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Geology & Exploration  
of the  
SANDON SILVER-LEAD PROPERTY  
SLOCAN MINING DIVISION  
Silmonac Mines Limited (N. P. L.)

W. M. Sharp, P. Eng.

November, 1967

7.

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STE. 808, 900 WEST HASTINGS ST.  
VANCOUVER 1, B. C.

November 17th, 1967.

President and Directors,  
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Vancouver 2, B.C.

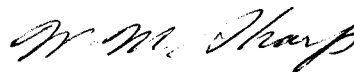
Gentlemen:

With this, and consequent to your initial request and authorization, the writer transmits his report "GEOLOGY and EXPLORATION of the SANDON SILVER-LEAD PROPERTY of SILMONAC MINES LIMITED (N.P.L.) in the SLOCAN MINING DIVISION, BRITISH COLUMBIA."

This report constitutes a broad summary of the considerable amount of detailed geological and exploration data accumulated by the Company's staff and principals since the inception of its Sandon project. These records were supplemented by general data from pertinent geological references and the writer's personal knowledge of the district geology.

The writer hopes that the observations and interpretations embodied in this report will be of practical assistance in the planning of further exploration and probable development of the several potentially productive lode structures presently indicated within the boundaries of your Slocan silver-lead property.

Respectfully submitted,



W.M. Sharp, P.Eng.

WMS/jm  
Encls. -

Report

GEOLOGY and EXPLORATION

of the

SANDON SILVER-LEAD PROPERTY

of

SILMONAC MINES LIMITED (N.P.L.)

in the

SLOCAN MINING DIVISION

of

BRITISH COLUMBIA

for

Silmonac Mines Limited (N.P.L.)

Vancouver, B. C.

by

W. M. Sharp, P. Eng.

November, 1967

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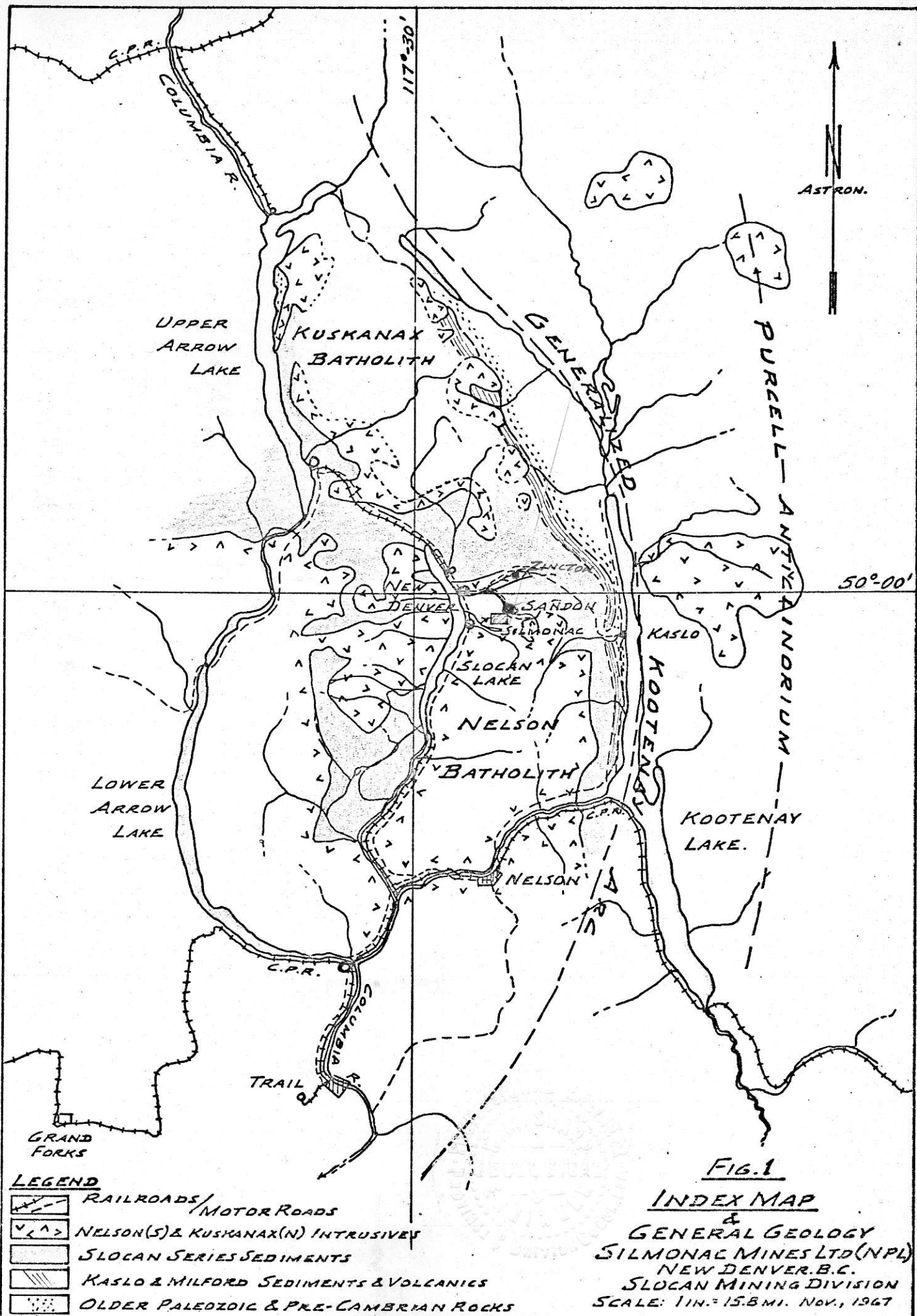
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## SUMMARY & RECOMMENDATIONS

The Company's block of 65 claims, southwest of Sardon, B.C. and within the main productive area of the Slocan silver-lead camp, cover a central 2 1/2 mile interval of the 6 mile length of the Main Slocan lode. The claims also include the Carnation "Footwall", "Minniehaha", and "Dorothy" veins, all lying in the footwall of the Main lode and now considered as separate components of a single lode which extends for some 2 miles across the group on a general northeasterly trend. A relatively minor amount of exploration on each of these has resulted in the development of small bodies of excellent silver-lead-zinc ore. Near its westerly end the property contains the principal 1 1/2 mile interval of the once-productive Wakefield lode; the southerly section of the claim group overlies an equivalent interval of the Adams-Ivanhoe major lode system. To date, and excepting the work accomplished by the Silmonac group, none of these structures has been significantly explored at generally optimum structural horizons and/or within specifically optimum geological situations.

Eight former mines situated on the southwesterly, and northeasterly-continuations of the Main lode beyond the Silmonac property produced over 1,300,000 tons of shipping, and milling-grade ore with a current gross value of \$78,500,000. Most significantly, 72 percent of the 1.8 million tons gross ore production of the Slocan mining camp originated from <sup>ore bodies along</sup> the Main lode. On the basis of the above statistics and assuming a similar frequency of ore occurrences, the gross value of the Silmonac Main lode potential is estimated at 27.5 million dollars.

Earlier exploration-development projects undertaken on the Silmonac section of the Main lode have been either superficial, or rendered ineffective through a lack of understanding or misinterpretation of the controlling geologic factors. During the most active years of the camp the identity and significance of the general Slocan fold and its key structural horizons were not realized. The current significance of this lies in the fact that the potentially productive zone, comprising the Queen Bess-Payne interval of the fold section, is situated within a general range of 1000-3000 feet below the lode outcrop at its relatively high

elevation and structural position on the Silmonac property. For this reason past programs, directed towards the exploration of these unfavourable regions of the lode, have been inherently ineffective. Other factors contributing to the general lack of success attending past exploration-development programs include the prevalence of heavy overburden, slow and/or inefficient methods and equipment, and rapid upward and downward fluctuations of metal prices. Modern methods and equipment have minimized the above-noted physical difficulties. The adverse factor of fluctuating metal prices has largely disappeared in view of the presently favourable long-term outlook regarding the supply, demand, and price of silver, and the characteristically high silver content of the Slocan ores.

As a result of the fund of information accruing from intensive and coordinated geological studies of the area within recent years, several prime exploration targets within the Silmonac Main lode interval have been indicated. In particular, highly encouraging results have been obtained in the recent diamond drill exploration program conducted on the West 3996-Mascot Basin lode interval.

x (Jan/72)  
re  
Geol. &  
expl'n  
possibilities

The Silmonac organization was initially conceived for the purpose of carrying out exploration of certain prime geological targets indicated within the superficially explored Hope-Carnation interval of the Main lode - specifically within the optimum bedding section comprising the "Queen Bess-Payne" vertical interval of the Slocan fold. By reason of the geologically appropriate position and relatively more convenient access provided by the existing Ruth 5 (3996) level workings, the necessary claims were acquired, legal details settled, and the program was initiated at the northeast end of the lode segment. Exploration commenced by way of a westerly drive from the west end of the old workings to locate possible depth extensions of the Hope ore zone into the optimum bedding panel. The 3996 drive, advanced at intermittent periods since 1963, reached its present position under East Tributary Creek last spring. The 3996 level has proved to be situated somewhat below the optimum bedding panel.

The Hope (Main) lode was intersected, following a drive through a complex of porphyries and highly deformed, complexly sheared soft argillaceous beds, some 700 feet vertically below the west end of the old Hope mine workings.

From here it has been followed and traced along its complex course, by means of frequent diamond drill holes, to its present location at 600-700 feet over the tunnel.

A 600 foot strike-length of the lode followed in the course of the 3996 west drive contained numerous small discontinuous bodies of excellent Ag-Pb-Zn mineralization, occurring as local gash veins, shear-lenses, and isolated shear-pods. Although these occurrences, individually or collectively, do not comprise an economically mineable deposit, all assays indicated a uniformly high Ag/Pb ratio for the mineralization. This section of the lode may yet contain an ore potential within the inferred ~~(westerly)~~-dipping panel over the Payne fold complex extending for a few hundreds of feet above the 3996 level, but does not constitute a prior exploration target.

*I*  
*flat southerly and westerly.*

The recent underground-surface exploration project has indicated a significantly mineralized, flatly-dipping lode section generally lying beyond and above the west end of the 3996 level. The restricted drilling program has thus far delineated a 300 foot strike length and 600 foot dip-extent of good Ag-Pb-Zn mineralization over indicated widths of 1 to 5 feet. The actual shape, trend, and total extent of the zone can only be inferred at this stage of exploration. The better sections of the zone probably comprise fair milling grade ore; however, with Ag/Pb ratios ranging from 1.8:1 to 17.4:1, with a general average of about 5:1, the potential extensions of the zone become highly significant.

From evidence supplied by structures and textures the writer infers that the mineralization occurs within a relatively compressed part of the lode structure; however, a pronounced change in lode attitudes within more westerly outcrop areas suggests the occurrence of a favourable lode-deflection and/or warp within, and for several 100's of feet to the west of the currently delineated zone. Extending these geological correlations to the easterly end of the Carnation 5480, the writer further infers a 3,000 foot gross length of structurally-favourable, potentially ore-bearing lode structure southwest of the current exploration area. Within this specific interval there are good possibilities of developing sufficient ore to return the gross exploration expenditure and subsequently sustain a profitable mining operation.

*J*

In view of the highly encouraging results obtained this season, and the good possibilities of significantly extending this zone and locating others along the southwesterly extension of the lode through Jennie Ridge, the writer makes the following specific recommendations:

1. 3996 Level

- A. Advance heading a minimum of 800 feet in a southerly direction to attain a practicable drilling position for the exploration of possible down-dip extensions of the "East Fork" mineral zone.
- B. From the above position, drill indicated section of the lode; provisionally allow 2500 l.f. by AX-W.L.

