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AND ASSOCIATES LTD.

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1475 TWO BENTALL CENTRE  
555 BURRARD ST.  
VANCOUVER 1, B.C.

GEOLOGY AND GEOCHEMISTRY

OF

THE WILLIAMS CREEK PROPERTY

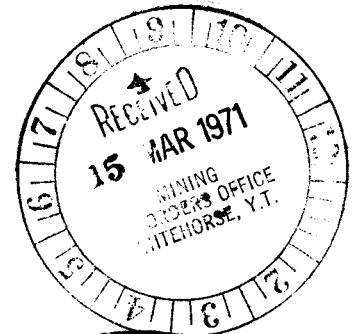
Boy 1-78, 83-110, 115-128, 137-150  
Man 1-16 Fr  
Mac 1-6 Fr  
Dun 1-4 Fr  
War 1-40  
Will 1-119 claims

Located On

Claim Sheet 115-I-7  
About 20 miles northwest of  
Carmacks in the Whitehorse  
Mining Division centered at  
approximately 62°22'N and  
136°43'W

Work Done

August 1, 1970 to October 11, 1970



This report has been examined by the Geological Department and is recommended to be accepted as representing the work done.

13.116.06

Report By

A.R. Archer, P. Eng.

*A.R. Archer*  
Geological Engineer

Considered as valid work under Section 53 (1) of the Yukon Mining Act.

*[Signature]*  
Commissioner of Yukon Territory

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Maps in Pockets

Figure W-1 - Claim Location - 1/2 mile

W-2 - Recce Geochem - Boy claims - 1/2 mile

W-3 - Soil Geochem - No. 1 Zone - 400 feet

W-4 - Soil Geochem - No. 2 Zone - 400 feet

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800 feet

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## INTRODUCTION

This report describes three work programs on the 319 claim Williams Creek property owned by Dawson Range Joint Venture: Stage I - bulldozer trenching, baseline cutting, and diamond drilling on the No. 1 Showing - to be used for assessment credit on the Boy 1-78, 83-110, 115-128, 137-150; Man 1-16 Fr; Mac 1-6 Fr and Dun 1-4 Fr claims (a total of 160 claims); Stage II - bulldozer trenching on the No. 2 Showing for assessment credit on the War 1-40 claims; and Stage III - grid soil sampling and geological mapping, to be used for assessment credit on the Will 1-119 claims. This report contains a description, with maps, of reconnaissance soil sampling and mapping on the Boy claims prior to bulldozing but this work is not being used as assessment credit. Personnel working on the Williams Creek property were senior supervisors A.R. Archer, P.Eng., R.J. Cathro, P.Eng. A.C. Ogilvy, P.Eng. and C.A. Main (geochemist) and field men D. Ratcliffe, K. Carswell, J. Rance, T. McLeod and P. Tredger. Camp cook was D. Miller. The days worked by each field man is shown on the invoices attached to the statement of expenditures.

## HISTORY

The vein showings on crown grants immediately east of the Boy claims are the oldest in the project area. The first lode claims were staked in July, 1898 by placer miners traveling the Yukon River enroute to the Klondike. Most of the

development, including the adits, was completed prior to 1910, although almost all the claims were later consolidated under the ownership of Dr. J.O. Lachapelle, a Dawson dentist, and a few tons of ore were shipped to the Granby Smelter in 1917. Fourteen of the original crown-granted claims are still maintained in good standing by payment of rent and are owned by a long time Carmacks resident, Mrs. Ida Goulter, daughter of a pioneer prospector, Colonel Mack. No record exists of work in this vicinity during the past fifty years.

Early work in the area was directed towards the few outcrops in the area, which occur mainly in recent bedrock canyons near the mouths of Williams, Merrice, Nancy Lee and Hoocheekoo Creeks. The showings on the crown grants are narrow fissure fillings occupying discontinuous, quartz filled shears along a volcanic intrusive contact.

#### 1970 PROGRAM, WILLIAMS CREEK PROPERTY

The 134 Boy claims, which form the core of the DRJV Williams Creek property, were staked by Whitehorse businessmen G. Wing and A. Arsenault late in the rush which followed the Casino discovery and were recorded on 9 March, 1970. The owners approached Gavin Dirom in Whitehorse on July 6 during the DRJV management committee meeting and signed a <sup>117 uwx</sup> few examination option on July 10. A prospecting and geochemical sampling program was conducted over the claims between July 18 and 24 under crew chief Grant Abbott. Two mineralized outcrops, the No. 1 and No. 2 zones, were found by prospecting.

Neither zone responded to the reconnaissance geochemical sampling although a tighter spaced grid survey over the No. 1 zone was successful in tracing it. A formal agreement was executed on September 21 in which a 90% interest was purchased for \$7500.00 and a \$200,000 option was arranged for the purchase of the minority interest. A further 185 claims were subsequently staked by DRJV to bring the total to 319 claims, including fractions, which form one contiguous block adjoining the old Crown Grants. The area held is approximately 15,000 acres. Mitsubishi owns eight TK claims within this block. They were staked on a magnetic low and were recorded on 11 June, 1969.

Work completed during the remainder of the field season consisted of an 800 foot by 400 foot grid soil survey of 14 square miles (on which the Will claim staking was based), about \$22,500 (assessment credit) of bulldozer trenching, and two X-ray size diamond drill holes in the No. 1 zone, totalling 103 feet. All of this work was done from a camp at Granite Mountain, partially for reasons of security.

#### GEOLOGY

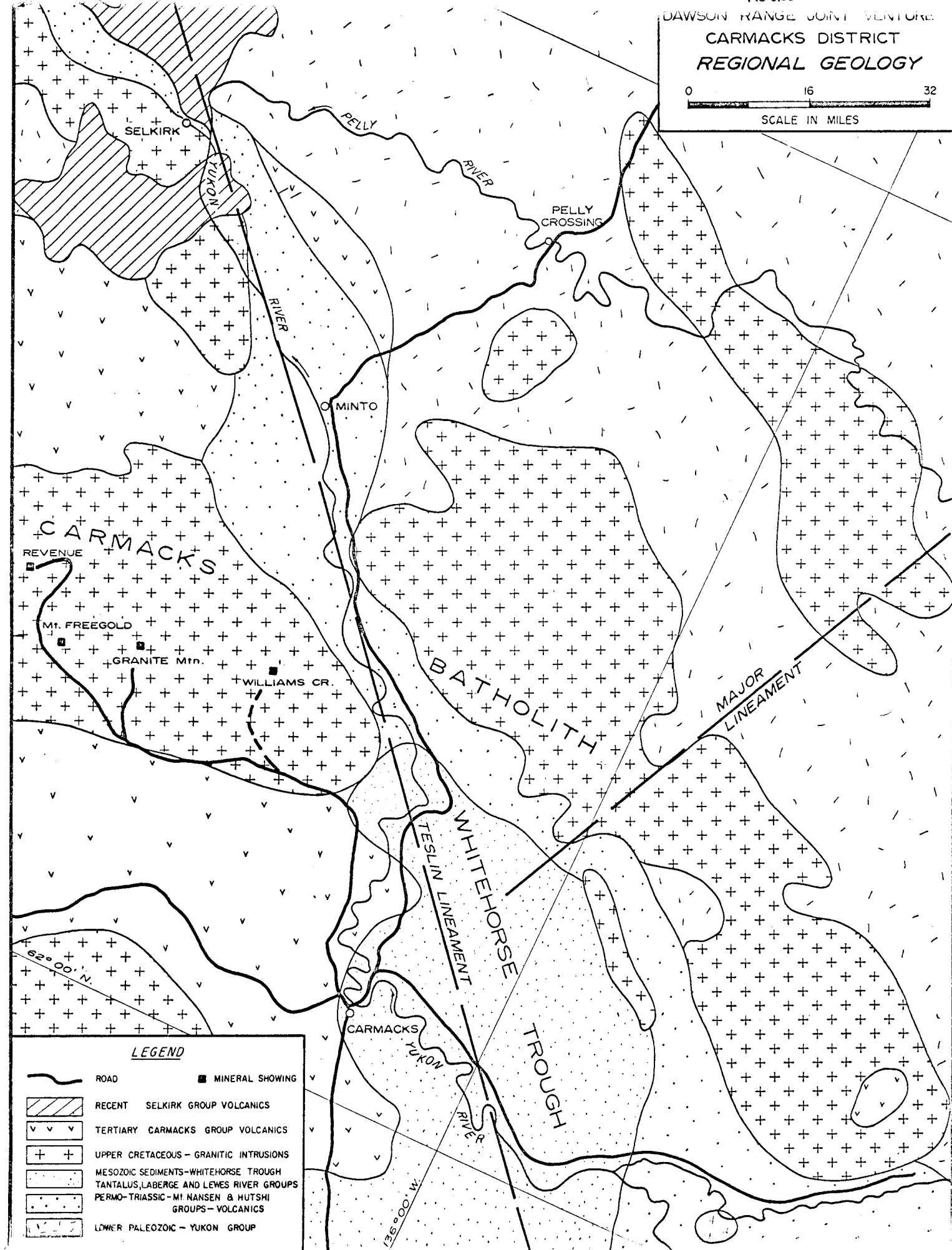
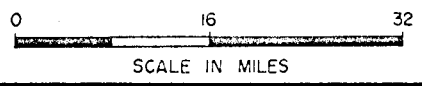
The copper mineralization on the property is low in both iron and molybdenum. The primary copper minerals, chalcopyrite and bornite, have oxidized near surface to malachite and cuprite (tentative identification). The surface exposures are deceptively uninteresting and their significance was not

