



**WELCOME NORTH MINES LTD. (N.P.L.)**

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WELCOME NORTH MINES LTD. AND GETTY MINES LTD.

VANGORDA '78 PROJECT

GEOLOGICAL AND GEOCHEMICAL REPORT

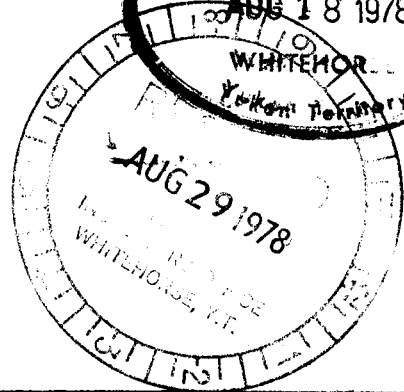
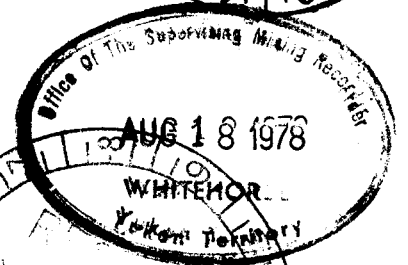
ON THE

EVA 49 - 82 CLAIM GROUP

N.T.S. 105K-5

WHITEHORSE MINING DISTRICT

YUKON TERRITORY



DURING THE PERIOD JUNE 27

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of \$5000.00

*[Handwritten Signature]*

Resident Geologist or  
~~Resident Mining Engineer~~

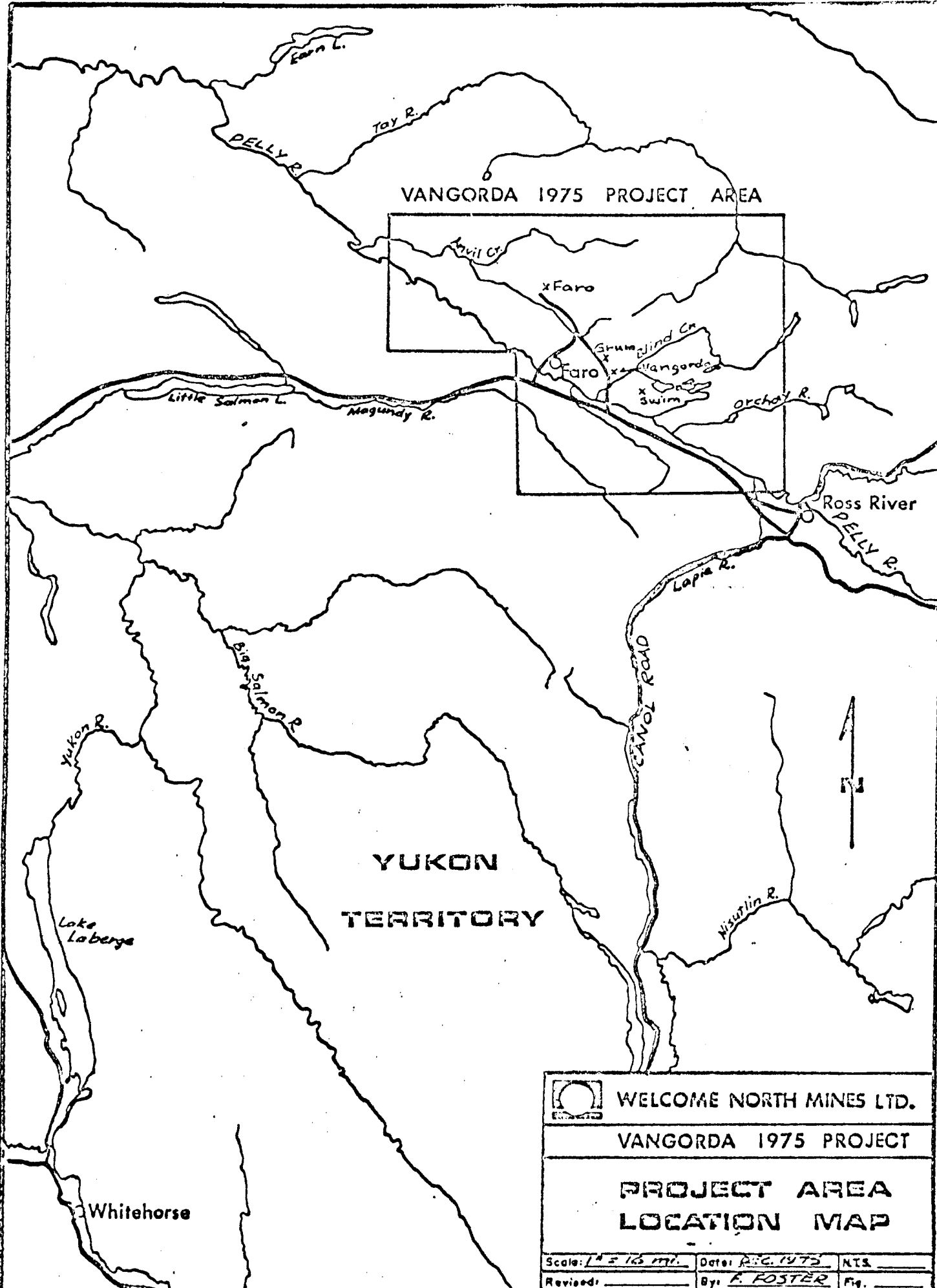
Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. R. BAXTER  
Supervising Mining Recorder

