

(a) MINING ENGINEER *Rmalk*  
(b) HEAD OFFICE LIBRARY.  
COMMONWEALTH OF AUSTRALIA.

120 PNG/1  
16/4/59

*Copy 3*

DEPARTMENT OF NATIONAL DEVELOPMENT.  
BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS.

RECORDS.

1959/33

019164

GEOLOGICAL REPORT ON THE MERRI CREEK MINE, EDIE CREEK

by

D. B. Dow



by D. B. Dow.

Records 1959/33

INTRODUCTION.

LOCATION AND ACCESS :

The Merri Creek Mine (altitude 7200 feet) is situated on the steep north bank of Merri Creek about  $1\frac{1}{2}$  miles above its junction with Edie Creek (see plate I). Access from Wau is by motor road to Edie Creek, then by walking track to a point along the Merri Creek, and finally by the stream bed to the mine.

CLIMATE :

The climate at the mine is usually warm by day and cold at night; the annual rainfall is about 110 inches, the summer months being the wettest.

TIMBER :

There is a plentiful supply of timber suitable for mining purposes on the company leases.

WATER :

Owing to the high altitude of the mine there is only sufficient permanent water to run the battery. The headwater of all the nearby tributaries have been tapped by water races, and during wet weather, the supply is sufficient for costeaning and stripping the open cut.

HISTORY AND TENURE :

The Merri Creek Mine is owned by Enterprise of New Guinea, Gold and Petroleum Development N.L. which holds Gold Mining Leases 1052, 1077, 1082 and 1084 in the Merri Creek Area; it is managed by Mr. A.E. Jentzsch.

As a result of systematic prospecting small auriferous stringers were found in porphyry near the head of Merri Creek in June 1955 and a small 2 head Riverside battery was erected on the site; the ore was treated by crushing and direct amalgamation. Work ceased at this mine in 1957.

The lode at present being worked was discovered in January, 1957. The ore was carried by native labour up to the battery till October 1958 when the battery was shifted to the present site and a 3-head Riverside battery added to increase the capacity.

DEVELOPMENT :

The mine has been developed by 4 levels driven from the fall into Merri Creek : No. 1 Level (altitude 7,218 feet) was driven 150 feet in ore, No. 2 Level (7,193 feet) driven 170 feet in ore, No. 3 Level (7,158 feet) driven 30 feet in ore, and No. 1A Level (7,260 feet) driven 30 feet in ore and connected to No 1 Level by a rise.

A prominent fault which carries thin patches of rich gold bearing quartz has been exposed by open cutting. As yet (October 1958) no stoping has been done on the main lode.

## GEOLOGY.

### GENERAL GEOLOGY :

The geology of the areas surrounding the mine is shown on plate 2. The oldest rocks exposed consist of laminated and thin-bedded quartz sericite and quartz mica schists of the Kaindi Metamorphics. Fossils found in similar rocks at Snake River about 20 miles to the north give the upper age limit of the Kaindi Metamorphics as Cretaceous but they are possibly much older.

The schists are composed of quartz granules with scales of micaceous minerals, mainly biotite with a few plagioclase crystals and varying amounts of chlorite, pyrite, titanite, magnetite, ilmenite and rutile. Shearing is pronounced, and with the added effect of crystallisation of flakes of mica along the shearing planes, a marked schistosity is imparted to the rock. The schistosity is usually at an angle to the bedding (up to  $15^{\circ}$ ), but is also commonly parallel to the bedding. Veinlets of quartz are common and are mainly roughly parallel to the bedding. Pyrite mineralisation, as discrete crystals scattered through the rock, is common, particularly near the porphyry intrusions. The rocks are broadly folded with dips usually between  $30^{\circ}$  and  $50^{\circ}$  but dips up to  $75^{\circ}$  are found.

The schists of the eastern and western portion of the Edie Creek area have been hydrothermally altered to chloritoid schist. The altered schist consists of : granules of quartz unaltered from the original rock; plagioclase, altered to sericite to a greater or less degree; sheaf-like aggregates of chloritoid prisms and anauxite crystals which have resulted from alteration of the ferro-magnesian minerals; magnetite and apatite in accessory amounts. Much of the original structure of the mica schist is obliterated as the chloritoid prisms are oriented at random. Some beds of schist were more susceptible to alteration, as seen near the boundary of the chloritoid schist zone in Merri Creek where there are beds of chloritoid schist interbedded with unaltered mica schist. Horsts of unaltered schist occur in the chloritoid schist, one large one occurring in Wilton's Creek.

