REPORT ON AN

AIRBORNE MAGNETIC AND VLF-EM SURVEY

McMURRAY TOWNSHIP

SAULT STE. MARIE MINING DIVISION, ONTARIO

for

MR. ROBERT HENDERSON

by

TERRAQUEST LTD.
Toronto, Canada

September 24, 1986

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1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for Mr. Robert Henderson of 31 Gillanders Road, Elliot Lake, Ontario P5A 1W4 by Terraquest Ltd., 905 - 121 Richmond St. W., Toronto, Canada. The field work was performed on July 22, 1986 and the data processing, interpretation and reporting from July 23 to September 24, 1986.

The purpose of a survey of this type is two-fold. One is to prospect directly for anomalously conductive and magnetic areas in the earth's crust which may be caused by, or at least related to, mineral deposits. A second is to use the magnetic and conductivity patterns derived from the survey results to assist in mapping geology, and to indicate the presence of faults, shear zones, folding, alteration zones and other structures potentially favourable to the presence of gold and base-metal concentration. To achieve this purpose the survey area was systematically traversed by an aircraft carrying geophysical instruments along parallel flight lines spaced at even intervals, 100 meters above the terrain surface, and aligned so as to intersect the regional geology in a way to provide the optimum contour patterns of geophysical data.

2. THE PROPERTY

The property is located in McMurray township, in the Salut Ste. Marie Mining Division of Ontario about 7 kilometres southeast of the town of Wawa. The claims lie in the southeast corner of the township and can be reached by logging roads from the south.

The latitude and longitude are 47 degrees 57 minutes, and 84 degrees 40 minutes respectively, and the N.T.S. reference is 41N/15.

The claim numbers are shown in figure 2 and listed below:

SSM	609118-609120	(3)
	608818-608819	(2)
	691890-691893	(4)
	761131-761151	(21)

.....total claims 30

3. GEOLOGY

Map References

1. Map 2220: Manitouwadge - Wawa Sheet, Geological Compilation Series. scale 1:253,440. O.D.M. 1972
2. Map P-2441: McMurray Township. scale 1:15,840. O.G.S. 1982

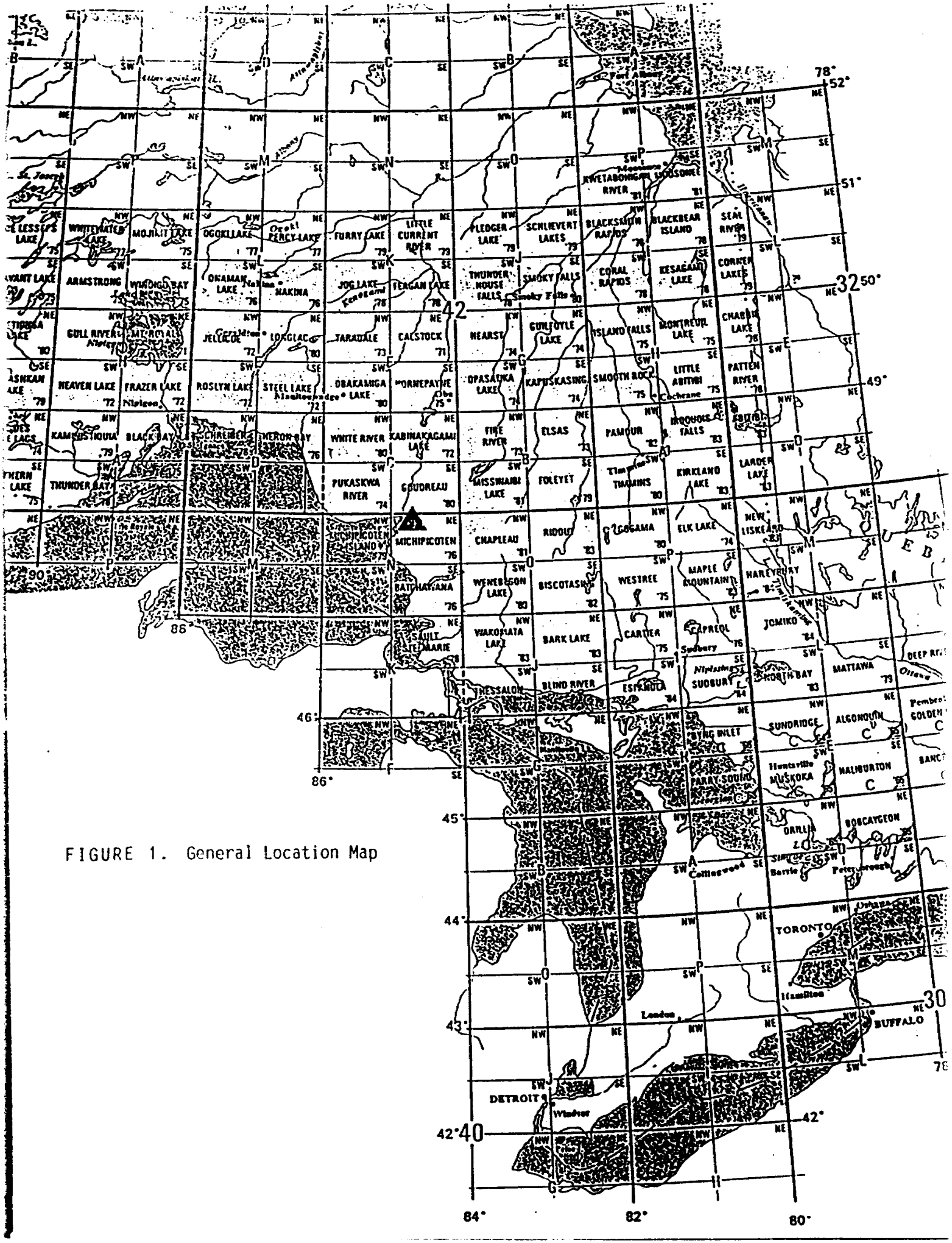
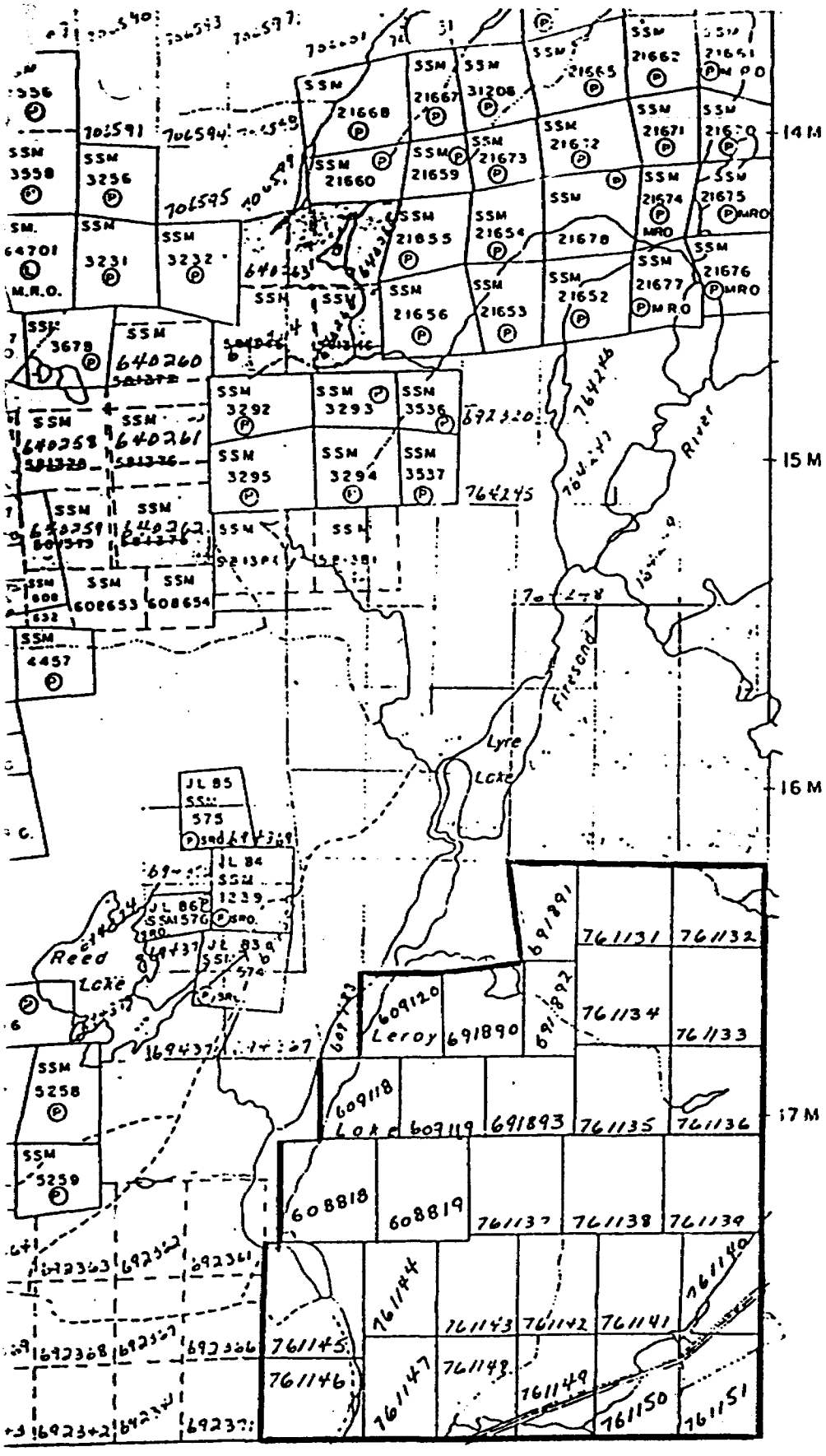


