

61/71
c.3

~~NON-LENDING COPY~~

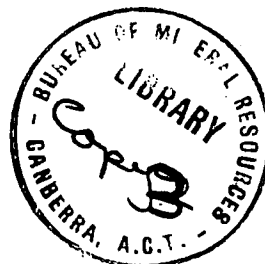
COMMONWEALTH OF AUSTRALIA.

~~NOT TO BE REMOVED~~
~~FROM LIBRARY~~

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

RECORDS.

1961/71



GEOLOGICAL INSPECTION OF PROSPECTING WORK
CARRIED OUT UNDER EXCLUSIVE PROSPECTING
LICENCE ONE (PAPUA) ON MISIMA ISLAND.

FEBRUARY 1961

by

P. W. Pritchard

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

GEOLOGICAL INSPECTION OF PROSPECTING WORK
CARRIED OUT UNDER EXCLUSIVE PROSPECTING
LICENCE ONE (PAPUA) ON MISIMA ISLAND.
FEBRUARY 1961

by

P. W. Pritchard

Records No. 1961/71

CONTENTS

	Page.
SUMMARY	1
INTRODUCTION	1
DEVELOPMENT WORK	2
GEOLOGY	2
REGIONAL GEOLOGY	2
LOCAL GEOLOGY	3
Country Rock	3
LODES IN THE AREA OF DETAILED COSTEANING	3
ORE CONTROLS	4
LODES OUTSIDE THE AREA OF DETAILED COSTEANING	4
RECOMMENDATIONS	5
REFERENCES	8

Plate.

- 1 Locality map showing estimated values of lode exposed by deep costeaning.
2. Detailed prospecting work to 23.2.61
3. Development work to 23.2.61.

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

SUMMARY

The prospecting work carried out by Pacific Island Mines Limited under Exclusive Prospecting Licence One (Papua) on Misima Island was inspected in February, 1961.

The company is carrying out a programme of long shallow costeaning supplemented by shorter deeper costeaning to discover and open up gold bearing quartz-manganese lodes in these areas. An adit has been driven on one of the lodes found by the deeper costeaning and a plant capable of treating fifty tons a day has been installed.

Most of the lode material opened up by the work done by the company occurs as lenses in a flat-lying shear zone in porphyry. The porphyry is intermediate and intrudes schist. The shear zone has been opened up over a width of eighty feet at right angles to the schist contact. A smaller lode (the one opened up by the adit) occurs in a sheared porphyry dyke intruded along the contact between two of the rock units recognised by de Keyser (1960) in the schists, namely the Ara Greenschist and the Umuna Schist. Other small lodes occur in the schist.

The grade of the lode determined by panning and visual estimation, appears to be four to six pennyweights of gold per ton. The lode-bearing shear zone has been opened up over an outcrop distance of more than 2500 feet.

Other lodes are known outside the present area of detailed costeaning, but none of these has been opened up.

Further work is needed in the area of detailed costeaning to obtain an accurate grade of the lode material; to discover the dimensions of the lenses already found; to prove down-dip and along-strike extensions of the lode-bearing shear zone, and to determine its thickness. Work is also needed to investigate the lodes known to exist outside the areas of detailed costeaning and to prospect the rest of the Exclusive Prospecting Licence Area.

INTRODUCTION

Pacific Island Mines Limited hold Exclusive Prospecting Licence One (Papua), which entitles the company to prospect for gold, lead-zinc, copper, silver, mercury, iron ore, and nickel over an area of about twenty-two square miles on the eastern end of Misima Island. The licence is held by Oceanic Minerals Development Proprietary Limited, which became a fully owned subsidiary of Pacific Island Mines Limited in 1959.

At the request of the company a geological inspection of the detailed prospecting work done on the licence area was made between 10th and 23rd February, 1961.

DEVELOPMENT WORK

In 1956 Mr. A.G. Palmer, the consulting mining engineer to Oceanic Minerals Development Proprietary Limited and subsequently to Pacific Island Mines Limited, visited and reported favourably on Misima Island (Palmer, 1957).

