84-#386-12345
06/85

Geochemical Report

TODD CREEK PROPERTY

SKEENA M.D.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

(104A-5W)

12,345

Owner/operator: J.R. Woodcock

by

J. R. Woodcock

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806 - 602 West Hastings St.
Vancouver, B. C.

June, 1984

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# TODD CREEK PROPERTY

## INTRODUCTION

A large conspicuous gossan occurs along the steep western side of Todd Creek, north of Stewart. In 1980, J. R. Woodcock was able to charter a helicopter one evening to briefly examine some of the gossan zones lying north of Stewart, including the one on the Todd Creek. In this quick stop below the gossan zone, a float of mineralized rock was collected and this included white volcanics with quartz sericite alteration, barite-bearing float, etc. The quartz sericite rock was somewhat anomalous in base metals.

In June of 1981, the claims which covered this part of this gossan zone expired and Dennis Gorc and Henry Awmack went to Stewart to stake the Todd 1 and 2 claims in preparation for some detailed prospecting and mapping to be carried on when the snow conditions improved.

Dennis Gorc and Henry Awmack returned to the area with J. R. Woodcock in July to start a program of mapping and prospecting. The base map for this mapping was an enlargement of a 40 chain air photo, B.C. 5504-041. This mapping and prospecting led to the discovery of widespread barite mineralization, in places associated with jasper and galena. In late July and early August, a stadia base map was made over the zone containing the most abundant barite-jasper-galena mineralization and this zone was mapped and sampled.

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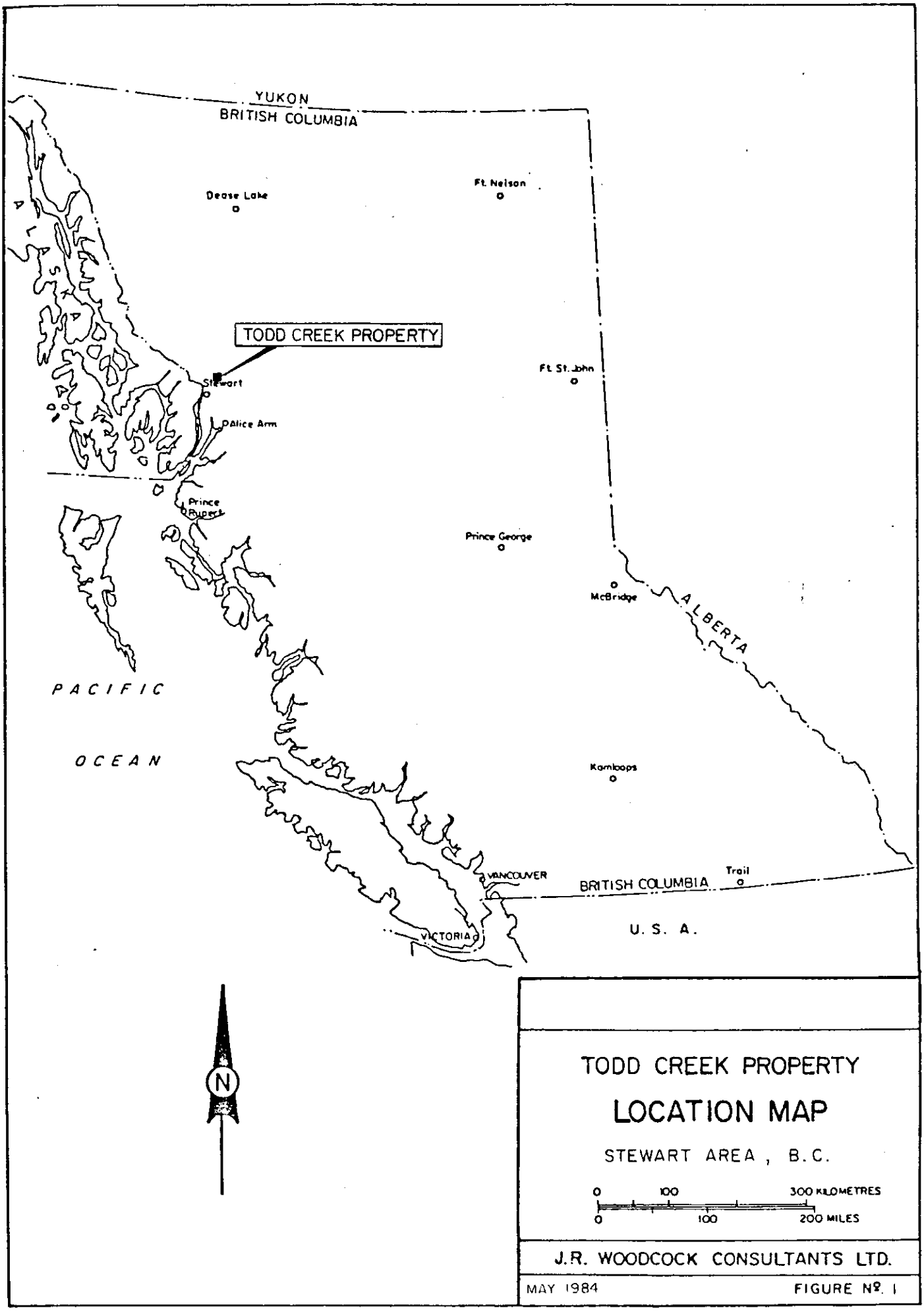
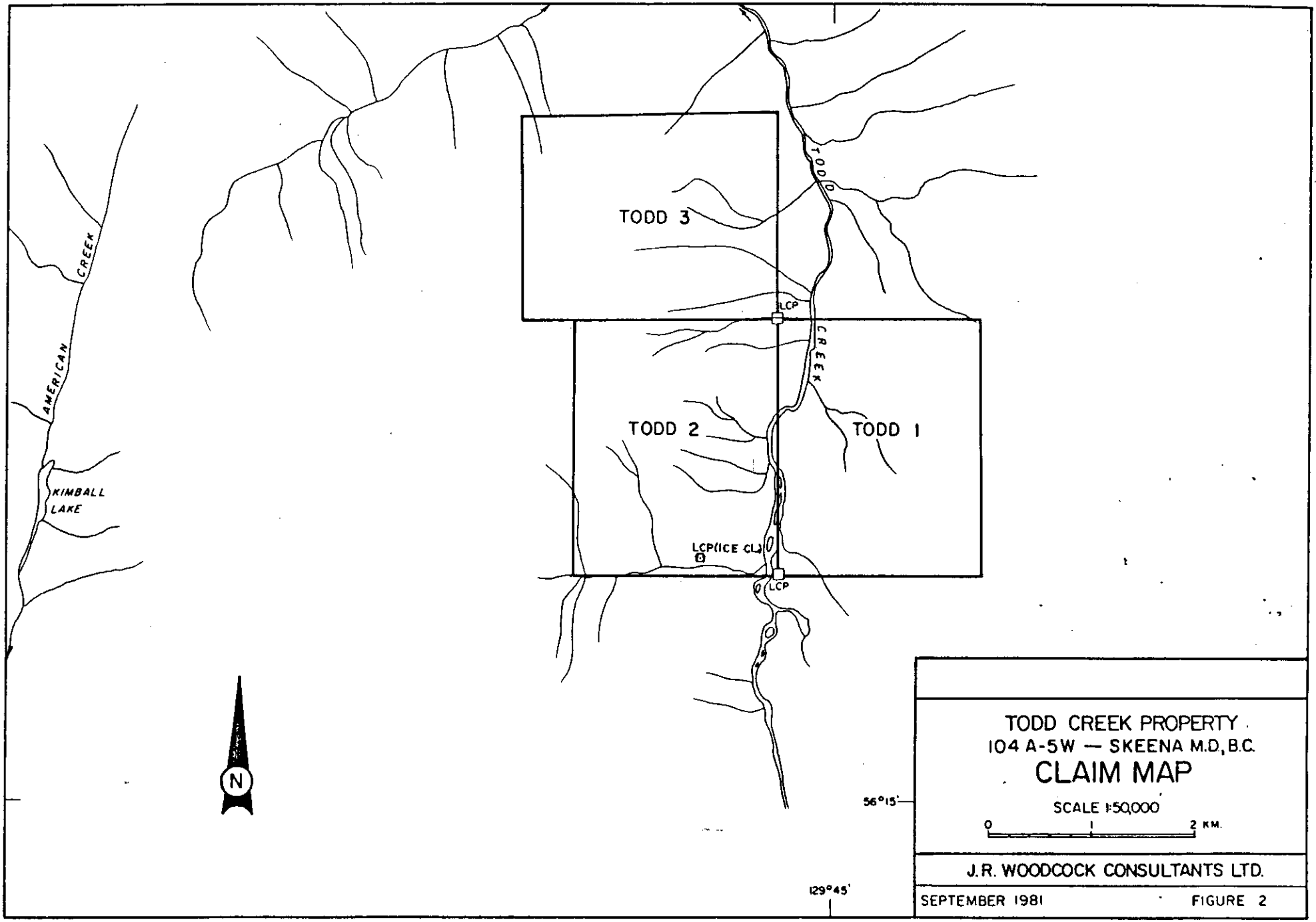