FIGURE 1. General Location Map



EDINA PROPERTY - McMURRAY TWP. ONT.

FIG. 2: CLAIM MAP

ONE INCH

Scale: 1" = ½ mile
From: MNR Ont. Plan #M1547

The property is underlain by massive flows of mafic to intermediate composition metavolcanics with narrow, conformable, early granitic intrusives, primarily diorites and granodiorite. Intermediate to felsic volcanics occur to the northwest beyond the northeast trending Firesand River Fault. Small plugs of gabbro and felsic intrusives and minor clastic metasediments occur throughout the area.

Several mineral occurrences of pyrite, pyrrhotite and iron formation are indicated on the geology map. The Adina Gold Syndicate prospect lies close to the centre of the claim block, just east of the Firesand River Fault zone.

4. SURVEY SPECIFICATIONS

4.1 Instruments

The survey was carried out using a Cessna 182 aircraft, registration C-FAKK, which carries a magnetometer and a VLF electromagnetic detector.

The magnetometer is a proton precession type based on the Overhauser effect. The Overhauser effect allows for polarization of a proton rich fluid of the sensor by adding a "free radical" to it and irradiating it with modest RF power. The sensor element is mounted in an extension of the right wing tip. It's specifications are as follows:

Resolution:	0.5 gamma
Accuracy:	0.5 gamma
Cycle time:	0.5 second
Range:	20000-100000 gammas in 23 overlapping steps
Gradient tolerance:	Up to 5000 gammas per meter
Model:	GSM-9BA
Manufacturer:	GEM Systems Inc., 105 Scarsdale Rd., Don Mills, Ontario, M3B 2R5

The VLF-EM unit uses three orthoganol detector coils to measure (a) the total field strength of the time-varying EM field and (b) the phase relationship between the vertical coil and both the "along line" coil (LINE) and the "cross-line" coil (ORTHO). The LINE coil is tuned to a transmitter station that is ideally positioned at right angles to the flight lines, while the ORTHO coil transmitter should be in line with the flight lines. It's specifications are:

Accuracy:	1%
Reading interval:	1/2 second
Model:	TOTEM 2A
Manufacturer:	Herz Industries, Toronto

The VLF sensor is mounted in the left wing tip extension.

Other instruments are:
- King KRA-10A Radar altimeter
- UDAS-100 data processor with Digidata nine track tape recorder, manufactured by Urtec Ltd., Markham, Ontario.
- Geocam video camera and recorder for flight path recovery, manufactured by Geotech Ltd., Markham, Ontario.

