81-#799-9572

REPORT ON GEOCHEMISTRY, GEOLOGY AND GEOPHYSICS

KATHY CLAIM GROUP

OMINECA MINING DIVISION

RECORD NUMBERS #1493, #3248, #417, #752, #753, #754

NTS 93N/9 MANSON LAKES

124°27'N; 55°40'W

AUTHOR: J.N. HELSEN

OWNER: MATTAGAMI LAKE EXPLORATION LIMITED

DATE: AUGUST 1981

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LOCATION AND ACCESS

The KATHY claim group is situated at about 2.5km southeast of the Manson Creek settlement, which is accessible via good gravel roads from Mackenzie or Fort St. James. Due to the high water levels, washed out bridges and generally bad weather conditions of late May and early June equipment had to be flown in by single otter on occasion.

The property itself can be reached via several 4x4 roads after crossing the Manson River bridge. This bridge however was partly destroyed by the high water level of the 1981 spring.

The average altitude is about 100m above sea level.

Both the Lost and Skeleton Creeks drain major parts of the KATHY claim group.

A location and property map is given (inset) on most major maps.

PROPERTY DEFINITION

The property consists of the following claims (Table 1):

TABLE ONE: KATHY CLAIM GROUP

Claim Name	Record Number	Recording Date	Units
KATHY	1493	October 6, 1978	20
LOST	3248	September 18, 1980	4
JOY	517	August 3, 1976	1
JOY 1	752	August 31, 1977	1
JOY 2	753	August 31, 1977	1
JOY 3	754	August 31, 1977	1

The JOY claims were sold to Mattagami Lake Exploration Limited by Mr. Neal Scafe on May 11, 1981. Consequently, all above mentioned claims, grouped into the KATHY claims group on July 31, 1981, are now owned by Mattagami Lake Exploration Limited (Mattagami, hereafter).

PURPOSE OF THE WORK DONE

A geochemical survey was carried out during the 1979 field season on the KATHY claim and duly reported for assessment purposes (#79-#441-#7519). During the 1980 field season more work was performed on this property, consisting in essence of a geochemical survey and geophysics (80-#996-#8814).

During the 1981 field season a total of 147 mandays were spent on the KATHY claims group. The work, under the supervision of J. Helsen, was carried out by the following people:

W. Ferreira	Party Chief
T. Donnelly	Senior Assistant
J. Thorpe	Junior Assistant
J. Kirk	Junior Assistant
J. Bell	Junior Assistant

This work consisted mainly of geology, geophysics and geochemistry on various grid systems.

GENERAL GEOLOGY OF THE AREA

The geology of the area has been described in GSC Map 876A, Manson Creek (Armstrong, 1946) and very recently by Tipper, H.W.; Campbell R.B.; Taylor, G.C.; and Stott, D.F. (1979 GSC Map 1424A, Parsnip River Sheet 93).

The geology of the area comprises a belt of Pennsylvanian-Permian Cache Creek metasediments and volcanics squeezed between the Germansen batholith (granitic) in the southwest and the Wolverine Complex in the northeast. The Germansen batholith has been dated as Upper Cretaceous (Columbian Epoch) whereas the Wolverine Complex, although of unknown age, is believed to be Proterozoic.

The Manson Creek Fault Zone, which is known for gold, lead and copper mineralization, is believed to run through the property. This may explain some of the anomalous values for copper, lead and zinc in some of the soils.

A tungsten anomaly, known for years as the GLO occurrence on the Mineral Inventory Map NTS 93N, is situated in an outcrop of very brittle schists containing quartz veins with minor galena and scheelite.

GEOLOGY OF THE PROPERTY

Introduction

Extensive geological mapping was carried out on the property, in particular on the Anomaly Grid. The results of this geological survey are shown in Figure 1.

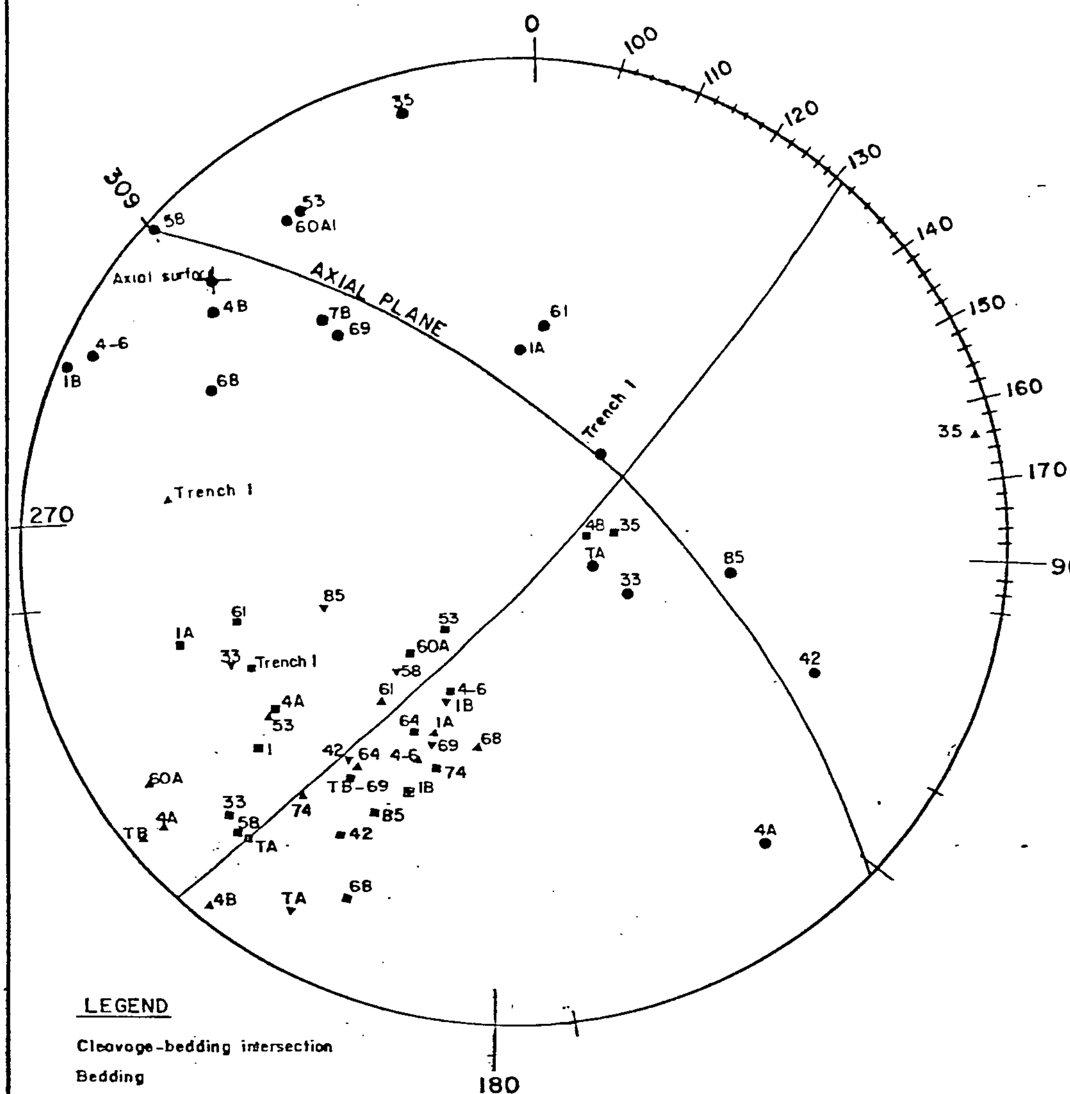
The rocks on the property consist mainly of metasedimentary Cache Creek Formation and diorite and granodiorite intrusive bodies. The Cache Creek Formation is divided into three units, from oldest to youngest, phyllite, quartz arenite and interbedded quartzite and derived orthoclase schist and calcareous black shale. Diorite and granodiorite intrusions have produced contact metamorphic aureoles of black hornfels and buff green magnetic hornfels.

The structure (Figure 2) of the property consists of recumbent folds with minor parasitic folds on the limbs and northwest striking faults. Stereonet projections of bedding to cleavage relationships (Figure 3) indicate that the folding attitude is axial plane strike 309°, dip 60°NE and axial surface plunge 10°NW. Faults generally occur on or close to the axial plane of folds and dip NE. Numerous mylonite zones up to 3m wide occur in the diorite, however only lineated quartz is observed in the granodiorite.

Description of Rock Types

Phyllite

Black with 3-7% rusty 2mm pyrite cubes. The rock fractures are parallel to bedding but cleavage is difficult to observe on most outcrops.



LEGEND

Cleavage-bedding intersection
Bedding
Cleavage
(Numbers correspond to outcrop)

AXIAL SURFACE OF FOLDS
TEND 309
PLUNGE 10° W
21 OUTCROPS
42 POINTS

FIGURE 3

Quartz Arenite Interbedded with Quartzite

Variable unit ranging from laminated to medium bedded and containing silt to sand sized particles. Locally phyllitic lenses occur within this unit. This unit always contains 10-50% red to grey quartzite beds. Locally quartz lenses 1-3cm in length are ubiquitous.

Orthoclase Schist and Interbedded Quartzite

Distinguished by soapy schistose texture and ubiquitous orange orthoclase porphyroblasts (3-12%) which usually form clusters 3-7mm long. Pyrite cubes occur locally but generally do not exceed 2%. Bedding planes can usually be seen on outcrop. Quartzite beds are ubiquitous and contain 3-10% rusty and fresh pyrite up to 1cm long. The quartzite ranges in color from orange to dirty buff. On one outcrop south of the scheelite showing the dirty buff quartzite is not interbedded with orthoclase schist. On this outcrop sericite and slickensides occur along fracture planes but no bedding is visible. The orthoclase schist and pyritic quartzite are interpreted to have been derived from the quartz arenite and quartzite beds.

Calcareous Shale

Black laminated to thin bedded and fractures well along bedding planes. Crenulation cleavage and white quartz-calcite veinlets are common. Locally graphitic horizons occur.

Diorite

The rock is easily identified by its 40-60% foliated subhedral augite. Generally the rock is medium to fine grained. Diorite dykes 1.5-3m wide extend into the country rock along the margins of the intrusion. In most of these dykes the mafic minerals are now green in colour. Mylonite zones are locally common and vary in the degree of mylonitization. In the main fault zone of the northwest section of the property along Manson River mylonites occur in zones up to 3m wide and consist of 1mm to 1cm leucocratic and melanocratic bands.

Grandiorite

This is easily distinguished by its absence of mafic minerals (<1%) and rusty orange colour with quartz ridges on the weathered surface. The quartz (15%) forms veinlets and varies in colour from white to green. Near the margins of the intrusion this rock contains 30% quartz and up to 5% pyrite and locally forms small gossans.

Hornfels

Three separate types of hornfels outcrop on the property: black hornfels, buff green hornfels along the margin of the diorite, and calcareous black hornfels along the margin of the granodiorite. Locally near the edge of the intrusion this rock contains 30% quartz and up to 5% pyrite and small gossan.

The black hornfels weathers to a distinct rusty red colour and is black on the fresh surface. The buff green hornfels occurs in beds 3-7m wide and forms both sharp and gradational contacts with black hornfels. The green colour is probably due to epidote and chlorite. Slickensides and asbestos occur along fracture planes. The rock is highly magnetic and locally shows a stockwork of chlorite and magnetite.

The calcareous black hornfels weathers to a tan colour. It contains numberous calcite quartz veins in jointing fractures.

All of the hornfels was probably derived from the black shale.

Grandiorite Pyritic Dykes or Sills

The unit is readily distinguished by 15-20% euhedral rusty pyrite ranging from specks to 1cm long. It contains 10% white quartz (1mm) which usually occurs adjacent to pyrite cubes.

In summary, the stratigraphy of the Cache Creek Formation on the property is interpreted to represent a regressive sea. The oldest unit (phyllite) represents deep water sedimentation. The arenite-quartzite unit would represent a higher energy beach environment. Black calcareous shale found in a lagoonal environment in which calcium was derived from evaporation of sea water and the graphite from organic matter.

