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# 2022 AIRBORNE GEOPHYSICS SURVEY
# AND
# LIDAR REPORT
# ON THE
# SIOUX LOOKOUT PROPERTY

SIOUX LOOKOUT AREA
District of Thunder Bay, Ontario, Canada
NTS MAP 52J/04
UTM NAD 83
Zone 15U


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December 2022

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# 1.0 SUMMARY

Prospectair Geosurveys and Eagle Mapping Ltd. was contracted by AuTECO Minerals Ltd. to perform a helicopter based airborne magnetic survey and LIDAR survey respectively over the 100% AuTECO Minerals Ltd. owned Sioux Lookout Property (Figure 1), from June 30 to July 16, 2022 and June 10, 2022.

The Sioux Lookout Property consists of 39 contiguous mining claims (Figure 2), covering a total of 166.7 $km^2$ as listed in Table 1. The Property is located approximately 390 km north-northwest of Thunder Bay, Ontario and 260 km south of Pickle Lake, Ontario (Figure 1).

AuTECO's Sioux Lookout Property is located in the Western Wabigoon subprovince just below the English River and Winnipeg River subprovinces (Figure 3). Local geology displays (Figure 4) several Archean shear zones with several north trending thrusts with Timiskaming type-conglomerates.

A historical investigation of the Ministry of Northern Development and Mines assessment files was conducted resulting in a number of files identified on and adjacent to the Property. A variety of work was conducted in the area since 1951 to the most current of 2017. Table 2 below provides a summary of assessment work listed by area, company, year and type of work that was performed.

The purpose of these programs was to better understand the geology and the associated mineralization and structures to identify drill targets for diamond drilling at a future date. The work highlighted the need for prospecting and diamond drilling of targets identified.

# 2.0 INTRODUCTION

Prospectair Geosurveys and Eagle Mapping Ltd. was contracted by AuTECO Minerals Ltd. to perform a helicopter based airborne magnetic survey and LIDAR survey respectively over the 100% AuTECO Minerals Ltd. owned Sioux Lookout Property (Figure 1), from June 30 to July 16, 2022 and June 10, 2022. AuTECO Minerals Ltd., an Australian listed company who owns 100% of the Sioux Lookout Property that consists of 39 contiguous mining claims (Figure 2), covering a total of 166.7 $km^2$ as listed in Table 1. The Property is located approximately 390 km north-northwest of Thunder Bay, Ontario and 260 km south of Pickle Lake, Ontario (Figure 1).

The purpose of this program is to better understand the geology and the associated mineralization and structures to identify drill targets for diamond drilling at a future date.

# 3.0 LOCATION

The Sioux Lookout Property (hereafter simply referred to as "the Property") is primarily in the Drayton Township with GTP Block 10, Jordan, Vermilion Lake, Zarn Lake and Sharron Lake Townships. The Property is situated in the Patricia Mining Division of Ontario, with the claims being located on NTS sheets 52 K/01 and 52 J/04. The property is located approximately 366 km NW of Thunder Bay and 260 km south of Pickle Lake and surrounds the southern extent of the town of Sioux Lookout (Figure 1).

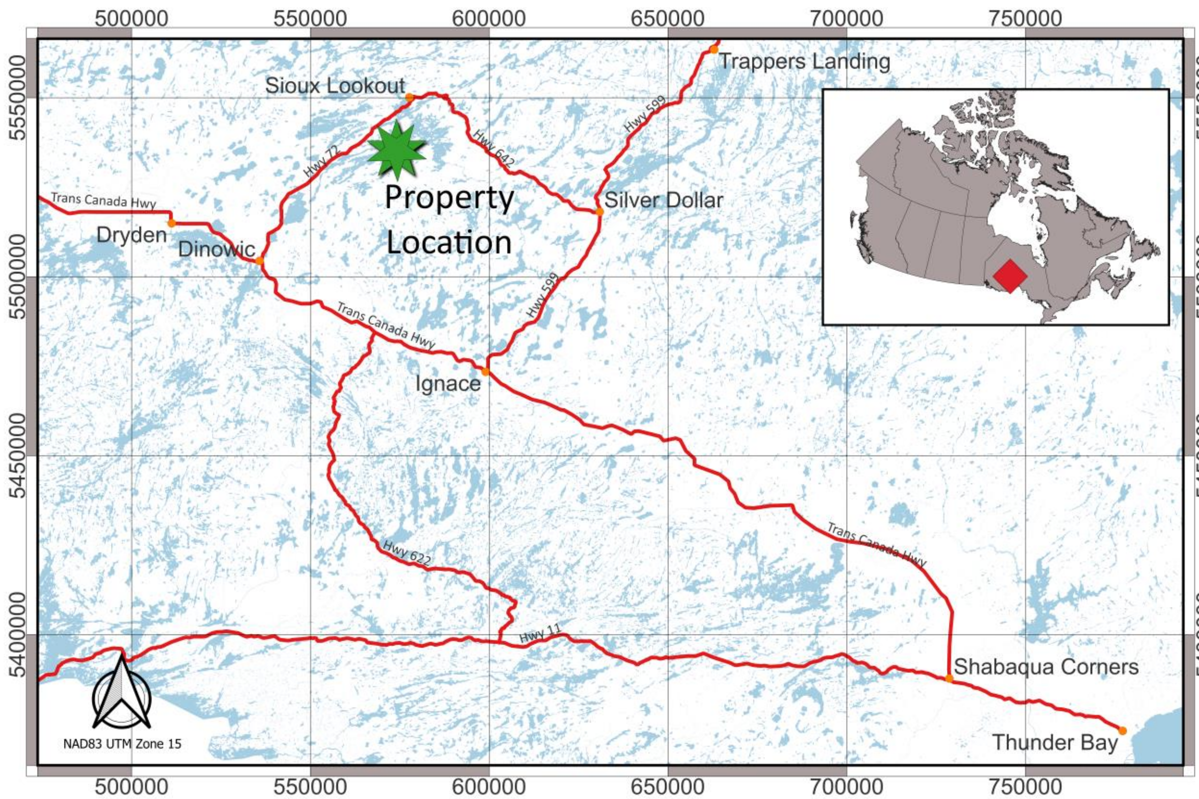


**FIGURE 1: SIOUX LOOKOUT PROJECT LOCATION MAP. DATUM NAD83 ZONE 15U.**

# 4.0 ACCESS

The City of Thunder Bay (population of 110,000) provides support services, equipment, and skilled labor for both the mineral exploration and mining industry. Rail, national highway, port and international airport services are available out of Thunder Bay. Tertiary support are available out of the town of Sioux Lookout and Dryden, Ontario.

The property can be reached from Thunder Bay by travelling west on highway 11/17, until the turnoff for highway 72 which travels north towards Sioux Lookout. From Sioux Lookout the block can be easily accessed via secondary forestry roads connecting to two main highways. One is highway 642, which crosses the block in its eastern part and links the town of Sioux Lookout to the village of Silver Dollar, further to the southeast. The second is highway 72, found in the west part of the block and connecting Sioux Lookout to the village of Dinorwic towards the southwest.

# 5.0 CLAIMS

The Property is comprised of legal mineral properties registered under and subject to the Mineral Tenure Act and Mineral Land Tax Act of the Province of Ontario. The Property consists of 39 contiguous mining claims (Figure 2), covering a total of 166.7 km$^2$ as listed in Table 1. All claims have not been legally surveyed, they have no environmental liabilities and are all in good standing as of the publication of this report.

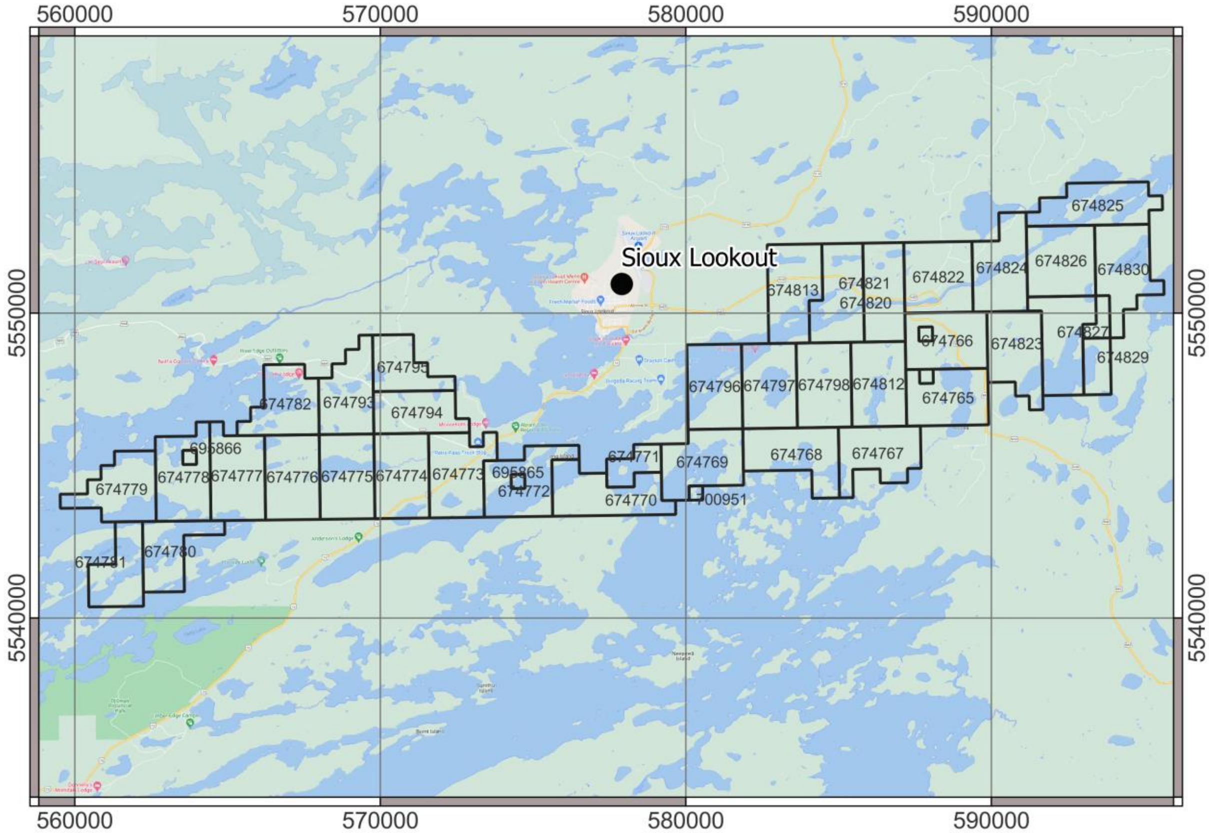


FIGURE 2: LAND TENURE FOR SIOUX LOOKOUT PROJECT (REVEL RESOURCES LTD.). DATUM NAD 83 ZONE 15U.

| | Township / Area | Tenure ID | Tenure Type | Anniversary Date | Tenure Status | Area (Ha) | Work Required |
|---|---|---|---|---|---|---|---|
| 1 | Drayton | 674765 | Multi-cell Mining Claim | 2022-08-05 | Active | 477.0 | $9,200 |
| 2 | Drayton, GTP Block 10 | 674766 | Multi-cell Mining Claim | 2022-08-05 | Active | 476.8 | $9,200 |
| 3 | Drayton | 674767 | Multi-cell Mining Claim | 2022-08-05 | Active | 456.4 | $8,800 |
| 4 | Drayton | 674768 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.6 | $10,000 |
| 5 | Drayton | 674769 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.9 | $9,600 |
| 6 | Drayton | 674770 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.7 | $10,000 |
| 8 | Drayton | 674771 | Multi-cell Mining Claim | 2023-09-07 | Active | 165.9 | $3,200 |
| 9 | Drayton | 674772 | Multi-cell Mining Claim | 2022-08-05 | Active | 477.2 | $9,200 |
| 10 | Drayton | 674773 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.6 | $10,000 |
| 11 | Drayton | 674774 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.9 | $9,600 |
| 12 | Drayton | 674775 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.9 | $9,600 |
| 13 | Drayton | 674776 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.9 | $9,600 |
| 14 | Drayton | 674777 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.6 | $10,000 |
| 15 | Drayton, Jordan | 674778 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.9 | $9,600 |
| 16 | Jordan, Vermilion | 674779 | Multi-cell Mining Claim | 2022-08-05 | Active | 477.2 | $9,200 |
| 17 | Drayton, Jordan | 674780 | Multi-cell Mining Claim | 2022-08-05 | Active | 373.6 | $7,200 |
| 18 | Jordan, Vermilion | 674781 | Multi-cell Mining Claim | 2022-08-05 | Active | 373.6 | $7,200 |
| 19 | Drayton | 674782 | Multi-cell Mining Claim | 2022-08-07 | Active | 456.2 | $8,800 |
| 20 | Drayton | 674793 | Multi-cell Mining Claim | 2022-08-07 | Active | 456.2 | $8,800 |
| 21 | Drayton | 674794 | Multi-cell Mining Claim | 2022-08-07 | Active | 394.0 | $7,600 |
| 22 | Drayton | 674795 | Multi-cell Mining Claim | 2022-08-07 | Active | 331.7 | $6,400 |
| 23 | Drayton | 674796 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.6 | $9,600 |
| 24 | Drayton | 674797 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.6 | $9,600 |
| 25 | Drayton | 674798 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.6 | $9,600 |
| 26 | Drayton | 674812 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.6 | $9,600 |
| 27 | Drayton, GTP Block 10 | 674813 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.1 | $10,000 |
| 28 | Drayton, GTP Block 10 | 674820 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.4 | $9,600 |
| 29 | Drayton, GTP Block 10 | 674821 | Multi-cell Mining Claim | 2022-08-05 | Active | 435.2 | $8,400 |
| 30 | GTP Block 10 | 674822 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.0 | $10,000 |
| 31 | Drayton, GTP Block 10, Zarn Lake Area | 674823 | Multi-cell Mining Claim | 2022-08-07 | Active | 476.8 | $9,200 |
| 32 | GTP Block 10 | 674824 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.3 | $9,600 |
| 33 | GTP Block 10, Sharron Lake Area, Zarn Lake Area | 674825 | Multi-cell Mining Claim | 2022-08-05 | Active | 497.1 | $9,600 |
| 34 | GTP Block 19, Zarn Lake Area | 674826 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.0 | $10,000 |
| 35 | GTP Block 10, Zarn Lake Area | 674827 | Multi-cell Mining Claim | 2022-08-07 | Active | 497.5 | $9,600 |
| 36 | Zarn Lake Area | 674829 | Multi-cell Mining Claim | 2022-08-07 | Active | 165.9 | $3,200 |
| 37 | Zarn Lake Area | 674830 | Multi-cell Mining Claim | 2022-08-05 | Active | 518.0 | $10,000 |
| 39 | Drayton | 695865 | Single Cell Mining Claim | 2023-12-10 | Active | 21.3 | $400 |
| 41 | Jordan | 695866 | Single Cell Mining Claim | 2023-12-10 | Active | 21.3 | $400 |
| 43 | Drayton | 700951 | Single Cell Mining Claim | 2024-01-12 | Active | 20.7 | $400 |

**TABLE 1: SIOUX LOOKOUT PROPERTY CLAIM DETAILS.**

# 6.0 PHYSIOGRAPHY

The area consists of low relief with areas of high relief being dominated by eskers. The region is covered by glaciofluvial and glaciolacustrine sediments topped by aeolian sands and gravels (Chubb, 1998). Outcrop exposure is limited on the property.

Vegetation consists of moderately sized cedar swamps and cedar forests in the topographic lows and cedar, jackpine, spruce, white and rock maple, poplar and balsam in the topographic highs (Chubb, 1998).

Climate is typical of Northwestern Ontario. A typical temperature range for the winter months would be -8°C to -24°C with extreme lows of <-40°C. While in the summer months, a typical temperature range would be 10°C to

25°C with extreme highs of >35°C. The average annual rainfall for the area is 517 mm and the average annual snowfall is 204 cm.

# 7.0 HISTORY

Investigation of the Ministry of Northern Development and Mines assessment files was conducted resulting in a number of files identified on and adjacent to the Property. A variety of work was conducted in the area since 1951 to the most current of 2017. Table 2 below provides a summary of assessment work listed by area, company, year and type of work that was performed.

The historical work provided by the Province has been obtained in this report through the digital portal on the Ministry of Northern Development and Mines online geoscience database (Ontario Assessment File Database). The files obtained contain technical reports on exploration work in the area. These details include locations, property ownerships, and work performed. It should be noted that the historical property location associated with the assessment reports is, in some cases difficult to determine and as such requires validation and verification. In addition, raw data (e.g. airborne geophysical survey data) are typically not supplied and therefore cannot be verified by the author.

| Area | Work Performed By | Year | Work Type | Report No. |
|---|---|---|---|---|
| Jordan Township | Moneta Porcupine Mines Inc. | 1951 | Diamond Drilling | 52K01SE8980 |
| Zarn Lake | Kerr-Addison Mines Ltd. | 1968 | Diamond Drilling | 52J04SE2120 |
| Drayton Township | Kerr-Addison Mines Ltd. | 1968 | Diamond Drilling | 52J04SW0047 |
| Zarn Lake | Kerr-Addison Mines Ltd. | 1969 | Diamond Drilling | 52J04SE0026 |
| Drayton Township | Kerr-Addison Mines Ltd. | 1969 | Diamond Drilling | 52J04SW0042 |
| Drayton Township | Kerr-Addison Mines Ltd. | 1969 | Diamond Drilling | 52J04SW0045 |
| Whipper Lake | Oja Ltd. | 1969 | Airborne Radiometric Survey | 52K01SW9511 |
| Drayton Township | Norman Paterson & Associates Limited | 1970 | Magnetometer Survey | 52J04SW8930 |
| Sturgeon Lake Area, Alcona Area, Drayton Area | Conwest Exploration Company Ltd. | 1971 | Electormagnetic and Magnetic Survey | 52J02NE0462 |
| FirstLoon Lake | Klement Danda and Jan Klein | 1971 | Airborne Geophysics | 52P12SE9000 |
| Drayton Township | Conwest Exploration Company Ltd. | 1972 | Electormagnetic and Magnetic Survey | 52J04SW0024 |
| Drayton Township | Geophysical Engineering | 1977 | Diamond Drilling | 52J04SW0034 |
| Whipper Lake | Nahanni Mines Limited | 1983 | Magnetometer and Electomagnetic Surveys | 52J04SW0010 |
| Drayton Township | Nahanni Mines Limited | 1983 | Diamond Drilling | 52J04SW0011 |
| Jordan Township | J.L. Wahl | 1983 | Geolgical Mapping, soil/rock geochemistry, Magnetic and VLF geophysical surveys | 20007560 |
| Drayton Township | Kenneth Guy Exploration Services | 1984 | Prospecting, Geological Mapping | 52J04SW8927 |
| Vermillion | William E. MacRae Geological Services | 1986 | Airborne Mag, Electromagnetic and geology mapping | 52K01SE0005 |
| Jordan Township | Moneta Porcupine Mines Inc. | 1987 | Diamond Drilling | 52K01SE8954 |
| Vermillion Township | TerraQuest Ltd | 1987 | Airborn Magnetic and VLF-EM Surveys | 52K04SW0500 |
| Drayton, Zarn Lake and Sharron Lake Area | Placer Dome | 1997 | Ground Magentometer Survey | 52J04NE0012 |
| Drayton Township | Superior Exploration | 2017 | Geophysical Modelling and Interpretation, drill core splitting and asssaying | 20000015248_01 |
| Drayton Township | AuTECO Minerals | 2020 | Prospecting, Geological Mapping | TBD |

**TABLE 2: SIOUX LOOKOUT PROJECT HISTORICAL EXPLORATION SUMMARY.**

# 8.0 GEOLOGICAL SETTING

## 8.1 REGIONAL GEOLOGY

The Sioux Lookout property is located in the Western Wabigoon subprovince just below the English River and Winnipeg River subprovinces (Figure 3). The Sioux Lookout orogenic ("greenstone") belt, a relatively small part of the western Wabigoon subprovince in northwest Ontario, is composed of the following tectonized stratigraphic units, from north to south: 1) the Northern Volcanic belt; 2) the Patara Formation; 3) the "Big Vermilion–Daredevil unit"; 4) the Ament Bay Formation; 5) the Daredevil Formation stratotype; 6) the Central Volcanic belt known as the Neepawa group; 7) the Minnitaki Group; and 8) the Southern Volcanic belt. The Sioux Lookout belt is bounded to the north by the Winnipeg River subprovince and to the south by the Basket Lake batholith (Devaney, 2000).

