

830608

GEOLOGICAL REPORT

ON THE

E-D 1 MINERAL CLAIM

Barriere Lakes - Birk Creek Area
Kamloops Mining Division
British Columbia

Latitude 51 22 North
Longitude 121 00 West
NTS 82M/5W; 92P/8E

FOR

FORAN MINING INC.

BY

N.C. CARTER, PH.D. P.ENG.
March, 1990

(Figure 2). Road distance from Barriere is 36 km.

Several logging roads traverse the area of the claim which is reasonably well situated with respect to existing infrastructure.

MINERAL PROPERTY

The E-D 1 Modified Grid mineral claim, located in the Kamloops Mining Division, consists of 20 mineral claim units.

The claim was located by E.J. Foran September 16, 1983 and was transferred by Bill of Sale ^{in 1989} ~~initially~~ to 356584 B.C. Ltd. ~~in 1989~~ ^{Whitelco} prior to ~~transfer~~ ^{an option Agt. with} to Foran Mining Inc. ~~of the claim~~ ^{negotiated}

Part of the east boundary ^{Whitel} and the Legal Corner Post ~~was~~ examined by the writer August 3, 1989 and the claim is believed to have been located in accordance with procedures as specified by the Mineral Tenure Act Regulations of the Province of British Columbia. According to Mineral Titles maps, ^{a small portion of the western of the Whiten Ridge} the westernmost 150 metres of the claim may overlap ~~a~~ ^{claim.} previously existing ~~claim.~~

The position of the E-D 1 mineral claim is shown on Figure 3 and details are as follows:

<u>Claim Name</u>	<u>Record Number</u>	<u>Units</u>	<u>Expiry Date</u>
E-D 1	4742	20	September 16, 1990

1 INTRODUCTION 2 3 4 5 6

Foran Mining Inc. holds title to the E-D 1 mineral claim situated ^{near} ~~west of~~ North Barriere Lake in south-central British Columbia.

This report, prepared at the request of Foran Mining Inc., is based ^{primarily} on results of an exploration program proposed ^{in 1989. A thorough was also undertaken} by the writer ~~and~~ ^{and} a review of published and unpublished reports and maps pertaining to the geological setting of the property and results of exploration work conducted on other properties in the vicinity of the E-D 1 claim.

The writer visited the property on four occasions between July 14 and October 4, 1989 while the exploration program was in progress.

LOCATION AND ACCESS

The E-D 1 property is situated 80 km north-northeast of Kamloops in south-central British Columbia (Figure 1). The mineral claim is located 10 km northwest of North Barriere Lake at the headwaters of Birk Creek (Figure 2) and straddles the boundary of NTS map-areas 82M/5W and 92P/8E. The geographic centre of the claim is at latitude 51 22' North and longitude 121 00' West.

Access is from Barriere on provincial highway 5 via the paved Barriere Lakes road and secondary logging roads

PHYSICAL FEATURES

The E-D 1 mineral claim covers an area including the principal south-flowing tributary of Birk Creek near its headwaters (Figure 3). The topography is predominantly moderate with some steep slopes near the north and northeast claim boundaries. Elevations range from 1370 metres (4,500 feet) near the claim Legal Corner Post to slightly more than 1800 metres (6,000 feet) in the northern part of the claim (Figure 3).

A forest cover of spruce and balsam extends over much of the property with the exception of the area underlain by granitic rocks in the northeast part of the claim and clear cut logged areas in the central claim area.

Overburden cover is locally extensive. Bedrock exposures are restricted to the northeast part of the claim which features near continuous exposure of granitic rocks, and isolated exposures along logging roads in the northwest claim area and in the major drainage in the central part of the claim. Bedrock is also exposed in a few trenches in the southwest claim area.

HISTORY

The earliest documented prospecting in the Birk Creek area dates back to the early 1900's.

The Energite (North Star) silver-lead-zinc prospect, adjoining the present E-D 1 claim on the south, was initially worked by underground drifting on some of the mineralized structures and 36 tonnes were shipped prior to 1972. More recent work has included geochemical and geophysical surveys and 5 diamond drill holes. X

Other prospects east of Birk Creek were initially explored in the 1920's by way of tunnelling and trenching and by geophysical and geochemical surveys between 1950 and 1970.

The area between Adams Lake and the North Thompson River, including the Barriere Lakes area, has been subjected to considerable exploration activity since the discovery of the Chu Chua massive sulphide deposit in 1978 and the Rea - Samatosum deposits in 1983 (Figure 2).

Noranda Exploration Company Limited conducted a major exploration program immediately east of the E-D 1 claim between 1984 and 1987. This work included airborne and surface geophysics, soil geochemistry, mechanical trenching and 14 diamond drill holes. Minnova Inc. conducted recent geological, geochemical and geophysical surveys on claims adjoining the E-D 1 property on the west.

Initial work within the area of the present claim reportedly included some investigation for placer gold potential but there are no official records of this work. A

reconnaissance soil geochemical and magnetometer survey carried out by Craigmont Mines in 1973 covered the area of the present claim (Vollo, 1973).