In December, 1959, systematic trenching was commenced in the area including Grants Claim north-west of the Double Chance (G.M.L.A. 354). Six shallow costeans up to 1500 feet long, running north-north-east across the area, were dug, and the lodes exposed in these costeans were opened up by shorter deeper costeans and by Number One Adit, the portal of which is at 1912 E, 2662 N. In addition shallow costeans have been dug from the north-eastern end of this area, one towards Boiou village and the other towards Kaubwaga village, and another shallow costean is being dug from the south-eastern corner of the area towards Ginesia Creek.

The treatment plant at present installed consists of a water pump, a Hazemag impact crusher and strakes from which the gold is to be recovered by amalgamation. This equipment has a capacity of fifty tons a day. The company is attempting to obtain the stamp batteries left on the island after previous gold mining operations.

It is thought that much of the lode material already exposed can be open-cut.

GEOLOGY

REGIONAL GEOLOGY

The geology of Misima Island has been mapped ^{in 1958} by the Bureau of Mineral Resources at 1:40,000 scale and the following information is from that source (de Keyser, 1960).

The eastern end of the island consists of metamorphic rocks of the quartz - albite - muscovite - chlorite subfacies of the greenschist facies intruded by acid and intermediate porphyritic and granitic rocks, and overlain by Tertiary limestone, conglomerate, and volcanics, and by Quaternary limestone, swamp deposits, and alluvium.

The immediately interesting rock units are the metamorphics and the porphyritic and granitic intrusions which are the hosts of the gold-bearing lodes.

De Keyser recognised three units in the metamorphics, which are, in stratigraphic order:

Umuna Schist - dark schist, phyllite, mica schist, quartz schist.
St. Patrick Limestone - dark calcareous schist, marble.
Ara Greenschist - greenschist,

and suggested that there is another unit similar to the Umuna Schist below the Ara Greenschist.

The intrusives are acid to intermediate rocks most of which are porphyritic. They include dacitic and andesitic feldspar porphyries and felsites, and some granodiorite.

The upper part of a large acid to intermediate intrusion into regionally metamorphosed rocks of the greenschist facies crops out on the eastern end of Misima Island.

Very little is known of the detailed structure. Many lineations are visible on the aerial photographs; most of them trend north to north-west. One extends from immediately west of the Double Chance Mine northwards through the area at present opened up by Pacific Island Mines' detailed prospecting. At least one of the lineations is a fault (the Umuna Fault). The regional strike of the fold axes in the metamorphics and of the outcrops of the acid to intermediate intrusion is west to north-west.

LOCAL GEOLOGY

Country Rock

The rock types exposed in the area inspected are Umuna Schist, Ara Greenschist, and acid to intermediate intrusives.

The Umuna Schist is grey-brown quartz-mica schist; and the Ara Greenschist is blue-grey, occasionally pyritic, massive rock, commonly weathered to brown clay at the surface.

The acid to intermediate intrusive rocks include dacitic and andesitic feldspar porphyries and granodiorite. The porphyritic phases are most common and the intrusion will be referred to as a porphyry.

The schist - porphyry contact is irregular in detail but broadly flat-lying. Minor faulting occurs in the schist and there is much shearing in the porphyry. So far, costeaning has exposed the porphyry only within eighty feet of the schist - porphyry contact and it is in the shears in this eighty feet that the known mineralisation is concentrated. A few small lodes occur in the schist and minor mineralisation in the form of manganese staining and quartz stringers occurs in joints in the porphyry and in the planes of schistosity and the joints in the schist.

LODES IN THE AREA OF DETAILED COSTEANING.

The lodes exposed in the area of detailed costeaning are banded quartz and hard and earthy manganese oxide. They carry pyrite, galena, sphalerite, chalcopyrite and barytes. The quartz is grey, white or brown (limonitic), and is vuggy. In places (e.g., 2488 E., 2480 N.) the banding is folded.

