

REPORT

800757

on

PRELIMINARY SURVEYS & GEOLOGICAL EXAMINATIONS

of

PLACER & LODE MINING PROSPECTS

near

ATLIN, B.C., ATLIN MINING DIVISION  
BRITISH COLUMBIA

(N.T.S. MAPS 104N/11W-1/2; 104N/12E-1/2)

for

SURPRISE\* RESOURCES LTD. (N.P.L.)  
VANCOUVER, B.C., CANADA

by

W.M. Sharp, M.A.Sc., P.Eng. (B.C.)

during

June, 1973

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ACCOMPANYING MAPS:

Dwg. No. 01, Lower Otter Creek; scale 1" = 200' - in pocket

General Index Map, Atlin Lode & Placer Prospects 1" = 4 mi.  
- bound in text

Fig. 1	Otter & Wright Creeks; 1" = 4000'	- bound in text
Fig. 2	Wright Creek; 1" = 200'	- " " "
Fig. 3	Spruce Creek P.M.L.'s per field survey; 1" = 2170'	- " " "
Fig. 3A	Spruce Creek P.M.L.'s per B.C.D.M.; 1" = 2170"	- " " "
Fig. 4	Lucky AuAg Prospect; 1" = 40'	- " " "
Fig. 5	Imperial AuAg Prospect, 1" = 40'	- " " "

APPENDIX:

(Statutory Declaration)  
Certificate of Assay, Imperial & Lucky Group Samples.

## INTRODUCTION

In accordance with the general directives and authorization provided by Mr. R. Day, the writer examined five designated mining prospects within the Atlin area during his June 4-12, 1973 visit. In addition, "background" trips were made to sites of current and past placer mining operations on the local creeks.

Four of the properties examined are held by T.O. and S.J. Connolly of Atlin via direct staking and/or acquisition of pre-existing leases. Locally, the above (basic) claim groups have been expanded, or may be further expanded by locations and acquisitions made on behalf of Company principals; Mr. Connolly has tentatively arranged for the acquisition of at least three placer mining leases on Spruce Creek.

In respect of the writer's placer examinations, no significant (central) sections of the old pay channel are currently exposed along the bed or banks of modern Otter Creek or, from present indications, along Wright Creek either. Consequently, current field and office investigations concerning the position and production potential of essentially buried 'pay channels' hinge mainly on indirect evidence of their position - supplemented by the rather general (re. actual locations) accounts from old reports and, to some extent, by geologically-based inferences.

Examination of the lode prospects was by standard preliminary mapping and sampling methods. The respective surveys adequately covered most of the existing exposures. However, some important sections were not accessible for examination and this fact is considered in the writer's preliminary evaluations and recommendations.

Over two field days were spent on the search and survey of claim posts and on survey work for the staking of protective and fill-in (fractional) claims.

Considerable field and 'office' assistance was provided by Mr./Mrs. T.O. Connolly and Mr. Don Roxborough, and is hereby thankfully acknowledged.

The preparation of the accompanying maps, particularly Dwg. No. 0-1, accounted for about one-half of the report preparation time, but in view of the lack of definitive information available, comprise an essential, if not the most important part of the report.

Dwg. No. 0-1 is based on fairly wide-ranging compass-chain/range-finder surveys by the writer and, in large part, on a 100-scale plan of lower Otter Creek kindly made available by Mr. M. White of Atlin - the latter map requiring conversion of old elevation data and subsequent reduction to 200-scale prior to combining it with writer's survey (plan).

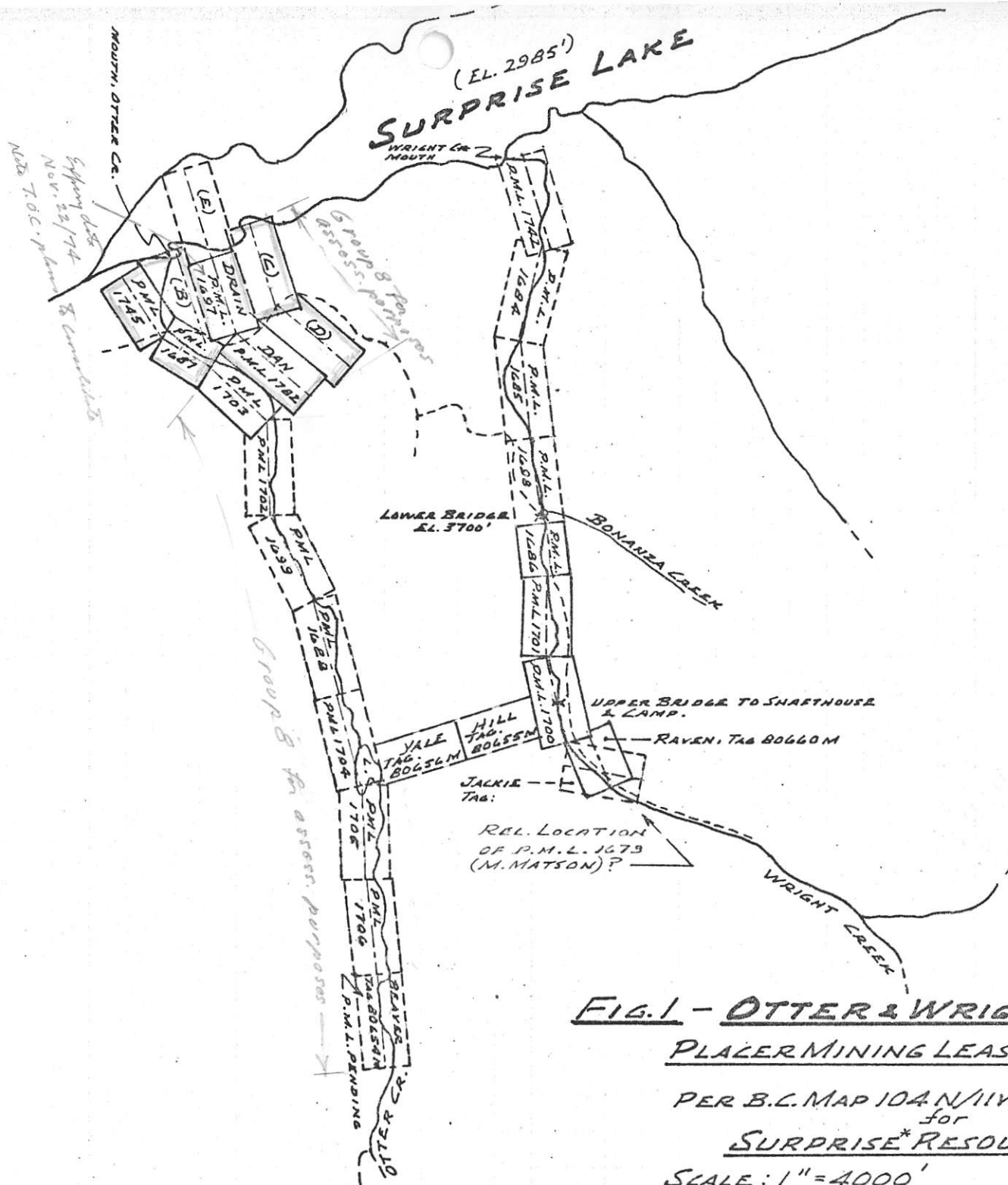
Of the several maps and sketches made available, only the above 100-scale plan and the 1936 M.M. Report plan of Spruce Creek were sufficiently definitive for purposes of on-site survey planning or control.

#### GENERAL GEOLOGY

##### A - BEDROCK

From Wright Creek to, and through Spruce Creek, and for several miles southeast of Mt. Munro, the generally drift/alluvium-blanketed land surface is underlain mainly by rocks of the Cache Creek Group of Carboniferous age. These include hard and soft (locally ribby) cherts, argillites, chert-pebble conglomerate, quartzite, greenstone, limestone, etc. Within the chert-argillite assemblages chert usually predominates; consequently these, like quartzite, form resistant outcrops. Greenstones, particularly the talcose and serpentized varieties, weather and abrade readily and are relatively soft;





**FIG. 1 - OTTER & WRIGHT CREEKS  
PLACER MINING LEASES & LOCATION.**

PER B.C. MAP 104.N/11W & FIELD SURVEY  
for  
**SURPRISE\* RESOURCES LTD.**

SCALE: 1" = 4000' JUNE, 1971  
 COMPIL. & SURVEYS BY W.M. SHARP, P. ENG.  
 ASSIST. BY T.O. & S.J. CONNOLLY, D. ROXBOROUGH.

consequently, they constitute the optimum type of bedrock for the development of 'pay-channels'.

Map 1082A shows that at least part of the lower sections of Wright and Otter Creeks are underlain by soft, talcose and serpentized ultra basic intrusives. Consequently, pay-channels developed within these rocks should be deeper and wider, and the floors themselves should constitute more efficient gold traps, than they would within more resistant rocks.

#### B - SURFICIAL

The deposits are mainly fresh appearing sandy, silty drifts with more or less clay binder; the cobble/boulder content is quite variable and the deposits may be massive or stratified. They are commonly intercalated with sandy/silty sediments of fluvio-glacial (interglacial) origin.

The essentially unmodified nature of the continentally-glaciated land forms suggests that, essentially, all of the surficial deposits are of Wisconsin age. However, the rusty-weathered cemented deposits occurring at a few localities along Pine and Spruce Creeks contrast with the predominant fresh gray to buff-coloured drift. These are thought to be of pre-Wisconsin age, but deposited within the general Pleistocene period. It is also possible that a small part of the (Wisconsin) pay gravels derive from pre-existing Pleistocene, or even earlier (Tertiary) concentrations.

