CHAPPARAL MINES LTD. (N.P.L.)

RAY GROUP

104-P-5, LIARD M.D., B.C.

674004

Report by
P.H. Sevensma, Ph.D., P.Eng.

January 10, 1969.

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1. INTRODUCTION

The writer examined the Ray claims and part of the adjoining area, held by Chapparal Mines Ltd. on September 2, 1968 and again on October 4, 1968 and during the period October 21 - 25, 1968.

During the latter visit, heavy snow and bad weather precluded the examination of a new molybdenite showing located while constructing a tote-road into the property. On September 2nd, 1968, the writer examined and sampled under favorable weather conditions, the original molybdenite showing on this ground, located at an elevation of about 5,650'.

The group adjoins to the North and Northeast claims held by New Jersey Zinc Corporation of Canada, where drilling on a large molybdenite deposit has been in progress during the last three summers. This operation was visited briefly by the writer on August 17, 1968 and on September 1, 1968.

To the East of the Chapparal claims, Coast Silver Mines is exploring a number of pyrrhotite-silver-lead-zinc occurrences, which have been traced by high grade float to the East boundary of the former claims.

2. ECONOMIC GEOLOGY of the Cassiar-McDame Area

An area with abundant mineral showings is centered on the McDame Lake and Creek area (Figure 1.). The first discoveries of placer gold were made about 1874 and during the 1930's considerable work was carried out, notably by the Consolidated Mining and Smelting Company of Canada Ltd. Upon discovery of gold in the Yellowknife area, the activities subsided in favour of the bigger and better grade showings in Precambrian shield environment in the N.W.T.

The discovery of the Cassiar Asbestos deposit in 1950 led to the start of road building. More recently, the discovery of what is believed to be a large molybdenite deposit of economic grade by New Jersey Zinc Exploration Co. (Canada) near Cassiar has again focussed the attention upon the potential of this district, which is now easily accessible by road.

The district lies along the East flank of the Cassiar batholith, a granodiorite intrusion of Mezozoic age.

A broad belt, from 8 to 16 miles wide, of Upper Devonian-Lower Mississipian volcanics, the Sylvester formation, trends in a NNW direction along the Cassiar batholith.

This formation is a broad syncline, overlying Cambrian and Proterozoic formations, which lie in a narrow strip between the batholith and the volcanics, and which form an elongated anticlinal zone, or dome, East of the volcanics.

From personal observation during the last ten years, by prospecting and by examinations of showings along the East flank of the Cassiar batholith between latitudes 58° N and 61° N, the writer has concluded that the McDame district presents one of the highest concentrations of near-commercial showings along this side of the batholith.

The following factors are favorable characteristics of a general nature:

1. East flank of the Cassiar batholith.

2. The late Proterozoic and Lower Cambrian formations, which are the host rocks for the majority of significant lead-zinc deposits throughout B.C. and the Yukon.

3. The lower section of the Sylvester volcanics, with interbedded volcanics and clastic sediments.

4. A dome of Proterozoic, characteristic of many ore districts throughout the Cordillera.

In addition, the McDame district exhibits well defined ENE striking trends of lineaments, of showings and of pronounced alterations of a type usually associated with economic mineral deposits; this combination of features is unique to this belt.

The presence of these five favorable groups of factors renders this district particularly attractive from an economic mineral point of view, and in the writer's opinion, showings of economic grade justify more thorough investigation in this district than similar, but more isolated showings, elsewhere.

The relatively deep overburden and the relatively dense vegetation in the area, as well as the rugged character of the mountains carved in the Sylvester volcanics, have so far discouraged detailed prospecting, geochemical reconnaissance, and detailed geological mapping.

Some of the more outstanding prospects of the area may be listed as follows:

New Jersey Zinc: 50 million (?) tons + of economic (?) Mo S2 grade, easily minable by open-pit. Original showing was small and low grade, with leaching of the ore body to a depth of about 100'.

Lang Creek Copper: Some 25,000 tons of massive pyrite with pyrrhotite and chalcopyrite, averaging about 2.5% Cu., lie along a favorable, but

as yet unexplored structure. This body is of the stratabound type.

Marble Creek, Silver-Lead-Zinc: Numerous occurrences of (gold) - silver - lead - zinc with a silver-lead ratio of about 1.1. Due to lack of geological mapping, and deep overburden on the lower slopes, the relationship between these showings is not yet understood. Exploration has recently been revived with significant encouragement.