appreciated without assays. A faint greenish colour is imparted by disseminated malachite and the absence of pyrite prevents normal limonite staining and leaching.

The regional geology is shown on the following page at a scale of 1 inch to 8 miles (Figure W-9). The main rock type is a large batholith, herein named the Carmacks Batholith (unofficial) which is related in composition (and probably in age) to the late Cretaceous Klotassin Batholith. An extension to the east is separated from the main mass by a narrow band of older Mt. Nansen volcanics which lies in the Yukon River Valley. These basic to intermediate flows, breccias and tuffs (greenstone) were originally thought to be Cretaceous but are now classified as Permo-Triassic. South of Carmacks they have been called the Hutshi Group. For a length of about 50 miles, between Five Fingers Rapids and Selkirk, the Yukon River Valley appears to follow the extension of the major Teslin Lineament, which lies between and roughly parallel to the Shakwak and Tintina Trenches. This belt of volcanics along the Teslin Lineament is the northern end of the Whitehorse Trough and the Intermontane Tectonic Belt. South of Five Finger Rapids, the Trough contains a very great thickness (up to 10,000 feet) of Mesozoic clastic sediments, including the Triassic Lewes River Group, Jurassic Laberge Group, and lower Cretaceous coal-bearing Tantalus Group. Large areas of Tertiary Carmacks Group basalt lie south and northwest of the Carmacks Batholith.

FIGURE W-9

DAWSON RANGE JOINT VENTURE  
CARMACKS DISTRICT  
REGIONAL GEOLOGY



LEGEND

- ROAD
- MINERAL SHOWING
- RECENT SELKIRK GROUP VOLCANICS
- TERTIARY CARMACKS GROUP VOLCANICS
- UPPER CRETACEOUS - GRANITIC INTRUSIONS
- MESOZOIC SEDIMENTS - WHITEHORSE TROUGH
- TANTALUS, LABERGE AND LEWES RIVER GROUPS
- PERMO-TRIASSIC - MI NANSEN & HUTSHI GROUPS - VOLCANICS
- LOWER PALEOZOIC - YUKON GROUP

North and south of Selkirk, volcanism has persisted up to a few thousand years ago, and the best preserved centre, Volcano Mountain, lies along the northern extension of the Teslin Lineament.

The two showings presently known are similar in mineralogy but differ significantly in environment. No. 1 zone occurs in quartz-feldspar-biotite gneiss while No. 2 zone, two miles north, occurs in porphyritic monzonite. Quartz monzonite is the most common rock locally but more detailed study will probably show considerable igneous complexity. There is less than 1% outcrop present and most of the petrological information has been gained from bulldozer trenches. Quartz veins, pegmatite and granitic dikes cut the area and may be related to the mineralization.

As presently defined by trenching and surface sampling, No. 1 zone is a near-vertical, tabular zone which strikes N35°W. It varies in width from 100 to 180 feet and grades between 0.70% and 0.98% copper in surface sampling over those widths. Over a width of 100 feet, grade would be slightly greater than one per cent copper, plus about fifty cents per ton in gold and silver. The zone has been traced for a length of 1600 feet (400S to 1200N) by trenches at intervals of 400 feet. It is open to the north and is cut off sharply at the south, where a subtle surface lineation and geochemical sampling suggest that it is offset 400 feet to the east by a left hand fault. The contacts between gneiss and batholith are

fairly sharp and mineralization is confined to gneiss. The dikes are only weakly mineralized. The gneiss is probably a down-folded or faulted roof pendant of Yukon Group which follows a major structure.

The No. 2 zone has a length of 410 feet on surface, and strikes N65°W. True width is about 100 feet and surface samples averaged 1.05% copper. Trenching on strike failed to encounter mineralization, and it is not known whether this was due to faulting, pinching, or too shallow trenching, and whether the monzonite porphyry occurs as a dike or a plug.

The shallow drilling (to 60 foot true depth) indicated a slight decrease in oxidation and showed that chalcopyrite and bornite are the primary minerals, with a ratio cpy:bo of between 2:1 and 1:1. No pyrite has been seen and only minor limonite is present. Alteration is very weak although epidote is moderately common in No. 2 zone. A minor amount of leaching is present near surface and it seems reasonable to assume that surface grades in the oxide zone are fairly representative of primary grade. Molybdenite is occasionally visible but the highest assay obtained was only 0.03% Mo. Most of the sulfides occur along hairline fractures which follows the schistosity. Grade in the gneiss is usually best where biotite content is highest.

No. 1 zone has the potential for a small to medium size mine. Its strike is still open north and possibly south. If the presently defined zone (1600 feet by 100) extends to a

depth of 800 feet (1/2 the length) its potential is 10,000,000 tons in the order of 1% copper. The fact that overburden cover is so extensive and two related mineral showings occur in different settings two miles apart gives this property extremely good potential. The mineralization seen thus far has several characteristics of a porphyry environment, except for geometry and alteration. Further extending of the No. 1 and No. 2 zones and searching for new zones could well lead to a true porphyry copper deposit.

#### GEOMORPHOLOGY

The property lies close to the western margin of Pleistocene glaciation. Evidence of weak valley glaciation in the form of small lateral moraines and kame terraces can be seen up to an elevation of 2500 feet above sea level. On the No. 1 zone, glacial material was found in trenches 4S and 8S but not in the remaining trenches which are further up the hill. The terrain is subdued with maximum relief of 1000 feet. Drainages are little affected by the valley glaciation and have a rectilinear pattern reflecting structural features. The area lies on the west side of the Yukon River valley on the northeast flank of the Dawson Range mountains. Annual precipitation is even lower than in the Dawson Range (probably less than 12 inches). Vegetation ranges from willows and alder in the swampy valleys to spruce thickets on the dryer hillsides. Outcrops, or areas of felsenmeer, are rare and

the subdued, rolling topography suggests thick overburden. Trenching on the No. 1 zone showed, however, that this is not so. A typical profile has several inches of moss and organic material overlying 2 to 8 inches of volcanic ash, which in turn overlies several inches of organic material (peat) and 6 to 18 inches of red brown soil. The ash is from a volcanic explosion that occurred near White River (about 180 miles to the southwest) approximately 1500 years ago. The ash is very fine and has accumulated, probably by wind action, in surface depressions where thicknesses of several feet are common. Permafrost is now rare and occurs only on northern slopes. Evidence of intense frost action in the recent past is found in the form of numerous pingos.

