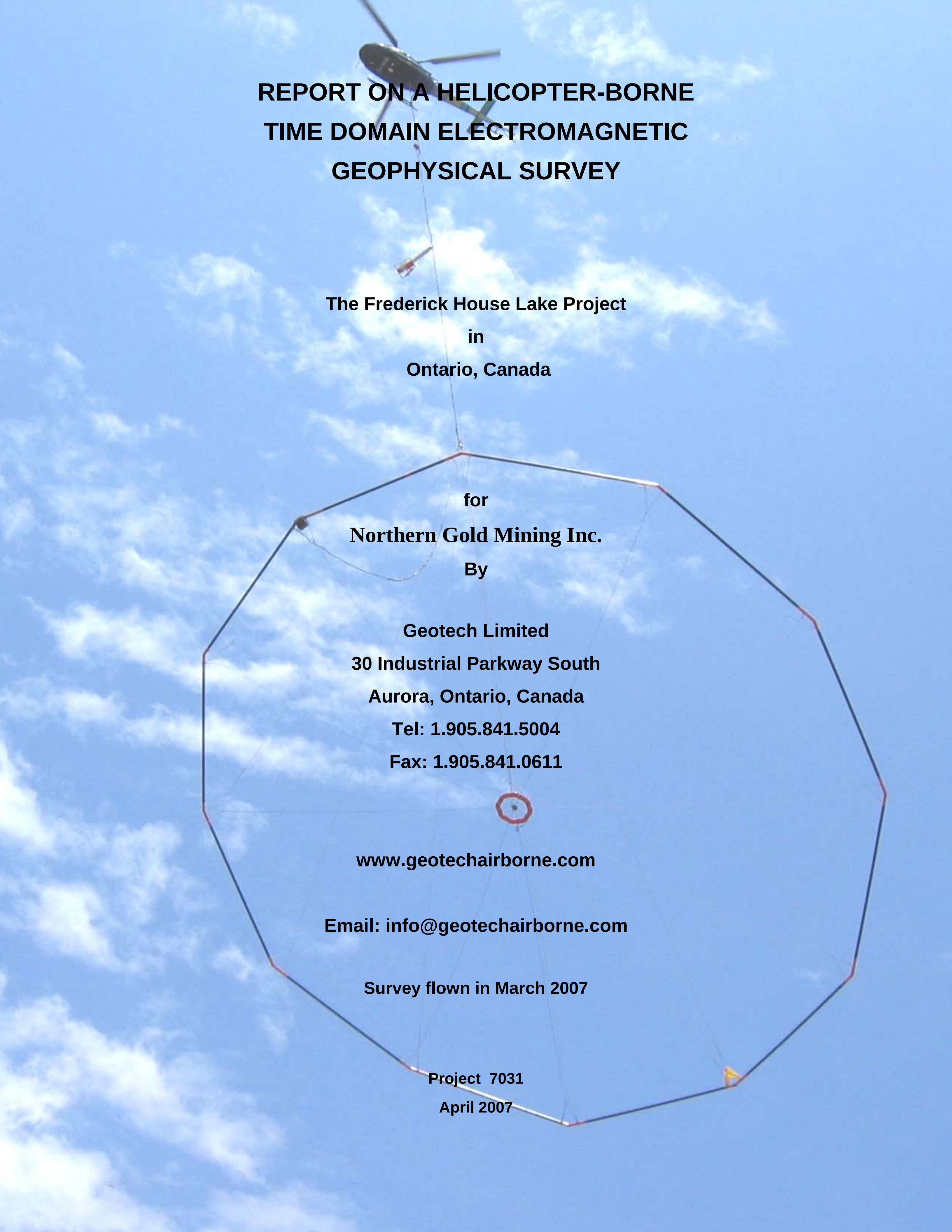

REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC GEOPHYSICAL SURVEY

The Frederick House Lake Project

in

Ontario, Canada

for

Northern Gold Mining Inc.

By

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Survey flown in March 2007

Project 7031

April 2007

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REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC SURVEY

Of the FREDERICK LAKE HOUSE block, Ontario, Canada

Executive Summary

During the period from March 5th to March 15th, 2007, Geotech Limited carried out a helicopter-borne geophysical survey for Northern Gold Mining Inc. over one block located 20 km south-west from Iroquois Falls, in Ontario, Canada.

Principal geophysical sensors included a versatile time domain electromagnetic system (VTEM) and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 360.9 line-km were flown.

In-field data processing involved quality control and compilation of data collected during the acquisition stage, using the in-field processing centre established at survey base. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Ltd in Aurora, Ontario.

The processed survey results are presented as total magnetic field grid and electromagnetic stacked profiles.

Digital data includes all electromagnetic and magnetic products plus positional, altitude and raw data.

1. INTRODUCTION

1.1 General Considerations

These services are the result of the Agreement made between Geotech Ltd. and Northern Gold Mining Inc., to perform a helicopter-borne geophysical survey over the FREDERICK HOUSE LAKE block, located 20 km south-west from Iroquois Falls, Ontario, Canada.

361 line-km of geophysical data were acquired during the survey.

The survey block is as shown in Appendix A.

The crew was based in Cochrane, Ontario, for the acquisition phase of the survey, as shown in Section 2 of this report.

The helicopter operator was Heli-Horizon Inc. The helicopter was an AS 350 B2, registration C-GWOW.
Survey flying was completed on March 15th, 2007. Preliminary data processing was carried out daily during the acquisition phase of the project. Final data presentation and data archiving was completed in the Aurora office of Geotech Ltd. in April 2007.

1.2. Survey and System Specifications

The survey block was flown at nominal traverse line spacing of 100 metres, with part of the grid flown at a line spacing of 25 metres, with line direction N90E / N270W.
Tie lines were flown perpendicular to one grid of traverse lines at a line spacing of 1500 metres and a direction of N0E, as shown in the Section 2 of this report.

Where possible, the helicopter maintained a mean terrain clearance of 70 metres, which translated into an average height of 35 metres above ground for the bird-mounted VTEM system and 55 metres for the magnetic sensor.

Details of the survey specifications may be found in Section 2 of this report.

1.3. Data Processing and Final Products

Data compilation and processing were carried out by the application of Geosoft OASIS Montaj and programs proprietary to Geotech Ltd.

Database, grid and maps of final products were presented to Northern Gold Mining Inc.

The survey report describes the procedures for data acquisition, processing, final image presentation and the specifications for the digital data set.

1.4. Topographic Relief

The survey block location is shown in the location map (Appendix A).

Topographically, the block exhibited flat relief, as all but a small corner sits upon Frederick House Lake. The elevation is approximately 270 ASL.

2. DATA ACQUISITION

2.1. Survey Area

The survey block and general flight specifications are as follows:

Survey area	Line /Tie spacing (m)	Area (km^2)	Line-km	Flight direction	Line number	LKM Total
Frederic Lake House	100		192.00	N90E / N270W	1010 - 1480	
	25		144.30	N90E / N270W	2010 - 2390	
	1500	18.8	24.60	N0E / N180W	5010 - 5060	360.90

Table 1 - Survey block

Location maps are shown in Appendix A.
Survey block boundaries are as shown in Appendix B.

