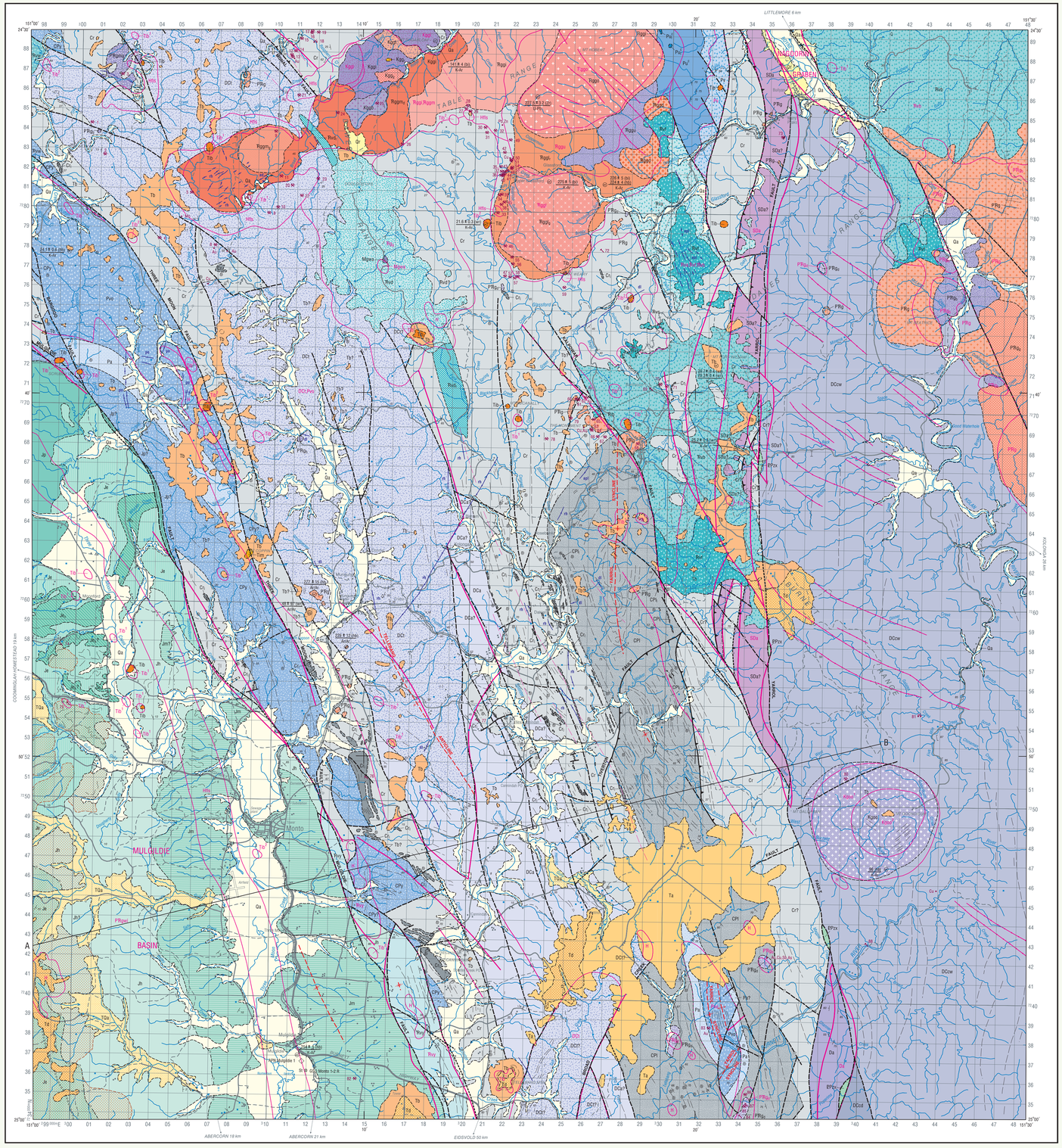
MONTO

QUEENSLAND

AUSTRALIA 1:100 000 GEOLOGICAL SERIES

SHEET 9148



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1:250 000 maps shown in blue

