



COMBINED GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL
ASSESSMENT REPORT

on

ROAD 1-4 and RAIL 1-62 MINERAL CLAIMS

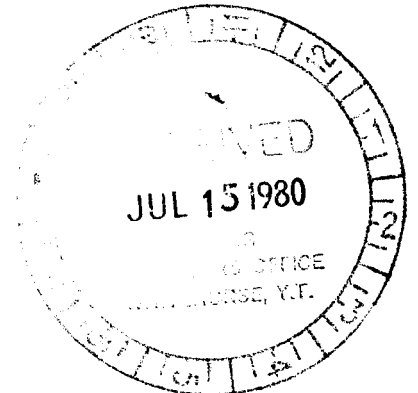
116-C-8

64°23'N - 140°10'W



Noranda Exploration Company Limited
(No Personal Liability)

090 637



May 1980

G. Macdonald

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representative of the amount of \$ 8000

[Handwritten signature]

Considered as representative work under Section 53 of the Mining Act.

E. R. BAXTER
Supervising Mining Recorder

[Handwritten signature]
Commissioner of Yukon Territory

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INTRODUCTION

=====

The claims referred to in this report are registered in the name of Noranda Exploration Company Limited (No Personal Liability) and comprise the following:

ROAD 1-4	YA 32570-73
RAIL 1-4	YA 32574-77
RAIL 5-12	YA 32666-73
RAIL 13-20	YA 32674-81
RAIL 21-24	YA 32777-80
RAIL 25-32	YA 32792-99
RAIL 35-46	YA 32800-11
RAIL 47-56	YA 32812-21
RAIL 57-59	YA 32822-24
RAIL 60-62	YA 32825-27

The property is located 35 miles northwest of Dawson City, Yukon Territory, on claim sheet 116-C-8 on the east side of the Yukon River. Access in 1979 was by helicopter from Dawson City.

Work in 1979 comprised reconnaissance-style prospecting and geological mapping (July 14, 28 and 29) by G. Macdonald and a grid magnetometer geophysical survey (July 28 - August 5) by L. Bradish. Both persons are employees of Noranda Exploration Company Limited (N.P.L.)

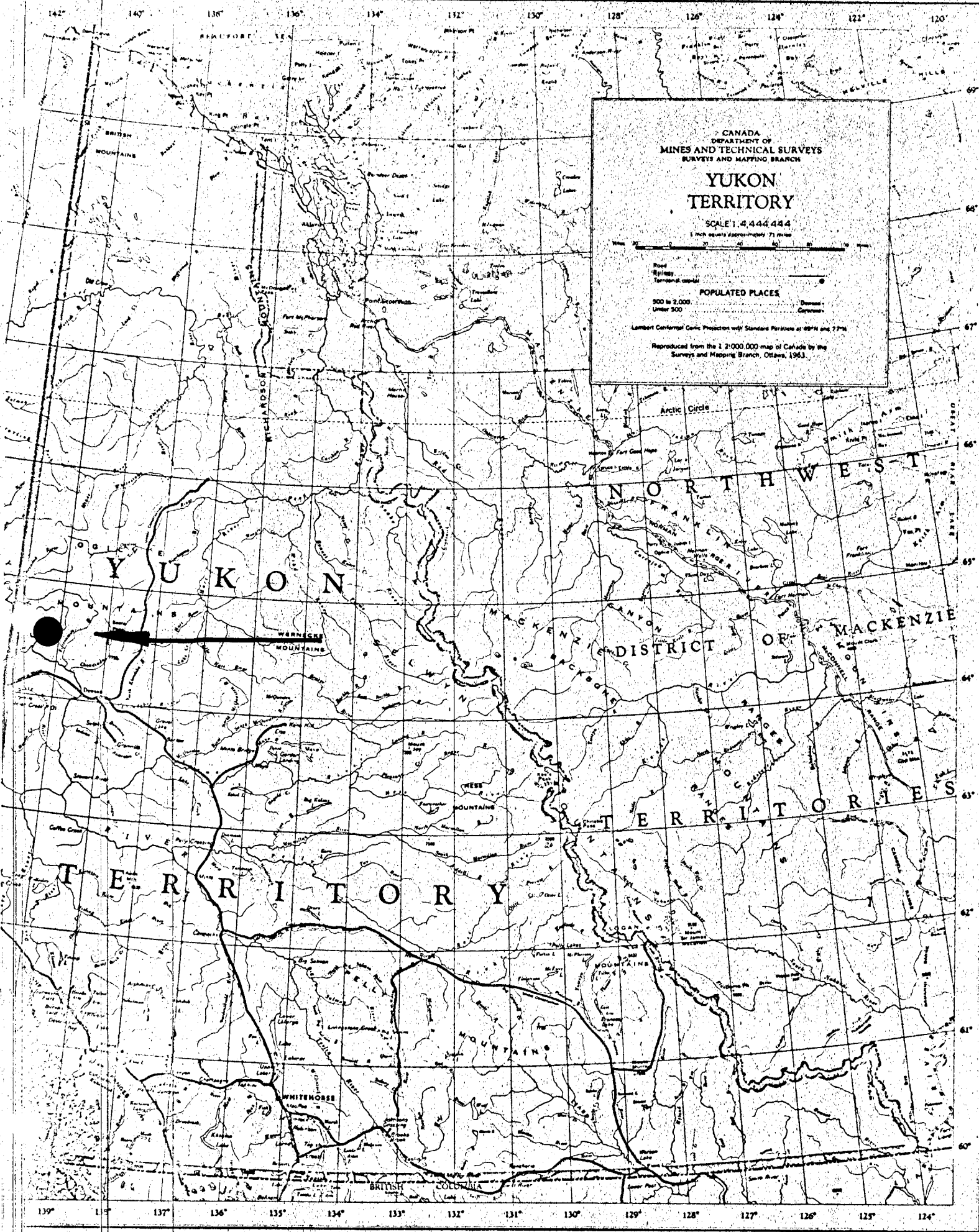
Line-cutting and a grid soil geochemical survey were conducted July 14-25, 1979 by Consolidated Ventures, Whitehorse, as contractor to Noranda.

Mapping survey control was provided by 1:10,000 scale topographical maps. Grid survey control was provided by chained compass lines 50 meters on centre with picketed stations every 50 meters, forming a grid pattern.

GEOLOGICAL RECONNAISSANCE

=====

Geological reconnaissance investigation was carried out by G. Macdonald, geologist for Noranda Exploration Company Limited (N.P.L.) Preliminary geology of the claims is presented in Drawing No. 5 to this report (in pocket).



CANADA
DEPARTMENT OF
MINES AND TECHNICAL SURVEYS
SURVEYS AND MAPPING BRANCH

**YUKON
TERRITORY**

SCALE 1:444 444

1 inch equals approximately 71 miles



Road
Ripity
Territorial capital

POPULATED PLACES

500 to 2,000
Under 500

Lambert Conformal Conic Projection with Standard Parallels at 69°N and 77°N

Reproduced from the 1:2,000,000 map of Canada by the
Surveys and Mapping Branch, Ottawa, 1963.

