MINERAL EXPLORATION ELDORADO AREA

MADOC TOWNSHIP

ONTARIO

NTS 31-C-12

OPAP GRANT OP 91-334

Brampton, Ontario
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SUMMARY

OPAP grant OP 91-334 was applied for and obtained to study a sizeable area centred about Eldorado, Ontario in Madoc Township. The study area, located about 250 kilometres north and east of Toronto is easily accessible year round and contains the Eldorado Copper and Richardson mines, both of which are past producers.

The current work was based on the hypothesis that the sediment-volcanic contact, in this area, maybe a geological environment with mineral potential for hosting gold-copper mineralization. Mapped by Hewitt (1968) and others in the 1960's and 1970's and re-evaluated by Carter (1984) it became evident that the region about Madoc, Ontario had a high probability of economic mineralization being discovered. The contact zone had not, to the knowledge of the author, been explored although some undisclosed work had been done at the Eldorado Copper Mine.

The area is predominantly underlain by volcanics and sediments of Proterozoic age that have been intruded by later felsic and mafic intrusives. Unconformably above these strata are arkosic and limestone sediments of Ordovician age and have been placed within the Basal and Simcoe Groups.

Structurally the Precambrian rocks have undergone at least one phase of folding with two synclinal folds, the Madoc and Queensborough being recognized in Madoc Township. A third and more obscure synform structure, tentatively termed, the "Eldorado Fold", exists within the study area.

Prospecting, geological mapping and VLF-EM and magnetometer surveys coupled with grab sampling were the techniques used to test the sediment-volcanic contact primarily west of the past producers. In addition to the six mineralized showings in the vicinity, one additional mineralized zone was discovered on the Rimington Road just east of Highway 62. It occurs within a silicified marble (?) unit of unknown dimensions. Mineralization consisted of fine grained pyrite, as with the other showings, and occurred adjacent to a mafic-felsic volcanic sequence.

The highest gold assay (720 ppb) came from showing Robinson #2 which was discovered prior to the turn of the century. Once again true dimensions were not ascertained.

The main conclusion arising from this study was the fact that the sediment-volcanic contacts in the area do hold potential for gold-copper-basemetal mineralization. With this the recommendations outline in detail a continued work program aimed at this type of mineralization and a review of other showings and deposits in the area.

INTRODUCTION

OPAP Grant OP 91-334 was obtained to investigate the strike extension of the former producing Eldorado Copper and Richardson mines. The study utilized a combination of prospecting, geological mapping and geophysics to test the sediment-volcanic contact and to a lesser extent the original mineralization within the sediments that was the source of the supergene enrichments known to occur in the area.

The study area is located about 250 kilometres east and north of Toronto, Ontario and is easily accessible. The program results expanded the geological and mineral potential information for the immediate area.

PROPERTY

The area examined does not include one specific property but encompasses an area of about 90 mineral claims in size (Figure 1). Within the boundary there is currently mining claims available for staking in scattered loactions. Generally no more than four could be obtained as a contiguous block with the remaining mineral rights held as patents. Ownership is highly variable with some of the patents held by the current surface rights owners while others are held by mining companies or by individuals living outside the area. Surface rights owners' follow a similar pattern.

LOCATION and ACCESS

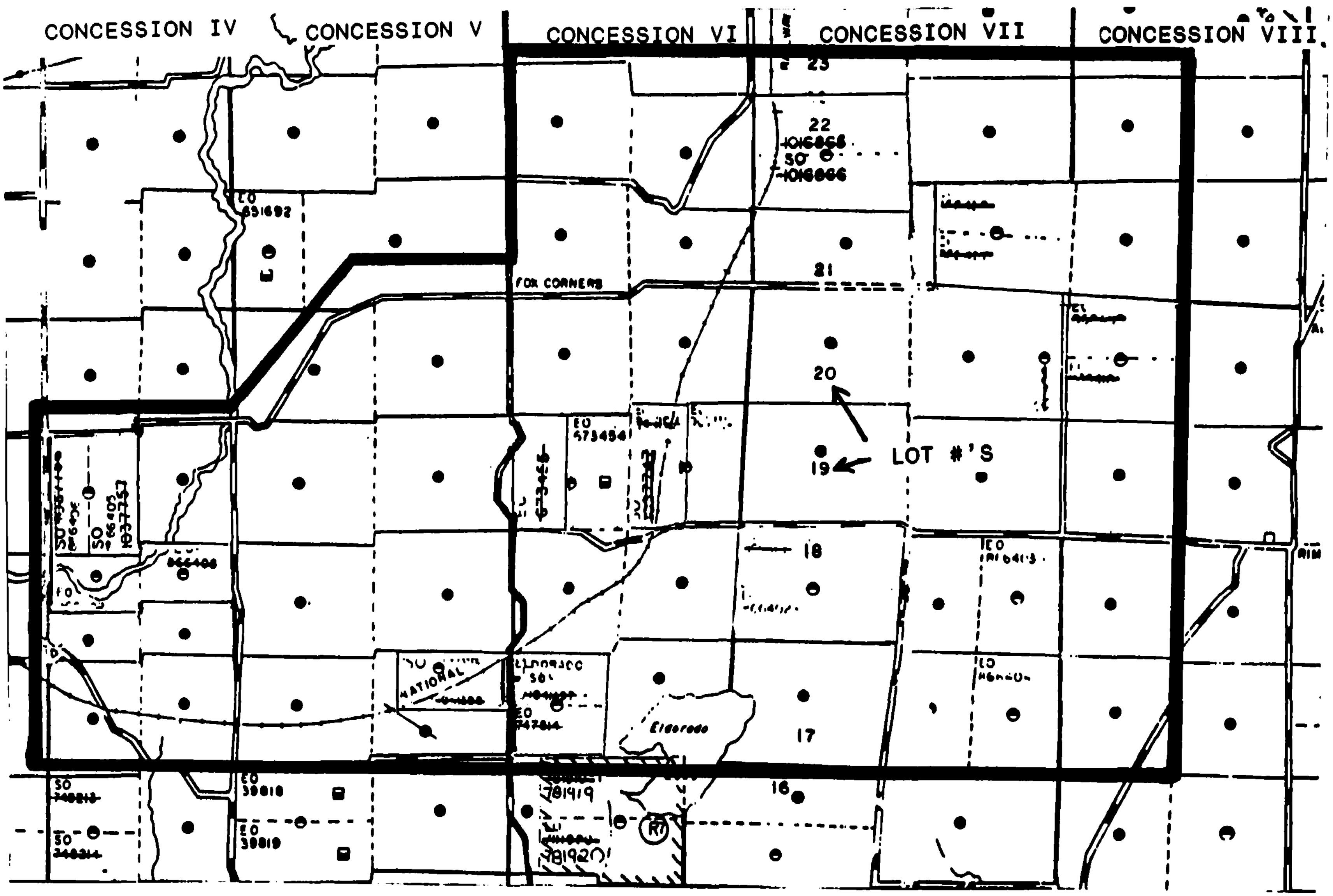
The study area is located north of the town of Madoc within Madoc Township in southern Ontario and centred about the hamlet of Eldorado (Figure 2) nine kilometres to the north. From Toronto access is available by road year round and can be travelled in about two and a half hours utilizing Highways 401 and 62. An alternate route uses Highway 45 which intersects Highway 401 at Cobourg and then Highway 7 to Highway 62. Travelling time is still the same and the distance of 250 kilometres is approximately identical.

TOPOGRAPHY and CLIMATE

Generally the topography can be described as gently rolling with elevations rarely greater than 20 metres. Rocky outcroppings form ridges and individual ovoid hills while the valleys are relatively flat and consist of thick sequences of alluvium.

Land use varies but most obvious is the large number of dairy farms in the area and coupled with that are the fields used for corn and hay. In addition to the farms are the marble and talc quarries as well as limited manufacturing and lumbering.

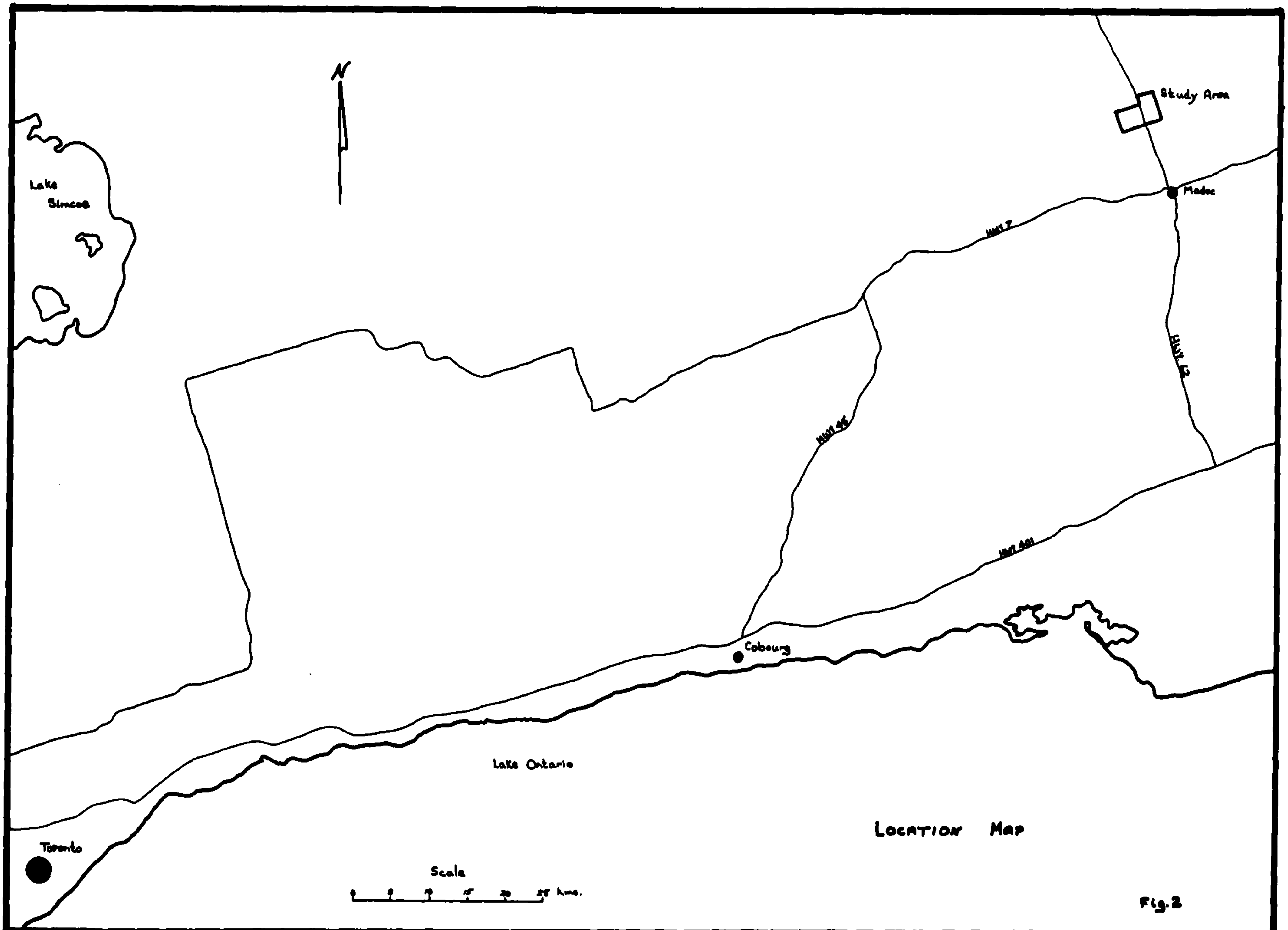
Climatically the area experiences continental weather patterns typical of southern Ontario. The year is marked by hot, humid summers and cold, relatively dry winters. The intervening seasons are quite pleasant.



Scale: 1" = 40 chains

STUDY AREA

FIGURE 1



Location Map

Fig. 2

VEGETATION

A large proportion of the area is currently either under cultivation or used as pasture for the dairy industry. The rocky ridges and swampy sections however are treed or are covered by brush. Cedar, spruce and poplar are common tree types with the latter being plentiful on the hills while the others are found on the slopes or within damper areas. Low brush consisting of alder and probably hawthorne predominate within some swampy sections however hawthorne can also be found on the hills and slopes. Hardwoods of maple and oak can also be found on the ridges.