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Queensland Government
Natural Resources, Mines and Water

SCALE 1:100 000

KILOMETRES

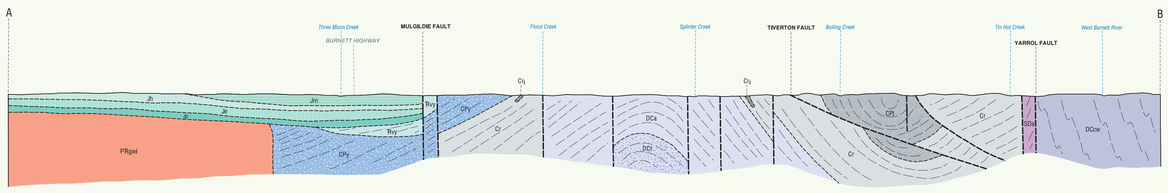
GREY NUMBERED LINES ARE 1 000 METRE INTERVALS OF THE MAP GRID OF AUSTRALIA 1994, ZONE 56
TRANSVERSE MERCATOR PROJECTION
HORIZONTAL DATUM: GEOCENTRIC DATUM OF AUSTRALIA 1994 (GDA94)

GDA

Geology: 1962-64 by J.F.Dear, R.G.McKellar and R.M.Tucker
: 1995-97 by G.A.Simpson, C.G.Murray and P.R.Blake
: 2000 by R.J.Bultitude
Mineral occurrence mapping: 1996-97 by D.A.Morwood
Compiled by G.A.Simpson, C.G.Murray and R.K.J.Blight
Cartography by C.W.Roberts, Graphic Services Unit, GSQ, Natural Resource Sciences, Department of Natural Resources, Mines and Water

SCHEMATIC SECTION

Calinzoic units omitted



QUATERNARY

- Qa1, Qa — Clay, silt, sand, gravel; intermediate terraces of Boyne River flood-plain alluvium / Clay, silt, sand, gravel; flood-plain alluvium
- Qr — Clay, silt, sand, gravel and soil; colluvial and residual deposits

TERTIARY - QUATERNARY

- TQa — Sand, mud and gravel; high-level alluvium and colluvium

TERTIARY

- Deep weathering profile; mottled leached and kaolinised rock
- Td — Indurated and ferruginised top of deep weathering profiles, locally including ferricrete
- Ta — Deeply weathered sandy claystone, clayey sandstone, minor gravel beds; old alluvium
- Tim — Olivine melilitite plug
- Tb — Basalt
- Tib — Basalt plug; Tb[1] - high to very high magnetic domain; Tb[2] - very low magnetic domain (reversely magnetised)

CRETACEOUS

Glasshford Igneous Complex

- Goondicum Gabbro — Kgbb — Layered troctolite, olivine-augite gabbro, biotite-hornblende-augite leucogabbro, ferrogabbro, anorthosite, clinopyroxenite, syenite dykes; Kgbb[1] - very high magnetic domain; Kgbb[2] - high magnetic domain
- Kgp — Rhyolite
- Tollbar Breccia — Kgp$_{gr}$ — White leucocratic fine to medium-grained alkali feldspar granite
- Burns Spur Nepheline Monzosyenite — Kggt — Coarse breccia, clasts dominantly altered grantoid
- Ridler Monzonite — Kgph — Altered pale pink medium-grained leucocratic ferrohastingsite-lepidomelane-melanite nepheline monzosyenite
- Kgpl — Pale grey leucocratic biotite-augite-hornblende syenite, biotite-hornblende-augite monzonite, ferrohastingsite-aegirine monzonite, biotite-hornblende-augite quartz monzonite, hornblende quartz monzodiorite, hornblende-biotite-augite gabbro and monzogabbro; high magnetic domain