*[Handwritten Signature]*  
Commissioner of the Yukon Territory


Aug. 3, 1978.

090334



VANGORDA 1975 PROJECT AREA

YUKON TERRITORY

		
WELCOME NORTH MINES LTD.		
VANGORDA 1975 PROJECT		
PROJECT AREA LOCATION MAP		
Scale: 1" = 16 mi.	Date: P.C. 1975	NTS.
Revised:	By: F. FOSTER	Fig.

Whitehorse

Lake Laberge

Yukon R.

Big Salmon R.

Little Salmon L.

Magundy R.

Tay R.

PELLY R.

Earn L.

Avil Cr.

x Faro

Shunglind Cr.

x Faro

x Mangorda

x Swim

Orchard R.

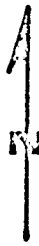
Ross River

PELLY R.

Lapie R.

CANAL ROAD

Waurin R.



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## INTRODUCTION

The EVA 1-47 claims were staked in 1975 as part of the original Vangorda Joint Venture. Ground acquisition was based upon projected, favourable stratigraphy and the known presence of geophysical anomalies outlined by Dynasty Exploration Ltd. in the area. The claim block was enlarged with the staking of EVA 49-82 in 1976 as the result of exploration activities by the Vangorda Project.

Previous work in the vicinity of the EVA claim block included:

- gravimetric surveys
- magnetic surveys
- electromagnetic surveys
- geochemical surveys
- geological mapping

Exploration work by the Vangorda Project entailed:

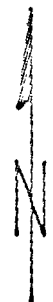
- 1975 a) The establishment of a control grid involving 18.4 miles of cut or brushed-out line.
- b) CEM electromagnetic and magnetic surveys over the grid to extend coverage and verify results of previous surveys.
- c) Contour soil and silt sampling.
- d) Geological mapping to correlate and verify previous mapping by Dynasty.
- 1976 a) 2,740 feet of diamond drilling in three holes.
- b) Staking of the EVA 49-82 claims to the west of the original claim block.
- 1977 a) 13 miles of additional grid line covering the EVA 49-82 claim block in preparation for geochemical and geophysical surveys.

During the period June 21, 1978 to June 30, 1978 Welcome North Mines Ltd. and Getty Mining Pacific Ltd. carried out a program of geological mapping and geochemical soil sampling over the 13 miles of additional grid line covering the EVA 49-82 claims. This report is primarily concerned with this latter work.

MINERAL CLAIMS

The EVA 1-82 claim group consists of the following 73 contiguous mineral claims located in the Whitehorse Mining District of the Yukon Territory (see Fig. 1).

<u>CLAIMS</u>	<u>GRANT NUMBERS</u>	<u>RECORDING DATE</u>
EVA 1-24	Y9240 <sup>2</sup> <del>1</del> -Y92426	Feb. 13, 1975
EVA 25-39	Y92427-Y92441	Feb. 17, 1975
EVA 49-82	YA7602-YA7635	Aug. 17, 1976 *****




ARO Group  
Cyprus Anvil

ROTO Group  
Cyprus Anvil

ALICE Group  
Vangorda

JOE Group  
Lion Mines

	WELCOME NORTH MINES LTD.
VANGORDA 1976 PROJECT	
EVA 1-39 & 49-82 Claims	
Claim Location Map	
Scale 1" = 1/2 mi.	Date: Jan. 1977
NTS 1:25,000	

SUMMARY AND CONCLUSIONS

The western part of the EVA 49-82 claims overlies a stratigraphic horizon of known massive sulphide potential as shown on Plate 1. The heavy till and talus cover makes the geological interpretation of the eastern part of the EVA 49-82 claims uncertain, however the northernmost EVA 49-82 claims lie within the granodiorite of unit 11. The EVA 49-82 claims are located farther north than shown on the claim map.