#### GEOCHEMISTRY

Stream sediment sampling of the area shows a low response, almost below background response. This is probably due to the lack of pyrite, low precipitation, and dilution of silt by volcanic ash. The No. 1 zone responded to grid soil sampling while the No. 2 zone did not. It is apparent that copper does not have good dispersion in soil. This is almost certainly due to two factors, (1) the lack of pyrite and (2) the lack of rapid solifluction due to absence of permafrost. The orientation survey conducted over the No. 1 zone indicates that soil sampling should be effective if a fairly tight grid is used. The sample must be taken from the B or B + C horizon

below the ash.

An area of 14 square miles was soil sampled to the west and north of the Boy claims to guide staking of the Will claims. Sample spacing was at 400 foot intervals on lines 800 feet apart. Sample lines were located by pace and compass from cut baselines established by chain and compass. Lines were well marked with orange glow flagging and sample points were marked by a short lath. Soil samples were taken below the ash, from a B or B + C horizon, using either a shovel or a mattock type grub-hoe. Samples were collected in standard Kraft envelopes that were sent to Chemex Labs Ltd., North Vancouver, B.C. for treatment. Each sample was assayed for copper and molybdenum by atomic absorption spectrometry of a hot nitric-perchloric extraction of a -80 mesh fraction.

Molybdenum response was uniformly low, all values being 1.0 parts per million or less, and consequently these values have not been plotted. Copper response is shown on Figures 5A and 5B. This spacing was considered to be too wide to actually pinpoint mineralized zones but was believed to be close enough to obtain several consecutive anomalous values if such zones existed. Copper background in the area sampled in between 15 and 20 parts per million which is a little lower than average for the rock types encountered. Values exceeding 35 ppm were therefore considered anomalous and a fairly specific area containing sporadic, and occasionally connected

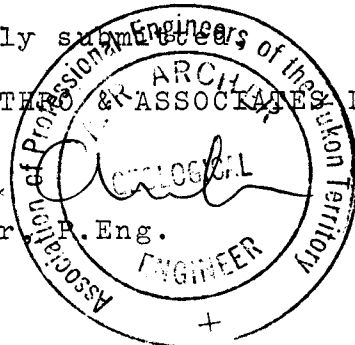
anomalous values was outlined. The Will claims were staked to cover this area. The Boy claims were not grid soil sampled in 1970 due to the higher priority of determining the extent of the mineralized area.

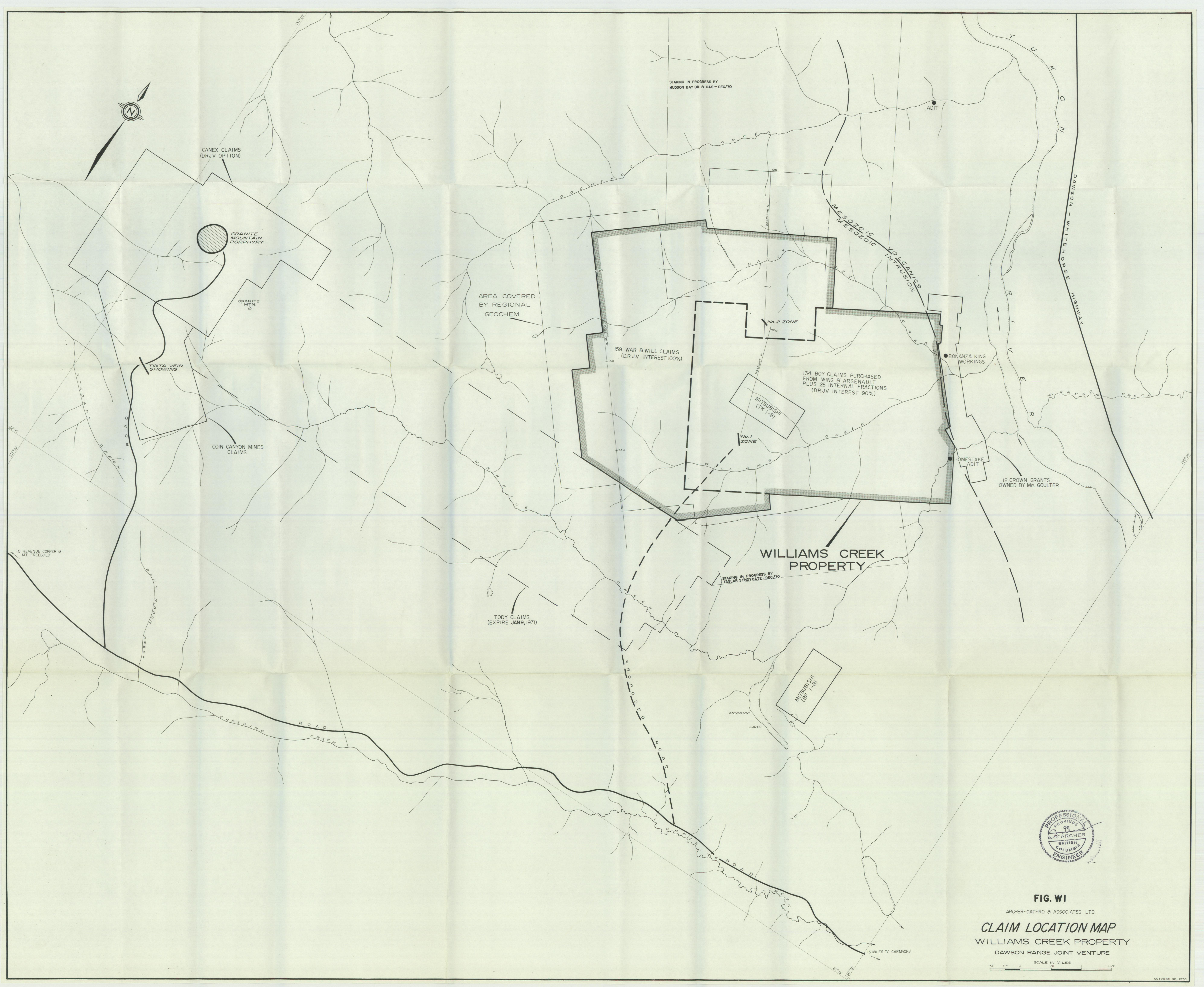
RECOMMENDED FUTURE WORK

Further work on the Williams Creek property should be directed toward two objectives, (1) developing the two known mineralized zones and (2) exploring for additional zones. To avoid the expense of a helicopter, a road should be constructed to the No. 1 zone in early May and a camp set up at Williams Creek where ample water is available. The road will be approximately 8 miles long and will leave the Mt. Freegold road at a point 20 miles from Carmacks. Application has already been made and approved to 50% assistance from the Tote Trail Fund. During the period from mid-May to the end of June, the Boy claims and geochemically responsive portions of the Will claims should be soil sampled at a 200 by 400 foot interval to locate new zones. The bulldozer will continue to expose the No. 1 and No. 2 zones in May and in June will explore anomalies found by soil sampling. In early July the most attractive mineralized zones should be tested by diamond drilling. Five 400 foot holes for a total of 2000 feet are budgeted for the initial drilling phase.

Respectfully submitted,  
 ARCHER, CATHART & ASSOCIATES LTD.

