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GEOLOGY DEPT.

SUMMARY GEOLOGICAL REPORT  
on the  
BOULDER MOUNTAIN PROPERTY  
Gold River Mines Ltd. (N.P.L.)  
Tulameen Area, Similkameen M.D.  
Sept. 21/72 T.R. Tough, P.Eng.

GOLD RIVER MINES - BOULDER MOUNTAIN PROPERTY  
Summary Geological Report, Tulameen Area,  
Similkameen. By: T.R. Tough, Sept. 21, 1972.  
92-H-10  
B.C.

**SUMMARY GEOLOGICAL REPORT**

**on the**

**BOULDER MOUNTAIN PROPERTY**

**of**

**GOLD RIVER MINES LTD. (N.P.L.)**

**TULAMEEN AREA**

**SIMILKAMEEN MINING DIVISION**

**BRITISH COLUMBIA**

**September 21, 1972  
Vancouver, B.C.**

**Thomas R. Tough, P.Eng.,  
Consulting Geologist**

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## MAP INDEX

Title	Scale
PROPERTY MAP	1" = 136 miles
CLAIM MAP	1" = 3000'
SOUTH COPPER SHOWING	1" = 100 feet
MIDDLE SHOWING	1" = 40 feet
GEOLOGY	

SUMMARY

The Boulder Mountain property consists of 42 contiguous mineral claims and four Mineral Leases located approximately 4½ miles NNW of Tulameen, British Columbia and is accessible by road. The claims cover the eastern flank and the summit of Boulder Mountain.

Elevations range from 4500 feet to 5125 feet with cliffs and related talus slopes on the eastern slopes. Timber is plentiful on the property and finished lumber is available in Princeton.

Water is available for all phases of exploration and diesel power would be required for the initial phases.

Winters are relatively cold with moderate to heavy snowfall, whereas the summers are warm with light rainfall.

Rail service is available at Tulameen and most supplies could be obtained at Princeton.

The property was originally discovered and staked prior to 1900. Subsequent exploration on the property consisted mainly of trenching, open-cuts, adits and shallow shafts.

In 1971 Gold River Mines Ltd (NPL) carried out limited soil sampling, trenching and diamond drilling.

In 1972 three shallow diamond drill holes were put down.

The claims are underlain by schists, greenstones and volcanics of the Nicola group of rocks. The Boulder granite outcrops along the southwestern corner of the property. The Eagle granodiorite lies to the west.

A major fault trends northwesterly across the northern edge of the property.

Mineralization occurs as chalcopyrite, azurite, malachite, and pyrite in veins, veinlets and as disseminations in addition to lead-zinc-silver-gold-copper veins within altered Nicola volcanics.

CONCLUSIONS

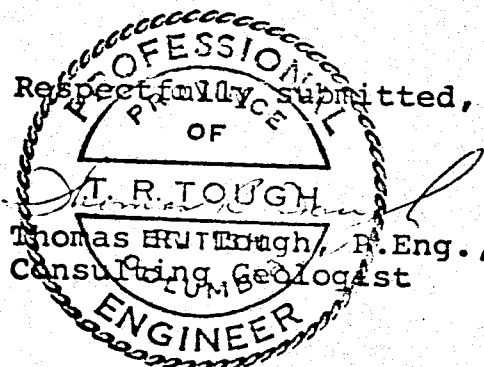
From the results of previous and recent work carried out on the property, and especially the results of diamond drill Hole No. 1, it is concluded that the property warrants more detailed exploration to fully assess its potential.

RECOMMENDATIONS

It is recommended that a three phased exploration programme be carried out on the property. The first phase should comprise geological mapping, the establishment of a survey grid and a geochemical survey. Bulldozer trenching, road building and drill site preparation should be carried out in conjunction with a diamond drill programme. Contingent upon the results of the above work programme subsequent phases of diamond drilling should follow.

It is further recommended that Gold River Mines Ltd (NPL) allocate the sum of \$60,000.00 to implement and execute Phase I of the recommended exploration programme.

September 21, 1972  
Vancouver, B.C.



## INTRODUCTION

The following report is compiled from data obtained by the writer during examinations of the property on July 2, August 19, and September 17, 1972 and from diamond drilling carried out under the writer's personal direction. Information was also obtained from previous government and private publications.

The purpose of the examinations was to examine all work carried out to date and to assess the potential of the property and to propose further exploration programmes to further test known mineralized occurrences.

## PROPERTY

The Boulder Mountain property consists of 42 contiguous mineral claims held by location, and Mineral Leases M82, M83, M84 and M87 and are as follows:

<u>Claim Name</u>	<u>Record Number</u>	<u>Expiry Date</u>
Ken # 1 - 2 incl.	29030-31 incl.	21 October 1974
JM #1 - 2 incl.	28204-05 incl.	1 September 1974
Rex # 1 - 4 incl	33780-83 incl.	18 June 1974



<u>Claim Name</u>	<u>Record Number</u>	<u>Expiry Date</u>
Hope # 1 - 2 incl	29022-23 incl	21 October 1974
Hope # 3 - 10 incl	33754-61 incl.	18 June, 1974
Hope # 12 - 20 incl	33763-71 incl.	18 June, 1974
Hawk # 1 - 4 incl.	29026-29 incl.	21 October 1974
Pit # 1 - 2 incl	29024-25 incl.	21 October 1974
Hope # 11	33762	18 June, 1974
Hope # 21 - 24 incl.	33772-75 incl.	18 June, 1974
Pit # 3 - 6	33776-79 incl.	18 June, 1974

<u>Mineral Lease</u>	<u>Lot Number</u>	<u>Expiry Date</u>
M-82 Cousin Jack	263	February 13, 1974
M-83 Morning	265	June 24, 1974
Oshkosh	266	June 24, 1974
Winnibago	267	June 24, 1974
Black Bird	268	June 24, 1974
Berlin Fraction	269	June 24, 1974
Anaconda	373	June 24, 1974
Ymir	264	June 24, 1974
M-84 Freddie Burn	270	June 24, 1974
M-87 Constitution	282	December 18, 1974
International	283	December 18, 1974

OWNERSHIP

The claims are owned by Gold River Mines Ltd (N.P.L.) of Vancouver, British Columbia.

