamorphic or sedimentary rocks - see also vein codes)
MT	magnetic / magnetite	BDD	bedded (can be used in volcanic, metamorphic or sedimentary rocks - see also vein codes)
GPH	graphitic (as in graphitic slate - higher grade than carbonaceous shale)	BOT	botryoidal / mammillated
CLC	calcareous (eg: in calcareous siltstones / shales)	BXW	boxworked
MSV	massive	HOM	homogeneous

ROCK TEXTURES (cont'd):

Grain Size Terms

VFG	very fine grained < 0.1mm (sediment)	PBL	pebbles / pebbly (sediment: 8-32mm)
FGR	fine grained <1mm (sediment & igneous)	CBL	cobbles / cobbly (sediment: 32-256mm)
MGR	medium grained (igneous: 1-5mm / sediment: 1-2mm)	BLD	boulder (sediment: >256mm)
CGR	coarse grained (igneous: 5-30mm / sediment: 2-4mm)	EQG	equigranular or granoblastic
VCG	very coarse grained (igneous: >30mm / sediment: 4-8mm)	SER	seriate (range in grain sizes)
MXT	megacrystic (eg: K-Spar megacrystic granite)	PEG	pegmatite / pegmatitic

Grain / Clast Morphology Terms / Textures

EUH	euhedral grains	RND	rounded clasts / grains / crystal fragments
SBH	subhedral grains	SRN	subrounded / grains / crystal fragments
ANH	anhedral grains	SAG	subangular clasts / grains / crystal fragments
		ANG	angular clasts / grains / crystal fragments

Sedimentary Terms / Textures

LAM	laminated (for sediments and possibly large veins - see vein codes)	CBN	carbonaceous (as in carbonaceous / black shale; *NOT* calcareous or graphitic)
FLG	flaggy	IJD	injection dykes / flame structures (sedimentary)
PHL	phyllitic (weakly metamorphosed shale)	RUC	rip up clasts
FSF	fossiliferous	ERS	erosional scours
PSO	poorly sorted (sedimentary / voclanic rocks / volcanic breccias)	MSU	matrix supported (sedimentary / voclanic rocks / volcanic breccias)
WSO	well sorted (sedimentary / voclanic rocks / volcanic breccias)	CSU	clast supported (sedimentary / voclanic rocks)

Bedding Terms / Textures

BTN	bedded - thinly (<1cm)	BFF	fine grained beds >> coarse grained beds (relative abundance of interbedded sediments: eg - sandstone and shale)
BMO	bedded - moderately (1cm? to 30cm)	BFC	fine grained beds > coarse grained beds (relative abundance of interbedded sediments: eg - sandstone and shale)
BTK	bedded - thickly (>30cm)	BFE	fine grained beds = coarse grained beds (relative abundance of interbedded sediments: eg - sandstone and shale)
BPM	bedded - poorly defined to massive (>1m) bedding	BCF	coarse grained beds > fine grained beds (relative abundance of interbedded sediments: eg - sandstone and shale)
ITB	interbedded	BCC	coarse grained beds >> fine grained beds (relative abundance of interbedded sediments: eg - sandstone and shale)
XBD	cross bedded (including trough and ripple cross bedding)	BGR	bedding - graded bedding

Volcano-Sedimentary Terms / Textures

AP	accretionary lapilli	LC	lithic / lithic clasts
ASH	ash / ash-rich (in matrix)	MM	momomict (conglomerates / volcanic sediments / volcanic breccias)
BIM	bimodal (generally grainsize for sediments - can be for composition of volcanic clasts)	PM	polymict (conglomerates / volcanic sediments / volcanic breccias)
XTR	crystal-rich / crystal fragments		

ROCK TEXTURES (cont'd):

Volcanic Terms / Textures

PH	phyric: for lavas with phenocrysts (use porphyritic / porphyroblastic for igneous / metamorphic rocks)	SX	spinifex textured; undifferentiated (specific to komatiites, may also occur at quench / contact zones)
APH	aphanitic (glassy lavas)	SXC	coarse spinifiex
FB	flow banded	SXF	fine spinifex
PLW	pillowed (for lavas)	SXM	medium spinifex
HYA	hyaloclastite / hyaolclastitic	SXR	randomly oriented spinifiex grains
PP	peperite / peperitic (lava intruding wet, unconsolidated sediments)	SXS	sheaf / book spinifex grains
SPH	spherultic	SXO	olivine spinifex
PBD	pebble dykes	SXP	pyroxene spinifex
VS	vesicular, amygdaloidal (in lavas)		
WLD	welded (for use in pumiceous tuffs / volcaniclastic rocks / ignimbrites): MUST have evidence of compaction or flowage	SXB	sheeted pyroxene spinifex ("stringy beef" texture)
PUM	pumiceous / pumice / scoria fragments		

Igneous / Metamorphic Terms / Textures

ACL	acicular / needle-like minerals (not bladed / spinifex textured)	AC	cumulate textured: adcumulate (generally in ultramafic rock or layered intrusions)
ATO	atoll textured grains (eg: quenched olivine crystals)	MC	cumulate textured: mesocumulate (generally in ultramafic rocks or layered intrusions)
AUG	augen textured	OC	cumulate textured: orthocumulate (generally in ultramafic rocks or layered intrusions)
INT	intruded / intercalated	LEU	leucocratic (<35% ferro-magnesian / dark minerals)
HF	hornfels / hornfelsed	MES	mesocratic (35-65% ferro-magnesian / dark minerals)
SCC	saccharoidal / sugary (mainly for metamorphic rocks)	MEL	melanocratic (>65% ferro-magnesian / dark minerals)
GN	gneissose	PMM	melanosome (partial melt texture)
GRP	graphic textured (as in granites & pegmatites)	PML	leucosome (partial melt texture)
SKL	skeletal grains	MIA	miarolitic cavities
SOP	sub-ophitic	MIG	migmatitic
HRS	harrisitic grains, distinct from acicular grain (eg: harrisitic olivine in komatiite)	MYR	myrmektite
HPR	hopper grains (olivine mineral texture)	OPH	ophitic (distinct in some dolerites)
HYP	hypidiomorphic	PK	poikolitic
IDO	idiomorphic	PO	porphyritic (generally for intrusive rocks) / porphryoblastic (metamorphic rocks)
VRT	varitextured	BOU	boudinaged
LAY	layered (for igneous rocks only, use bedding terms for sediments)	PTG	ptygmatic (as in ptygmatically veined gneiss)

Breccia Clast (compostions / litholotypes)