The Kaindi Metamorphics in the area shown on plate 2 are intruded by two types of porphyry : one, named the Upper Edie Porphyry by Fisher 1939, is exposed at Day Dawn Mine and south along Edie Creek. It is a quartz biotite andesite porphyry, which has been subject to hydrothermal alteration. The quartz is unaltered but the biotite has been altered to anauxite but still retains its hexagonal crystalline form; the feldspars have been altered to sericite. The groundmass is very fine and indeterminate. Magnetite haematite and apatite are present as accessory minerals and pyrites is abundant as scattered discrete crystals. Three other small porphyry bodies of similar composition intrude the metamorphics in the vicinity of the Merri Creek Mine. In addition many small sills and dykes intrude the chloritoid schist near the margins of the larger bodies.

Near the southern margin of the area, at the head of Mystery Creek, a body of fairly coarse-grained hornblende porphyry is exposed. This body is of different age from the Upper Edie Porphyry.

### ORE GEOLOGY : (See plate 3)

The country rock at the mine is chloritoid schist with interbedded unaltered quartz sericite schist; it is laminated and thin-bedded and the schistosity is at an angle of approximately  $15^{\circ}$  to the bedding. The beds strike between

280° and 30° and dip to the west and north at angles between 30° and 60°. A small lens of quartz porphyry, striking to 280°, i.e. roughly parallel to the bedding at that locality, and dipping to the north at 60°, intrudes schist on the battery site.

The lode trends at an average of 350° and dips to the west at 45° to 50°.

#### NO. 1 LEVEL :

No. 1 Level follows the lode, which trends fairly consistently to 340°, for 150 feet. The lode is well defined and varies in width between 8 inches and 18 inches, averaging 12 inches, and dips to the west at between 40° and 50°. The ore is completely oxidised and consists of a layer of grey fault gouge up to 3" thick on the footwall overlain by iron-stained, sugary and friable quartz which is usually manganiferous, manganese oxide usually being an indicator of high gold content. Scattered crystals of pyrites are common in the fault gouge which is impervious and has protected the pyrites from oxidation.

The country rock in the footwall is little jointed. In contrast the hanging wall country is very much jointed and appears to have moved under the force of gravity with the lode and footwall as a glide-plane.

#### NO. 2 LEVEL :

No. 2 Level follows the lode for 150 feet. The lode averages 18 inches in width and is similar in composition to No. 1 Level and trends to 340° and dips to the west between 30° and 65°. Beyond a fault 90 feet from the portal it changes direction to 310° and has an average width of 12 inches. At 150 feet the lode swings abruptly to the south and cuts out, but the drive was inaccessible at the time of the writer's visit, and it is uncertain if the lode is truncated by a fault.

#### No. 3 LEVEL. :

No. 3 Level was driven on a bearing of 289° and struck the lode at 43 feet. However, the average width of the lode is less than 6 inches and the grade uneconomic and the drive was discontinued after following the lode for about 30 feet.

A prominent fault was exposed during open cut operations and the fault plane has been exposed over a considerable area to the east of the workings (see plate 3.) The fault is marked by grey fault gouge up to 3 inches thick on the footwall overlain by up to 3 inches of brown ironstained, or white, sugary quartz which is auriferous. In patches the quartz carries remarkably rich fern-leaf gold, 50 oz. of gold having been won from a patch about 2 inches thick and a few square feet in area.

A fault of similar appearance was cut by No. 1 Level at 80 feet from the portal and is probably the same fault. However, it does not dislocate the lode so the fault must pre-date the main lode. The rise on the main lode at 90 feet from the portal of No. 1 Level must have joined this fault within a few feet but exposures are now poor and it is impossible to see the junction. The rise followed the fault to No. 1 A Level the portal of which is on the exposed fault plane. No. 1 A Level follows the fault for nearly 30 feet, the sugary quartz averaging about 3 inches in width and carrying patchy gold. At the time of writing (October 1958), open cut operations are still in progress exposing the fault plane.

### MINOR FAULTING :

Minor faulting which post-dates the formation of the main lode is common. All are normal faults with a maximum throw of 6 feet but most are around 2 feet. They do not effect the values in the main lode.

