



42A01SW0056 2.9054 HOLMES

010

HELICOPTER GEOPHYSICAL SURVEY  
IN THE HOLMES, FLAVELLE AND CAIRO TOWNSHIPS, ONTARIO.

for  
FALCONBRIDGE LTD.

**RECEIVED**

APR 28 1986

**MINING LANDS SECTION**

by  
GEOPHYSICAL SURVEYS INC.  
2272 Léon Harmel,  
Québec, QUE.  
G1N 4L2.

MARCH 1986



42A01SW0056 2.9054 HOLMES

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## 1. INTRODUCTION

Geophysical Surveys Inc. carried out a helicopter-borne geophysical survey of 394 line kilometres in the Holmes, Flavelle and Cairo Townships of Ontario for Falconbridge Ltd. in February 1986.

The lines were spaced 100 metres apart. The survey area is shown on the index map (figure 1.1) and was flown with the REXHEM-4 system combined with a gradiometer for measurement of the vertical magnetic gradient.

The REXHEM-4 instrumentation includes an EMEX-1 from Geotech Ltd., a VLF system TOTEM-2A from Herz Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EMEX-1 bird shell; two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 639 and 4150 Hz for the co-axial, 900 and 5000 Hz for the coplanar coils.

The electromagnetic coils mounted in a bird shell of 8 metres in length were towed 30 metres below the helicopter at an average height of 30 metres above ground.

The two gradiometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three V-200 Scintrex cesium vapour magnetometers.

The total field and the quadrature component of the VLF electromagnetic field were recorded simultaneously from two stations - NAA Cutler, Maine and NSS Annapolis, Maryland.

The data processing and interpretation were done in Quebec on a PDP11/70 computer and a Zeta drum plotter.

## 2. DATA PRESENTATION

The maps at a scale of 1:5,000 accompanying this report are:

- the isomagnetic contours of the total field;
- the isomagnetic contours of the vertical magnetic gradient;

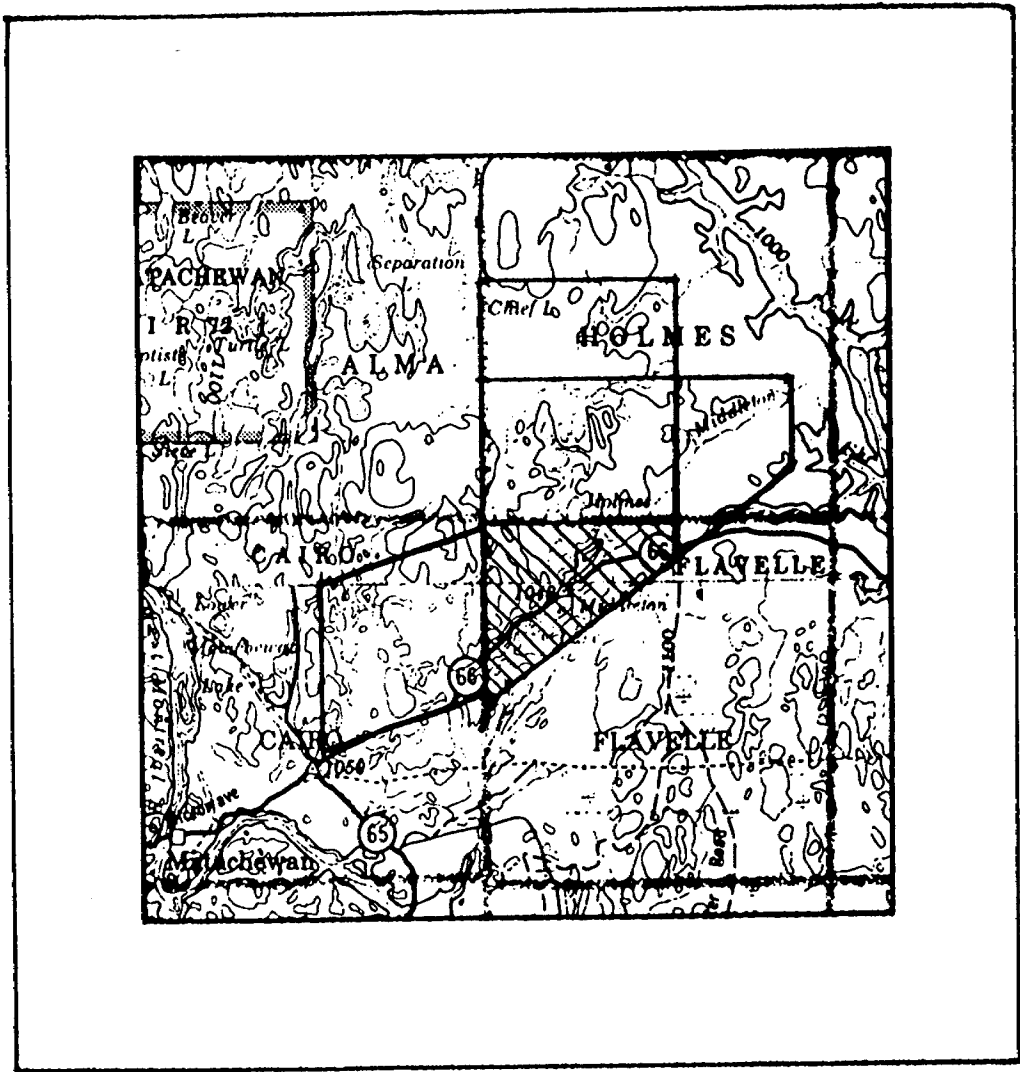


FIGURE 1.1

- the total field and quadrature profiles of the VLF-EM;
- the in-phase and quadrature profiles of the electromagnetic field recorded at 4150Hz.

The Applicon color maps of the total field and the vertical magnetic gradient were produced at a scale of 1:10,000.

### 3. INTERPRETATION OF THE ELECTROMAGNETIC DATA

We haven't found any anomaly related to a bedrock conductor.

The electromagnetic field recorded from the four frequencies electromagnetic system and the two frequencies of the VLF-EM system is related to a conductive overburden.

These wide anomalies have low conductivity-thickness values and most of them were recorded over lakes.

The presence of magnetite has caused some reversals of the in-phase component but these anomalies were not retained for investigation because the amplitude of the quadrature component was too weak.

#### 4. GENERAL INTERPRETATION

The EM conductor parameters, apparent conductance and conductor depth are defined by a computer-based interpretative procedure using the graphic terminal model 4052 from Tektronix Ltd.

The model used is the vertical thin sheet (figure 4.1). The EM anomalies are picked on the screen by the geophysicist with a cursor and the conductor parameters, conductivity-thickness, depth, and location are automatically calculated and stored on a cassette for later transmission to the main computer and plotting of these anomalies.

The apparent conductance obtained in this way is the product of the electrical conductivity and average thickness.

The best conductivity-thickness product approximations are made from the stronger anomaly responses, whereas for weaker anomalies of less than 3 ppm, the approximation is less valid. Usually the mhos calculation for each conductor is a good discriminating parameter. Depth estimated to the tops of the conductors should, however, be treated with caution as the geometry and strength of the anomaly are critical in this approximation.

Most overburdens have apparent conductances lower than 4 mhos and also have very weak bedrock conductors and "structural conductors" such as unmineralized faults and shears.

Ordinarily, the overburden conductors are easily distinguished from these bedrock and structural features by the shapes of their responses. The overburden conductors are identified by the symbol 'X' on the electromagnetic anomalies map but, when the anomaly cannot be related with confidence to an overburden response, the X is put in a circle. (See the legend of the electromagnetic anomalies map.)

Poor to moderate conductance (4 to 20 mhos) may originate from massive sulphides if they are not well connected or if they are of a poor-conductor variety such as pyrite or galena.

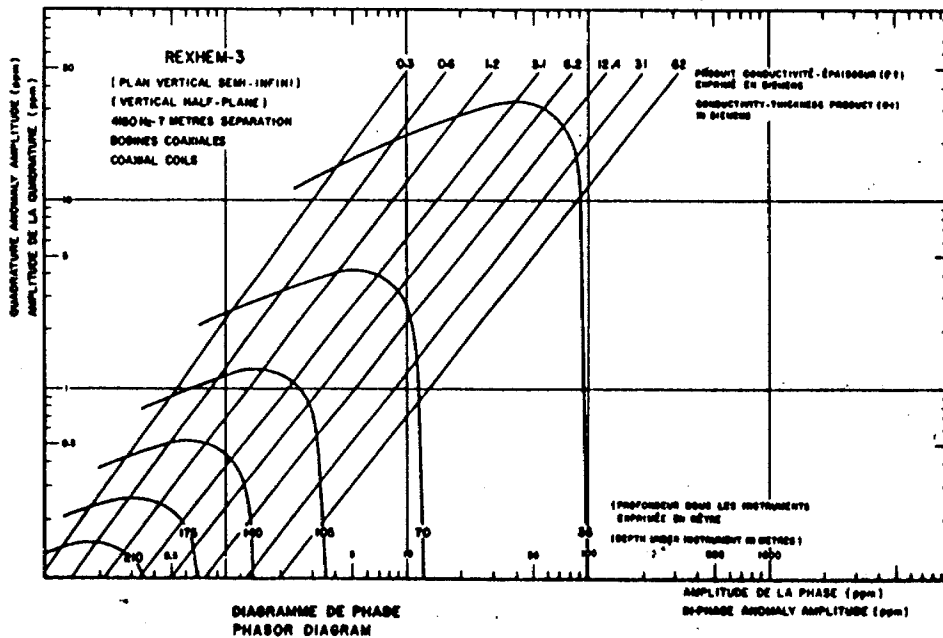
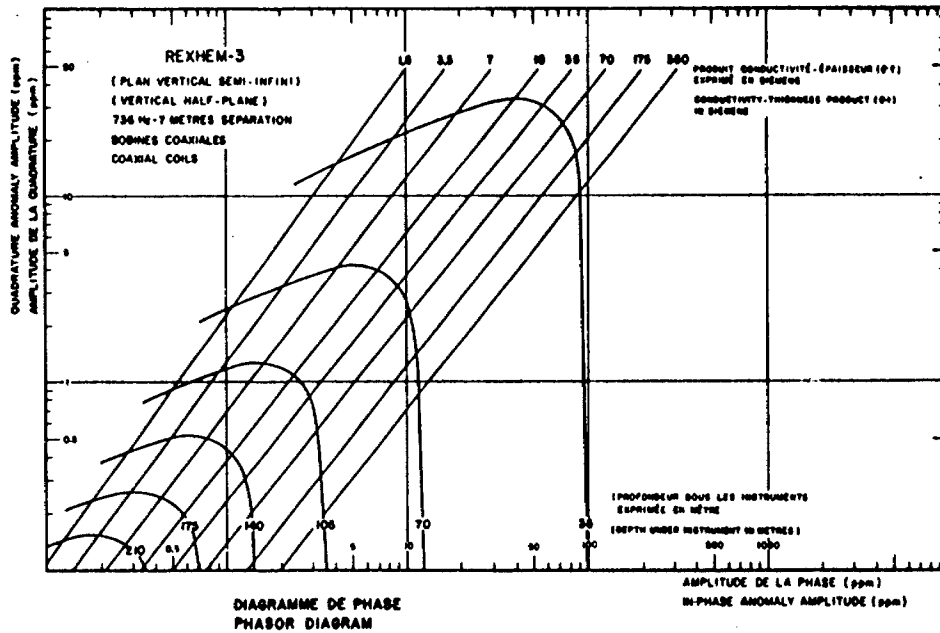


FIG. 4.1 PHASOR DIAGRAMS-VERTICAL HALF-PLANE

A strong conductance higher than 20 mhos indicates well-connected mineralization extending throughout a fairly large region. This often suggests either graphitic zones or massive sulphides.

When long conductors without magnetic correlation are located on or parallel to known faults or photographic linears, graphite is most likely the cause. It is unfortunate that graphite can also occur as a relatively short conductor and produce attractive-looking anomalies. With no other information than the airborne results, these must be examined on the ground.

An EM anomaly with a magnetic correlation may be caused by a conductor which is also magnetic, or by a conductor which lies near a magnetic body.

The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite.

Conductive and magnetic bodies in close association are often graphite and magnetite. It is usually very difficult to distinguish between cases.

When the conductor is strongly magnetic, the amplitude of the in-phase EM anomaly is weakened and, if the conductivity is also weak, the in-phase EM anomaly may even be reversed in sign. These anomalies are indicated by the letter 'M' inside a circle on the electromagnetic anomalies map.

Contact zones can often be predicted when anomaly trends coincide with the lines of maximum gradient along a flanking magnetic anomaly.

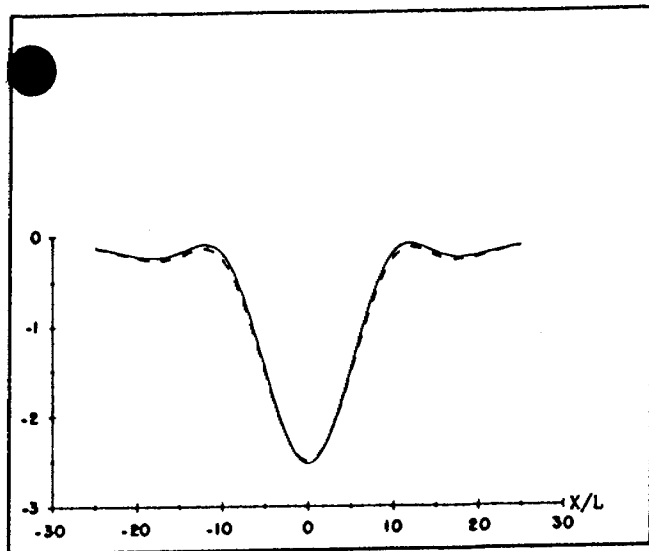
The characteristic response curve of the coplanar coil over a thin conductor (minimum over the conductor with two adjacent peaks) is particularly useful to differentiate closely-spaced conductors from thick, massive conductors or from thick, massive conductors of variable conductivity (figures 4.2 and 4.3).

Power lines can sometimes produce spurious anomalies, but these can be identified by reference to the monitor trace.

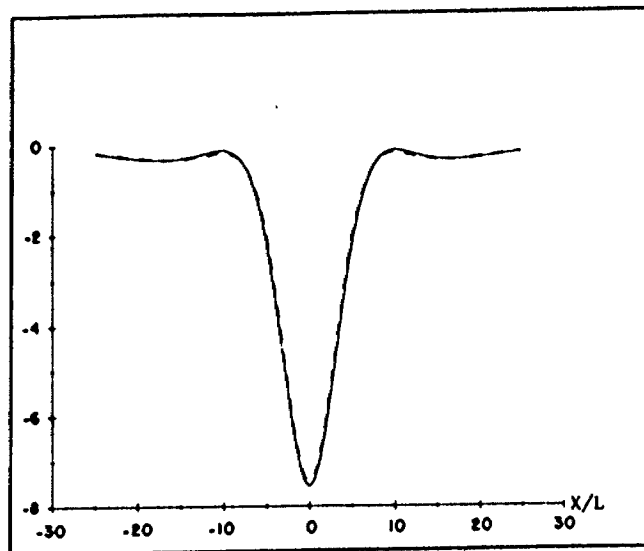
Railroads, pipeline and other artificial conductors are recognized by studying the video tapes.

Commercial sulphide ore bodies are rare, and those that respond to airborne survey methods usually have medium to high conductivity. Many have magnetic correlation caused by magnetite and/or pyrrhotite and most of them are relatively short conductors.

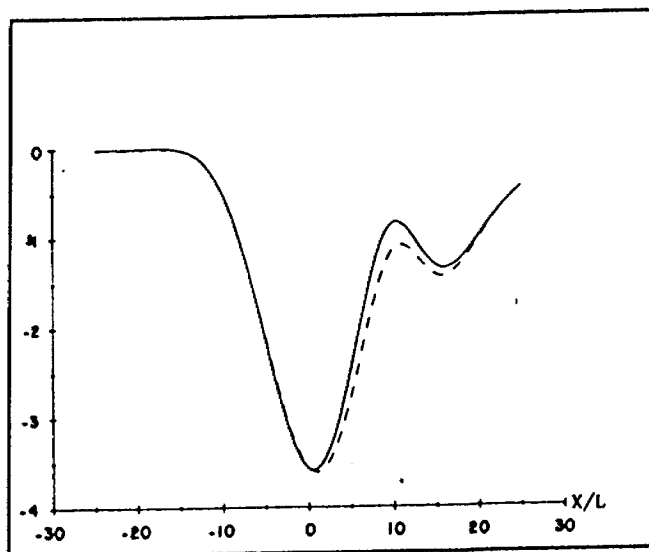




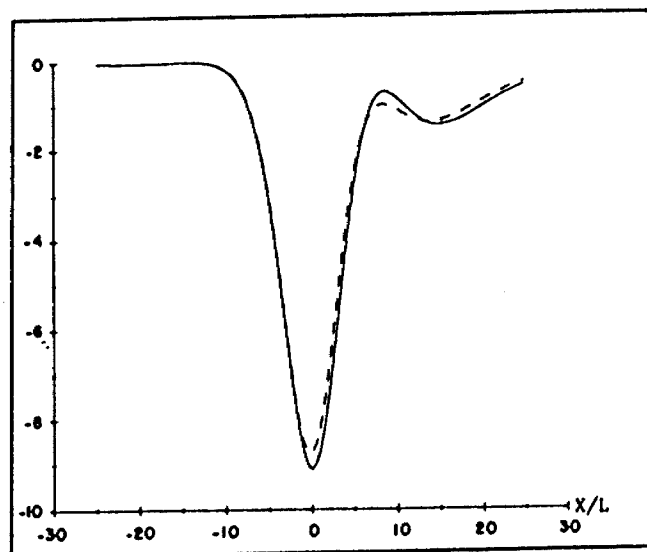
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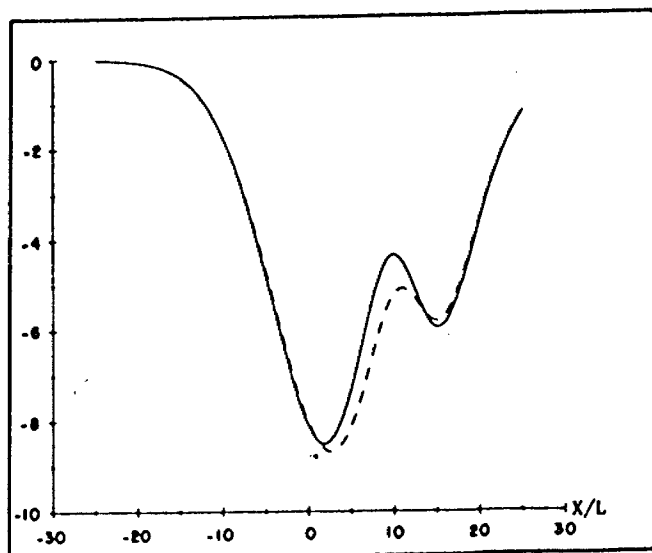
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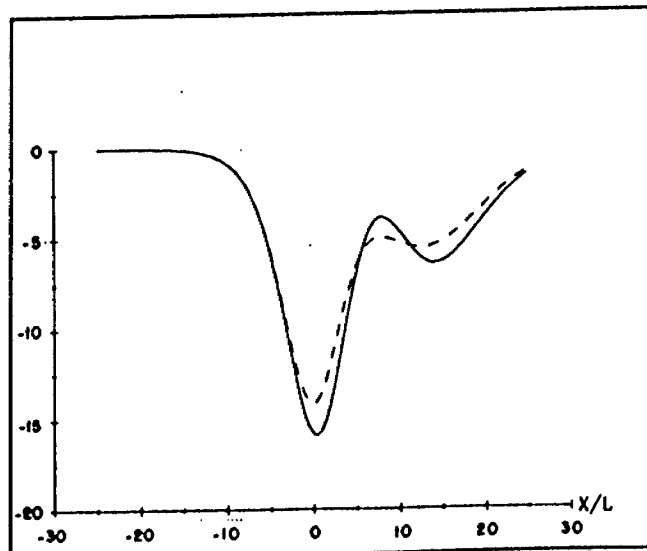
STRIKE, DIP, PLUNGE = (30.0, 60.0, 0.0)



STRIKE, DIP, PLUNGE = (60.0, 60.0, 0.0)



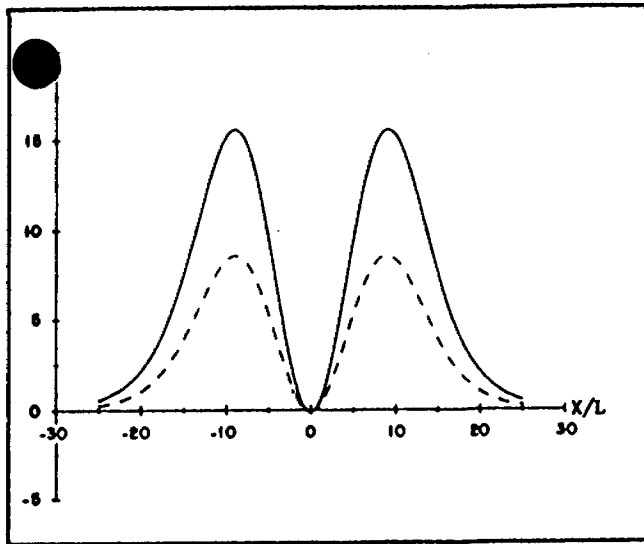
STRIKE, DIP, PLUNGE = (30.0, 30.0, 0.0)



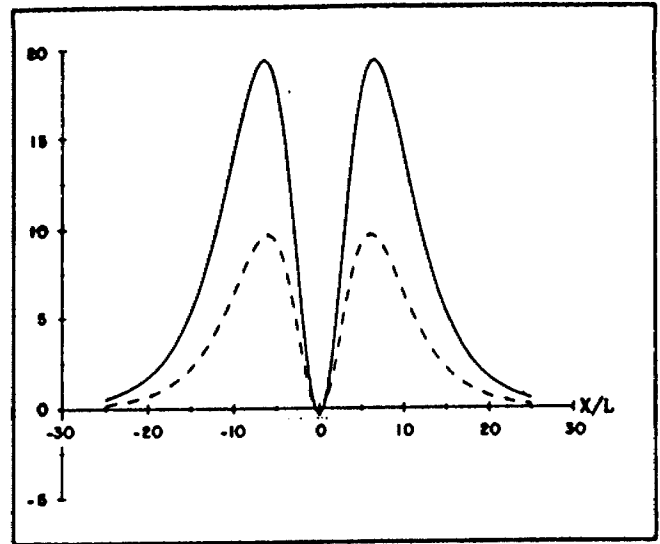
STRIKE, DIP, PLUNGE = (60.0, 30.0, 0.0)

COAXIAL COILS, FREQUENCY = 736 Hz, SEPARATION = 7 METRES  
 DEPTH UNDER THE INSTRUMENTS = 50 METRES, REAL (SOLID) IMAGINARY (DASH) IN P.P.M.  
 CONDUCTANCE = 20 SIEMENS

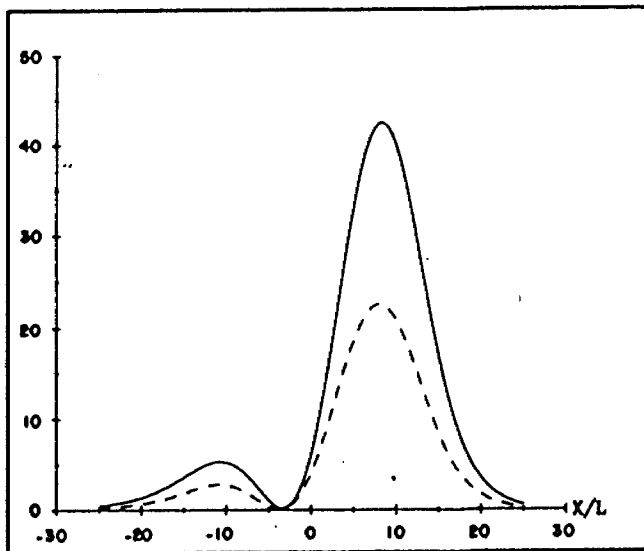
FIG. 4.2 MODEL CURVES



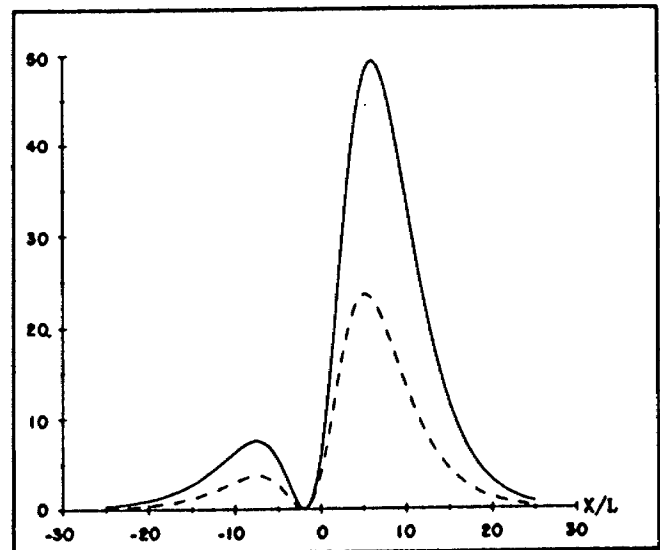
STRIKE, DIP, PLUNGE = (30.0, 90.0, 0.0)



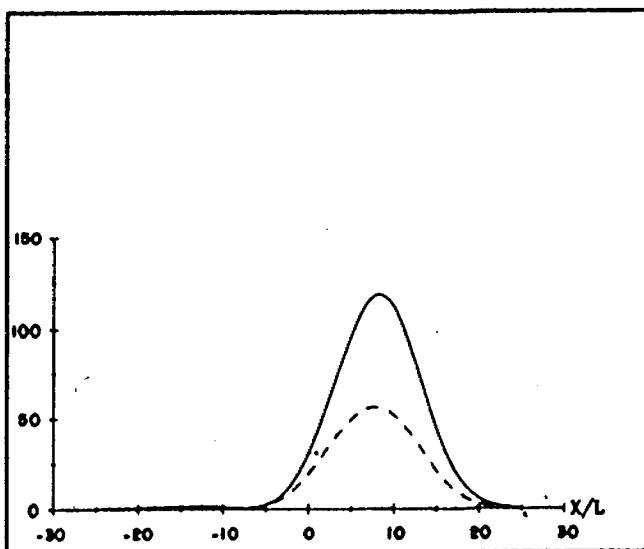
STRIKE, DIP, PLUNGE = (60.0, 90.0, 0.0)



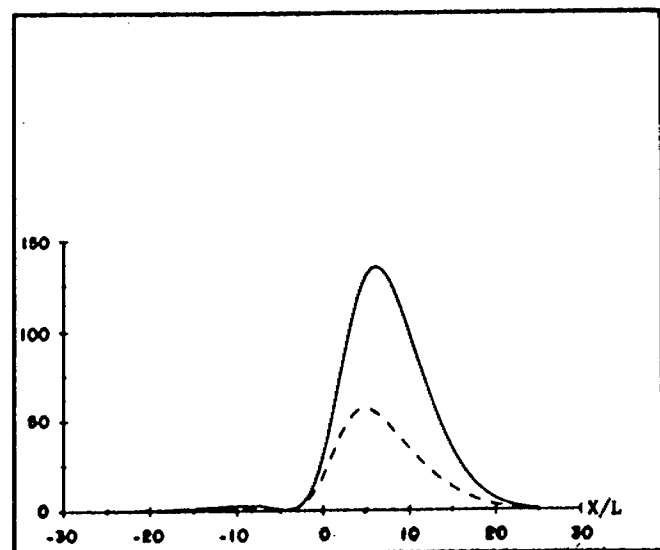
STRIKE, DIP, PLUNGE = (30.0, 60.0, 0.0)



STRIKE, DIP, PLUNGE = (60.0, 60.0, 0.0)



STRIKE, DIP, PLUNGE = (30.0, 30.0, 0.0)



STRIKE, DIP, PLUNGE = (60.0, 30.0, 0.0)

HORIZONTAL COPLANAR COILS, FREQUENCY = 1800 Hz, SEPARATION = 7 METRES  
 DEPTH UNDER THE INSTRUMENTS = 50 METRES, REAL (SOLID) IMAGINARY (DASH) IN P.P.M.  
 CONDUCTANCE = 20 SIEMENS

FIG. 4.3 MODEL CURVES

## 5. DESCRIPTION OF THE GEOPHYSICAL INSTRUMENTATION

### 5.1 The REXHEM-4

The REXHEM-4 main component is a new towed electromagnetic prospecting system which features multiple simultaneous frequencies and coil configuration, providing more diagnostic geophysical information about conductors, thereby increasing the chances of discovering massive sulphide ores.