### LOCATION AND ACCESS

The EVA 1-82 claims are located in the Whitehorse Mining District of the Yukon Territory (N.T.S. 105K-5) at latitude 62°26'N, and longitude 133°48'W, 125 miles northeast of Whitehorse, Yukon Territory and 13 miles northwest of the town of Faro, Yukon Territory (Fig. 2).

Access to the property can best be gained by helicopter from Faro or by one cat trail from the Anvil minesite situated 7 miles east of the property in Rose Creek valley. This ground access route is serviceable only by tracked vehicle or trail bike. The route traverses the northeast slope of Rose Creek valley and ends above treeline on a ridge one mile east of the property. A cat trail in much poorer condition provides access to the eastern portion of the property from the top of this ridge.

The property is located on a broad bench of glacial overburden, about 200 feet thick, in the bottom of Anvil Creek valley two miles northeast of the junction of Anvil Creek and Rose Creek. All the property is below treeline and 70 percent of the property is covered by muskeg. Anvil Creek borders the property on its eastern side and a gentle hill which gives way to the slopes of a northeast trending ridge flanking the north of Anvil Creek valley occupies the central and western portion of the property.

Outcrop is extremely limited and occurs in a few isolated locations on the eastern flanks of the gentle hill found in the central region of the property.

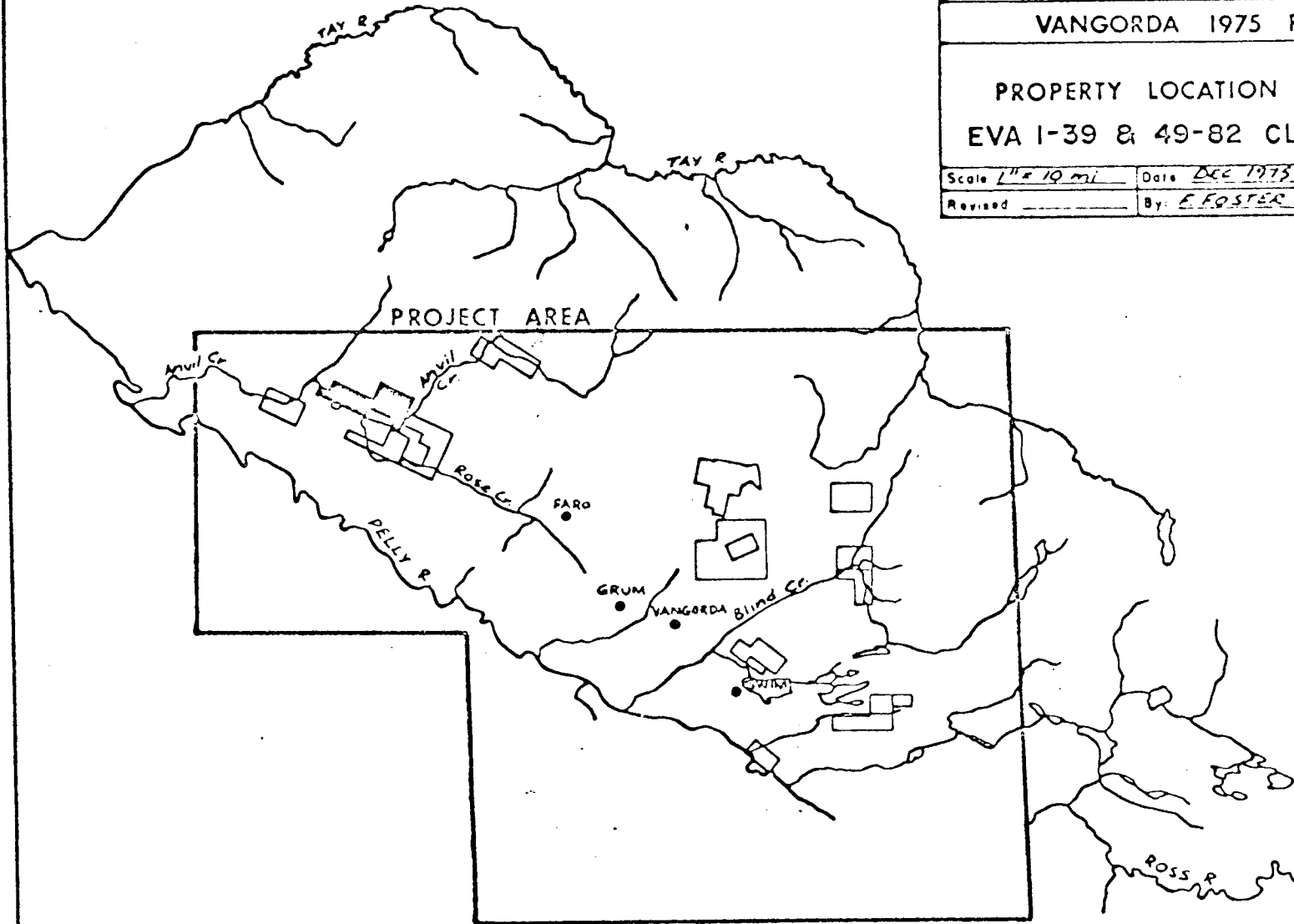


WELCOME NORTH MINES LTD.

