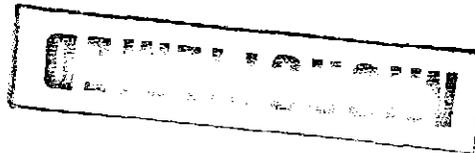


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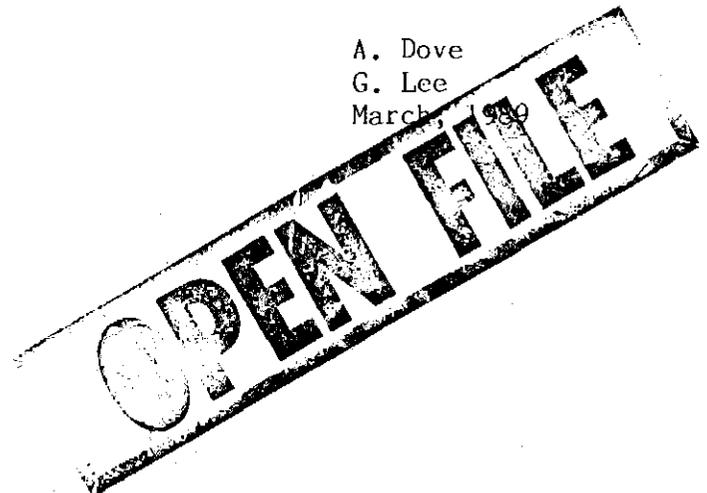
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E.L. 39/87 Tasmania

Annual Report on Exploration Completed in the
Georgetown - Weymouth Area of North-Eastern Tasmania

Report Prepared for
Bach Holdings Pty. Ltd. and Pennant Holdings Ltd.

A. Dove
G. Lee
March, 1989



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SYNOPSIS

1. AIM

To examine the Tasmanian north-east coast between Georgetown and Weymouth for economic heavy mineral sand occurrences.

2. REASON

Recent increases in the price of mineral sand commodities, particularly rutile and zircon, has been caused by shortages of supply. Price rises combined with technological advances have given impetus to examination of areas previously considered to be unattractive.

Parts of E.L. 39/87 have previously been examined, however much of this work was of a reconnaissance nature and was restricted to the occurrences of tin.

3. SUMMARY & CONCLUSIONS

- 3.1 Exploration Licence 39/87 covers an area of 201 km² between Georgetown and Weymouth on the north-eastern coastline of Tasmania.
- 3.2 Previous work by Planet Gold has indicated heavy mineral concentrations to the south of Five Mile Bluff.
- 3.3 Rutile, zircon and ilmenite were recognised in the area by McMahon.
- 3.4 Recent mineralogy confirms McMahon's mineralogy, although problems are associated with interpreting the results reported.
- 3.5 An air-photo interpretation study was carried out over the area covered by this licence.
- 3.6 Exploration targets identified were Bellbuoy Beach and an area between Pipers Head and Little Pipers River.

