

REPORT ON  
GEOPHYSICAL WORK

HAN-15  
HAN-24  
HANNA TOWNSHIP

NTS: 42-A/15

PROJ #

FOR  
FALCONBRIDGE LIMITED

APRIL 2005

D. LONDY  
TIMMINS GEOPHYSICS LTD

2. 29730

## **SUMMARY AND RECOMMENDATIONS**

Magnetic and HLEM surveys were carried out over the HAN-15 and HAN-24 properties for Falconbridge Limited in May 2004.

The magnetic survey mapped a wide ultramafic body which strikes east southeast through the southern edge of the HAN-24 grid. The HLEM survey detected good conductivity close to the north and the south contacts of the ultramafic. The best conductivity (anomaly 'C'), along the southern contact, appears to have been tested by diamond drilling on strike to the east. It is recommended that anomaly 'A', which is located close to the north contact, is tested by diamond drilling on Line 1400 East.

Four zones detected on the HAN-15 grid have very poor conductivity and are most likely surficial.

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## INTRODUCTION

Magnetic and horizontal loop electromagnetic (HLEM) surveys were carried out on the HAN-15 and HAN-24 properties for Falconbridge Limited in May 2004. This work was part of an exploration program carried out on grids in Hanna, Lucas and Reaume Townships.

The grid is located approximately 50 kilometres north northeast of the city of Timmins and 20 kilometres south of the Town of Cochrane (Figure 1(a)) in the southeast quadrant of Hanna Township, Porcupine Mining Division. Pickerel Creek, a tributary of the Frederick House River, flows north along the west edge of the survey area. The property was accessed by ATV along a bush road which runs north from a gravel road located along the border between Concessions V and VI, Mann Township.

The HAN-15 and HAN-24 grid covers parts of four contiguous mining claims which are comprised of a total of thirty-one, 40 acre claim units (Table 1). Three of the claims are located in Hanna Township and the fourth is located in Mann Township.

The magnetic survey was run by J. Derweduwen and the HLEM survey was carried out by the author of this report and B. South.

CLAIM #	# of UNITS	RECORDING DATE	RECORDED HOLDER	DESCRIPTION	TOWNSHIP
P 1201319	2	June 21, 1996	Falconbridge Limited	N1/2 of N1/2 Lot 4 Con VI	Mann
P 3010668	16	Apr 22, 2003	Falconbridge Limited		Hanna
P 3010669	4	Apr 22, 2003	Falconbridge Limited		Hanna
P 3010673	9	May 20, 2003	Falconbridge Limited		Hanna