Four pairs of coils are installed in a kevlar bird shell 8 metres in length; two pairs are in a standard coaxial (maximum coupled) configuration and the two others are in a horizontal coplanar (minimum coupled) configuration.

The transmitting frequencies are 736 and 4150 Hz for the coaxial coils, 900 and 5000 Hz for the coplanar coils.

The advanced design of this electromagnetic system offers the following features:

- a) A noise level smaller than 0.5 ppm is obtained by using kevlar for the bird shell, a material offering a degree of structural rigidity not previously available; also, a new suspension system reduces bird bending noise. The noise level is actually the lowest of all existing helicopter electromagnetic systems.
- b) High resolution. The short rise time of 0.1 second combined with the small coil separation (8 metres) provides exceptionally high resolution. The REXHEM-4 is an ideal system to discriminate between closely-spaced multiple conductors and to identify conductors too small to be detected by airborne electromagnetic system having a large coil separation.
- c) Eight channels of electromagnetic data recorded from coaxial and coplanar coil pairs at four different frequencies provide more diagnostic geophysical information and yield conductivity-thickness products more accurately than those derived from less sophisticated systems. The conductivity-thickness values calculated from different frequencies and transferred on the phasor diagram permit to check if the model used is appropriate for the interpretation. Consequently, this test is useful to discriminate bedrock conductors from overburden

thickness and conductivity may be quite variable in a survey area, the depth of penetration of an airborne system may be insufficient to detect bedrock conductors. Part of the survey area would therefore remain effectively unexplored. With the information gathered on the eight channels of electromagnetic data, these areas can now be identified and retained for further exploration by some ground geophysical techniques that are capable of penetrating the overburden masking effect.

In addition, the use of multiple frequencies allows for a wider range of bedrock conductors to be energized.

The low frequencies of the REXHEM-4 system are much less sensitive to surface conductors than the two higher frequencies and is therefore more effective to detect underlying massive sulphide ores.

The massive sulphide lens may be masked by a strong overburden response at the high frequencies but low conductivity mineralization without interfering surface conductors will respond better at the higher frequencies.

- d) Unique ability to determine conductor geometry by comparison of the electromagnetic responses from the coaxial and the coplanar coil configurations. Closely spaced thin conductors can be differentiated from thick massive conductors or from thick massive conductors of variable conductivity.

This discrimination is made possible by comparing the characteristics of anomaly shape (minimum response over the conductor with two adjacent peaks) obtained over thin conductors as defined by the coplanar coils.

Moreover, the relative amplitude of the two peaks of these anomalies is an indication of the conductor dip-angle.

The coplanar coil pair yields data which are unaffected by the conductor orientation relative to the flight direction. This coil configuration can therefore detect the conductors striking parallel to the flight line which cannot be energized by the coaxial coil pairs.

- e) Improved electronic signal processing substantially reduces interference from thunderstorm radiation spherics and from radar, FM, television and standard broadcast transmitters. The REXHEM-4 can thus be flown near urban areas.

The system is equipped with a 60 Hertz power line monitor and a "spherics" monitor to distinguish power lines and spherics from target conductors.

The VLF-EM is the TOTEM-2A from Herz Industries Ltd., operating simultaneously at two frequencies. Consequently, two VLF stations can be tuned to energize conductors in the survey area which may be oriented perpendicular or parallel to the flight lines.

The digital data acquisition system is the Sonotek SDS-1200 which features Z-80 microprocessor, interactive communication via keyboard and alphanumeric display, complete read-after-write, verification of magnetic tape records, and analog-to digital-to analog data replay capability in flight for 100% confidence level. An another key feature of this system is the fact that all data collection routines, checking, buffering, recording and verification are software controlled and therefore programs can be easily altered to suit almost any special requirement. The memory capacity of 64k bytes, combined with the power and speed of Z-80 microprocessor, enables us to do real-time data processing, in addition to all the usual data acquisition and formatting functions.

The GR-33 graphic recorder, from RMS Instruments Ltd., operated under control of a host computer allows the annotation of recording parameters and messages. This computer controls the 1240 individual printing elements for the maximum flexibility in creating high resolution graphic images. Up to 32 analog or 32 digital signals may be recorded in a format similar to a conventional multi-channel strip chart recorder.

The video flight path recorder with automatic iris wide angle lens assures perfect exposures with no operator adjustment. It records both video and data which is stored alphanumerically in the top portion of each frame. Data and video are available for review immediately after each flight with no further processing. Therefore, anomaly identification and localization can be carried out in the field more rapidly and precisely than with a conventional 35mm tracking camera.

5.2 The vertical magnetic gradiometer

Three V-200 Scintrex cesium vapour magnetometers were used for the measurement of the total field from the lower and upper sensors and the vertical magnetic gradient.

The sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The vertical magnetic gradient and the total field were measured twice a second with a sensitivity of 0.005 gamma.

6.

DESCRIPTION OF THE ANALOGUE CHARTS

The geophysical data were recorded on 17 channels by the RMS graphic recorder. These information channels are:

RALT	Elevation above ground	10 ft/mm
19/EM-1	Phase 639 Hz coaxial	2 ppm/mm
EM-5	Phase 4150 Hz coaxial	2 ppm/mm
17/EM-3	Phase 900 Hz coplanar	2 ppm/mm
23/EM-7	Phase 5000 Hz coplanar	2 ppm/mm
20/EM-2	Quadrature 639 Hz coaxial	2 ppm/mm
EM-6	Quadrature 4150 Hz coaxial	2 ppm/mm
18/EM-4	Quadrature 900 Hz coplanar	2 ppm/mm
24/EM-8	Quadrature 5000 Hz coplanar	2 ppm/mm
GRD1	Vertical magnetic gradient	±5 gammas/4cm.
TFB1	Total magnetic field (lower mag)	100 gammas/4cm.
TFA2	Total magnetic field (upper mag)	100 gammas/4cm.
TFA1	Total magnetic field (upper mag)	1000 gammas/2cm.
21/VLF-4	Quadrature from NAA Cutler	5%/mm
VLF-3	Total field from NAA Cutler	5%/mm
VLF-2	Quadrature from NSS Annapolis	5%/mm
VLF-1	Total field from NSS Annapolis	5%/mm

We hadn't been able to modify the microprocessor software prior to the survey and some channels were identified using the numbers 17 to 24.

The analogue chart scale is approximately 1:10,000. The chart paper moves through the recorder console at a speed of 2.5mm/sec. and the average speed of the helicopter is 90 kilometres per hour.

The camera fiducial marks were printed on the analogue chart at 0.5 second intervals. A longer fiducial mark was printed at every multiple of 10. The text printed over these fiducial marks, for example: A 004001 14:01:54 00507, are, respectively, the line number, the time, and the fiducial number at the fiducial mark located immediately at the left of the 'A' letter.



Written by

*Claude Jobin*

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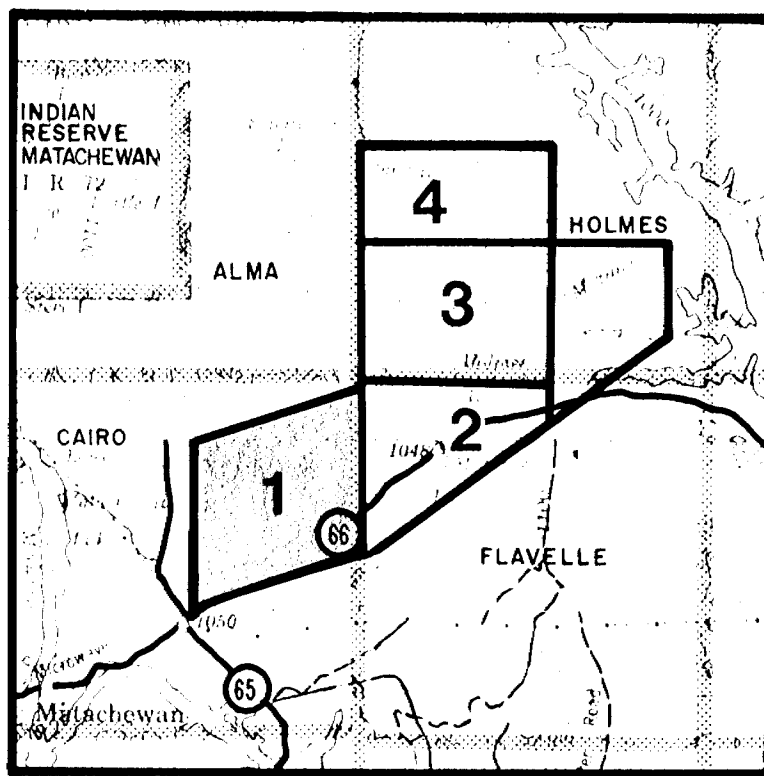
Claude Jobin, Geophysicist

Verified by

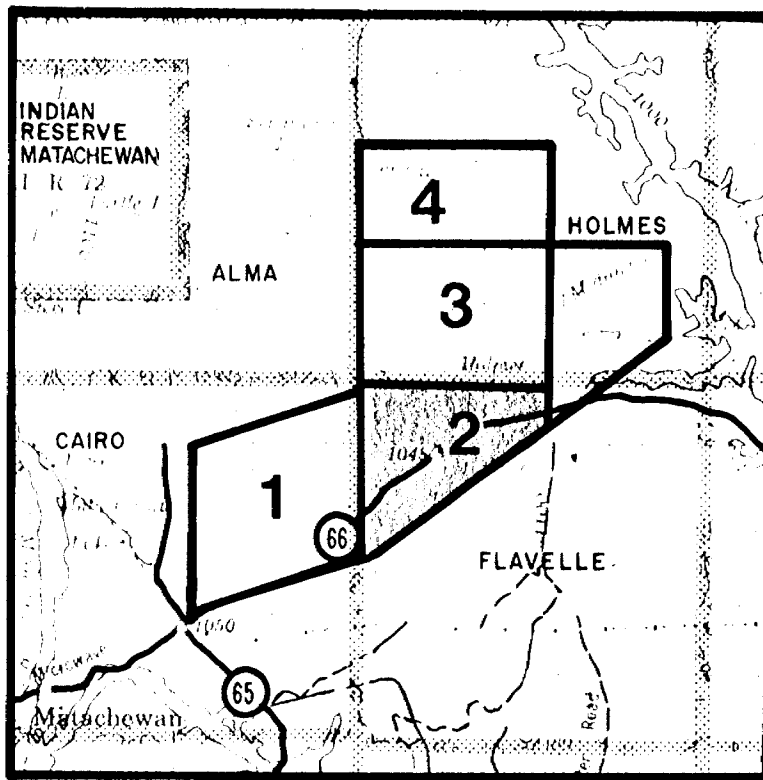
*Jean-Pierre Dery*

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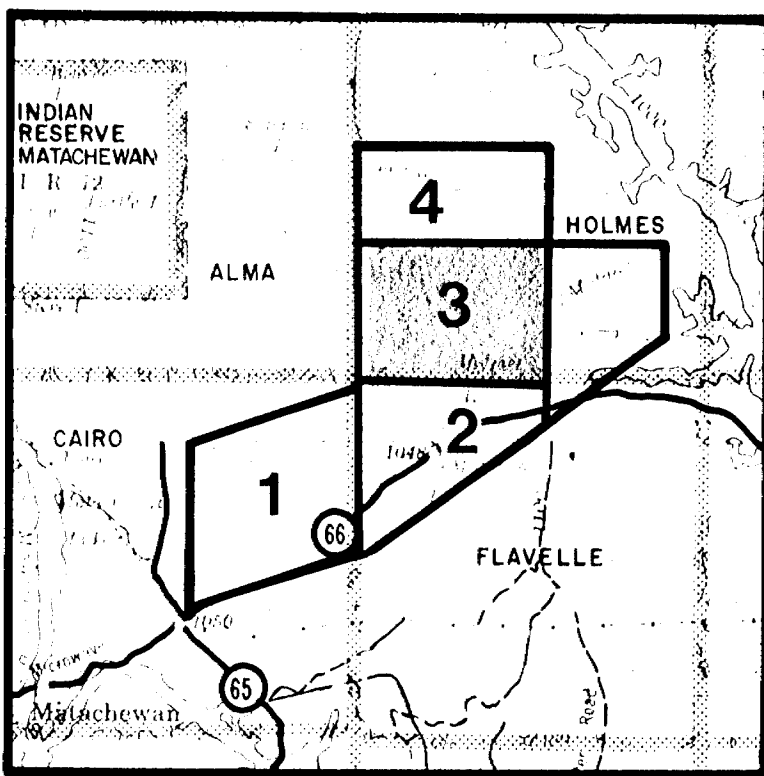
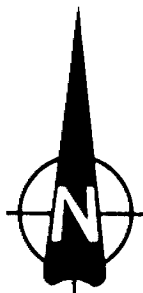
Jean-Pierre Dery, Geophysicist



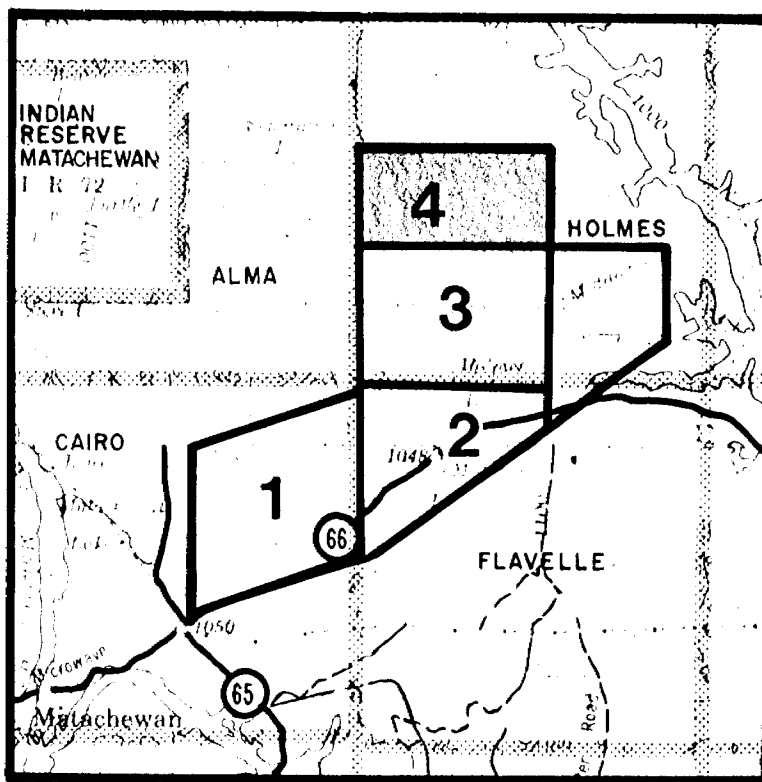
# HOLMES - FLAVELLE TOWNSHIPS



# HOLMES - FLAVELLE TOWNSHIPS



# HOLMES - FLAVELLE TOWNSHIPS



# HOLMES - FLAVELLE TOWNSHIPS



42A01SW0056 2.9054 HOLMES

900

January 23, 1987

Your File: 445/86

Our File: 2.9054

Mining Recorder  
Ministry of Northern Development and Mines  
4 Government Road East  
Kirkland Lake, Ontario  
P2N 1A2

Dear Sir:

RE: Notice of Intent dated December 31, 1986  
Geophysical (Electromagnetic and Magnetometer)  
Surveys on Mining Claims L 859204, et al,  
in Cairo Township

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The assessment work credits, as listed with the above-mentioned  
Notice of Intent, have been approved as of the above date.

Please inform the recorded holder of these mining claims and  
so indicate on your records.

Yours sincerely,

J.C. Smith, A/Manager  
Mining Lands Section  
Mineral Development and Lands Branch  
Mines and Minerals Division

Whitney Block, Room 6610  
Queen's Park  
Toronto, Ontario  
M7A 1W3

Telephone: (416) 965-4888  
DK/mc

cc: R.A. Bernatchez  
G. Bernatchez  
126 Willow Road  
Atikokan, Ontario  
POT 1C0

Resident Geologist  
Kirkland Lake, Ontario

Encl.

*lgcd*

Geophysical Surveys Inc  
2272 Leon Harmel Rue  
Quebec, Quebec  
G1N 4L2

Mr. G.H. Ferguson  
Mining and Lands Commissioner  
Toronto, Ontario



Recorded Holder  
**R.A. BERNATCHEZ AND G. BERNATCHEZ**

Township or Area  
**CAIRO TOWNSHIP**

Type of survey and number of Assessment days credit per claim	Mining Claims Assessed
<b>Geophysical</b> Electromagnetic _____ <b>40</b> days Magnetometer _____ <b>40</b> days Radiometric _____ days Induced polarization _____ days Other _____ days Section 77 (19) See "Mining Claims Assessed" column Geological _____ days Geochemical _____ days Man days <input type="checkbox"/> Airborne <input checked="" type="checkbox"/> Special provision <input type="checkbox"/> Ground <input type="checkbox"/> <input type="checkbox"/> Credits have been reduced because of partial coverage of claims. <input type="checkbox"/> Credits have been reduced because of corrections to work dates and figures of applicant.	<b>L 859204 to 09 inclusive 859240-41</b>

**Special credits under section 77 (16) for the following mining claims**

\_\_\_\_\_

**No credits have been allowed for the following mining claims**

not sufficiently covered by the survey       insufficient technical data filed

**L 859242**

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geological - 40; Geochemical - 40; Section 77(19) - 60.



Ontario

*Jan 15/87*

Ministry of  
Northern Development  
and Mines

December 31, 1986

Your File: 445/86  
Our File: 2.9054

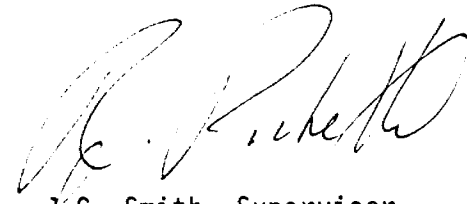
Mining Recorder  
Ministry of Northern Development and Mines  
4 Government Road East  
Kirkland Lake, Ontario  
P2N 1A2

Dear Sir:

Enclosed are two copies of a Notice of Intent with statements listing a reduced rate of assessment work credits to be allowed for a technical survey. Please forward one copy to the recorded holder of the claims and retain the other. In approximately fifteen days from the above date, a final letter of approval of these credits will be sent to you. On receipt of the approval letter, you may then change the work entries on the claim record sheets.

For further information, if required, please contact Mr. R.J. Pichette at (416) 965-4888.

Yours sincerely,



J.C. Smith, Supervisor  
Mining Lands Section

Whitney Block, 6th Floor  
Queen's Park  
Toronto, Ontario  
M7A 1W3

DK/mc  
Encl.

cc: R.A. Bernatchez  
G. Bernatchez  
126 Willow Road  
Atikokan, Ontario  
POT 1C0

Geophysical Surveys Inc  
2272 Leon Harmel Rue  
Quebec, Quebec  
G1N 4L2

Mr. G.H. Ferguson  
Mining & Lands Commissioner  
Toronto, Ontario





Ontario

Ministry of  
Northern Development  
and Mines

Notice of Intent  
for Technical Reports  
December 31, 1986  
2.9054/445/86

An examination of your survey report indicates that the requirements of The Ontario Mining Act have not been fully met to warrant maximum assessment work credits. This notice is merely a warning that you will not be allowed the number of assessment work days credits that you expected and also that in approximately 15 days from the above date, the mining recorder will be authorized to change the entries on the record sheets to agree with the enclosed statement. Please note that until such time as the recorder actually changes the entry on the record sheet, the status of the claim remains unchanged.

If you are of the opinion that these changes by the mining recorder will jeopardize your claims, you may during the next fifteen days apply to the Mining and Lands Commissioner for an extension of time. Abstracts should be sent with your application.

If the reduced rate of credits does not jeopardize the status of the claims then you need not seek relief from the Mining and Lands Commissioner and this Notice of Intent may be disregarded.

If your survey was submitted and assessed under the "Special Provision-Performance and Coverage" method and you are of the opinion that a re-appraisal under the "Man-days" method would result in the approval of a greater number of days credit per claim, you may, within the said fifteen day period, submit assessment work breakdowns listing the employees names, addresses and the dates and hours they worked. The new work breakdowns should be submitted directly to the Land Management Branch, Toronto. The report will be re-assessed and a new statement of credits based on actual days worked will be issued.

445/86

Mining Act 2.9054

Instructions: - Please type or print.  
- If number of mining claims traversed exceeds space on this form, attach a list.  
Note: - 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: **Airborne - Mag and EM** Township or Area: **Cairo Twp**

Claim Holder(s): **R.A. Bernatchez, G. Bernatchez** Prospector's Licence No.: **R.A. Bernatchez K18156**

Address: **126 Willow Rd Atikokan, Ontario POT 1C0**

Survey Company: **Geophysical Surveys Inc.** Date of Survey (from & to): **12 2 86 12 2 86** Total Miles of line Cut: **11.9 Km**

Name and Address of Author (of Geo-Technical report): **Geophysical Surveys Inc., 2272 Leon Harmele Quebec G1N 4L2**

Credits Requested per Each Claim in Columns at right

Mining Claims Traversed (List in numerical sequence)

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
For each additional survey: using the same grid: Enter 20 days (for each)	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits	Electromagnetic	Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.		40
	Magnetometer	40
	Radiometric	

Mining Claims Traversed (List in numerical sequence)			Mining Claims			Expend.		
Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	859204							
	859205							
	859206							
	859207							
	859208							
	859209							
	859240							
	859241							
	859242							

**RECEIVED**  
OCT 27 1986  
LANDS SECTION

**RECEIVED**  
OCT 27 1986  
10:15am  
JB

*See revised work sheet attached*

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. **9**

Date: **October 16/86** Recorded Holder or Agent (Signature): **R.A. Bernatchez P.Eng.**

For Office Use Only

Total Days Cr. Recorded: **720** Date Recorded: **OCT 27 1986** Mining Recorder: *[Signature]*

Date Approved as Recorded: *[Signature]* Branch Director

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: **Raymond A. Bernatchez 126 Willow Rd Atikokan Ontario POT 1C0**

Date Certified: **October 16/86** Certified by (Signature): **R.A. Bernatchez P.Eng.**

Mining Lands Section

File No 29054

Control Sheet

TYPE OF SURVEY

- GEOPHYSICAL
- GEOLOGICAL
- GEOCHEMICAL
- EXPENDITURE

MINING LANDS COMMENTS:

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\_\_\_\_\_  
Signature of Assessor

\_\_\_\_\_  
Date

kg. Ld.  
L.A.  
Lgd.