JURASSIC

- Mulgildie Coal Measures — Jm — Carbonaceous mudstone, labile to quartzose sandstone, minor coal
- Hutton Sandstone — Jh — Fine to medium-grained, sublabile to quartzose sandstone, siltstone, mudstone, minor conglomerate and coal
- Evergreen Formation — Je — Oolitic ironstone, sandstone, siltstone / Labile and sublabile, fine to medium-grained sandstone, carbonaceous mudstone, siltstone and minor coal; local oolitic ironstone
- Precipice Sandstone — Jp — Thick-bedded, cross-bedded fine to coarse-grained, pebbly quartzose sandstone and minor lithic sublabile sandstone, siltstone and mudstone

TRIASSIC - CRETACEOUS

- Warrong Teschenite — Mgwa — Grey medium-grained ophitic olivine-titanaugite teschenite, locally banded; very low magnetic domain (reversely magnetised)

TRIASSIC

- Rgp — Basalt plug
- Winterbourne Volcanics — Rvo — Olivine basalt, pyroxene andesite, pebbly volcaniclastic sandstone; Rvs, Rvl, Rvb - moderate magnetic domain
- Rvl — Volcaniclastic sandstone and siltstone, shale
- Rvy — Rhyolitic ignimbrite, breccia and flows; clacitic to andesitic volcanic breccia; volcaniclastic sandstone; numerous aplite dykes; Rvs, Rvl, Rvb - moderate magnetic domain
- Rvrx — Purple volcaniclastic sandstone, conglomerate and breccia, pyroxene andesite; Rvs, Rvl, Rvb - moderate magnetic domain
- Rvw — Rhyolite, trachyte, ignimbrite, rhyolitic breccia, tuff, minor basalt
- Dooloo Tops Volcanics — Rvd — Rhyolitic ignimbrite, rhyolite, volcanic breccia
- Rvdc — Rhyolitic dyke swarm
- Cynthia beds — Rvy — Boulder conglomerate, lithic sandstone, rhyolitic and andesitic volcanics, siltstone, shale; moderate magnetic domain
- Rg$_{gr}$ — Granite, granodiorite, diorite; moderate magnetic domain

Glasshford Igneous Complex

- Deception Quartz Monzonite — Rgpt — Pink fine to medium-grained hornblende-biotite quartz monzonite and granite with granophyric groundmass and miarolitic cavities
- Robert Granite — Rggo — Pink fine to medium-grained hornblende granite and quartz monzonite with granophyric groundmass and miarolitic cavities; arfvedsonite granite; low to moderate magnetic domain
- Rule Gabbro — Rggu — Grey medium-grained ophitic biotite-hornblende-olivine-augite gabbro, augite dolerite; high magnetic domain
- Lawyer Granite — Rggd$_p$ — Pale pink medium-grained hornblende-biotite granodiorite and granite; Rggl - moderate magnetic domain
- Rggd$_l$ — Grey medium-grained augite-biotite-hornblende quartz monzodiorite, locally foliated; Rggl - moderate magnetic domain
- Littlemore Granodiorite — Rggl — Pinkish grey to grey medium to coarse-grained biotite-hornblende granodiorite and quartz monzodiorite; Rggl, Rggm - low to moderate magnetic domain

Glasshford Igneous Complex

- Monal Granodiorite — Rggm$_p$ — Pale grey to pink medium-grained hornblende-biotite granodiorite and granite; Rggl, Rggm - low to moderate magnetic domain
- Rggm$_d$ — Grey medium-grained biotite-hornblende granodiorite to quartz diorite; Rggl, Rggm - low to moderate magnetic domain

PERMIAN - TRIASSIC

- PRg — Granite, granodiorite, diorite; moderate magnetic domain
- PRg$_{gr}$ — Granite, granodiorite
- PRg$_{di}$ — Diorite, monzonite; moderate magnetic domain
- PRg$_{ga}$ — Gabbro; locally high magnetic domain
- Munholme Quartz Diorite — PRgm$_{di}$ — Grey medium-grained biotite-hornblende quartz diorite and tonalite, biotite-augite-hornblende diorite
- Wingfield Granite — PRgwl — Porphyritic hornblende-biotite granite, granodiorite, minor gabbro (concealed; in section); moderate magnetic domain