**Table 1** : Property Description

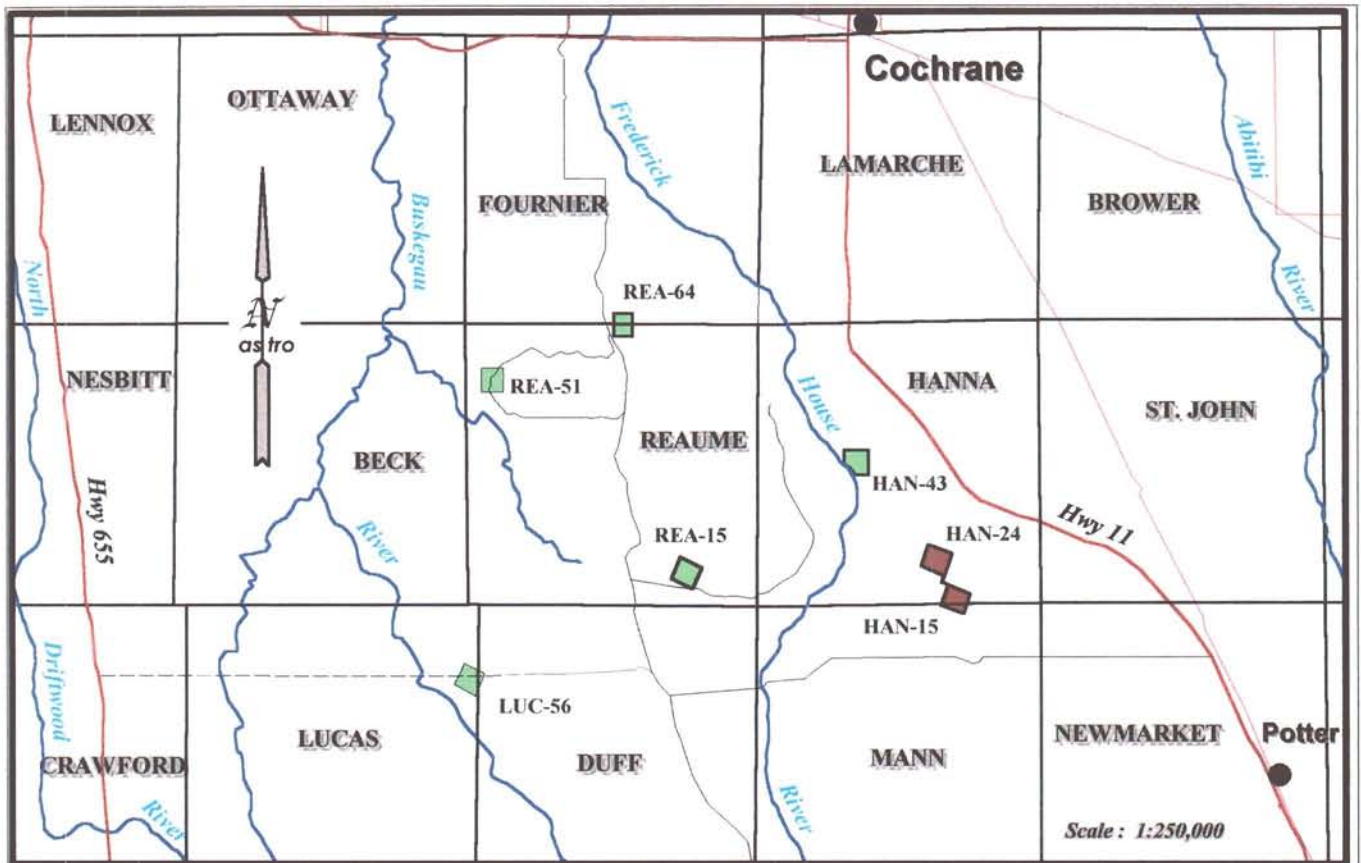


Figure 1(a) : Location Map

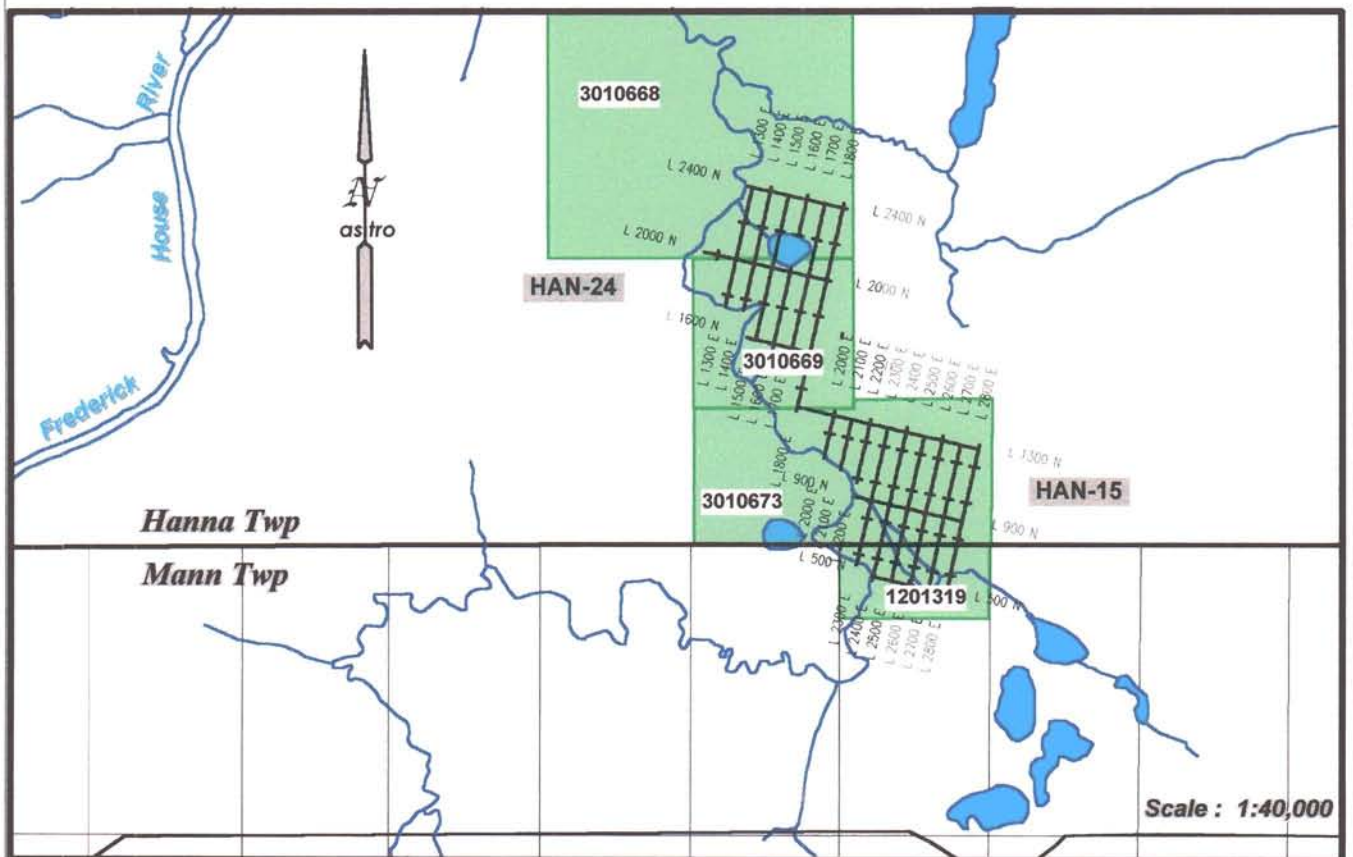


Figure 1(b) : Claim Map

## GENERAL GEOLOGY

The geology of Hanna and Mann Townships are presented on regional map 2205 at a scale of 1:253,440 (Pyke, 1973) and on map P3379 at a scale of 1:100,000 (Ayer et al, 1998) and map P3391 at a scale of 1:50,000 (Barrie, 1999).

The southwest half of Hanna Township and most of Mann Township are underlain by Archean felsic to mafic volcanics which have been intruded by mafic and ultramafic bodies. The northeast half of Hanna Township and northeast corner of Mann Township is underlain by felsic intrusive rocks.

Hole PP4-5, which was drilled by Geophysical Engineering Limited in 1977 directly to the east of the HAN-24 grid, suggests that the area is underlain by west northwest striking mafic volcanics and graphitic sediments.

## PREVIOUS WORK

The following is a description of previous exploration work carried out in the vicinity of the HAN-15 and HAN-24 grids (Table 2).

In 1950/51, **Canadian Johns-Manville Company Limited** carried out a magnetic survey over a block of 24 claim units which were centered between Frederick House River and Pickereel Creek in southern Hanna Township and included the present HAN-24 survey area. The vertical component of the earth's magnetic field was measured along north-south grid lines spaced every 400 feet.

In 1973, **Noranda Exploration Co. Ltd** ran magnetic and VLEM surveys over a claim group which covered the present HAN-15 grid. The surveys were run on grid lines spaced every 400 feet and oriented N20°E. The magnetic survey was run with a vertical component, fluxgate magnetometer.

In 1977, **Shell Canada Resources Limited** ran a magnetic survey over a contiguous group of 124

claims in southeast Reaume, southern Hanna and northern Mann Townships. The grid on these claims covered the ground directly to the west of the HAN-15 survey area. The magnetic survey in this area was run with a Fluxgate magnetometer on grid lines oriented N30°E and spaced every 100 metres.

In 1977, **Geophysical Engineering Limited** drilled a hole (PP4-5) directly to the north of the HAN-15 grid and southeast of the HAN-24 grid to test a conductor. The hole was drilled at a dip of 60° and azimuth of 205°; it intersected a number of graphitic sediment units.

In 1980, **D. Carlson** ran a VLF-EM survey over 8 contiguous claims which included the present HAN-15 survey area. The survey was run along the same grid lines which were cut by Noranda in 1973. The transmitter used in the survey was Annapolis, Maryland (21.4 kHz).

YEAR	COMPANY	GEOPHYSICS	DRILL HOLES	TIMMINS/AFRI FILES
1950	Canadian Johns-Manville Company Ltd	Mag		T459
1973	Noranda Exploration Co. Ltd.	Mag, VLEM		T1605
1977	Shell Canada Resources Ltd.	Mag		T1907
1977	Geophysical Engineering Limited		PP4-5	42A15NW0009
1980	D. Carlson	VLF-EM		T2471
1989 1990	Comstate Resources Ltd.	Geology Mag, HLEM		T3316
1995 1996	Falconbridge Limited	Mag, HLEM Mag, HLEM		T-3740

**Table 2.** Summary of previous assessment work.

In 1987, the **Geological Survey of Canada** flew an airborne magnetic and EM survey over the Timmins area which included Hanna Township. This survey was flown along north-south lines spaced approximately every 200 metres.

In 1989, **Comstate Resources Ltd.** began an exploration program over 54 contiguous claims which



included the present HAN-24 grid. The program included a geological survey in 1989 and magnetic and HLEM surveys in 1990. The surveys were run along north-south lines spaced every 125 metres. The magnetic readings were taken with a total field, proton precession magnetometer and the EM survey was run with a coil separation of 150 metres and frequencies of 444 and 1777 Hertz.

In 1995/96, **Falconbridge Limited** carried out an exploration program in the area. Magnetic and HLEM surveys were run on two grids which consisted of north-south lines spaced every 100 metres, directly to the west of the HAN-15 AND HAN-24 grids. The magnetic survey was run with a proton precession magnetometer and the HLEM survey was run with coil separations of 150 and 200 metres at frequencies of 440 and 1760 Hz.

## **SURVEY DESCRIPTIONS**

The HAN-15 and HAN-24 grid consists of lines oriented at N13°E, spaced every 100 metres and picketed every 25 metres (Figure 1(b)).

The magnetic readings were taken every 12.5 metres with a Scintrex IGS-2/MP-4. This instrument is a proton precession magnetometer which measures the earth's total magnetic field to an accuracy of 0.1 nT. Diurnal variations were monitored every 10 seconds with a Scintrex MP-3 base station magnetometer, located off the grid. A total of 1104 readings were taken along 13.5 kilometres of line.

The horizontal loop EM survey was carried out with the Apex Parametrics MaxMin I-5. This instrument measures the in-phase and quadrature components of the secondary field as a percentage of the primary field; the depth of penetration is approximately half of the coil separation. Readings were taken every 25 metres using a coil separation of 200 metres at frequencies of 222, 444 and 1777 Hertz. A total of 331 stations were sampled along 11.2 kilometres of line.

## MAGNETIC RESULTS

The magnetic results are contoured every 100 nT on map 1 at a scale of 1:5000. They are also presented in Figure 2 at a scale of 1:10,000.

A broad magnetic high anomaly strikes east southeast through the southern half of the HAN-24 survey area. The amplitude of the anomaly is up to 9600 nT above background on Line 1300 East. The government airborne survey (OGS, 1988) indicates that this anomaly continues to the east southeast for about a kilometre and the west northwest for approximately 3 kilometres. The high amplitude of the anomaly suggests that the source is most likely an ultramafic flow or sill. EM anomalies 'A' and 'B' are located along the northern flank of this magnetic high and EM anomaly 'C' is located along the southern flank.