Since location of the E-D 1 claim in 1983, work done has included some mechanical trenching in the extreme southwest corner of the claim. The 1989 program consisted of establishing 27 km of grid (3.1 km of cut baseline; 24 km of flagged cross-lines, (principally at 200 metre spacings with several fill-in lines at 50 and 100 metre spacings), the collection and analysis of 950 soil samples and VLF-EM and magnetometer surveys over 21.3 km of grid. X

REGIONAL GEOLOGY AND MINERALIZATION

The Adams Lake - Barriere Lakes - North Thompson River area, near the western fault-bounded margin of the Omineca Crystalline Belt, is underlain principally by Paleozoic volcanic and sedimentary rocks. These include Cambrian to Mississippian Eagle Bay Assemblage metasedimentary and metavolcanic rocks and Devonian to Permian Fennell Formation sediments and volcanics. Both are intruded by mid-Cretaceous granitic rocks of the Baldy batholith and by younger felsic and basic dykes. Erosional remnants of Tertiary volcanic and sedimentary rocks locally overlie older rocks. X

The Paleozoic sequences are contained in four structural

packages separated by northwest striking, southwesterly directed thrust faults (Schiarizza and Preto, 1987). The upper three fault slices contain rocks of the Eagle Bay Assemblage while the lowest (and westernmost) includes Fennell Formation rocks which were tectonically emplaced over slightly younger units of the upper Eagle Bay Assemblage along a zone of north-striking, easterly directed thrust faults.

The predominantly northwest trending structural and stratigraphic grain of the area is offset by northeast faults, the largest of which extends up Barriere River and through North Barriere Lake.

A variety of mineral deposits and occurrences are hosted in Paleozoic rocks throughout the Adams Lake - Barriere Lakes - North Thompson River area. The most significant of these are volcanogenic massive sulphide deposits including polymetallic precious and base metals deposits in ^{metased.} metavolcanic rocks of the Eagle Bay Assemblage and copper-zinc deposits in Fennell Formation volcanic rocks.

Examples of polymetallic massive sulphide deposits include showings east of Birk Creek and the Homestake, Rea and Samatosum deposits near Adams Lake (Figure 2).

The Homestake and Rea volcanogenic sulphide - barite deposits occur on opposite limbs of an overturned syncline developed in younger units of the Eagle Bay Assemblage (Hoy

and Goutier, 1986). The Homestake polymetallic base and precious metal zones are contained in barite lenses in deformed quartz-sericite schists derived from felsic volcanic rocks within a thick succession of mafic volcanic tuffs and flows. The Rea deposit, in slightly younger units of the Eagle Bay Assemblage, consists of two massive sulphide lenses near the top of a felsic tuff and chert sequence which overlies a thicker sequence of mafic volcanic rocks. One of the massive sulphide lenses is capped by massive barite (Hoy and Goutier, 1986).

Both the Homestake and Rea deposits feature extensive silicification, sericitization and pyritization in footwall alteration zones. Metallic minerals within the massive sulphide zones include pyrite, arsenopyrite, sphalerite, galena, chalcopyrite, tetrahedrite and native silver and gold.

The Samatsum deposit, currently being mined under a joint venture including Minnova Inc. and Rea Gold Corporation, is adjacent to the Rea deposit. Reported reserves prior to mine start-up in mid-1989 were 670,800 tonnes grading 834 g/t silver (24.3 oz/ton), 1.6 g/t gold (0.046 oz/ton), 1% copper, 3% zinc and 1% lead. Mineralization, consisting of tetrahedrite, sphalerite, galena and chalcopyrite within a larger body of pyritic

material (Pirie, 1989), is best developed along a contact between mafic pyroclastic volcanics and clastic sedimentary rocks which include graphitic horizons. Three styles of mineralization include massive sulphide bands with quartz, quartz veinlets with sulphide minerals and finely disseminated tetrahedrite in clastic sedimentary rocks. Sericite alteration is well developed in the mafic volcanics which form the structural hangingwall within the overturned sequence.

The association of most of the tetrahedrite (and most of the economic values) with areas of silicification and quartz veins which cut lower grade massive sulphide mineralization suggests that these better mineralized sections at Samatsum are products of remobilization (Pirie, 1989).

Several occurrences east of Birk Creek and north of North Barriere Lake are stratiform lenses of massive to disseminated sulphides hosted by Eagle Bay Assemblage quartz-sericite schists (Schiarizza and Preto, 1987) near the south margin of the Baldy batholith. Mineralization includes pyrite, pyrrhotite, galena, sphalerite, chalcopyrite and magnetite. *@ Cherty horizons within*

The second style of volcanogenic massive sulphide mineralization in the area is represented by the Chu Chua or CC deposit near the summit of Chu Chua Mountain (Figure 2).

Upper Fennell Formation pillow and massive basalts host two major and several minor stratiform massive sulphide lenses associated with a chert horizon and lenses of magnetite. Massive basalts on the east side of the near vertical, closely spaced main sulphide lenses are variably altered to talc, carbonate and chlorite and are interpreted as being part of the footwall (Schiarizza and Preto, 1987). x

The massive sulphide lenses consist of pyrite with chalcopyrite and minor sphalerite. The Chu Chua deposit is currently being considered for production by Minnova Inc. and open pit reserves are reported as being 1,049,000 tonnes grading 3% copper, 0.3% zinc, 10 g/t silver (0.29 oz/ton) and 0.58 g/t gold (0.017 oz/ton) (Heberlein and Pirie, 1990).

The Energite and North Star showings, 1 km south of the E-D 1 claim, ^{0.5-} _(Fig. 5) consist of sulphide-bearing quartz veins developed along the regional fault contact between Fennell Formation rocks and those of the Eagle Bay Assemblage. The quartz veins, ranging in width from a few cm to 1 metre (Schiarizza and Preto, 1987), and striking northerly with moderate easterly dips, contain galena, pyrite and lesser sphalerite and chalcopyrite. A sorted 4.5 tonnes shipment to Cominco smelter in 1972 contained 39.8 g/t gold (1.154 oz/ton), 708 g/t silver (20.5 oz/ton), 27.4% lead, 13.3% zinc and 0.25% copper (Schiarizza and Preto, 1987). S
x

Check! - AR.