#### SECT. 1 - OTTER CREEK

##### GENERAL

Fig. 1 and Dwg. No. 0-1 supplement this section of the report.

Otter Creek flows northward into Surprise Lake, joining it approximately 1/2 mile from its west end. From Atlin, Otter Creek (bridge) is reached by 12.2 miles of good gravel road.

A narrow, locally steep dirt/gravel road departs from the Surprise Lake road closely west of the bridge and leads to the upper Otter Creek workings. Most of the up-stream section is only accessible via foot-travel; however, the latter is relatively easy in most areas.

Considering the latitude (close to 60°N) of the area, the climate is relatively moderate. In past years hydraulic mining was normally carried out between May 15th and October 15th.

Within the Atlin 'dry belt' the forest cover mainly comprises open stands of small lodgepole pine and spruce, with relatively light underbrush. Major swampy areas (water reservoirs) occur along the upper parts of creeks - particularly in the generally flat summit-headwater regions.

Most of the local mountains have been rounded by continental glaciation. Glacial drift covers all but local areas of bedrock right up to summit elevations, and thick deposits of boulder-clay till and intercalated fluvio-glacial sand and silt occur within most of the modern drainage courses. Down-cutting by post-glacial (modern) creeks has left bank exposures of these deposits up to 150-feet high.

Otter Creek, including its upper west-flowing part, is about 9 miles long. In this distance it drops 1600 feet - an average gradient of 178 ft./mi. The present Otter Creek drainage area, or watershed, amounts to 16-1/2 sq.mi.; of this about 40% is drained by the upper west-flowing part of the creek.

#### HISTORY

Placer mining commenced on the upper part of the creek about 1899, and until 1903 was carried out via small-scale surface and underground methods. Within one early-worked interval of the creek the average yield of pay-gravels was about \$1 per c.y. (1900 basis) from a pay-channel with 80' x 4' cross-sectional

dimensions. The writer estimates, from the very sketchy records available, that the 1906-11 production from upper Otter Creek amounted to 1560 oz. (reported) gold from 210,000 c.y. of overburden and gravel, of which it appears that approximately 54,000 c.y. comprised pay gravel. From this the following unit values are estimated:

Gold content (a) gravel ----- approx. 60¢/c.y.  
(b) overburden & gravel --- " 15¢/c.y.

With gold at \$120 per ounce, the present-day equivalents of the above would be about (a) \$3.60 per c.y., (b) 90¢ per c.y. Also, judging from even sketchier records, it appears that much of the overlying glacial drift yielded 4¢-8¢ per c.y. (gold at \$20 per oz.).

On lower Otter Creek the old channel, east of the present channel, was profitably worked by underground methods. However, large-scale hydraulic operations in this section were never able to get down to the pay-horizon; hence were commercially unsuccessful. The sparse gold content of the general glacial overburden is indicated by the 1921 results. During that year some \$10,000 in gold was derived from 200,000 c.y. of material moved - for a (1921) yield of 5¢ per c.y. (present value approx. 30¢ per c.y.).

The middle interval of the creek has not been mined, but has been drilled over a long period of years. It is reported that 21 holes were drilled (with a Keystone churn-drill) in 1921, and that all returned values wherever bedrock was reached. An average channel depth of 44 feet (reference?) was reported.

Drift mining being carried on in 1938 opened a 40' width of good pay-gravel below the layer of typically firm, silty hardpan; however, as the workings could not be held open because of squeezing ground conditions no significant production resulted.

Finally, drilling during 1950, on the east bank of the creek, at about 1 mile from Surprise Lake, found bedrock at a depth of about 140 ft. The writer estimates that this was done on the east bench at a location approximately across from sta. 6 of his upper traverse.

### CLAIMS

Those originally staked, and recently staked or layed out for staking are shown on Fig. 1. To safely cover the projected, or tentatively-indicated trend of the old channel under the east bank of the creek it would be advisable to stake claims adjoining the east boundaries of P.M.L's 1702, 1699, 1688, and 1704.

### FIELD WORK

June 4, arrive in Atlin and plan field work with T. Connolly.

June 5, on reconnaissance of Otter Creek, including random magnetometer tests; start control traverse.

June 6, continue traverse and topog. surveys.

June 7, continue surveys, with geological mapping; search for and tie in claim posts - noting errors in existing claim plots.

June 8, search out and tie in claim posts with T. Connolly; survey Drain Lease, with detailing; review claim situation with T. Connolly in evening.

June 9, (a.m.) with crew - establishing claim posts and location lines for protective-staking. (p.m.-Wright Cr.).

Dwg. No. 0-1, correlating the writer's surveys and the 100-scale detail, adequately covers the bottom end of the property. However, the important up-creek extensions of it could be covered more efficiently and economically via a smaller scale but adequately detailed (approx. 10' contour-interval) topographic map. A 1"=800' map derived from 1 in.=1/4 mi. air photography, if available, would provide excellent control for both the preliminary surveys and any follow-up exploratory and/or mining operations on Otter Creek.

LOCAL GEOLOGY (ref. Dwg. No. 0-1)

The drift cover is predominantly cobble/boulder-clay till with varied proportions of silty or sandy fines. The typically near-vertical slope of creek banks of this material, with faces locally over 100 feet in height, indicate the firm, coherent character of the material. Some sections of it are well stratified, while others are massive. In places the vertical section contains generally conformable, gently-dipping lensy layers of thin-bedded silty sediments; at other places it includes layers or lenses of silty to sandy cross-bedded outwash (delta-fan) material.

Within one relatively short interval of the present Otter Creek (sta. 31 + 15 - 33 + 15) the mass of drift is underlain by fine open gravel, silty hardpan, and a basal layer of tighter (clay), somewhat rusty gravel. It is probable that this basal material comprises old, pay-channel gravels adjacent to the westerly (quartzite) rim of that channel. Section B-B on Dwg. No. 0-1 represents the surficial geology in this locality. Section C-C, close to B-B but incorporating drill intersections of bedrock to the east of the present creek, depicts the writer's preliminary interpretation of a wider cross-section - tentatively indicating the old channel. Section A-A depicts a typical section of till about the lower (lake) pit.

Over most of the lower Otter Creek area bedrock is not exposed. However, where it is well exposed along a 1700-foot interval of the creek it is predominantly massive to ribby-bedded quartzite and argillaceous quartzite. Only one relatively narrow panel of talc and serpentine-altered schist was seen within this section. If G.S.C. Map 1082A is correct the latter rock type should predominate within the one-mile interval of the creek upstream of the last outcrop observed by the writer. On the basis of the observed spatial relationships between the exposures of

basal gravels and quartzites noted above, the writer is inclined to interpret the latter as rim-rock comprising the west edge of the old pay-channel. If this is true, the main channel axis would situate in and under the east bank of the creek - possibly in a section of softer rocks abutting the panel of quartzitic rocks exposed within the above-noted 1700-foot interval.

#### PRELIMINARY APPRAISAL

Some aspects of the property which relate to its potential as a productive placer operation are:

1. The gold content of the placers derives from a significantly large source area of (eroded) mineralized bedrock.
2. Favourable conditions for placer-gold concentration occur over much of the 9-mile length of the creek.
3. A significantly large pay-channel is indicated - old reports noting a 200' x 40' cross-section within a lower central part of the creek, and an 80-foot width containing a 4-foot paystreak with a present value (Au @ \$120/oz.) of \$6 per cu.yd.
4. With the 1906-11 operations on upper Otter Creek giving a reported (2/3 of actual ?) yield of 1560 oz. of gold from 54,000 c.y. of gravel in 210,000 c.y. of overburden and gravel, the following present values are indicated:  

gravel -----	\$3.60 per c.y.
overburden plus gravel -----	.90 per c.y.
5. The potential of the lower Otter Creek interval of the channel is partly indicated by the results of underground operations, which delineated a part-width of 40 feet of reportedly good pay gravel.
6. Large-scale hydraulic mining operations carried out over a long period of years on lower Otter Creek were financially

unsuccessful; however, they were, at the same time, physically unsuccessful in that they never reached down to the old channel indicated by concurrent and subsequent underground operations (and test-drilling?).

7. The sum of the current information indicates that mining operations on the lower and central parts of the creek might encounter waste-to-pay gravel ratios of 10 to 1, or slightly more or less. However, such an operation could be economically successful if pay gravels grading \$5-\$6 per c.y. were present, and mining and capital costs not in excess of those currently envisioned.

Following his serious consideration of all of the above aspects, the writer believes that the property warrants at least a limited programme of exploration, which could lead to a large-scale mechanical/hydraulic mining operation.

#### TECHNICAL CONSIDERATIONS

The following estimates are presented as a comparison of the relative stripping capacities of hydraulic and mechanical equipment.

##### (A) Hydraulic Equipment

May 25-Oct. 15, 1907 (100 10-hr. working days):

1 - No. 3 Giant on cutting down.

1 - No. 3 monitor for bank-water (by water).

20,000 c.y. moved.

Stripping rate for 1 - No. 3 Giant = 200 c.y./day.

May-Oct. 1908, 30,000 c.y. moved.

Stripping rate for 1 - No. 3 Giant = 270 c.y./day.

May-Oct. 1908 - Lower Otter Creek.

Equipment, 2 - No. 4 Giants plus wash-monitors against 60'-100' banks.

Production - 112,000 c.y. moved in 100 days.