2.2. Survey Operations

Date	Flights	Production	Crew location	Remark
5-Mar-07			Thriftlodge, Cochrane	Mobilization
6-Mar-07			Thriftlodge, Cochrane	Equipment installation
7-Mar-07			Thriftlodge, Cochrane	Equipment installation
8-Mar-07			Thriftlodge, Cochrane	Equipment installation
9-Mar-07			Thriftlodge, Cochrane	No production due to weather
10-Mar-07			Thriftlodge, Cochrane	No production due to weather
11-Mar-07	1, 2, 3	210.5	Thriftlodge, Cochrane	
12-Mar-07			Thriftlodge, Cochrane	No production due to weather
13-Mar-07			Thriftlodge, Cochrane	No production due to weather
14-Mar-07	4, 5, 6	128.2	Thriftlodge, Cochrane	
15-Mar-07	7, 8	48	Thriftlodge, Cochrane	
16-Mar-07			Thriftlodge, Cochrane	Demobilization

Table 2 - Survey schedule

2.3. Flight Specifications

The nominal EM sensor terrain clearance was 35 m (EM bird height above ground, i.e. helicopter is maintained 70 m above ground). Nominal survey speed was 80 km/hour. The data recording rates of the data acquisition was 0.1 second for electromagnetics and magnetometer, 0.2 second for altimeter and GPS. This translates to a geophysical reading about every 2 metres along flight track. Navigation was assisted by a GPS receiver and data acquisition system, which reports GPS co-ordinates as latitude/longitude and directs the pilot over a pre-programmed survey grid.

The operator was responsible for monitoring of the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic feature.

On return of the aircrew to the base camp, the survey data was transferred from a compact flash card (PCMCIA) to the data processing computer.

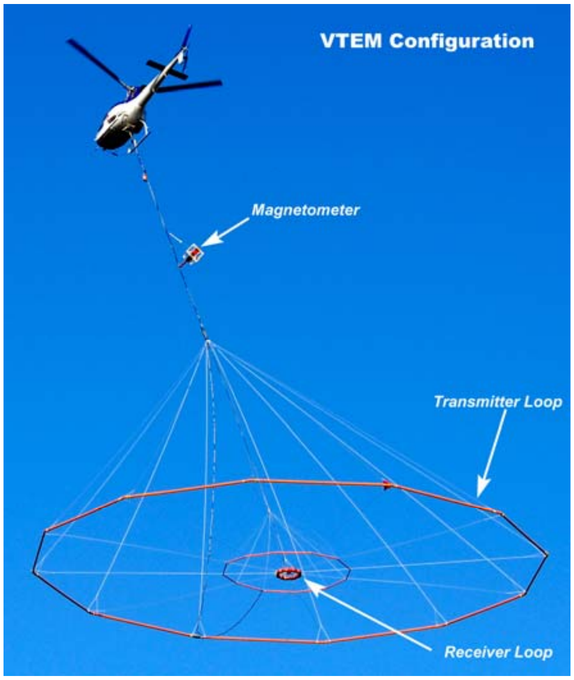
2.4. *Aircraft and Equipment*

2.4.1. Survey Aircraft

An Astar 350 B2 helicopter, registration C-GWOW - owned and operated by Heli-Horizon Inc. was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Geotech Ltd.

2.4.2. Electromagnetic System

The electromagnetic system was a Geotech Versatile Time Domain EM (VTEM) system. The layout of the configuration used for this survey is as indicated in Figure 1 below.



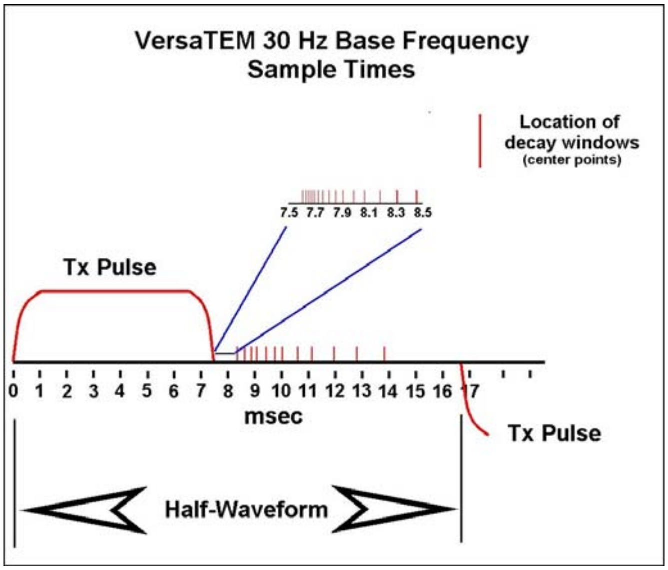


Figure 1 - VTEM Configuration

Figure 2 - VTEM sample times

Twenty-six measurement gates were used in the range from 130 µs to 7540 µs, as shown in the following table.

VTEM Decay Sampling scheme (Microseconds)			
Time gate	Start	End	Width
130	120	140	20
150	140	160	20
170	160	180	20
190	180	205	25
220	205	240	35
260	240	280	40
300	280	325	45
350	325	380	55
410	380	445	65
480	445	525	80
570	525	625	100
680	625	745	120
810	745	885	140
960	885	1045	160
1130	1045	1235	190
1340	1235	1470	235
1600	1470	1750	280
1900	1750	2070	320
2240	2070	2450	380
2660	2450	2920	470
3180	2920	3480	560
3780	3480	4120	640
4460	4120	4880	760
5300	4880	5820	940
6340	5820	6860	1040
7540	6860	8220	1360

Table 3 - VTEM decay sampling scheme

Transmitter coil diameter was 26 metres, the number of turns was 4.
Transmitter pulse repetition rate was 30 Hz.
Peak current was 212 A.
Duty cycle was 44%.
Peak dipole moment was 450,000 NIA.

Receiver coil diameter was 1.2 metre, the number of turns was 100.
Receiver effective area was 113 m^2
Wave form – trapezoid, pulse width 7.3 ms.
Recording sampling rate was 10 samples per second.

The EM bird was towed 42 m below the helicopter.

2.4.3. Airborne magnetometer

The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapour magnetic field sensor, mounted in a separate bird towed at the same altitude as the EM sensor. The sensitivity of the magnetic sensor is 0.02 nanoTesla (nT) at a sampling interval of 0.1 seconds. The magnetometer sends the measured magnetic field strength as nanoTeslas to the data acquisition system via the RS-232 port.

2.4.4. Ancillary Systems

2.4.4.1. Radar Altimeter

A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit.

2.4.4.2. GPS Navigation System

The navigation system used was a Geotech PC based navigation system utilizing a NovAtel's WAAS enable OEM4-G2-3151W GPS receiver, Geotech navigate software, a full screen display with controls in front of the pilot to direct the flight and an NovAtel GPS antenna mounted on the helicopter tail.
The co-ordinates of the block were set-up prior to the survey and the information was fed into the airborne navigation system.

2.4.4.3. Digital Acquisition System

A Geotech data acquisition system recorded the digital survey data on an internal compact flash card. Data is displayed on an LCD screen as traces to allow the operator to monitor the integrity of the system. Contents and update rates were as follows:

DATA TYPE	SAMPLING
TDEM	0.1 sec
Magnetometer	0.1 sec
GPS Position	0.2 sec
Radar Altimeter	0.2 sec

Table 4 - Sampling Rates

2.4.5. Base Station

A combine magnetometer/GPS base station was utilized on this project. A Geometrics Cesium vapour magnetometer was used as a magnetic sensor with a sensitivity of 0.001 nT. The base station was recording the magnetic field together with the GPS time at 1 Hz on a base station computer. The base station magnetometer sensor was installed away from electric transmission lines and moving ferrous objects such as motor vehicles. The magnetometer base station's data was backed-up to the data processing computer at the end of each survey day.

3. PERSONNEL

The following Geotech Ltd. personnel were involved in the project.

Field

Crew chief:	Les Moschuk
Operator:	Paul Taylor

The survey pilot and the mechanic engineer were employed directly by the helicopter operator – Heli-Horizon Inc.

Pilot:	Yohanne Gravol
Mechanical Engineer:	Tommy Levesque

Office

Data Processing:	Harish Kumar
Data Processing / Reporting:	George Lev
Data Technician:	Maria Jagodkin

Data acquisition and processing phases were carried out under the supervision of Andrei Bagrianski, Surveys Manager. Overall management of the project was undertaken by Edward Morrison, President, Geotech Ltd.