POWER

Although there are no major power plants in the immediate area, there is no shortage of supply and would certainly be plenty for any future mining operation.

ANCILLARY SERVICES

The region around the study area can provide all services necessary for either an exploration program or a mining operation. The exception would be the supply of heavy mining machinery which could be obtained from the Toronto or Montreal regions.

Manpower requirements may be sufficient in the region depending on the requirements.

PROPERTY HISTORY

The region has seen widespread mineral exploration with numerous discoveries made in both metallic and industrial minerals. The prospective area however has had only sporadic recorded exploration and the following outlines the history as best as could be determined:

1866 -gold discovered in the Eldorado area by M.H. Powell and W. Berryman, shaft sunk to 15 feet; mine known as the Richardson.

1866-68 -Lomard and Hardin new owners, work continued.

1866 -on Fox prospect adjacent to the Richardson a shaft was sunk on a vein mineralized with gold; known as Fox prospect; uneconomic.

1898 -from the Cook prospect thirty tons/day of hematite and magnetite ore were shipped from an open pit 25 feet in diameter and 30 feet deep; owned by A.W. Coe and Thomas Barnes et al.

1901-03 -the Coe or Moore iron mine was opened with work being done by Medina Gold Mining Co.

1903-06 -Coe Mine renamed the Eldorado Copper Mine; west of the Richardson.

1906 -shaft abandoned at the Eldorado Copper Mine

1907 -Eldorado Copper Mine owned by Ontario Copper Company

1956 -Picton Uranium Mines Ltd. dewatered the shaft and re-examined the deposit.

1969-70 -an IP survey and some diamond drilling was done by Grasset Lake Mines Ltd.

1970 -Earl Sager drilled one 150 foot hole in Con. V, Lot 16, S1/2 for limestone

1971 -Earl Sager drilled a 270 foot hole in the same general area for limestone

1973 -Earl Sager drilled a 388 foot hole in the same area and intersected a sulphide zone

1984 -William Purvis Houston tested for marble in Con VI, Lot 19 E1/2 of W1/2

1985 -Mr. Houston tested the marble in the same location

1987 -Mr. Houston tested for marble in Con VI, Lot 19, E1/2 of E1/2; drilled two holes for 203 feet

REGIONAL GEOLOGY

Regionally, the study area lies within the Central Metasedimentary Belt of the Grenville Province (Figure 3) and is underlain by rocks of Middle Proterozoic age (Figure 4).

The stratigraphy of these rocks has been subdivided based on lithology and has also been subdivided into "allochthonous lithotectonic supracrustal sequences or terranes" (Carter, 1984; Figure 5). On this basis the study area lies within the Elzevir Terrane and Table 1 outlines the Precambrian formations exposed in this area and the surrounding region.

Within the study area are exposed, at the base of the Hermon Group, mafic volcanics of the Tudor Formation. In Madoc Township these rocks are well exposed along the eastern boundary (Hewitt, 1968) and consist of green-weathering andesites. To the west Hewitt (1968) mapped what he termed the Madoc Volcanics in an area north and northwest of Madoc. Predominately these rocks consist of massive, pillowed, vesicular and amygdaloidal mafic metavolcanics but range in composition to felsic varieties. These latter

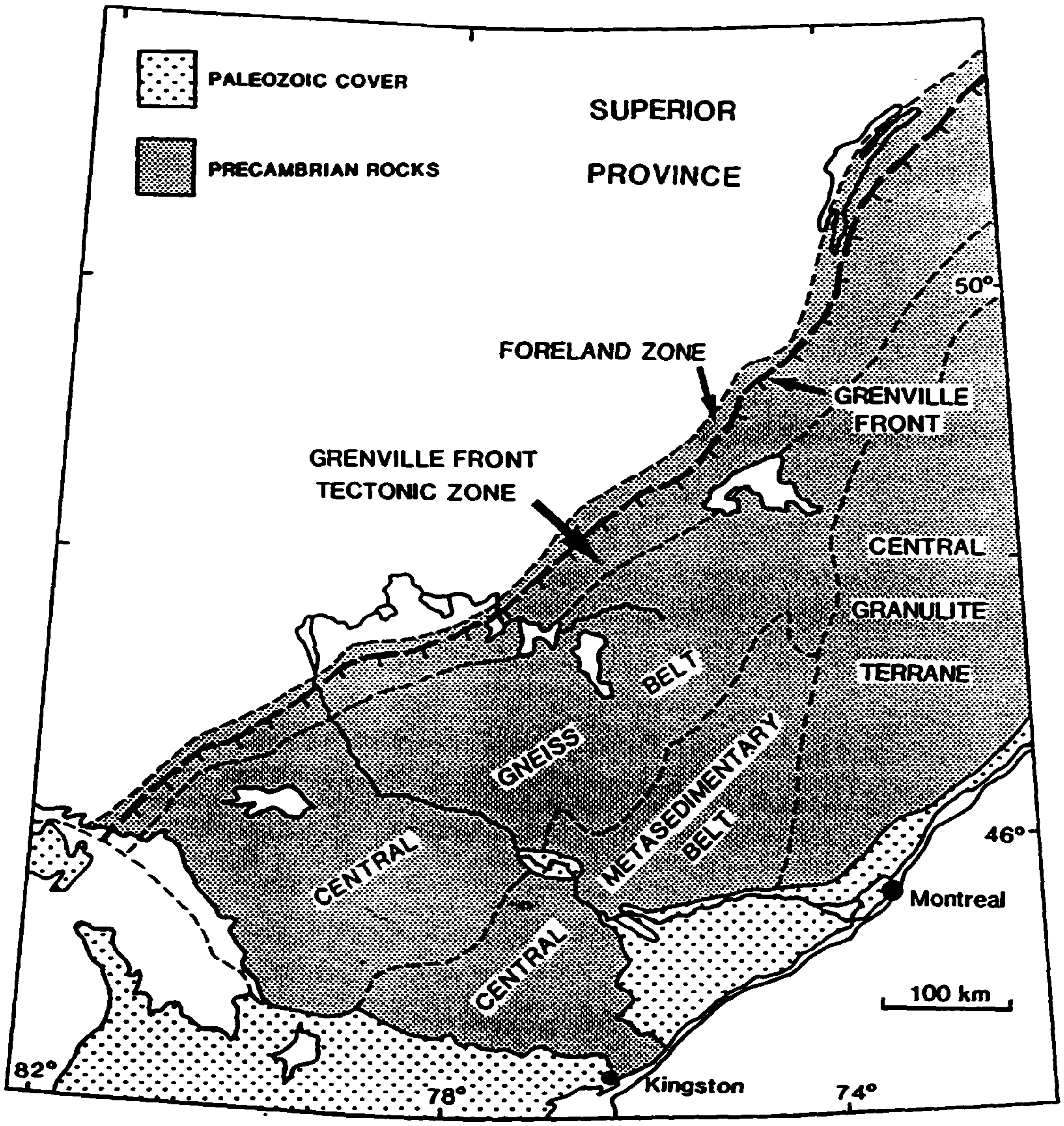


Figure 3: Structural subdivisions of the western Grenville Province, Ontario and Quebec.

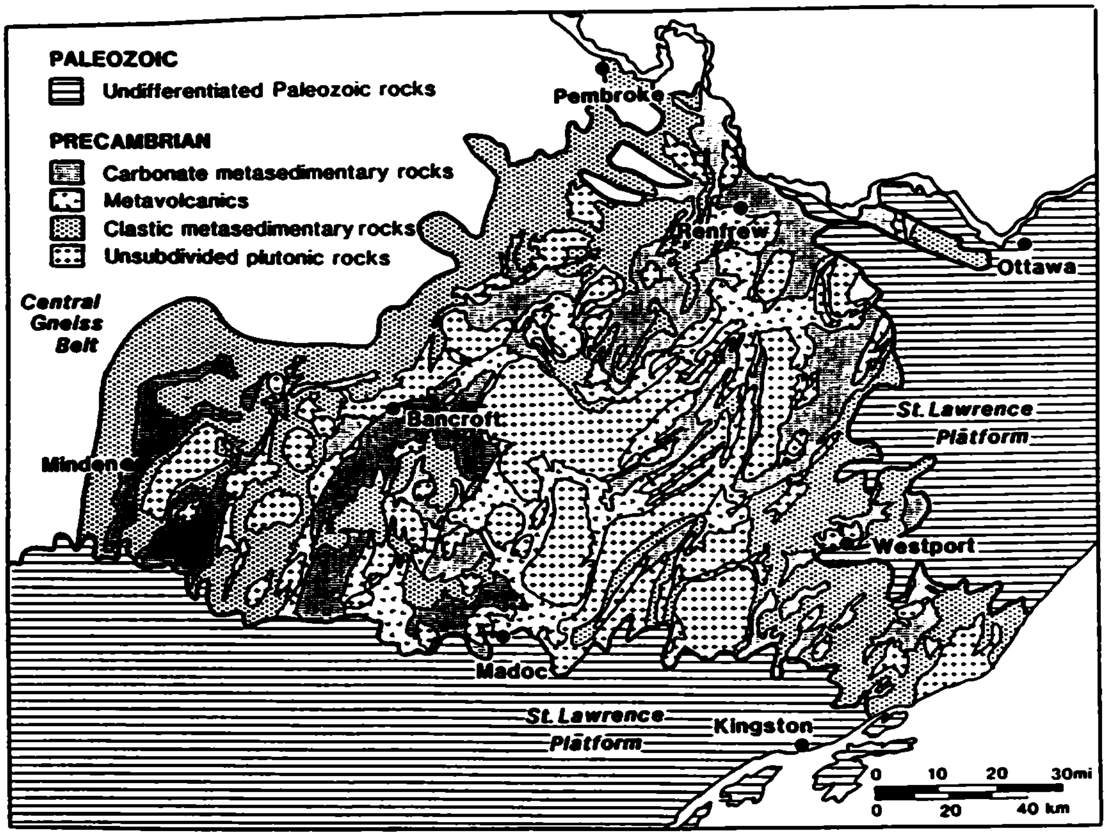


Figure4: General geology of the Centrul Metasedimentary Belt, Grenville Province, southeastern Ontario. Adapted from Carter (1984)

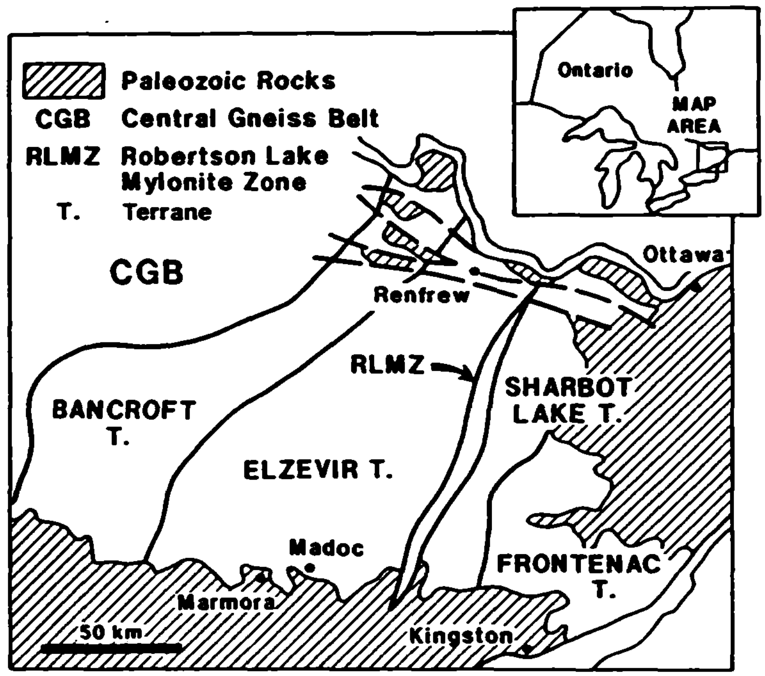


Figure 5: Structural subdivisions of the Central Metasedimentary Belt, Grenville Province, southeastern Ontario.

