

# GM 73493

Logistic and interpretation report, unmanned aerial magnetic survey, Barraute project

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UNMANNED AERIAL MAGNETIC SURVEY



LOGISTICS AND INTERPRETATION REPORT

PREPARED FOR



## BARRAUTE PROJECT

FIEDMONT TOWNSHIP, QUÉBEC, CANADA  
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# 1. RESEARCH OBJECTIVE

## □ REGIONAL GEOLOGY

The Barraute area is located in the southern part of the Abitibi Subprovince of the Superior Province. Rocks in this area form an Archean volcano-sedimentary pile consisting of mafic, intermediate, and felsic volcanic and volcanoclastic rocks (2727 ±2 Ma to 2716 ±2 Ma) along a narrow strip of sedimentary rocks (Fiedmont Formation).

These are units found in the Barraute area (Figures 1 and 2A), from north to south: 1) the Figuery Group; 2) the Deguisier Formation, included in the Kinojévis Group; 3) the Landrienne Formation; 4) the Lanaudière Formation, also included in the Kinojévis Group; and 5) the Fiedmont Formation.

### **Volcanic Rocks**

The geological and stratigraphic settings of the Barraute area are described below from the oldest to the youngest.

- The Landrienne Formation (nAla): consists of basalt, gabbro sills, and felsic volcanoclastics and volcanics. It is bordered by the longitudinal Abcourt (north flank) and Aiguebelle (south flank) faults.

The Landrienne Formation includes a rhyolitic unit (2727 +/-2 Ma) significantly older than adjacent volcanic rocks located north (Deguisier Formation) and south (Lanaudière Formation) and belonging to the Kinojévis Group (age range of 2716-2720 Ma). This layout can likely be explained by the presence of a large anticlinorium, the Manneville Thrust Zone, whose central part is occupied by the Landrienne Formation, and which is truncated by many faults, including the Aiguebelle and Landome faults, and the Uniacke Deformation Corridor (Figure 2B). The Venus gold showing is located in the Landrienne Formation and consists of pyritic-quartz veins with a reported 50,000 t resource at a grade of 8.9 g/t Au.

- The Figuery Group (nAfg): consists of plagioclase porphyritic andesitic flows, intermediate to felsic volcanoclastics and felsic volcanics. The Figuery Group is bordered to the north by the Amos Group and the Beauchamp Fault, to the south by the Lyndhurst Fault and the Deguisier Formation. The mean age of Figuery Group volcanics should be comparable to or slightly older than that of the Taschereau Batholith (2718.3 +2.3/-2.2 Ma), a tonalitic to granodioritic intrusion interpreted as synvolcanic.

The Kinojévis Group (nAki) was subdivided into two formations, the Deguisier Formation (nAdg) at the base and the Lanaudière Formation (nAln) at the top.

- The Deguisier Formation (nAdg) consists of tholeiitic basalt, thin chert horizons between flows, tholeiitic rhyolite (2719.4 ±1 Ma and 2718.1 ±1.3 Ma) and intermediate to felsic volcanoclastics. It is in fault contact with the Figuery Group to the north and the Landrienne Formation to the south (Figure 2C).
- The Lanaudière Formation (nAln): consists of mafic to felsic volcanics. The close spatial association observed between ultramafic lava and rhyolitic complexes of this formation, dated 2718.7 ±0.7 Ma and 2716.2 ±0.8 Ma, suggests several similarities with the Kidd-Munro Assemblage. On the other hand, the Lanaudière Formation is bound to the south by the La Corne Batholith and to the north by the Aiguebelle Fault (Figure 2B & 2C).

This northward low-dipping fault may represent one of the subsidiary faults of the Destor-Porcupine Fault Zone further west. Goutier (1997) and Pilote (2009) proposed that the Deguisier and Lanaudière formations were originally joint and that they were subsequently separated by faults.



## Sedimentary Rocks

- The Fiedmont Formation (nAfd) consists of grauwacke, biotite schist and siliceous to ferruginous hexhalite. Numerous cross-bedded sequences representing river deposition environments, similar to Timiskaming-type sedimentary units, are interstratified in conglomerate. The Fiedmont Formation is bordered to the north by the Aiguebelle Fault. This sedimentary rock strip extends southward where it is truncated by the La Corne Batholith.

## Intrusive Units

Numerous pre-tectonic and post-tectonic dioritic-tonalitic to monzonitic and monzogranitic intrusions cut the volcanic sequence (e.g., the La Corne Batholith and the Mogador Pluton).

- The Mont-Vidéo Intrusive Suite (nAvid) includes ultramafic intrusions (peridotite and pyroxenite), amphibolite, gabbro and diorite. These lithologies are masked by a thick overburden cover and have only been recognized by drilling. These intrusive rocks are interpreted as winding dykes and sills cutting host volcanic rocks. Late dykes and intrusions of quartz monzonite and granodiorite (I2Ea), possibly comparable to some adjacent phases associated with the La Corne Batholith, cut the ultramafic and mafic lithologies.
- The Carpentier Pluton (nAcrp) consists of pinkish white porphyritic tonalite, massive and intensively fractured in places. It contains enclaves of felsic volcanic rock distributed mainly along its edge and in its eastern half.
- The Barraute Pluton (nAbrt) consists of porphyritic tonalite of calc-alkaline affinity. Mafic to felsic dykes cut this pluton in a few places. This pluton is interpreted as synvolcanic, based on the presence of a significant regional S<sub>1</sub> fabric and the absence of a significant contact metamorphism aureole in host volcanics.
- The Mogador Pluton (nAmog) has a composition that ranges from quartz monzonite to granodiorite. This pluton does not outcrop and is covered by more than 30 m of surface deposits. Based on its shape and location, the Mogador Pluton appears to be partially conformable with host volcanics of the Lanaudière Formation. This pluton also contains dioritic, gabbroic and amphibolitic marginal phases. Mafic dykes cutting it have been recognized in drilling. By its composition and calc-alkaline geochemistry, granodiorite is reminiscent of the La Corne Batholith unit. This suggests that the Mogador Pluton is late-tectonic, and this interpretation is also supported by the absence of a penetrative fabric in this unit.
- The Barraute area includes the NE portion of the La Corne Batholith (nAlac) in the SW corner. This batholith consists of several early intrusive phases, but only the nAlac1 (quartz monzonite, granodiorite and pegmatite) and nAlac3 (hornblende monzonite) phases are found in this area. The nAlac3 facies also form large dykes and elongated intrusions of hornblende monzonite intruding into the Lanaudière Formation volcanics in the south-central part of the Barraute area. The La Corne Batholith is part of the Preissac–La Corne Plutonic Suite (nAplc).