### GENESIS OF THE ORE :

The orebody is a fissure filling probably emplaced at a shallow depth; the presence of fault gouge shows that the fissure was caused by a fault. No evidence of replacement was seen. The gold fineness varies between 520 and 545 parts/thousand. In common with other lodes mined at Edie Creek, the gold bearing solutions which have given rise to the lode have originated in the magma of the intruding porphyry. Several medium-sized and many small intrusions of porphyry intrude the schist in the Stowers Creek - Merri Creek Area.

### ORE RESERVES. :

Ore reserves are estimated at 1350 tons of probable ore between No. 1 Level and No. 2 Level calculated with a stoping width of 30 inches and using a factor of 20 cubic ft. of unbroken ore to the ton. Without more development work it is impossible to estimate the possible ore above No. 1 Level and below No. 2 Level.

No sampling has been done but during the course of development in ore, using selective mining, 343 tons of ore were treated for a yield of 314 ounces of fine gold, i.e. the ore averaged 0.91 ozs. per ton (see table I). As the ore reserves have been calculated on a stoping width of 30 inches, without using selective mining the grade of the above reserves will undoubtedly be lower and will probably average 0.5 to 0.6 ozs/ton.

TABLE I.

#### GOLD RETURNS - MERRI CREEK MINE.

Month	Gold Fineness	Standard Gold (Ozs.)	Fine Silver (Ozs.)	Tons Treated
1957				
September	5445	56.22	34.54	36
October	5385	26.94	16.97	20
November	5375	16.41	10.49	28
December	5190	10.75	7.40	26
1958				
January	5325	20.34	13.30	26
February	5280	17.50	11.7	25
March	5485 *	14.93	8.98	30
April	5635 *	43.44	24.03	26
May	5665 *	32.17	17.70	31
June	5630 *	21.03	11.85	30
July	5710 *	34.73	18.68	35
August	5725 *	19.37	10.55	30

\* Higher fineness due to alluvial gold included in returns.

### RECOMMENDATIONS :

The main orebody on No. 3 Level is of uneconomic size. The best chance for more ore is in No. 1 Level to the north and it is recommended that the drive in No. 1 Level to

