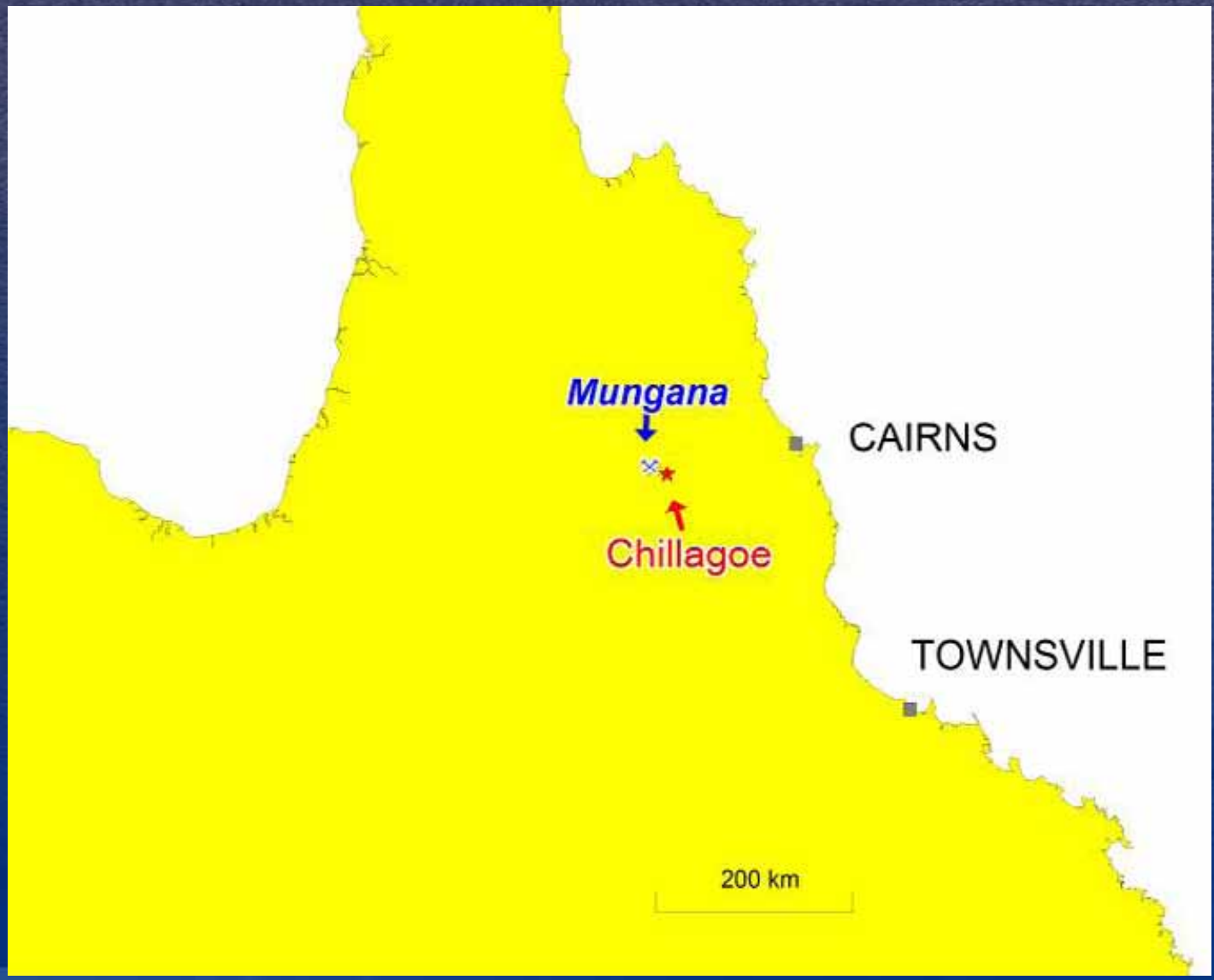
KAGARA ZINC LTD

# The Mungana porphyry-related polymetallic deposit, North Queensland

**KZL EXPLORATION**

**Mines and Wines, September 2007**

# LOCATION



# TOPICS

- History
- Regional geological setting
- Local geology
- Mine geology
- Age dating
- Geochemical associations
- Ore textures

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# Mungana - 21 years old

# MUNGANA RESOURCES, 2007

BASE METALS RESOURCE (INDICATED + INFERRED)

1.96 Mt @ 14.3 %Zn, 2.8 %Cu, 2.2 %Pb, 188 g/t Ag, 1.15 g/t Au

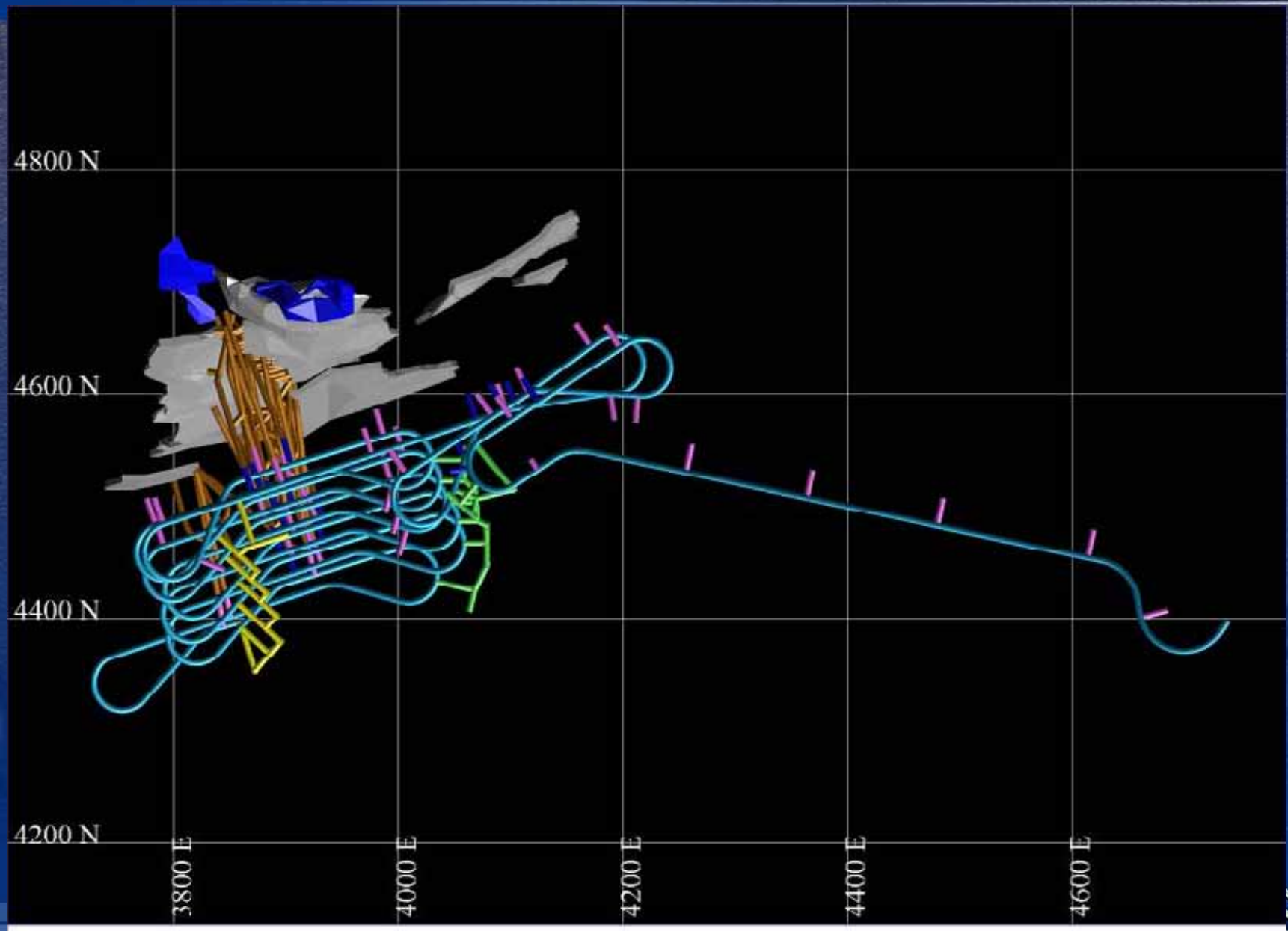
*(280,000 t Zn, 55,000 t Cu, 40,000 t Pb, 12 M oz Ag, 70,000 oz Au)*