X$	breccia clast; sulphidic (undiff)	XI	breccia clast; intermediate (undiff)
XS	breccia clast; sediment (undiff)	XIV	breccia clast; intermediate volcanic
XSU	breccia clast; fine grained sediment (shale, slate, mudstone sitlstone etc…)	XM	breccia clast; mafic (undiff)
XSD	breccia clast; medium grained sediment (arkose, sandstone etc…)	XMV	breccia clast; mafic volcanic
XSC	breccia clast; coarse grained sediment	XDD	breccia clast; doleritic
XCB	breccia clast; carbonate / limestone	XDG	breccia clast; gabbroic
XC	breccia clast; chert / BIF	XDA	breccia clast; anorthositic
XF	breccia clast; felsic (undiff)	XDT	breccia clast; troctolitic
XFV	breccia clast; felsic volcanic	XU	breccia clast; ultramafic (undiff)
XGR	breccia clast; granitic	XPX	breccia clast; pyroxenitic
XDI	breccia clast; dioritic	XPD	breccia clast; peridotitic

ROCK TEXTURES (cont'd):

Sulphide Textural Terms

Note: Use ORE MINERAL FIELDS to describe habits of important / ore minerals

NT	net-textured sulphides	STR	stringer sulphides
NTR	reverse net-textured sulphide		

Structural Terms / Textures

DH	downhole facing direction (younging direction)	FO	fold / folded (undifferentiated style)
UH	uphole facing direction (younging direction)	FM	fold: M-fold (looking up-hole)
CLV	cleavage	FS	fold: S-fold (looking up-hole): use ONLY in oriented drill co or if cleavage relationships can be determined
FOL	foliated (tightly spaced cleavage to weakly sheared)	FZ	fold: Z-fold (looking up-hole): use ONLY in oriented drill co or if cleavage relationships can be determined
SZ	strongly schistose	CRN	crenulated
MYL	mylonitic - strongly sheared	LIN	lineated (as in L- and L-S tectonites)
STY	stylolite / stylolitic		

MINERAL SPECIES:

Metal / Ore / Sulphide Minerals

CU	Native copper	ILM	Ilmenite
AU	Native gold	LOE	Loellingite
AG	Native silver	MAL	Malachite
ELT	Electrum	MAR	Marcasite
PT	Platinum	ML	Millerite
PD	Palladium	MO	Molybdenite
ALL	Allanite	MNZ	Monazite
AN	Antinomy	NIC	Niccolite / Nickeline (NiAs)
AGT	Argentite	ORP	Orpiment
AS	Arsenopyrite	PN	Pentlandite
AZR	Azurite	PBL	Pitchblende
BI	Bismuthanite / Bismuth	PY	Pyrite
BO	Bornite	PO	Pyrrhotite
CAS	Cassiterite (tin)	SCH	Scheelite
CER	Cerussite (Pb Carbonate)	SP	Sphalerite
CH	Chalcocite	STB	Stibnite
CP	Chalcopyrite	SXX	Sulphide: unknown
CR	Chromite	S	Sulphur
CRY	Chrysocolla	TA	Tantalite
CNB	Cinnabar	TEL	Telluride (undifferentiated)
CBT	Cobaltite	TNN	Tennantite
CV	Covellite	TET	Tetrahedrite
CUB	Cubanite (Cu sulphide)	TBN	Torbenite (Cu-U Phosphate)
CUP	Cuprite	TRL	Troilite (FeS in meteroites)
DMD	Diamond	URN	Uranite
DSP	Diaspore (assoc with bauxite)	VIO	Violarite (Ni_2FeS_4)
ENR	Enargite	WO	Wolframite
GA	Galena	WLL	Willemite ($ZnSi0_2$)
GNT	Garnierite (Ni laterites)	WUR	Wurtzite
GDF	Gersdorffite (Ni(Pt)AsS)	ZIN	Zincite (ruby zinc)
GBB	Gibbsite (bauxite mineral)	ZRC	Zircon

Carbonate Minerals

CB	Carbonate (undifferentiated)	DLM	Carbonate - Dolomite
ANK	Carbonate - Ankerite	MGN	Carbonate - Magnesite
CT	Carbonate - Calcite	SD	Carbonate - Siderite
ARG	Aragonite	RDC	Rhodocrosite (Mn-carbonate)
HZC	Hydrozincite	SMT	Smithsonite (Zn carbonate)

MINERAL SPECIES (cont'd):

Silicate Minerals

AXN	Axinite	ALB	Feldspar - Albite
BRL	Beryl	AMZ	Feldspar - Amazonite (Pb - bearing)
BST	Bustamite	ANO	Feldspar - Anorthite
FLR	Flourite	LAB	Feldspar - Labradorite
EPD	Epidote	MCR	Feldspar - Microcline
CLZ	Clinozoisite (epidote mineral)	OLG	Feldspar - Oligoclase
PDM	Piedmontite / Piemontite (red-brown epidote)	ORT	Feldspar - Orthoclase
SPN	Sphene / Titanite	PLG	Feldspar - Plagioclase
TPZ	Topaz	KFS	Feldspar - Potassium-feldspar (undiff)
TML	Tourmaline (undifferentiated)	SAN	Feldspar - Sanidine
AMP	Amphibole (undifferentiated)	FLD	Feldspar (undifferentiated)
ACT	Amphibole - Actinolite	PRX	Pyroxene (undifferentiated)
ANT	Amphibole - Anthophyllite	AUG	Pyroxene - Augite / Aegerine
CUM	Amphibole - Cummingtonite	BRZ	Pyroxene - Bronzite (opx)
GRN	Amphibole - Grunerite	CPX	Pyroxene - Clinopyroxene (undiff)
HMQ	Amphibole - Holmquistite (K-bearing)	DIO	Pyroxene - Diopside (cpx)
HBL	Amphibole - Hornblende	ENS	Pyroxene - Enstatite (opx)
TRM	Amphibole - Tremolite	HEN	Pyroxene - Hendenbergite (cpx: Fe-rich end member to Diopside)
ATG	Asbestos - Antigorite	HYP	Pyroxene - Hypersthene (opx)
ACR	Asbestos - Chrysotile	OMP	Pyroxene - Omphacite (cpx)
ASB	Asbestos (undifferentiated)	OPX	Pyroxene - Orthopyroxene (undiff)
QZ	Quartz (use for mesothermal grains)	SPO	Pyroxene - Spodumene (Li-bearing cpx)
QZS	Quartz: (sub)chalcedonic silica (amorphous) - common in epithermal veins	RHD	Rhodonite (pyroxenoid)
AMT	Quartz: Amethyst	OLV	Olivine (undifferentiated)
QZB	Quartz: blue quartz (BH type)	FAY	Olivine - Fayalite
QZM	Quartz: microcrystalline	FOR	Olivine - Forsterite
SI	Silica / Silicified (use for alteration instead of quartz)	ZEO	Zeolite (undifferentiated)
LAZ	Feldspathoid - Lazurite	LAU	Zeolite - Laumontite
LEU	Feldspathoid - Leucite	NAT	Zeolite - Natrolite
NPH	Feldspathoid - Nepheline	PRE	Zeolite - Prehnite
SOD	Feldspathoid - Sodalite	PUM	Zeolite - Pumpellyite
		SLB	Zeolite - Stilbite