YUKON
BRITISH COLUMBIA
Dease Lake
Ft. Nelson
ALASKA
TODD CREEK PROPERTY
Stewart
Ft. St. John
Alice Arm
Prince Rupert
Prince George
McBride
ALBERTA
PACIFIC
OCEAN
Kamloops
VANCOUVER
Trail
BRITISH COLUMBIA
U. S. A.
VICTORIA
N
TODD CREEK PROPERTY
LOCATION MAP
STEWART AREA, B.C.
0 100 300 KILOMETRES
0 100 200 MILES
J.R. WOODCOCK CONSULTANTS LTD.
MAY 1984
FIGURE Nº. 1




TODD CREEK PROPERTY
104 A-5W — SKEENA M.D., B.C.

# CLAIM MAP

SCALE 1:50,000

0 1 2 KM.

J.R. WOODCOCK CONSULTANTS LTD.

SEPTEMBER 1981 FIGURE 2

The work was done for Riocanex Incorporated and this company applied the results of the field work for assessment work in 1982.

The rock chip samples were analyzed for antimony and arsenic in 1984 and this will be applied for assessment work on the Todd 2 claim.

## LOCATION AND ACCESS

The Todd Creek gossan lies along the west side of Todd Creek at latitude 56° 17', longitude 129° 47' on map sheet 104A-5W.

It is an area of extremely rugged and steep terrain with the mineralized zone extending between elevations 2700 feet and 6700 feet. The treeline is at 4000 feet and most of the gossan is above treeline. Access is only by helicopter from Stewart, 40 kilometers to the south-southwest. Access for any mine would need to be down Todd Creek to the valley of the Bowser River and then easterly to the Stewart-Cassiar Highway.

## CLAIM DATA

The Todd 1 and 2 claims were staked by Dennis Gorc and Henry Awmack in the spring of 1981 to protect the gossan on the west side of the valley. This gossan is largely covered by the Todd 2 claim; the Todd 1 claim covers the east side of the valley. The Todd 3 claim was added to the north of the Todd 2 while mapping.

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The claims were staked by Dennis Gorc in his own name and on April 13, 1982 transferred to Riocanex Incorporated. On May 17, 1984 the Todd 1 to 3 claims were transferred from Riocanex Incorporated to John R. Woodcock.

The original claim data was as follows:

| Claim Name | Units | Record Number | Date Staked | Date Recorded |
|---|---|---|---|---|
| Todd 1 | 20 | 3093 | June 5, 1981 | June 12, 1981 |
| Todd 2 | 20 | 3094 | June 5, 1981 | June 12, 1981 |
| Todd 3 | 20 | 3153 | June 17, 1981 | Aug. 6, 1981 |

The western five units (4, 13, 20, 24, 31) of the Todd 2 claim were abandoned on May leaving this claim with 15 units.

## REGIONAL GEOLOGY

Although the Todd Creek area is on the edge of a region which has received considerable exploration intermittently over the last 80 years, the geological mapping has not covered this area. The map and studies made by George Hansen of the Portland Canal area, cover the area to the west and the area to the south as far as Alice Arm. The more detailed recent study of the Stewart area by E. W. Grove concentrates only on the area west of Todd Creek. The only geological map covering this area is the large reconnaissance survey of the Stikine River area (map 9-1957).