2. 4620 Level

- A. Complete access road, complete portal site excavation and re-locate mine plant.
- B. Drive crosscut, from portal between E. & W. Fork Tributary Creek, to intersect Main lode in vicinity of presently-indicated E. Fork mineralized zone.
- C. Provision for preliminary stage of lode exploration - 500 l.f. drift.

3. Carnation 5480 Level (supplementary recommendation)

- A. Explore Main lode below level, target being Footwall-Main lode intersection and/or upper section of Queen Bess axial plane - this to be accomplished from inner end of main crosscut via down-holes parallelling strike of lode in this locality.

*W.M. Harp*

# ESTIMATED COSTS

These are preceded by a detailed break-down of the drifting costs recorded for the November, 1966 advance of the 7' x 7' 3996 heading, as provided by Mr. J. C. Black, Manager, Silmonac project:

|   | <u>Per Ft.</u> |
|---|----------------|
| Contract labour per foot, 18.00 + 16% (W.C.B., etc.)              | \$20.88        |
| Explosives  | 3.40           |
| Steel and bits  | 4.00           |
| Drill repair and maintenance                                      | 2.00           |
| Equipment repair and maintenance                                  | 3.00           |
| Air and power (labour and supplies)                               | 5.00           |
| Miscell. heading expense  | .50            |
| Rail @ 250.00 -   | 1.67           |
| Ties and fastenings   | .28            |
| 2" & 4" pipe - estim.   | 2.00           |
| Ventilation duct  | .60            |
| Track & pipe  | \$ 4.55        |
| Mine office - management, acct's., geol. & eng. sals.             | 14.00          |
| General - equip. rent, access rights, taxes, transport, UIC, etc. | 12.00          |
| H.O. admin. & consultants   | 5.00           |
| <u>Total:</u>   | <u>\$74.55</u> |

Mr. Black notes that a cost of \$70.00 per foot should be applicable to the 4620 line drive.

## Detail:

### 1. 3996 Level

|    |  |            |
|----|--|------------|
| A. | 800 ft. @ \$70. per lin. ft. (use salvage materials) | \$ 56,000. |
| B. | 2500 ft. @ \$6.50 per lin. ft.                       | 16,250.    |

### 2. 4620 Level

|    |   |                   |
|----|---|-------------------|
| A. | General Provision: road, portal site, plant, etc. | \$ 10,000.        |
| B. | Cross-cut 3,000 ft. @ \$70. per lin. ft.          | 210,000.          |
| C. | Provision, prelim. drift; 500 l.f. @ \$70.        | 35,000.           |
|    | Sub-total:  | <u>\$327,250.</u> |
|    | General Provision for miscell. expense            | <u>22,750.</u>    |
|    | Total, Main Project:                              | <u>\$350,000.</u> |

### 3. Carnation 5480 Level, supplementary provision (estimate 1000 lin. ft. drilling AX-W.L. \$10,000.)

Respectfully submitted,

*W.M. Sharp*

W.M. Sharp, P.Eng.

Vancouver, Canada.

## INTRODUCTION

This report briefly recapitulates the more significant data presented in the writer's previous reports and, in addition, details progress made and results obtained from the recently completed phase of coordinated underground and surface exploration of the West 3996-Mascot Basin interval of the lode accomplished this year.

The current report is the fourth submitted by the writer since his appointment as geological consultant for the project in June, 1964. Each of these reports has followed upon personal visits to the property and/or comprehensive discussions with the Company's officers and staff. The writer has been additionally informed of current development via semi-monthly progress reports which, along with relevant maps and sections, have provided a continuous, detailed record of exploration progress and new geological data. For these data, the writer hereby expresses his thanks and acknowledgments to the officers and staff of Silmonac Mines Limited.

This report has been ordered for the following reasons:

- (a) To record, interpret, and evaluate the total accrued exploration data.
- (b) To present detailed recommendations for follow-up exploration, which will include the combined exploration and preliminary development of the recently disclosed zone of excellent Ag-Pb-Zn mineralization in the West 3996-Mascot Basin-Jennie Ridge interval of the main lode. In view of the apparently favourable bedding-lode relationships that are inferred to exist within this section of the structure, this phase of the general exploration program will be the most significant and, quite possibly, the most rewarding to date.
- (c) To provide an accurate estimate of the total cost of carrying out the above work.



- (d) To re-assess the value of the average grades of ore and of the total ore mined from neighbouring sections of the main Slocan lode; this is a necessary prerequisite for making soundly-based valuations of the currently-indicated mineralization and possible ore sections and extensions. The writer's current estimates indicate that the gross value of average-grade Slocan Ag-Pb-Zn ore has significantly increased over the past two years; this being the net result of a substantial increase in silver price versus a moderate decline in lead and zinc prices over this period. On the basis of this marked increase in the value of average and expectable grades of the typical silver-rich Slocan ore, and on expectations of further, imminent increases in the price of silver, it is obvious that work at the property should be resumed at the earliest possible date.

This report, in general, is based on material contained in Dominion and Provincial Government Geological Memoirs and Bulletins, maps, sections, and general geological data accruing from the 1946-51 investigations and exploration of most of the Sandon-Silverton part of the area by Kelowna Exploration Company Limited; the writer was personally involved in this major geological campaign from 1946 to 1950. Subsequently, he was employed, as mine geologist and manager successively, at the local Violamac (Victor) mine; with this he has had a total of seven years continuous experience on local geological studies, exploration-development, and mining operations, and a continued association - via other projects in the general area - up to the present time. In this connection, the writer notes that the gross production of the small Violamac operation exceeded \$1,000,000. per year over an appreciable part of its total productive life; this includes periods of low Pb-Zn prices and an average silver price of less than half the present figure.

Much of the time required to prepare this report has been occupied with the compilation of a new 200-scale set of maps and sections. These include most of the geological detail contained in the original set of four 100-scale maps accruing from Kelowna Exploration's geological study of the area, and also include pertinent sections of the more recent Silmonac 100-scale geological compilations. In regard to these the writer would suggest that as much, if not more attention should be given to studies of the accompanying maps as to perusals of the written text of this report.

PRINCIPAL REFERENCES

J.C. Black, S.J. Pedley, P.Eng., & W. Leszczyszyn:  
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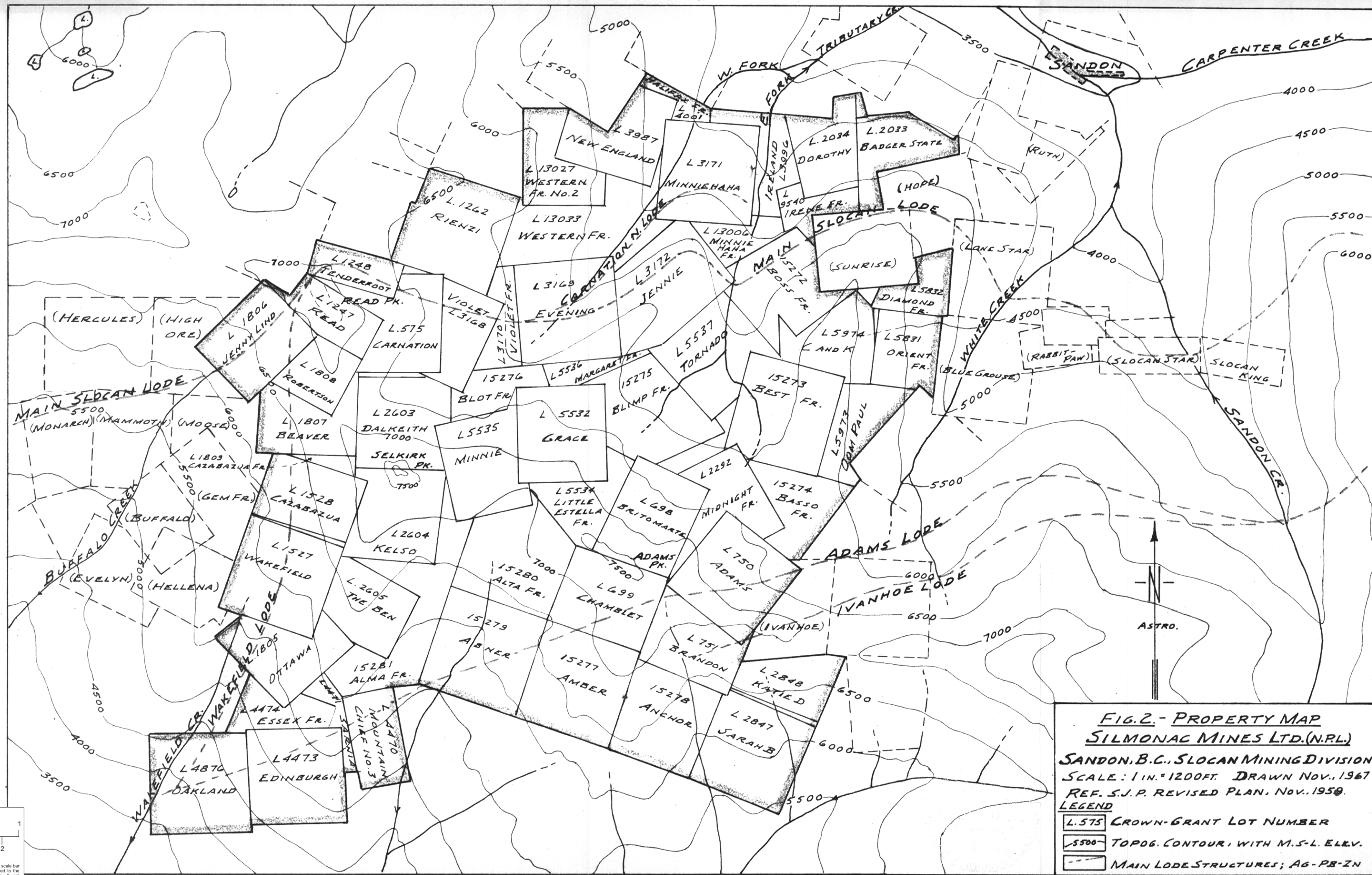
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"Description of Properties, Slocan Mining Camp,  
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J.T. Fyles,  
"Geology of the Duncan Lake Area, Lardean District,  
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## PROPERTY

Reference is made to Fig. 2, Property Map.

The property comprises one block of 65 adjoining Crown-granted claims situated closely southwest of Sandon and between the properties of Carnegie Mining Corporation, on the east, and Western Exploration Co. Ltd. on the west; these flanking properties cover the northeasterly and southwesterly extensions, respectively, of the Main Lode.

The original 62-claim group was finally consolidated late in 1962. This was recently supplemented by acquisition of two adjoining Crown-granted claims and one Crown-granted fractional claim.

Individual claims, with lot numbers and acreages, comprising the Silmonac group have been scheduled in the writer's July, 1964 report; a similar record, with supplementary legal details, is filed at the Company's head office. This detail is shown on Fig. 2.

Silmonac Mines Limited (N.P.L.) comprises the joint participation of the Silver Standard, Moneta Porcupine, Kam-Kotia, and Oil Participations mining and exploration companies.

## LOCATION, ACCESS, & FACILITIES

From its northeasterly end, at one-half mile southwest of Sandon, the property extends some three miles to the southwest, over and beyond the high Silver Ridge divide. Some 2 1/2 miles of the main Slocan lode - of 6 miles total length - traverses the Silmonac claims. The Silmonac property encompasses a central interval of this through-going structure; the immediate southwesterly and northeasterly extensions of it contained the major producing mines of the camp - the Standard, Mammoth, Hope, Silver smith, Slocan Star, and Richmond-Eureka properties. (Fig. 4).