Supergroup	Group	Formation	Description
	Flinton	Stewart	marble, graphitic marble
		Madoc	pelite
		Fernleigh	thin-bedded black shale and limestone, pyritic in part dolostone, limestone, dolostone
		Myer Cave	conglomerate, black pyritic shale
		Lessard	calcareous and non-calcareous feldspathic sandstone basal, hematitic quartzite (locally
		Bishop Corners	cross-bedded) quartz-pebble conglomerate and shale
		UNCONFORMITY	
Grenville	Mayo	Lasswade	marble, minor calcareous metasandstone and metasiltstone, rare recrystallized chert
		Apsley	poorly sorted feldspathic metasandstone with upper and lower members of calcarous metasandstone and metasiltstone
		Dungannon	80% marble; remainder mainly calcareous metasandstone and metasiltstone, poorly sorted feldspathic metasandstone, and rare recrystallized chert; mafic metavolcanic flows and iron formation rare near base of formation overlying Tudor metavolcanics
	Hermon	Burnt Lake	mainly rhyolitic, trachytic, dacitic, and andesitic metavolcanics with minor metabasalt flows; lensoid marble units and sandy siliceous metasedimentary rocks
		Turriff	75% pillowed basaltic and andesitic metavolcanic flows; 20-25% dacitic and felsic flows and pyroclastic rocks, minor iron formation
		Vansickle	mainly poorly sorted feldspathic metasandstone, locally with abundant marble, felsic and mafic metavolcanics, metaconglomerate, and well sorted quartz-rich meta-sandstone; arkosic metasedimentary rocks commonly associated with felsic metavolcanics
		Oak Lake	mainly metamorphosed felsic pyroclastic rocks and arkose with some mafic and felsic metavolcanic flows; rare marble and metaconglomerate in upper part of formation
		Tudor	mainly metamorphosed pillowed basaltic and andesitic flows

Table 1: Table of the Precambrian formations exposed in southeastern Ontario

types may in fact be included in Lumbers' (1967) Oak Lake Formation while the mafic volcanics may be coeval and correlative with the Tudor Formation.

Overlying these rocks are those of the Dungannon Formation of the Mayo Group which broadly includes calcitic and dolomitic marbles, metasandstone and metasiltstone.

There are numerous felsic intrusives in the area of which the Deloro Granite and the Gawley Creek Syenite are most notable. The former occupies the northwest corner of Madoc Township into the northeastern part of Marmora Township. The latter is in the southern central section of Madoc Township and it also extends west into Marmora Township.

The Gawley Creek pluton is composed of a coarse grained pink biotite-hornblende syenite; while the Deloro Granite is a composite intrusion composed predominantly of pink medium to coarse grained perthite granite. A granodioritic intrusion has been mapped by Hewitt (1968) on the east boundary of Madoc Township and this intrusive extends easterly into Elzevir Township.

Mafic intrusives of gabbro and dioite were mapped by Hewitt (1968) and were found to occur within or in close proximity of the felsic plutons. All are of limited extent and may in part be related to the mafic volcanics of the Tudor Formation.

Metamorphic grade is variable but is generally greenschist facies to lower amphibolite.

Structurally, the area has undergone several phases of folding and subsequent brittle and ductile deformation. Of note would be the Queensborough and Madoc synclines and to a lesser extent the fold structure at and north of Eldorado. The intrusions of numerous granitic and gabbroic bodies has also imposed well defined structural imprints.

The region is overlain by Paleozoic sediments of Ordovician age to the south of Madoc. North of this point, these sediments occur as numerous outliers of variable extent. Hewitt (1968) states that the lowest unit consists of a sequence of limestones with a basal unit of reddish, greenish or chocolate-brown arkose. This is followed by variously coloured cryptocrystalline to medium crystalline limestone.

Hewitt (1968) tentatively named this basal sequence as the Black River limestone while Di Prisco and Springer (1991) have placed the conglomerate-arkose rocks into the Shadow Lake Formation of the Basal Group and the overlying limestones into the Lower Member of the Gull River Formation of the Simcoe Group (Table 2).

An angular unconformity marks the contact between these rocks and the underlying Precambrian formations. Jointing and gentle fold flexures were noted in several exposures and sedimentary structures are well preserved.

AGE (Ma)	SYSTEM	GROUP	FORMATION	MEMBER	LITHOLOGY
458	MIDDLE ORDOVICIAN	SIMCOE	LINDSAY		
			VERULAM		
			BOBCAYGEON	Upper	Crystalline Limestone Calcarenite Limestone Sublithographic Limestone
				Middle	Sublithographic Limestone
				Lower	Argillaceous Limestone Calcarenite Limestone
			GULL RIVER	Upper	Limestone Lithographic Limestone
				Middle	Laminated Limestone Lithographic Limestone
				Lower	Dolomitic Limestone Lithographic Limestone Limestone and Dolomite
		BASAL	SHADOW LAKE		Red and Green Conglomerate Sandstone, Arkose and Shale
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TABLE 2: Lithostratigraphic classification of the Paleozoic rocks in southeastern Ontario.

LINECUTTING

For proper control a picketed grid was established over the Bateman and Robinson properties (DWG.'s 1 and 2). Individual but parallel baselines were completed on each property. Baselines were marked every 50 metres and crosslines were run at these 50 metre intervals. Crosslines were also picketed every 50 metres. Due to the Moira River, the Robinson grid utilized a main tieline at 4+50 S and a shorter tie at 3+50 S.

The direction for each baseline was N 72 E. The 4+50 S tieline varied from this heading and the minor tieline ran at N 80 E. Total lineage was 12.8 kilometres.

AREA GEOLOGY

GENERAL

Within the study area outcrop exposure of Precambrian aged rocks was quite high; however, due to some recent road/shoulder repair east of Fox Corners some outcrops had been buried. This was an unfortunate circumstance since these outcrops were of pelitic metasediments and possible hosts to economic mineralization.

In general, the geological mapping and prospecting revealed outcrop and rock types as illustrated on Hewitt's (1968) map. This program; however, also revealed additional outcrop in a key stratigraphic area and one rock type not previously reported.

Although only a small proportion of the study area was mapped in any detail; the lack of few assessment reports for the area only provided little additional information (DWGS. 1 and 2).

MAFIC VOLCANICS

Only one road cut was investigated that had been mapped as mafic paragneiss. The outcrop area was more extensive then the cut but this location on Highway 62 provided relatively fresh rock surfaces and a three dimensional exposure.

The mafic paragneiss was a massive, amphibole rock cut by numerous, narrow carbonate stringers at all orientations. No sulphide mineralization was noted and all original or relict structures were absent. There is the possibility that these rocks could be correlative with the Tudor Formation. No other exposures of mafic volcanics were uncovered.

PELITIC SEDIMENTS

Rocks in this group include fine grained siltstones, and argillites. Most were composed of quartz, feldspar and mafic minerals with minor amounts of sulphides (pyrite) and hematite. Thin laminations were common and were the result of mineral layering and probably grain size. Both weathered and fresh faces were generally grey in colour although variations were noted dependent on mineral composition. Of note was an exposure of a quartz-sericite rock east of Highway 62 on the Rimington Road. Originally mapped as a quartzite, this rock is a highly crenulated, sericite schist veined with quartz. The sericite is well developed on the crenulated surfaces and the quartz is white to semi-transparent. Once again no sulphides were noted and a grab sample returned only low values in all metals. Stratigraphically below is a fine grained massive and structureless rock with a reddish fresh surface. Carbonate stringers are present and randomly oriented. This unit could be a quartzite but its placement above the mafic volcanics and associated with a sericite schist suggests it maybe a felsic volcanic. Thin section work would probably determine its type.

From the current mapping and also on Hewitt's (1968) map these rocks form distict stratigraphic units that can be traced over considerable distances. Their presence in the Richardson and Eldorado Copper Mine area elevated their importance as possible hosts to economic mineralization. As mentioned above the occurrence of sulphides in these rocks was rare and definitely not in economic concentrations.

DUNGANNON FORMATION

Calcitic and dolomitic marbles are widespread throughout the study area. Most outcrops consisted of massive marbles of variable grain size and composition. Banded varieties were common and varied in colour from white to brown or bluish. Calcitic units were coarser grained and stongly reactive to dilute HCl.

In addition to the mineralogical impurities responsible for the colourations; the marbles were, in some cases mineralized with pyrite as disseminations and narrow laminae parallel to the foliation. Overall content rarely exceeded five percent.

FELSIC INTRUSIVES

The Deloro Granite is located in the southwest corner of the study area. Other than a brief examination of this intrusive on the road between Concessions IV and V; these rocks were not looked at in detail. One sample was obtained just south of the study area (PAD-12) and is that of a medium grained granite composed of quartz and microcline with minor amphibole.

The granite stock in the vicinity of the Richardson and Eldorado Copper mines was not investigated. Mapping and prospecting revealed only minor additional felsic intrusive activity. One occurrence would be at the Robinson No. 5 showing, where pyrite mineralization is associated with what appears to be narrow granitic dyklets. Another narrow dyklet was noted cutting the felsic volcanics (?) sample RR-7. Here no sulphide mineralization was evident to be associated with the intrusive.

MAFIC INTRUSIVES

Only one body of medium grained gabbro was located. This was on the Carter property, northeast of the Highway 62 - Rimington Road intersection (samples C-9; PAD-2). Amphibole and plagioclase were the main mineral constituents; however, fine to medium grained pyrite formed a minor accessory. The rock was massive, non-foliated and had a fresh appearance. Colouration varied between blackish to greenish.

Due to lack of outcrop exposure, its dimensions could not be determined. It cross-cuts the strike of the adjacent marbles to the immediate south; however, the strike of the marbles changes from north-south to northeast-southwest in this area and therefore this intrusive may have been injected along a zone of weakness or within a fold nose. A small excavation occurs at the eastern edge of the gabbroic outcrop. Rock on the "dump" is hematized and silicified and may represent the contact zone of the gabbro.

No ground geophysics was conducted over this area and the most recent airborne results failed to detect what probably is an intrusive of limited extent.

PALEOZOIC SEDIMENTS

As mentioned under "Regional Geology" exposures of Paleozoic sediments form outliers on the Precambrian strata. Several of these exposures were encountered at the north end of the study area, on the road east of Fox Corners. Sample PAD-6 is a massive, sandy unit representative of the basal section of the Shadow Lake Formation. Similar rocks were mapped on the Robinson grid on Line 0+50E at 4+00S (sample ROB-5). Exposures were not large but the hill is probably in part underlain by these flat lying sediments. A short distance to the east another small outcrop was discovered on Line 3+50E at 3+50 S and on Line 5+00E at 4+00S. Between; however, on Line 1+50E at 4+00S were several poor exposures of Precambrian metasediments. The thickness therefore of these basal units is relatively thin and the unconformable contact is not at great depth.

METAMORPHISM

Metamorphic grade is that of the greenschist or lower amphibolite facies. Rocks within the study area were in general well preserved. Biotite, chlorite and amphibole were noted in many of the samples and are indicative of this grade of metamorphism.

ALTERATION

Silicification, carbonatization and biotization were all evident but the current program did not outline any specific zones. The mineralized showings and occurrences definitely, in some instances, displayed silicification and/or biotization. Hematite, carbonate and potassic alteration was present at others. The biotite, occurring as books at the Robinson No. 3 showing may be indicative of a granitic intrusion at depth. Samples ROB-22 and 23 both show biotite development accompanied by carbonate in a fine grained silicious sediment. This alteration is centred about fractures that crosscut the local foliation trend.

STRUCTURE

The major structure is the "Eldorado Fold" that occurs throughout the area and is easily recognizable on Hewitt's (1968) map. Rocks have been folded about a northwesterly trending axis forming a synform type fold structure. Study of the top directions indicates that there probably is at least one earlier phase of folding. Parasitic folds were mapped on the Moira River just north of the Robinson Property. Here plunges of the "Z" folds were in the order of 29 to 60 degrees to the east.

Shearing on a small scale was evident and throughout the area there was predominant east-west foliation trends.