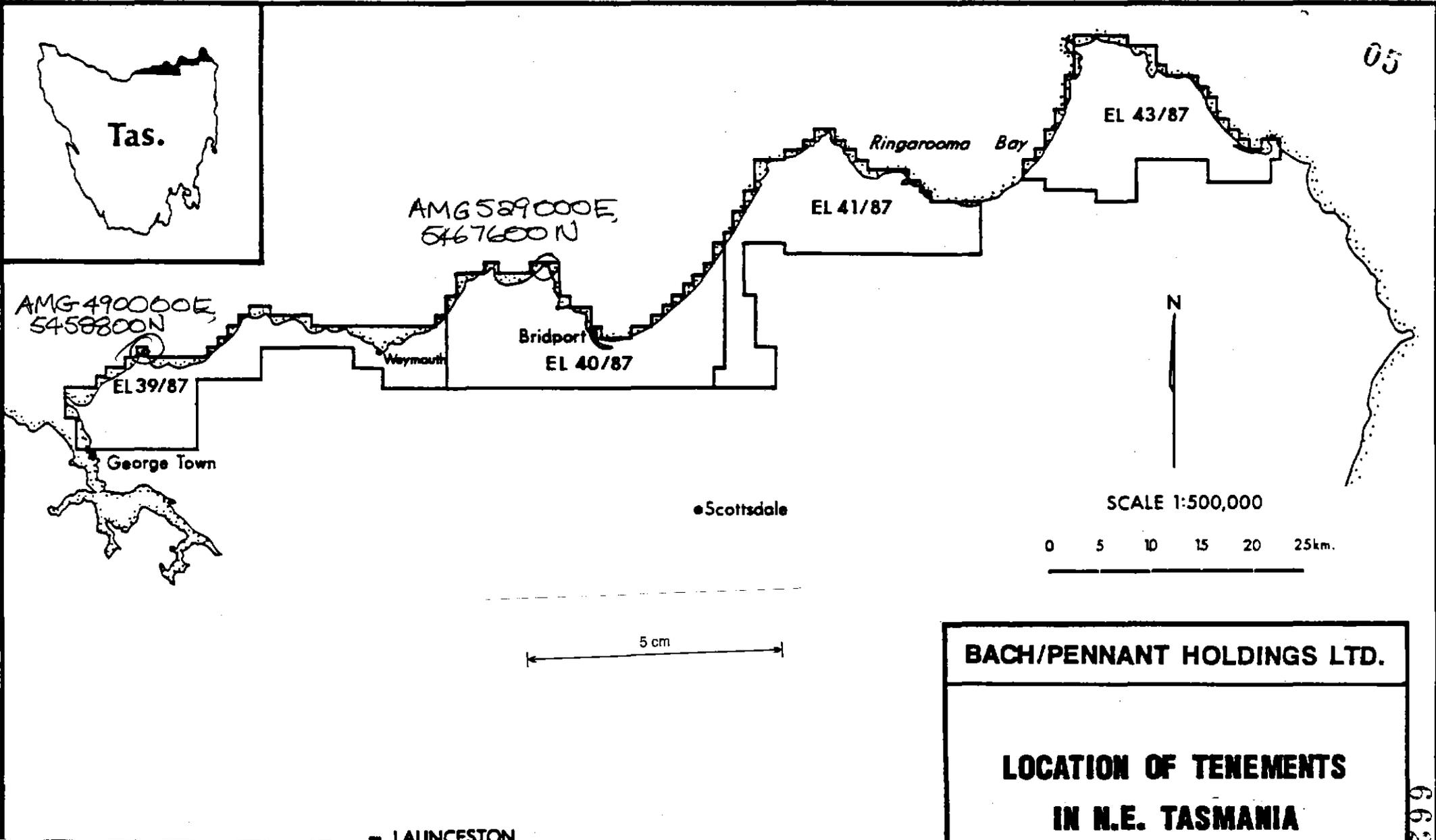
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3.7 Examination of heavy mineral concentrate obtained during reconnaissance investigation of the area indicated the presence of rutile and zircon at levels between 5 - 15%.

4. RECOMMENDATIONS

An initial reconnaissance sampling programme should be undertaken with one traverse line located at Bellbuoy Beach, and a second in the Pipers Head to Little Pipers River area.

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AMG REFERENCE POINTS ADDED

■ LAUNCESTON

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BACH/PENNANT HOLDINGS LTD.		
LOCATION OF TENEMENTS IN N.E. TASMANIA		
Author: A. DOVE	Date: MAR. '89	Fig. No.: 1

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R E P O R T

5. INTRODUCTION

Preliminary exploration was carried out by Peter H. Stitt & Associates Pty. Ltd. on behalf of Bach Holdings Pty. Ltd. on their E.L. 39/87 located on the north-east coast of Tasmania.

Exploration is aimed at the testing of sands for heavy mineral sand deposits, containing economic minerals; particularly rutile, leucoxene, ilmenite (TiO₂ raw materials), zircon and monazite.

During the past three years the world market has been dominated by a short fall in supply to meet the demand, particularly for TiO₂ pigment minerals, zircon and rare earth heavy minerals. As a consequence the price for these minerals has risen to historically high levels. Predictions for the future supply and price of titanium and zirconium raw materials is one of buoyancy.

