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Report

Drone Magnetometer Survey
For
C. Villeneuve Construction Co. Ltd.

Claim 532878
Devitt Township
Porcupine Mining Division



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Total Field Magnetic Survey – Contours

1st Vertical Derivative – Contours

1.0 Introduction

Mining claim 532878 is located in Devitt Twp, Porcupine Mining Division. On July 23rd 2019 the claim was 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 C. Villeneuve Construction Co. Ltd. The survey was performed in order to map the magnetic signature of the underlying lithology and to identify any host rock that may be of economic interest.

Data processing and maps were prepared between July 24th and 26th, 2019. Assessment report was prepared between July 24th and 28th, 2019.

2.0 Location and Access

The mining claims are located approx 238 kilometers driving distance north west of Timmins, Ontario in Devitt Township, Porcupine Mining Division. Access was gained from Timmins by traveling 238 km along Hwy 655 and Hwy 11.

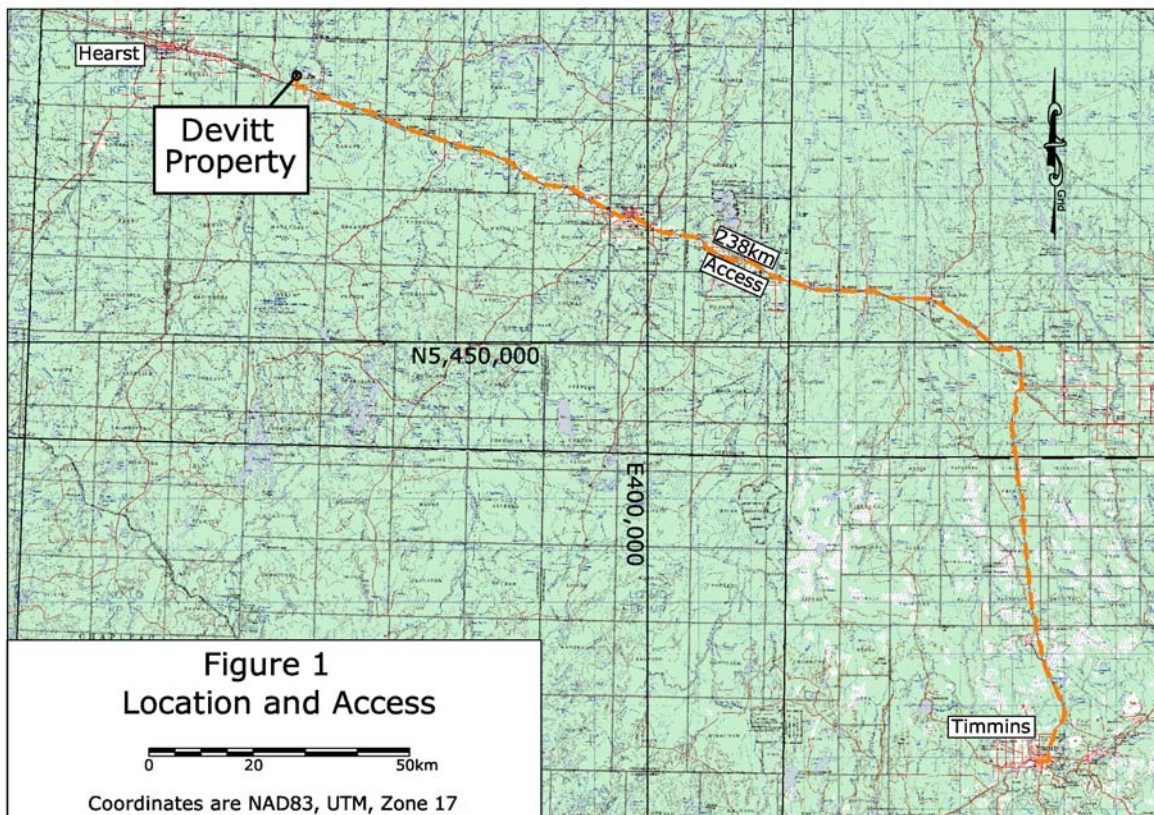


Figure 1 – Location and Access

Claim 532878 is a multi-cell mining claim as presented in **Figure 2** below.