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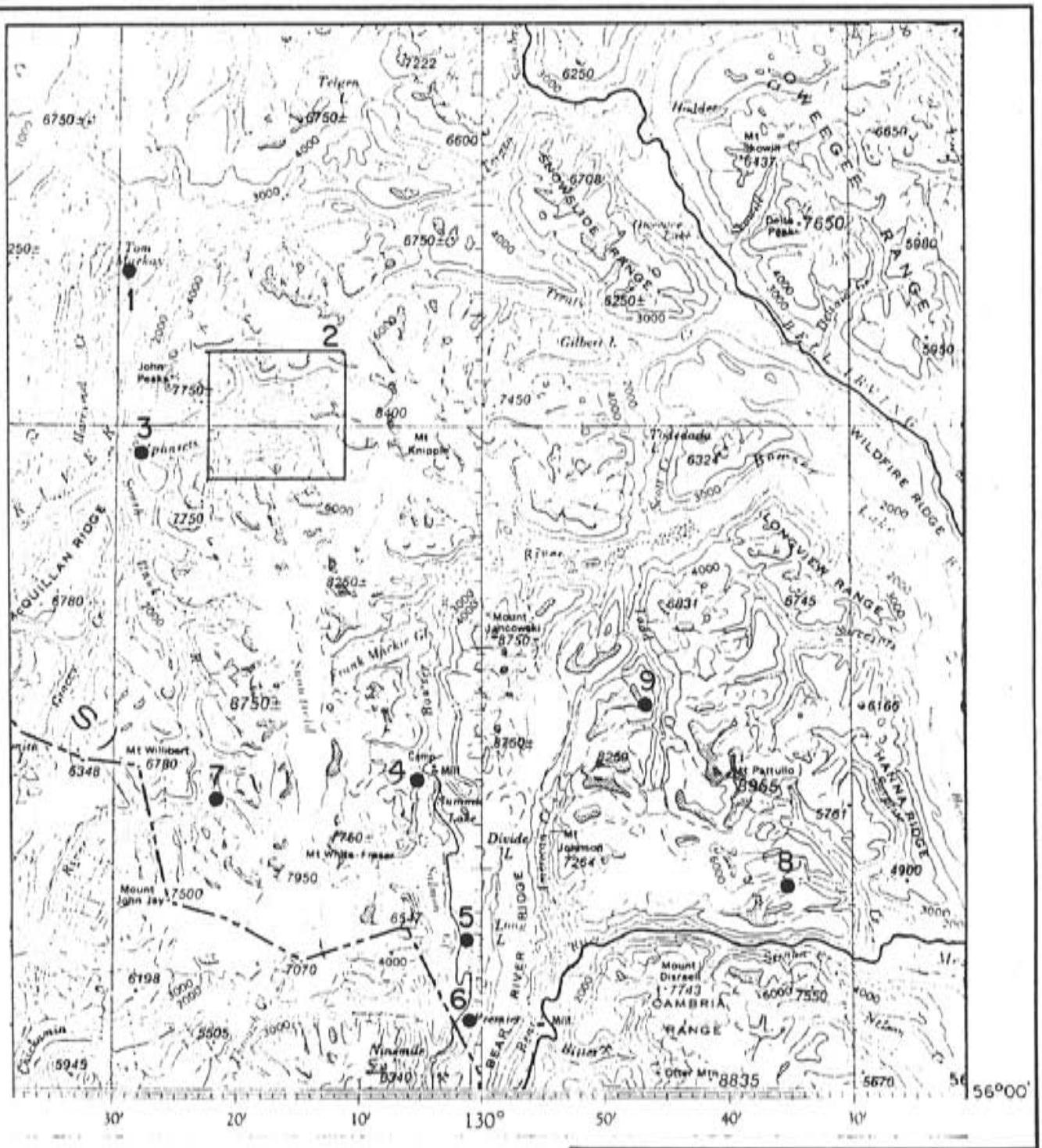


## PROPERTIES

1. Tom Mackay
2. Sulphurets Ck.
3. Daly - Cumberland
4. Scottie Gold
5. Big Missouri
6. Silbak - Premier
7. Granduc
8. Goat Ridge
9. Todd Creek

N

# MINERAL PROPERTIES

STEWART AREA, B.C.

Scale 1: 500,000

0 5 10 20 KM

0 5 10 15 MILES

J.R. WOODCOCK CONSULTANTS LTD.

MAY 1984

FIGURE Nº 3

The upper part of Todd Creek is underlain by volcanics of the Hazelton Group (lower to middle Jurassic age). These consist of red and green volcanic conglomerates, crystal and lithic tuffs, and minor breccia and minor siltstone. Bowser Lake sedimentary rocks are largely black, in places very carboniferous, shales, greywackes, and gritstones. These extend from the edge of the Bowser Basin southwesterly, remnants occurring in the high mountains where they unconformably overlie the strata of the Hazelton Group.

Gently dipping strata of the Bowser Lake Sediments crop out along the lower reaches of Todd Creek. These strata and the underlying Hazelton Group of strata appear to be gently folded, with the fold axis striking north-northwest.

To the west of the Todd Creek, intrusive dikes and small plugs are quite common and in places dikes appear as swarms. However, on the Todd Creek property only a few basic dikes occur.

## Mineralization

The Stewart area of British Columbia has been the focus of considerable mineral exploration, especially for precious metals, since the turn of the century. Currently several precious metal prospects in the area are being explored. The important developments in the area in recent years included the mining at the Granduc Mine, the start-up of the Scottie Gold Mine in 1981, the ongoing exploration of the Silbak-Premier and Big Missouri prospects by Westmin Mineral Resources and the exploration of the Sulpherets Creek property by Esso Minerals.

Figure 3 shows the distribution of the more important gold-silver properties in the area. These are briefly described as follows:

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1. Silbak-Premier - During the period 1918 to 1968, 4,670,170 tons of ore were mined containing 1,804,318 ounces of gold, 40,863,280 ounces of silver, 4,083,635 pounds of copper, 54,628,047 pounds of lead and 17,468,730 pounds of zinc. The property is currently under exploration by Westmin Resources Ltd.

The ore is restricted to several sulphide-rich shoots enclosed within essentially barren quartz-pyrite zones. Both the ore shoots and the surrounding barren quartz zones are enclosed by irregular zones of quartz-pyrite-sericite alteration. The ore shoots consist of sphalerite, galena, chalcopyrite, pyrrhotite, argentite, tetrahedrite, mercury and electrum within a gang of quartz-calcite-barite.

Three types of ore occurred in the mine including: (1) stephanite-native silver (2) "black sulphide" ore, and (3) lower grade siliceous ore. The surface bonanza ores (stephanite-native silver) and the black sulphide ores contained up to 5% mercury. Silver content within galena averaged 1 oz/ton but ranged up to 55 oz/ton.

In recent years, some geologists have interpreted the ore zones as volcanogenic exhalations.

2. Big Missouri - From 1927 to 1942 the Big Missouri Mine produced 847,615 tons of ore containing 58,384 ounces of gold, 52,677 ounces of silver, and 2,712 pounds of lead. The prospect is currently being explored by Westmin Resources; in 1983 this company published open pit reserves of 1.9 million tons averaging 0.1 oz/ton gold.

