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ZEN GEOMAP INC.

Assessment Report

Drone Magnetic Survey

Nipissing Diabase Project

(Darien Grid)

Long Township

Sault Ste. Marie Mining Division

Prepared for:

Darien Aggregates Inc.

Prepared by:

Kevin Cool – Technical Report

Matthew Johnston, P. Geo. – Geophysical Maps and Interpretation

Mining Claims Surveyed:

237159, 209446, 126269, 126268, 155566, 142795

December 15, 2021

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1.0 Introduction

The Darien Aggregates, ***Nipissing Diabase Project*** consists of a contiguous group of 58 Active Mining Claims. This report covers a drone magnetic survey carried out across 6 of the Active Mining Claims.

A drone magnetic survey was conducted on a portion of the Nipissing Diabase Property (see ***Figure 2***). Mining claims covered by this survey are located in Long Township, Sault Ste. Marie Mining Division. ***Table 1*** includes a list of mining claims, including the work value completed on each claim.

On November 8^{th}, 2021 the mining claims were surveyed using a Geometrics MFAM magnetometer mounted on a DJI M600 drone. Zen Geomap of Timmins, Ontario, carried out the magnetic survey on a contract basis for the client. The survey was performed to better-define a diabase dyke that sits within the survey grid area.

Data processing and maps were completed between November 9 and December 10, 2021 and the assessment report was prepared between November 10 and December 15, 2021.

2.0 Location and Access

The property is accessed from Timmins along Highway 101 and 144 to a point near Sudbury, then south to Hwy 17, then west along Hwy 17 to Pronto Road, which sits approximately 18km east of Blind River, then 2.2km along Pronto Road. The total driving distance from Timmins to the parking spot on Pronto Road is 461 km. The final 3km into the central grid area was accessed by ATV.

Figure 1 shows location and access.

		($)	$	(sq. m)			($)
	Anniversary	Work	in	Area	Area	Area %	Work
Claim #	Date	Required	reserve	Surveyed	Notes	of Total	Completed
170598	2022-06-07	400	57	0	Not Surveyed	0.00	0
220146	2022-06-07	400	57	0	Not Surveyed	0.00	0
113138	2022-06-07	200	57	0	Not Surveyed	0.00	0
323410	2022-06-07	200	57	0	Not Surveyed	0.00	0
113140	2022-06-07	400	57	0	Not Surveyed	0.00	0
303907	2022-06-07	400	57	0	Not Surveyed	0.00	0
135894	2022-06-07	400	57	0	Not Surveyed	0.00	0
113139	2022-06-07	200	57	0	Not Surveyed	0.00	0
211440	2022-06-07	200	0	0	Not Surveyed	0.00	0
296301	2022-06-07	200	0	0	Not Surveyed	0.00	0
211439	2022-06-07	400	0	0	Not Surveyed	0.00	0
143436	2022-06-07	400	57	0	Not Surveyed	0.00	0
170600	2022-06-07	400	57	0	Not Surveyed	0.00	0
237159	2022-06-07	400	57	70947	Portion of cell surveyed	11.31	688
170599	2022-06-07	400	57	0	Not Surveyed	0.00	0
314040	2022-06-07	400	0	0	Not Surveyed	0.00	0
117078	2022-06-07	400	0	0	Not Surveyed	0.00	0
230259	2022-06-07	400	0	0	Not Surveyed	0.00	0
257477	2022-11-25	400	57	0	Not Surveyed	0.00	0
209446	2022-11-25	400	57	103165	Portion of cell surveyed	16.44	1001
126269	2022-11-25	400	57	220968	Portion of cell surveyed	35.22	2143
126268	2022-11-25	400	57	43773	Portion of cell surveyed	6.98	425
296302	2022-06-07	400	0	0	Not Surveyed	0.00	0
100430	2022-06-07	400	0	0	Not Surveyed	0.00	0
143437	2022-06-07	400	0	0	Not Surveyed	0.00	0
155567	2022-11-25	400	0	0	Not Surveyed	0.00	0
155566	2023-11-25	400	826	97739	Portion of cell surveyed	15.58	948
142795	2022-11-25	400	0	90839	Portion of cell surveyed	14.48	881
209447	2022-11-25	200	0	0	Not Surveyed	0.00	0
278338	2022-01-17	200	0	0	Not Surveyed	0.00	0
258913	2022-06-07	400	0	0	Not Surveyed	0.00	0
222972	2022-06-07	400	0	0	Not Surveyed	0.00	0
296303	2022-06-07	400	0	0	Not Surveyed	0.00	0
324137	2022-11-25	400	0	0	Not Surveyed	0.00	0
294332	2022-11-25	400	0	0	Not Surveyed	0.00	0
221524	2022-11-25	400	0	0	Not Surveyed	0.00	0
221523	2022-11-25	200	0	0	Not Surveyed	0.00	0
233087	2022-01-17	200	0	0	Not Surveyed	0.00	0
164337	2022-01-17	200	0	0	Not Surveyed	0.00	0
258914	2022-06-07	400	0	0	Not Surveyed	0.00	0
222973	2022-06-07	400	0	0	Not Surveyed	0.00	0
143438	2022-06-07	400	0	0	Not Surveyed	0.00	0
314041	2022-06-07	400	0	0	Not Surveyed	0.00	0
102218	2022-01-17	400	0	0	Not Surveyed	0.00	0
221054	2022-01-17	200	0	0	Not Surveyed	0.00	0
155702	2022-01-17	400	0	0	Not Surveyed	0.00	0
241884	2022-01-17	400	0	0	Not Surveyed	0.00	0
276935	2022-01-17	200	0	0	Not Surveyed	0.00	0
215212	2022-01-17	200	0	0	Not Surveyed	0.00	0
156372	2022-01-17	200	0	0	Not Surveyed	0.00	0
325108	2022-01-17	200	0	0	Not Surveyed	0.00	0
258420	2022-01-17	200	0	0	Not Surveyed	0.00	0
221744	2022-01-17	200	0	0	Not Surveyed	0.00	0
276934	2022-01-17	200	0	0	Not Surveyed	0.00	0
191843	2022-06-12	200	0	0	Not Surveyed	0.00	0
128429	2022-01-17	200	0	0	Not Surveyed	0.00	0
102398	2022-06-12	200	0	0	Not Surveyed	0.00	0
162458	2022-01-17	200	0	0	Not Surveyed	0.00	0
			1738	627431	Total Area Surveyed on Active Mining Claims	**100.00**	**6086**
				6086	Total Survey Cost (not including HST)		