A. R. Archer  
 A.R. Archer, P. Eng.





STAKING IN PROGRESS BY HUDSON BAY OIL & GAS - DEC/70

ADIT

CANEX CLAIMS (DRJV OPTION)

GRANITE MOUNTAIN PORPHYRY

GRANITE W/TN

AREA COVERED BY REGIONAL GEOCHEM

159 WAR & WILL CLAIMS (DRJV INTEREST 100%)

No. 2 ZONE

134 BOY CLAIMS PURCHASED FROM WING B ARSENAULT PLUS 26 INTERNAL FRACTIONS (DRJV INTEREST 90%)

MITSUBISHI (TA 1-B)

No. 1 ZONE

BONANZA KING WORKINGS

COIN CANYON MINES CLAIMS

TINTA VEIN SHOWING

12 CROWN GRANTS OWNED BY MS. GOULTER

WILLIAMS CREEK PROPERTY

STAKING IN PROGRESS BY TASLAR SYNDICATE - DEC/70

TODY CLAIMS (EXPIRE JAN 9, 1971)

MITSUBISHI (TB 1-B)

MERRICE LAKE



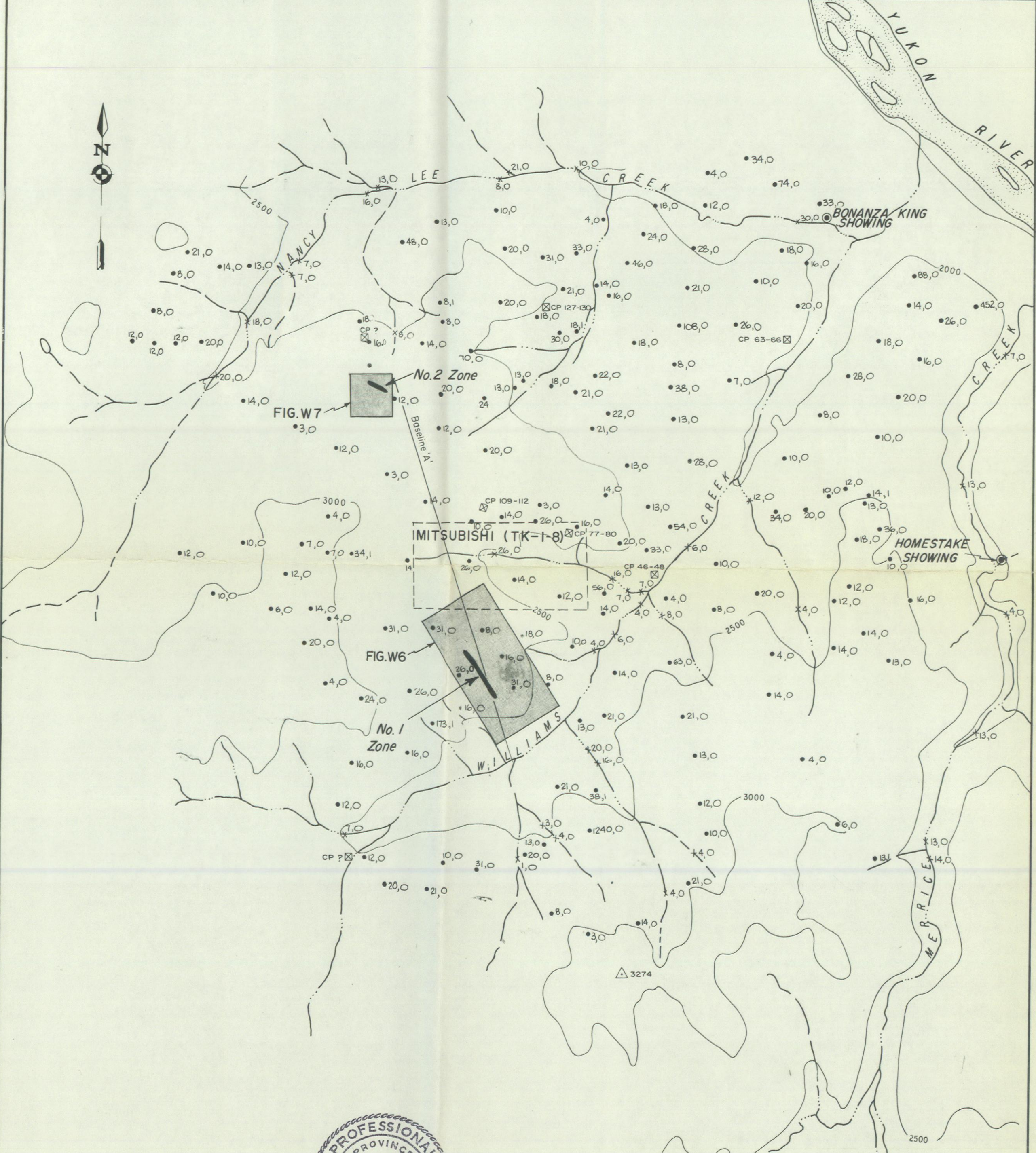
FIG. W1

ARCHER-CATHRO & ASSOCIATES LTD.

CLAIM LOCATION MAP  
WILLIAMS CREEK PROPERTY  
DAWSON RANGE JOINT VENTURE

SCALE IN MILES

15 MILES TO CARMACKS



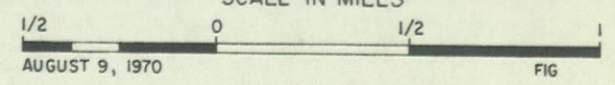
**LEGEND**

- 10,1 Soil sample - Cu., Mo
- X 10,1 Silt sample - Cu., Mo
- ⊙ Showing
- ⊠ Claim Post

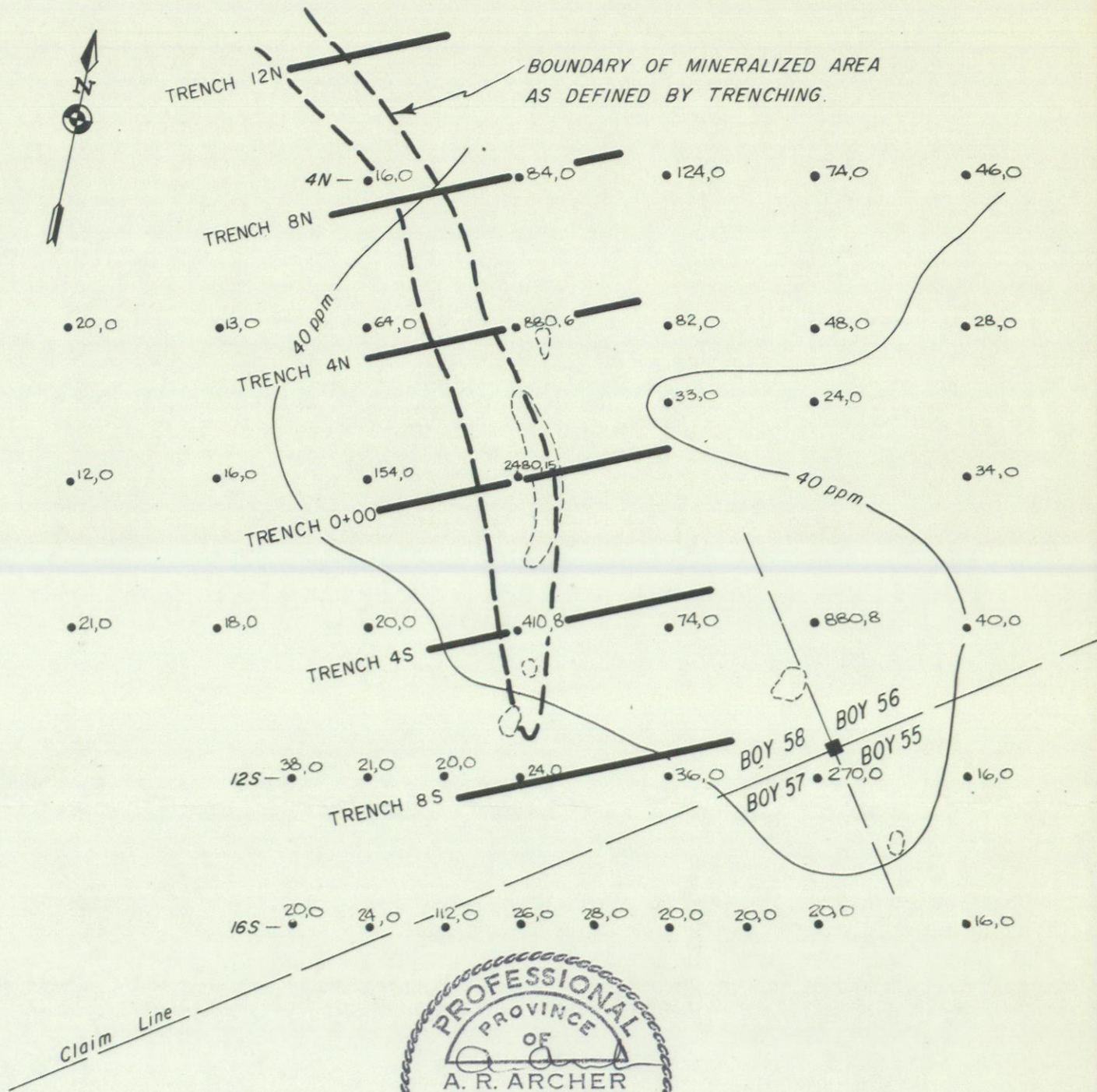


**FIG. W2**

ARCHER, CATHRO & ASSOCIATES LTD.  
**GEOCHEMICAL SURVEY**  
 BOY CLAIMS - DAWSON RANGE  
 WILLIAMS CREEK PROPERTY  
 DAWSON RANGE JOINT VENTURE  
 SCALE IN MILES



**Copper · Molybdenum**



LEGEND

○ Limit of Outcrop with malachite

● Soil sample Cu, Mo in ppm.