FLAVELLE TOWNSHIP

CLAIM

- 765249 ✓
- 765250 ✓
- 765251 ✓
- 765252
- 765253 ✓
- 765254 ✓

CAIRO TOWNSHIP

- 799244
- 765246 ✓
- 765247 ✓
- 765248 ✓
- 765255 ✓
- 799248 ✓
- 799250 ✓
- 799251 ✓
- 799252
- 799253 ✓
- 799254 ✓
- 799255 ✓
- 799552 ✓
- 801770
- 801771
- 801772
- 801773

HOLMES  
TWP

CLAIM

- ✓ 800140
  - ✓ 800141
  - ✓ 822348
  - ✓ 843697
  - ✓ 843698
  - ✓ 843699
  - ✓ 843700
  - ✓ 843409
  - ✓ 843410
  - ✓ 843411
-



L857254	L857291	L821445
L857255	L857292	L821446
L857256	L857293	L821447
L857257	L857294	L821448
L857258	L857295	L821449
L857259	L857296	L821450
L857260	L857297	
L857264	L857298	
L857265	L857299	
L857269	857300	
L857270	857301	L833650
L857271	857302	L833651
L857272	857303	L833652
L857273	857304	L833653
L857274	857305	L833654
L857275	857306	
L857276	857307	
L857277	857308	
L857284	857309	L833661
L857285	857310	L833662
L857286	857311	641611
L857287	857312	750775
L857288		750777
L857289		750778
L857290		



File \_\_\_\_\_

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT  
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT  
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Helicopter Geophysical Survey  
 Township or Area Cario, Holmes, Flavelle Twps  
 Claim Holder(s) Falconbridge Ltd  
A - 21647  
 Survey Company Geophysical Survey Inc.  
 Author of Report Claude Jobin  
 Address of Author 2272 Leon Harmele Quebec  
 Covering Dates of Survey GIN 412  
12/2/86 13/2/86  
 (linecutting to office)  
 Total Miles of Line Cut \_\_\_\_\_

**MINING CLAIMS TRAVERSED**  
List numerically

(prefix) (number)

see attached list A

If space insufficient, attach list

**SPECIAL PROVISIONS**  
**CREDITS REQUESTED**

DAYS  
per claim

ENTER 40 days (includes  
line cutting) for first  
survey.

ENTER 20 days for each  
additional survey using  
same grid.

- Geophysical
  - Electromagnetic \_\_\_\_\_
  - Magnetometer \_\_\_\_\_
  - Radiometric \_\_\_\_\_
  - Other \_\_\_\_\_
- Geological \_\_\_\_\_
- Geochemical \_\_\_\_\_

**AIRBORNE CREDITS** (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric \_\_\_\_\_  
 (enter days per claim)

DATE: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_  
 Author of Report or Agent

Res. Geol. \_\_\_\_\_ Qualifications 2.8706

**Previous Surveys**

File No.	Type	Date	Claim Holder

TOTAL CLAIMS 64

OFFICE USE ONLY



# GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS -- If more than one survey, specify data for each type of survey

Number of Stations \_\_\_\_\_ Number of Readings \_\_\_\_\_

Station interval \_\_\_\_\_ Line spacing \_\_\_\_\_

Profile scale \_\_\_\_\_

Contour interval \_\_\_\_\_

## MAGNETIC

Instrument \_\_\_\_\_

Accuracy -- Scale constant \_\_\_\_\_

Diurnal correction method \_\_\_\_\_

Base Station check-in interval (hours) \_\_\_\_\_

Base Station location and value \_\_\_\_\_

## ELECTROMAGNETIC

Instrument \_\_\_\_\_

Coil configuration \_\_\_\_\_

Coil separation \_\_\_\_\_

Accuracy \_\_\_\_\_

Method:  Fixed transmitter  Shoot back  In line  Parallel line

Frequency \_\_\_\_\_  
(specify V.L.F. station)

Parameters measured \_\_\_\_\_

## GRAVITY

Instrument \_\_\_\_\_

Scale constant \_\_\_\_\_

Corrections made \_\_\_\_\_

Base station value and location \_\_\_\_\_

Elevation accuracy \_\_\_\_\_

## INDUCED POLARIZATION RESISTIVITY

Instrument \_\_\_\_\_

Method  Time Domain  Frequency Domain

Parameters -- On time \_\_\_\_\_ Frequency \_\_\_\_\_

-- Off time \_\_\_\_\_ Range \_\_\_\_\_

-- Delay time \_\_\_\_\_

-- Integration time \_\_\_\_\_

Power \_\_\_\_\_

Electrode array \_\_\_\_\_

Electrode spacing \_\_\_\_\_

Type of electrode \_\_\_\_\_

SELF POTENTIAL

Instrument \_\_\_\_\_ Range \_\_\_\_\_

Survey Method \_\_\_\_\_

Corrections made \_\_\_\_\_

RADIOMETRIC

Instrument \_\_\_\_\_

Values measured \_\_\_\_\_

Energy windows (levels) \_\_\_\_\_

Height of instrument \_\_\_\_\_ Background Count \_\_\_\_\_

Size of detector \_\_\_\_\_

Overburden \_\_\_\_\_

(type, depth - include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey \_\_\_\_\_

Instrument \_\_\_\_\_

Accuracy \_\_\_\_\_

Parameters measured \_\_\_\_\_

Additional information (for understanding results) \_\_\_\_\_

AIRBORNE SURVEYS *see attached list*

Type of survey(s) \_\_\_\_\_

Instrument(s) \_\_\_\_\_

(specify for each type of survey)

Accuracy \_\_\_\_\_

(specify for each type of survey)

Aircraft used \_\_\_\_\_

Sensor altitude \_\_\_\_\_

Navigation and flight path recovery method \_\_\_\_\_

Aircraft altitude \_\_\_\_\_ Line Spacing 100 m

Miles flown over total area 394 km Over claims only \_\_\_\_\_

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken \_\_\_\_\_

Total Number of Samples \_\_\_\_\_

Type of Sample \_\_\_\_\_  
(Nature of Material)

Average Sample Weight \_\_\_\_\_

Method of Collection \_\_\_\_\_

Soil Horizon Sampled \_\_\_\_\_

Horizon Development \_\_\_\_\_

Sample Depth \_\_\_\_\_

Terrain \_\_\_\_\_

Drainage Development \_\_\_\_\_

Estimated Range of Overburden Thickness \_\_\_\_\_

SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis \_\_\_\_\_

General \_\_\_\_\_

ANALYTICAL METHODS

Values expressed in: per cent   
p. p. m.   
p. p. b.

Cu, Pb, Zn, Ni, Co, Ag, Mo, As, -(circle)

Others \_\_\_\_\_

Field Analysis (\_\_\_\_\_ tests)

Extraction Method \_\_\_\_\_

Analytical Method \_\_\_\_\_

Reagents Used \_\_\_\_\_

Field Laboratory Analysis

No. (\_\_\_\_\_ tests)

Extraction Method \_\_\_\_\_

Analytical Method \_\_\_\_\_

Reagents Used \_\_\_\_\_

Commercial Laboratory (\_\_\_\_\_ tests)

Name of Laboratory \_\_\_\_\_

Extraction Method \_\_\_\_\_

Analytical Method \_\_\_\_\_

Reagents Used \_\_\_\_\_

General \_\_\_\_\_

1. INTRODUCTION

Geophysical Surveys Inc. carried out a helicopter-borne geophysical survey of 394 line kilometres in the Holmes, Flavelle and Cairo Townships of Ontario for Falconbridge Ltd. in February 1986.

The lines were spaced 100 metres apart. The survey area is shown on the index map (figure 1.1) and was flown with the REXHEM-4 system combined with a gradiometer for measurement of the vertical magnetic gradient.

The REXHEM-4 instrumentation includes an EMEX-1 from Geotech Ltd., a VLF system TOTEM-2A from Herz Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EMEX-1 bird shell; two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 639 and 4150 Hz for the co-axial, 900 and 5000 Hz for the coplanar coils.

The electromagnetic coils mounted in a bird shell of 8 metres in length were towed 30 metres below the helicopter at an average height of 30 metres above ground.

The two gradiometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three V-200 Scintrex cesium vapour magnetometers.

The total field and the quadrature component of the VLF electromagnetic field were recorded simultaneously from two stations - NAA Cutler, Maine and NSS Annapolis, Maryland.

The data processing and interpretation were done in Quebec on a PDP11/70 computer and a Zeta drum plotter.

L857254	L857291	L821445
L857255	L857292	L821446
L857256	L857293	L821447
L857257	L857294	L821448
L857258	L857295	L821449
L857259	L857296	L821450
L857260	L857297	
L857264	L857298	
L857265	L857299	
L857269	857300	
L857270	857301	L833650
L857271	857302	L833651
L857272	857303	L833652
L857273	857304	L833663
L857274	857305	L833664
L857275	857306	
L857276	857307	
L857277	857308	
L857284	857309	L833661
L857285	857310	L833662
L857286	857311	
L857287	857312	641611
L857288		750775
L857289		750777
L857290		750778

Dunmore Twp.

THE TOWNSHIP OF  
OF  
**HOLMES**

DISTRICT OF  
TIMISKAMING

LARDER LAKE <sup>SEP 26 1986</sup>  
MINING DIVISION.

SCALE: 1-INCH=40 CHAINS

LEGEND

PATENTED LAND	⊙
CROWN LAND SALE	⊙
LEASES	⊙
LOCATED LAND	⊙
LICENSE OF OCCUPATION	⊙
MINING RIGHTS ONLY	M.R.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	—
IMPROVED ROADS	—
KING'S HIGHWAYS	—
RAILWAYS	—
POWER LINES	—
MARSH OR MUSKEG	—
MINES	⊙
CANCELLED	⊙

NOTES

400' Surface rights reservation around "Lakes Five"

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
SEC. 56/80	W. 24/82	29/11/82	S.P. & M.R.	168528

PLAN NO.- M.224

ONTARIO #16  
MINISTRY OF NATURAL RESOURCES  
SURVEYS AND MAPPING BRANCH

VI

V

IV

III

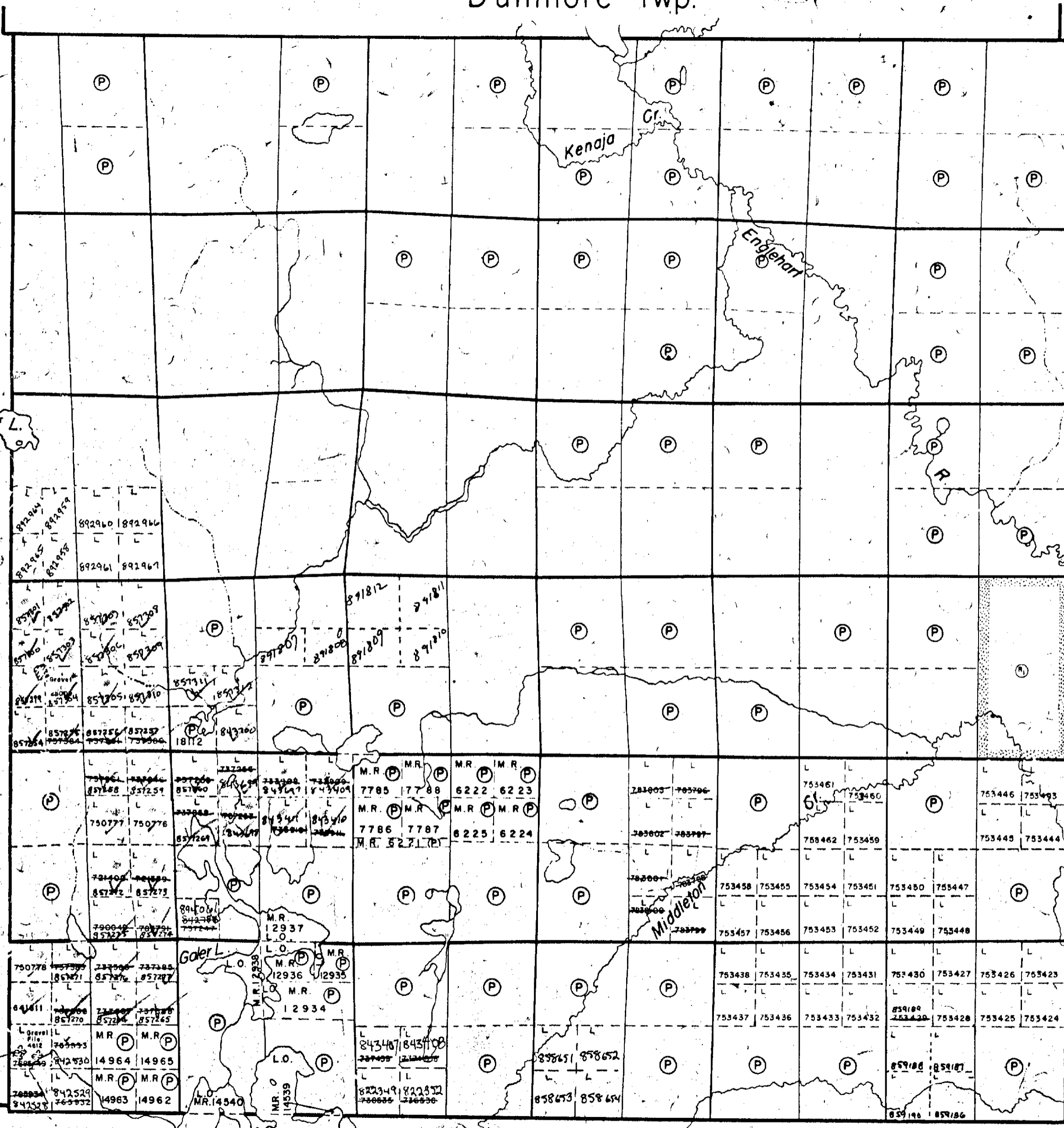
II

I

Burt Twp.

Chief L.  
Lima Twp.

738547  
642531



Flavelle Twp.



42A15W055 2.9054 HOLMES

200





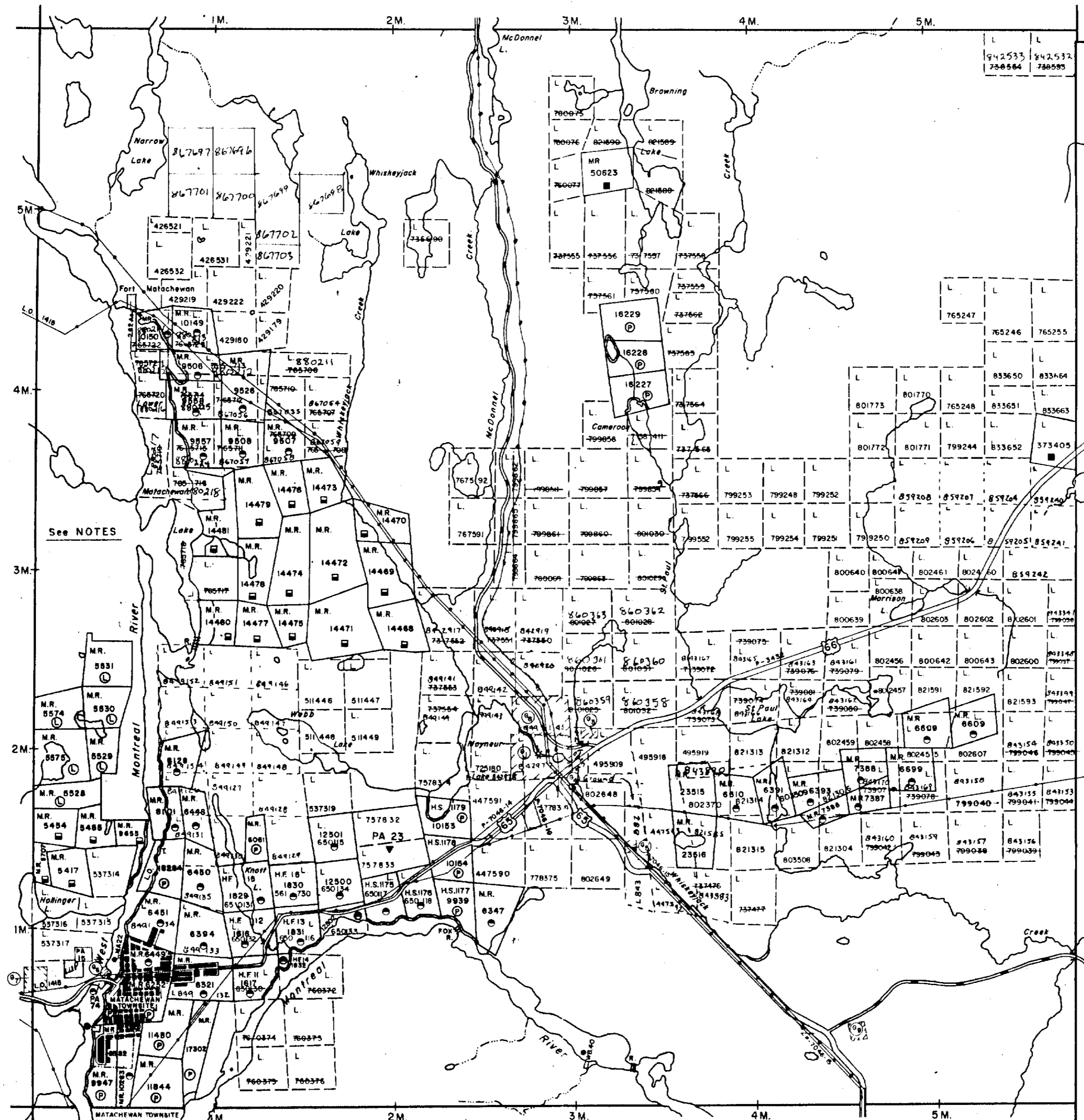


**REFERENCES**

FROM DISPOSITION

RIGHTS ONLY	FILE NO.	DATE	DISPOSITION	FILE
AND SURFACE RIGHTS				
	NRW 6543	10/11/83	MR 1 SR	

**Alma Twp.**



**SAND and GRAVEL**

M.T.C.	Gravel	Pit 206
M.T.C.	Gravel	Pit 1313
Gravel	Pit 205	
Gravel	Pit 204, File 127307	
Gravel	Pit	
M.T.C.	Pit 3F-4, File 127307	
M.T.C.	Gravel	Pit 3F-21
M.T.C.	Pit 3F-28	

**NOTES**

AREA WEST OF WEST MONTREAL RIVER CLOSED TO STAKING SUBJECT TO SEC. 38(1) OF THE MINING ACT, 20 SEPT. 1978.

**LEGEND**

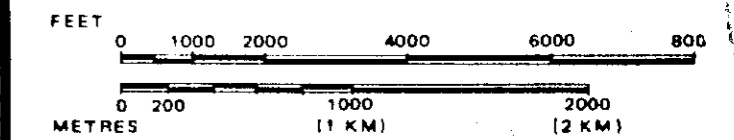
- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING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

**DISPOSITION OF CROWN LAND**

TYPE OF DOCUMENT	SYM
PATENT, SURFACE & MINING RIGHTS	⊙
" " SURFACE RIGHTS ONLY	○
" " MINING RIGHTS ONLY	⊖
LEASE, SURFACE & MINING RIGHTS	⊕
" " SURFACE RIGHTS ONLY	⊙
" " MINING RIGHTS ONLY	⊖
LICENCE OF OCCUPATION	L.O.
ORDER-IN-COUNCIL RESERVATION	⊖
CANCELLED	⊖
SAND & GRAVEL	⊕

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO 1913, VESTED IN ORIGINAL PATENTEE BY THE PL. LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBS.

SCALE: 1 INCH = 40 CHAINS



FEB 10 1985

TOWNSHIP

**CAIRO**

M.N.R. ADMINISTRATIVE DISTRICT  
 KIRKLAND LAKE  
 MINING DIVISION  
 LARDER LAKE  
 LAND TITLES / REGISTRY DIVISION  
 TIMISKAMING

Ministry of Natural Resources  
 Land Management Branch  
 Ontario

Date JANUARY 1985

Number

**G-3209**



42A815W0056 2.9854 HOLMES

NOTES

400' surface rights reservation along the shores of all lakes and rivers.

The subdivision of this Township into lots and concessions is partially annulled, December 3rd 1963

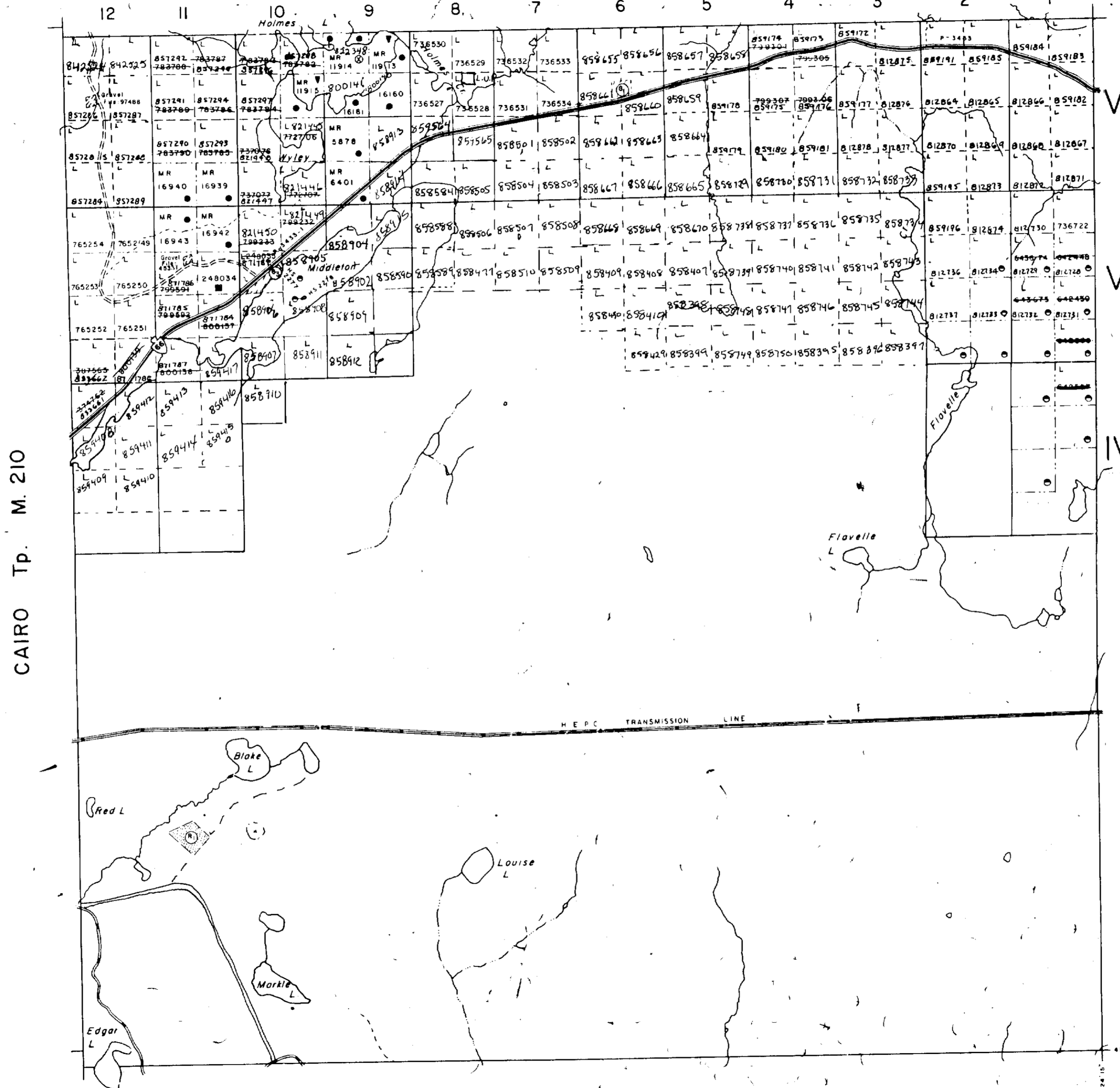
- ④ M.T.C. Gravel Pit 203
- ⑤ M.T.C. Pit 1394

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
④ SEC. 36/80	W. 93/84	8/6/84	M.B.S.	