Recent advances in technology and understanding of heavy mineral deposits has caused a re-evaluation of prospective areas. Chief points of advancement are:

- . Lower grade deposits are now economic.
- . Exploration methods have been developed particularly with regard to quantitative assessment of low grade areas.
- . Mineralogical determinations have seen the employment of the scanning electron microscope to identify minerals difficult to optically identify; particularly distinguishing black rutile from other black opaque minerals and identification of rare earth element minerals.
- . Mining technology has advanced, for example in dredging and dredge cutters, to lower costs and to make difficult areas now mineable.
- . Metallurgical treatment has seen the development of new spirals with higher throughput and suited to lower grade ore. Magnetic separators are now capable of more finely tuned separations to upgrade ilmenite

and chromite products which have been rejected in the past.

- . Overall efficiency of the industry has advanced in order to meet market requirements.

The initial programme was based on the study of topographic maps, aerial photographs and previous work.

In addition to this exploration licence the Company holds E.Ls 43/87, 40/87 and 41/87. These four exploration licences cover most of the coastal strip from the Tamar Estuary in the west to Musselroe Point in the east.

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6. TENEMENT INFORMATION

Exploration Licence 39/87 was issued to Bach Holdings Pty. Ltd. and Minproc Mining (Tasmania) Pty. Ltd. It covers an area of 201 km² of the north-eastern coastal area of Tasmania in the Land District of Dorset to the east of Georgetown.

The licence location is shown in Figure 1.

The area excludes:

- . 0.2 km² Lighthouse Reserve
- . 0.8 km² Crown Reserve
- . 0.2 km² Low Head Coastal Reserve
- . 1 ha Marram Grass Nursery Reserve

The area comprises:

- . 117.2 km² Private Property
- . 50.3 km² Crown Land
- . 25.8 km² Stoney Head Artillery Range
- . 6.0 km² State Forest
- . 0.8 km² Georgetown Wildlife Sanctuary
- . 0.7 km² Timber Reserve

The Coastal Crown reservation to the east of Low Head within the licence is subject to the Mining Act 1929. The area contains: Low Head Settlement and Stoney Head - Black Rock Point, Australian Heritage Act, Registered Entries.

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7. PREVIOUS WORK

A review of available literature and reports of past exploration work was completed for the coastal areas from the Tamar River mouth in the west to Musselroe Point in the east. Information summarised in this section covers all of the four (4) exploration licences held by the Company.

In 1965 B.H.P. reported occurrences of cassiterite in several areas along the coastline in the north eastern part of the State.

Between February, 1966 and March, 1967, Ocean Mining A.G., conducted an intensive exploration programme for alluvial tin, rutile and zircon in Bass Strait, off the north coast of Tasmania.

An evaluation of the results of the programme indicated several areas of potential interest and one in particular, Ringarooma Bay, showed considerable promise. Ringarooma Bay and several other potential targets were subjected to further exploration.

The report (Ocean Mining 1969) indicated reserves within Ringarooma Bay of 23 million m³ (30 million yds³) containing 148 gm/m³ (4oz/yd³) of tin metal; equivalent to 0.009% Sn in raw sand. Zircon indicated to be present at 0.014% of raw sand and rutile 0.006%; after conversion from the quoted ounces/yd³. Significant ilmenite content was noted but contained chromium contents between 0.1 and 0.3%. Traces of gold and minor monazite occur. These deposits were identified as occurring in old alluvial deposits (Pleistocene interglacials) filling the old Ringarooma River course which is now off shore and below modern sea level.

Planet Gold Ltd. (McMahon 1968) during 1967 examined an area from Low Head on the Tamar entrance to Stony Head as part of a more extensive

programme including areas west of the Tamar. Eleven (11) of the holes drilled are within EL 39/87. The location of three (3) of these holes are shown on Figure 2. They are located on or near the present day beaches and contain greater than 1% heavy mineral as tabulated below:

PLANET GOLD DRILLHOLES CONTAINING >1% HEAVY MINERAL

<u>Hole</u>	<u>Depth (m)</u>	<u>% Heavy Mineral</u>
25S	0 - 1.5	1.45
	1.5 - 3.0	0.98
	3.0 - 4.5	1.82
	4.5 - 5.8	1.05
		1.34% Average
30S	0 - 1.5	1.05
	1.5 - 3.0	1.11
	3.0 - 4.0	0.93
		1.04% Average
34S	0 - 1.5	1.42
	1.5 - 3.0	3.28
	3.0 - 4.5	2.36
	4.5 - 5.6	1.92
		2.27% Average

Mineralogy results are not given for individual drill holes but are stated overall as:- "The mineral fractions were mineralogically examined and found to contain only 6 - 8% rutile, traces of zircon, and 7½ to 16½% ilmenite, with the balance being mainly amphiboles, garnet, topaz-andalusite, tourmaline and iron oxides."