Table 1

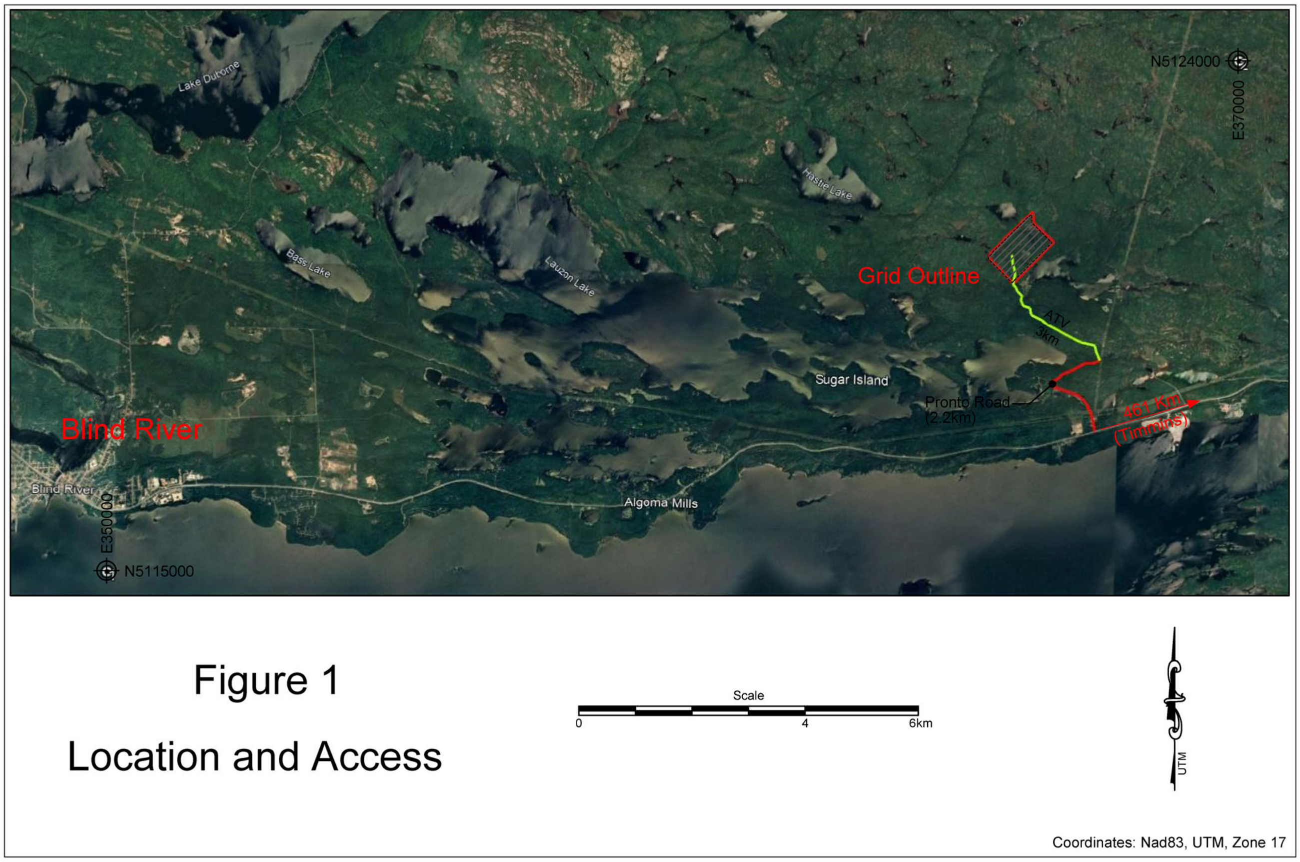


Figure 1 – Location and Access

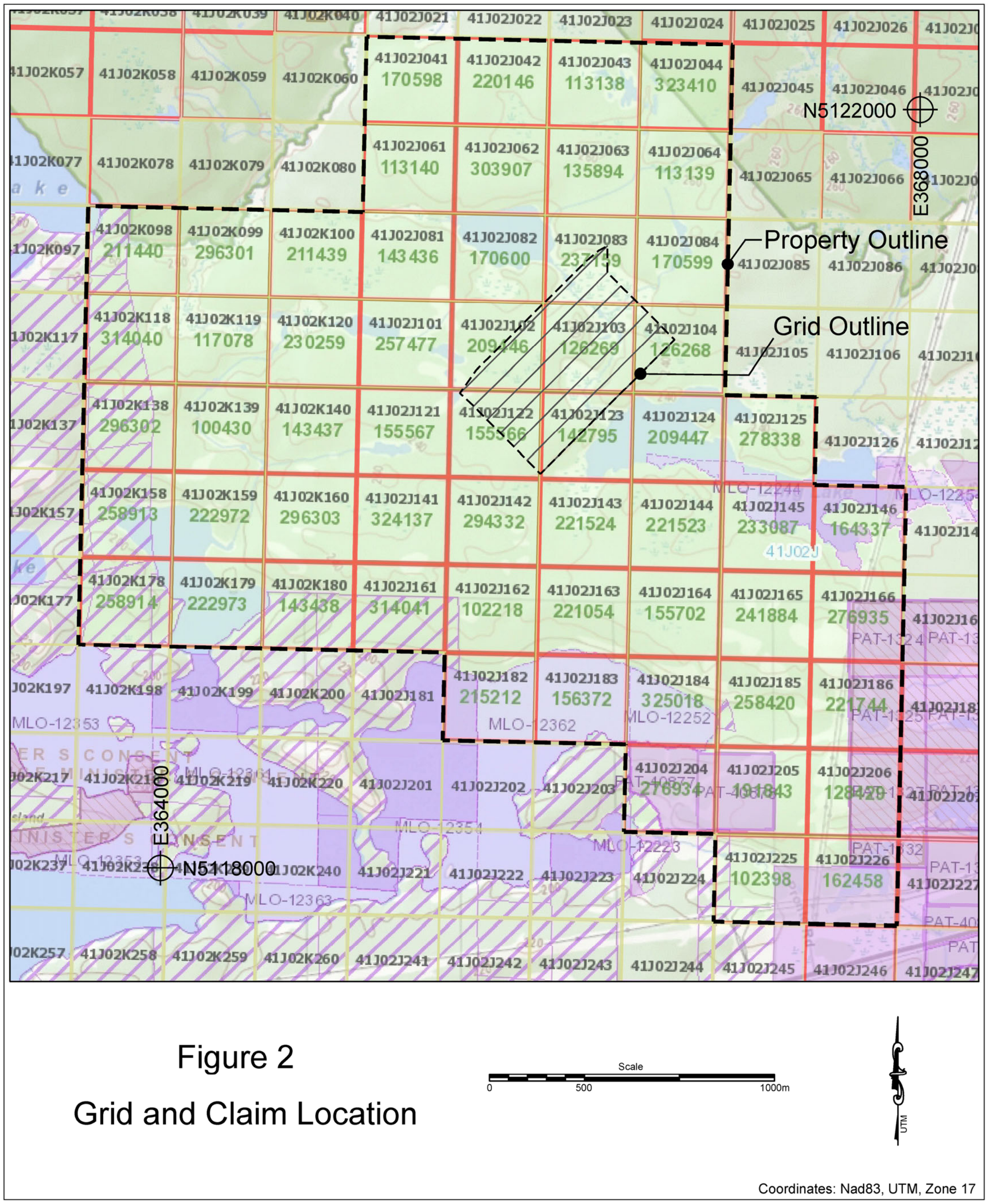


Figure 2 – Grid and Claim Location Map

3.0 Regional and Local Geology

In August, 2017 a report on diamond drilling for the Nipissing Diabase Project was submitted by JMK Exploration Consulting for assessment purposes. The following description of regional and local geology is being used with permission from the author of that report.

The project is located within the Southern Structural Province of the Canadian Shield which, in general terms, consists of an Archean basement overlain by the Early Proterozoic Huronian Supergroup and intruded by a number of felsic and mafic intrusive bodies that range in age from Early to Middle Proterozoic. The Archean rocks exposed in the Project area consist dominantly of massive to gneissic granitic rocks. Huronian rocks present in the Project area include the Lower and Middle Mississagi Formations (feldspathic quartzite, arkose to greywacke, siltstone and argillite respectively) and the Gowganda Formation (interbedded conglomerate, feldspathic quartzite, argillite and siltstone). The southeastern part of the main block of claims include mafic metavolcanics rocks and related chloritic sedimentary rocks. Both the Archean and granitic rocks and the Huronian sedimentary rocks are intruded by mafic intrusive rocks known as Nipissing Diabase during the Hudsonian Orogeny at approximately 2.155 Ma. In the Project area, these intrusions form west to northwest trending, vertical to steeply dipping, dyke or sill-like bodies that typically range in thickness from a few metres to <100 metres, however a number of thicker intrusions have been mapped. The dykes consist dominantly of diabase, gabbro and diorite (Lavigne, 2009).

4.0 Property History

2006: Darrien Resources Inc. completed limited reconnaissance prospecting.

2009: Darrien Resourced Inc. completed 5 diamond drill holes totaling 301 m located to the northwest of the current land package.

2011: Darien Resources Inc. completed trenching and bulk sampling on claims 3009531, 4219196 and 4223995.

2015: Darrien Aggregates Inc. completed the installation of 7 ground water monitoring wells. The diamond drill core was logged and submitted for assessment.

2016: Darien Aggregates Inc. completed geological mapping on claim 3009531.

2017: Darien Aggregates Inc. completed a diamond drilling program, consisting of 13 drill holes totaling 822m. All drill holes were completed within claim 3009531.

5.0 Summary of 2021 Drone Magnetic Survey

The program consisted of 1 grid summarized as follows:

Surveyed Nov 8, 2021:	**Total 9.5 line kilometers**
Altitude:	**50m above ground level**
Area:	**Total Survey Area 62.74 ha**

The grid lines were spaced 100 m apart and flown at an azimuth of 45 degrees with 3 tie lines spaced at approximately 466m intervals and flown at an azimuth of 135 degrees.
A Geometrics MFAM magnetometer mounted on a DJI M600 Pro hexacopter drone was used to survey all grid lines.

A Geometrics G856AX proton procession magnetometer was operated as a base station throughout the survey to provide diurnal monitoring of the local magnetic field variations. (Loc; **E365980 N5120567**)
Equipment specifications are provided in ***Appendix 1, 2 and 3***.
The survey covered 6 Active mining claims. (***Figure 2***)

6.0 Processing

Magnetometer data was collected on 2 Geometrics MFAM sensors operating at 1000hz. The data was processed through a custom program operating in Python. This converts raw data from Geometrics MFAM into a format compatible with Geosoft Oasis Montaj.

Customized import templates were used within Geosoft, to identify and separate mag readings into organized grid and tie lines. This step eliminates extraneous mag data collected as the drone travels to and from the grid.

Grid and tie line data were corrected to remove heading error and lag.
Corrected grid data was then levelled based on tie lines.

7.0 Interpretation, Conclusions and Recommendations

The current survey was successful at identifying and mapping magnetic anomalies at the Nipissing Diabase Project, Darien Grid. The residual magnetic values range between -100 and -275 nT.

The background magnetic pattern is disrupted by one linear anomalous magnetic high, indicated as anomaly A on the TMI and 1VD interpretive maps (P15 and 16). This magnetic anomaly likely represents a mafic diabase dike.

Geological mapping carried out in 2016 and diamond drilling completed in 2017 have identified and mapped the outline of Nipissing Diabase across the current, 2021 drone magnetic survey grid. The extent or limits of the Nipissing Diabase are known to exceed the more intense footprint identified as anomaly A. It is possible that anomaly A represents a Sudbury dike and the surrounding, moderately high magnetics to the NE and SW (orange / yellow / green) may represent Nipissing Diabase.

It is recommended that the 2021 drone magnetic survey data be re-processed or modeled in attempt to emphasize the Nipissing Diabase, which has been the primary focus of the client dating back to initial reconnaissance in 2006.

The cost of re-processing and / or 3D inversion modeling ranges between $2,000 and $6,000 and is recommended as the next step for evaluating the Nipissing Diabase Project. Any future processing could be overlaid on past geological mapping and diamond drilling from 2016 / 2017.

Statement of Qualifications

Author - Kevin Cool		
		Education
from	to	Description
	1983	Photography - 1 year, Humber College, Toronto Ontario
1988	1990	Survey Engineering Technician - 2 year honours diploma, Northern College Porcupine Campus
	2014	Received Permanent Prospectors Licence, by reason of having held a Prospector's Licence for 25 years or more
	2014	Aviation Ground School, Transport Canada Compliant Unmanned Aerial System training seminar
	2014	Radio Operators Certificate - Aeronautical
		Companies owned and operated
1990	2001	**General Surveys & Exploration** - mining, exploration, aggregate, construction survey and computer drafting.
2000	2005	**Big Red Diamond Corp.** - traded publicly on TSX Venture excahange under symbol DIA. Junior mining company exploring for diamonds.
		Participated in and managed regional-scale airborne geophysical programs, stream sampling, geochem sampling and camp construction.
		Property-scale work includes ground magnetometer, grid cutting and survey.
2005	2011	**True North Mineral Laboratories Inc.** - heavy mineral separation by heavy liquid. Crushing / pulverizing for other assay. 30+ employees.
		Provided services to the mining and exploration industry such as claim staking, till and geochem sampling, magnetometer survey.
2014	current	**UAV Timmins** - drone aerial mapping and survey. 1st company to apply drone air photo survey as valid mining claim assessment in Ontario.
2017	current	**Zen Geomap Inc.** - drone magnetometer survey. 1st company to apply drone mag survey as valid mining claim assessment in Ontario.