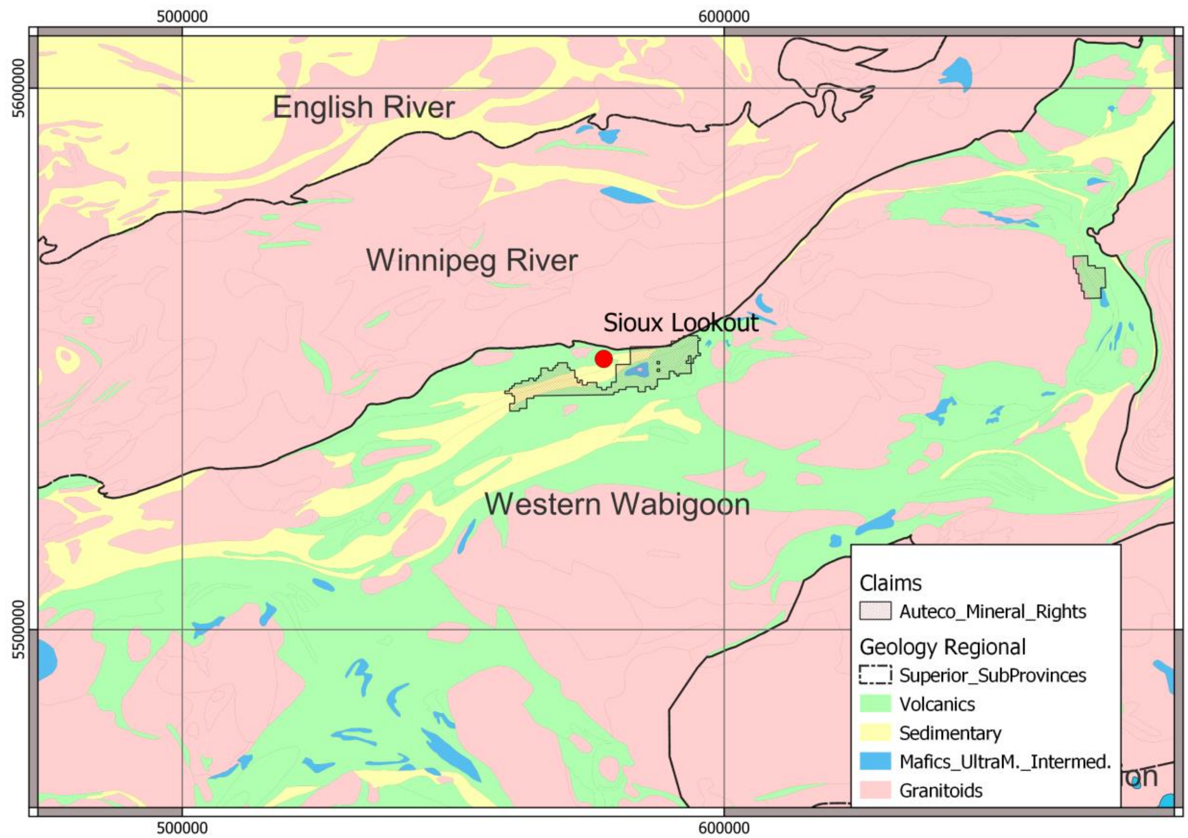


**FIGURE 3: REGIONAL GEOLOGY MAP. SIMPLIFIED FROM MINERAL EXPLORATION RESEARCH CENTRE (MERC) SUPERIOR CRATON GEOLOGICAL MAP, DATUM NAD83 ZONE 15U (MONTSION ET AL., 2018).**

## 8.2 LOCAL GEOLOGY

Local geology displays (Figure 4) several Archean shear zones with several north trending thrusts with Timiskaming type-conglomerates. Several showings are present on the property with gold assays up to 1.76 oz/t. There are 26 diamond drill holes on the property, but many reports do not contain geological or geochemical information. The region is known to have multiple verging thrust basins with nearby muti-million oz gold deposits including Treasury Metals' Goliath deposit.

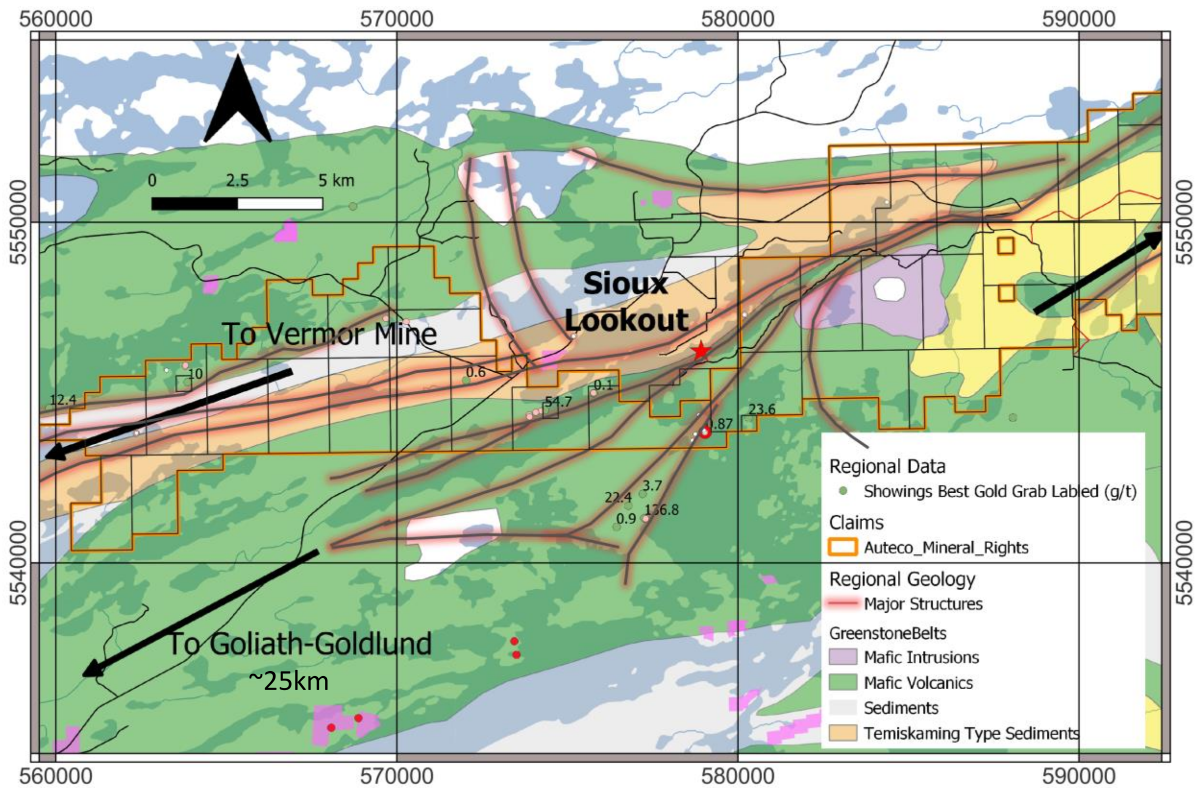


**FIGURE 4: PROPERTY GEOLOGY MAP. MODIFIED FROM MERC SUPERIOR CRATON GEOLOGICAL MAP, DATUM NAD83 ZONE 15U (MONTSION ET AL., 2018) BY SANS PEUR EXPLORATION SERVICES.**

# 9.0 ASSESSMENT WORK

Prospectair Geosurveys was contracted to perform a helicopter based airborne magnetic survey in June 2022 for AuTECO Minerals on the 100% owned Sioux Lookout Property (Figure 1) for a total of 2,924 line kilometers (l-km). The helicopter and survey crew operated out of the Sioux Lookout Airport located less than 5 km from the block. The field team included Dominic Latour, Marc Patenaude (survey pilots) and Johnathan Drolet (survey system technician) with support from the Prospectair Geosurveys office.

The following three sections (9.1, 9.2, 9.3) are an exert from the Technical Report provided to AuTECO from Prospectair upon completion of contracted work. For the entire report refer to the Appendix 2

The Sioux Lookout block was mainly flown with traverse lines at 100 m spacing. Likewise, control lines were locally spaced every 500 m within these areas, and 1000 m elsewhere. The survey lines were oriented to N150. The control lines were oriented perpendicular to traverse lines. The average height above ground of the helicopter was 41 m and the magnetic sensor was at 22 m. The average survey flying speed was 30.3 m/s. The elevation ranges from 355 to 443 m above mean sea level (MSL).

A few infrastructures are found within the block, like the highways, one railway somewhat parallel to highway 642 and another one rather parallel to Marchington River/Botsford Lake and extending towards the northeast, some power lines, as well as a few private properties and buildings found to the south and east of Sioux Lookout. The block is approximately centered over Abram Lake and the north end of the large Minnitaki Lake. Coordinates outlining the survey block are given in Appendix A in Prospectair Geosurveys report, with respect to NAD83 datum, UTM projection zone 15N. The location of the Sioux Lookout Property claims and of the survey lines is shown on Figure 6

## 9.1 Survey Equipment

### 9.1.1 Airborne Magnetometer

*Geometrics G-822A*

The heliborne system used a non-oriented (strap-down) optically-pumped Cesium splitbeam sensor. These magnetometers have a sensitivity of 0.005 nT and a range of 15,000 to 100,000 nT with a sensor noise of less than 0.02 nT. The heliborne sensor was mounted in a bird made of non-magnetic material located 19 m below the helicopter when flying. Totalmagnetic field measurements were recorded at 10 Hz in the aircraft.

### 9.1.2 Real-Time Differential GPS

*Omnistar DGPS*

Prospectair uses an OmniStar differential GPS navigation system to provide real-time guidance for the pilot and to position data to an absolute accuracy of better than 5 m. The Omnistar receiver provides real-time differential GPS for the AGIS on-board navigation system. The differential data set was relayed to the helicopter via the Omnistar network appropriate geosynchronous satellite for the survey location. The receiver optimizes the corrections for the current location.

### 9.1.3 Airborne Navigation and Data Acquisition System

*Pico-Envirotec AGIS-XP system*

The Airborne Geophysical Information System (AGIS-XP) is advanced, software driven instrument specifically designed for mobile aerial or ground geophysical survey work. The AGIS instrumentation package includes an advanced navigation system, real-time flight path information that is displayed over a map image of the area, and reliable data acquisition software. Thanks to simple interfacing, the radar and barometric altimeters and the Geometrics magnetometer are easily integrated into the system and digitally recorded. Automatic synchronization to the GPS position and time provides very close correlation between data and geographical position. The AGIS is equipped with a software suite allowing easy maintenance, upgrades, data QC, and project and survey area layout planning.

### 9.1.4 Magnetic Base Station

*GEM GSM-19*

A GEM GSM-19 Overhauser magnetometer, a computer workstation and a complement of spare parts and equipment serve as the base station. Prospectair establish the base station in a secure location with low magnetic noise. The GSM-19 magnetometer has resolution of 0.01 nT, and 0.2 nT accuracy over its operating range of 20,000- to 100,000 nT. The ground system was recording magnetic data at 1 Hz.

### 9.1.5 Altimeters

*Free Flight Radar Altimeter*

The Free Flight radar altimeter measures height above ground to a resolution of 0.5 m and an accuracy of 5% over a range up to 2,500 ft. The radar altimeter data is recorded and sampled at 10 Hz.

*Digital Barometric Pressure Sensor*

The barometric pressure sensor measures static pressure to an accuracy of ± 4 m and resolution of 2 m over a range up to 30,000 ft above sea level. The barometric altimeter data are sampled at 10 Hz.

### 9.1.6 Survey helicopter

*Robinson R-44 (registration C-GBOU)*

The survey was flown using Prospectair's Robinson R-44 helicopter that handles efficiently the light equipment load and the survey range for magnetic surveys. Table 3 presents the helicopter technical specifications and capacity, and the aircraft is shown in Figure 5.

| Item | Specification |
|---|---|
| Powerplant | One 195kW (260hp) Textron Lycoming O-540 |
| Rate of climb | 1,000 ft/min |
| Cruise speed | 223 km/h – 120 kts |
| Service ceiling | 14,000 ft |
| Range with no reserve | 645 km |
| Empty weight | 635 kg |
| Maximum takeoff weight | 1,090 kg |

TABLE 3: TECHNICAL SPECIFICATIONS OF THE C-BOU ROBINSON R-44 HELICOPTER.

**FIGURE 5: C-GBOU ROBINSON HELICOPTER.**

## 9.2 SURVEY SPECIFICATIONS

### 9.2.1 Data Recording

The following parameters were recorded during the course of the survey:

In the helicopter:

- GPS positional data: time, latitude, longitude, altitude, heading and accuracy (PDOP) recorded at intervals of 0.1 s;
- Total magnetic field: recorded at intervals of 0.1 s;
- Pressure as measured by the barometric altimeter at intervals of 0.1 s;
- Terrain clearance as measured by the radar altimeter at intervals of 0.1 s;

At the base and remote magnetic ground stations:

- Total magnetic field: recorded at intervals of 1 s;
- GPS time recorded every 1 s to synchronize with airborne data.

### 9.2.2 Technical Specifications

The data quality control was performed on a daily basis. The following technical specifications were adhered to:

- Height – 50m mean terrain clearance for the helicopter except in areas where Transport Canada regulations prevent flying at this height, or as deemed by the pilot to ensure safety. Traverse lines and control lines must be flown at the same altitude at points of intersection; the altitude tolerances are limited to no more than 30 m difference between traverse lines and control lines.
- Airborne Magnetometer Data – A 0.5 nT noise envelope not to be exceeded for more than 500 m line-length without a reflight.
- Diurnal Specifications – A maximum tolerance of 5.0 nT (peak to peak) deviation from a long chord of one minute at the base station.
- Flying Speed – The average ground speed for the survey aircraft should be 120 kph. The acceptable high limit is 180 kph over flat topography.
- Radar Altimeter – minimal accuracy of 5%, minimum range of 0-2500 m.
- Barometer – Absolute air pressure to 0.1 kPa.
- Flight Path Following – The line spacing not to vary by more than 30% from the ideal spacing over a distance of more than 300 m, except as required for aviation safety.

#### 9.2.2.1For Sioux Lookout Block:

- Traverse lines: Azimuth N150, 50 and 100 m spacing.
- Control Lines: Azimuth N060, 500 and 1000 m spacing.

## 9.3 SYSTEM TESTS

### 9.3.1 Magnetometer System Calibration

The survey configuration using a bird towed 19 m below any magnetic piece of the helicopter allows the simplification of the magnetic calibration requirement. Consequently, heading error and aircraft movement noise was considered negligible and no correction was applied to the data.

### 9.3.2 Instrumentation Lag

The magnetometer lag is a combination of two factors: 1) the time difference between when a reading is sensed, and when that value is recorded by the acquisition system, and 2) the time taken for the sensor to arrive at the location of the GPS antenna. The second factor is defined by the physical distance between the GPS antenna and any given sensor, and the speed of the aircraft. The average total magnetic lag value for the AGIS acquisition system has been calculated to -0.90 s for this survey.

## 9.4 Costing

Money spent for the work performed can be found in Table 4.

| Description | Amount |
|---|---|
| Sioux Lookout Project | $ 272,000 |
| Move to Sioux Lookout | $ 5,000 |
| **TOTAL** | **$ 277,000** |

TABLE 4: COSTS FOR FIELD WORK PERFORMED BY PROSPECTAIR GEOSURVEYS.

# 10.0 AIRBORNE GEOPHYSICS RESULTS & INTERPRETATION

## 10.1 Results

A total of 2,914 l-km were flown (flight lines shown in Figure 6) over the Property.

The following is an exert from the Technical Report provided to AuTeco from Prospectair upon completion of contracted work. For the entire report refer to the Appendix 2

The residual Total Magnetic Intensity (TMI) of the Sioux Lookout block, presented in Figure 7, is extremely active and varies over a range of 38,742 nT, with an average of -43 nT and a standard deviation of 965 nT.

Most of the surveyed area is affected by linear magnetic features characteristic of alternating sequences of mafic volcanic rocks with sedimentary or intermediate to felsic volcanic rocks, with possibly some intrusive stocks, sills or dykes locally. The strongest anomaly of the survey exceeds 35,000 nT, an amplitude typical of magnetic rich iron formations, and occurs in the northeastern part of the block. Stronger anomalies are best seen on Figure 8 which shows the residual TMI data with a linear color distribution. Most magnetic lineaments are generally trending from E-W to NE-SW in the area, with a few instances of lineaments rather striking from NNE-SSW to NW-SE in the south-central and southeast parts of the block.

Shorter wavelength anomalies are greatly enhanced on the FVD (Figure 9) and on the TILT (Figure 10) products. Since the FVD attenuates longer wavelength anomalies, and the TILT enhances very weak amplitude anomalies, they are the preferred products for structural interpretation (Figure 11).

Regarding cultural interference, human infrastructures related to the main roads, and their associated bridges and power lines, to the railways, and to all the buildings found in the vicinity of the secondary roads to the south and east of Sioux Lookout, are known to be possible sources of non-geological noise in the magnetic data. As a consequence, high frequency anomalies located near such infrastructures are likely to originate from cultural sources and should be treated with caution when planning ground investigations of magnetic anomalies.

In addition, when the helicopter had to steeply climb up above these infrastructures for obvious safety reasons, the magnetic response can appear somewhat blurred, with anomalies being attenuated in amplitude and increased in wavelength because of the greater sensor distance from the ground. This can result in local stripes parallel to survey lines in the data. This effect is local and quickly fades out on either side of the obstacle, but must be nevertheless considered when following-up on the results

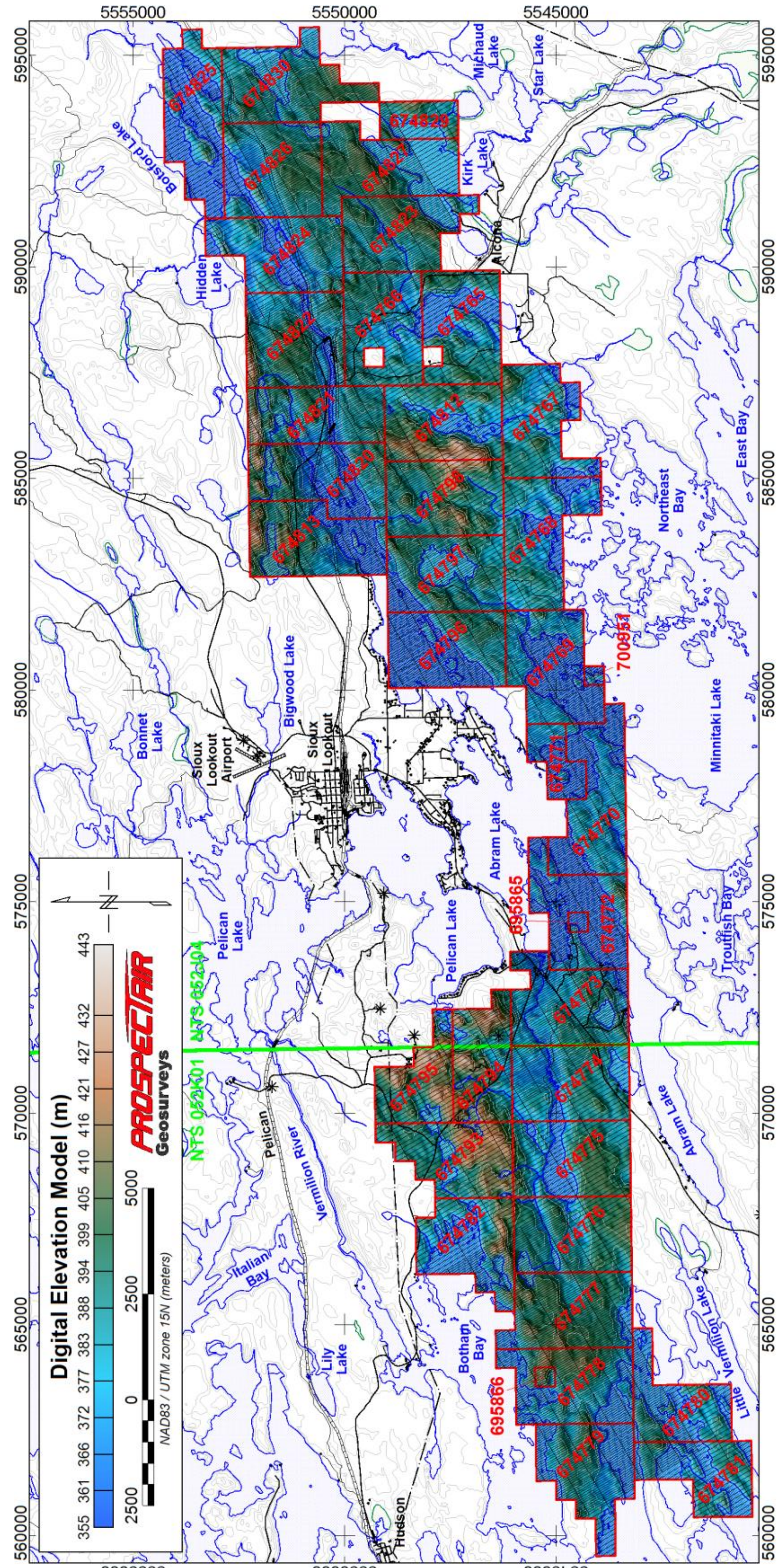


**FIGURE 6: SURVEY LINES AND SAVANT PROPERTY CLAIMS SUPERIMPOSED ON A DIGITAL ELEVATION MODEL (M). DATUM NAD 83 UTM ZONE 15U.**