4.2 Lines and Data

a) Line spacing:	200 meters
b) Line direction:	360 and 090 degrees
c) Terrain clearance:	100 meters
d) Average ground speed:	156 km/hr.
e) Data point interval:	Magnetic - 27 metres
	VLF-EM - 27 meters
f) Tie Line interval:	north-south line data has been completely leveled with east-west line data
g) Channel 1 (LINE):	NSS Annapolis, 21.4 kHz
h) Channel 2 (ORTHO):	NAA Cutler. 24.0 kHz
	These were switched around for the North -South lines

i) Line km over total survey area: 100
j) Line km over claim groups: 78

4.3 Tolerances

a) Line spacing: Any gaps wider than twice the line spacing and longer than 10 times the line spacing were filled in by a new line.
b) Terrain clearance: Portions of line which were flown above 125 meters for more than one km were reflown if safety considerations were acceptable.
c) Diurnal magnetic variation: Less than twenty gammas deviation from a smooth background over a period of two minutes or less as seen on the base station analogue record.
d) Manoeuvre noise: Approximately +/-5 gammas.

4.4 Photomosaics

For navigating the aircraft and recovering the flight path, mosaics of aerial photographs were made from existing air photos.

5. DATA PROCESSING

Flight path recovery was carried out in the field using a video tape viewer to observe the flight path as recorded by the Geocam video camera system. The flight path recovery was completed daily to enable reflights to be selected where needed for the following day.

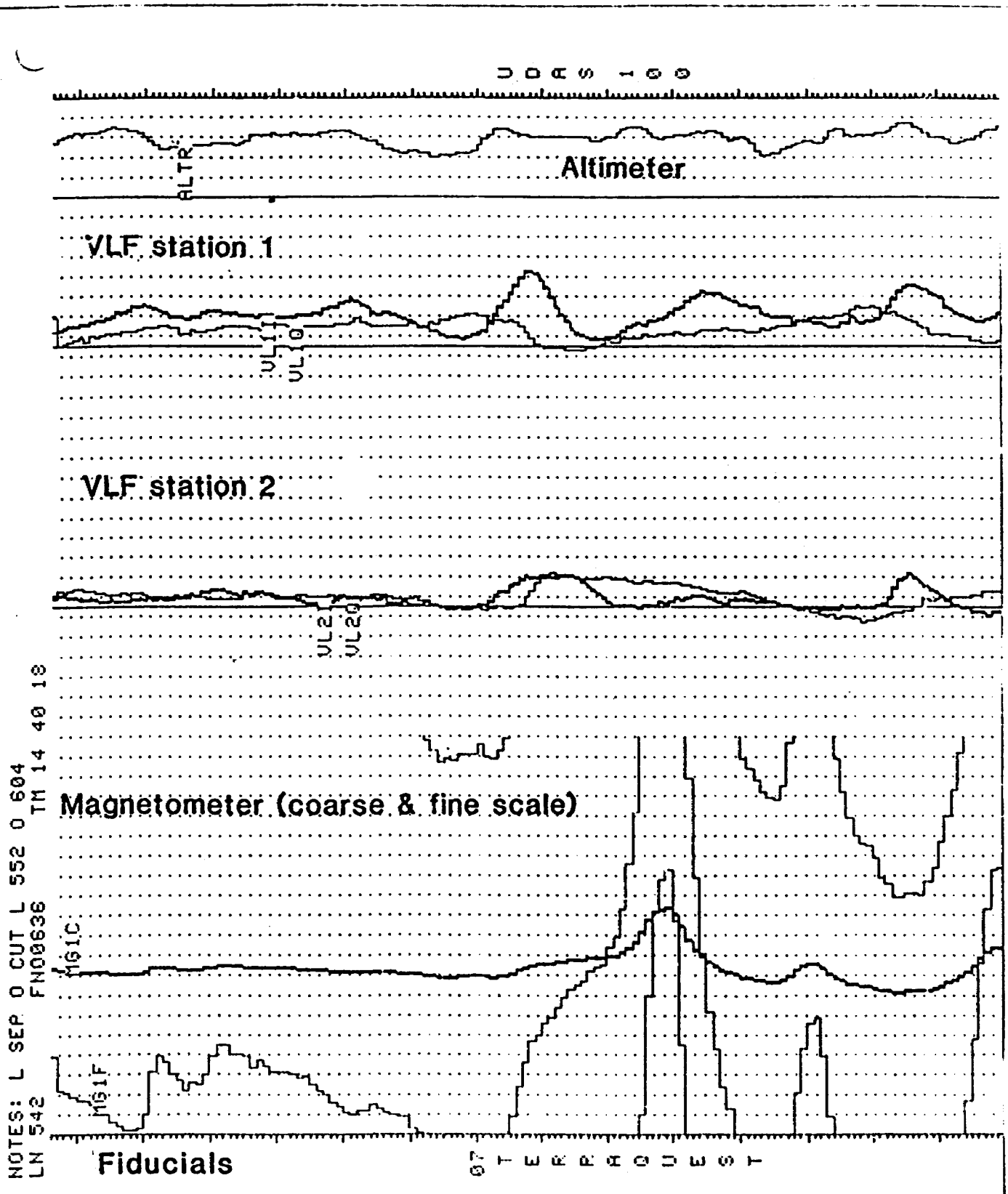


FIGURE 3. Sample of analogue data

The magnetic data was levelled in the standard manner by tying survey lines to the tie lines. The IGRF has not been removed. The total field was contoured by computer using a program provided by Dataplotting Services Inc. To do this the final levelled data set is gridded at a grid cell spacing of 1/10th of an inch at map scale.

The vertical magnetic gradient is computed from the total field data using a method of transforming the data set into the frequency domain, applying a transfer function to calculate the gradient, and then transforming back into the spatial domain. The method is described by a number of authors including Grant, 1972 and Spector, 1968. The computer program for this purpose is provided by Paterson, Grant and Watson Ltd. of Toronto

The VLF data was treated automatically so as to normalize the non conductive background areas to 100 (total field strength) and zero (quadrature). The algorithms to do this were developed by Terraquest and will be provided to anyone interested by application to the company.

All of these dataprocessing calculations and map contouring were carried out by Dataplotting Services Inc. of Toronto.

INTERPRETATION

6.1 General Approach

To satisfy the purpose of the survey as stated in the introduction, the interpretation procedure was carried out on both the magnetic and VLF data. On a local scale the magnetic gradient contour patterns were used to outline geological units which have different magnetic intensity and patterns or "signatures". Where possible these are related to existing geology to provide a geological identity to the units. On a regional scale the total field contour patterns were used in the same way.