4. DATA PROCESSING AND PRESENTATION

4.1. Flight Path

The flight path, recorded by the acquisition program as WGS 84 latitude/longitude, was converted into the UTM coordinate system in Oasis Montaj.

The flight path was drawn using linear interpolation between x, y positions from the navigation system. Positions are updated every second and expressed as UTM eastings (x) and UTM northings (y).

4.2. Electromagnetic Data

A three stage digital filtering process was used to reject major sferic events and to reduce system noise. Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events. The filter used was a 16 point non-linear filter.

The signal to noise ratio was further improved by the application of a low pass linear digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 1 second or 20 metres. This filter is a symmetrical 1 sec linear filter.

The results are presented as stacked profiles of EM voltages for the gate times, in logarithmic scale.

Generalized modeling results of the VTEM system, written by Geophysicist Roger Barlow, are shown in Appendix C.

The VTEM output voltage of the receiver coil is shown in Appendix D.

4.3. Magnetic Data

The processing of the magnetic data involved the correction for diurnal variations by using the digitally recorded ground base station magnetic values. The base station magnetometer data was edited and merged into the Geosoft GDB database on a daily basis. The aeromagnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

Tie line levelling was carried out by adjusting intersection points along the traverse lines. A micro-levelling procedure was then applied. This technique is designed to remove persistent low-amplitude components of flight-line noise remaining after tie line levelling.

The corrected magnetic data was interpolated between survey lines using a random point gridding method to yield x-y grid values for a standard grid cell size of approximately 0.2 cm at the mapping scale. The Minimum Curvature algorithm was used to interpolate values onto a rectangular regular spaced grid.

5. DELIVERABLES

5.1. *Survey Report*

The survey report describes the data acquisition, processing, and final presentation of the survey results.

The survey report is provided in two paper copies and digitally in PDF format.

5.2. *Maps*

Final maps were produced at a scale of 1: 10,000. The coordinate/projection system used was the NAD83, UTM zone 17 north. All maps show the flight path trace. Latitude and longitude are also noted on maps.

The following maps are presented to Northern Gold Mining Inc. on paper as a result of the helicopter-borne geophysical survey carried out over the FREDERICK HOUSE LAKE block.

- Total Magnetic Field contours and colour images
- Logarithmic scale VTEM profiles, Time Gates 0.22 - 6.34 ms

5.4. *Digital Data*

There are three (3) main directories,

Data contains a database, grid and maps, as described below.

Report contains a copy of the report and appendixes in PDF format.

VTEM_fp_GoogleEarth
contains a kmz file containing flightpath of the FREDERICK HOUSE LAKE Project.
Free version of Google Earth software can be downloaded from,
http://earth.google.com/download-earth.html

- Database in Geosoft GDB format,

7031FHL.GDB containing the following channels:

X:	X positional data (metres – NAD83, utm zone 17 north)
Y:	Y positional data (metres – NAD83, utm zone 17 north)
Z:	GPS antenna elevation (metres - ASL) (on the tail of the helicopter)
Gtime1:	GPS time (seconds of the day)
Radar:	Helicopter terrain clearance from radar altimeter (metres - AGL)
DEM:	Digital elevation model (metres)
Mag1:	Raw Total Magnetic field data (nT)
Basemag:	Base station magnetic data (nT)
Mag2:	Total Magnetic field base station corrected data (nT)
Mag3:	Leveled Total Magnetic field data (nT)
C130f:	Raw 130 microsecond time channel ($pV/A/m^4$)
C150f:	Raw 150 microsecond time channel ($pV/A/m^4$)
C170f:	Raw 170 microsecond time channel ($pV/A/m^4$)
C190f:	Raw 190 microsecond time channel ($pV/A/m^4$)
C220f:	Raw 220 microsecond time channel ($pV/A/m^4$)
C260f:	Raw 260 microsecond time channel ($pV/A/m^4$)
C300f:	Raw 300 microsecond time channel ($pV/A/m^4$)
C350f:	Raw 350 microsecond time channel ($pV/A/m^4$)
C410f:	Raw 410 microsecond time channel ($pV/A/m^4$)
C480f:	Raw 480 microsecond time channel ($pV/A/m^4$)
C570f:	Raw 570 microsecond time channel ($pV/A/m^4$)
C680f:	Raw 680 microsecond time channel ($pV/A/m^4$)
C810f:	Raw 810 microsecond time channel ($pV/A/m^4$)
C960f:	Raw 960 microsecond time channel ($pV/A/m^4$)
C1130f:	Raw 1130 microsecond time channel ($pV/A/m^4$)
C1340f:	Raw 1340 microsecond time channel ($pV/A/m^4$)
C1600f:	Raw 1600 microsecond time channel ($pV/A/m^4$)
C1900f:	Raw 1900 microsecond time channel ($pV/A/m^4$)
C2240f:	Raw 2240 microsecond time channel ($pV/A/m^4$)
C2660f:	Raw 2660 microsecond time channel ($pV/A/m^4$)
C3180f:	Raw 3180 microsecond time channel ($pV/A/m^4$)
C3780f:	Raw 3780 microsecond time channel ($pV/A/m^4$)
C4460f:	Raw 4460 microsecond time channel ($pV/A/m^4$)
C5300f:	Raw 5300 microsecond time channel ($pV/A/m^4$)
C6340f:	Raw 6340 microsecond time channel ($pV/A/m^4$)
C7540f:	Raw 6340 microsecond time channel ($pV/A/m^4$)
PLinef:	Power line monitor (linear trend removed)

- Grids in Geosoft GRD format, as follow,

  7031FHL_Magfin: Total Magnetic field (nT)

  A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information.

  A 10m. grid cell size was used.

- Maps in Geosoft MAP format, as follow,

  7031FHL_Magfin: Total Magnetic Field image and contours
  7031FHL_EMLP: Logarithmic scale profiles, Time Gates 0.22 – 6.34 ms

- ASCII file VTEM_WaveForm.xyz in Geosoft format containing the following channel:

  Volt: output voltage of the receiver coil
  (volts, sampling rate 20 microseconds)

- A *readme.txt* file describing the content of digital data, as described above.

6. CONCLUSIONS

A versatile time domain electromagnetic helicopter-borne geophysical survey has been completed over one block located 20 km south-west from Iroquois Falls, Ontario, Canada.

Total survey line coverage is 360.9 line kilometres. The principal sensors included a Time Domain EM system and a magnetometer. Results have been presented as colour contour maps and stacked profiles.