Hanna Gold - Snow Creek Gold - Table Mountain - McDame Lake Area: Semi-developed gold showings, which are no doubt inter-related, as they all dip towards a common center, the Lang Creek - Snow Creek belt of alteration. Grades are commercial (1.5 oz/t Au.) to near-commercial (0.3 oz/t Au.), but widths are somewhat narrow, or dips are flatter than 40°, or the surface expression has been insufficiently traced. The disposition of the veins suggests that they are likely to improve with depth. This belt requires and warrants detailed mapping.

Haskin Mountain: A typical Cambrian stratabound lead-zinc deposit related to a granite-porphyry intrusion, with significant mineralized shears and often attractive silver and copper values. The Southern portion of the deposit is mostly eroded, but is believed to have covered roughly a square mile, with a pre-erosion tonnage of some 20 million tons. The Northern part of the occurrence is now under exploration; there are indications of possible copper-porphyry type mineralization, as well as large sulphide bodies.

Ram Showings: Sizeable occurrence with inconspicuous silver-copper mineralization with high silver-copper ratios.

Ventures Mining: The old Bartle group of claims contains some 40,000 tons of 4.73 Ag., 1.86% Pb., and 1.70% Zn., with bismuth values; the silver; lead ratio is about 2.5:1.

A number of other occurences are known to the writer; a good proportion of these warrant further work.

A factor common to all these situations is that they require detailed geological mapping; the success of NJZ in developing a large and probably economic molybdenite deposit is due in large part to efficient geological work.

An added factor hampering exploration in the area is the very poor quality of the claim maps, which are on a poor topographical base, full of plotting errors and usually about six months or so out of date.

As a result, exploration personnel and examining engineers are required to spend a great deal of time inspecting claim post locations instead of performing work of a technical nature.

Similarly, the major alteration trend running from Lang Creek to Snow Creek towards the Haskin Mountain and Mount Reed lead-zinc areas, required much more detailed investigation.

The alteration consists mostly of dolomitization and pyritization, especially well defined around the gold bearing quartz veins with dolomitization extending anywhere from a few feet to fifty feet or more from the vein walls.

The Lang Creek copper deposit presents a halo of rust due to minor disseminated pyrite. Malachite staining extends some 20' or 30' above the sulphide occurrence.

Large patches of rust and/or dolomitization are very conspicuous for several miles along the Lang Creek - Snow Creek lineament, and their accurate delineation and mapping will no doubt reveal excellent target areas for fruitful exploration.

In summary, it is the writer's considered opinion that the Cassiar-McDame area is a mineral district with a high probability of further economic discoveries, where the majority of showings warrant considerably more work.

3. PROPERTY, LOCATION, ACCESS

The main showing of the Ray Group lies at an elevation of 5,650', well above timberline, at about Lat. N 59° 17' and Long. W 129° 50', on NTS 104-P-5.

The group is accessible by highway to Cassiar and then by a, 4 wheel drive, tote road to various parts of the property. Access roads on the property were completed late this fall to ensure ready access during the 1969 field season.

The group consists of the following claims:

Name	Tag No.	Record No.	Expiry Date
Ray 1 - 8	497409-16	14773-80 K	Aug. 3/69.
Mo 1 - 6		31617-22 K	Aug. 6/69.
Mos 1 - 6		31623-28 K	Aug. 6/69.
Dom 1 - 4		31629-32 K	Aug. 6/69.
Fall 1 - 4			Oct. /69.

This is a total of 28 claims. The only cairns checked by the writer in the field are those of the Ray 1, 2, 3 and 4 claims.

The area lies in a relatively heavy snowbelt, with some 5' - 6' of packed snow in spring. Timber and water supplies are abundant in the valley below and good timber extends to an elevation of about 4,500'.

Water for drilling purposes is available in a lake lying some 400' vertical distance below and 1,500' horizontal distance West of the showing.

The road distance to Cassiar is between 3 and 4 miles.

4. GEOLOGY

The property covers a NE trending granodiorite spur of the Cassiar batholith and part of the slightly metamorphic sediments of Cambrian age on the NE flank of the batholith.

Molybdenite occurrences lie in a belt several miles long, extending from the workings of Cassiar Molybdenum, South of Lang Creek, North through the New Jersey Zinc claims into the Ray Group.