Grant, F.S. and Spector A., 1970: Statistical Models for Interpreting Aeromagnetic Data; Geophysics, Vol 35
Grant, F.S., 1972: Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics Vol 37-4
Spector, A., 1968: Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto

Faults and shear zones are interpreted mainly from lateral displacements of otherwise linear magnetic anomalies but also from long narrow "lows". The direction of regional faulting in the general area is taken into account when selecting faults. Folding is usually seen as curved regional patterns. Alteration zones can show up as anomalously quiet areas, often adjacent to strong, circular anomalies that represent intrusives. Magnetic anomalies that are caused by iron deposits of ore quality are usually obvious owing to their high amplitude, often in tens of thousands of gammas.

VLF anomalies are categorized according to whether the phase response is normal, reverse, or no phase at all. The significance of the differing phase responses is not completely understood although in general reverse phase indicates either overburden as the source or a conductor with considerable depth extent, or both. Normal phase response is theoretically caused by surface conductors with limited depth extent.

Areas showing a smooth response somewhat above background (ie. 110 or so) are likely caused by overburden which is thick enough and conductive enough to saturate at these frequencies. In this case no response from bedrock is seen.

6.2 Interpretation

The total magnetic field has a relief of about 275 gammas and indicates the general trend of the lithologies and their displacement by northeast trending faults. The vertical magnetic gradient shows improved resolution and has been used to delineate the stratigraphy and structure. The relative magnetic intensities were obtained from the total magnetic field data.

The strongly magnetic horizons have been interpreted as belonging to Unit 2m, the magnetic strata within the mafic to intermediate metavolcanics. They are probably related to increased concentrations of pyrrhotite or magnetite within the mafic flows.

The remaining lithologies are interpreted to form the magnetic background. Lack of individual resolution is related to the small size of the lithological bodies and their similar magnetic response at this scale.

Faults interpreted from a combination of magnetic and VLF-EM data and air photo lineaments trend to the north-northeast (Firesand River Fault), northeast and east. The northeast trending faults generally possess minimal lateral displacements. The east trending fault displays approximately 200 metre dextral displacement.

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FIGURE 4

TERRAQUEST CLASSIFICATION OF VLF-EM CONDUCTOR AXES

SYMBOL	CORRELATION	ASSOCIATION: Possible Origins
a , A	Coincident with magnetic stratigraphy	Bedrock magnetic horizons: stratabound mineralogic origin or shear zone
b , B	Parallel to magnetic stratigraphy	Bedrock non-magnetic horizons: stratabound mineralogic origin or shear zone
c , C	No correlation with magnetic stratigraphy	Association not known: possible small scale stratabound mineralogic origin, fault or shear zone, overburden
d , D	Coincident with magnetic dyke	Dyke or possible fault: mineralogic or electrolytic
f , F	Coincident with topographic lineament or parallel to fault system	Fault zone: mineralogic or electrolytic
ob , OB	Contours of total field response conform to topographic depression	Most likely overburden: clayey sediments, swampy mud
cul , CUL	Coincident with cultural sources	Electrical, pipe or railway lines

NOTES

1 - Upper case symbols denote a relatively strong total field strength

2 - Underlined symbols denote a relatively strong quadrature response

3 - Mineralogic origins include sulphides, graphite, and in fault zones, gouge

4 - Electrolytic origins imply conductivity related to porosity or high moisture content

Numerous VLF-EM conductor axes have been identified and evaluated according to the Terraquest classification system (Figure 4). This system correlates the nature and orientation of the conductor axes with stratigraphic, structural and topographic features to obtain an association from which one or more origins may be selected.

The VLF-EM method is extremely well suited to this property, particularly using east-west flight lines and the Annnapolis transmitter. All conductor axes have moderate to strong total field strength, are well defined and correlate with Unit 2m horizons. They possess good potential as bedrock stratabound origins, probably as sulphides or graphite. Ground follow-up is recommended using EM or IP techniques.

7. SUMMARY

An airborne combined magnetic and VLF-EM survey has been done on the property at line intervals of 200 metres in two directions. The total field and vertical gradient magnetic data, VLF-EM data and interpretation maps are produced at a scale of 1:10,000.

The magnetic data has been used to modify and update the existing geology and has shown a number of new contacts and faults. A number of VLF-EM conductor axes were found. They possess good potential for sulphide origins and have been recommended for additional investigation.

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Charles Q. Barrie, M.Sc.
Geologist

Suite 915 | 121 Richmond Street West | Toronto, Canada M5H 2K1 | Telephone (416) 366-4810

LENDRUM TP.
(M.1557)

TOWN OF WAWA PLAN M 27 REG'D

RABAZO TP.
(M.1556)

NAVEAU TP.
(M.1546)

OF ELLIOTT

McMURRAY-0065-C1
M-1547
SCALE: 1 INCH = 40 CHAINS
ONE INCH

Oakley Lake

Ontario and Miles

(Geophysical, Geological, Geochemical and Expenditures) #83-86

Mining Act 7433

Note: 3 exceeds space on this form, attach a list. Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns. – Do not use shaded areas below.

Type of Survey(s): AIRBORNE GEOPHYSICS

Township or Area: McMURRAY

Claim Holder: ROB HENDERSON

Prospector's Licence No: D 15680

Address: 31 GILLANDERS ROAD

Survey Company: TERRAQUEST LTD

Date of Survey (from & to): 15 Day | 07 Mo. | 86 Yr. | ---- Day | Mo. | Yr.

Total Miles of line Cut:

Name and Address of Author (of Geo-Technical report): SUITE 905 121 RICHMOND ST. W. TORONTO ONT M5H 2K1

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
For each additional survey: using the same grid: Enter 20 days (for each)	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	
	Geochemical	
Man Days Complete reverse side and enter total(s) here	Geophysical - Electromagnetic	
	Geophysical - Magnetometer	
	Geophysical - Radiometric	
	Geophysical - Other	
	Geological	
	Geochemical	
Airborne Credits Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

MINING LANDS SECTION

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
SSM	609118			761144	
	609119			761145	
	609120			761146	
	609818			761147	
	608819			761148	
	691890			761149	
	691891			761150	
	691892			761151	
	691893				
	761131				
	761132				
	761133				
	761134				
	761135				
	761136				
	761137				
	761138				
	761139				
	761140				
	761141				
	761142				
	761143				

SAULT STE. MARIE MINING DIV. RECEIVED JUL 25 1986 A.M. P.M. 7 8 9 10 11 12 1 2 3 4 5 6

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits: Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Total number of mining claims covered by this report of work: 30