Arctic Circle

NORTHWEST

YUKON

DISTRICT OF MACKENZIE

TERRITORY

TERRITORIES

BRITISH COLUMBIA

GENERAL GEOLOGY

=====

The RAIL 1-62 and ROAD 1-4 mineral claims are underlain by highly regionally metamorphosed Lower (?) Paleozoic pelitic and carbonate sedimentary rocks intruded by a Cretaceous granodiorite and biotite quartz monzonite stock. Near their contact with intrusive rocks, the sedimentary units have undergone intense local metamorphism.

The following table summarizes lithologies noted:

Table 1
Table of Formations

Cretaceous	Fresh, fine to medium grained granodiorite to quartz monzonite
Lower Paleozoic	(i) Light grey and silvery weathering quartz-biotite ± muscovite schist; occasionally graphitic and/or garnet bearing
	(ii) Coarsely recrystallized limestone and/or skarn
	(iii) Chloritic quartzite and/or skarn
	(iv) Greenstone (amphibole schist or gneiss?) and minor quartzite. May overlie (i)

Granitic rocks on the property comprise a commonly fairly even-textured, medium grained granodiorite grading into(?) a very uneven-textured quartz monzonite near the intrusive margins. Quartz monzonites range from very fine grained to porphyritic with feldspar crystals to 2 cm in length. Phenocrysts of smokey-coloured quartz are common in the quartz monzonite. Mafic minerals (including predominantly biotite with lesser hornblende) are generally fresh and unaltered in both intrusive types.

Aplitic and pegmatitic dykes occur on the margins of the intrusive and appear to cut all rock units. Pegmatitic (muscovite-hornblende) quartz feldspar dykes occur up to a kilometer away from the contact. Quartz veining is common near the contact of the granitic and sedimentary rocks.

The sedimentary succession is comprised of a vertical assemblage of lithologies. A quartz-muscovite-biotite schist occurs at higher elevations. This unit is fairly recessive weathering and only seen in a few places. Occasionally this schist is graphitic (near RAIL 14 and 52) or contains small garnets (RAIL 59). The unit appears to dip gently (<15°) to the east.

The contact between the schist and underlying units is not exposed anywhere but may represent an unconformity.

Coarsely recrystallized limestone (Unit (ii))(faces to 0.5 cm) and a chloritic quartzite (Unit (iii))underlie the schist unit. The relationship between these two lithologies is not understood but they appear to grade into each other.

Unit (iv) is a dark green amphibolite or greenstone. This lithology was seen only in isolated outcrops (generally lower in valleys) and its relationship to Units (i) - (iii) is not known. A similar-appearing rock occurs off the property, near the Yukon River - perhaps overlying Unit (i).

STRUCTURAL GEOLOGY

=====

The property lies southwest of the main Tintina Trench. Sedimentary rocks on the RAIL mineral claims exhibit light isoclinal folding (quartzites) and development of an intense foliation which may obscure original bedding. Introduction of the granitic complex has produced an apparent "doming" effect locally on the stratigraphy intruded. High angle normal faults (related to en-echelon large scale Tintina faulting?) are common and apparently dictate drainage patterns of most smaller (and occasionally larger) streams.

SKARN (ALTERATION) GEOLOGY

=====

Economic mineralization on the RAIL 1-62 mineral claims occurs in skarn zones of which the following assemblages have been recognized:

- (i) Garnet-diopside-epidote ± pyrrhotite
- (ii) Quartz-diopside-calcite ± tremolite ± pyrrhotite
- (iii) Fine grained cherty grey-green skarn
- (iv) Calcite (recrystallized limestone) with accessory very fine grained darker minerals (diopside?)

With the exception of garnet, skarn minerals are microcrystalline. Garnet is occasionally present as 0.1 - 0.5 cm crystals. Garnet-diopside variants make up the largest percentage of total skarn (>75%?) and commonly contain 1 - 5% of finely disseminated non-magnetic to weakly magnetic pyrrhotites. Most scheelite (and other potentially economic minerals - minor chalcopyrite, sphalerite, molybdenite and galena) minerals occur in a dark, fine grained garnet-diopside skarn.

Assays of grab samples taken to date range from Tr. to 4.5% W₃, with the average being around 0.7%. Two outcrops sampled ran 0.22% and 0.75%.

GEOCHEMICAL SOIL SURVEY

=====

All soils were analyzed for copper, zinc, lead, molybdenum and tungsten at the Whitehorse Assay Office in Whitehorse, Yukon Territory; analyst was Roy Kato.

Sampling Method

Samples were obtained by digging holes with a maddock to a depth (if feasible) where visible "B" horizon or sub-outcrop was encountered. (The "B" horizon was preferably sampled.) Samples were placed in "Hi Wet Strength Kraft 3½ x 6 1/8" open end" envelopes on which the sample station co-ordinates were marked in indelible felt pen.

Laboratory Determination Method

The samples are first placed in a drying cabinet for a period of 24 to 48 hours; the sample material is then screened and sifted to obtain a -80 mesh fraction. The determination procedure for total copper, lead, zinc and molybdenum is as follows:

0.200 grams of the -80 mesh material is digested in 2 ml of HClO_4 and 0.5 ml of HNO_3 for approximately 4 hours. Following digestion, each sample is diluted to 5 ml with de-mineralized H_2O . A varian Techtron model AA-5 Atomic Absorption Spectrophotometer is used to determine the parts per million copper, lead, zinc and molybdenum content in each sample.

The theory of Atomic Absorption Spectrophotometer process is fully described in the literature and will not be elaborated upon in this report.

Presentation of Results

Results of the soil survey are presented in Drawings 2 (Cu and Pb) and 3 (Zn and W) of this report. These plan maps have a scale of 1:5,000 and present elements in parts per million.

Discussion of Results

The following table summarizes values as determined for the area:

Table 2
Summary of Soil Values

Cu	Threshold	24 - 40 ppm
	Anomalous	> 40 ppm
Zn	Threshold	70 - 99 ppm
	Anomalous	>100 ppm
Pb	Threshold	25 - 34 ppm
	Anomalous	> 35 ppm
W	Threshold	5 - 9 ppm
	Anomalous	>10 ppm

(a) Copper-Lead (Drawing No. 2)

Only erratic threshold to weakly anomalous responses were obtained in copper and lead geochemistry on the two grids surveyed. The significance of these results is not known.

(b) Zinc-Tungsten (Drawing No. 3)

GRID NO. 1:

A region of highly anomalous tungsten soil response extends from approximately 50+00 N to 58+00 N to 49+00 E to 50+50 E. Peak values on the grid are 900 ppm. Only two zinc samples returned as weakly anomalous; these were coincident with higher tungsten values.

GRID NO. 2:

A moderately anomalous tungsten soil response is present on the north side of Grid No. 2. The anomaly extends approximately from 50+00 W (57+00 - 58+00 N) to 57+00 W (54+00 - 55+00 N), although there are gaps of only background to threshold values on lines 53+00 W and 56+00 W. Moderately anomalous zinc values are present in two situations:

One - Spatially related to anomalous tungsten responses at 55+00 W / 57+00 N and 59+00 W / 57+00 - 58+00 N;

Two - Grouped as a zinc anomaly from 59+00 W / 53+00 N to 61+00 W / 52+00 N.

DISCUSSION OF RESULTS

=====

Grid soil geochemistry has been an effective tool in delineating areas of mineral potential on the RAIL/ROAD mineral claims. Both tungsten and zinc anomalies on Grids 1 and 2 reflect scheelite and sphalerite mineralization in alteration (skarn) zones along the contact of intrusive and sedimentary rocks. Mineralized garnet-diopside skarn in outcrop or float has been located in the area of both grid anomalies.