The ore body has been described as a 200-foot fracture zone laced with quartz-calcite veinlets. The veinlets contain varying but generally small amounts of galena, sphalerite and chalcopyrite. The ore occurs within chloritic schists which have been sericitized, silicified, and

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pyritized. Silicification would appear to be the most persistent form of alteration. Recent talks by Harlan Meade of Westmin Resources indicate the possibility that the Big Missouri might contain a number of small lenses of exhalative sulphides with associated alteration zones.

3. Scottie Gold - The Scottie Gold Mine began operation in 1981 at which time reserves were reported as 175,000 tons grading 0.75 oz/ton gold.

Mineralization is described as consisting of erratic, discontinuous masses of sulphide mineralization occurring within siliceous replacement bodies. Sulphides include pyrrhotite, pyrite, arsenopyrite and chalcopyrite with minor sphalerite and galena.

4. Granduc Mine - The Granduc Mine was opened by Esso Minerals Ltd. in 1980 at which time the indicated reserves were 10,890,000 tons using a cut-off of 1.79% copper. The mine closed again in 1983.

5. Sulpherets Prospect - Both porphyry copper-molybdenum and gold-silver mineralization are found within this very extensive rusty alteration zone. In the west central area of the alteration zone, gold is found within a pyritic shell that occurs around the small core of copper-molybdenum-gold mineralization. In the eastern part of the property gold is found within a volcanic breccia containing 5% to 10% disseminated pyrite. Veins of quartz-calcite also occur within a one-kilometer wide zone of intense sericite alteration. These veins carry gold, silver, lead, zinc and copper. Silver:gold ratios vary from 3:1 to 85:1.

6. Cumberland-Daily - Gold-silver-lead-zinc mineralization was also found near the mouth of Sulpherets Creek, about ten kilometers east of the Esso Minerals prospects. These showings, discovered in the 1930's, include two types. One type consists of sheared fissure

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veins containing quartz, calcite, barite, pyrite, galena, sphalerite, stibnite, tetrahedrite, and argentite. These mineralized lenses are small and irregular but can carry high amounts of silver. The second type consists of quartz replacement zones containing pyrite, pyrrhotite, chalcopyrite, sphalerite, galena and gold. A grab sample from one of these returned 0.26 oz/ton gold, 2.4 oz/ton silver in addition to some base metals.

7. Tom MacKay - This prospect is owned by Stikine Silver Ltd. In 1973 the inferred reserves were reported as 107,200 tonnes using a 0.25 oz/ton gold cut-off.

The mineralization consists of stockworks of quartz veins irregularly mineralized with pyrite, tetrahedrite, sphalerite, galena, chalcopyrite and arsenopyrite. These stockworks occur within prominent oxidized knolls or domes.

8. Goat Ridge Mine - This mine, owned by Noradco Mines Ltd., has undergone sporadic development since 1978. In 1979 indicated reserves were estimated at between 500,000 and 1,000,000 tonnes grading 1% to 2% lead, 4% zinc and 80 gm/ton silver.

Mineralization consists of sphalerite, arsenopyrite, pyrite, galena, freibergeite within three siderite-quartz-calcite veins.

## PROPERTY GEOLOGY

### Rock Types

#### Intermediate Volcanics

These rocks are predominantly massive light-grey, fine-grained tuffs with little or no bedding. In places the rocks are characterized by small (0.5 cm) white clasts and/or small vugs. The rocks, which con-

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tain only trace pyrite, weather grey.

The rocks crop out predominantly along the eastern edge of the property on the slope adjacent to Todd Creek.

Red Agglomerate

This is a distinctive rock with a predominantly reddish to purplish matrix, characterized by abundant subrounded clasts up to 30 cm across. Most of the clasts are of fine-grained volcanic rocks. In places the agglomerate has a greyish matrix but such zones are minor. A few thin horizons of crystal tuffs were also noted. The unit contains only trace pyrite and is not iron-stained. The unit is characteristically hard, resistant and massive, although good bedding occurs in a few places. The massive and resistant nature of these rocks account for much of the ruggedness of the area.

Red Tuff

This unit, with a similar reddish to purplish matrix, may in part be equivalent to the red agglomerate. However, the clasts of this unit are less than 0.5 cm. The unit is also massive with only trace pyrite. It occurs predominantly in the northern part of the property where it is widespread. This unit is uniform except for a few thin lenses or horizons of greyish fine-grained intermediate volcanics. In a triangular area between Shear and Cirque Creek, the rock is strongly sheared (orientation 154° dip 59° E).

Light-grey Siliceous Tuff

This unit is found only at the junction of the Todd Creek and Fall Creek. It is characteristically light-grey, fine-grained, massive, hard and siliceous and contains no pyrite.

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Brown-weathering Tuff

Adjacent to the above siliceous unit is a soft, brown-weathering, fine-grained carbonate-rich tuff.

Volcanic Breccia

This unit is found only along Fall Creek. It is characteristically grey-weathering, massive and resistant. The unit has a fine-grained grey matrix with abundant angular clasts of volcanic rock. Generally the unit contains no pyrite; however, a few random small pods of very altered, iron-stained rock occur. These are associated with barite and/or quartz-pyrite veins.

Carbonate-rich Pyritic Tuff

Also found along Fall Creek is a unit which contains abundant carbonate and up to 15% finely disseminated pyrite. Despite the high pyrite content the unit is grey-weathering. This unit is the host for copper-gold mineralization which will be described in a subsequent section. The unit is fine-grained, very light-grey and relatively soft. Note that little of the unit is exposed because a thin zone of glacial debris covers most of the valley.

Rock similar to this unit also occurs a short distance to the north near sample site 516.

Limestone

A platy, thinly-bedded grey limestone occurs on the northern edge of the property.

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### Basic Dikes

Thin (20-30 cm) basic dikes are the only intrusive rocks on the property. The dikes are fine-grained, dark-grey with small hornblende phenocrysts. They contain no pyrite and have no alteration selvages.

## Alteration

The Todd Creek target is characterized by intensely altered rock which is hard siliceous and pyritic and which weathers to create a brilliant yellow to orange gossan. The hard, resistant nature of the altered rock forms steep iron-stained cliffs to the west of Todd Creek.

The alteration includes introduction of abundant silica and pyrite and bleaching associated with the introduction of the silica and minor sericite.

The altered rocks are classified and mapped according to three grades of intensity:

### Intense

Intensely altered rock is very fine-grained, highly siliceous and generally white but grey in places of very high pyrite content. The alteration is so intense that the original rock and bedding is indecipherable. It is feasible that felsic rock units may be included within the larger altered zones. The widespread surface leaching of the pyrite makes it difficult to estimate pyrite content. However, the abundant jarosite stain both on the surface and within small vugs within the rock as well as small pockets containing up to 15% pyrite suggest that originally the pyrite content was high.