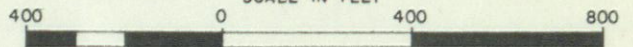
**FIG. W3**

ARCHER, CATHRO & ASSOCS. LTD.  
**GEOCHEMICAL SURVEY**

SHOWING # 1

WILLIAMS CREEK PROPERTY  
 DAWSON RANGE JOINT VENTURE

SCALE IN FEET



**Copper · Molybdenum**



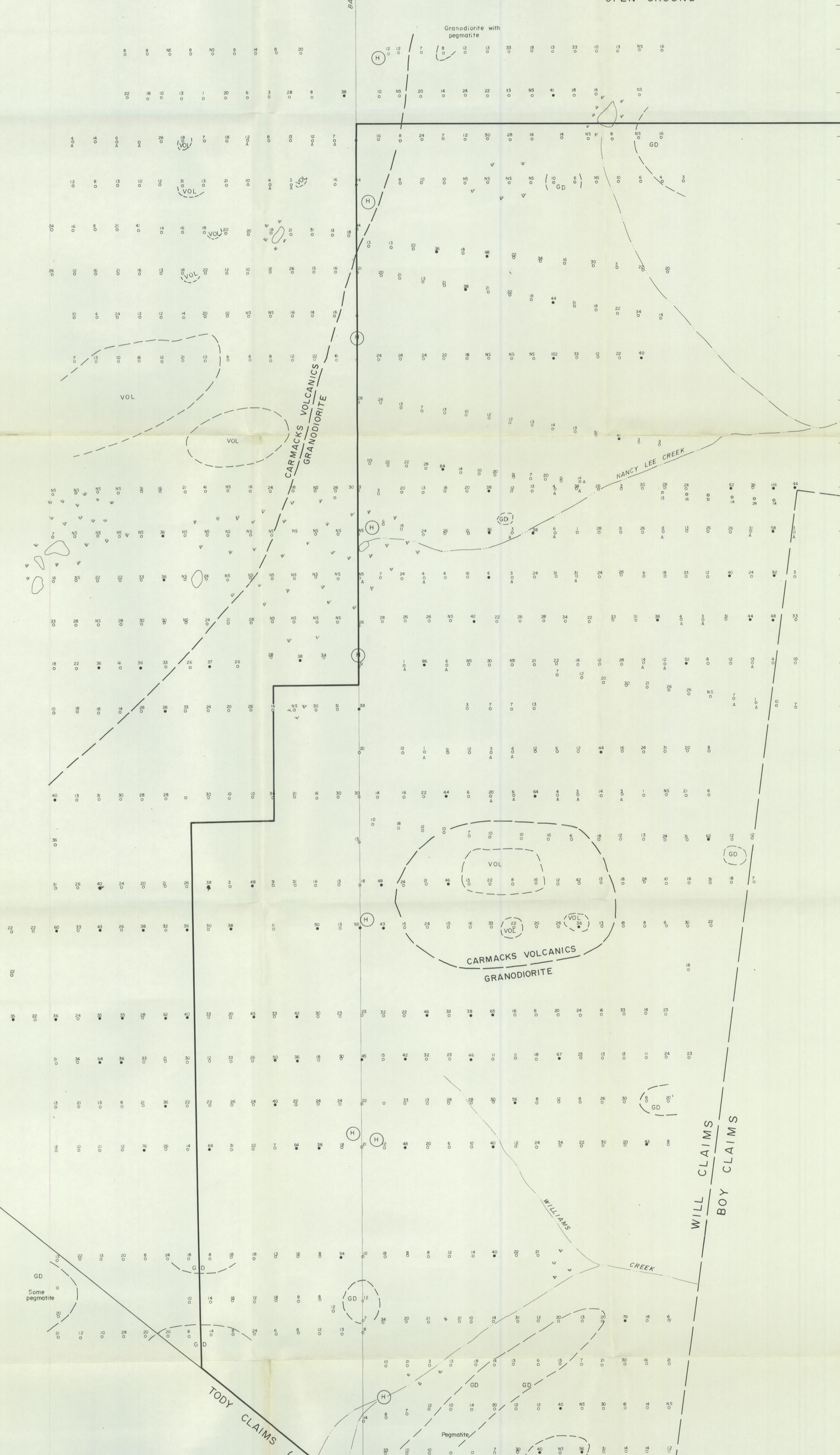
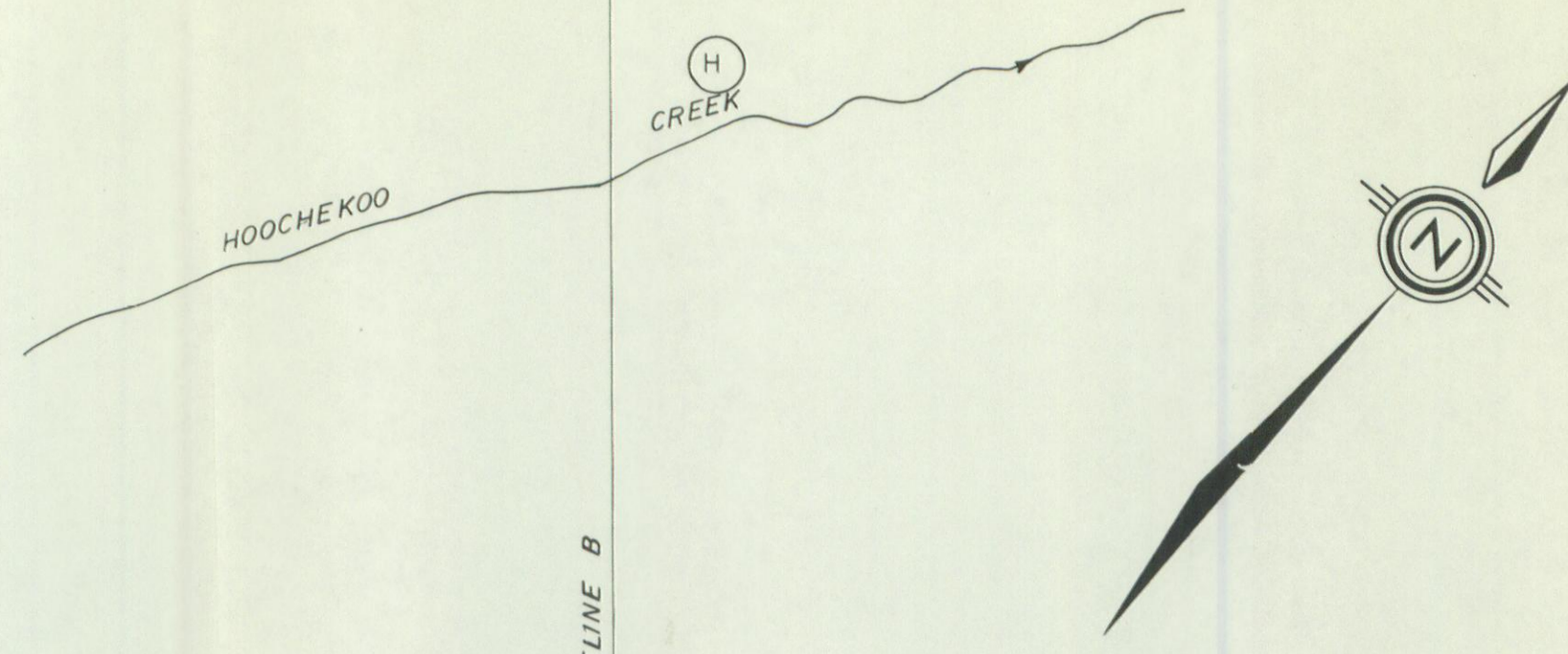
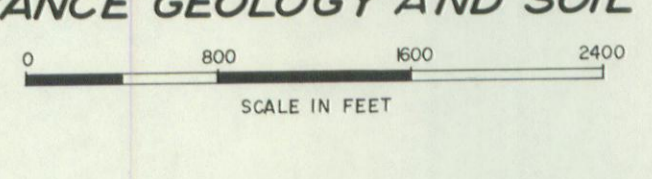
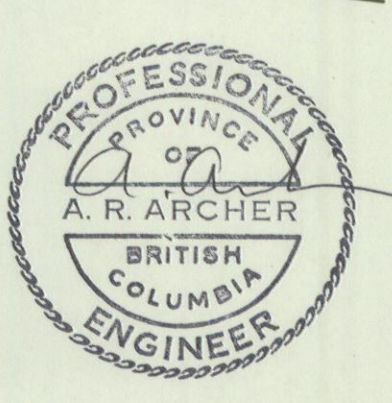