On the New Jersey Zinc claims, leaching of molybdenite is general to a depth of about 100', with only occasional patches having escaped the leaching and providing visible evidence of molybdenite. The molybdenite occurs mainly as patches and disseminations in pink porphyritic granite and in porphyry, as well as in small quartz veins usually up to $\frac{1}{2}$" wide. A system of N-S, E-W and N-E zones of sheeting controls the high grade molybdenite areas, and post-ore movement has created several mineralized blocks off-set in relation to each other.

Detailed geological mapping based on work by New Jersey Zinc is as yet unavailable and the position of the various faults is known only approximately.

It is an accepted fact that in this area any molybdenite occurrence of 0.05% MoS_2 warrants investigation, in view of the general and widespread surface leaching.

To the N and NE, in the sediments bordering the granite, a silver-lead-zince vein of significant width is known on the adjacent property, striking into the Chapparal ground.

After the writer's initial examination, tote-road construction and trenching has located pyrrhotite, lead and magnetite mineralization in the trenches and a new molybdenite showing, inaccessible at the time of the writer's last visit.

5. SHOWINGS

The main molybdenite showing, lying at an elevation of 5,600 feet, just below the top of the ridge and to the SE of it, consists of a coarse grained feldsparquartz pegmatite with coarse grained rosettes of molybdenite lying at the interface of the two principal constituant minerals. The pegmatite outcrop is 7' wide and strikes about N 80° W with an 80° dip to the North; it intrudes a quartz-eye granite, with quartz eyes of about $\frac{1}{4}$" diameter and with pinkish feldspar which forms phenocrysts up to 2" long and 1" across. The writer's sample across the 7 foot section assayed 0.39% MoS_2 and 0.1 oz/t. Ag. (assay report No. 1706 by Coast Eldridge, dated September 18, 1968.

N 50° E sheeting with 75° SE dip is prominent in the granite. Occasional fine grained bunches of molybdenite were seen in some of the granite.

Proceeding NE along the ridge, there is an area of bleached and leached granite, followed by a well oxidized area until the contact with the sediments is reached.

The owners report having traced molybdenite bearing float across the ridge to the NNW and to have located a showing near a small lake at the 4,800 foot level. A somewhat weathered specimen from this showing carrying molybdenite and pyrite, assayed 0.06% Mo (Coast Eldridge Report No. 3938, January 9, 1969).

One of the major controlling E-W faults is very apparent in the sediments on the next ridge to the East, but its exact trend into the

granite area is obscured by the overburden in the intervening valley.

The pegmatite showing is very different from the usual type of mineralization in the area, and in general, pegmatites have less chance to develop large ore bodies than certain structurally favorable granite areas.

However, occasional molybdenite is visible in the granite up to several hundred feet from the showing and there is a typical bleached granite below the showing.

The NW side of the ridge with the showing drains into a small creek flowing along a flattish bench covered with talus.

This creek, which only flows in spring and early summer, does carry molybdenite flakes, suggesting either an extension of the showing into this area or the presence of molybdenite bearing granite.

The proper way to assess the presence and grade of molybdenite in the pegmatite and in the adjacent granite is obviously the drilling of some core-holes across the zone into the unleached granite, i.e. to a vertical depth of at least 200' below the surface.

A silver-lead-zinc vein is reported to have been cut by bull-dozer trenching in the sediments. A number of other trenches, not as yet examined by the writer, were completed and mineralization, predominantly magnetite, is reported.

As the dark oxidation in the granite increases markedly towards the contact with the sediments in the area where the silver-lead-zinc has been cut, some trenching in the talus in suitable areas should be carried out to expose the underlying bedrock.

6. ECONOMIC POTENTIAL

The original surface showings in the area where the New Jersey Zinc orebody is located were most inconspicuous and unattractive and were condemned as uneconomical after some initial trenching by drilling

and blasting had been carried out. The presence of molybdenite near the small lake may be very significant, as any values of 0.05% Mo in place may reflect the presence of economic mineralization in the unleached granite at depths exceeding about 100'.

The presence of silver-lead-zinc pyrrhotite-magnetite mineralization just off the granite contact provides a secondary target and is an additional inducement to the conduct of a detailed exploration program.

In the area, there is a distinct relationship suggested between the latter type of mineralization and the molybdenite in the intrusive. In the Haskin Mountain area, 15 miles to the East, large sulphide masses overlie the molybdenite-bearing parts of a small granitic plug, and in the Granite-Marble Creek area under consideration, E-W and NE striking zones of faulting and sheeting are associated both with the molybdenite and the silver-lead mineralization following the bedding of the adjacent clastics and carbonates.