The magnetic field over the rest of the survey area is quite uniform. An increase in the field along the southern edge of the HAN-15 grid is likely in response to an ultramafic body centered to the south.

## HLEM RESULTS

The results of the HLEM survey are profiled on maps 2, 3 and 4 at a scale of 1:5000; the profile scale used is 1 cm = 20 % for all of the frequencies. The 444 Hertz results are also presented in Figure 3 at a scale of 1:10,000.

**Anomaly 'A'** is a low amplitude response which strikes south southeast between 2100 North on Line 1300 East and 2075 North on Line 1400 East. The source of the anomaly is a narrow zone of good conductivity at a depth which ranges from 64 metres on Line 1300 East and 84 metres on Line 1400 East (Table 3). The dip appears to be to the south.

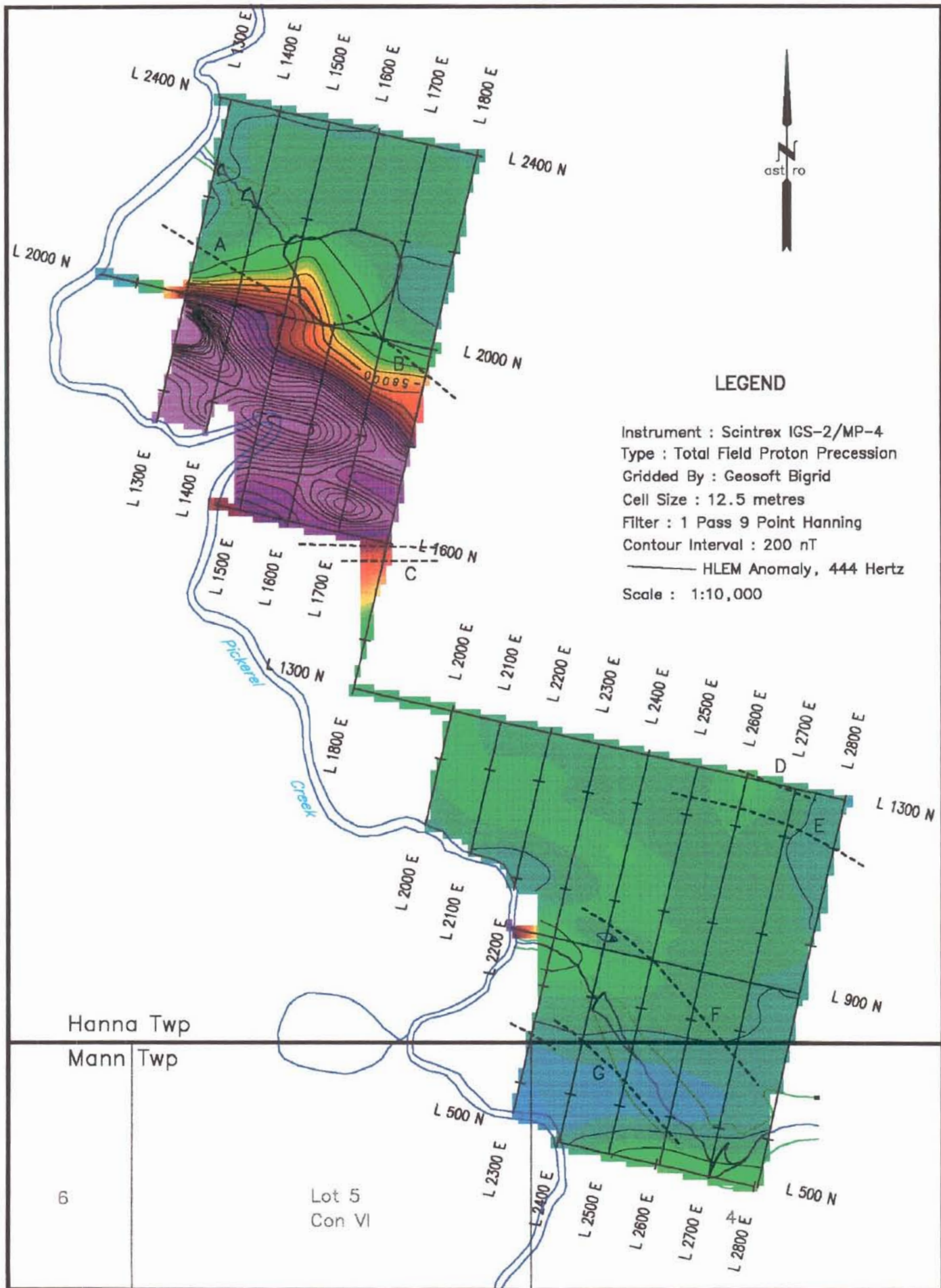


Figure 2 : Total Magnetic Field, Han-15/24

LINE	ANOMALY CENTER	ANOMALY WIDTH (m)	IP (%)	Q (%)	DEPTH (m)	CONDUCTIVITY THICKNESS (mhos)	COMMENTS
1300 E	2100 N	narrow	3	4	64	4	
1400 E	2075 N	narrow	4	4	84	10	

**Table 3:** Anomaly 'A' Interpretation, 444 Hz, 200 metre coil separation.

**Anomaly 'B'**, is a low amplitude, in-phase response which also strikes east southeast between 2000 North on Line 1700 East and 1950 North on Line 1800 East. It is difficult to interpret any parameters, besides the conductor axis, because of the lack of quadrature component. This conductor is most likely the east extension of conductor 'A'.

LINE	ANOMALY CENTER	ANOMALY WIDTH (m)	IP (%)	Q (%)	DEPTH (m)	CONDUCTIVITY THICKNESS (mhos)	COMMENTS
1700 E	2000 N	narrow	1	?	?	?	
1800 E	1950 N	narrow	3	?	?	?	

**Table 4:** Anomaly 'B' Interpretation, 444 Hz, 200 metre coil separation.

**Anomaly 'C'**, strikes east-west between 1587 North on Line 1800 East and 1562 North on Line 1700 East. The source of the anomaly on Line 1800 East is a wide zone of very good conductivity at a depth of 96 metres (Tables 5); the dip is close to vertical. The anomaly is incomplete on Line 1700 East and the only parameter which can be interpreted is the northern edge of the conductor.