VANGORDA 1975 PROJECT

PROPERTY LOCATION MAP  
EVA 1-39 & 49-82 CLAIMS

Scale <u>1" = 10 mi</u>	Date <u>DEC 1975</u>	NTS <u>105%</u>
Revised _____	By <u>E. FOSTER</u>	Fig <u>2</u>



## REGIONAL GEOLOGY

The Anvil District, as outlined in Fig. 3, lies immediately northeast of the Tintina Trench, the probable locus of a major zone of northwest-southeast transcurrent faulting.

The central part of the district is formed by the Anvil Range, the dominating structure being a doubly plunging arch-like feature around the Anvil batholith. The core of the Anvil Range is underlain by granitic rocks for which potassium-argon age determinations suggest an age of eighty-ninety million years. The Anvil Arch is flanked on the southwest and northeast by phyllites, calc-silicate gneisses and schistose rocks thought to be of Cambrian (?) to Ordovician age; these metasediments which have undergone at least three phases of deformation are host to the known massive sulphide deposits of Faro, Vangorda, Grum and Swim.

The schistose quartz-rich host rocks of the Faro sulphide deposits are confined to the upper part of a unit of carbonaceous biotite-muscovite andalusite whose sections are sometimes graphitic. Small greenstone lenses are often found within this sequence. This section constitutes the lower member of a 6,000-foot thick sequence of biotite-muscovite schist, calc-silicate gneiss and skarn, phyllite, chloritic greenstone bodies, and tuffaceous phyllite.

The phyllitic host rocks of the Grum, Vangorda and Swim sulphide deposits are confined to graphitic quartz-rich sections of phyllite situated close to relic volcanic complexes of greenstone, chloritic phyllite, limestone, and pyroxenite in the lower and upper parts of an estimated 3,000-foot thick unit of phyllite. The phyllite unit is separated from the lower schist unit in many areas by thick sections of calc-silicate gneiss.



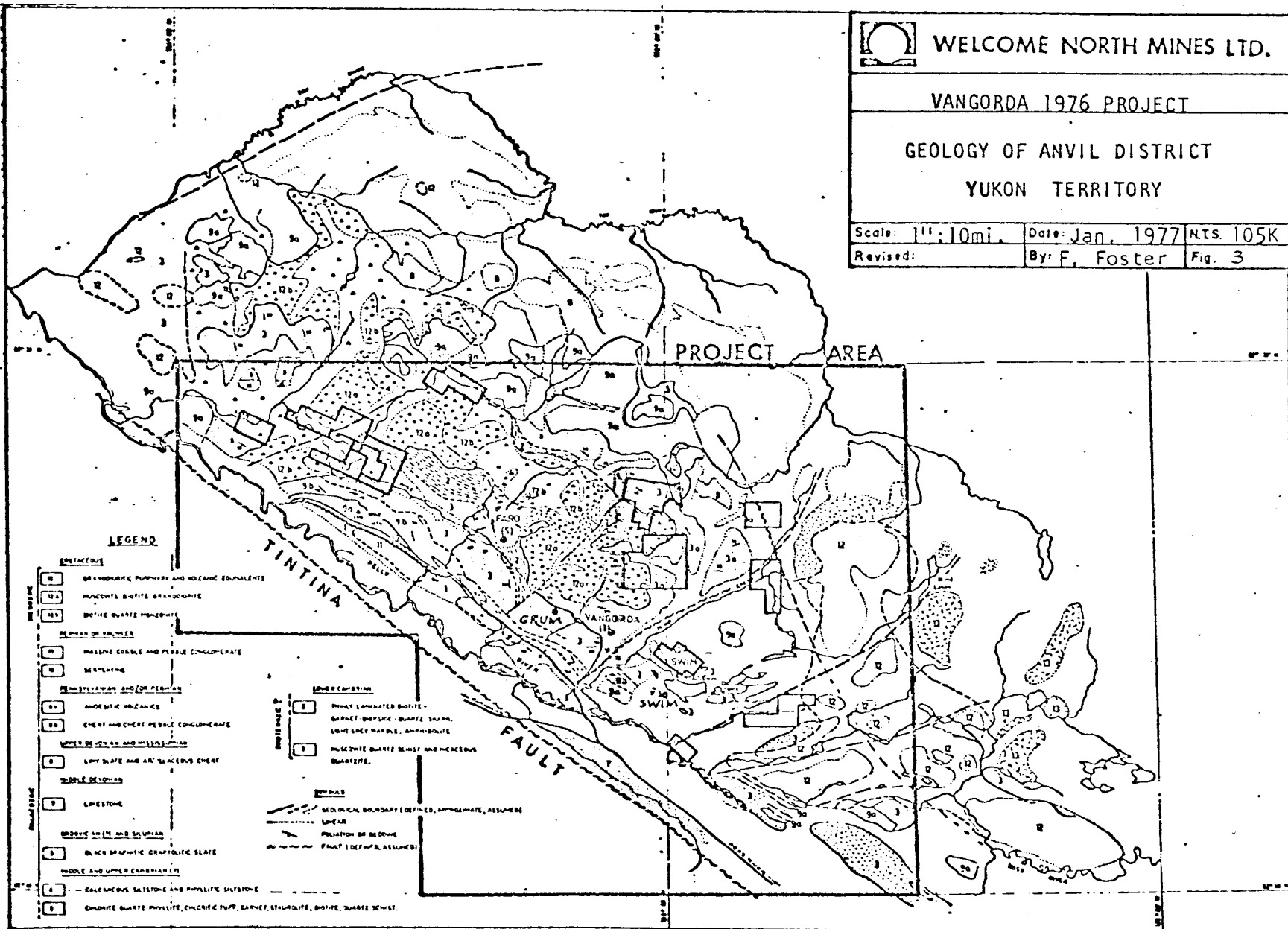
WELCOME NORTH MINES LTD.