GOLD RESOURCE (INFERRED)

53.7 Mt @ 1.1 g/t Au, 0.1 %Cu, 0.2 %Zn, 0.1 %Pb, 8 g/t Ag

*(2 M oz Au)*

# MUNGANA MINE DEVELOPMENT PLAN



# MASSIVE SPHALERITE/CHALCOPYRITE IN SANDSTONE


700.7-724.7m:- 24m @ 6.1 %Cu, 13.4 %Zn, 510 g/t Ag, 1.3 g/tAu

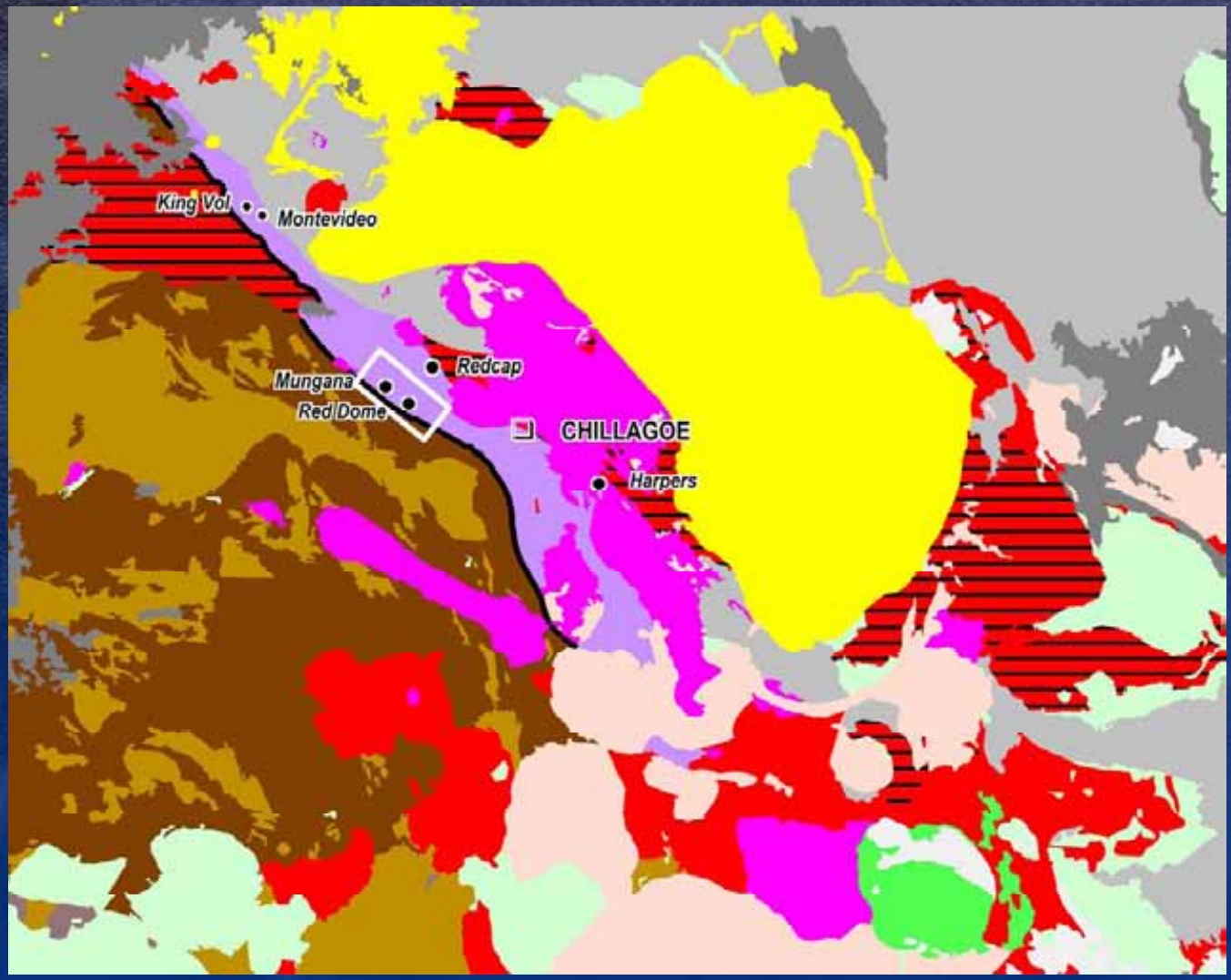
# MASSIVE SPHALERITE/CHALCOPYRITE IN LIMESTONE


700.7-724.7m:- 24m @ 6.1 %Cu, 13.4 %Zn, 510 g/t Ag, 1.3 g/tAu

# MASSIVE SPHALERITE/CHALCOPYRITE IN LIMESTONE


700.7-724.7m:- 24m @ 6.1 %Cu, 13.4 %Zn, 510 g/t Ag, 1.3 g/tAu

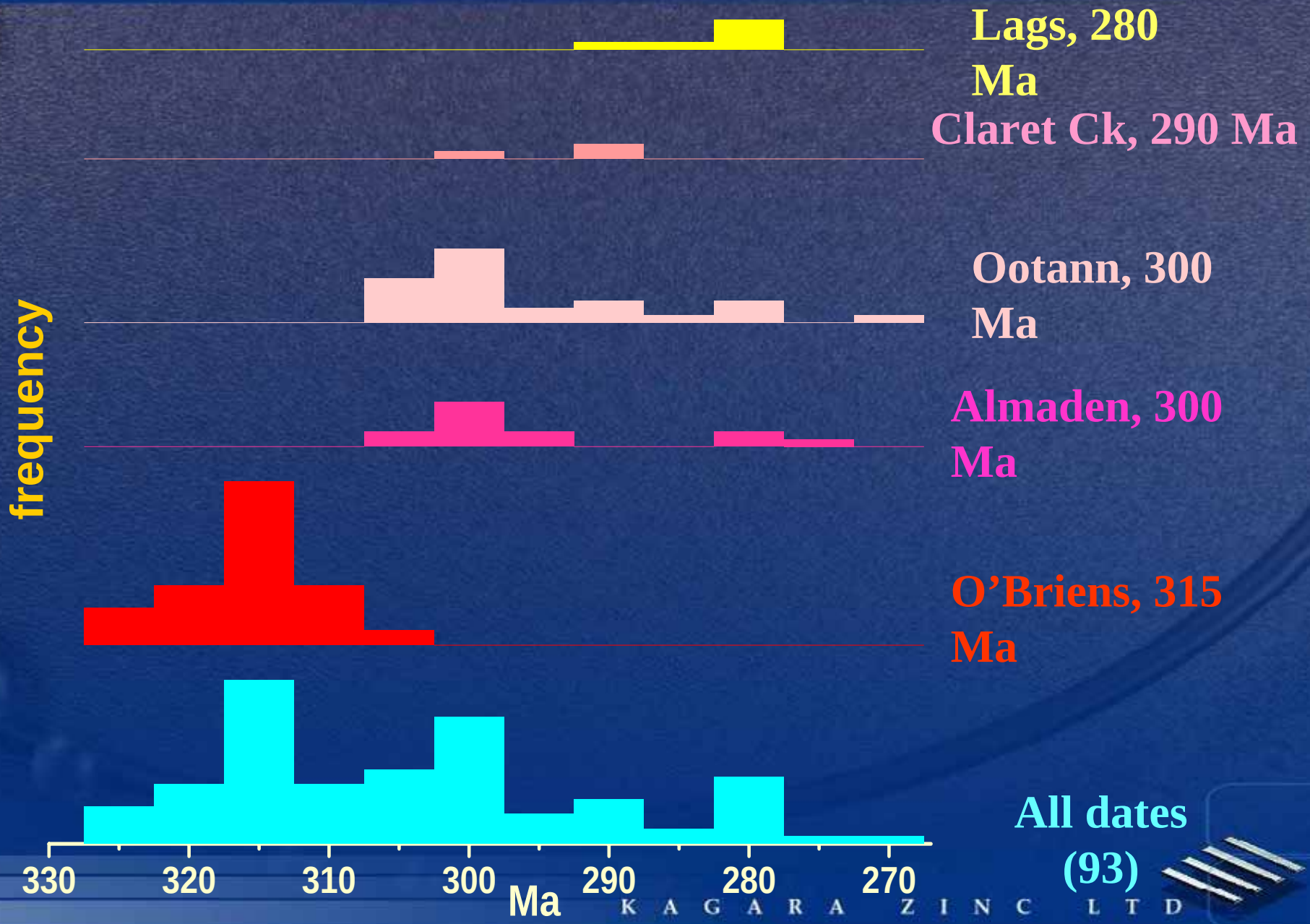
# GEOLOGICAL UNITS IN THE CHILLAGOE AREA