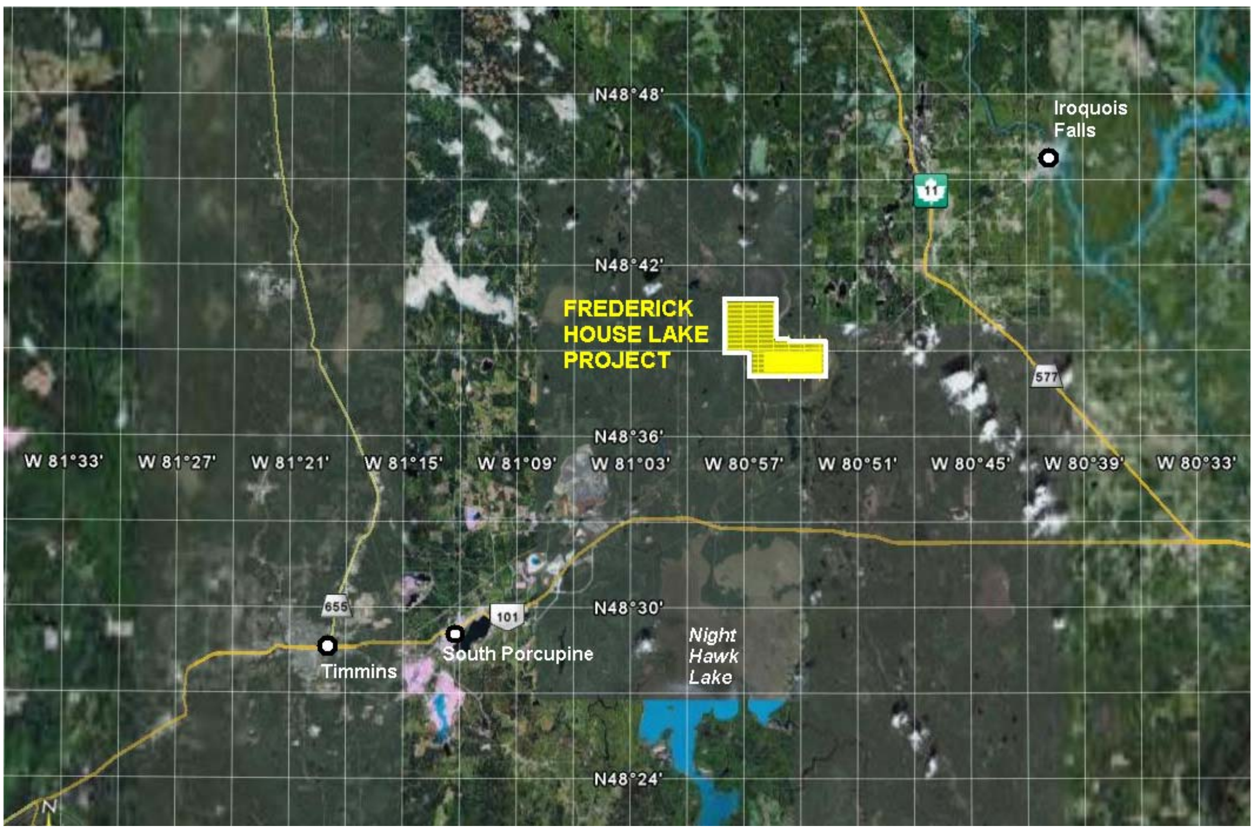
Final data processing at the office of Geotech Ltd. in Aurora, Ontario was carried out under the supervision of Andrei Bagrianski, Surveys Manager.

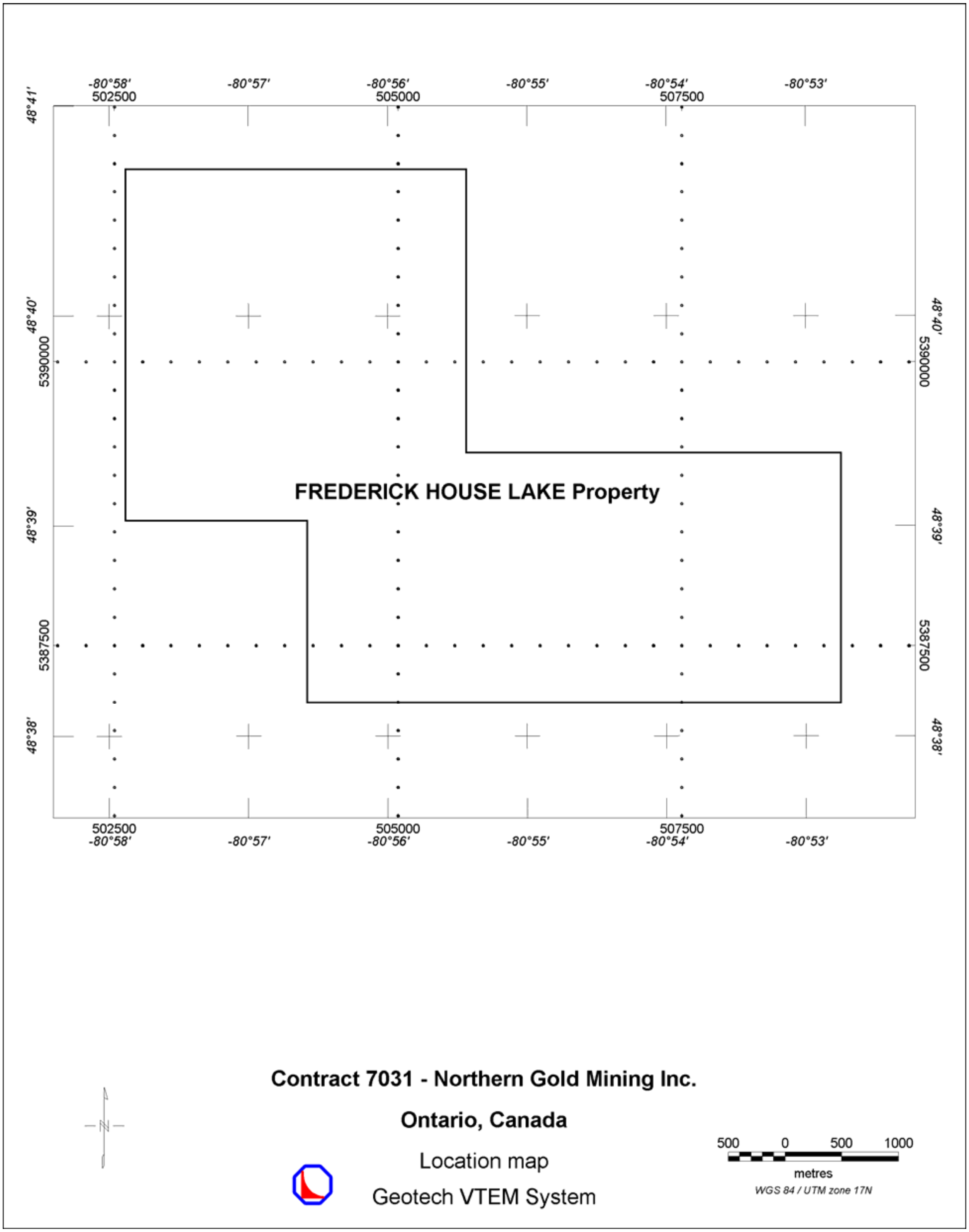
Respectfully submitted,

George Lev
Geotech Ltd.
April, 2007

APPENDIX A

SURVEY BLOCK LOCATION MAP





FREDERICK HOUSE LAKE Property
502500
505000
507500
-80°58'
-80°57'
-80°56'
-80°55'
-80°54'
-80°53'
48°41'
48°40'
48°39'
48°38'
5390000
5387500
Contract 7031 - Northern Gold Mining Inc.
Ontario, Canada
Location map
Geotech VTEM System
500
0
500
1000
metres
WGS 84 / UTM zone 17N

APPENDIX B

SURVEY BLOCK COORDINATES

(WGS 84, UTM zone 17N)