I, Kevin Scott Cool, of 15 Prospector St., Gold Centre in the City of Timmins, Province of Ontario, hereby certify that:

1) I am a graduate of Northern College of Applied Arts and Technology, May 26th 1990, Porcupine Campus, with a 2 year Honors Diploma in Survey Engineering Technology

2) I have subsequently operated above businesses, directly engaged with the mining and exploration industry.

3) I have been actively engaged in my profession since May, 1990, in all aspects of ground and airborne exploration programs including the planning and execution of regional and property-scale programs, supervision, data processing, maps, interpretation and reports.

Kevin Scott Cool

Zen Geomap
204-70C Mountjoy ST. N.
Timmins, ON P4N 4V7

Statement of Qualifications

This is to certify that: MATTHEW JOHNSTON

I am a resident of North Bay; province of Ontario since November 1, 2017.

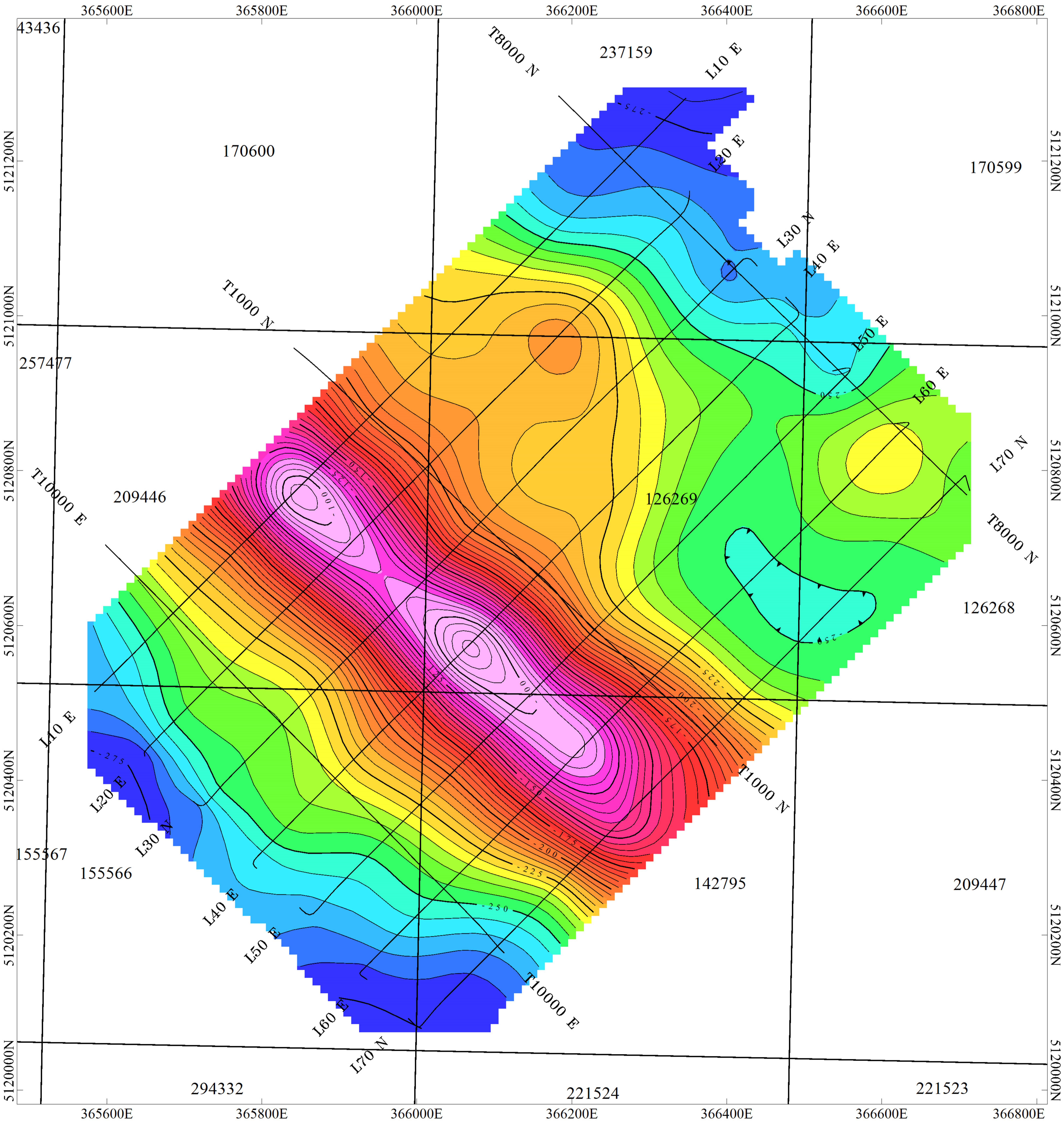
I am self-employed as a Consulting Geophysicist, based in North Bay, Ontario.

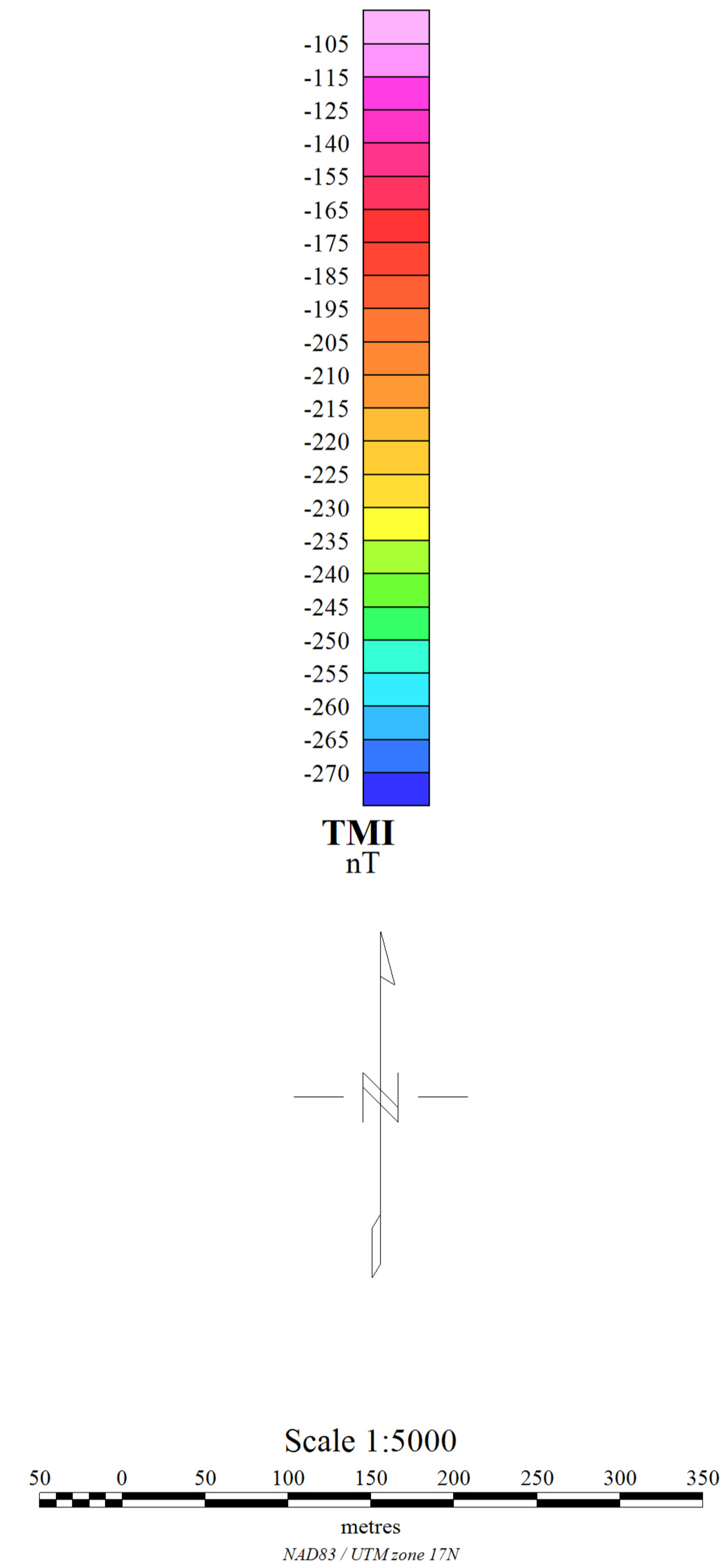
I have received a B.Sc. in geophysics from the University of Saskatchewan; Saskatoon, Saskatchewan in 1986.

I have been employed as a professional geophysicist in mining exploration, environmental and other consulting geophysical techniques since 1986.