Of the other holes three (3) are located on small beaches within the Tamar Estuary and contain very limited resource potential. Five (5) are further inland from the holes shown on Figure 2 and have probably been drilled into alluvial or eluvial deposits.

B.M.I. Mining (Kociumbas 1971) examined an area east of Bridport, the exact location of which is not apparent from their map. Holes were drilled on four (4) lines spaced 800m. (½ mile) apart and at right angles to the beach, with the holes spaced at 122m. (400 ft.) intervals. In all twenty three (23) holes were drilled.

Samples were panned to give approximately the same quantity for each interval. Insufficient data is recorded to fully assess the results. However, the following trends appear from information available:-

Ilmenite	in	raw	sand	generally	<	0.1%
Rutile	"	"	"	"	<	0.02%
Zircon	"	"	"	"	<	0.05%

Monazite and leucoxene were observed along with traces of cassiterite and gold. The results also indicate an overall trend of decreasing heavy mineral content towards the north east.

The S.F.L.W.L. Syndicate (Lockhart 1972) carried out investigations along the coastal areas between Weymouth and Bridport between 1970 and 1972. Reported are summary results for bulk composite samples tested. A summary of results is tabulated below:-

S.F.L.W.L. SYNDICATE HEAVY MINERAL CONTENTS

<u>Area</u>	<u>Line</u>	<u>Depth (m)</u>	<u>Average % H.M.</u>
East Double Sandy Point	SC1	0 - 9.0 (max)	0.55
Noland Bay (Little Pipers River)	NB3	0 - 1.5	1.40
		1.5 - 4.5	0.93
Anderson Bay (Great Forester River)	WH	0 - 4.5 (max)	0.28
	WH	0 - 7.5	0.77

The location of these traverses is shown on Figure 2 of the Report for EL 40/87.

Mineralogy of the heavy mineral suite is given as:

Rutile	8.00%
Ilmenite	25.35%
Zircon	12.10%
Magnetite	2.30%
Others	51.23%
Leucoxene	1.02%

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No comment is made as to the origin of the sample subjected to mineralogical examination.

Maps accompanying the S.F.L.W.L. Syndicate Report indicate that additional drilling was carried out in the West Sandy Point area, but no results are stated.

In 1975 an exploration licence was granted south of Musselroe Point to C.C.J. Blacklow. The objective of exploration was to find silica sand in the -20 +30 mesh size of high quality and sufficient quantity, and also any other mineral sands of commercial value.

Blacklow (1983) reporting on the work has shown that interesting heavy mineral grades occur on the beach to the south of Musselroe Point. The beach width varies from 20 to 26 metres wide and was drilled by auger on 5 traverse lines orientated perpendicular to the coast line. Individual hole depths ranged between 1.1m. (3.5ft.) and 2.1m. (7.0ft.) Heavy mineral grades for the traverse lines ranged from 1.4% to 4.2%, with tin values of 0.004% to 0.065% in the raw sand.

While Blacklow mentions rutile and zircon as being present along with tin he does not indicate how the "recoverable grades" stated were determined. Furthermore he states: "..... the ilmenite present in the H.M. assemblage was quoted as containing 0.65% CrO" No mention is made about the ilmenite quantity.

The licence was held to at least November, 1982, but due to delays in renewal, and objections by the Australian Conservation Foundation, and the Department of Mines, the granting of mining lease was denied for tin. A Miners Right and Easement Licence was kept current in case sample lots of silica sand were required by potential customers.

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In 1976 Minsands Exploration Pty. Ltd. was granted an exploration licence in the vicinity of Ringarooma Bay (Benussi 1976). The objective of the company was to carry out exploratory drilling with the view of locating economic deposits of mineralised sand to the east of Boobyalla Beach. A total of 80 holes were drilled using a hand auger with holes terminating at the water table. They concluded that the mineralization was of too low a grade to be of any economic value. While heavy mineral grades are typically less than 0.5%, the evaluation failed to test sand deposits beneath the water table. As well the mineralogical study was based on XRF determinations on which "several problems were encountered".