Five diamond drill holes in 1984 included one hole which reportedly intersected 10.3 g/t (0.30 oz/ton) and 5.49 g/t (0.16 oz/ton) gold over core lengths of 0.8 and 1.5 metres and at hole depths exceeding 100 metres (Miller, 1989).

The BC-1 claim, adjoining the E-D 1 claim on the east, includes pods of stratiform massive and stringer sulphides with silver lead and zinc values and associated barite (Miller, 1989).

PROPERTY GEOLOGY, GEOPHYSICS AND GEOCHEMISTRY

Geology

The E-D 1 claim is underlain by metasediments of the upper part of the Eagle Bay Assemblage which are in fault contact with Fennell Formation sediments in the western claim area. The Eagle Bay Assemblage is intruded by granitic rocks of the Baldy batholith in the northeast part of the claim. *(Fig. 5)*

Dark grey to black phyllites and graphitic siltstones which underlie much of the E-D 1 claim are part of the youngest unit of the Eagle Bay Assemblage, considered to be of Mississippian age, and these occupy the west limb of the Slate Creek anticline (Schiarizza and Preto, 1987). Bedrock was observed in only a few localities and one of the best exposures is in the major drainage in the central part of the claim. Here, thinly bedded black shale strikes northeast and

dips moderately northwest.

Eagle Bay rocks are in reverse or thrust fault contact with older Fennell Formation sequences in the western part of the claim. These are believed to be part of the lower structural division of the Fennell (Schiarizza and Preto, 1987) and are lithologically similar to Eagle Bay sequence.

The major fault separating the two sequences is well exposed in the vicinity of the Energite showings (Schiarizza and Preto, 1987). Here, the zone is marked by brecciated rock with fragments of chert and siltstone. Several trenches near the southwest corner of the E-D 1 claim are on or adjacent to this fault zone. Buff to dark grey, rusty phyllites exhibit strong, north-northwest, steeply dipping schistosity and these rocks may be part of the Fennell Formation.

Granitic rocks of the Baldy batholith are well exposed in the northeast part of the E-D 1 claim where they are leucocratic, medium to coarse grained biotite quartz monzonites. Muscovite coats fractures in the quartz monzonite and Eagle Bay phyllites adjacent to the contact have been converted to biotite hornfels.

While most of the Eagle Bay Assemblage phyllites and graphitic siltstones seen in the claim area contain minor pyrite and some iron oxide staining, best evidence of

mineralization in limited exposures available is in trenches in the southwest corner of the claim. ^(Fig. 13) Most rocks here display weak to intense iron oxide staining and some 4 mm pyrite cubes were noted. Most trenches expose one or more quartz veins which may be a metre or more wide and are irregular along strike. Several samples were collected from the trenches including three grab samples of rusty phyllite (TR3-1, TR1-2, TR2-1) and two samples of quartz vein material (TR2-2, TR1-1). Four showed slightly elevated copper, lead and zinc values, but the best result was from TR1-2, rusty, sheared phyllite, which yielded 80 ppb gold, 1.2 ppm silver, 54 ppm lead, 112 ppm zinc and 16 ppm copper.

Geophysics

An airborne electromagnetic and magnetometer survey, carried out on behalf of Noranda Exploration Company Limited in 1985, covered a large area centred on Birk Creek including the E-D 1 claim. These data were compiled by Miller (1989) and show a number of northwest trending EM conductors within an area of relatively low magnetic susceptibility in that part of the claim underlain by Eagle Bay Assemblage rocks. Strongest EM conductors were along the western claim boundary in the area believed to be underlain by rocks of the Fennell Formation.

A surface VLF-EM and magnetometer survey, conducted on

using an Integrated Geophysical System (IGS-2).
↑ all.

behalf of Foran Mining Inc. by Quest Canada Exploration Services Inc. in October of 1989 (Chung, 1989), essentially confirmed the results of the airborne survey and provided better definition of some of the conductive zones.

The magnetometer survey ^(Figure 6) showed higher magnetic susceptibilities along the western claim boundary which is probably a reflection of Fennell Formation rocks in this area.

Northwest trending VLF-EM conductors were best defined by the Annapolis transmitter station (Chung, 1989) and are mainly west of the baseline ^(Figure 7) where they are coincident with magnetic highs. Strongest conductors are in the southwest part of the claim.

Geochemistry

Soil sampling was undertaken over 27 km of grid established on the E-D 1 claim. A cut baseline originated at the Legal Corner Post in the southeast part of the claim and was extended northwest across the claim. Flagged northeast-southwest cross-lines at 200 metre intervals were extended to the south and west claim boundaries and to the granite contact in the northeast part of the claim. ^P Soil samples were collected ^{from the topography} at 30 metre intervals along the flagged lines and subsequent cross-lines at 50 and 100 metre spacings which were established for follow-up sampling. Some 950 samples

Abundant amounts of glacial till featuring a variably developed soil profile. Samples were collected from the B horizon at depths between 10-30 cm.

were analyzed for gold, silver, copper, lead and zinc by geochemical methods at Kamloops Research and Assay Laboratory *as contained in App I and 8-12* Ltd. Results *are shown on Figures 4-8 and described as follows:*

Copper

Range: 3-95 ppm
 Median: 17 ppm
 Mean: 23 ppm
 95th %ile: 42 ppm

As noted on Figure 8, contour intervals of 35, 50 and 75 ppm *(+75 ppm)* were selected. Higher values are west of the baseline, *part of the claim.*

~~principally in the southwest and northwest parts of the claim.~~ *Weakly anom values (+50 ppm) are widespread in the northern claim area.*

Lead

Range: 4 - 100 ppm
 Median: 13 ppm
 Mean: 18 ppm
 95th %ile: 25 ppm

Lead values were found to be fairly uniform throughout the claim area. Values of 50 ppm and above are moderately to

strongly anomalous and these are contained in three areas *west* in the ~~western~~ claim area (Figure 9). *of the baseline in southern*

Zinc

Range: 14 - 436 ppm
 Median: 74 ppm
 Mean: 93 ppm
 95th %ile: 176 ppm

Values in excess of 175 ppm are considered anomalous and *are coincident with anom Cu + Pb values in the SW & NW* these, like copper and lead anomalous areas, are restricted *claim area (Fig. 10). Higher Zn values are also present on line 6N NE of the baseline.*

mainly to the western claim area (Figure 6).