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
2400	July 25/86	
	Date Approved as Recorded	Branch Director

Date: July 25/86 Recorded Holder or Agent (Signature): Rob Henderson

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: ROB HENDERSON 31 GILLANDERS ROAD ELLIOT LAKE ONT. P5A 1W4

Date Certified: July 25/86

Certified by (Signature): Rob Henderson

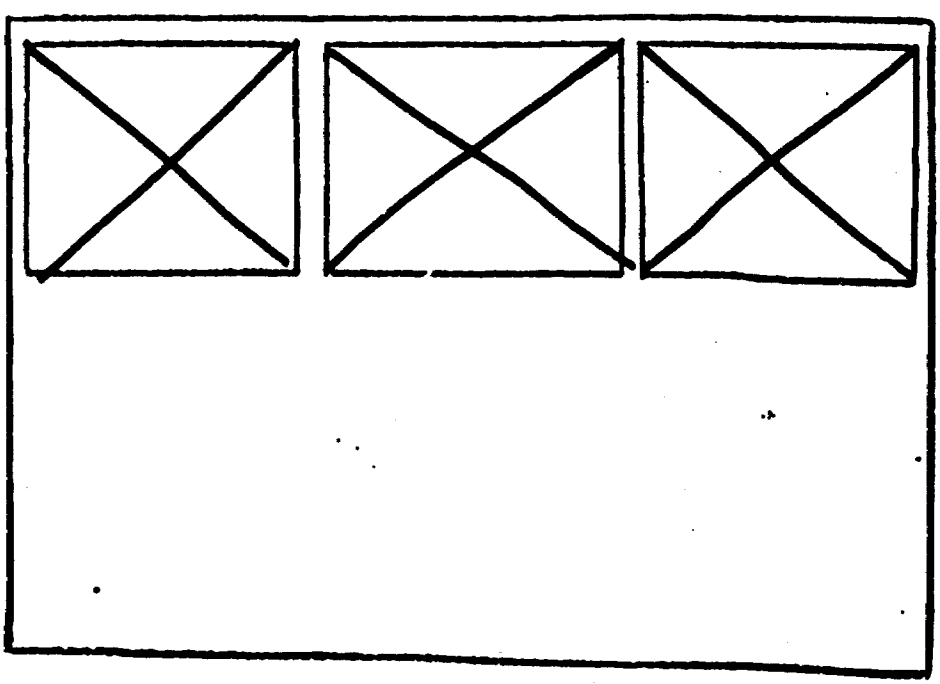
also on 608818

1362 (85/12)

SEE ACCOMPANYING MAP(S) IDENTIFIED AS

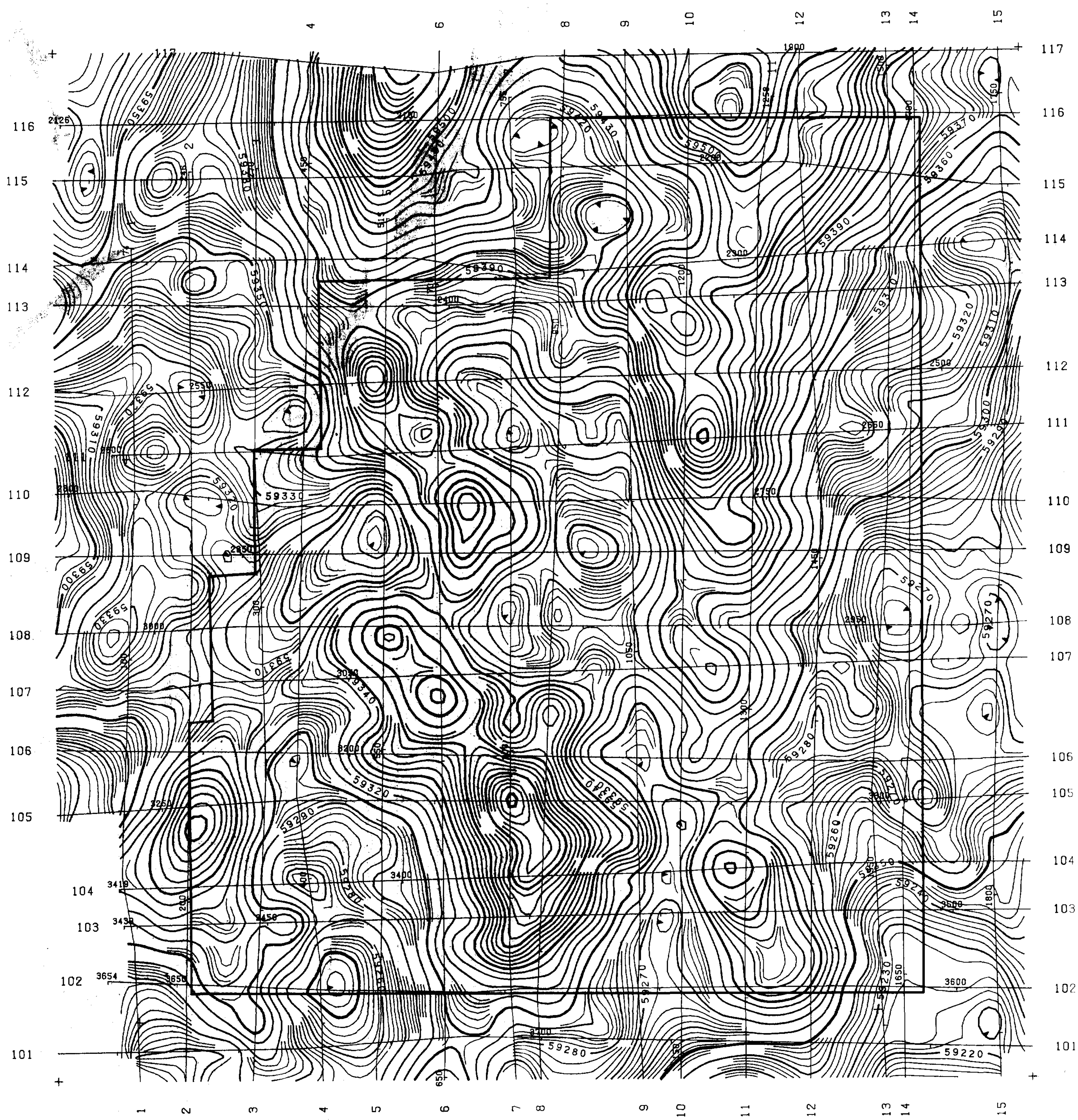
MCMURRAY-0066-A1 #1-3

LOCATED IN THE MAP CHANNEL IN THE FOLLOWING SEQUENCE (X)



For Additional Information See Maps:

MCMURRAY-0066-A1 #4,5



LEGEND

Terrain Clearance .... 100 meters
Line Spacing .... 200 meters

250 gammas
50 gammas
10 gammas
2 gammas

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AIRBORNE MAGNETIC SURVEY
TOTAL MAGNETIC FIELD

EDINA PROPERTY,
McMURRAY TOWNSHIP, ONT.