Structure

A structural cross-section of the geology of Trench I is given in Figure 2. This section shows the presence of overturned folds. Some generalization with regards to the overall structure, however can be summarized as follows. Due to a lack of outcrop and topography the placement of the fold axes is subjective. Consequently, the position is largely based upon the stereonet projection depicted in Figure 3. Placement of the axes laterally from Lost Creek Gorge will be largely dependent upon topography. In addition to this problem it is possible that shoving from the intrusive bodies, if indeed they did post-date folding, can deflect the fold axes. General structural information is given in Figure 3a.

The degree of metamorphism of the sedimentary rocks is variable. Field relationships show that unmetamorphosed quartz arenite occurs on the north limb of recumbent anticlines near the syncline troughs. Therefore, it is concluded that this metamorphism is simply zoned by the extreme pressure introduced along the crest and more steeply dipping south limbs of the anticline.

Shale only occupies the less steeply dipping north limbs of anticlines or syncline troughs. Because shale is an incompetent rock it can easily be squeezed off the anticline crest northeast into the adjacent "pressure shadow". This is a common phenomena in tightly folded sequences.

Phyllite is derived from shale. Therefore, repeating units of this rock type in a folded sequence seems to pose a problem. However, the shale is calcareous and the phyllite is not. Furthermore, because the shale was squeezed out of an area of high pressure it should now occupy an area of lower pressure. One or both of these factors could solve the problem.

Mineralization

Observation of new scheelite mineralization in the trenches due to a recent rock slide revealed concentrations in two adjacent minor synclines and locally along the margins of the galena-pyrite quartz vein on the west side of the northernmost trench. This suggests that the scheelite was mobile. Detailed mapping of Trench I (Figure 2) indicates that mineralization lies just south of a syncline trough in an area where the pressure induced by folding should be at a minimum. Similarly tungsten anomalies in soil samples lie on or close to these structures. Variation could easily be attributed to misplacement of the fold axes due to reasons previously discussed or simply downslope movement of tungsten in the soil.

The rock sample containing tungsten and donated by Neal Scafe is a non-calcareous greywacke. This rock type has not been observed on the property. According to Mr. Scafe this rock was taken from near the quartz-arenite shale contact. The contact between the quartz-arenite and shale was observed at one other location on the property. No scheelite or greywacke was observed, however.

GEOCHEMISTRY OF THE PROPERTY

The Anomaly Grid mentioned previously in Assessment Report 80-#966-#8814 was extended considerably, and subsequenlty sampled during the 1981 field season. This extension of the Anomaly Grid consisted of:

i) additional lines in between existing lines,

ii) extension of existing lines in both a northeast and southwest direction,

iii) establishment of a small grid over the trenches with lines also running in a northeast-southwest direction. These lines are at 50m intervals of each other.

Soil samples from the Anomaly Grid were taken generally from the B-horizon just below the A-horizon at 50m intervals. The soils range from black to dark to medium grey into brown, but the predominant colour is brown.

The soils were routinely analyzed for the following elements: W, Mo, Cu, Pb, Zn, Ag, Sb and As by the Noranda Exploration Company laboratories in Vancouver. The results for Mo and W (in ppm) are plotted on Figure 4; on Figure 5 for Cu and Zn (in ppm); for Pb and Ag on Figure 6 (in ppm) and for As and Sb (in ppm) on Figure 12. These figures are in pockets at the back of the report.

The threshold values are in essence the same as those used for the 1979 and 1980 geochemistry surveys. These values are given in Table 2.

TABLE 2: Threshold values for the KATHY claim soil survey

Element	W	Mo	Cu	Pb	Zn	Ag	As
Soils (ppm)	20	6	100	20	140	2.0	140

The Lost Creek Grid was sampled during the 1980 field season and duly reported. This grid system was also extended and surveyed geochemically.

The comments made for the Anomaly Grid with regards to soil horizon taken, elements analyzed for, thresholds, etc. are valid for the Lost Creek Grid as well. The Mo and W values (in ppm) are plotted on Figure 7; Cu and Zn (in ppm) on Figure 8; Pb and Ag (in ppm) on Figure 9 and the As and Sb results (in ppm) on Figure 13.

Results of the Anomaly Grid show the following information:

Molybdenum (Figure 4): Apart from a few spotty anomalies elsewhere a small zone of high Mo values occur on the small grid over the trenches. This zone runs roughly east-west between L9,950SE and L10,300SE. Values as high as 140 ppm were noted.

Copper (Figure 5): A few high values occur scattered over the grid. Although anomalous these values are not very high, generally not above 200 ppm. Most of these values are believed to have been caused by human activity such as flumes, remnants of equipment of placer mining, etc. A few high values however seem to coincide with the anomalous Mo values on the small grid over the trenches.

Zinc (Figure 5): Zn also shows spotty anomalies which are discarded because of possible human influence. Two, maybe three zones of importance may exist. The first zone is delineated by the following grid markings: L9,100SE between 9,500NE and 9,375NE; L9,300SE between 9,475NE and 9,500NE. This first zone may continue well into L9,700SE (between 9,650NE and 9,750NE) and L9,900SE (between 9,750NE and 9,925NE).

The second zone coincides with the anomalous Cu and Mo values on the small grid over the trenches. Only Zn seems to spread out over a wider area. Values as high as 1,700 ppm Zn have been recorded.

Lead (Figure 6): The scattered values again seem to be due to human activity. Anomalous values occur on L11,000SE but no not extend significantly into L11,100SE. On the small grid over the trenches the anomalous Pb values, one as high as 14,000 ppm seem to have been caused by galena in quartz veins. The anomaly coincides with the other anomalous values for Cu, Zn and Mo in a roughly east-west running direction.

Silver (Figure 7): This element does not show up as a very anomalous one except on L9,900SE/10,750NE (4.4 ppm). Even on the small grid over the trenches coincidence of high Ag values with high values of Pb is more an exception than a rule. On this grid only eight soils have anomalous Ag values ranging from 2.0 ppm Ag to 19 ppm Ag.

Tungsten (Figure 4): No anomalous values seem to occur on the property.

Arsenic (Figure 12): With a few exceptions, eg. 1100 ppm Arsenic on the Lost Creek claim boundary, As values are well below the threshold.

Antimony (Figure 12): No anomalous values seem to occur.

In summary, a small belt with anomalous Pb, Zn, Ag, Cu and Mo values occurs on the small grid over the trenches.

Results from the Lost Creek grid lead to the following conclusions:

Molybdenum (Figure 7): Values as high as 34 ppm occasionally occur on this grid. A small arcuate zone may indicate the anomaly.

Copper (Figure 8): This element is not anomalous.

Zinc (Figure 8): Although several high values occur on the Lost Creek grid (highest is 430 ppm Zn) no real pattern is visible. The Zn threshold in this area is believed to be greater than 140 ppm.

Lead (Figure 9): This element follows a similar trend as Zn, i.e. several anomalous values but none very high. These high values may be due to existing quartz veins with the occasional galena. No very high values however occur as is the case on the Anomaly Grid.

Silver (Figure 9): Silver does not seem anomalous.

Tungsten (Figure 7): No anomalous tungsten values occur on this grid system.

Arsenic (Figure 13): No anomalous arsenic values seem to occur on this grid system.

Antimony (Figure 13): No anomalous antimony values appear to occur here.

In summary, the results of the Lost Creek Grid seem much less exciting than those of the Anomaly Grid.

TRENCHING

Introduction

Trenching was started on the proposed sites on the KATHY claim on July 3, 1981.

This trenching work was carried out with a D-8 Cat. The D-8 Cat, owned by Dick Bater of Prince George was operated by Ed Hendry of Manson Creek.

Work Performed

According to the 1981 proposal for the KATHY claim five sites were suggested on or near the "Anomaly Grid" for trenching. These trenches are the following ones, in order of declining priority (Table 3).

TABLE 3: Suggested Trenches According to 1981 Proposal (Helsen)

Trench No.	Grid Location	Length (m)	From → To		Total Surface
I	Existing Trench	≈25			≈150m^2
II	L10,100SE	75	9,900NE	9,975NE	≈375m^2
III	L10,700SE	50	10,025NE	10,075NE	≈250m^2
IV	L10,500SE	50	10,025NE	10,075NE	≈250m^2
V	L 9,800SE	125	10,050NE	10,175NE	≈625m^2

The width of trenches is approximately 5 metres.

These suggested trenches are marked on Figure 1. A breakdown of the trenching carried out is given in Table 4. More information with regards to each trench individually is given below.

TABLE 4: Trenching Performed on KATHY Claim

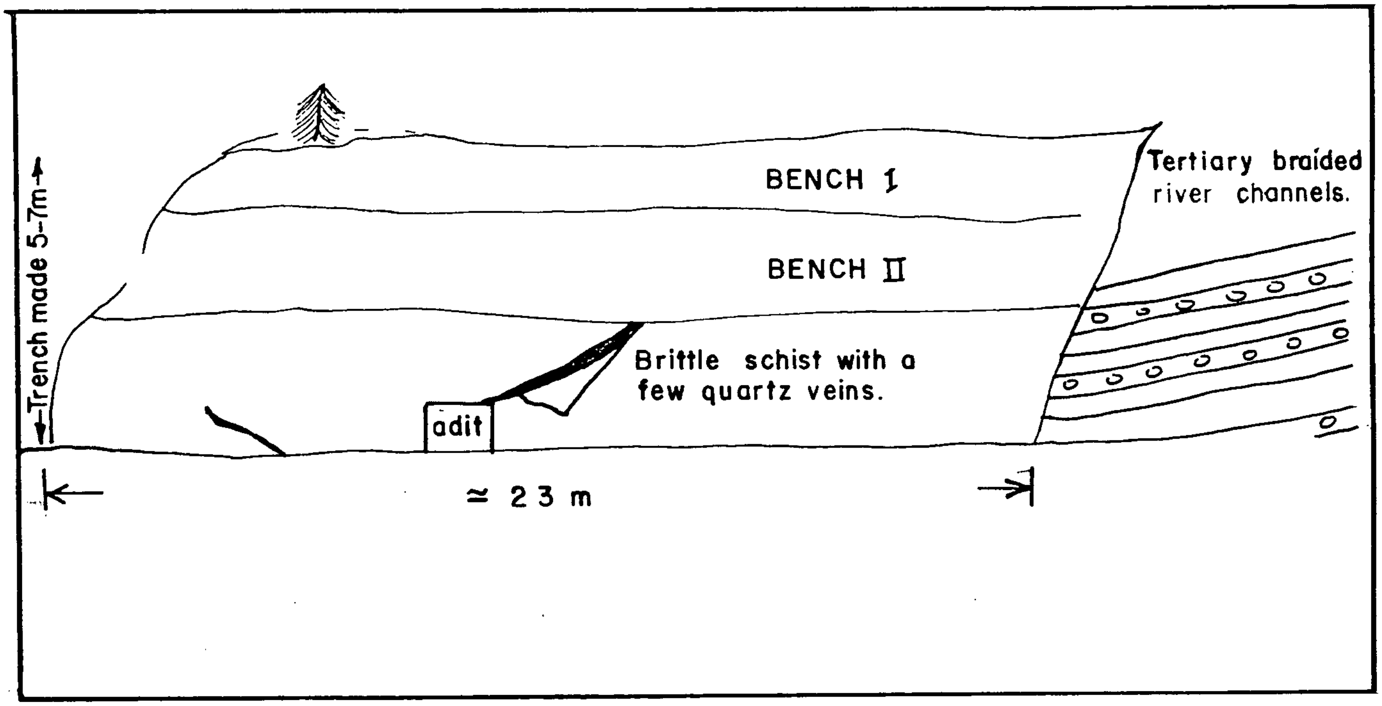
Date	Trench No.	Total Hours	Special Remarks
July 3	III	10	includes 2 hrs. walking down from C.M.S.
July 4	III & IV	7½	filling in trench IV; start trench III
July 5	IV	2	cleaning trench IV; D-8 breakdown
July 6	IV & I	9½	more cleaning up trench IV; start trench I
July 7	I	8	finished trench I
July 8	II	4½	Start trench II; D-8 breakdown - right trac
July 9	II	8	Finished trench II
July 10	II	2	Filling trench II

Trench I

The purpose of Trench I was to deepen it to its original depth in order to find the "enigmatic" rock which, according to Mr. Scafe, occurs at the bottom of the cliff in the trench. This rock, contrary to the various types of rocks so far encountered on this site, is compact, highly mineralized in scheelite occurring in small, thin, quartz lenses (metamorphic differentiation) as opposed to scheelite in quartz veins. Unfortunately while surveying the lower part of this rock face, no such compact, mineralized rock was found.