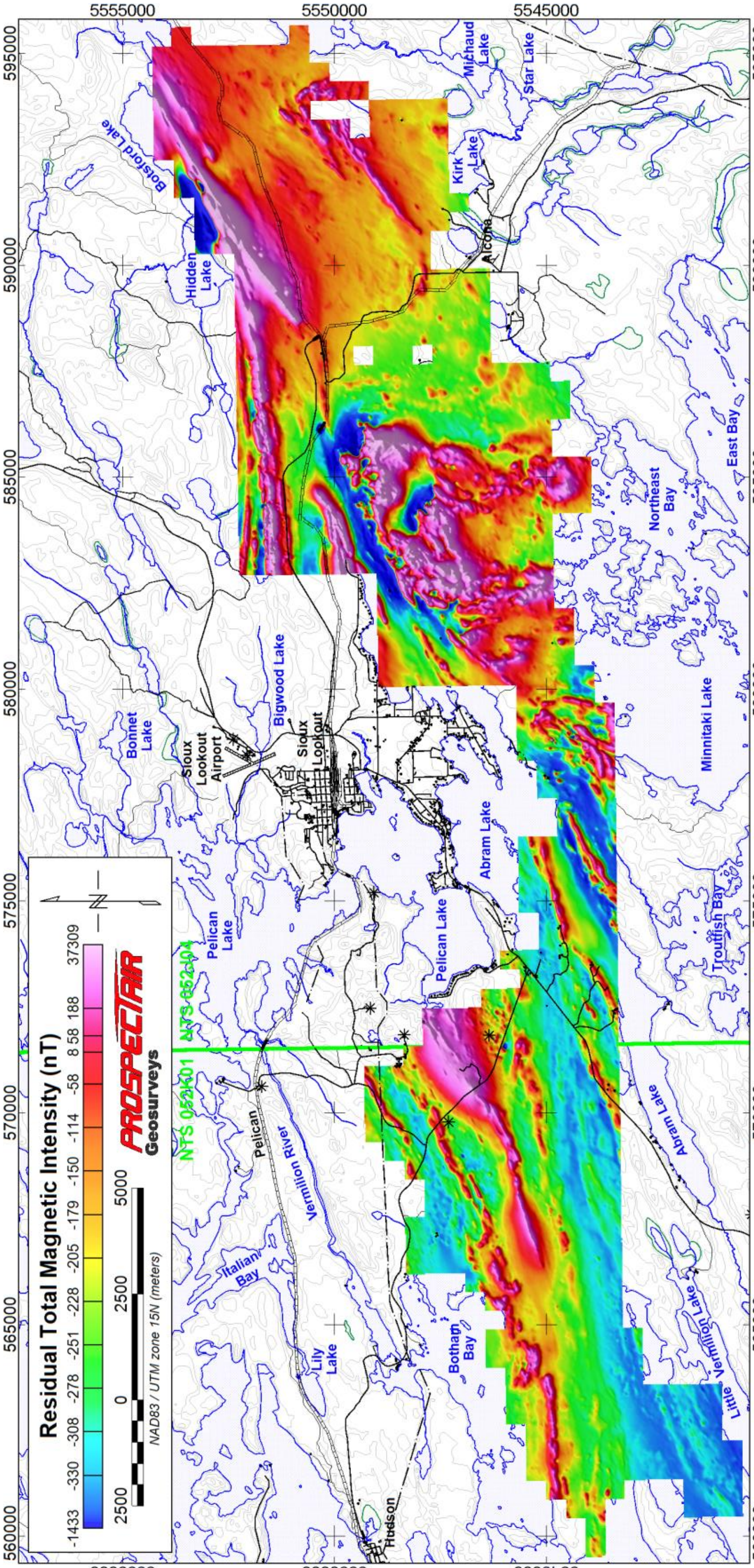


**FIGURE 7: RESIDUAL TOTAL MAGNETIC INTENSITY WITH EQUAL AREA COLOR DISTRIBUTION. DATUM NAD 83 UTM ZONE 15U.**

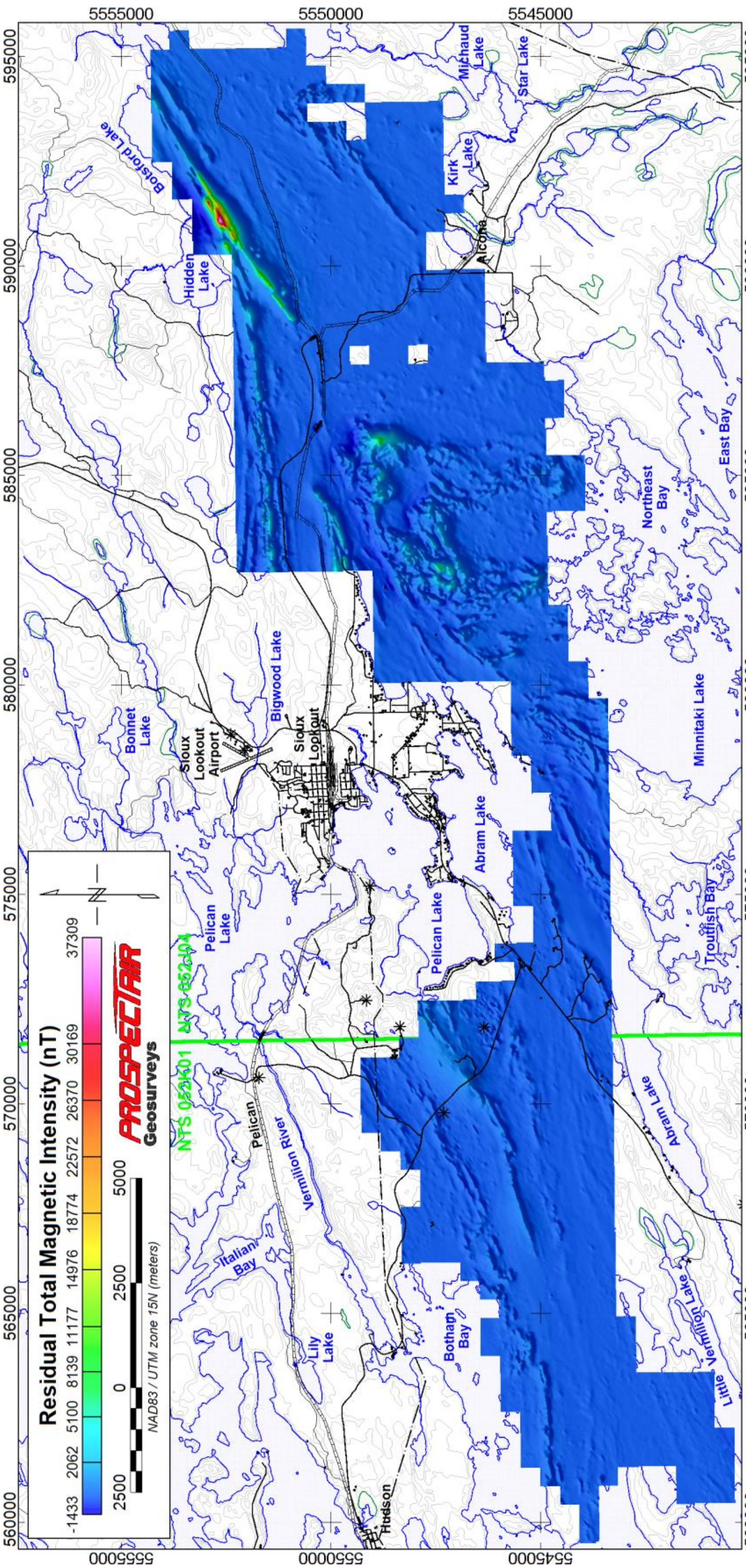


**FIGURE 8: RESIDUAL TOTAL MAGNETIC INTENSITY WITH LINEAR COLOR DISTRIBUTION. DATUM NAD 83 UTM ZONE 15U.**

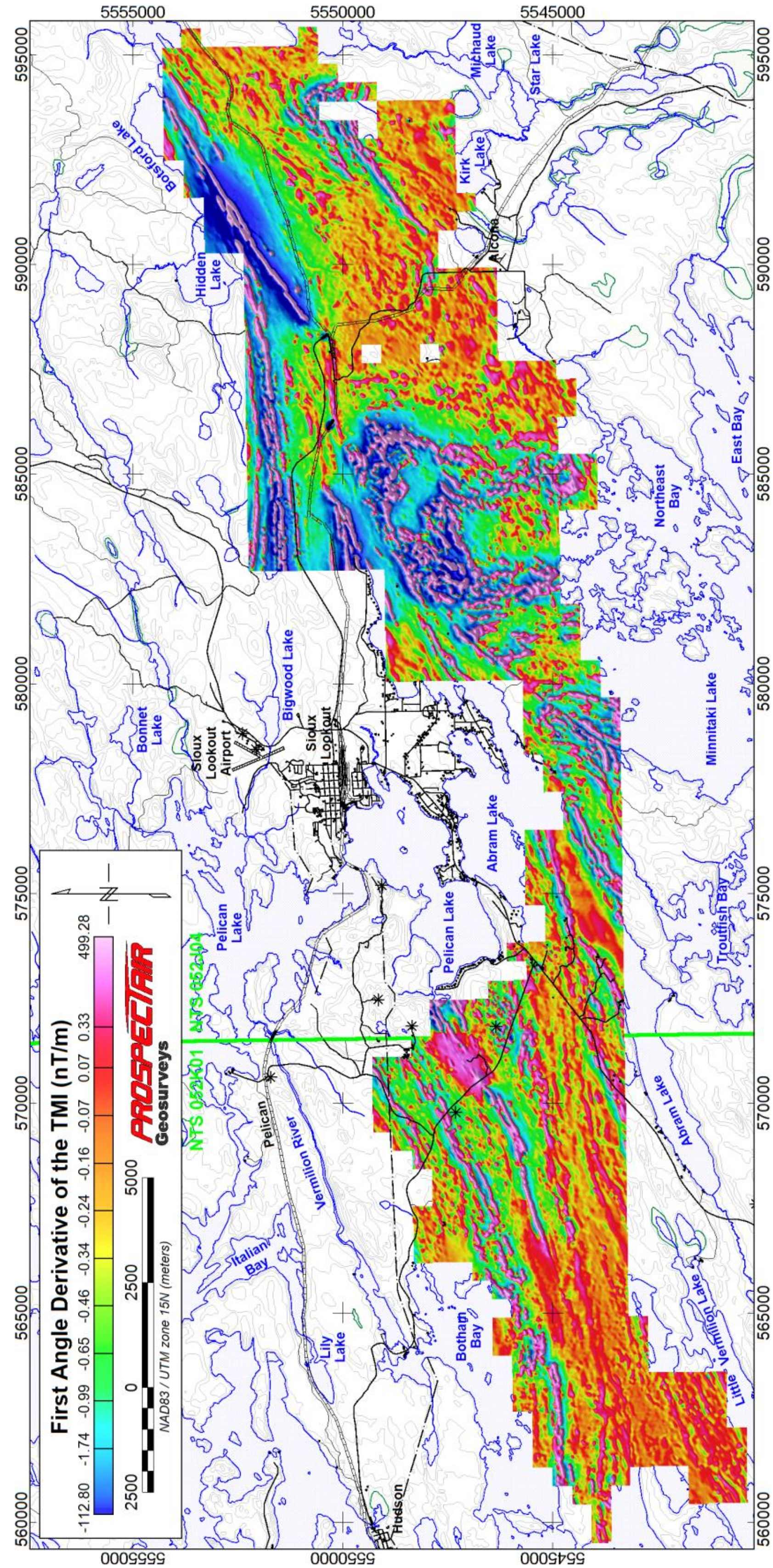


**FIGURE 9: FIRST VERTICAL DERIVATIVE OF TMI. DATUM NAD 83 UTM ZONE 15U.**

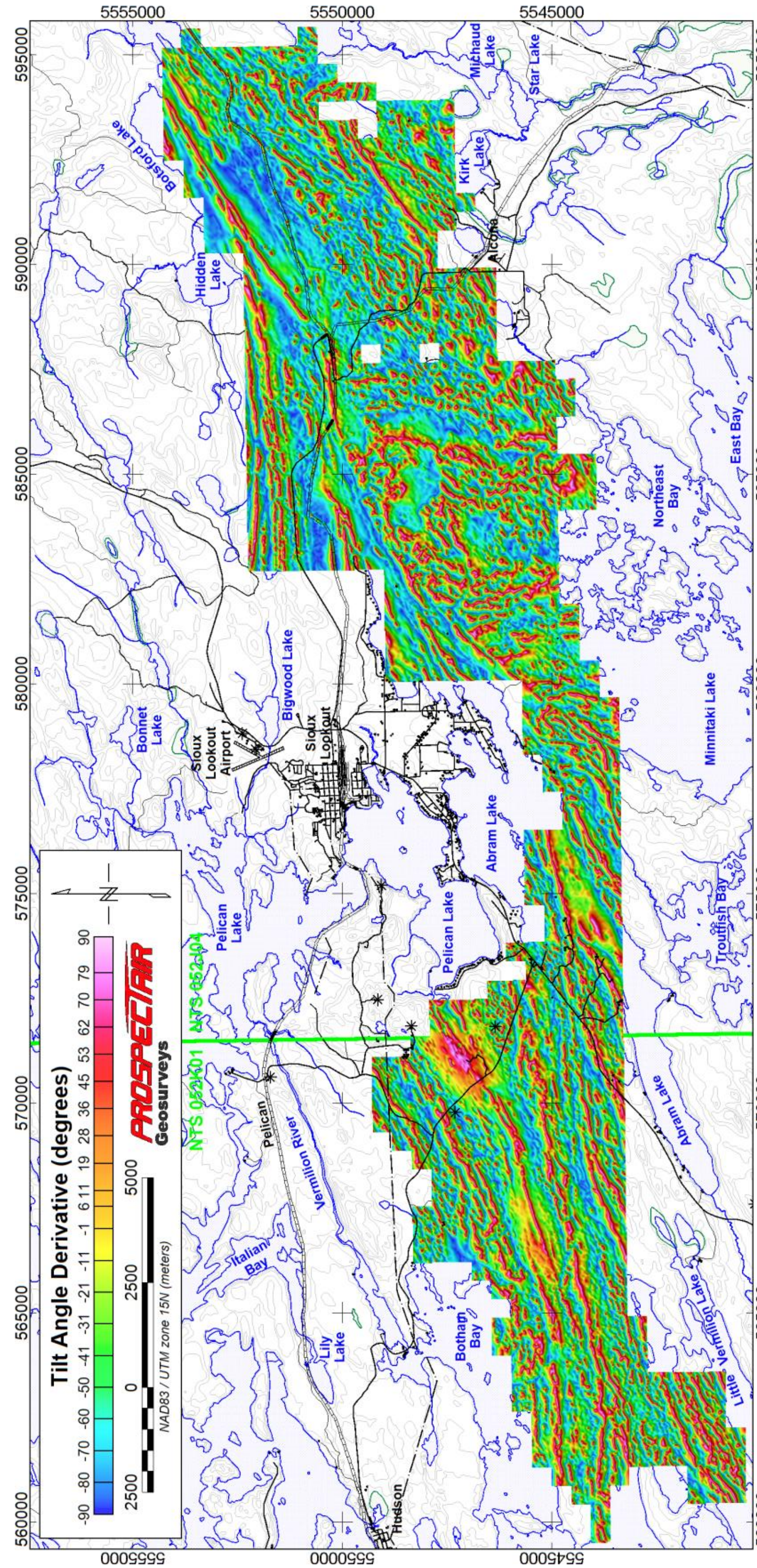


**FIGURE 10: TILT ANGLE DERIVATIVE. DATUM NAD 83 UTM ZONE 15U.**

## 10.2 Interpretation – Preliminary

A high level preliminary structural interpretation was performed on the TILT geophysics (Figure 11).

Overall, the geophysics displays several lithological contacts that trend east-west which follow the geologic interpretation well. It appears that there are two distinct zones, one on the northwestern side of the claim block and the other southeastern side. The first zone has a distinct east west trends whereas the second zone is more massive. There is also a possible fold structure (Figure 11) displayed in the central region of the second zone.

### 10.2.1 Costing

Money spent for the work performed can be found in Table 5.

| Description | Amount |
|---|---|
| Structural Interpretation: 3 days @ 750$/day | $ 2,250 |
| **TOTAL** | **$ 2,250** |

**TABLE 5: COSTS FOR PRELIMINARY GEOPHYSICAL INTERPRETATION BY AUTECO STAFF.**

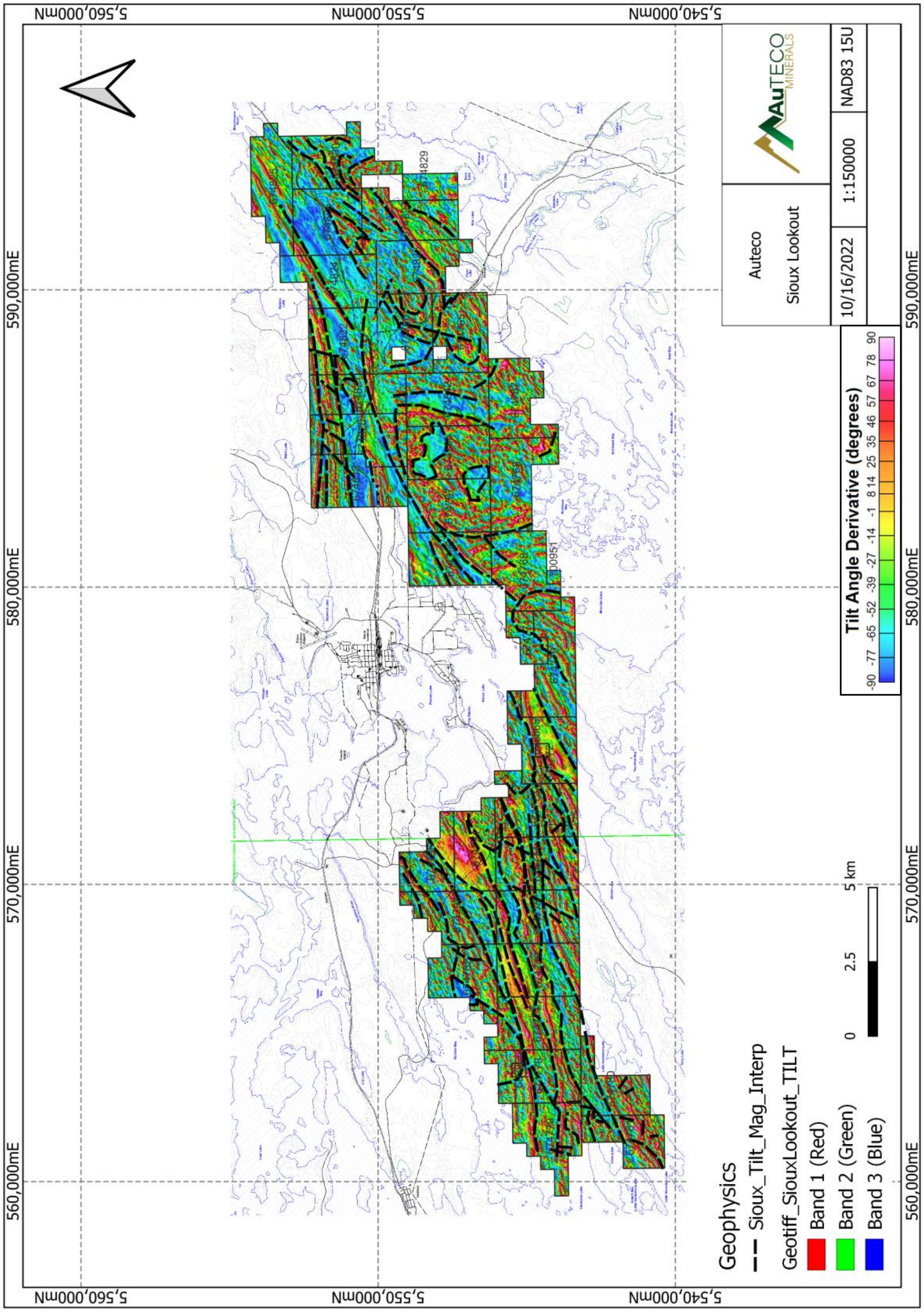


**FIGURE 11: PRELIMINARY STRUCTURAL INTERPRETATION OF SIOUX LOOKOUT PROPERTY USING TILT GEOPHYSICS. DATUM NAD 83 UTM ZONE 15U.**

## 10.3 Interpretation – Final

H. Veldhuyzen was hired to provide geological and structural interpretation on the Airborne Geophysics that was flown in 2022. Mr. Veldhuyzen worked a total of 44 hours.

### 10.3.1 Costing

Money spent for the work performed can be found in Table 6.

| Description | Amount |
|---|---|
| Sioux Lookout Printing | $ 85.06 |
| Sioux Lookout Interpretation | $ 3,960.00 |
| **TOTAL** | **$ 4,045** |

**TABLE 6: COSTS FOR FINAL GEOPHYSICAL INTERPRETATION BY H. VELDHUYZEN.**

### 10.3.2 Lithological Units

H. Veldhuyzen provided an interpretation on the lithological units (Figure 12) using 6 maps published by the Ontario Geological Society (41b, P0468, P0421, P0408, P0337, MDR288), the newly flown geophysical data by Prospectair Geosurveys in 2022 and historical assessment files. The following is a summary of his report:

- The Miniss Fault and East-West breaks separate the claim group into two geological domains, the North and South blocks (figure 12).
- The rock type responsible for the laterally significant units may be high magnetite volcanics or more extensive iron formation beds
- The mafic volcanics, the sediments and tuffs have well defined internal units not suggested by the geological mapping.
- The North Block contains a well-defined high magnetic stratigraphic unit, unrecognized by files recovered from the Ontario Geological Survey (OGS). The high magnetic volcanic unit is a defined unit and is sufficiently distinct to be placed in Sioux Lookout property stratigraphic column.
- Geological boundaries plotted on Total Magnetic Intensity (TMI) plot are chosen to be consistent with the geological mapping except when boundaries were interpolated between outcrops (Figure 13)
- Geological boundaries plotted on First Calculated Vertical Derivative (1VD) plot indicates the mafic volcanics and the sediments and tuffs have well defined internal units not suggested by the geological mapping (Figure 14).