In addition to the Main lode, the Company's property contains the 1 1/2-2 mile long North Carnation-Minniehaha-Dorothy lode system; most of the 1 1/2 mile strike length of the formerly productive Wakefield lode; and equivalent increments of the also once-productive Adams and Ivanhoe major lodes.

Surface elevations over the extent of the group range, approximately, between 4500 and 7500 feet above sea-level; the current exploratory work is situated within a general 1500 foot vertical section, between the 4000 and 5500-foot elevations.

Ruth No. 5 portal, which is the point of entry for the current 3996 drive and site of the present mine plant, is reached by two miles of all-weather road from Sandon - the latter connecting with New Denver by nine miles of secondary highway, maintained by B.C. Dept. of Highways crews. Sandon, in turn, is situated 40 miles northwest of Nelson, and 100 miles north of Trail, B.C. and the Cominco smelter. Hence the property is advantageously situated with respect to sources of supply, and general supply and transportation costs.

*140-150 average*  
An efficient mill of about 150 tons daily capacity, situated closely below Sandon and controlled by Kam-Kotia Mines Ltd., is immediately available for concentration of the local ores.

The "Carnation" road was recently extended to the site of the proposed Silmonac 4620 adit; hence local transportation of men, supplies, and eventually, ore could be accomplished with ease. *\*tot 3 mi from Sandon*

Adequate amounts of power and compressed air for the present scale of underground exploratory-development operations are available, at low cost, from Carnegie Mines' hydro plant at Sandon.

## HISTORY

The original Ruth-Hope claim group, within and adjoining the northeasterly parts of the present Silmonac block (Fig. 2) was staked in 1892, and represents one of the earliest locations within the Sanden area;

The initial production, comprising high-grade direct-shipping silver-lead ore was derived from the main Ruth vein. The development of the Hope lode commenced in 1906, with continuous production ensuing until 1919 - the bulk of this being shipped directly to the smelter. During this period the then-economically unprofitable zinc-rich fractions of the stoped ore were left underground along with the general back-fill, or stock-piled as separate dumps for eventual recovery of the zinc content - pending the development and installation of efficient lead and zinc concentrating facilities. During the earlier years of the operation every effort was made to minimize the zinc content of the direct-shipping silver-lead ores; this was mandatory in view of the prevailing high transportation costs and the heavy zinc penalties imposed by the smelters of this period.

The combined Ruth-Hope ore production is estimated at about 54,000 tons with a present gross value of about \$5,000,000. or \$92.50 per ton. The 26,000 tons of shipping ore derived from the Hope orebodies would be worth \$2,437,890. at today's metal prices. The present gross value of the zinc-rich portions of the stoped ore, which were either left underground or stockpiled on the surface, is a matter for personal speculation as no record of the probable amount and grade of this material is currently available. However, Cairnes states that, "some of the zinc blende carried high values in silver - an assay by H.A. Leverin, of the Mines Branch, of a picked specimen, giving 318.38 oz/ton silver and 0.07% copper." This suggests that small amounts of silver-rich tetrahedrite, etc. associated with the zinc mineralization could have significantly enhanced its value.

During the early history of the camp the degree of mining activity varied considerably from year to year due to rapid, extreme fluctuations in metal prices. However, within recent years lead and zinc prices have

stayed within a reasonably satisfactory range, while that of silver, because of a recent general world-wide shortage of the metal, has doubled within a relatively short period of time. In view of the increasing industrial demand for silver and its seemingly permanent short-supply position, it appears that further substantial price increases may be expected. Even without further increases, which appear inevitable, the present price provides sufficient incentive to proceed immediately with an active exploration-development program on the Company's Slocan property.

Extensive geological studies and general exploratory work performed within the general Sandon area since World War II have resulted in the development of more soundly based concepts of the nature of the principal geological controls of ore deposition. Where the ore search is generally based on these concepts, and a reasonably flexible geological outlook maintained, the probabilities of success will be much higher than they would be if exploration and development are allowed to proceed without due consideration of the geological factors.

During the early years of mine exploration and development in the camp preliminary geological studies and interpretations of structure could be deleted without greatly altering the possibilities for successful development of specific orebodies, as the latter generally outcropped or, in less direct fashion, provided some evidence of their existence. Success in development hinged mainly on the persistence of the ore to depth, and on the widths of ore generally realized. Now however, with all of the outcropping orebodies mined out, considerations of geological structure, with some pre-selection of target zones, are necessary before embarking on major underground programs of exploration for possible non-outcropping orebodies. In the case of the Silmonac program, every effort has been made to interpret and project lode and bedding structures as exploration proceeds; with this the current geological situation appears highly favourable for the discovery and development of a significant tonnage of good grade ore during the next major phase of the program.

*re name the main lode*  
Six major, and two small mines along the six-mile gross length of the main Slocan lode have produced over 1.3 million tons of relatively high-grade Ag-Pb-Zn ore. The gross value of this production, at present-day metal prices, is estimated at about 78.52 million dollars, for an (Fig. 4)



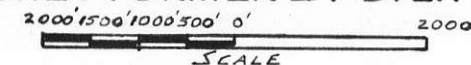
# LONGITUDINAL VERTICAL PROJECTION

ON THE

## MAIN SLOCAN LODE

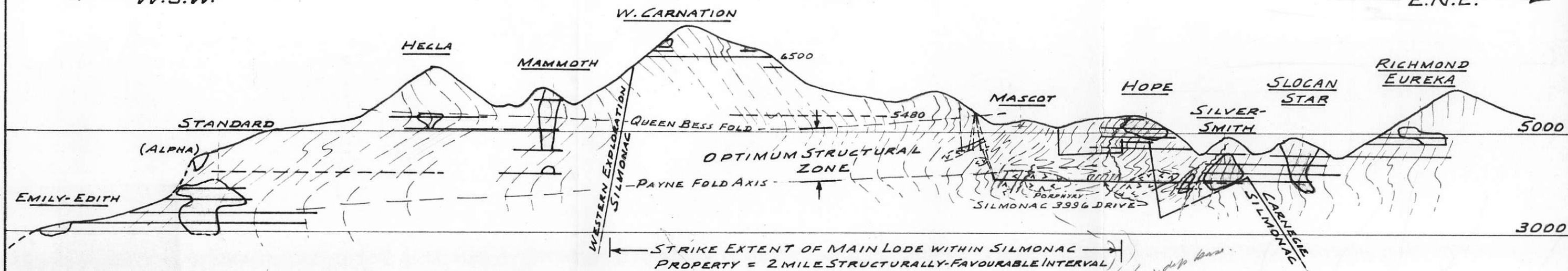
SHOWING

GENERAL STRUCTURE, FORMER & POTENTIAL ORE SECTIONS



← W.S.W. ---

--- E.N.E. →



## STATISTICS, PAST-PRODUCTION

| MINE                    | TONS ORE |                | AVERAGE ORE GRADES |           |             | RATIO    |              | CURRENT GROSS VALUE                |                       | BASIC DATA             |                |
|-------------------------|----------|----------------|--------------------|-----------|-------------|----------|--------------|------------------------------------|-----------------------|------------------------|----------------|
|                         | PRODUCED | SILVER, OZ./T. | LEAD, %            | ZINC, %   | AG. OZ./PB% | PER TON  | TOTAL        | SILVER : \$1.985 CAN. PER TROY OZ. | LEAD : \$0.14 PER LB. | ZINC : \$0.135 PER LB. |                |
| STANDARD GROUP          | 779,182  | 11.0           | 5.4                | 6.7       | 2.04        | \$ 55.05 | \$42,890,073 |                                    |                       |                        |                |
| HECLA                   | 1,600    | 35.0           | 9.0                | 5.0       | 3.89        | 108.17   | 173,080      |                                    |                       |                        |                |
| MAMMOTH                 | 83,349   | 12.0           | 4.0                | 5.2       | 3.0         | 49.06    | 4,089,102    |                                    |                       |                        |                |
| HOPE (EXCL. RUTH SECT.) | 26,000   | 29.0           | 11.0               | 2.0 (EST) | 2.64        | 93.77    | 2,437,890    |                                    |                       |                        |                |
| SILVERSMITH & EXTENSION | 227,000  | 17.0           | 6.6                | 3.8       | 2.57        | 62.49    | 14,184,095   |                                    |                       |                        |                |
| SLOCAN STAR             | 145,194  | 23.7           | 14.5               | 2.0       | 1.64        | 83.05    | 12,057,636   |                                    |                       |                        |                |
| RICHMOND-EUREKA         | 42,535   | 19.1           | 6.2                | 2.2       | 3.08        | 61.17    | 2,601,866    |                                    |                       |                        |                |
| CARNATION               | 677      | 40.5           | 16.6               | 2.7       | 2.44        | 134.16   | 90,826       |                                    |                       |                        |                |
| EMILY-EDITH & MISCELL.  | = 72% of |                |                    |           |             |          |              |                                    |                       |                        | NOT SPECIFIED. |

TOTALS, MAIN LODE ONLY - 1,305,537 TONS @ LISTED METAL PRICES

\$ 78,524,568 - VALUE OF CD & AU NOT INCLUDED.

REFERENCES: "MAIN LODE, LONGITUDINAL PROJECTION," S.J.P., 1960

BULLETIN NO. 29, B.C.D.M., M.S.H., 1952

### LEGEND



FORMER ORE BODIES, ORE ZONES.

LODE DRIFTS & LATERALS:

SHOWING: PRINCIPAL WORKINGS  
SECONDARY "

BEDDING DIPS ON SECTION:

SHOWING AXIAL SECTIONS OF RECUMBENT FOLDS & OPTIMUM ORE STRUCTURES

### FIG. 4

ESTIMATED PAST-PRODUCTION

FROM THE

MAIN SLOCAN LODE

WITH

PRINCIPAL TARGET SECTION

SILMONAC MINES EXPLORATION PROJECT  
VICINITY OF SANDON, B.C. NOVEMBER, 1967

DRAWN BY W.M.S.

average unit value of \$60.00 per ton. Also, on the basis of a total recorded production of 1.8 million tons from this one section of the Slocan camp, the main Slocan lode has produced some 72% of the total mine output. On this basis, the interval of the lode lying within Silmonac ground has an impressive possible potential, in that it amounts to some 35% of the gross length of the structure. Extending this premise, the gross potential should be in the vicinity of 27.5 million dollars.

The recent completed phase of exploration of the main Slocan lode within Silmonac ground has included a further westerly advance of the 3996 level, the driving of a 500 foot crosscut to the north, in the footwall of the 600 foot mineralized lode interval encountered during 1963 to 64, diamond drill exploration of the lode from this crosscut and the current face of the level, diamond drill and trench exploration of the lode below, and within the Mascot Basin. Some bulldozer exploration of parts of the subordinate Minniehaha, Dorothy, and Margaret lodes was also undertaken during the past two field seasons.

The part of this work devoted to the exploration of the main lode has produced excellent indications of the existence of a significant zone of Ag-Pb-Zn mineralization within the Mascot-Jennie interval of the lode. A noteworthy feature of this mineralization is the high Ag:Pb ratio which, at least in this vicinity, is about 5:1 - or nearly twice the over-all average ratio obtaining for the gross production from the main Slocan lode.

The current Silmonac project is, essentially, a large scale resumption of the project started by Kelowna Exploration Company several years ago. Between 1946 and 1948 this company explored, by tunnelling and diamond drilling, the westerly extensions of the Silversmith lode and mineralization within the New Ruth section of mine workings.