GEOPHYSICAL SURVEY

=====

A magnetometer survey was conducted on the soil geochemistry grids (Grids 1 and 2) by L. Braddish and G. Fenton of Noranda Exploration Company Limited (N.P.L.) between July 28 and August 5, 1979.

Two Scintrex MF2 magnetometers were used.

Field Procedure

The magnetometers were adjusted on the property such that background values would fall in the lowest positive range in order to attain highest accuracy. This adjustment, once made, was not changed for the duration of the survey. Both instruments were calibrated to a common reading at a base station to which checks were made periodically during the day. Diurnal drifts were thereby held to a minimum.

Presentation of Results

Results of the magnetometer survey are plotted on Drawing No. 4 in the pocket to this report. The results are plotted at a scale of 1:5,000 with a contour interval of 100 gammas.

Discussion of Results

The magnetic response is attributed to weakly magnetic pyrrhotite in skarn or altered quartz monzonite.

GRID NO. 1:

A magnetically anomalous region (highs and lows) extends from 50+00 E / 58+00 N to 46+00 E / 51+00 N with an arc-like pattern. The anomaly corresponds with the intrusive-sediment contact and is partially coincident with the tungsten soil geochemistry anomaly. Peak values were +1175 gammas (57+00 N / 49+50 E) and -285 gammas (54+50 N / 49+00 E).

GRID NO. 2:

No magnetic pattern was developed on Grid No. 2 to reflect the contact area or soil geochemistry anomaly. No magnetic response occurred in areas with 5%+ pyrrhotite in quartz-diopside \pm garnet skarn (58+00 W / 50+00 N).

CONCLUSIONS AND RECOMMENDATIONS

=====

Prospecting, soil geochemical surveys and a magnetometer survey have indicated that tungsten mineralization is widespread in a contact metamorphic zone on the RAIL/ROAD mineral claims.

Detailed mapping, additional grid geochemistry and geophysics and diamond drilling should test the economic potential of this occurrence.

Submitted by:



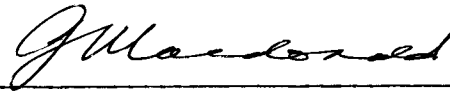
G. Macdonald, Geologist.

A P P E N D I C E S

STATEMENT OF QUALIFICATIONS

I, GLEN MACDONALD, of the City of Whitehorse in the Yukon Territory, DO
HEREBY CERTIFY that:

1. I have been employed as a Geologist by Noranda Exploration Company Limited (No Personal Liability) since May 1976.
2. I am a graduate of the University of British Columbia, with a Bachelor of Science degree in Geology.
3. I am a member of the Canadian Institute of Mining and Metallurgy.



G. Macdonald, Geologist,
Noranda Exploration Company Limited
(N.P.L.)

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Cassiar Creek

DATE March 1980

TYPE OF REPORT

a) Wages:

No. of Days 4
Rate per Day \$ 75.48767
Month of: June 1979
Total Wages 4 x \$ 75.48767 301.95

b) Food and Accomodation:

No of days 4
Rate per day \$ 36.61577
Month of: June 1979
Total Cost 4 x \$ 36.61577 146.46

c) Transportation:

No of days 4
Rate per day \$ 102.92758
Month of: June 1979
Total Cost 4 X \$ 102.92758 411.71

d) Instrument Rental:

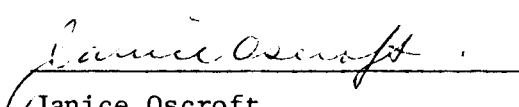
Type of Instrument
No of days
Rate per day \$
Month of:
Total Cost X \$

Type of Instrument
No of days
Rate per day \$
Month of:
Total Cost X \$

f) Analysis (See attached schedule)		Nil
g) Cost of preparation of Report		
Author		
Drafting	8.43	
Typing		<u>8.43</u>
h) Other:		
Camp & Field	6.86	
		<u>6.86</u>
Total Cost		<u><u>\$875.41</u></u>

e) Unit costs for
 No of days
 No of units
 Unit costs /
 Total Cost x

I certify the cost of \$875.41 is true and correct


Janice Oscroft
Branch Accountant

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Cassiar Creek

DATE March 1980

TYPE OF REPORT Combined Geological, Geophysical & Geochem

a) Wages:

No. of Days 79
Rate per Day \$75.48767
Month Of: July 1979
Total Wages 79 x \$75.48767 5,963.53

b) Food and Accomodation:

No of days 79
Rate per day \$36.61577
Month of: July 1979
Total Cost 79 x \$36.61577 2,892.65

c) Transportation:

No of days 79
Rate per day \$102.92758
Month of: July 1979
Total Cost 79 X \$102.92758 8,131.28

d) Instrument Rental:

Type of Instrument
No of days 24
Rate per day \$10.00
Month of: July 1979
Total Cost 24 X \$10.00 240.00

Type of Instrument

No of days

Rate per day \$

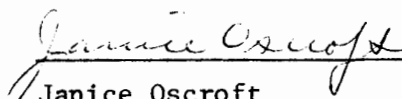
Month of:

Total Cost X \$

f) Analysis (See attached schedule)		<u>2,282.90</u>
g) Cost of preparation of Report		
Author		
Drafting	166.44	
Typing		
		<u>166.44</u>
h) Other:		
Camp & Field Supplies	135.40	
Consolidated Ventures	6,197.25	
Trans North Turbo Air	567.16	
C.P. Air	34.50	
Eldorado Hotel	753.46	
		<u>135.40</u>
 Total Cost		 <u>\$19,812.20</u>

e) Unit costs for	
No of days	
No of units	
Unit costs	/
Total Cost	x

I certify the total of 19,812.20 is true and correct.



 Janice Oscroft
 Branch Accountant

NORANDA EXPLORATION COMPANY, LIMITED
(WESTERN DIVISION)

DETAILS OF ANALYSES COSTS

PROJECT: Cassiar Creek

July 1979

<u>ELEMENT</u>	<u>NO. OF DETERMINATIONS</u>	<u>COST PER DETERMINATION</u>	<u>TOTAL</u>
Cu)			
Pb)	398	6.00	2,388.00
Zn)			
Mo)			
W)			
Sn	27	3.00	81.00
		Less 10%	(246.90)
W	26	2.00	52.00
	Mcl Prep. (4)	2.20	8.80

\$2,282.90

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Cassiar Creek

DATE March 1980

TYPE OF REPORT Combined Geological, Geophysical & Geochem

a) Wages:

No. of Days 33
Rate per Day \$ 75.48767
Month Of: August 1979
Total Wages 33 x \$75.48767 2,491.09

b) Food and Accomodation:

No of days 33
Rate per day \$ 36.61577
Month of: August 1979
Total Cost 33 x \$36.61577 1,208.32

c) Transportation:

No of days 33
Rate per day \$ 102.92758
Month of: August 1979
Total Cost 33 X \$102.92758 3,396.61

d) Instrument Rental:

Type of Instrument Magnetometer
No of days 13
Rate per day \$ 10.00
Month of: August 1979
Total Cost 13 X \$10.00 130.00

Type of Instrument

No of days

Rate per day \$

Month of:

Total Cost X \$

f) Analysis
(See attached schedule)

g) Cost of preparation of Report

Author	75.49	
Drafting	69.52	
Typing	75.49	<u>220.50</u>

h) Other:

Camp & Field Supplies	56.56	
Supervision: D.E. Cross P. Eng.		
G.E. Dirom P. Eng.		
3 days @ 200.00	600.00	
		<u>656.56</u>

Total Cost \$8,103.08

e) Unit costs for

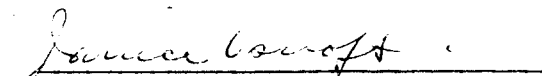
No of days

No of units

Unit costs /

Total Cost x

I certify the cost of \$8,103.08 is true and correct



Janice Oscroft
Branch Accountant

NORANDA EXPLORATION COMPANY, LIMITED

STATEMENT OF COST

PROJECT Cassiar Creek

DATE March 1980

TYPE OF REPORT Combined Geological, Geophysical & Geochem

a) Wages:

No. of Days 1
Rate per Day \$75.48767
Month Of: September 1979
Total Wages 1 x \$75.48767 75.49

b) Food and Accomodation:

No of days 1
Rate per day \$36.61577
Month of: September 1979
Total Cost 1 x \$36.61577 36.62

c) Transportation:

No of days 1
Rate per day \$102.92758
Month of: September 1979
Total Cost 1 X \$102.92758 102.93

d) Instrument Rental:

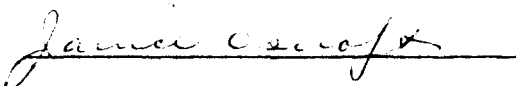
Type of Instrument
No of days
Rate per day \$
Month of:
Total Cost X \$

Type of Instrument
No of days
Rate per day \$
Month of:
Total Cost X \$

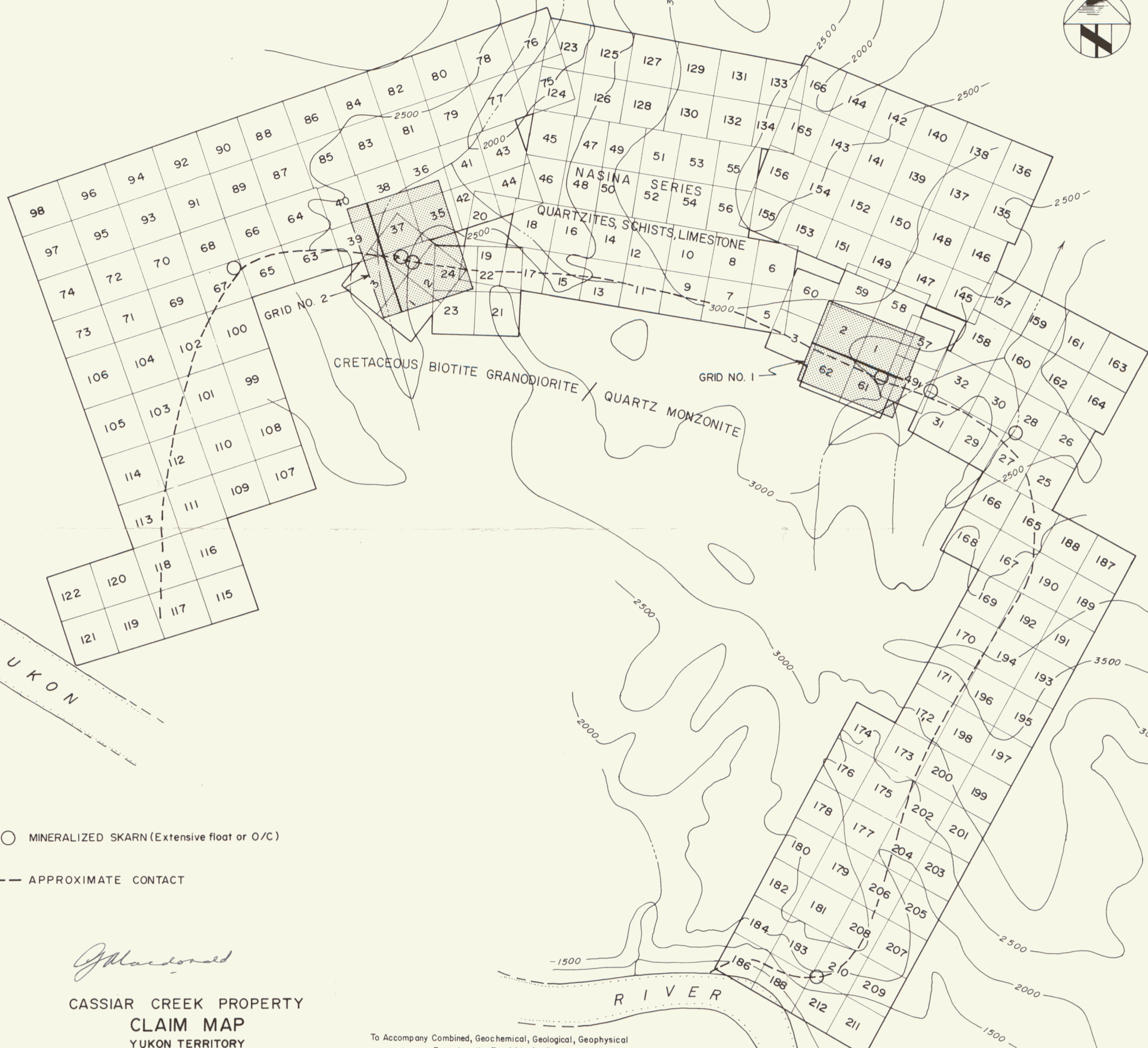
f) Analysis (See attached schedule)		
g) Cost of preparation of Report		
Author		
Drafting	2.11	
Typing		<u>2.11</u>
h) Other:		
Camp & Field Supplies	1.71	
		<u>1.71</u>
Total Cost		<u>\$218.86</u>

e) Unit costs for		
No of days		
No of units		
Unit costs	/	
Total Cost	x	

I certify the cost of \$218.86 is true and correct



Janice Oscroft
Branch Accountant



○ MINERALIZED SKARN (Extensive float or O/C)