VANGORDA 1976 PROJECT

GEOLOGY OF ANVIL DISTRICT  
YUKON TERRITORY

Scale: 1" = 10mi. Date: Jan. 1977 NTS. 105K

Revised: By: F. Foster Fig. 3



The sulphide bodies of the Anvil district are tabular and lie in the plane of the crenulation foliation developed during the first phase of deformation. The long axes coincide with the intersection of primary and secondary foliation. The sulphide deposits appear to have been only slightly affected by the regional metamorphism of phyllite host rocks. However, a district average grain size increase from the Swim northwest to the Faro deposits reflects a thermal metamorphic gradient caused by the intrusion of the Anvil Batholith. The base metals have been introduced into the phyllite prior to its metamorphism and deformation.

It appears that two units, the pelitic schists and phyllites, are host rocks for the four economically important sulphide masses and are also host to several smaller, presently non-economic deposits in the area.

Chloritic tuffaceous greenstone outcrops are close to all four deposits but are nowhere immediately against ore. Graphite is present in host rocks around all four deposits, but it is far more prevalent around the Swim body than near the Vangorda, Grum or Faro deposits.

A description of the rocks that make up the stratigraphic section of the Anvil Arch, and their tentative ages, is listed on the following page. The description has been taken from Tempelman-Kluit (1968) and modified by field observations and by information obtained from Cyprus Anvil Mining Company.