## Proterozoic Diabase Dykes

Only one dyke outcrop was observed on the western shore of Fiedmont Lake, outside and further south of the mapped area (SE quarter of sheet 32C05). It consists of a N-S to NNE-SSW oriented subophitic gabbro sill. Proterozoic diabase dykes can be traced from their high magnetic signature. Those observed in the Barraute area are not assigned to any particular family.

\* Some of the geological information presented in this section was taken from “ *Bulletin géologique: Geology of the Barraute Area Abitibi Subprovince*, by P. Pilote, J. Marleau and J. David, BG-2019-06.”.

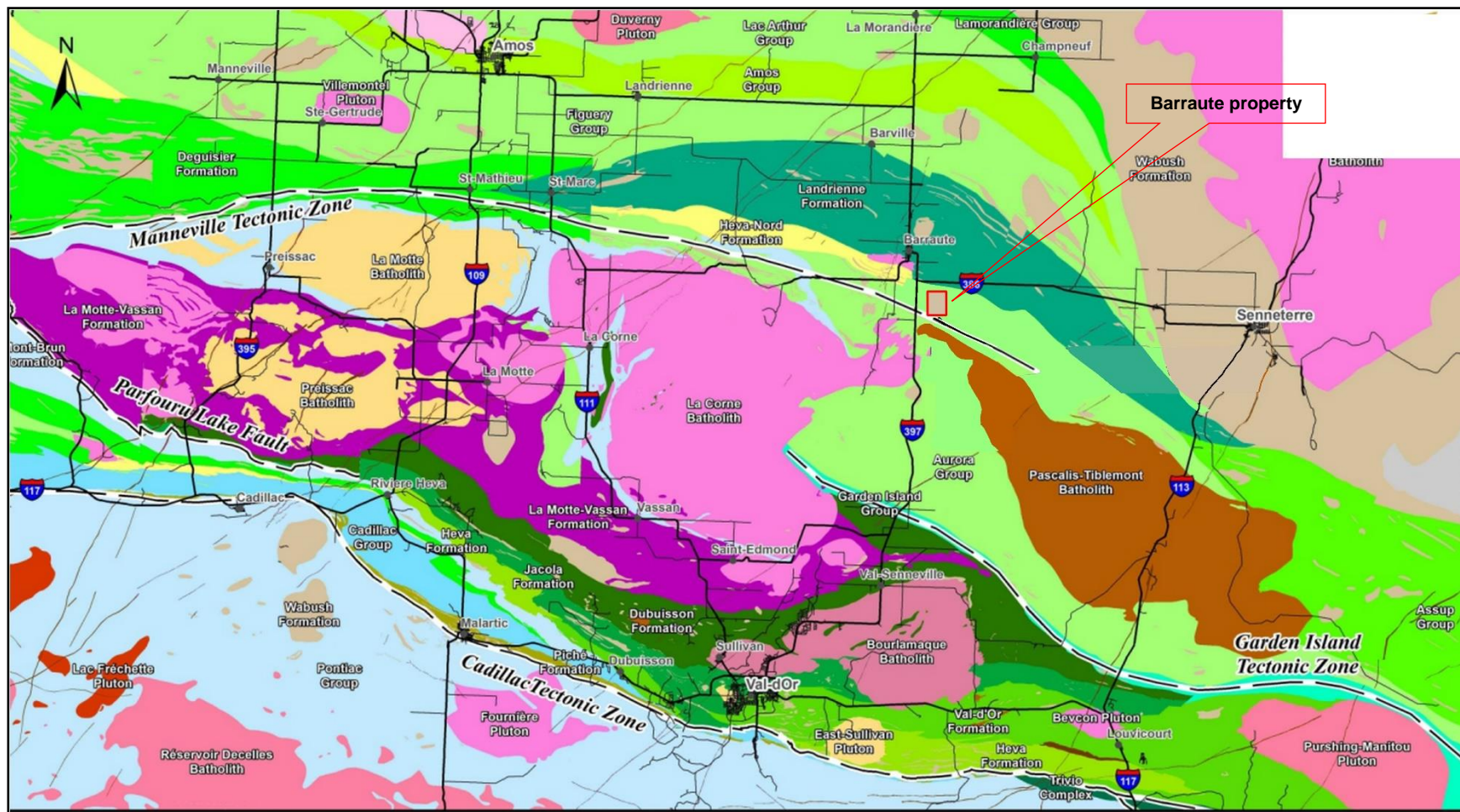


Figure 1. Regional geological setting of the Barraute area, including the location of the Barraute property.