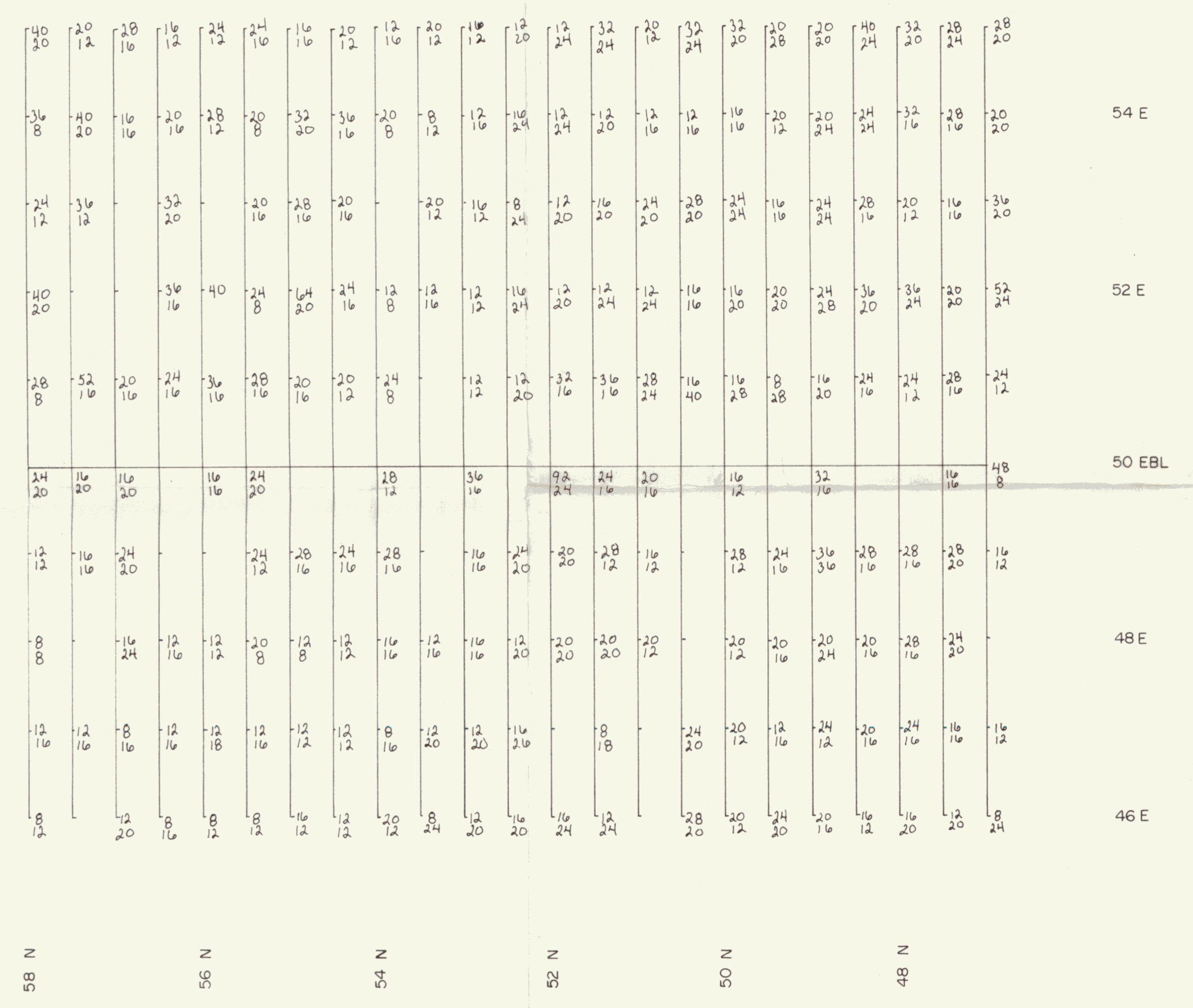
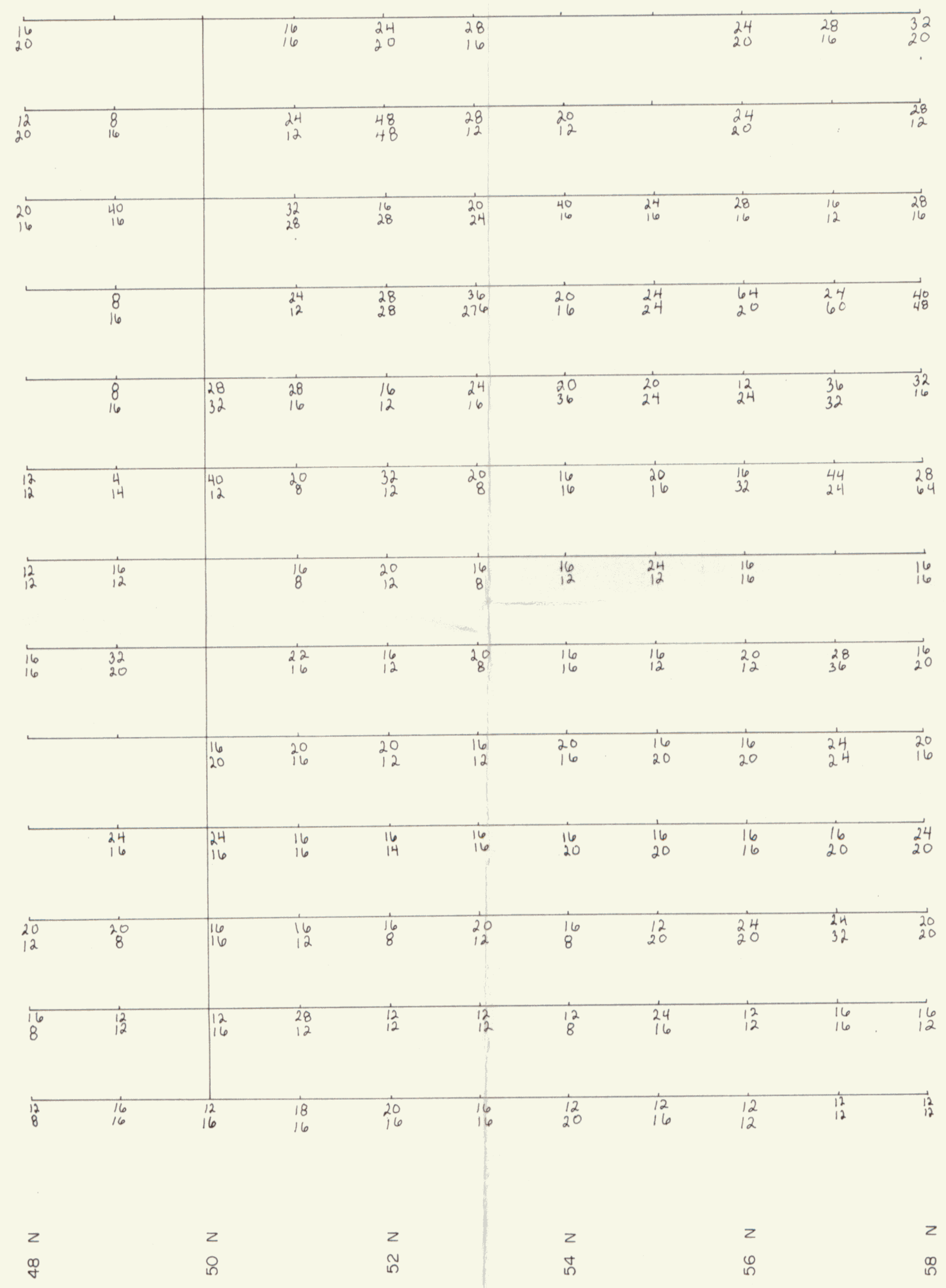
--- APPROXIMATE CONTACT

G. Macdonald

**CASSIAR CREEK PROPERTY
CLAIM MAP
YUKON TERRITORY**

NTS: 116C/8 — SCALE 1 INCH = 1/2 MILE — DATE: AUGUST 1979
DWG. NO. 1

To Accompany Combined, Geochemical, Geological, Geophysical
Report on the Road 1 to 4, Rail 1-212 M.C.,
Dawson M.D., Yukon By Glen Macdonald
Dated May 1980