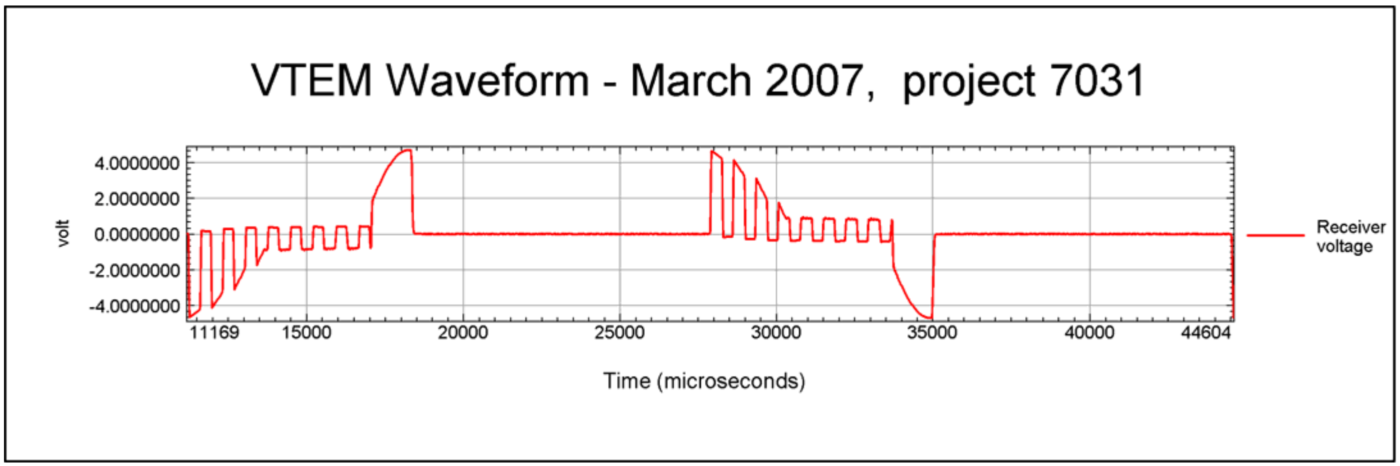
FREDERICK HOUSE LAKE	
X	Y
502600	5391700
505600	5391700
505600	5389200
508900	5389200
508900	5387000
504200	5387000
504200	5388600
502600	5388600

APPENDIX C

GENERALIZED MODELING RESULTS OF VTEM SYSTEM

APPENDIX D

VTEM WAVE FORM


VTEM Waveform - March 2007, project 7031
volt
4.0000000
2.0000000
0.0000000
-2.0000000
-4.0000000
11169
15000
20000
25000
30000
35000
40000
44604
Time (microseconds)
Receiver voltage

GENERALIZED MODELING RESULTS OF THE VTEM SYSTEM

Introduction

The VTEM system is based on a concentric or central loop design, whereby, the receiver is positioned at the centre of a 26.1 meters diameter transmitter loop that produces a dipole moment up to 625,000 NIA at peak current. The wave form is a bi-polar, modified square wave with a turn-on and turn-off at each end. With a base frequency of 30 Hz, the duration of each pulse is approximately 7.5 milliseconds followed by an off time where no primary field is present.

During turn-on and turn-off, a time varying field is produced (dB/dt) and an electro-motive force (emf) is created as a finite impulse response. A current ring around the transmitter loop moves outward and downward as time progresses. When conductive rocks and mineralization are encountered, a secondary field is created by mutual induction and measured by the receiver at the centre of the transmitter loop.

Measurements are made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) is present.

Efficient modeling of the results can be carried out on regularly shaped geometries, thus yielding close approximations to the parameters of the measured targets. The following is a description of a series of common models made for the purpose of promoting a general understanding of the measured results.

Variation of Plate Depth

Geometries represented by plates of different strike length, depth extent, dip, plunge and depth below surface can be varied with characteristic parameters like conductance of the target, conductance of the host and conductivity/thickness and thickness of the overburden layer.

Diagrammatic models for a vertical plate are shown in figures A and G at two different depths, all other parameters remaining constant. With this transmitter-receiver geometry, the classic **M** shaped response is generated. Figure A shows a plate where the top is near surface. Here, amplitudes of the duel peaks are higher and symmetrical with the zero centre positioned directly above the plate. Most important is the separation distance of the peaks. This distance is small when the plate is near surface and widens with a linear relationship as the plate (depth to top) increases. Figure G shows a much deeper plate where the separation distance of the peaks is much wider and the amplitudes of the channels have decreased.

Variation of Plate Dip

As the plate dips and departs from the vertical position, the peaks become asymmetrical. Figure B shows a near surface plate dipping 80º. Note that the direction of dip is toward the high shoulder of the response and the top of the plate remains under the centre minimum.

As the dip increases, the aspect ratio (Min/Max) decreases and this aspect ratio can be used as an empirical guide to dip angles from near 90º to about 30º. The method is not sensitive enough where dips are less than about 30º. Figure E shows a plate dipping 45º and, at this angle, the minimum shoulder starts to vanish. In Figure D, a flat lying plate is shown, relatively near surface. Note that the twin peak anomaly has been replaced by a symmetrical shape with large, bell shaped, channel amplitudes which decay relative to the conductance of the plate.

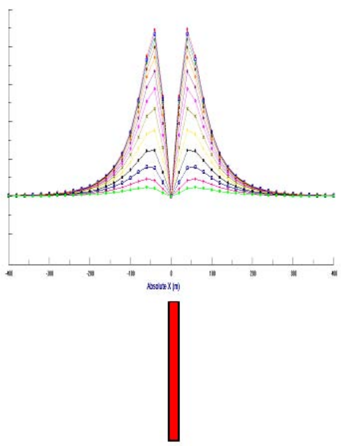
Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded formations where the conductors where once flat lying.

Variation of Prism Depth

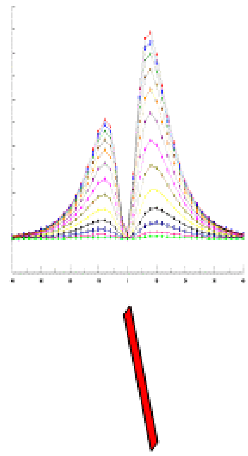
Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby, representing the thickness of the body more accurately.

Figures C, F and I show the same prism at increasing depths. Aside from an expected decrease in amplitude, the side lobes of the anomaly show a widening with deeper prism depths of the bell shaped early time channels.

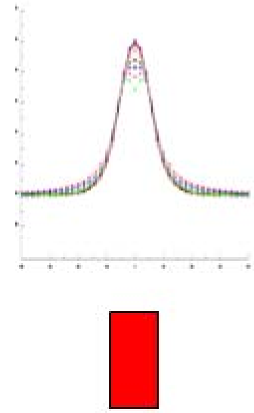
A



B



C



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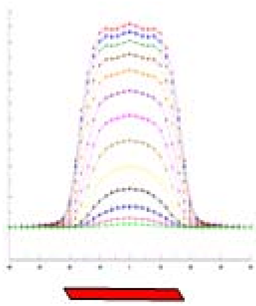
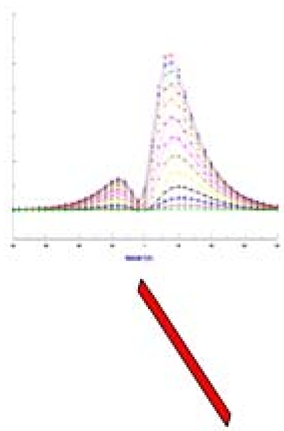
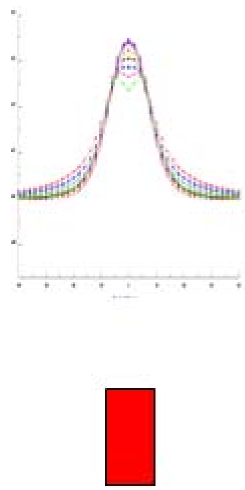


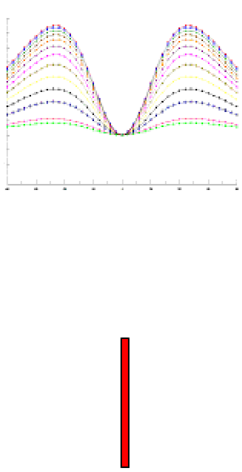
E



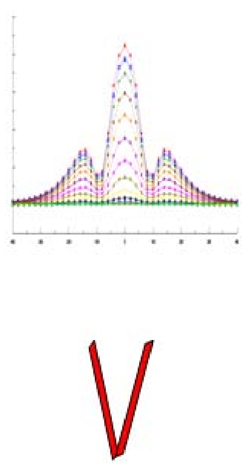
F



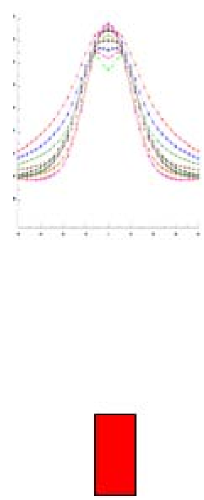
G



H



I



General Modeling Concepts

A set of models has been produced for the Geotech VTEM® system with explanation notes (see models A to I above). The reader is encouraged to review these models, so as to get a general understanding of the responses as they apply to survey results. While these models do not begin to cover all possibilities, they give a general perspective on the simple and most commonly encountered anomalies.