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8. AERIAL PHOTOGRAPHY INTERPRETATION

Aerial photograph interpretation using the most recently available black and white photography from the Tasmania Department of Lands was carried out over the E.L. Details are as follows:

Scale:	1: 42 000
Date:	18.10.84
Run 5:	Nos. 86, 87, 90 to 93
Run 6:	Nos. 43 to 52

The interpretation map (Figure 2) shows sufficient geographic features to enable location using the 1:100,000 topographic series. Distortion between photographs created some problems in preparing the composite and is reflected by variation in the angle and the length of some tenement boundaries shown.

The following points are noteworthy:

- . There are a number of small Aeolian sand deposits in the licence.
- . The main target area would appear to be Five Mile Bluff, the dune system north of Beechford and the coast around the mouth of Little Piper River.
- . The Aeolian dune system north of Beechford lies within the Stoney Head Artillery Range.
- . It is possible that the Aeolian sand dunes are overlying older mineralised strandlines.

9. HEAVY MINERAL DETERMINATION

Two samples of surface concentrations of heavy minerals were collected during a reconnaissance trip to E.L. 39/87 in December, 1988. The samples were collected from East Beach near Georgetown and Lulworth Beach, and were submitted for heavy mineral determination and semi-quantitative modal analysis.

Quantitative heavy mineral separation (by heavy liquid sink - float) was carried out with the following results:

<u>Sample No. & Location</u>	<u>Heavy Mineral</u> %
1. East Beach, Georgetown	<0.1
2. Lulworth Beach	16.4

The heavy mineral fractions were bulked together with samples from E.L.'s 40/87, 41/87 and 43/87 and the heavy mineral fractions examined optically. They were found to contain high topaz with a combined rutile and zircon fraction of between 5 to 15 percent. Other potential economic minerals such as ilmenite were present in the range of 5 to 15 percent, chromite in the range 5 to 15 percent and monazite in the range 0.05 to 0.5 percent. Cassiterite, a mineral likely to be associated with topaz was not detected, however no effort was made at this preliminary stage to examine the concentrates for cassiterite.

10. DISCUSSION

The airphoto interpretation in Section 8 of this report has outlined three prospective targets with medium sand tonnages. These are:

- . Aeolian dunes to the south of Five Mile Bluff.
- . A dune system north-east of Beechford (mostly within the Stoney Head Artillery Range).
- . Aeolian dunes around the mouth of Little Pipers River.

There are additional small sand bodies along the coastal strip, particularly in the vicinity of Bellbuoy Beach and to the west of Beechford. No observable strandline deposits have been noted within the exploration licence area. The coastal strip hinterland areas frequently have thin veneers of Aeolian sand along with alluvial and eluvial deposits.

Previous work within the licence area was carried out in 1968 by Planet Gold. Three of their drill holes intersected heavy mineral grades at >1%. Two of these holes were drilled on or very close to the modern beach on which heavy mineral concentrations are visually apparent.

One hole being designated "25S" was drilled into the Aeolian dune south of Five Mile Bluff and contained an average heavy mineral grade of 1.34% to a depth of 5.8m. This sand body should be further explored with a view to confirming the likelihood of significant mineral sand resources within the area.

The mineralogy work carried out by McMahon indicated the presence of rutile, zircon and ilmenite. Recent mineralogical sampling reported in Section 9 of this report confirms McMahon's mineralogy. However there is currently insufficient information on which to establish reliable species contents within the heavy mineral suite. The fact that both investigations have indicated the presence of topaz is significant, particularly from the viewpoint that some cassiterite may occur within the sands.