## EXPLANATION

- Post Permian cover
- Permo-Carb igneous rocks (undifferentiated)
- Lags Supersuite
- Ootann Supersuite
- Claret Creek Supersuite
- Almaden Supersuite
- O'Briens Supersuite volcanics
- O'Briens Supersuite plutons
- Dev-Carb sediments
- Ord-Dev sediments
- Blackman Gap Supersuite
- Proterozoic metamorphics

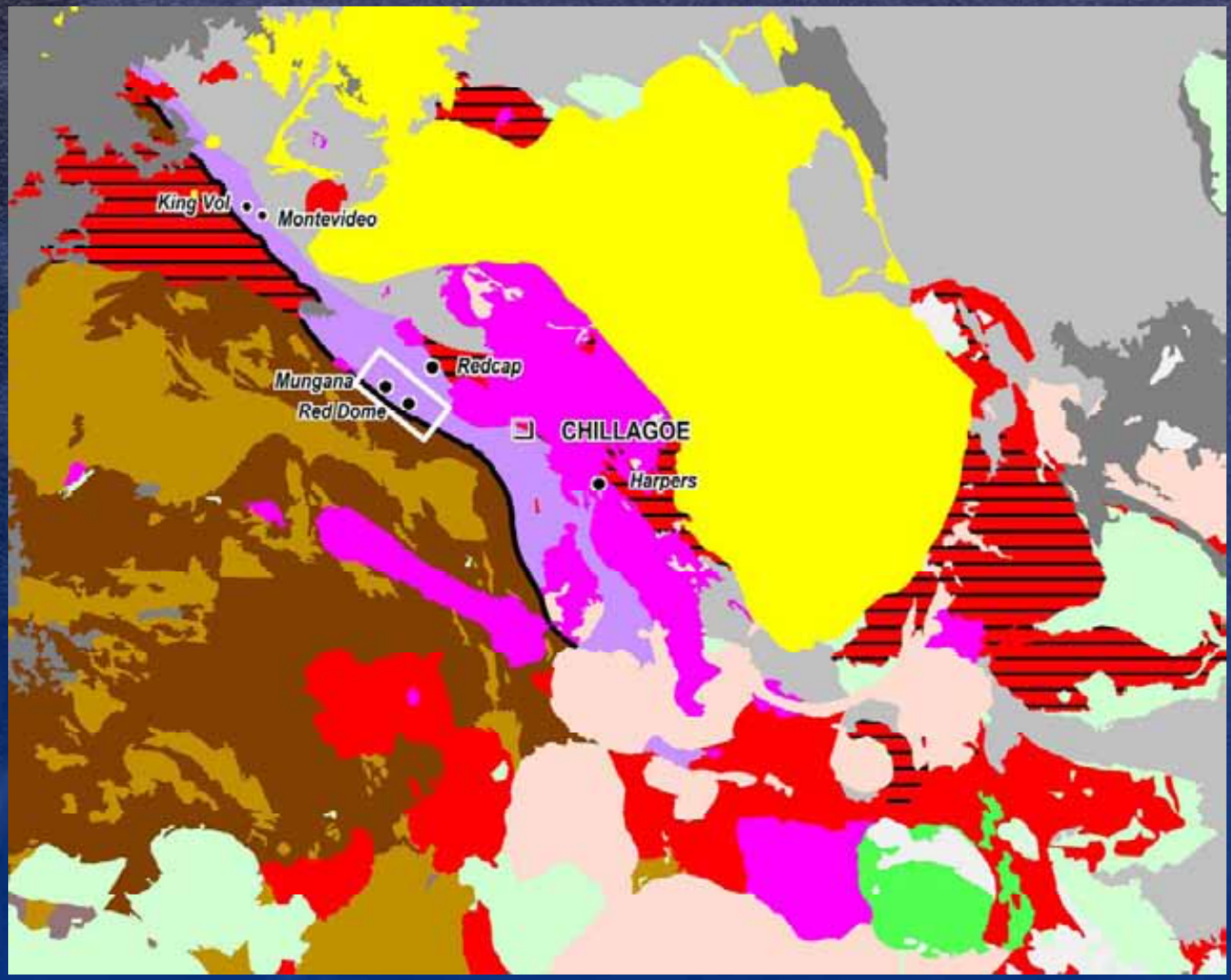
# PUBLISHED SUPERSUITE AGE DATES, ATHERTON 250K SHEET



# PERMO-CARBONIFEROUS SUPERSUITES, CHILLAGOE AREA

- O'Briens Creek Supersuite (315 Ma) - felsic I type, reduced, highly fractionated - typically Sn; also W,Cu,Au,Ag,Pb,Zn,Bi, As,Sb
- Almaden Supersuite (300 Ma) - felsic to andesitic I type, oxidised, unfractionated - typically Cu,Pb,Zn,Ag,As
- Ootann Supersuite (300 Ma) - felsic I type, mostly reduced, highly fractionated - typically W,Mo,Bi
- Claret Creek Complex (290 Ma) - felsic to andesitic I type, oxidised, unfractionated
- Lags Supersuite (280 Ma) - felsic A type, reduced and oxidised, unfractionated; minor U,F,Au

# GEOLOGICAL UNITS IN THE CHILLAGOE AREA

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# METAL DEPOSIT TYPES BY COMMODITY IN THE CHILLAGOE DISTRICT

Many polymetallic deposits (telescoped) that fall into 3 broad groups -

- high grade base metals only (Zn-Cu-Pb-Ag), no gold

  *Examples:- Girofla, Lady Jane, King Vol, Redcap group*

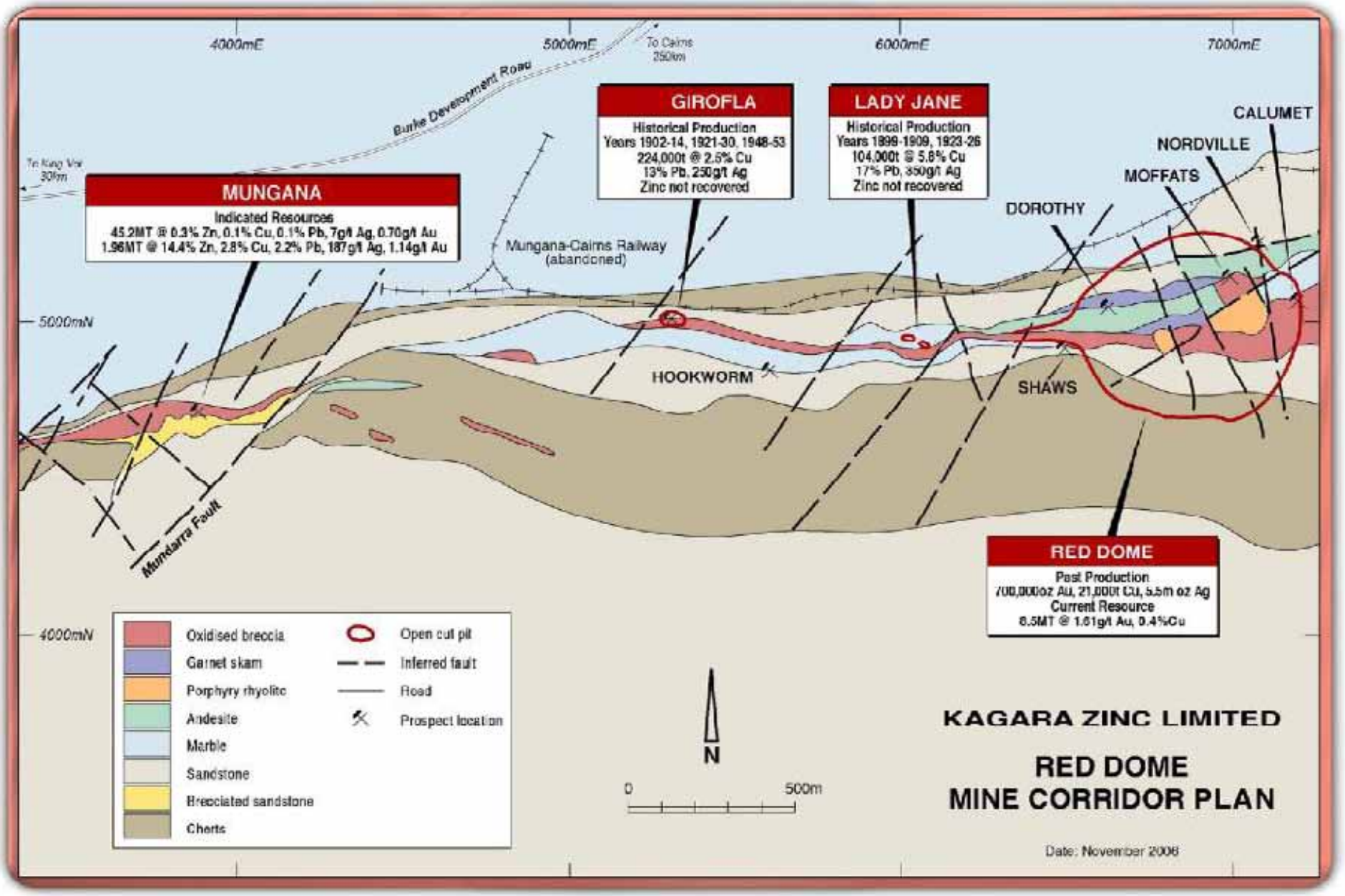
- gold-copper, with high-grade base metals (Zn-Pb-Ag)