LOCATION AND ACCESS (49° 121° S)

The claims are situated on the eastern flank and summit of Boulder Mountain immediately northwest of the north end of Otter Lake in the Similkameen Mining Division in south-central British Columbia.

The property is reached by the paved and gravelled road northwest from Princeton to Tulameen and Otter Lake. A dirt mine access road leads west from the north end of Otter Lake and switch-backs up the east slope of Boulder Mountain and provides good access to most of the known showings.

TOPOGRAPHY AND TIMBER

Elevations within the property vary between 4500' on the east slope of Boulder Mountain to 5125' on the summit. The eastern slope frequently has cliffs and related talus slopes. Good stands of timber cover most of the claims. Finished lumber would be available from local sawmills in the Princeton area.

WATER AND POWER

Water is available for all phases of exploration, especially during the spring and early summer months, from various creeks and streams which traverse the claims. Diesel electric power would be required for early stages of development and hydro-electric power would be obtainable if future requirements warrant it.

CLIMATE

Winters are relatively cold with moderate to heavy snowfall whereas the summer months are warm with light rainfall.

TRANSPORTATION AND SUPPLIES

Rail service is available at Tulameen, a distance of some 5 miles to the south or in Princeton, some 15 miles southeast of Tulameen. Most supplies would be available from Princeton.

HISTORY

The property was originally discovered and staked prior to 1900 and was reported on in the Report of the Minister of Mines for 1901, 1905, 1908, 1922, 1933, 1934 and 1937 covering the Cousin Jack Group. The work done consisted

of trenches, open-cuts, adits, and shallow shafts.

A good description of the main workings is contained in the Report of the Minister of Mines for 1937. The following is an excerpt from the same:

#### GOLD-SILVER-LEAD-ZINC DEPOSITS

##### Tulameen Area

"Cousin Jack" - This property, consisting of five Crown-granted and five located claims, is owned by John Osborne, W. D. Vallance, and associate, of Tulameen and Blakeburn. It lies on Boulder Mountain  $4\frac{1}{2}$  miles north of the village of Tulameen and 1 mile due west of the railway at the head of Otter Lake. The topography is subdued, the southern section being nearly flat and the northern section sloping at medium to high angles to the east and north-east. A short distance east of the property the ground falls off rapidly to the Otter Creek Valley. There is adequate timber for mining purposes, and water is obtainable, for domestic use only, from a spring near the cabin.

An excessively steep trail leaves the Tulameen-Merritt Highway on Otter Lake near Smith Creek, and climbs the 1,670 feet rapidly to the summit of Boulder Mountain, and

then drops 100 feet in the next half a mile to the cabin, elevation 4,130 feet. (Note:- On Geological Survey, Canada, Map 46A, the elevation reads approximately 4,600 feet). An alternative trail, used for pack-horses, crosses Rabbitt Mountain and Boulder Creek, and is about  $4\frac{1}{2}$  miles in length from the Law's Camp Road.

The rocks are members of the Tulameen series, intruded by Boulder granite. The showings lie 1,000 feet to 1,500 feet north-west and west of the granite-contact, in greenstone which is more or less sheared. The shearing, the planes of which dip westerly at angles between 15 and 25 degrees, is locally so intense as to produce a chlorite-sericite schist, and when most intense the rock is pyritic. Mineralization is in four well-defined zones that strike west of north and in part follow the dip of the schistosity and in part are nearly vertical. Two isolated exposures may indicate two additional zones which have not been traced.

The most westerly zone is traceable for some 1,200 feet and is opened up by two adits and a number of open-cuts. No. 1 adit, elevation 4,235 feet, is 70 feet long, in addition to which there is an 18-foot open-cut at the portal.

Mineralization includes chiefly pyrite and sphalerite and a little galena in varying proportions in quartz

and silicified greenstone. It occurs as impregnations and replacement of the schistose greenstone and only to a minor extent as fissure-filling by quartz. Some of the material is banded, evenly, or warped and convuled. Width and attitude are uncertain, because the mineralization both cuts across and follows the planes of schistosity. The strongest section is at the portal and is lost in the bottom of the adit; throughout the adit are bands, stringers and masses, individually up to 2 to 4 feet wide, with predominating flat westerly dips. In No. 2 adit, elevation 4,190 feet, 122 feet long, there is a rib of quartz across the back 65 feet from the portal that is 20 inches wide, and this widens downward irregularly to several feet in width. The dip is steep to the west and the mineralization is not heavy. Some irregular white quartz occurs near the portal and some at 70 to 90 feet from the portal. The open-cuts on this zone show apparent widths of 4 to 5 feet or more of quartzose material more or less strongly mineralized; there is apparently variation represented between the extremes of habit seen in the two adits. It is difficult, if not impossible, to judge the width and attitude in these or in most open-cuts on the property; the strike seems quite uniform and the dip is westward at a high angle, but there is a tendency everywhere for the

mineralization to penetrate along the planes of shearing, so that in cross-section any body is seen to consist of an irregular stem with branch-like offshoots, principally on the west side.

An open-cut at elevation 4,150 feet, discloses stringery quartzose mineralization in weakly-sheared greenstone, dipping apparently flatly westward. This is across 8 to 10 feet but is poorly exposed.

A zone north of the cabin is traced for 550 feet. At the southern end is an open-cut on a nearly vertical lead of quartz in sheared ground; the lead is here about 5 feet wide, not all quartz, and is weakly mineralized with pyrite and sphalerite. An open-cut at elevation 4,105 feet, just opened up, discloses quartz, apparently flat and less than 12 inches wide, with some likely-looking mineralization.