N.T.S. NO. 41N/15	DRAWING NO. A-627-1
SCALE: 1:10,000	DATE: September 1986

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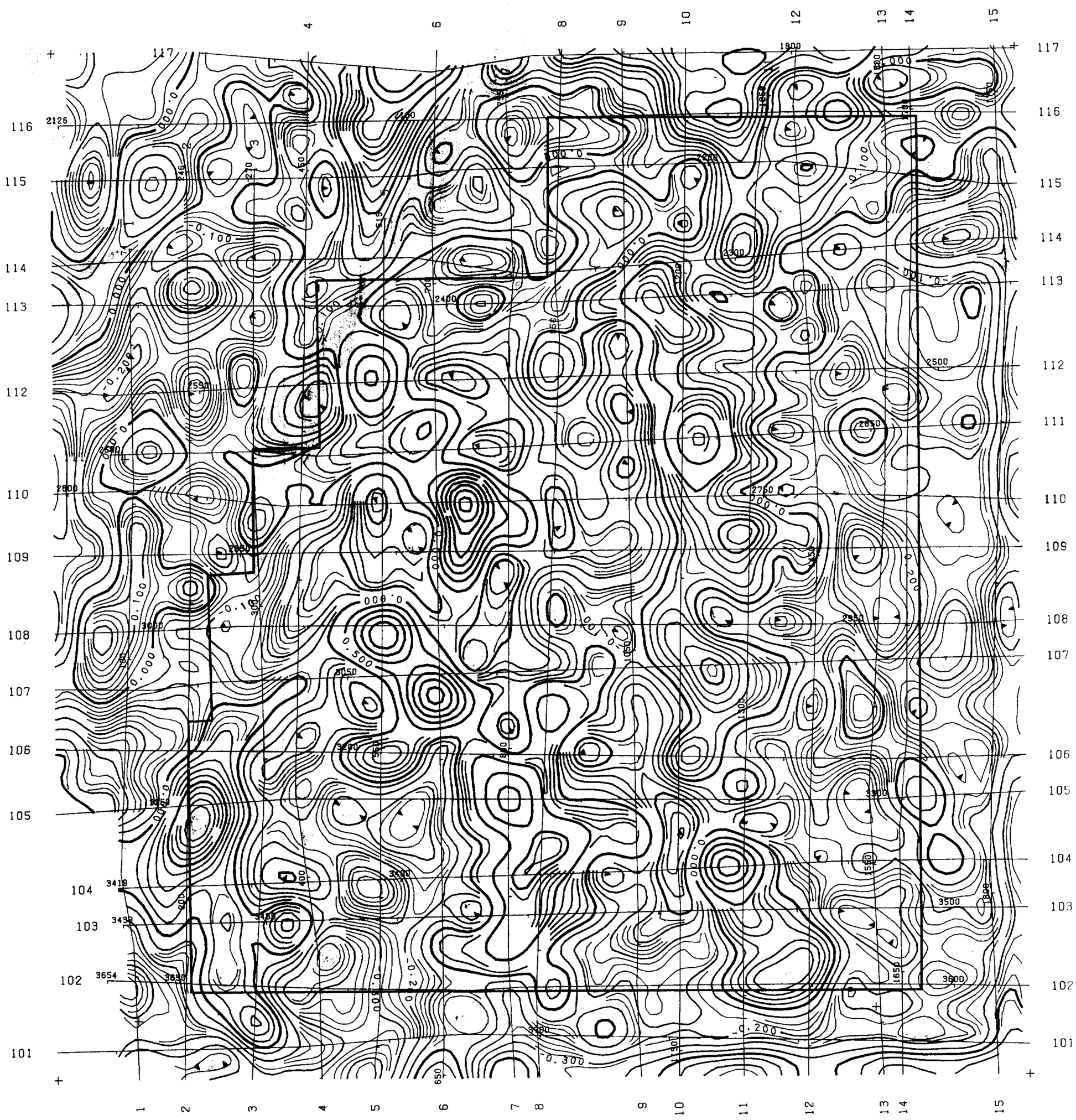
McMURRAY_0066-A1, #1

200



LEGEND

Terrain Clearance	100 meters
Line Spacing	200 meters
2.500 gammas / meter	
.500 gammas / meter	
.100 gammas / meter	
.025 gammas / meter	

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AIRBORNE MAGNETIC SURVEY

VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

EDINA PROPERTY,
McMURRAY TOWNSHIP, ONT.