Cenozoic	Tertiary			
		14a	Rhyolitic tuff	
		14a	Quartz-feldspar porphyry	
RELATIONS NOT KNOWN				
Mesozoic	Cretaceous or Tertiary	13	Saundersitized porphyritic hornblende diorite	
	INTRUSIVE INTO UNITS 2, 3, AND 11			
	Age unknown	12b	Hornblende diorite, gabbro	
		12a	Pyroxenite, sometimes cataclastic and serpentinized	
	INTRUSIVE INTO UNITS 2 AND 3			
	Cretaceous	Anvil Batholith	11	Porphyritic biotite-quartz monzonite and granite diorite; muscovite-biotite granodiorite; foliated equivalents
INTRUSIVE INTO UNITS 2, 3, AND 8				
Lower or Middle Triassic		10	Massive, well indurated cobble and pebble conglomerate with fragments of mica quartz schist (Unit 1), basalt (Unit 8), chert (Unit 8a), limestone (Unit 8c) and serpentinite (Unit 9); brown sandstone slate and argillaceous limestone	
Upper Permian or Lower Triassic		9	Serpentinite and serpentinized peridotite	
FAULT BOUNDED				
Paleozoic	Upper Permian	Anvil	8c	Light gray, massive resistant recrystallized limestone
	Lower Permian	Range	8b	Massive green basalt, commonly amygdaloidal, includes common pyroclastic and less common pillowed varieties, metamorphosed equivalents near granitic bodies
	Lower Permian and Upper Permian		8a	Greenish grey, pale green and brick red argillaceous and tuffaceous chert
	UNCONFORMABLE ON UNITS 3, 4, 5, 6, 7			
	Upper Devonian		7	Grey slate, chert, greywacke, chert pebble conglomerate and limestone
	UNCONFORMABLE ON UNITS 3 AND 4			
	Middle Devonian		6	Limestone and dolomite
	Silurian and Devonian		5	Light grey, medium bedded, medium-grained orthoquartzite
	CONFORMABLE			
	Middle Ordovician Lower Silurian		4	Dark grey and black graphitic slate, minor thin-bedded black chert
UNCONFORMABLE ?				
Ordovician Silurian		3a	Amygdaloidal chlorite phyllite; massive andesitic greenstone at lower boundary of unit; contains 3b (host here for Sulf massive sulphide deposit) and 3d.	
		3d	Rhyolitic quartz feldspar tuff, sometimes pyrrhite; bleached quartz-sericite (pyrrhite) phyllite (tuff).	
		3c	Medium-green, foliated actinolite schist; andesitic greenstone; foliated fine-grained amphibolite.	
		3b	Graphitic phyllite and quartzite; can contain 3d; can contain massive sulphide (Gruber Vangorda).	
		3a	Medium greenish-grey, lustrous, fine, chlorite-muscovite-quartz phyllite; sometimes weakly graphitic; contains 3b, 3c, and 3d.	
Cambro-Ordovician		2a	Marble, contains quartzites.	
		2d	Metabasite; see unit 1e for description.	
		2c	Non calcareous carbonaceous and/or siliceous phyllite containing marble lenses and minor (< 5%) calc silicate bands; contains 2d.	
		2b	Calc silicate gneiss undifferentiated; variable amounts of marble, biotite phyllite, and calc silicate; contains 2d and 2e.	
	2e	Transition zone, interbanded schist and calc silicate, marble bands and schistose biotite phyllite bands, some quartzite.		
Cambrian		1f	Marble; can contain quartzite compositions.	
		1e	Metabasite; well banded greenstone, sometimes exhibiting flaser structure; biotite concentrated in thin laminations; sometimes actinolite schist.	
		1d	Graphitic schist and phyllite; variable graphite content; some andalusite present where weakly graphitic biotite present as thin laminations; can contain 1e and 1f; can be calcareous or siliceous; contains rare massive sulphide deposit.	
		1c	Carbonaceous biotite-muscovite-andalusite schist; upper sections contain 1d, 1e, and 1f; muscovite-quartz schist sometimes containing andalusite present in upper sections; andalusite contains carbonaceous inclusions, chloritoid sometimes present; pyrrhite and pyrrhotite present in trace amounts.	
		1b	Transition zone, combination of quartz-feldspathic biotite-muscovite schist (1a) and carbonaceous biotite-muscovite-andalusite schist (1c), andalusite disappearing, garnet and staurolite content increasing, biotite reddish in colour; textures more granoblastic; can contain 1e.	
		1a	Quartzofeldspathic biotite-muscovite schist; can contain 1e; garnet and staurolite present; gneissic textures.	

**TABLE 1 LITHOLOGIC SECTION, ANVIL DISTRICT**

## PREVIOUS WORK

The first work to be carried out in the area of the EVA claims was by Dynasty Explorations, who flew helicopter-borne EM and magnetic surveys as part of a regional exploration program conducted in 1965.

As a result of this work, in 1970 Dynasty staked the LORNA, ARO and ROTO claims over airborne geophysical anomalies obtained in 1965. The original ROTO claims are now re-staked in part as the EVA 1-8 and 15-18 claims.

Dynasty conducted ground geophysical surveys, including gravity, electromagnetic and magnetic surveys, and geological mapping and soil sampling over the claims in 1970. A Turam electromagnetic survey was carried out over the claims in 1973.

In 1966, as a result of the 'Anvil staking rush' the JOE claims were staked by New Far North Explorations Ltd. Prior to 1968, New Far North carried out airborne EM and magnetometer, linecutting, geochemical, magnetic and gravity surveys on the JOE property. The JOE 1-8 claims are currently in good standing and are held under option by Lion Mines (Fig. 1). The balance of the original property was allowed to lapse and was subsequently re-staked by Welcome North with the EVA 40-47 mineral claims.

Engineering data and reports that have been utilized during the course of the geological, geophysical and geochemical compilations are summarized in the bibliography appended to this report.

## GEOLOGY

The EVA 49-82 claims are heavily covered by overburden, and outcrop other than unit 11 was only observed at the far west end of the property. The Anvil Batholith (unit 11) forms a prominent hill along the north claim boundary and granitic talus covers the southern flanks of this hill. The geology of EVA 49-82 is shown on Plate 1.

Several sub-outcrops, consisting of angular rubble, of sub-unit 1a were observed in the western part of the property. The rock is light brown weathering, grey-brown quartz-feldspar-biotite-muscovite schist. The presence of about 10 percent K-feldspar was detected by etching with HF acid. Minor ( $\leq 1\%$ ) pyrite was observed locally and a few garnets were also observed. No outcrops of sub-unit 1a were seen.