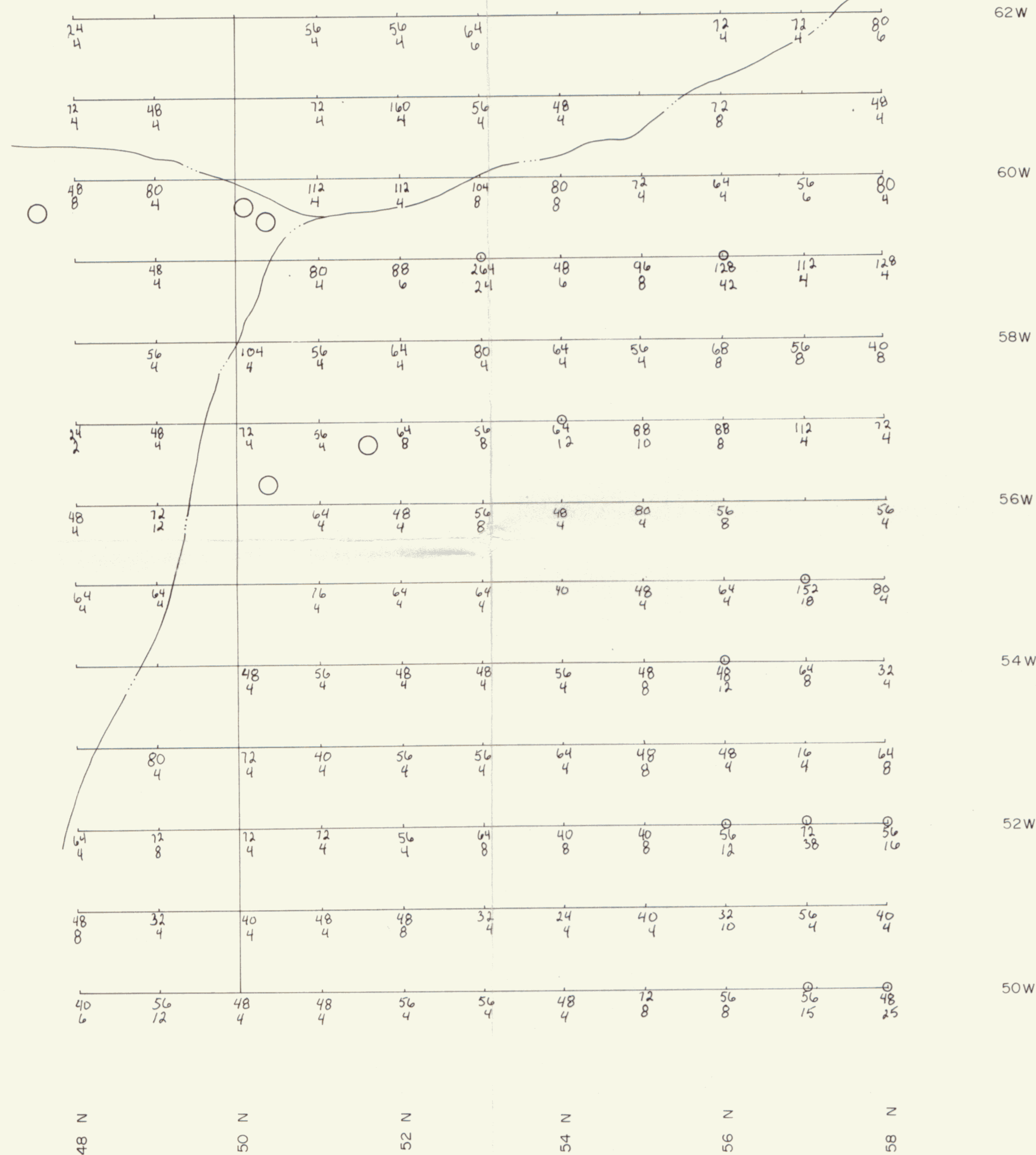
G. Macdonald



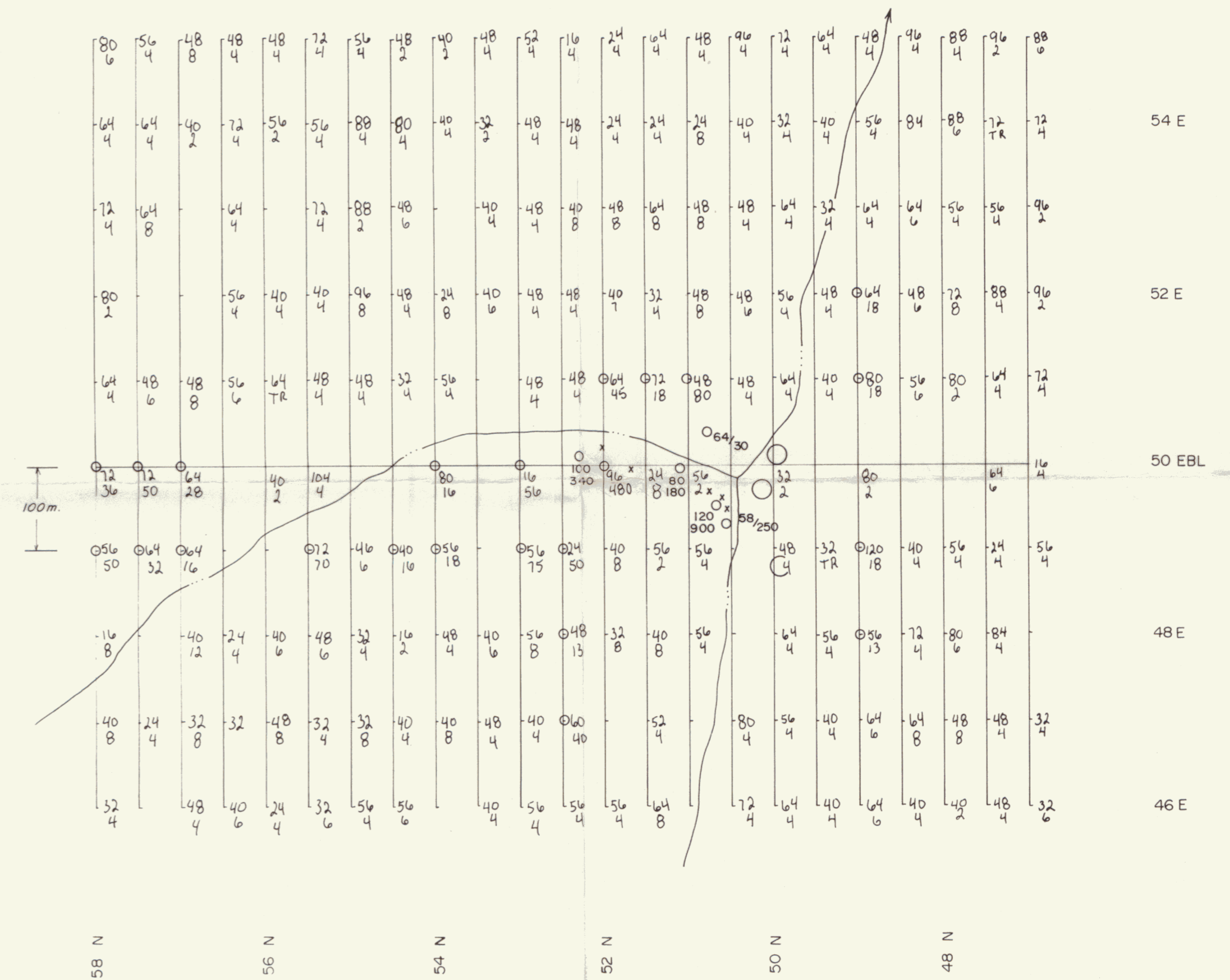
To Accompany Combined, Geochemical, Geological, Geophysical Report on the Road 1 to 4, Rail 1-212 M.C., Dawson M.D., Yukon. By Glen Macdonald Dated May 1980

REVISED	CASSIAR CREEK	
	GEOCHEMICAL SOIL SURVEY	
	Cu & Pb IN P.P.M.	
PROJ. No.	SURVEY BY: G.M.	DATE: ... AUG. 1979
N.T.S. 1:16,000	DRAWN BY: J.V., S.D.H.	SCALE: 1:5000
DWG. No. 2	NORANDA EXPLORATION	
	OFFICE: VANC.	