HOLMES Tp. M. 224

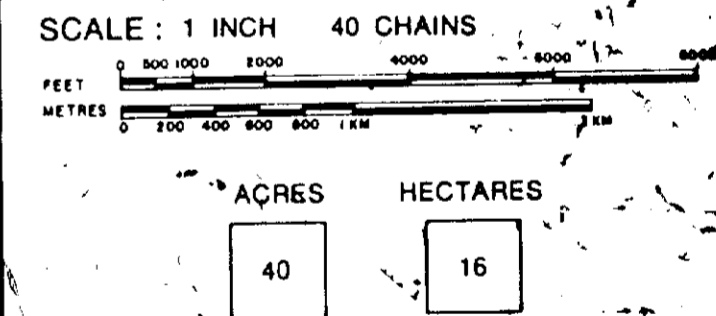


LEGEND

- 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
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES

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	
CROWN LAND SALE	
ORDER-IN-COUNCIL	
RESERVATION	
CANCELLED	
SAND & GRAVEL	



TOWNSHIP *Jan. 8/86*  
**FLAVELLE**  
 DISTRICT  
 TIMISKAMING  
 MINING DIVISION  
 L'ARDER LAKE

Ministry of Natural Resources #4  
 Ontario Surveys and Mapping Branch

Date Feb '73      Plan No. **M. 220**  
 Whitney Block  
 Queen's Park, Toronto



**NOTES**

400' surface rights reservation along the shores of all lakes and rivers.

The subdivision of this Township into lots and concessions is partially annulled. December 3rd 1963

- ④ M.T.C. Gravel Pit 203
- ④ M.T.C. Pit 1394

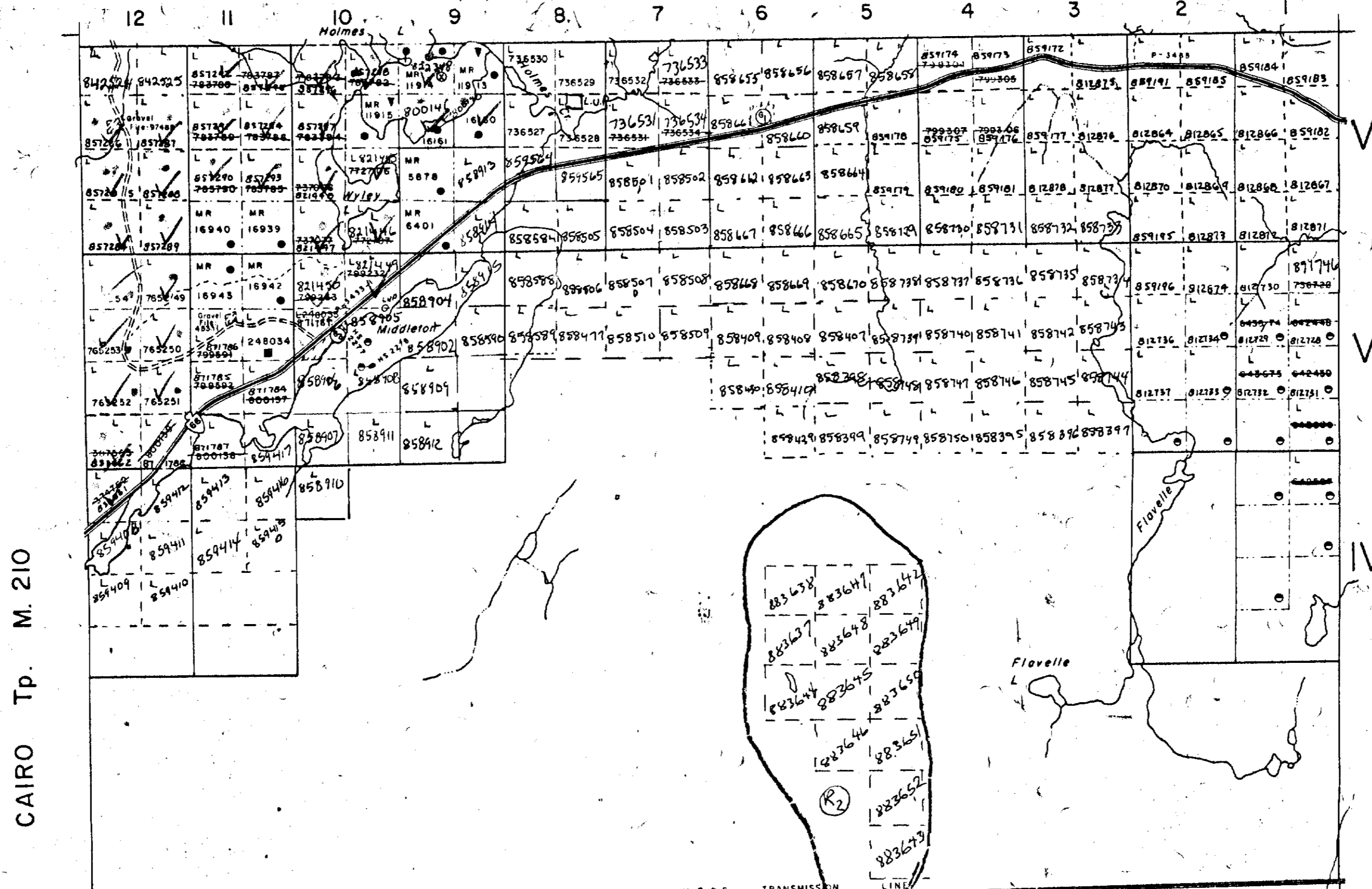
**AREAS WITHDRAWN FROM DISPOSITION**

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

Description	Order No.	Date	Disposition	File
④ SEC. 36/80	W. 93/84	8/6/84	M. & S.	

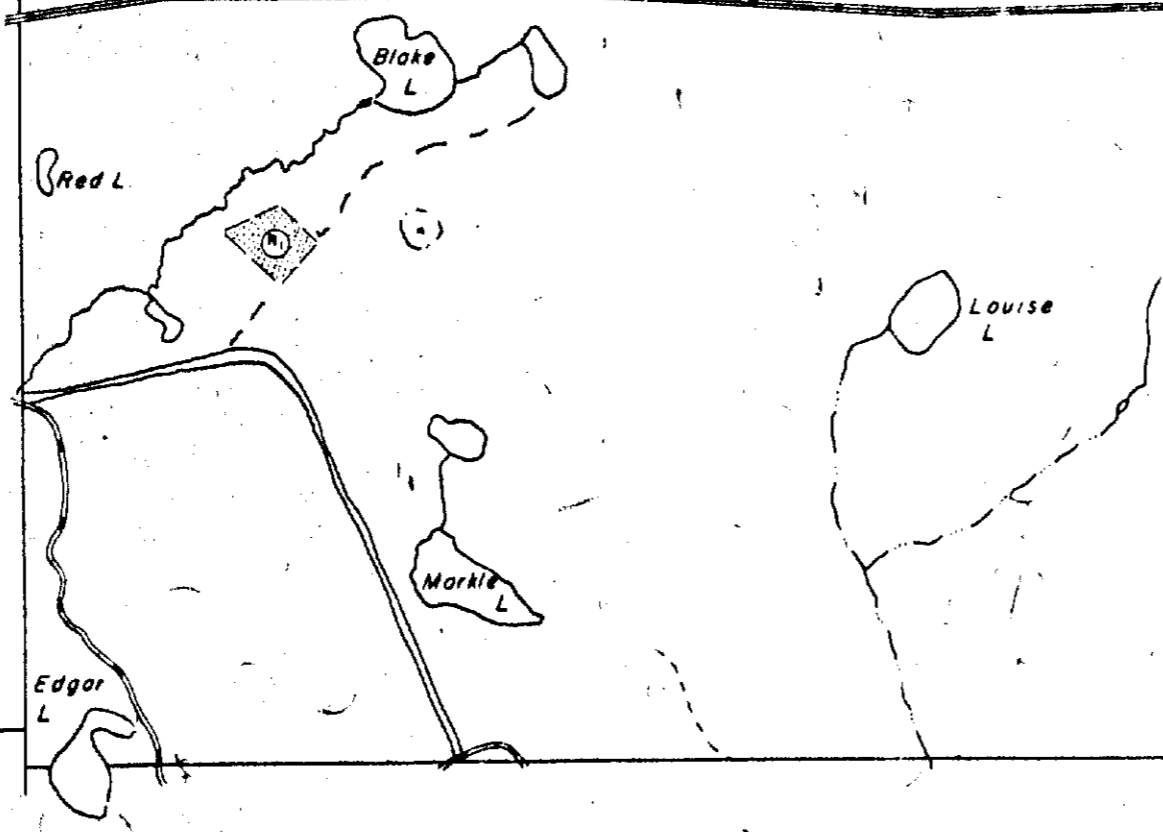
④ Lands Sub to Sec. 31(b) of The Mining Act, R.S.O. 1980 Feb 11, 1984 @ 3:07 pm. (mrs)

**HOLMES Tp. M. 224**



CAIRO Tp. M. 210

GROSS Tp. M. 487



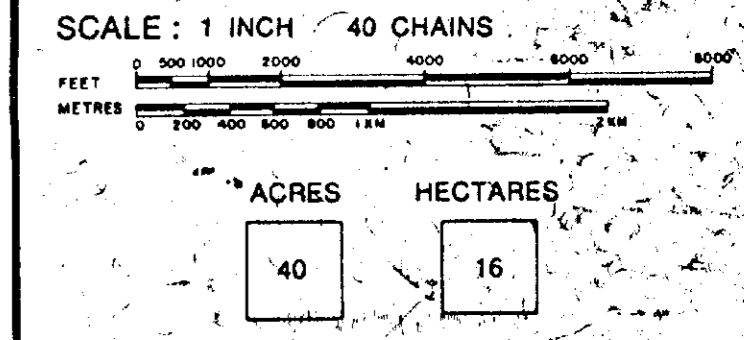
**WILLISON Tp. M. 259**

**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
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES

**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	▼
CROWN LAND SALE	CS
ORDER-IN-COUNCIL	OC
RESERVATION	⊙
CANCELLED	⊖
SAND & GRAVEL	⊗



TOWNSHIP JUN 20 1986  
**FLAVELLE**  
 DISTRICT  
 TIMISKAMING  
 MINING DIVISION  
 LARDER LAKE

Ministry of Natural Resources # 4  
 Ontario Surveys and Mapping Branch

Date Feb '73 Plan No. M. 220

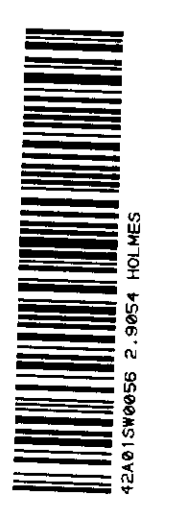
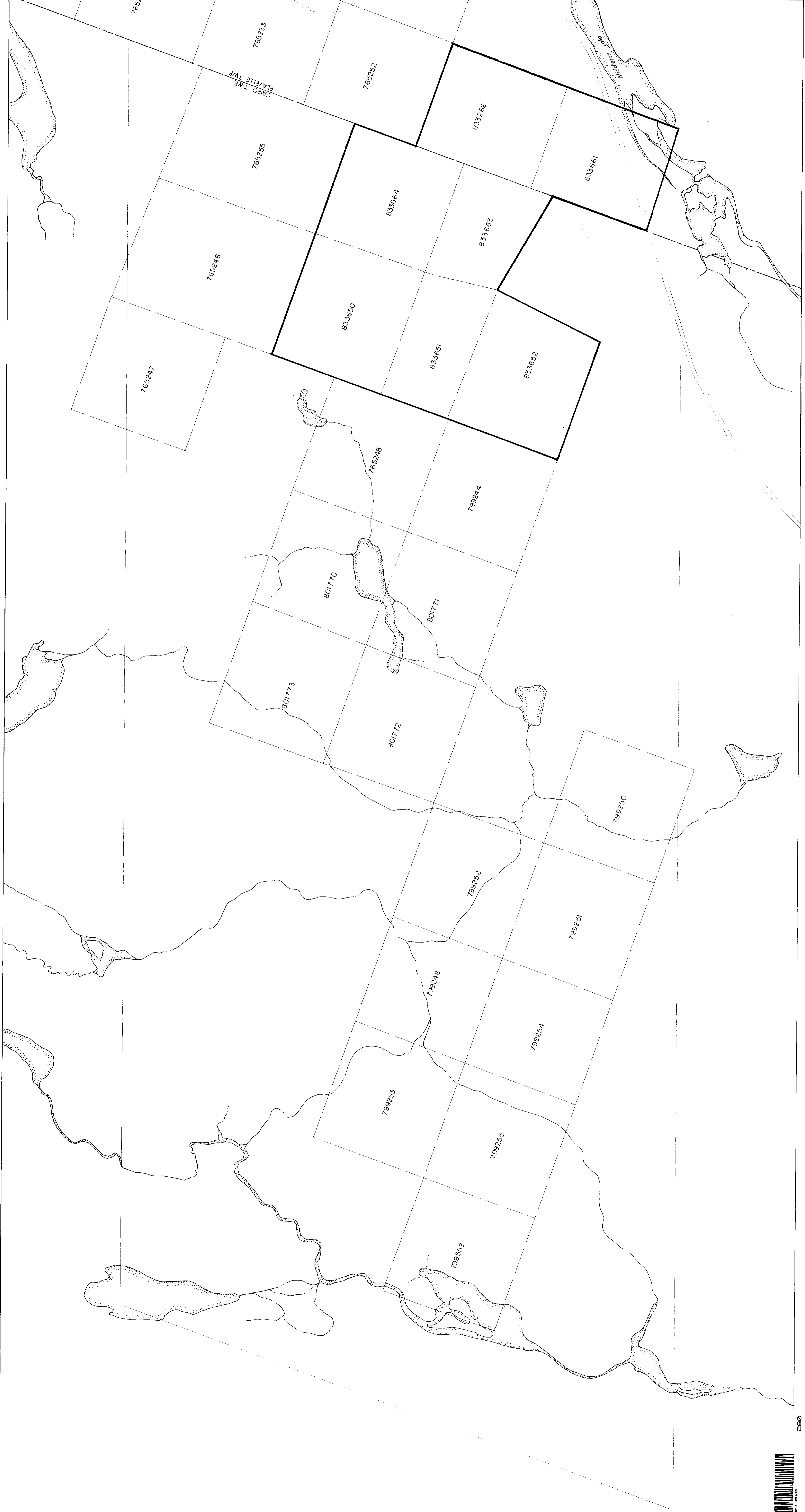


42A015W0056 2.9054 HOLMES



FALCONBRIDGE LTD/LIÉE  
HOLMES-FLAVELLE TOWNSHIPS  
PN-625,628  
CAIRO TWP., MAP 1  
CLAIMS MAP

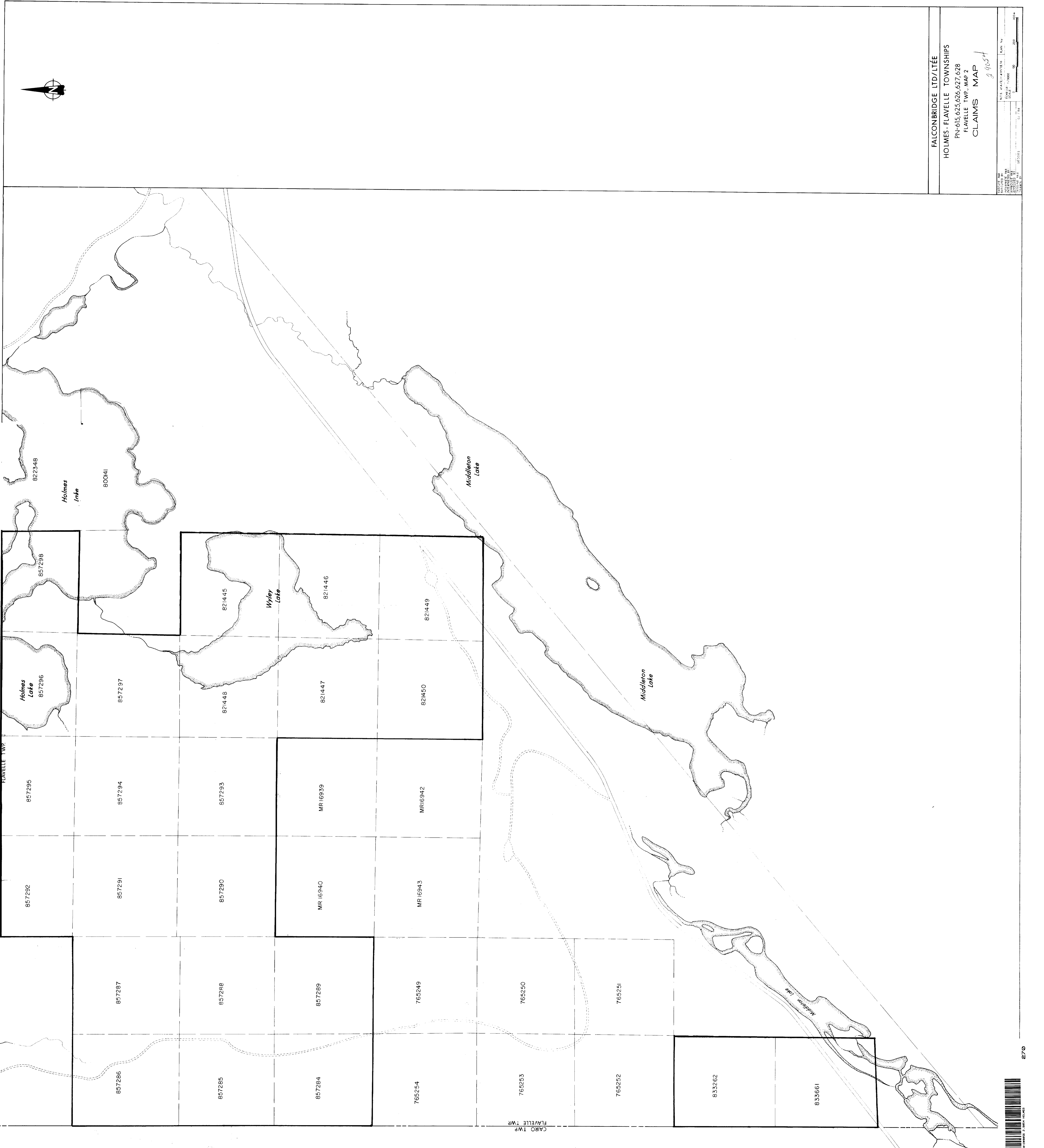
09/18  
SCALE 1:200  
200'  
300'  
400'  
500'





FALCONBRIDGE LTD/LTÉE  
 HOLMES - FLAVELLE TOWNSHIPS  
 PN-615,625,626,627,628  
 FLAVELLE TWP. MAP 2  
 CLAIMS MAP

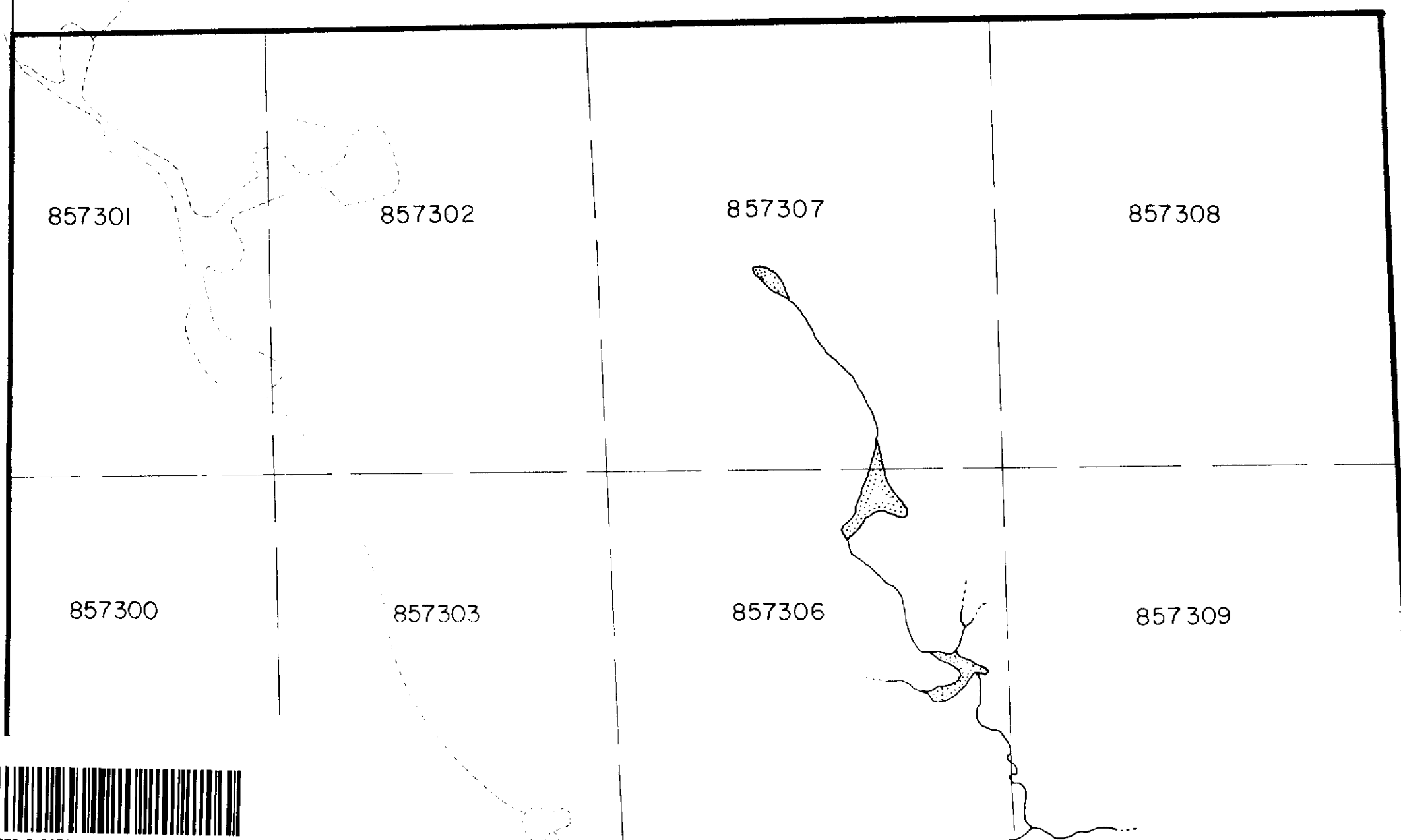
REGISTRY NO. 10000000000000000000  
 PLAN NO. 10000000000000000000  
 SCALE 1:10000  
 DATE 08/2014







ALMA TWP.  
HOLMES TWP.