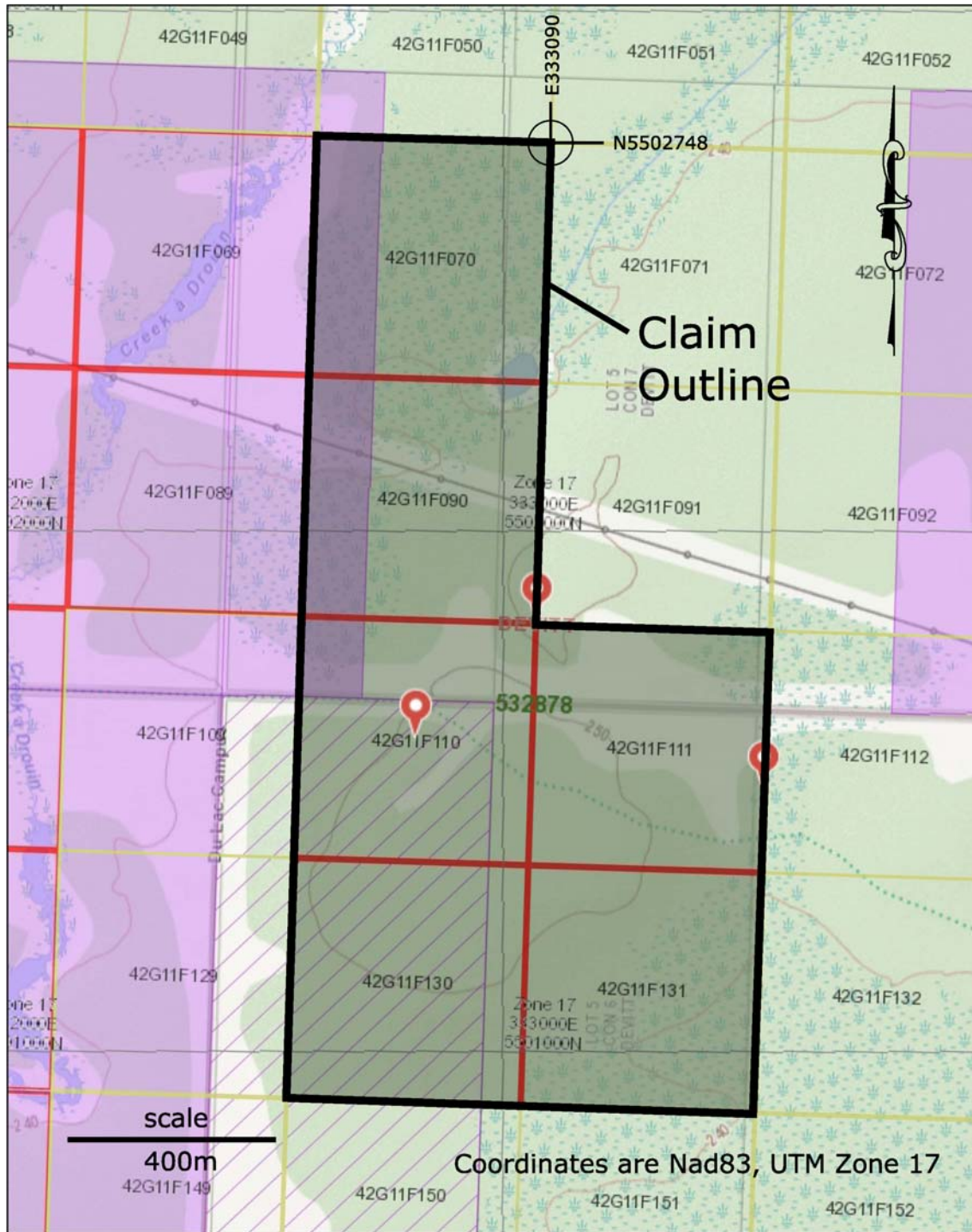


Figure 2 – Claim Location Map

3.0 Regional and Local Geology

Based on bedrock geology Map 2543, Devitt Property is surrounded by metasedimentary rocks described as “paragneisses and migmatites”.

A portion of Map 2543 is included below for reference.