PERMIAN

- Pv — Porphyritic olivine basalt, altered amygdaloidal basalt and andesite; moderate magnetic domain
- Ps[2] — Quartzofeldspathic and volcanilithic sandstone, dark fossiliferous mudstone, siltstone, amygdaloidal basalt, limestone
- Ps[1] — Limestone, calcsilicates
- Owl Gully Volcanics — Pvo — Andesitic lava, lithic sandstone, siltstone; moderate magnetic domain
- Yarrol Formation — Pa — Sandstone, siltstone, limestone, chert, minor andesite

LATE CARBONIFEROUS - EARLY PERMIAN

- Youlambie Conglomerate — CPy — Granule to boulder polymictic conglomerate commonly with abundant granite and rhyolite clasts, felsic volcaniclastic sandstone, tuffaceous and carbonaceous siltstone, clacitic to rhyolitic ignimbrite, breccia, mudstone, minor coal
- Lorray Formation — CPl — Bryozoan-rich mudstone, fossiliferous siltstone, sandstone, granite-rich, quartz-bearing, polymictic conglomerate and subordinate crinoid-rich limestone
- CPk — Crinoid-rich skeletal limestone

EARLY CARBONIFEROUS

Curtis Island Group

- Rockhampton Group — Cr — Dark grey mudstone and siltstone; felsic volcaniclastic sandstone; ooid-bearing sandstone; ooid-bearing conglomerate with dark grey mudstone rip-up clasts; rounded polymictic conglomerate, oolitic limestone
- Crl — Oolitic limestone, calcareous sandstone

LATE DEVONIAN - EARLY CARBONIFEROUS

- Wandilla Formation — DCsw — Mudstone, lithic sandstone, siltstone, jasper, chert, slate and schist
- Doonside Formation — DCsd — Chert, jasper, mudstone, siltstone, lithic sandstone, tuff, limestone and altered basalt
- Mount Alma Formation — DCa — Thinly interbedded fine-grained sandstone and siltstone and thick beds of conglomerate with andesitic to clacitic volcanic clasts and siltstone rip-up clasts
- Three Moon Conglomerate — DCt — Green, grey to purple, granule to cobble andesitic to basaltic polymictic conglomerate, lithofeldspathic to feldspatholithic sandstone, siltstone, mudstone and andesite; minor acid tuff and fossiliferous limestone; rare basaltic pillow lava and hyaloclastite; high magnetic domain

LATE DEVONIAN

- Channer Creek beds — Da — Lithic sandstone, siltstone, conglomerate; moderate magnetic domain

LATE SILURIAN - EARLY DEVONIAN

- Calliope beds — SDa — Basaltic to andesitic (rarely dacitic and rhyolitic) volcaniclastic sandstone and conglomerate, limestone, siltstone, andesite; moderate to high magnetic domain

NEOPROTEROZOIC OR PALAEOZOIC

- BPzx — Serpentinite, serpentinised harzburgite, altered gabbro, minor pyroxenite (tectonically emplaced in Permian - Triassic)
- H — Unidentified high magnetic domain

TOPOGRAPHICAL AND CULTURAL FEATURES

- Highway
- Secondary road
- Minor road
- Vehicle track
- Railway
- Transmission line
- Homestead
- Building
- Trigonometrical station
- Tank or small dam
- Waterhole
- Windpump

GEOLOGICAL SYMBOLS

- Geological boundary
- Weathering boundary
- Fault
- Thrust fault, triangles pointing in direction of fault dip
- Shear zone
- Anticline
- Syncline
- Dyke or vein; ad - andesite, ap! - aplite, dl - dolerite, po - porphyry, rh - rhyolite

Where location of boundaries, faults and folds is approximate, line is broken; where inferred/queried; where concealed, boundaries and folds are dotted, faults are shown by short dashes

- Strike and dip of strata
- Strike and dip of strata, facing not known
- Strike and dip of overturned strata
- Trend line
- Lineament — Airphoto interpretation
- Joint pattern
- Strike and dip of cleavage
- Vertical cleavage