The gold is mostly very fine grained mustard and pinhead gold with occasional pieces of wiregold. That from the Double Chance is reported to be about 800 fine.

Two lode systems are present. The larger is in the shear zone exposed in most of the costeaning work. This zone is generally flat lying and contains stockworks, stringers, and lenses of lode material, with widely varying attitudes. In general the attitude of this zone, as distinct from minor components within it, conforms with the schist-porphyry contact. The minor lode system is represented by the moderately dipping lode opened up by the Number One Adit. This lode occurs in a porphyry dyke intruded along the Umuna Schist - Ara Greenschist contact.

The tenor of the lodes has been tested only by panning the material removed from costeans and visually estimating the gold recovered. Because of the spotty nature of the gold distribution in lodes previously worked on Misima Island, Pacific Island Mines Limited has decided not to test the values in the lodes by channel sampling or by diamond or percussion drilling. Instead it intends to test the grade in a pilot plant using bulk samples of a ton or more and arriving at the head grade by combining the recovery grade and assay of the tailings.

The estimated values are usually four to six pennyweights of gold per ton with maximum values of one ounce per ton.

ORE CONTROLS

The relationship of the lodes to the porphyry-schist contact has been pointed out by most reporters on the gold field. De Keyser (1960 p.2) has also noted that the Ara Greenschist usually crops out near the known lode-bearing areas.

In the area examined both these features are present. According to information so far available most of the lodes are in shears.

LODES OUTSIDE THE AREA OF DETAILED COSTEANING

Several lodes outside the area of detailed costeaning were shown to me by Mr. A.G. Palmer. Some of them are shown on Plate 1.

D. Cubed Area: Pacific Island Mines Limited have found an area containing massive quartz lode float on the headwaters of Gincosia Creek. Five soil samples from this area were panned and estimated to contain one to two pennyweights of gold per ton.

The Double Chance Mine: The Double Chance is a small open-cut mine which has been described by Davies (1958 p.7). Very fine and wire gold occurs in manganese-stained joints containing minor quartz stringers. Two main joint sets are present, one striking 342° and dipping 84° W, and the other striking 313° and dipping 70° E. The gold from this mine is reported to be about 800 fine.

Wiregold Creek: Twenty yards up Wiregold Creek from its junction with Ingubinaina Creek is a flat dipping sheared zone of grey pug striking at 080° and carrying gold and pyrite.

Imgubinaina Creek: On the right hand bank of Imgubinaina Creek, one hundred and twenty yards downstream from its junction with Wiregold Creek, a sulphide-bearing quartz-manganese lode is exposed, dipping parallel to the hill slope. It is more than fifteen feet thick and is reported to assay five pennyweights of gold to the ton.

Wells Tunnel: The quartz-manganese lode exposed at Wells Tunnel is estimated to be thirty feet wide. The tunnel is about seventy feet long, (de Keyser, 1960 p.23), but the length of the lode is not known.

Mill Creek: A quartz-manganese lode is exposed in Mill Creek upstream from where the Bwagaoia - Umuna Road crosses Mill Creek.

Unnamed Creek: Towards the head of the first left hand tributary of Imgubinaina Creek downstream from Mill Creek is a recently slipped area in which a two feet wide shear carrying a quartz-limonite-manganese lode is exposed. The country rock is porphyry in which small joints and faults show manganese staining. The major joint set strikes 140° and dips 45° west.

RECOMMENDATIONS

It is certain that extensions in the length and width of lode-bearing shear zone in the intermediate intrusion will be exposed by further costeaning both inside and outside the present area of detailed costeaning.

Work is needed

1. To obtain a more accurate estimate of the grade of the lode material.
2. To prove the down dip extensions of the lode lenses exposed in the costeans.
(Less than 2500 tons of lode (i.e., that opened up in the Number One Adit) has been proven in depth).
3. To determine the thickness of the zone of shearing in which the lode material may occur.
4. To prove the dimensions of the lode-bearing shear zone.
5. To open up the lodes already known to exist outside the area of detailed costeaning.
6. To prospect the whole of the Exclusive Prospecting Licence Area.