Silver

Range: 0.0 - 6.1 ppm
 Median: 0.17 ppm
 Mean: 0.33 ppm
 95th %ile: 0.70 ppm

Values of more than 1 ppm are considered definitely anomalous.

and highest values are in the southwest claim area (Figure 11)

when they are coincident with Zn values.
~~Other~~ anomalous values are contained in several zones

west of the baseline.

Gold

Range: 3 - 670 ppb
 Median: 8 ppb
 Mean: 18 ppb
 95th %ile: 22 ppb

As indicated on Figure 8, contour intervals have been selected for values of 25, 50, 100 and 200 ppb. Again,

anomalous values are principally west of the baseline and

some of these trend in a northwesterly direction. However,

it is significant that the two strongest anomalous areas are

normal to the northwest structural grain. These areas include

one in the central claims area which contains some of the

highest values, and another in the northwest part of the

claim. *between lines 26 and 30N.*

Within ~~all~~ anomalous areas, distinctly anomalous values

are commonly separated by low values *(Fig. 12) which may be simply*

~~high values to constitute an anomalous area.~~

an expression of variable DB depths. In the case of
~~structure by topography~~

*Three open areas with elevated Au values
to one line 64, 84 (2 areas) and 284 (Fig. 11) were*

Follow-up sampling in the vicinity of some of the higher gold values in some instance failed to duplicate original results. In most cases however, additional anomalous values were indicated nearby the original sample sites.

CONCLUSIONS

The E-D 1 mineral claim is underlain by Paleozoic sequences known to host nearby vein and volcanogenic massive sulphide deposits. The two principal Paleozoic sequences of the area are separated by a regional fault zone which extends through the western part of the claim. This zone of shearing, which hosts vein type mineralization 1 km south of the E-D 1 property, is poorly exposed in several trenches in the southwest part of the claim.

Geophysical surveys indicate a number of conductive zones coincident with magnetic highs both of which reflect the regional northwest structural grain.

Geochemical soil sampling has identified a number of areas with anomalous gold, silver, copper, lead and zinc values. Coincident and /or contiguous areas with anomalous base metal and silver values in the southwest and northwest parts of the claim correlate well with stronger VLF-EM conductors (Figure 9). Orientation of these anomalous areas also reflects the regional northwest trend.

Areas of anomalous gold values are either adjacent to the multi-element anomalous areas or normal to them (Figure 9). This possibly reflects transverse bedrock structures or is simply a feature of element dispersion in overburden.

Results obtained to date are considered encouraging and additional exploration work is warranted for the E-D 1 mineral claim.

RECOMMENDATIONS

Additional surface work is recommended as part of a Phase I program on the E-D 1 claim. A horizontal loop electromagnetic survey will better define the ^{apparently stratiform} conductive zones in the western property area. Detailed soil sampling should be undertaken within and adjacent to the area with the highest gold values in the central part of the claim along lines which are normal to the apparent northeast trend of this zone.

Excavator trenching and reverse circulation overburden drilling are recommended to further evaluate the zones of anomalous soil geochemistry prior to a program of diamond drilling.

A Phase II program, consisting of additional diamond drilling, would be predicated on the receipt of positive results from the Phase I exploration program.