  *Examples:- Mungana, Harpers*

- gold-copper only, little or no base metals

  *Examples:- Red Dome*

# GEOLOGY, RED DOME – MUNGANA MINE CORRIDOR



# PORPHYRY WITH QV & UST

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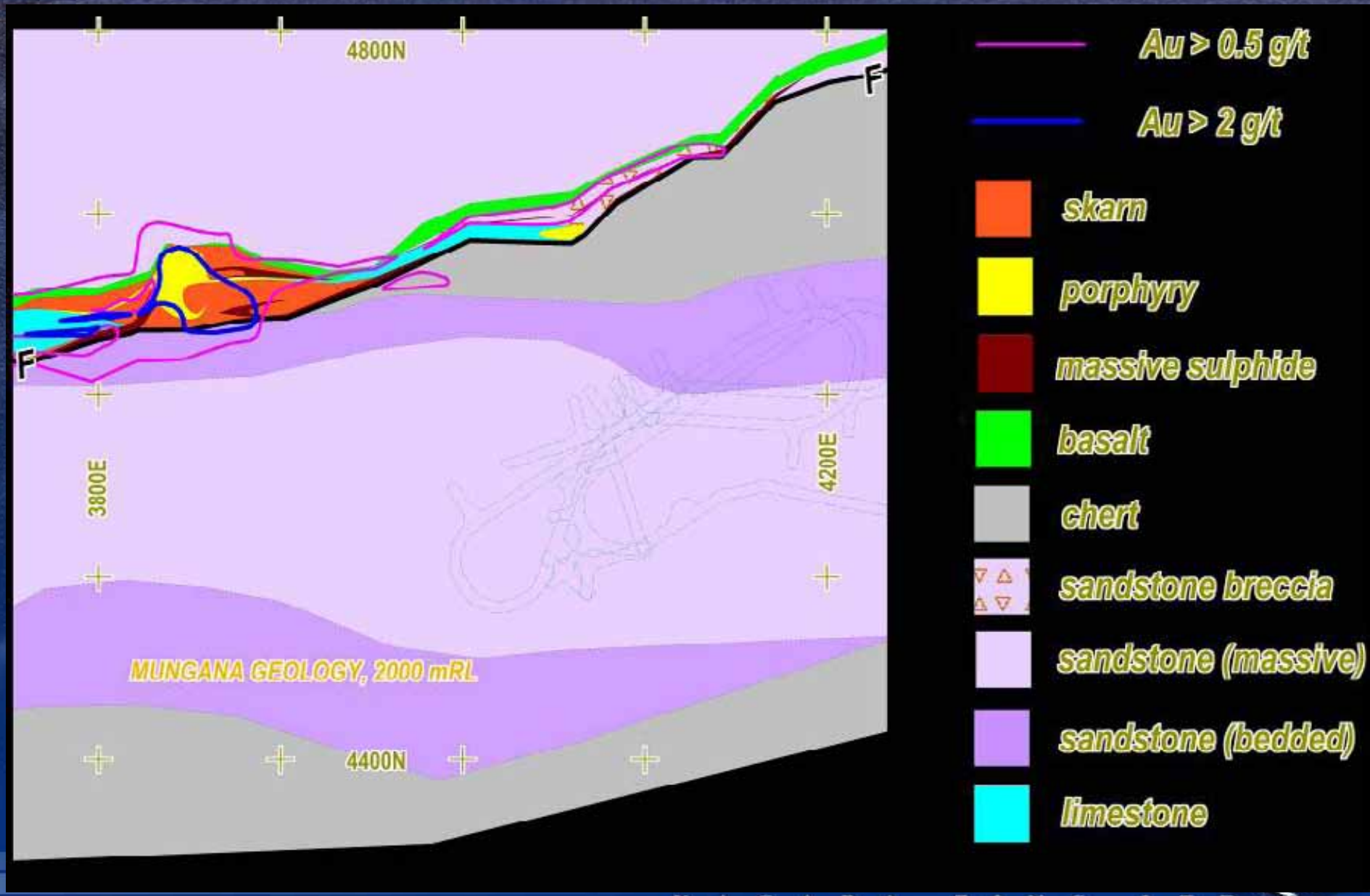
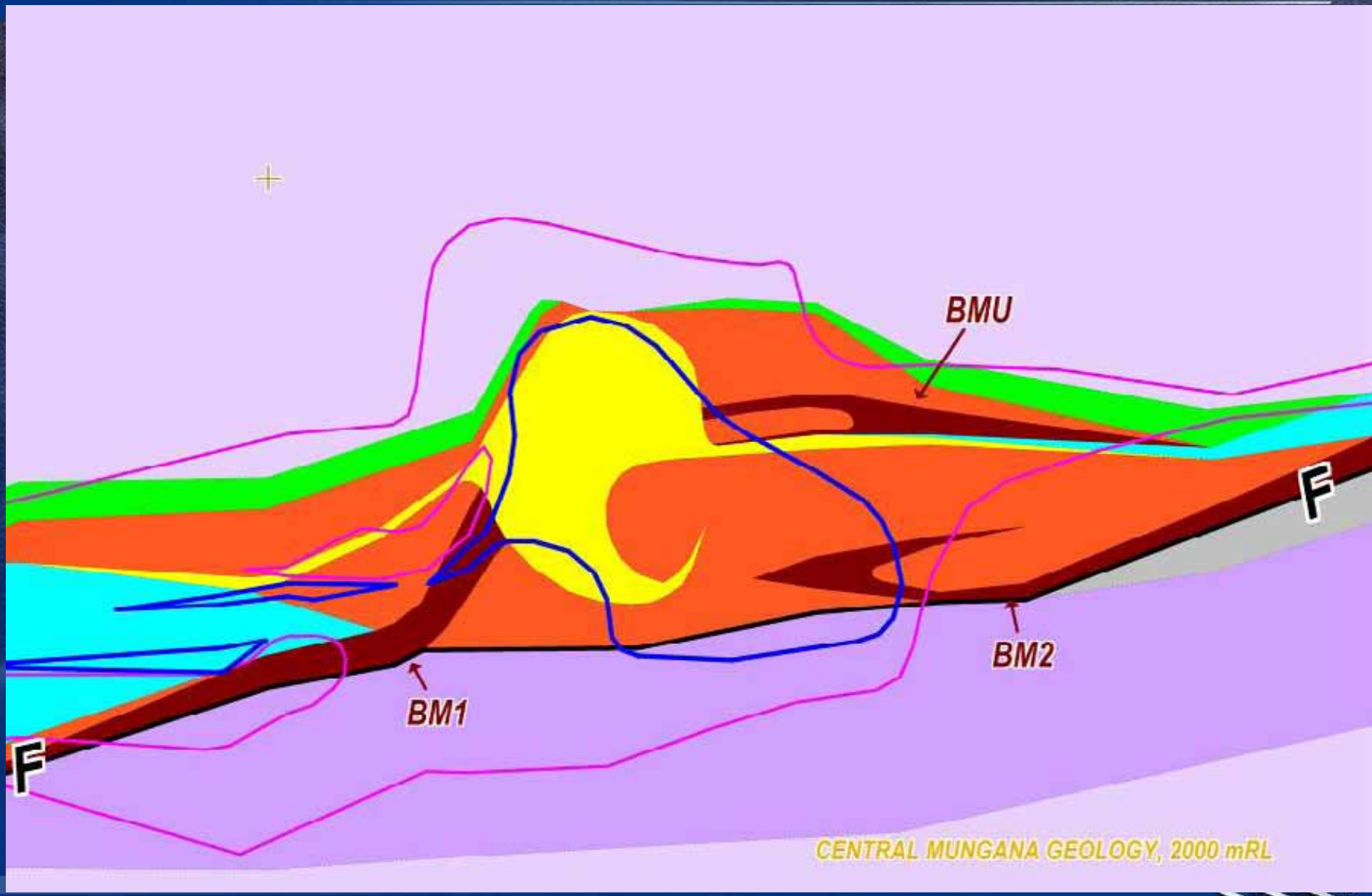
# PORPHYRY WITH QUARTZ STOCKWORK