Metamorphic Minerals

AND	Andalusite	GAR	Garnet (undifferentiated)
SLM	Sillimanite	ALM	Garnet - Almandine
KYA	Kyanite	ADR	Garnet - Andradite
COR	Cordierite	GGR	Garnet - Grossular
STR	Staurolite	PYP	Garnet - Pyrope
GHN	Gahnite (Zn-spinel)	SPS	Garnet - Spessertine / Spessarite
SCA	Scapolite (Ca-rich m'mic rocks / alt'n of plagioclase)	GLP	Glaucophane
SPL	Spinel	JAD	Jadeite (Hi-P pyroxene)
WLS	Wollastonite (Ca-pyroxenoid)	SPP	Sapphirine (Hi-P m'mic)
CRS	Cristobalite (Hi-T quartz)		

Epithermal / Porphyry Minerals

ADU	Adularia	KAO	Kaolinite
ALU	Alunite	MTM	Montmorillonite
DIK	Dickite	PYR	Pyrophyllite
ILT	Illite	SMC	Smectite
CLY	Clay (undifferentiated: illite / dickite / kaolinite / smectite……)		

Oxide Minerals

OX	Oxides (undifferentiated)	MGH	Maghemite
GOE	Goethite / Limonite	MNO	Manganese Oxide
HEM	Haematite	MKT	Mushketovite (magnetite psuedomorph on hematite)
SPC	Specularite / Specular Hematite	PRL	Pyrolusite (MnO2)
MT	Magnetite	RUT	Rutile / Leucoxene

MINERAL SPECIES (cont'd):

Phyllosilicate Minerals			
SER	Sericite / Phengite	GLC	Glauconite
MV	Muscovite	GPH	Graphite
BT	Biotite	LEP	Lepidolite
PHG	Phlogopite	PRG	Paragonite
BRU	Brucite (Mg(OH)2	PRV	Perovskite
CHL	Chlorite	SRP	Serpentine
TLC	Talc	STC	Stichtite (Mg-Cr muscovite, bright purple in serpentinite)
FU	Fuchsite (Cr muscovite)	STL	Stilpnomelane

Sulphate / Phosphate / Other Minerals			
ANH	Anhydrite	GYP	Gypsum
APA	Apatite	HAL	Halite / Salt
BAR	Barite	JAR	Jarosite
CRN	Corundum	SUL	Sulphates (undifferentiated)

VEINS & STRUCTURE:

Vein Type Codes			
BL	Bladed (epithermal veins)	PT	Ptygmatic veins
BN	Banded (eg: by mineral composition)	SH	Sheeted (numerous thin veins with similar orientation)
BX	Hydrothermal breccia	ST	Stringer veins
CB	Comb-textured ("sparry / dog-tooth")	SW	Stock-work (numerous veins with 2-3 dominant orientations)
CD	Chalcedonic	SY	Stylolitic veins
CF	Colloform (eg: fine rhythmic banding in epthermal veins)	TG	Tension gashes / en-echelon veins
LA	Laminated veins	VL	Veinlets - very thin, minor veins
MA	Massive vein (ie: massive quartz vein)	VU	Vugghy / drusy (open space)
PG	Pegmatitic / Pegmatite (granitic "veins")		

Degree of Shearing

% Breaks	Definition
0	**Unfoliated and undeformed rock**
10	**Very weak or incipient foliation;** no associated mineral growth or recrystallisation (may be mistaken for flow banding) stylolites, spaced cleavages
20	**Weak foliation;** continuous or slatey cleavages and other primary flattening deformation involving mineral alignment
30	**Moderate foliation;** poorly developed metamorphic segregation
40	**Strong foliation;** development of segregation banding. Micaceous minerals dominant to sub-dominant; pervasive foliation, original rock type discernible
50	**Schistocity;** moderate to strong segregation banding; some primary structures preserved; most textures destroyed in volcanic rocks preserved in sediments and phaneritic rocks
60	**Schistocity;** strong mineral segregation into compositional laminae
70	**Schistocity;** strong foliation with slickensiding and mineral growth on s-surfaces, broken rock.
>80	**Mylonite / cataclastite**

VEINS & STRUCTURE (cont'd):

Structure Types Max of 1 descriptor per feature / structure measured.			
S0	Bedding / Geological Contact	L	Lineation: undifferentiated
S1	1st Fabric / Cleavage (if structural relationships known accurately)	LM	Mineral lineation
S2	2nd Fabric / Cleavage (if structural relationships known accurately)	L1	Lineation related to 1st fabric / cleavage
S3	3rd Fabric / Cleavage (if structural relationships known accurately)	L2	Lineation related to 2nd fabric / cleavage
S4	4th Fabric / Cleavage (if structural relationships known accurately)	L3	Lineation related to 3rd fabric / cleavage
SA	Fabric / Cleavage - Axial Plane to fold (if structural relationships not accurately known)	L4	Lineation related to 4th fabric / cleavage
SE	Early Fabric / Cleavage - based on observed relationships/timing (if structural relationships not accuratel known)	FA	Fold axis / fold hinge: undifferentiated
SL	Late Fabric / Cleavage - based on observed relationships/timing (if structural relationships not accuratel known)	F1	Fold axis: 1st deformation event
SZ	Shear	F2	Fold axis: 2nd deformation event
SZDS	Shear with dip-slip movement sense (unable to determine if Reverse or Normal Shear)	F3	Fold axis: 3rd deformation event
SZDX	Shear with dextral movement sense (as determined by kinematic indicators)	F4	Fold axis: 4th deformation event
SZNM	**Normal Shear** (as determined by kinematic indicators)	FL	Foliation (default fabric/foliation if structural relationships ar not known)
SZRV	**Reverse Shear** (as determined by kinematic indicators)	FT	Fault (undifferentiated)
SZSS	Shear with strike-slip movement sense (unable to determine if Sinistral of Dextral movement)	FTDS	Fault with dip-slip movement sense (unable to determine if Reverse or Normal Fault)
SZSX	Shear with sinistral movement sense (as determined by kinematic indicators)	FTDX	Fault with **dextral** movement sense (as determined by kinematic indicators)
BD	Banding - in metamorphic rocks:***NOT*** bedding	FTNM	**Normal Fault** (as determined by kinematic indicators)
BX	Breccia	FTRV	**Reverse Fault** (as determined by kinematic indicators)
IC	Geological Contact - Intrusive	FTSS	Fault with strike-slip movement sense (unable to determine if Sinistral of Dextral movement)
JN	Joint	FTSX	Fault with **sinistral** movement sense (as determined by kinematic indicators)
VN	Vein - undifferentiated (put composition in Vein Type & Vei Minerals columns)		

ALTERATION:

Breaks (%)	Alteration Intensity Guidelines: Definition
0	No alteration
10	Weak alteration
30	Moderate alteration
50	Strong alteration, replacement of mineralogy, fabric preserved
80	Intense alteration, near-total replacement of original fabric and mineralogy

ALTERATION (cont'd):

Nature / character / setting of ALTERATION (not composition)
Fracture / plumbing network that allows fluid access to the rock-mass
Maximum of 1 descriptor to be used. Use dominant/main descriptor.

prefix U:

UNDIFFERENTIATED / UNIDENTIFIED plumbing - ONLY for use when unable to confidently identify plumbing system for the alteration (eg: in large-scale High-sulphidation epithermal systems)

UP	**Pervasive** overprint without shearing	UC	Preferential replacement of **clast** in fragmental / clastic rock.
UI	**Irregular** or patchy alteration	UB	Preferential replacement of **bedding** in fragmental / clastic rock.
UX	Preferential replacement of **matrix** in fragmental / clastic rock.	UM	Preferential replacement of **specific mineral species** within rock-mass (distinct from pervasive alteration)

prefix S:

SHEARING / FOLIAITON acting as plumbing / pathway for alteration fluids (eg: in orogenic deposits)

SP	**Pervasive** within zone of shearing	SC	Preferential replacement of **clast** in fragmental / clastic rock - *ONLY* if still identifiable as clasts (eg: relict pebbles or cobbles are recognisable)
SI	**Irregular** or patchy alteration within shear	SB	Preferential replacement of **bedding** in fragmental / clastic rock - *ONLY* if bedding is preserved and recognisable
SX	Preferential replacement of **matrix** in fragmental / clastic rock - *ONLY* if still identifiable as matrix (eg: relict pebbles or cobbles are recognisable)	SM	Preferential replacement of **specific mineral species** within rock-mass (distinct from pervasive alteration)

prefix V:

Selvedge to VEIN / VEIN-SET that is the likely feature that acted as plumbing / pathway for alteration fluids

VP	**Pervasive** alteration centred on the vein / vein-set	VC	Preferential replacement of **clast** in fragmental / clastic rock
VI	**Irregular** or patchy alteration adjacent to the vein / vein-set	VB	Preferential replacement of **bedding** in fragmental / clastic rock - can produce the classic "telegraph" or "chirstmas-tree" alteration patterns at the local and/or deposit scale
VX	Preferential replacement of **matrix** in fragmental / clastic rock	VM	Preferential replacement of **specific mineral species** within rock-mass (distinct from pervasive alteration)

prefix W:

Alteration assoicated with a STOCKWORK set of veins that is the likely feature that acted as plumbing / pathway for alteration fluids

WP	**Pervasive** alteration centred on the vein stockwork	WC	Preferential replacement of **clast** in fragmental / clastic rock
WI	**Irregular** or patchy alteration adjacent to the vein stockwork	WB	Preferential replacement of **bedding** in fragmental / clastic rock
WX	Preferential replacement of **matrix** in fragmental / clastic rock	WM	Preferential replacement of **specific mineral species** within rock-mass (distinct from pervasive alteration)

prefix X:

HYDROTHERMAL BRECCIAS

X	Alteration associated hydrothermal / vein breccias (for alteration intensity >30% only). *NOTE* - different ambient conditions related to brecciation (eg: P & T) can produce modified alteration products from the same ore fluid

ORE MINERAL HABITS:

Ore Mineral Habits			
AC	Acicular	IC	Intercumulus
AG	Mineral aggregates	IN	Inclusions
AM	Amorphous	IT	Insterstitial
BC	Breccia clast	IR	Irregular
BD	Bedded (distinct from replacement of bedding)	MA	Massive
BL	Blebby	NT	Net-textured
BM	Breccia matrix	PK	Poikolitic
BN	Banded (distinct from replacement of bedding)	PV	Pervasive
BO	Botryoidal / mammillated	RA	Radiating
BX	Brecciated	RB	Preferential replacement of bedding (sediment / volcaniclastic)
CF	Colloform	RC	Preferential replacement of clasts (sediment / volcaniclastic)
CO	Concretion(s)	RM	Preferential mineral replacement
CV	Cleavage plane / foliation (along / aligned)	RN	Reverse net-textured
DN	Dendritic	RX	Preferential replacement of matirx (sediment / volcaniclastic)
DS	Disseminated	SM	Semi-massive
FB	Framboydal	ST	Stringer
FL	Flame-textured	TL	Telegraph
HD	Heavy disseminated	VN	Internal to vein
HY	Hydrothermal breccia infill (part of)	VS	Vein selvedge

REGOLITH & WEATHERING:

Regolith & Weathering Guidelines

Code	Description
TPD	**Transported or superficial deposits:** Material that has undergone significant transportation from source (eg: loess, gravels or colluvium). *NOT* scree.
SOIL	**Residual soil:** Dervided from basement / bedrock material
LAT	**Lateritic residuum:** Duricrust and lateritic gravels; complete replacement of primary and secondary fabric (rare in China) *NOTE:* Silcrete and ferricretes are often transported and not residual landform features.
USAP	**Upper saprolite:** Lack of primary rock fabric; clay dominated; leached or secondary cemented.
REDOX	**Redox front:** Strong Fe-rich zone between upper and lower saprolite denoting base of leaching of upper saprolite. Usually strongly goethitic (yellow) if acidic or occasionally hematitic (red) if alkaline. Generally <5m thick. *Not always present / identifiable*
LSAP	**Lower saprolite:** Clay mineral dominated; <70% secondary oxides; primary fabric preserved; sulphides absent or replaced; may preserve rock colour.
SAPRK	**Saprock:** <20% secondary oxides; fine detail in fabric preserved; sulphides weathered; preserved felsic minerals
FRESH	**Fresh rock:** Fresh sulphides and silicates.