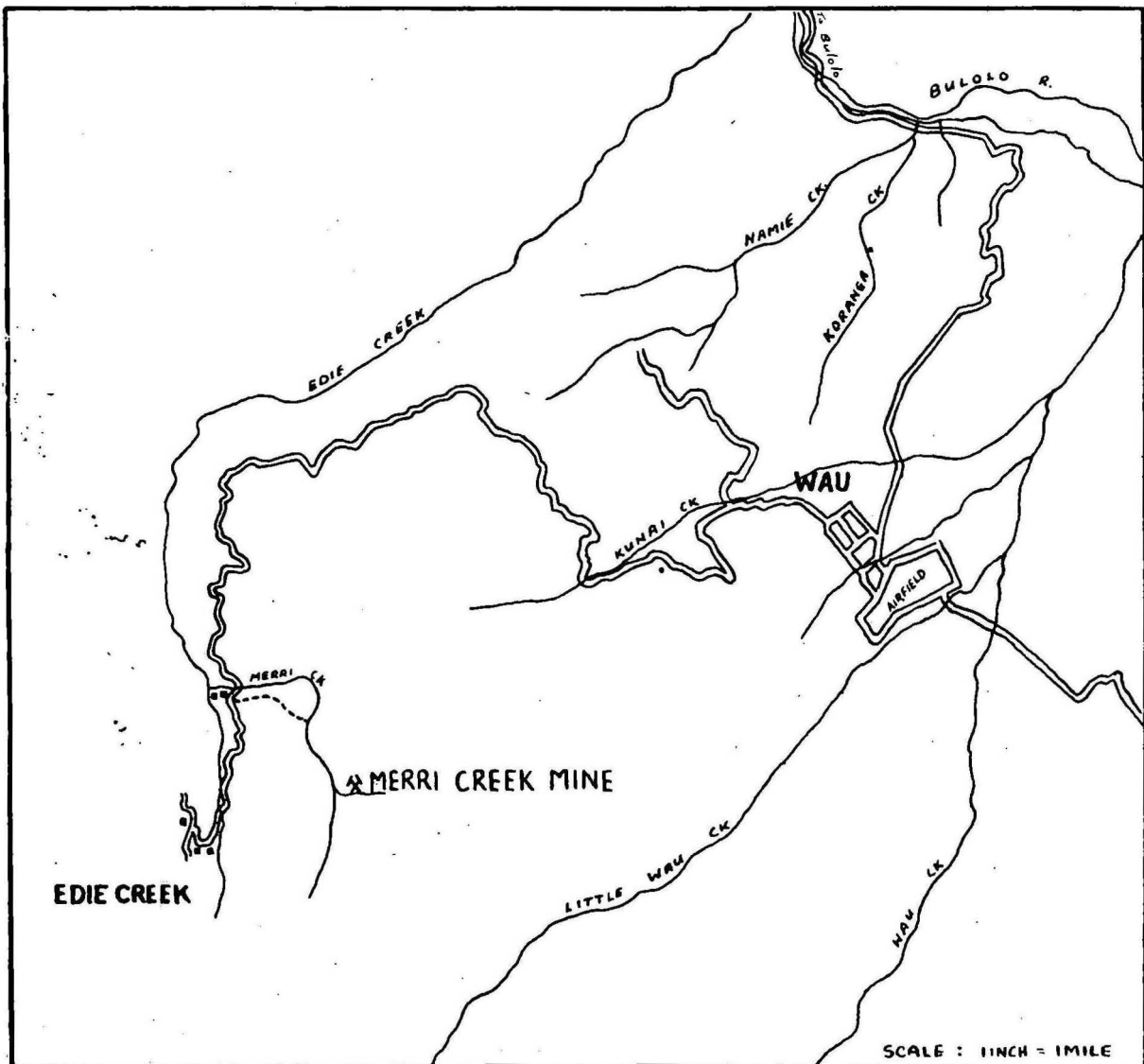
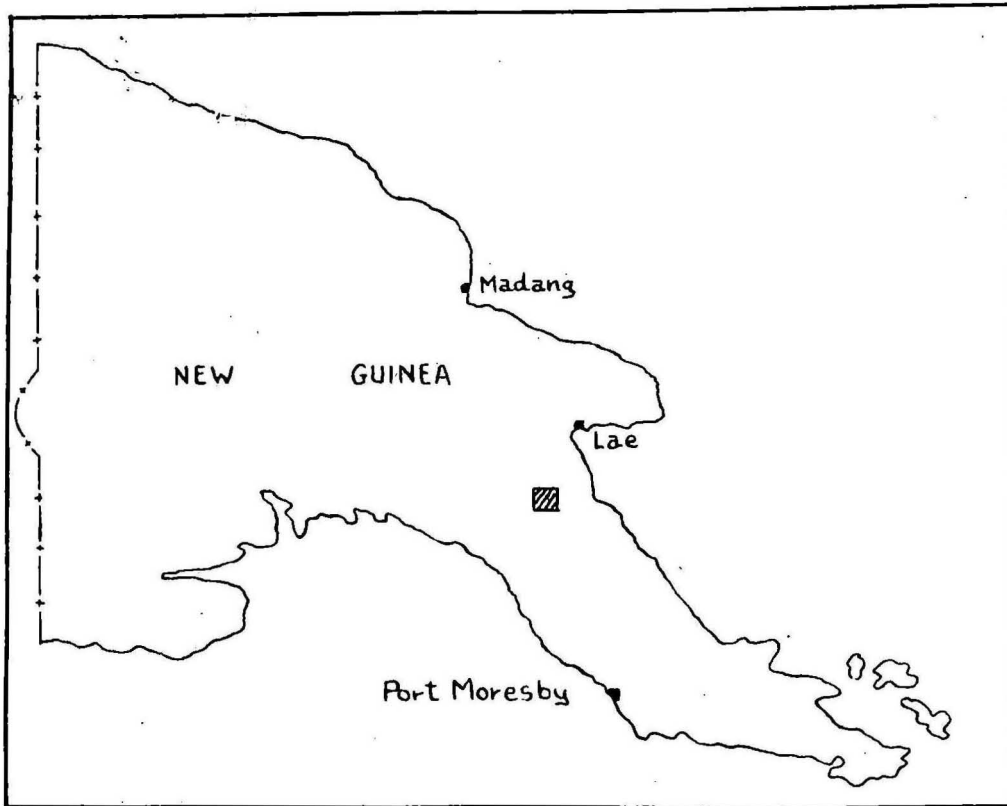


be continued and a rise and a winze be started in ore about 125 feet from the portal as information on the vertical extent of ore is very limited in this area.

A patch of rich eluvial ground is at present being won from the south-western end of the open cut. This has moved downhill under the force of gravity and may have originated from the northwestward extension of the fault which is at present being exposed by the open cut. As the supply of water permits it is recommended that the stripping of the fault be continued in the hope of unearthing more rich patches of ore.

WAU,  
October, 1958.