The final phase of the program comprised exploration of the inferred Main lode over a short distance beyond the offsetting Lone Star fault. However, when drill exploration located only minor pods of zinc ore within an apparently minor lode strand - and this at a time when the company was confronted with a large option payment - the project was abandoned. In addition, the locally unfavourable and confusing geological situation discouraged considerations of a program of long-range exploration of the Main lode within this general section of the structure.

Between 1949 and 1951 Kelowna Exploration Company investigated the Main lode to the east of, and below the old Carnation workings via the 5480 exploration project. This project was based on interpretations and inferences accruing from an extensive geological investigation of the Sardon area. The Main lode was discovered to be essentially barren at this general structural horizon and the project was abandoned after completing an 1800 foot westerly drive on the main structure, with subsidiary drifts and crosscuts.

The Carnation 5480 program was initiated on the assumption that the axial plane of the Queen Bess overturn lay slightly above the 5480 horizon; hence lode and bedding structural relationships should have been optimum for the occurrence of ore within this interval of the lode. At the completion of this project it was apparent that the preliminary inference of a higher position for the Q.B. axial plane had been based on misinterpretation of the actual significance of a series of west-dipping beds over the tunnel. Hence the 5480 level was inadvertently driven within the unfavourable, over-turned section of the Queen Bess fold, and at an actual horizon, several hundreds of feet above the currently-inferred position of the true axial plane of the fold.

The Footwall lode, intersected by the 5480 crosscut, contained excellent Pb-Zn mineralization where first intersected. This mineralization, occurring as a series of rather distinct lenses - locally up to 18 inches in width, was exposed over a total length of 340 feet by drifts to the southwest and northeast. Subsequent raising failed to establish any significant up-dip extensions of this mineralization. However, to the writer's knowledge, the down-dip possibilities of that section of the <sup>lode</sup> traversing, and lying east of the 5480 crosscut have not been explored. Furthermore, the writer considers that the general zone of intersection <sup>or convergence</sup> of the Footwall and Main lodes, presumably occurring at a horizon some 500-800 feet below the 5480 workings, and in fairly close proximity to Queen Bess axial plane, constitutes a high-priority exploration target. The possibility of mineralization occurring in this geological situation is enhanced by indications of a slight northerly bend on the lode closely east of the 5480 workings.

## GENERAL GEOLOGICAL SETTING

Figure 1 supplements this section of the report.

### (A.) REGIONAL FRAMEWORK

The Slocan Mining camp lies within the concavity of the Kootenay arc, specifically within a north-central part of this regional structure. The following descriptions derive principally from Bull. No. 49, B.C. Dept. of Mines, 1964.

N/A  
The Kootenay arc comprises a curving belt of highly deformed sedimentary, volcanic, and metamorphic rocks extending southeast from the vicinity of Revelstoke, south along Kootenay Lake, and south and west across the International Boundary. It is a structural belt bounded somewhat arbitrarily by quartzites underlying the Badshot Limestone. In general, strata within the arc dip steeply and are bowed around the eastern margins of the two principal granitic bodies of the region - the Nelson batholith in the south, and the Kuskanax batholith in the north. The regional gneissic complex comprising the Shuswap Terraine buttresses the Kootenay arc from the west.

The Kootenay arc is of major economic importance in British Columbia. Mines within it have produced most of the silver, lead, zinc, and tungsten of the Province, and important amounts of other metals. Separate geological studies within the region have shown that most of the mineral deposits in the arc are controlled or otherwise influenced by the structure of the enclosing rocks. - except where of syngenetic (strata bound) variety.

### (B.) SANDON AREA

Geologically, the Sandon area is centrally situated within an intensely deformed corridor of Mesozoic sediments, with minor amounts of tuff at the present top of the stratigraphic section. The above rocks

(Slocan Series) are contained by the Nelson batholith on the south, the Kuskanax batholith on the northwest, and the Kaslo greenstones on the east and northeast. In addition the highly-folded Slocan rocks are sporadically intruded by frequent stocks, dykes, and sills of Nelson quartz diorite, diorite, "porphyry", etc.

Within the central part of the camp the Slocan sediments have been uniquely deformed to a major complex recumbent fold - locally termed the "Slocan Overturn". This was originally deduced by the late Paul Billingsley, geological consultant and corroborated his associate, E.B. Mayo, and also by M.S. Hedley in the course of a detailed geological study of the area by the B.C. Dept. of Mines. Where not locally deformed by the intrusion of the Nelson batholith, the major overturn and its components have northwesterly axial trends. The main component parts of the general fold, in descending order, have been termed, by P. Billingsley, the "Silver Ridge", "Queen Bess", and "Payne" overturns. Their respective axial planes are approximately horizontal although, in detail, are slightly bent and/or warped.

The above fold complex has been cross-faulted and fractured - the principal transverse structures comprising a system of E.N.E. -trending, southerly-dipping multiple shear zones. These structures contain the typical ore deposits of the camp. C-1

In detail, the favoured sites for ore deposition, in regard to optimum bedding structure, are the west-dipping bedding sections adjacent to the axes of recumbent folds, and including the axial zones - particularly where physically optimum assemblages of rocks (i.e., interbedded argillites and quartzites) intersect the lodes, and where bedding attitudes are relatively normal to the inferred lode-displacement vector (usually raking to the east at low to moderate angles). Variations of rock type across the bedding section are significant, in that they may produce favourable intermittent deflections of lode trend. The more abrupt, but not necessarily the most favourable deflections occur near, and along intersections of the lode with transverse (formational) faults. K.



The typical ore mineral assemblages comprise argentiferous galena and sphalerite with, or without grey copper and/or other silver-rich sulpho-salts. These occur as vein, and/or breccia-fillings. Vein and lode gangue minerals consist of quartz, calcite, siderite, and wall-rock breccia in various proportions and physical combinations.

### (C.) SILMONAC PROPERTY

With respect to the following, particular reference should be made to Dwg. 1 & 1-A and Figs. 3A, 3B, & 4.

Elements of both the Queen Bess (upper) and Payne (lower) overturns occur within the total exposed vertical section of bedding between the easterly and westerly boundaries of the property. Both of these structures have been fairly well delineated within the easterly half of the section (Dwg. 1-A) where exploration has been carried out in greater detail over a more comprehensive vertical range of section. Throughout the westerly half of the section the relatively higher surface exposures and underground openings contain only the easterly-dipping, overturned limb of the Queen Bess fold. Consequently, the so-called "optimum panel" - comprising the panel of westerly-dipping beds - is inferred to occur on section within a vertical range of some 400-1400 feet below the Carnation 5480 adit. The existence of the optimum panel at this depth on section is quite firmly substantiated by actual structural evidence obtained from the Mammoth-Standard workings, which are situated within a corresponding part of the vertical section, but appreciably westward of the east Carnation workings.

A wide variety of rock types occurs across the S.W.-N.E. extent of the property. Due to the considerable displacement of footwall-hanging wall rocks across the lode it has not been possible, thus far, to match up the respective exposures and/or the structures on vertical section. By reason of the larger number and greater vertical range of exposures within the footwall section, this is the more completely delineated part of the structure. In a southwesterly direction across the section the principal formational units are: a wide section of (sandy) limestones, quartzites, and minor argillites over most of Hope Ridge; a section comprising soft, to hard, cherty argillites occupying much of the

L.  
incl. to  
G.B. of  
fold. 'open  
zones'

East Fork of Tributary Creek and Mascot Basin; a broad panel of mixed, locally massive quartzites and argillites, with minor limy sections and extending over Jennie Ridge and into West Fork (Carnation) Basin; a wide section of rather soft, crumpled sandy limestones across Read Peak to the west boundary of the property. With the exception of the closely-plicated, soft argillite section enclosing the 3996 level, occurring at this deep horizon below the Hope-Mascot surface area, the general section appears relatively competent and/or structurally favourable for ore deposition.

*pseudo-soft  
due to shear  
& mashing*

With the exception of the latter 200 feet of the drive, the Silmonac 3996 workings lie within a rather uniquely deformed, incompetent bedding section. Bedding at this general horizon is closely and flatly creased, contorted, sheared, and broken; the section evidently representing part of the overturned bedding panel within a general axial section of the Payne fold, or somewhat below the arbitrary axial plane of the structure. Much of the section is filled by large flat lense-like masses and thinner sheets of porphyry and diorite. The more westerly mass intersected by the 3996 tunnel shows more normal sill-like relationships with the enclosing, rather steeply west-dipping beds.

*insert  
flatly  
5-dipping*

*- which will prob. warp. to  
south dips upward towards 4625' hor*

*Within this environment*  
Throughout much of the 3996 level, the main (Hope) lode is deflected by, and generally follows the upper surface of these "axial plane" porphyries. In addition, thin sill-like apophyses of these bodies but frequently of darker, finer-grained material, have been observed closely over and under the up, and down-dip extensions of the lode. Throughout most of 3996 level the lode has followed a complicated course, being offset and/or deflected on the porphyries and the many complex cross-faults and bedded shear zones. With respect to this rather unpredictable behaviour of the lode, it is noted that a considerable number of the diamond drill holes showing on the drawings were put in to simply locate the lode - for proper directional control of the drive, rather than to explore the lode for occurrences of mineralization.

*or lode-  
panel  
sill-sheets  
and lenses*

With respect to the Company's general exploration program, the principal emphasis is on exploration of the main Slocan lode below and to the west of the former Hope orebodies or, more specifically, to



the west of the present face of the 3996 heading. This comprises a gross, currently unexplored strike-length of about 2 miles. At least two potentially mineralized sections are indicated within the 3500 foot strike interval beyond the present face. The downward and westward extensions of the currently-indicated zone constitutes the immediate exploration objective; the Carnation North lode - Main lode intersection at depth below the 5480 level comprises the second currently indicated target. (dip) (2)

The footwall (North) Carnation lode and its general north-easterly extensions through the Minniehaha area comprises an important additional exploration target. The contemplated 4620 cross-cut, primarily planned to provide exploration access to the recently-indicated 3996- East Fork mineralized zone would almost certainly intersect the easterly course of the Minniehaha lode - probably within the geologically-favourable west-dipping bedding panel. *not intersected + confirming winter's earlier intersection of Minniehaha as (essentially) a faulted and warped flatly-dipping bedding lode' still above 4620 X-C.*

Extensions of the Margaret lode constitute a third exploration target in the hanging wall of the Main lode. Exploration of this structure should be deferred until such a time as the proposed 4620 crosscut is advanced to a point where the general Evening-Margaret lode system may be investigated within the optimum, west-dipping bedding panel. 4625 N

## SILMONAC-MAIN LODGE EXPLORATION.

### A. PRELIMINARY REMARKS

The Silmonac group was formed with its general objective comprising the exploration of the Main lode within the consolidated claim group, on geological bases and premises accruing from the earlier geological studies and operations of Kelowna Exploration Company and contemporary groups. The broad objective was for exploration of the lode within the general optimum panel of bedding structures between, and including the Payne and Queen Bess axial planes. As Ruth No. 5 level provided the only ready access to the lode at a suitably deep horizon, the necessary rehabilitation of the old underground workings was effected and the westerly drive started from the existing face of Ruth 5 level - renamed the 3996 level. With this, the preliminary target comprised

the exploration of the Hope lode at this horizon - then inferred to be at about the same elevation as the axial plane of the Payne fold. (i.e.  $\pm 4000'$  + downwarped)

#### B. INITIAL EXPLORATION, 3996 LEVEL (Dwgs. 1 & 1-A)

The first section of the 3996 drive was directed to investigate an inferred intersection of the Hope lode via Kelowna Exploration d.d.h. R-5. This was found to be only the sheared contact zone of the West Porphyry body. With this the "North Drive" was abandoned and a new heading started from the collar of the initial (North) Silmonac crosscut, as a line-drive to the west. This heading, starting in the footwall of the south lode, was advanced over 800 feet before making an initial intersection with the Hope lode. Subsequently the lode was followed westward for about 600 feet, at which point it deflected around and over a flattish mass of diorite as a flatly-dipping, broad, mineralized shear departing, on a southwesterly strike into the "hanging-wall" of the heading. From this point where the lode swung into the hangingwall, the heading was continued on a strong, steeply-dipping fault zone traversing the above-noted West diorite body. The heading was driven about 50 feet past the west, sheared contact of the diorite, and further exploratory drilling accomplished from this point.