- 225.4 ± 5 (M) K-Ar — Isotopic age in millions of years; K-Ar - potassium-argon method, Ar/Ar - argon/argon method, U-Pb - uranium-lead method; bi - biotite, hb - hornblende, wr - whole rock, zr - zircon
- Macrofossil locality
- Conodont locality
- Plant fossil locality
- GSQ Monto 1-2 R — Oolite marker bed
- St — Stratigraphic hole with reference number

MAGNETIC INTERPRETATION

Magnetic interpretation is shown in magenta using standard geological linestyles. Areas labelled in magenta indicate the extent of mapped units, or anomalies associated with concealed magnetic units, interpreted from aerial magnetic data. Areas labelled 'HBs' indicate high magnetic domains interpreted as zones of hornfels adjacent to intrusions

MINING SYMBOLS

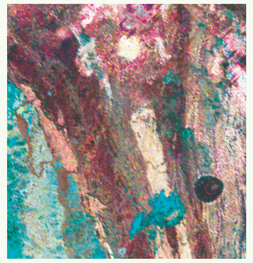
- Mine; Mine, abandoned
- Alluvial workings, abandoned
- Prospect; Prospect, abandoned
- Au — Mineral occurrence
- APH Mulgildie 1 — Petroleum exploration well

Ag - silver, As - arsenic, Au - gold, C - coal, Cu - copper, Cy - clay, Fe - iron, Fs - feldspar, Im - ilmenite, Ls - limestone, Mo - molybdenum, Mt - magnetite, Pb - lead, Sb - antimony, Ti - titanium, Zn - zinc

FIELD OBSERVATION POINTS

RADIOMETRIC IMAGE

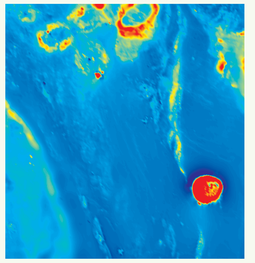
Red-green-blue ternary (potassium-thorium-uranium)



The radiometric image shows the relative concentrations of the radioactive elements potassium, thorium and uranium in the topmost 20-30 cm of the Earth's surface, as measured by an airborne detector that records gamma radiation. The data are displayed as a composite coloured image, with potassium in red, thorium in green and uranium in blue. Rock units with different contents of these elements are clearly outlined by their different colours. Those with relatively high contents of all three elements appear white in the image, like the Lawyer Granite in the north; those with low contents (and water bodies) are dark, like the Goondicum Gabbro in the south-east.

MAGNETIC IMAGE

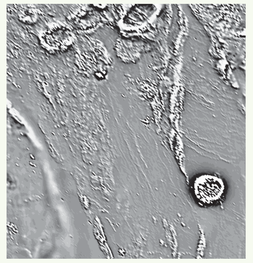
Total magnetic intensity - reduced to pole



The total magnetic intensity image shows variations in the Earth's magnetic field caused by differences in the magnetic properties of rock units in the upper crust. The magnetic response of rocks is directly related to the content of magnetic minerals, and is depicted by means of a rainbow colour scale from red (strongly magnetic like the Goondicum Gabbro in the south-east), through yellow (moderately magnetic like the Lawyer Granite in the north), to blue (weakly to non-magnetic like the Rockhampton Group in the centre). Dark blue to black areas represent rocks that have an ancient component of remnant magnetisation produced when the polarity of the Earth's magnetic field was opposite to that at present, like the Warrong Teschenite in the north.

MAGNETIC IMAGE

First vertical derivative - reduced to pole



The first vertical derivative of the total magnetic intensity data enhances short-wavelength magnetic features relative to those with long wavelengths. This image emphasises the high gradients around the edges of magnetic bodies, and in particular highlights narrow linear magnetic features such as dykes. Variations in magnetic response are indicated by shades of grey, with the strongest magnetic units shown in white. Black areas are either reversely magnetised rock units like the Warrong Teschenite in the north, or a 'shadow' effect adjacent to highly magnetic features like the Goondicum Gabbro in the south-east.