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Two variations of intense alteration are mapped within the area of detailed mapping (Figure 5). One variation has a red hematite colour and lower pyrite content. Within the area of this red silicification is a small area of light-grey completely silicified rock.

Medium Alteration

Such alteration is also quite intense but differs from the above in that the resulting rock is coarser-grained and contains less pyrite (1%). The amount of pyrite is again difficult to estimate because of surface leaching. However, the preponderance of orange limonite versus jarosite suggests a lower pyrite content. Silica alteration is somewhat less than in the intensely altered zones.

Low to Minimal Alteration

These rocks are fine-grained intermediate volcanics slightly altered with sporadic, small patches (5 square cm to 5 square m) of highly altered rock. Pyrite content is low although noticeably more than in the unaltered intermediate volcanics. Often such rock reacts to acid, sometimes quite vigorously. Except for the small altered patches, the rock is grey-weathering. This rock is not siliceous.

Distribution of Alteration

The gossans and zones of alteration occur within an area bounded by Glacier Creek to the north, Drill Creek to the west and Todd Creek to the east. The southern boundary is not well defined because of forest cover, but it probably does not extend far beyond the area of exposure.

Within this large area (1500 m by 1200 m) are four separate zones of intense to medium alteration that stand out distinctly from the unaltered or minimally altered rock.

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Main Zone

Occurring between Drill and Camp Creeks and bounded by sample sites G-81342, 392, 402, 183, 359, and 355, this zone of alteration and iron-staining is the largest on the property (1000 m x 500 m) and encompasses much of the barite mineralization.

The zone is bounded very sharply on the west and northwest by a discontinuity which may be a fault with an easterly dip. This discontinuity, be it fault or otherwise, is significant in that it so sharply delimits the zone of alteration and gossan. Essentially no pyrite or alteration extends to the west of this contact.

The eastern boundary of this main altered zone is partly obscured by talus.

Camp Creek, Fault Creek, Glacier Creek

The remaining altered zones are much smaller and seem to be related to or affected by faults. The alteration zones along Glacier and Fault Creeks especially are noticeably linear. In places, small faults separate unaltered from altered rock.

Structure

Bedding is almost non-existent. The few unquestionable bedding attitudes and any possible bedding attitudes indicate northwest to north strike and an easterly dip of 45°. Such attitudes are compatible with Grove's measurements to the west along American Creek.

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Faults are numerous with two and perhaps three sets of faults:

a) Main Set - strike NW; dip approximately 60° W

b) Second Set - strike E; vertical dip

c) Third Set - strike E; dip approximately 25° N.

These faults have had a significant effect on the distribution of alteration and on the barite mineralization.

## Mineralization

### Pyrite

Pyrite is the most widespread and abundant mineralization. Although much of the pyrite has been leached from the surface rocks, pockets of up to 15% pyrite and abundant jarosite suggest a high content in the original rock. The pyrite is predominantly finely disseminated with lesser amounts along fractures or within barite veins.

### Barite

Barite is found throughout the property although much of the mineralization occurs within the zones of alteration. Only the larger more significant barite showings are indicated on Figure 3.

The barite mineralization occurs in pods or lenses, veins, and small concentrations.

The pods are irregular in shape but generally elongated. These pods range in size from one meter width to 30 meters by 7 meters. The pods consist of massive white barite with minor galena and pyrite in places.

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The barite is quite pure, generally without jasper, quartz or calcite.

The veins vary in thickness from 10 cm to 2 m and most veins have a length of 10 m to 20 m. A few of the larger veins have a length of 30 m to 60 m. One should stress the discontinuous nature of most veins.

The two largest veins may have a length of 300-500 m but this is based partly on projection under semi overburden. One of these includes the "Jasper-Barite Zone" which was the locus of the detailed mapping (Figure 5). The other structure extends scutheasterly from G-81-468 to 460 and perhaps to 218. In this second vein, calcite is the dominant mineral with secondary amounts of jasper and barite and only a trace of galena.

The small concentrations of barite are up to a maximum of 4 cm across and are found both within altered rock and within unaltered rock near the altered zones. In many of these concentrations the barite may have replaced some of the surrounding rock. In such cases barite is intermixed with the volcanic.

Jasper-Barite Zone

This zone consisting of jasper, barite, jasper breccia and minor galena and pyrite, extends from G-81-519 to 407 (Figure 5).

It is characterized by somewhat convoluted banding in which layers of brick-red jasper or jasper breccia alternate with layers of coarse bladed barite. The amount of barite versus jasper varies considerably along the zone. In its western part, near G-81-519 and G-81-526, the zone is predominantly barite with most horizons of jasper only 3-4 cm

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wide and one horizon of 1 meter width. However, at G-81-385, the zone is predominantly jasper with only small amounts of barite. At G-81-407, the zone is again predominantly barite.

The jasper breccia is a distinctive rock type within the zone. The breccia is found only in localized pockets and is best observed near G-81-526 and G-81-407. Characterized by clasts of brick-red jasper to 20 cm across, the breccia varies from that with a barite cementing matrix to that with a jasper matrix.

This zone is not the only vein structure containing such breccia. Jasper breccia is also found along many veins within the property.

The zone appears to be thinning and pinching out at the western end but may swing around to the south and abut against an east-west fault (south of G-81-396). The eastern end may abut against another east-west fault.

The main large silicified gossan zone and this barite-jasper zone are part of a marked zonation in geology. From the southeast to northwest this zonation includes:

1. White to medium-grey highly silicified and pyritic volcanics.
2. Hematite-rich and highly silicified rock which is less pyritic and has a width of about 50 meters.
3. Jasper-barite zone which is approximately 10 meters wide.
4. Non-pyritic, unaltered coarse-red agglomerate.

The sharp change in alteration on the northwest side of this jasper-barite zone and the geological zonation imply that the jasper-barite zone lies along a discontinuity which could be fault or a depositional feature.

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To the northeast the jasper-barite zone gives way to some of the bleached pyritic rock.

Copper-Gold Mineralization

Adjacent to Fall Creek in the south part of the property, there are three trenches, each about 20 meters long. Several drill sites and scattered core lie west of the trenches. The trenches expose brecciated volcanics which are cut by quartz and calcite veins. The veins contain pyrite and chalcopyrite with minor malachite and azurite. The mineralization is hosted by a light-grey, highly pyritic, carbonate-rich volcanic tuff.

This showing was recently covered by the Ice claims of P. Ferguson. These lapsed in 1981.

Assay and geochemical analyses from channel samples in the trenches are shown on Table 4. The results are only geochemically anomalous. Note that sample 453 was taken about 30 m west of the trenches within the pyritic host rock.