Stripping Rate per single No. 4 Giant = 560 c.y./day.



(B) Mechanical Equipment

(1) Bulldozers:

(1960) *since improved / Olive Boyd of Gen Enterprises*  
(Manufacturers performance data for ripping/stripping)  
firm, coherent clay containing small boulders)

Basic, 200-foot passes and ripping 1/3 of cycle.

D-7, per 10-hour shift: gross, 700 c.y.; avg. net, 550 c.y.

D-8, " " " " gross, 850 c.y.; avg. net, 680 c.y.

(2) 2-1/2 c.y. Power Shovel: @ 50% of normal capacity in loose,  
clean material and 2 hours down-time = 1200 c.y./10-hr. day.

*(2000 cy/day feasible, 1973)*

PRELIMINARY RECOMMENDATIONS

1. Complete survey (chainage) checks on existing claims.
2. Stake protective claims, where indicated by (1).
3. Carry out a geological reconnaissance examination and inspection of exposures and workings over at least the next 1-mile (up-stream) interval of Otter Creek.
4. Commence detailed delineation of the pay-channel, beginning at the up-stream end <sup>or half</sup> of the Drain Lease. Note that the reconnaissance phase of this project might be done adequately and economically by combining overburden-drill and geophysical (resistivity) profiling methods. *or seismic*
5. Sample indicated channel sections via (6") Keystone churn-drill. *use what concerns on O.B. drill & seismic*

*This above Surprise Lake valley cut off (more white)*

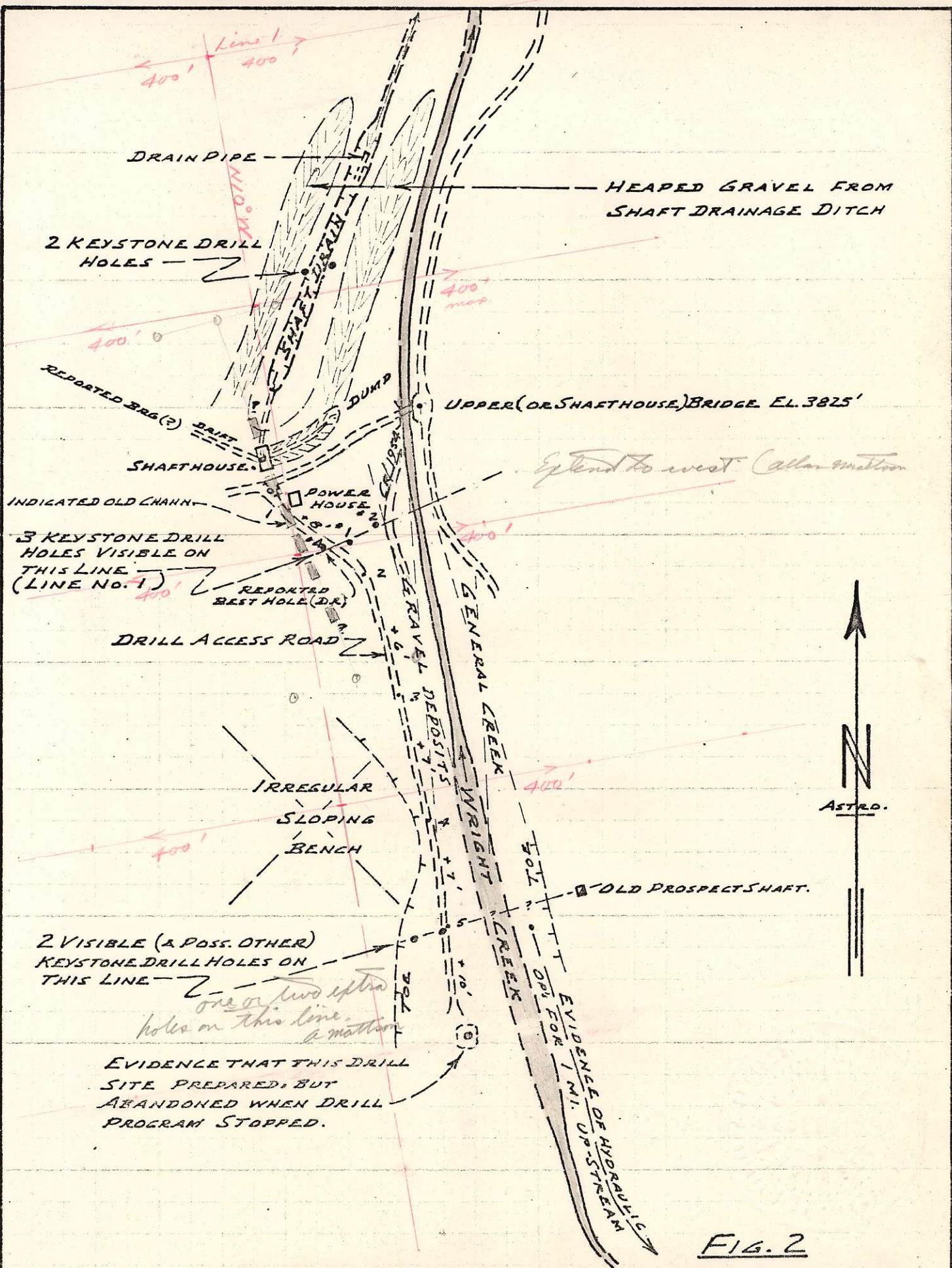
SECT. 2 - WRIGHT CREEK

GENERAL

Figs. 1 and 2 supplement the following text.

Wright Creek, which generally parallels Otter Creek, joins Surprise Lake nearly 2 miles east of it. The first (lower) bridge on Wright Creek is reached via a 3-mile continuation of the road





**FIG. 2**  
**SURPRISE RESOURCES LTD. - DRILL-HOLE & GENERAL DETAIL**  
**WRIGHT CREEK, ATLIN, B. C.**  
 SCALE: 1 IN. = 200 FT. JUNE, 1973  
 W. M. SHARP, P. ENG.



beyond the Otter Creek bridge. The 1955 shaft and camp, adjacent to the No. 1 line of Keystone drill holes and situating about 1 mile south of the lower Wright Creek bridge, is 16 road-miles from Atlin.

The Wright Creek terrain, like that of Otter Creek, is flatly rounded - particularly within the headwaters area of the creek. However, the Wright Creek headwaters storage capacity is considerably smaller and less effective than that of Otter Creek and, as a consequence, its flow is smaller and more seasonal. Wright Creek, including its west-flowing branch, is only about 6 miles long; its 7 square-mile drainage area is less than half as large as that of Otter Creek. Within the following intervals average stream gradients are:

- (a) Headwaters to shaft-camp bridge, 2.7 mi. @ 6.8%.
- (b) Shaft-camp bridge to lower bridge (flats), 1 mi. @ 2.3%.
- (c) Lower bridge to mouth (canyon section), 2.2 mi. @ 6.2%.

#### HISTORY

Wright Creek has been worked mainly along its upper section - along, and for a short interval below its westerly-flowing part. The broad, generally flatter valley section between the bend and the lower canyon has been explored by drill holes and a shaft in fairly recent years. First placer mining was by small-scale sluicing methods during brief spring-early summer run-off periods; existing reports contain little factual data on which the volume and tenor of the gravels worked might be estimated.

Between 1936(?) and the mid-1940's Hodges and partners carried out hydraulicking operations, using one or two small monitors. This mining was consistently hampered by a lack of water; after the spring run-off there was, reportedly, only enough for about four 1/2-hour runs per day. Some production data, from W.W. Johnson's Oct. 22, 1963 letter are:

1936-37, 16,000 c.y. yielded \$13,759 (485 oz. gold), or 86¢/c.y.  
1938 , 13,800 c.y. yielded \$32,715 (1154 oz.), or \$2.36/c.y.

The latter grade, at the present \$120/oz., would be approximately \$8/c.y.

During 1951-52 the pay channel, at about 170 ft. south (upstream) of the present shaft-house, was explored by 3 (plus one abandoned) holes comprising Line No. 1 (Fig. 2). Two of these penetrated pay-gravel and bedrock forming the west brow and side, respectively, of the channel; the third was stopped in gravel - possibly at 4'-6' above the bedrock floor(?). Holes are on approximately 40-foot E-W centers. The drill logs indicate that bedrock, at least locally, is black slate. The drill-indicated depth of the old channel is about 18 or 20 feet, and the indicated average thickness of pay gravel is about 13 feet - including the near-rim intersection. The weighted-average grade (1954) of the 3 intersections is \$12.64 per c.y.; the grade, on \$120/oz. gold, is about \$43 per c.y. The average and individual grades of these intersections is from 5 to 8 times larger than the grade of the best previously-reported production; hence, it is highly unlikely that they are representative of pay gravels underlying this general interval of the creek.

In 1952 six holes were drilled on an indicated 800-foot wide, and relatively flat cross-section of the valley. However, the writer was unable to find any evidence of them during his recent visit. Subsequent re-examination of the available data suggests that the line of holes may locate 1800 feet below the lower, rather than the upper bridge. This possibility is based on map and field indications of the valley topography and bedrock depths. As all holes encountered bedrock (per photocopy) at depths between 11-19.5 feet, it is hardly likely that they were collared anywhere on the drift and alluvium-covered flat between the bridges or, specifically, on a line 1800 feet down-stream of the upper bridge.

Also, there was no evidence of even the former existence of requisite drill-access roads leading to this location. The writer now concludes that the most logical place to investigate is an indicated 'flat' cross-section of the valley at about 1/2 mile north of the lower bridge.