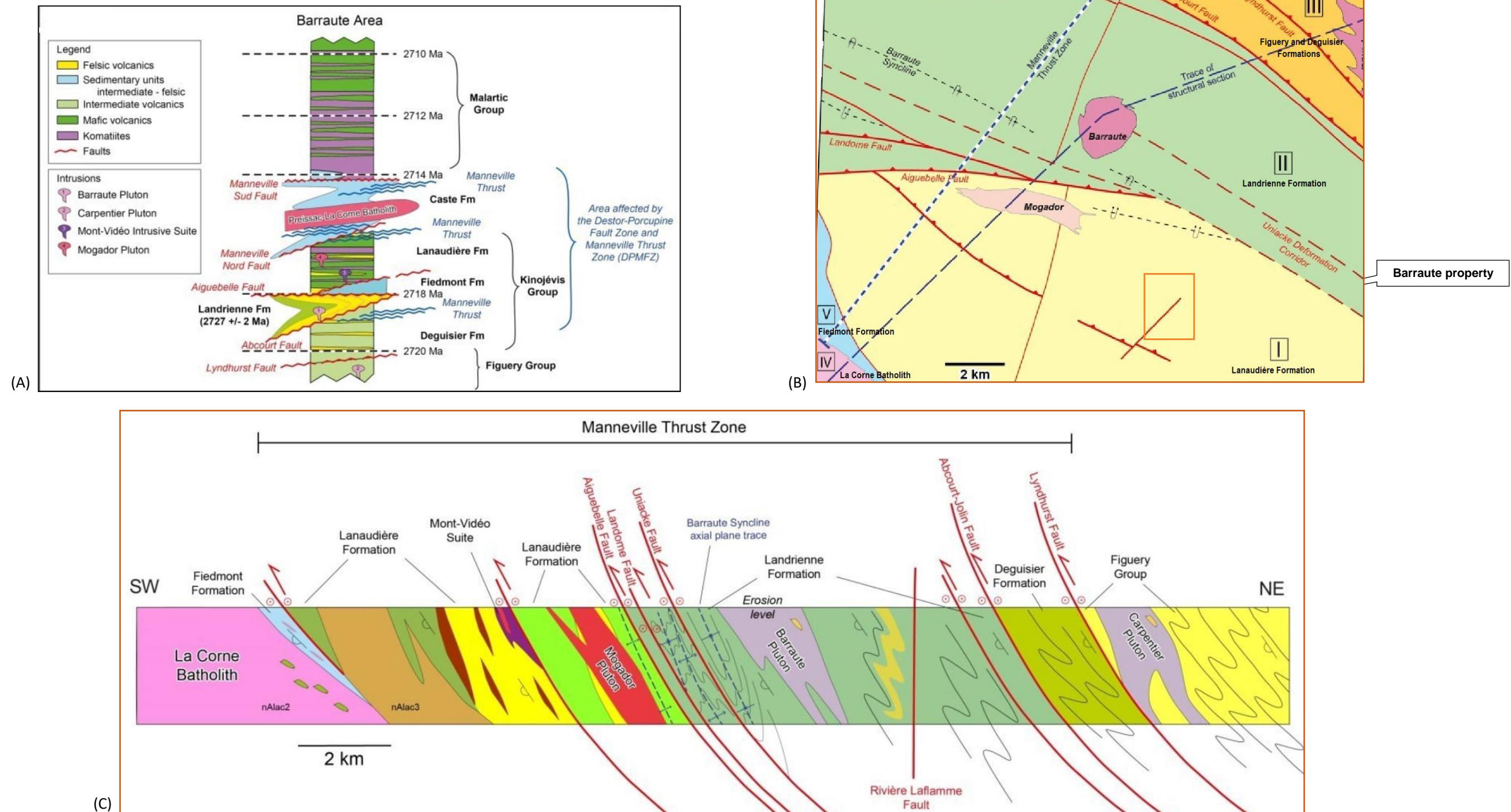


Figure 2. Stratigraphic settings of the Barraute area (A); Subdivision of the Barraute East area in structural domains I to V (B), Schematic NW-SE composite section through the Magador, Barraute and Carpentier Plutons.



## □ **LOCAL GEOLOGY**

The Barraute property which lies within the Amos-Barraute volcanic rock belt, is located in the east-central part of the famous Abitibi Greenstone Belt.

The Abitibi Greenstone Belt (AGB) is a linear volcano-sedimentary sequence intruded by plutonic suites. The Belt has a length of about 700 kilometers and an average width of approximately 300 kilometres, making it the largest and best-preserved, recognized greenstone belt in the world and one of the richest Volcanogenic Massive Sulphides (VMS)-bearing belts in the world. These include syngenetic VMS and auriferous VMS deposits, as well as sulphide-rich gold bearing quartz veins and Cu-Au-bearing sulphide veins. All are genetically associated with felsic volcanic complexes.

As shown in Figures 1 and 2B, the Barraute property is underlain by the Lanaudière Formation (Heva-Nord Formation). This formation is composed of mafic to felsic volcanics that lie 3-4 kilometers west of the property and are found flanking the south side of the granodiorite Mogodor stock.

At the scale of the study grid, the most dominant geological units are andesites (V2J) and intermediate volcanics (V2) in the northern and southwestern parts of the study grid, and dacites (V1D) and felsic volcanic rocks (V1) in the center of the study area (Figure 3). A gabbro sill intruding andesitic rocks (V2J) in the northwestern part of the study grid is mapped on the SIGEOM interactive map.

Three faults appear to cross the property. One strikes northeast and the two others northwest. The important and major structures in the vicinity of the study area are the Uniacke deformation corridor, which is 2.3 km to the north, the EW-trending Aiguebelle fault which is 3.5 km to the NW, and the NE-trending Rivière Laflamme fault which is 3.6 km to the west.

\* Some of the geological information presented in this section was taken from "Report on geology, Litho geochemistry and Diamond Drill Program, Laflamme Property, by Dave Camble, 1997." (GM 55909).