FALCONBRIDGE LTD/LTÉE  
HOLMES - FLAVELLE TOWNSHIPS  
PN-615  
HOLMES TWP., MAP4  
CLAIMS MAP *29654*



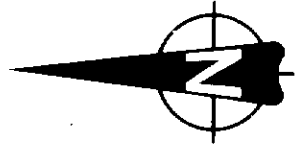
290

EXÉCUTÉ PAR:	NTS 42A/2.1	PLAN No:
ENQUÊTEUR:		
INTÉPRÉTÉ PAR:	ÉCHELLE:	
APPROUVÉ PAR:	SCALE:	
DESIGNÉ PAR:	0	100 200 300m
DRAWN BY:	GÉODÈS	03 / 86





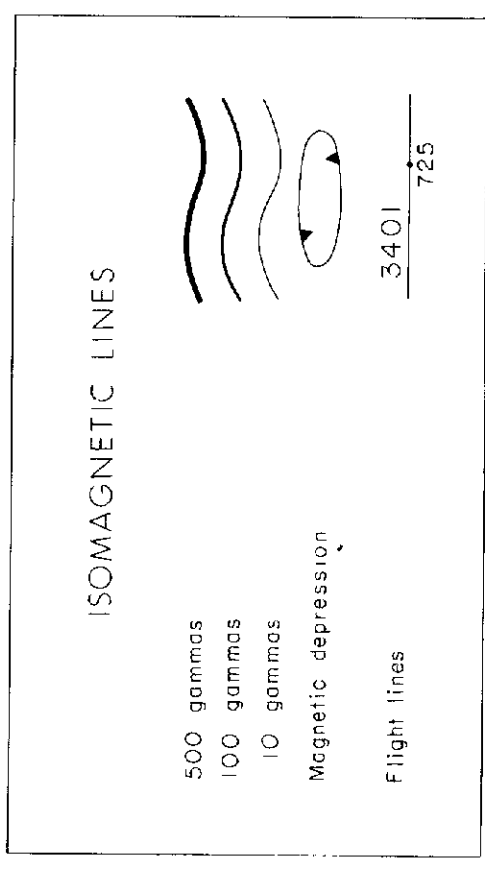




# HOLMES - FLAVELLE TOWNSHIPS

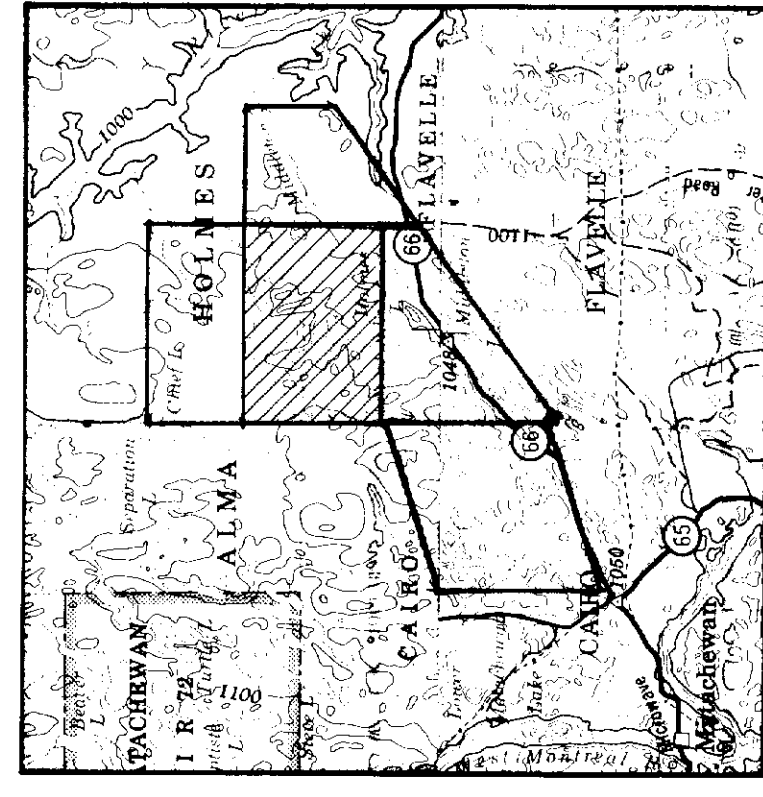
AEROMAGNETIC TOTAL FIELD MAP

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986



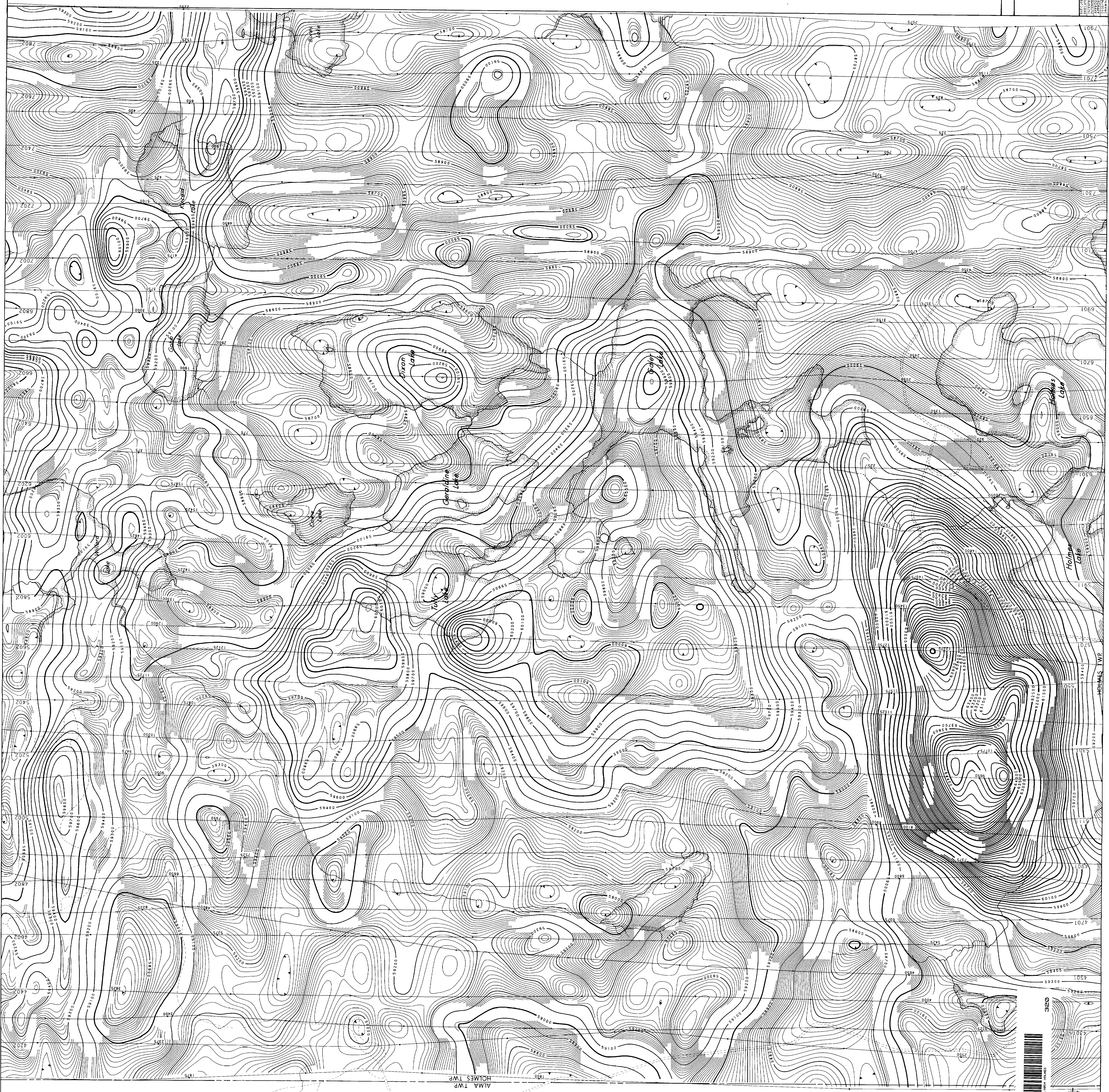
LES RELIÉS GÉOPHYSIQUES INC.

This survey was taken with the REMOTE AREA SYSTEM (RAS) a system of instruments for measurement of the vertical magnetic gradient. The instruments are based on the principle of the Faraday effect. The instruments are based on the principle of the Faraday effect. The instruments are based on the principle of the Faraday effect.



FALCONBRIDGE LTD/LTÉE  
HOLMES - FLAVELLE TOWNSHIPS  
PN 615,624,627  
HOLMES TWP., MAP 3

PROJECT NO.	615,624,627	PLAN NO.	
DATE OF SURVEY	1986	SCALE	1:50,000
PROJECT NAME	HOLMES TWP.	DATE OF COMPILATION	1986
PROJECT AREA	HOLMES TWP.	DATE OF PRINTING	1986



ALMA TWP.  
CARBONATE



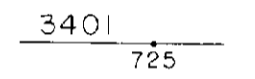


# HOLMES - FLAVELLE TOWNSHIPS

AEROMAGNETIC TOTAL FIELD MAP

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

29054

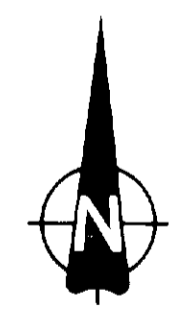
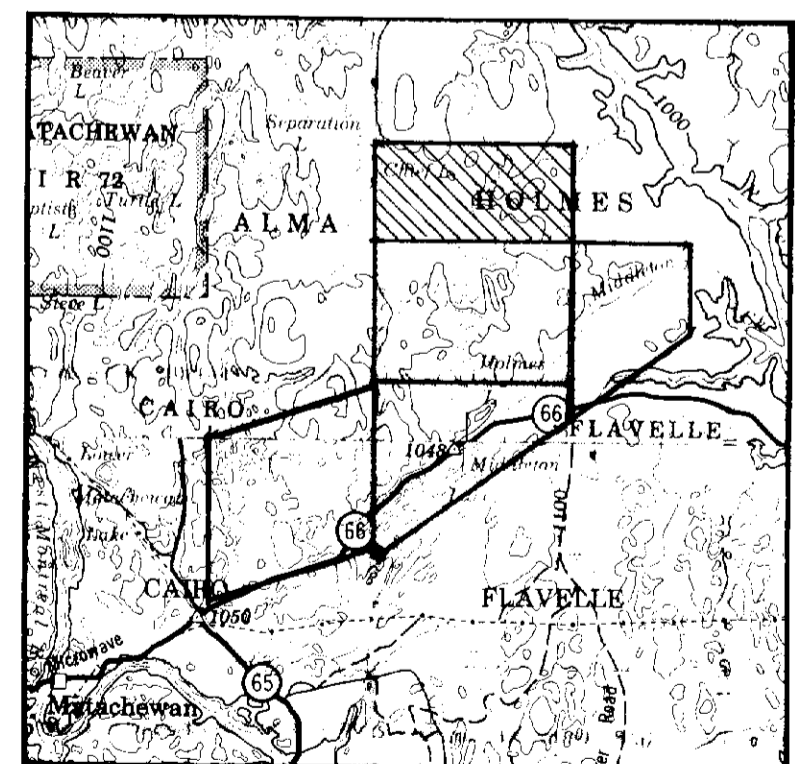
ISOMAGNETIC LINES

- 500 gammas 
- 100 gammas 
- 10 gammas 
- Magnetic depression 
- Flight lines 

This survey was flown with the REXHEM-4 system combined with a gradiometer for measurement of the vertical magnetic gradient.

The instrumentation includes an EMEX-1 from Geotech Ltd., a VLF system TOTEM-2A from Hex Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EMEX-1 bird shields - two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 639 and 4317 Hz for the coaxial, 876 and 4972 Hz for the coplanar coils.

The two magnetometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three V-200 Scintrex cesium vapour magnetometers.




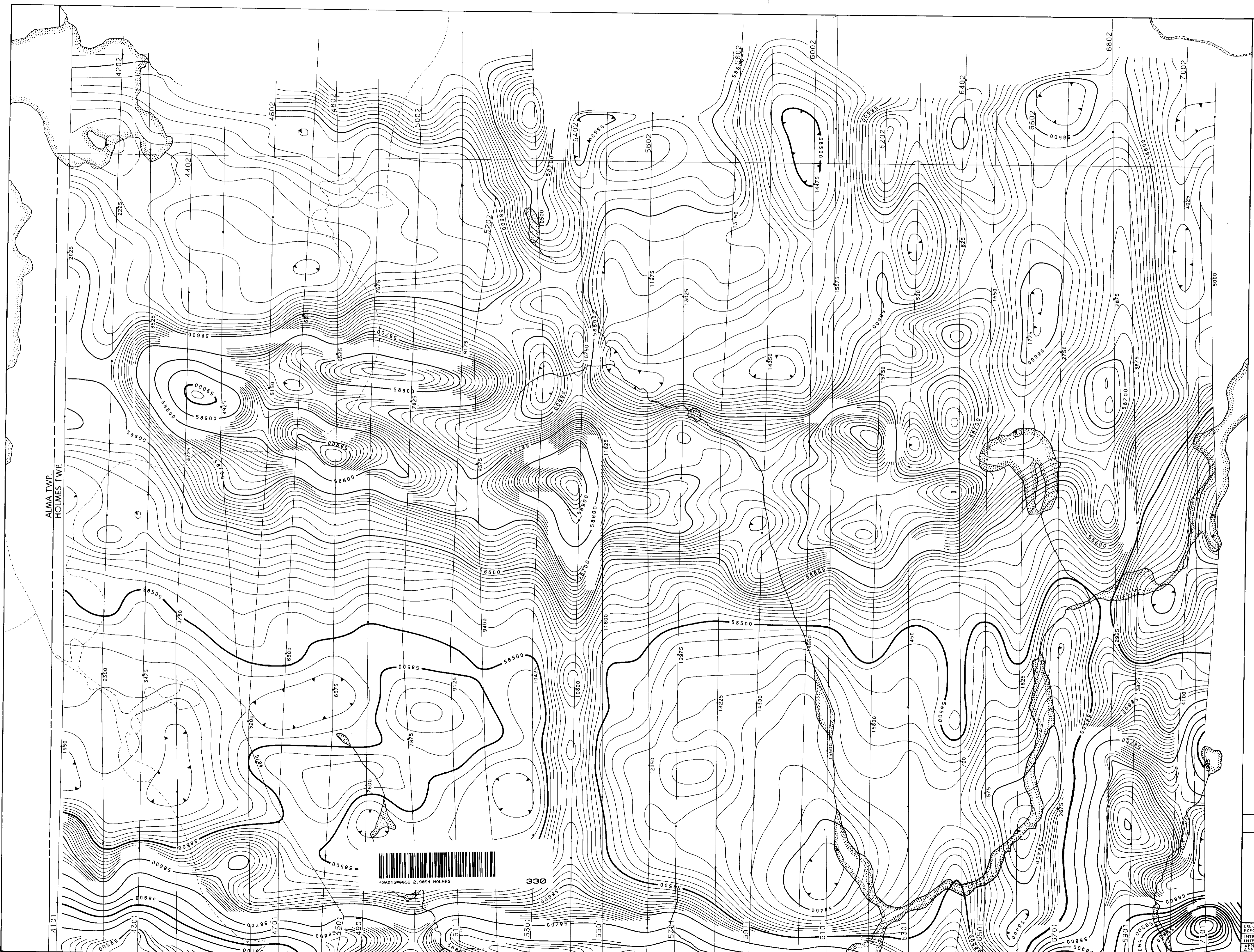
FALCONBRIDGE LTD/LTÉE

HOLMES-FLAVELLE TOWNSHIPS  
PN-615  
HOLMES TWP., MAP 4

EXECUTE PAR: \_\_\_\_\_  
 EXECUTED BY: \_\_\_\_\_  
 INTERPRETE PAR: \_\_\_\_\_  
 APPROUVE PAR: \_\_\_\_\_  
 DESINE PAR: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_

N.T.S. 42 A / 2.1  
 ÉCHELLE: 1/5000  
 SCALE: 1" = 100m

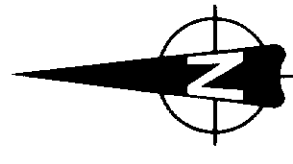
PLAN No: \_\_\_\_\_

330

ALMA TWP.  
HOLMES TWP.





# HOLMES - FLAVELLE TOWNSHIPS

AEROMAGNETIC VERTICAL GRADIENT MAP

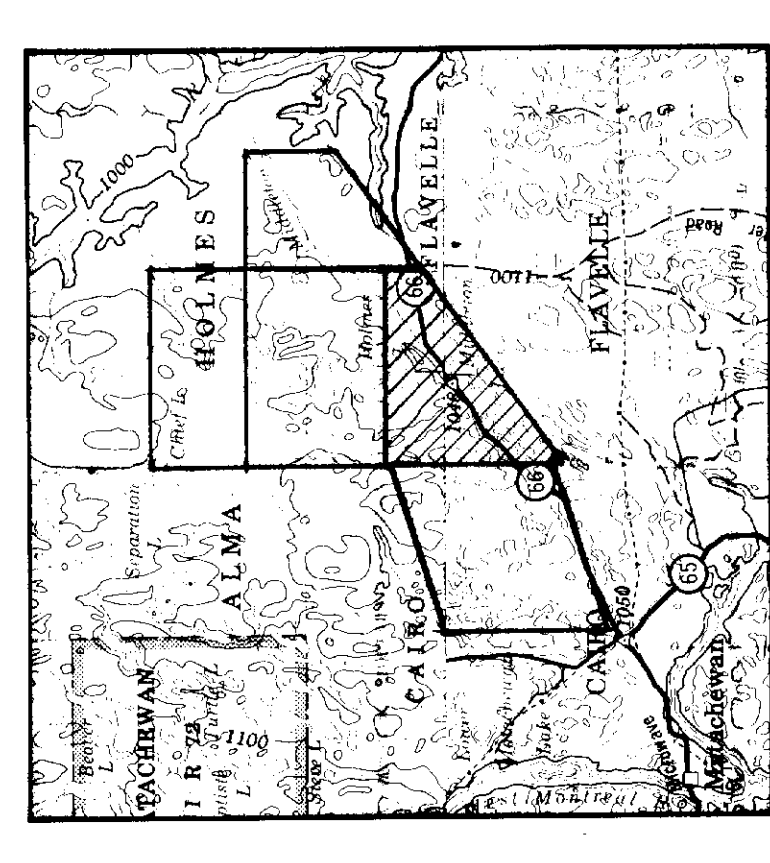
SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

ISOMAGNETIC LINES

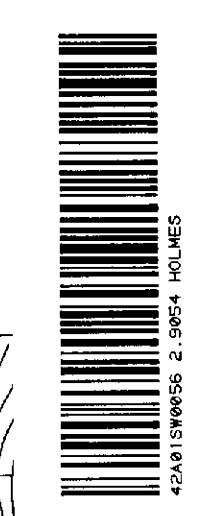
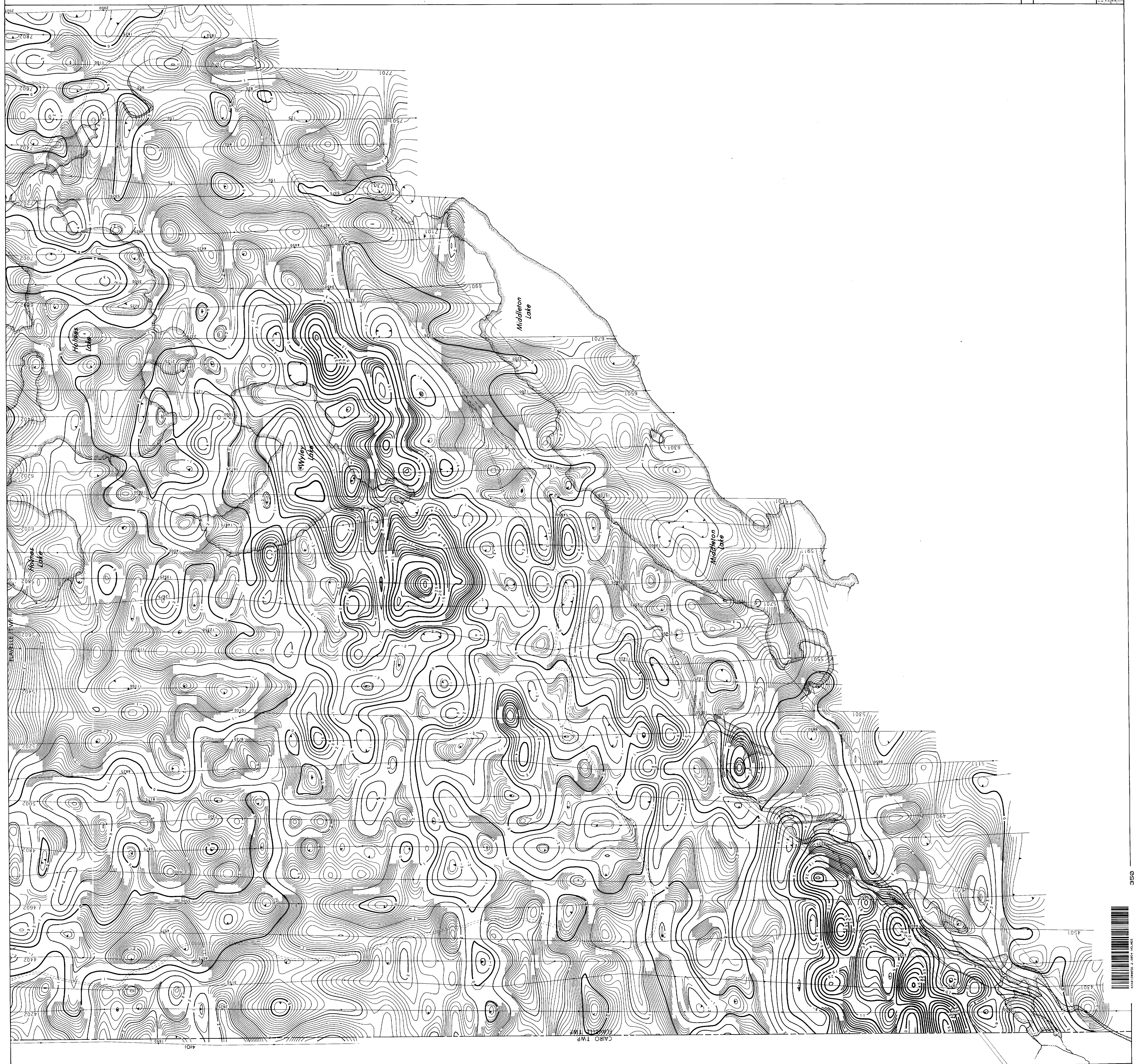
5 gammas/meter  
1 gammas/meter  
Magnetic depression  
Flight lines

LES RELEVÉS GÉOPHYSIQUES INC.

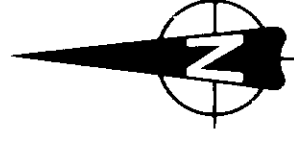
This survey was flown with the REMUM 4 system combined with a  
 precision for measurement of the vertical magnetic gradient.  
 The system consists of an EMU 1 from Geometrics Ltd., a 400  
 MHz magnetometer, a 400 MHz receiver, a 400 MHz transmitter,  
 and a 400 MHz antenna. The system is capable of measuring  
 magnetic intensity, magnetic declination, and the vertical  
 magnetic gradient. The system is also capable of measuring  
 the horizontal magnetic gradient. The system is also capable  
 of measuring the magnetic field strength. The system is also  
 capable of measuring the magnetic field direction. The system  
 is also capable of measuring the magnetic field magnitude.



FALCONBRIDGE LTD/LTÉE  
 HOLMES - FLAVELLE TOWNSHIPS  
 PN-615,625,626,627,628  
 FLAVELLE TWP., MAP 2



3950

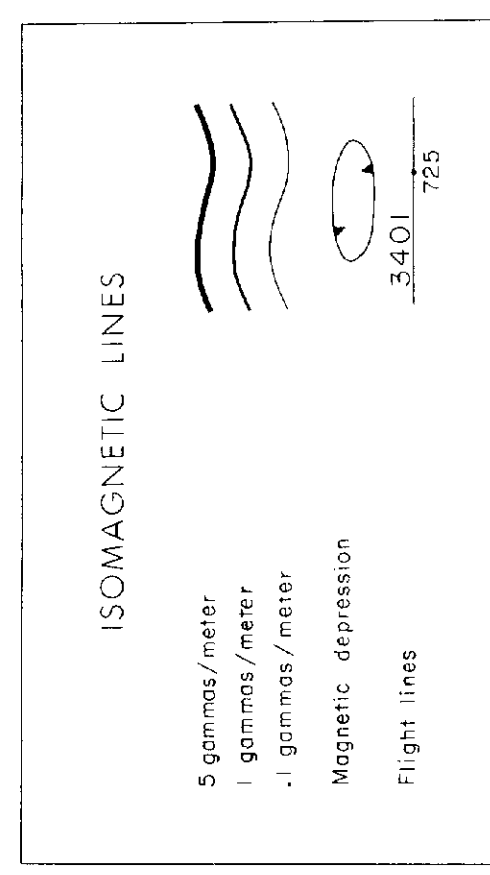


# HOLMES - FLAVELLE TOWNSHIPS

AEROMAGNETIC VERTICAL GRADIENT MAP

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.

1986

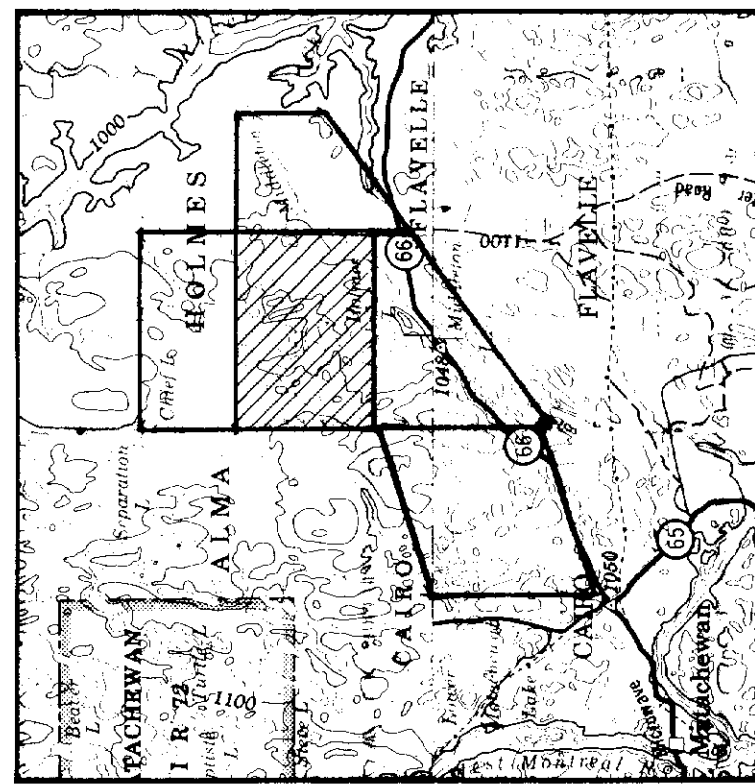


LES REVENUS GÉOPHYSIQUES INC.

This survey was flown with the REMUM-4 system combined with a parametric for measurement of the vertical magnetic gradient.

The data were collected on a flight from October 1984, a 70% coverage of the area. The data were processed and the magnetic field was derived from the data. The data were then processed and the magnetic field was derived from the data. The data were then processed and the magnetic field was derived from the data.