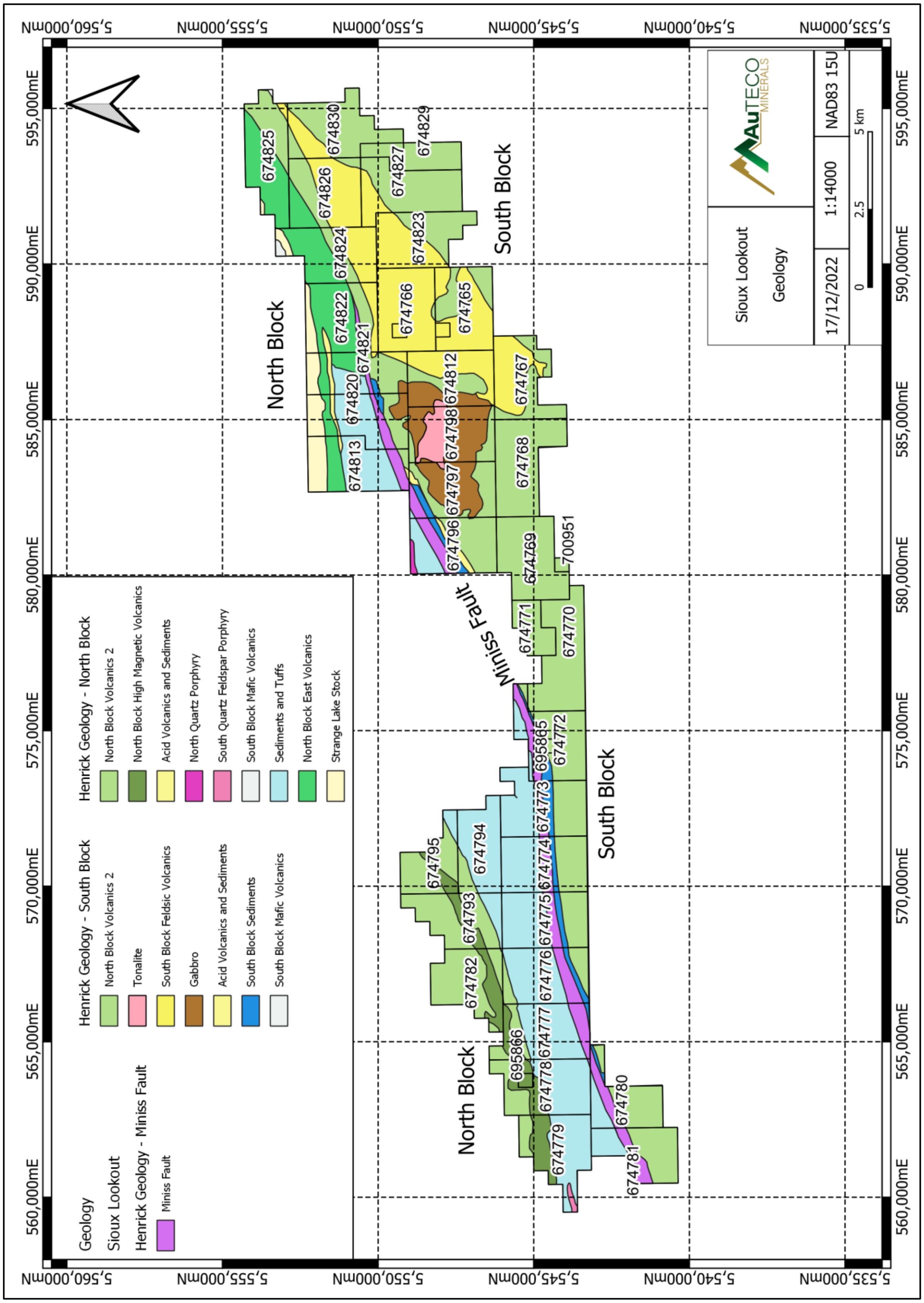


**FIGURE 12: GEOLOGICAL INTERPRETATION FROM AIRBORNE GEOPHYSICS PERFORMED 2022 WITH OGS AND GSC GEOLOGICAL MAPS IN THE AREA. DATUM NAD 83 UTM ZONE 15U. (VELDHUYZEN, 2022).**

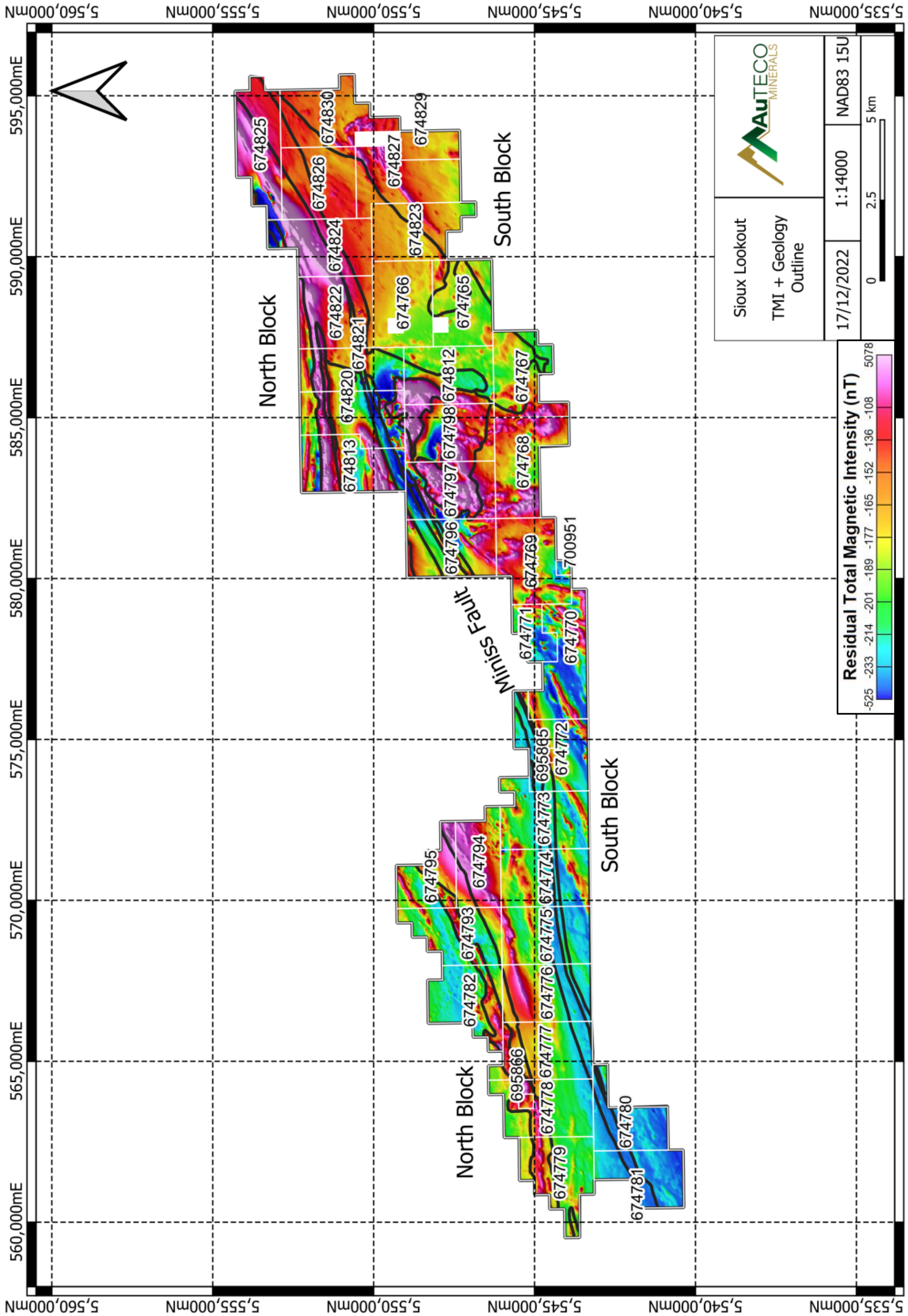


**FIGURE 13: GEOLOGICAL INTERPRETATION FROM AIRBORNE GEOPHYSICS PERFORMED 2022 WITH TMI GEOPHYSICS, DATUM NAD 83 UTM ZONE 15U (VELDHUYZEN, 2022).**

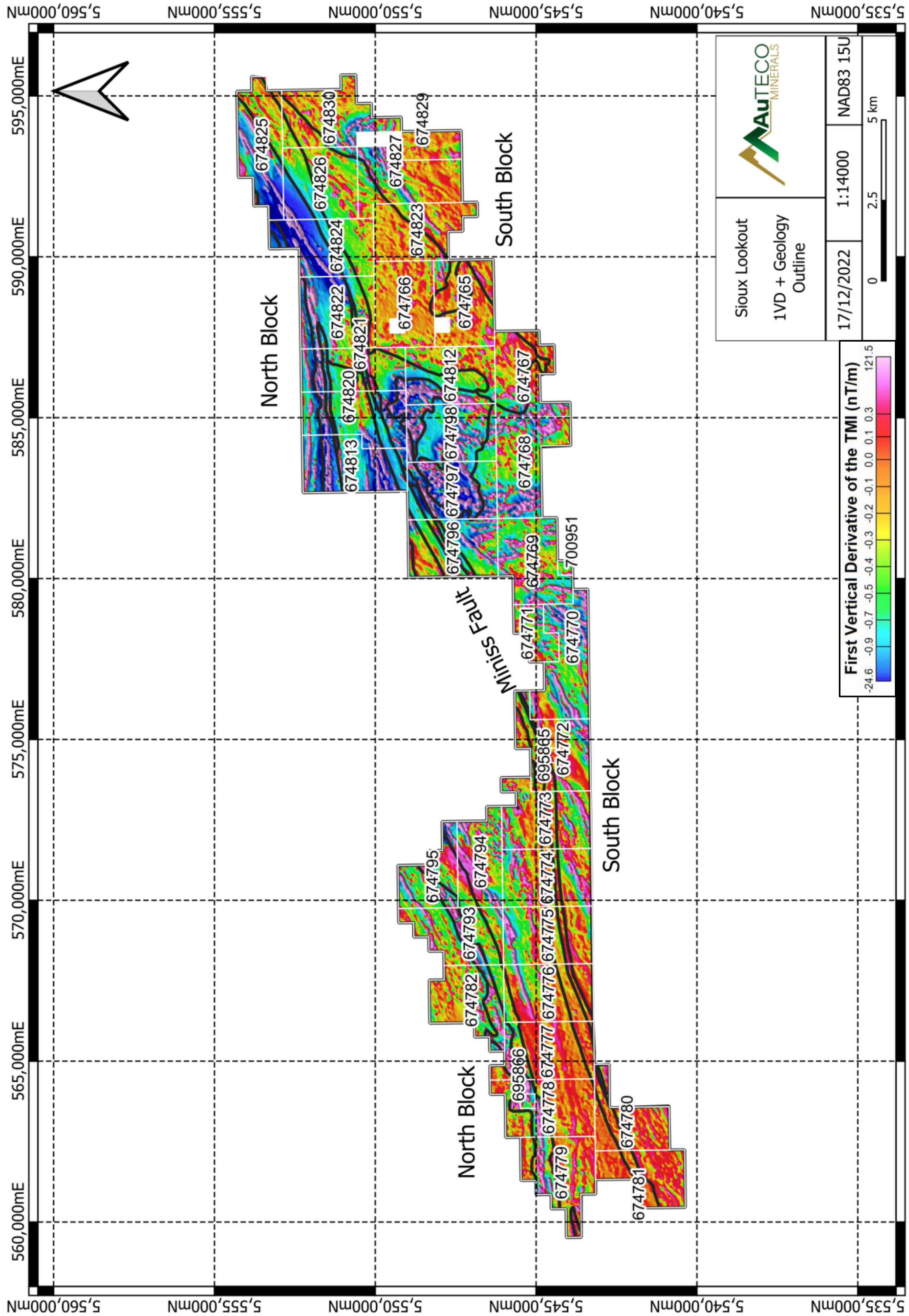


FIGURE 14: GEOLOGICAL INTERPRETATION FROM AIRBORNE GEOPHYSICS PERFORMED 2022 WITH 1VD GEOPHYSICS, NAD 83 UTM ZONE 15U (VELDHUYZEN, 2022).

### 10.3.3 Structural Interpretation:

Veldhuyzen, 2022 identified three episodes of structural breaks, 1) Early Pre Miniss Faulting; 2) Late Pre-Miniss Faulting (related to igneous intrusion in the South block); 3) Miniss Fault Zone (with apparently related East-West structures forming the kink in the Miniss Fault trend). Episodes 1 and 2 may have overlapped in time.

1 & 2) PreMiniss Faulting – figure 15, figure 16

- No structural elements are considered to cross the Miniss Fault Zone. Two breaks that may align on either side of the Miniss fault is considered a coincidence.
- Not only are the North and South block different, the west and east sides of the blocks are again different from each other.
- North and South Blocks are structurally unrelated and should be assessed separately (Figure 15).

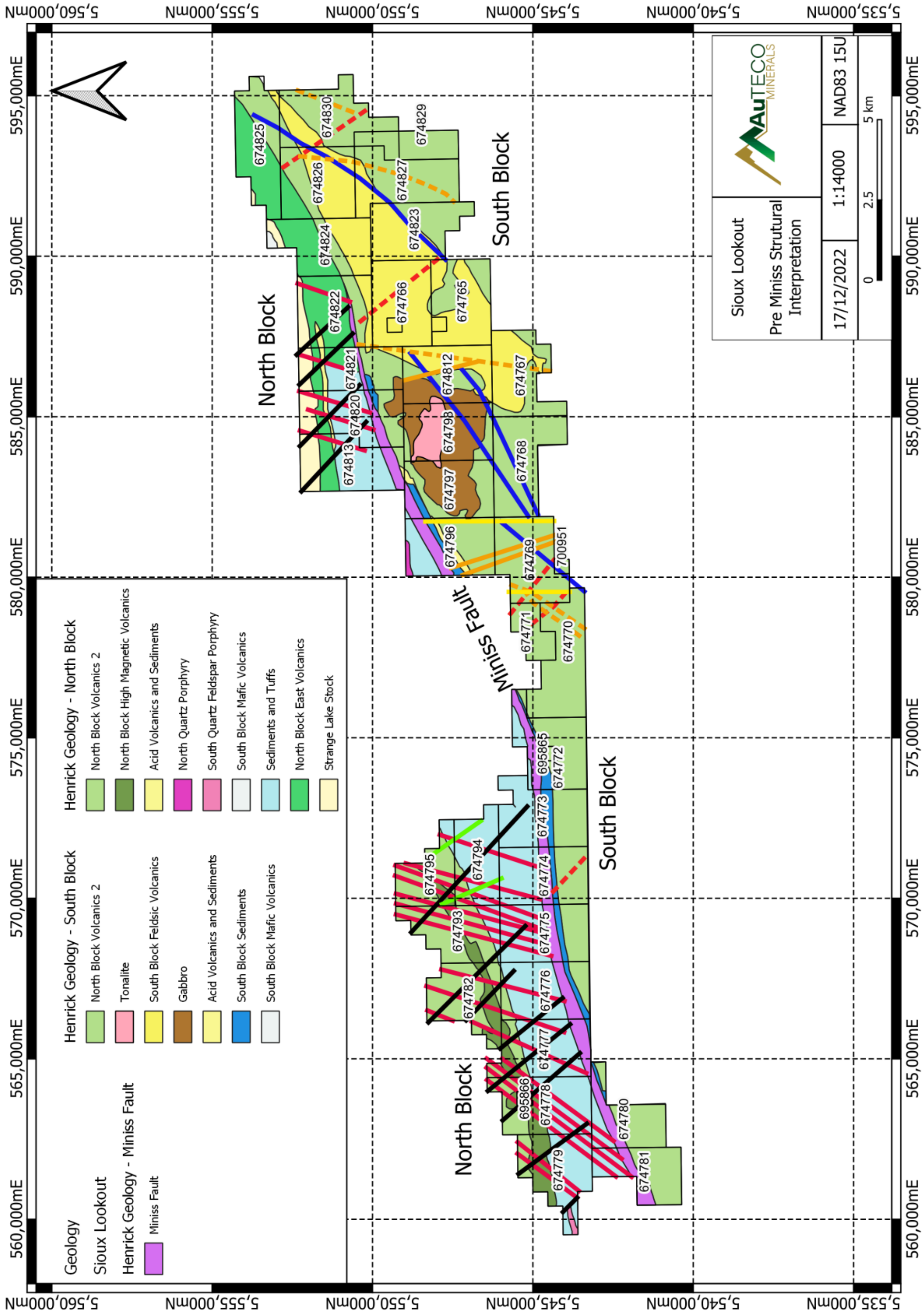


FIGURE 15: PRE-MINISS STRUCTURAL LINEATIONS PLOTTED ON THE INTERPRETED GEOLOGY, NAD 83 UTM ZONE 15U (VELDHUYZEN, 2022).

3) Miniss Fault Zone – Figure 17

- The Miniss Fault Zone is the last structural movement which divided the claims into the North and South Blocks. Concurrent with the Miniss Faulting are east-west lineations (Figure 16).
- Plotting of these two orientations on the TMI data illustrates the presence of two separate geological domains.
- Plotting of these two orientations on the 1VD ($1^{st}$ calculated Vertical Derivative) data illustrates the presence of two separate styles for the two geological domains.
- Plot of the Miniss Fault Zone and associate east-west shears plotted on the geology and Mineral Deposit Inventory (MDI) locations has one MDI location coinciding with an east-west structure.
- Poor correlation of Miniss structure and mineralization.
- The Miniss Fault and its associated lineations obliquely cross the claim group separating the geological domains into the North and South blocks

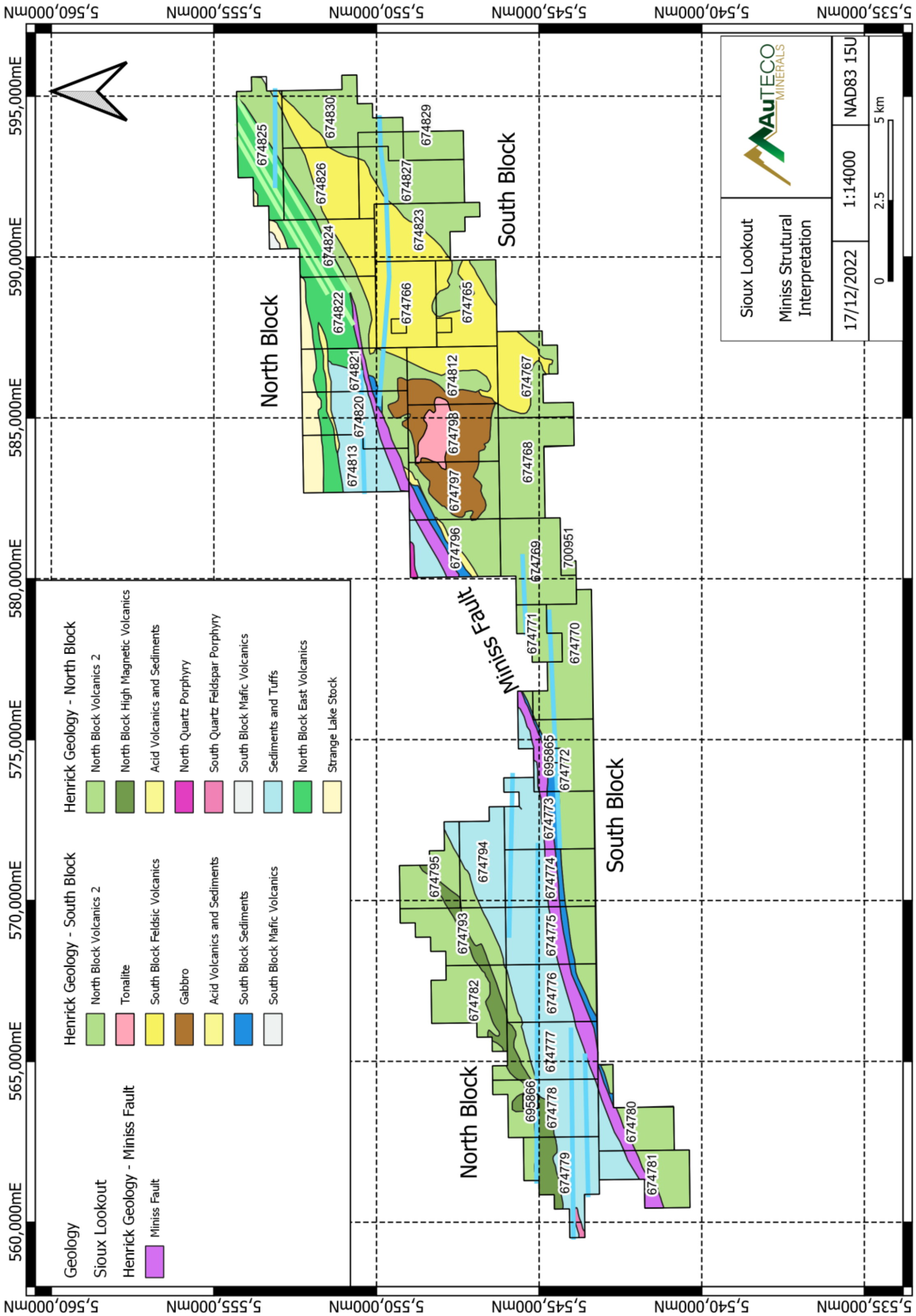


**Figure 16: Miniss Fault Zone and Associated East-West Breaks Plotted on the Interpreted Geology, NAD 83 UTM Zone 15U (Veldhuyzen, 2022).**

The Claim Group is divided into the North and South Blocks by the Miniss Fault system. The Miniss Fault system post-dates all other interpreted structures. As such the earlier structural styles do not cross the Miniss Fault zone. The Miniss structural fabric has overprinted much if not all of the area. Miniss Fault system does not appear to be the principle mineralizing event. There are many reported, unmineralized veins associated with the Miniss fault.

The interpreted breaks follow well defined magnetic lows and areas where the magnetic trends change directions.

Early structures are associated with mineralization. These are typically at a high angle to lithological banding except for east-west structures. The early structural style in the North and South blocks is different and mineralization if present, is expected too also be different.

It is not clear which orientations are the main mineralizing controls. Suspicion is mineralization may be controlled by second or third order structures while the mineralized envelop is controlled by first order structures.

# 11.0 LIDAR ASSESSMENT WORK

Eagle Mapping Ltd was contracted to conduct an airborne LIDAR survey. The survey was flown on June 10, 2022 using a Cessna 206 aircraft with a Riegl LMS-Q1560 LiDAR unit and a iXM-RS150F cameral unit. Survey and data acquisition details are found in the Appendix 3. The following were the products generated from the survey:

- High-Resolution Air Photo, Figure 20
- Topographic Contours (0.5 m spacing), Figure 21
- Digital Elevation Model (DEM, 0.5 m resolution) Figure 22
- Bare Earth Hillshade (BEHS) Image, Figure 23

The air photo, DEM, BEHS and topographic contours were generated by Eagle Mapping Ltd to:

- Generate more accurate elevation surfaces
- For assistance in field program planning (mapping, sampling, drilling, etc.)
- For general geological use,
- Future 3D modeling work.