A small adit, however, was uncovered, which also according to Mr. Scafe was made in previous years by a Falconbridge crew. This adit goes into the hill for not more than 2m. No information of importance was gathered from this adit except that several small quartz veins seem to concentrate here.

The cliff face is extremely unstable because of the brittleness of the sheared rocks and also because of the orientation of the foliation and joints. Mapping of the cliff face causes problems because as soon as the face is washed it is covered again with dust and sand from above (see sketch, not to scale).



The following samples were taken from Trench I:

81-128-R_H-518: chip sample of cliff face at 0.5m intervals
-519: schist with reasonable response to short wave ultra violet light. It could, however be contaminated from the high grading spot of Neal Scafe.
-520: also brittle schist responsive to S.W.U.L.
-521: quartz vein with some brown buff rather soft mineral (not S.W.U.L. responsive).
-522: seems only sample i.e. quartz vein with definite scheelite in it (no high grading contamination from higher up).

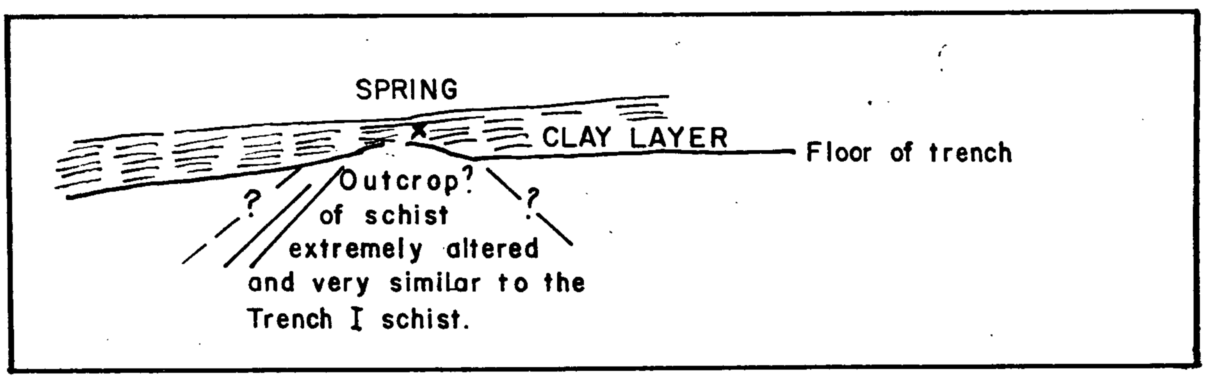
Trench I was only deepened.

Trench II

This trench is the only other trench where some outcrop might have been encountered. The D-8 could not cut through the rounded and very clayey surface at the base of the trench. However, a sample was taken at 1m intervals there in what is believed to be outcrop (81-128-R_H-523). This site was chosen from anomalous values in soils for W, Sb, Ag and Zn. Also because the site of this trench lies between two 1980 VLF-EM crossovers. Before starting the trenching several soil samples were taken in order to confirm the anomalous values. These samples are:

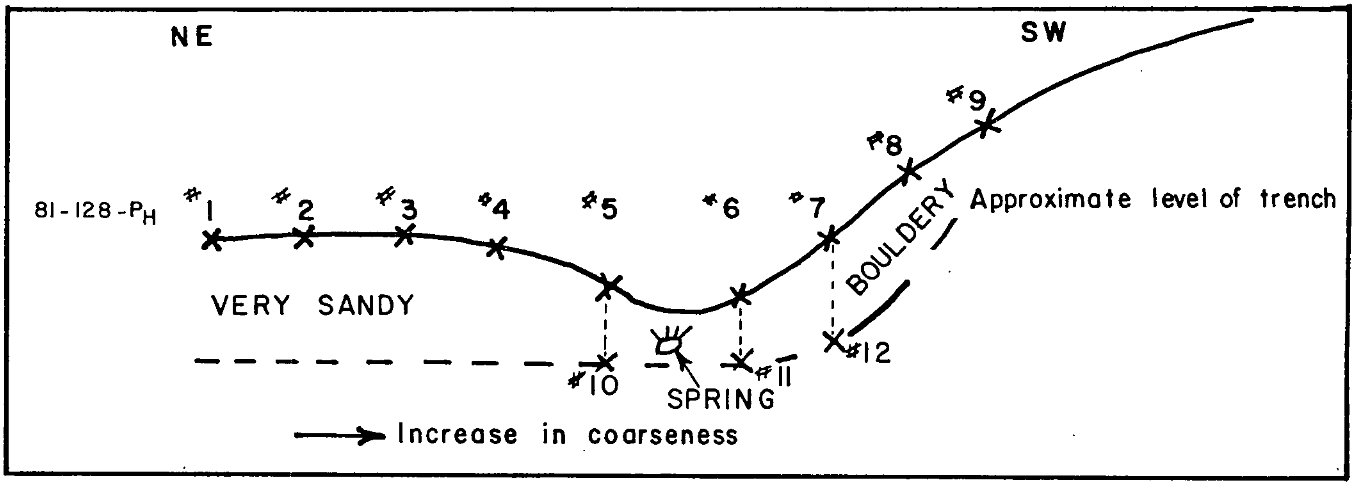
81-128-P_H-#18 taken at L10,100SE/9,900NE
19 taken at L10,100SE/9,910NE
20 taken at L10,100SE/9,920NE
21 taken at L10,100SE/9,930NE
22 taken at L10,100SE/9,940NE
23 taken at L10,100SE/9,950NE
24 taken at L10,100SE/9,960NE
25 taken at L10,100SE/9,970NE
26 taken at L10,100SE/9,980NE

After taking the samples the trench was filled in in order to avoid problems later on because it was filling up quickly with water from the spring (see sketch, not to scale).



Trench III

This trench was chosen mainly because of anomalous values for W in soils. This trench was completely in overburden which consisted of fine to medium grained buff colored sand in the NE part of the trench becoming gradually coarser with gravel and boulders towards the southwest. Groundwater or a spring prevented the D-8 from going any deeper (greatest depth about 3.5m). Because no outcrop was encountered the trench was filled in after taking some samples (see sketch, not to scale).



The crosses mark where soils were sampled approximately before the trench was dug. The interval of sampling was 5m. Three samples were taken before filling the trench again. These samples are:

81-128-P_H-#10 roughly at the site of sample #5
#11 roughly at the site of sample #6
#12 roughly at the site of sample #7

Trench IV

In this trench no outcrop was found either. This trench was made some 10m to the east of the suggested site because of very steep slopes. The site was chosen because of anomalous W values in soils and to a lesser extent anomalous Pb and Zn.

The following samples were taken in a southwest direction at 10m intervals:

81-128-P_H-#13 L10,500SE/10,075NE
#14 L10,500SE/10,065NE
#15 L10,500SE/10,055NE
#16 not taken, all organic
#17 L10,500SE/10,035NE

No samples could be taken after trenching. The trenching was stopped here after the D-8 got stuck in the mud and had to winch itself out.

Trench V

The lowest priority trench of all was not made for various reasons such as the D-8 was no longer available, the trench area was known to be an area of much disturbance due to human activity in the early 30's (placer mining), also the W value was the least interesting anomalous W value in the soils of the KATHY property.

Logistics and Access

Existing roads were used in order to reach the proposed trench sites. When access was not possible via an existing road a trail was made through the bush in order to reach the site of the trench. These access cuts were the width of the bulldozer i.e. about 5m resulting in the following areas. No scraping was involved.

TABLE 5: Access trails to the various trenches

Trench	Length of trail	Surface Area	Remarks
I	N/A	N/A	At road
II	≃ 75m	375m²	--
III	≃100m	500m²	--
IV	≃ 20m	100m²	--
V	N/A	N/A	Not trenched

These access trails through the bush were afterwards cleaned of slash and logs which were cut were piled up.

Results

Results so far received for soils and/or rocks collected during the trenching are given in Table 6.

TABLE 6: Values (in ppm) for various elements in soils and/or rocks

A) SOILS

Sample Number	W	Cu	Zn	Pb	Ag	Mo	As	Au (in ppb)
81-128-P_H- 1	1	24	110	2	0.4	<2	<2	
2	1	10	110	6	0.4	<2	<2	
3	1	20	110	4	0.6	<2	<2	
4	1	10	74	4	0.2	<2	<2	
5	1	22	80	4	0.4	<2	<2	
6	1	12	56	6	0.4	<2	<2	
7	1	12	50	8	0.4	<2	<2	
8	1	14	74	10	0.4	<2	<2	
9	1	16	54	6	0.4	<2	<2	
10	1	46	110	8	0.6	4	16	
11	1	62	94	4	0.4	<2	6	
12	1	72	54	6	0.2	<2	<2	
13	1	24	86	18	0.4	6	10	
14	1	18	180	14	0.4	<2	6	
15	2	32	220	32	0.8	4	40	
17	1	12	10	2	0.4	<2	2	
18	1	16	84	4	0.4	<2	<2	
19	1	12	140	2	0.6	<2	4	
20	1	22	110	4	0.4	<2	<2	
21	1	16	96	10	0.8	2	64	
22	1	14	76	10	0.4	<2	36	
23	2	14	88	8	0.4	<2	8	
24	1	16	88	4	0.4	<2	8	
25	1	18	100	6	0.4	<2	12	
26	2	34	120	10	0.4	<2	20	

B) ROCKS

Sample Number	W	Cu	Zn	Pb	Ag	Mo	As	Au (in ppb)
81-128-R_H-519		84	126	52	2.0	12		<3
520		66	258	620	16.0	6		3
521		222	206	1068	4.6	12		<3
522		30	170	76	0.4	8		15

Conclusions

Four out of five suggested trenches were made. The fifth one, i.e. the lowest priority one, was not dug. In only two trenches was outcrop encountered. Several samples, both soils and rocks were taken prior to and after digging. None of the results received so far seem to be anomalous.

GEOPHYSICS ON THE PROPERTY

The geophysical surveys carried out on the property consisted of a magnetometer survey and a VLF-EM survey.

Magnetometer Survey

A McPhar fluxgate magnetometer instrument was used for this survey. The appropriate corrections for diurnal variation, etc. were made. In other words, the data were corrected by running closed loops along the NE-SW lines and correcting at the baseline for time variation.

The results are plotted on Figure 10 and contour lines were drawn for:

$\geq$ 500γ
$\geq$ 1000γ
$\geq$ 1500γ
$\geq$ 2000γ

These contour lines show two anomalous zones, i.e.:

- a weak anomalous zone lying mainly between the Manson Creek Road and the Manson River in the northeast corner of the property. The highest anomaly is 680γ.
  This anomaly is not believed to be of very much significance because of extensive human activity in this area such as placer mining which always brings with it a lot of debris and waste.
- a strong anomaly however, occurs between L9,000SE and L9,700SE southwest of the 10,000NE Baseline.
  This strong anomaly, for which the true causes have not been found yet, is believed to be related to either mineralization or a change in rock i.e. presence of intrusive rock with higher magnetic content, or contact between intrusion and country rock.

VLF-EM Survey

A Geonics VLF-EM16 instrument was used for this purpose. The in-phase and quadrature data are plotted on Figure 11.

Several crossovers are present but they all seem rather weak. A pattern, if any exists at all, may be invoked on that part of the Anomaly Grid between L10,300SE and L10,800SE. Within this area a conductor seems to branch out into two smaller conductors.

It should be kept in mind that large chunks of graphite have been found on the property.

In summary, a definite magnetometer anomaly occurs on the property. VLF-EM hint at the presence of a possible conductor but these data are obscured by their weakness.

JH/sal

CERTIFICATE

I, Jan Helsen of the City of Edmonton, Province of Alberta, do hereby certify that:

1. I am a geologist residing at 7305 - 180 Street, Edmonton.
2. I am a graduate of the University of Leuven, Belgium with a "Licenciaat in Geologie".
3. I am a graduate of McMaster University, Ontario, with a M.Sc. (1970) and a Ph.D. (1976) in geology.
4. I have been practicing my profession since 1976 and am at present Exploration Geologist with Mattagami Lake Exploration Limited.
5. I am a fellow of the Geological Association of Canada.
6. I supervised the work that is described in this report.