During the general drive a number of boxholes, raises and crosscuts were driven to explore the lode within the above-noted 600-foot interval. Considerable exploratory drilling was accomplished from these auxiliary headings.

Throughout the initial section of advance, prior to entering the West diorite body, the incompetent argillite panel is intensely and flatly folded, pleated, sheared, and broken. Subsequent exploration indicates that this section of the drive is situated within the lower overturned part of the Payne fold - locally represented as a complexly flat-plicated and sheared zone. Within this unfavourable structural situation the lode occurs as a flatly south-dipping, <sup>steeply</sup> faulted, braided shear zone containing small shoots of good galena-sphalerite mineralization. These occur as intermittent steeper gash veins, or as small, sheared lenses within the general section of the composite shear lode. The following assays, taken by the staff, are representative of the grade of mineralization occurring within the better mineralized parts of the 600 foot lode section:

| Location             | Width | oz/ton<br>Silver | %<br>Lead | %<br>Zinc | Ag<br>Pb ratio |
|----------------------|-------|------------------|-----------|-----------|----------------|
| 13,025 Boxhole       | 18"   | 51.5             | 3.57      | 13.23     | 14.4           |
| 12,800 "             | 18"   | 13.0             | 3.39      | 9.23      | 3.8            |
| "                    | 18"   | 13.7             | 3.39      | 8.36      | 4.05           |
| 13,000 " ; track+16' | 0.7'  | 9.2              | 3.9       | 3.95      | 2.36           |
| 12,900 " ; " +51'    | 0.7'  | 24.2             | 4.17      | 3.95      | 5.8            |
| " ; " +60'           | 2.0'  | 10.75            | 3.22      | 4.67      | 3.34           |

The significant feature of the mineralization is the exceptionally high Ag:Pb ratio. Even narrow widths of such mineralization could be profitably mined, if these were to occur with adequate continuity.

\*. RECENT EXPLORATION, 3996 LEVEL - MASCOT BASIN

A. PRELIMINARY EXPLORATION

Reference drawings for this section are Dwgs. 1 & 1A, Figs. 3A & 3B.

Prior to concentrating exploration within the Mascot-Jennie Ridge lode interval some additional exploration was undertaken on 3996 level. This entailed a 700-foot westward advance of the main heading to its present position - determined by preliminary inferences of the probable location of the lode at this horizon. One possibility related to a steeper dip-projection of Main lode from the Mascot area, and which could conform with a postulated right-hand offset of the structure on the major formational shear intersected at 11,900 E on 3996 level; the other possibility hinged on the assumption that the lode continued to the west in the "hanging wall" of the drive, on top of the respective flat-lying diorite and porphyry intrusives encountered in the latter part of the drive. The latter proved to be the valid assumption. In addition to the main heading advance, a 500 foot crosscut was driven in the footwall of the 600 foot mineralized lode segment. This was required for additional exploration of the up-dip continuation of the lode, and for exploration to the north of, and below 3996 level.

Both the North crosscut and the two fans of drill holes from it (Cross-Section B-B) established the identity of the Hope and 3996 lode segments. However, no significant extension of the 3996 mineralization was indicated by any of the up-holes. Also drilling below and in the footwall of the lode failed to disclose other possible parallel or steeper lodes. Drill hole S-42, however, indicated the presence of panel of firmer, less deformed beds starting some 300 feet above the level; S-44 disclosed an additional mass of porphyry below the level.

Five holes were drilled, and surveyed by Tro-Pari compass, from the west end of 3996 level. The first, S-46, drilled northerly and slightly downward to test the possibility of a "footwall" position of the lode, failed to locate a discernible lode strand. There is a possibility, however, that a significantly steeper footwall strand, if one exists, could lie beyond the end of the hole.

*This possibility pretty well ruled out - 1970*

#### B. UNDERGROUND DRILL EXPLORATION

Holes S-47 and S-48 both intersected the lode at some 650 feet in the hanging wall of the drill station. Both deflected considerably from their initial lines in such a way that they accomplished near-coincident intersections with the lode. Hole S-49 was abandoned following an excessive initial deflection. The final hole of the series, S-50, deflected considerably, but intersected the lode some 400 feet east of, and 50 feet higher than S-48 intersection.

The consistent, clock-wise pattern of deflection of all of the up-holes may be explained through the inference of a progressive warping of the bedding upward through the section. Obviously, the most direct way of reducing future drill hole lengths, reduce deflection, and adequately test the probable down-dip extensions of mineralization is to advance the heading an appreciable distance towards its inferred projection at the 3996 horizon.

*\* This confirmed by 4625 drift geology.*

*Southward or Southwestward*

*The lode is on*

Assays of the foregoing lode intersections are summarized:

| Hole No. | Core Interval         | Core Length, ft. | Silver oz/ton | Lead % | Zinc % | Ag Pb Ratio |
|----------|-----------------------|------------------|---------------|--------|--------|-------------|
| S-47     | 657.3-658.7           | FW 1.4           | 4.4           | 2.4    | 8.5    | 1.83        |
|          | 658.7-662.0           | vein 3.3         | 0.4           | 0.6    | 0.4    |             |
|          | 674.2-675.1           | hw 0.9           | 0.7           | 0.5    | 3.0    |             |
|          | 675.1-675.8           | kn 0.7           | 30.7          | 13.7   | 14.4   | 2.24        |
|          | (average 674.2-675.8) | avg 1.6          | 13.5          | 6.5    | 8.0    | 2.08        |
| S-48     | 420.6-421.2           | FW 0.6           | 0.4           | -      | 0.75   |             |
|          | 662.8-665.3           | HW 2.5           | 3.7           | 0.7    | 3.9    | 5.3         |
| S-50     | 700.0-700.8           | 0.8              | 6.6           | 1.8    | 1.2    | 3.66        |

Peabody — Note 4625 develop proved lode widths of 1' - 6' plus ft.!

Attention is called to the excellent silver-lead ratios relevant to the more important underground drill hole intersections. The same relationship was evident via assays of the mineralization opened in the drift and raises some 2000' eastward on 3996 level.

## SURFACE-BASED EXPLORATION

### A. GENERAL EXPLORATION

① Soil sampling, bulldozer trenching and geological mapping of the Hope Mine - Jennie Ridge interval of the Main lode and other general exploration targets were accomplished concurrently with the 3996 exploration program. As a result of this work the surface trace of the structure over this strike interval was very adequately delineated. Trenches, principally to the west of the Mascot tunnels expose the lode as a wide, stranded, sheared and fractured zone; there is a marked tendency for steeper footwall strands to diverge from the flatter hanging wall section on a more westerly course. The locally minor lead-zinc mineralization is related to these and other steep fractures.

① No. rock chip sampling on surface

Fillings of massive calcite, with minor quartz and siderite characterize the Hope-Mascot and Jennie Ridge sections of the structure. Visual evidence of mineralization is slight; however, the geochemical field tests exhibited marked zinc anomalies over most of the Hope-Mascot sub-section. The markedly steeper dips displayed by the calcite ribs, together with the open-space character of these fillings, suggests that they occur in general

R.H.S. best results on drainage courses.

② The present geol. data suggest that the Mascot workings are, most likely on a steeper dipping shear departing from the main (flat) lode strand and running into (possibly dying out?) well below the footwall of the main lode.

"gash" relationship to the flatter dipping shear-walls and strands of the lode. Descriptions of the lode within the Hope mine indicate that similar structural relationships were characteristic of the complex of galena-bearing calcite lenses or "shingles" comprising parts of the former Hope orebody. The Mascot-East Jennie Ridge lode-segment differs; the Company geologist describes it as a "4 to 5-foot wide (zone) of crushed, brecciated, and altered argillites, shot through with heavily-oxidized quartz-carbonate stringers". In the vicinity of the north pit on the east slope of Jennie Ridge the lode strikes S65°W and dips 38° southerly. The ridge-crest outcrops dip similarly, but strike more southerly. Relating these attitudes to that of the drilled segment, the writer infers a decided lode-warp occurring within the Jennie Ridge lode section which, if it persists down-dip, could materialize as a counter-clockwise bend and warp, situated at a few hundred feet westerly of the mineralization intersected by the recent surface drilling. Judging from lode attitudes observed on Jennie Ridge and East Fork Basin, the full extent of the lode underlying Jennie Ridge could be involved in this structure.

Near the beginning of this century the nearby Mascot workings produced a few tons of ore from the flatly-dipping lode segment. Cairnes notes that one ton shipped carried 52 ounces of silver and 30% lead.

Other surface work relevant to the current program, and accomplished this season includes the extension of the Carnation 5480 access road to the site of the proposed 4620 crosscut portal between East and West Fork Tributary Creek, clearing of the portal site, general check-surveys to the drilling area, and an extension of the survey control to the 4620 portal area.

(or 4625)

#### B. DIAMOND DRILL EXPLORATION

The approach of winter weather conditions at the 5000 foot level of the Slocan area and the limited exploration budget of the company permitted a somewhat abbreviated, but very satisfactory drilling program to be accomplished. This comprised 4 holes from the initial drill site and one from the second, the latter being some 300 feet southwest of the first; both set-ups were close to East Fork Tributary Creek at about the 5400 foot elevation. The general target comprised that segment of the Main lode extending westward of the Mascot tunnels and under E. Fork. It was not feasible, or considered necessary

*and the up-dip extension of mine in detail by the West-3996 drilling.*



to complete all of the proposed drilling. Wire-line equipment for the recovery of BQ diameter core was used; this combination produced excellent core recoveries. The geologist surveyed (incl. Tro-Pari) each hole and logged all cores in detail, providing full descriptions of rock type, bedding and fracture structures, alteration, and mineralization. The following core logs are abbreviated summaries of the original logs; all holes are shown on the accompanying plans and sections:

D.D.H. #SS-1

*1 vein only, only 0.5' fair*

- Col. - 23.0' Casing  
23.0 - 175.0 Medium to thin-bedded derty and limy argillites; avg. core-bedding 50-60°; Fine grained biotite-diorite (bi-di) @ 93-100'; Minor sphalerite @ 122'.
- 175.0-350.0 Mixed argillites and limy argillites; avg. core-bedding @ 40-55°; 1.5' bi-di @ 288'; alt. bi-di @ 345-50'; 1" qz.-cht. with minor sphal. @ 208'.
- 429.5 Argillites, cherty and limy argillites; avg. core-bedding @ 60-70°; 1' - 2' sills bi-di @ 366', 375', 420' 429'; numerous 92-cht. seams.
- 467.0 Argillites, cherty arg., quartzite, avg. core-bedding 80°; 1' bi-di @ 437'
- 476.0 Chert-lime silicate alteration, grey, green, brown banding (henceforth abbrev. to chert-silicate)
- 478.0 Sheared, graphite, breccia, mud with freq. 92-cbt. seams.
- 481.5 Altered argillite.
- 502.0 Lode; sheared, brecciated, with quartz, siderite, calcite; scant ZnS-PbS @ 500.5-501.0'
- 701.0 Argill-quartzites, quartzites.