## 11.1 Costing

Money spent for the work performed can be found in Table 7.

| Description | Amount |
|---|---|
| Sioux Lookout Project Acquisition/Processing | $ 40,681 |
| Sioux Lookout Vectorizing Hydro/Outcrop | $ 2,700 |
| **TOTAL** | **$ 43,381** |

**Table 7: Costs for LIDAR Acquisition/Processing and Vectorization by Eagle Mapping Ltd.**

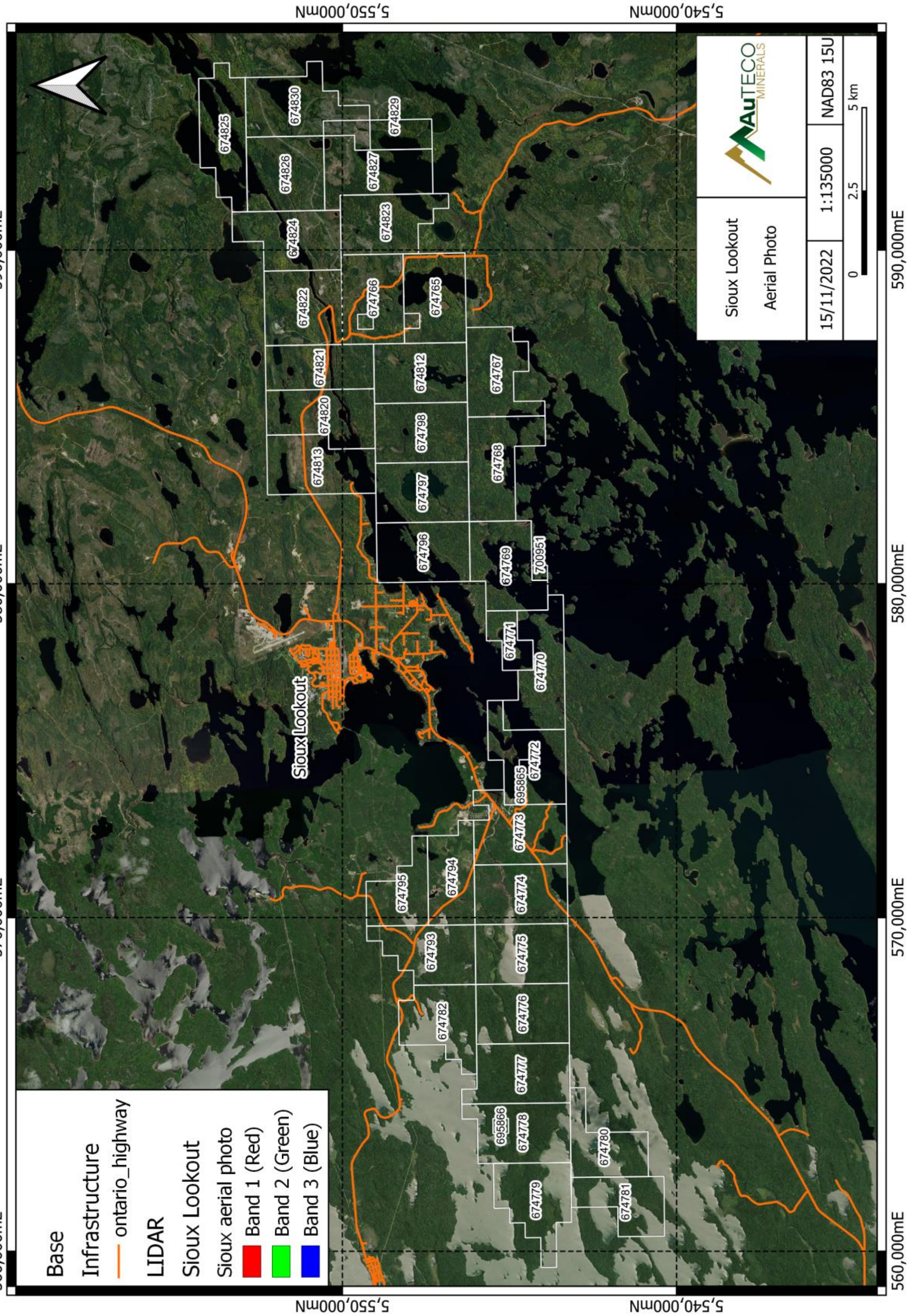


**FIGURE 17: SIOUX LOOKOUT AIRPHOTO. DATUM NAD 83 UTM ZONE 15U.**

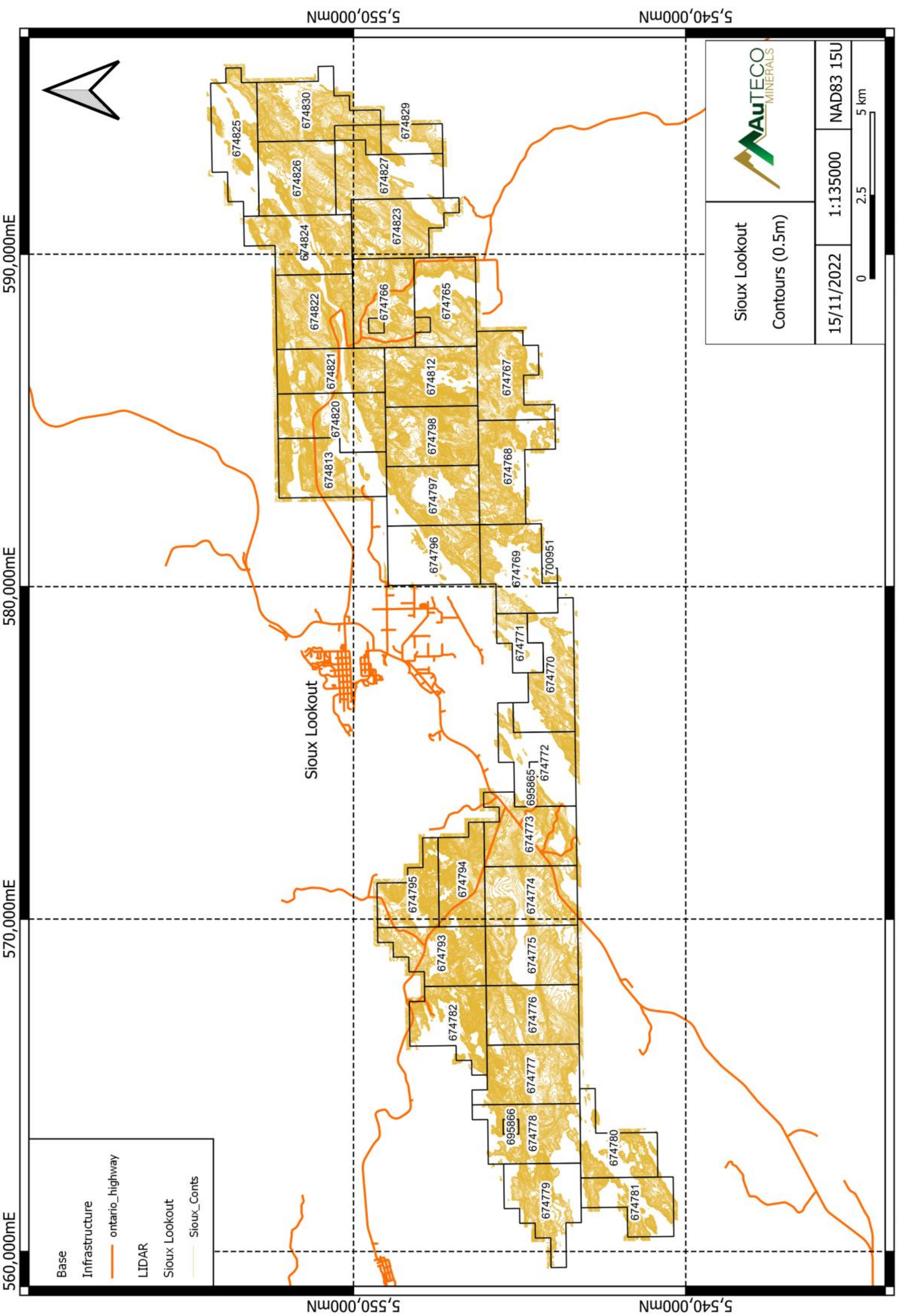


**FIGURE 18: SIOUX LOOKOUT CONTOURS (0.5M CONTOURS). DATUM NAD 83 UTM ZONE 15U.**

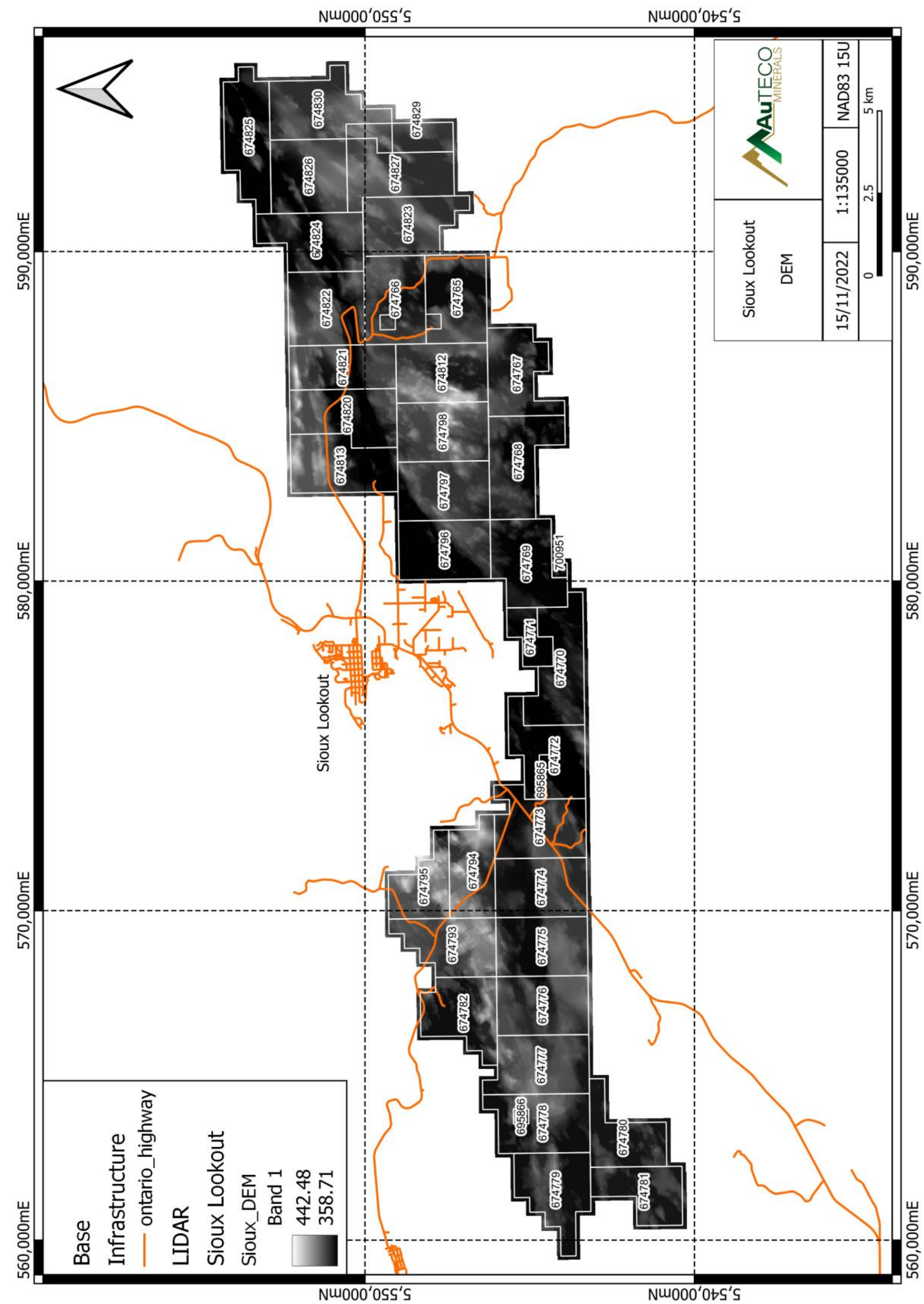


**FIGURE 19: SIOUX LOOKOUT DIGITAL ELEVATION MODEL. DATUM NAD 83 UTM ZONE 15U.**

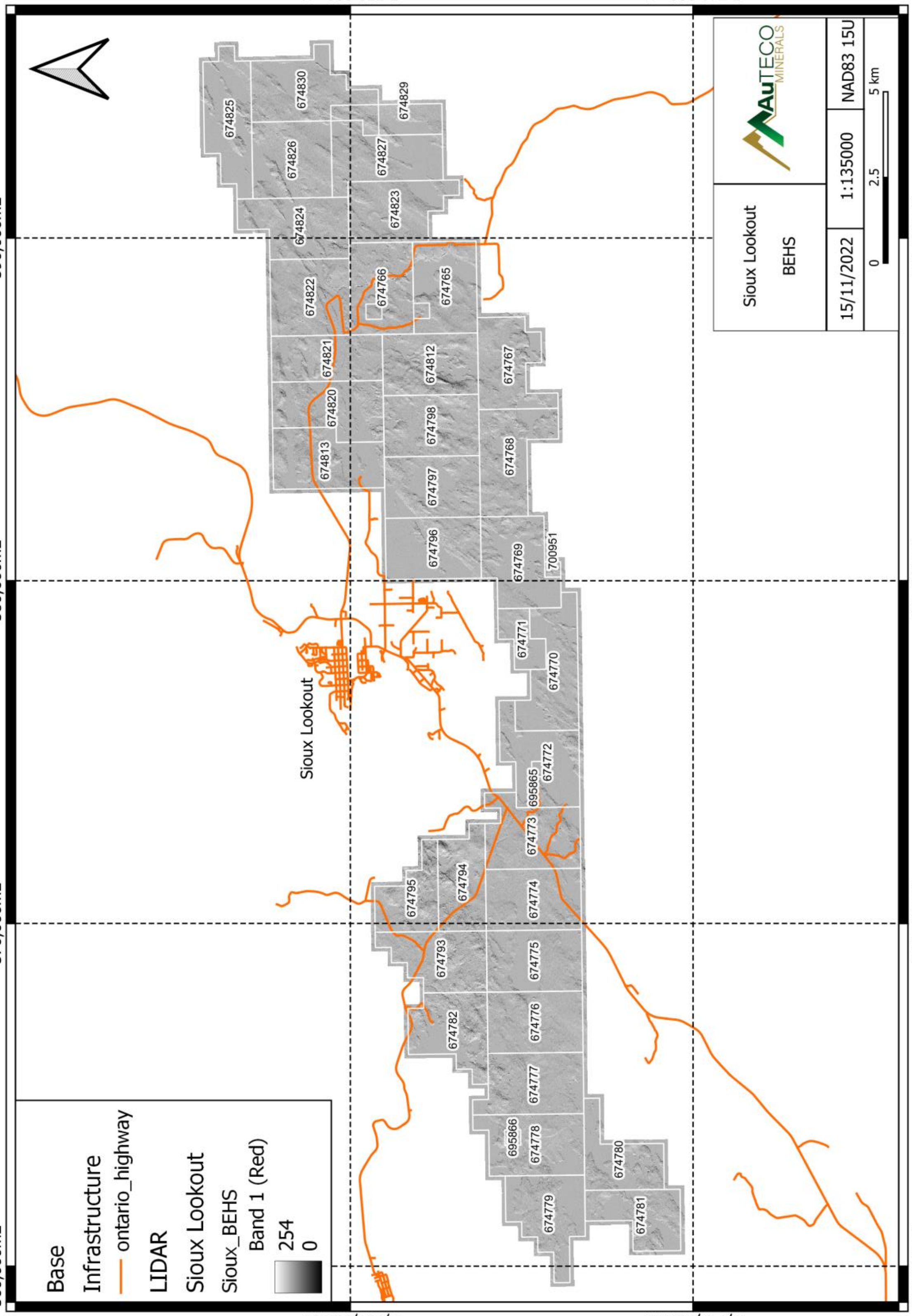


**FIGURE 20: SIOUX LOOKOUT BARE EARTH HILLSHADE (BEHS). DATUM NAD 83 UTM ZONE 15U.**

# 12.0 LIDAR RESULTS AND INTERPRETATION

The combined acquisition of LIDAR point data and high-resolution imagery permits the production of base maps of exceptional quality over the Property.

As part of Eagle Mapping Ltd deliverables was to interpret the LIDAR images for waterways including streams, rivers, swamps and lakes (Figure 24).

The results from the LIDAR survey have greatly improved outcrop identification, included in the Eagle Mapping deliverables included shape files that identify areas that suggest bare outcrop (Figure 25). The Property contains flat areas covered with dense bush. These conditions previously made it difficult to locate rock outcrops during initial mapping operations.

The LIDAR data, integrated into GIS systems, will allow actionable structural interpretation of bedrock fabric and faulting, determining the locations of historic trenching and pitting locations, and determining areas of potential outcrop, especially in low-lying or swampy areas. The LIDAR elevation data, used in conjunction with geological mapping, prospecting, geophysics will remain an important tool to explore the Property.

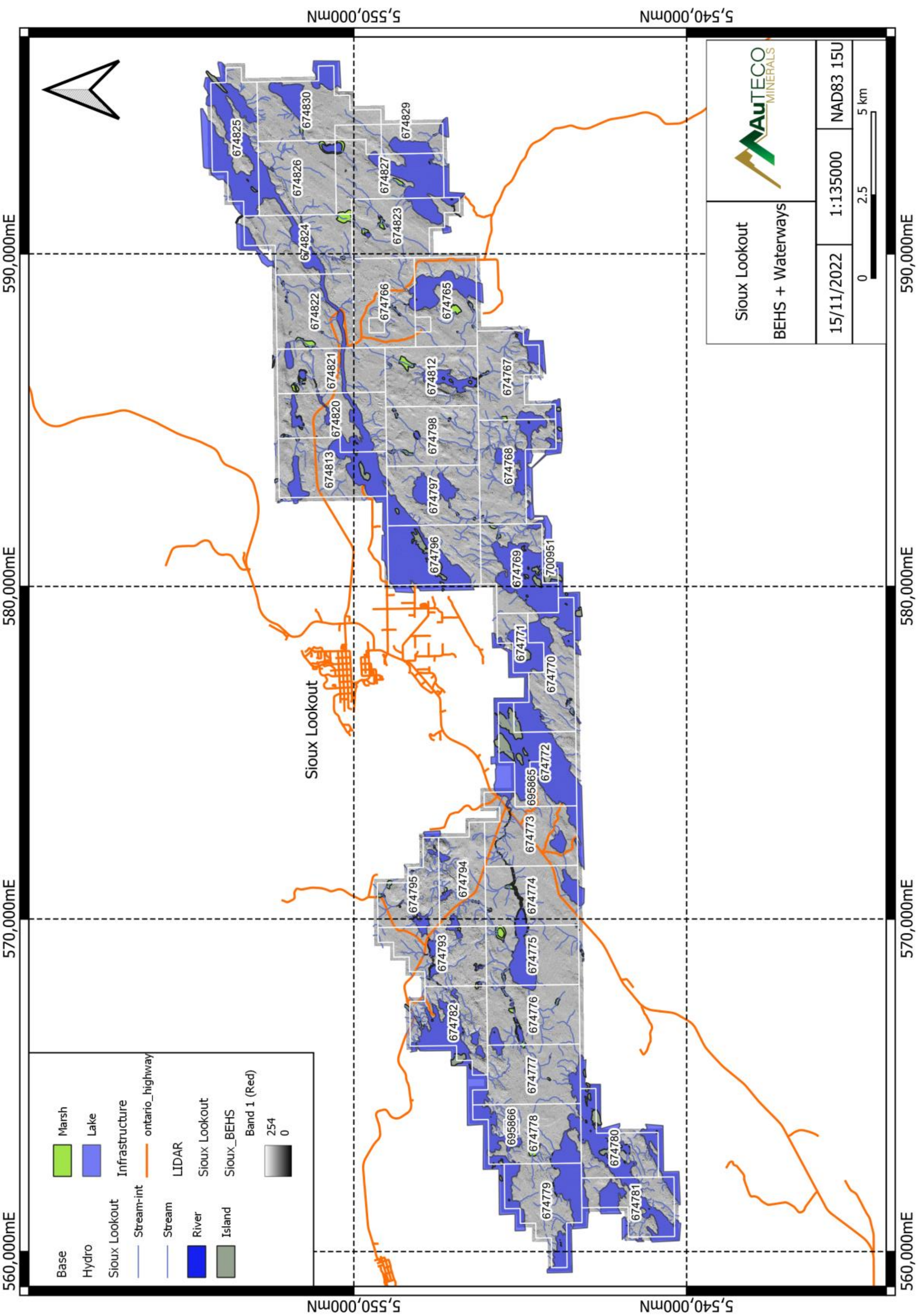


**FIGURE 21: SIOUX LOOKOUT VECTORIZED WATERWAYS. DATUM NAD 83 UTM ZONE 15U.**

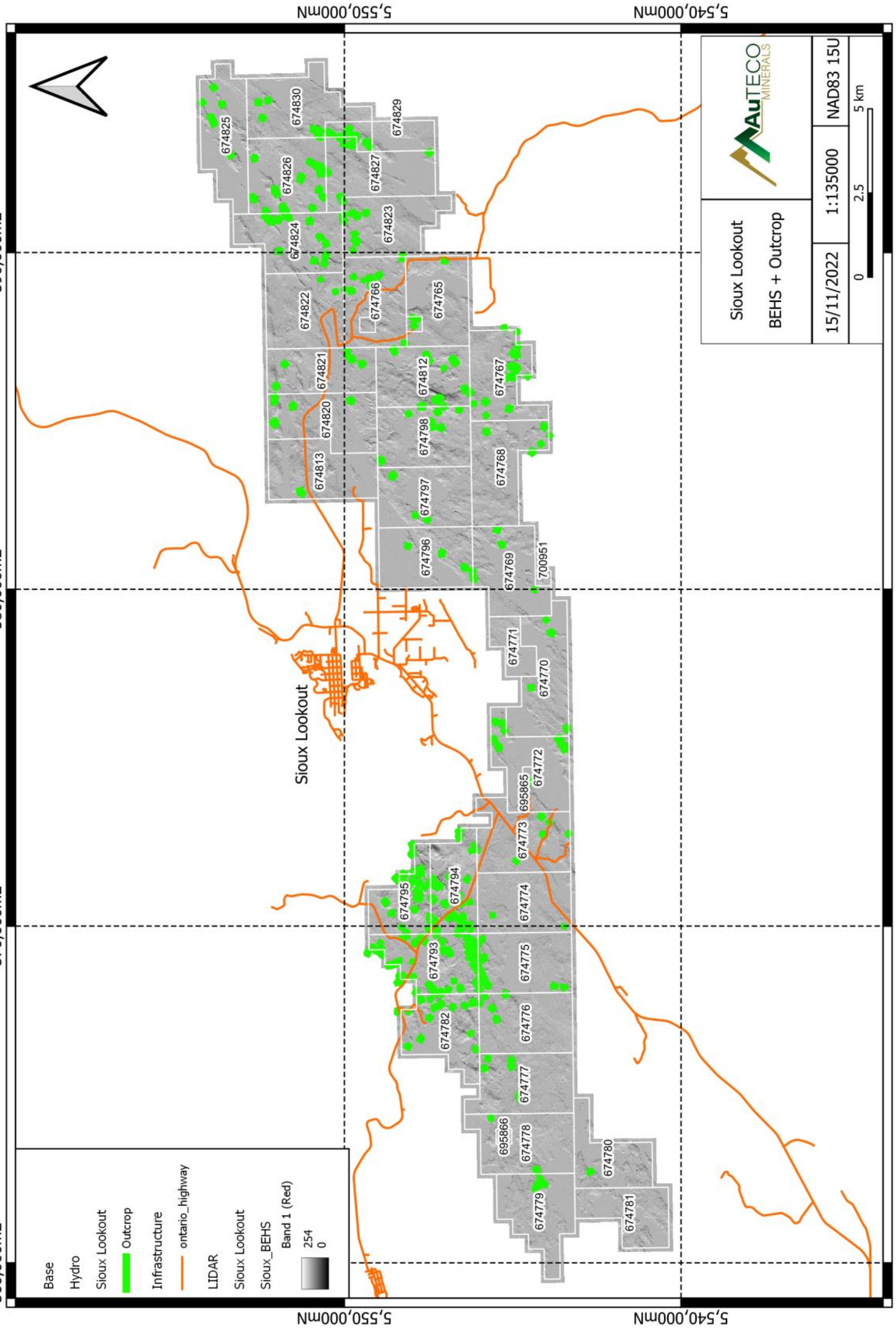


**FIGURE 22: SIOUX LOOKOUT / VECTORIZED OUTCROP, DATUM NAD 83 UTM ZONE 15U.**

# 13.0 CONCLUSIONS AND RECOMMENDATIONS

In conclusion the airborne magnetic survey, the LIDAR and the high-resolution air photos produced were a success. These new data sets will greatly aid in future prospecting and drillhole targeting in the coming years.