1. GRADE

It is important that the proposed systematic bulk sampling programme for the lode material already exposed be carried out as soon as possible. Trial bulk samples indicate that the grade of the lode material is higher than that estimated by panning.

It may be worth remembering that the oxidised zone at the Umuna Mine consisted of a poor, and as a result unworked, zone near the surface and a richer zone at depth. Among several possibilities, this zoning may indicate secondary enrichment and similar zoning may exist in the area at present being prospected.

In areas that will be mined by open cut methods, the schist and porphyry overburden should be bulk sampled in the hope that they will repay being put through the treatment plant.

Later an attempt should be made to test channel sampling and to compare it with bulk sampling. Channel sampling should be quicker and cheaper than bulk sampling and it may provide useful information on the distribution of gold in the lodes. In the Umuna Mine it was found that the reddish ore on the footwall of the lode and dark coloured (manganiferous) ore carried the highest values.

2. DOWN DIP EXTENSIONS

It appears from work in the northern section of the area of detailed costeaning and in the Grant's Claim Area that the shear zone contains numerous lenses and stringers of lode. The longest lens so far uncovered occurs in the eastern part of the area and has a length of over 400 feet. (Plate 2).

While it is most likely that the lode-bearing shear zone exists over a wide area, its extent and the size of the lode lenses and stockworks within it down dip from the outcrop areas is not known. Because of the flat dip of the shear zone and because in places it is exposed towards the tops of the ridges, it will be possible in these places to prove down dip extensions by costeaning on the other side of those hills already costeaned.

The Grant's Claim Area deserves first priority because it is there that the thickest development of ore has been exposed and because it is close to the treatment plant. A costeaning programme has been started on the western side of the ridge where Grant's Claim is sited. (Plate 1).

Down dip extensions to the northernmost lode exposure can be proved by lengthening every fourth costean on the western side of the ridge on which it occurs.

Elsewhere the downdip extensions will have to be proved by underground workings or by diamond drilling.

3. THICKNESS OF THE LODGE-BEARING SHEAR ZONE

The maximum width of the lode-bearing shear zone so far exposed is eighty feet. Information on the total width of this shear zone can be obtained by extending some of the northernmost costeans downhill to the creeks on either side of the ridge and by extending some of the south-eastern and central costeans uphill to the intrusion - schist contact and downhill into the area underlain by the intrusion. Again the extension of about every fourth costean should provide sufficient information.

4. EXTENSIONS OF THE LODGE-BEARING SHEAR ZONE ALONG STRIKE

It is most likely that the outcrop of the lode-bearing shear zone extends along strike from the areas already opened up.

Detailed costeaning is needed to test for such extensions north of Grant's Claim Area, north of the northernmost costeans, on the ridge on the western side of the left hand branch of Imgubinaina Creek opposite the Grant's Claim Area, and on the ridge behind the treatment plant. These costeans should be dug at right angles to the ridges.

5. LODES OUTSIDE THE AREA OF DETAILED COSTEANING

Of the lodes known outside the area of detailed costeaning the one on Imgubinaina Creek and the D Cubed are the most interesting and deserve first priority in development work outside the area already costeaned.