It is obvious that no prediction as to the economic potential of any molybdenite showing in this area can yet be made without a thorough investigation, using a judicious combination of geological mapping, prospecting, soil sampling, trenching and diamond drilling.

7. RECOMMENDED PROGRAM

The following program is recommended:

1.	Extend tote-road with a bulldozer and trench in suitable location, 200 hours @ $40.00 per hour overall	$8,000.00
2.	Geological Mapping, Geologist and Assistant	3,000.00
3.	Linecutting and General Labour	2,500.00
4.	Boundary Survey	1,000.00
5.	Preparation of 400 scale base map	500.00

6.	Geochemical Survey, 500 samples @ $5.00 per sample	2,500.00
7.	Geophysical Surveys (a) airborne, shared cost basis	3,000.00
	(b) ground follow-up	2,000.00
8.	Camp (a) construction and maintenance	3,000.00
	(b) operation, 500 man days at $10.00 per day	5,000.00
9.	Supervision and Field Management	2,500.00
10.	Transportation and Communications	4,500.00
11.	Consulting, Fees and Expenses	3,000.00
12.	Diamond Drilling (a) Molybdenite showings, 4 holes, 300 ft. long @ $15.00 per foot	18,000.00
	(b) Silver-lead-zinc vein, 2 holes 250 ft. long @ $15.00 per foot	7,500.00
13.	Contingency Allowance = 15%	9,000.00
	ESTIMATED BUDGET, this stage	$75,000.00

While further drilling would be predicated upon the results to this stage it would be advisable to make a provision for the conduct of additional work on a contingent basis as success in outlining a significant area of molybdenite mineralization could warrant an immediate follow-up program of either deep drilling or of expanded drilling to about a 500' depth. A 3,000' program of either type is estimated to cost in the order of $45,000.00.

As the writer has not yet examined the new silver-lead-zinc showing but is familiar with work elsewhere in this zone, it is regarded as an attractive target warranting careful examination. The absence of outcrop in an area where faulting and local alteration effects may be highly significant dictates the need for a carefully controlled program of soil sampling, mapping, trenching and drilling.

8. SUMMARY

The claims of Chapparal Mines Ltd. cover a molybdenite-bearing pegmatite occurrence assaying 0.39% MoS_2 across 7' lying in the N-S trending molybdenite belt in which New Jersey Zinc Corporation is believed to have proven an economic deposit minable by open pit about $1\frac{1}{2}$ miles to the South.

The claims also cover the extension of a silver-lead-zinc vein of significant size known on adjacent ground to the NE, and it is understood that after the writer's examination, cat-work has exposed this vein on Chapparal ground.

In view of the 100' deep leaching of molybdenite, common in this area, it is recommended to explore this ground by trenching and mapping as well as by drilling on both the molybdenite and the base-metal occurrences. Field costs for the first stage of this work are estimated at $75,000.00 and a provision for deeper drilling, contingent on results of the first stage is estimated at $45,000.00.

Respectfully submitted,

P.H. Sevensma

P.H. Sevensma, Ph.D., P.Eng.

Vancouver, B.C.
January 10, 1969,

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C. do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland, (Physics and Chemistry, 1937; Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

3. From February 1948 until December 1965, I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined and sampled the original molybdenite showing on September 2, 1968, but have not examined all the trenches nor the newly discovered molybdenite showing, covered by snow at the time of my last visit to the property.