In conclusion the airborne magnetic survey flown in Sioux Lookout was successful, producing areas of interest for prospecting and possible drillhole targets. A high level structural interpretation was performed on the TILT geophysics.

The geophysics displays several stringers of magnetic highs that define clearly a NE trend. When analyzed with the Ontario geology the geophysics follows similar trends. There are some interesting features in the Central East portion of the property.

The structural interpretation has provided focused locations for prospecting and diamond drillhole targets. Future work should include prospecting and soil sampling interesting areas that have been highlighted with the recent survey and the structural interpretation. The prospecting will then lead to targeting areas for a diamond drill program in the area.

The LIDAR produced will be used in assisting with planning and execution of future field programs. The LIDAR interpretations generated GIS shape files of waterways and outcrops that will further assist in the planning of future field programs.

The work reported on in this assessment file was successful in producing areas of interest for future work in the area.

## 13.1 Budget

A summary of the costing for these programs can be found in Table 8.

| Description | Amount |
|---|---|
| Aeromagnetic Geophysical Survey | $ 277,000 |
| Preliminary Structural Interpretation | $ 2,250 |
| Final Structural Interpretation | $ 4,045 |
| LIDAR Survey + Interpretation | $ 43,381 |
| Report Writing | $ 6,750 |
| **TOTAL** | **$ 333,426** |

TABLE 8: TOTAL COSTING OF PROGRAMS.

# 12.0 REFERENCES


Beakhouse, G.P., 2013: Summary of Field Work and Other Activities 2013, Ontario Geological Survey, Open File Report 6290, 5. Project Unit 09-006. Western Wabigoon Subprovince Synthesis Project p.5-1 to 5-7.

Devaney, J.R., 2000. Regional Geology of the Sioux Lookout Orogenic Belt, Western Wabigoon Subprovince: Stages of Archean Volcanism, Sedimentation, Tectonism and Mineralization, Ontario Geological Survey Open File Report 6017

Edwards, G.R. and Davis, D.W., 1986: The Western Wabigoon Subprovince, Superior Province, Canada: Late Archean greenstone succession in rifted basement complex; Workshop on Tectonic Evolution of Greenstone Belts. A Lunar and Planetary Institute Workshop held January 16-18, 1986, at the Lunar and Planetary Institute, in Houston, Texas. Edited by M. J. deWit and Lewis D. Ashwal. LPI Technical Report 86-10, published by Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058

Jube, Joel, 2022: Technical Report; High-Resolution Heliborne Magnetic Survey, Internal Document.Montsion, R., Thurston, P., Ayer, J., 2018, 1:2 000 000 Scale Geological Compilation of the Superior Craton – Version 1: Mineral Exploration Research Centre, Harquail School of Earth Sciences, Laurentian University Document Number MERC-ME-2018-017

Veldhuyzen, H. 2022. Sioux Lookout Claim Group Geophysical – Structural Interpretation; Internal Report

# 13.0 STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS:

I, Jim Edwards, of the town of Caledon, Ontario, do hereby swear and affirm that:

1. I am a Professional Geologist registered in good standing with the Association of Professional Geoscientists of Ontario (Membership #2215) (since 2009).

2. I have an Honours B.Sc. degree in Geology from Laurentian University in Sudbury, ON.

3. I was employed as an exploration geologist by several major mining companies and the public sector on a full-time or contract basis from 1992 to 2022 throughout Ontario. From 2005 to March 2015. I was employed at the Musselwhite gold mine as a Senior Geologist. Mine Geologist in 2016 with Harte Gold at the Sugar Zone. In 2017-2018 Employed as a Senior Project Geologist with Agnico Eagle Nunavut. I consulted in 2019-2020 and have been employed by Auteco Minerals since September 2021.

4. I am currently an Exploration Manager at Auteco Minerals and personally overseen the geological work and directly supervised all contractors and employees on site.

5. I have no financial interest in Auteco Minerals or the properties it owns.

Jim Edwards

Date: _June 6, 2022

# APPENDICES

# APPENDIX 1: INVOICE

# APPENDIX 2: PROSPECTAIR GEOSURVEYS REPORT

# Technical Report

## High-Resolution Heliborne Magnetic Survey

### Sioux Lookout Property, Sioux Lookout Area
### Patricia Mining Division, Ontario, 2022

### Revel Resources Ltd.
### Ground Floor, 24 Outram Street West
### Perth, WA 6005
### Australia


### Prospectair Geosurveys

### Dynamic Discovery Geoscience

**Prepared by:**
***Joël Dubé, P.Eng.***

**July 2022**

Dynamic Discovery Geoscience
7977 Décarie Drive
Ottawa, ON, K1C 3K3
jdube@ddgeoscience.ca
819-598-8486

Survey flown by :

PROSPECTAIR Geosurveys

15 chemin de l'Étang
Gatineau, Québec J9J 3S9
819-661-2029
contact@prospectair.ca

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## FIGURES



## TABLES

# I. INTRODUCTION

Prospectair Geosurveys conducted a heliborne high-resolution magnetic (MAG) survey for the mineral exploration company Revel Resources Ltd. on its Sioux Lookout Property located in the Sioux Lookout area, Patricia Mining Division, Province of Ontario (Figure 1). The survey was flown from June 30 to July 16, 2022.

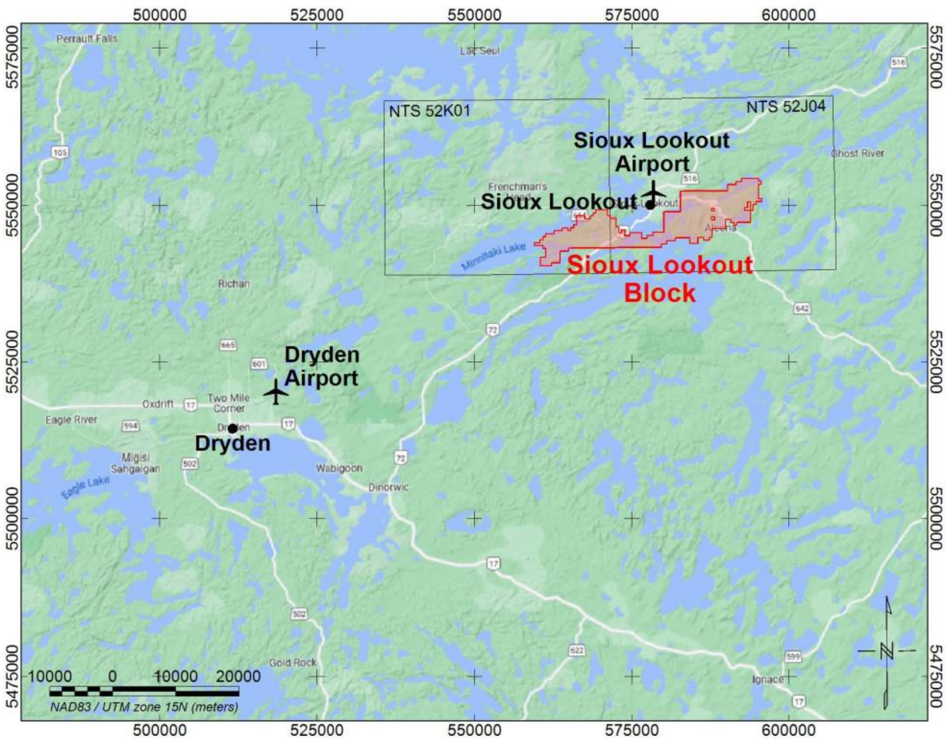
Figure 1: **General Survey Location**

One survey block was flown for a total of 2,924 l-km. A total of 23 production flights were performed using Prospectair's Robinson R-44, registration C-GBOU. The helicopter and survey crew operated out of the Sioux Lookout Airport located less than 5 km from the block (Figure 2).

Table 1: **Survey block particulars**

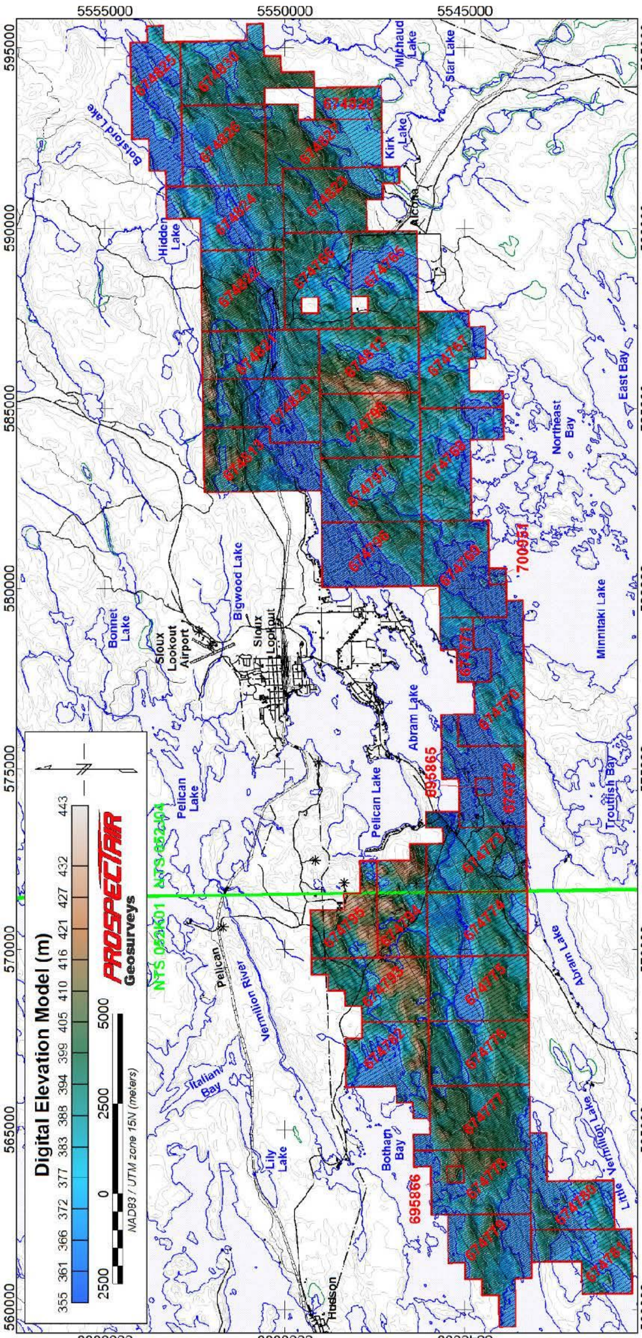
| Block | NTS Mapsheet | Line-km flown | Flight numbers | Dates Flown |
|---|---|---|---|---|
| Sioux Lookout | 052K01 & 052J04 | 2,924 l-km | Flt 1 to 23 | June 30 to July 16 |

Figure 2: **Survey Location and base of operation**



The Sioux Lookout block was mainly flown with traverse lines at 100 m spacing, with two smaller areas of greater interest flown at 50 m spacing. Likewise, control lines were locally spaced every 500 m within these areas, and 1000 m elsewhere. The survey lines were oriented N150. The control lines were oriented perpendicular to traverse lines. The average height above ground of the helicopter was 41 m and the magnetic sensor was at 22 m. The average survey flying speed was 30.3 m/s. The survey area is covered by forest, lakes and some wetlands. The topography is mostly gently undulating, with a few low-level hills. The elevation is ranging from 355 to 443 m above mean sea level (MSL). From the ground, the block can be easily accessed via secondary forestry roads connecting to two main highways. One is highway 642, which crosses the block in its eastern part and links the town of Sioux Lookout to the village of Silver Dollar, further to the southeast. The second is highway 72, found in the west part of the block and connecting Sioux Lookout to the village of Dinorwic towards the southwest. A few infrastructures are found within the block, like the highways, one railway somewhat parallel to highway 642 and another one rather parallel to Marchington River/Botsford Lake and extending towards the northeast, some power lines, as well as a few private properties and buildings found to the south and east of Sioux Lookout. The block is approximately centered over Abram Lake and the north end of the large Minnitaki Lake. Coordinates outlining the survey block are given in Appendix A, with respect to NAD-83 datum, UTM projection zone 15N. The location of the Sioux Lookout Property claims (in red) and of the survey lines is shown on Figure 3. The Property claims numbers, as well as the approximate amount of line-km flown over each claim, are also listed in Appendix B.

Figure 3: **Survey lines and Sioux Lookout Property claims**



# II. SURVEY EQUIPMENT

Prospectair provided the following instrumentation for this survey:

**Airborne Magnetometer**
*Geometrics G-822A*
The heliborne system used a non-oriented (strap-down) optically-pumped Cesium split-beam sensor. These magnetometers have a sensitivity of 0.005 nT and a range of 15,000 to 100,000 nT with a sensor noise of less than 0.02 nT. The heliborne sensor was mounted in a bird made of non-magnetic material located 19 m below the helicopter when flying. Total magnetic field measurements were recorded at 10 Hz in the aircraft.

**Real-Time Differential GPS**
*Omnistar DGPS*
Prospectair uses an OmniStar differential GPS navigation system to provide real-time guidance for the pilot and to position data to an absolute accuracy of better than 5 m. The *Omnistar* receiver provides real-time differential GPS for the Agis on-board navigation system. The differential data set was relayed to the helicopter via the Omnistar network appropriate geosynchronous satellite for the survey location. The receiver optimizes the corrections for the current location.

**Airborne Navigation and Data Acquisition System**
*Pico-Envirotec AGIS-XP system*
The Airborne Geophysical Information System (AGIS-XP) is advanced, software driven instrument specifically designed for mobile aerial or ground geophysical survey work. The AGIS instrumentation package includes an advanced navigation system, real-time flight path information that is displayed over a map image of the area, and reliable data acquisition software. Thanks to simple interfacing, the radar and barometric altimeters and the Geometrics magnetometer are easily integrated into the system and digitally recorded. Automatic synchronization to the GPS position and time provides very close correlation between data and geographical position. The AGIS is equipped with a software suite allowing easy maintenance, upgrades, data QC, and project and survey area layout planning.

**Magnetic Base Station**
*GEM GSM-19*
A GEM GSM-19 Overhauser magnetometer, a computer workstation and a complement of spare parts and equipment serve as the base station. Prospectair establish the base station in a secure location with low magnetic noise. The GSM-19 magnetometer has resolution of 0.01 nT, and 0.2 nT accuracy over its operating range of 20,000- to 100,000 nT. The ground system was recording magnetic data at 1 Hz.

**Altimeters**

*Free Flight Radar Altimeter*

The Free Flight radar altimeter measures height above ground to a resolution of 0.5 m and an accuracy of 5% over a range up to 2,500 ft. The radar altimeter data is recorded and sampled at 10 Hz.

*Digital Barometric Pressure Sensor*

The barometric pressure sensor measures static pressure to an accuracy of ± 4 m and resolution of 2 m over a range up to 30,000 ft above sea level. The barometric altimeter data are sampled at 10 Hz.

**Survey helicopter**

*Robinson R-44 (registration C-GBOU)*

The survey was flown using Prospectair's Robinson R-44 helicopter that handles efficiently the light equipment load and the survey range for magnetic surveys. Table 2 presents the helicopter technical specifications and capacity, and the aircraft is shown in Figure 4.

Table 2: **Technical specifications of the R-44 Robinson helicopter**

| Item | Specification |
|---|---|
| Powerplant | One 195kW (260hp) Textron Lycoming O-540 |
| Rate of climb | 1,000 ft/min |
| Cruise speed | 223 km/h – 120 kts |
| Service ceiling | 14,000 ft |
| Range with no reserve | 645 km |
| Empty weight | 635 kg |
| Maximum takeoff weight | 1,090 kg |

Figure 4: **C-GBOU Robinson R-44**

# III. SURVEY SPECIFICATIONS

## Data Recording

The following parameters were recorded during the course of the survey:

In the helicopter:

- GPS positional data: time, latitude, longitude, altitude, heading and accuracy (PDOP) recorded at intervals of 0.1 s;
- Total magnetic field: recorded at intervals of 0.1 s;
- Pressure as measured by the barometric altimeter at intervals of 0.1 s;
- Terrain clearance as measured by the radar altimeter at intervals of 0.1 s;

At the base and remote magnetic ground stations:

- Total magnetic field: recorded at intervals of 1 s;
- GPS time recorded every 1 s to synchronize with airborne data.

## Technical Specifications

The data quality control was performed on a daily basis. The following technical specifications were adhered to:

- *Height* – 50m mean terrain clearance for the helicopter except in areas where Transport Canada regulations prevent flying at this height, or as deemed by the pilot to ensure safety. Traverse lines and control lines must be flown at the same altitude at points of intersection; the altitude tolerances are limited to no more than 30 m difference between traverse lines and control lines.
- *Airborne Magnetometer Data* – A 0.5 nT noise envelope not to be exceeded for more than 500 m line-length without a reflight.
- *Diurnal Specifications* – A maximum tolerance of 5.0 nT (peak to peak) deviation from a long chord of one minute at the base station.
- *Flying Speed* – The average ground speed for the survey aircraft should be 120 kph. The acceptable high limit is 180 kph over flat topography.
- *Radar Altimeter* – minimal accuracy of 5%, minimum range of 0-2500 m.
- *Barometer* – Absolute air pressure to 0.1 kPa.
- *Flight Path Following* – The line spacing not to vary by more than 30% from the ideal spacing over a distance of more than 300 m, except as required for aviation safety.

  For Sioux Lookout Block:

  Traverse lines: Azimuth N150, 50 and 100 m spacing.

  Control Lines: Azimuth N060, 500 and 1000 m spacing.

# IV. SYSTEM TESTS

**Magnetometer System Calibration**

The survey configuration using a bird towed 19 m below any magnetic piece of the helicopter allows the simplification of the magnetic calibration requirement. Consequently, heading error and aircraft movement noise was considered negligible and no correction was applied to the data.

**Instrumentation Lag**

The magnetometer lag is a combination of two factors: 1) the time difference between when a reading is sensed, and when that value is recorded by the acquisition system, and 2) the time taken for the sensor to arrive at the location of the GPS antenna. The second factor is defined by the physical distance between the GPS antenna and any given sensor, and the speed of the aircraft. The average total magnetic lag value for the AGIS acquisition system has been calculated to 0.90 s for this survey.

## V. FIELD OPERATIONS

The survey operations were conducted out of the Sioux Lookout Airport, from June 30 to July 16, 2022. The data acquisition required 23 flights. At the end of each production day, the data were sent to the Dynamic Discovery Geoscience office via internet. The data were then checked for Quality Control to ensure they fulfilled contractual specifications. The full dataset was inspected prior to provide authorization for the field crew to demobilize. The GSM-19 magnetic base station was set up in a magnetically quiet area close to the airport, at latitude 50.1220416°N, longitude 91.8975492°W. The survey pilots were Dominic Latour and Marc Patenaude and the survey system technician was Jonathan Drolet.

Figure 5: **Example of a magnetic base station setup**

# VI. DIGITAL DATA COMPILATION

Data compilation including editing and filtering, quality control, and final data processing was performed by Joël Dubé, P.Eng. Processing was performed on high performance computers optimized for quick daily QC and processing tasks. Geosoft software Oasis Montaj version 2021.2.1 was used.

**Magnetometer Data**

*General*

The airborne magnetometer data, recorded at 10 Hz, were plotted and checked for spikes and noise on a flight basis. An average of 0.90 second lag correction was applied to the data to correct for the time delay between detection and recording of the airborne data.

Ground magnetometer data were recorded at 1 sample per second and interpolated by a spline function to 10 Hz to match airborne data. Data were inspected for cultural interference and edited where necessary. Low-pass filtering was deemed necessary on the ground station magnetometer data to remove minor high frequency noise. The diurnal variations were removed by subtracting the ground magnetometer data to the airborne data and by adding back the average of the ground magnetometer value.

The levelling corrections were applied in several steps. First of all, a correction for altitude was applied by multiplying the First Vertical Derivative (FVD) of the Total Magnetic Intensity (TMI) by the difference between the actual survey altitude and the average survey altitude. Standard levelling corrections were then performed using intersection statistics from traverse and tie lines. After statistical levelling was considered satisfactory, decorrugation was applied on the data to remove any remaining subtle non-geological features oriented in the direction of the traverse lines.

Once the Total Magnetic Intensity (TMI) was gridded, its First Vertical Derivative (FVD) and Second Vertical Derivative (SVD) were calculated to enhance narrow and shallow geological features. Finally, the component of the normal Earth's magnetic field, described by the International Geomagnetic Reference Field (IGRF), has been removed from the TMI to yield the residual TMI.

*Tilt Angle Derivative*

In order to enhance the subtle magnetic features some more, the Tilt Angle Derivative (TILT) was also computed for this project.

It has been shown that it is possible to use the Tilt Angle Derivative to estimate both the location and depth of magnetic sources (Salem et al., 2007).