COST ESTIMATE

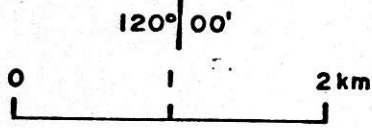
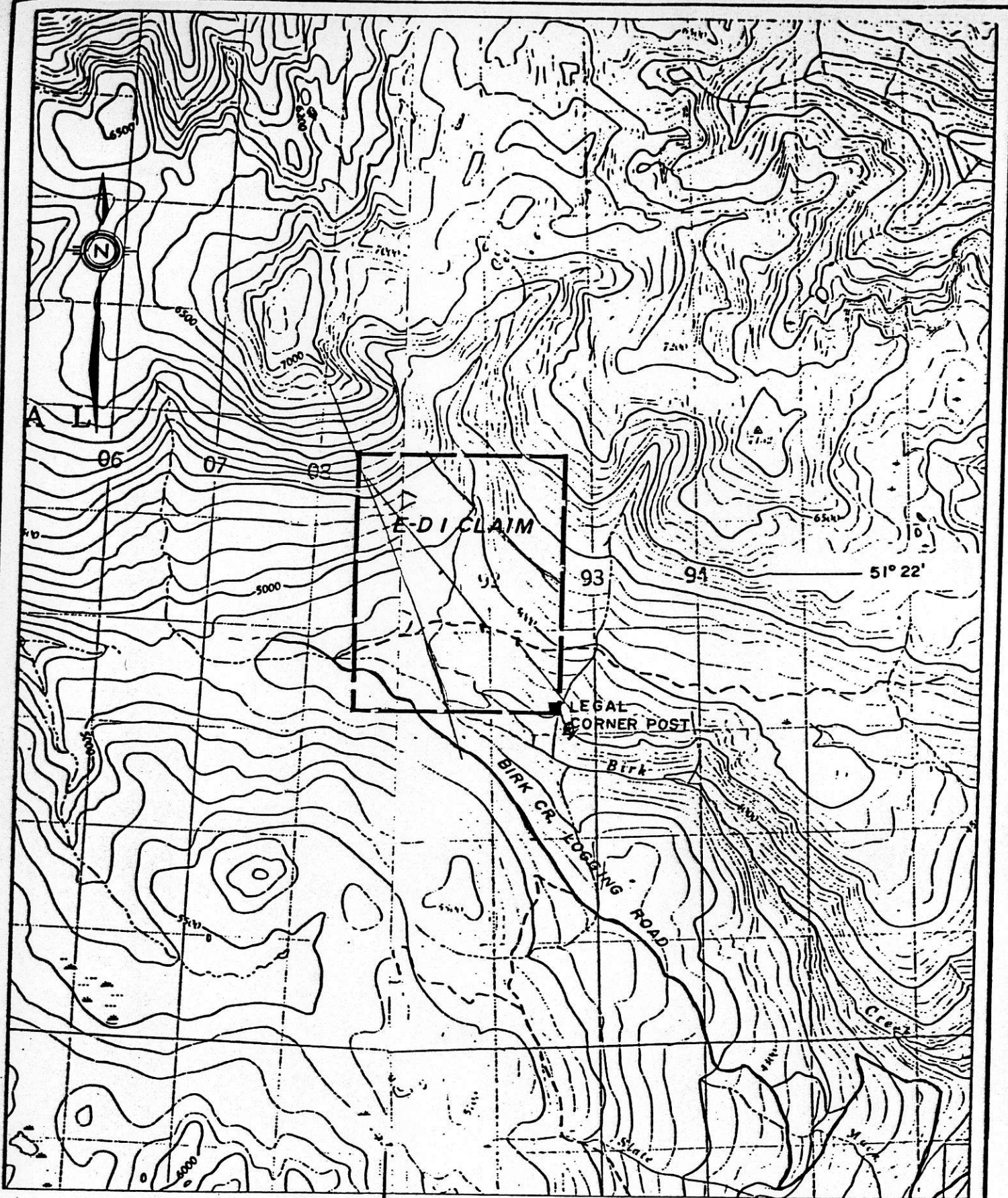
Better Ground?

Phase I

Geophysics - horizontal loop EM - 20 days @ \$500/day	\$10,000.00
Detailed Soil Sampling - collection and analyses	\$5,000.00
Excavator Trenching - 40 hours @ \$250/hour	\$10,000.00
Overburden Drilling-1000 metres @ \$50/metre	\$50,000.00
Diamond Drilling - 1500 metres @ \$100/metre	\$150,000.00
Sample Analyses	\$25,000.00
Supervision, reports, etc.	\$25,000.00
Contingencies	<u>\$25,000.00</u>
Total	\$300,000.00 ✓

Phase II?

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ELEVATIONS IN FEET

E-D I CLAIM		
TOPOGRAPHY AND ACCESS		
DRAWN BY: DCM	NTS 82M/5W, 92P/8E	FIGURE
REPORT DATE JAN. 16, 1989	PROJECT NO. 8949	3