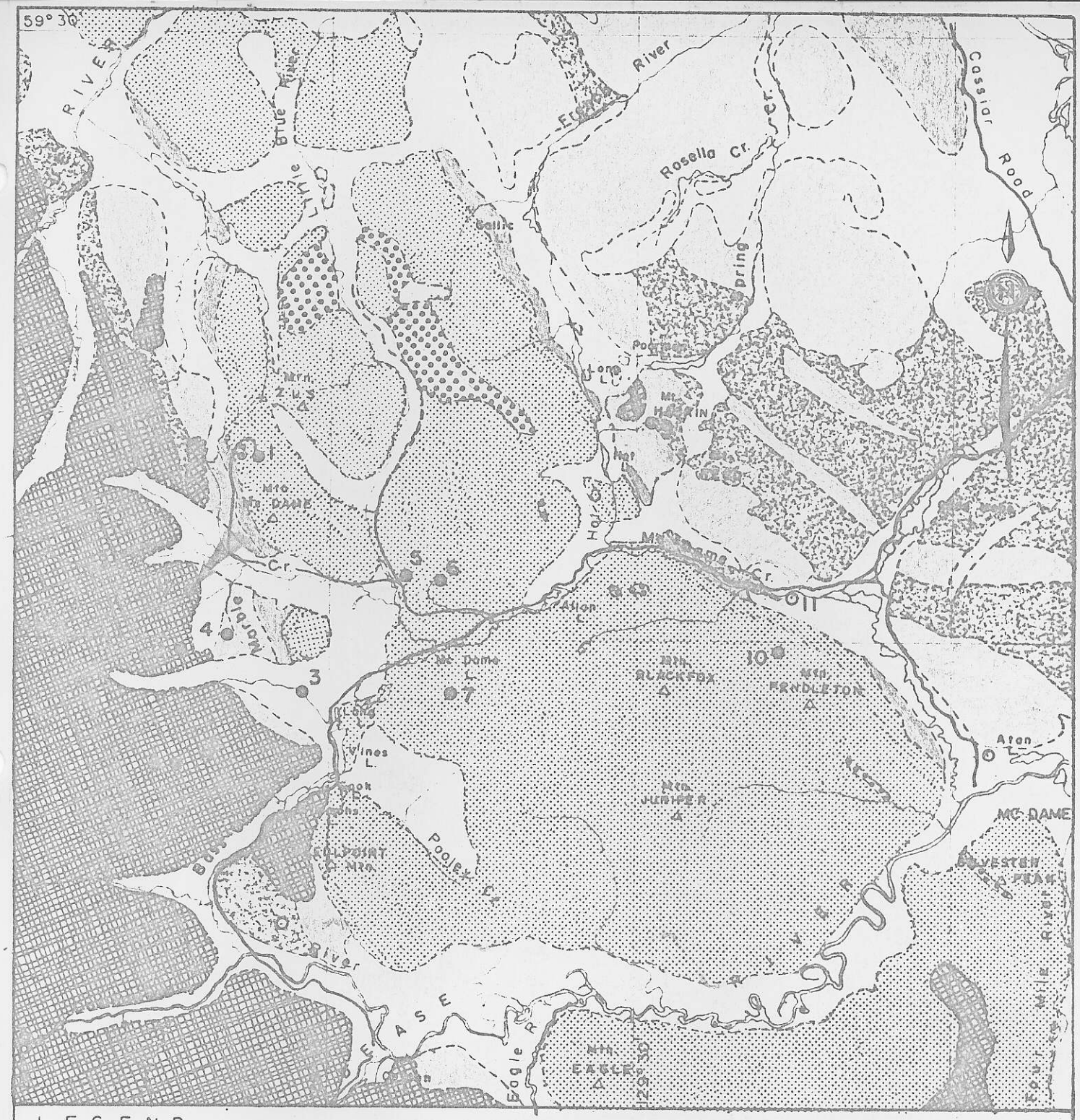
5. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Chapparal Mines Ltd. (N.P.L.).

Respectfully submitted,

P.H. Sevensma

P.H. Sevensma, Ph.D., P. Eng.

Vancouver, B.C.
January 10, 1969.



LEGEND

- Overburden
- Granite
- Peridotite Serpentinite
- Sylvester volcanics
- Ordovician
- Cambrian
- Proterozoic

Outstanding Prospects

1. Cassiar Asbestos
2. N.J.Z.
3. Lang Creek Copper
4. Marble Creek
5. Hanna Gold
6. Snow Creek
7. Table Mountain
8. Cassiar Molybdenum
9. Haskin Mountain
10. Ram
11. Ventures Mining
12. Ray

O Other showings of interest

CHAPPARAL MINES LTD. (N.P.L.)