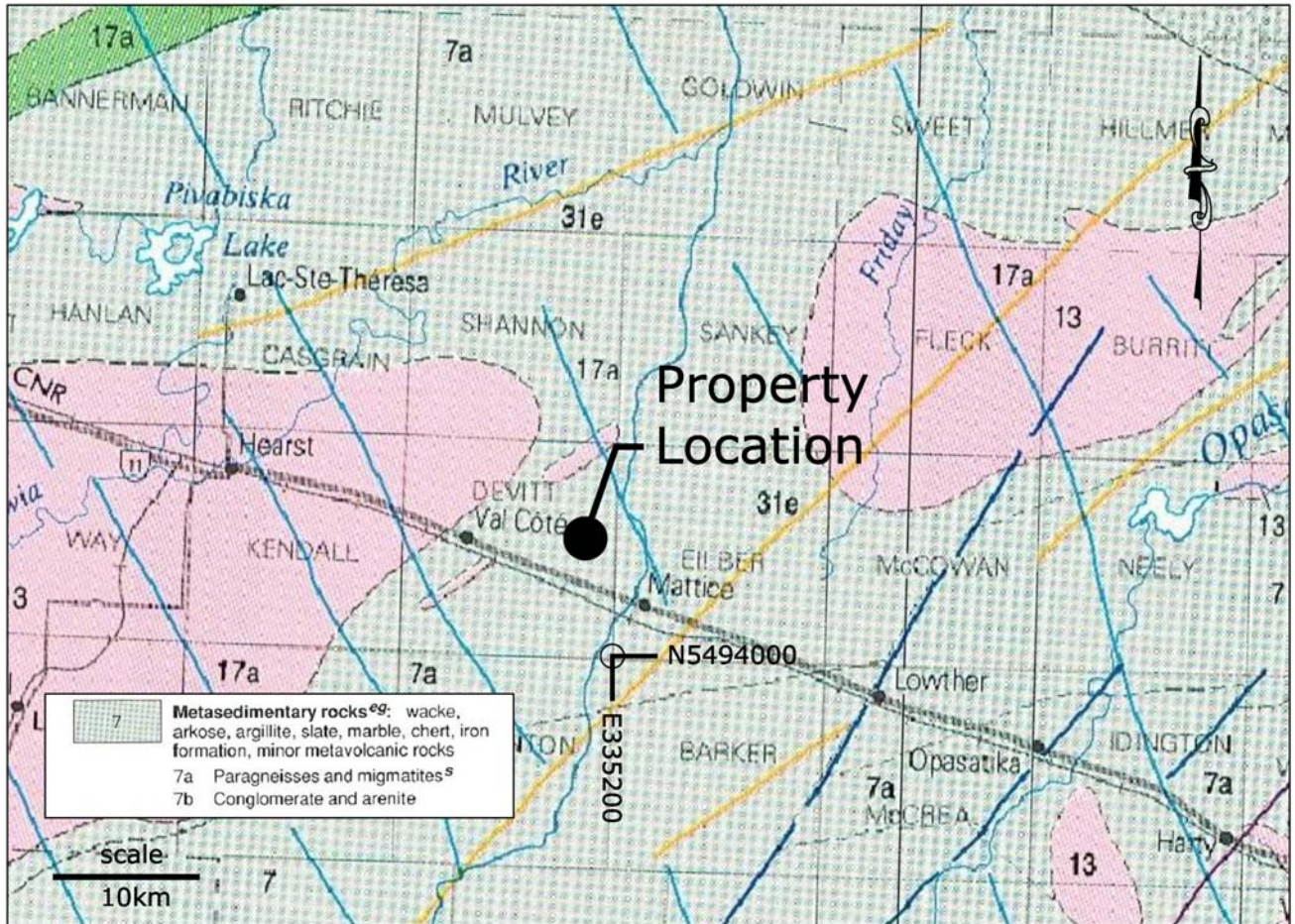


Figure 3 – regional bedrock geology Map 2543

*Reference: Map 2543 – Bedrock Geology of Ontario – East-central sheet
Published in 1991*

On a local scale, Devitt Property sits proximal to 3 documented mineral showings. **Figure 4** presents 3 nearest mineral showings available through the MDI database.