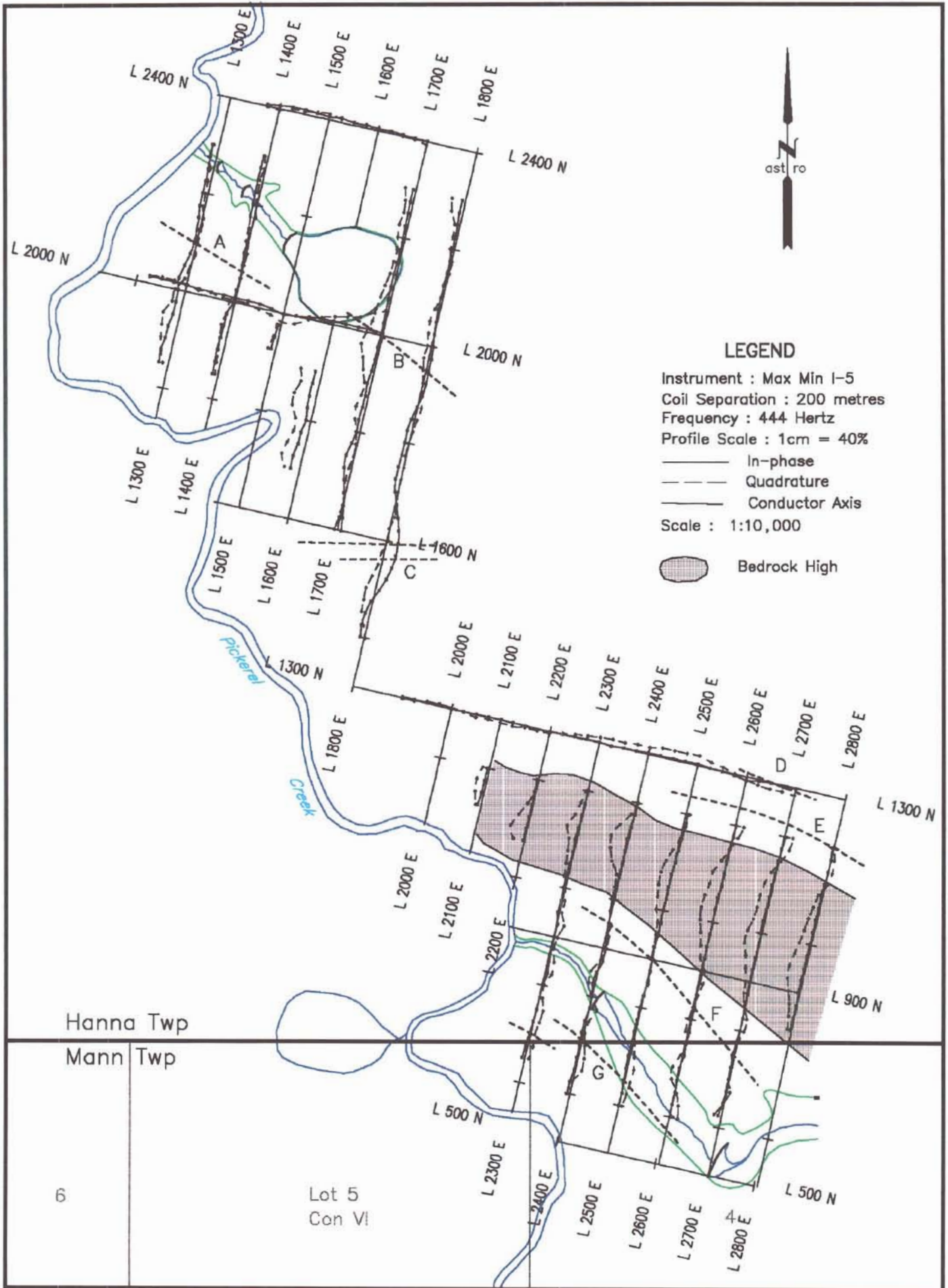


Figure 3 : HLEM Survey, 444 Hertz, Han 15/24

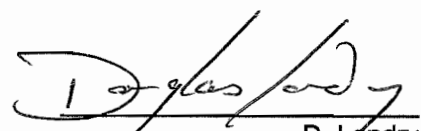
LINE	ANOMALY CENTER	ANOMALY WIDTH (m)	IP (%)	Q (%)	DEPTH (m)	CONDUCTIVITY THICKNESS (mhos)	COMMENTS
1700 E	1562 N	?	?	?	?	?	
1800 E	1587 N	65	11	2	96	110	

**Table 5:** Anomaly 'C' Interpretation, 444 Hz, 200 metre coil separation.

The 1990 Comstate EM survey indicates that this conductor swings east southeast, to the east of HAN-24. It was likely the target of Hole PPP4-5, which was drilled by Geophysical Engineering in 1977; it intersected a number of zones of graphitic sediments.

**Anomalies 'D', 'E', 'F' and 'G'** strike east southeast to southeast through the HAN-15 grid. All of these anomalies are low amplitude, mainly quadrature component responses. The conductivities are very poor, suggesting that the sources are surficial; anomalies 'E' and 'F' are located along the north and south flanks, respectively, of a bedrock high.

APRIL 20, 2005  
Date

  
D. Londry  
Timmins Geophysics Limited

## REFERENCES

**Ayer, J.A. and Trowell, N.F.**

1998: Geological Compilation of the Timmins Area, Abitibi Greenstone Belt; Ontario Geological Survey, Preliminary **Map P.3379**, scale 1:100,000.

**Ayer, J.A., Berger B. R. and Trowell, N.F.**

1999: Geological Compilation of the Lake Abitibi area, Abitibi Greenstone Belt; Ontario Geological Survey, Preliminary **Map P.3398**, scale 1:100,000.

**Barrie, C.T**

1999: Geological Compilation, Brower, Duff, Fournier, Hanna, Lamarche, Little, Mann, McCart, Newmarket, Reaume, St. John and Tully townships; Ontario Geological Survey, Preliminary **Map P.3391**, scale 1:50,000.

**Hunt, D.S. and Richard, J.A.**

1980: Hanna Township, District of Cochrane; Ontario Geological Survey Preliminary **Map P.2307**, Timmins Data Series, Scale 1:15,840 or 1 inch to 1/4 mile. Data compiled 1979.