PERCENTAGE RANGES:

To be used for: Mineral%, Shearing, Alteration Intensity, Vein%, Ore Mineral% & Sample Recovery

0, 0.5 (trace), 1, 2, 3, 5, 7, 10 (only 5% increments after 10%), 15, 20, 25, 30, 35……..85, 90, 95, 100

GEOTECHNICAL LOGGING CODES:

ROCK STRENGTH

Code	DEFINITION & DESCRIPTION
VW	**VERY WEAK:** Crumbles, can scratch with finger-nail, cut & peel with knife (eg: Clay)
W	**WEAK:** Can scratch with iron nail, can cut but not peel with knife (eg: Gypsum)
M	**MEDIUM:** Scratch with nail with difficulty, scratch with knife hammer 2-3 mm dent multiple blows to break
S	**STRONG:** Difficult to scratch with a knife, hammer makes small dent (>1-2 mm), multiple blows to break
VS	**VERY STRONG:** Hammer causes superficial damage (eg: Silicified rhyolite & BIF)

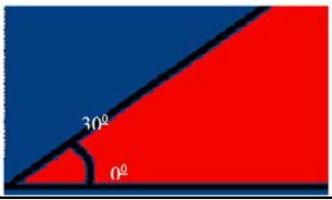
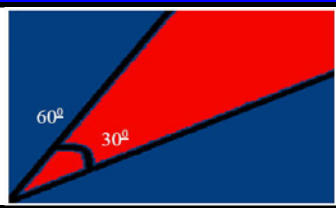
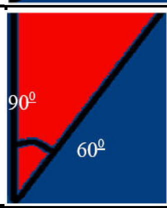
NUMBER OF FRACTURE SETS (NFS)

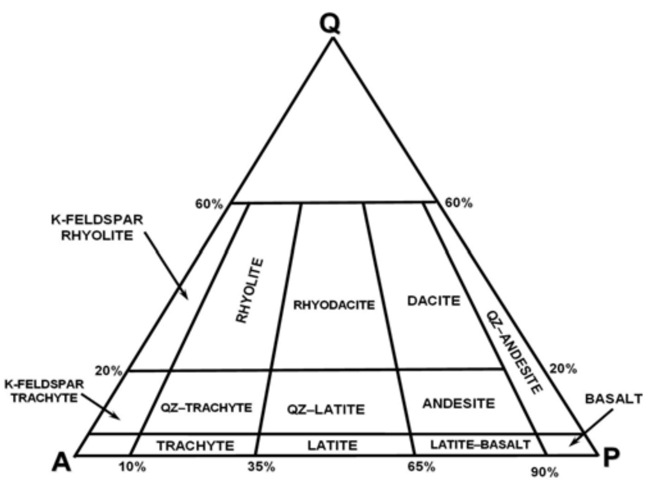
Any whole number equal or greater than 0 (no decimals).

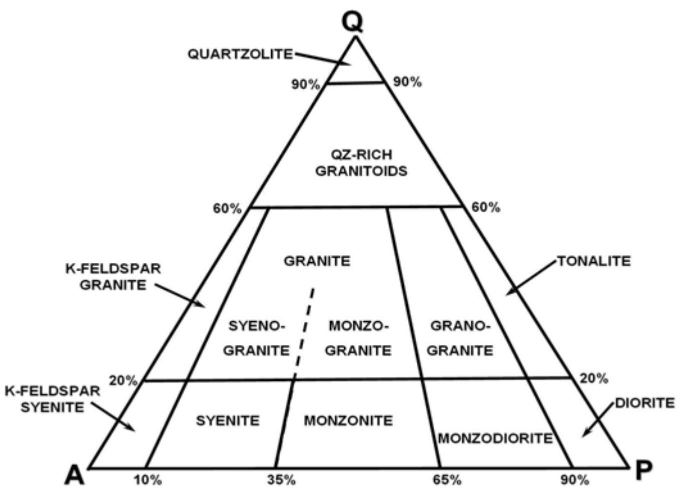
FRACTURE ROUGHNESS

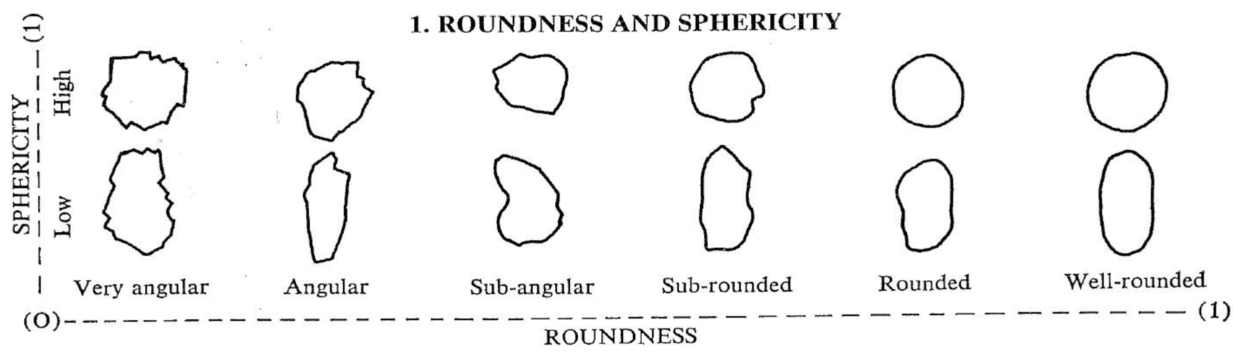
-	No Fractures		
PR	Planar rough	PP	Planar polished
PS	Planar smooth	PK	Planar slickensided
SR	Stepped rough	SP	Stepped polished
SS	Stepped smooth	SK	Stepped slickensided
UR	Undulating rough	UP	Undulating polished
US	Undulating smooth	UK	Undulating slickensided

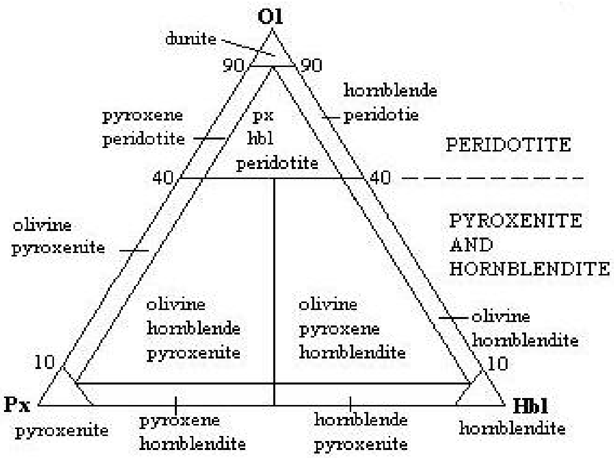
FRACTURE ANGLE TYPE CATEGORIES

Type 1 (0^o to 30^o)		**Type 2 (30^o to 60^o)**	
Core Axis		**Type 3 (60^o to 90^o)**	