When producing these models, a few key points were observed and are worth noting as follows:

- For near vertical and vertical plate models, the top of the conductor is always located directly under the centre low point between the two shoulders in the classic **M** shaped response.

- As the plate is positioned at an increasing depth to the top, the shoulders of the **M** shaped response, have a greater separation distance.

- When faced with choosing between a flat lying plate and a prism model to represent the target (broad response) some ambiguity is present and caution should be exercised.

- With the concentric loop system and Z-component receiver coil, virtually all types of conductors and most geometries are most always well coupled and a response is generated (see model H). Only concentric loop systems can map this type of target.

The modelling program used to generate the responses was prepared by PetRos Eikon Inc. and is one of a very few that can model a wide range of targets in a conductive half space.

General Interpretation Principals

Magnetics

The total magnetic intensity responses reflect major changes in the magnetite and/or other magnetic minerals content in the underlying rocks and unconsolidated overburden. Precambrian rocks have often been subjected to intense heat and pressure during structural and metamorphic events in their history. Original signatures imprinted on these rocks at the time of formation have, it most cases, been modified, resulting in low magnetic susceptibility values.

The amplitude of magnetic anomalies, relative to the regional background, helps to assist in identifying specific magnetic and non-magnetic rock units (and conductors) related to, for example, mafic flows, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.

In addition to simple amplitude variations, the shape of the response expressed in the wave length and the symmetry or asymmetry, is used to estimate the depth, geometric parameters and magnetization of the anomaly. For example, long narrow magnetic linears usually reflect mafic flows or intrusive dyke features. Large areas with complex magnetic patterns may be produced by intrusive bodies with significant magnetization, flat lying magnetic sills or sedimentary iron formation. Local isolated circular magnetic patterns often represent plug-like igneous intrusives such as kimberlites, pegmatites or volcanic vent areas.

Because the total magnetic intensity (TMI) responses may represent two or more closely spaced bodies within a response, the second derivative of the TMI response may be helpful for distinguishing these complexities. The second derivative is most useful in mapping near surface linears and other subtle magnetic structures that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical derivative results. These higher amplitude zones reflect rock units having strong magnetic susceptibility signatures. For this reason, both the TMI and the second derivative maps should be evaluated together.

Theoretically, the second derivative, zero contour or colour delineates the contacts or limits of large sources with near vertical dip and shallow depth to the top. The vertical gradient map also aids in determining contact zones between rocks with a susceptibility contrast, however, different, more complicated rules of thumb apply.

Concentric Loop EM Systems

Concentric systems with horizontal transmitter and receiver antennae produce much larger responses for flat lying conductors as contrasted with vertical plate-like conductors. The amount of current developing on the flat upper surface of targets having a substantial area in this dimension, are the direct result of the effective coupling angle, between the primary magnetic field and the flat surface area. One therefore, must not compare the amplitude/conductance of responses generated from flat lying bodies with those derived from near vertical plates; their ratios will be quite different for similar conductances.

Determining dip angle is very accurate for plates with dip angles greater than 30º. For angles less than 30º to 0º, the sensitivity is low and dips can not be distinguished accurately in the presence of normal survey noise levels.

A plate like body that has near vertical position will display a two shoulder, classic **M** shaped response with a distinctive separation distance between peaks for a given depth to top.

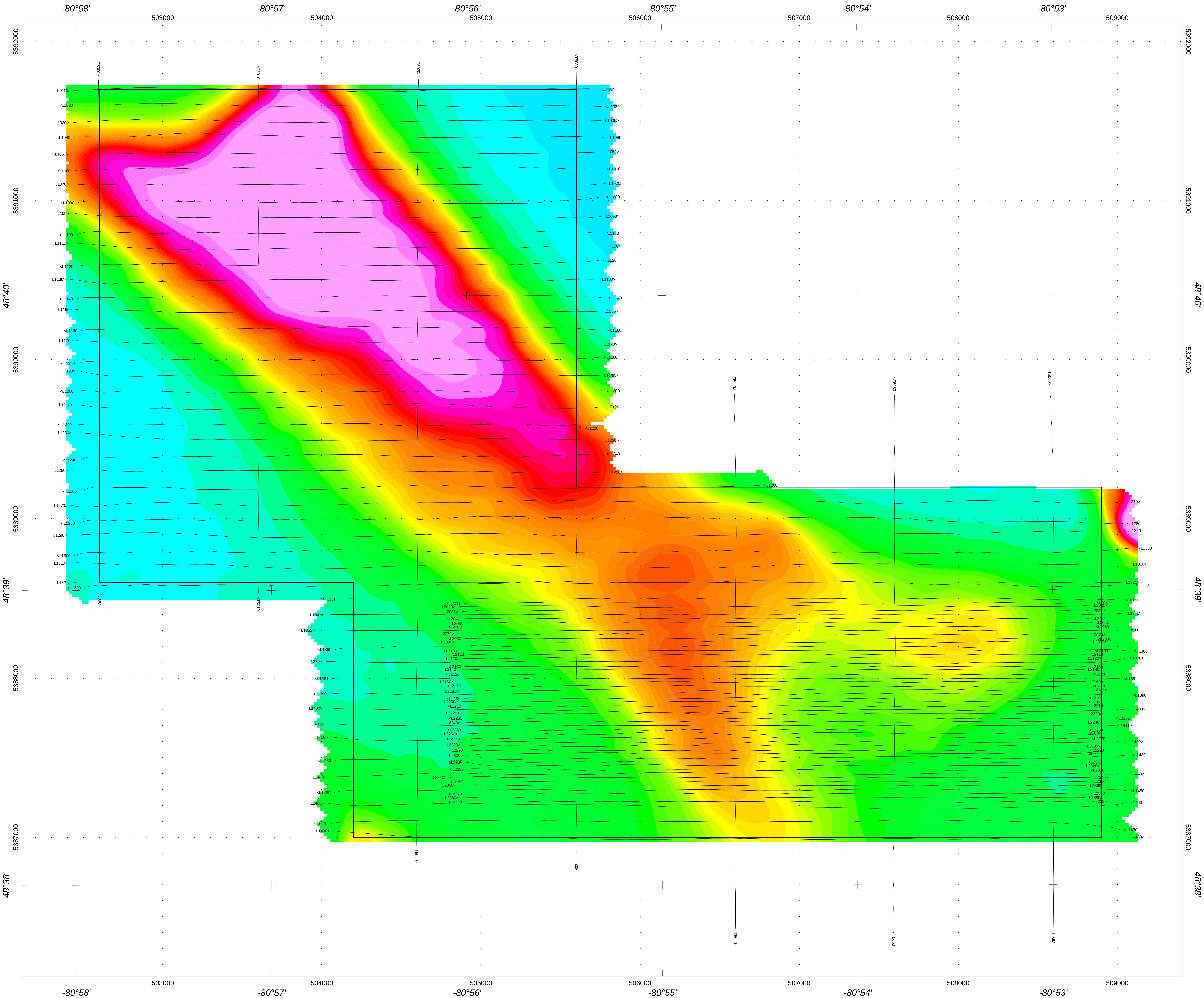
It is sometimes difficult to distinguish between responses associated with the edge effects of flat lying conductors and poorly conductive bedrock conductors. Poorly conductive bedrock conductors having low dip angles will also exhibit responses that may be interpreted as surfacial overburden conductors. In some situations, the conductive response has line to line continuity and some magnetic correlation providing possible evidence that the response is related to an actual bedrock source.