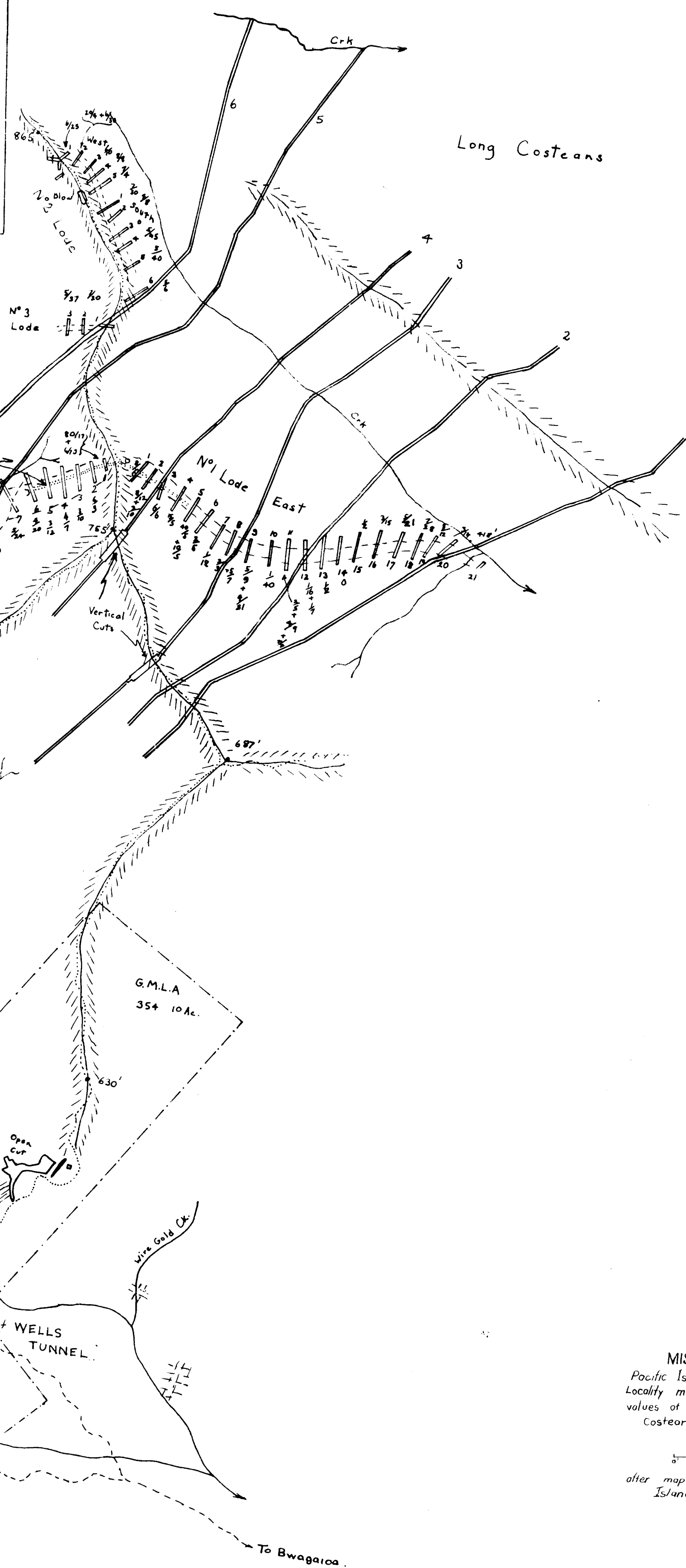
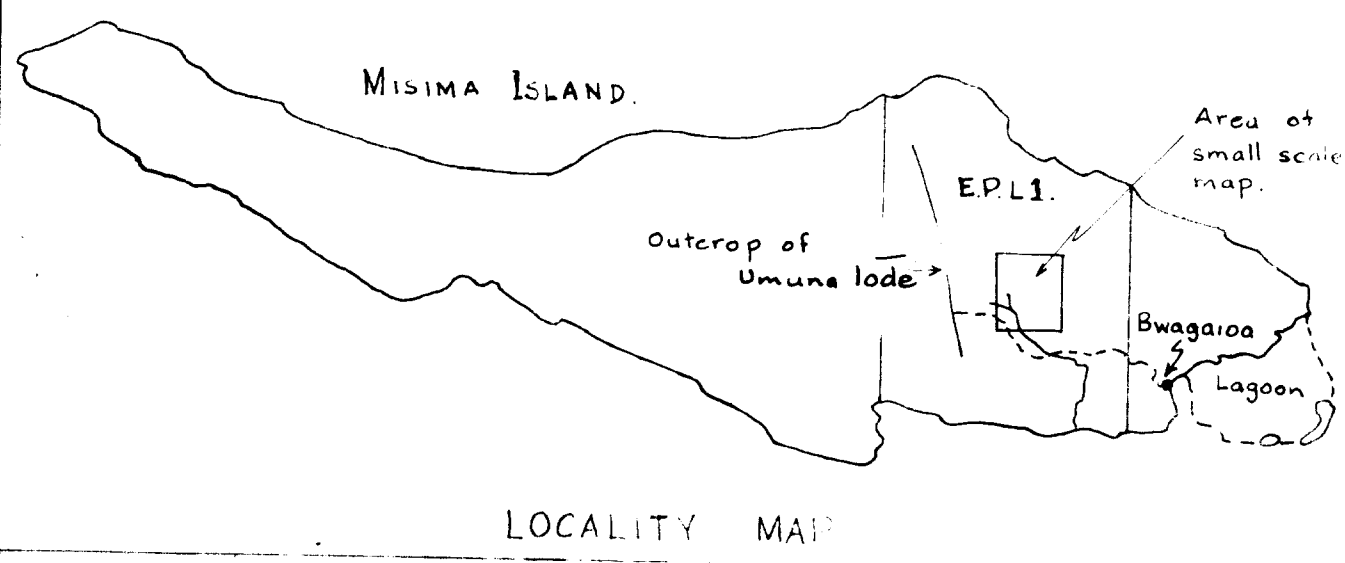
6. PROSPECTING THE EXCLUSIVE PROSPECTING LICENCE AREA