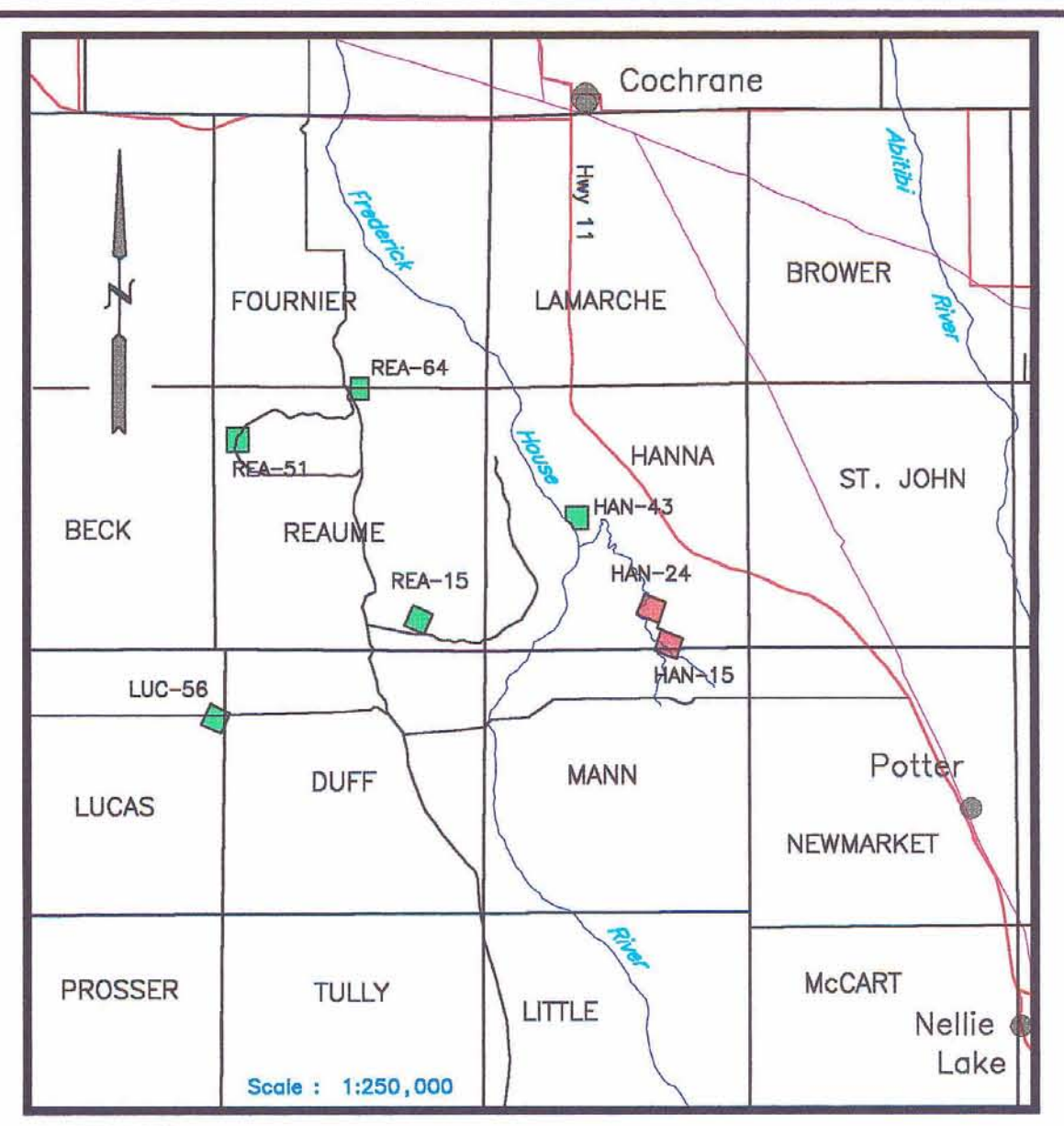
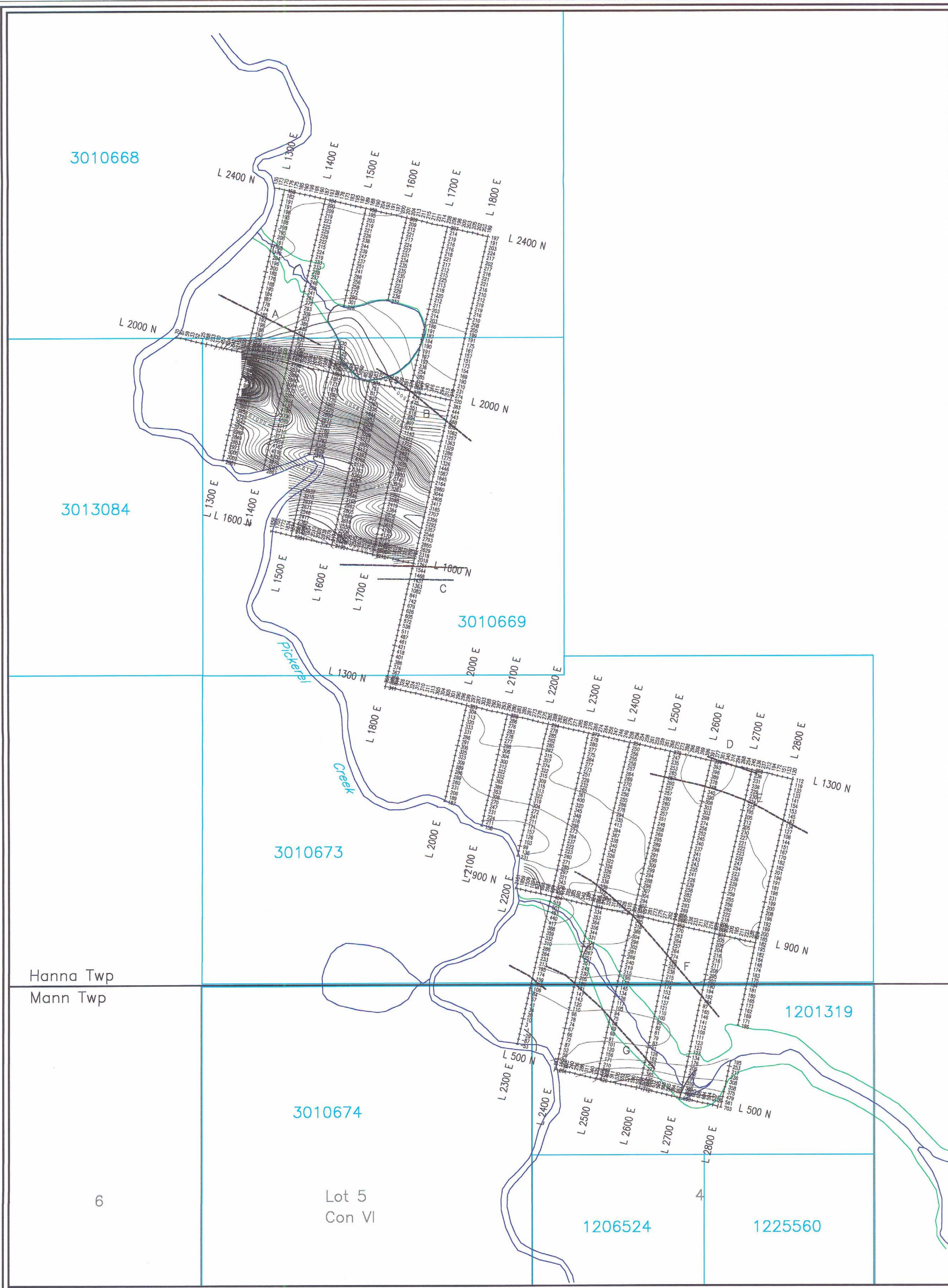
**Ontario Geological Survey**

1988: Airborne Electromagnetic and Total Intensity Survey, Timmins Area, **Hanna Township**, Districts of Cochrane and Timiskaming Ontario; by Geoterrex Limited, for Ontario Geological Survey. Geophysical/Geochemical Series **Map 81041**. Scale 1:20,000. Survey and compilation from March 1987 to October 1987.

**Pyke, D.R., Ayres, L.D. and Innes, D.**

1973: Timmins-Kirkland Lake Sheet; Ontario Division of Mines, Geological Compilation Series, **Map 2205**, scale 1" = 4 miles.





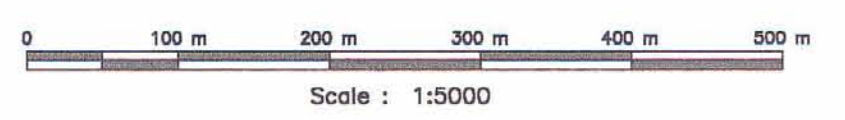
INDEX MAP



LEGEND

- Instrument : Scintrex IGS-2/MP-4
- Type : Total Field Proton Precession
- Datum Level : 57000 nT
- Contour Interval : 100 nT
- Gridded By : Geosoft Bigrid
- Cell Size : 12.5 metres
- Filter : 1 Pass 9 Point Hanning
- EM Anomaly, 444 Hertz

2.29730



<b>FALCONBRIDGE LIMITED</b>	
MAGNETIC SURVEY	
HAN 15/24	
HANNA TOWNSHIP	
File : H15.XYZ	Date : May, 2004
NTS : 42-A/15	Proj# :
WORK BY : <i>Timmins Geophysics Ltd.</i>	