# LOCALITY MAP



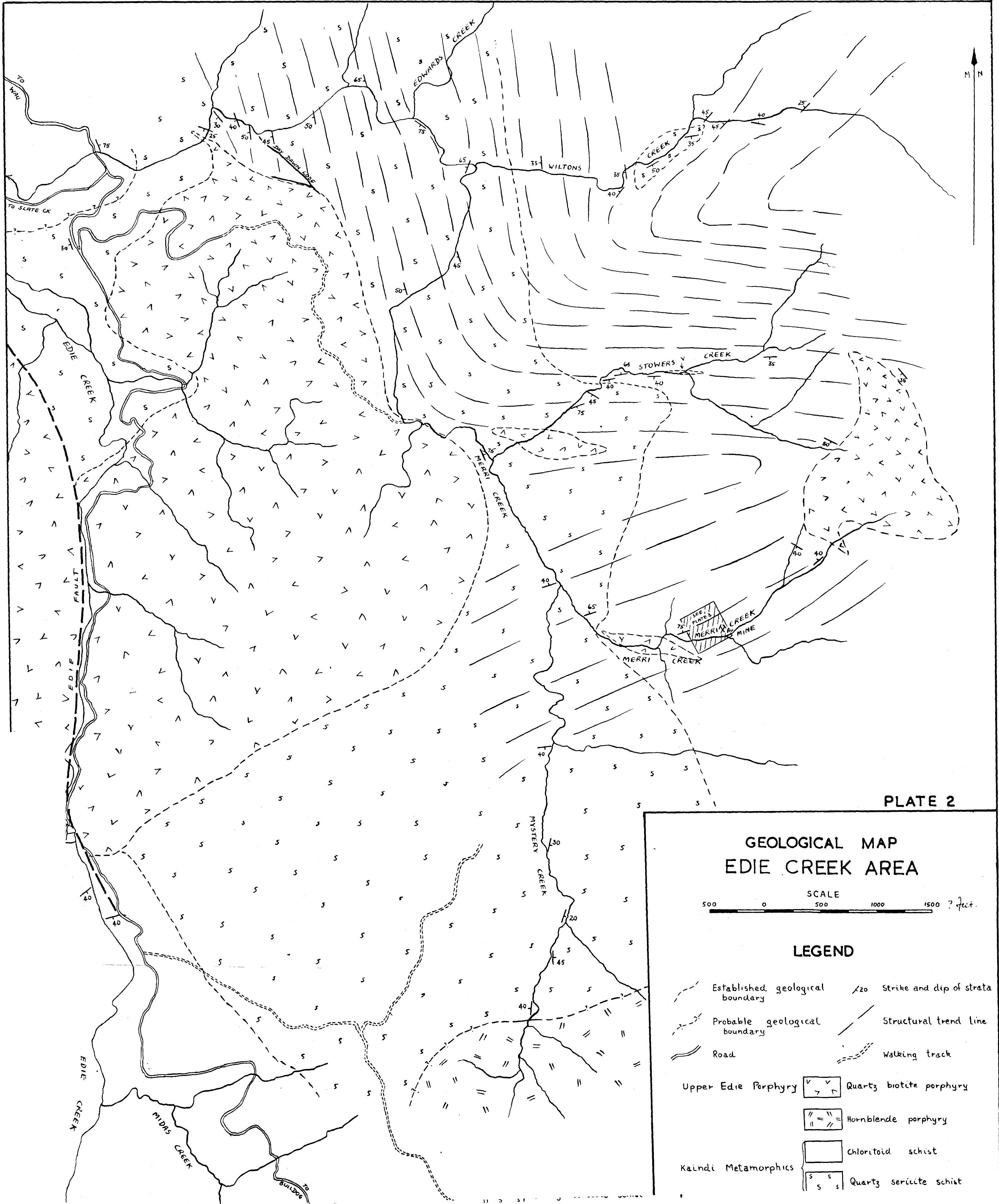


PLATE 2

# GEOLOGICAL MAP EDIE CREEK AREA

SCALE  
500 0 500 1000 1500 feet

## LEGEND

- |                                 |     |                          |
|---------------------------------|-----|--------------------------|
| Established geological boundary | /20 | Strike and dip of strata |
| Probable geological boundary    | —   | Structural trend line    |
| Road                            | --- | Walking track            |
| Upper Edie Porphyry             |     | Quartz biotite porphyry  |
|                                 |     | Hornblende porphyry      |
|                                 |     | Chloritoid schist        |
| Kaindi Metamorphics             |     | Quartz sericite schist   |