*note - these  
not sparsely  
w. limited*

| Assays:       | Core<br>Length, ft. | Silver<br>oz/ton | Lead<br>% | Zinc<br>% | Ag<br>Pb Ratio |
|---------------|---------------------|------------------|-----------|-----------|----------------|
| 500.5'-501.0' | 0.5                 | 7.8              | 1.2       | 2.2       | 6.5            |



D.D.H. #SS-2

*- / Kien only. very good ore 2.2'*

Col. - 11.0'  
11.0-175.0'

Casing

Argillite, cherty and limy argillite; Avg. core - bedding 45° @ 60-100'; sheared @ 51-55'; fine-grd. bi-di "sill" @ 131.5-141.5' & 167-171'.

-462.3'

Interbedded argillite, cherty and limy argillite; avg. core-bedding 70-90° @ 240-462'; bi-di dyke @ 398-405'; shear: qz-cbt. and graphite @ 404.5-406'.

-539.5'

Chert-silicate and quartzite - grey, green, mauve, etc.: avg. core-bedding 80-90°; bi-di porph. @ 521-322'; sparse sphal.-gal. in breccia @ 539.0-39.5'.

*Continued*

*539.5* -541.7

Lode: Brecciated with slips; dense, sheared sphal. and gal.

| Assays      | Core Length, ft. | Silver oz/ton | Lead % | Zinc % | Ag Pb Ratio |
|-------------|------------------|---------------|--------|--------|-------------|
| 539.5-540.0 | 0.5              | 61.0          | 16.6   | 10.4   | 3.7         |
| 540 -541.0  | 1.0              | 15.4          | 1.0    | 3.7    | 15.4        |
| 541 -541.7  | 0.7              | 38.4          | 2.2    | 6.2    | 17.4        |
| (Average)   | 2.2'             | 33.1          | 4.9    | 6.0    | 6.75)       |

D.D.H. #SS-3

*- Composite lode - Ruins*

Co. - 10.0  
10.0 - 350.0

Casing.

Cherty to limy argillite and argill. limestone; core-bedding, generally @ 40-60° range; several bedding shears; bi-di porph. dyke (30°) at 291.5-293'; quartz cbt.-graph. shear with scant sphal. @ 315.2-316'.

-427.0

Argillites, locally limey; core-bedding avg. 45-60°;

-485.0

Argillite, limy argillite, argill.-limestone; core-bedding avg. 45-60°; occasional bedding slips.

-504.5

Cherty argillites; core-bedding 45-60°.

-546.0

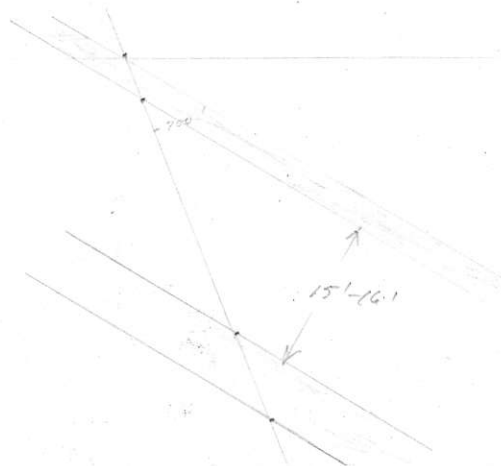
" " , variably broken, altered.

- 546.0-589.0 cherty to limy argillites and quartzites; core-bedding avg. 30-40°; brecciated w. qz.-cbt. and traces of sphal. @ 559-561'.
- 684.2 Variably altered (chert-silicate) limy argillite and argill.-limestone; core bedding avg. 25-45°; bedding shears; 2' @ 597', 4' @ 653', 2' @ 563'
- 691.5 Altered bi-di porphyry sill (over lode)
- 732.4 Composite lode, mineralized foot and hanging wall sects. with central barren sect.; sheared-broken-brecciated w. qz.-cbt.; pyrite, sphal., and galena as veins, patches, grains, etc.
- 768.0 Variably altered (chert-silicate) argillite; occasional qz.-cbt. veining.

| Assays      | Core Length, ft. | Silver oz/ton | Lead % | Zinc % | Ag Pb Ratio |
|-------------|------------------|---------------|--------|--------|-------------|
| 691.5-693.0 | 1.5              | 0.6           | tr.    | 1.2    | -           |
| 693.0-695.4 | 2.4              | 0.4           | nil    | 1.6    | -           |
| 695.4-696.3 | 0.9              | 125.0         | 30.9   | 20.8   | 4.05        |
| 696.3-696.8 | 0.5              | 1.2           | nil    | 2.0    | -           |
| 696.8-710.3 | 13.5             | 0.6           | nil    | nil    | -           |
| 710.3-712.8 | 2.5              | 0.6           | 0.6    | 6.4    | -           |
| 712.8-722.5 | 9.7              | 0.2           | nil    | 0.2    | -           |
| 722.5-724.6 | 2.1              | 1.0           | nil    | 2.2    | -           |
| 724.6-732.4 | 7.8              | 17.0          | 2.4    | 11.0   | 7.1         |

Weighted averages:

|      |              |      |       |      |      |      |
|------|--------------|------|-------|------|------|------|
| H.W. | 691.5-696.8  | 5.3  | 21.69 | 5.12 | 4.78 | 4.28 |
| F.W. | 722.5-732.4  | 9.9  | 13.60 | 1.89 | 9.13 | 7.2  |
|      | (691.5-732.4 | 40.9 | 6.16  | 0.91 | 4.81 | - )  |



D.D.H. #SS-4

*1 strand only*

- col. - 11.0 Casing  
11.0 - 158.0 Limy argillites; core-bedding avg. 20-30° gen. sheared @ 58-76'; 0.5' bi-di @ 84.5'
- 170.0 Highly altered argillite.
- 280.0 Limy argillites, argillites, and argill.-limestone; core-bedding avg. 45-60°; 0.8' bi-di @ 233'.
- 303.5 Shear zone; strong, broken-graphitic. core-shear angles locally acute, avg. parallel to beds - prob. represents sheared crumple
- 522.0 Argillites progressive to cherty altered; core-bedding avg. 50-70°; sheared @ 493-500' shattered and silicified @ 517.5-522'.
- 569.5 Chert-silicate alteration, gray-green-brown banded.
- 631.5 Biotite-diorite porphyry; qz.-cbt. veins and breccia w. minor sphal. @ 594.5-596'.
- 693.2 Lode: dense siderite stringers & breccia filling with irreg. veins sphal.-galena, some dispersed grains sphal.-galena.
- 659.0 Quartzite; freq.qz.-cbt. veinlets
- 737.0 Chert-silicate alteration. indistinct colour banding-mottling; minor qz.-cbt. veining with scant sphal.

| Assays               | Core Length, ft. | Silver oz/ton | Lead % | Zinc % | Ag Pb Ratio |
|----------------------|------------------|---------------|--------|--------|-------------|
| 631.5-631.7          | 0.2              | 106.9         | 2.4    | 37.0   | (44.5)      |
| 631.7-636.5          | 4.8              | 0.1           | nil    | 0.8    | -           |
| 636.5-639.2          | 2.7              | 17.4          | 6.4    | 10.0   | 2.72        |
| (Average 631.5-639.2 | 7.7              | 8.94          | 2.31   | 4.97   | 3.84)       |

*1 only*

D.D.H. #SS-5

*- 2 narrow strands only*

- Col. - 17.0 Casing.  
17.0-190.0 Interbedded limy argillite, argillite, limestone,  
Core-bedding avg. 35-45°; 1" calcite-siderite  
vein w. sparse sphalerite @ 75.0'.
- 349.5 Dominantly massive limy argillite and argill.-limestone,  
Core-bedding avg. 35-50°; bi-di sills @ 225-34', 237-40',  
248-53'.
- 356.5 Altered dyke, silic.-rhyolitic.
- 440.0 Interbedded argillite-limy argillite; avg. core bedding  
50-70°; 2' bi-di @ 415'.
- 719.5 Argillites, cherty to limy argillites; avg. core bedding  
60-70°; occasional chert silicate.
- 725.0 Lode; minor graphitic shearing; calcite-siderite and  
qz.-crt veining, etc, sphal.-galena in veinlets.
- 747.0 Chert-silicate alteration; locally brecciated.
- 772 Argillites, cherty argillites, some crushing and veining  
with scant stringers sphal.-galena = possible F.W. lode section
- 839.0 Biotite diorite dyke (10°) slightly porph.

| Assays      | Core<br>Length, ft. | Silver<br>oz/ton | Lead<br>% | Zinc<br>% | Ag<br>Pb Ratio |
|-------------|---------------------|------------------|-----------|-----------|----------------|
| 719.5-719.7 | 0.2                 | 1.6              | 0.6       | 1.8       | not applicable |
| 719.7-725.0 | 5.3                 | 0.2              | nil       | 0.1       | " "            |
| 749.5-749.7 | 0.2                 | 7.8              | 4.6       | 7.4       |                |

## C SUMMARY 3996 - EAST FORK GEOLOGY & MINERALIZATION

Surface and underground drilling has delineated a west southwesterly-striking lode segment dipping at about 20 degrees southerly. The lode, or general lode zone, normally consists of variably-fractured and brecciated cherty argillite and argillite, veined by quartz and calcite, and mineralized by fine-grained to amorphous mixtures of sphalerite, galena, (grey copper?), pyrite, and pyrrhotite(?). Yellow siderite is locally conspicuous.

*P*  
*actually found to be Ag-rich terranite and some chert*

Conspicuous features of the lode horizon comprise a hanging wall dyke, or dykes of fine-grained altered biotite-diorite to biotite quartz-feldspar porphyry and variably thick sections of chert-lime silicate-altered limy argillites - the latter having a white-grey-brown-pale green banded and mottled appearance.

*the 5480 altm.*

The general lode hangingwall section consists of mixed argillites, limy argillites, and argillaceous limestone; the footwall section is comprised of massive to banded cherty argillites and argillaceous quartzites. The latter section extends from the lode footwall to a little above the 3996 horizon; the general 3996 lithologic section consists of tightly-fissile cherty and quartzitic argillites, containing panels of more highly-sheared, contorted fissile graphitic argillite. The more significant diorite and porphyry intrusions occur within the lode-footwall structural panel, with larger flat "axial-plane" bodies forming the general lode control throughout most of the 3996 level. These become less extensive and significant within the harder, apparently more competent rocks comprising the general footwall panel at, and beyond the westerly end of the level.

Intersections made by diamond drill holes S-47, S-48, SS-2, SS-3, and SS-4 provide a preliminarily-indicated mineral, or ore shoot with a strike-length of 225 feet and dip length of some 600 feet. The writer's preliminary estimate of the volume of this partly-delineated shoot is  $\frac{100' + 350' \times 600' \times 2.5'}{2} =$

337,000 cu. ft. This, with the weighted-average grade of the five significant drill hole intersections, results in an initially indicated 28,000 tons @ Ag, 15.2 oz/ton; Pb, 3.6%; Zn, 5.6% over an average width of 2.5 feet. Mining dilution may be expected to decrease grade and increase tonnage.

*(J.B. 45,000 tons, avg. 5.0')*

The above calculation excludes the single footwall intersection, by #SS-3, of 5.7' @ Ag, 17.0 oz/ton; Pb, 2.4%; Zn, 11.0% and the minor hanging wall intersection, by S-47, of 4.5' @ Ag, 1.6 oz/ton; Pb, 1.1%; Zn, 2.8%.

The gross value of the indicated mineralization, or ore, is \$55.37 per ton; the writer prefers to defer estimates of the gross value of the indicated block until such a time as some corroborative drifting and/or diamond-drilling has been completed on the 3996 and 4620 levels.