FIG. W5-A  
 ARCHER, CATHRO & ASSOCIATES LTD.  
 DAWSON RANGE JOINT VENTURE  
 WILLIAMS CREEK PROPERTY (WEST)  
**RECONNAISSANCE GEOLOGY AND SOIL SAMPLING**



- LEGEND**
- 15  
○ Copper Value in Parts Per Million
  - Sample Exceeding 35 Parts Per Million
  - A Sample Containing Much Volcanic Ash
  - (H) Heliport
  - (---) Boundary of Area Containing Outcrops or Flats
  - (VOL) Carmacks Volcanics
  - (GD) Granodiorite

**NOTE:** Soil samples were analysed for molybdenum but all values are less than 1 part per million



NOTE: Baseline continues to 363 (about 200' south of Merrice Creek)

0  
8  
16  
24  
32  
40  
48  
56  
64  
72  
80  
88  
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344

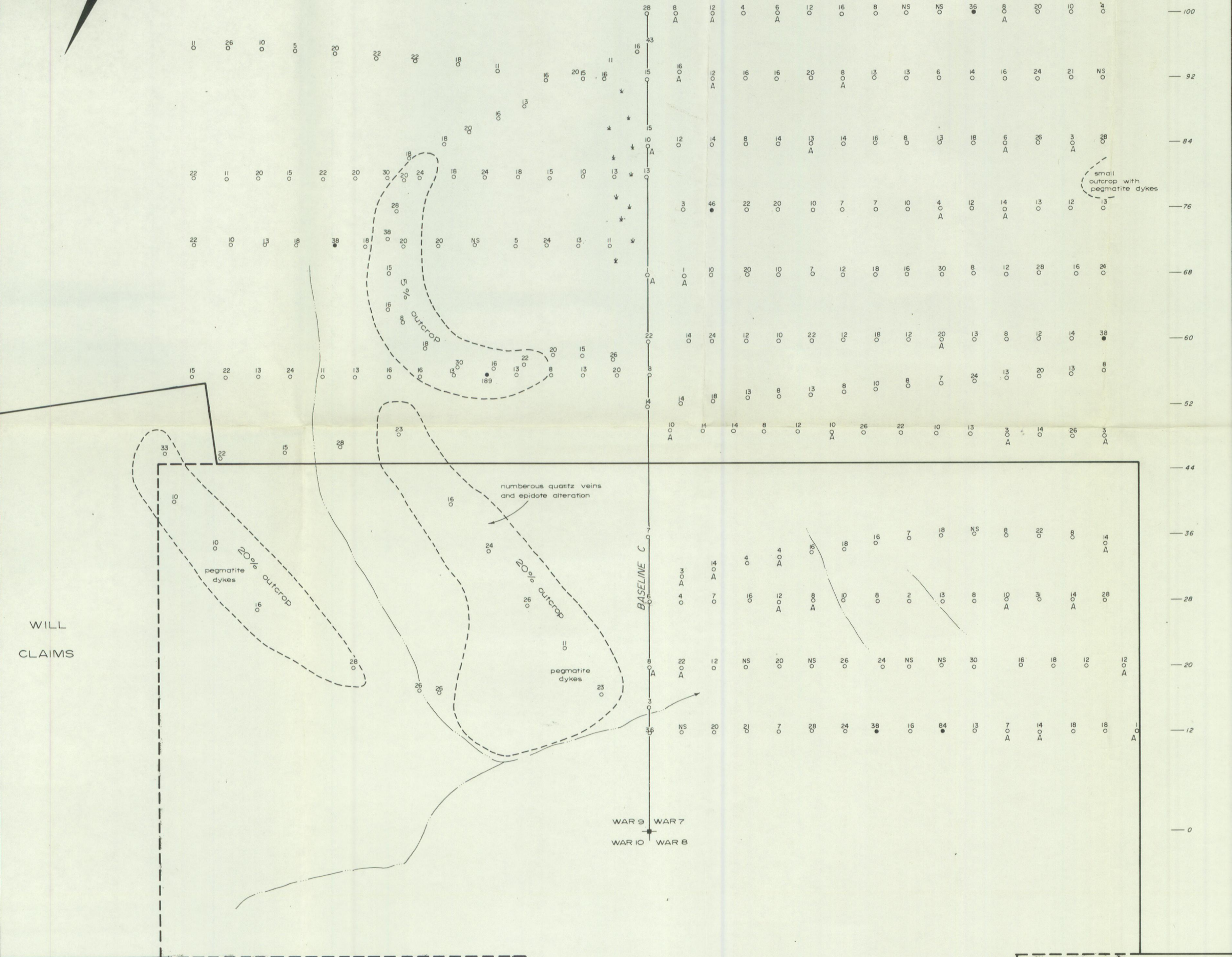
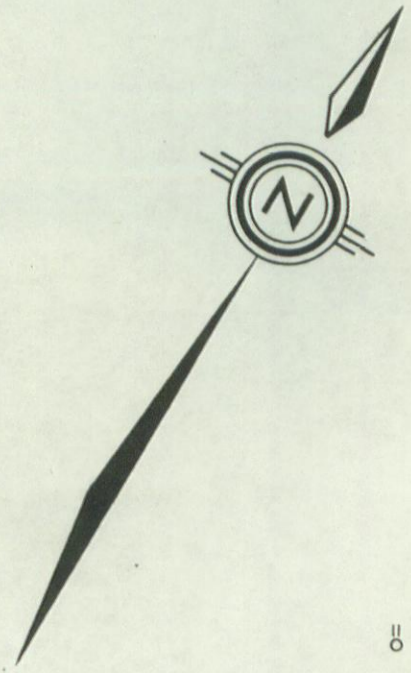
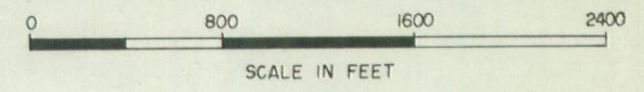
OPEN GROUND

OPEN GROUND

TODY CLAIMS (Expire Jan. 9, 1971)