GRID No. 2



GRID No. 1



LEGEND

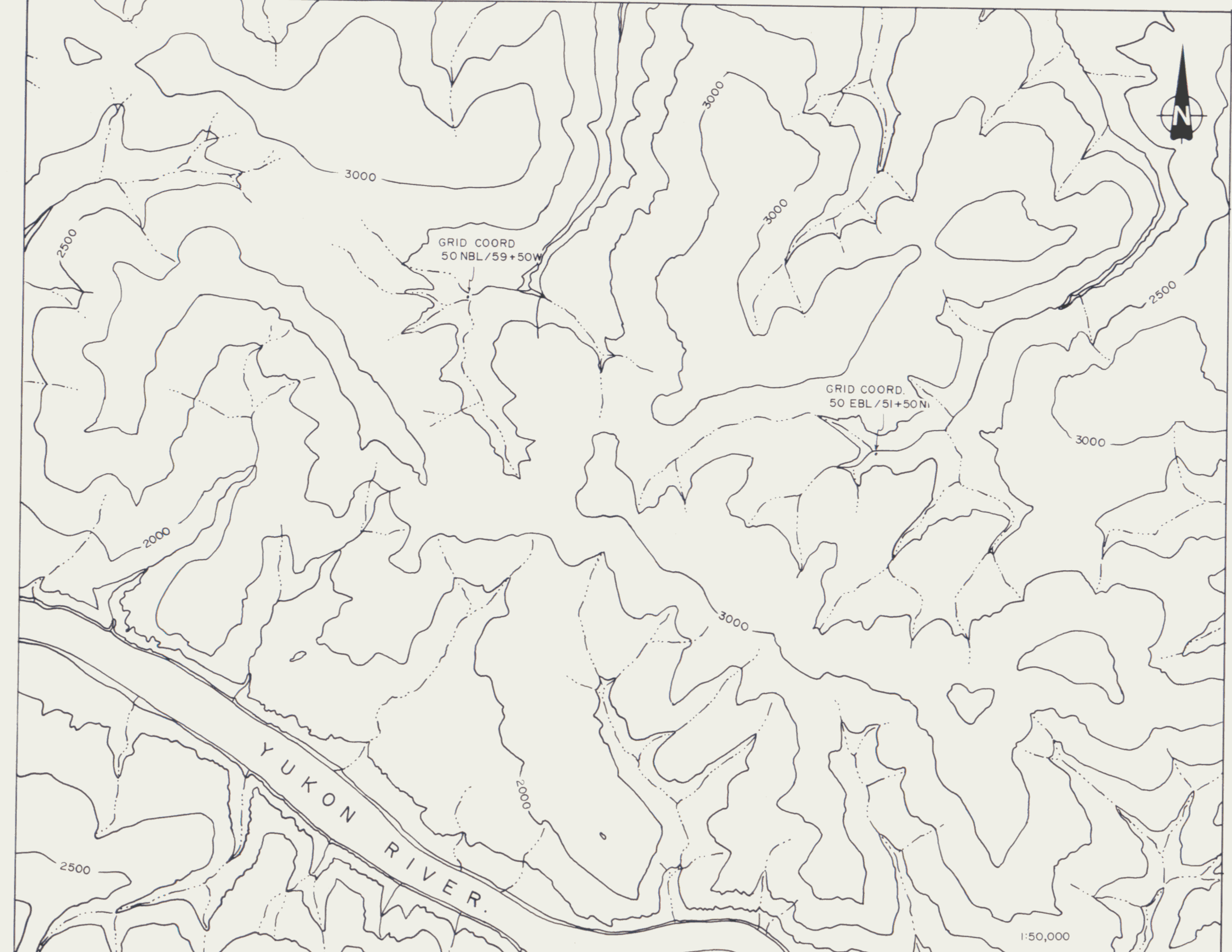
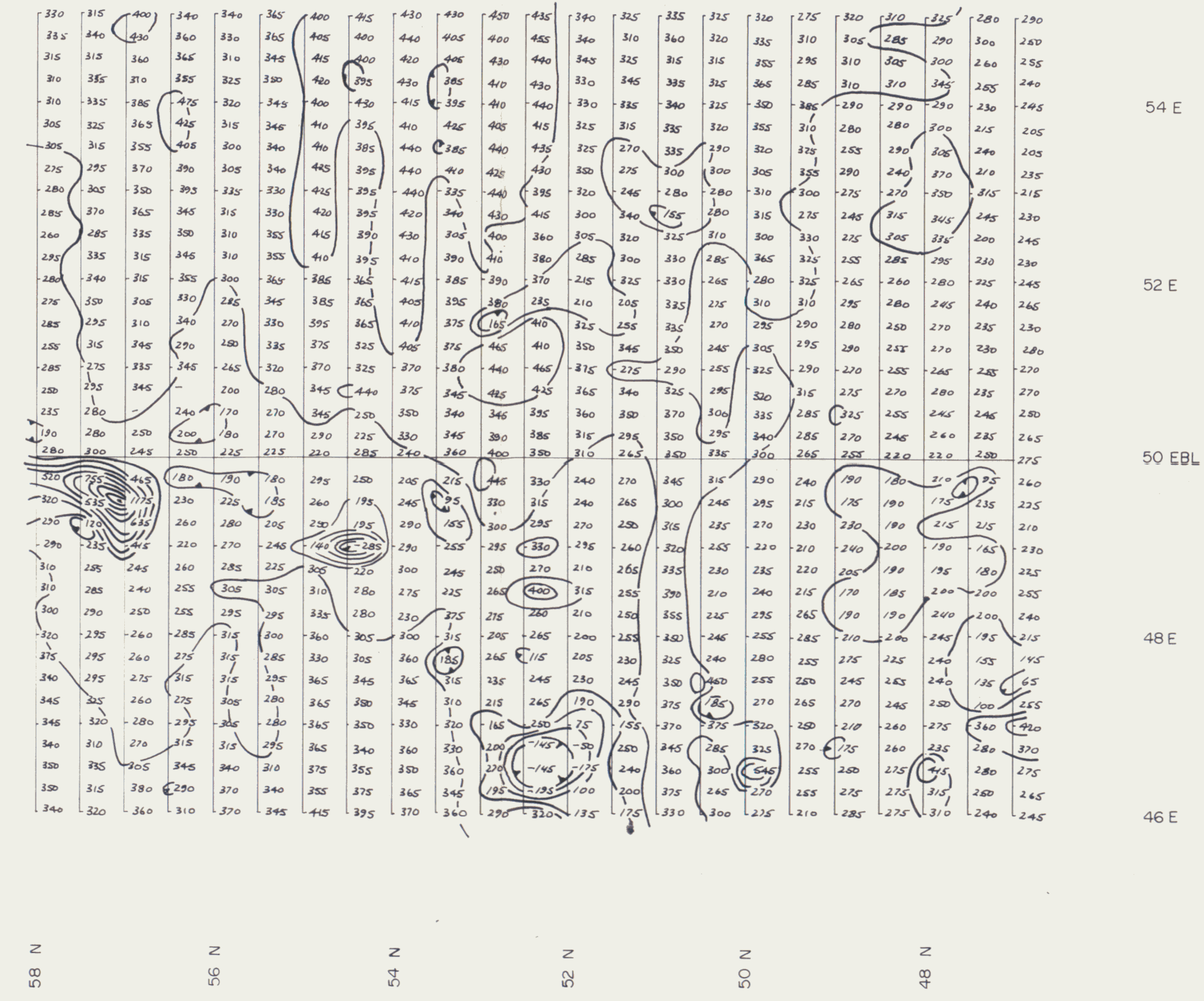
- CAMP
- CHOPPER PAD
- MINERALIZED O/C (SILICIFIED G-D SKARN)
- x MINERALIZED FLOAT IN PITS.
- ANOMALOUS SOIL SAMPLE