The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

The first stage is to determine which time gates are most descriptive of the overall conductance patterns. Maps of the time gates that represent the range of responses can be very informative.

Next, stacking the relevant channels as profiles on the flight path together with the second vertical derivative of the TMI is very helpful in revealing correlations between the EM and Magnetics.

Next, key lines can be profiled as single lines to emphasize specific characteristics of a conductor or the relationship of one conductor to another on the same line. Resistivity Depth sections can be constructed to show the relationship of conductive overburden or conductive bedrock with the conductive anomaly.



Survey Specifications:

Aircraft: Astar helicopter, Registration C-GWOW
Flight Line Spacing: 50 metres
Nominal terrain clearance 72 metres
EM Loop is 42 metres under helicopter
Magnetic sensor is 15 metres under helicopter

Instruments:

Geotech Time Domain Electromagnetic System (VTEM)
with concentric Rx/Tx geometry
Transmitter Loop Diameter 26 m, Base Frequency 30 Hz
Dipole Moment 425,000 NIA
Transmitter Wave Form: Trapezoid, Pulse Width 7.5 ms
Geometrics Optically-pumped,
High Sensitivity Cesium Magnetometer
Mag Resolution 0.02 nT at 10 samples/sec

PRELIMINARY

Time Channel 1.13 msec (pV/A/m^4)

Scale 1:10000

metres

WGS 84 / UTM zone 17N

Northern Gold Mining Inc.
Frederic House Lake Project
Ontario, Canada

Geotech VTEM System
Time Channel 1.13 milli-sec

Flown and processed by Geotech Ltd.
30 Industrial Parkway S.,
Aurora, Ontario, Canada L4G 3W2
www.geotechairborne.com

March 2007

Project 7031

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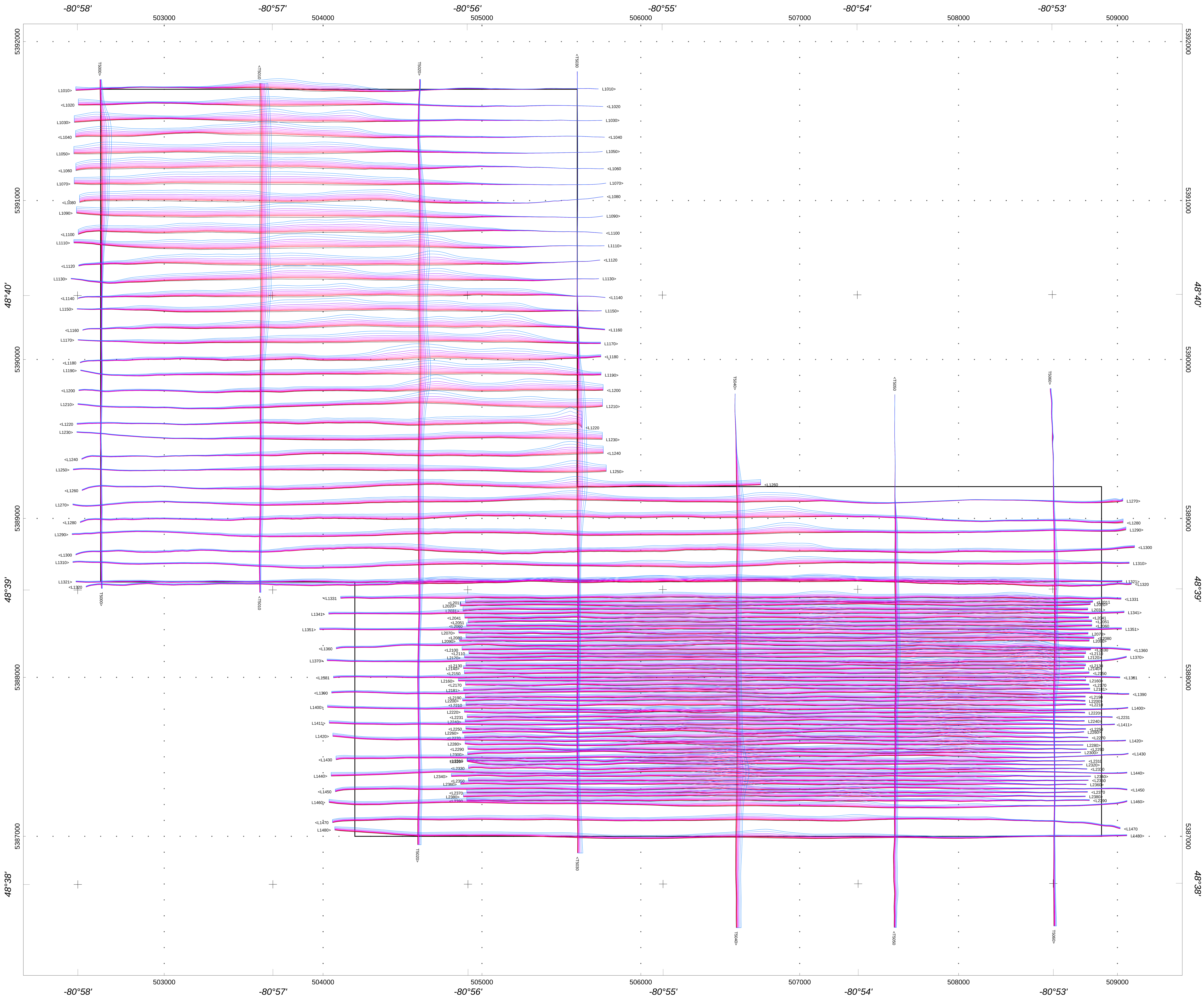

0.19 ms, 1mm = 1.5 pV/A/m^4
0.22 ms, 1mm = 1.5 pV/A/m^4
0.26 ms, 1mm = 1.5 pV/A/m^4
0.30 ms, 1mm = 1.5 pV/A/m^4
0.35 ms, 1mm = 1.5 pV/A/m^4
0.41 ms, 1mm = 1.5 pV/A/m^4
0.48 ms, 1mm = 1.5 pV/A/m^4
0.57 ms, 1mm = 1.5 pV/A/m^4
0.68 ms, 1mm = 1.5 pV/A/m^4

Scale 1:10000

100 0 100 200 300 400 500

metres

WGS 84 / UTM zone 17N

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Frederic House Lake Project
Ontario, Canada