Five kilometers to the south is another mineralized zone referred to as the Todd prospect in government reports. Mineralization, similar to the Fall Creek mineralization, is described as consisting of chalcopyrite and pyrite in quartz-impregnated brecciated dacite with minor silver and gold values. The history of the property is meager but first mention of it in government reports is 1960 at which time Newmont owned the property. In 1969, Kerr Addison Mines staked it for a short time after which it was soon acquired by C. S. Powney. In 1971, A. G. Hodgson examined the property for Mr. Powney.

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## Miscellaneous Mineralization

Occasionally chalcopyrite or malachite were noted within the zones of intense alteration. Copper stain was also noted along several of the quartz-pyrite veins that occur along Fall Creek. The most interesting copper showing occurs along a small shear at G-81-567 (Figure 5). This small showing, consisting of malachite and perhaps tetrahedrite, returned a value of >100 ppm Ag.

Sphalerite was noted at only one locality, but the many high zinc values (up to 3350 ppm) suggest that traces of zinc mineralization must be widespread.

## ARSENIC-ANTIMONY GEOCHEMISTRY

In 1981, 241 rock samples, 132 barite-rich samples and 97 silt samples were taken. The rock samples were analyzed for molybdenum, lead, zinc, copper and occasionally gold. Silt samples were analyzed for molybdenum, lead, zinc, silver and occasionally gold. In addition a variety of rock chip samples and many silt samples were analyzed for other signature elements such as mercury, arsenic, antimony, and silver. Many of the samples were anomalous in these elements.

In 1984, 58 rock chip samples, 16 barite-rich samples, and 26 silt samples were analyzed for arsenic and antimony and the results are presented on Figure 4. Barite samples were analyzed for arsenic, antimony, silver, lead, zinc. These analyses were done by Vangeochem Lab Ltd.

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## TABLE I - GEOCHEMISTRY OF BARITE

| Sample Number | Pb | Zn | Ag | As | Sb | Au (ppb) |
|---|---|---|---|---|---|---|
| **Standard Perchloric and Nitric Acid Digestion** | | | | | | |
| G 83 - 157 | | | | 60 | 20 | |
| 160 | 24 | 1,590 | 7.1 | 25 | 10 | |
| 205 | 195 | 12,000 | 27.5 | 2 | 10 | |
| 290 | 56 | 91 | 4.2 | 20 | nd | 10 |
| 314 | 440 | 940 | 8.0 | 35 | 25 | |
| 316 | 292 | 1,290 | 10.8 | 10 | 30 | |
| 332 | 1,280 | 11 | 26.7 | 35 | 75 | |
| 338 | 126 | 2,040 | 9.7 | 30 | 10 | |
| 369 | 10 | 1,160 | 1.6 | 25 | 20 | |
| 380 | 3,130 | 2,620 | 45.6 | 80 | 580 | |
| 383 | | | | 10 | 5 | nd |
| 393 | | | | | | 40 |
| 402 | 42,000 | 369 | 2.3 | 2 | 10 | |
| 483 | 930 | 490 | 2.8 | | 50 | |
| 525 | | | | 4 | 20 | 50 |
| 528 | | | | 10 | 10 | nd |
| 559 | | | | 40 | 5 | nd |
| | | | | | 403B 40 | |
| **Carbonate Fusion Digestion** | | | | | | |
| G 83 - 160 | 374 | 1,750 | 4.0 | | | |
| 205 | 3,524 | 13,450 | 24.0 | | | |
| 290 | 274 | 100 | 6.0 | | | |
| 314 | 5,274 | 1,150 | 5.0 | | | |
| 316 | 39,524 | 1,350 | 25.0 | | | |
| 332 | 11,524 | 38 | 22.0 | | | |
| 338 | 324 | 13 | 2.0 | | | |
| 369 | 374 | 13 | 2.0 | | | |
| 380 | 5,024 | 38 | 2.0 | | | |
| 402 | 3,024 | 350 | 6.0 | | | |
| 483 | 1,624 | 600 | 10.0 | | | |
| **Sodium Peroxide Digestion** ($Na_2O_2$ fusion in $HNO_3$ acid) | | | | | | |
| G 81 - 160 | 120 | 1,220 | 6.0 | | | |
| 205 | 3,960 | 12,200 | 26.0 | | | |
| 290 | 220 | 20 | 10.0 | | | |
| 314 | 4,080 | 880 | 16.0 | | | |
| 316 | 3,280 | 1,120 | 2.0 | | | |
| 332 | 19,600 | 5 | 30.0 | | | |
| 338 | 1,120 | 1,680 | 2.0 | | | |
| 369 | 100 | 950 | 6.0 | | | |
| 380 | 320,000 | 26,000 | 102.0 | | | |
| 402 | 3,200 | 310 | 1.0 | | | |
| 483 | 1,040 | 690 | 1.5 | | | |

Notes: Tables in order of increasing intensity of digestion.
Samples 383, 393, 525, 528, 559 from jasper-barite zone.
All values in ppm except gold which is in ppb.

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The results of this work show that the antimony values are lower than that indicated by the analyses obtained in 1981. The arsenic values, however, do give an anomalous zone which, on Figure 4, is contoured with values at 5, 20, and 250 ppm. This shows a high on the northern end of the mineralized and altered zone which is largely coextensive with the area that contains the most jasper and barite. These contours are based on the values for the rock chip samples and based on the majority of values. An occasional low value has been ignored in this contouring. The silt samples within this area also indicate anomalous conditions.

In the collection of rock geochemical samples at Todd Creek, additional samples composed mainly of barite were also collected with the idea that samples with a constant matrix might yield a better geochemical trend. Sixteen of these samples were submitted to Vangeochem Lab for analysis for lead, zinc, silver, antimony, and arsenic. Five of these samples were also analyzed for gold.

Analytical analyses for trace elements with a barite matrix are very difficult. Many of the elements, especially lead, are relatively insoluble in the presence of sulphate. The 16 samples were digested with acid and also with carbonate fusion and one can note from Table 1 the great discrepancy for the lead results from these two digestion methods. The problems introduced by the presence of barite seem to be present regardless of which laboratory is used, although many geologists and some laboratories overlook this problem. Not only is it a problem in trace analysis of lead, it is also a problem in assays for lead.

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## CONCLUSIONS

1. The property lies west of Todd Creek. It is underlain by fine to coarse pyroclastics of the Lower to Middle Jurassic Hazelton Group. Minor limestone and a few basic dikes are also present.

2. Brilliant iron-stained, highly pyritic and silicified altered rock occurs extensively in the center of the property. The alteration consists of quartz, pyrite and minor sericite. Four zones of medium to intense alteration occur, the largest being 1000 m by 500 m.