I am a member in good standing with the Association of Professional Geoscientists of Ontario as a Practicing member; membership no. 2046

Signed in North Bay, Ontario, this December 15, 2021





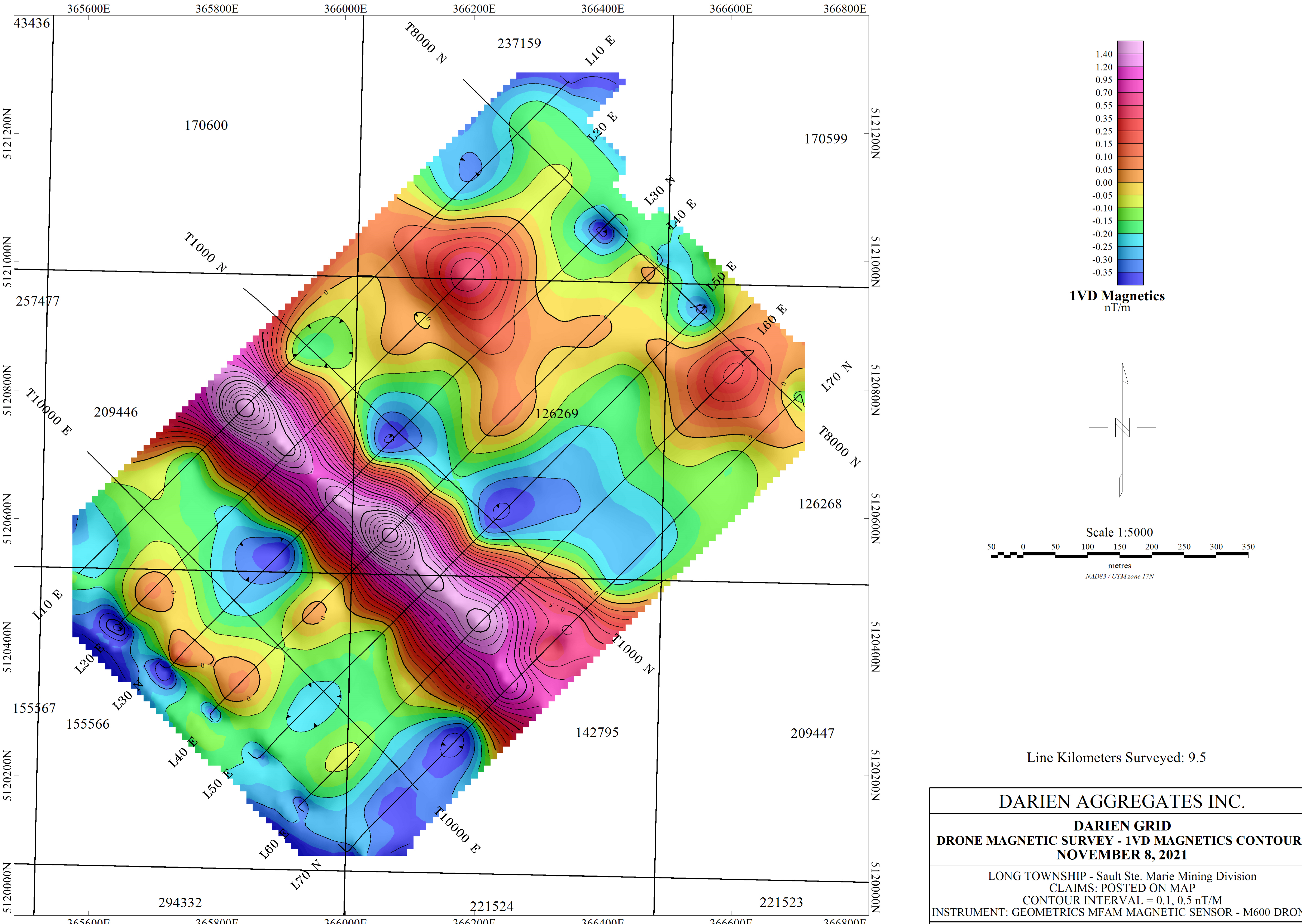
Line Kilometers Surveyed: 9.5

DARIEN AGGREGATES INC.

DARIEN GRID
DRONE MAGNETIC SURVEY - TMI CONTOURS
NOVEMBER 8, 2021

LONG TOWNSHIP - Sault Ste. Marie Mining Division
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 5, 25 nT
INSTRUMENT: GEOMETRICS MFAM MAGNETIC SENSOR - M600 DRONE

SURVEYED BY: ZEN GEOMAP INC.



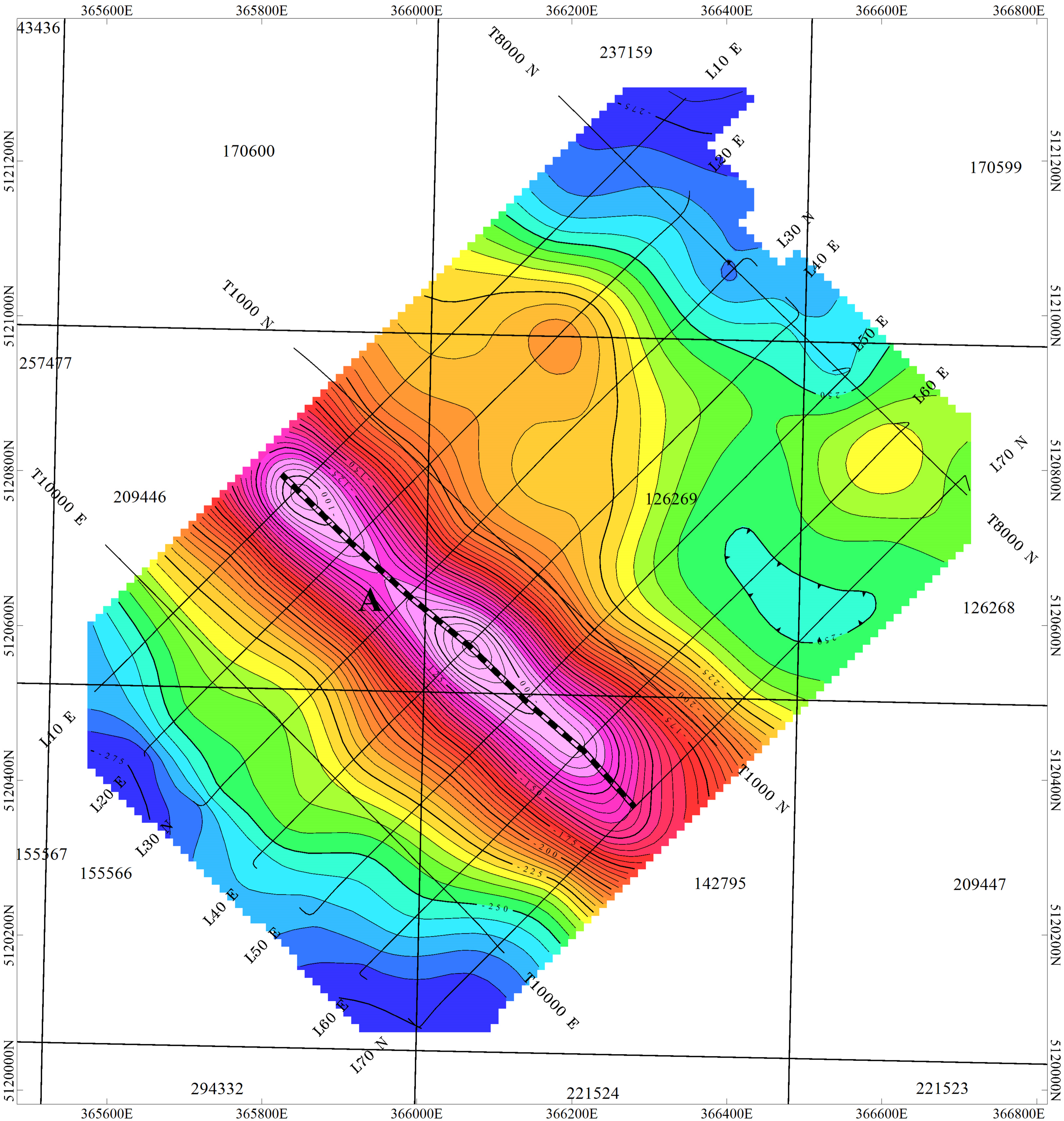
Line Kilometers Surveyed: 9.5

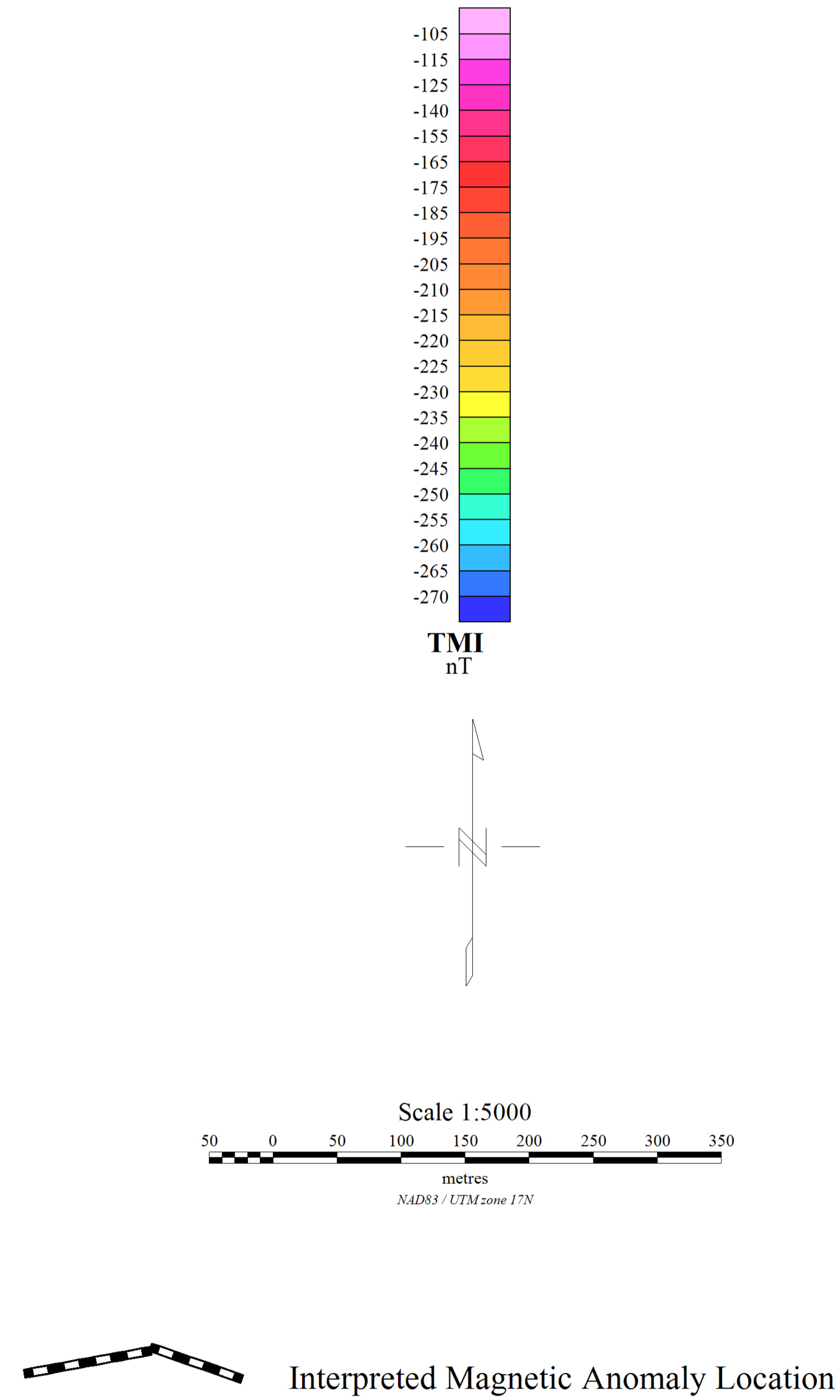
DARIEN AGGREGATES INC.