WILL CLAIMS  
BOY CLAIMS

OPEN GROUND



WILL CLAIMS

WAR CLAIMS

BOY CLAIMS

BOY CLAIMS

No. 2 ZONE

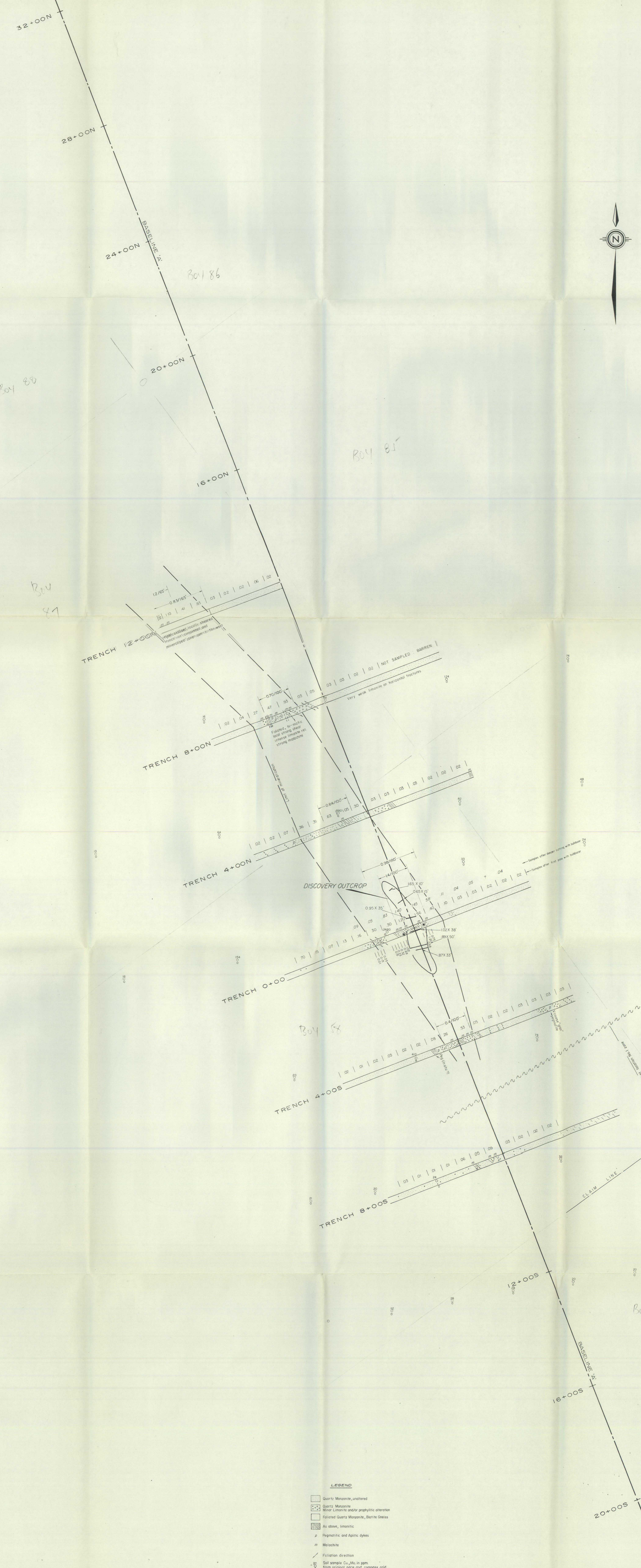
LEGEND

- 0.1 Copper value in parts per million
- Samples exceeding 35 parts per million
- \* Swampy ground
- A Samples containing much volcanic ash

Boundary of area containing outcrop, all outcrop is relatively unaltered fresh granodiorite or quartz monzonite.

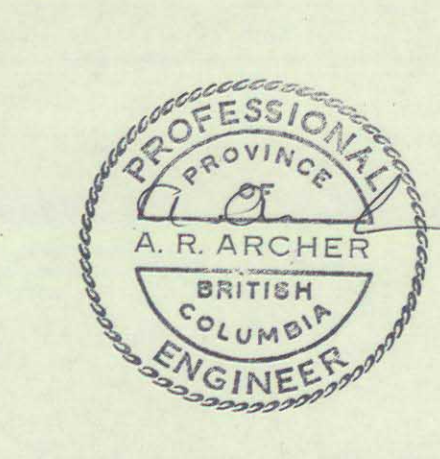
NOTE: Soil samples were analysed for molybdenum but all values were less than 1 parts in million.





**LEGEND**

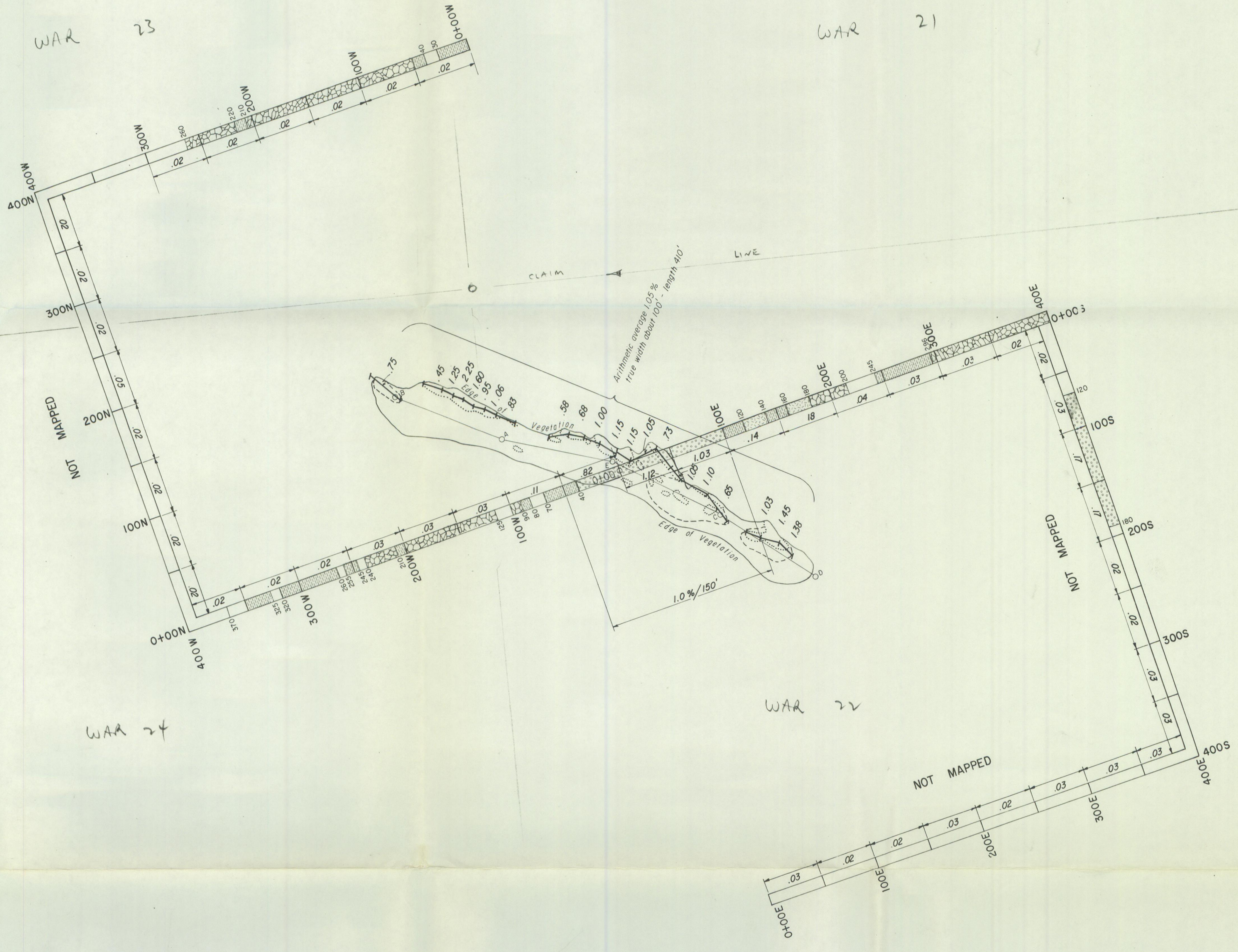
- Quartz Monzonite, unaltered
- Quartz Monzonite
- Altered Quartzite and/or gneissic alteration
- Foliated Quartz Monzonite, Barite Gneiss
- As above, leucocratic
- Pegmatitic and Aplitic dykes
- Melonchite
- Foliation direction
- Soil sample Cu, Mo in ppm from original pace and compass grid



**FIG. W6**  
 ARCHER, CATHRO & ASSOCIATES LTD.  
**GEOLOGY & SAMPLING No. 1 ZONE**  
 WILLIAMS CREEK PROPERTY  
 DAWSON RANGE JOINT VENTURE

SCALE IN FEET  
 0 100 200 300 400

OCTOBER 30-1970



**LEGEND**

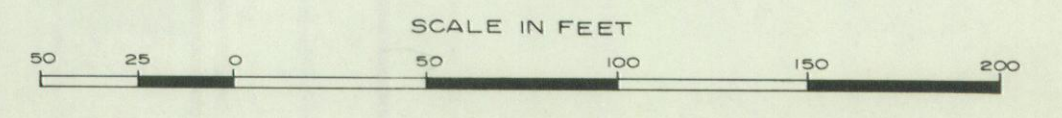
- UNIT 1**  
Green-black diorite — highly mafic, usually foliated with quartz lenses. Prominently malachite stained.
- UNIT 2**  
Fresh white intrusive rock—qtz. monzonite to qtz diorite resistant to weathering.
- UNIT 3**  
Probably equivalent to unit 2, weathers easily, limonite stained, occasionally has pink K-spars.
- UNIT 4**  
Probably equivalent to unit 2 with prominent pink K-spars, often accompanied by epidote and minor malachite.
- UNIT 5**  
Pegmatitic veins, macrocrystalline K-spar, biotite, and quartz. Usually 6" to several feet.