When two body of different magnetic susceptibility are in contact, the vertical and horizontal gradients along a horizontal line perpendicular to the vertical contact are governed by the following equations:

$\delta M/\delta h=2KFc(z_c/(h^2+z_c^2))$
$\delta M/\delta z=2KFc(h/(h^2+z_c^2))$

where
K = susceptibility contrast
F = magnetic field's strength
c = 1-cos$^2$(field Inclination)sin$^2$(field Declination)
h = location along an horizontal axis perpendicular to the contact
$z_c$ = contact depth
$\delta M/\delta h = sqrt((\delta M/\delta x)^2+(\delta M/\delta y)^2)$

The Tilt Angle (θ) is defined as
$\theta = \tan^{-1}[(\delta M/\delta z)/(\delta M/\delta h]$

By substitution of the gradients we get
$\theta = \tan^{-1}[h/z_c]$

This has two main implications for any given anomaly:

1- The 0° angle line is located directly above the contact between a magnetic source and the surrounding rock. This allows for accurate estimation of source location.
2- The distance between the 0° and the +45° contour lines as well as the distance between the -45° and the 0° contour lines are equal to the depth of the source at the contact. This allows for a direct estimation of the depth of the source of the anomaly. The depth estimated with this method is actually the distance between the magnetic sensor and the top of the source. Knowing that the sensor was 22 m above the ground in average enables direct depth estimates.

In practice, the signal originating from multiple sources at different depth within a same area will cause juxtaposition of the Tilt Angle values, and complicate location and depth estimation. Nevertheless, the method remains an excellent tool for rapid assessment of sources characteristics, without the need for complex assumptions to be made or heavy computer requirements, as is the case with 3D Euler deconvolution or 3D data inversions.

*Gridding*
The magnetic data were interpolated onto a regular grid using a bi-directional gridding algorithm to create a two-dimensional grid equally incremented in x and y directions. The final grids of the magnetic data are supplied with a 20 m grid cell size. Traverse lines were used in the gridding process.

**Radar Altimeter Data**
The terrain clearance measured by the radar altimeter in metres was recorded at 10 Hz. The data were filtered to remove high frequency noise using a 1 sec low pass filter. The final data were plotted and inspected for quality.

**Positional Data**

Real time DGPS correction provided by Omnistar was applied to the recorded GPS positional data.

Positional data were originally recorded at 10 Hz sampling rate in geographic longitude and latitude with respect to the WGS-84 datum. The delivered data locations are provided in X and Y using the UTM projection zone 15 North, with respect to the NAD-83 datum. Altitude data were initially recorded relative to the GRS-80 ellipsoid, but are delivered as orthometric heights (MSL elevation).

**Terrain Data**

Terrain elevation data (also referred to as digital elevation model, or DEM) are computed from the altitude of the helicopter, given by DGPS recordings, and the radar altimeter data.

## VII. RESULTS AND DISCUSSION

The residual Total Magnetic Intensity (TMI) of the Sioux Lookout block, presented in Figure 6, is extremely active and varies over a range of 38,742 nT, with an average of -43 nT and a standard deviation of 965 nT.

Most of the surveyed area is affected by linear magnetic features characteristic of alternating sequences of mafic volcanic rocks with sedimentary or intermediate to felsic volcanic rocks, with possibly some intrusive stocks, sills or dykes locally. The strongest anomaly of the survey exceeds 35,000 nT, an amplitude typical of magnetic rich iron formations, and occurs in the northeastern part of the block. Stronger anomalies are best seen on Figure 7 which shows the residual TMI data with a linear color distribution. Remaining anomalies of lower amplitude could pertain to mafic/ultramafic intrusive/volcanic rocks. For instance, the strong magnetic anomaly depicting a significantly deformed annular shaped feature to the north of Minnitaki's Lake Northeast Bay is possibly related to a mafic intrusive complex. Other areas with lower background values and decreased signal variability are likely to be dominated by sedimentary or felsic intrusive/volcanic rocks.

Most magnetic lineaments are generally trending from E-W to NE-SW in the area, with a few instances of lineaments rather striking from NNE-SSW to NW-SE in the south-central and southeast parts of the block. A majority of lineaments appear curved, either by shearing or folding structures, or possibly also at the contact zone with intrusions. These evidences are attesting that the area underwent strong deformation events in the past. In general terms, magnetic lineaments are related to rock formations that are enriched in magnetic minerals (magnetite and/or pyrrhotite).

In some areas, it is possible to detect structural features offsetting observed magnetic lineaments and causing abrupt interruption or changes of the magnetic response. These features are typically caused by faults, fractures and shear zones. If they are thought to be favorable structures in the exploration context of the Sioux Lookout project, they should be paid particular attention and should be the object of a comprehensive structural interpretation, which is beyond the scope of this report.

Shorter wavelength anomalies are greatly enhanced on the FVD (Figure 8) and on the TILT (Figure 9) products. Since the FVD attenuates longer wavelength anomalies, and the TILT enhances very weak amplitude anomalies, they are the preferred products for structural interpretation.

Regarding cultural interference, human infrastructures related to the main roads, and their associated bridges and power lines, to the railways, and to all the buildings found in the vicinity of the secondary roads to the south and east of Sioux Lookout, are known to be possible sources of non-geological noise in the magnetic data. As a consequence, high frequency anomalies located near such infrastructures are likely to originate from cultural sources and should be treated with caution when planning ground investigations of magnetic anomalies.

In addition, when the helicopter had to steeply climb up above these infrastructures for obvious safety reasons, the magnetic response can appear somewhat blurred, with anomalies being attenuated in amplitude and increased in wavelength because of the greater sensor distance from the ground. This can also result in local stripes parallel to survey lines in the data. This effect is really local and quickly fades out on either sides of the overflown obstacle, but must be nevertheless considered when following-up on the results

Figure 6: **Residual Total Magnetic Intensity with equal area color distribution**

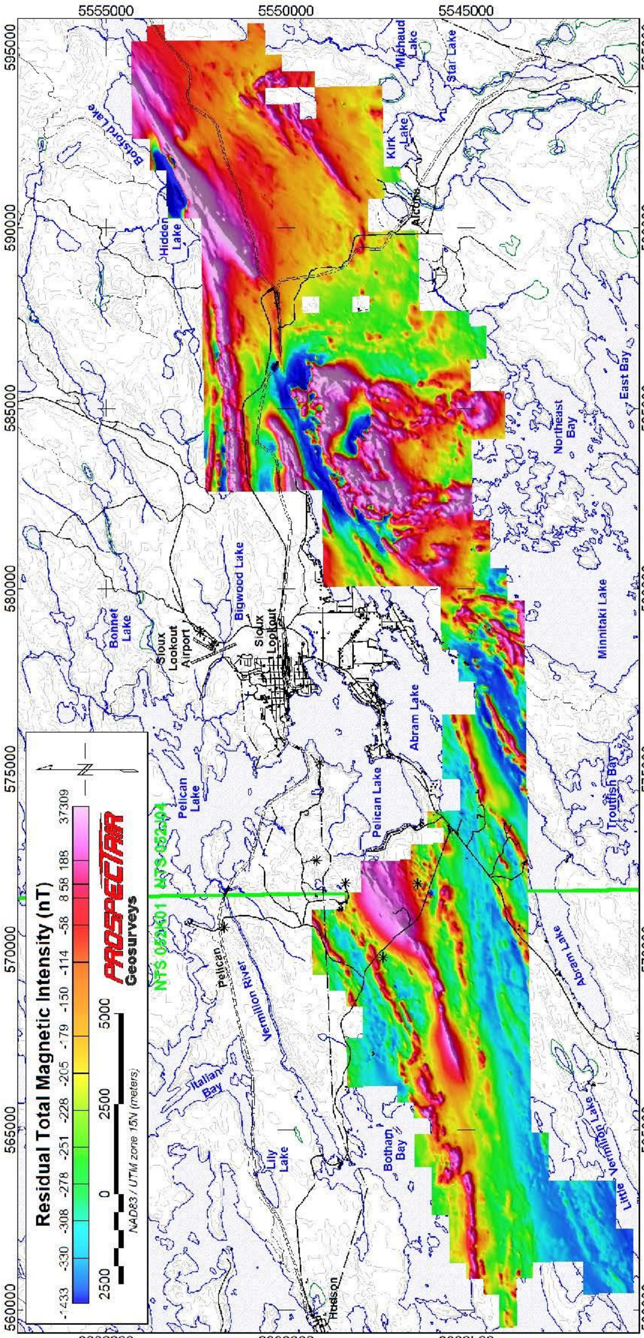
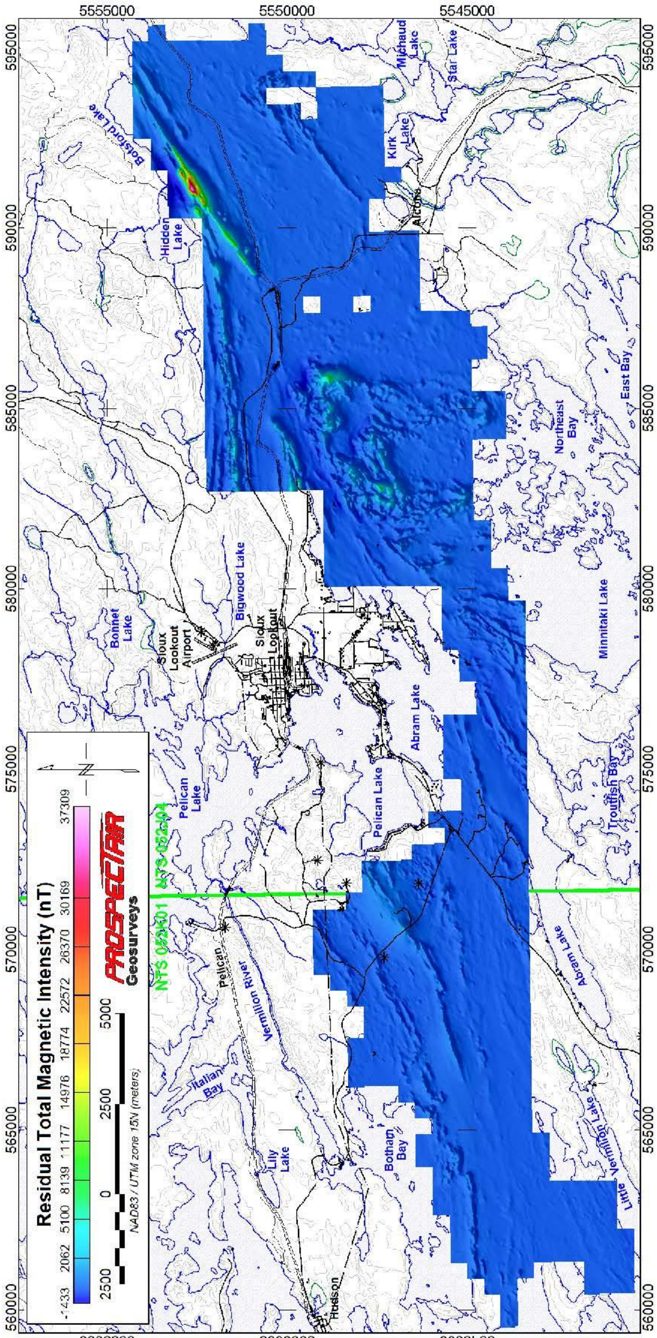
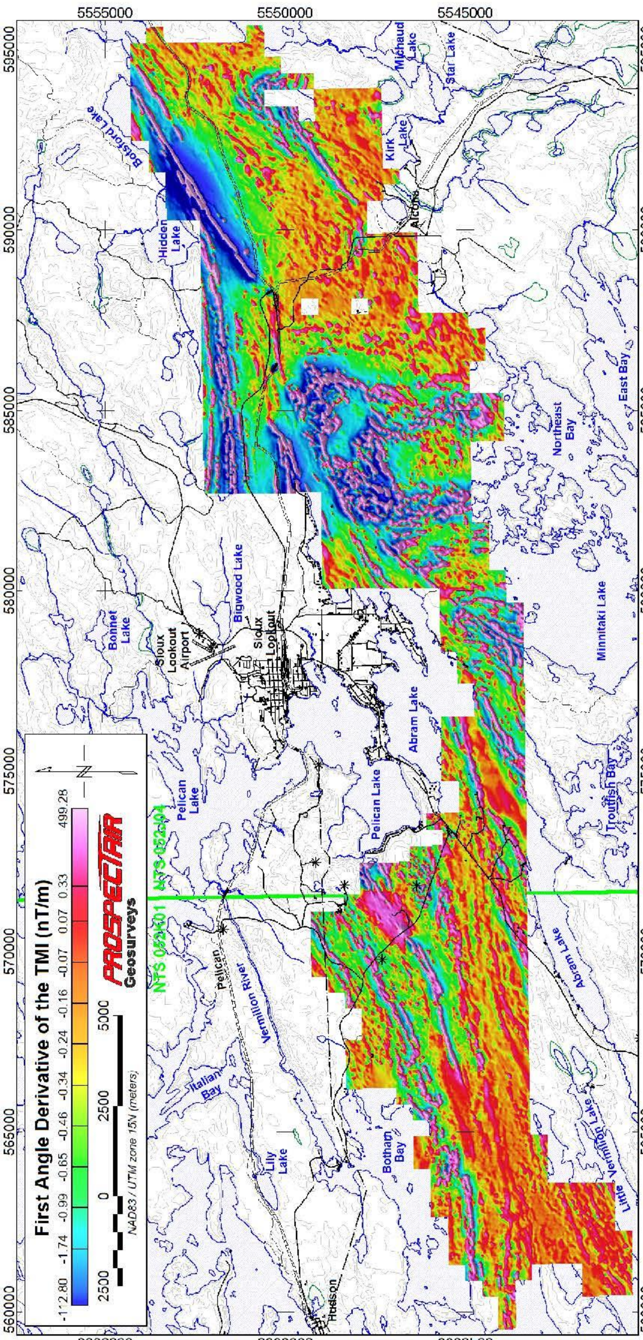


Figure 7: **Residual Total Magnetic Intensity with linear color distribution**



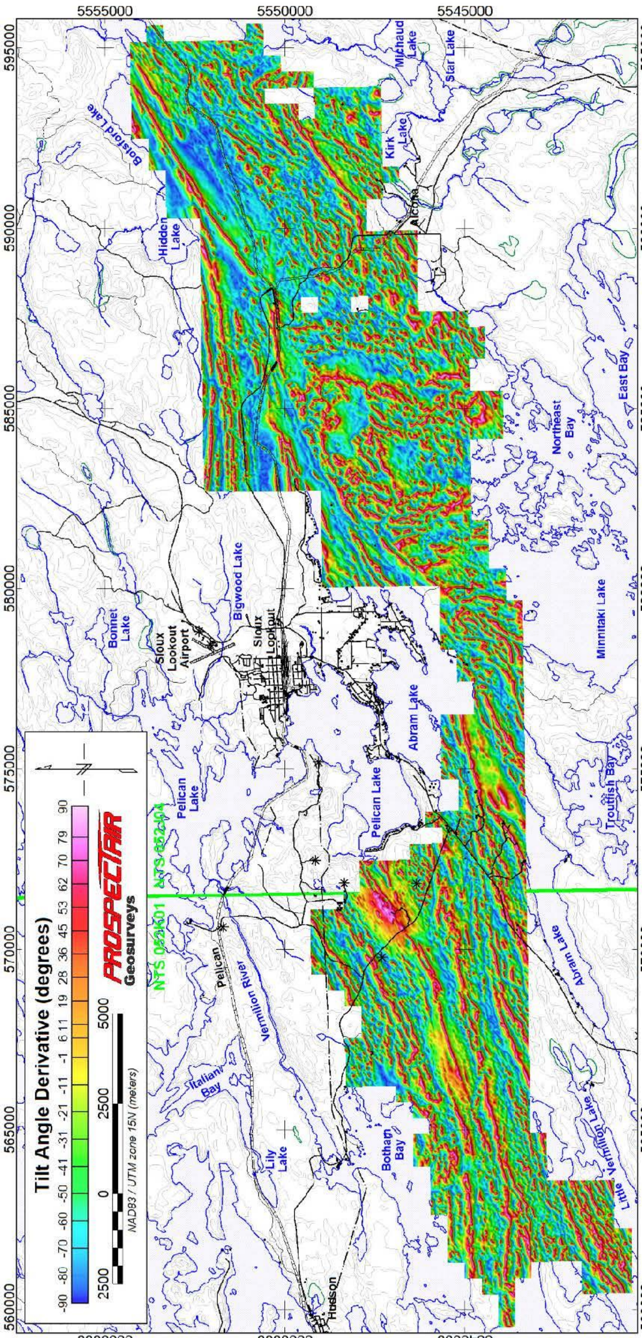

PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE

Figure 8: **First Vertical Derivative of TMI**




PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE

Figure 9: **Tilt Angle Derivative**




PROSPECTAIR – DYNAMIC DISCOVERY GEOSCIENCE

# VIII. FINAL PRODUCTS

**Digital Line Data**

The Geosoft database is provided with the channels detailed in Table 3.

Table 3: **MAG line data channels**

| No. | Name | Description | Units |
|---|---|---|---|
| 1 | UTM_X | UTM Easting, NAD-83, Zone 15N | m |
| 2 | UTM_Y | UTM Northing, NAD-83, Zone 15N | m |
| 3 | Lat_deg | Latitude in decimal degrees | Deg |
| 4 | Long_deg | Longitude in decimal degrees | Deg |
| 5 | Gtm_sec | Second since midnight GMT | Sec |
| 6 | Radar | Ground clearance given by the radar altimeter | m |
| 7 | Terrain | Calculated Digital Elevation Model (w.r.t. MSL) | m |
| 8 | GPS_Z | Helicopter altitude (w.r.t. MSL) | m |
| 9 | Mag_Raw | Raw magnetic data | nT |
| 10 | Mag_Lag | Lagged magnetic data | nT |
| 11 | Gnd_mag | Base station magnetic data | nT |
| 12 | Mag_Cor | Magnetic data corrected for diurnal variation | nT |
| 13 | TMI | Fully levelled Total Magnetic Intensity | nT |
| 14 | TMIres | Residual TMI (IGRF removed) | nT |

**Maps**

All maps are referred to NAD-83 datum in the UTM projection Zone 15 North, with coordinates in metres. Maps are at a 1:30,000 scale and are provided in PDF, PNG and Geosoft MAP formats for the products detailed in Table 4.

Table 4: **Maps delivered**

| No. | Name | Description |
|---|---|---|
| 1 | DEM+FlightPath+Claims | Digital Elevation Model with flight path and property claims |
| 2 | TMI | Residual Total Magnetic Intensity |
| 3 | FVD | First Vertical Derivative of the TMI |
| 4 | TILT | Tilt Angle Derivative |

**Grids**

All grids are referred to NAD-83 in the UTM projection Zone 15 North, with coordinates in metres. Grids are provided in Geosoft GRD format, with a 20 m grid cell size, as well as in the Geotiff format for the products listed in Table 5.

Table 5: **Grids delivered**

| No. | Name | Description | Units |
|---|---|---|---|
| 1 | Terrain | Calculated Digital Elevation Model | m |
| 2 | TMI | Total Magnetic Intensity | nT |
| 3 | FVD | First Vertical Derivative of TMI | nT/m |
| 4 | SVD | Second Vertical Derivative of TMI | $nT/m^2$ |
| 5 | TMIres | Residual TMI (IGRF removed) | nT |
| 6 | TILT | Tilt Angle Derivative | Degree |

**Project Report**

The report is submitted in PDF format.

Respectfully submitted,

LICENSED PROFESSIONAL ENGINEER J. P. DUBÉ 100194954 PROVINCE OF ONTARIO

Joël Dubé, P.Eng.
July 28, 2022

# IX. STATEMENT OF QUALIFICATIONS

Joël Dubé
7977 Décarie Drive
Ottawa, ON, Canada, K1C 3K3

Telephone: 819.598.8486
E-mail: jdube@ddgeoscience.ca

I, Joël Dubé, P.Eng., do hereby certify that:

1. I am a Professional Engineer specialized in geophysics, President of Dynamic Discovery Geoscience Ltd., registered in Canada.

2. I earned a Bachelor of Engineering in Geological Engineering in 1999 from the École Polytechnique de Montréal.

3. I am an Engineer registered with the Ordre des Ingénieurs du Québec, No. 122937, and a Professional Engineer with Professional Engineers Ontario, No. 100194954 (CofA No. 100219617), with the Association of Professional Engineers and Geoscientists of New Brunswick, No. L5202 (CofA No. F1853), with the Association of Professional Engineers of Nova Scotia, No. 11915 (CofC No. 51099), with Engineers Geoscientists Manitoba, No. 43414. (CofA No. 6897), with Professional Engineers & Geoscientists Newfoundland & Labrador, No. 10012 (PtoP No. N1134) and with the Northwest Territories Association of Professional Engineers & Geoscientists, No. L4447 (PtoP No. P1414).

4. I have practised my profession for 23 years in exploration geophysics.

5. I have not received and do not expect to receive a direct or indirect interest in the properties covered by this report.