Strata dips and directions were variable but generally dips were in the range of 40 to 90 degrees. The exception being the relatively flat lying rocks of Paleozoic age.

No major faults were recognized.

SOIL GEOCHEMISTRY

A more complete soil geochemical survey was initially planned; however, the depth of the overburden in many areas combined with cultural disturbances would have made the results questionable and perhaps uninterpretable. In total seven samples were collected and the assay results are presented in Appendix I. The locations for these samples are on Drawings 1 and/or 2 and are tabulated below:

B-3 and B-4	- both were bank samples taken on the Moira River.
RS-1 and 2	- both were taken at Pit 2 on the Robinson ground.
RRS-1, 2, 3	- hematite zones (RRS-1, 2) and a limonite zone on Highway 62 at the Rimington Road.

MINERALIZATION

Sulphide mineralization consisting predominantly of fine grained pyrite was noticeable within the marbles and to a lesser extent the amphibolitized mafic volcanics. It occurred as discrete crystals and as small blebs or masses both of which in many occurrences formed distinct laminae.

Iron oxide mineralization of both limonite and hematite was more widespread with hematite being most common. Generally it occurred as an alteration within the marbles as a weathering halo about the pyrite but also as wide altered zones.

Chalcopyrite was noted but was rare and generally occurred in association with pyrite. Both galena and sphalerite were not recognized but the low concentrations of lead and zinc detected in the assays (Appendix I)indicate that probably each of these minerals do occur if only in minor amounts.

The following sections briefly describe the mineralized occurrences that were located; some of which have not been tested by assay.

HIGHWAY 62 SHOWING

Located in a road cut 0.7 kilometres north of Eldorado on Highway 62; this showing consists of varied coloured marbles of the Dungannon Formation capped in several areas by a distinctive red hematitic paleosol. Limonite occurred further down the outcrop exposure, depth-wise, and although present was not as extensively developed as the hematite.

Karsting in this exposure, as well as in other areas has been well documented by Di Prisco and Springer (1991). The current examination of this outcrop confirms the presence of karst features and to the presence of a hematite-rich paleosol marking the contact with the overlying Paleozoic sediments. Di Prisco and Springer in their diagram illustrate and mention that on the western section of the roadcut there are exposed red shales of Paleozoic age. On the eastern half; however, grey to black shales were exposed which appeared to be infolded with the marbles. It is conceivable that these rocks are also Paleozoic in age and were formed within the paleo-eroded surface of the marbles.

The origin of the hematization and the limonite was due to the weathering of the pyritic marbles.

Three soil samples were collected from this showing, numbered RRS-1,2 and 3. RRS-1 and RRS-3 were taken from two hematized zones located approximately 10 metres apart. RRS-2 sampled the limonitic soil about two metres below RRS-3. All three samples returned low gold values as well as low values in copper and zinc. RRS-1 however did return 59 ppm in lead; the highest value of all the samples taken during the current program. None of these samples indicate the presence of any major accumulations of metals.

Rock sample 39110, collected from an adjacent hematized zone; approximately 10 metres north of samples RRS-2 and 3 reported only low metal values.

ROBINSON #1

This showing consisted of a pit that measured approximately 2.5 metres square and about 1.5 to 2.0 metres in depth. It is plausible that when first excavated the depth was greater although the amount of material on the dump would confirm that the present depth may in fact be close to the original. The dump material immediately to the west of the pit indicates that the host rock was metasedimentary and had been intruded by one or more white to clear quartz veins. It is assumed therefore that the search was for gold in quartz veins. In addition to the vein material; however, there were rusty blocks of mineralized host rock. Pyrite was the only sulphide recognized and it was fine grained and formed upto 10% of the rock. An assay from a grab sample of this mineralized material indicated only low values for all metals (sample 39102).

Adjacent to the pit was a large north-south trending trench presumably of more recent origin. Rocks exposed in this excavation indicate few quartz veins but did reveal a zone of foliated and altered metasediments which are assumed to be the same zone from the pit some 15 metres to the east. Stratigraphically the zone's footwall is a laminated cherty sediment which is folded and sheared; while the hanging wall is a sheared, vuggy, carbonate sediment. The zone is intensely sheared, brecciated, altered by hematite and has a rusty weathered surface. The hanging and footwall rocks are foliated at about N90E and dip to the north at 74 degrees. The mineralized zone however is foliated at N64E and dips at 74 degrees to the northwest. Samples from the trench were obtained but not sent for assay.

ROBINSON #2

As with the Robinson #1; this occurrence is exposed by a pit having similar dimensions. Currently the pit is filled with refuse making a detailed examination difficult. Dump material is scarce having either been removed or is buried. Present however are highly hematized soils and similarly altered metasediments. The original showing therefore probably consisted of a hematized zone within fine grained metasediments near the upper contact with the overlying marbles. The width of the zone or its strike length are unknown.

Two soil samples were collected (RS-1 and RS-2) and upon assay revealed high values in both copper, zinc and lead. Gold values are considered anomalous although the actual numbers are not that high. Rock sample 39112 again registered high copper but only low values for zinc and lead. Gold on the other hand was high at 720 ppb.

This is the showing indicated on Hewitt's map (1968).

ROBINSON #3

A third pit marks this showing about 200 metres east of Robinson #2. Mineralization in the form of fine grained pyrite occurs in foliated metasediments and is well exposed on the west wall of the pit. Hematite alteration forms an envelope about the strataform mineralization for a total width of about 2 metres. One grab sample (39114) was sent for assay and returned 130 ppb in gold and only low values for copper, lead and zinc. Strike dimensions of this zone could not be determined.

ROBINSON #4

No samples of this zone were taken for assay; however hand samples indicate medium grained biotite developed in a fine grained brown dolomitic marble. The width of this mineralization was less than one metre and the strike length is unknown. The showing is marked by a conical dump now overgrown with grass. Although probably not of any economic importance its location in relation to a boulder of quartz veined sericite schist (sample ROB-21) is of some interest.

ROBINSON #5

This showing lies in the northeast quadrant of the Robinson Property in an area of fair outcrop exposure. All indications suggest that this is a new occurrence for a search of the literature failed to provide any information.

Within the immediate area all the outcrops consist of fine grained metasiltstones trending in a general east-west direction. Sulphide mineralization was minimal or more commonly absent from these rocks. The showing, as with the others, constitutes a zone of fine grained pyrite mineralization within a hematized alteration envelope dipping at 68 degrees to the north and striking due east. The pyrite by volume is between 2-3% and is disseminated or occurs as small masses. Biotization and potassic alteration are also present and amphibole and carbonate were noted. The footwall rock, tentatively classified as a marble, is a laminated carbonate rich sediment, light grey in colour.

Several samples were taken of the zone and the footwall rocks but none were sent for assay.

BATEMAN SHOWING

The Bateman Property contains two mineral claims and is located north and west of the Robinson Property. No outcrop was found on the property but extrapolation of the stratigraphy from the southeast indicated that the ground was underlain by favourable geology.

Prospecting revealed rounded boulders of limy Paleozoic sediments as well as a large number of Proterozoic marbles . One such boulder was heavily rusted, silicified and was mineralized with pyrite to 2% as streaks or cubes oriented parallel to the foliation. It measured about 30-35 centimetres in diameter and 10 centimeters in thickness and was sub-rounded.

Assays from the one sample (39115) were disappointing in all metals with gold being 3 ppb.

CONCLUSIONS

This program has indicated numerous features about the area and the following are the conclusions based on the survey results:

1. The study area is underlain by rocks of the Central Metasedimentary Belt of the Grenville Province and that the rocks lie within the Elezevir Terrane based on lithotectonic supracrustal sequences.

2. The Tudor Formation, of the Hermon Group composed of mafic volcanics forms the base of the stratigraphy and is overlain by sedimentary rocks of the Dungannon Formation which are primarily calcitic and dolomitic marbles.

3. Overlying unconformably these two formations are the shale and arkosic sediments of the Shadow Lake Formation of the Ordovician Basal Group. Conformably above are the limestones of the Gull River Formation of the Simcoe Group.

4. Regionally, there are two prominant synclinal folds, the Madoc and the Queensborough. A third, tentatively named the "Eldorado Fold" has been outlined in the study area.

5. Sulphide mineralization is associated with hematization, silicification, carbonatization and to a lesser extent biotite formation.

6. Sulphide mineralization occurs as disseminations or thin layers and is probably stratabound in nature within silicified marbles.

7. Sulphide mineralization at or adjacent to the sediment-volcanic contact can be traced to the west of Eldorado for about two kilometres.

8. East and north of Eldorado there is a possibility of an occurrence of felsic volcanics capped by a quartz vein bearing sericite schist.

9. With the presence of several traceable sediment-volcanic contacts and sulphide mineralization present at this interface; the study area hosts a most favourable geological environment for basemetal and gold deposits.

RECOMMENDATIONS

The current program has outlined the potential for basemetal and/or gold mineralization at the sediment-volcanic contact similar to the mineralization at the past producing Eldorado Copper Mine. Also this program formed only the basis of what should be a continued study to evaluate the mineral potential of the area. For this reason, exploration work should be continued and is highly recommended. The following recommendations are put forth as a guide for a new program:

1. The mineral rights of the area should be ascertained and obtained including that of the Eldorado Copper and Richardson mines.

2. For those areas selected a cut grid should be established for control purposes.

3. Detailed geological mapping accompanied by prospecting and manual stripping should be completed over the entire gridded area.

4. Magnetometer and VLF-EM surveys should be conducted as mapping tools and an IP survey should be undertaken to delineate mineralized zones in preparation for trenching and diamond drilling. As a test, Max-Min could be run over the known occurrences to evaluate the effectiveness of this technique.

5. Trenching could be used effectively in anomalous areas and all pre-existing trenches should be cleaned out, mapped and systematically sampled.

6. Showings outside the immediate area should be re-evaluated based on the new geological information, in particular the massive sulphide deposit intersected in Concession 5, Lot 16, W1/2.

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3. Hewitt, D.F. 1968. Geology of Madoc Township and the North Part of Huntingdon Township; Ontario Department of Mines, Report 73,45p.

4. Lumbers, S.B. 1967. Stratigraphy, plutonic activity and metamorphism of the Ottawa River Remnant in the Bancroft-Madoc area of the Grenville Province of Southeastern Ontario; unpublished Ph.D. thesis, Princeton University, 331p.

CERTIFICATE OF QUALIFICATION

I, Peter A. Dadson, residing at 4 Moffatt Avenue, Brampton, Ontario, do hereby certify that:-

1. I am an independent consulting geologist.

2. I am a graduate of Carleton University, with a Bachelor of Science degree in Geology (1974) and have been practising my profession since graduation.

3. I am a Fellow in good standing of the Geological Association of Canada.

4. I am a member in good standing of the Prospectors and Developers Association of Canada and the Atlantic Geoscience Society.

5. This report and the conclusions and recommendations are based on the management and supervision of this project on a daily basis.

Peter Dadson.

Peter A. Dadson, B.Sc., F.G.A.C.