N.T.S. NO. 41N/15	DRAWING NO. A-627-2
SCALE: 1:10,000	DATE: September 1986

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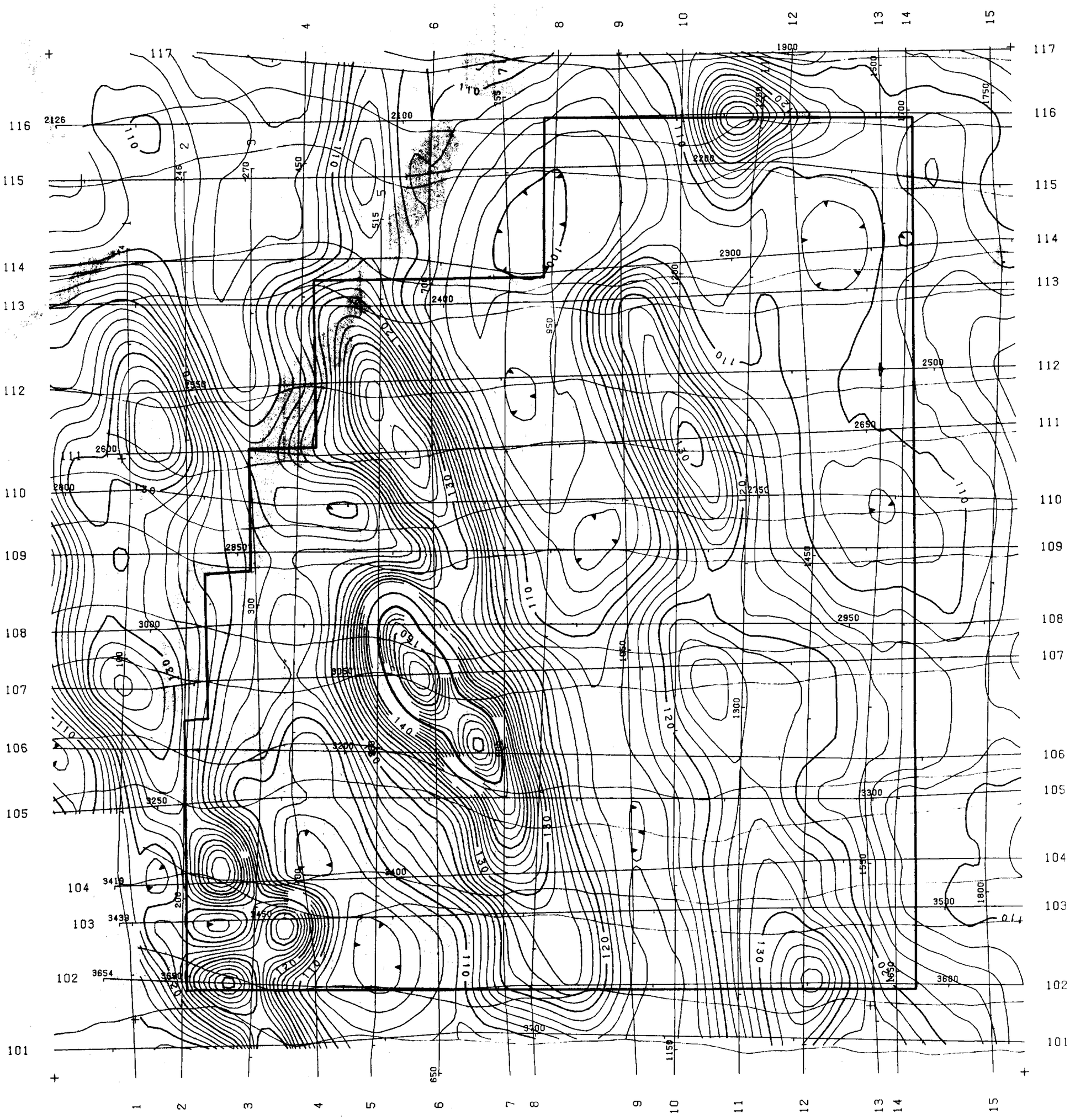
McMURRAY-0066-A1, #2



LEGEND

Terrain Clearance	100 meters
Line Spacing	200 meters
Field Strength	
50%	———
10%	———
2%	———

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AIRBORNE VLF-EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

FLIGHT DIRECTION: EAST-WEST

EDINA PROPERTY,
McMURRAY TOWNSHIP, ONT.

N.T.S. NO. 41N/15	DRAWING NO. A-627-3
SCALE 1:10,000	DATE September 1986

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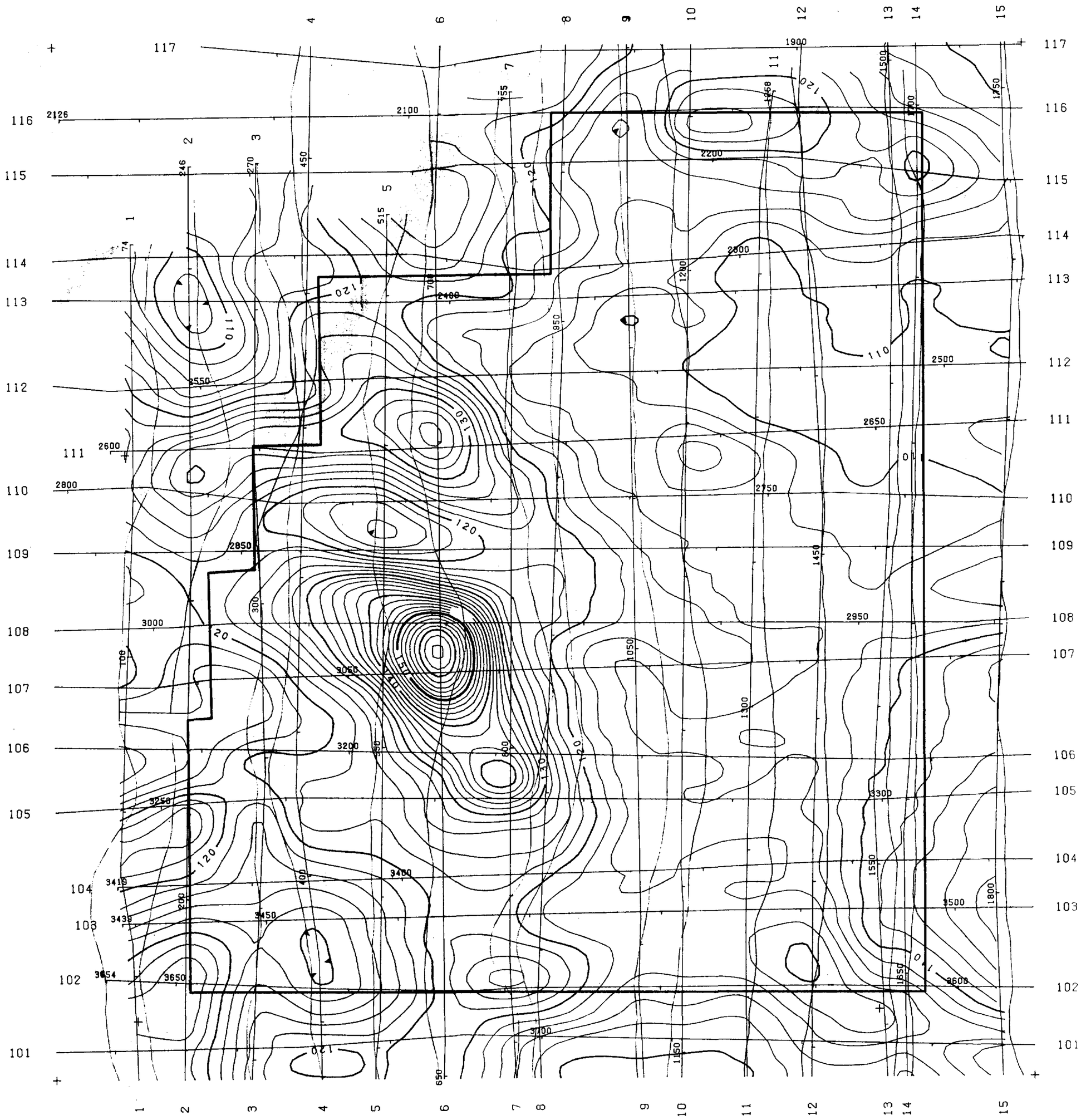
McMURRAY-0066-A1, #3