The present information on ore controls, and the geological mapping by de Keyser (1960) indicate that the most interesting area outside that extending from Mt. Sisa to Kulumalia and including the Umuna Fault and the present area of detailed costeaning, is the area between Ara and Ginesia Creeks. Later the area of porphyritic intrusions at the head of the Kobel Creek warrants attention.

Pacific Island Mines' present method of prospecting, using first shallow costeans to pick up gold bearing areas and then deeper costeans to open up the lodes, is most satisfactory. In general the long shallow costeans should run north-east to cut across the regional strike of the geology and the deeper costeans should be deep enough to pass through the eluvial zone and expose weathered rock in situ. It is quite possible for individual lodes to be missed if this is not done.

REFERENCES

- DAVIES, H.L., 1958 - Report on a visit to Misima Island. Bur. Min. Resour. Rec. 1958/95 (unpub).
- _____, 1959 - Geological Observations in the Louisiade Archipelago. Bur. Min. Resour. Rec. 1959/133 (unpub).
- DE KEYSER, F., 1960 - Misima Island - Geology and gold mineralisation. Bur. Min. Resour. Rec. 1960/53 (unpub).
- KING, H.F., MOODIE, R.O.K.T., THOMAS, W.N., 1949 - Report on Cuthbert's Misima Goldmine Limited, Misima Island, Territory of Papua. Zinc. Corp. Ltd. (confidential report).
- PALMER, A.G., 1957 - Mineral deposits on Misima Island, Territory of Papua. Oceanic Minerals Development Pty. Ltd. (confidential report).
- STANLEY, E.R., 1915 - Report on the geology of Misima (St. Aigran), Louisiade Goldfield. Bull. Terr. Papua. No.3.