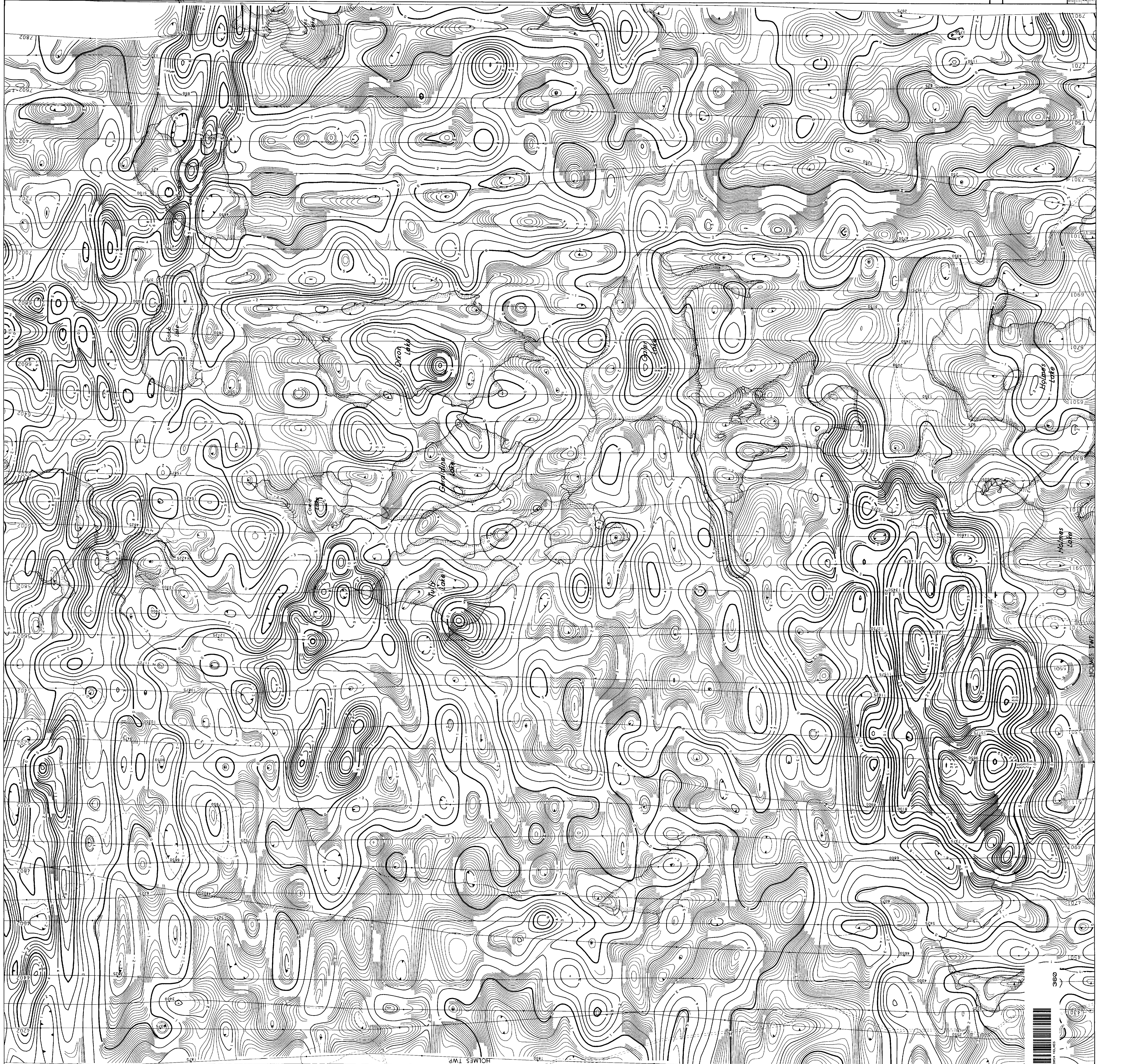
The data were processed and the magnetic field was derived from the data. The data were then processed and the magnetic field was derived from the data. The data were then processed and the magnetic field was derived from the data.



FALCONBRIDGE LTD/LTÉE

HOLMES - FLAVELLE TOWNSHIPS  
PN-015.624.627  
HOLMES TWP. MAP3

PROJECT NO.	MAP NO.
DATE OF SURVEY	SCALE 1:5000
PROJECT NAME	DATE OF COMPILATION
PROJECT LOCATION	PROJECT AREA
PROJECT STATUS	PROJECT TYPE



ALMA TWP  
HOLMES TWP

# HOLMES - FLAVELLE TOWNSHIPS

AEROMAGNETIC VERTICAL GRADIENT MAP

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

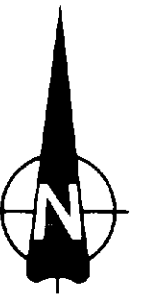
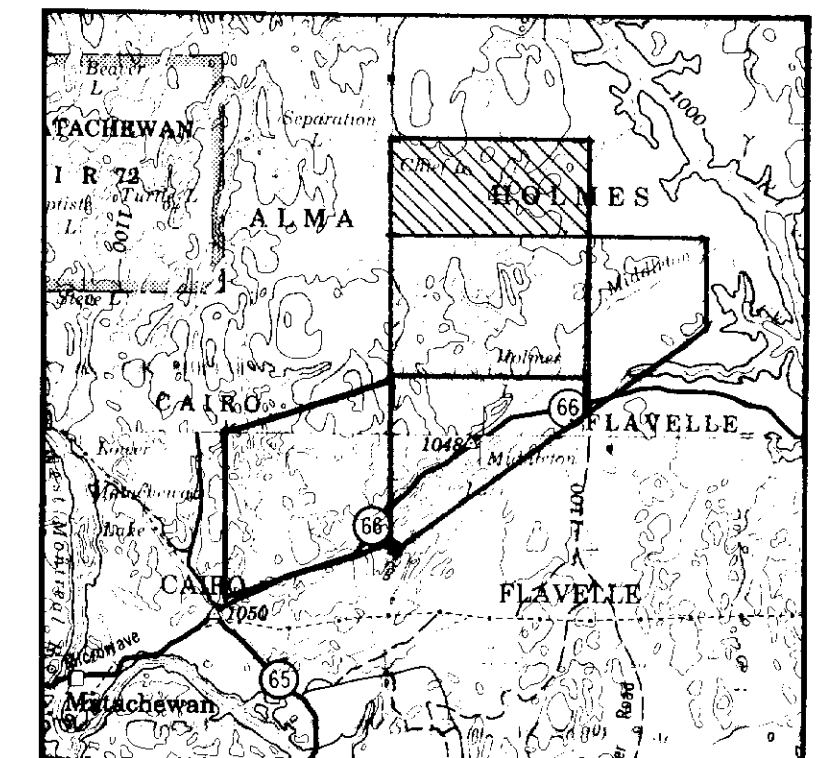
ISOMAGNETIC LINES

5 gammas/meter	
1 gammas/meter	
.1 gammas/meter	
Magnetic depression	
Flight lines	

This survey was flown with the REXHEM-4 system combined with a gradiometer for measurement of the vertical magnetic gradient.

The instrumentation includes an EHEX-1 from Geotech Ltd., a VIF system TOTEM-2A from Hertz Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EHEX-1 bird shell; two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 639 and 4517 Hz for the coaxial, 875 and 4972 Hz for the coplanar coils.

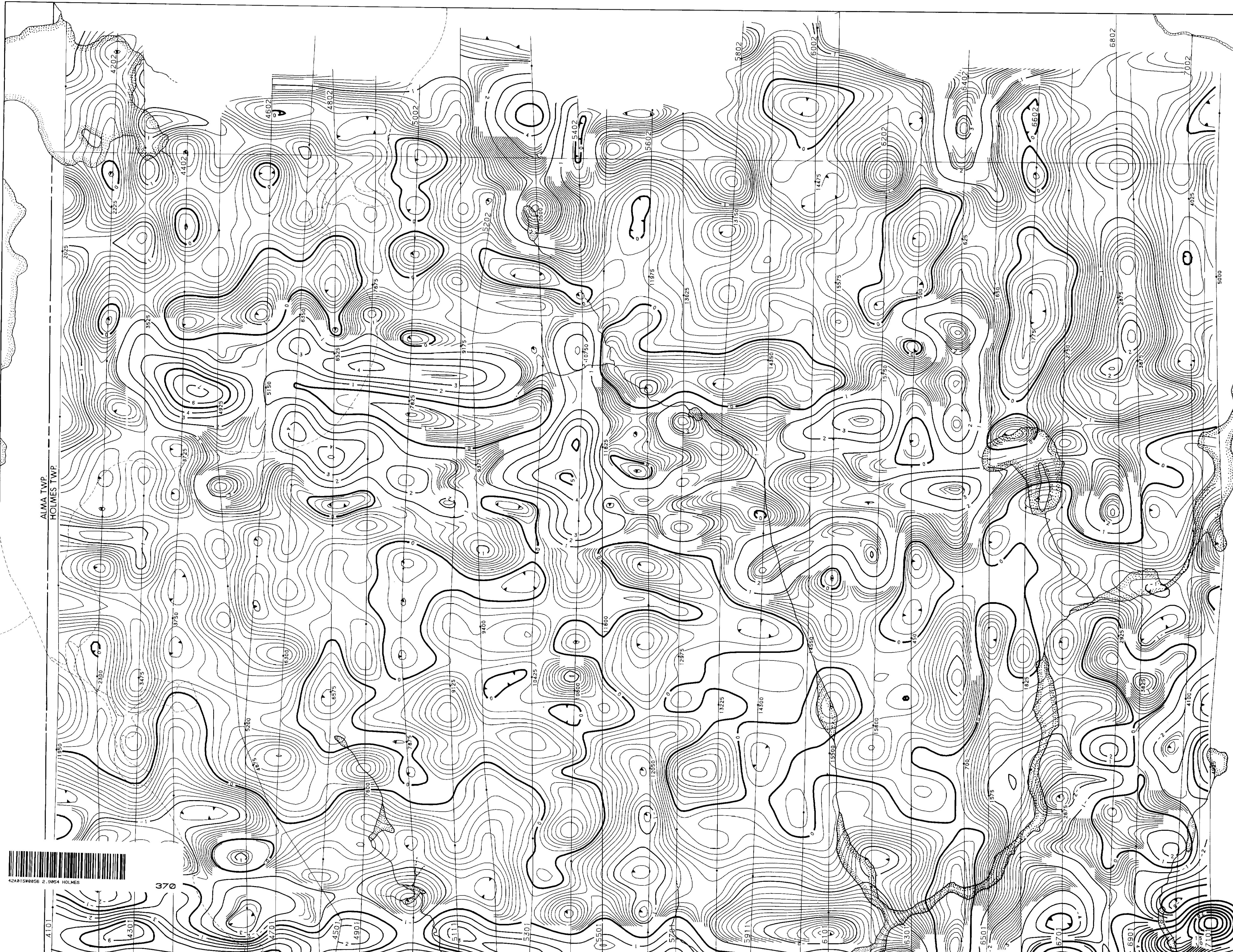
The two magnetometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three V-100 Scintrex cesium vapour magnetometers.



FALCONBRIDGE LTD/LTÉE

HOLMES-FLAVELLE TOWNSHIPS  
PN-615  
HOLMES TWP., MAP 4

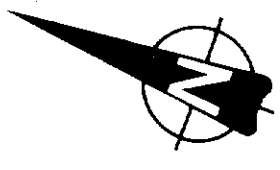
EXECUTÉ PAR: \_\_\_\_\_ NTS: 42/2.1 PLAN No: \_\_\_\_\_  
 INTERPRÉTÉ PAR: \_\_\_\_\_  
 APPROUVÉ PAR: \_\_\_\_\_  
 DRESSÉ PAR: \_\_\_\_\_  
 ÉCHELLE: 1/5000  
 SCALE: 1:5000  
 0 100 200 300m



ALMA TWP.  
HOLMES TWP.

370

4101



# HOLMES - FLAVELLE TOWNSHIPS

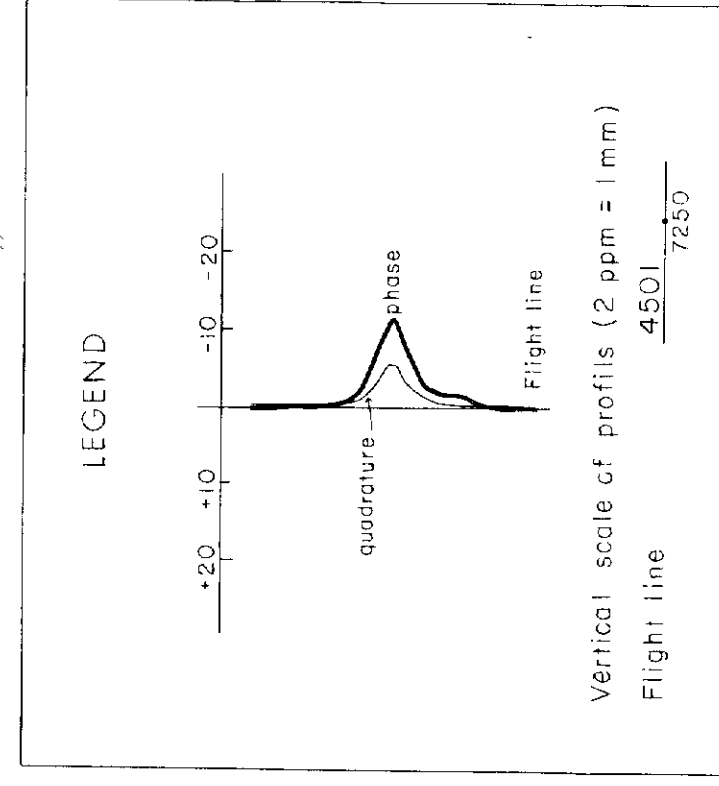
PHASE AND QUADRATURE PROFILES OF  
THE ELECTROMAGNETIC FIELD MAP

COAXIAL COILS 4317 HZ

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.

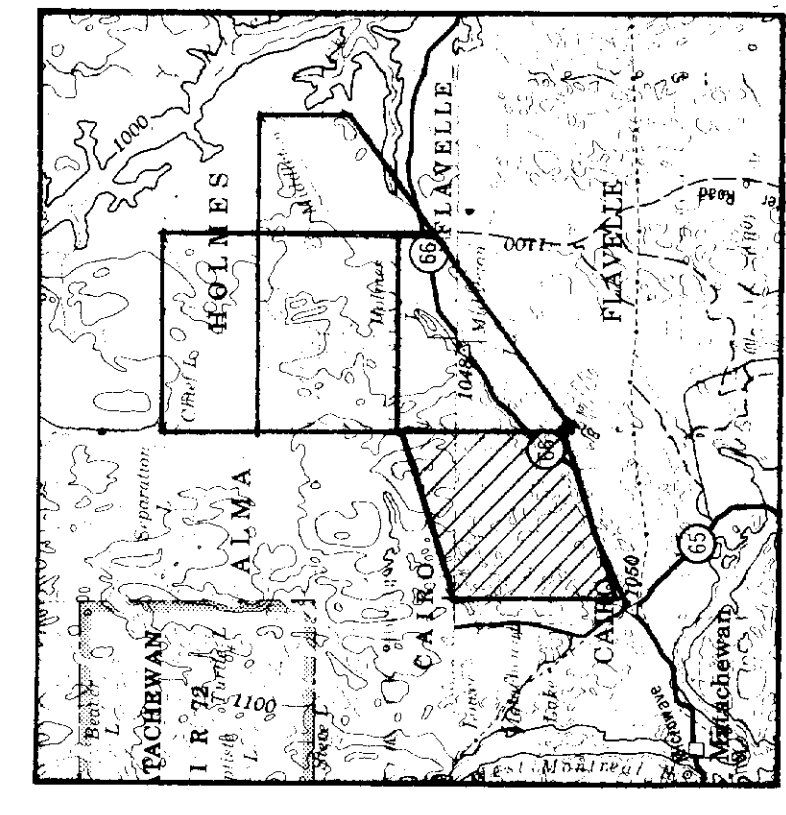
1986

3054



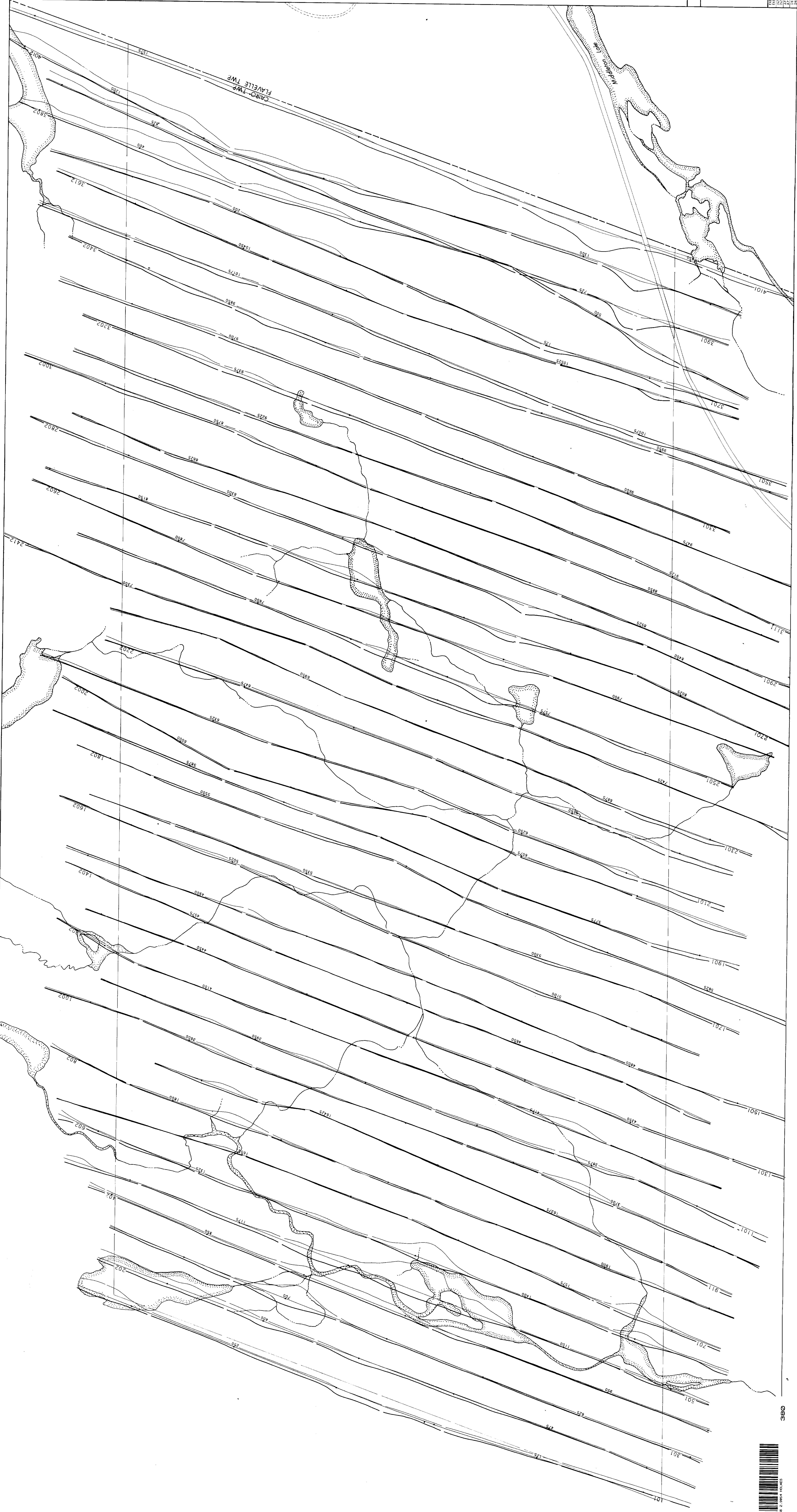
LES RELIEVES GEOPHYSIQUES INC.

This survey was flown with the REMEM-4 system combined with a  
 phase and quadrature measurement of the vertical magnetic gradient.  
 The instrumentation includes an EM-101 from Geotrol Ltd., a VLF  
 transmitter from Geotrol Ltd., a phase and quadrature data ac-  
 quisition system from Geotrol Ltd., and a computer system from  
 Geotrol Ltd. The data was processed and plotted on a standard map  
 grid at the 1:50,000 scale. The phase and quadrature data were  
 processed and plotted on a standard map grid at the 1:50,000 scale.  
 The phase and quadrature data were processed and plotted on a  
 standard map grid at the 1:50,000 scale. The phase and quadrature  
 data were processed and plotted on a standard map grid at the  
 1:50,000 scale. The phase and quadrature data were processed  
 and plotted on a standard map grid at the 1:50,000 scale.

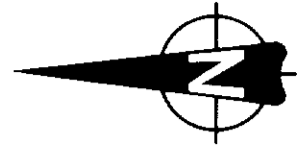


FALCONBRIDGE LTD/LTÉE  
 HOLMES - FLAVELLE TOWNSHIPS  
 PN-625,628  
 CAIRO TWP., MAP 1

PROJECT NO.  
 SHEET NO.  
 SCALE 1:50,000  
 DATE





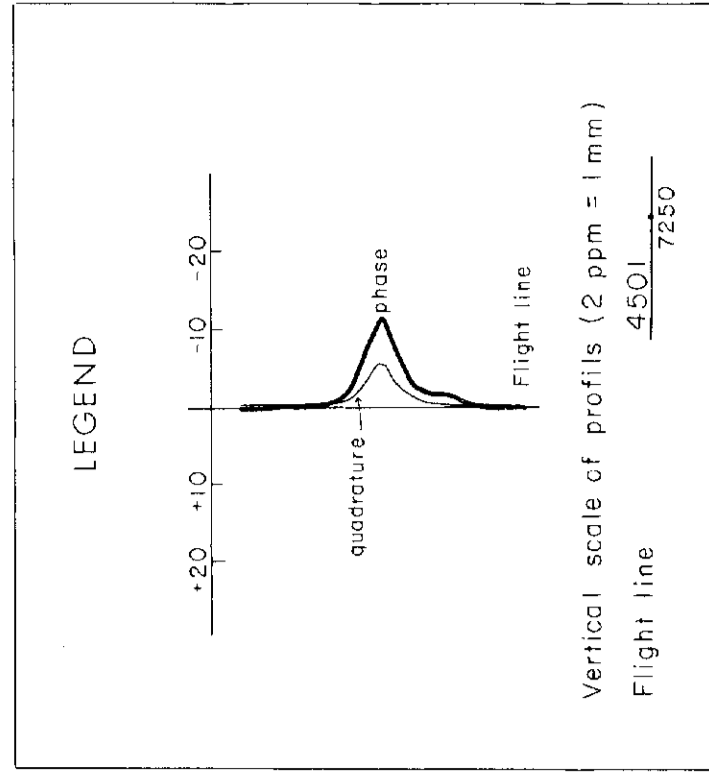


# HOLMES - FLAVELLE TOWNSHIPS

## PHASE AND QUADRATURE PROFILES OF THE ELECTROMAGNETIC FIELD MAP

COAXIAL COILS 4317 Hz

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

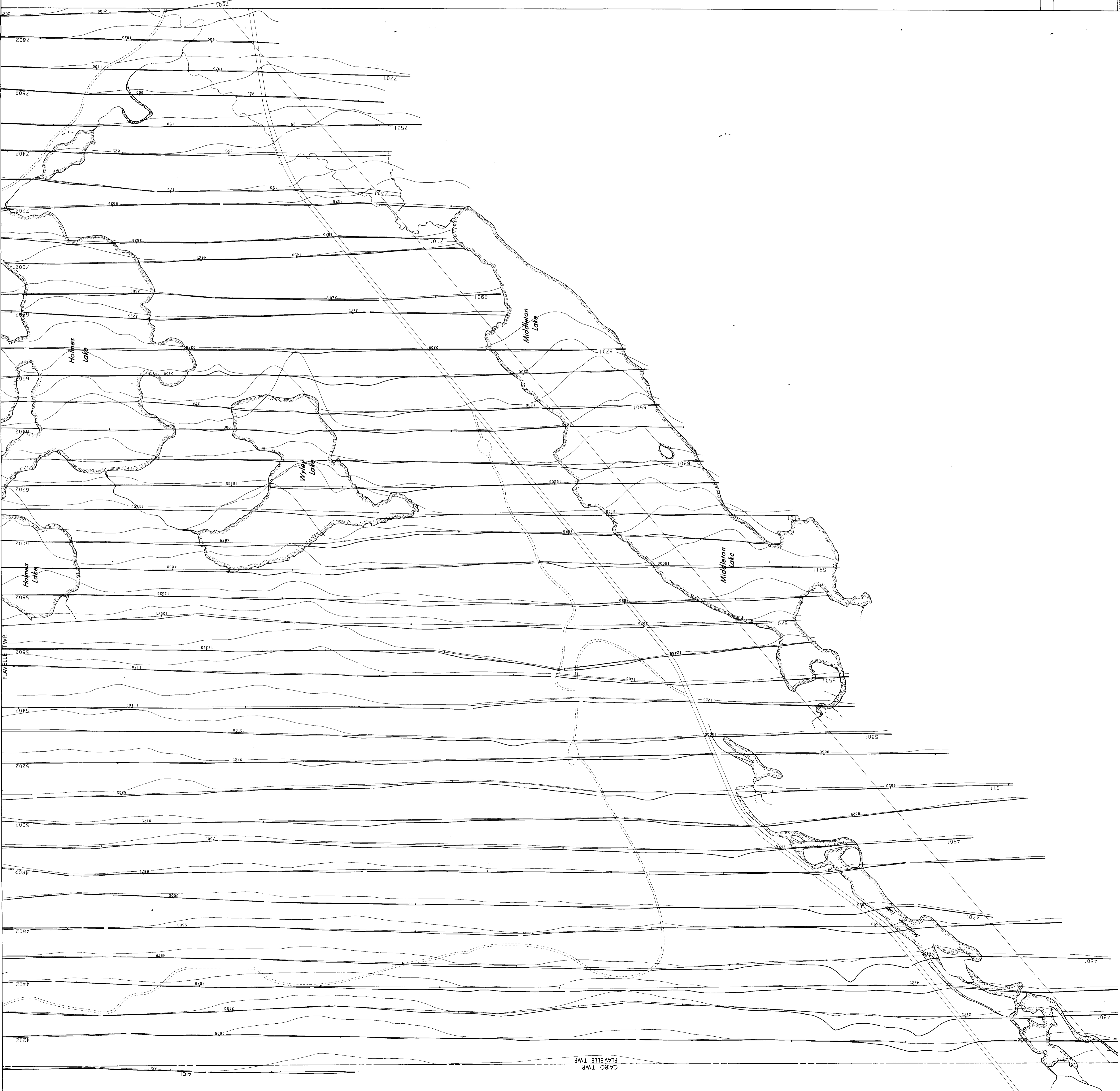
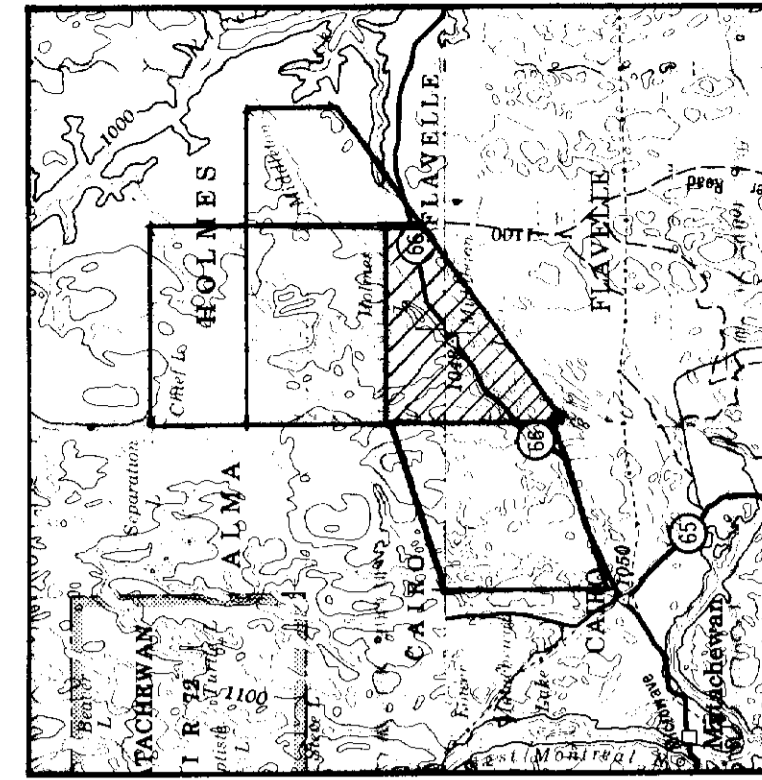


LES RELIÉS GÉOPHYSIQUES INC.