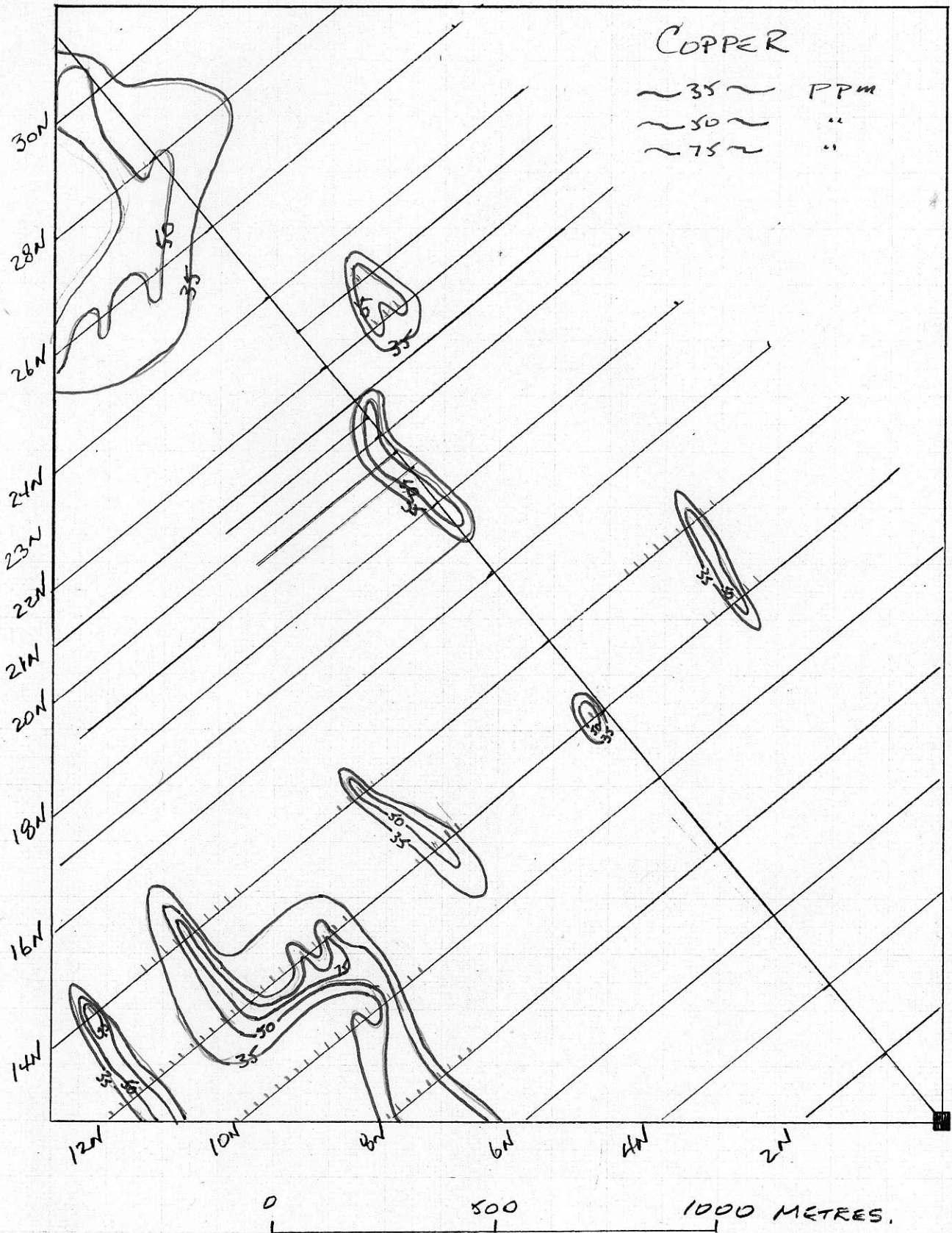


FIG. 4. E-T 1 MINERAL CLAIM.

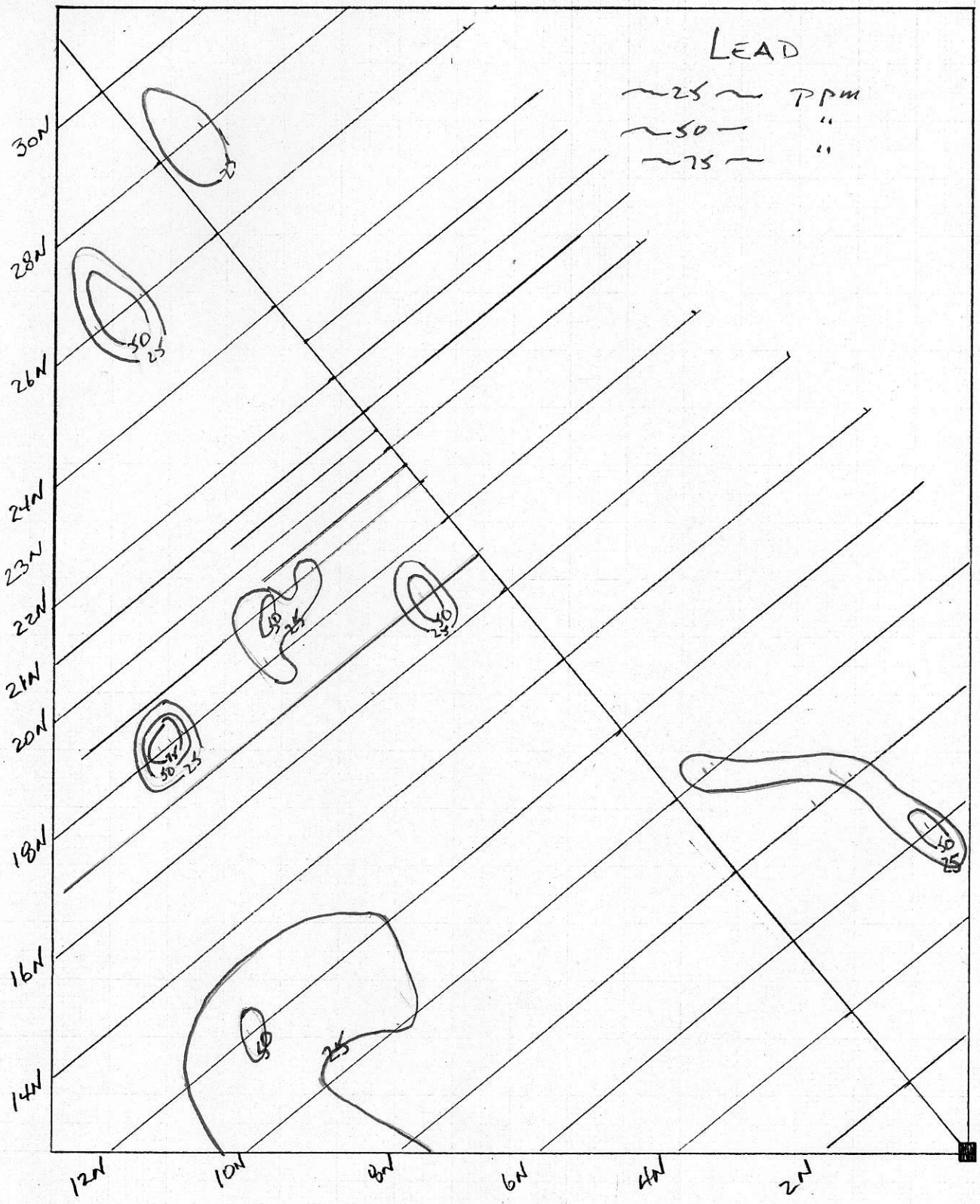


FIG. 5 E-D 1 MINERAL CLAIM.