To date, diamond drill and tunnel exploration at the 3996 horizon has indicated a continuously mineralized 2500 foot gross strike-length of flatly-dipping lode. Within the current E. Fork - 3996 exploration section a dip-length of some 3000 feet is indicated. Over half of this appears to lie within the optimum bedding section. Of the currently-delimited 2500 by 3000 foot projected area, only two sections, of 800' x 600' and 225' x 600' area, respectively, have been explored to a significant extent.

#### OTHER EXPLORATION

##### A. EVENING-MARGARET LODGE:

The apparent principal elements of this broad shear-lode zone comprise the Evening and Margaret strands, as exposed at their 6100 and 5990 horizons by old drifts on the west and east sides of upper Jennie Ridge. These, with additional footwall strands, indicate a 100 ft. presently-delimited horizontal width. The Margaret adit was opened, mapped and sampled by the field staff late this season; assays are currently pending. In addition, some trenching of the easterly extension of the zone was undertaken, but stopped when rolling excavated material threatened to endanger drill crews at No. 2 drill set-up.

The above stripping exposed a local southwesterly-dipping panel of argillites within the general east-dip bedding panel. These suggest the presence of a significant drag-fold-overtaken down-dip to the east - which may constitute a favourable high-level exploration target on the lode. The potential of the structure may be best explored, eventually, from the 4620 crosscut (Fig. 3A), where the Main lode - Margaret lode horizontal separation appears to be about 1500 ft.,



(dip-normal 850 ft.)

The lode, as exposed in the Margaret adit contains minor amounts of pale sphalerite, with very sparse galena.

#### B. DOROTHY LODE:

The 1966 trench exposures showed two rather weak, erratically mineralized lode strands within the local, highly contorted, soft "plastic" argillites. The field geologists' mapping of the accessible tunnel exposures reveals an essentially similar, complex lode structure at 100 to 200 ft. vertically below the trenched exposures.

#### C. MINNIEHAHA LODE:

Considerable bulldozer stripping of the lode zone was undertaken in the vicinity of the old workings during 1966. The larger cut is on the lode outcrop above and to the south of the main adit portal; some high-grade Ag-Pb ore is exposed in a northerly-trending, steeply dipping lode strand within the more southerly bedrock cut. The mineralization appears strongest where this steep "tension" break is joined by a N.E.-trending, mineralized shear-strand. The northerly cuts and adit cross-cut partly expose a N.E.-trending, flatly S.E.-dipping shear-lode strand which appears rather sparsely mineralized by siderite and sphalerite. Two N.E.-trending, steeply-dipping "links" were noted in the bench cut between the north and south exposures.

The writer's interpretation of the general lode structure is that ore occurs within a complex of steeply-dipping shear and "gash" lode strands which root in a through-going, N.E.-trending, flatly (20-30°) S.E.-dipping shear strand - the latter showing generally similar trends and characteristics as the Carnation "Footwall" lode, to which it is presently correlated.

This lode segment is credited with a production of 99 tons of Ag-Pb shipping ore, made during 1927.

The southwesterly (and probably depth) extensions of the lode within, and closely under the Queen Bess fold axis comprise an excellent exploration target. The local projections of the lode should be cut at only a few hundreds of feet from the collar of the proposed 4620 crosscut.

Respectfully submitted,

*W. M. Sharp*

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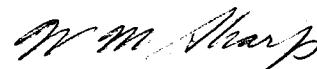
W.M. Sharp, P.Eng.

## CERTIFICATE

I, William M. Sharp, with business address in Vancouver, British Columbia, and residential address in North Vancouver, British Columbia, do hereby certify that:

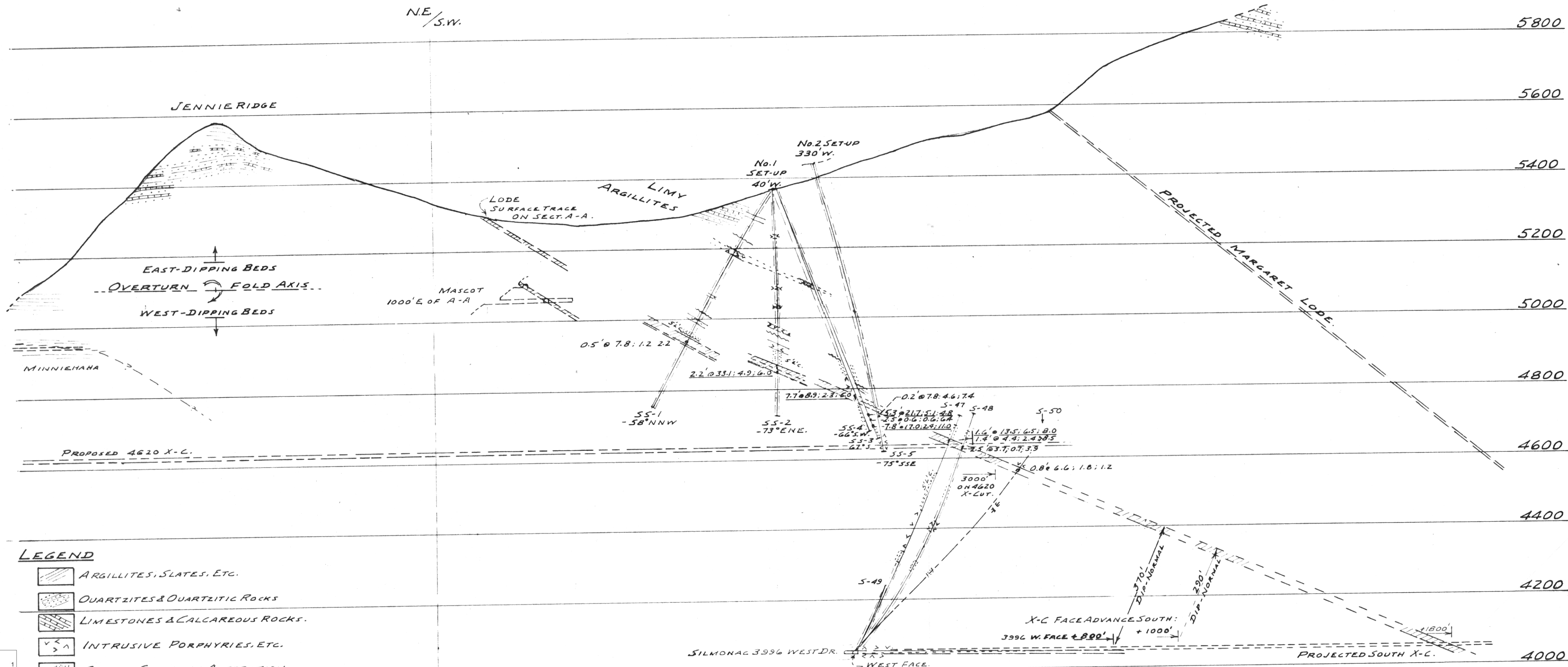
1. I am a consulting geological engineer.
2. I am a graduate of the University of British Columbia with B.A.Sc. (1945) and M.A. Sc. (1950) degrees in Geological Engineering.
3. I am a registered Professional Engineer in the Province of British Columbia.
4. I have practiced my profession since 1946, in both geological and managerial capacities with Canadian mining and construction companies until 1964, when I established my own consulting practice.
5. I have personally inspected the Silmonac Mines Limited property at Sandon, B.C., and examined all company reports, drawings, and correspondence pertaining to the property, and interviewed the resident staff. I have also examined available government reports and bulletins pertaining to the property.
6. I have no interest, direct or indirect, in the properties or securities of the above Company, nor do I expect to have any such interest.
7. The Silmonac claim group is composed entirely of surveyed Crown-granted claims, hence the ground extent of the property is as depicted on the accompanying Fig. 2, "Property Map".

Respectfully submitted,



W.M. Sharp, P.Eng.

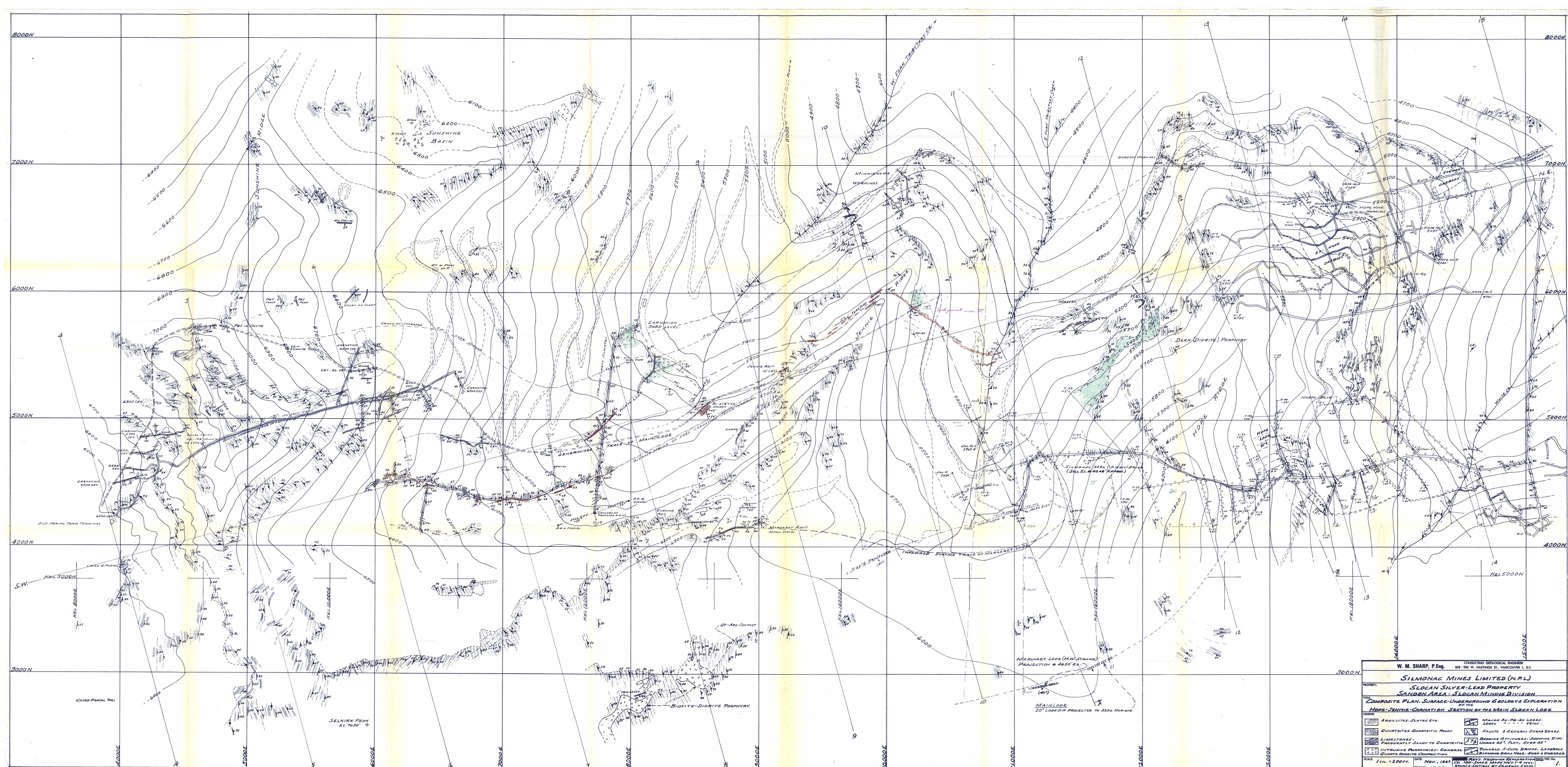
Vancouver, B.C.  
November, 1967.