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3013084

3010669

3010673

3010674

1201319

1206524

1225560

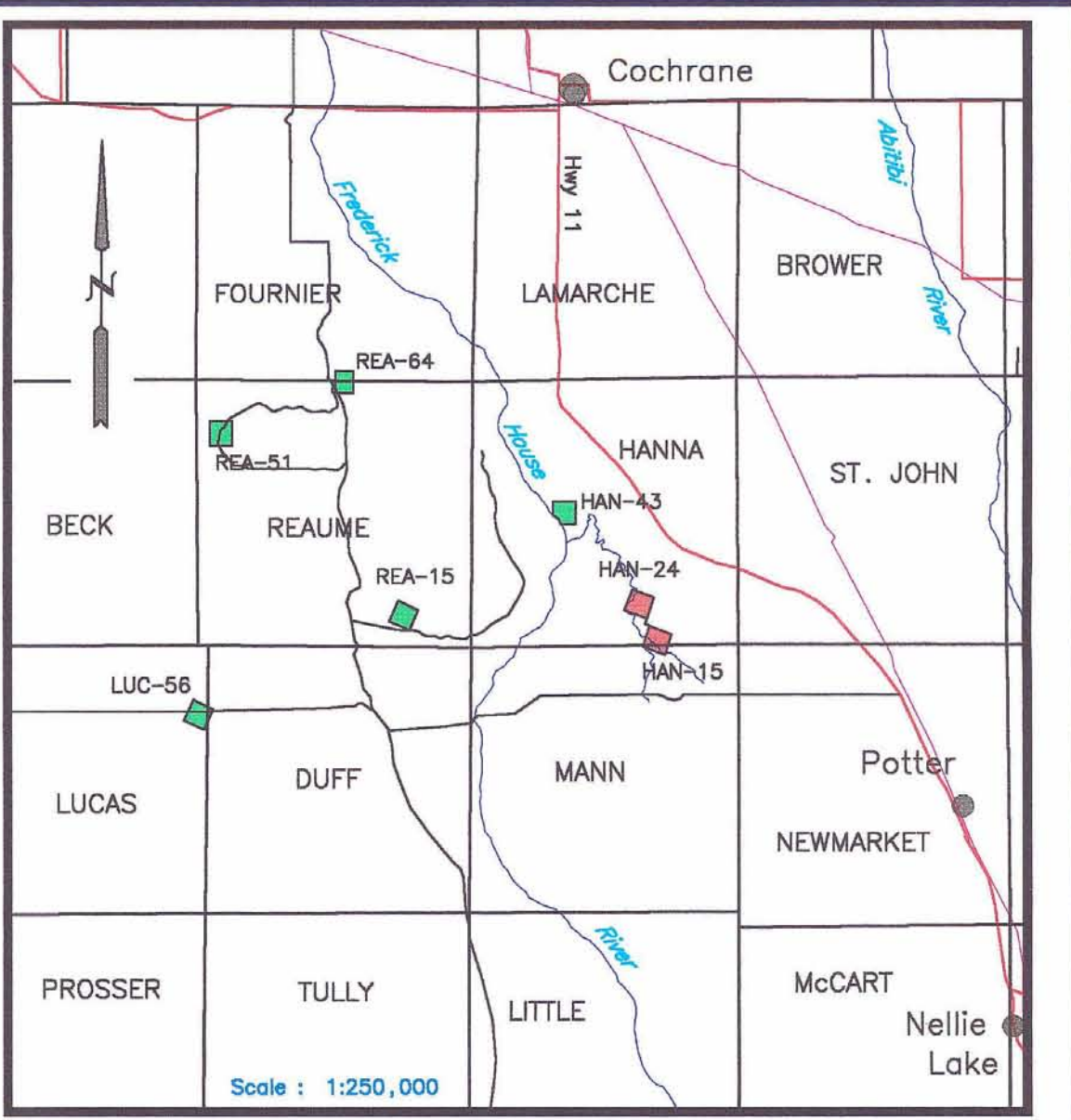
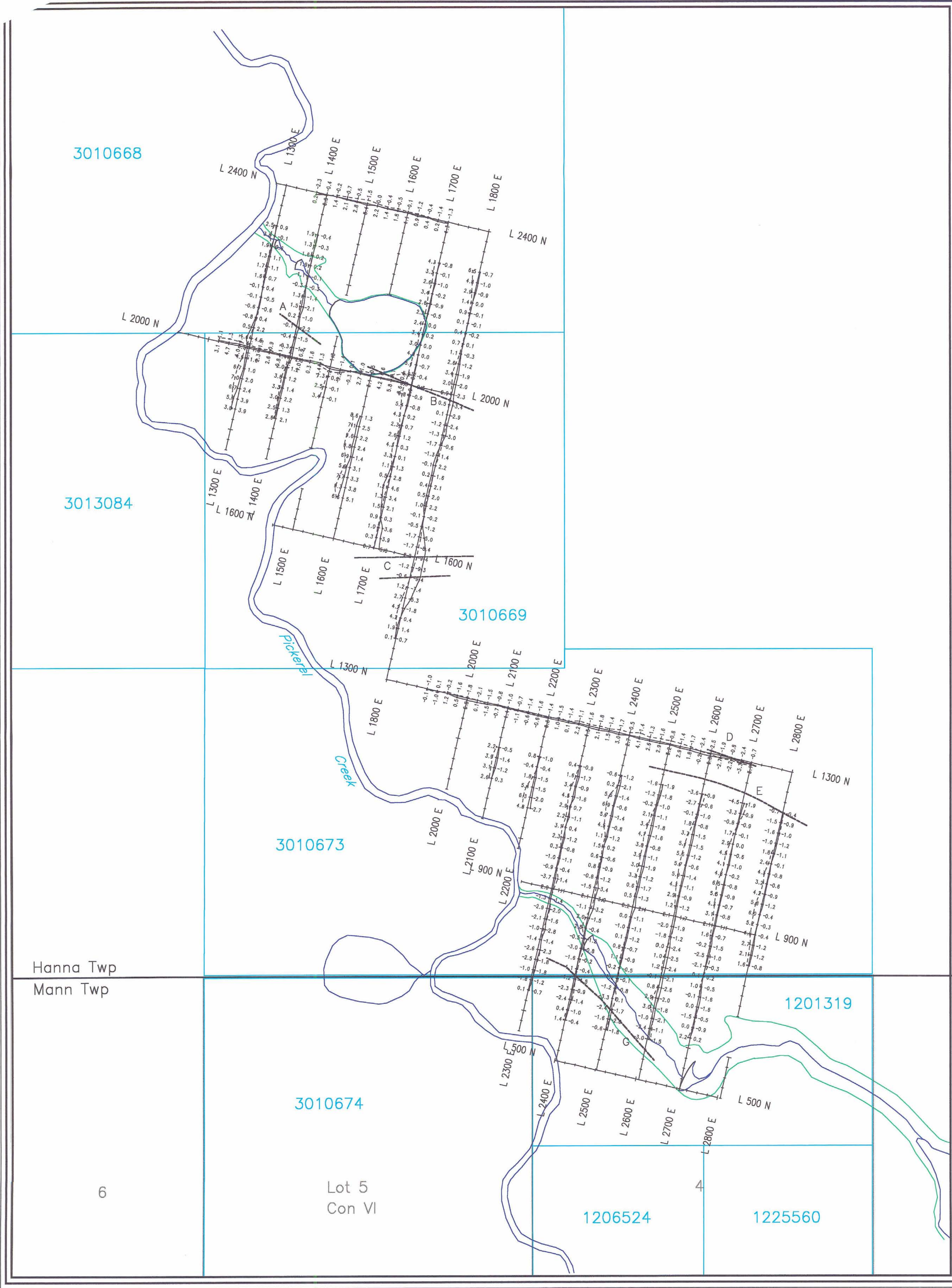
Hanna Twp  
Mann Twp

Lot 5  
Con VI

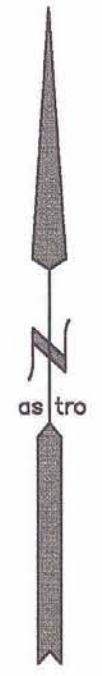
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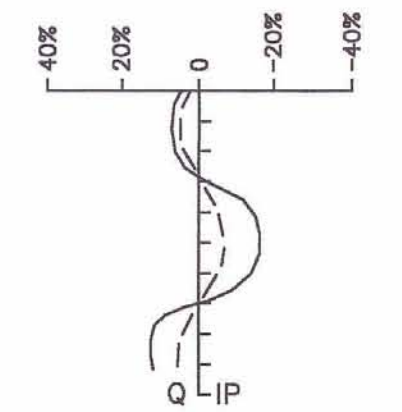


INDEX MAP



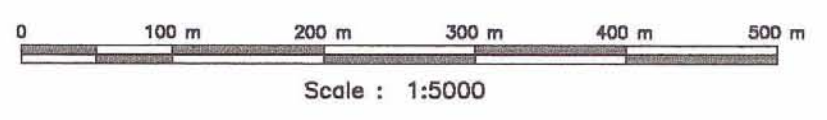
LEGEND

Instrument : Apex Parametrics MaxMin 1-5  
 Coil Separation : 200 metres  
 Frequency : 222 Hertz  
 Profile Scale : 1cm = 20%