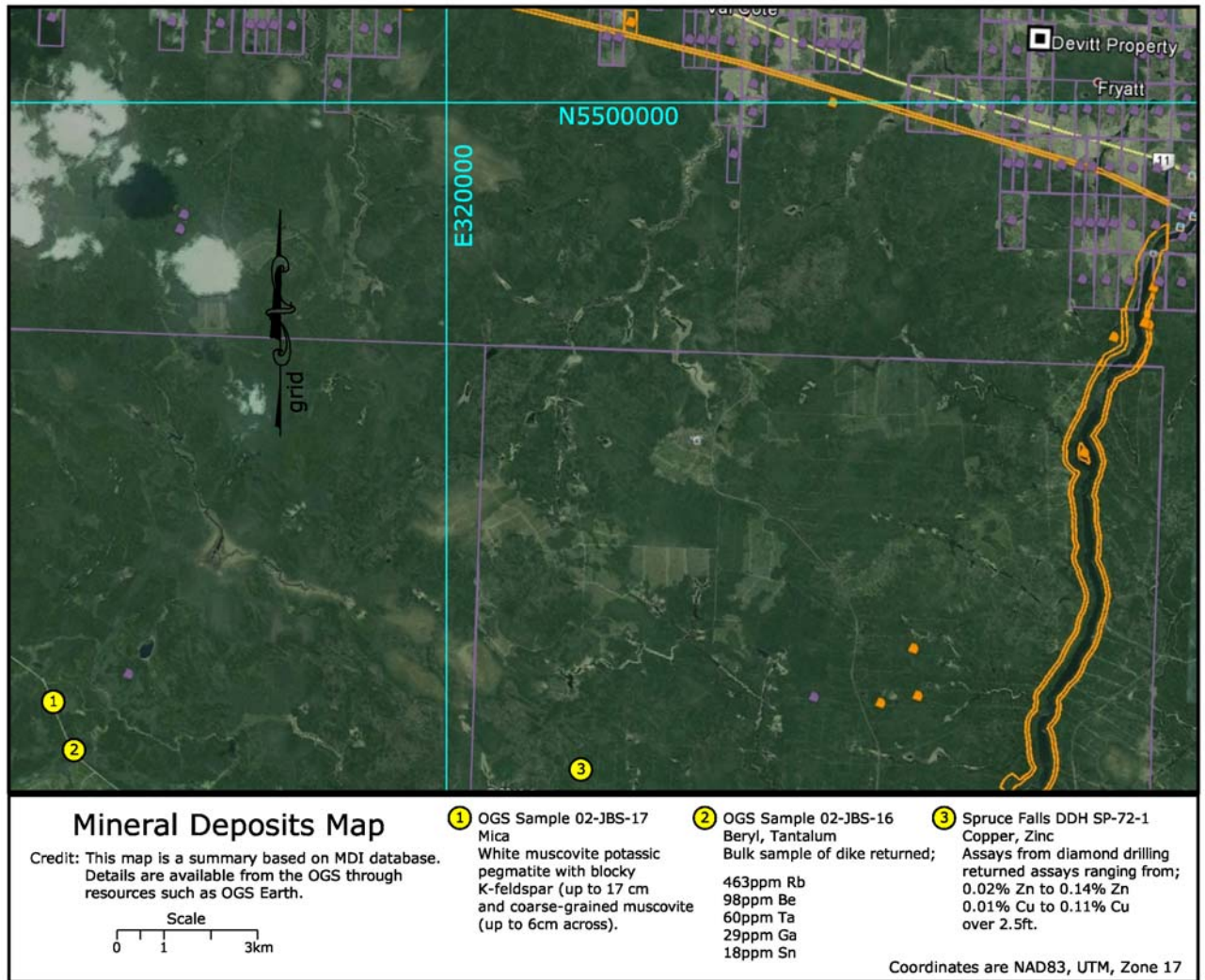


Figure 4 – MDI mineral showings near Devitt Property

4.0 Type of Mineral Deposit

The client is exploring for any host rock that may be of economic interest. Soil geochem sampling of the property in 2015 outlined anomalous nickel, zinc and copper values.

5.0 Property History

The southern portion of property underwent geochem sampling in 2015. Anomalous nickel, zinc and copper values were identified and magnetometer survey was recommended as follow-up.

The current drone-based magnetometer survey has been overlaid on 2015 geochem results. An interpretive map is included in this report.

6.0 Summary of 2019 drone magnetic survey

The program consisted of a drone magnetic survey carried out on a grid with 19 N-S lines spaced at 50 m and 3 E-W tie lines spaced at 928m.

Total line kilometers: 34.7
Altitude: 50m AGL

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 correction.

Equipment specifications are provided in Appendix I through III.

7.0 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 leveled based on tie lines.

8.0 Discussion of Results

The magnetic survey on the Devitt grid indicates a relatively quiet magnetic background with a magnetic range of approximately 340nT.

The overall magnetic pattern is disrupted by one moderate strength linear anomalous magnetic high striking NNW. This magnetic anomaly is located in the central portion of the grid area and is easily observed on the magnetic contour map. This magnetic anomaly may represent a mafic diabase dike, common to this geologic setting.

The results of the magnetic survey are presented as contoured total field and 1st vertical derivative maps.

9.0 Conclusions and Recommendations

The magnetic survey completed over the Devitt grid was successful in mapping a magnetic-high linear feature thought to arise from a bedrock source.

The mag-high anomaly is presented in **Figure 5** below, along with the nickel/zinc/copper anomaly from 2015 geochem survey.

Further compilation of magnetic, geochem and all other geological data is recommended in order to further evaluate Devitt Property. Other geophysical surveys, such as EM may help to evaluate mineral potential within the property.