Dated: ______________

GEOLOGICAL ASSOCIATION OF CANADA
J. HELSEN
FELLOW

J. Helsen, Ph.D.

APPENDIX ONE

CHEMICAL PROCEDURES

BREAKDOWN OF SAMPLES ANALYSED

Apart from 50 rocks for which no analyses have been received a total of 1,245 soils were collected on the property grid systems. These soils were sent out to the Noranda Exploration Company Laboratories in Vancouver for analysis for W, Mo, Cu, Pb, Zn, Ag, As, Sb and/or Au. So far results were received only for Mo, Cu, Pb, Zn and Ag. These results have been duly plotted on the various maps.

The chemical procedures as used by the Noranda lab is given overpage.

Methodology of the Geochemical Laboratory

Physical methods of sample treatment.
Rock and core samples involve crushing and pulverizing with a rotary plate or a ring and puck pulverizer, whichever is appropriate. Subsequently, the -200 mesh sample is rolled to insure uniformity.

For sediment and soil samples, these are dryed at ca.80°C for 24 to 48 hours.

The samples are then sieved to -80 mesh with nylon screen; the +80 mesh (reject) material is discarded.

The panned - heavy mineral samples are analyzed as received without further sample preparation, except where the material is too coarse; this material is passed through a -40 mesh screen.

Perchloric-nitric acid decomposition ($HClO_4$-HNO_3)

The analysis of soil, sediment and rock geochemistry to determine the lighter transition elements, is carried out by decomposition with a perchloric plus nitric acid mixture. The procedure for preparing geological samples for trace analysis by atomic absorption is as follows:

> Weigh 0.40g of sample and digest with 4ml perchloric acid (70%) plus nitric acid (4+1) for 4 hours at reflux temperature.
> After digestion, each sample is diluted to 10ml with water. This solution is used for the determination of Cd, Cr, Co, Cu, Fe, Pb, Mn, Mo, Ni, Ag, V and Zn with a Varian AA-475 complete with background correction.
> Complete dissolution of such elements as Cr, Fe, Mn and V is not always achieved, and may be of little significance for geochemical exploration purposes.

A brief description of elements requiring specific techniques

Determination of mercury and the elements that form volatile hydrides i.e. As, Bi, Sb, Se and Te are carried out with a hydride vapour generation accessory (Varian M-65). The hydride is formed by sodium borohydride reaction with an acidified solution of the sample. This enables measurement of trace quantities by atomic absorption.

Fluorine: 0.25g sample is sintered with sodium carbonate-potassium nitrate flux and dissolved in water. The fluoride content is compared to standards on a specific ion electrode meter. (U.S. G.S. Paper 700-C).

Gold: 10.0g sample is digested with aqua regia. Gold is extracted into MIBK from the aqueous HCl solution. Atomic absorption is used to determine gold, and a sensitivity of 10ppb is attained. (At. Absorpt. Newsl. 6, 126, 1979).

Tin: 0.5g sample is heated with ammonium iodide: tin present as cassiterite is converted into stannic iodide, which sublimates. The sublimate is dissolved in 1M HCl. A pink tin complex is formed with gallein. This allows colormetric comparison with standards to determine tin to as low as 2 ppm. (R.E. Stanton, 1962).

Tungsten: 1.0g sample is sintered with carbonate flux and is leached with water. The leachate is treated with KSCN. This forms a yellow tungsten thio-cyanate which is extracted into tri-n-butyl phosphate. This permits colormetric comparison with a standard series to ca. 4 ppm (F.N. Ward, 1963).

Uranium: Sample digestion will depend on the extraction requested, however, if not specified, an aliquot is taken from the perchloric-nitric decomposition. The aliquot is taken diluted with water and buffer, and the luminescence of the uranyl ion is quantitatively measured on the UA-3 (Scintrex). Sensitivity of 0.1 ppm in geological samples is easily obtained.

Hydrofluoric-perchloric-nitric decomposition (HF/HCl_4-HNO_3)

The analysis of silcate rock for major elements, i.e. alkaline and earth alkaline metals, is performed by decomposition with hydrofluoric-perchloric-nitric acid, with subsequent removal of the fluoride ion. Total dissolution of the major constituents is accomplished and this method is suitable for determination of Na, K, Mg, Ca, Mn, Fe, Rb, Sr, and Ba. Silicon is not determined sinee it volatilizes during dissolution.

This method is not intended to replace the elaborate fusion techniques (eg. $LiBO_2$ fusion) for major oxide analysis, and should be used as a supplementary method for geochemical exploration where quick results are necessary. (Anal. Chim. Acta 32, 1, 1965).

Whole rock analysis employing lithiumborate fusion

An atomic absorption procedure is used for the analysis of rock to determine Si, Al, Fe, Mg, Ca, K, Na, Mn, Cr, Sr, and Ti. The method employs a lithium metaborate ($LiBO_2$) fusion and dissolution in diluted nitric acid. This is recommended for whole rock analysis of rocks and core of widely ranging major element composition. (Atomic Absorpt. Newsl. 2, 25, 1969).

The lab intends to implement the Bernas Type teflon-lined bomb for decomposition of ores and minerals at a later date.

The lab will continue the policy that after operating costs of the lab have been covered, any surplus will be rebated on a pro-rated basis.

There is considerable difference of opinion regarding what geochemical methods to use in exploration. Since there is no universally suitable method for any geochemical analysis which is mainly due to varying sample material, in order to maintain quality control and consistent data, it is important to request the same decomposition and analytical methods, when various labs are contracted.

For further information please contact the Noranda Vancouver Laboratory at the following number: (604) 684-9246.

APPENDIX TWO

STATEMENT OF COSTS

STATEMENT OF COSTS - Geophysics, Geology and Geochemistry - Crew of 5 people

The breakdown of the total salary of the 5-man crew is given in Table A-1.

TABLE A-1: Mandays and wage costs per technique and per person. The wage costs includes payroll burden and bush bonus.

Person	Geochemistry		VLF-EM		Magnetometer		Geology		Miscellaneous*	
W. Ferreira @ 84.57/day	13 days	1,099.41	2 days	169.14			15 days	1,268.55	3 days	253.71
T. Donnelly @ 67.28/day	10 days	672.80					7 days	470.96	3 days	201.84
J. Thorpe @ 60.07/day	19 days	1,141.33	7 days	420.49			2 days	120.14	3 days	180.21
J. Kirk @ 52.85/day	23 days	1,215.55					2 days	105.70	3 days	158.55
J. Bell @ 52.85/day	18 days	951.30			11 days	581.35	1 day	52.85	3 days	158.55
TOTAL Mandays and Cost	83 days	5,080.39	9 days	589.63	11 days	581.35	27 days	2,018.20	15 days	952.86
Cost in wages/manday	61.21		65.51		52.85		74.75		63.52	

* Miscellaneous includes travel time and set-up of camp.

The total cost of the wages is $ 9,222.43 for 145 mandays.

<u>Wages</u>

Travel, set-up camp	$ 952.86		
Geology	2,018.20		
Geochemistry	5,080.39		
VLF-EM	589.63		
Magnetometer	581.35		
		145 mandays	$ 9,222.43

<u>Accomodation</u>

$ 35.00/manday x 145 mandays	5,075.00

<u>Equipment Rental</u>

SBX-11A Radio @ $ 150.00/month	150.00

<u>Vehicle Rental</u>

1 Suburban vehicle @ $ 975.00	975.00
50 gallons of gas @ $ 1.75/gallon	87.50

<u>Geochemical Analyses</u>

1,245 soils analyzed for Mo, Cu, Pb, Zn, Ag @ $ 3.65/sample (i.e. $ 1.25 + 60¢ + 60¢ + 60¢ + 60¢)	4,544.25
Sample bags	114.24

<u>Transportation</u>

Trail bikes to property via single otter	270.00
10 gallons gasoline for trailbikes @ $ 2.10	2.10

<u>Drafting</u>	700.00
<u>Report Writing</u>	700.00
Supervision of Crew	1,400.00
TOTAL COST OF THE WORK CARRIED OUT	$ 23,259.42

Total cost of the work carried out:	$ 23,259.42
Less Wages:	9,222.43
	$ 14,036.99
Less geochemical analyses and soil bags:	4,658.49
TOTAL CAMP OPERATION COST	$ 9,378.50

Camp Operation Cost per manday: $\frac{\$\ 9{,}378.50}{145} = \$\ 64.68/\text{day}$

TOTAL COST OF THE MAGNETOMETER SURVEY (22 line kilometres, 11 mandays)

Wages:	$ 581.35
Camp Cost (11 mandays x $ 64.68)	711.48
Total Cost of Survey	$ 1,292.83

Cost per line kilometre: $\frac{\$\ 1{,}292.83}{22\text{km}} = \$\ 58.80/\text{km}$

TOTAL COST OF THE VLF-EM SURVEY (22.5 line kilometres, 9 mandays)

Wages:	$ 589.63
Camp Cost (9 mandays x $ 64.68)	582.12
Total Cost of Survey	$ 1,171.75

Cost per line kilometre: $\frac{\$\ 1{,}171.75}{22.5\text{km}} = \$\ 52.00/\text{km}$

COST OF TRENCHING (July 2 - July 10, 1981)

51.5 hours, D-8 Cat @ $ 50.00/hour	$ 2,275.00
Diesel Fuel	232.30
Accomodation	203.00
Engineering, supervision	1,600.00
Truck rental @ $ 975/month	260.00
Gasoline, 50 gallons at $ 1.75/gallon	87.50
Total Trenching Cost	$ 4,957.80

SUMMARY

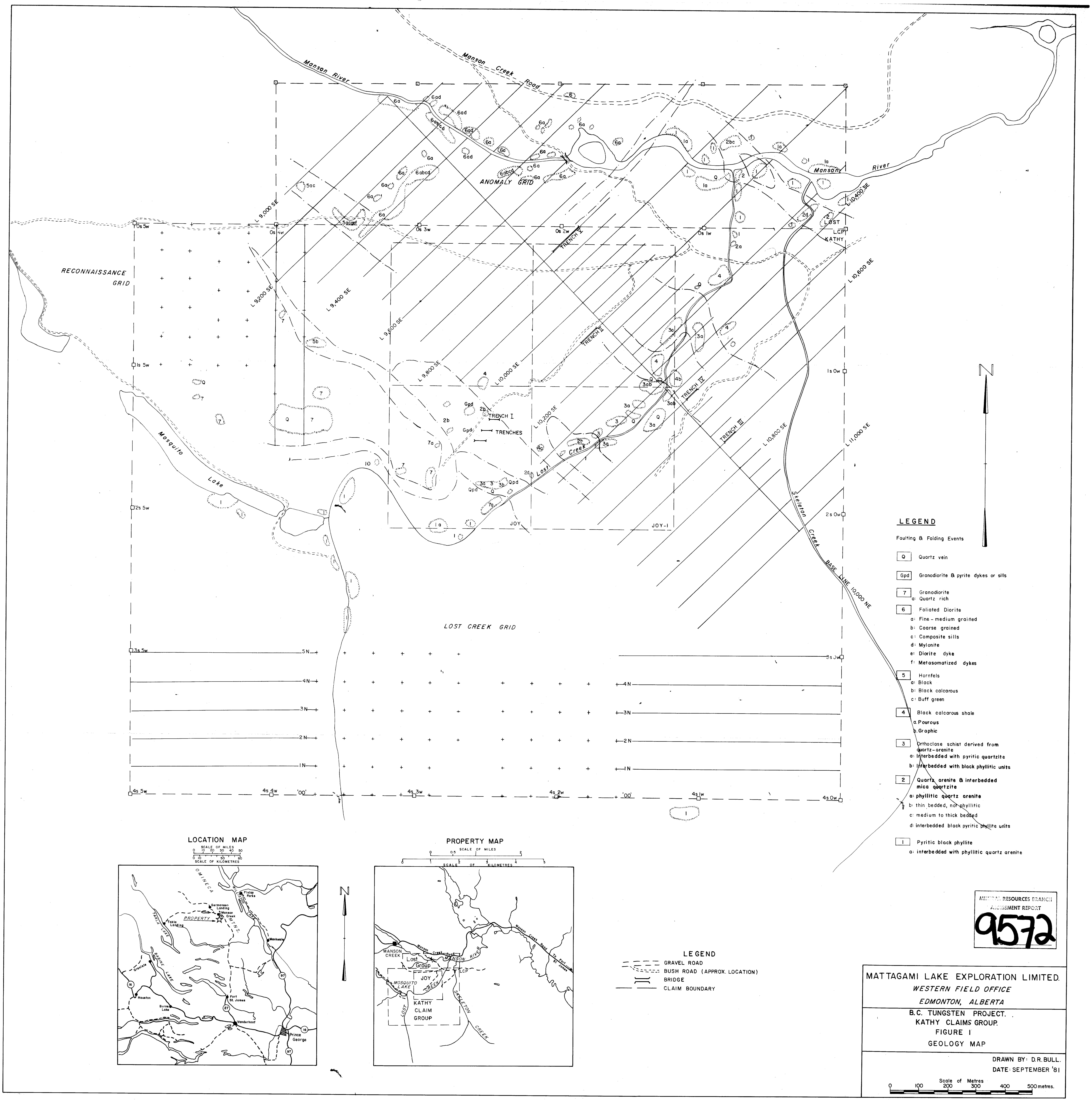
Cost of Geology, Geochemistry and Geophysics	$ 23,259.42
Cost of Trenching	4,957.80
TOTAL COST OF 1981 WORK ON KATHY CLAIM GROUP	$ 28,217.22