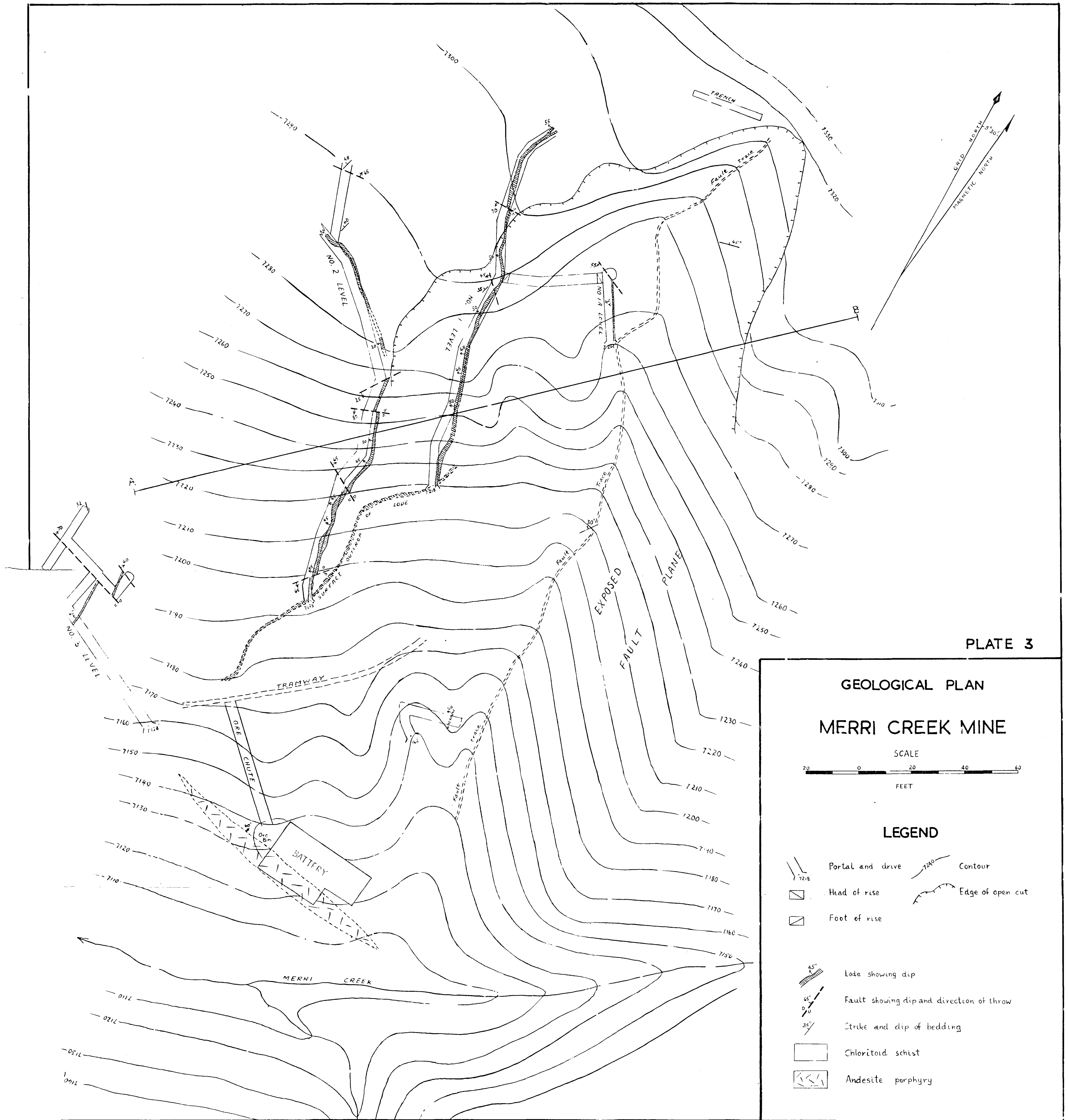
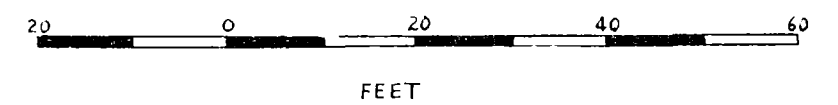


PLATE 3

GEOLOGICAL PLAN

MERRI CREEK MINE

SCALE



LEGEND