1. ROUNDNESS AND SPHERICITY
(1)
SPHERICITY
High
Low
Very angular
Angular
Sub-angular
Sub-rounded
Rounded
Well-rounded
(O)
(1)
ROUNDNESS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PYROXENITE
AND
HORNBLENDITE
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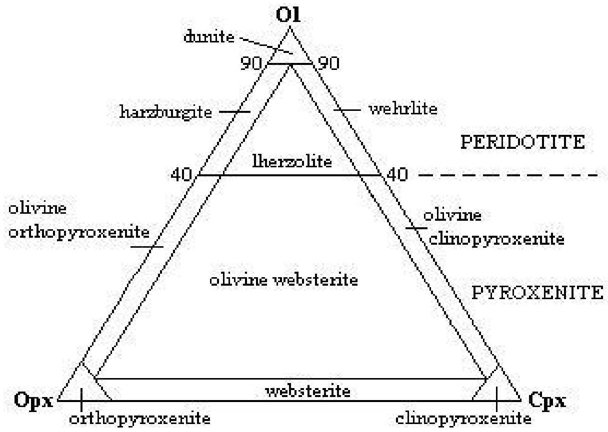
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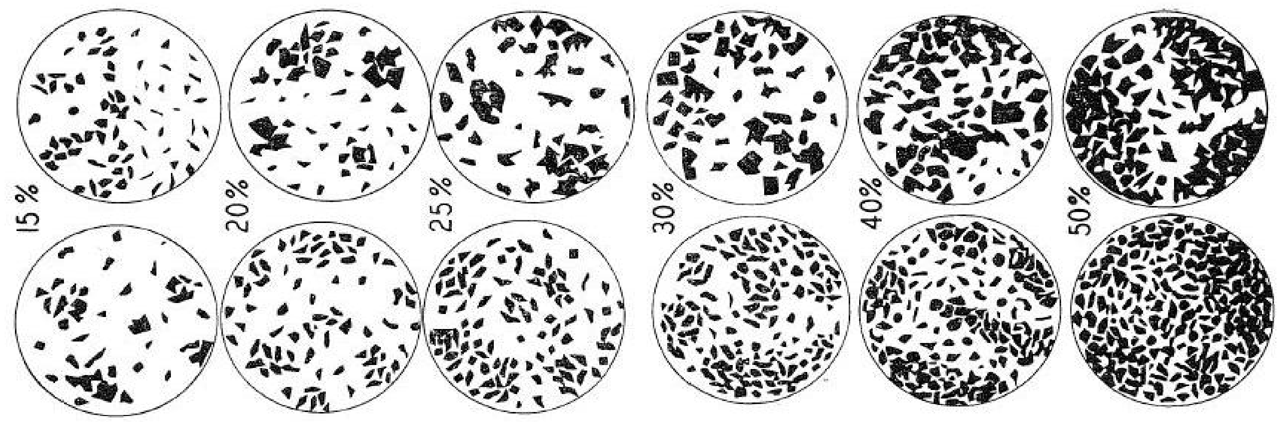
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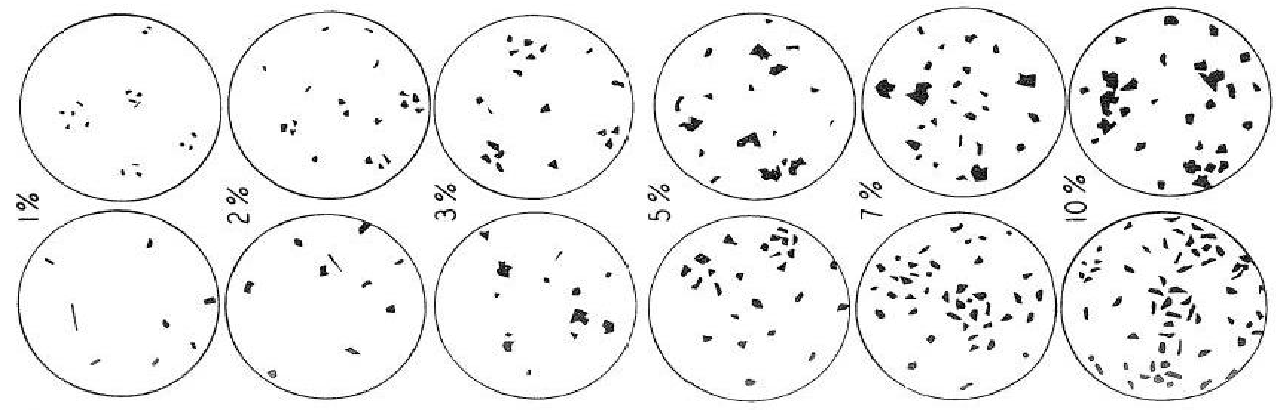
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7%
10%

Colour Codes:

Colour Code	Colour Description	Colour Code	Colour Description	Colour Code	Colour Description
-	Not logged	KH	Khaki	RD	Red
BK	Black	KH1	Light Khaki	RD1	Light Red
BK1	Light Black	KH2	Dark Khaki	RD2	Dark Red
BK2	Dark Black	OR	Orange	TN	Tan
BN	Brown	OR1	Light Orange	TN1	Light Tan
BN1	Light Brown	OR2	Dark Orange	TN2	Dark Tan
BN2	Dark Brown	PK	Pink	WH	White
BU	Blue	PK1	Light Pink	WH1	Light White
BU1	Light Blue	PK2	Dark Pink	WH2	Dark White
BU2	Dark Blue	PU	Purple	YE	Yellow
GN	Green	PU1	Light Purple	YE1	Light Yellow
GN1	Light Green	PU2	Dark Purple	YE2	Dark Yellow
GN2	Dark Green				
GY	Grey				
GY1	Light Grey				
GY2	Dark Grey				

Drill Hole Types:

Drill Type	Drill Type Description
AC	Air Core Drill Hole
AUG	Auger Drill Hole (for geochemical sampling)
DDH	Diamond Drill Hole
PC	Percussion Drill Hole (open hole)
RAB	RAB Drill Hole
RC	Reverse Circulation Drill Hole
RCX	Reverse Circulation Drill Hole with Cross-over
TRENCH	Trench (treat as horizontal drill hole in database)
TUNNEL	Tunnel (treat as horizontal drill hole in database)
VAC	Vacuum

Drill Extensions / Re-entries:

Extension Type	Description
NONE	None
RE-ENTRY	Re-entry
WEDGE	Wedge

Naming convention for wedges / daughter holes:

Description	Hole Name
Parent / Mother Hole	SXDD105
1^{st} Wedge / Daughter Hole	SXDD105W1
2^{nd} Wedge / Daughter Hole	SXDD105W2
3^{rd} Wedge / Daughter Hole	SXDD105W3
4^{th} Wedge / Daughter Hole	SXDD105W4

Sample Type Codes:

Sample Type Code	Sample Type	Sample Type Code	Sample Type
WHCORE	Whole Core	PETROLOGY	Petrology sample
1/2CORE	1/2 Core Sample	ROCK	Rock Chip samples (trench / rock / tunnel)
1/3CORE	1/3 Core Sample	SOIL	Soil samples
1/4CORE	1/4 Core Sample	STREAM	Stream Sediment samples
AC 1m	Air core drilling 1m samples	AUGER	Auger Samples
AC 2m	Air core drilling 2m samples	VEG	Vegetation sample
AC 3m	Air core drilling 3m samples	STANDARD	Sample Standard / Blank (details in Sample Category)
AC 4m	Air core drilling 4m samples		
MUD 1m	Mud Rotary 1m sludge sample	RAB 1m	RAB drilling 1m samples
MUD 2m	Mud Rotary 2m sludge sample	RAB 2m	RAB drilling 2m composite samples
MUD 3m	Mud Rotary 3m sludge sample	RAB 3m	RAB drilling 2m composite samples
MUD 4m	Mud Rotary 4m sludge sample	RAB 4m	RAB drilling 4m composite samples
MUD 6m	Mud Rotary 6m sludge sample	RC 1m	RC Drilling 1m samples
PC 1m	Open Hole Percussion 1m samples	RC 2m	RC Drilling 2m composite samples
PC 2m	Open Hole Percussion 2m composite samples	RC 3m	RC Drilling 3m composite samples
PC 3m	Open Hole Percussion 3m composite samples	RC 4m	RC Drilling 4m composite samples
PC 4m	Open Hole Percussion 4m composite samples		