Images generated from airborne geophysical data available from the Department of Natural Resources, Mines and Water, Brisbane

INDEX TO MINES AND PROSPECTS

1	Peels	Cu,Ag	005842	23	Dooloo Creek	Au,Cu	120815	45	Eastons	Cu	215804
2	Clarks	Cu	011826	24	Kellys Molybdenite Find	Mo	129849	46	---	Cu,Fe	215782
3	Silver Star	Ag,Pb,Zn,Cu,Au	009867	25	Burns Spur	Cu	149854	47	Sperber West	Cu	215767
4	Eastern Star	Au,Cu,Ag	039784	26	Golden Age	Au	162833	48	Smiths	Cu	216820
5	Spring Creek	Au	056807	27	Mount Hutton No.2	Cu,Au	165852	49	---	Cu	217836
6	---	Cu,Au	068781	28	Mount Hutton No.1	Au	190853	50	---	Cu	218826
7	Kingsleys	Au	084805	29	Mount Hourigan	Cu,Au	197850	51	North Tunnel	Cu	218825
8	True Blue	Au	095797	30	Ironstone Gully	Fe	204842	52	---	Cu	218706
9	Wild Bull	Au	098839	31	Magnetite	Fe	205840	53	---	Cu	218821
10	Blue Blue	Au,Cu	100800	32	---	Cu	210841	54	---	Cu	218822
11	Silver Plane	Au,Cu,Mo	101816		GLASSFORD CREEK GROUP			55	Butchertbird	Cu,Fe	219776
	MONAL GOLD FIELD			33	Lady Inez	Cu,Au,Ag,Pb,Fe	211799	56	Sperber North	Zn,Cu,Au,Ag	219773
12	Red Wing - South	Au	106878	34	Glassford No.6	Cu	212808	57	---	Cu,Fe	220766
13	Red Wing - North	Au	106877	35	Pollards	Au	213822	58	Sperber South	Cu	222767
14	Cemetary	Au	108880	36	No.1 West	Cu	213818	59	Little Rodney	Cu	246761
15	Red Flag	Au	111886	37	McDonalds	Cu	213820		MOUNT CANNINDAH GROUP		
16	Great Eastern	Au	116889	38	Tippets	Cu	213803	60	Mount Cannindah	Cu,Ag,Au	252705
17	---	Au	116890	39	Kellys	Cu,Au	213808	61	Blockade	Cu	254704
18	Raspberry Creek	Au	117885	40	---	Cy	214818	62	East Cannindah	Au	257706
19	Trident	Au	119889	41	---	Cu	214818	63	Lifesaver	Cu	260689
20	Bobby Dazzler	Au	107812	42	Crowes	Cu	214830	64	Lifesaver (Cha Cha)	Cu	261689
21	Goodys	Au	110857	43	Blue Bag	Cu,Ag,Au,Zn,Mt	214820	65	United Allies	Cu	261695
22	---	Au	112806	44	---	Cu	215819	66	Dunno	Cu	264868
67	Apple Tree	Cu,Au,Ag,Fe	267868								
68	---	Au	284682								
69	Barrimoon Prospect	Au,Fe,Ti	291710								
70	Golden Crown	Au,Fe	295713								
71	---	Au,Fe	298712								
72	Boggy Creek	Au	265780								
73	Many Peaks	Cu,Au	356839								
74	Moonford - Site 1	Fe	992577								
75	Moonford - Site 2	Fe	996547								
76	Cannindah Creek	Ls	149511								
77	Splinter Creek	Ls	204541								
	MOUNT CANNINDAH GROUP										
78	Busy Bee	Cu	238684								
79	Little Wonder	Au	250695								
80	Goondicum Crater	Im,Fs,Ti	392513								
81	Galleta	Au,Cu	429547								
82	Monto	C	144258								
83	---	Au,Cu	324386								
84	Central Ridge	Au	341341								
85	Yarrol North	Au,Cu	343346								
86	---	Au,Cu	343352								
87	Yarrol Gold Prospect	Au	343347								
88	Goondicum Alluvial	Im	404429								

The grid reference is a six figure abbreviated MGA 94 coordinate to the nearest 100 metres

MONTO

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Copies of this map may be obtained from the Department of Natural Resources, Mines and Water, Brisbane