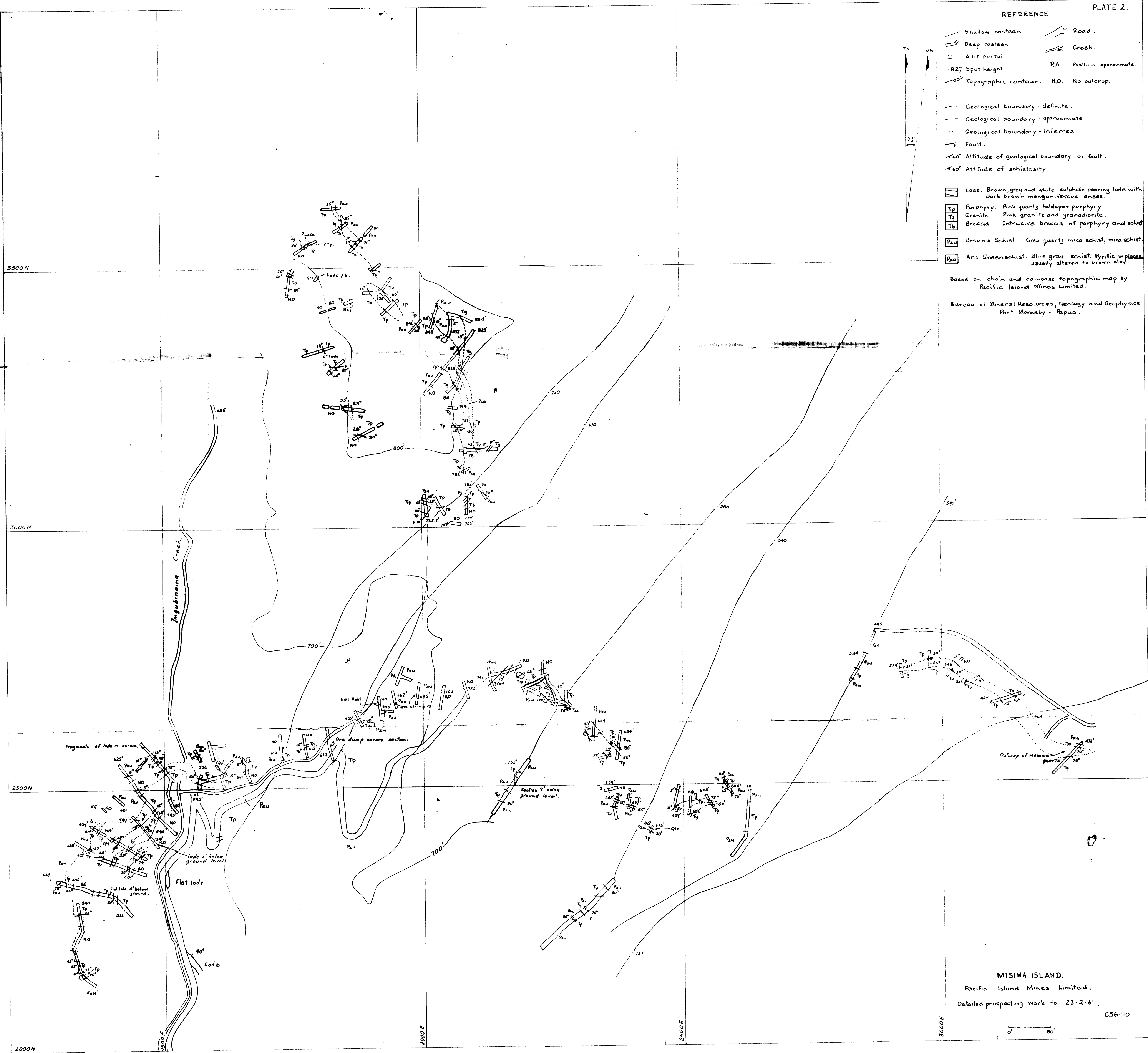
- REFERENCE.
- Ridge
 - Creek
 - 535' Spot height
 - Costean with number used by PIM Ltd
 - Road
 - Track
 - House or Battery
 - 20 Indicates twenty feet width of lode exposed estimated to carry 6 dwts of gold per ton.
 - 1/1 Lode outcrop.

MISIMA ISLAND.
Pacific Island Mines Limited
Locality map showing estimated
values of lode exposed by deep
Costeaning.
Scale.
0' 100'

REFERENCE.