To Accompany Combined, Geochemical, Geological, Geophysical
Report on the Road 1 to 4, Rail 1-212 M.C.,
Dawson M.D., Yukon. By Glen Macdonald
Dated May 1980



Glen Macdonald

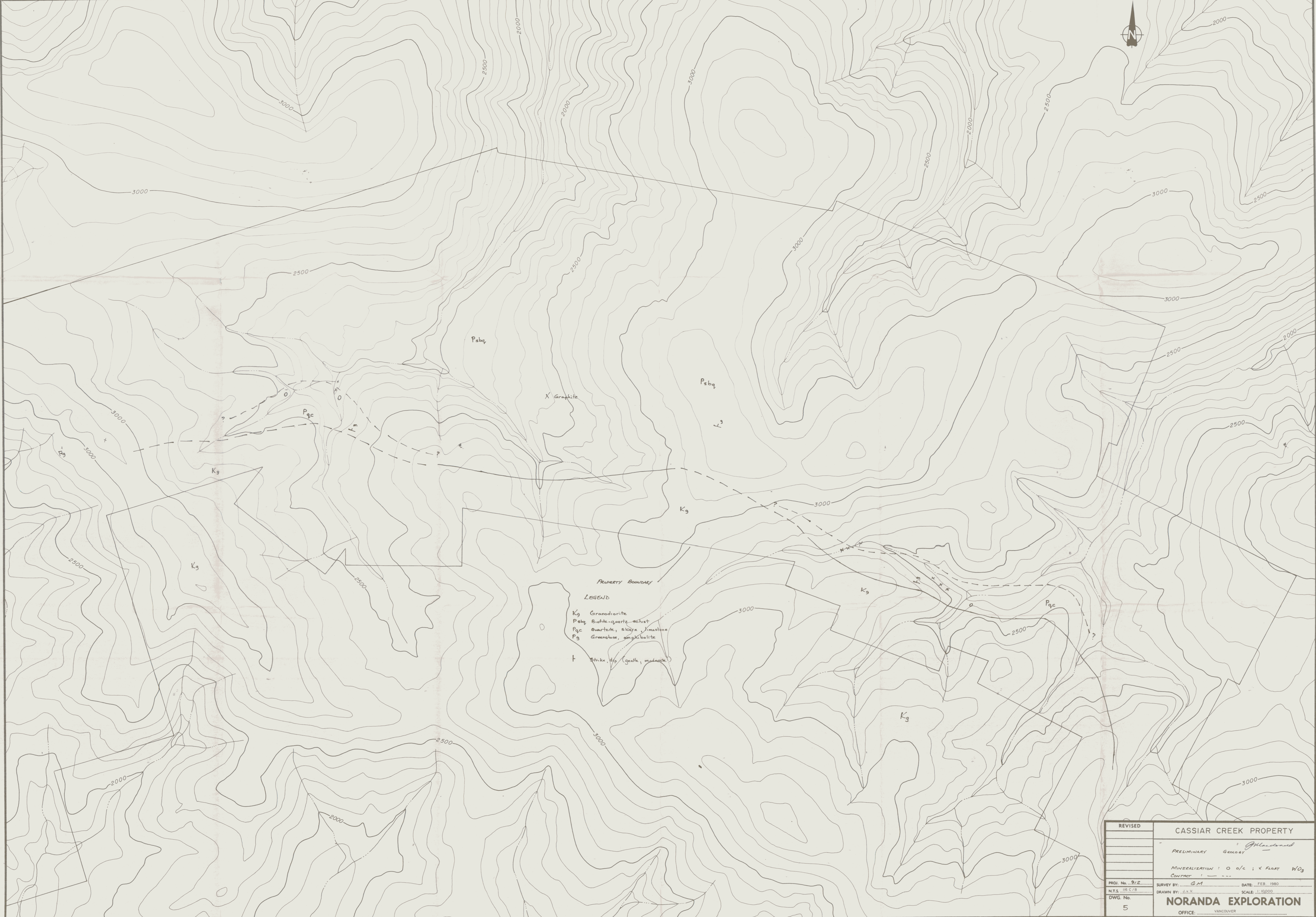
REVISED	CASSIAR CREEK	
OCT (G.M.)		
	GEOCHEMICAL SOIL SURVEY Zn & W IN P.P.M.	
	(Zn/W)	
PROJ. No. 912	SURVEY BY: G.M.	DATE: AUG 1979
N.T.S. 1:16,000	DRAWN BY: J.V.V., S.D.H.	SCALE: 1:5000
DWG. No. 3	NORANDA EXPLORATION	
	OFFICE: VANC.	



J. Macdonald

REVISED	CASSIAR CREEK	
	MAGNETOMETER SURVEY VERTICAL FIELD	
	CONTOUR INTERVAL : 100 Y	
PROJ. No.	SURVEY BY: L.C.B. & G.L.F.	DATE: JUL. AUG. 1979
N.T.S. 1:16,000	DRAWN BY: L.C.B.	SCALE: 1:5000
DWG. No. 4	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	

To Accompany Combined, Geochemical, Geological, Geophysical Report on the Road 1 to 9, Roll 1-212 M.C., Dawson M.D., Yukon By Glen Macdonald Dated May 1980



PROPERTY BOUNDARY

LEGEND

Kg Granodiorite

Psg Biotite-quartz schist

Pgc Quartzite, siltstone, limestone

Pg Greenshale, amphibolite

T Strike slip (gentle, moderate)

REVISED	CASSIAR CREEK PROPERTY	
	PRELIMINARY Geology <i>Glendon</i>	
	MINERALIZATION: O o/c; X FLAT WD ₃	
	CONTACT: ---	
PROJ. No. 9/E	SURVEY BY: GM	DATE: FEB. 1980
N.T.S. 1:625	DRAWN BY: J.Y.V.	SCALE: 1:10000
DWG. No. 5	NORANDA EXPLORATION	
	OFFICE: VANCOUVER	