Brampton, Ontario
January 27, 1992

APPENDIX I

ROCK SAMPLES

ASSAY CERTIFICATES

ANALYTICAL TECHNIQUES

ELDORADO AREA ROCK and SOIL SAMPLES

FIELD No.	ASSAY No.	SAMPLE TYPE	ROCK TYPE	MINERALIZATION	GOLD (ppb)	COPPER (ppm)	ZINC (ppm)
PAD-1		grab	sediment				
PAD-2		grab	gabbro	pyrite			
PAD-3		grab	marble				
PAD-4		grab	marble	quartz, hematite			
PAD-5		grab	marble				
PAD-6		grab	arkose				
PAD-7		grab	marble	pyrite			
PAD-8		grab	siltstone				
PAD-9		grab	marble				
PAD-10		grab	siltstone	carbonate			
PAD-11		grab	marble				
PAD-12		grab	granite	quartz, microcline			
PAD-13		grab	mafic volcanic	biotite, calcite			
BR-1		grab	siltstone				
BR-2		grab	arkose				
BR-3		grab	sediment	hematite			
BR-4		grab	limestone				
BR-5		grab	siltstone				
BR-6		grab	siltstone				
BR-7	39125	grab	gneiss	pyrite	12	45.7	79.5
BR-8		grab	sediment	qtz, pyrite			
BR-9		grab	siltstone	pyrite			
BR-10		grab	marble				
BR-11		grab	limestone				
BR-12	39115	grab	marble	pyrite	3	13.6	16.2
BR-13		grab	quartz				
BR-14		grab	marble				
BR-15		grab	siltstone				
BR-16		grab	marble				
C-1	39116	grab	marble	pyrite, hematite	5	3.1	20.7
C-2		grab	qtz. vein				
C-3	39117	grab	marble	pyrite	3	11.1	9.2
C-4	39118	grab	marble		2	<0.5	12.5
C-5	39119	grab	gabbro		9	106.0	41.6
C-6	39120	grab	gabbro		<1	10.0	56.5
C-7	39121	grab	marble	pyrite	2	<0.5	20.2
C-8	39122	grab	marble		4	<0.5	11.9
C-9	39123	grab	gabbro		4	21.7	45.6
C-10	39124	grab	marble		2	101.0	48.9
RR-1	39102	grab	marble		2	13.6	81.8
RR-2	39103	grab	marble	pyrite	140	8.0	38.2
RR-3	39104	grab	marble		<1	97.0	18.7
RR-4	39105	grab	marble		1	5.6	29.8

RR-5	39106	grab	siltstone	pyrite	<1	9.9	20.6
RR-6	39107	grab	siltstone	hematite	<1	1.2	51.1
RR-7	39108	grab	felsic volcanic	calcite	<1	2.5	39.7
RR-8	39109	grab	sericite schist		<1	5.8	13.2
RR-9	39110	grab	marble		<1	10.2	38.7
R-1	39111	grab	sediment	carbonate, pyrite	2	162.0	6.1
R-2	39112	grab	marble(?)	hematite, quartz	720	119.0	18.8
R-3	39113	grab	sediment		2	5.4	14.2
PIT-3	39114	grab	marble	hematite, pyrite	130	4.2	5.3
ROB-1		grab	siltstone	pyrite			
ROB-2		grab	siltstone (?)				
ROB-3		grab	siltstone				
ROB-4		grab	marble				
ROB-5		grab	arkose				
ROB-6		grab	siltstone	hematite			
ROB-7		grab	siltstone	hematite, calcite, boitite			
ROB-8		grab	siltstone				
ROB-9		grab	siltstone				
ROB-10		grab	marble				
ROB-11		grab	intrusive (granitic ?)	pyrite			
ROB-12		grab	gneiss				
ROB-13		grab	gneiss				
ROB-14		grab	sediment				
ROB-20		grab	sediment				
ROB-21		grab	marble	sericite, quartz			
ROB-22		grab	siltstone (?)				
ROB-23		grab	siltstone	biotite, calcite			
ROB-24		grab	sediment	hematite			
ROB-25		grab	marble				
ROB-26		grab	marble				
ROB-30		grab	sediment				
ROB-31		grab	sediment				
ROB-32		grab	sediment	hematite			
ROB-33		grab	siltstone				
RRS-1		soil			6	6.5	36.2
RRS-2		soil			<1	3.3	12.5
RRS-3		soil			<1	5	25.3
RS-1		soil			13	169	135
RS-2		soil			4	127	84.3
B-3		soil			2	9	59.7
B-4		soil			2	10.2	62.5

XRAL

17-DEC-91 REPORT 17741 REF.FILE 11437-U3

SAMPLE	AU PPB	CO PPM	NI PPM	CU PPM	ZN PPM	MO PPM	AG PPM	CD PPM	PB PPM
39102	2	20	28	13.6	81.8	2	.6	<1	34
39103	140	44	29	8.0	38.2	1	<.5	<1	19
39104	<1	5	8	97.0	18.7	2	<.5	<1	4
39105	1	11	21	5.6	29.8	2	<.5	<1	6
39106	<1	14	9	9.9	20.6	2	<.5	<1	6
39107	<1	6	18	1.2	51.1	2	<.5	<1	4
39108	<1	10	13	2.5	39.7	1	<.5	<1	8
39109	<1	2	4	5.8	13.2	<1	<.5	<1	4
39110	<1	<1	<1	10.2	38.7	2	<.5	<1	5
39111	2	7	7	162.	6.1	2	.7	<1	10
39112	720	11	5	119.	18.8	2	.5	<1	4
39113	2	1	2	5.4	14.2	2	<.5	<1	4
39114	130	26	2	4.2	5.3	4	<.5	<1	5
39115	3	13	16	13.6	16.2	1	<.5	<1	10
RRS-1	6	7	30	6.5	36.2	<1	<.5	<1	59
RRS-2	<1	4	9	3.3	12.5	2	<.5	<1	2
RRS-3	<1	4	7	5.0	25.3	1	<.5	<1	8
RS-1	13	26	26	169.	135.	2	.7	1	26
RS-2	4	21	22	127.	84.3	2	.5	<1	15
C DCP CONTROL	--	6	12	10.4	17.5	3	<.5	<1	3
D 39102	--	20	27	13.4	78.5	2	.6	1	34
D 39114	--	27	3	4.4	4.8	4	<.5	<1	4

C - QUALITY CONTROL STANDARD
D - QUALITY CONTROL DUPLICATE

X-RAY ASSAY LABORATORIES 1885 Leslie Street Don Mills Ontario M3B 3J4 (416)445-5755 Fax (416)445-4152 Tlx 06-986947
Member of the SGS Group (Société Générale de Surveillance)

XRAL

20-DEC-91 REPORT 17793 REF.FILE 11474-T2

SAMPLE	AU PPB	CO PPM	NI PPM	CU PPM	ZN PPM	MO PPM	AG PPM	CD PPM	PB PPM
39116	5	<1	<1	3.1	20.7	2	<.5	<1	<2
39117	3	11	19	11.1	9.2	9	<.5	1	<2
39118	2	<1	<1	<.5	12.5	<1	<.5	<1	3
39119	9	31	36	106.	41.6	3	<.5	1	2
39120	<1	44	50	10.0	56.5	3	.7	2	<2
39121	2	1	3	<.5	20.2	2	<.5	<1	<2
39122	4	<1	<1	<.5	11.9	<1	<.5	<1	<2
39123	4	23	42	21.7	45.6	3	<.5	1	<2
39124	2	20	25	101.	48.9	2	.6	<1	<2
39125	12	47	90	45.7	79.5	4	.7	<1	<2
B-3	2	8	12	9.0	59.7	1	<.5	<1	2
B-4	2	8	13	10.2	62.5	<1	<.5	<1	<2
C DCP CONTROL	--	6	12	11.9	16.4	4	<.5	1	<2
D 39116	--	<1	<1	1.8	24.7	1	<.5	<1	<2

C - QUALITY CONTROL STANDARD
D - QUALITY CONTROL DUPLICATE

X-RAY ASSAY LABORATORIES 1885 Leslie Street Don Mills Ontario M3B 3J4 (416)445-5755 Fax (416)445-4152 Tlx 06-986947
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XRAL **X-Ray Assay Laboratories**
A Division of SGS Supervision Services Inc.

Acid Extraction, determination by DCP Spectroscopy - 16 elements

Description:

A quarter gram sample is digested with 2 ml of nitric acid for one half hour in a water bath, then 1 ml of hydrochloric acid is added and the digestion continues for another 2 hours. Test tubes are shaken at regular intervals.

In house standards and previously analysed samples are run to monitor proper digestion procedures. Synthetic standards are used to calibrate the instrument.

Limitations:

The nitric aqua regia extraction will not completely extract Cr.

Elements:

Cd	1ppm	Pb	2ppm	Ag	0.5ppm
Ca	100ppm	Mg	100ppm	Na	100ppm
Cr	2ppm	Mn	2ppm	Ti	10ppm
Co	1ppm	Mo	1ppm	Zn	.5ppm
Cu	.5ppm	Ni	1ppm		
Fe	100ppm	P	10ppm		

Prepared by	Approved by	Date

XRAL **X-Ray Assay Laboratories**
A Division of SGS Supervision Services Inc.

Geochemical Gold, Platinum and Palladium by Lead Fire Assay
Assay Gold, Platinum, Palladium and Silver by Lead Fire Assay

Description:

A. Sample Preparation

Primary reduction is achieved by a two stage crushing facility which employs a 6" x 8" jaw crusher for the first stage followed by a smaller crusher as second stage. The product from this system is typically 45% minus 1/8" and 99% minus 1/4".

A subsample is withdrawn from this crusher product by means of a 3/8" Jones sample splitter. The subsample will vary in size depending on the size of the original sample but will normally represent not less than 1/8 of the original. Samples of less than 1/2 pound are normally not split.

Secondary reduction is achieved by means of either a Braun disc pulverizer or an oscillatory swing mill. The former is normally used for the larger samples associated with assessment work, with the swing mills being reserved for geochemical applications. The Braun pulverizer product is 100% minus 100 mesh whereas the swing mill product is minus 200 mesh. The unused portion of the crusher product (crusher reject) is stored for possible future use free of charge for 90 days or is disposed of as per the client's instructions. The pulverized subsample (or assay pulp) is sent on for assay. Any material which remains after assay work is complete is put in storage for 180 days as above.

A clean quartz sample is placed at the beginning and end of each batch of samples processed. This cleaner is carried through all the sample preparation steps and is analysed along with the samples. The purpose of the cleaner is to spot contamination that might be carried over from the previous sample batch. To avoid cross contamination from samples within the batch a sample of clean quartz is milled between each sample.

XRAL has two separate primary crushing facilities backed by eight swing mill stations and two Braun pulverizers.

B. Fire Assay (Gold, Platinum & Palladium)

XRAL fire assay facilities consist of 5 - 32 pot electric assay furnaces, four of which are used for the fusions with the other employed exclusively for cupellation work.

The assay procedure follows the classical lines of the lead-silver collection. The flux used for this purpose is prepared from the highest purity reagents avail... .., being comprised of the normal proportions of litharge, soda-ash, borax and silica. Adjustments to the flux to compensate for abnormal sulphide or carbonate content of samples are made at time of assay. For such samples a pilot assay is required which utilizes a small aliquot of sample and provides the information required to make these adjustments properly. This practice assures the best composition necessary for a good collection during the fusion.

Prepared by	Approved by	Date

XRAL **X-Ray Assay Laboratories**
A Division of SGS Supervision Services Inc.

Geochemical Gold , Platinum and Palladium by Lead Fire Assay
Assay Gold, Platinum, Palladium and Silver by Lead Fire Assay

Our quality control includes the following procedures:

1. The cleaner sample which was crushed before the samples is analysed along with the samples.

2. A standard reference sample doped with cobalt and copper is run with each tray. The position of this standard is varied systematically from one tray to the next. This serves as a check to identify each batch through to the final cupellation and as a monitor of the final measurement of gold content.

3. Every tenth sample is run in duplicate. The second run is made at a different time from the first.

4. anomalous samples are repeated.

The routine involves weighing of a 15 or 30 gram aliquot of sample on a top loader electronic balance to_+_ 0.01 grams tolerance. This is added to a assay crucible which has been pre-charged with 100-200 grams of flux. A fixed amount of reducing agent is then added to ensure production of a 30-50 gram lead button during fusion. Finally for gold assays five milligrams of silver is added and the sample and flux are mixed together.

The fusion is carried out at an average temperature of about 1000 degrees celsius for about 1 hour. Melts are poured and when the slag has cooled the lead buttons are recovered, deslagged, and placed in preheated cupels in the cupellation furnace. Cupellation takes about 1 hour and is carried out at about 960 degrees celsius. The silver bead recovered after cupellation can be treated in several ways to determine the gold content as indicated below.

1. Plasma spectrometry: Requires digestion of the bead with aqua regia followed by measurement of the gold content in the solution. Platinum and palladium may also be determined on this solution (XRAL Group 02-1).

2. Neutron activation analysis: This requires only an irradiation of the bead followed by measurement of the gold content by gamma spectrometry. It is normally used for the analysis of gold only.

3. For high grade samples the gold can be parted from the silver and weighed as per the classical technique.

Atomic absorption is seldom used as the sensitivity is not quite adequate for the low levels required for geochemical applications.