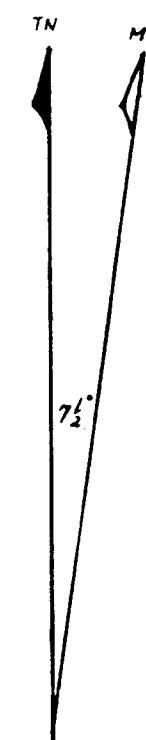
- Shallow costean. / Deep costean. / Adit portal. / 827 Spot height. / 700 Topographic contour.
- Road. / Creek. / PA. Position approximate. / NO. No outcrop.
- Geological boundary - definite. / Geological boundary - approximate. / Geological boundary - inferred.
- Fault. / Attitude of geological boundary or fault. / Attitude of schistosity.
- Lode. Brown, grey and white sulphide bearing lode with dark brown manganiferous lenses.
- Porphyry. Pink quartz feldspar porphyry. / Granite. Pink granite and granodiorite. / Breccia. Intrusive breccia of porphyry and schist.
- Umuna Schist. Grey quartz mica schist, mica schist.
- Ara Greenachist. Blue grey schist. Pyritic in places, usually altered to brown clay.

Based on chain and compass topographic map by Pacific Island Mines Limited.
Bureau of Mineral Resources, Geology and Geophysics Port Moresby - Papua.

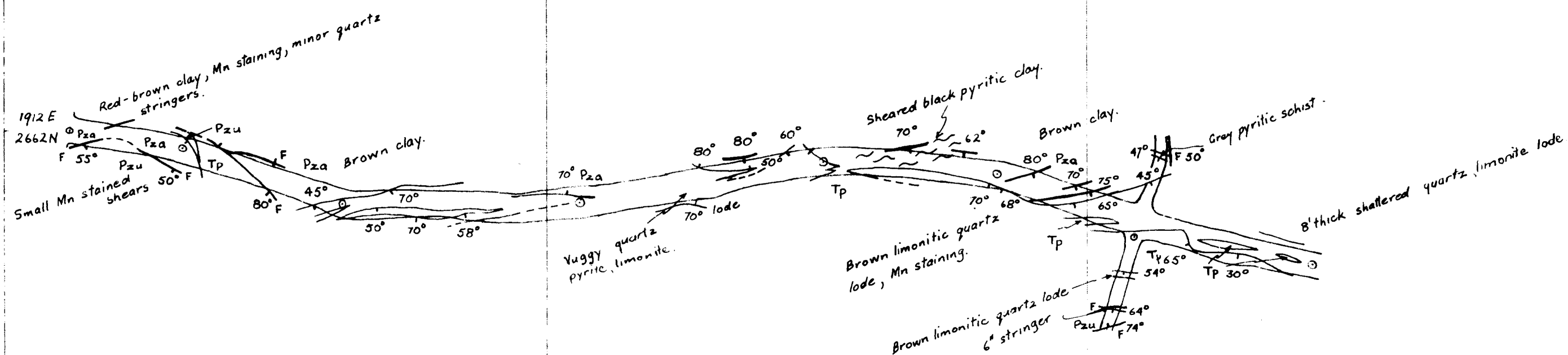


MISIMA ISLAND.
Pacific Island Mines Limited.
Detailed prospecting work to 23.2.61.





2700 N



2600 N

Reference.

- Geological boundary, position definite.
- Geological boundary, position approximate.
- F Fault.
- /// Shear zone.
- <60° Attitude of geological boundary or fault.
- o Galvanised nail in back.
- = adit portal.
- ▨ Lode. Brown, grey and white sulphide bearing quartz lode.
- TP Porphyry. Rnk quartz-feldspar porphyry.
- Pzu Umuna Schist. Grey quartz-mica schist.
- Pza Aka Greenschist. Blue-grey, in places pyritic schist. Usually altered to brown clay.

Bureau of Mineral Resources, Geology
and Geophysics,
Port Moresby - Papua.

2000 E

2100 E

2200 E

2300 E

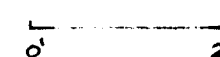
MISIMA ISLAND.

Pacific Island Mines Limited.

Development work to 23.2.61.

No. 1 Adit.

C56-10.



2500 N