A single outcrop of sub-unit 1c was mapped in the far western part of the property. The rock is a brown weathering, dark-grey biotite-muscovite-quartz schist. The rock contains abundant biotite (25%) and no K-feldspar. Minor limonite was observed on cleavage planes.

Outcrops of sub-unit 2b were located in the far western part of the property and two sub-outcrops of sub-unit 2b were located east of the fault on line 16+00E. The rock is a light brown weathering, light greenish-grey calcareous-siliceous schist or gneiss. The rock varies from strongly calcareous with siliceous laminae to strongly siliceous with calcareous laminae. Tremolite and minor brown mica are present.

Sub-unit 2d outcrops in the far west of the property. The "greenstones" vary from a massive, dense, foliated, brown weathering black amphibolite to a schistose light brown weathering, fine grained black metavolcanic. Lighter coloured calcareous laminae are also present locally.

Numerous outcrops of unit 11 were observed. Unit 11 is a light brown weathering, light pink porphyritic granodiorite. Possible feldspar-biotite-xenoliths containing minor pyrite were also observed.

No structural interpretation was possible because of the limited exposure. A prominent cleavage trends north to northwest and dips steeply. Units 1 and 2 are assumed to onlap unit 11 and dip to the south. The good exposure at the west end of the property allowed geological contact to be drawn in with some confidence. These contacts were then extrapolated to the east across the map area to the northeast trending fault. The location of the contact between units 1 and 11 is uncertain because of the heavy till and talus cover. The northeast trending fault is known from regional mapping and was drawn in from airphoto interpretation.

No economic mineralization was observed during geological mapping. A few small pieces of limonite were found in the till at L24+30W, L11+50S. The western part of the EVA 49-82 claims lies over a stratigraphic horizon of known massive sulphide potential.

SOIL GEOCHEMISTRY

A program of soil sampling was carried out over the existing grid on EVA 49-82 mineral claims. The samples were analyzed for zinc, lead and silver by Acme Laboratories in Ross River. The results are plotted on Plates 2, 3 and 4 at the back of this report.

No rigorous statistical treatment of the data was carried out but approximate backgrounds are:

Lead	20	ppm
Zinc	50	ppm
Silver	0.1	ppm

Only one significant anomaly was detected and it is located on Line 40+00W. The following values were obtained:

	<u>Pb (ppm)</u>	<u>Zn (ppm)</u>	<u>Ag (ppm)</u>
L1+00N	1100	600	3.0
L0+00	1600	770	4.5
L1+00S	240	520	1.1
L2+00S	124	590	0.5

As the geology is presently interpreted, the anomaly is associated with the contact between unit 1 and the granodiorite. However the lack of outcrop in this area makes the geological interpretation uncertain and this anomaly should be followed up. It should also be pointed out the anomaly lies on the claim boundary.

Several marginally anomalous samples are also present. Some occur within unit 2b southeast of the fault and others are associated with the granodiorite-sediment contact or the granodiorite itself.

The grid should be extended to the west and a program of soil sampling carried out.

RECOMMENDATIONS

The western part of the EVA 49-82 lies on a stratigraphic horizon of known massive sulphide potential. It is recommended that the grid be extended to the western boundary of the property. A program of soil sampling, geological mapping and geophysics could then be carried out over the entire EVA 49-82. Such a program should concentrate on the western part of the EVA 49-82 claims.

The following claims that lie within unit 11 could be allowed to lapse:

EVA 70, 72, 73, 74, 75, 76, 78, 80

Finally, the extension of the favourable stratigraphy further to the west of EVA 63, 64, 81, 82 should be investigated.