3. Across the northwestern border of the main zone of alteration, there is a marked zonation in the geology which, from south to north, is as follows:

1. White to medium grey, highly silicified and pyritic volcanics.
2. Hematite-rich and highly silicified rock which is less pyritic.
3. Jasper-barite zone.
4. Non-pyritic, non-altered, red agglomerate.

4. Pyrite is the most abundant form of mineralization. Associated with the zones of alteration, it is primarily finely disseminated.

5. Barite mineralization is also widespread and is also found predominantly within the zones of alteration. However, barite lenses and veins also occur well beyond the zones of alteration. The mineralization consists of barite with minor galena and pyrite and varying amounts of calcite, jasper and jasper breccia. The barite is found as pods (up to 30 m by 7 m), veins and small concentrations (4 cm across).

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Most veins are discontinuous, but two structures have lengths of 300 m to 500 m. The most attractive of the large structures is the jasper-barite zone. Geochemical analyses and assays of such mineralization returned sporadically anomalous Cu, Pb, Zn and Ag with up to 18.56 oz/ton Ag.

6. The zones of alteration are anomalous in lead, zinc, silver, arsenic. In addition high anomalous mercury occurs with the mineralized barite-jasper zones and anomalous antimony occurs in places. Copper and molybdenum are sporadically anomalous. Gold analyses are generally low.

7. All of the data, including the alteration, the mineralization such as the barite, the jasper alteration and the geochemistry indicate more intense hydrothermal conditions at the north end of the large alteration zone.