During 1956 the existing shaft was sunk to a probable depth of about 110 feet. In view of the bedrock depths indicated by the Line No. 1 drill holes, it is unlikely that it reached the 'reported' depth of 136 feet. From the shaft bottom a drift was driven (in gravel?) for 180 ft. northwest, reportedly to explore the west rim, when the obvious target would have been the pay-gravels intersected by the up-stream line of drill holes - particularly those intersected by Hole No. 4. In 1957 a drift being driven towards Line No. 1 was stopped after an advance of 40 feet - apparently because of a pump failure.

#### CLAIMS

The writer and T. Connolly check-chained the location lines of P.M.L.'s 1686, 1701, and 1700; T.O. and S.J. Connolly checked-chained the claims south of the latter while the writer was engaged in other surveys. The actual position and length of the above-noted claims is shown on Fig. 1. However, claims north of P.M.L. 1686 have yet to be checked; it is expected that this will lead to some revisions of the 'official' claim plots.

#### FIELDWORK

June 9, p.m. - Preliminary reconnaissance; locate shaft-house on Map 104N/11-W 1/2; run chain-line for 2000 feet north (d/s) of upper bridge.

June 10 - Check-chaining claims; search out and survey old Keystone churn drill-hole collars; search for Line No. 2 drill-hole collars and/or evidence of old drilling operations.

### GEOLOGY

Up-stream of the upper bridge the valley is continuously drift-filled and largely blanketed with tailings (boulders, gravel, sand) from former mining operations. Between bridges, the valley expands from about 200-300 ft. to roughly 700 feet in width, and appears to be floored by 100 or more feet of glacial till; this flat, poorly-drained area is superficially covered by tailings and natural alluvium.

Other examination priorities precluded personal inspections of the few, out-of-the way bedrock exposures. However, G.S.C. Map 1082A shows soft, talc-altered ultrabasic rocks underlying Wright Creek from about 300-3000 feet north of the lower bridge - which probably explains the local increase of the creek-gradient and down-cutting in this locality. The G.S.C. map also indicates that the up-stream parts of the valley are underlain by cherty and argillaceous rocks of the regional Cache Creek Group. Bedrock penetrated by the Line No. 1 drill holes is logged as black slate. More probably, however, it consists of the typically shaly argillite and argillaceous quartzite of the general locality which, if striking across the trend of Wright Creek as is suggested by the G.S.C. mapping, might be reflected in the long profile (hump and hollow?) of the floor of the buried pay-channel.

### PRELIMINARY APPRAISAL

The mile-long, 400-700 foot-wide flat area between bridges is apparently underlain, surficially, by a thick blanket of the typical local clay/silt/sand till. That this is probably water-saturated is evidenced by the flat, locally swampy cover and sinuous, braided stream pattern. Therefore, even surface mining (mechanical or hydraulic) in this area might be difficult and costly. Such an operation would probably entail relocation and deepening of the creek channel, and continuous unwatering (via sumps, pumps, etc.) of the working area. These and other factors could restrict operations and increase mining costs to levels perhaps not

justified by the existing reserves (?) of pay-gravel. The writer's revised estimates of the potential profitability of mining a 1400-foot length of pay gravel in this locality are based on a hopefully-realistic extrapolation of the figures provided by the Line No. 1 drilling, and on the difficulty of mining in water-saturated ground. Values previously on \$35 per oz. gold base are transposed to the current \$120 per oz. base:

**Preliminary Estimates:**

**(a) Based on uncut 1954 drill-hole sample data:**

Gross Recovery, 45,000 c.y. @ \$23.46 (3 x 7.82/1963)		\$1,056,000.
Stripping, 515,000 c.y. @ 0.50	\$257,500.	
Mining, 45,000 c.y. @ 1.00	45,000.	
Washing, 45,000 c.y. @ 0.25	11,250.	
Royalty, etc.	53,000.	366,750.
<b>Gross Profit</b>		<b>\$ 689,250.</b>
Dam construct., 18,000 c.y. @ 0.50	\$ 9,000.	
Bridges and light structures	4,000.	
Install washing/waste disposal facilities	40,000.	
Roads	2,000.	
Financing, interest, overhead	20,000.	
Contingencies (mainly operational)	25,000.	100,000.
<b>Net Profit</b>		<b>\$ 589,250.</b>

**(b) Based on cut drill-hole assays:**

The average of these is cut to a level equal to twice the current value of the 1938 production:

Gross Recovery, 45,000 c.y. @ \$16		\$ 720,000.
Pit-preparation & mining costs	\$366,750.	
Plant installation cost, etc.	100,000.	466,750.
<b>Net Profit</b>		<b>\$ 253,250.</b>

**(c) Based on tentative break-even grade:**

Gross Recovery, 45,000 c.y. @ \$11		\$ 495,000.
Pit-preparation & mining costs	\$366,750.	
Plant installation cost, etc.	100,000.	466,750.
<b>Net (residual) Profit</b>		<b>\$ 28,250.</b>

PRELIMINARY RECOMMENDATIONS

- (1) Complete check (chain) survey of claims.
- (2) Complete reconnaissance investigation of property.
- (3) Delineate pay-channel over 1400' length in vicinity of 1956 shaft:

Suggest use of overburden drill in conjunction with geophysical (resistivity) profiling on cross-lines 200 ft. apart.

- (4) Sample (and check-sample vic. Line No. 1) indicated channel via (6" dia.) Keystone churn-drill or equivalent equipment.
- (5) Pending results of above, investigate water content and permeability of glacial and alluvial deposits overlying pay-gravels - re. subsequent detailed feasibility studies.

SECT. 3 - SPRUCE CREEK

*June 4/74 200 cfm/hr - (at Dawson V.T.)  
 Washing plant - 150,000 -  
 Ruddy can acquire for \$60,000  
 has made \$1,500 deposit.*

GENERAL

Figs 3 and 3A supplement the following text.

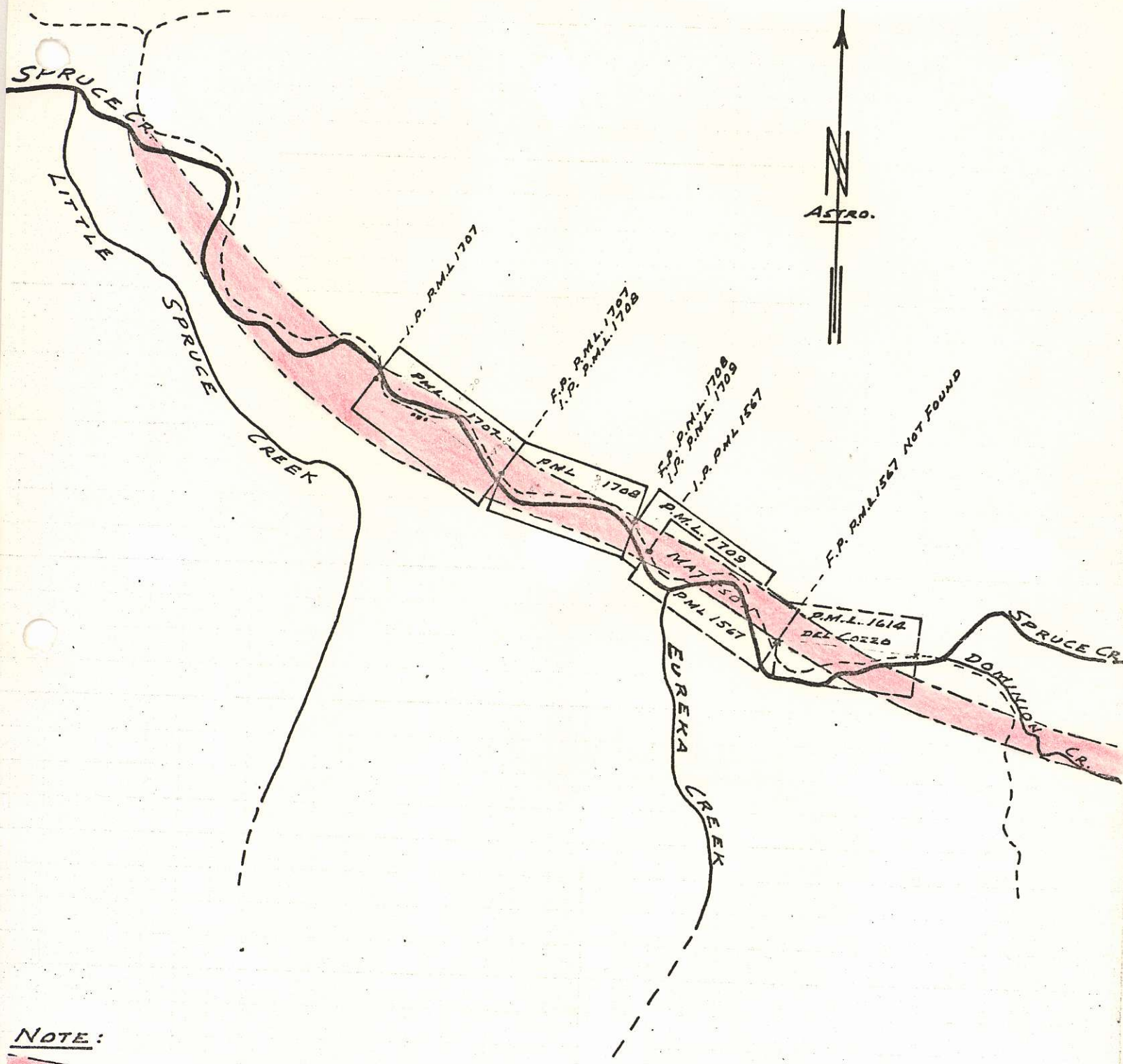
From Atlin, the leases on lower Spruce Creek are readily accessible via 7 miles of good road.