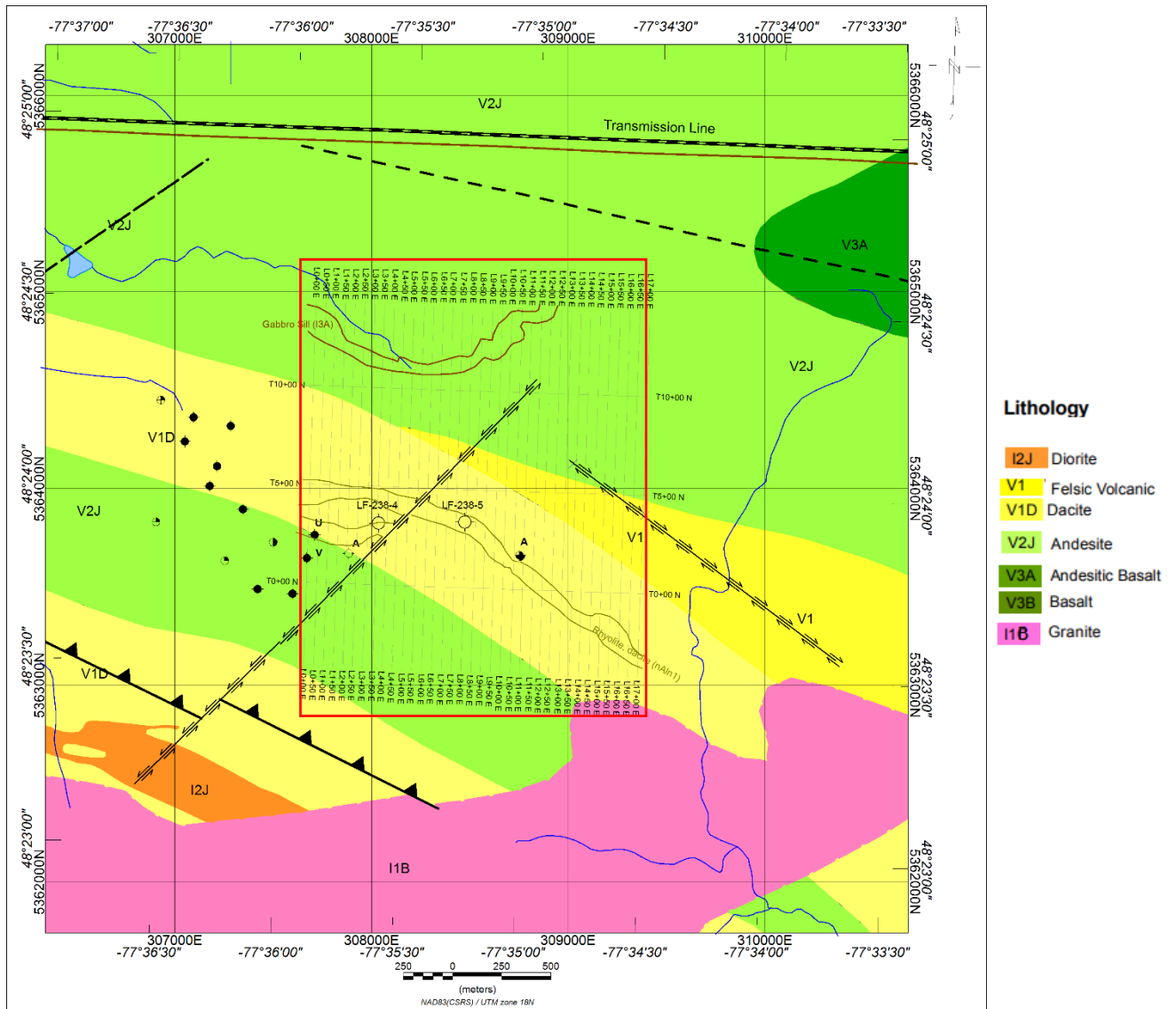


Figure 3. Simplified geological map of the Barraute property including the major faults, existing drillholes and MEGATEM anomalies.



## □ ECONOMIC GEOLOGY

The Barraute area is prospective for at least three (3) types of mineralization (Figure 4):

1. Base metal massive sulphides associated with volcanic rocks:

- **Barvallée:** Reserves: 275 923 t at 1.31 g/t Au, 48.06 g/t Ag, 4.38% Zn and 0.87% Cu. Recent estimate) shows potential reserves of 181 000 t at 44.23 g/t Ag, 1.23% Cu and 5.71% Zn.
- **Belfort (Roymont):** Reserves: 66 625 t at 1.05 g/t Au, 19.22 g/t Ag, 5.71% Zn and 0.18% Cu.
- **Vendôme No1 (Mogador):** Reserves: 675 554 t at 1.10 g/t Au, 58.50 g/t Ag, 7.50% Zn and 0.51% Cu.
- **Projet Laflamme:** 7.5 g/t Ag and 4397 ppm Zn over 0.78 m.
- **Absam:** 14.76 g/t Ag over 5.5 m; 17 g/t Ag over 3.6 m; 9.4 g/t Ag over 1 m; 5.9 g/t Ag over 1.4 m; 1.5 g/t Au over 1 m; 17.3% Zn over 2.3 m; 0.75% Zn over 1.4 m.
- **Canadian Shield:** 1.37 g/t Au over 0.91 m; 1.20 g/t Au over 1.52 m.

2. Gold mineralization associated with orogenic type-veins:

- **Lac Vendôme:** 10.40 g/t Au over 0.52 m; 11.60 g/t Au over 0.30 m.
- **Oregon :** 3.8 g/t Au over 0.6 m; 41.5 g/t Au over 1.0 m (GM 42404); 20.4 g/t Au.
- **Vénus (Barexor):** Reserves (not compliant with NI 43-101) of 29 700 t at an average grade of 10.12 g/t Au.
- **Vénus-Nord:** 37.45 g/t Au; 4.2 g/t Au over 1.6 m (GM 55636); 23.45 g/t Au over 0.3 m.
- **Vénus-Ouest:** 1.06 g/t Au over 1.0 m; 2.93 g/t Au.
- **Vallée (Currie-Mills) :** 22.46 g/t Au; 2.47% Cu (GM 52154); 45.3 g/t Au over 0.15 m.
- **Tri-Cor :** 36.7 g/t Au over 0.30 m; 103.6 g/t Au over 1.83 m; 17.0 g/t Au over 0.60 m.