# ?QV / ?SIL PORPHYRY – 15 g/t Au

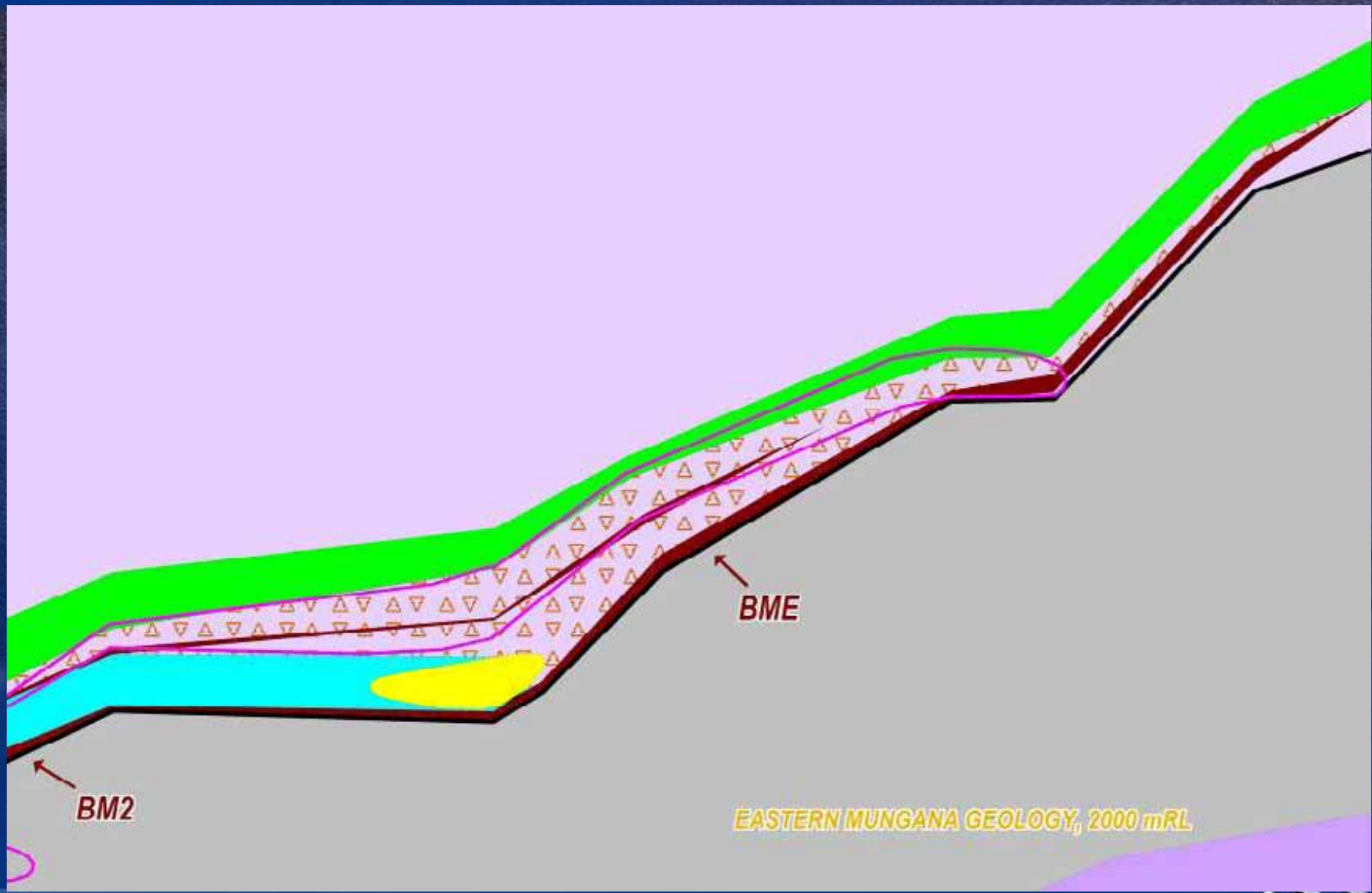
# MUNGANA GEOLOGY, 2000 mRL

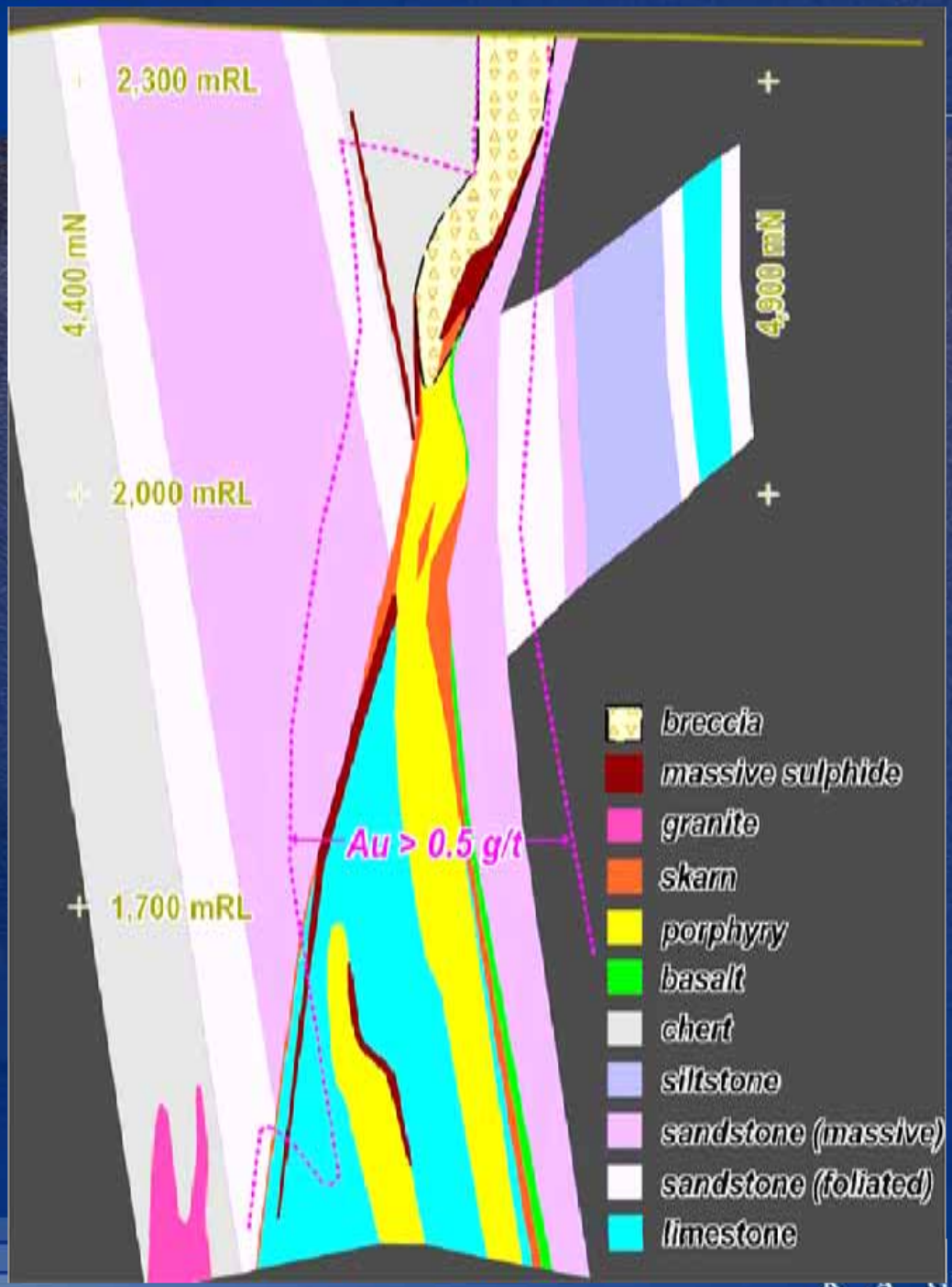


# CENTRAL MUNGANA GEOLOGY, 2000 mRL



# EASTERN MUNGANA GEOLOGY, 2000 mRL






# MUNGANA 3850E XSECTION

# MUNGANA GRANITE

# ZIRCON SHRIMP AGE DATES, MUNGANA INTRUSIONS

# GEOCHEMICAL ASSOCIATIONS

- High-grade base metals

  - typically high Zn, Cu, Pb, Ag, As

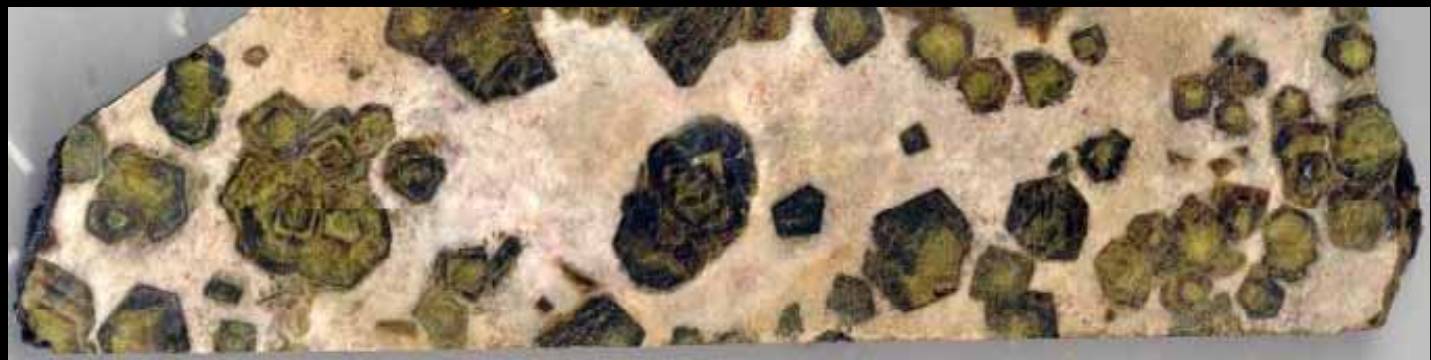
  - strongly anomalous Sn +- W

- Gold - typically Au, Bi

  - Ag, Cu

NOTE:- Mo, Sb moderately elevated, unknown status