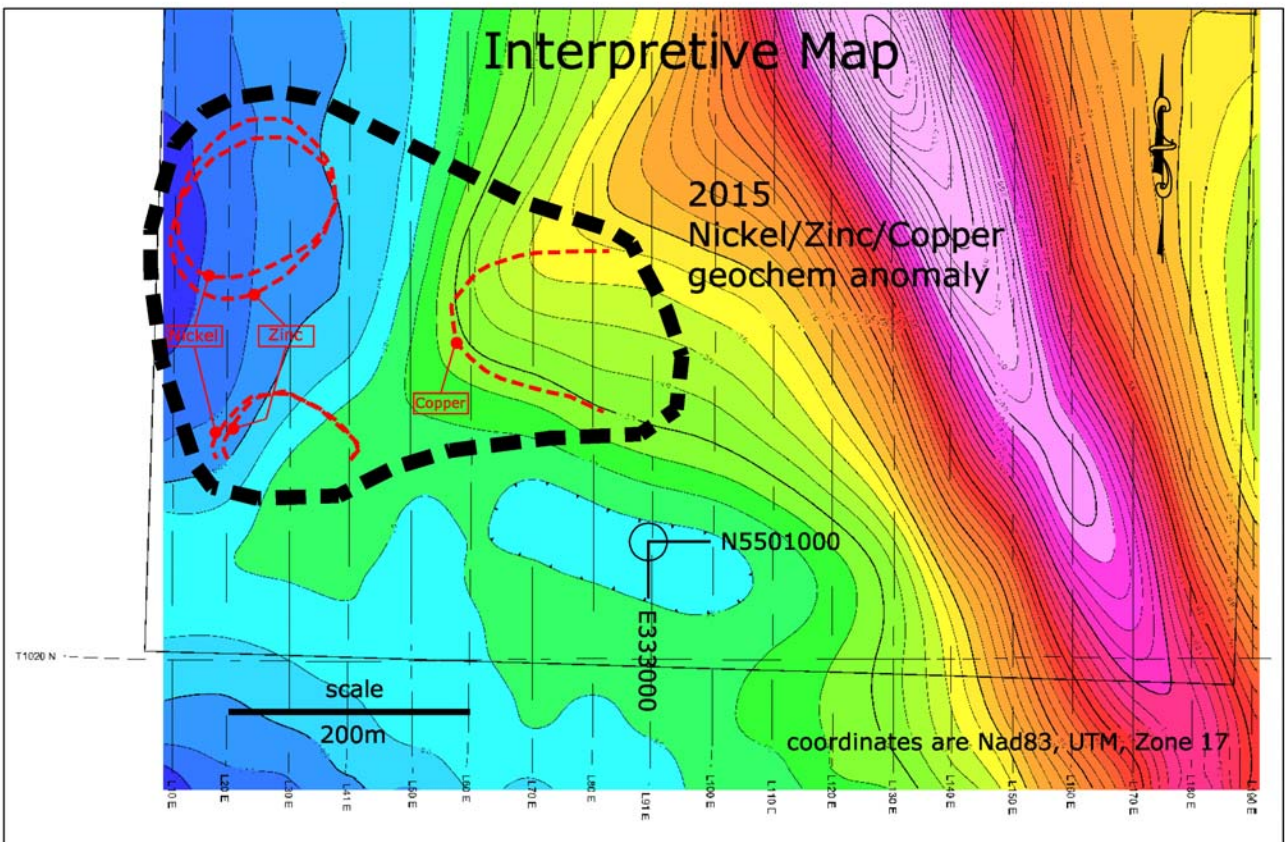


Figure 5 – Interpretive Map

Statement of Qualifications

Author - Kevin Cool		
<i>Education</i>		
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
<i>Companies owned and operated</i>		
1990	2001	General Surveys & Exploration - mining, exploration, aggregate, construction survey and computer drafting.
2000	2005	Big Red Diamond Corp. - traded publicly on TSX Venture exchange 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

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. .

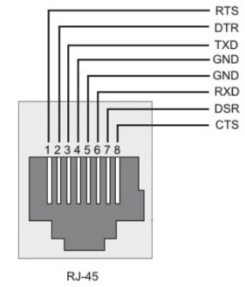


Figure 3: Serial Port Pinout

- 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.