Geotech VTEM System
VTEM Profiles
Time Gates 0.19 - 0.68 ms

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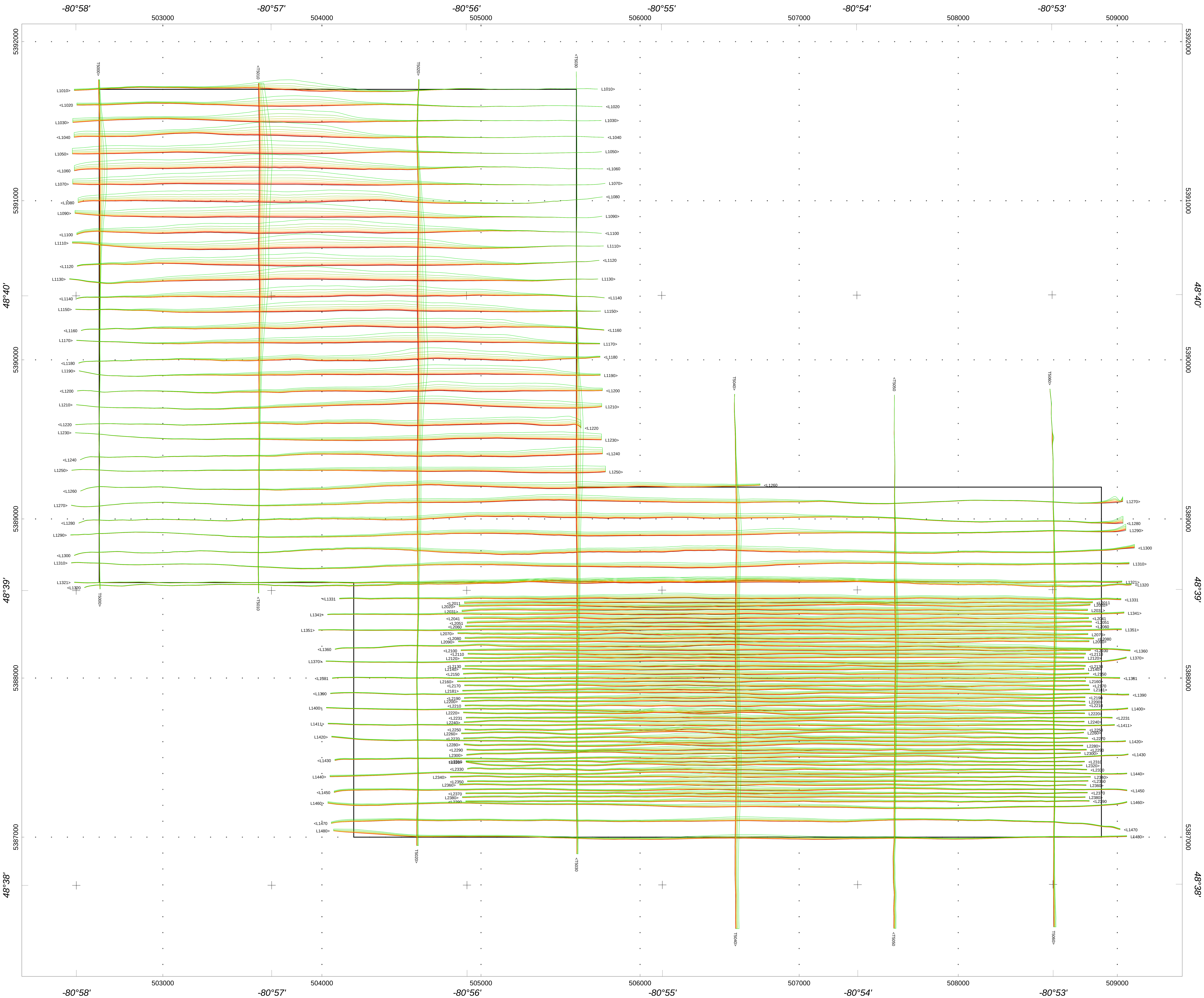

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Mag Resolution 0.02 nT at 10 samples/sec

0.81 ms, 1mm = 0.1 pV/A/m^4
0.96 ms, 1mm = 0.1 pV/A/m^4
1.13 ms, 1mm = 0.1 pV/A/m^4
1.34 ms, 1mm = 0.1 pV/A/m^4
1.60 ms, 1mm = 0.1 pV/A/m^4
1.90 ms, 1mm = 0.1 pV/A/m^4
2.24 ms, 1mm = 0.1 pV/A/m^4
2.66 ms, 1mm = 0.1 pV/A/m^4
3.18 ms, 1mm = 0.1 pV/A/m^4

Scale 1:10000

100 0 100 200 300 400 500

metres

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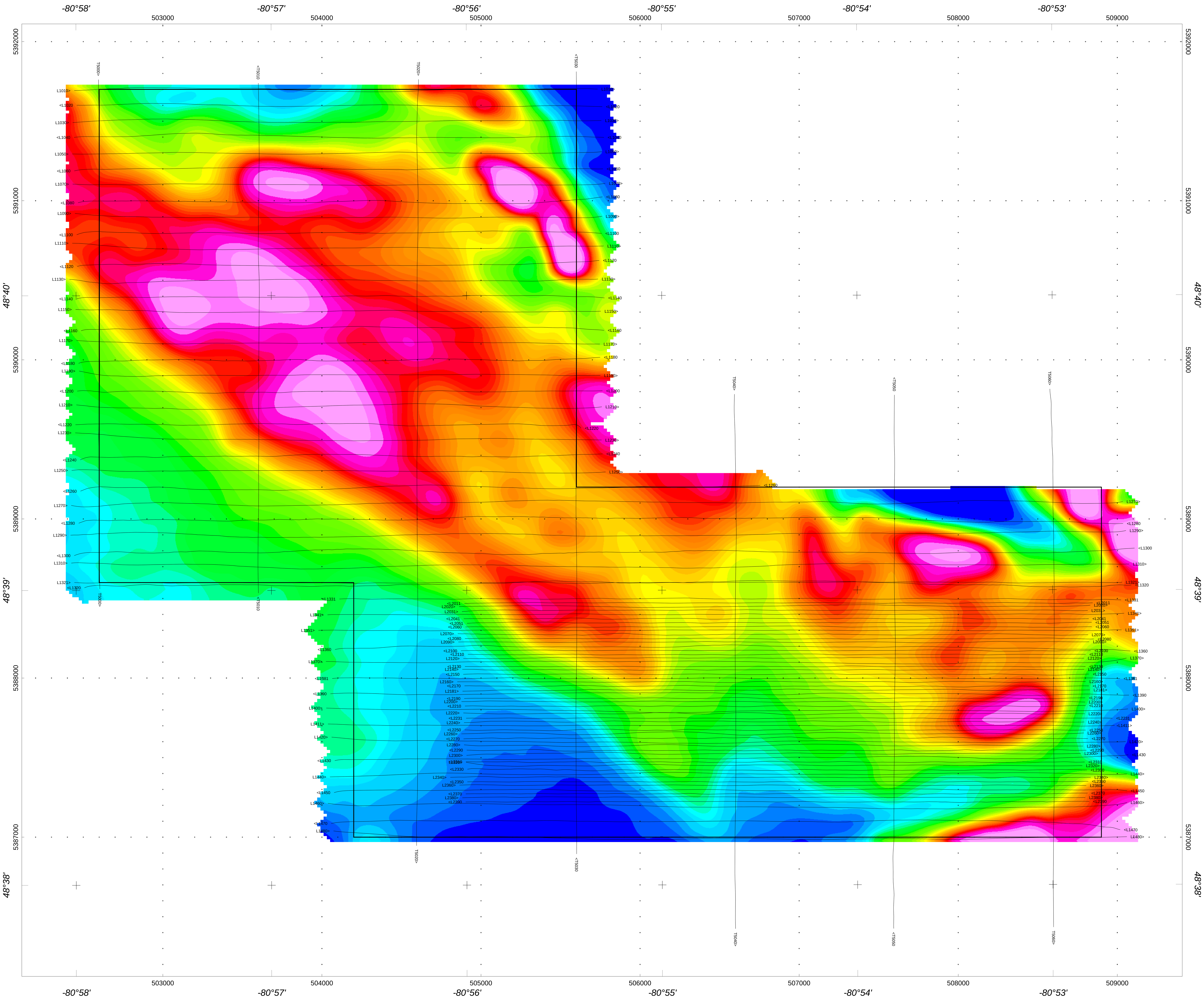

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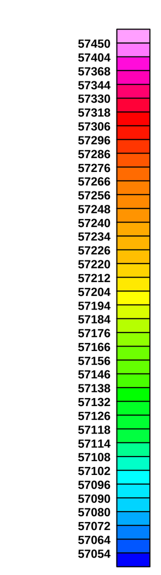

Magnetic field (nT)

Contour intervals:

- 2 nT
- 10 nT
- 50 nT
- 200 nT

Scale 1:10000

100 0 100 200 300 400 500

metres

WGS 84 / UTM zone 17N

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Ontario, Canada

Geotech VTEM System
Total Field Magnetics

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