An adit at elevation 4,000 feet, 25 feet long, bearing south 55 degrees west, is in flatly-sheared greenstone containing considerable pyrite in fine scattered grains. There is a little flatly-dipping mineralization above the portal which is not encountered in the adit.

The next main zone at elevation about 3,980 feet, is traced 350 feet and on it are four open-cuts. These disclose more

or less sheared greenstone in which are ribs of quartz or siliceous sulphide, seams, some dipping steeply and some flatly, as well as crenulated ribbons of quartz and sulphide mineralization. The apparent width of the zone in these open-cuts is about 2 feet, and mineralization is variable and only locally strong.

The easternmost zone, elevation about 3,915 feet, is traced for 200 feet, and is opened up by three open-cuts, a short adit-crosscut 20 feet long, and a filled-up shaft said to be 35 feet deep. The mineralization exposed by these several workings is hard to describe without going into extreme detail; it is very irregular, in flat, steep, and curving strands individually up to 2 feet wide and over apparent widths up to 6 feet and more. One sample, which assayed: Gold, 0.16 oz. per ton; silver, 1.4 oz. per ton; lead, 12.9 per cent; zinc, 18.6 per cent. - was taken across a steep 18-inch band containing the most galena seen; another sample, channelled 5½ feet down the face of the adit, including little mineral except in the central 2 feet, assayed: Gold, 0.02 oz. per ton; silver, trace; lead, nil; zinc, 3.1 per cent. More opening up accompanied by bulk-sampling would be necessary before averages of dimension and metal content could be obtained."



PRESENT WORK

During 1971 Gold River Mines Ltd. (N.P.L.) carried out a limited soil sampling programme over portions of the property, particularly in the vicinity of Crown-granted claims. The survey covered a distance of 16 line miles involving a total of 800 soil samples. A number of anomalous conditions were found to exist which involved lead, zinc and copper values.

Numerous trenches were cut utilizing a bulldozer which uncovered lead-zinc and copper occurrences. Two shallow diamond drill holes were put down on the Cousin Jack claim, the results of which were not available to the writer.

Most of the work done during this period has not been compiled to date.

During the month of July, 1972, Gold River Mines Ltd (NPL) drilled three shallow exploratory holes on Mineral Lease M-87 to test copper occurrences.

### GENERAL GEOLOGY

Within the general area, the Nicola group of heterogenous rocks predominates. They consist of a succession of lavas through which are irregularly distributed lenses of tuffaceous and argillaceous rocks and occasional beds of limestone.

Regionally, the property is bounded to the west by the northwesterly trending belt of the Eagle granodiorite intrusive. Immediately to the west is a more localized lenticular granitic intrusion (Boulder granite) which is adjacent to a stock of Otter Lake granodiorite.

A number of small stocks of Otter Lake and ultra-mafic intrusions outcrop within the Nicola rocks bounded by the aforementioned intrusions.

Elliot Creek, which bounds the property to the north, is an expression of the Otter Lake fault which is the principal fault of the Otter system of faults radiating northwesterly from the vicinity of Princeton. It is often marked by a wide zone of crushed, silicified and leached material.

Along the east margin of, and paralleling the Eagle granodiorite along a belt as much as four miles wide, the Nicola rocks are sheared into chlorite and sericite schists.

#### LOCAL GEOLOGY

Intercalated sericite-chlorite schists, greenstones and volcanics, all of the Nicola group of rocks are represented on the property.

The schistose zones strike northerly and dip westerly at angles between 15 and 25 degrees which appears to conform to the original bedding.

The greenstone intervals are relatively widespread, indicates various degrees of metamorphism, and may exhibit some degree of schistosity. Pyrite is common and quartz stringers may be present within this "unit".

The Boulder granite-Nicola contact trends northerly across the south-east corner of the property. The silver-lead-zinc showings lie 1,000 feet to 1,500 feet north-west and west of the contact in sheared greenstone.

MINERAL OCCURRENCESCousin Jack Mineral Claim

The Cousin Jack Mineral Claim has several trenches, pits, and old adits exposing parallel veins containing lead-zinc-silver-gold-copper mineralization. A recent series of grab samples assayed as follows:

<u>Pb%</u>	<u>Zn%</u>	<u>Ag oz/ton</u>	<u>Au oz/ton</u>	<u>Cu%</u>
3.44	10.60	0.74	0.330	0.19
4.45	11.00	0.76	0.376	0.18
0.56	4.36	0.46	0.110	0.05
0.67	3.48	0.38	0.164	0.06
1.26	4.10	0.46	0.144	0.05
3.81	9.80	0.88	0.590	0.10
2.80	9.60	0.64	0.134	0.08
4.43	10.10	0.92	0.460	0.11
0.94	3.42	0.32	0.170	0.19
1.71	8.34	0.34	0.072	0.19
3.71	2.98	4.16	0.660	0.21

SOUTH SHOWINGMineral Lease M-87

Three shallow diamond drill holes were drilled from a common station cutting across the apparent mineralized zone. The mineralization consists of chalcopryrite, azurite, malachite and pyrite occurring in veins, veinlets and

disseminations within altered Nicola volcanics.

Diamond drill hole No. 1 assayed as follows:

<u>Sample No.</u>	<u>Footage</u>	<u>Cu%</u>	<u>Ag oz/ton</u>	<u>Au oz/ton</u>
576D	0' - 7'	1.06	0.06	0.002
509D	7' - 15'	1.11	0.10	0.012
577D	15' - 18'	1.68	0.22	0.002
508D	18' - 23'	3.64	0.42	0.002
510D	23' - 29'	0.77	0.06	0.002
578D	29' - 37'	1.59	0.14	0.002
579D	37' - 45'	0.62	0.06	0.002
511D	45' - 46'	2.44	0.23	0.002
580D	46' - 52'	0.83	0.04	0.002
581D	52' - 58'	1.01	0.08	0.002
512D	58' - 62'	4.20	0.20	0.002
582D	62' - 67'	0.26	0.02	0.002
583D	67' - 72'	0.65	0.14	0.002
584D	72' - 77'	7.86	0.94	0.002
585D	77' - 87'	0.20	0.02	0.002
586D	87' - 92'	0.91	0.02	0.002
587D	92' - 97'	0.46	0.02	0.002
588D	97' - 103'	0.55	0.02	0.002
589D	103' - 110'	1.90	0.22	0.002

DDH # 1 ended at a depth of 110 feet and the average weighted grade over the core length of 110' is 1.47% Cu with minor silver and gold values.