Note 1: For drill chip samples from RAB / AC / RC etc… choose the sample type used for the compositing interval. A smaller interval sample type will have a higher rank in the database than a wider sample interval. EG: If a 4m composite is resampled as 1m samples the assay results from an AC 1m sample will supersede an AC 4m sample. For database integrity the re-sampling is required to be done within the original composite sample interval.

Note 2: For drill core it is important to document what core remains in the core trays – samples are classed accordingly.

Sample Categories, used to identify / document standards, blanks and duplicate samples.

SampCat Code	Sample Category	SampCat Code	Sample Category
BLANK	Blank Sample (either quartz or barren country rock)	STD OREAS 13P	Mineralised Gabbro Norite (Disseminated NiS)
DUPLICATE	Duplicate sample from same site / interval	STD OREAS 14P	Massive Sulphides (2.1%Ni)
ORIGINAL	Original Sample	STD OREAS 24P	Unmineralised Gabbro
STD AANI-2		STD S2	
		STD S3	
		STD S4	

APPENDIX 3
SOIL GEOCHEMISTRY

APPENDIX 4
RAB GEOCHEMICAL DIGITAL DATA

APPENDIX 5
PETROLOGY REPORT

Report Name:	**Petrology of RAB holes (LYRB08-118 to 144).** **at the Lynd Project - Dido Dam.** **Tenement Number EPM15915.**
Author:	**Fiona Best – PHD Candidate** **CODES University of Tasmania**
Date:	**April – May 2009**

Representative rock chips from each of the 27 RAB holes (LYRB08-118 to 144) drilled at the Lynd Project, Dido Dam, EPM15915, were thin sectioned and studied at the University of Tasmania. An overview of the main lithologies observed in these holes is given in *Table 1* and *Figure 1*, and the end of hole geology of each RAB hole is detailed in *Table 2*.

The basement geology of the area of EPM15915 covered by the RAB holes is dominated by medium grained, foliated diorites and tonalites. Hornblende is the main mafic phase in both rock types, and biotite is widespread but generally less abundant. Plagioclase is the dominant felsic phase in the diorites, with k-feldspar and quartz becoming more significant in the tonalites. It was common to observe gabbro, diorite and tonalite in individual RAB holes suggesting a close association and gradual transition between these rock types. Most RAB holes contained chips of finer grained gabbros and metagabbros (amphibolites) which are interpreted as mafic dykes. Rare ultramafic rocks consisting of wehrlites, pyroxenites and hornblendites were also observed in the drilled area. RAB chips composed entirely of opaques (magnetite) were associated with the pyroxenite.