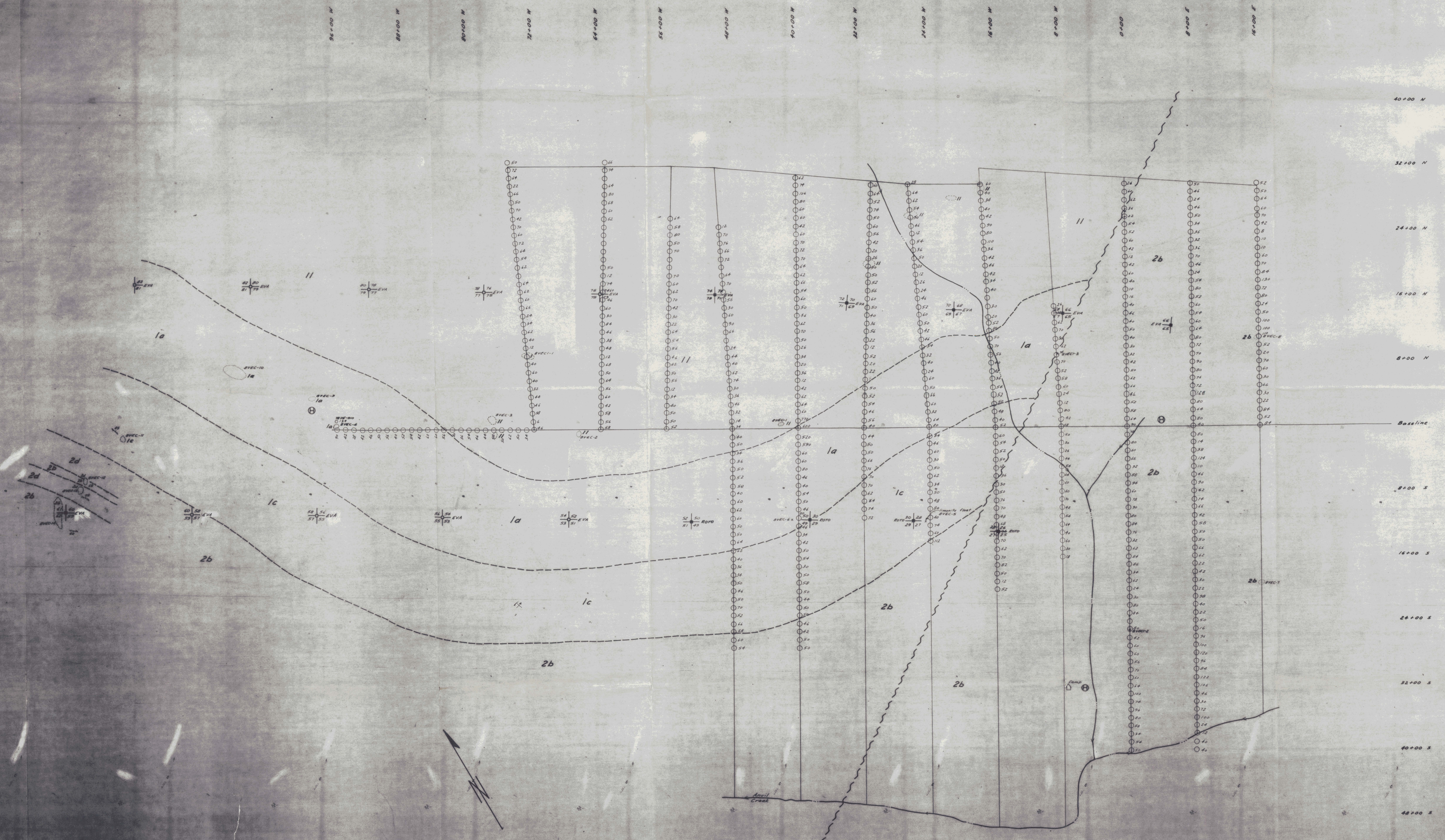
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- Legend**
- CRETACEOUS**
- II Perthite, biotite, quartz, muscovite, and sericite; massive to highly granular, foliated equivalents.
- CAMBRIAN and ORDOVICIAN**
- 2d Foliated amphibolite, pale green chlorite schists, muscovite granitoid.
  - 2b Calc-silicate schist, gneiss and phyllite; can contain 2d.
- CAMBRIAN**
- 1c Chloromylonite, biotite, muscovite, amphibole, quartz, garnet, staurolite, kyanite, and phyllite; some showing "base" structure.
  - 1a Quartz-feldspathic biotite muscovite schist, garnet and staurolite; preserve granitic features.

- Geologic Contact, approx. ....
- Foliation ..... /
- Fault, approx. ....
- Outcrop ..... /
- Subcrop ..... /
- Flow ..... /
- Claim Post, located in field. ....
- Claim Post, assumed. ....
- Helicopter Pad. ....
- Creek. ....
- Soil Sample Location. ....
- Grid Line. ....
- Site Sample Location. ....



○ Soil Sample Location  
 ○ Soil Sample Location

**WELCOME NORTH MINES LTD.**  
 Gatty Mining Pacific Ltd.  
 Vangorda Project  
 EVA Claims  
 Geochemistry - Zinc in Soils

Scale: 1" = 400' Date: July 1979 NTS: 1056/14  
 Revised: By: S. Crummett Plate





○ Soil Sample Location  
 ○ Silt Sample Location

<b>WELCOME NORTH MINES LTD.</b>		
Gatty Mining Pacific Ltd. Vangorda Project EVA Claims		
<b>Geochemistry - Silver in Soils</b>		
Scale: 1" = 400'	Date: July 1978	NTS 1000/10
Revised:	By: S. Stammers	Plate