Fig. 3 is a plot of P.M.L.'s 1707,-08,-09 and the upstream contiguous claims according to the writer's check-survey. Fig. 3A portrays the general group of claims covering lower Spruce Creek, and including those on Fig. 3, according to B.C. Dept. of Mines maps. The position of the old buried channel (per map - Rept. to Min. of Mines, 1936) is shown on both.

FIELDWORK

This was done on June 12, 1973 and comprised a chainage check, using the mouth of Eureka Creek as the local topographic reference point, of P.M.L. 1707,-08,-09 initial and final posts and the initial post of Mattson's P.M.L. 1567; the final post of the latter

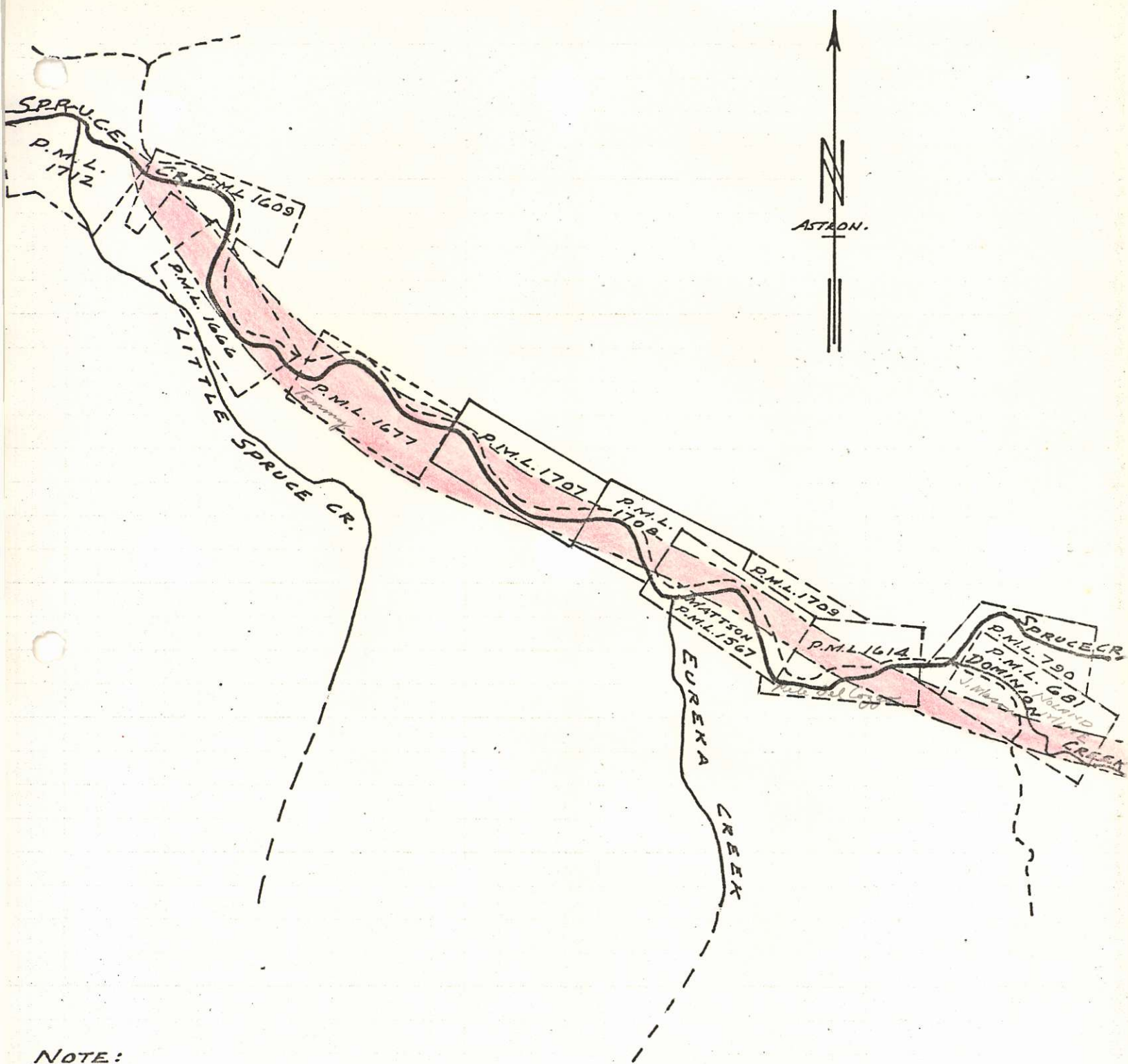




NOTE:

PROJECTED COURSE OF BURIED OLD CHANNEL.

**FIG. 3**  
SPRUCE CREEK P.M.L.'S.  
PER FIELD CHECK-CHAIN SURVEY  
 SCALE: 1 IN. = 2170 FT. JUNE, 1973  
SURPRISE\* RESOURCES LTD (N.P.L.)  
 W.M. SHARP, P. ENG.  
 ASST. T.O. CONNOLLY, ATUN



**NOTE:**

PROJECTED COURSE OF BURIED OLD CHANNEL.

**FIG. 3A**  
**SPRUCE CREEK P.M.L.'s.**  
 PER B.C. DEPT. OF MINES MAP 104N/12E  
 SCALE: 1 IN. = 2470 FT. JUNE, 1973  
 for  
**SURPRISE\* RESOURCES LTD. (N.P.L.)**  
 GEOL. REF: REPT OF MIN. OF MINES, 1936

W.M. SHARP, P. ENG.

could not be located. The main characteristics of the local glacial deposits were noted but not mapped.

#### HISTORY & PRINCIPAL FEATURES

Spruce Creek has a total length of about 15 miles. It drains a major area which is extensively underlain by rocks of the "Gold Series" and overlain by thick deposits of (mainly Wisconsin) glacial till and alluvial deposits; the latter range from about 50-250 feet in thickness below the present level of the creek or lower benches.

The buried pay-channel has been closely explored and/or mined over a length of about 3-1/4 mi. A further 5-mile, up-stream stretch of potential pay-channel is indicated (1936). The indicated range in width of pay gravel is 600'-1200' downstream of Dominion Creek, and narrowing to 375 ft. up-stream of it. Over its length, the pay-channel was explored and mined via surface and/or underground methods. However, it seems probable that only a minor part of its gross potential has been exploited to date, by reason of physical and economic limitations.

Old 'drift' exposures of the pay-channel show that the soft-altered or weathered bedrock is overlain by 6' to 10' of sticky, clay-cemented gravel containing boulders up to 30" in diameter. Gold values varied from about 1/2 oz. to 20 oz. per 40 sq.ft. ("set") (loc. 11 c.y.?) of gravel/bedrock section, including gold in bedrock.

#### PRELIMINARY APPRAISAL

P.M.L.'s 1707,-08,-09 include a one-mile length of the indicated pay-channel, and about 90% of its projected area within this interval of Spruce Creek. Only one determination of relative surface/bedrock elevations within this interval is given by the 1936 M.M. Report map - this indicating bedrock at a depth of only 35 feet near the down-stream end of P.M.L. 1708. It indicates a



60-foot bedrock depth at a point (within the Mattson P.M.L. 1567) situating about 1150 up-stream of the <sup>east</sup> west end of P.M.L. 1708. The foregoing suggests that pay-channel bedrock depths over the P.M.L. 1707-08-09 interval of the creek are about 40 ft. to 70 ft., going up-stream.

Reports studied by the writer contain little information from which even approximate estimates of grade might be made. However, it appears that several of the former mining operations on Spruce Creek were profitable. More locally, it is fairly evident that the (1934-36-?) steam-shovel operation, on ground that would now situate near the boundary of P.M.L.'s 1707-08, was profitable at the \$35/oz. level; therefore, a similar type of operation at current price-levels should be profitable on equivalent or lower grade material. Between the banks of Spruce Creek, and allowing space for its diversion, a 200-foot wide strip of pay gravel plus bedrock should be minable by power shovel. Over the length of P.M.L. 1707-08-09, and further assuming an average 10-foot pay-layer, this would contain gross minable reserves of  $\frac{5400 \times 200 \times 10}{27}$  equals 400,000 c.y.

The total minable remaining reserves would probably be in excess of 200,000 c.y.

In view of the number of 'unknowns' involved, the writer is unable to offer a valid opinion concerning the feasibility of a mining operation in this locality, or even if one should be contemplated - in view of the prospects existing on Otter and Wright Creeks.

#### PRELIMINARY RECOMMENDATIONS

- (1) Attempt to acquire P.M.L.'s 1666 and 1667 for provisional *b. r. drain* down-stream access and tailings disposal - depending on current probability of acquiring P.M.L.'s 1707-08-09 on favourable terms.

- (2) Map existing workings, general topography, and pertinent geological detail, via a compass-chain traverse, within P.M.L's 1707-08-09 and part of down-stream area.
- (3) Continue field investigations (incl. Atlin 'sources') pertaining to former exploratory and mining operations on Spruce Creek.
- (4) Evaluate prospects on basis of the data resulting from (2) and (3) above.

#### SECT. 4 - LUCKY GOLD-SILVER PROSPECT

##### GENERAL

Fig. 4 supplements the following text.