DARIEN GRID
DRONE MAGNETIC SURVEY - 1VD MAGNETICS CONTOURS
NOVEMBER 8, 2021

LONG TOWNSHIP - Sault Ste. Marie Mining Division
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 0.1, 0.5 nT/M
INSTRUMENT: GEOMETRICS MFAM MAGNETIC SENSOR - M600 DRONE

SURVEYED BY: ZEN GEOMAP INC.





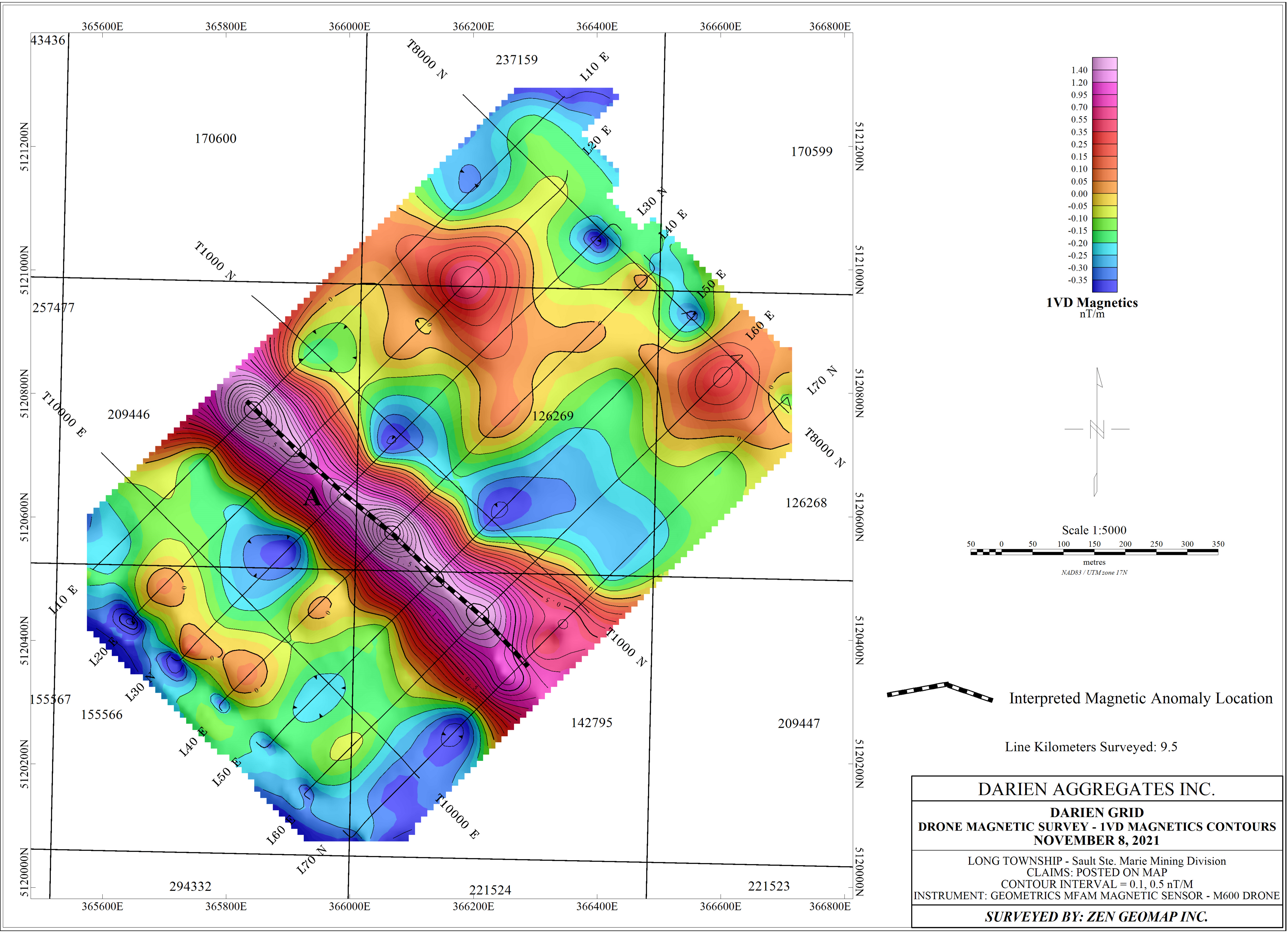
Line Kilometers Surveyed: 9.5

DARIEN AGGREGATES INC.

DARIEN GRID
DRONE MAGNETIC SURVEY - TMI CONTOURS
NOVEMBER 8, 2021

LONG TOWNSHIP - Sault Ste. Marie Mining Division
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 5, 25 nT
INSTRUMENT: GEOMETRICS MFAM MAGNETIC SENSOR - M600 DRONE

SURVEYED BY: ZEN GEOMAP INC.


365600E
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294332
221524
221523
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T10000 E
L10 E
L20 E
L30 N
L40 E
L50 E
L60 E
L70 N
A
1.40
1.20
0.95
0.70
0.55
0.35
0.25
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
1VD Magnetics
nT/m
Scale 1:5000
50 0 50 100 150 200 250 300 350
metres
NAD83 / UTM zone 17N
Interpreted Magnetic Anomaly Location
Line Kilometers Surveyed: 9.5
DARIEN AGGREGATES INC.
DARIEN GRID
DRONE MAGNETIC SURVEY - 1VD MAGNETICS CONTOURS
NOVEMBER 8, 2021
LONG TOWNSHIP - Sault Ste. Marie Mining Division
CLAIMS: POSTED ON MAP
CONTOUR INTERVAL = 0.1, 0.5 nT/M
INSTRUMENT: GEOMETRICS MFAM MAGNETIC SENSOR - M600 DRONE
SURVEYED BY: ZEN GEOMAP INC.

Appendix I

Geometrics MFAM Magnetometer Specifications

System Basics

- System utilizes 2 MFAM sensors
- Sensors are controlled by 1 sensor module
- Sensor module communicates with a Texas Instruments main board
- Sensitivity: 0.00003nT
- Sensors operate at 1000Hz (collect 1000 readings per second on both sensors)

Technical Specifications

SPECIFICATIONS:

Mechanical:
  Enclosure Dimensions: 9" x 6 5/8" x 1 3/16"
  Sensor Cable length (Development box to Sensor): 20.5 inches
Power:
  AC adapter: 13.5 to 16 Volts DC at 1.0A
  Battery Pack: 12 volt 1800 mA-Hour Lithium Polymer

FEATURES:

1) **TIVA TM4C1294NCPDT Micro controller:** This is a 32 bit ARM Cortex-MF4 based microcontroller running at up to 120 MHz. It has 1024K of flash, with 256K bytes of RAM, and 6 KBytes of EEPROM.

2) **USB 2.0 Micro Connector:** USB functionality is provided by the TIVA microcontroller and TIVAWare support libraries.

3) **Four User LEDs:** Four user controlled LEDs are wired to TIVA microcontroller GPIO pins PK0, PK1, PN0, and PN1.

4) **Two User Switches:** Two user read switches are wired to the microcontroller pins PK6 and PJ1.

5) **One Microcontroller Reset Switch:** This switch is used to reset the microcontroller.

6) **Wi-Fi port for TI CC3100 Wi-Fi Booster Pack:** The Development board layout allows a TI CC3100 Wi-Fi Booster pack to be directly plugged in. Using TIVAWare libraries, software can be developed to allow Wi-Fi communication between the Development board and a computer.

7) **USB XDS110 Port for Firmware Downloading and Debugging:** This second USB port is used as a debug/firmware download interface between the TI Code Composer Studio development suite and the Development Kit.

8) **Two RS-232 Serial Ports with RJ-45 Connectors:** Two general purpose serial ports are available to the user. The first serial port is wired to TIVA microcontroller UART4, and supports RTS and CTS handshaking. The second serial port is wired to TIVA microcontroller UART5. This port supports only TxD and RxD. Both of these ports use +/- 8 volt voltage swings, and support baud rates up to 920 KBaud. Note that these two ports are wired as Data Terminal Equipment (DTE) Thus to connect either of these two ports to a computer it would need to connect through a null modem. .

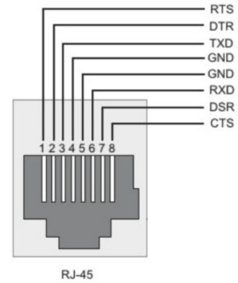


Figure 3: Serial Port Pinout

9) **On Board GPS Module:** An Adafruit GPS module is included with the Development Kit. It features 66 channels, -165 dBm sensitivity, and 3 Meter accuracy. An external GPS antenna is included so that signals can be received inside the box even with the cover in place. By default the GPS powers up to 9600 baud with several GPS sentences being output. The firmware that comes with the Development kit reconfigures the GPS to output only an RMC sentence at 115200 baud. This RMC string is sent with the output TCP data packet as described in the "Ethernet Data Format" section. The GPS is wired to UART7 on the TIVA microcontroller using 0-3.3 volt logic swings.