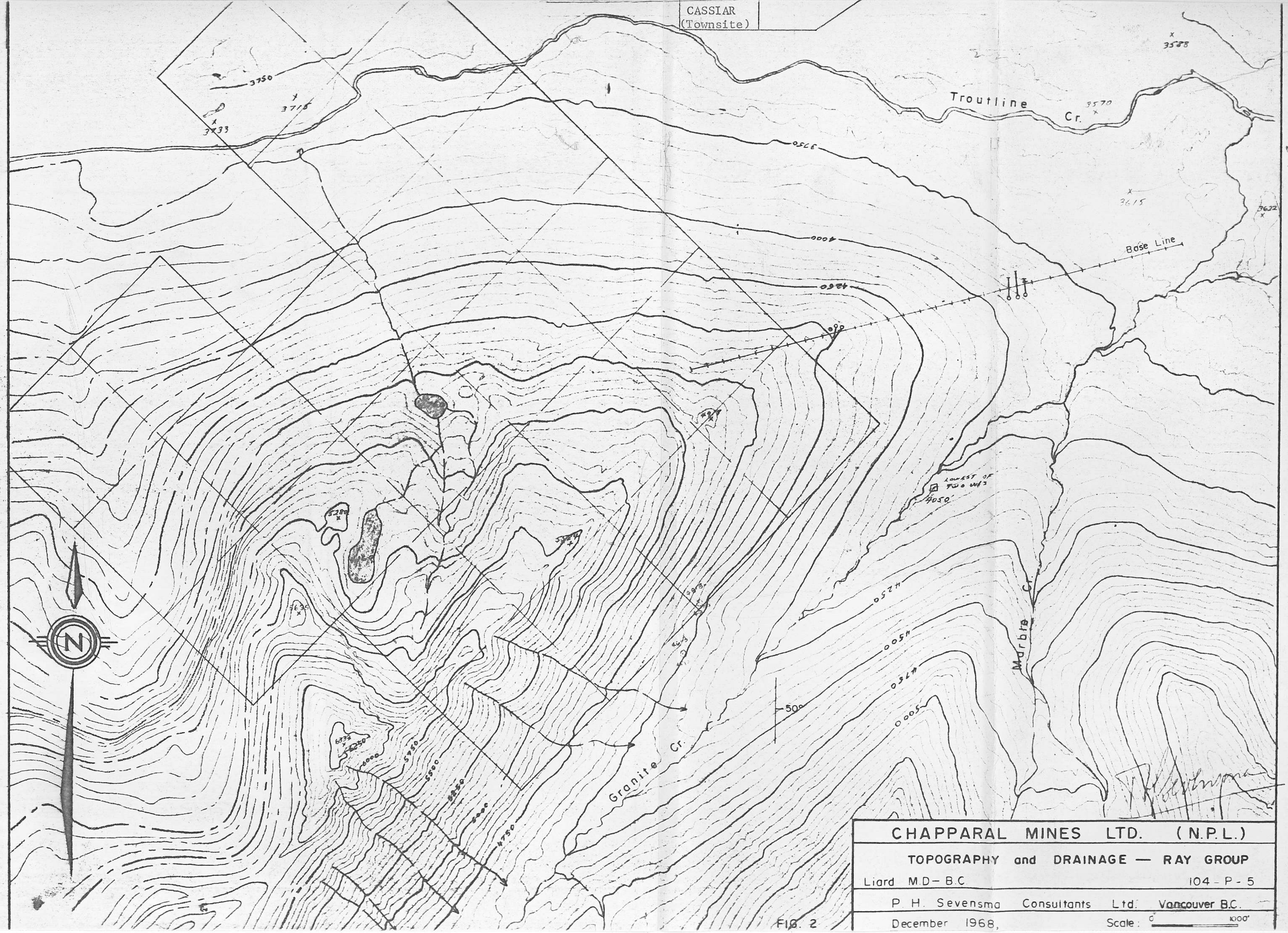
Property Locations

Liard MD-B.C. 104-P

P.H. Sevensma Consultants Ltd — Vancouver B.C.

FIG. 1

September 1968, Scale: 0 4 MILES



CHAPPARAL MINES LTD. (N.P.L.)

TOPOGRAPHY and DRAINAGE — RAY GROUP

Liard M.D–B.C 104-P-5

P. H. Sevensma Consultants Ltd. Vancouver B.C.

December 1968, Scale: 0 — 1000'

FIG. 2

CASSIAR
(Townsite)

N

Troutline Cr

Const Silver 1968 Drill Program.

B.L.

Road

LAKE

LAKE

Marble Cr

LEGEND

CASSIAR INTRUSIVE
Granodiorite

ATAN GROUP
Quartzite, shale, argillite and siltstone

Limestone, dolomite and marble

MoS_2 Showing

MoS_2 (in float)

Magnetite showing.

Ag, Pb, Zn showing

Geological boundary

Bulldozer trench

P.H. Sevensma

CHAPPARAL MINES LTD. (N.P.L.)

GEOLOGY and EXPLORATION PLAN

Liard M.D.-B.C. 104-P-5

P. H. Sevensma Consultants Ltd. Vancouver, B.C.

Dwg No. Fig: 3

January 1969 Scale: 0 1000'