The writer mapped and sampled the Lucky surface showings on June 11, 1973. Older workings, comprising a shallow shaft and a 50-60 foot adit, were inaccessible.

##### CLAIMS

These consist of 2 Crown-granted and 20 located claims. The present 22-claim group of contiguous Crown-grants and locations comprise a 1 by 1-1/2 mile block.





The Pictou (L5643) and Scarab (L5644), originally located in 1933, were acquired on September 27, 1966 by T.O. Connolly via M.L. No. 32. Lucky 1-20, Rec. No's 8500N-8519N inclusive, were staked by S.J. and T.O. Connolly in October, 1967. The owners state that all claims are in good standing.

The showings examined by the writer reportedly situate on the Pictou claim; they lie within a 250 by 300 foot area.

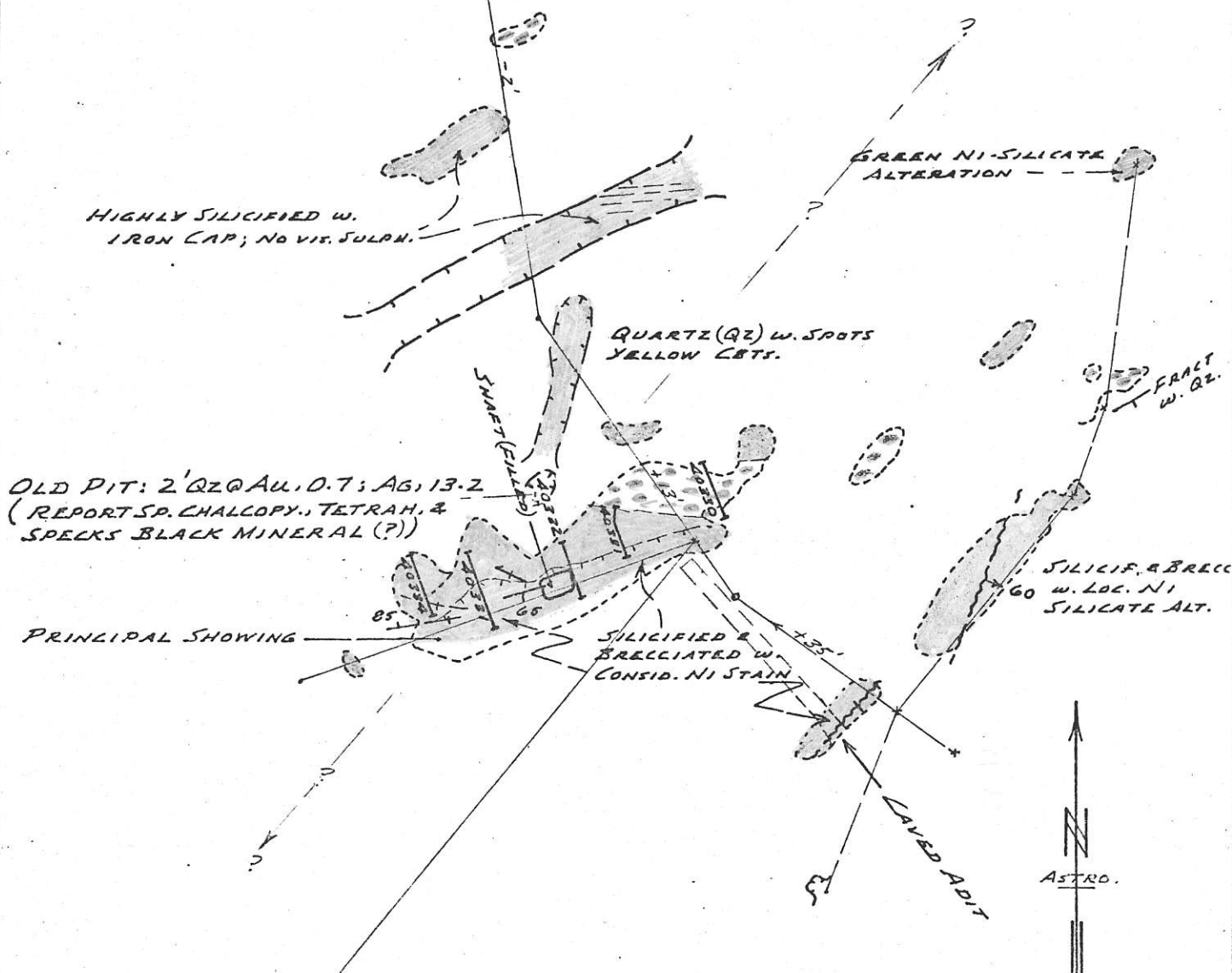
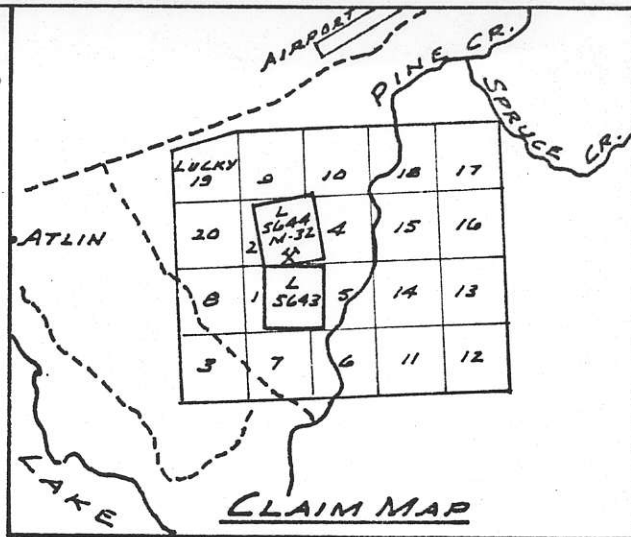
##### LOCATION & ACCESS

The Pictou/Scarab claims lie about one mile east (approx.) of Atlin, B.C. The showings are easily accessible by way of some

**LEGEND**

-  STRONGLY ALTERED HOST ROCKS (BASIC TO ULTRABASIC INTRUSIVES).
-  WEAKLY TO MODERATELY ALTERED HOST RX.
-  FAULT
-  MINOR FRACTURE.

PALE GRAY INTRUSIVE:  
 FLECKS OF TALL-SERP.  
 ALTERATION) SPECKS OF (?)  
 DARK MINERAL (TETRAH ?)



HIGHLY SILICIFIED  
 W. CONSID. NI SILICATE  
 ALTERATION

5. INITIAL POSTS: LUCKY 1.  
 LUCKY 4.  
 (LUCKY 7)

**SAMPLES:**

NO.	FT.	AU, OZ.	AG, OZ.
40330	15.0	0.18	0.54
-31	15.0	0.14	0.32
-32	15.0	0.08	0.39
-33	20.0	0.22	6.0
-34	18.0	0.20	1.3

**FIG. 4**

**SURPRISE RESOURCES LTD.**  
**LUCKY AU-AG PROSPECT**  
**VICINITY OF ATLIN, B.C.**  
 SCALE: 1" = 40' EXAM. JUNE, 1973  
 SURVEY & SAMPLING - W.M. SHARP, P. ENG.  
 " ASSISTANCE - T.O. CONNOLLY

2 miles of good gravel road. Locally, the showings lie along the east slope and crest of a low (N.E. trending) ridge rising out the Pine Creek flats - the latter consisting of thick valley-floor deposits of drift and alluvium. In elevation, the showings and natural exposures of bedrock range from 5-50 feet above the flat ground.

The claims area, which is low, lightly forested, and with very little underbrush, is ideally situated for rapid, surface exploration.

#### HISTORY

1899, Prospected by open-cutting; no sample records.

(1925-30?), Prospected by open cuts, short tunnel, and shallow shaft.

1931, Inspected by J.T. Mandy (reliable), Resident Mining Engineer:

(a) Zone of quartz-veining and wall-rock alteration over widths of 20-60 feet.

(b) Ridge-pit sample - 2' quartz @ Au, 0.7 oz/ton; Ag, 13.2oz/ton  
" " dump - grab @ Au, 0.68 oz/ton; Ag, 7.4 oz/ton.

Bottom of shaft - 9" quartz @ Au, 0.03 oz/ton; Ag, 0.20oz/ton

1933, Inspected by A.M. Richmond (reliable), Asst. Res. Min. Eng.:

(a) Ridge-pit sample - 22" quartz @ Au, 0.10 oz/ton;  
Ag, 0.40 oz/ton.

Ridge-pit sample - 24" quartz @ Au, 0.60 oz/ton;  
Ag. 5.0 oz/ton.

(b) During year Pictou and Scarab claims located.

1966, (a) T.O. Connolly obtained M.L. No. 32; blasting done near old shaft; samples - Au, 1.78 oz/ton; Ag, 135.6 oz/ton;  
Cu, 0.63%; - Au, 2.16 oz/ton; Ag, 207.3 oz/ton.

1967, (a) Rock excavation by T.O. Connolly, and bulk sample of mineralized material sent to Trail, returning assay incl.  
Au, 0.295 oz/ton; Ag, 8.0 oz/ton; Pb, 0.2%, Zn, 0.1%,  
Cu, 0.05%.