LEGEND

Terrain Clearance	100 meters
Line Spacing	200 meters
Field Strength	
50%	———
10%	———
2%	- - -

McMURRAY-0066-A1, #4

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AIRBORNE VLF-EM SURVEY

CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

FLIGHT DIRECTION: NORTH-SOUTH

EDINA PROPERTY,
McMURRAY TOWNSHIP, ONT.

N.T.S. NO. 41N/15	DRAWING NO A-627-4
SCALE: 1:10,000	DATE September 1986

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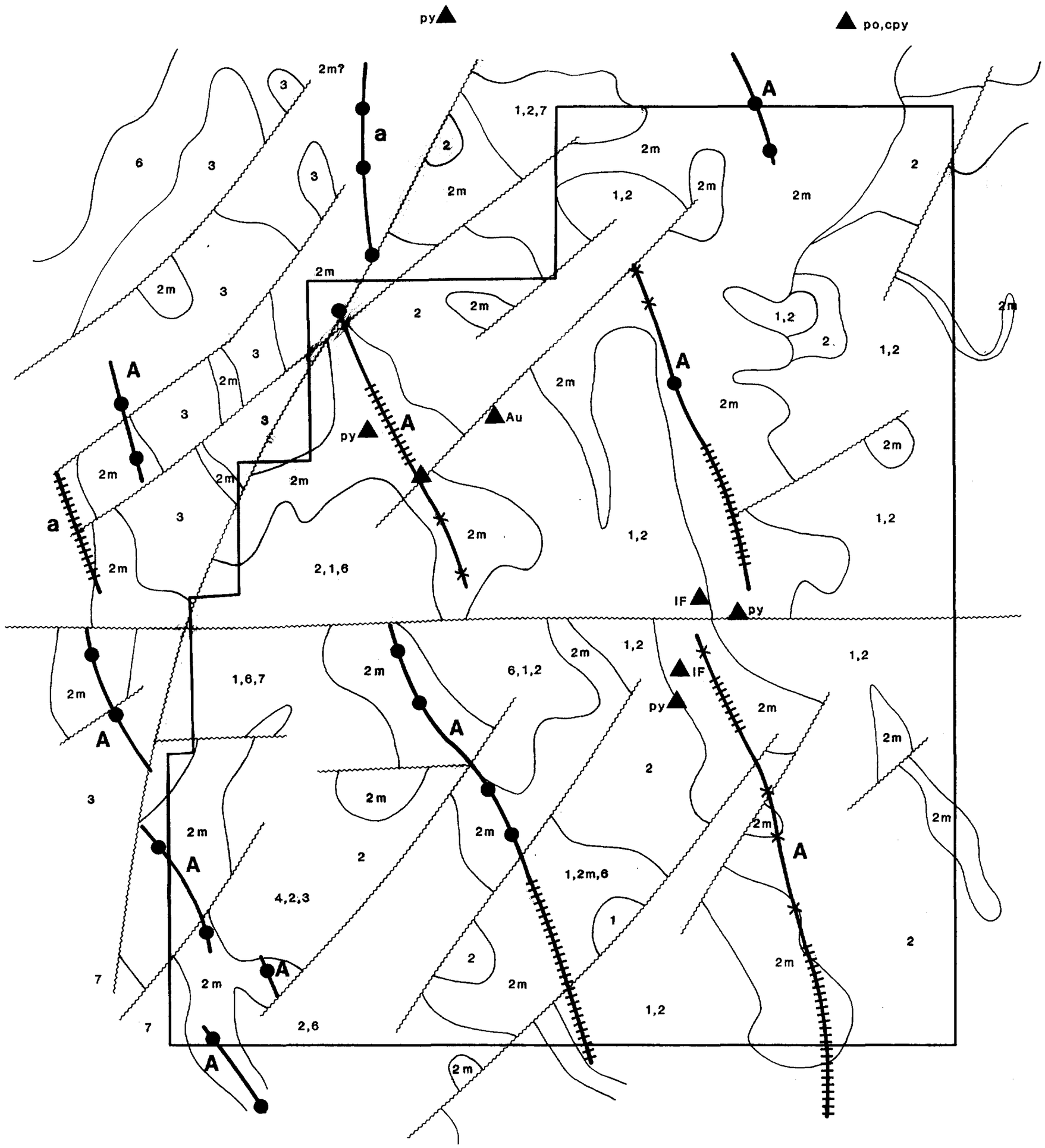
TORONTO CANADA



NSS Annapolis
21.4 kHz
Azimuth 143.5

NAA Cutler
24.0 kHz
Azimuth 99

LITHOLOGY

7	Felsic Intrusives
6	Gabbro
4	Clastic Metasediments
3	Intermediate to Felsic Volcanics
2m	Magnetic unit within 2.
2	Mafic to Intermediate Volcanics
1	Granitic Rock
IF	Iron Formation

LEGEND

INTERPRETATION

- Contact
- Fault
- Property Boundary

VLF-EM Conductor Axes

- normal quadrature
- reverse quadrature
- total field only

See text for classification of conductors.

Terrain Clearance ..... 100 meters
Line Spacing ..... 200 meters

MR. ROBERT HENDERSON

INTERPRETATION

EDINA PROPERTY,
McMURRAY TOWNSHIP, ONT.

N.T.S. NO. 41N/15	DRAWING NO. A-627-5
SCALE: 1:10,000	DATE: September 1986

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McMURRAY-0066-A1, #5