The 1PPS pulse from this GPS goes to the MFAM development module and disciplines the cycle rate to exactly 1 kiloSamples per second.

10) **Micro SD Card Slot for Storing Data Locally:** A micro SD card slot is available for the user to read and write data using a SPI interface. It is connected to SPI port 1 of the TIVA microcontroller.

11) **10 MHZ Timing Reference Input Port:** This input port takes a 10 MHz reference signal from a GPS disciplined reference oscillator, buffers and squares it up, and sends it to the MFAM module. The purpose of this signal is to lock the MFAM clocking system to this reference signal so that the Larmor frequency can be measured to an absolute standard. At this time, the MFAM does not support this feature. This function will be implemented in the future.

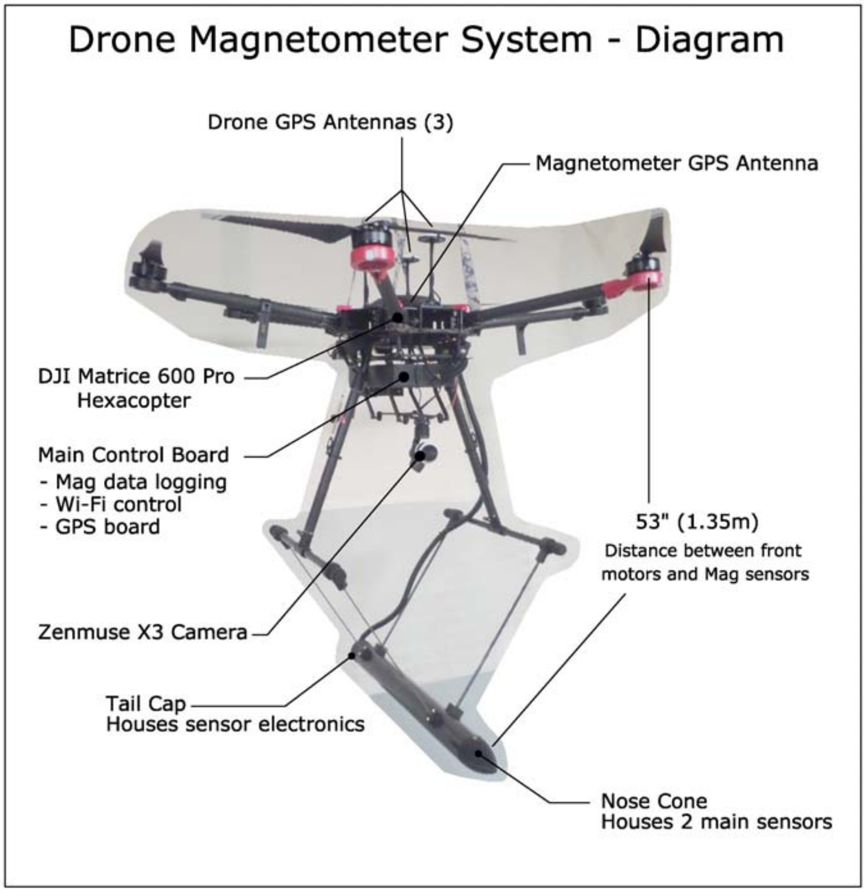
12) **Ethernet port with Power over Ethernet Compatibility**: The Tiva microcontroller contains a fully integrated Ethernet MAC and PHY. In addition, the Ethernet port can power the Development Kit via Power over Ethernet (PoE) using an Ethernet power injector.

13) **1.8 Amp-Hour Battery pack:** Three on board lithium/polymer batteries can power the system for 2 hours. A switch on the Development board allows the battery to be turned on/off. In addition, if the battery voltage falls below 8 volts the MFAM module will automatically shut down while keeping the microcontroller alive.

14) **Integrated Battery Charging system:** A lithium/polymer battery charging system is on board. If the battery switch is turned on, and the AC power adapter is plugged in, the batteries will be charged.

15) **Four Differential Analog Input Channels:** There are four differential analog inputs available for use. Channels 0 and 1 are +/- 2.5 volts full scale, while channels 2 and 3 are 0 to +5 volts full scale. In the firmware supplied with the Development kit (which sends MFAM/GPS data to the MFAMConsole program on the computer), all four channels are sampled synchronously with the MFAM data input to the Tiva are included in the data stream.

16) **On board Power/Status LEDs:** Several Status and Power LEDs are arranged along the front edge of the board. They include the four user LEDs, Power status LEDs (which power source is powering the board, and whether the battery is charging or the voltage low). They are listed in the Front and Back Panel Connection and Indicator section below.



<u>Description and Location of components</u>

The Geometrics MFAM magnetometer "main board" is attached directly below the central body of the DJI Matrice 600 Pro hexacopter drone. This box contains a small, Texas Instruments computer that collects and stores magnetometer readings on a micro-SD card. It also houses a 66 channel Adafruit GPS module, which operates independent of the (3) internal drone GPS modules. The Adafruit GPS collects and stores "GPS readings" (Lat / Long / Altitude / Time). The GPS readings are assigned to each mag reading, as the drone navigates along grid lines. A Wi-Fi module is attached to the Texas Instruments computer, which allows the operator to start and stop the magnetometer at a distance.

The Geometrics MFAM magnetometer operates using 2 separate mag sensors, attached to a "sensor module" with a flexible circuit board. The sensor module and 2 sensors are housed in a carbon graphite tube, which is mounted (suspended) 53 inches (1.35m) below the 2 front motors of the drone.

Magnetic shielding (mu-metal) is installed at 6 locations around the drone body, to provide additional shielding between drone components and the 2 mag sensors.

The magnetometer GPS antenna (for the internal Adafruit GPS) is mounted on top the drone body, to allow for clear signal. The vertical distance between this antenna and the 2 mag sensors, is 1.20m. This value is considered when reporting "mean terrain clearance", by subtracting 1.2m from the elevation assigned to each mag reading.

Appendix II

Geometrics G856AX
Proton procession magnetometer specifications

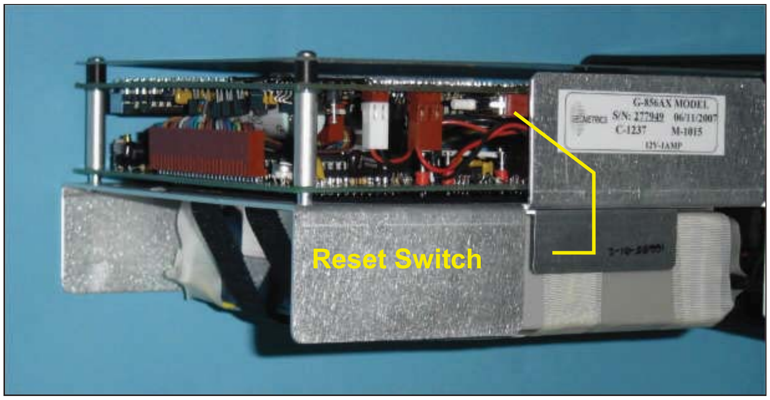


Figure 23. Internal reset switch.

Specifications

- Displays - Six digit display of magnetic field to resolution of 0.1 gamma or time to nearest second. Additional three-digit display of station, day of year, and line number.

- Resolution - Typically 0.1 gamma in average conditions. May degrade to lower resolution in weak fields, noisy conditions or high gradients.

- Absolute accuracy - One gamma, limited by remnant magnetism in sensor and crystal oscillator accuracy.

- Clock - Julian clock with stability of 5 seconds per month at room temperature and 5 seconds per day over the temperature range of -20 to +50 degrees Celsius.

- Tuning - Push button tuning from keyboard with current value displayed on request. Tuning range 20 to 90 μT.

- Gradient - Tolerates gradients to 1800 gammas/meter. When high Tolerance gradients truncate count interval, maintains partial reading to an accuracy consistent with data.

- Cycle Time - Complete field measurement in three seconds in normal operation. Internal switch selection for faster cycle (1.5 seconds) at reduced resolution or longer cycles for increased resolution.

- Manual Read - Takes reading on command. Will store data in memory on command.

- Memory - Stores more than 5700 readings in survey mode, keeping track of time, station number, line number day and magnetic field reading. In base station operation, computes for retrieval but does not store time of recording designated by sample interval, allowing storage of up to 12,000 readings.

- Output - Plays data out in standard RS-232 format at selectable baud rates. Also outputs data in real time byte parallel, character serial BCD for use with digital recorders.

- Inputs - Will accept an external sample command.

- Special - An internal switch allows:
  - adjustment of Functions polarization time and count time to improve performance in marginal areas or to improve resolution or speed operation
  - three count averaging
  - choice of lighted displays in auto mode.

- Physical -
  - Instrument console: 7 x 10 ½ x 3 ½ inches (18 x 27 x 9 cm), 6 LB (2.7 kg)
  - Sensor: 3 1/2 x 5 inches (9 x 13 cm), 4 LB (1.8 kg)
  - Staff: 1 inch x 8 feet (3cm x 2.5m), 2 LB (1kg)

- Environmental: Meets specifications from 1 to 40°C. Operates satisfactorily from -20 to 50°C.

- Power - Depending on version, operates from internal rechargeable Gel-cells or 9 D-cell flashlight batteries . May be operated from external power ranging from 12 to 18 volts external power. Power failure or replacement of batteries will not cause loss of data stored in memory.