Appendix II

Geometrics G856AX
Proton procession magnetometer specifications

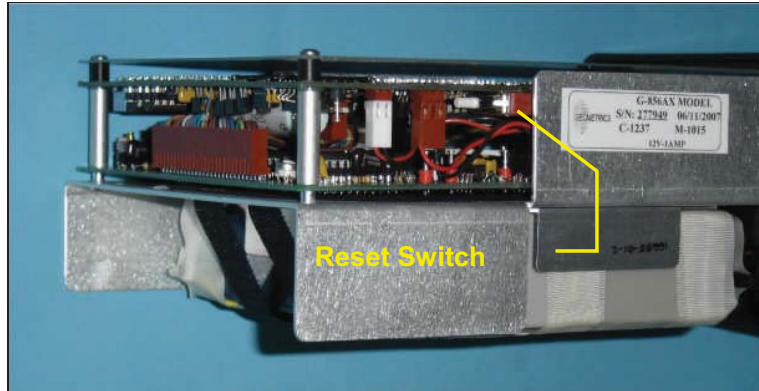


Figure 23. Internal reset switch.

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 μ T.
- 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)

Appendix III - DJI Matrice 600 Pro Specifications

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 XT, 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	LiPo 6S
Energy	129.96 Wh
Net Weight	680 g
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
HIGH DEFINITION MULTIMEDIA INTERFACE

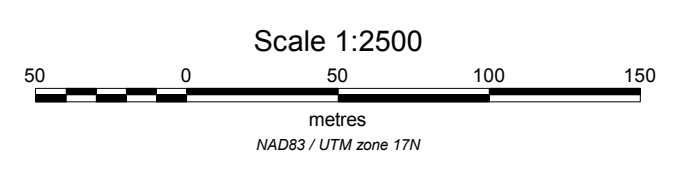
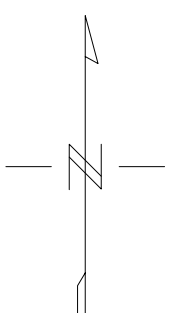
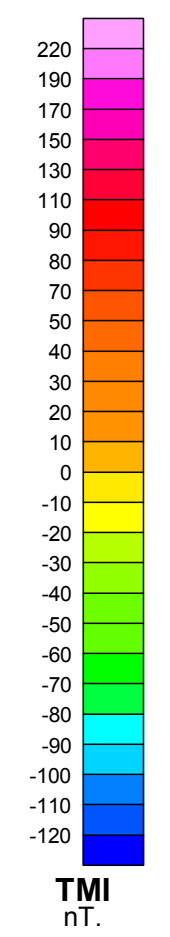
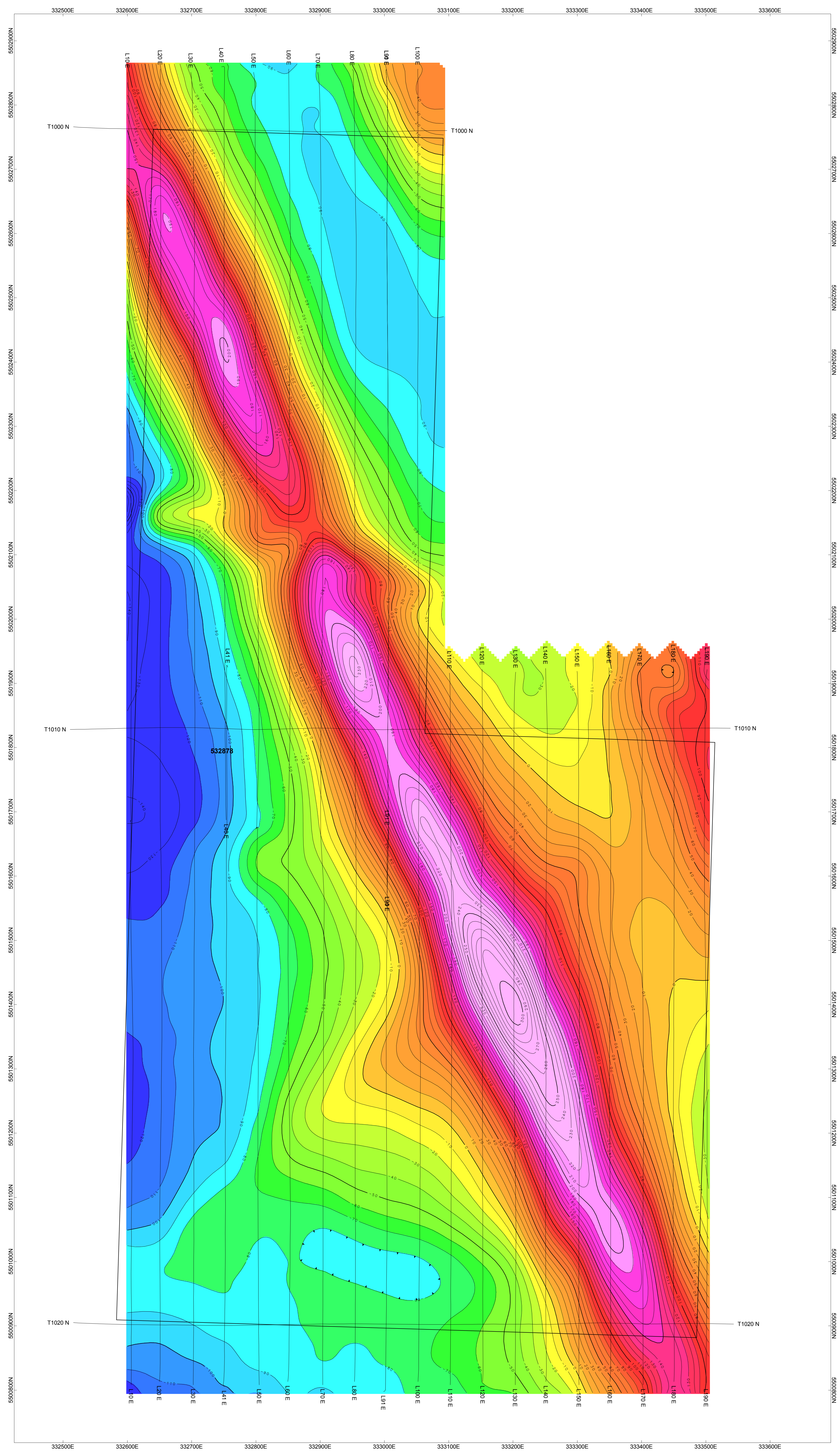
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Download the detailed user manual at:
www.dji.com/matrice600-pro