1968, Bulldozer-clearing & ripping, with vein exposed on either side of the shaft for 60 feet; "random samples" ran:

<u>No.</u>	<u>Au,oz/ton</u>	<u>Ag,oz/ton</u>	<u>Cu,t</u>
A#2	1.40	57.4	0.39
B#2	1.54	78.3	0.42
#2R	1.52	52.3	0.27

#### GEOLOGY & MINERALIZATION

G.S.C. Map 1082A shows the Atlin-lower Pine Creek area (down-stream of mouth of Spruce Creek) to be entirely underlain by Atlin ultrabasic intrusive rock, comprising peridotite, meta-diorite and metagabbro. In the vicinity of the Lucky showings these have been sheared, brecciated, hydrothermally-altered, and mineralized. The alteration is characterized by a rather pervasive silicification - including distinct quartz-veining - and spotty carbonatization. The most distinctive alteration mineral is a nickel-chrome silicate, which imparts a bright green mottled aspect to locally-extensive areas of grey and brown rock. It is most conspicuous in well fractured/brecciated areas of general siliceous alteration and is at least spatially related to the local metallic mineralization.

The local gold-silver/Cu-Pb-Zn sulphide mineralization is dispersed within quartz veins and the enclosing altered wall rocks. To date its trend and extent have not been established. If it is fracture-controlled, its trend may be indicated by local, northeasterly-striking shears and fractures.

#### CURRENT SAMPLING

In view of the apparent generally-diffused character of the mineralization, the writer elected to sample for 'bulk-potential'. This was done via five long chip-channel samples, taken at intervals across(?) the largest, well mineralized exposure. The samples were not taken at uniform 'strike-intervals', but where the best cross-sectional continuity of exposures and mineralization



was indicated. These (Fig. 4) returned the following assays:

<u>Sample No.</u>	<u>Sample-type</u>	<u>Length,ft.</u>	<u>Au,oz/ton</u>	<u>Ag,oz/ton</u>
40330	contin-chip	15.0	0.18	0.54
40331	"	15.0	0.14	0.32
40332	"	15.0	0.08	0.39
40333	"	20.0	0.22	6.0
40334	"	18.0	0.20	1.3
<b>Weighted-Average</b>		<b>16.6</b>	<b>0.169</b>	<b>1.95</b>

The writer considers that the above is a 'conservative-average' grade in that an apparently well mineralized section at the southwest corner of the sample area, that had been generally buried during the earlier stripping operations, was excluded. Allowing for this, the gold-silver values would appear to correspond reasonably well with those obtained from the T.O.C. bulk sample shipped to Trail in 1967. Hence, a gross value of upward of \$25 per ton (gold @ \$120, silver @ \$2.60) is indicated for the 80' x 20' area sampled.

#### SUMMARY & RECOMMENDATIONS

Mineralization with a gross value of \$25 per ton over an approximate 80' x 20' area is indicated by the recent sampling. The writer would expect that at least 90% of the contained gold and silver, plus associated Cu-Pb-Zn sulphides, might be extracted by conventional milling methods, and resulting in a net value of \$22.50 plus per ton. To constitute ore, this material would have to occur over a considerably larger (possibly 10X) surface area, with comparable persistence to depth.

To date, exploration and/or sampling have been confined to a small area around the shaft. Consequently, this should be extended by appropriate methods - initially via the stages suggested below:

- (1) Chip-sample remaining exposures; assay as indicated.
- (2) Geochemical soil and rock-sampling:

- (a) Local profiling and possible trend-delineation over the general area of showings via sampling on a 50' x 50' grid plan.
  - (b) Prospecting and general delineation outward of general area of showings via sampling on a 100' x 100' grid plan.
- (3) Carry out systematic surface stripping and sampling of bedrock mineralization on a 25' x 25' to 50' x 50' grid plan over the current showings - preferably by short (pack-sack) drill cores.
  - (4) Diamond drill dip-extensions of specific zones indicated by results of (1) and (2).

#### SECT. 5 - IMPERIAL GOLD-SILVER PROSPECT

##### GENERAL

Details of the local geology and sampling are shown on Fig. 5.

The surface showings were mapped and sampled on June 11, 1973; both adits were inaccessible.

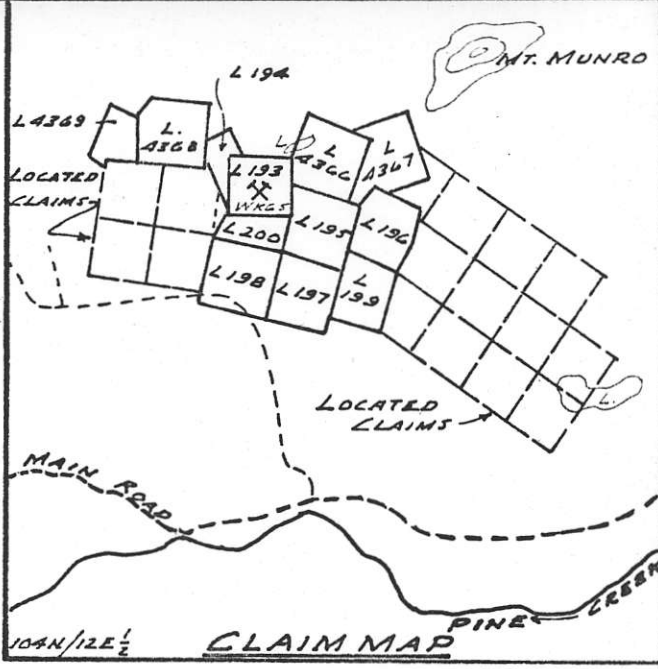
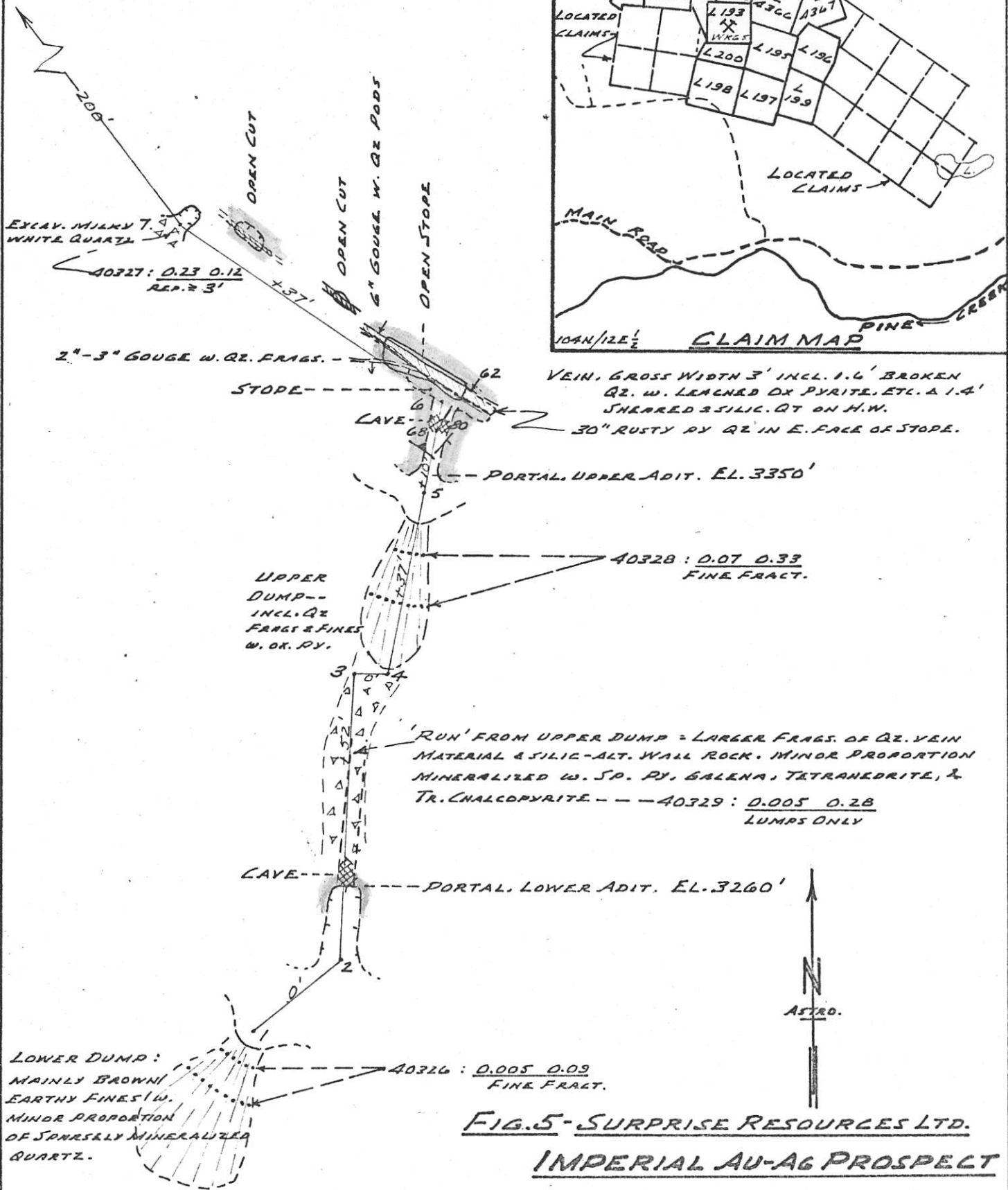
##### CLAIMS

Fifteen contiguous Crown-granted claims plus recent locations to cover lateral extensions of the vein comprise the present group (record no's pending).

The basic block of Crown-grants consists of the Imperial group of 4, the Kitchener group of 3, the Aerial group of 4, and the Nanaimo group of 4 claims.