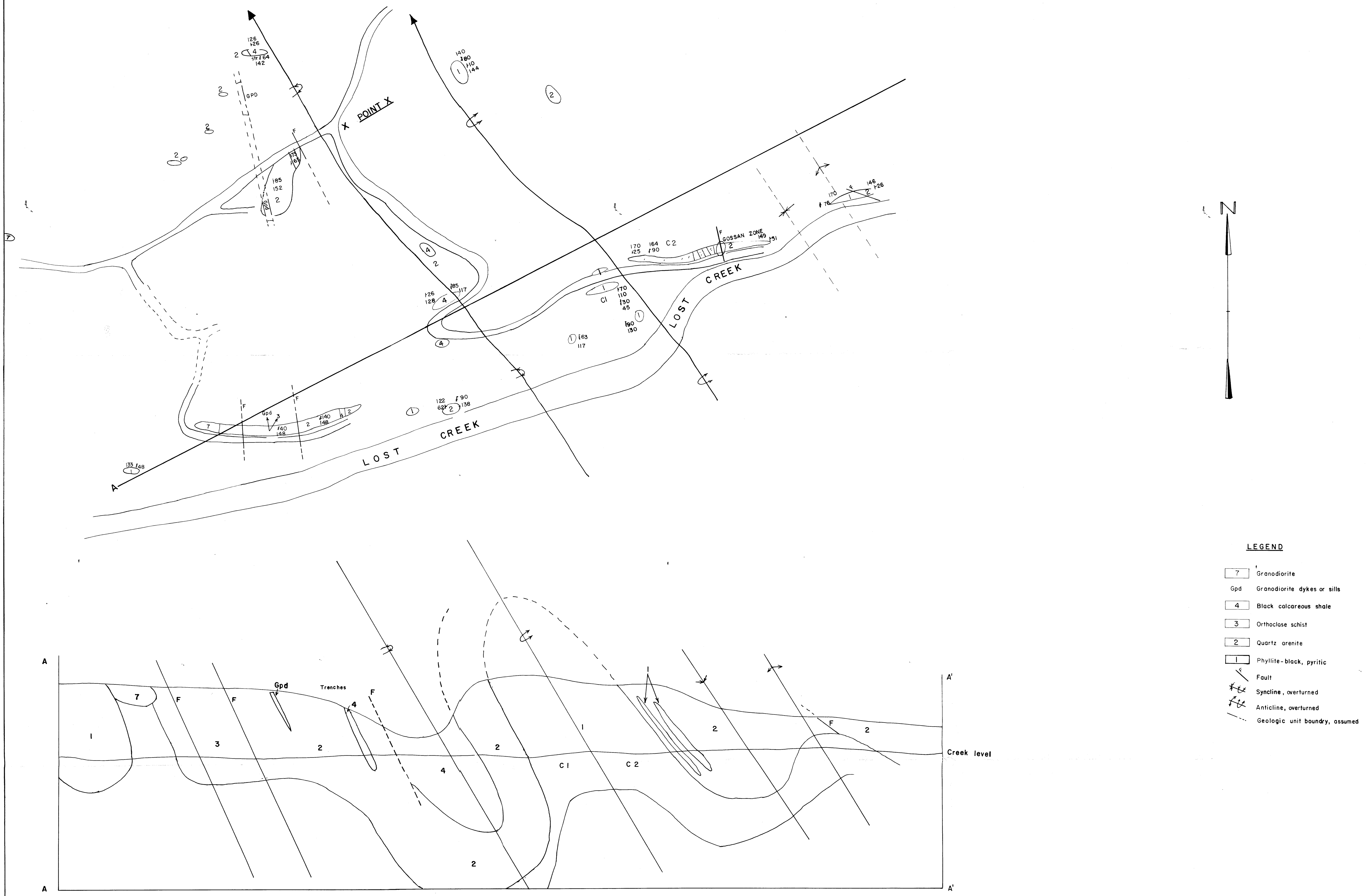
LATE COSTS

Analysis of 1,245 soils for As, Sb and W	
- by Neutron Activation Services, Hamilton, Ontario	
1,245 x $ 5.50/sample	$ 6,847.50
Previous Total	28,217.22
FINAL TOTAL	$ 35,064.72

GEOLOGICAL ASSOCIATION OF CANADA
W. MERCER
FELLOW

W. Mercer, Regional Manager
Mattagami Lake Exploration Limited


Manson River
Manson Creek Road
ANOMALY GRID
RECONNAISSANCE GRID
LOST CREEK GRID
Mosquito Lake
Lost Creek
Skeleton Creek
BASE LINE 10,000 NE
TRENCH I
TRENCHES
LOST
LCP
KATHY
JOY
JOY-I
LEGEND
Faulting & Folding Events
Q Quartz vein
Gpd Granodiorite & pyrite dykes or sills
7 Granodiorite
a: Quartz rich
6 Foliated Diorite
a: Fine - medium grained
b: Coarse grained
c: Composite sills
d: Mylonite
e: Diorite dyke
f: Metasomatized dykes
5 Hornfels
a: Black
b: Black calcarous
c: Buff green
4 Black calcarous shale
a. Pourous
b. Graphic
3 Orthoclase schist derived from quartz-arenite
a: Interbedded with pyritic quartzite
b: Interbedded with black phyllitic units
2 Quartz arenite & interbedded mica quartzite
a: phyllitic quartz arenite
b: thin bedded, not phyllitic
c: medium to thick bedded
d: interbedded black pyritic phyllite units
1 Pyritic black phyllite
a: interbedded with phyllitic quartz arenite
LOCATION MAP
SCALE OF MILES
SCALE OF KILOMETRES
PROPERTY
Germansen Landing
Manson Creek
Tokie Landing
Fort St. James
Vanderhoof
Prince George
Houston
PROPERTY MAP
SCALE OF MILES
SCALE OF KILOMETRES
MANSON CREEK
MOSQUITO LAKE
KATHY CLAIM GROUP
LEGEND
GRAVEL ROAD
BUSH ROAD (APPROX. LOCATION)
BRIDGE
CLAIM BOUNDARY
MINERAL RESOURCES BRANCH ASSESSMENT REPORT
9572
MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA
B.C. TUNGSTEN PROJECT.
KATHY CLAIMS GROUP.
FIGURE I
GEOLOGY MAP
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER '81
Scale of Metres
0 100 200 300 400 500 metres.



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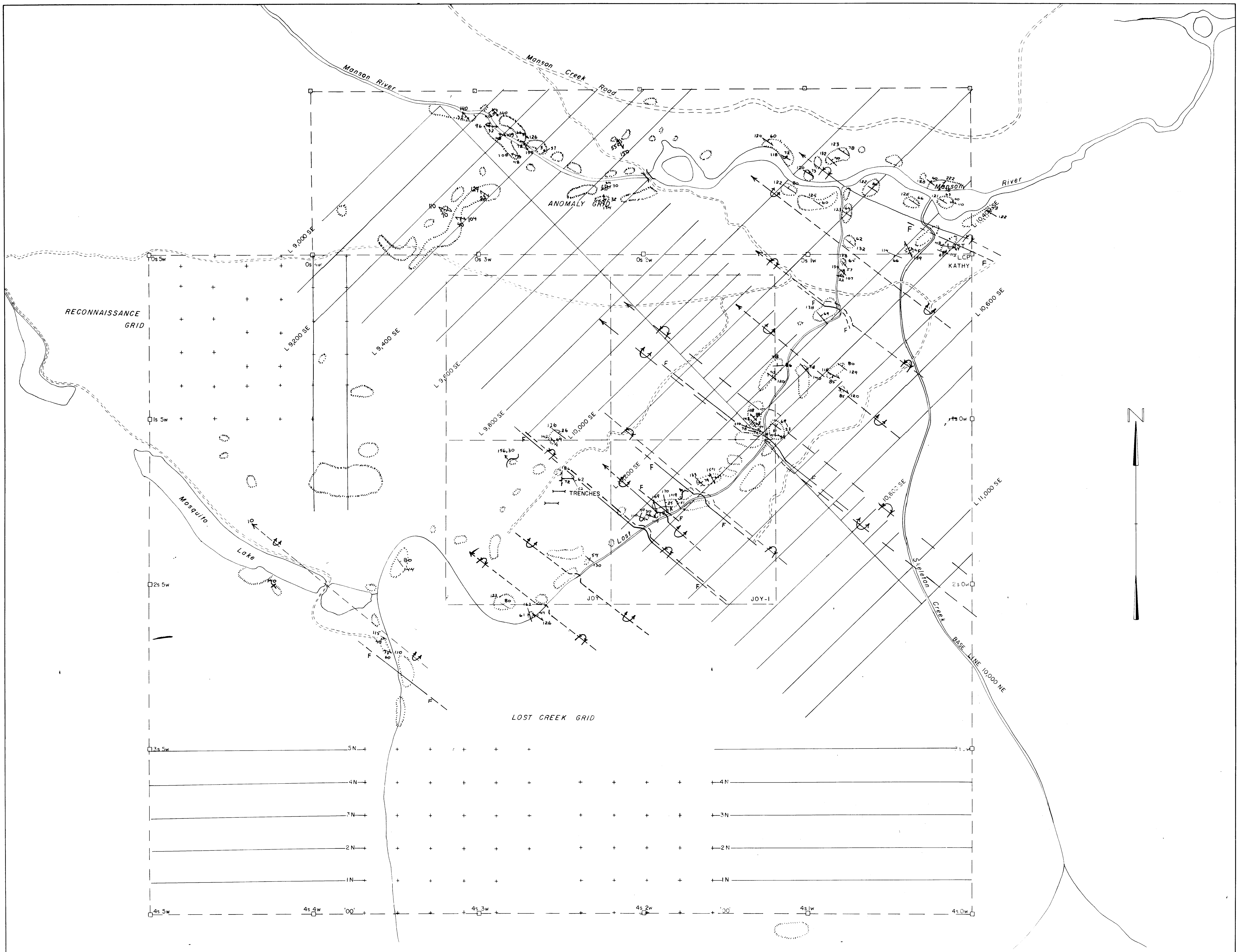
EDMONTON, ALBERTA