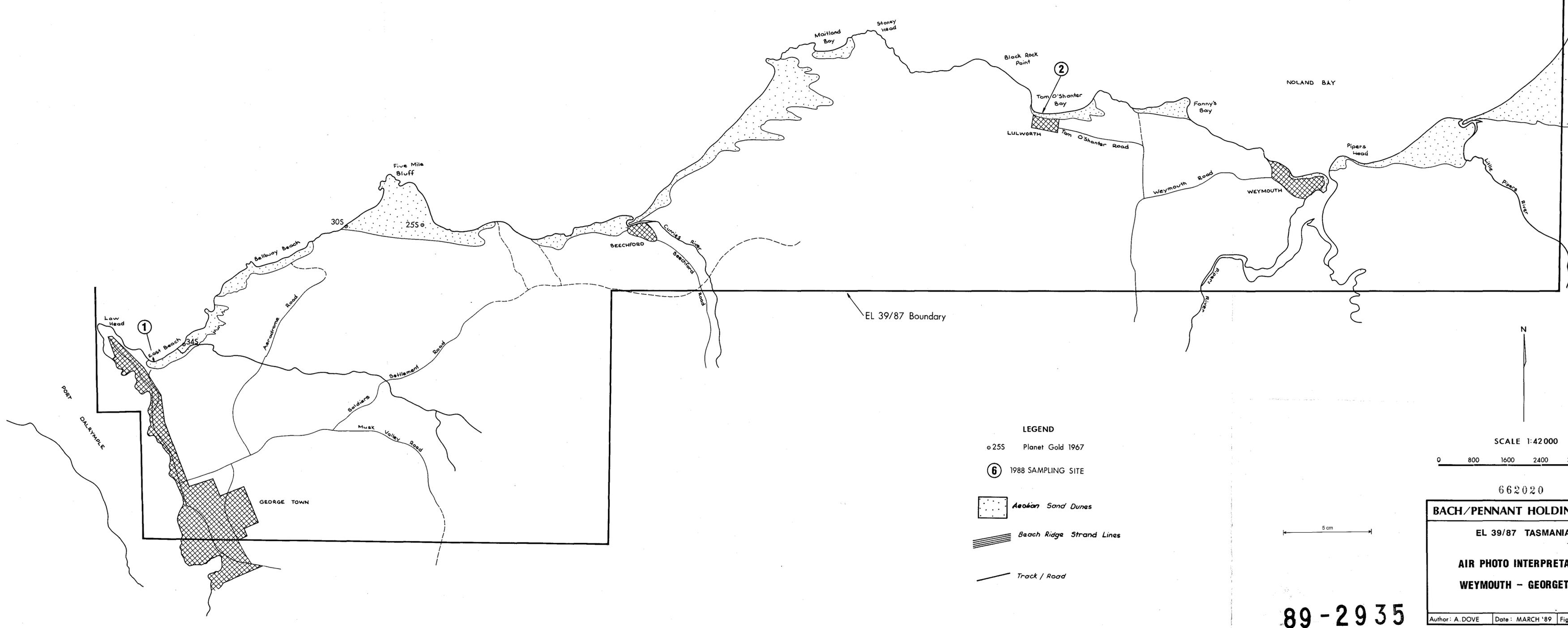
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Exploration work should proceed with a reconnaissance drilling programme examining some of the more prospective areas within the licence. Initially two areas have been nominated, these being Bellbuoy Beach and an area between Pipers Head and Little Pipers River. One traverse line with drill holes spaced at 40m. intervals has been previously proposed for these two areas. The investigations should initially concentrate on mineralogical sampling with follow-up investigations to establish heavy mineral grades. In particular follow-up work should examine the Five Mile Bluff sand body; since this area has a reasonable tonnage potential as well as an indication that grades are >1%, heavy mineral might be obtained.

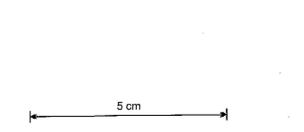
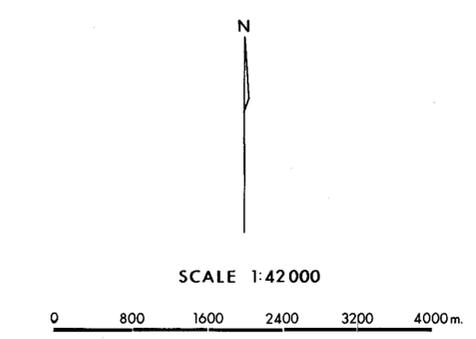
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- LEGEND**
- o 255 Planet Gold 1967
 - ⑥ 1988 SAMPLING SITE
 - [Dotted Pattern] Aeolian Sand Dunes
 - [Wavy Line Pattern] Beach Ridge Strand Lines
 - [Solid Line] Track / Road



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BACH/PENNANT HOLDINGS LTD.

EL 39/87 TASMANIA

AIR PHOTO INTERPRETATION

WEYMOUTH - GEORGETOWN

Author: A. DOVE Date: MARCH '89 Fig. No: 2

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