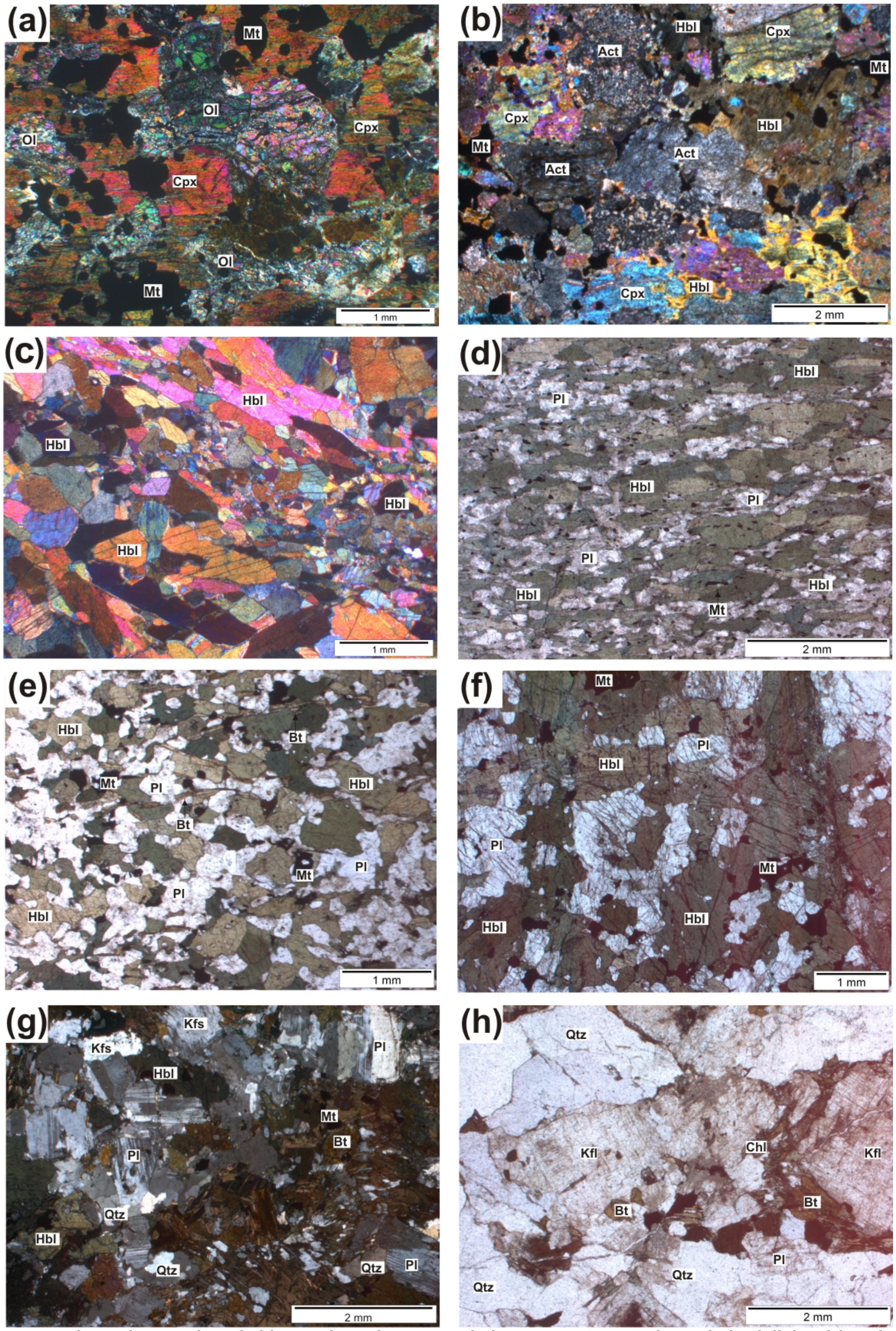

Figure 1: Photomicrographs of thin sections from RAB holes, EMP15915, under polarized light: (a) wehrlite composed of cumulus olivines (partially serpentinised), clinopyroxene and magnetite (cross polarised light); (b) clinopyroxenite composed of interlocking clinopyroxenes and partially actinolite-replaced pyroxenes, oikocrystic hornblende, and intercumulus magnetite (cross polarised light); (c) hornblendite composed entirely of interlocking euhedral to subhedral hornblendes (cross polarised light); (d) amphibolite composed of flattened and aligned hornblende and plagioclase and minor small magnetites (plane polarised light); (e) fine grained hornblende gabbro composed of interlocking subhedral hornblende and plagioclase, minor biotite laths and small magnetites (plane polarised light); (f) medium grained hornblende gabbro to diorite composed of interlocking hornblende and plagioclase and lesser magnetite (plane polarised light); (g) biotite hornblende quartz diorite composed of interlocking plagioclase, quartz, minor k-feldspar and clots of biotite and hornblende (cross-polarised light); and (h) biotite tonalite dominated by k-feldspar, quartz and plagioclase and containing minor clots of biotite/ chlorite (plane polarised light).

Rock type	Petrographic description
Wehrlite Ol (35), Cpx or Amp (55), Mt (<10)	• Equigranular, medium grained • 1mm rounded, fractured and partially serpentinised olivines • 1mm, intercumulus, oikocrystic clinopyroxenes • Clinopyroxenes entirely replaced by brown amphibole in places • Smaller 0.5 mm cumulate magnetites, often forming small clots and occassionally included in olivines and clinopyroxenes/ amphiboles • No sulphides
Clinopyroxenite Cpx (70), Hbl (25), Mt (5)	• Inequigranular, coarse grained • Rounded clinopyroxenes/ relic clinopyroxenes generally 1- 2 mm in size • Oikocrystic hornblendes (1-2mm) and smaller subhedral intercumulus hornblendes (<1mm) • Low amphibolite facies - Clinopyroxenes partially to entirely replaced by actinolite and have thin hornblende rims • Magnetite grains, <0.5 mm, occupies the intercumulus space and is enclosed within pyroxenes • Based on other rock chips from the same hole it is possible that the clinopyroxeneite contains >cm-scale veins/ clots of magnetite
Hornblendite Hbl (100)	• Variable texture - medium to fine grained • Euhedral to subhedral interlocking hornblendes • Hornblendes flattened in places defining a weak foliation
Amphibolite Hbl (50), Pl (45), Mt (5)	• Inequigranular, fine to medium grained • Hornblendes >1 mm, plagioclase <0.5 mm • Flattened, elongate hornblendes and plagioclase define a strong foliation • Magnetites <0.2mm, flattened and frequently enclosed within hornblende
Hornblende to hornblende biotite gabbro Hbd (40-45), Bt (5-10), Pl (40-45), Mt (2-5)	• Fine grained Equigranular, interlocking subhedral hornblende and plagioclase (partially altered by sericite). Laths of brown biotite define a weak foliation, <0.2 mm magnetites • Medium grained Granular, interlocking subhedral hornblende and plagioclase. Hornblende is deep green, often twinned and predominantly slightly larger (1-2 mm) than plagioclase (1 mm). Smaller rounded plagioclase crystals are commonly included in hornblende. Magnetites (generally <0.5 mm) have curved boundaries at the contact with hornblende and plagioclase.
Hornblende to hornblende biotite diorite Hbd (20-35), Bt (0-15), Pl (50-55), Qtz (<5),	• Medium to coarse grained • Equigranular, interlocking subhedral plagioclase and lesser hornblende • Biotite (when present) often forms mm-scale clots enclosing smaller anhedral plagioclase crystals and is frequently strained • Rare, rounded and partially actinolite altered clinopyroxenes • Minor, mm-scale patches of strained quartz • Small (<2 mm) magnetites generally closely associated with mafic minerals
Quartz diorite Hbd (15-20), Bt (0-10), Pl (60-65), Kfls (<5), Qtz (10-15), Mt (<1)	• Medium to coarse grained • Equigranular, dominated by interlocking subhedral plagioclase • Plagioclase is generally partially replaced by sericite • Deep green hornblendes are subhedral to slightly rounded and frequently enclose small rounded plagioclase laths • Biotite (when present) is generally small (<1mm) and occassionally forms minor clots
Tonalite Hbd (0-7), Bt (0-10), Pl (65-70), Kfls (5-10), Qtz (15-20)	• Medium to coarse grained • Equigranular interlocking plagioclase and quartz dominates • Feldspars are often partially replaced by sericite and epidote alteration is common in same samples • Dark brown biotite laths (when present) are generally smaller than the felsic minerals (<1mm) and frequently form small clots • Dark green subhedral hornblendes are frequently oikocrystic, enclosing small, rounded plagioclase • Generally weakly foliated, defined by a flattening of quartz and biotite alignment

Table 1: Modal compositions and major petrographic characteristics of the main lithologies observed in RAB holes from the EPM15915, Lynd area (modal composition in volume %)

Hole ID	End of hole geology
LYRB08-118	Qtz diorite (hbl + bt)
LYRB08-119	Gabbro (hbl + bt)
LYRB08-120	Diorite (hbl + bt)
LYRB08-121	Tonalite (bt)
LYRB08-122	Qtz diorite (hbl + bt)
LYRB08-123	Wehrlite
LYRB08-124	Metagabbro/ amphibolite
LYRB08-125	No thin section available
LYRB08-126	Diorite (hbl + bt)
LYRB08-127	Diorite (hbl)
LYRB08-128	Diorite (hbl)
LYRB08-129	Diorite (hbl)
LYRB08-130	Hornblendite and clinopyroxenite
LYRB08-131	Diorite (hbl)
LYRB08-132	Diorite (hbl + bt)
LYRB08-133	Diorite (hbl + bt)
LYRB08-134	Diorite (hbl)
LYRB08-135	Qtz diorite (hbl + bt + ep)
LYRB08-136	Qtz diorite (hbl + bt + ep)
LYRB08-137	Tonalite (hbl + chl)
LYRB08-138	Qtz diorite (hbl)
LYRB08-139	Qtz diorite (hbl)
LYRB08-140	Qtz diorite (hbl + bt)
LYRB08-141	Tonalite (hbl + bt)
LYRB08-142	Tonalite (hbl)
LYRB08-143	Diorite (hbl + bt)
LYRB08-144	Gabbro (hbl)

Table 2: End of hole geology, RAB holes LYRB08-118 to LYRB08-144