3. Magmatic Ni-Cu:

- **Vendôme No2 (Mogador):** Reserves (not compliant with NI 43-101) of 317 518 t at 0.82% Ni and 0.68% Cu.

No known mineral occurrence is reported within the study property; however the Barraute property lies within the Lanaudière (Heva-Nord) Formation, which hosts a number of significant VMS type base metal deposits, including Vendôme No. 1 (Mogador), Barvallée, Belfort, Absam and the Laflamme showing (Ag-Cu-Zn) discovered in 1995 at 3.8 km to the west of the study grid.

The felsic volcanics of the Lanaudière Formation, in the mineralized areas, are reported to consist of rhyodacite to rhyolite flows, flow breccia, and pyroclastic tuff. The Formation also consists of abundant andesite-basalt flow sequences distal from the mineralized felsic volcanic accumulation near the Mogador stock intrusive center.



The mineralization consists of lenticular clusters of massive to semi-massive sulphides, usually subconformable and discontinuous, containing mainly pyrite, sphalerite, chalcopyrite and galena. There are also economic contents of gold and silver. The lateral extension of zones can reach >300 m (Vendôme No1 site). Mineralized clusters are oriented 300° and have a steep northward dip. These mineralized sites are all located on the south side of a large, kilometre-wide intrusion of monzonite and granodiorite (Mogador Pluton).

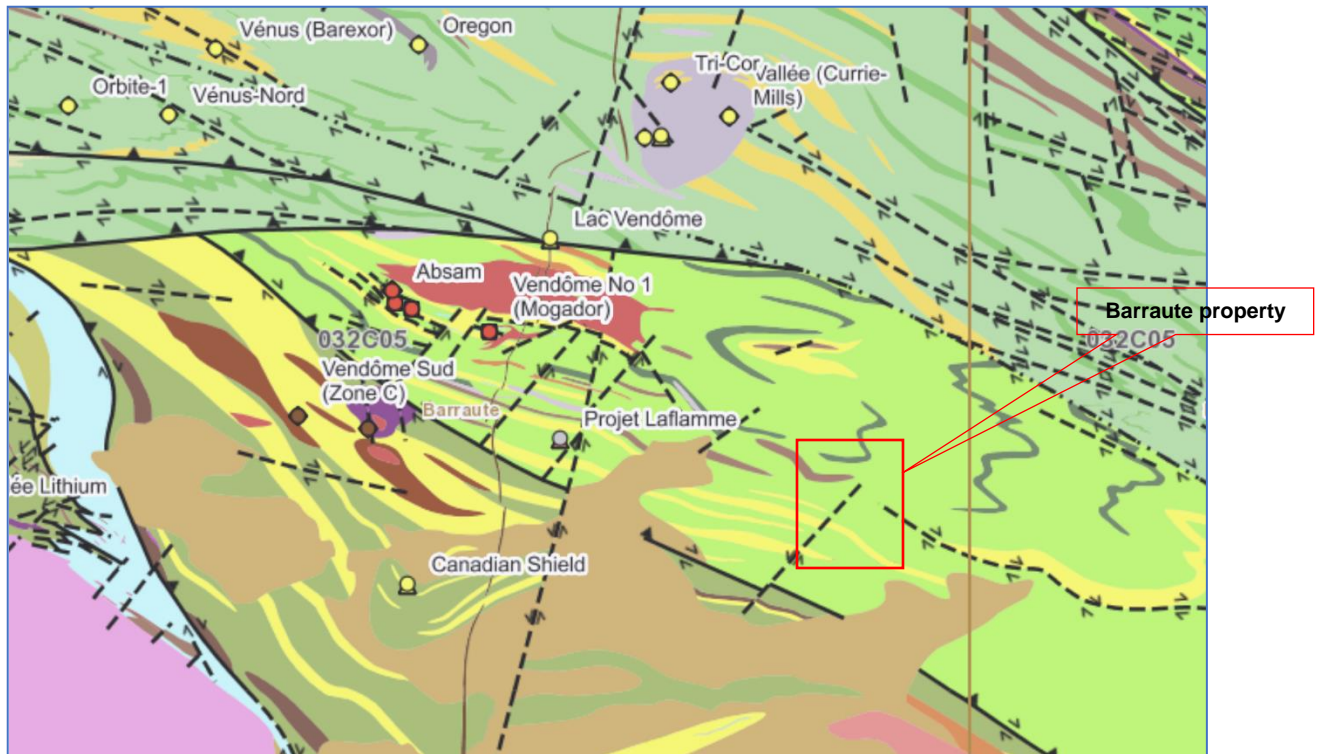


Figure 4. Main deposits in the vicinity of the Barraute property.

Note that a recent geological map published in the Geological Bulletin of Québec (BG-2019-06) by Pierre Pilote and Jonathan Marleau (2018), showed that the Barraute property is prospective for Zinc mineralization as shown in Figure 5.