**SYMBOLS**

- Outcrop
- Outcrop float
- Channel sampling % copper

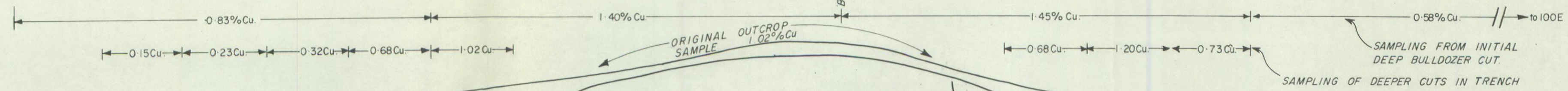


**FIG. W7**  
 ARCHER, CATHRO & ASSOCIATES LTD.  
**GEOLOGY & SAMPLING No. 2 ZONE**  
 WILLIAMS CREEK PROPERTY  
 DAWSON RANGE JOINT VENTURE



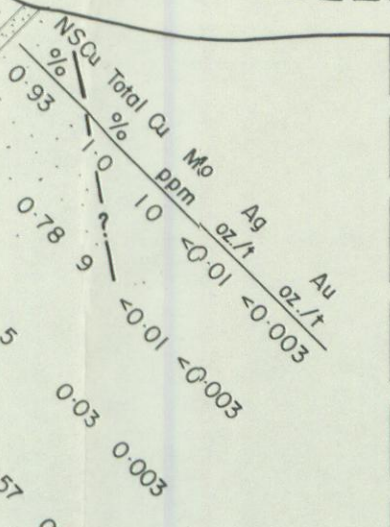
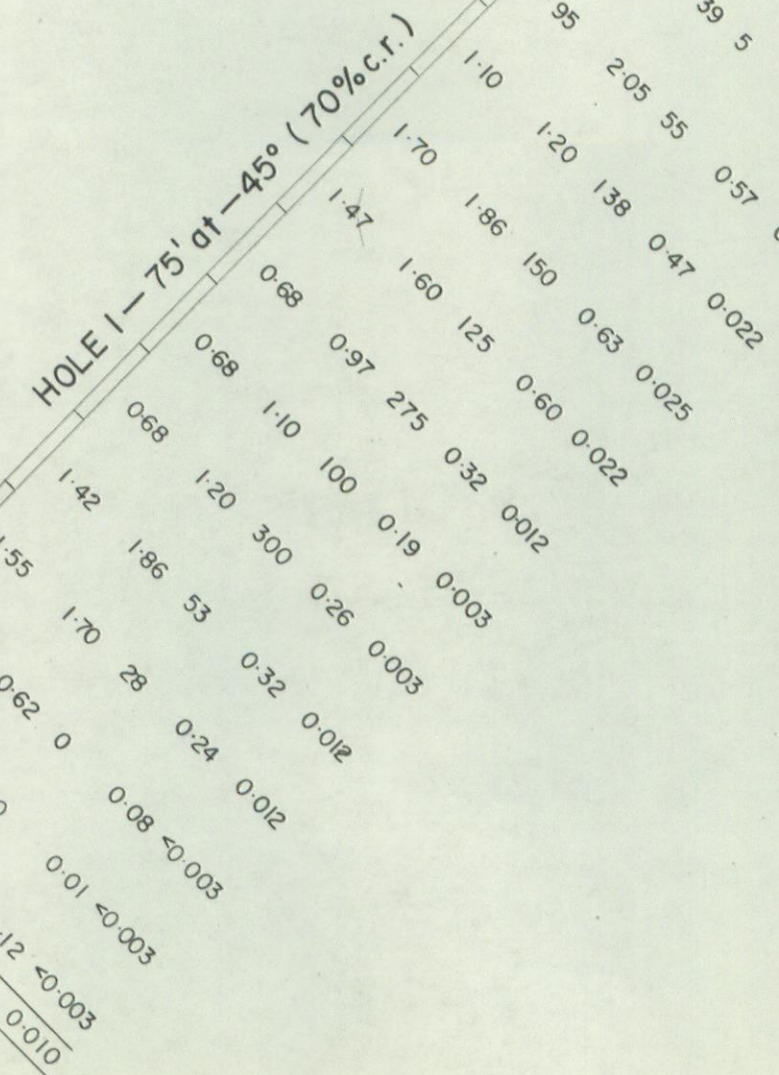
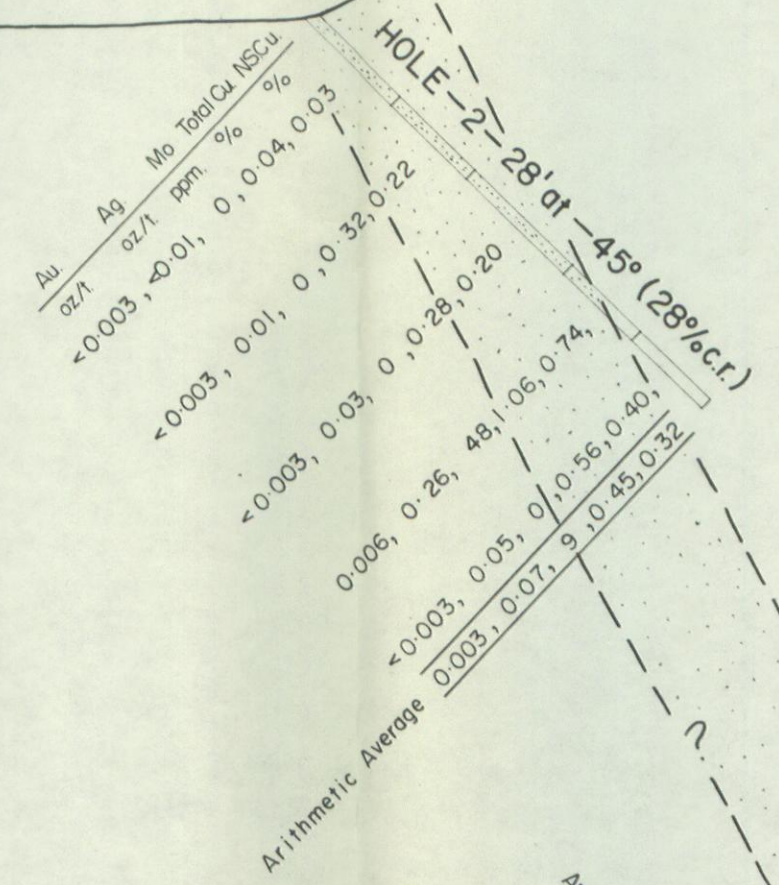
WEST ← → EAST

SECTION LOOKING NORTH



OVERBURDEN

OVERBURDEN



**LEGEND**

□ BIOTITE GNEISS

▨ QUARTZ MONZONITE

NOTE : NSCu = non sulphide copper.  
c.r. = core recovery



**FIG. W8**  
 ARCHER, CATHRO & ASSOCIATES LTD.  
**X-RAY DIAMOND DRILLING**  
 SECTION 0+00N - No. 1 ZONE  
 WILLIAMS CREEK PROPERTY  
 DAWSON RANGE JOINT VENTURE