Dated this 28th day of July, 2022

LICENSED PROFESSIONAL ENGINEER
J. P. DUBÉ
100194954
PROVINCE OF ONTARIO

Joël Dubé, P.Eng. #100194954

# X. Appendix A – Survey block outline

**Sioux Lookout Block**

| Easting | Northing |
|---|---|
| 562247 | 5540380 |
| 560450 | 5540359 |
| 560435 | 5541754 |
| 561330 | 5541764 |
| 561314 | 5543149 |
| 560867 | 5543144 |
| 560861 | 5543607 |
| 559519 | 5543592 |
| 559514 | 5544060 |
| 560409 | 5544070 |
| 560403 | 5544533 |
| 560851 | 5544539 |
| 560845 | 5545002 |
| 561293 | 5545007 |
| 561288 | 5545470 |
| 562630 | 5545486 |
| 562624 | 5545949 |
| 563966 | 5545965 |
| 563961 | 5546429 |
| 564860 | 5546439 |
| 564866 | 5545975 |
| 565308 | 5545981 |
| 565303 | 5546444 |
| 565750 | 5546450 |
| 565744 | 5546913 |
| 566181 | 5546919 |
| 566191 | 5546924 |
| 566174 | 5548309 |
| 567521 | 5548325 |
| 567526 | 5547870 |
| 567531 | 5547862 |
| 568416 | 5547873 |
| 568410 | 5548336 |
| 568857 | 5548342 |
| 568851 | 5548806 |
| 569298 | 5548811 |
| 569292 | 5549275 |
| 571085 | 5549298 |
| 571098 | 5548372 |
| 571545 | 5548377 |
| 571551 | 5547914 |
| 572445 | 5547926 |
| 572464 | 5546537 |
| 572911 | 5546542 |
| 572924 | 5545616 |

| | |
|---|---|
| 573367 | 5545622 |
| 573360 | 5546086 |
| 573813 | 5546092 |
| 573825 | 5545165 |
| 574715 | 5545177 |
| 574709 | 5545641 |
| 576503 | 5545666 |
| 576516 | 5544740 |
| 577406 | 5544752 |
| 577400 | 5545216 |
| 578294 | 5545229 |
| 578288 | 5545692 |
| 580072 | 5545718 |
| 580077 | 5545721 |
| 580029 | 5548961 |
| 582711 | 5549002 |
| 582661 | 5552245 |
| 590257 | 5552368 |
| 590241 | 5553295 |
| 591581 | 5553317 |
| 591573 | 5553781 |
| 592467 | 5553796 |
| 592459 | 5554259 |
| 595143 | 5554306 |
| 595152 | 5553843 |
| 595599 | 5553851 |
| 595607 | 5553383 |
| 595160 | 5553375 |
| 595201 | 5551064 |
| 595648 | 5551072 |
| 595657 | 5550603 |
| 594763 | 5550587 |
| 594771 | 5550124 |
| 594324 | 5550116 |
| 594340 | 5549190 |
| 593893 | 5549182 |
| 593926 | 5547329 |
| 591690 | 5547290 |
| 591698 | 5546827 |
| 591245 | 5546819 |
| 591237 | 5547282 |
| 590790 | 5547275 |
| 590782 | 5547738 |
| 589893 | 5547723 |
| 589916 | 5546333 |
| 587680 | 5546296 |
| 587702 | 5544906 |
| 587255 | 5544899 |
| 587263 | 5544436 |

| | |
|---|---|
| 586363 | 5544421 |
| 586355 | 5544884 |
| 585465 | 5544870 |
| 585480 | 5543944 |
| 584133 | 5543922 |
| 584118 | 5544849 |
| 581886 | 5544814 |
| 581893 | 5544351 |
| 580550 | 5544330 |
| 580557 | 5543867 |
| 579662 | 5543854 |
| 579669 | 5543391 |
| 564900 | 5543191 |
| 564905 | 5542728 |
| 563563 | 5542712 |
| 563585 | 5540859 |
| 562241 | 5540843 |

# XI. Appendix B – Property claims covered by the survey

| Tenure number | Holder | l-km within claim |
|---|---|---|
| 674780 | (100) Revel Resources Ltd | 164.651 |
| 674781 | (100) Revel Resources Ltd | 164.651 |
| 674821 | (100) Revel Resources Ltd | 191.761 |
| 674767 | (100) Revel Resources Ltd | 201.136 |
| 674766 | (100) Revel Resources Ltd | 210.114 |
| 674765 | (100) Revel Resources Ltd | 210.203 |
| 674772 | (100) Revel Resources Ltd | 210.291 |
| 674779 | (100) Revel Resources Ltd | 210.291 |
| 674825 | (100) Revel Resources Ltd | 219.048 |
| 674824 | (100) Revel Resources Ltd | 219.136 |
| 674820 | (100) Revel Resources Ltd | 219.180 |
| 674796 | (100) Revel Resources Ltd | 219.313 |
| 674798 | (100) Revel Resources Ltd | 219.313 |
| 674797 | (100) Revel Resources Ltd | 219.313 |
| 674812 | (100) Revel Resources Ltd | 219.313 |
| 674769 | (100) Revel Resources Ltd | 219.401 |
| 674778 | (100) Revel Resources Ltd | 219.401 |
| 674775 | (100) Revel Resources Ltd | 219.401 |
| 674774 | (100) Revel Resources Ltd | 219.401 |
| 674776 | (100) Revel Resources Ltd | 219.401 |
| 674826 | (100) Revel Resources Ltd | 228.246 |
| 674830 | (100) Revel Resources Ltd | 228.291 |
| 674822 | (100) Revel Resources Ltd | 228.291 |
| 674813 | (100) Revel Resources Ltd | 228.291 |
| 674768 | (100) Revel Resources Ltd | 228.556 |
| 674777 | (100) Revel Resources Ltd | 228.556 |
| 674773 | (100) Revel Resources Ltd | 228.556 |
| 674770 | (100) Revel Resources Ltd | 228.556 |
| 674829 | (100) Revel Resources Ltd | 73.104 |
| 674795 | (100) Revel Resources Ltd | 146.164 |
| 674794 | (100) Revel Resources Ltd | 173.628 |
| 674793 | (100) Revel Resources Ltd | 201.004 |
| 674782 | (100) Revel Resources Ltd | 201.048 |
| 674823 | (100) Revel Resources Ltd | 210.114 |
| 674827 | (100) Revel Resources Ltd | 219.269 |
| 674771 | (100) Revel Resources Ltd | 73.149 |
| 695866 | (100) Revel Resources Ltd | 9.141 |
| 695865 | (100) Revel Resources Ltd | 9.141 |
| 700951 | (100) Revel Resources Ltd | 9.141 |

# APPENDIX 3: EAGLE MAPPING REPORT

EAGLE MAPPING

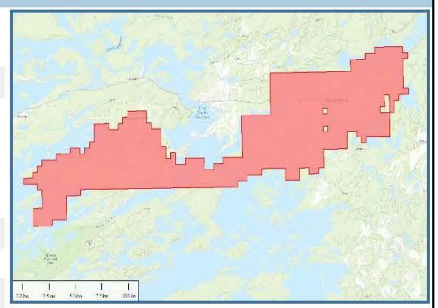
# REPORT

EM #: 22-039

## SIOUX LOOKOUT

**Client Name:** Revel Resource Ltd.
A wholly owned subsidiary of Auteco Minerals

**Client Address:** 24 Outram Street - Ground Floor
West Perth
WA 6005
Australia



**Specifications:**

| | |
|---|---|
| **LiDAR:** | 8 pulses/m² |
| **Imagery:** | 15 cm |

**AOI:** ~ 167 sq. km

## MAP PROJECTION

| | |
|---|---|
| **Projection:** | UTM Z15 N |
| **Horizontal Datum:** | NAD83(CSRS) |
| **Vertical Datum:** | CGVD2013 |
| **Geoid:** | CGG2013a |
| **Units:** | meters |

**EPSG:** 3159

## PRODUCT DELIVERABLES

| Product | Resolution/Type | Delivered As | File Format |
|---|---|---|---|
| Point Cloud | unclass & ground | prj tiles | LAS v1.4 (.las) |
| DEM & DSM | 0.50 m | prj file | ASCIIGrid (.asc) |
| BE Hillshade | 0.50 m | prj file | GeoTIFF (.tif) |
| Contours | 0.50 m (2.5m indicies) | prj file | Shapefile (.shp) |
| Orthophoto<br>Vectorized Hydro & Outcrops | 0.15 m | prj tiles &<br>prj file | GeoTIFF (.tif) &<br>ECW (.ecw) |
| Bdy & Tile Layout | 1500 m | prj file | Shapefile (.shp) |

## ACQUISITION DETAILS

| | |
|---|---|
| **Flight Date(s):** | June 10, 2022 |
| **Aircraft:** | Cessna 206 |
| **Flight Altitude:** | 1600 m (AGL) |
| **Flight Speed:** | 120 knots |

**Sensor Settings**

| | | | |
|---|---|---|---|
| **LiDAR Unit:** | Riegl LMS-Q1560 | **Camera Unit:** | iXM-RS150F |
| **Scan Rate:** | 800kHz (533kHz usable) | **Simultaneous:** | yes |
| **Field of View:** | 58° | **Forward-lap** | 60% |
| **Overlap:** | 55% | **Side-lap** | 55% |

Eagle Mapping Ltd.
420 - 20178 96 Ave
Langley City, BC. Canada
V1M 0B2

Tel: 1-604-942-5551
Toll Free: 1-877-942-5551
Fax: 1-604-942-5951
www.eaglemapping.com

EAGLE MAPPING

# Report

## TRAJECTORY PROCESSING - SBET

| | |
|---|---|
| **INS-GNSS:** | Applanix POS AV610 (IMU 57) |
| **Processing Software:** | POSPac MMS v 8.7 |
| **Processing Mode:** | IN-Fusion PP-RTX |
| **Ref. Station:** | none |

| | Satellites | | PDOP | | RMSE (m) | |
|---|---|---|---|---|---|---|
| **Results:** | **Min:** | 7 | **Range:** | 1.1 - 2.8 | **X, Y:** | 0.014 |
| | **Max:** | 17 | **Mean:** | 1.4 | **Z:** | 0.037 |

## WAVEFORM ANALYSIS

| | |
|---|---|
| **Extraction & Registration Software:** | RiPROCESS v 1.9.2.2 |
| **Calibration Software:** | BayesStripAlign v 2.21 |
| **Quality Control Software:** | LAStools v 220613 |

| | Avg. Pulse Density | Passing Cells |
|---|---|---|
| **Results:** | 13 ppm | 94% |

Pulse Density verification is conducted using a 5m grid covering the entire project using last and only returns. Initial noise classes are excluded from the calculation as well as any acceptable data voids such as waterbodies. The quality routine identifies cells containing the required project pulse density and those which did not. A visual grid is output showing cells that pass as green and those that fail as red.

## POSITIONAL ACCURACY

| LiDAR | |
|---|---|
| Number of GCP: | N/A |
| Average Dz: | |
| Minimum Dz: | |
| Maximum Dz: | |
| Avg. Magnitude: | |
| Std. Deviation | |

| IMAGERY | |
|---|---|
| Number of GCP: | N/A |
| Avg. Magnitude: | |

RMS(95%) N/A

No control was available to verify the absolute accuracy of the dataset. However, due to a robust trajectory solution and good calibration results, it is Eagle Mappings conclusion that the delivered dataset is positioned with a horizontal accuracy of ± 0.30m and vertical accruacy of ± 0.15m. Visual inpsection of the rectified imagery determined the orthophoto is accurate to within ± 2 pixels.

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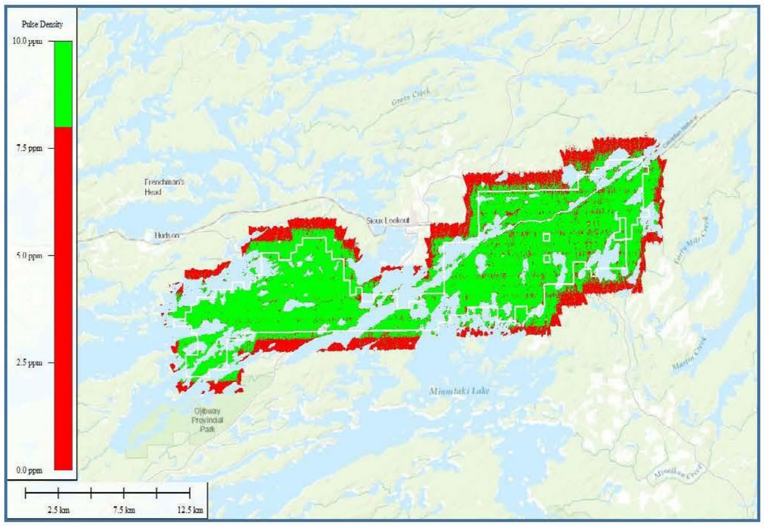
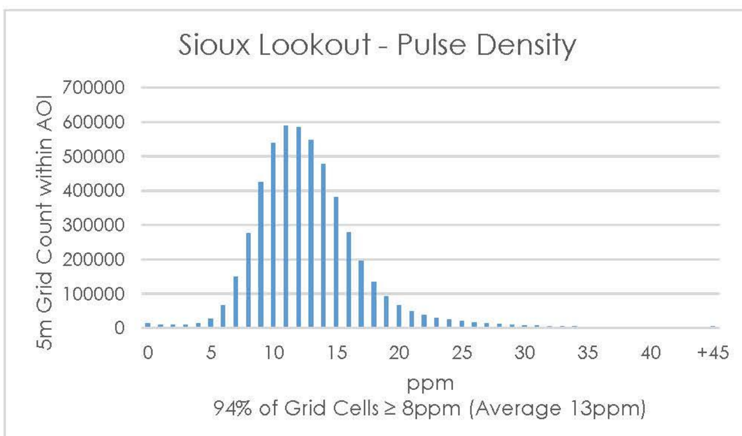
EAGLE MAPPING

Report

PULSE DENISTY - LAST &ONLY RETURNS

**Sioux Lookout**





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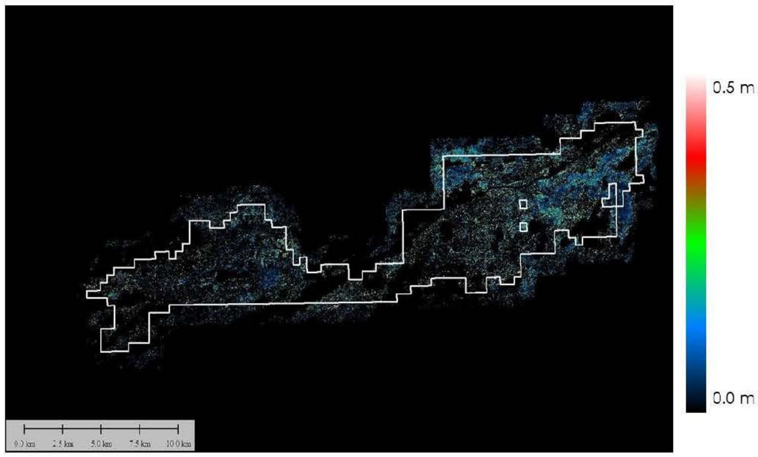
EAGLE MAPPING

Report

CALIBRATION RESULTS

**Sioux Lookout**

ELEVATION DIFFERENCES AFTER CALIBRATION




| CORRECTIONS APPLIED (m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mean (X, Y, Z) | | | StdDev (X, Y, Z) | | | RMS (X, Y, Z) | | |
| -0.022 | -0.011 | +0.005 | 0.019 | 0.032 | 0.037 | 0.142 | 0.119 | 0.039 |

| ELEVATION DIFFERENCE (m) | | | |
|---|---|---|---|
| Dataset | StdDev | RMS | |
| Input | 0.053 | 0.060 | |
| Registered | 0.020 | 0.021 | |

Eagle Mapping Ltd.
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V1M 0B2

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www.eaglemapping.com

EAGLE MAPPING

Report

## LiDAR EXTRACTION & CALIBRATION PROCEDURES

| | |
|---|---|
| **Process:** | Trajectory Solution |
| **Software:** | Applanix POSPac MMS |
| **Description:** | |

GNSS post processing is performed using Applanix POSPac MMS software. Here the aircraft GNSS and IMU data is coupled together to provide adjusted positions for the aircraft in latitude, longitude, height, roll, pitch and yaw. The final trajectory is then smoothened and exported in .pos format for use in LiDAR processing. The resulting flight path is commonly referred to as a Smoothed Best Estimate of Trajectory (SBET).

| | |
|---|---|
| **Process:** | Extract & Register LiDAR Point Cloud |
| **Software:** | Riegl RiPROCESS |
| **Description:** | |

Riegl RiPROCESS is used to extract and register point cloud data using calibrated scanner parameters calculated from a boresight mission. Target point extraction is performed to digitize the echo signals and transform range and scan-angle data into the Scanner's Own Coordinate System (SOCS). The result is a point cloud dataset where each point contains descriptors such as timestamp and intensity values. The SBET is then applied to transform the point cloud data from the SOCS to a real-world coordinate system. The LiDAR data is then exported in LAS format with the proper projection and geoid applied.

| | |
|---|---|
| **Process:** | LiDAR Swath Calibration |
| **Software:** | BayesStripAlign |
| **Description:** | |

LiDAR data is calibrated using BayesStripAlign software. This software registers overlapping LiDAR swaths and corrects both relative and absolute geometric errors. It uses a rigorous time-dependent approach to reduce discrepancies between strips due to IMU attitude and positional errors. Once aligned, results are inspected, and manual cross-section checks are performed to verify the automatic results. If control is present, elevation comparison reports are generated, and data is visually examined to identify systematic positioning errors which could be compensated for with further calibration.

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# EAGLE MAPPING Report

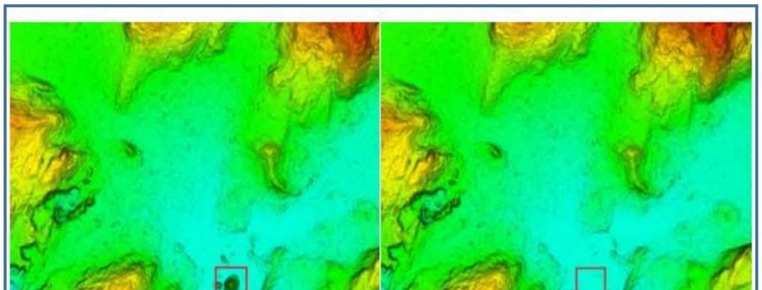
## LiDAR CLASSIFICATION & DELIVERABLE PROCEDURES

| | |
|---|---|
| **Process:** | LiDAR Classification |
| **Software:** | TerraScan |
| **Description:** | |

TerraScan software is used for LiDAR classification. Calibrated swath data is imported into project tiles with the appropriate source ID values for swath identification. Point cloud data is then cleaned by classifying any low or high noise using an isolated point algorithm and via manual cross-section cleaning. Once cleaned, proprietary classification macros are run to generate Digital Elevation Models (DEMS). These models are then visually checked for inconsistencies in the ground surface and any outliers are flagged and then manually corrected in TerraScan. Then if available, the ground surface is compared against survey checkpoints to ensure positional accuracy. Once a final ground class has been identified, algorithms are then run to classify any additional project classifications such as vegetation, buildings or water features and automatic results are again visually inspected and manually corrected in TerraScan.

| | |
|---|---|
| **Process:** | Deliverables |
| **Software:** | TerraScan, LASTools & Global Mapper |
| **Description:** | |

Once the point cloud has been classified and quality control checks have been satisfied, The LiDAR data is exported in LAS format. Project deliverables such as DEMs and DSMs are generated at the project required grid spacing and all outputs are examined by LiDAR technicians to ensure each product is correctly clipped to the project boundary and in the correct format. Metadata for each deliverable type is viewed to confirm units, projection, min/max elevation ranges, and covered area. Lastly, a file count is performed to ensure consistency between final deliverable products. The data is then archived for shipping.



DEM artifact from erroneous ground classified point.    DEM after manual correction

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# Report

## ORTHOPHOTO PROCEDURES

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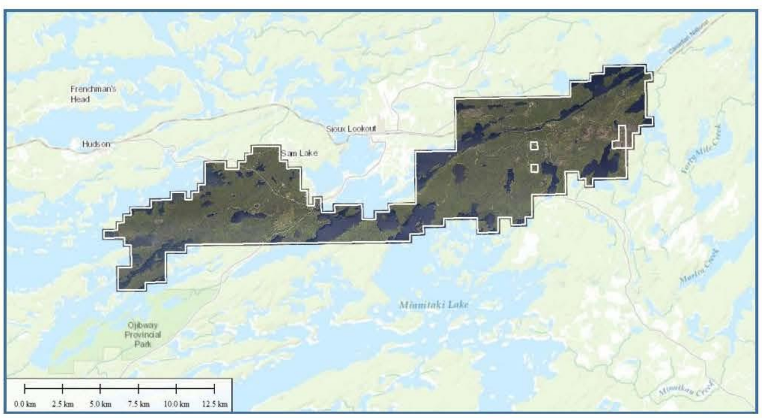
|---|---|
| **Process:** | Photo Orientation & Aerial Triangulation |
| **Software:** | Leica Aerial Triangulation Mensuration & Match AT |
| **Description:** | |

Imagery is first reviewed for any issues that may inhibit the accuracy or resolution, such as cloud cover. The Airborne GNSS/IMU data is then extracted to provide an initial photo orientation. The orientation data is then further refined by incorporating Aerial Triangulation (AT). This involves tying all photos to each adjacent frame photogrammetrically using tie-points, as well as surface model data, LiDAR intensity, calibrated camera parameters and control if available. AT tie-points as well as Airborne GNSS/IMU data is then run through a least-squares adjustment package to provide the best possible orientation solution.

| | |
|---|---|
| **Process:** | Orthorectification & Mosaicing |
| **Software:** | Inpho Ortho Processing & Global Mapper |
| **Description:** | |

The Orientation data is then used in the orthophoto rectification process, along with the LiDAR DEM. First, Imagery is colour balanced to provide even tones with the best radiometry. Then each frame is rectified to eliminate distortions caused by undulation of the terrain utilizing the central portion of the image to lessen the radial distortion. The rectified frames are then mosaicked together using care in the placement of seamlines. Tiles are then extracted from the overall mosaic and visually inspected by a technician before being exported into the final delivery format.

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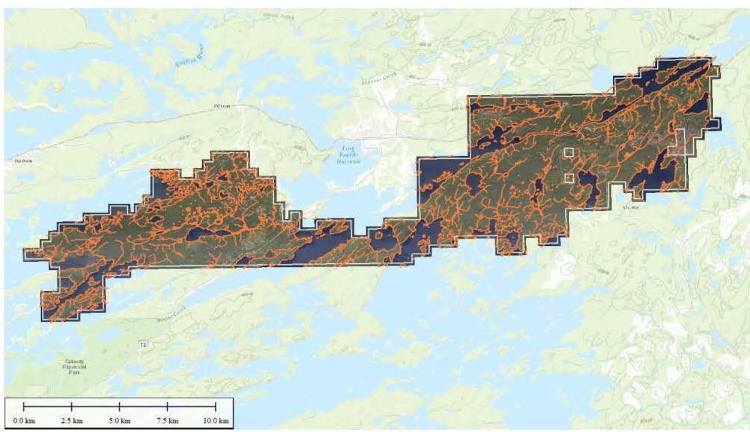
# Report

## VECTORIZATION OF OUTCROPS/DRAINAGE

| | |
|---|---|
| **Process:** | Vectorization |
| **Software:** | Global Mapper, QGIS, AutoCad |
| **Description:** | |

The drainage was manually digitized from the orthophoto imagery, with the Contour file in background as a reference. This was done in Global Mapper. The potential Outcrops were identified using a combination of QGIS to automatically identify areas that are elevated from surrounding terrain. A more manual inspection of the hillshade and imagery was incorporated to identify potential outcrops that were not picked up in QGIS. Once the basic delineation of the drainage and outcrops were generated, the data was edited in Autocad to provide a more cartographically correct data set. The final data was output to a shape file for each feature captured.



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