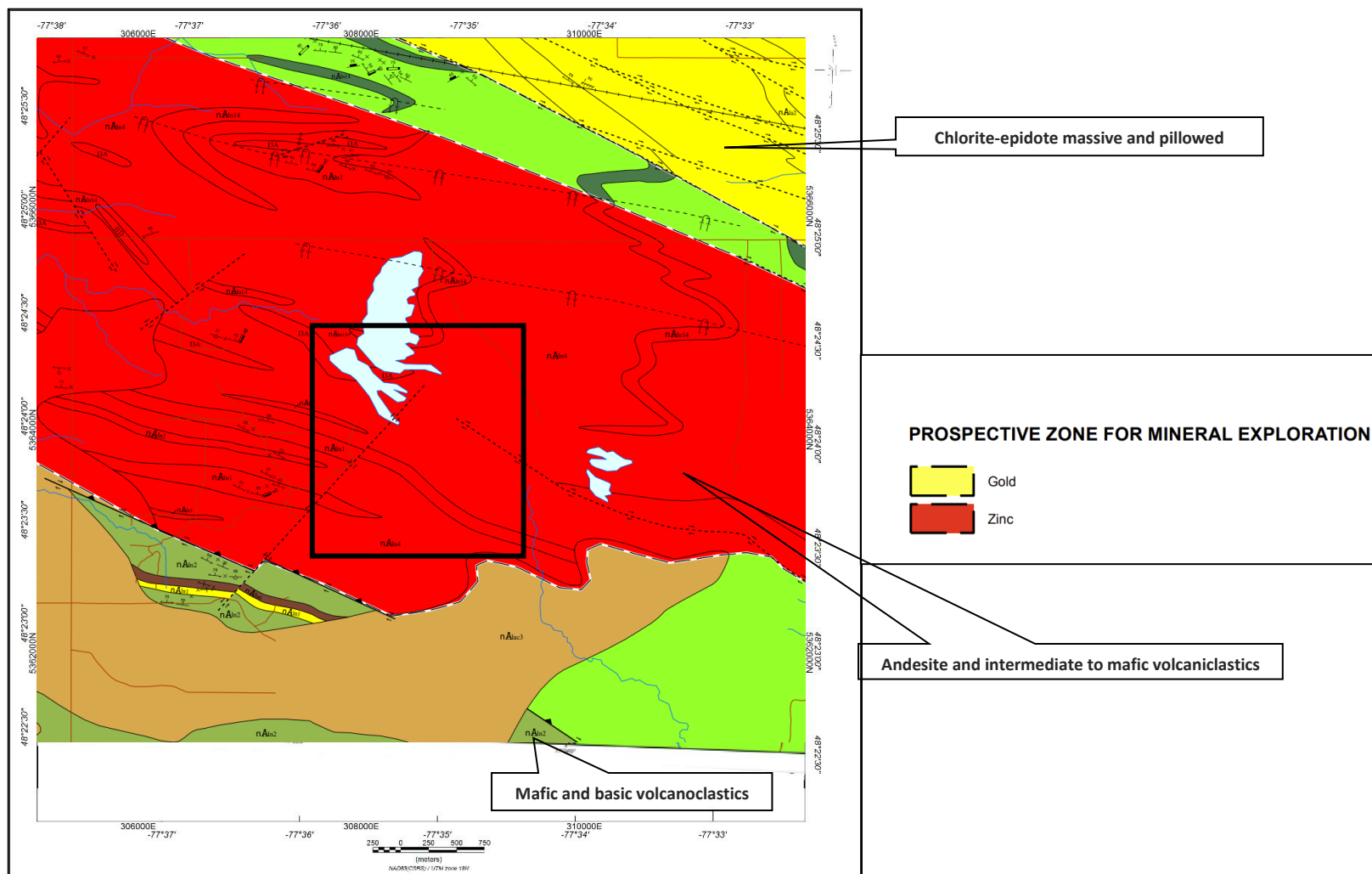


Figure 5. Mineral potential of the Barraute property; Prospective for Zinc mineralization (BG-2019-06).



## 2. IMPLEMENTED SOLUTION

The closest mineral occurrence to the Barraute property is the Laflamme showing (Ag, Zn, Cu) located at coordinates [304042mE; 5365321mN], on the banks of the Laflamme River, on lot 40 of the ninth (9) range. This showing (7.5 g/t Ag and 4397 ppm Zn over 0.78 m) was discovered in 1995 by drilling the presumed extension of a massive sulphide zone, located on lot 32 of the Tenth (10) Range in Fiedmont Township (GM 54128).

The mineralization consists of semi-massive sulphides associated with rhyodacitic felsic volcanics containing up to 15% sulphides, mainly pyrite. The pyrite is accompanied by 5-15% magnetite. A cherty or intensely silicified horizon is associated with the mineralization.

In addition to the proximity (~ 3.8 km) of the Laflamme showing to the Barraute property, the geology of these two properties is the same, consisting essentially of the Lanaudière (Heva-Nord) Formation, which hosts a few significant VMS deposits to the west. This interesting geological context and the detection of MEGATEM anomalies (**A**, **V** and **U**) on the Barraute property make it an attractive zone for the discovery of new VMS-type base metal deposits.

A high-resolution drone magnetic survey at low altitude can play a key role in geological mapping (lithological differentiation), locating feeder faults, folding structural traps and possible alteration zones, which is not always straightforward.

In July 2023, Val-d'Or Mining Corporation commissioned Abitibi Geophysics to conduct a high-resolution, drone magnetic (AeroVision®) survey to cover the Barraute claims using regular line intervals of 50 m. With the AeroVision® drone-magnetic survey, Abitibi Geophysics offers a high-end geophysical survey with unmatched resolution, relying on a ground-breaking flight control system, unique in North America: The *AimLow™* navigation and obstacle avoidance system, developed in close collaboration with Devbriio Geophysics, allows us to maintain the lowest achievable altitude throughout the survey, even in the most rugged conditions. With advanced control algorithms the UAV can maintain a constant *At Ground Level* (AGL) altitude while continuously avoiding occasional obstacles, like higher trees or structures. The resulting data has the resolution of a ground survey, but it is collected with the effectiveness of an airborne survey.

The interpretation of the magnetic data intends to improve the geological knowledge of the Barraute property.