Drill holes No. 2 and 3 have not yet been logged, split, or assayed.

#### MIDDLE COPPER SHOWING

Two adits, open-cuts and trenching reveal chalcopyrite and pyrite mineralization associated with azurite and malachite occurring in Nicola volcanics. The minerals occur in vein and veinlets as disseminations and in breccia fillings in Nicola volcanics.

A series of grab samples collected by J.A. Mitchell, P. Eng., along the floor of a trench assayed 5.93% Cu, 0.80 oz Ag/ton and 0.02 oz Au/ton.

#### NORTH COPPER SHOWING

A number of trenches have revealed chalcopyrite and pyrite, azurite and malachite in poor exposures. More work will be necessary to fully expose the mineralization for mapping and sampling to assess the occurrences.

EXPLORATION AND DEVELOPMENT PROGRAMMES

The entire group of claims should be geologically mapped and prospected utilizing a survey grid in conjunction with soil sampling.

Bulldozer trenching of anomalous areas should be undertaken in conjunction with road building and diamond drill site preparation.

Diamond drilling should be continued in the area of the South showings and also to check the other zones which exhibit mineralization over significant areas.

The exploration should be carried out in three phases, the latter two to consist of diamond drilling.

ESTIMATE OF COSTS OF EXPLORATION AND DEVELOPMENT PROGRAMMES

PHASE I

Survey grid, 40 miles @ \$150/line mile	\$ 6,000.00
Geological Mapping	3,000.00
Geochemical Survey, 800 samples @ \$5/sample including assaying	4,000.00
Bulldozer trenching, road building, drill site preparation	10,000.00

Diamond drilling, 2000 feet @ \$12/foot	\$24,000.00
Assaying	3,000.00
Engineering and Supervision	2,000.00
Travel and Living Expenses	2,000.00
Contingencies	6,000.00
	<hr/>
	\$60,000.00

PHASE II

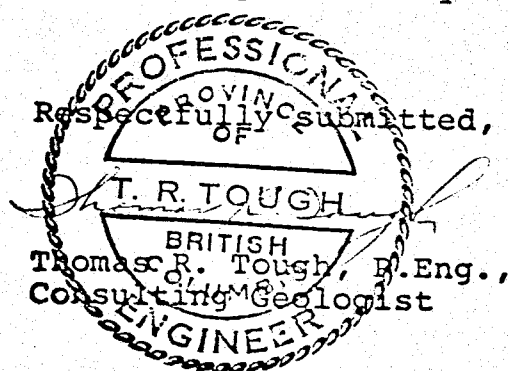
Diamond drilling and related costs	\$70,000.00
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PHASE III

Diamond drilling and related costs	\$70,000.00
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All exploration phases should be contingent upon the results of previous phases.

It is estimated that Phase I should take approximately three months to complete.



September 21, 1972

Vancouver, B.C.



## BIBLIOGRAPHY

Minister of Mines, B.C. Annual Reports

1901, pp. 1088-1178

1922, p. 168

1933, pp. 173-4

1934, pp. D22-23

1937, pp. D27-28

Geological Survey of Canada - Memoir No. 36, 1911

Geological Survey of Canada - Memoir No. 243, 1960

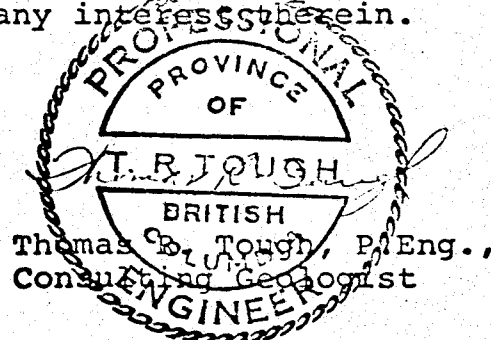
CERTIFICATE

I, Thomas R. Tough, of the City of Vancouver,  
in the Province of British Columbia, do hereby certify:

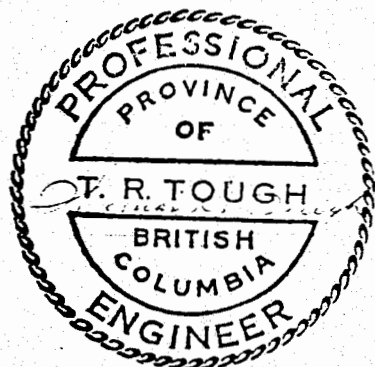
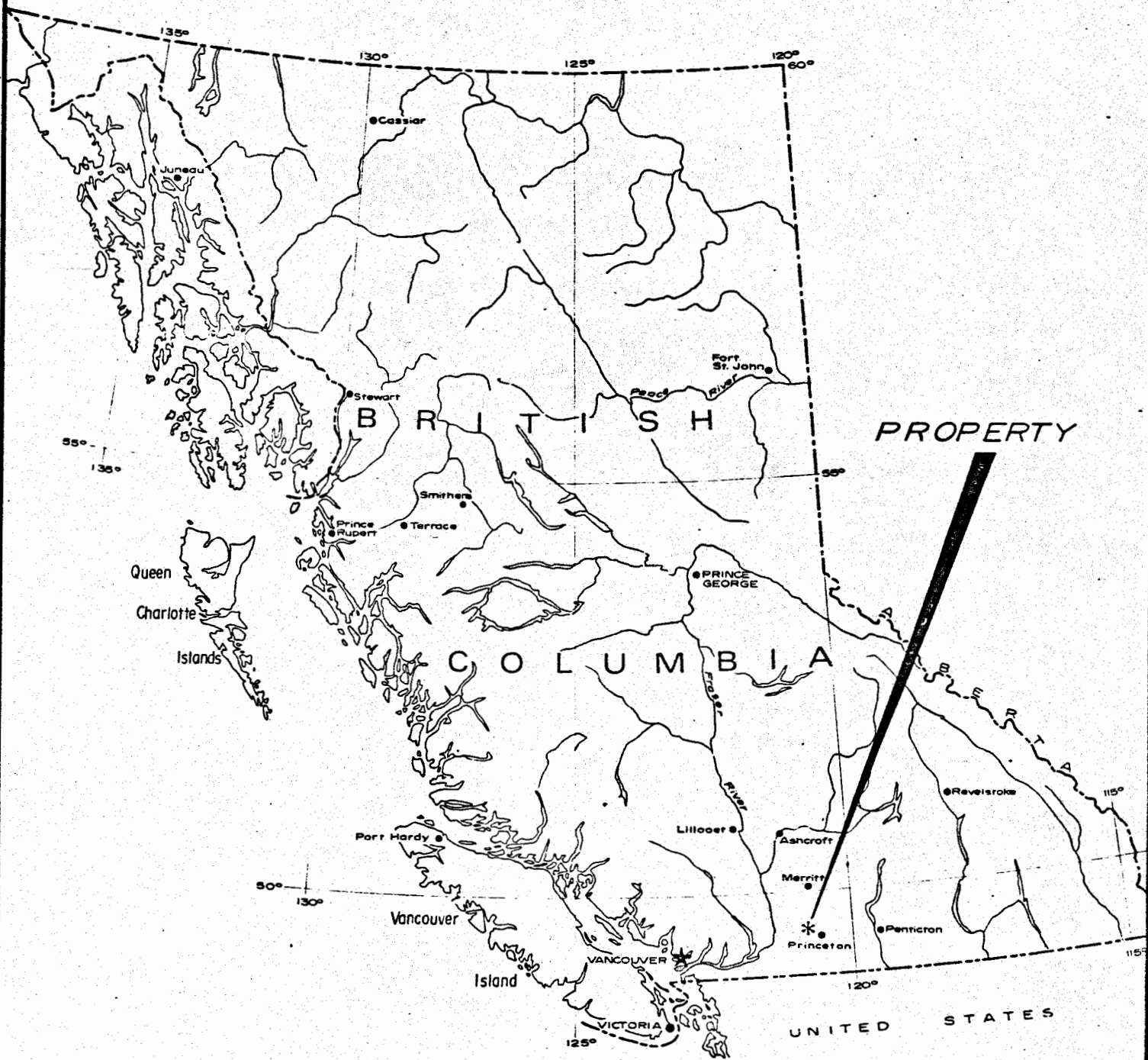
That I am a Consulting Geologist and an  
associate of T.R. Tough & Associates Ltd., with offices  
at 519-602 West Hastings Street, Vancouver, B.C.

I further certify:

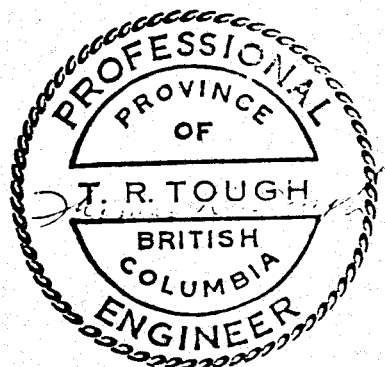
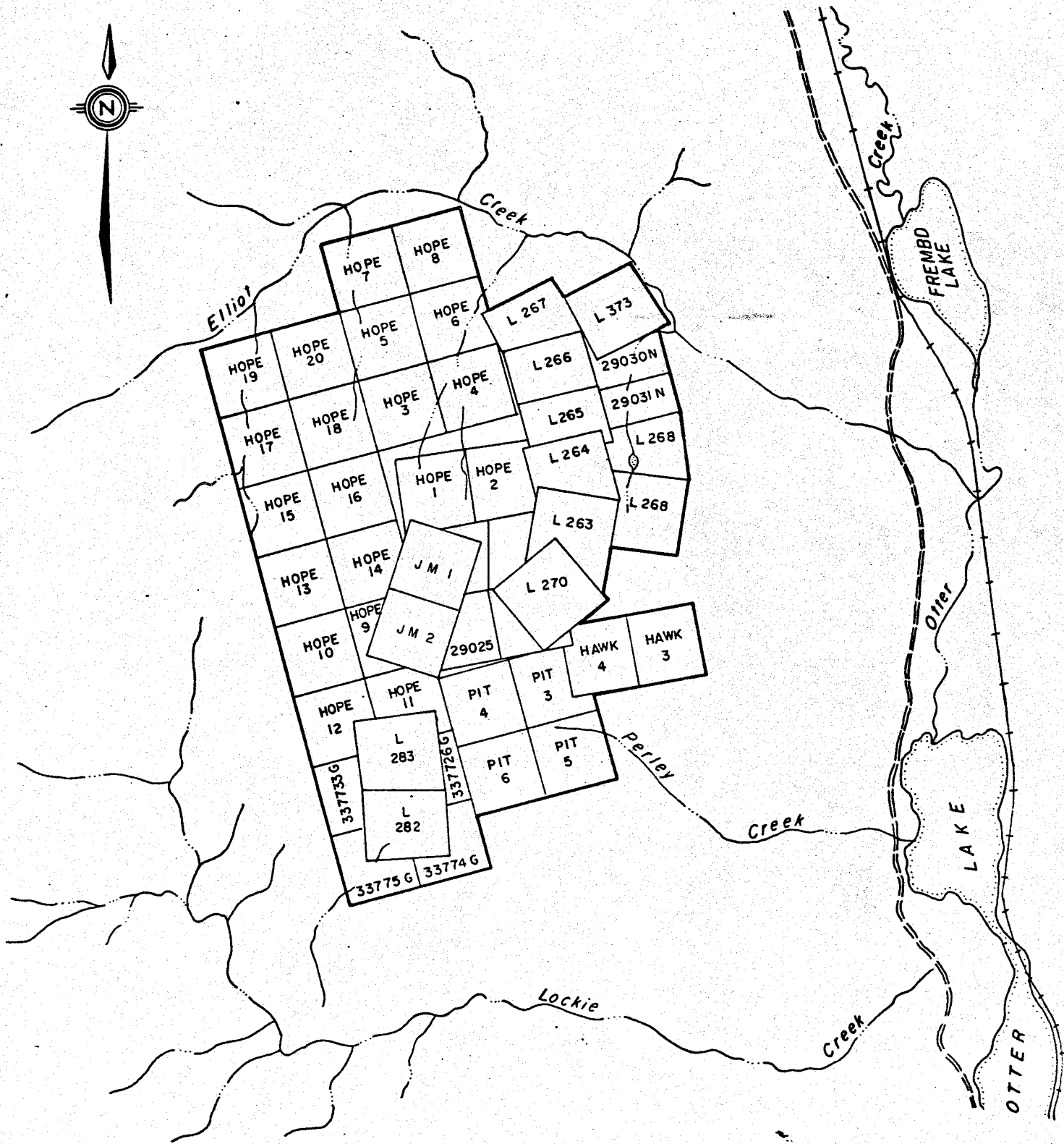
1. That I am a graduate of the University of  
British Columbia (1965) and hold a B.Sc.  
degree in Geology.
2. I have been practising in my profession for  
the past seven years and have been active in  
the mining industry for the past fourteen  
years.
3. I am registered with the Association of  
Professional Engineers of British Columbia.
4. The accompanying report is based on information  
compiled by the writer during personal  
examinations of the property on July 2, August 19,  
and September 17, 1972, from diamond drilling  
carried out under the writer's supervision,  
and from previous government and private  
publications.
5. I have no direct or indirect interest whatsoever  
in the property described here, nor in the  
securities of Gold River Mines Ltd. (NPL) and do  
not expect to receive any interest therein.