Silver analyses follow the same path as gold samples except that the final measurement is always gravimetric and no silver is added to the pot.

Prepared by	Approved by	Date

APPENDIX II

GEOPHYSICAL REPORT

REPORT ON

GROUND VLF ELECTROMAGNETIC

AND MAGNETIC SURVEYS

MADOC STUDY AREA,

ONTARIO

For

PETER DADSON

by

SHAWONIS EXPLORATIONS & ENT. LTD.

JANUARY 29, 1992

TABLE OF CONTENTS

1. INTRODUCTION

During the periods from November 16 to November 20, 1991 and December 12 to December 19, 1991, Shawonis Explorations, on behalf of Peter Dadson, carried out line cutting and ground geophysical surveys in the Madoc area of Eastern Ontario.

Equipment operated included a Crone Radem VLF and a Barringer Mini Proton Magnetometer.

The purpose of these surveys was to record ground geophysical data over areas of interest to Mr. Dadson in order to determine the existence of any potential geophysical signatures with respect to possible economic mineralization.

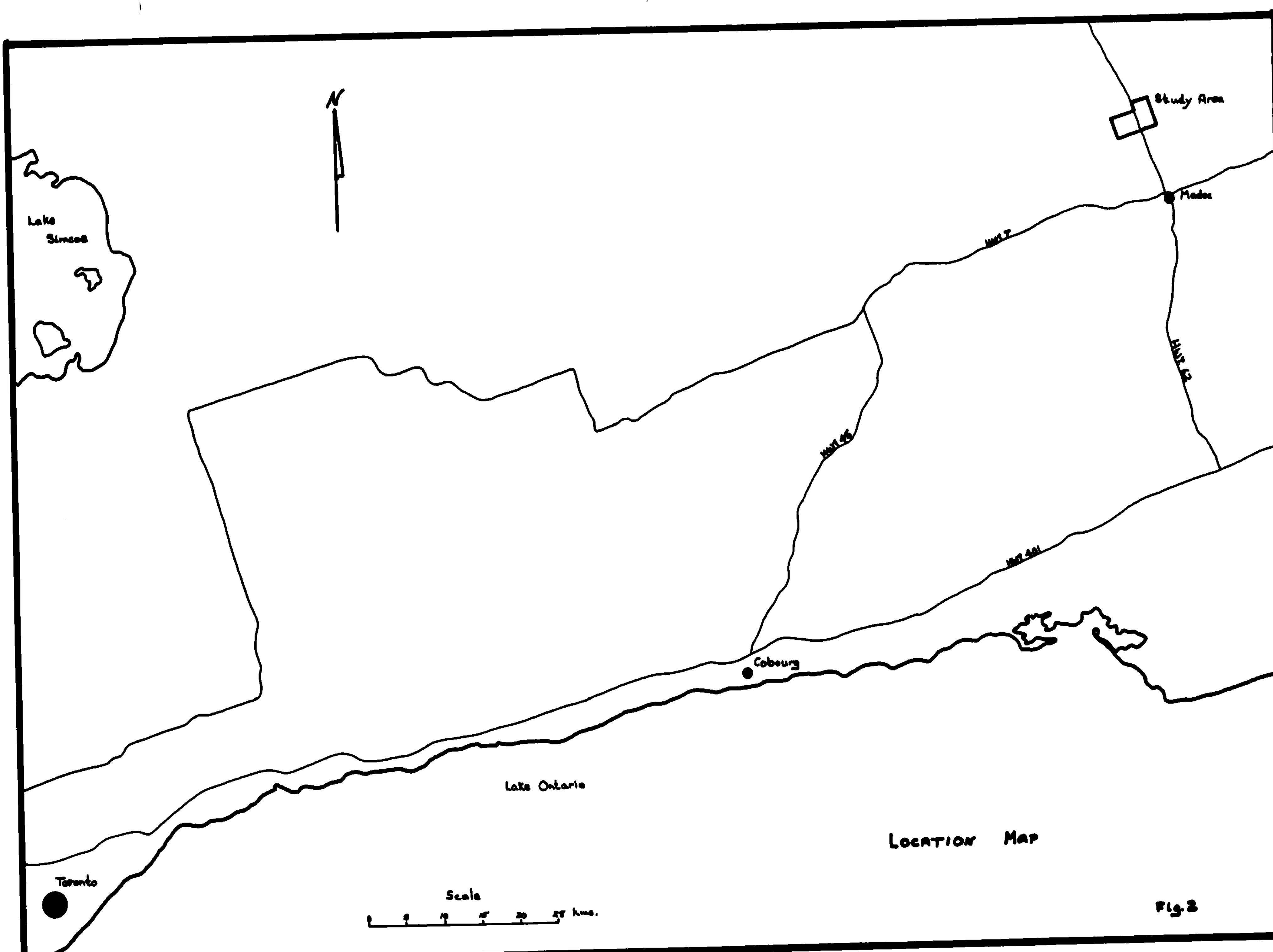
2. SURVEY AREA AND LOCATION

The survey area encompasses approximately six mineral claims located in Concession IV, Lot 18 (E-1/2, W-1/2) and Lot 19 (W-1/2) of Madoc Township, Hastings County, Southeastern Ontario Mining Division. (NTS Reference 31 C/12).

The properties are situated about nine kilometres north of Madoc, Ontario, at roughly Latitude 44 degrees, 30 minutes, Longitude 77 degrees, 30 minutes. (Figure 2)

Access is via County Road 11, west of Highway 62 near the hamlet of Eldorado. These roads are well maintained and accessible year round.

The survey consisted of 12.8 kilometres of picketed grid lines, designated as the Bateman grid (north half) and the Robinson grid (south grid). Line spacings were established at 50 metres with 50 metre station intervals. Several half stations were also read during the geophysical surveys. For further description of the grid refer to sections on line cutting, Dadson Report, January 1992.


N
Study Area
Madoc
HWY 7
HWY 62
HWY 45
HWY 401
Lake Simcoe
Cobourg
Lake Ontario
Toronto
Scale
0 5 10 15 20 25 kms.
LOCATION MAP
Fig. 2

3. EQUIPMENT

3.1 VLF-ELECTROMAGNETIC SURVEY

The VLF system used in the survey was a Crone Radem VLF-EM receiver. Cutler, Maine (NAA) with a frequency of 24.KHz was the transmitter station utilized.

The Radem measures the field strength, dip angle and quadrature components of the VLF communication stations. (Appendix I).

Although all data was recorded at the time of survey, only the dig angle measurements are currently plotted.

A total of 12.8 kilometres (331 readup) was surveyed. Map G-1.

3.2 MAGNETOMETER SURVEY

The magnetometer used was a Barringer Model GM-122 proton precession type. (Appendix I).

The sensitivity of the unit is ± 1 gamma. However, the writer feels that there may have been some difficulties due to dampness and temperature variance as well as technical problem with the units locking device which may have greatly reduced the units accuracy.

Readings were generally taken at 25 metre fill in stations on 50 metre cross lines and on all baselines and tielines. A total of 339 readings were taken along 12.8 kilometres of surveyed grid.

4. DATA PRESENTATION

4.1 BASE MAP

The base map, at a scale of 1:2,500, was established from a photographic enlargement of 1:10,000 scale Ontario Basic Mapping Plan Series, which covered an area over part of Madoc Township. Map numbers 10-18-2950-49350 and 49440 encompass the area coverd by the geophysical surveys.

4.2 VLF PROFILE MAP

All VLF electromagnetic data was recorded and filed VLF-EM unfiltered profiles have been plotted at a scale of 1:2,500. Profile scale is 10° = 2 cm. All apparent true crossovers have been marked on the profile map and resultant conductor axes have been established.

4.3 MAGNETIC CONTOUR MAP

Magnetic data was corrected for diurnal variation using the time-loop method. No correction for regional variation was applied. All calculations were processed by hand.

Corrected data has been plotted on a base plan of 1:2,500 and contoured at 100 gamma intervals.

5. INTERPRETATION

5.1 GEOLOGY

A fairly detailed geological map at a scale of 1:2,500, prepared by the client, shows the survey area to be largely overlain by unconsolidated, cultivated Quaternary sediments which form gently rolling hills with flat valley floors. However, in the eastern portion of the Robinson grid, numerous outcroppings of locally mineralized, Paleozoic to Ordovician aged siltstones and marbles occur. Past work in the vicinity consists largely of a number of isolated pits and trenches assumed to target gold mineralization within these sediments. Several of these workings appear on the Robinson grid as shown on Dadson maps (Refer to Dadson, 1992).

5.2 ELECTROMAGNETICS

Unfiltered VLF dip angle data has been plotted on a base plan of 1:2,500. Using Crone convention and a constant east-facing orientation direction, true cross-overs appear on the map from north to south as negative to positive readings.

Several weak to moderate VLF conductors occur in the grid area. Many one-line cross-overs can most liekly be attributed to very local topographic effects (ie. topo lows) and cultural responses.

In the northern most part of the survey area, conductor axes A and B appear to cross cut topography and are therefore thought to arise from underlying structures or mineralization.

Conductor axis C may represent a fault structure as it tends to parallel a topographic paleo-ridge type structure over several metres.

Conductor axis D should be traced through an eastward extension of the survey in order to determine if it is an isolated cross-over or a true conductor axis, in which case it may be a parallel structure to that defined by the axis of conductor C.

E and F also appear to be true conductors which should receive further testing.

6. RECOMMENDATIONS

1. It is strongly recommended that all data from these surveys be re-processed through computer enhancement.

2. All conductor axes which extend over two lines or more and which are not clearly attributable to cultural or topographic effects should be tested further by other means.

3. Due to the nature and abundance of overburden in the survey area it is recommended that a Max Min II survey be used to further delineate VLF conductors.

4. Because most mineralization in the study area appears to be fairly disseminated an IP survey over Man-Min II conductors is recommended as additional follow-up.

5. Due to technical errors with the particular GM-122 as observed in the field, is strongly recommended that another magnetometer be used to re-survey target areas. The writer feels that current results may be suspect.

6. It is also recommended that before engaging in other magnetic surveys where metal pickets are to be used that the magnetic susceptibility of these pickets be determined in a test plot.

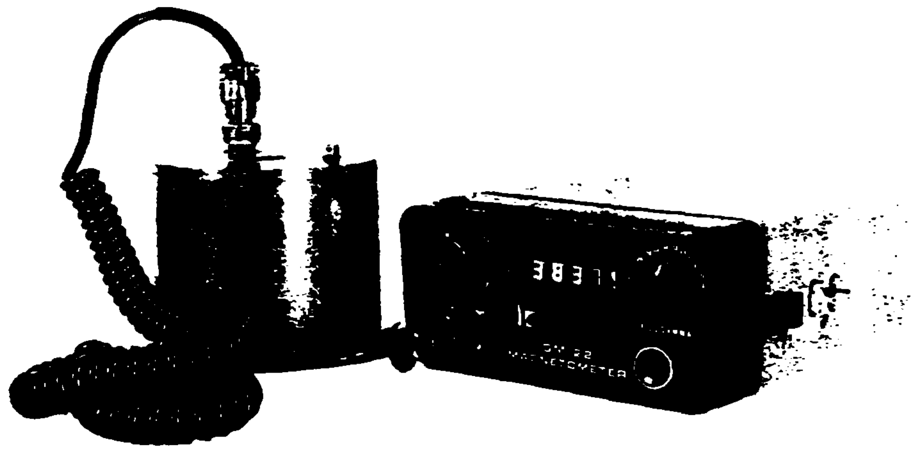
7. Probably the most important recommendation regarding magnetic surveys in this area would be the use of a base station magnetometer. Using the time-loop method with a single magnetometer in this area will not allow for recognition of subtleties in readings necessary to delineate structure a lithography.

APPENDIX I

INSTRUMENT SPECIFICATIONS

BARRINGER RESEARCH

MINI PROTON MAGNETOMETER
Model GM-122



DESCRIPTION

The Barringer GM-122 mini proton magnetometer provides an absolute measurement of the earth's total magnetic field intensity. The rugged design is combined with lightweight, small size and simple operation.