This survey was flown with the REMUM-4 system combined with a magnetometer for measurement of the vertical magnetic gradient.

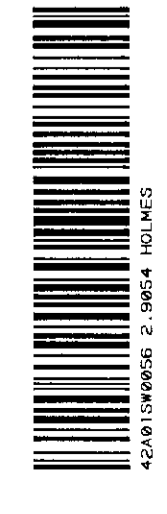
The system was calibrated on 08/07/86 from 0800 to 1000. A 20% correction was applied to the data. The data was processed with the REMUM-4 software. The data was then plotted on a grid. The data was then processed with the REMUM-4 software. The data was then plotted on a grid. The data was then processed with the REMUM-4 software. The data was then plotted on a grid.

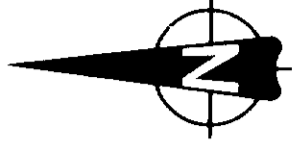
The data was processed with the REMUM-4 software. The data was then plotted on a grid. The data was then processed with the REMUM-4 software. The data was then plotted on a grid. The data was then processed with the REMUM-4 software. The data was then plotted on a grid.



FALCONBRIDGE LTD./LITEE  
HOLMES - FLAVELLE TOWNSHIPS  
PN-615,625,626,627,628  
FLAVELLE TWP., MAP 2

PROJECT NO. 86-01  
DATE OF SURVEY 1986  
SCALE 1:5000  
DRAWN BY  
CHECKED BY  
APPROVED BY

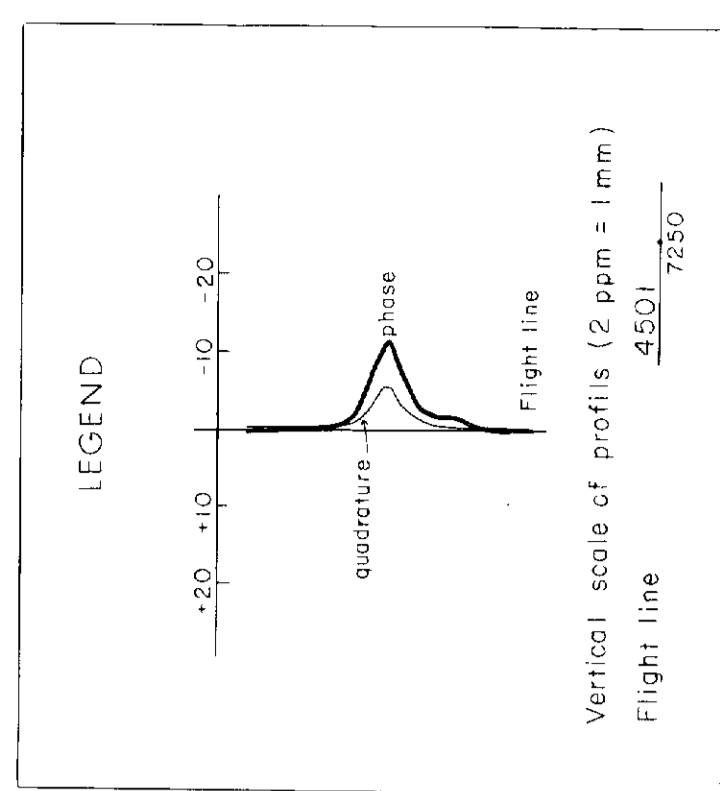




# HOLMES - FLAVELLE TOWNSHIPS

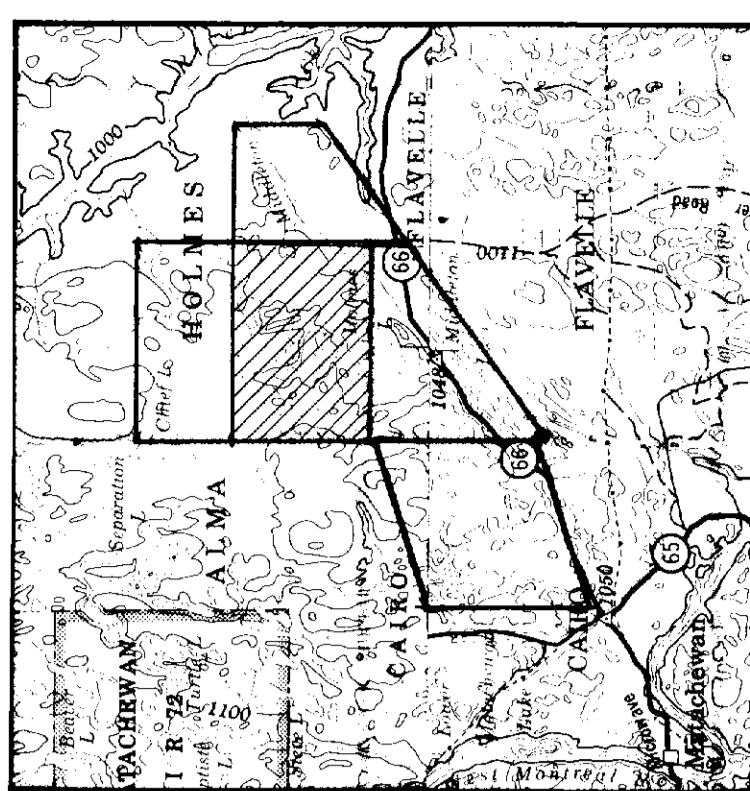
PHASE AND QUADRATURE PROFILES OF  
THE ELECTROMAGNETIC FIELD MAP  
COAXIAL COILS 4317 HZ

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986



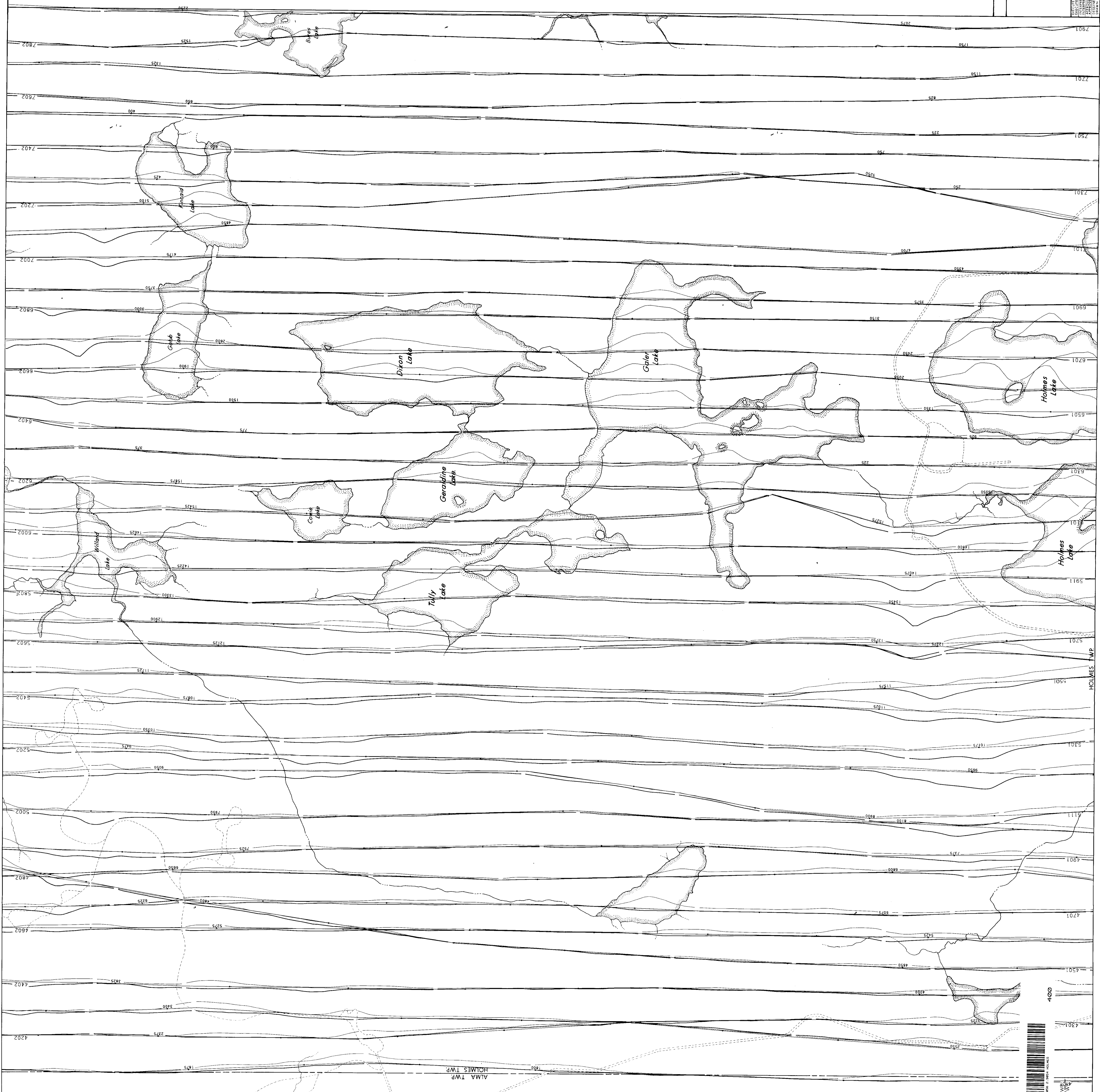
LES RELEVÉS GÉOPHYSIQUES INC.

This survey was done with the help of a grant provided with a  
subsidy for measurement of the vertical magnetic induction.  
The compensation includes an EM-1 from Geometrics Ltd., a VLF  
source from Geometrics Ltd. and a VLF receiver from Geometrics  
Ltd. The survey was done with the help of a grant provided with a  
subsidy for measurement of the vertical magnetic induction.  
The survey was done with the help of a grant provided with a  
subsidy for measurement of the vertical magnetic induction.  
The survey was done with the help of a grant provided with a  
subsidy for measurement of the vertical magnetic induction.



FALCONBRIDGE LTD/LTÉE  
HOLMES - FLAVELLE TOWNSHIPS  
PN-615,624,627  
HOLMES TWP., MAP 3

PROJECT NO.	PN-615,624,627
DATE	1986
SCALE	1:50,000
PROJECTED BY	LES RELEVÉS GÉOPHYSIQUES INC.
DATE OF SURVEY	1986
DATE OF COMPILATION	1986
DATE OF PRINTING	1986
PROJECTED BY	LES RELEVÉS GÉOPHYSIQUES INC.
DATE OF SURVEY	1986
DATE OF COMPILATION	1986
DATE OF PRINTING	1986



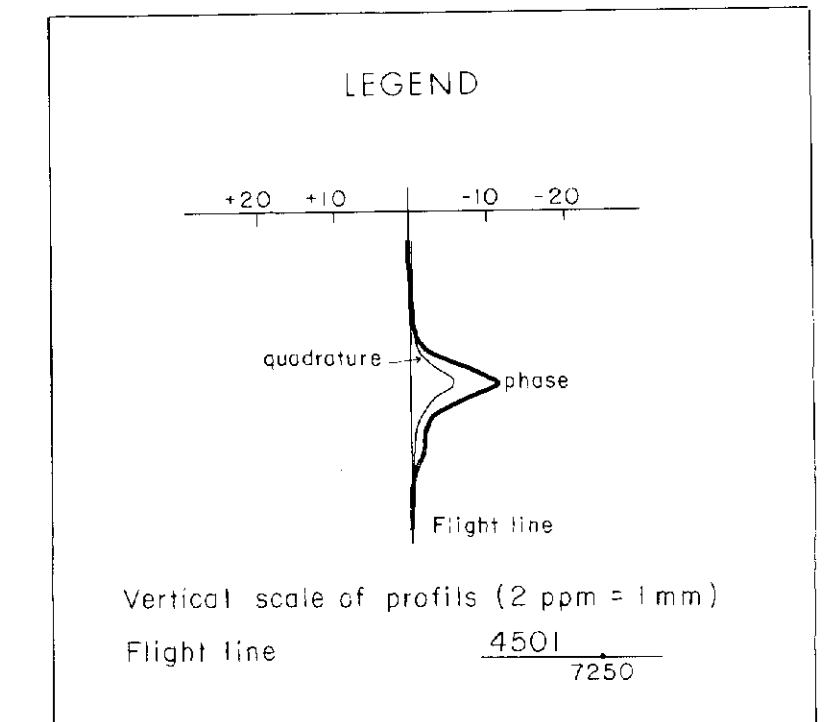
4000  
ALMA TWP.  
HOLMES TWP.

# HOLMES - FLAVELLE TOWNSHIPS

PHASE AND QUADRATURE PROFILES OF  
THE ELECTROMAGNETIC FIELD MAP  
COAXIAL COILS 4317 Hz

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

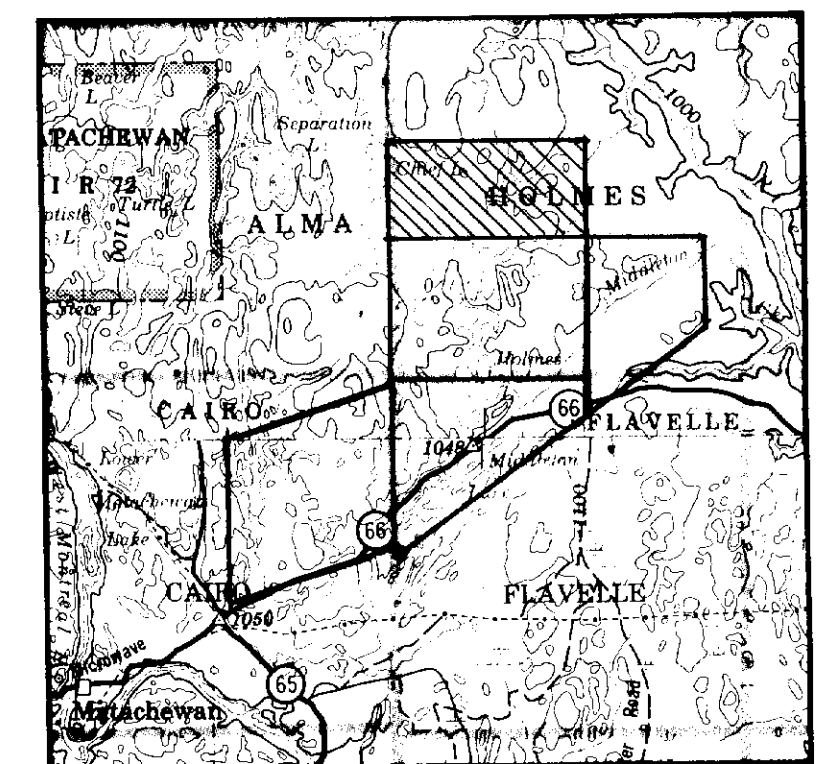
29154



This survey was flown with the REXHEM-4 system combined with a gnomometer for measurement of the vertical magnetic gradient.

The instrumentation includes an EMEX-1 from Geotech Ltd., a VLF system TOTEM-2A from Hex Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EMEX-1 bird shell; two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 839 and 4317 Hz for the coaxial, 876 and 4972 Hz for the coplanar coils.

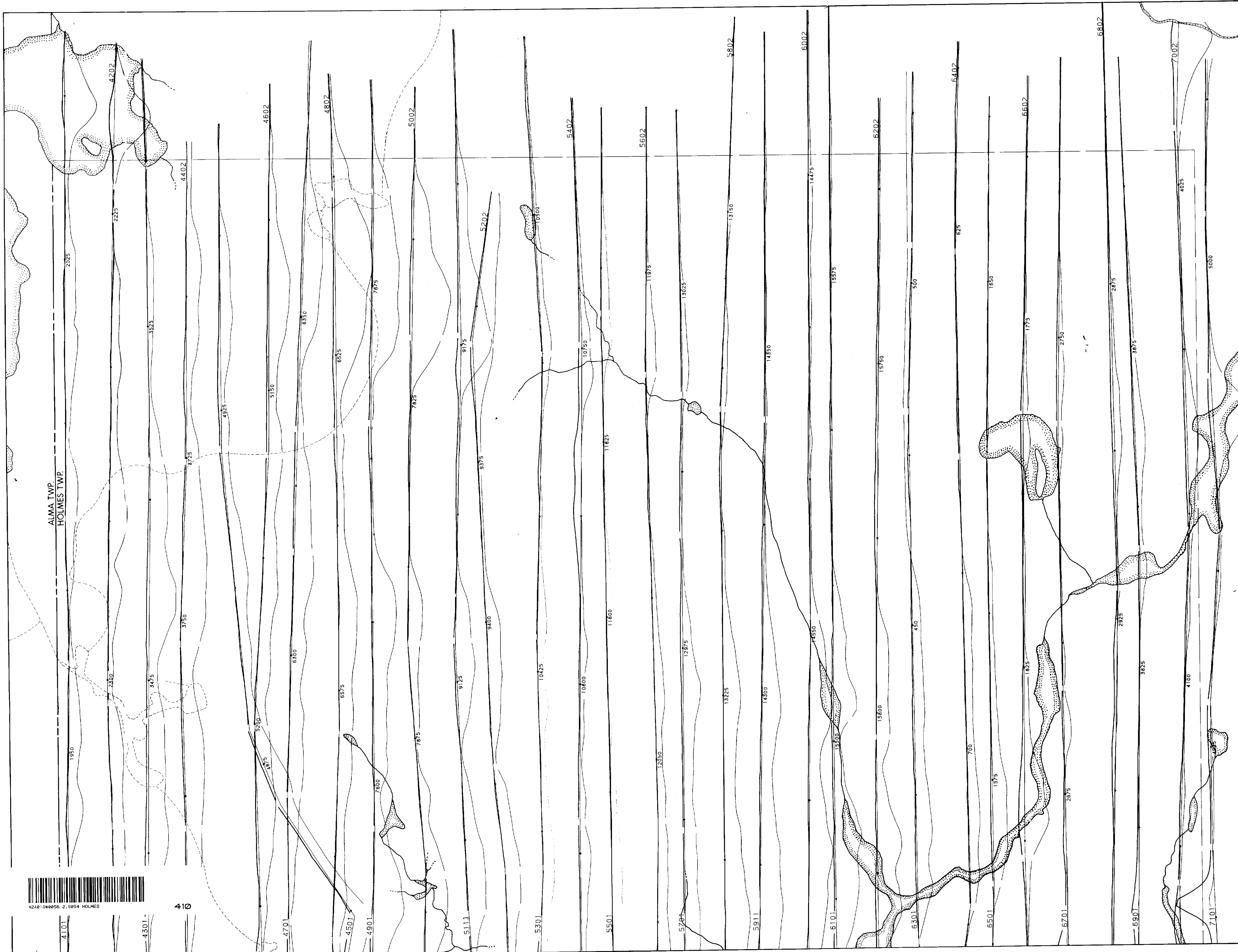
The two magnetometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three V-200 Scintrex cesium vapour magnetometers.