To achieve the geophysical objectives of this project the following steps were carried out:

- Processing of magnetic data to provide a high-quality map of the total magnetic intensity, its reduction-to-pole and the RTP residual anomaly.
- Generating a high-resolution first vertical derivative map and illustrating its effectiveness in locating faults/shears and lithological contacts.
- Outlining the major tectonic features of the Barraute property.
- Highlighting the regions of high structural complexity and generating an orientation entropy (OE) heat map to pick the areas with significant structural complexity perceived to be prospective for VMS deposits.



### 3. GEOPHYSICAL INTERPRETATION

#### □ ANALYSIS OF THE AEROVISION® SURVEY

The AeroVision® magnetic survey over Barraute property was carried out along 35 lines (from L0+00E to L 17+00E) using regular flight lines spaced 50 m apart. The lines were flown with an azimuth of N002° at an average altitude (ground clearance) of 24 m. A total of 70.1 line-kilometers of high-resolution magnetic data was collected in this project.

The total magnetic values over the Barraute grid range from 54 812 nT to 55 506 nT, with an average of approximately 55 018 nT. The highest magnetic value (55 506 nT) was recorded in the NE part of the survey grid, at line 13+00E, coordinates [309 003 E, 5 364 529 N], on a complex-shaped (probably folded) magnetic feature, while the lowest magnetic value was found in the western side of the grid on line 0+00E, coordinates [307 675 E, 5 363 756 N].

The resulting total magnetic intensity map and its reduction to the pole (RTP) are shown in Figures 6A and 6B respectively. As seen, the obtained high-quality magnetic maps were successful in mapping the magnetic properties of the geological formations lying within the Barraute property. The most dominant features within these maps are:

- Complex-shaped magnetic anomaly: This anomaly (**BR-01**), which appears to be circular in shape, was identified in the NE part of the survey grid between L 11+50E and L 16+00E, within andesite and intermediate to mafic volcanoclastics rocks, according to the geological map of the study area. The delineated magnetic signature could correspond to a mafic unit, such as a gabbro intrusion or sill. The residual amplitude of the BR-01 anomaly is estimated to be 550 nT above a magnetic background of approximately 54 950 nT. The width of BR-01 is around 300 m and its magnetic susceptibility could range between 0.010 and 0.02 SI.
- NW-trending magnetic lineament: This NW-trending magnetic lineament (**BR-02**) is only visible south of tie-line 5+00N from L 7+00E to L 17+00E. The delineated magnetic trend appears to be seriously disrupted by NE-trending faults, especially in the center of the grid between L 5+50E and L 7+00E. Anomaly BR-02 is characterized by moderate amplitudes ranging from 170 to 190 nT and a width of about 65 m.

According to the geological map of the study area, anomaly BR-02 appears to coincide with felsic volcanic rocks (rhyolite, dacite and felsic volcanoclastics). This unit was drilled in 1997 (hole LF-238-5) and a thick sequence of andesite to basalt flows were intersected to depth 110 m with several thin intervals (< 1.0 to 2.0 m), intercalated, interflow mafic tuff and /or flow top breccia-agglomerate intervals.

Three zones of weakly disseminated pyrite - pyrrhotite, and fine stringers and fracture fillings of pyrite - pyrrhotite were intersected. The assay results returned low and insignificant ranging from Nil -17 ppb Au, 0.1 - 0.4 ppm Ag, 25 - 218 ppm Cu, and 77 - 288 ppm Zn.



- **Northern folded magnetic lineament:** A curved (folded) magnetic lineament (**BR-03**) was highlighted in the northern part of the survey grid from L 0+00E to L 12+00E. The delineated magnetic signature corresponds to a gabbro sill well mapped on the geological maps (Figures 3 & 5). The width of this lineament is estimated between 55 m and 75 m, and its magnetic amplitude ranges from 100 nT to 250 nT. At least two NE-trending faults have affected this trend.

A few short-wavelength magnetic anomalies were also highlighted by the present magnetic survey, particularly in the center of the grid. Most of these anomalies are oriented NW, but one of particular interest (**BR-04**) is oriented NS. This anomaly is only visible on L 9+00E, and one of these small sections reappears further north offset at line 10+00E. The amplitude of BR-04 is estimated between 35 and 50 nT above a magnetic background of 54 950 nT.

Finally, we report the presence of an elliptical-shaped magnetic anomaly (**BR-05**) at line 5+00E, coordinates [308 754 E; 5 363 669 N]. This punctual anomaly measures approximately 90 x 50 m and has an amplitude of about 350 nT. The BR-05 anomaly is outlined almost in contact with the BR-03 magnetic lineament reflecting the gabbro sill. It is highly probable that anomaly BR-05 is part of the BR-03 lineament but offset to the south by a thrust fault.

To further characterize the delineated magnetic features within the Barraute property, enhancement techniques consisting of the residual anomaly and first vertical derivative all using reduced-to-pole (RTP) data, were calculated (Figures 7A and 7B). These products were used to better assess the magnetic amplitudes of the outlined anomalies within the study grid, to enhance subtle anomalies near the surface, and to track the tectonic features (fault/shear) that affected the survey grid.

#### □ **PREDICTIVE TARGETING ANALYSIS**

Structural complexity mapping can be applied to exploration for economic minerals. Frequently, mineral prospectivity studies use proximity or density calculations of favorable features (e.g., fault traces, fold axes, favorable lithological units) to represent structurally complex zones as a proxy for both fluid pathways and traps, which are likely to be genetically related to ore formation.

To identify zones of significant structural complexity favorable for gold and base metal mineralization on the Barraute property, an analysis was made on the RTP-total magnetic intensity using an automatic predictive method known as Centre for Exploration Targeting (CET) grid analysis.