**FIG. 3-A**  
**CROSS-SECTION A-A**  
THROUGH  
3996 WEST DR. - E. FORK TRIBUTARY CR.  
SILMONAC MINES SANDON PROJECT.  
SCALE: 1"=200'  
OCTOBER, 1967.  
W.M.S.







W. M. SHARP, P. Eng. CONSULTING GEOLOGICAL ENGINEER  
808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.

**SILMONAC MINES LIMITED (N.P.L.)**  
**SLOCAN SILVER-LEAD PROPERTY**  
**SANDON AREA - SLOCAN MINING DIVISION**

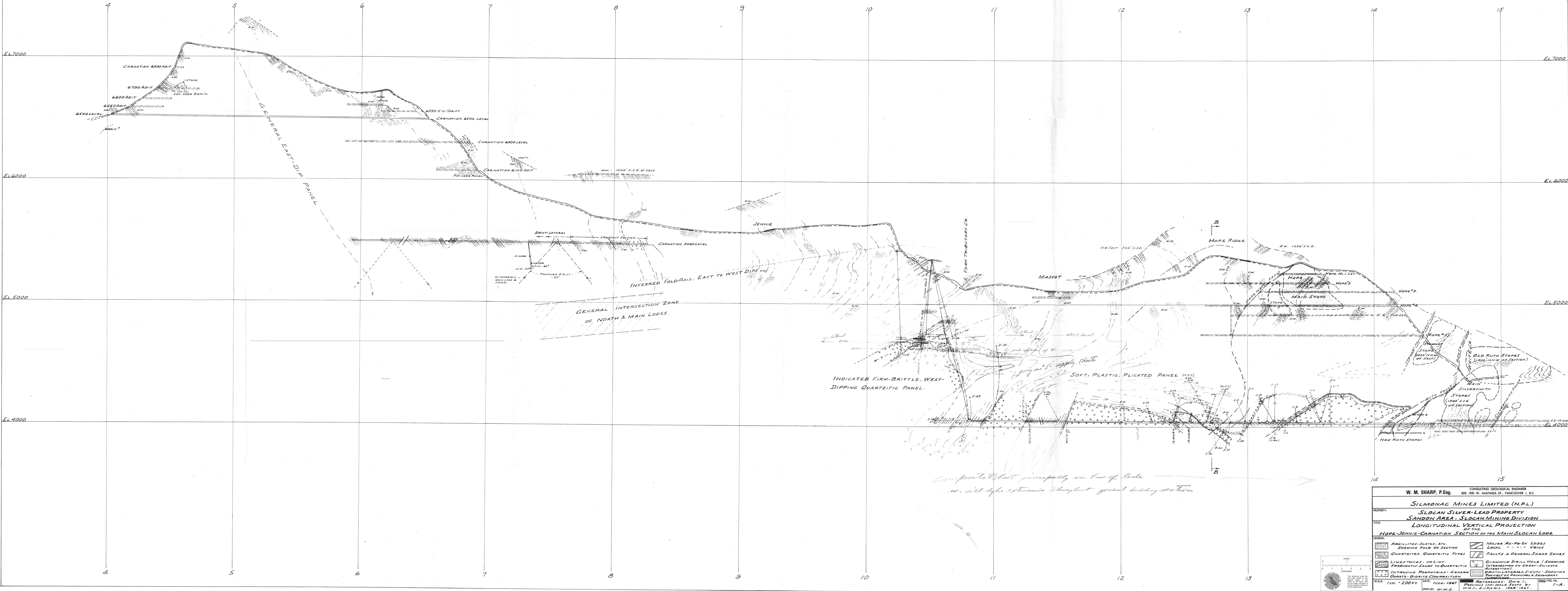
**COMPOSITE PLAN, SURFACE-UNDERGROUND GEOLOGY & EXPLORATION OF THE HOPE-JENNIE CARNATION SECTION OF THE MAIN SILMONAC LOBE**

**LEGEND**

|   |  |
|---|--|
| ARILLITES, SLATES, ETC.                                   | MAJOR AS-PB-SH LODES                                       |
| QUARTZITE QUARTZITIC ROCKS                                | FAULTS & GENERAL SHEAR ZONES                               |
| LIMESTONES  | BEDDING ATTITUDES, SHOWING DIPS: UNDER 45°, FLAT, OVER 45° |
| FREQUENTLY SANDY TO QUARTZITIC QUARTZ DIORITE COMPOSITION | TUNNELS, CUTS, DRIFTS, LATERALS                            |
| INTRUSIVE PORPHYRIES - GENERAL                            | DIAMOND DRILL HOLES - SURF & UNDERG.                       |
| INTRUSIVE PORPHYRIES - GENERAL                            | REEL'S KIDUNA EXPLORATION                                  |

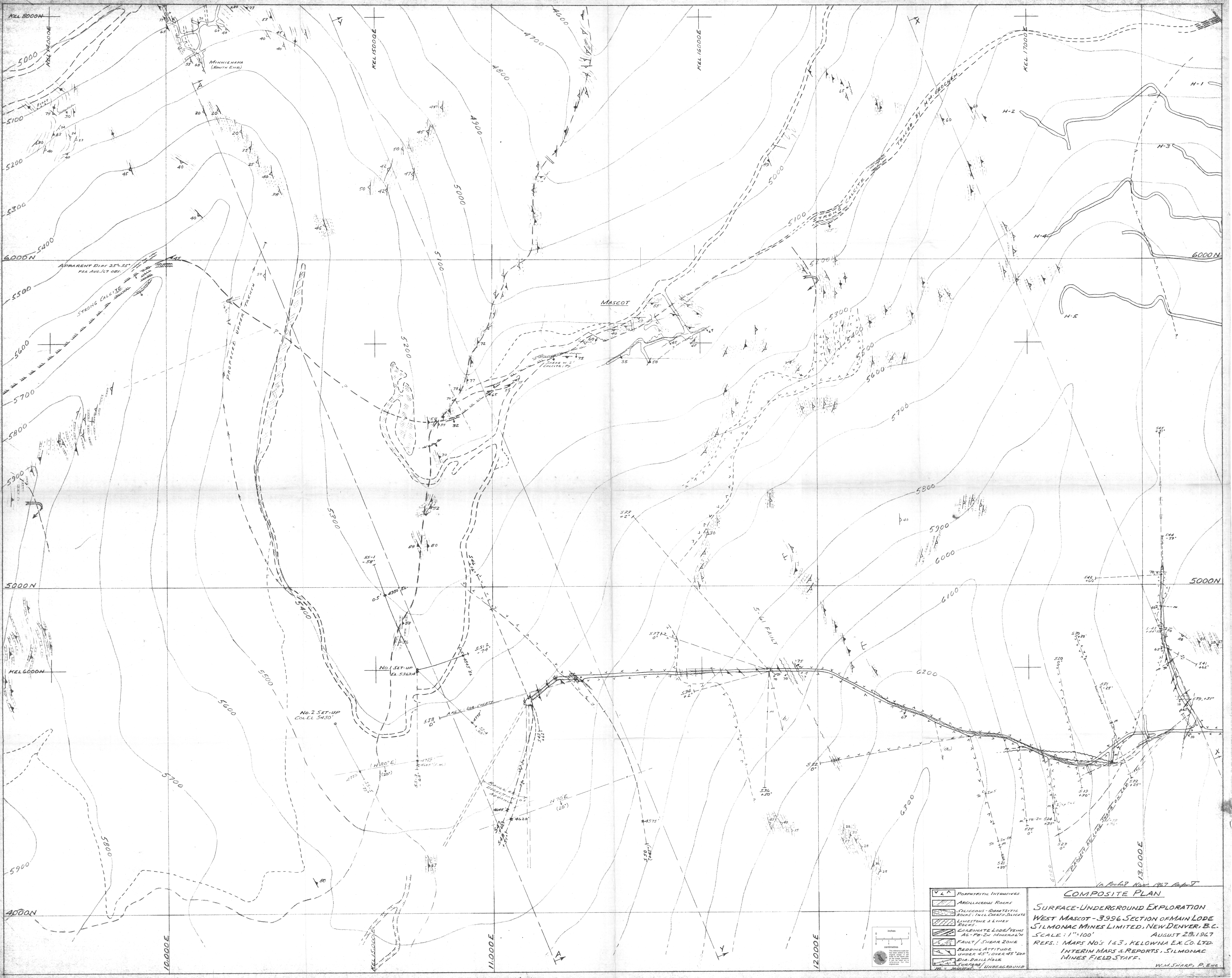
SCALE: 1" = 200 FT. DATE: NOV., 1947  
DRAWN BY: W.M.S.



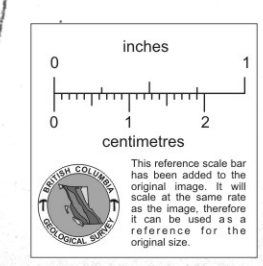


|  |  |
|--|--|
| W. M. SHARP, P.Eng.  |  |
| CONSULTING GEOLOGICAL ENGINEER   |  |
| 808-900 W. HASTINGS ST., VANCOUVER 1, B.C.   |  |
| PROPERTY: SILMONAC MINES LIMITED (N.P.L.)  |  |
| SLOCAN SILVER-LEAD PROPERTY  |  |
| SANDON AREA, SLOCAN MINING DIVISION  |  |
| TITLE: LONGITUDINAL VERTICAL PROJECTION OF THE HOPE-JENNIE-CARNATION SECTION OF THE MAIN SLOCAN LORE |  |
| LEGEND:  |  |
| ARILLITES, SLATES, ETC. SHOWING FOLD ON SECTION  | MAJOR AG-PB-ZN LOSES LOCAL   |
| QUARTZITES, QUARTZITIC TYPES   | FAULTS & GENERAL SHEAR ZONES   |
| LIMESTONES, OR LIME INTERSECTION ON CHERT-DIAGENETIC ALTERATION                                      | DIAMOND DRILL HOLE (SHOWING ALTERATION ON CHERT-DIAGENETIC ALTERATION)           |
| INTRUSIVE PORPHYRIES - GENERAL QUARTZ-DIOGENE COMPOSITION  | DRIFT-LATERAL CUT - SHOWING TUNNELS OF PRINCIPAL & SECONDARY INTERSECTIONS       |
| SCALE: 1 IN. = 200 FT.   | DATE: NOV. 1967  |
| OWN BY: W.M.S.   | REFERENCES: DIVE 1, PREVIOUS 100' SCALE SECT. BY W.M.S., S.J.P.A.W.L. 1964-1967. |
| FIG. No. 17A   |  |





- ▲ PORPHYRYTIC INTERTIVES
- ▲ ARGILLACEOUS ROCKS
- ▲ SILICEOUS QUARTZITIC ROCKS, INCL. CHERT-DAKOTA
- ▲ LIMESTONE & LIMBY ROCKS
- ▲ CARBONATE LODGE/VEINS
- ▲ AG-PB-ZN MINERALIN
- ▲ FAULT / SHEAR ZONE
- ▲ BEDDING ATTITUDE, UNDER 45°, OVER 45° DIP
- ▲ DIA-DRILL HOLE
- ▲ SURFACE / UNDERGROUND



**COMPOSITE PLAN**  
SURFACE-UNDERGROUND EXPLORATION  
WEST MASCOT-3996 SECTION OF MAIN LODGE  
SILMONAC MINES LIMITED, NEW DENVER, B.C.  
SCALE: 1"=100'  
AUGUST 23, 1967  
REFS.: MAPS NO'S 163, KELOWNA EX. CO. LTD.  
INTERIM MAPS & REPORTS, SILMONAC  
MINES FIELD STAFF.  
W.M. SHARP, P. ENG.