# ZONED GARNET IN WOLLASTONITE



# ZONED GARNET IN WOLLASTONITE

# MASSIVE SPHALERITE INTERSTITIAL TO GARNETS IN SKARN

# SKARN BRECCIA WITH HONEY SPHALERITE MATRIX

# MASSIVE SPHALERITE IN SIDERITE

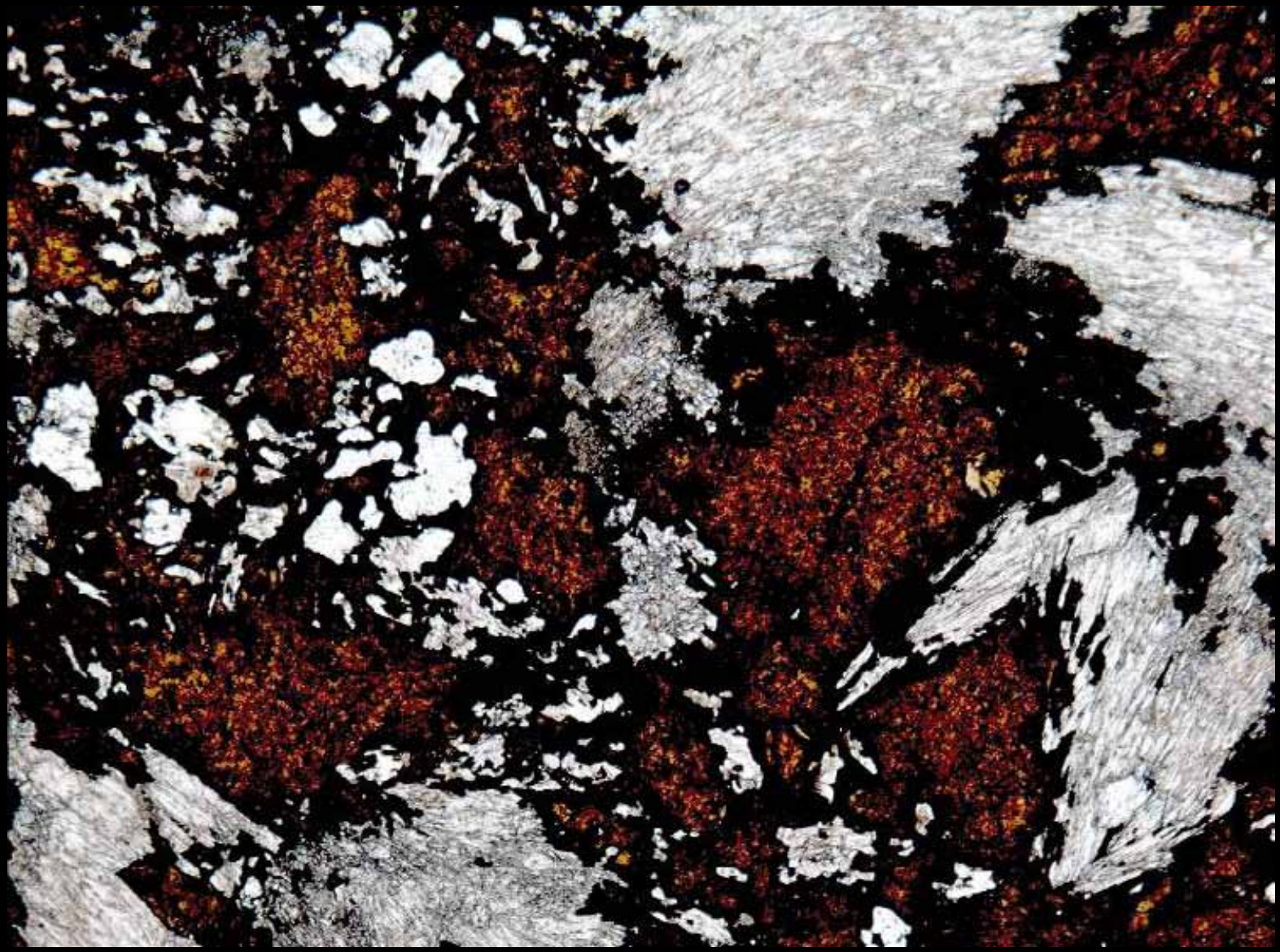
# MASSIVE SPHALERITE IN SIDERITE

# MOLYBDENITE IN GARNET-WOLLASTONITE-QUARTZ SKARN

# ZONED GARNET WITH SPHALERITE INCLUSIONS

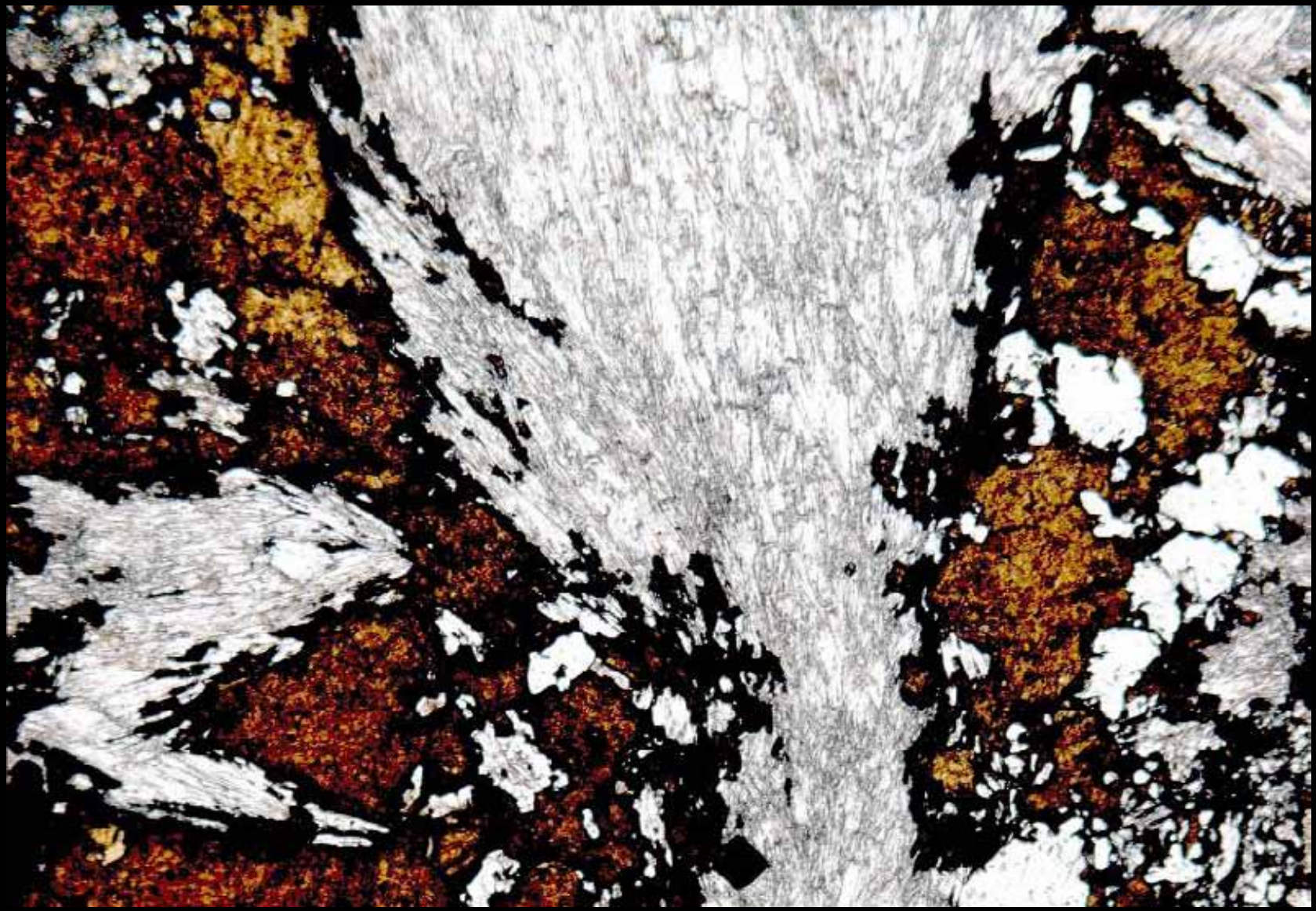
Plane polarised light; Length of image = 5.6 mm; matrix mostly retrograded to calcite

# SPHALERITE INTERGROWN WITH WOLLASTONITE



Plane polarised light; Length of image = 5.6 