In-phase ———  
 Quadrature - - - -

2. 2973 0



<b>FALCONBRIDGE LIMITED</b>	
HLEM SURVEY (222 Hz)	
HAN 15/24	
HANNA TOWNSHIP	
File : H15HL.XYZ	Date : May, 2004
NTS : 42-A/15	Proj# :
WORK BY : <i>Timmins Geophysics Ltd.</i>	

3010668

3013084

3010669

3010673

Hanna Twp  
Mann Twp

3010674

Lot 5  
Con VI

1206524

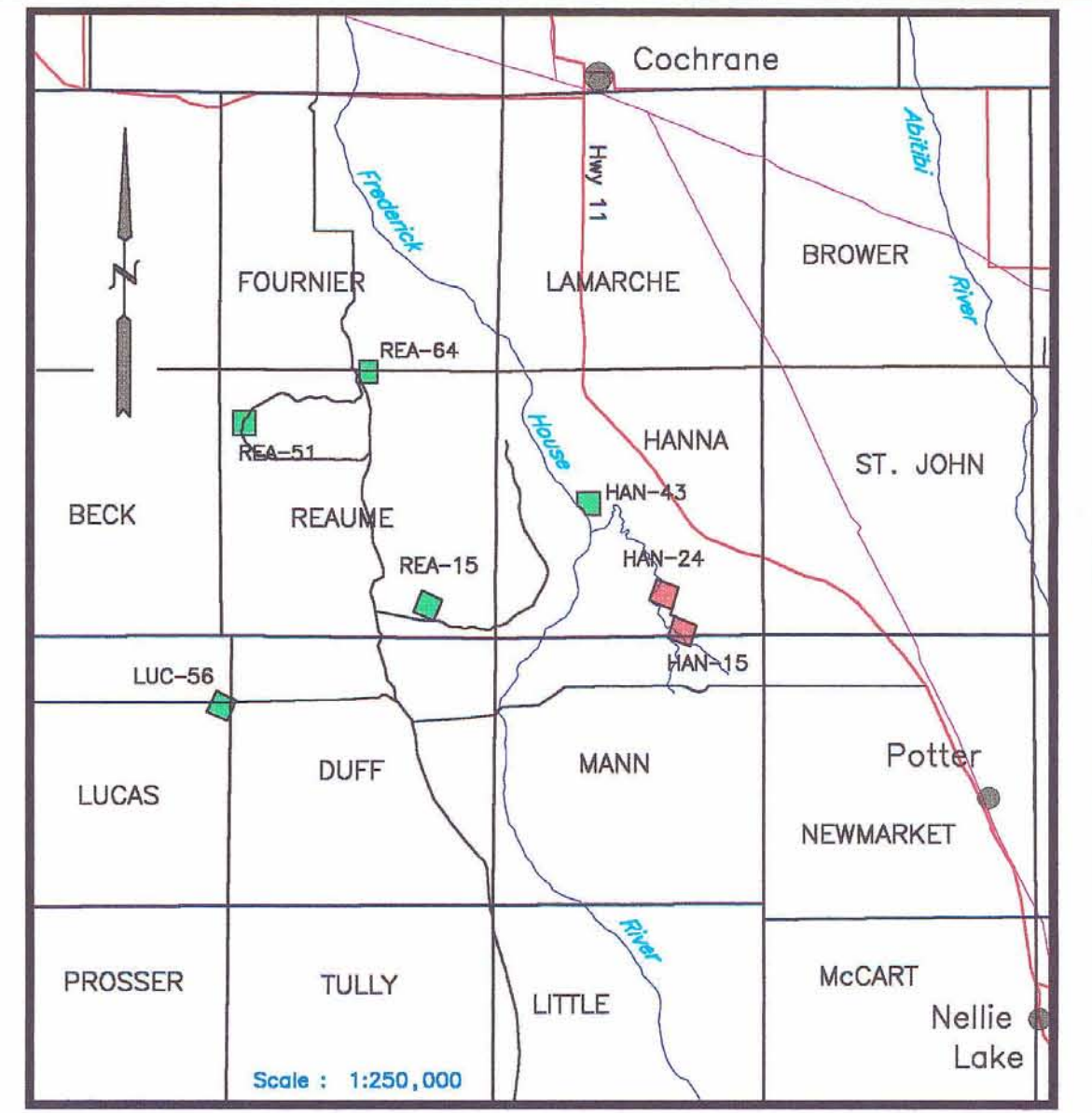
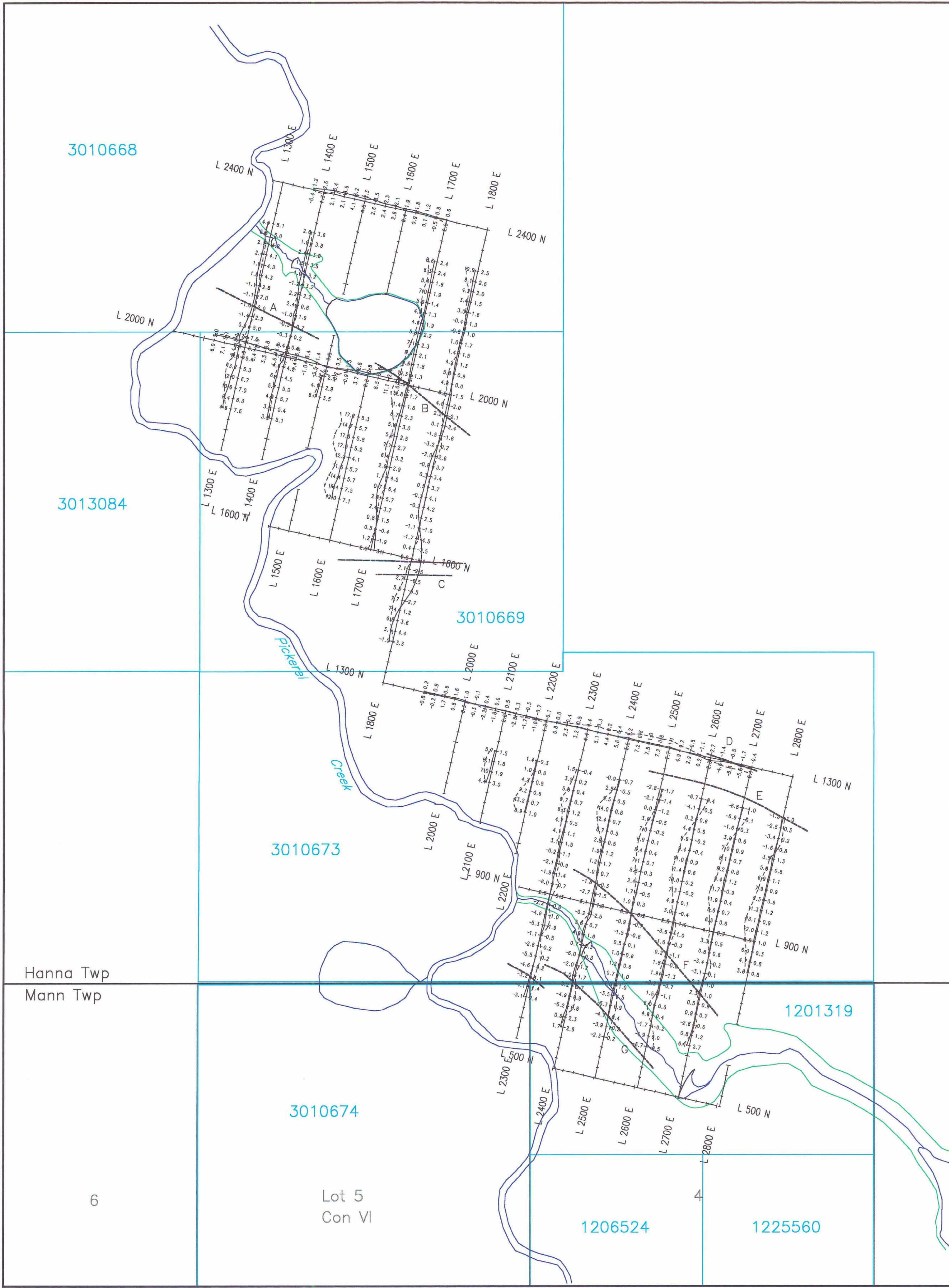
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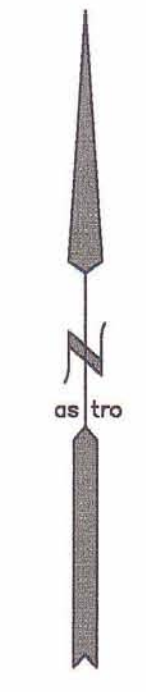
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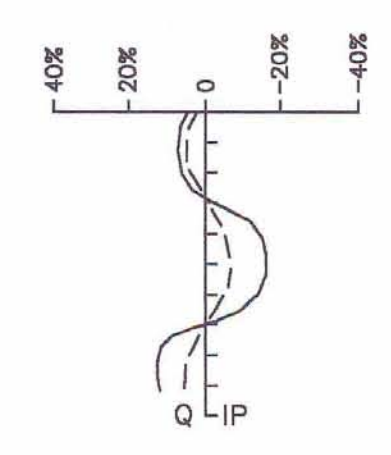