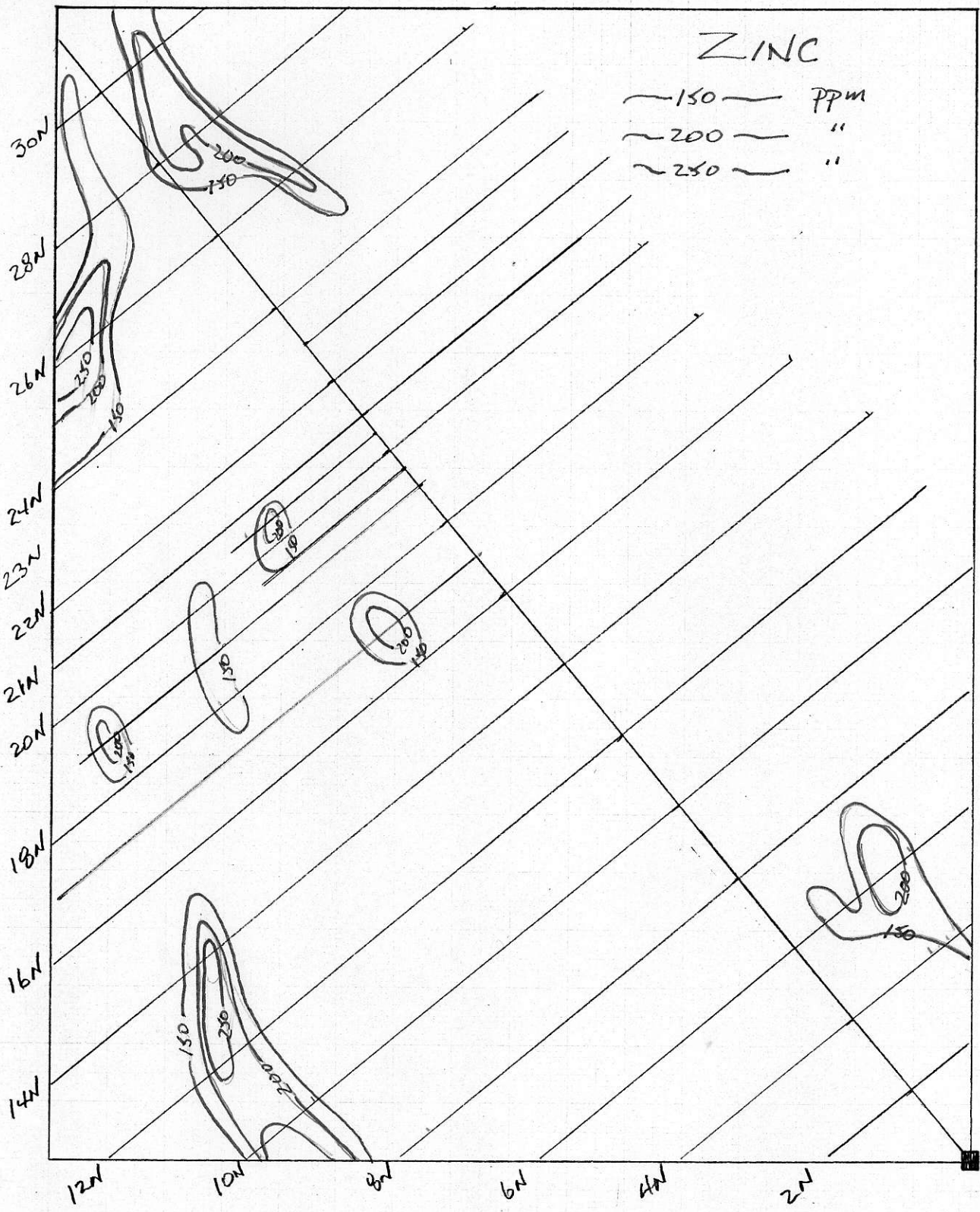


FIG. 6 E-D 1 MINERAL CLAIM.