FEATURES

• High Sensitivity	± 1 gamma
• Toroidal Sensor	No alignment or calibration required
• Automatic Lock-out	Last three digits blanked if gradient exceeds 600 gammas per meter
• Rugged Design	Withstands extreme shock. Operates at –40°C to 55°C, 0 to 100% relative humidity
• Lightweight	Weight of total system 5.1 kg.
• Easy Operation	Single button initiates digital display

APPLICATIONS

- Geo-magnetic surveying
- Mineral and petroleum exploration
- Search for buried objects
- Archaeological prospecting

SYSTEM COMPONENTS

- Lightweight console and harness
- Toroidal sensor and cable
- Five foot extendable aluminum shaft
- Impact resistant shipping case

SPECIFICATIONS:

Sensitivity/Resolution	1 gamma
Absolute Accuracy	±10 ppm — better than ±1 gamma
Range	20,000 — 100,000 gammas in 12 ranges with 100% overlap
Gradient Tolerance	600 gammas/meter
Operating Range	—40°F to + 131°F —40°C to + 55°C 0 to 100% relative humidity (splash proof)
Size	console 3.5" x 7" x 11" (9 cm x 18 cm x 28 cm) sensor 4⅞" diameter (12 cm) 4⅜" height (11 cm)
Weight	console 5.5 lbs (2.4 kg) sensor 4.0 lbs (1.8 kg) staff 2.0 lbs (0.9 kg)
Output	5 digit incandescent filament display with a 3 or 6 second sampling rate
Sensor	toroidal, omni-directional and noise cancelling
Logic Function	early low battery indicator in the form of a L.E.D. notifies the operator when 250 readings remain in the power supply lock indicator — last 3 digits of the display are blanked off when the gradient is exceeded or when the instrument is operated incorrectly digital readout test — all display readouts light up to permit visual inspection
Construction	high impact low temperature plastic: polyurethane and lexan case, shock and vibration proof mountings
Power Supply	12 alkaline "D" cells provide up to 10,000 readings
Option Accessories	external battery belt staff extender sensor backsack for one-hand operation

Barringer Research Limited
304 Carlingview Dr.
Metropolitan Toronto
Rexdale, Ontario, Canada M9W 5G2
Phone: 416-675-3870
Telex: 06-989183

Representative:

CRONE GEOPHYSICS LIMITED
RADEM VLF EM RECEIVER

An EM receiver measuring the FIELD STRENGTH, DIP ANGLE and QUADRATURE components of the VLF communications stations.

s is a rugged, simple to operate, ONE MAN EM unit. It can be used without line cutting and is thus ideally suited for GROUND LOCATION OF AIRBORNE CONDUCTORS and RECONNAISANCE SURVEYS of MINERAL SHOWINGS. This instrument utilizes higher than normal EM frequencies and is capable of detecting poorly conductive sulphide deposits and fault zones. It accurately isolates BANDED CONDUCTORS and operates through areas of HIGH POWERLINE NOISE. The method is capable of deep penetration but due to the high frequency used its penetration is limited in areas of clay and conductive overburden.

The DIP ANGLE measurement detects a conductor from a considerable distance and is used primarily for location conductor The FIELD STRENGTH measurement is used to define the shape and attitude of the conductor.

- Instrument Sales, Rental and Repair Services
- Contract Survey Services
- Consulting Services
- Computer Plotting and Processing Services

HEAD OFFICE: 3607 Wolfedale Rd.
MISSISSAUGA, Ontario
CANADA L5C 1V8
PHONE: (416) 270-0096
TELEX: 06-961260

SPECIFICATIONS*

SOURCE OF PRIMARY FIELD: VLF Communications Stations 1 to 25 KHz

NUMBER OF STATIONS: 7 Switch Selectable

STATIONS AVAILABLE: The Seven Stations May Be Selected From:

	CODE	STATION & LOCATION	CALL SIGN	FRE(
Standard	CM	Cutler, Maine	NAA	17.8
"	SW	Seattle, Washington	NLK	24.8
"	AM	Annapolis, Maryland	NSS	21.4
"	H	Laulualei, Hawaii	NPM	23.4
"	BOF	Bordeaux, Frace	NWU	15.1
"	E	Rugby, England	GBR	16.0
Optional	MS	Moscow, Russia	UMS	17.1
"	OD	Odessa (Black Sea)	EWB	15.6
"	NC	Exmouth, Australia	NWC	22.3
"	HN	Helgelend, Norway	JXZ	17.6
"	YJ	Yosamai, Japan	NDT	17.4
"	TJ	Tokyo, Japan	JG2AR	20.0
"	BA	Buenos Aires, Argentina		23.6

CHECK THAT STATION IS TRANSMITTING: Audible signal from speaker.

PARAMETERS MEASURED:

(1) DIP ANGLE in degrees of the magnetic field component, from the horizontal, of the major axis of the p ellipse. Detected by a minimum on the field strength meter and read from an inclinometer with a range

(2) FIELD STRENGTH (total or horizontal) of the magnetic component of the VLF field, (amplitude of the of the polarization ellipse). Measured as a percent of normal field strength established at a base station. ±2% dependent on signal. Meter has two ranges: 0-300% and 0-600%.

(3) QUADRATURE component of the magnetic field, perpendicular in direction to the resultant field, as of the normal field strength, (amplitude of the minor axis of the polarization ellipse). This is the minimu of the Field Strength meter obtained when measuring the dip angle. Accuracy ±2%.

OPERATING TEMPERATURE RANGE: −40°C to 50°C (−40°F to 120°F)

DIMENSIONS: 9 cm x 19 cm x 27 cm (3½" x 7½" x 10½")

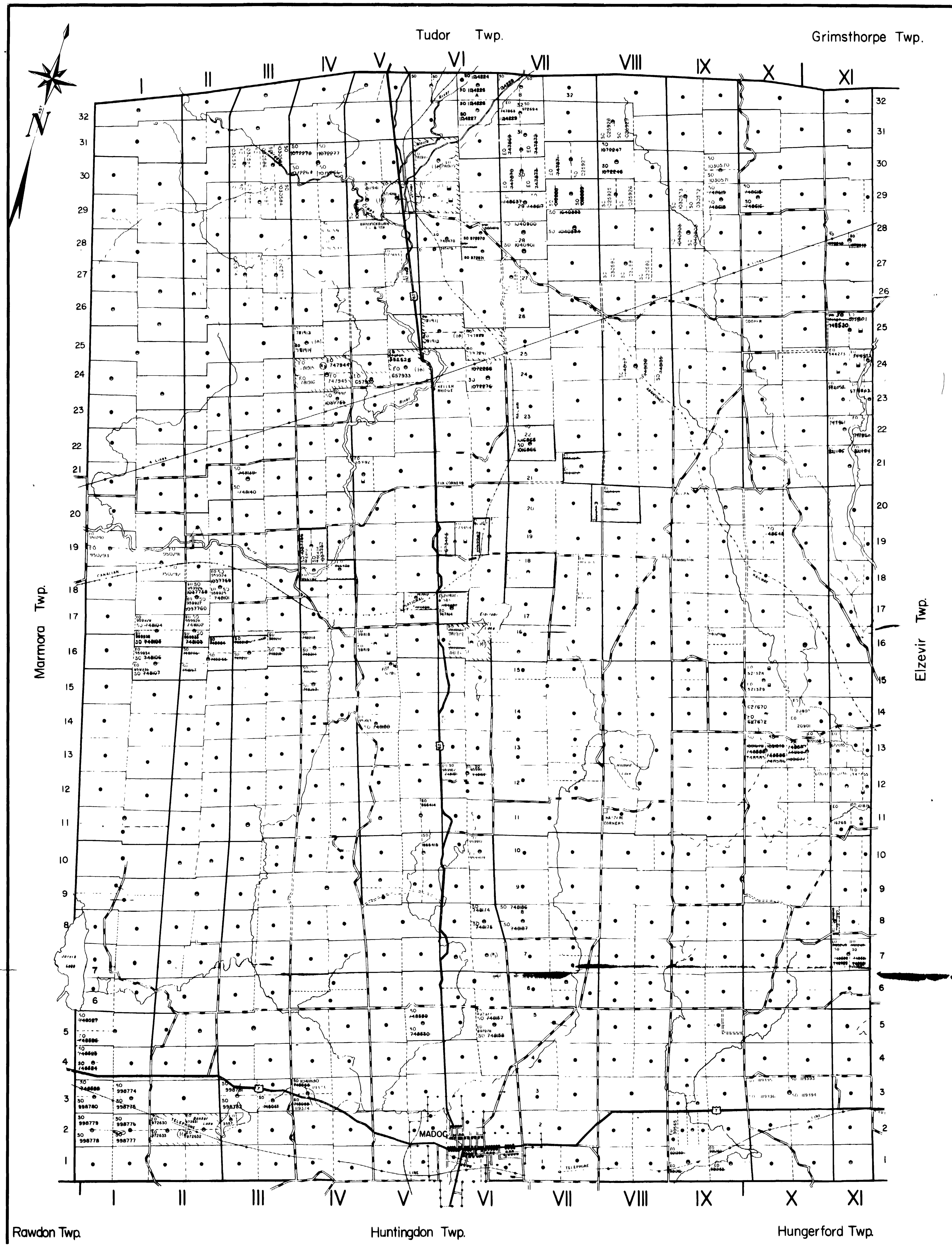
SHIPPING DIMENSIONS: 30 cm x 14 cm x 36 cm (11⅞" x 5½" x 14")

WEIGHT: 2.7 kg (6 lbs)

SHIPPING WEIGHT: 6.0 kg (13 lbs)

BATTERIES: 2 of 9 volt
Average Life Expectancy
20 Hours for Continuous Operation

Specifications subject to change without notice



LEGEND

HIGHWAY AND ROUTE No
OTHER ROADS
TRAILS
SURVEYED LINES
TOWNSHIPS BASE LINES ETC
LOTS MINING CLAIMS PARCELS, ETC
UNSURVEYED LINES
LOT LINES
PARCEL BOUNDARY
MINING CLAIMS ETC
RAILWAY AND RIGHT OF WAY
UTILITY LINES
NON PERENNIAL STREAM
FLOODING OR FLOODING RIGHTS
SUBDIVISION OR COMPOSITE PLAN
RESERVATIONS
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINES
TRAVERSE MONUMENT

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT SURFACE & MINING RIGHTS	●
SURFACE RIGHTS ONLY	
MINING RIGHTS ONLY	
LEASE SURFACE & MINING RIGHTS	■
SURFACE RIGHTS ONLY	
MINING RIGHTS ONLY	
LICENCE OF OCCUPATION	▼
ORDER IN COUNCIL	OC
RESERVATION	Ⓡ
CANCELLED	
SAND & GRAVEL	

NOTE MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6 1913 VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT RSO 1970 CHAP 380 SEC 63 SUBSEC 1

SCALE 1 INCH 40 CHAINS

FEET 0 1000 2000 4000 6000 8000

METRES 0 200 1000 (1 KM) 2000 (2 KM)

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY
S.R.O. – SURFACE RIGHTS ONLY
M + S. MINING AND SURFACE RIGHTS

Description	Order No	Date	Disposition	File
(R1)	W2/76		M R	

400 SURFACE RIGHTS RESERVATION ALONG THE SHORES OF ALL LAKES AND RIVERS

(R3) SEC 36	W107/87 ER	87/12/22	MRO	188551
SEC 36				188551
SEC 36				
(R) SEC 36	W18/88 ER	88/02/24	MRO	
(R) SEC 36	W 500/88 ER	88/08/22	MRO	

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES AND ACCURACY IS NOT GUARANTEED THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