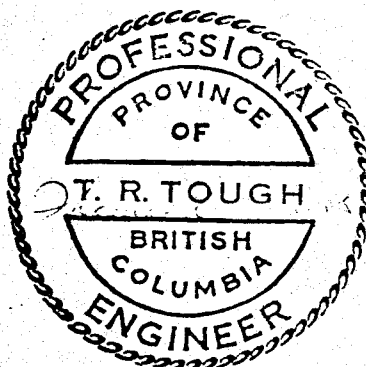
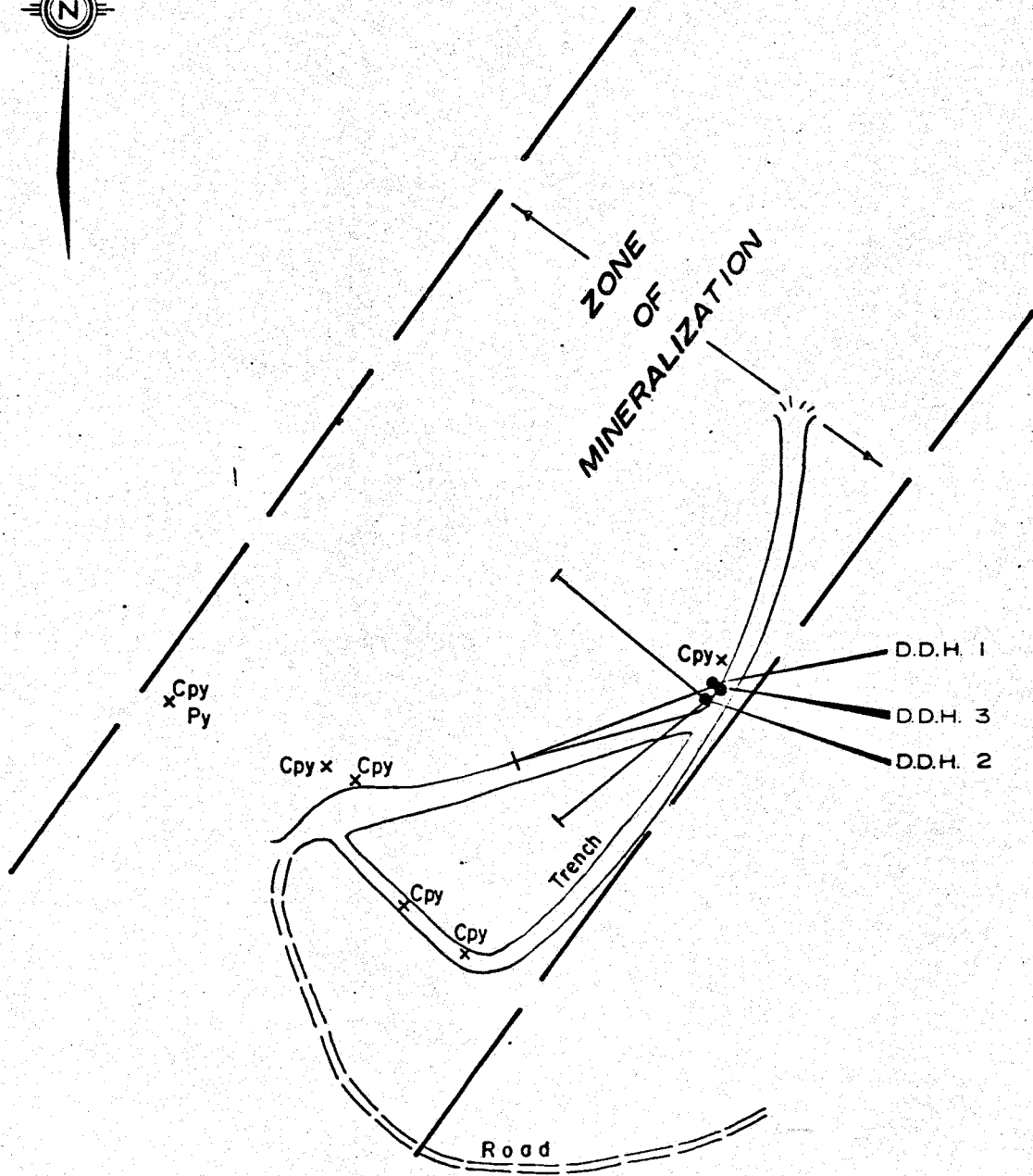
September 21, 1972