- Standard system (P/N 16600-02) components:
  - Sensor (P/N 16076-01) and sensor cable (P/N 16134-01)
  - Console (P/N 16601-01)
  - Staff, one top section (P/N 16535-01), two middle sections (P/N 16536-01) and 1 bottom section (P/N 16537-01)
  - Carry harness (P/N 16002-02)
  - Two sets of rechargeable batteries (P/N 16697-01) and battery charger (P/N 16699-01)
  - Carrying case (P/N 16003-01)
  - Download cable (P/N 16492-01)
  - Hardcopy operation manual (P/N 18101-02)
  - Magnetometer CD (P/N 26648-01)

- Optional accessories:
  - Tripod kit for base-station operation (P/N 16708-02)
  - Gradiometer kit (P/N 166651-01)
  - Gradiometer carry/storage case (16003-01)

Specifications

• Aircraft	
Diagonal Wheelbase	1133 mm
Dimensions	1668 mm × 1518 mm × 727 mm with propellers, frame arms and GPS mount unfolded (including landing gear) 437 mm × 402 mm × 553 mm with propellers, frame arms and GPS mount folded (excluding landing gear)
Weight (with six TB47S batteries)	9.5 kg
Weight (with six TB48S batteries)	10 kg
Max Takeoff Weight Recommended	15.5 kg
Hovering Accuracy (P-GPS)	Vertical: ±0.5 m, Horizontal: ±1.5 m
Max Angular Velocity	Pitch: 300°/s, Yaw: 150°/s
Max Pitch Angle	25°
Max Wind Resistance	8 m/s
Max Ascent Speed	5 m/s
Max Descent Speed	3 m/s
Max Speed	40 mph / 65 kph (no wind)
Max Service Ceiling Above Sea Level	2170 propellers: 2500 m, 2195 propellers: 4500 m
Hovering Time* (with six TB47S batteries)	No payload: 32 min, 6 kg payload: 16 min
Hovering Time* (with six TB48S batteries)	No payload: 38 min, 5.5 kg payload: 18 min
Flight Control System	A3 Pro
Supported DJI Gimbals	Ronin-MX; ZENMUSE™ Z30, Zenmuse X5/X5R, Zenmuse X3, Zenmuse X1, Zenmuse Z15 Series HD Gimbal: Z15-A7, Z15-BMPCC, Z15-5D III, Z15-GH4
Retractable Landing Gear	Standard
Operating Temperature	14° to 104° F (-10° to 40° C)
• Remote Controller	
Operating Frequency	920.6 MHz to 928 MHz (Japan); 5.725 GHz to 5.825 GHz, 2.400 GHz to 2.483 GHz
Max Transmission Distance	FCC Compliant: 3.1 mi (5 km), CE Compliant: 2.2 mi (3.5 km) (Unobstructed, free of interference)
Transmitter Power (EIRP)	10 dBm @ 900M, 13 dBm @ 5.8G, 20 dBm @ 2.4G
Video Output Port	HDMI, SDI, USB
Operating Temperature	14° to 104° F (-10° to 40° C)
Battery	6000 mAh LiPo 2S
• Charger (Model: MC6S600)	
Voltage Output	26.1 V
Rated Power	600 W
Single Battery Port Output Power	100 W
• Standard Battery (Model: TB47S)	
Capacity	4500 mAh
Voltage	22.2 V
Battery Type	LiPo 6S
Energy	99.9 Wh
Net Weight	595 g
Operating Temperature	14° to 104° F (-10° to 40° C)
Max Charging Power	180 W
• Optional Battery (Model: TB48S)	
Capacity	5700 mAh
Voltage	22.8 V
Battery Type	LiPo6S
Energy	129.96 Wh
Net Weight	680g
Operating Temperature	14° to 104° F (-10° to 40° C)
Max Charging Power	180 W

* Hovering time is based on flying at 10 meters above sea level in a no-wind environment and landing with a 10% battery level.

CE1313 RoHS

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

HDMI

DJI incorporates HDMI™ technology.
The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

Download the detailed user manual at:
www.dji.com/matrice600-pro

※ This content is subject to change without prior notice.

Drone Operation and Ground Control Methods

The DJI Matrice 600 Pro drone is programmed to fly an automated flight path (the survey grid lines and tie lines), using software that is available and ready to use on a wide variety of drones. Zen Geomap uses UgCS software, Drone Deploy and Pix4D software;

- Drone Deploy and Pix4D, on simple grids that do not require advanced control with regards to following complex terrain (example – flying in relatively flat ground, using Google Earth or other simple elevation model).
- UgCS, in rugged terrain, where we obtain a detailed 3D terrain model (DEM or DTM) using photogrammetric drone prior to magnetic survey. In this case we upload our own, custom DEM into UgCS software and the DJI M600 drone will follow the terrain at a fixed offset.

Using a Drape

The automated flight path will always use (follow) a “drape” in one form or another.

- On simple grids in flat terrain, the drape is generated as an offset of a simple DEM, such as Google Earth or other coarse elevation model such as DEMs available on-line through USGS.
- In complex terrain, the drape is generated as an offset of our own, custom DEM.

All of our piloting software is capable of following a drape at a fixed offset. We typically program the drone to fly 50m above coarse DEMs, such as Google Earth, or USGS. When a custom DEM is available, we typically fly 25-30m above DEM.

The actual / final “height above terrain” (or mean terrain clearance), is determined in the field by our crews. They visually inspect and look for obstacles such as hills, trees, buildings and towers.

The height above terrain (or mean terrain clearance) is included in the logistical and assessment reports we prepare for our clients.

Ground Control Methods

The DJI M600 drone uses a combination of 3 separate GPS receivers and 3 separate barometers. This system developed by DJI is called the A3 Controller.

The A3 controller is designed to maintain a stable altitude, relative to the take-off point. Over a 5 year period (2014 to current), we have found the A3 controller to be reliable to sub-metre accuracy, when it comes to maintaining stable altitude over a typical 20 to 30 minute flight.

Based on this long-term record, we rely on the A3 controller to navigate the drone at a pre-programmed, fixed offset above DEM. Over the same 5 year period, we have observed consistent and accurate agreement between the A3 GPS locations and the Adafruit (Magnetometer) GPS locations. When plotted in plan view, the A3 GPS tracks have always agreed with the Adafruit tracks to approximately 1 metre accuracy.

The author if this report has been an active surveyor since 1990 and is familiar with real-time (RTK) GPS and post-processed GPS methods.

Appendix IV

Statement of Costs

$ 2000.00	2 flights @ $1,000 Nov 8, 2021
$ 461.00	Mobe / Demobe Timmins to Site (922km @ $0.50)
$ 400.00	Food and Lodging
$ 225.00	ATV rental
$ 1000.00	Processing and Maps
$ 2000.00	Report

$6,086.00	Total Survey Cost (total does not include HST)

<u>Calculation of Costs – Completed across 6 Active Mining Claims;</u>

The drone magnetic survey covered 6 Active Mining Claims.

Table 1 provides detail of how costs are applied to each mining claim

Appendix V

Quality Control / Tests and Calibrations / Processing Steps

Quality Control

Throughout the data acquisition phase, data are monitored closely for quality control and error-checking on all channels. Output from the Geometrics MFAM magnetometer includes a wide range of error codes, which are written to the raw data file to help diagnose problems when they occur in the field.

All data are checked on a daily basis, as field data are transferred to Zen Geomap offices in Timmins or North Bay, Ontario. When errors or problems occur, the field crew is instructed to re-fly problem areas.

Tests and Calibrations

The following tests and calibrations are carried-out on all magnetometer equipment and sensors employed by Zen Geomap Inc.;

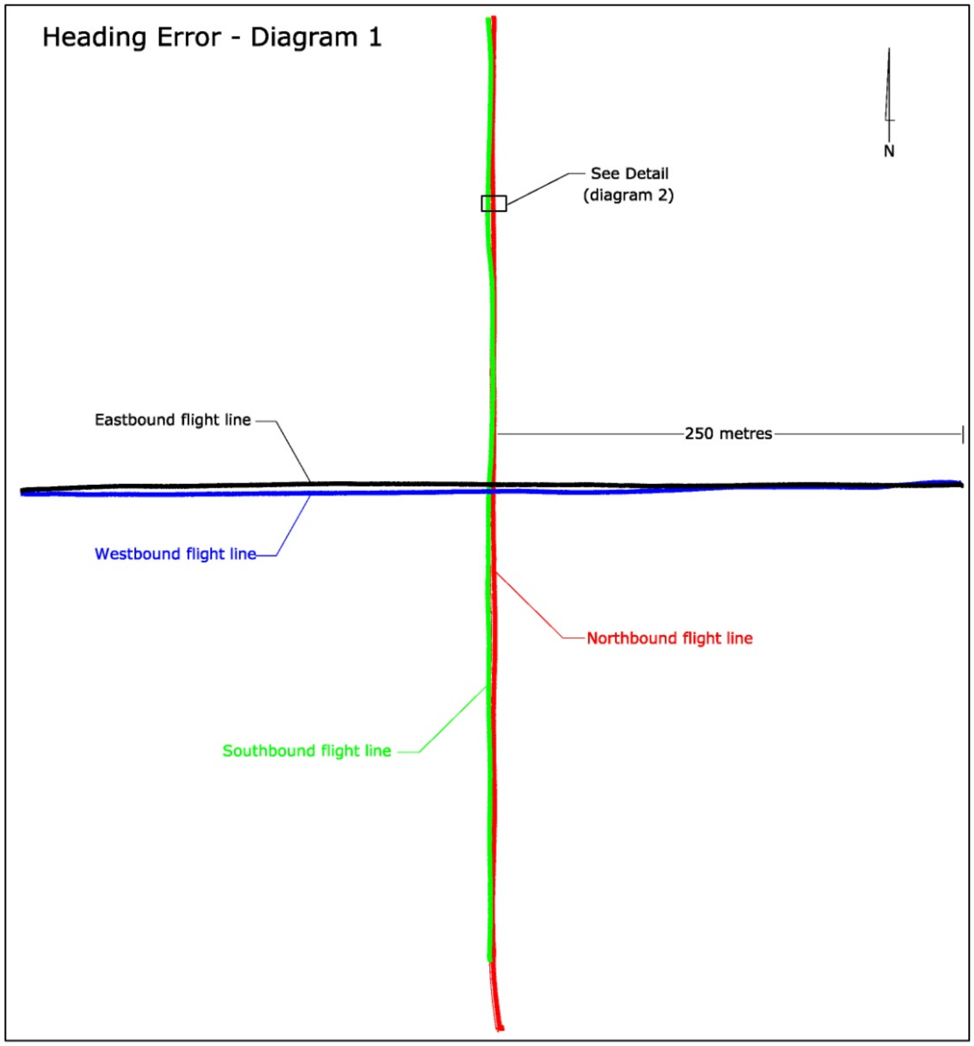
Heading Error

Upon receipt of a new magnetometer (or after significant repair or modification to any system component), a test flight is carried-out to determine heading error.