TOWNSHIP

MADOC

M.N.R. ADMINISTRATIVE DISTRICT

TWEED

MINING DIVISION

SOUTHERN ONTARIO

LAND TITLES / REGISTRY DIVISION

HASTINGS

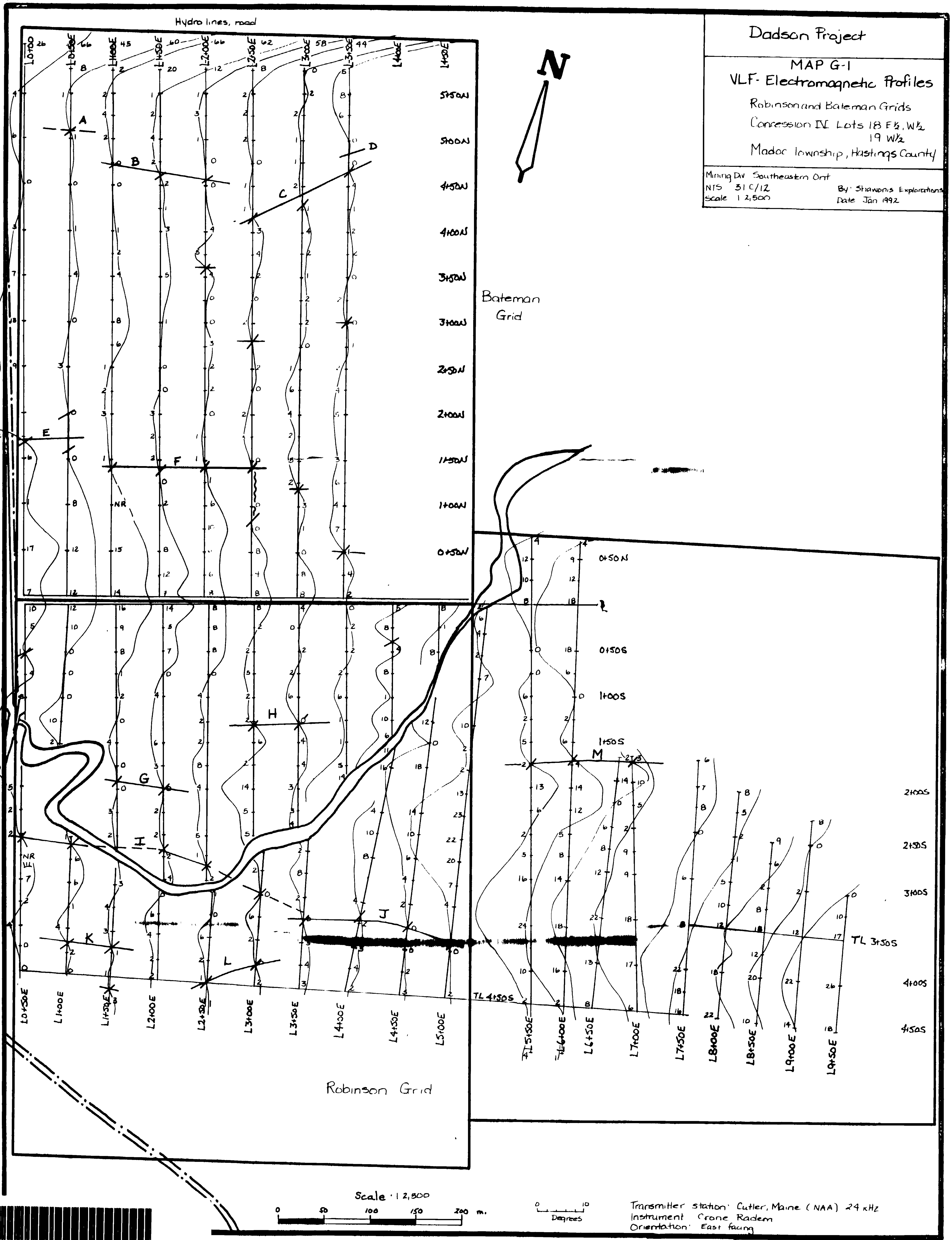
Ontario — Ministry of Natural Resources — Ministry of Northern Development and Mines

Date MARCH 1987

Number G-1269

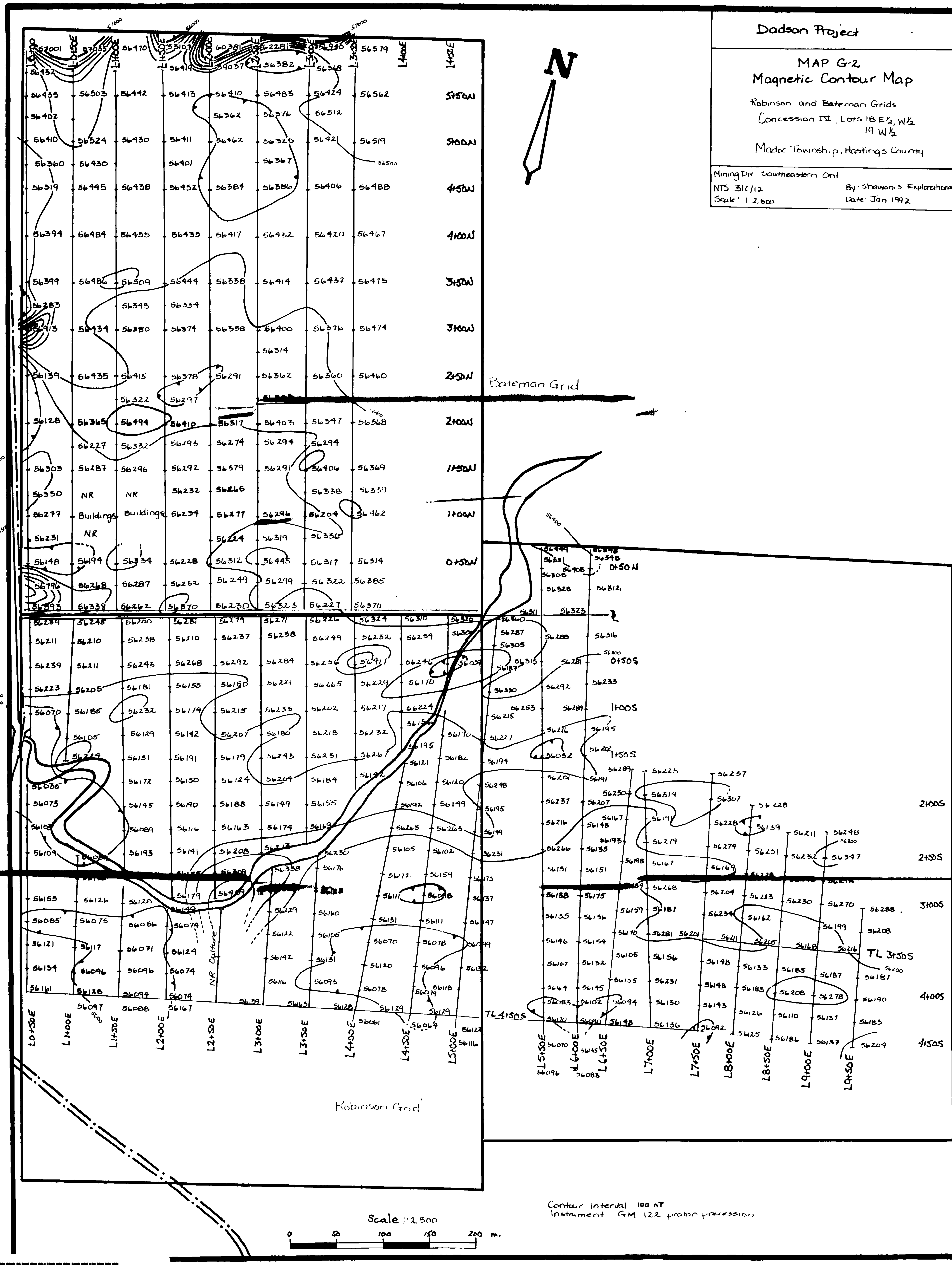
OP9 3.'4

200



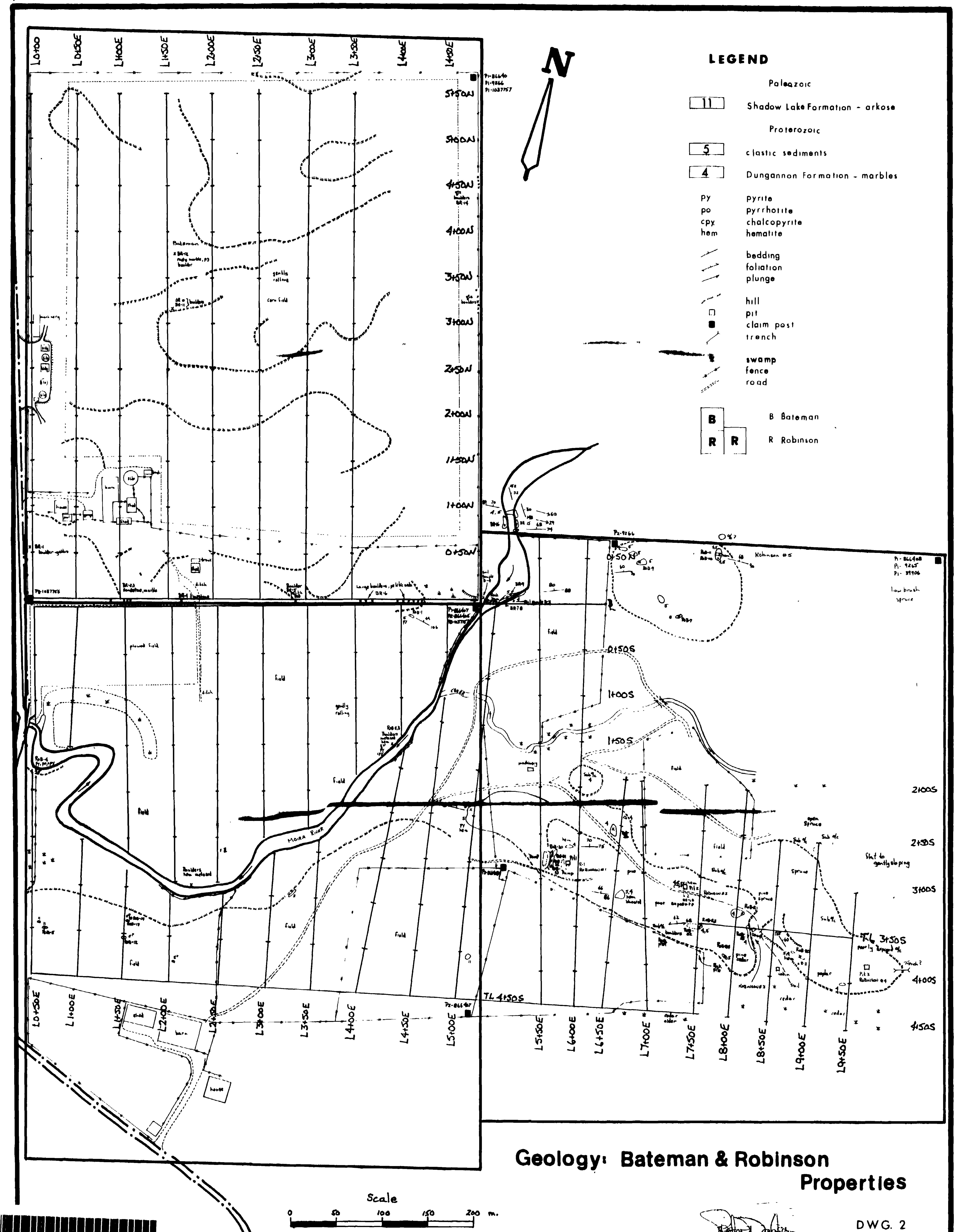
210

31C11NW0002 OP91-334 MADOC



31C11NW0002 OP91-334 MADOC

220



Geology: Bateman & Robinson Properties

DWG. 2


LEGEND
11 Paleozoic sediments
9a Felsic intrusives
7 Gabbro
6 Felsic volcanics (?)
5 Pelitic sediments
4,4a Marbles
2a,3 Mafic volcanics
shaft
pit
bedding
foliation
jointing
assumed contacts
NOTE: Rock types and numbers based on Hewitt's (M68) map.
Scale 1:5000
N
ROAD 11
FOX CORNERS
HWY 62
LOT 19 CON 5
LOT 19 CON 4
LOT 18 CON 6
Moira River
Richardson Mine
ELDORADO
Eldorado Copper Mine
CNR
For detail see Dwg 2

GEOLOGY ELDORADO AREA

DWG. 1