J. R. Woodcock, P. Eng.

JRW

# J.R. WOODCOCK CONSULTANTS LTD.

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TELEPHONE: (604) 685-6720


Invoice #21-84

CLIENT

## INVOICE
(DISBURSEMENTS)
& Fees

DATE SUBMITTED June 8, 1984

PROJECT Todd

PERIOD COVERED Apr. 15-June 7/84

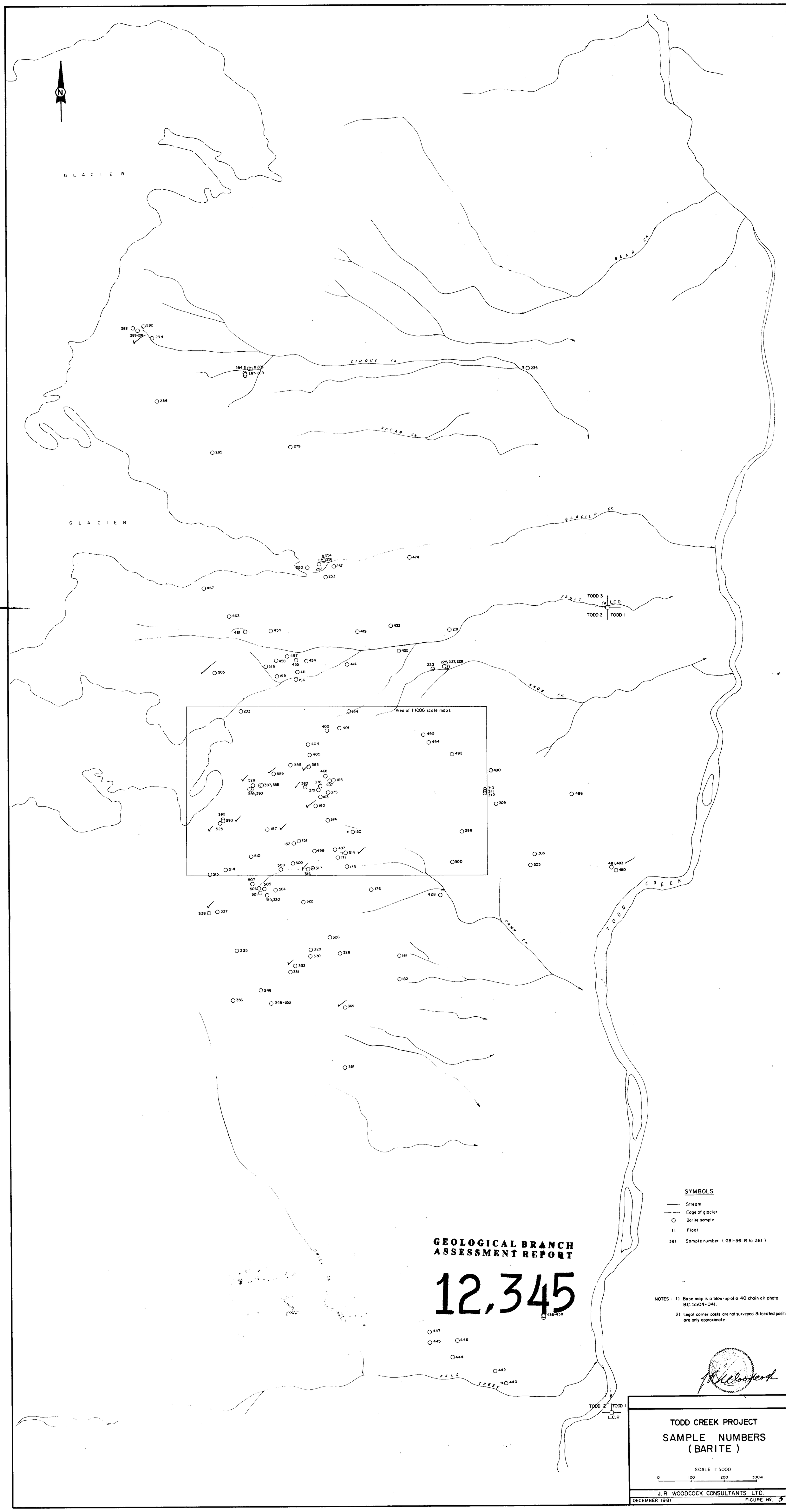
EXPLANATION

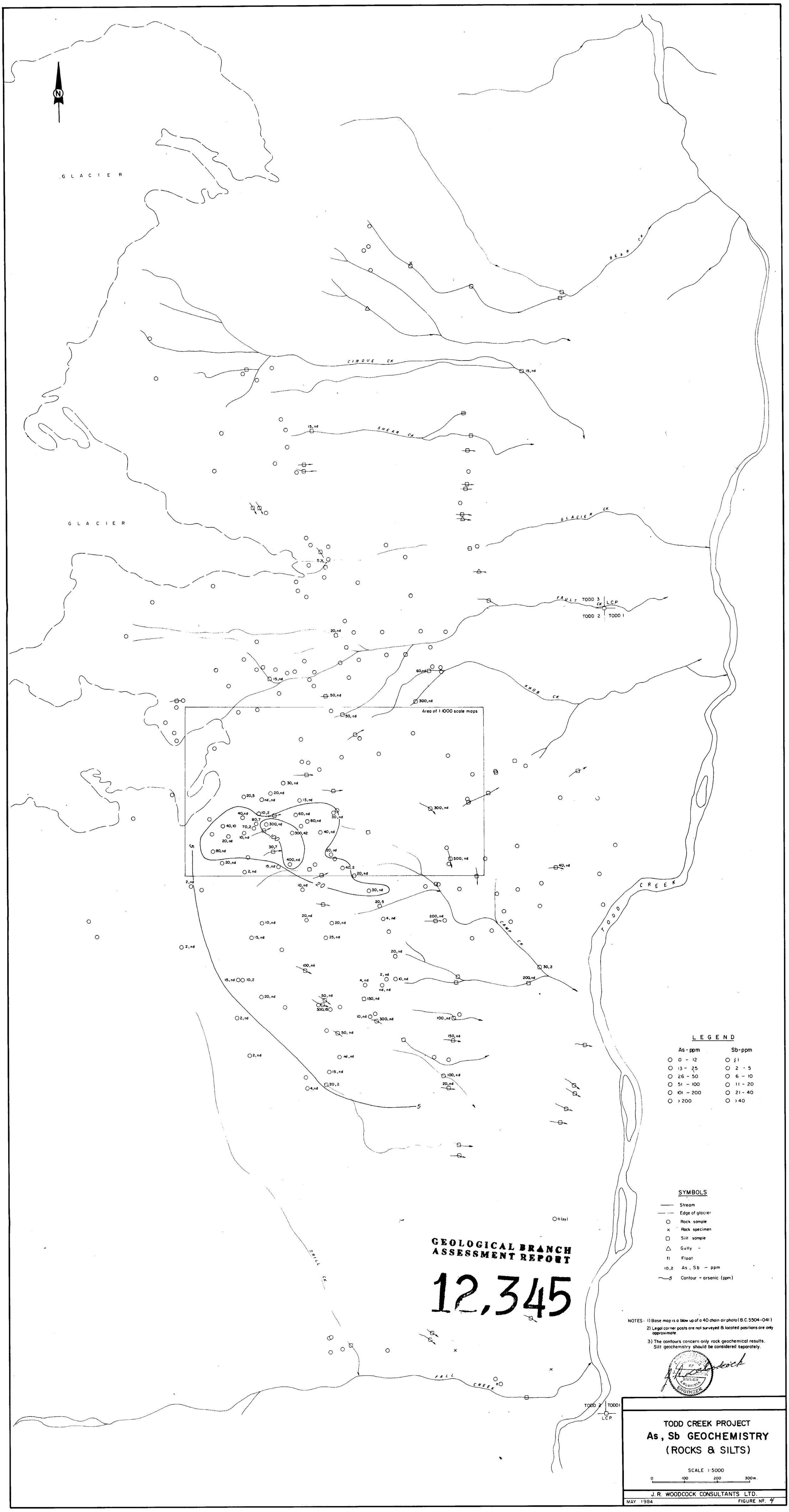
| DATE 1984 | DESCRIPTION | ALLOCATION Sub-Project | ALLOCATION Category | AMOUNT |
|---|---|---|---|---|
| | Disbursements: | | | |
| May 28 | F. Chong - drafting | | | $ 84.00 |
| May 28 | Vangeochem Lab Inv. #7838, 7839, 7841, 7843 | | | 576.75 |
| June 4 | Vancal Reproductions Inv. #100127, 100210, 100245 | | | 23.21 |
| June 6 | J/V - Petty Cash - photocopies | | | 14.82 |
| June 7 | Vangeochem Lab Inv. #7875 | | | 161.50 |
| | Total | | | 860.28 |
| | + 10% Mark=up | | | 86.02 |
| | Total Disbursements | | | $ 946.30 |
| | Fees: | | | |
| | J. R. Woodcock | | | |
| Apr.15-May 12 | 1/4 day | | | |
| May 14-June 4 | 1/2 day | | | |
| | 3/4 day @ $450/day | | | $ 337.50 |
| | D. Gorc | | | |
| May 6 - 19 | See time sheet - 1/4 day @ $200/day | | | 50.00 |
| May 20-June 2 | See time sheet - 1 day @ $200/day | | | 200.00 |
| | M. Brooks - secretarial work | | | |
| May 20-June 2 | Rough draft and final copy report - 6 hrs. | | | |
| June 2-6 | Final copy report - 2 hrs. | | | |
| | Total 8 hrs. @ $18/hr. | | | 144.00 |
| | Total Fees | | | $ 731.50 |

Fees & Disbursements TOTAL $ 1,677.80

APPROVED J. R. Woodcock

INVOICE No. 21-84


GLACIER
GLACIER
BEAR CK
CIRQUE CK
SHEAR CK
GLACIER CK
FAULT
TODD 3
TODD 2
TODD 1
L.C.P.
KNOB CK
Area of 1:1000 scale maps
TODD CREEK
CAMP CK
DRILL CK
FALL CREEK
SYMBOLS
Stream
Edge of glacier
Barite sample
fl. Float
361 Sample number (GBI-361 R to 361)
NOTES: 1) Base map is a blow-up of a 40 chain air photo BC 5504-041.
2) Legal corner posts are not surveyed & located positions are only approximate.
GEOLOGICAL BRANCH
ASSESSMENT REPORT
12,345
TODD CREEK PROJECT
SAMPLE NUMBERS
(BARITE)
SCALE 1:5000
0 100 200 300m
J.R. WOODCOCK CONSULTANTS LTD.
DECEMBER 1981
FIGURE No. 3




LEGEND

| As - ppm | Sb - ppm |
|---|---|
| 0 - 12 | ≤ 1 |
| 13 - 25 | 2 - 5 |
| 26 - 50 | 6 - 10 |
| 51 - 100 | 11 - 20 |
| 101 - 200 | 21 - 40 |
| > 200 | > 40 |

SYMBOLS

- Stream
- Edge of glacier
- Rock sample
- Rock specimen
- Silt sample
- Gully
- fl Float
- 10,2 As, Sb - ppm
- Contour - arsenic (ppm)

NOTES: 1) Base map is a blow up of a 40 chain air photo (B.C.5504-041)
2) Legal corner posts are not surveyed & located positions are only approximate.
3) The contours concern only rock geochemical results. Silt geochemistry should be considered separately.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,345

TODD CREEK PROJECT
As, Sb GEOCHEMISTRY
(ROCKS & SILTS)

SCALE 1:5000
0 100 200 300m

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MAY 1984 FIGURE Nº. 4