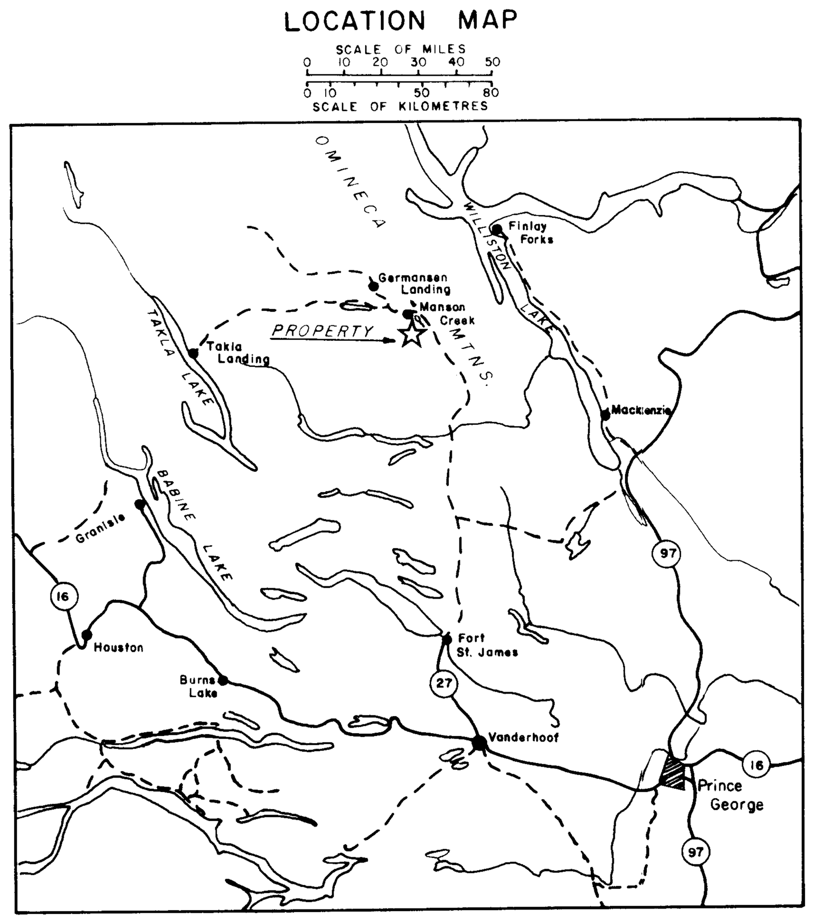
SCAFE OPTION.
KATHY CLAIMS GROUP
FIGURE 2
STRUCTURE OF TRENCH AREA.

DRAWN BY: L. KOZAK
DATE: AUGUST 1981

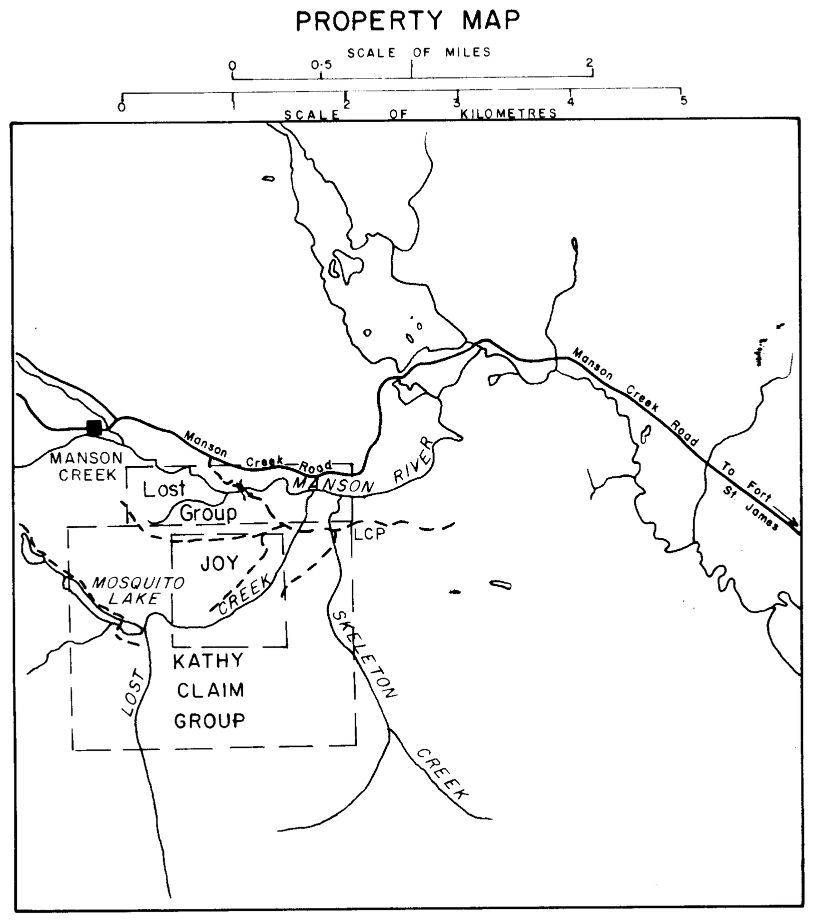
Scale of Meters
0 10 30 50 70 100 metres



LOCATION MAP



PROPERTY MAP



LEGEND

- Outcrop
- Bedding: strike & dip.
- Bedding overturned: strike & dip.
- Cleavage & foliation: strike & dip.
- Jointing: strike & dip.
- Mylonite foliation: strike & dip.
- Drag fold: trend & plunge, arrow shows plunge direction.
- Fault: known, inferred.
- Anticline, overturned, arrow shows plunge; known, inferred.
- Syncline, overturned, arrow shows plunge; known, inferred

Note: Stereonet projections of bedding to cleavage measurements define fold attitudes as trend 309°, plunge 10°.

- Road, bush road.
- Bridge

MINERAL RESOURCES BRANCH ASSESSMENT REPORT

9572

MATTAGAMI LAKE EXPLORATION LIMITED.

WESTERN FIELD OFFICE

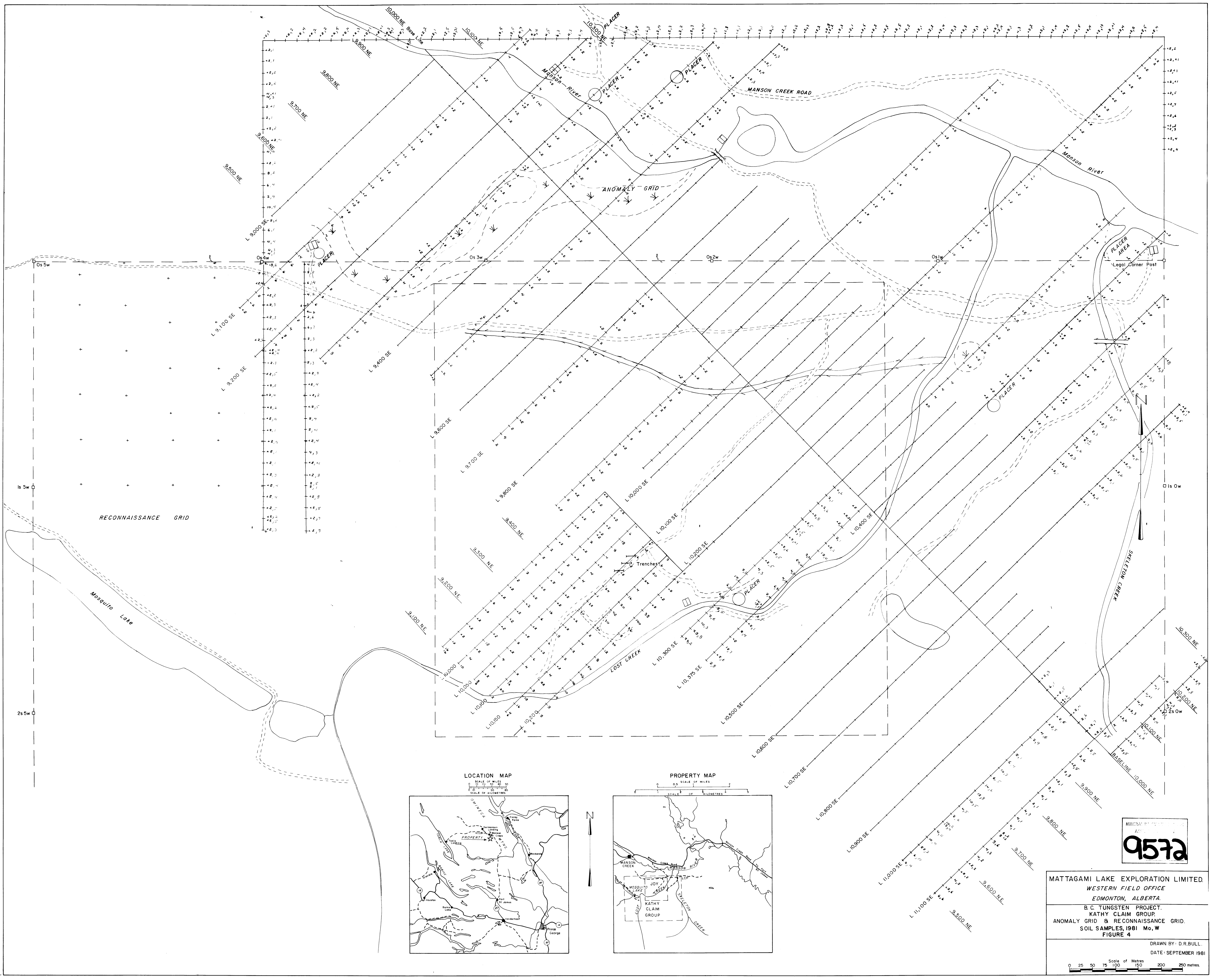
EDMONTON, ALBERTA

B.C. TUNGSTEN PROJECT.
KATHY CLAIMS GROUP.

FIGURE 3-A
GEOLOGICAL STRUCTURE MAP.

DRAWN BY: D.R. BULL.
DATE: SEPTEMBER '81

Scale of Metres: 0 100 200 300 400 500 metres.



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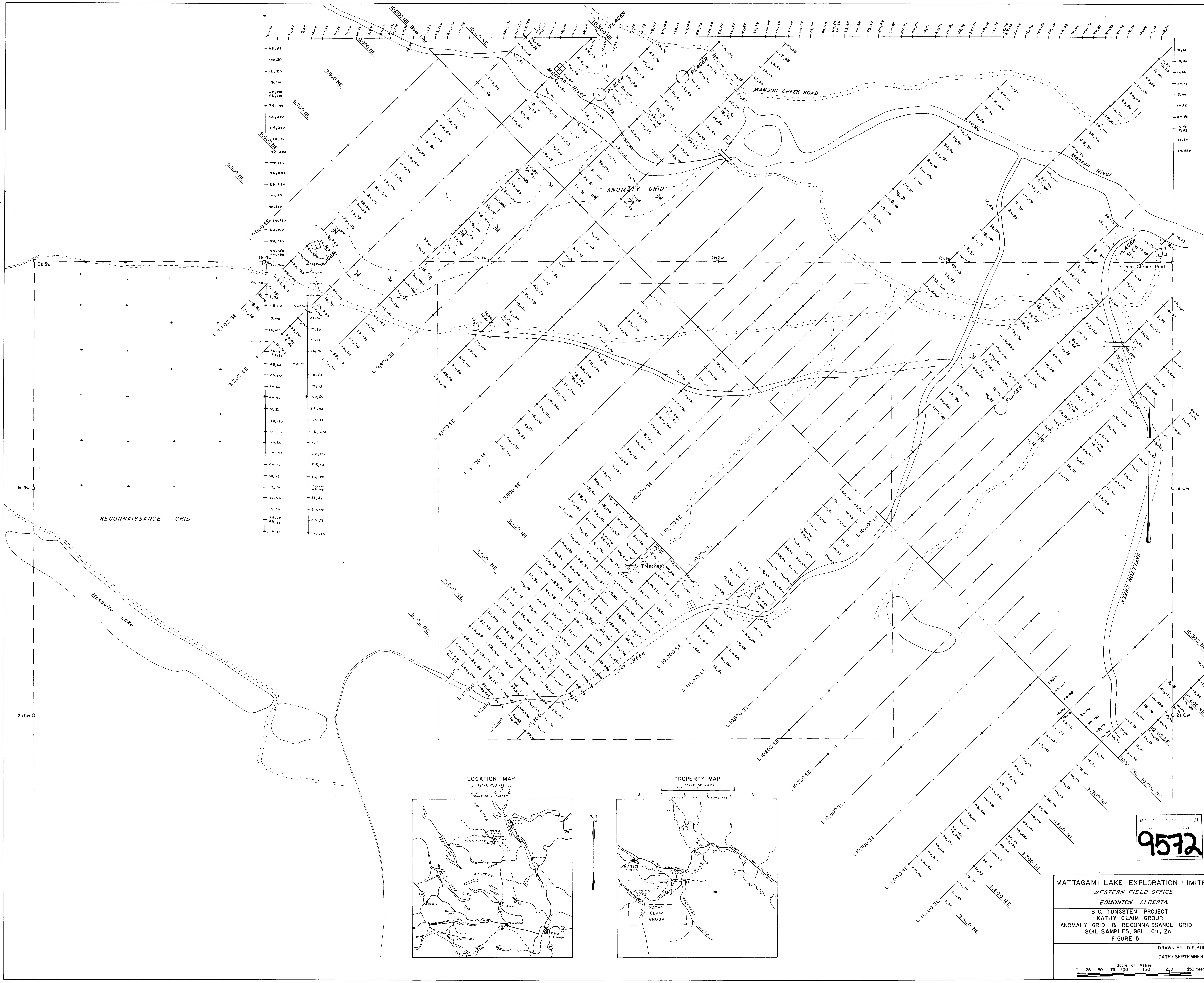
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
SOIL SAMPLES, 1981 Mo, W
FIGURE 4
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER 1981
Scale of Metres
0 25 50 75 100 150 200 250 metres.
9572
LOCATION MAP
PROPERTY MAP
MANSON CREEK
MOSQUITO LAKE
KATHY CLAIM GROUP
JOY
RECONNAISSANCE GRID
ANOMALY GRID
Mosquito Lake
Manson River
MANSON CREEK ROAD
LOST CREEK
SKELETON CREEK
PLACER
PLACER AREA
Legal Corner Post
Trenches
Base Line
BASELINE 10,000 NE