INDEX MAP



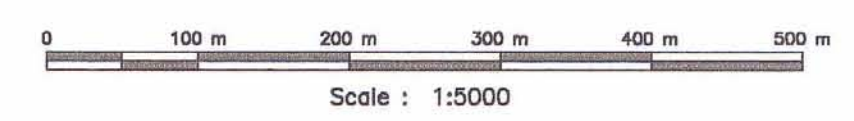
LEGEND

Instrument : Apex Parametrics MaxMin I-5  
 Coil Separation : 200 metres  
 Frequency : 444 Hertz  
 Profile Scale : 1cm = 20%



In-phase ———  
 Quadrature - - - - -

2. 29730



<b>FALCONBRIDGE LIMITED</b>	
HLEM SURVEY (444 Hz)	
HAN 15/24	
HANNA TOWNSHIP	
File : H15HL.XYZ	Date : May, 2004
NTS : 42-A/15	Proj# :
WORK BY : <i>Timmins Geophysics Ltd.</i>	



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3013084

3010669

3010673

3010674

1201319

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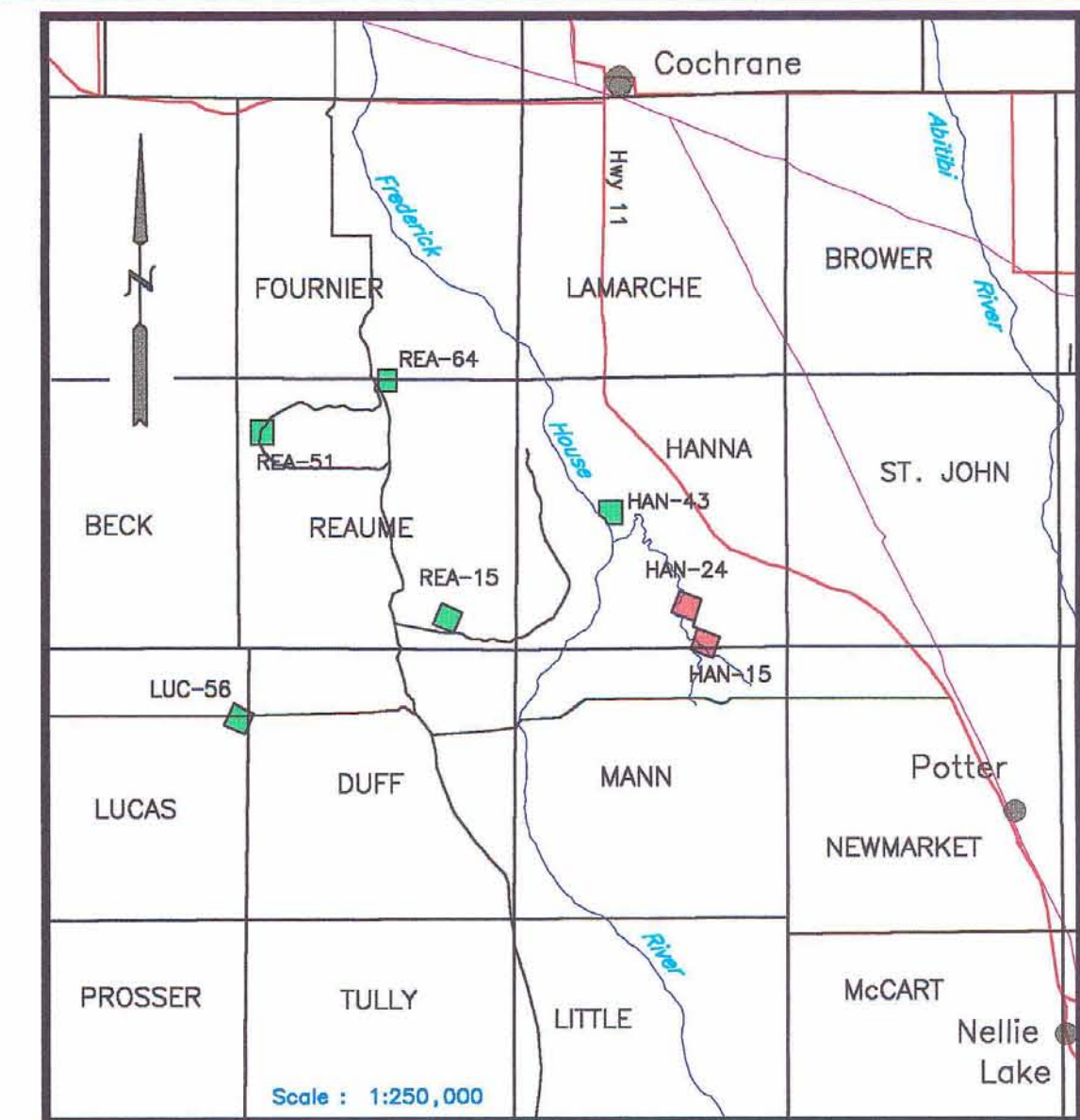
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Hanna Twp  
Mann Twp

6

Lot 5  
Con VI

4

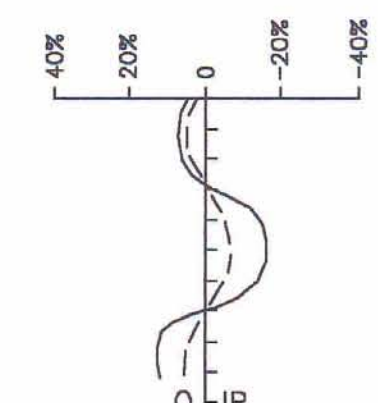


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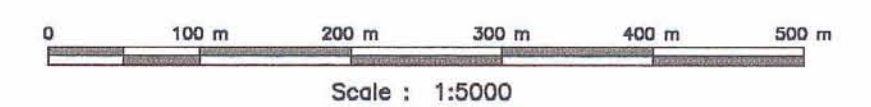


LEGEND

Instrument : Apex Parametrics MaxMin I-5  
 Coil Separation : 200 metres  
 Frequency : 1777 Hertz  
 Profile Scale : 1cm = 20%



In-phase  
 Quadrature



FALCONBRIDGE LIMITED

HLEM SURVEY (1777 Hz)

HAN 15/24

HANNA TOWNSHIP

File : H15HL.XYZ

Date : May, 2004

NTS : 42-A/15

Proj# :

WORK BY :

Timmins Geophysics Ltd.