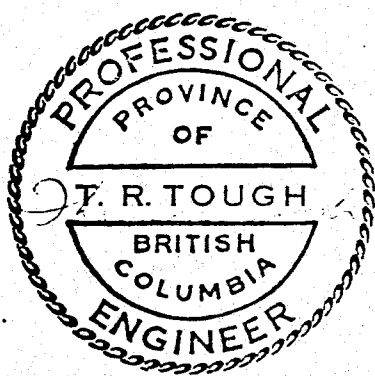
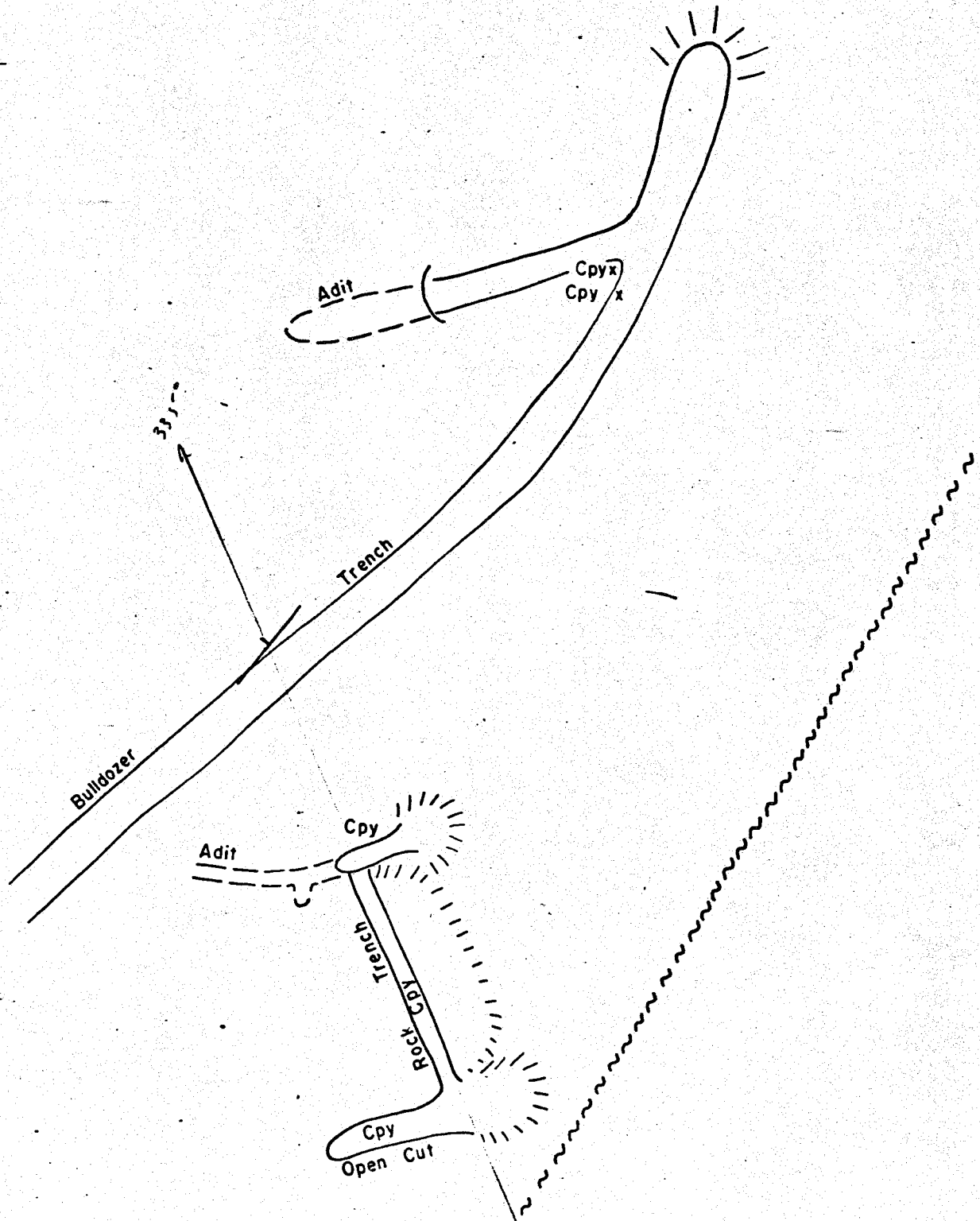
TR. TOUGH & ASSOCIATES LTD.	
GOLD RIVER MINES LTD. (NPL)	
BOULDER MOUNTAIN PROPERTY	
<b>PROPERTY MAP</b>	
SIMILKAMEEN MD., BC.	
SCALE	
1" = 136 MILES	
DATE: SEPT. 1972	CHECKED:



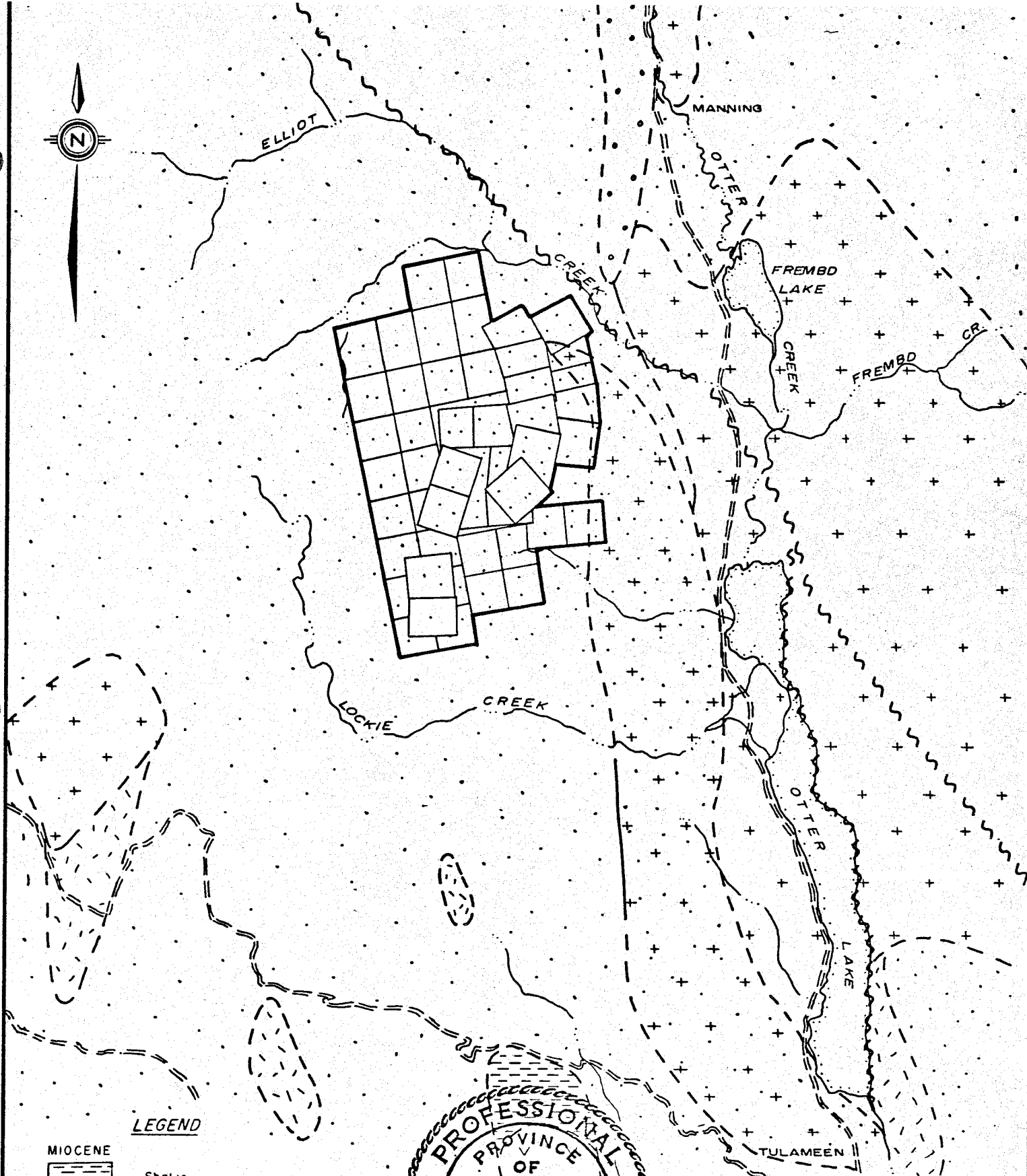
T.R. TOUGH & ASSOCIATES LTD.	
GOLD RIVER MINES LTD. (N.P.L.) BOULDER MOUNTAIN PROPERTY	
<b>CLAIM MAP</b>	
SIMILKAMEEN MD, B.C.	
FEET 3000 1500 0 3000 FEET	
DATE	SEPT. 1972
CHECKED	



TR. TOUGH & ASSOCIATES LTD.	
GOLD RIVER MINES LTD. (NPL)	
BOULDER MOUNTAIN PROPERTY	
<i>SOUTH COPPER SHOWING</i>	
SIMILKAMEEN M.D., B.C.	
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DATE	SEPT 1972
CHECKED:	

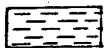


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GOLD RIVER MINES LTD. (NPL)	
BOULDER MOUNTAIN PROPERTY	
<i>MIDDLE SHOWING</i>	
SIMILKAMEEN M.D., B.C.	
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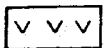


**LEGEND**

**MIOCENE**

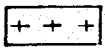


Shales

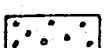


Volcanics

**CRETACEOUS**

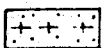


Otter Intrusives

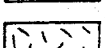


Kingsvale Group

**JURASSIC**

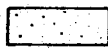


Coast Range Intrusives

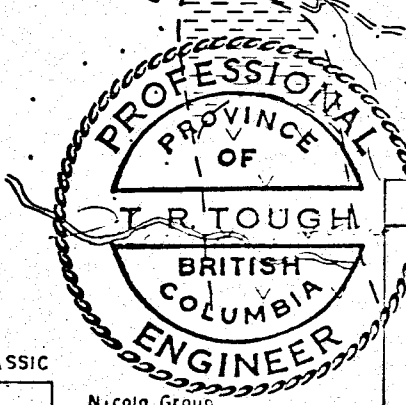


Basic Intrusives

**TRIASSIC**



Nicola Group



T.R. TOUGH & ASSOCIATES LTD.

GOLD RIVER MINES LTD (NPL)  
BOULDER MOUNTAIN PROPERTY

**GEOLOGY MAP**

SIMILKAMEEN M.D., B.C.

SCALE  
1:50,000

DATE: SEPT. 1972

CHECKED