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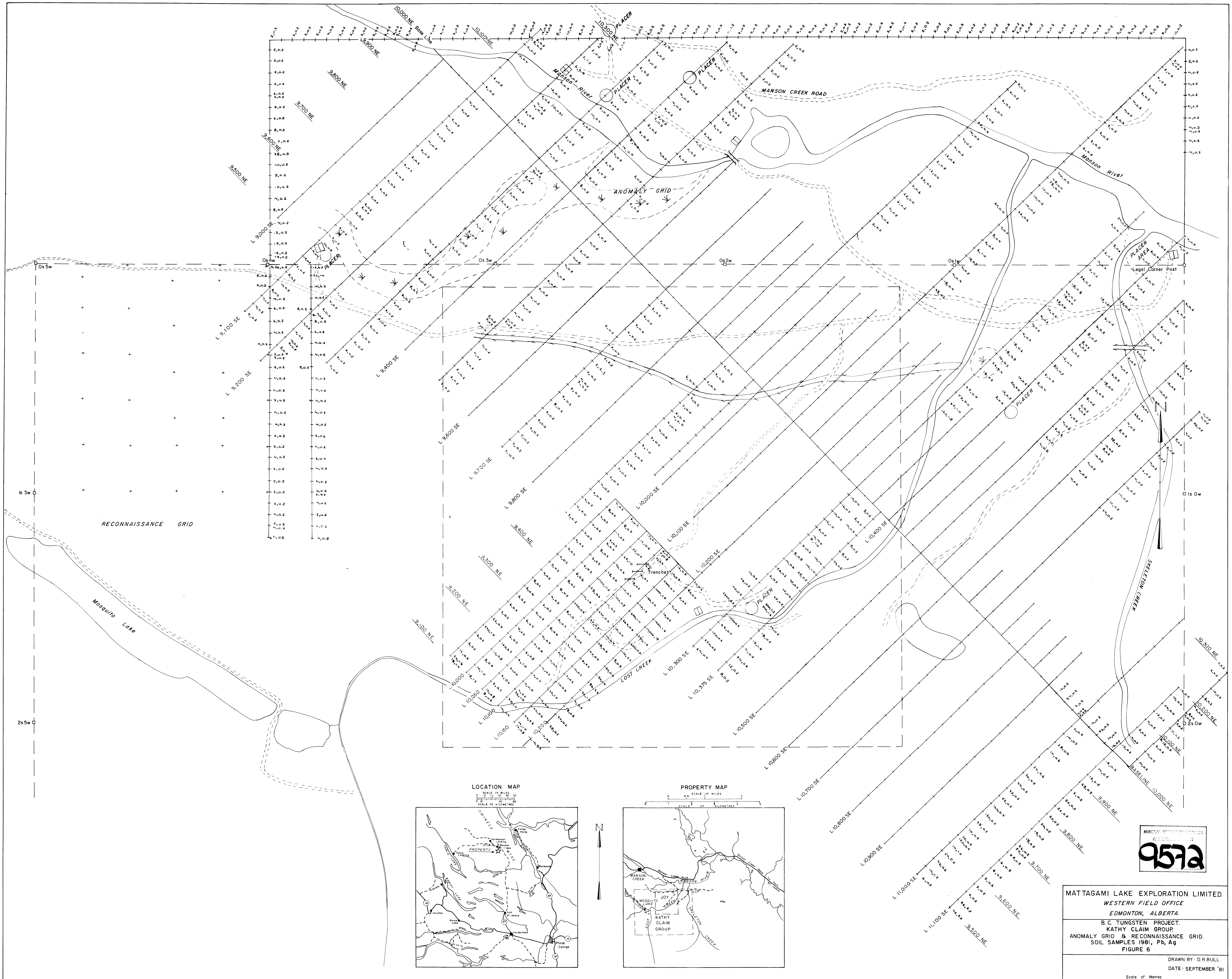
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
SOIL SAMPLES, 1981 Cu, Zn
FIGURE 5

DRAWN BY: D.R.BULL.
DATE: SEPTEMBER 1981
Scale of Metres
0 25 50 75 100 150 200 250 metres.



MANSON CREEK ROAD
Manson River
PLACER
ANOMALY GRID
RECONNAISSANCE GRID
Mosquito Lake
LOST CREEK
SKELETON CREEK
Trenches
Legal Corner Post
PLACER AREA
Base Line
LOCATION MAP
PROPERTY MAP
KATHY CLAIM GROUP
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
9572
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WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B. C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
SOIL SAMPLES 1981, Pb, Ag
FIGURE 6
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER '81
Scale of Metres
0 25 50 75 100 150 200 250 metres.

MATTAGAMI LAKE EXPLORATION LIMITED.
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EDMONTON, ALBERTA.

B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
LOST CREEK GRID
SOIL SAMPLES, Mo, W 1981
FIGURE 7

DRAWN BY: D.R. BULL.
DATE: SEPTEMBER '81

Scale of Metres
0 25 50 75 100 150 200 250 metres

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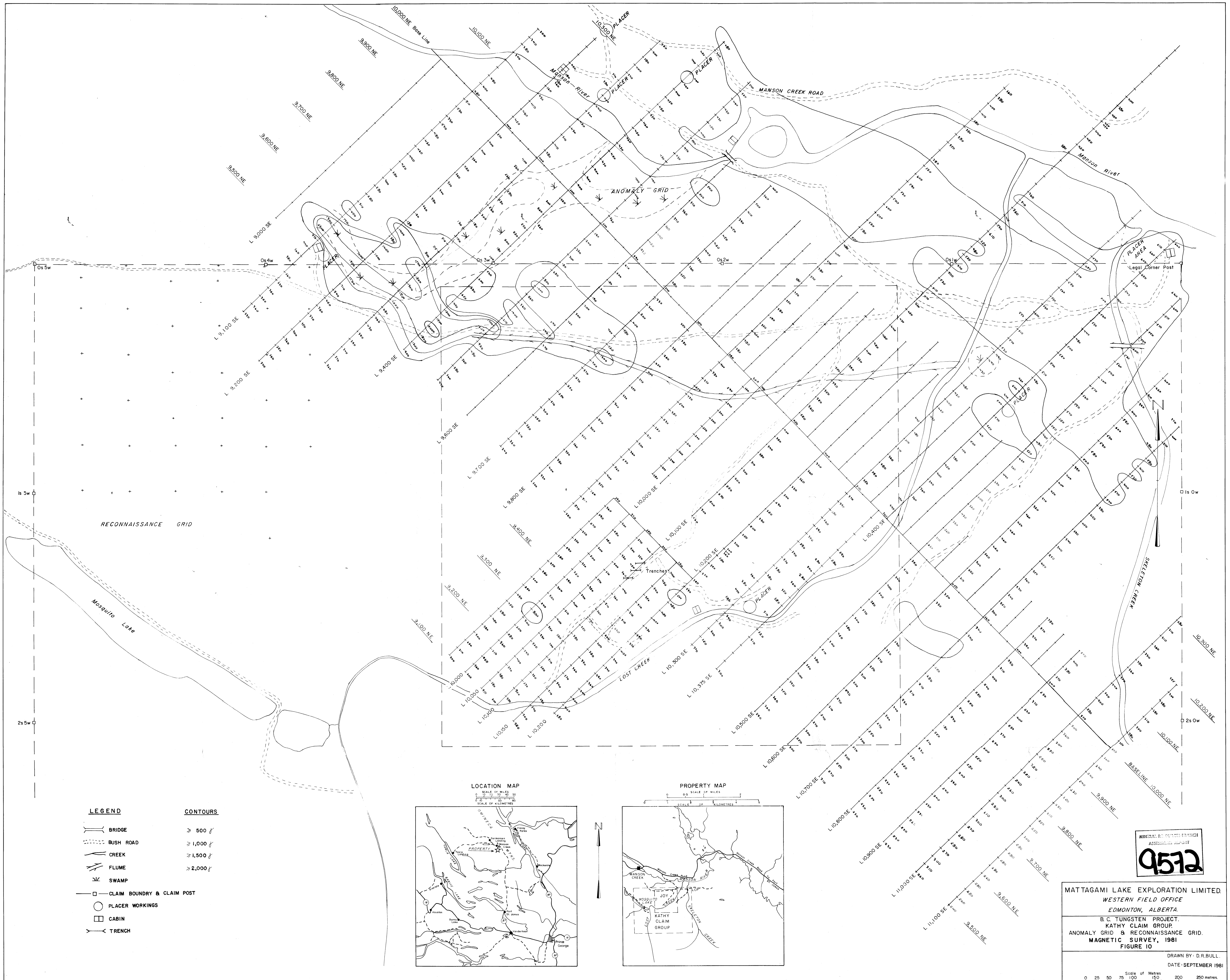
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
LOST CREEK GRID
SOIL SAMPLES, 1981 Cu, Zn
FIGURE 8

DRAWN BY: D.R. BULL.
DATE: SEPTEMBER 1981

Scale of Metres
0 25 50 75 100 150 200 250 metres


Mosquito Lake
Trenches
RECONNAISSANCE GRID
Lost Creek
L 10,500 SE
L 10,600 SE
L 10,700 SE
L 10,800 SE
L 10,900 SE
Base Line 10,000 NE
10,200 NE
10,100 NE
9,900 NE
9,800 NE
9,700 NE
9,600 NE
9,500 NE
Skeleton Creek
N
LOST CREEK GRID
7N
6N
5N
4N
3N
BL
1N
0N
2s 5w
3s 5w
4s 5w
4s 4w
4s 3w
4s 2w
4s 1w
4s 0w
3s 0w
2s 0w
LOCATION MAP
SCALE OF MILES
SCALE OF KILOMETRES
PROPERTY
Prince George
Fort St. James
PROPERTY MAP
MANSON CREEK
MOSQUITO LAKE
JOY
KATHY CLAIM GROUP
LOST CREEK
SKELETON CREEK
9572
MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
LOST CREEK GRID
SOIL SAMPLES 1981 Pb,Ag
FIGURE 9
DRAWN BY: D.R. BULL.
DATE: SEPTEMBER '81
Scale of Metres
0 25 50 75 100 150 200 250 metres