mm; sphalerite with px inclusions (clear) co-existing with un-retrograded fibrous wollastonite

# SPHALERITE INTERGROWN WITH WOLLASTONITE



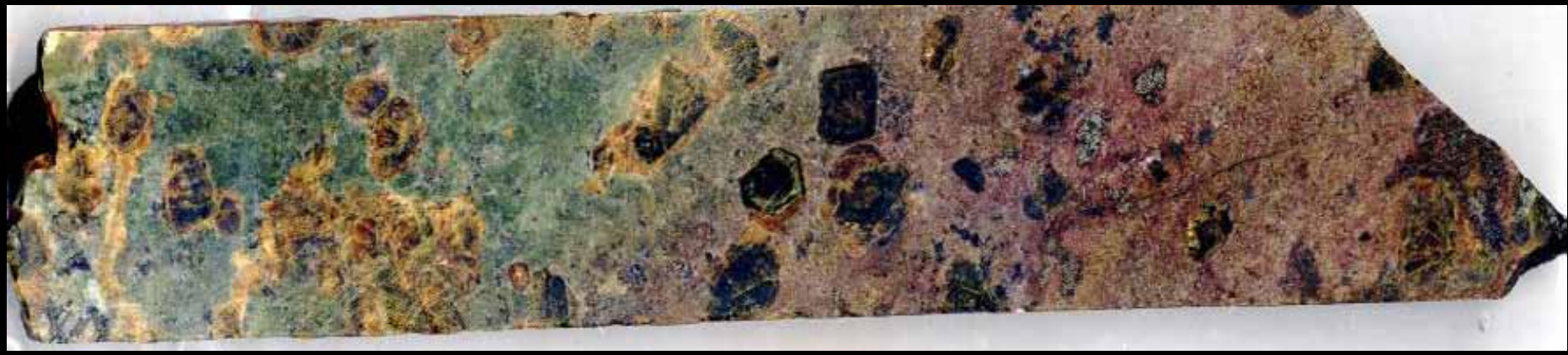
Plane polarised light, close-up of previous; sphalerite with px inclusions (clear) co-existing with un-retrograded fibrous wollastonite

# ZONED GARNET & INTERGROWN WOLLASTONITE / SPHALERITE & CALCITE

½ NQ2 core

Top half of photo (mottled lt gy) => marble
Bottom half => garnet (yw) + intergrown wollastonite / sphalerite

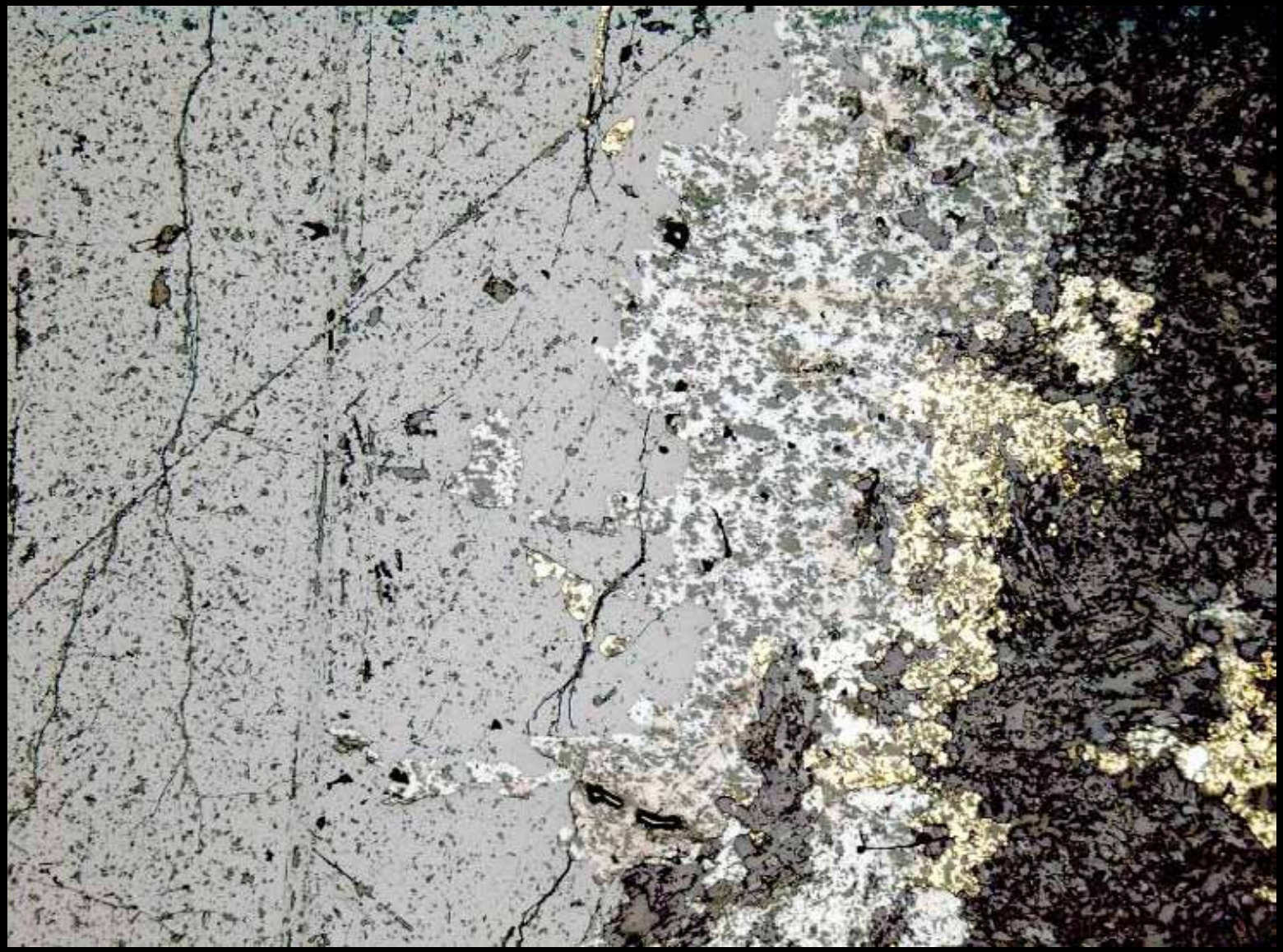
# GARNET IN PYROXENE / SPHALERITE MATRIX