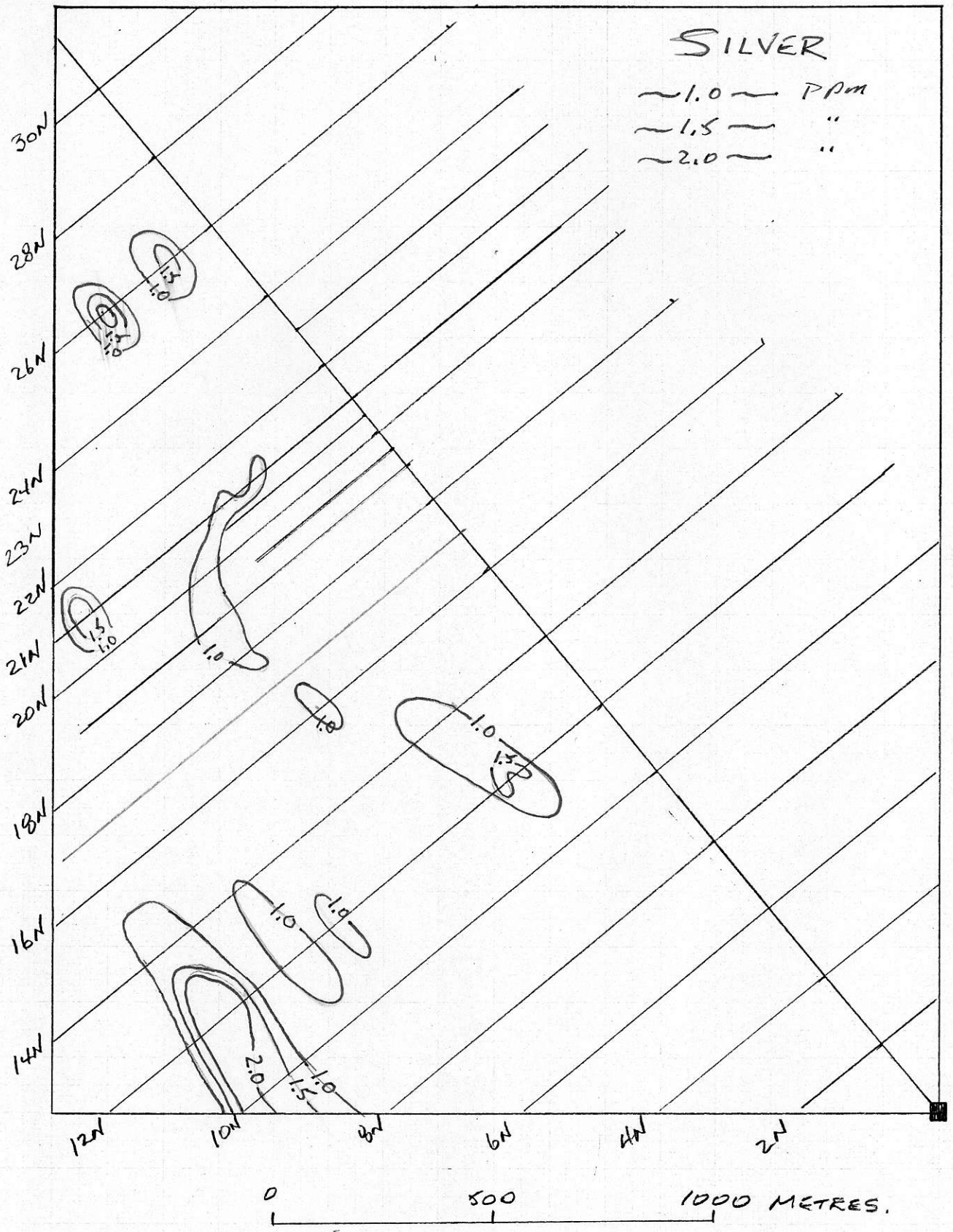


FIG. 7 E-D 1 MINERAL CLAIM.

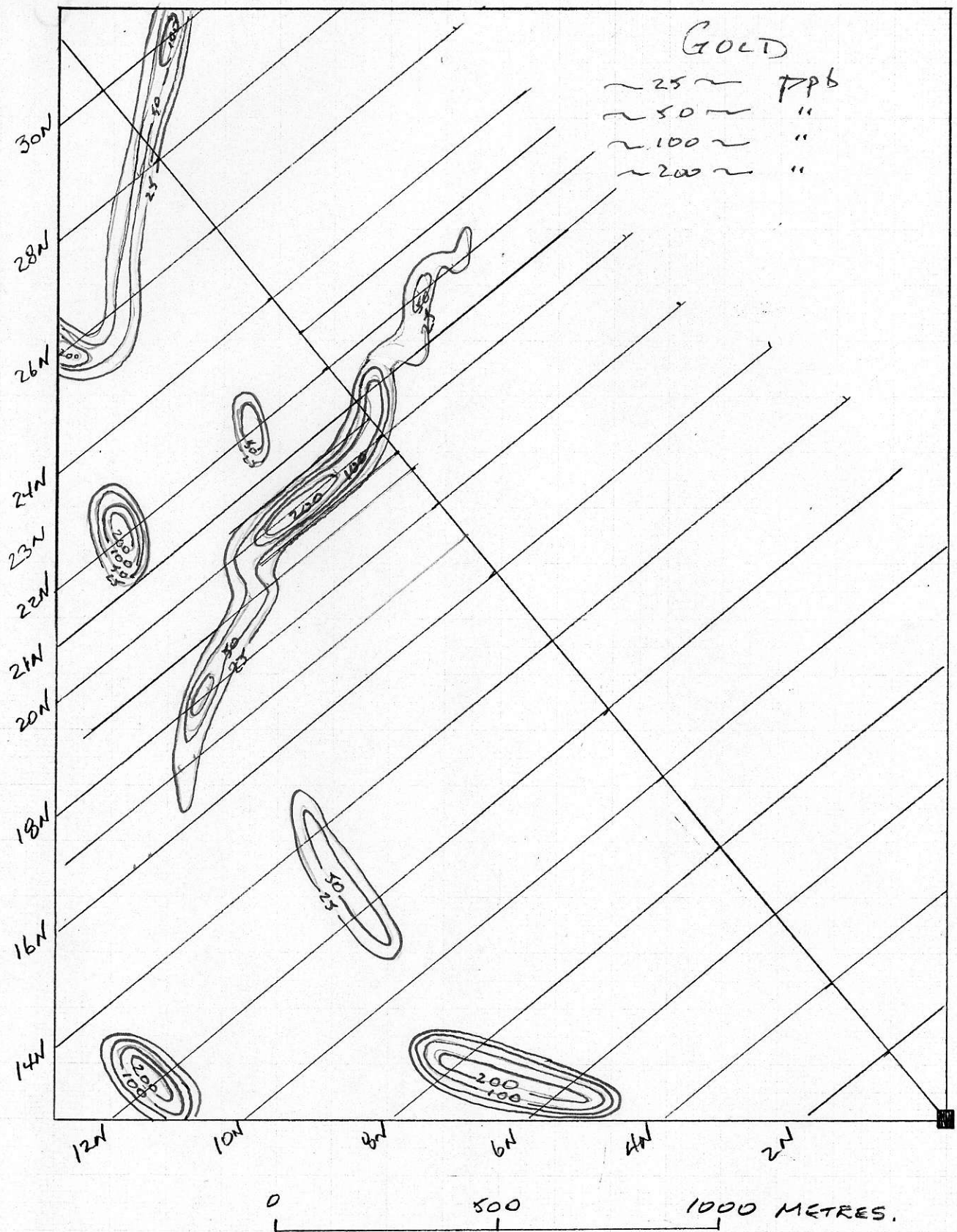


FIG. 8 E-D 1 MINERAL CLAIM.