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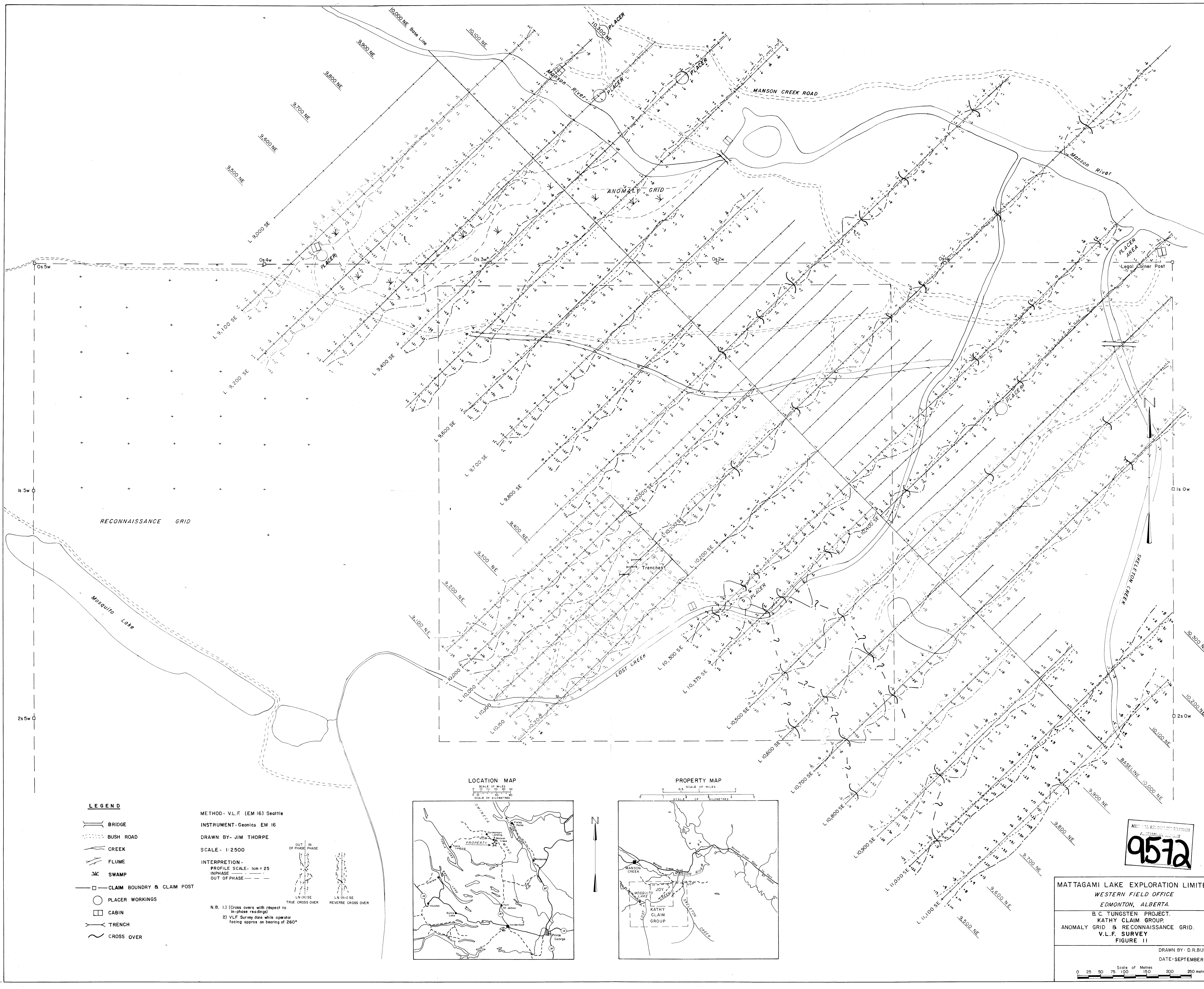
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
MAGNETIC SURVEY, 1981
FIGURE 10
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER 1981
Scale of Metres
0 25 50 75 100 150 200 250 metres.
LEGEND
BRIDGE
BUSH ROAD
CREEK
FLUME
SWAMP
CLAIM BOUNDRY & CLAIM POST
PLACER WORKINGS
CABIN
TRENCH
CONTOURS
≥ 500 γ
≥ 1,000 γ
≥ 1,500 γ
≥ 2,000 γ
LOCATION MAP
PROPERTY MAP
MANSON CREEK
JOY
KATHY CLAIM GROUP
MOSQUITO LAKE
SKELETON CREEK
Manson River
MANSON CREEK ROAD
ANOMALY GRID
RECONNAISSANCE GRID
Mosquito Lake
LOST CREEK
SKELETON CREEK
PLACER
PLACER AREA
Legal Corner Post
Trenches
10,000 NE Base Line
BASELINE 10,000 NE
9572



10,000 NE Base Line
10,100 NE
10,300 NE
9,900 NE
9,800 NE
9,700 NE
9,600 NE
9,500 NE
PLACER
Manson River
MANSON CREEK ROAD
ANOMALY GRID
L 9,000 SE
L 9,100 SE
L 9,200 SE
L 9,400 SE
L 9,600 SE
L 9,700 SE
L 9,800 SE
L 10,000 SE
L 10,100 SE
L 10,200 SE
L 10,300 SE
L 10,375 SE
L 10,400 SE
L 10,500 SE
L 10,600 SE
L 10,700 SE
L 10,800 SE
L 10,900 SE
L 11,000 SE
L 11,100 SE
0s 5w
0s 4w
0s 3w
0s 2w
0s 1w
Legal Corner Post
PLACER AREA
1s 5w
1s 0w
2s 5w
2s 0w
RECONNAISSANCE GRID
Mosquito Lake
Trenches
LOST CREEK
SKELETON CREEK
9,400 NE
9,300 NE
9,200 NE
9,100 NE
10,300 NE
10,200 NE
10,100 NE
BASELINE 10,000 NE
9,900 NE
9,800 NE
9,700 NE
9,600 NE
9,500 NE
N
LOCATION MAP
PROPERTY MAP
MANSON CREEK
JOY
MOSQUITO LAKE
KATHY CLAIM GROUP
LEGEND
BRIDGE
BUSH ROAD
CREEK
FLUME
SWAMP
CLAIM BOUNDRY & CLAIM POST
PLACER WORKINGS
CABIN
TRENCH
CROSS OVER
METHOD- V.L.F. (EM 16) Seattle
INSTRUMENT-Geonics EM 16
DRAWN BY- JIM THORPE
SCALE- 1:2500
INTERPRETION-
PROFILE SCALE- 1cm = 25
INPHASE
OUT OF PHASE
OUT OF PHASE
IN PHASE
LN (X) SE
TRUE CROSS OVER
LN (X+1) SE
REVERSE CROSS OVER
N.B. 1.) (Cross overs with respect to in-phase readings)
2) VLF Survey done while operator facing approx on bearing of 260°
9572
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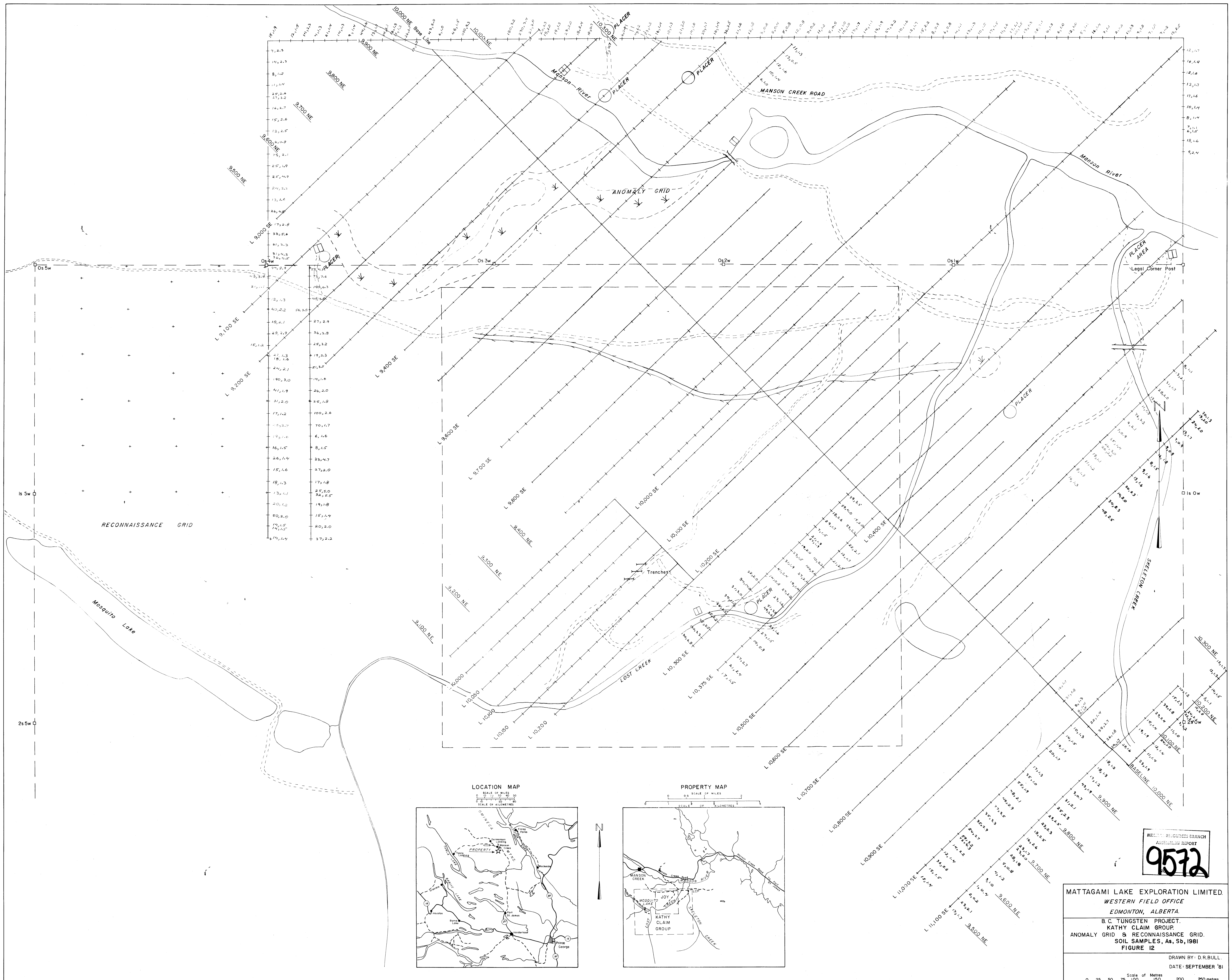
WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
V.L.F. SURVEY
FIGURE 11
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER 1981
Scale of Metres
0 25 50 75 100 150 200 250 metres.



MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
ANOMALY GRID & RECONNAISSANCE GRID.
SOIL SAMPLES, As, Sb, 1981
FIGURE 12
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER '81
Scale of Metres
0 25 50 75 100 150 200 250 metres.
9572
LOCATION MAP
PROPERTY MAP
RECONNAISSANCE GRID
ANOMALY GRID
Mosquito Lake
Manson River
MANSON CREEK ROAD
LOST CREEK
SKELETON CREEK
PLACER
PLACER AREA
Legal Corner Post
Trenches
Base Line
BASELINE 10,000 NE


Mosquito Lake
Trenches
RECONNAISSANCE GRID
Lost Creek
L 10,500 SE
L 10,600 SE
L 10,700 SE
L 10,800 SE
L 10,900 SE
10,200 NE
10,100 NE
Base Line 10,000 NE
9,900 NE
9,800 NE
9,700 NE
9,600 NE
9,500 NE
Skeleton Creek
2s 5w
2s 0w
3s 5w
3s 0w
4s 5w
4s 4w
4s 3w
4s 2w
4s 1w
4s 0w
B.L.
LOST CREEK GRID
7N
6N
5N
4N
3N
1N
0N
N
LOCATION MAP
PROPERTY MAP
MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
9572
NO.
MATTAGAMI LAKE EXPLORATION LIMITED.
WESTERN FIELD OFFICE
EDMONTON, ALBERTA.
B.C. TUNGSTEN PROJECT.
KATHY CLAIM GROUP.
LOST CREEK GRID
SOIL SAMPLES, As, Sb 1981
FIGURE 13
DRAWN BY: D.R.BULL.
DATE: SEPTEMBER '81
Scale of Metres
0 25 50 75 100 150 200 250 metres