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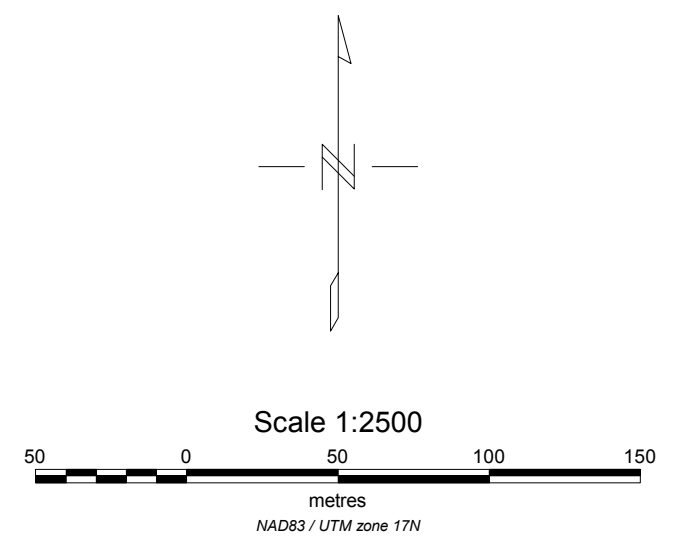
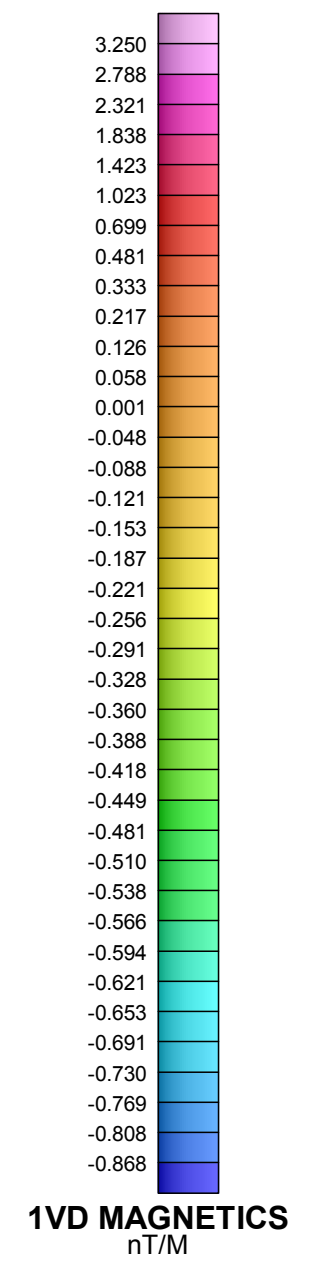
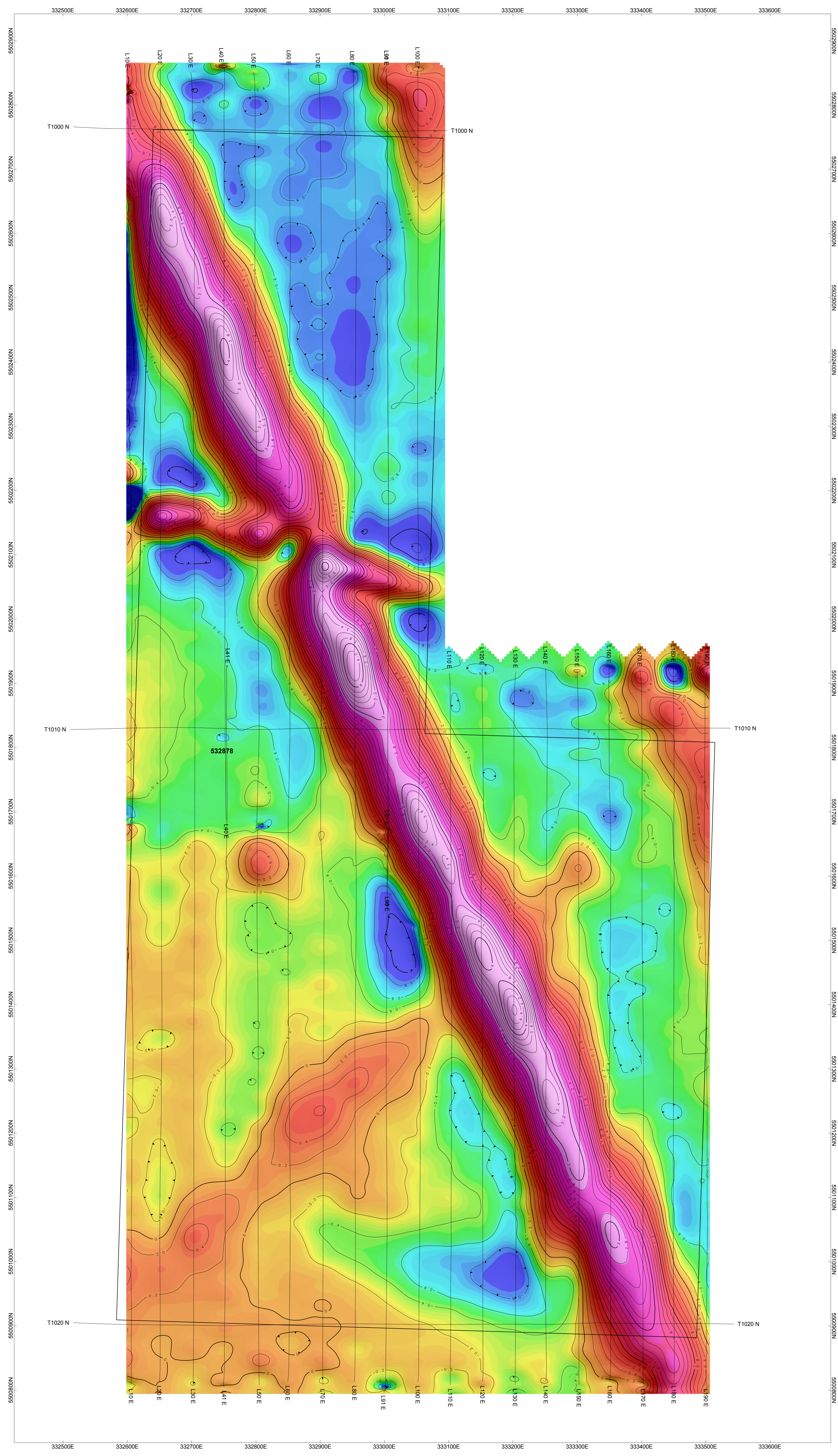


LINE KILOMETRES SURVEYED: 34.7

C. VILLENEUVE CONSTRUCTION CO. LTD.
DEVITT TOWNSHIP PROPERTY
DRONE MAGNETIC SURVEY - TMI CONTOURS
JULY 2019

DEVITT TWP. PORCUPINE MINING DIVISION
 CLAIM NO. 532878
 CONTOUR INTERVAL = 10, 50 nT
 INSTRUMENT: GEOMETRICS MFAM SENSOR & M600 DRONE

SURVEYED BY: ZEN GEOMAP INC.



LINE KILOMETRES SURVEYED: 34.7

C. VILLENEUVE CONSTRUCTION CO. LTD.
 DEVITT TOWNSHIP PROPERTY
 DRONE MAGNETIC SURVEY - CALCULATED 1VD MAGNETICS
 JULY 2019
 DEVITT TWP. PORCUPINE MINING DIVISION
 CLAIM NO. 532878
 CONTOUR INTERVAL = 0.2, 1.0 nT/m
 INSTRUMENT: GEOMETRICS MFAM SENSOR & M600 DRONE
 SURVEYED BY: ZEN GEOMAP INC.