FALCONBRIDGE LTD/LTÉE

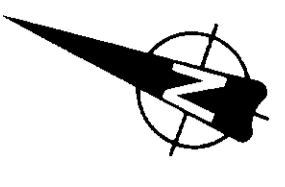
HOLMES-FLAVELLE TOWNSHIPS  
PN-615  
HOLMES TWP., MAP 4

EXECUTÉ PAR:	NTS 42A/2,1	PLAN No:
INTERPRÉTÉ PAR:	ÉCHELLE: 1/5000	
APPROUVÉ PAR:	SCALE: 0 100 200 300m	
DESINÉ PAR:		
DRAWN BY:		



410

410

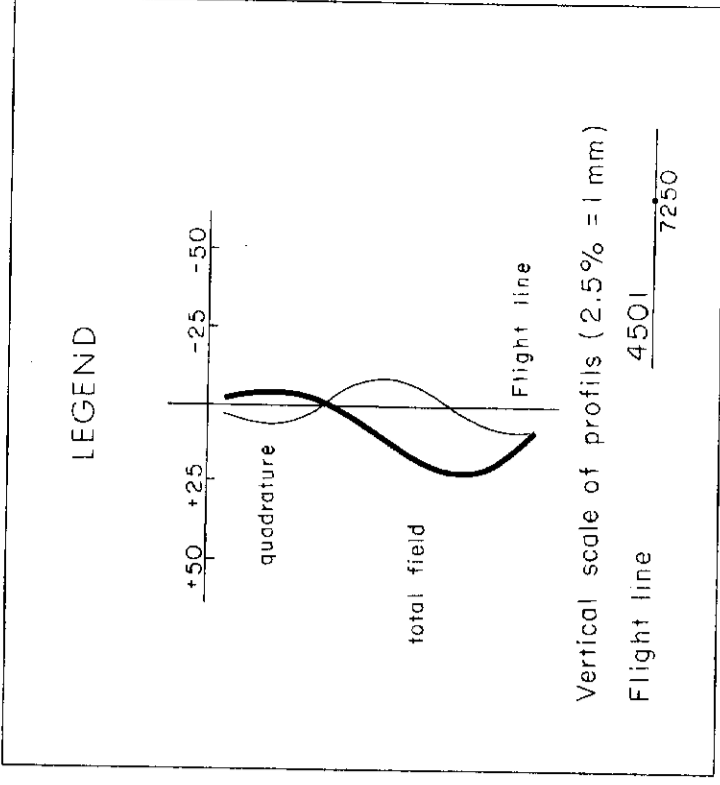


# HOLMES - FLAVELLE TOWNSHIPS

TOTAL FIELD AND QUADRATURE PROFILES  
OF THE VLF-EM

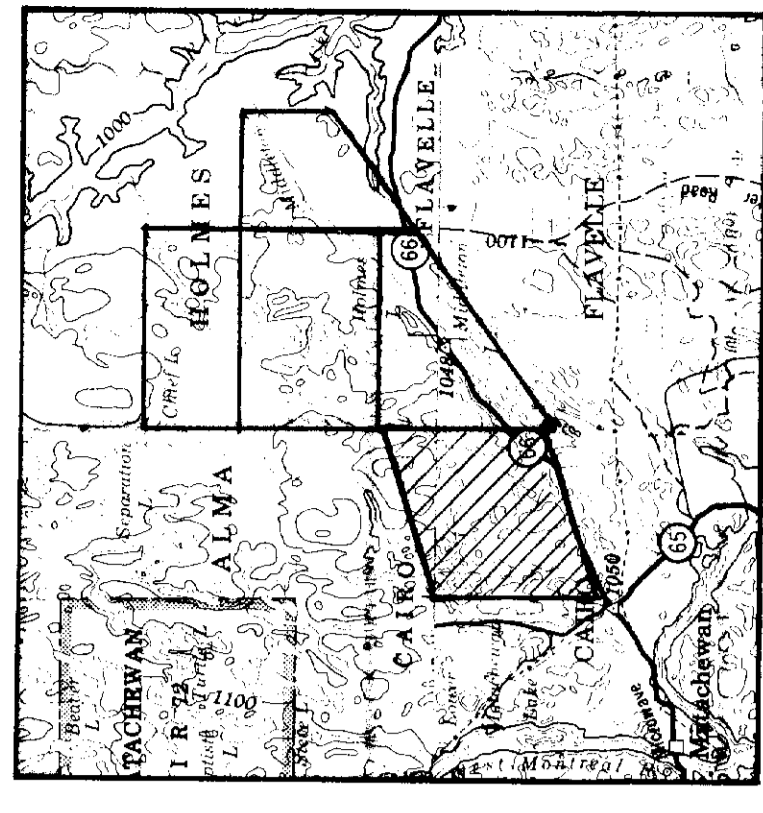
SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986

19854



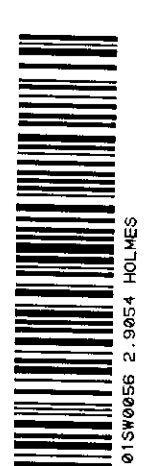
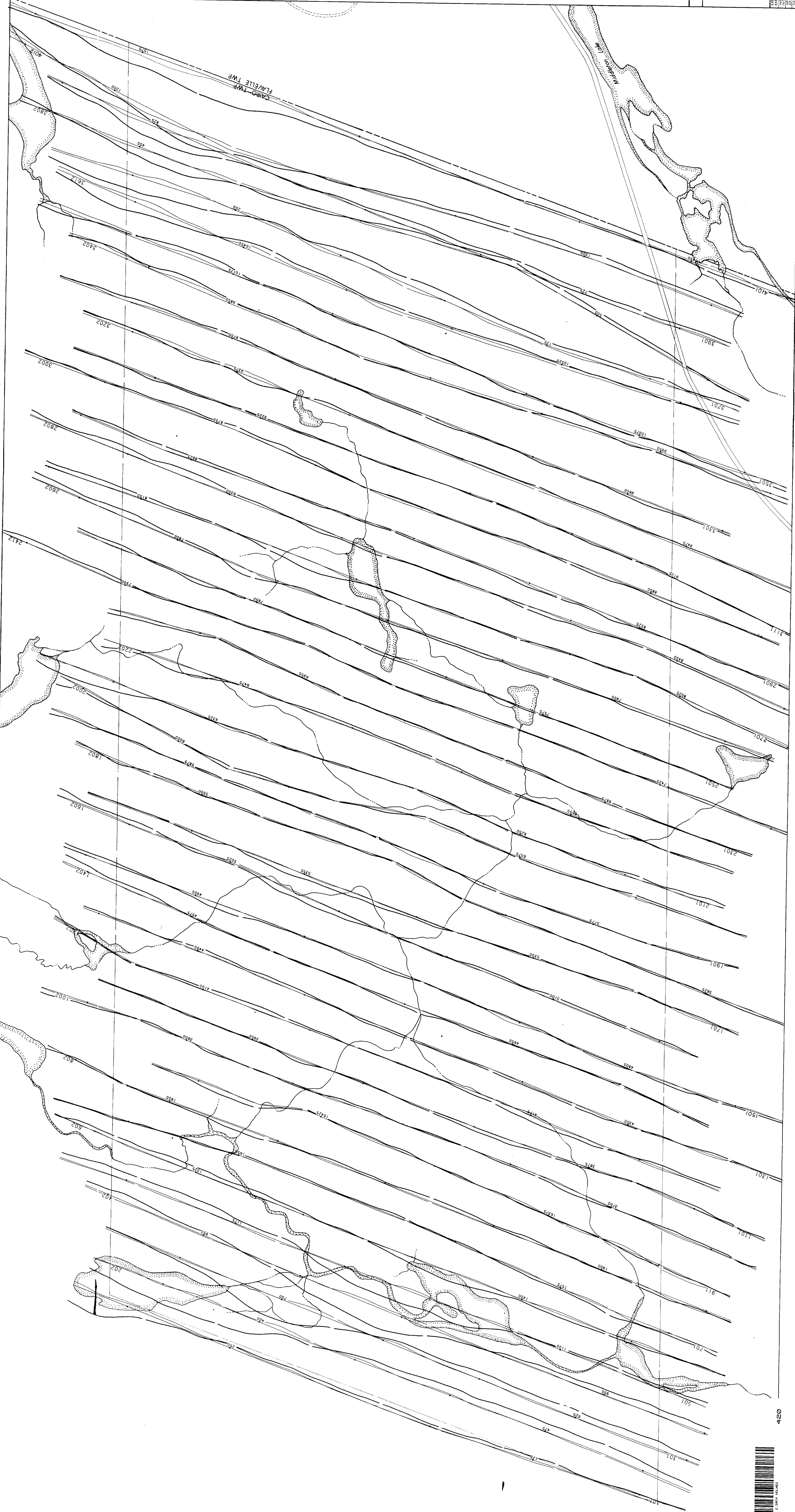
VLF station used: NSS, Annapolis, MD-USA  
21.4 MHz

This survey was flown with the GEMINI VLF system equipped with a quadrature and total field measurement of the westward magnetic gradient. The instrumentation includes an EM57 from Geosols Ltd., a VLF system T01B-24 from Ives Instruments Ltd., and a digital data recorder on the EM57. The flight lines were spaced at a standard 1000 ft interval. The data were processed on a computer using a program written by the author. The data were plotted on a standard grid. The data were then processed on a computer using a program written by the author. The data were plotted on a standard grid. The data were then processed on a computer using a program written by the author. The data were plotted on a standard grid.



FALCONBRIDGE LTD/LTÉE  
HOLMES - FLAVELLE TOWNSHIPS  
PN-625,628  
CAIRO TWP., MAP 1

SCALE 1:50,000  
DATE 1986/15  
PROJECT 17/2000  
SHEET 1 OF 1





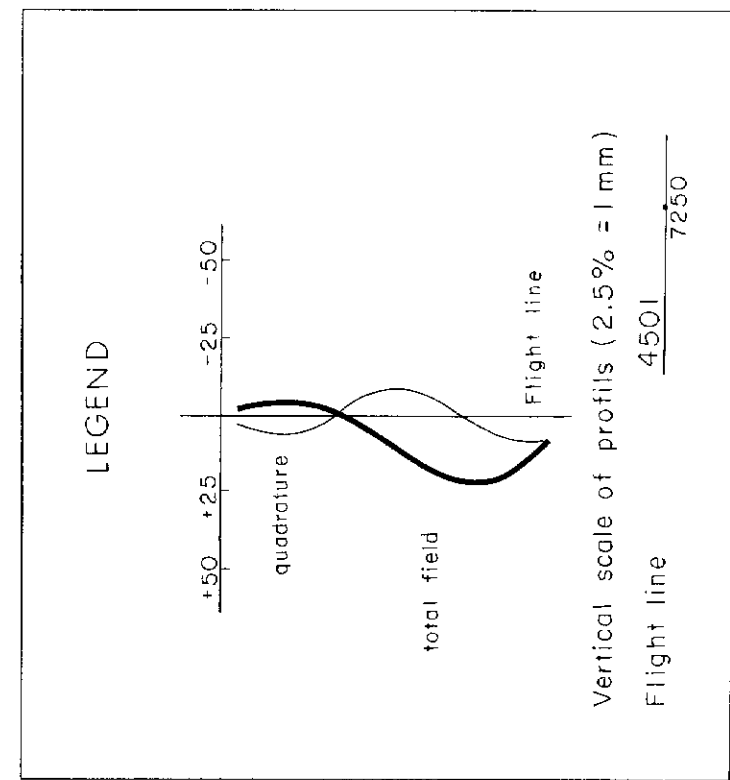


# HOLMES - FLAVELLE TOWNSHIPS

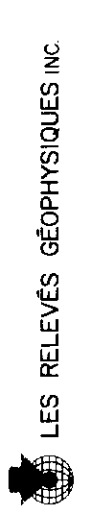
45000

## TOTAL FIELD AND QUADRATURE PROFILES OF THE VLF - EM

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.  
1986



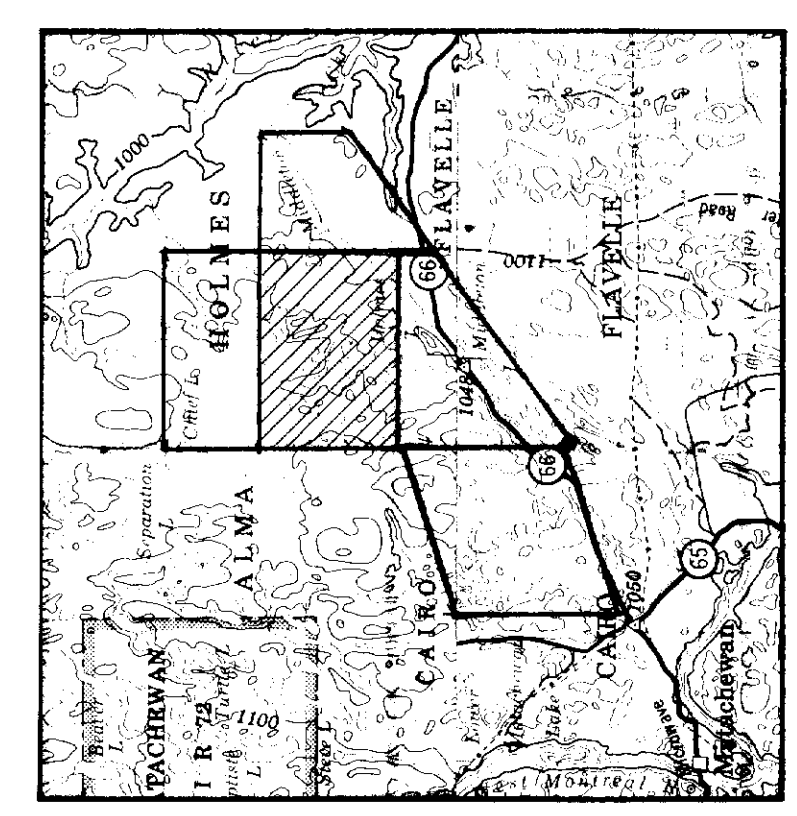
VLF station used : NSS Annapolis, MD-USA  
21.4 MHz



This survey was done with the REMTEC system connected with a geophysical survey system.

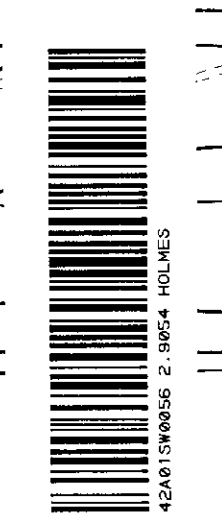
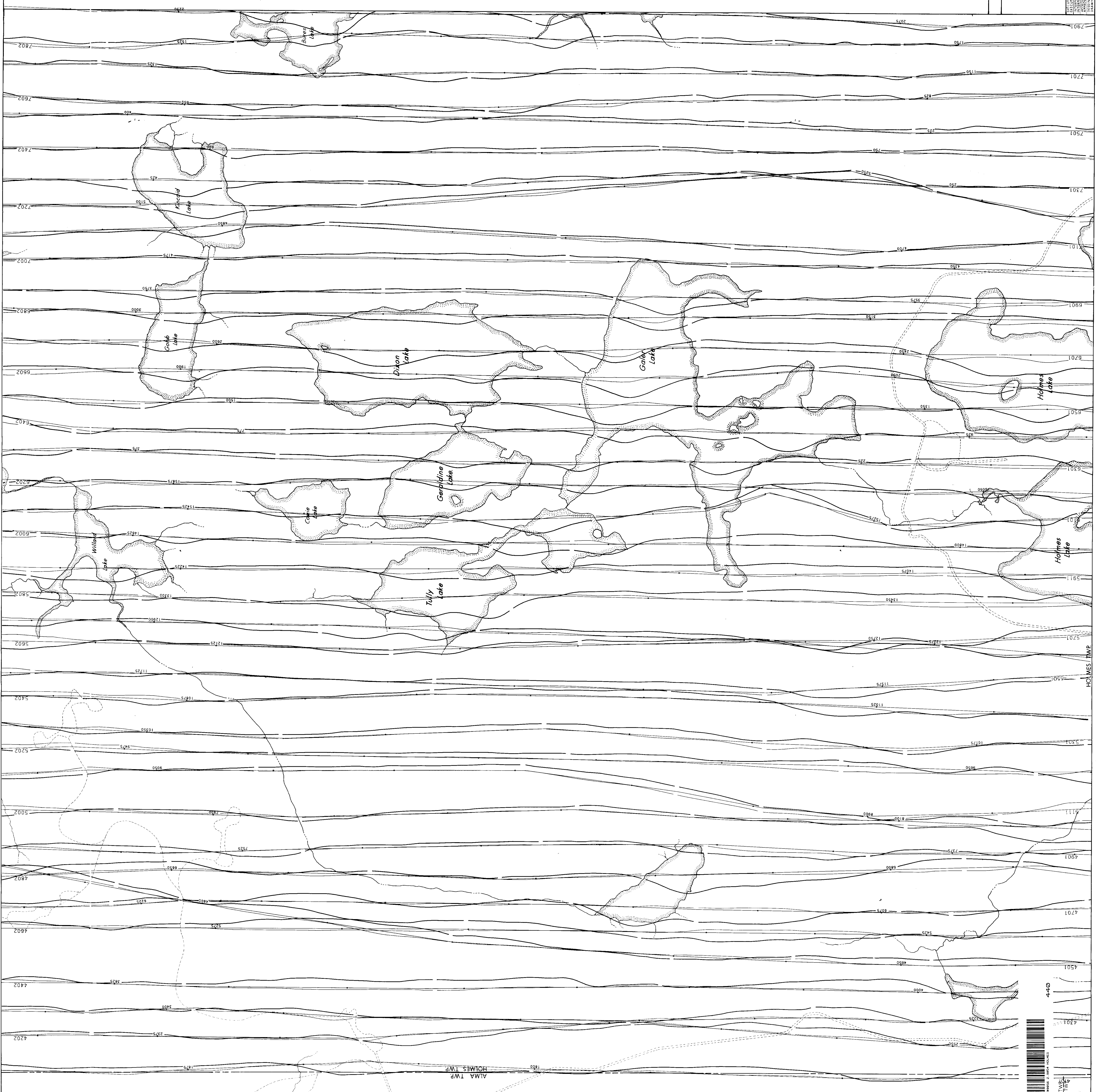
The data was collected on the 1986, from the 1st of July to the 15th of August. The data was collected on the 1st of July to the 15th of August. The data was collected on the 1st of July to the 15th of August.

The data was collected on the 1st of July to the 15th of August. The data was collected on the 1st of July to the 15th of August. The data was collected on the 1st of July to the 15th of August.



FALCONBRIDGE LTD/LTÉE  
HOLMES - FLAVELLE TOWNSHIPS  
PN-615 624 627  
HOLMES TWP., MAP3

DATE	1986	SCALE	1:1000
PROJECT	HOLMES - FLAVELLE TOWNSHIPS	MAP	MAP3
CLIENT	FALCONBRIDGE LTD/LTÉE	DATE	1986



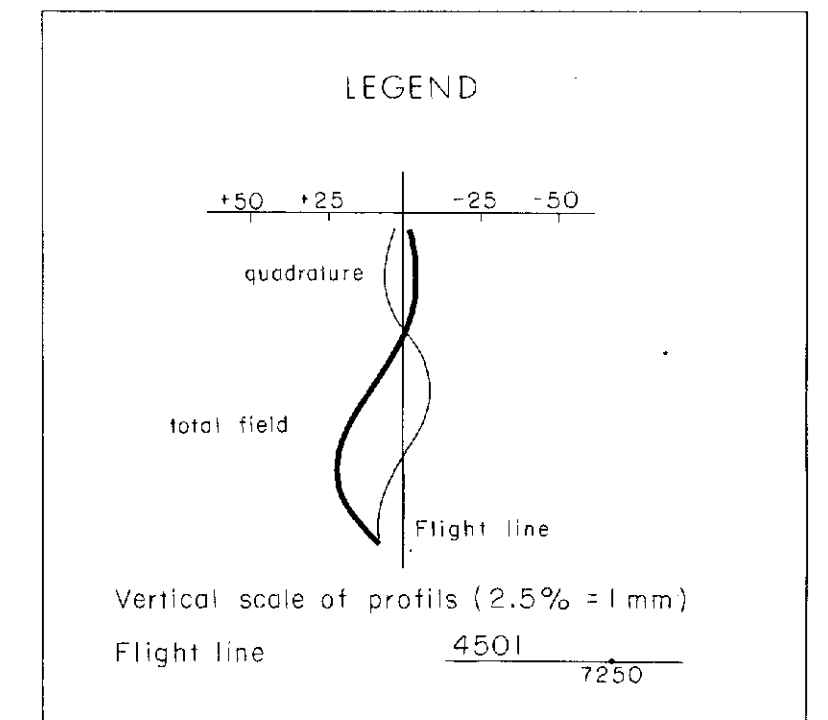
ALMA TWP.  
CARD TWP.

# HOLMES - FLAVELLE TOWNSHIPS

TOTAL FIELD AND QUADRATURE PROFILES OF THE VLF-EM

SURVEY AND COMPILATION BY  
GEOPHYSICAL SURVEYS INC.

1986

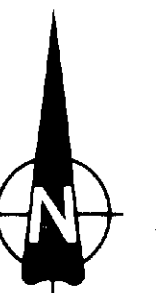
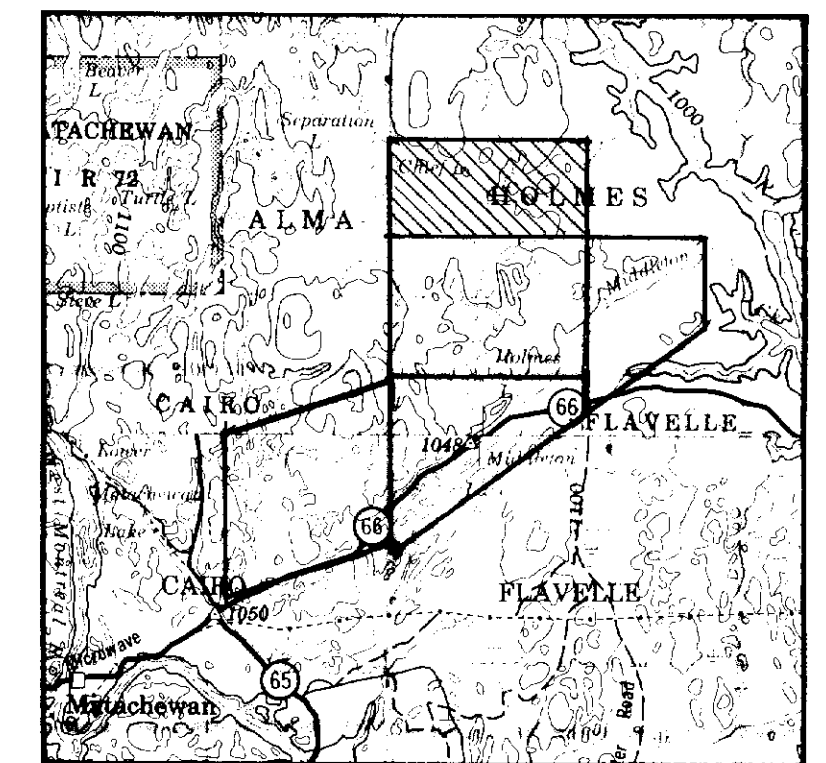


VLF station used : NSS Annapolis, MD-USA  
21.4 kHz

This survey was flown with the REXEM-4 system combined with a gradiometer for measurement of the vertical magnetic gradient.

The instrumentation includes an EHEX-1 from Geotech Ltd., a VLF system TOTEM-2A from Herz Industries Ltd., and a digital data acquisition system from Sonotek Ltd. Four pairs of coils are installed in the EHEX-1 bird shell; two pairs are in a standard vertical coaxial configuration and the two others are in a horizontal coplanar configuration. The transmitting frequencies are 639 and 4317 Hz for the coaxial, 876 and 4972 Hz for the coplanar coils.

The two magnetometer sensors, vertically 2m apart, were installed at a height of 6 metres above the electromagnetic bird. The total magnetic field from the lower and upper sensors and the vertical magnetic gradient were recorded by three U-200 Scintrex cesium vapour magnetometers.

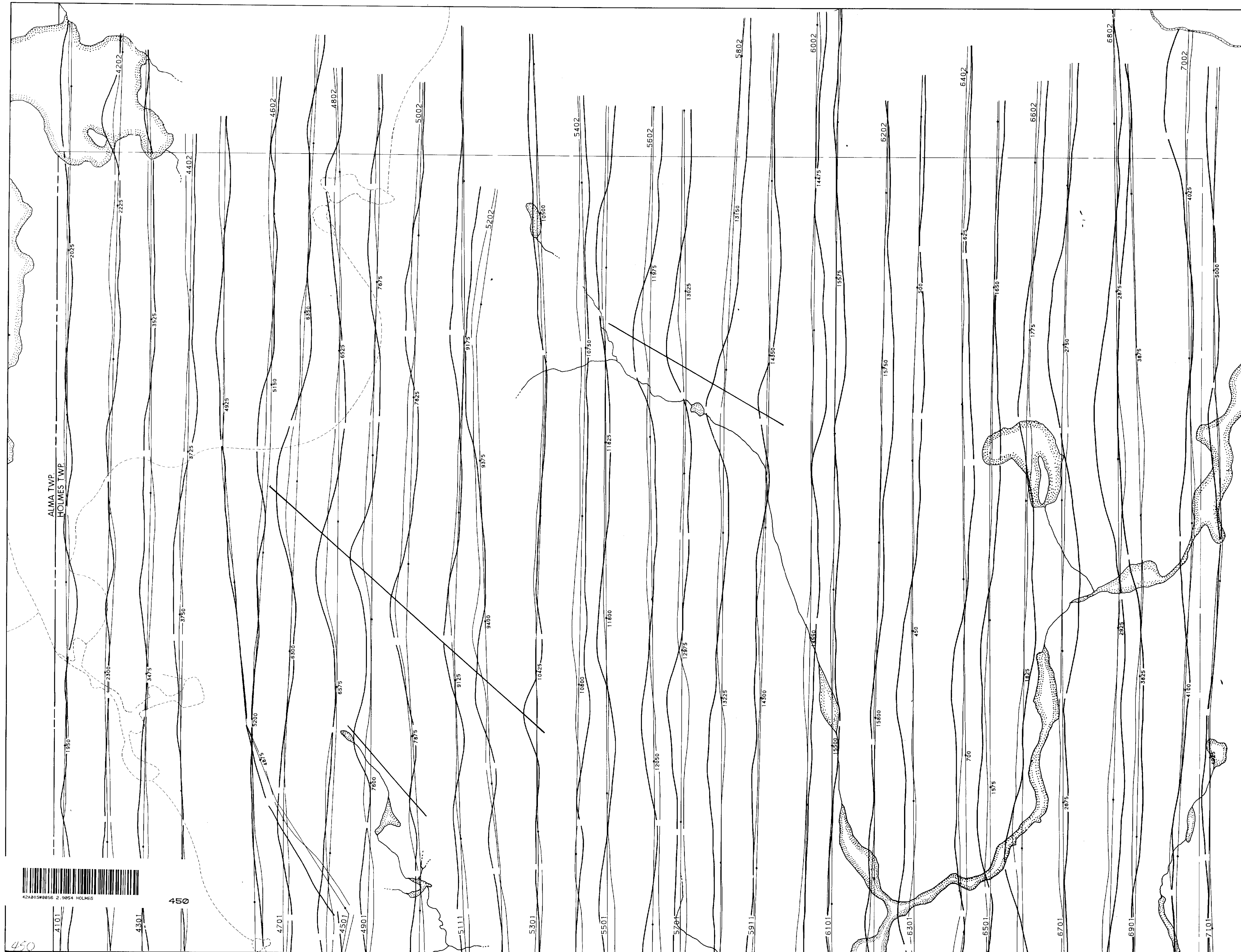


FALCONBRIDGE LTD/LTÉE

HOLMES-FLAVELLE TOWNSHIPS  
PN-615

HOLMES TWP., MAP 4

EXÉCUTE PAR: \_\_\_\_\_ N.S. 42 A/2,1 PLAN No: \_\_\_\_\_  
 INTERPRÉTÉ PAR: \_\_\_\_\_ ÉCHELLE: 1/5000  
 APPROUVÉ PAR: \_\_\_\_\_ SCALE: 1/5000  
 DÉSSINÉ PAR: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_



450

4101  
4301

450