##### LOCATION & ACCESS

The claim groups and showings situate on the southwest slope of Mt. Munro; the adit showings lie at about 4 air-miles northeast of Atlin, at roughly 1000 feet above the valley flats. The



**FIG. 5 - SURPRISE RESOURCES LTD.**  
**IMPERIAL AU-AG PROSPECT**  
**MT. MUNRO, ATLIN, B.C.**  
 SCALE: 1" = 40' EXAM. JUNE, 1973  
 SURVEY & SAMPLING - W.M. SHARP, P. ENG.  
 " ASSISTANCE - T.O. CONNOLLY

ASSAYS REPORTED:  $\frac{\text{AU}; \text{AG OZ/TON}}{\text{PER GRAB SAMPLE}}$

The property is easily accessible via the Pine Creek road and Imperial trail. The workings are judged to be on Lot 193.

#### HISTORY

The first claims (Imperial Group) were located in 1899, and bonded to the Nimrod Syndicate of London, England in 1900. This company built a 5-stamp mill, did considerable underground development, and mined a few hundred tons of ore before relinquishing their bond. In 1902 it was optioned by Herbert Fears, but no significant work was undertaken.

The group was recently acquired by T.O/S.J. Connolly of Atlin.

#### VEIN AND WORKINGS

The vein, locally consisting of two to three closely parallel quartz veins, strikes N50-65°W and dips 50-65° S.W. It varies from 5 inches to over 6 feet wide, averaging about 2.5-3.0 feet. Mineralization consists of sparsely disseminated pyrite, galena, chalcopyrite, oxidation products of these and, locally, some free gold. Much of the small shoot mined from the upper adit graded about \$10 per ton (Au @ \$20.67/oz.).

Old workings comprise an upper and lower adit, respectively driven 25 ft. and 112 ft. to intersect the vein; thence 170 and 135 feet on the vein - mainly to the southeast.

#### GEOLOGY

G.S.C. Map 1082 indicates that the workings lie within Atlin meta-diorites and gabbros near their contact with Cache Creek greenstone and greywacke. However, the writer identifies the local wall rocks as massive to faintly-bedded quartzites - possibly of the Cache Creek Group. At the upper portal these (hanging wall) beds strike about N60°W and dip 68°N.E. - towards the vein.

The quartz vein can be traced from old pits, for at least 250 feet northwest of the upper adit (stope).

#### MINERALIZATION

Old sampling and geological reports indicate an average 0.8 oz. ton gold within a 20 inch by 35 foot section of the vein where intersected by the upper adit cross-cut. The vein interval exposed in the lower adit was essentially barren; however, A.M. Richmond (1933) notes that drifting on the lower level was away from (S.E. of) the projected plunge of the small oreshoot opened by the upper adit.

The writer took one sample of vein fines from the lower dump, one of similar material from the upper dump, one of coarse fragments of vein material from the upper adit, and one of apparently barren white quartz from an open pit at 100 ft. N.W. of the upper portal. None revealed anything of commercial importance.

#### CONCLUSIONS & RECOMMENDATIONS

The amount of exploratory work and sampling done to date does not provide a sufficient base for even a qualitative assessment of the gross ore potential of the vein. In view of the fact that good grade Au-Ag mineralization has been locally exposed on a strong, possibly long quartz vein, the writer feels that it warrants at least a small programme of surface stripping or cross-trenching and sampling. This could be carried out in about two days by a small bulldozer. The N.W. strike-extension of the vein appears to furnish the most attractive target.

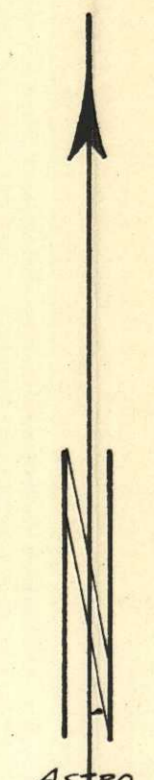
*W.M. Sharp*  
W.M. Sharp, P.Eng.

APPENDIX





SURPRISE LAKE, M.M.L. @ EL. 2985'



**LEGEND:**

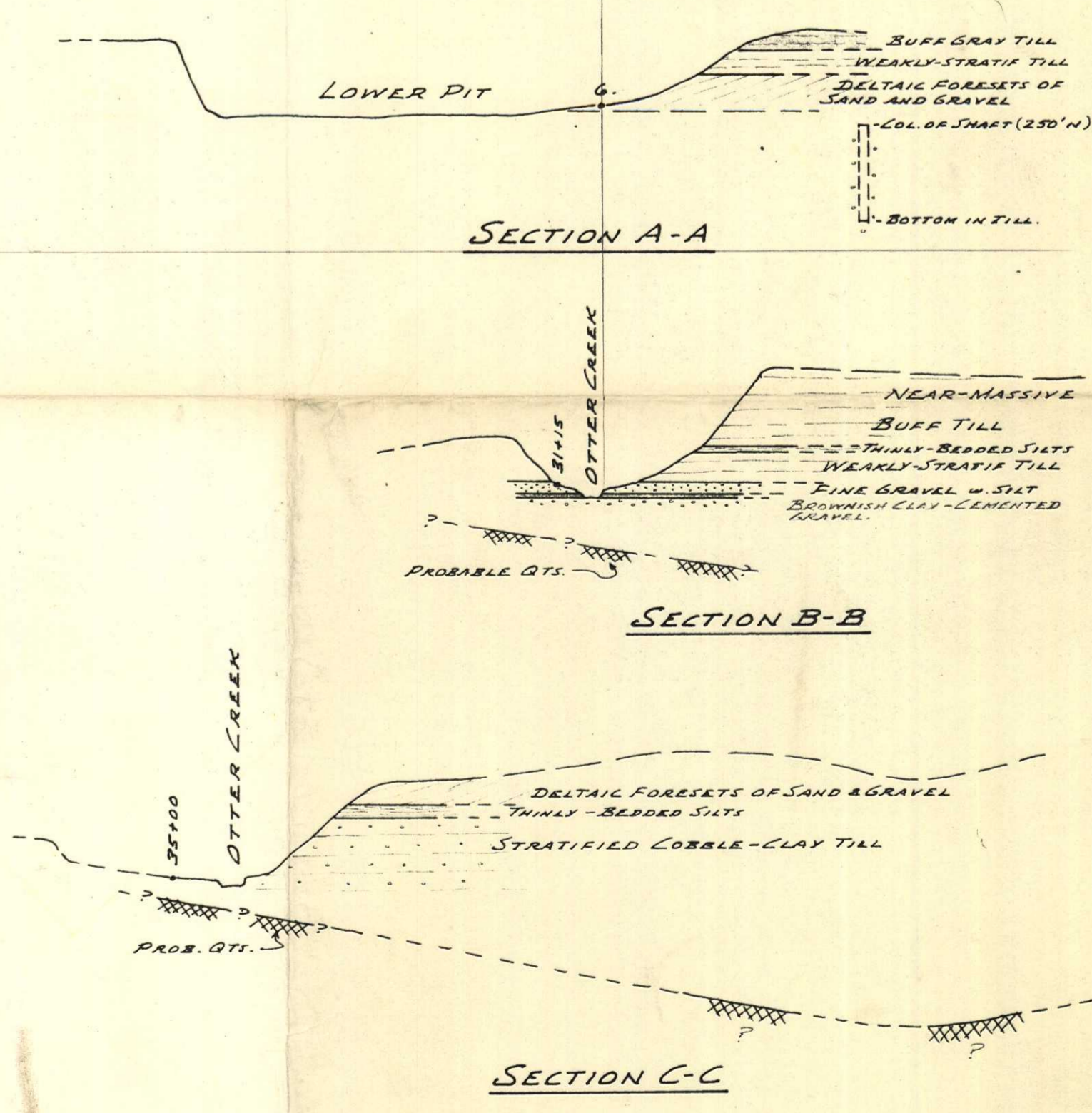
- APPROXIMATE BROW OF PIT WALL OR CLIFF
- ROAD
- BEDROCK OR 'RIM'
- ATTITUDE OF BEDDING/SCHISTOSITY
- AVERAGE ELEVATION OF BENCH OR FLAT
- PRELIM. INTERPRETATION OF AXIS OF OLD CHANNEL

**ABBREVIATIONS:**

- ARILL (AR) QT ARILLACEOUS QUARTZITE
- S.R.P. SERPENTINE
- S.R. BEDROCK
- P.H. POWER HOUSE
- P.M.L. PLACER MINING LEASE
- H.P. HARDPAN

**GEOLOGICAL CROSS-SECTIONS**

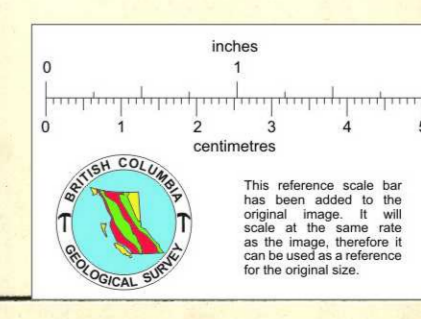
SCALE: 1" = 100'



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NORTH VANCOUVER, B.C.

**SURPRISE RESOURCES LTD.**  
**LOWER OTTER CREEK**  
**ATLIN, B.C.**

**PLACER CLAIMS**  
**AND**  
**TOPOGRAPHY, WORKINGS & GEOLOGY**  
PRINCIPAL RES. GOLDFIELD PLACERS, NOV. 1939



Scale: 1" = 200' Date: JUNE 1973

Drawn by: W.M. Sharp Date: JUNE 1973

Draw No. 0-1