½ NQ2 core

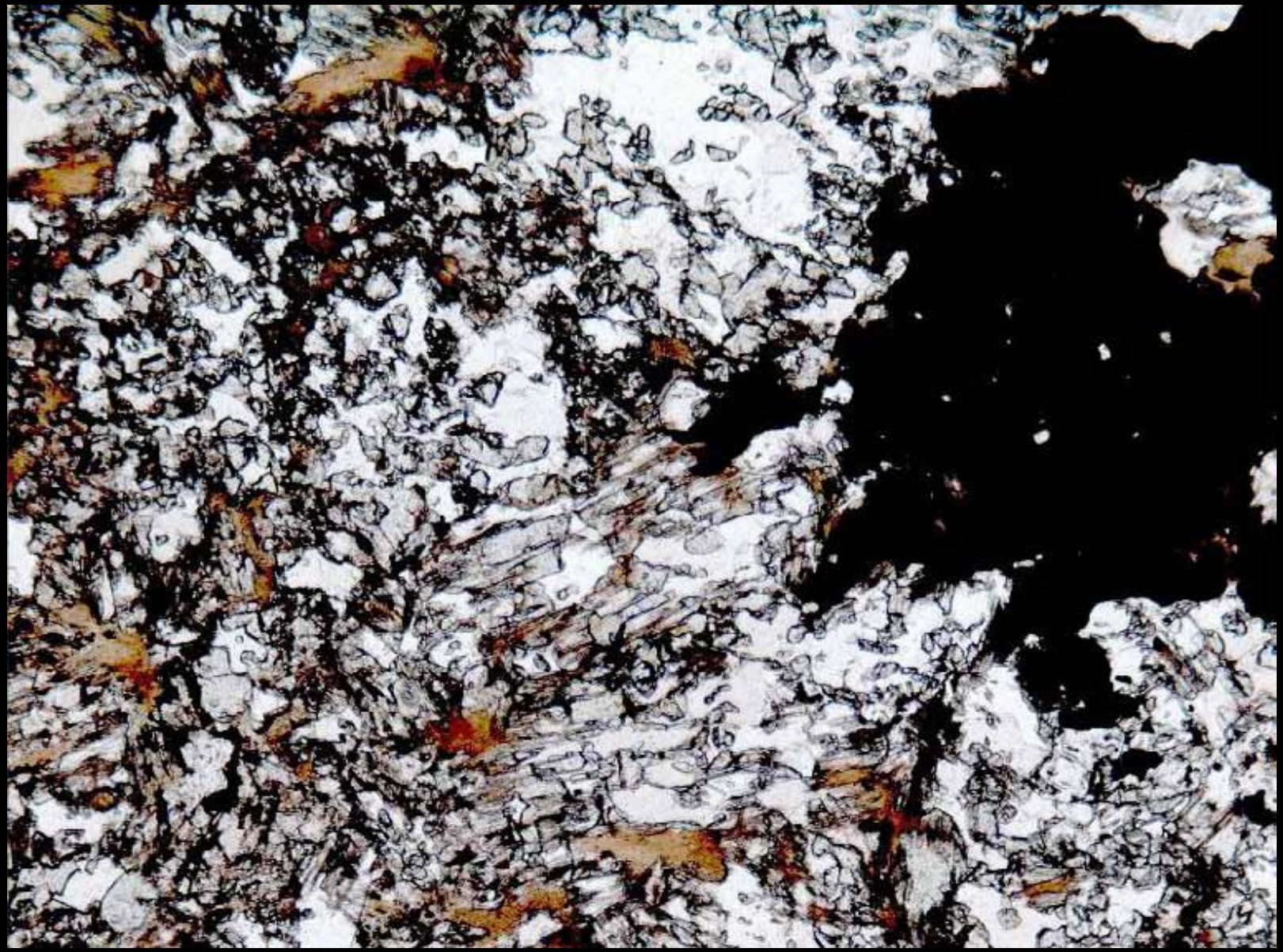
Garnet + clinopyroxene on left, garnet in sphalerite-rich matrix on right

# ZONED GARNET RIMMED BY SPHALERITE/CHALCOPYRITE



Reflected light, length of photo = 5.6 mm; left to right = garnet (med gy) => sphalerite (lt gy) => chalcopyrite (yw) => retrograded matrix (dk gy); note sp-cp inclusions in gt

# SPHALERITE/CHALCOPYRITE IN QUARTZ-CALCITE-ACTINOLITE MATRIX

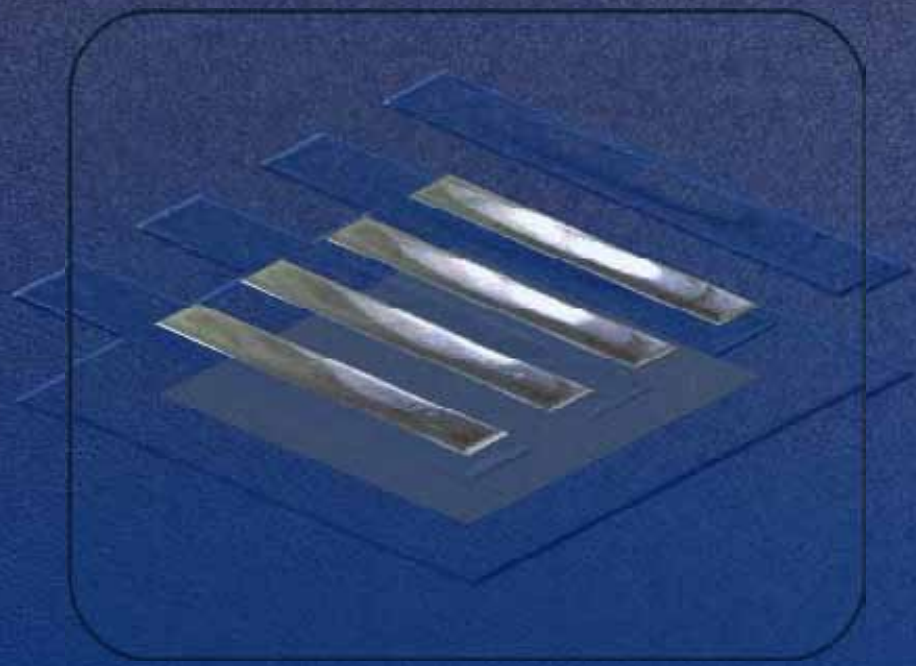


Plane polarised light; length of photo = 2.8mm; chalcopyrite / sphalerite (bk), matrix is retrograded qtz + calcite + actinolite (brown)

# CONCLUSIONS – KEY POINTS

- high grade base metals developed at fairly high temperatures at an early retrograde skarn phase
- porphyry emplacement followed
- base metal mineralization can be assigned to the “O’Briens Creek” Supersuite event
- Au not so certain, second retrograde event = syn O’Briens porphyry? or post?
- later development of the near-surface breccia cone probably just re-distributed metals, as concluded by previous workers
- preliminary fluid inclusion studies => coexistence of high-temperature vapour-rich and sulphide-rich inclusions

K A G A R A  Z I N C  L T D



Thank you