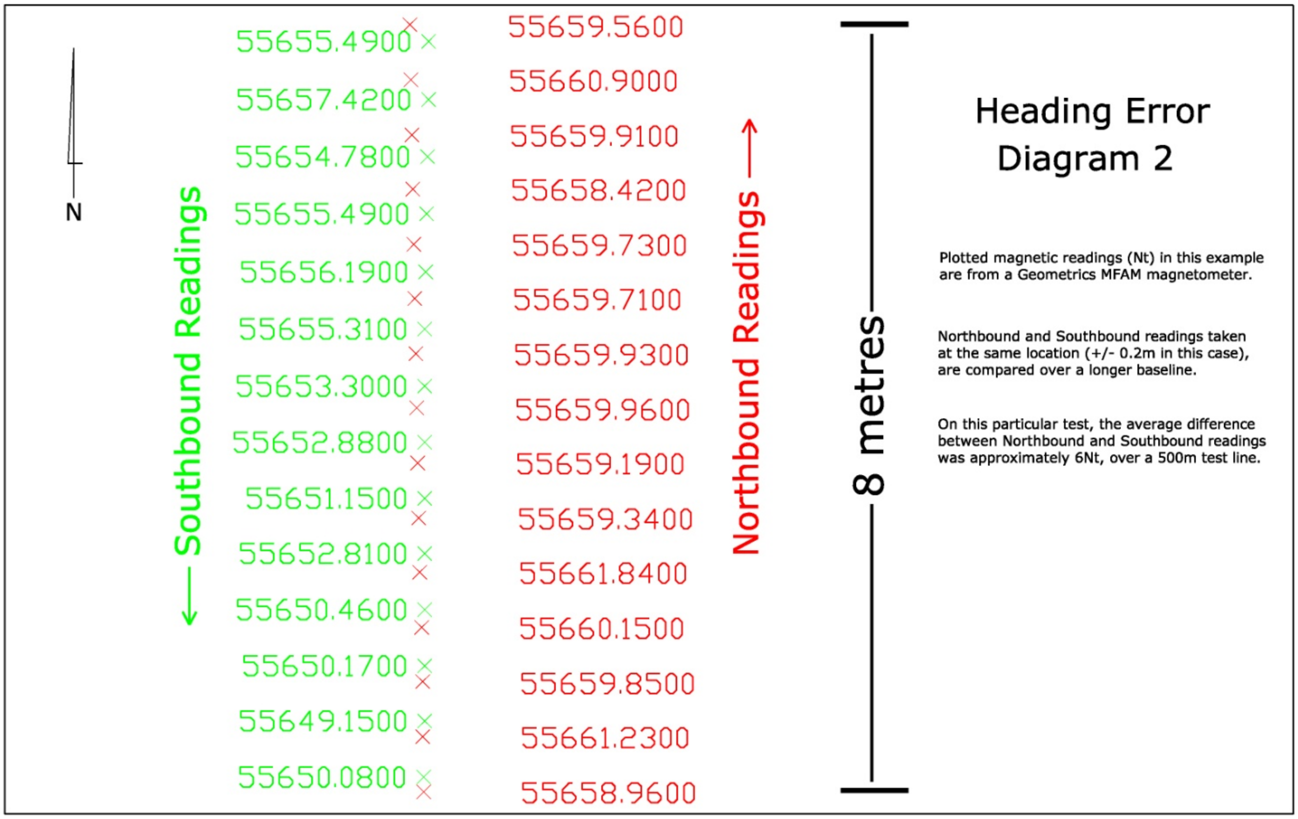
A cross-pattern is flown as shown in ***Diagram 1***, with 500 metre N-S and E-W lines.
Magnetic readings are collected along the same lines, flown in opposite directions.

Northbound and Southbound readings at the same location (+/- 0.2m in this example) are compared.
Eastbound and Westbound readings undergo the same process.

(See: Heading Error – ***Diagram 2***).



Example test flight by Zen Geomap, August, 2019



Example – Geometrics MFAM readings, August, 2019

The difference between Northbound and Southbound readings, averaged over a 500m baseline is calculated. The resulting value (6 Nt in above example), is used to apply a correction for heading error during processing.

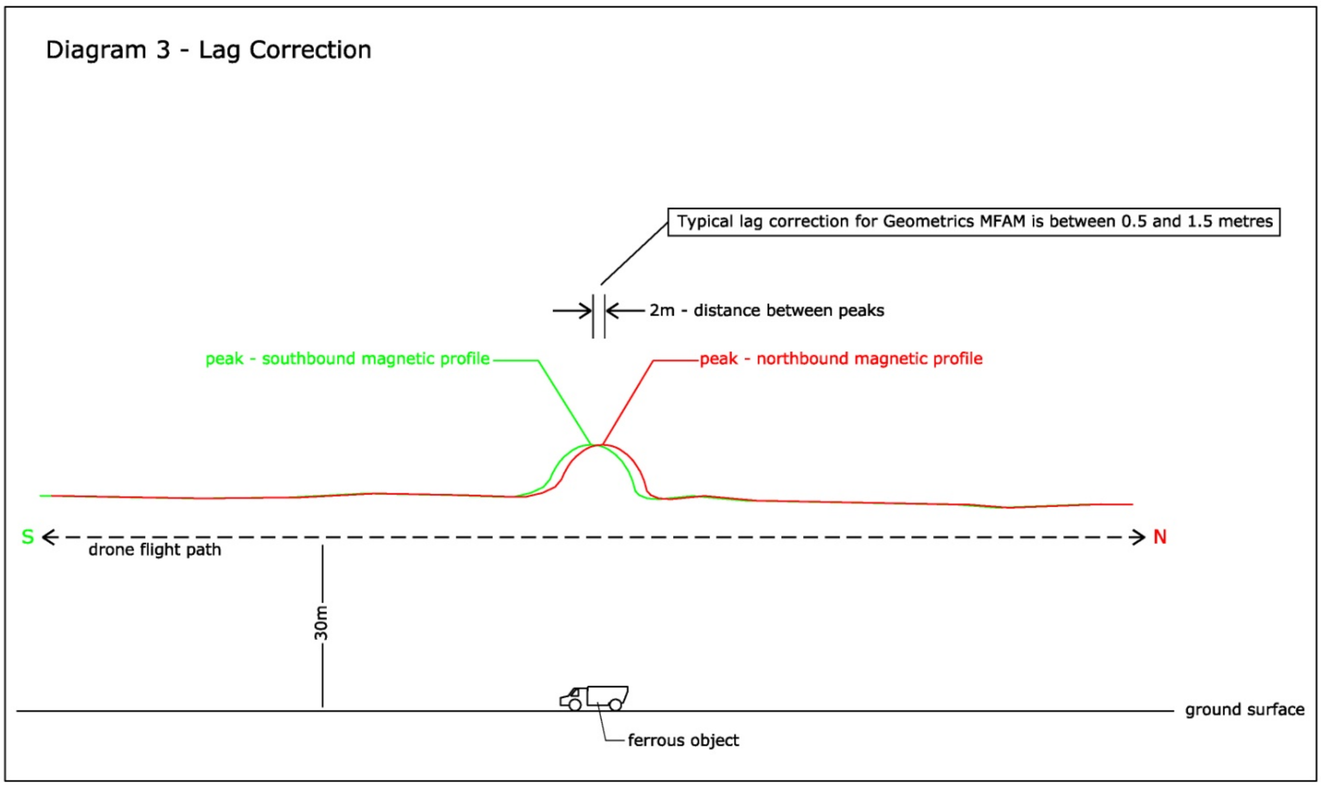
Each mag sensor will produce a unique result, however we typically apply a correction of 3Nt or less, to adjacent flight lines.

Lag Correction

Tests are performed to determine lag correction, by flying the drone magnetometer in opposite directions over top a ferrous object. Suitable objects include steel bridges, vehicles or heavy equipment.

Diagram 3 shows a typical flight test to determine lag correction.

A Geometrics MFAM magnetometer will typically have a lag error between 0.5 and 1.5 metres. Each mag sensor will produce a unique value. We typically apply a correction of 1m or less, to the location of magnetic readings on adjacent lines.



Diurnal Correction

A Geometrics G856AX proton procession magnetometer is operated as a base station on all projects, to provide diurnal monitoring of the local magnetic field variations. Adjustment may be applied to the raw MFAM readings, when variations exceed 10 or more Nt over the course of any flight. However, we typically re-fly grid lines, if the magnetic field variation is excessive.

The location (UTM coordinate) of the base station is included in the report body.

Processing Steps

Diurnal is examined for flights covering tie lines.
If magnetic field variation is excessive during tie line flights, all readings across tie lines are corrected using the base station data.

Tie lines provide a framework for leveling grid lines.
Readings on grid lines (once corrected for heading error and lag), are translated to conform to the tie lines. This process involves adjusting individual grid line segments, based on tie line intersections.

Unlike conventional airborne survey, such as fixed-wing or helicopter, a drone will take-off and land multiple times during the course of a survey. The resulting ferry lines are removed from the overall dataset prior to processing. Zen Geomap has developed import templates that run in Geosoft Oasis Montaj, to accomplish this task.

Geometrics MFAM data is not directly compatible with industry-standard software such as Geosoft.
Zen Geomap has developed software (Python code) to convert raw MFAM data into a format compatible with Geosoft and other industry-standard geophysical software. The raw data from MFAM is processed through Python, prior to initial processing.

The Python code developed by Zen Geomap has been adopted by Geometrics, as the standard conversion software for drone-mounted MFAM. Geometrics has been the industry leader for airborne magnetometer equipment since 1969.