The principle of the CET method is well detailed in the Computer & Geosciences 34 article entitled: *Towards the automated analysis of regional aeromagnetic data to identify regions prospective for gold deposits* (Eun J. Holden & Mike Dentith et al.).

The result of the CET method is shown in Figure 8. As can be seen, the delineated magnetic anomalies BR-01, BR-02, BR-03 and BR-05 as well as MEGATEM anomalies A, U and V, all appear to be located in area of structural complexity; the geological structures in this are either folded or highly disrupted by faults (Figure 8A).



To extract further information about the delineated magnetic anomalies, an unconstrained 3D magnetic inversion was performed on the residual magnetic anomaly. The final inversion result is illustrated in Figure 9A, as 3D voxel of the magnetic susceptibility. All the geometrical parameters and magnetic properties of the detected magnetic sources can be directly taken from the voxel delivered with this report.

The causative source of anomaly BR-01 is characterized by susceptibility values ranging from 0.01 to up 0.02 SI and appears to dip northwards. As for anomaly BR-02, its source appears in the magnetic susceptibility voxel as an unrooted source (shallow source) dipping slightly to the NE and characterized by susceptibility values ranging from 0.004 to 0.008 SI.

On the other hand, the BR-03 magnetic lineament is characterized by magnetic susceptibility values ranging from 0.002 to 0.008 SI. This folded magnetic feature is also seen as a shallow source with no dip (steeply or vertically dipping). All the magnetic sources interpreted on the Barraute property appear to be outcrops or very close to the surface.

Finally, with the help of the 3D magnetic inversion, a simplified structural map (Figure 9B) was generated using the horizontal slice of magnetic susceptibility extracted at an elevation of 250 m, including the location of the MEGATEM anomalies (A, U and V), known geological faults, and the major inferred faults/shears deduced from the previous regional airborne as well as the present drone magnetic surveys.



## 4. CONCLUSION AND RECOMMENDATIONS

High-resolution magnetic datasets are considered essential components of mineral exploration programs. Generally, these are indirectly used to map structures (feeder faults/shears and folds) and lithological units where gold or base-metal deposits could be located.

Within the framework of this project, the interpretation of the AeroVision® magnetic data has provided a better understanding and characterization of the geology of the Barraute property. Three main magnetic anomalies (BR-01 to BR-03) of moderate to high (100 to 550 nT) amplitudes were successfully mapped. According to the geological map of the Barraute area, anomaly BR-01 was identified within andesite and intermediate to mafic volcanoclastic rocks; this anomaly could reflect a mafic intrusion. Magnetic lineaments BR-02 and BR-03 appear to be associated with a rhyodacitic unit and gabbro sill, respectively. The geometrical and physical parameters (magnetic susceptibility) of the sources of these anomalies are well defined in the 3D magnetic model.

Based on the high-resolution obtained magnetic map, an update of the geology of the study area is necessary, as discrepancies have been observed between the known mapped geological units and the delineated magnetic signatures.

Overall, the interpretation and inversion of the AeroVision® magnetic data have provided:

- Various high-resolution magnetic maps for the Barraute property.
- A 3D magnetic susceptibility model that provides information on the subsurface architecture (geometry) of the magnetic sources lying within the Barraute grid.
- A predictive targeting map (heat map) where zones of significant structural complexity perceived as potential targets to host VMS base metal deposits were identified.
- A detailed structural map showing the distribution of the magnetic susceptibility, including the outlines of some known and unknown faults/shears.

The previous MEGATEM survey, carried out in 2003, revealed three prominent conductive anomalies (**A**, **U** and **V**) on the Barraute grid. To our knowledge, none of these anomalies have been drill-tested.

Anomaly **A** is located within the BR-02 magnetic lineament in a fault zone. This EM conductor is picked between L 10+50E and L 11+00E, at coordinates [308 754 E; 5 363 669 N]. Fugro MEGATEM modeling (Fugro–GDB-Anomaly Listing) found the source of anomaly **A** buried at a depth of 199 m, while the sources of anomalies **U** and **V** buried at depths of 175 m and 177m, respectively.

Two short holes LF-238-4 and LF-238-5 were drilled in 1997 by Phelps Dodge Corporation Ltd on the Barraute property but targeted none of these MEGATEM anomalies.

Hole L-238-5 was drilled 325 m northwest of the **A** anomaly, targeting the BR-02 magnetic lineament. This hole intersected a thick sequence of andesite to basalt flows and revealed 3 weakly disseminated pyrite – pyrrhotite zones at the depth intervals of 38 - 47m, 57 - 63m and 73 - 77m.

The same applies to hole L-238-4, drilled on L 3+50E, targeting a probable continuity of the BR-02 anomaly to the west, 328 m east of the MEGATEM **U** anomaly. This hole intersected a sequence of andesite to basalt pillowed flow and revealed two narrow zones of stringer to disseminated pyrrhotite, with trace chalcopyrite mineralization, from 19.65 m to 20.45 m and from 77.0 to 77.5 m.



Assay results for Cu, Zn, Au, and Ag, for both boreholes were weak and insignificant. Previous records (GM 55467) indicate that holes LF-238-4 and LF-238-5 targeted shallow induced polarization (IP) anomalies.

Ground follow-up on target **A** was carried out by Golden Valley Mines in 2011 using an HLEM (MaxMin) survey with a coil separation of 150 m. Unfortunately, the MaxMin survey failed to detect any conductors at depth. An additional HLEM survey with a wider coil separation, was then planned and carried out in the field on the following days to increase the depth investigation (penetration), as the source of the MEGATEM anomaly appeared to be deeper than expected. Despite this, the HLEM method was unable to see any conductors (GM 65450).

Under these conditions, we recommend a TDEM survey (surface InfiniTEM) combined with a deep Resistivity/Induced polarization survey such as OreVision ( $a=25\text{m}$ ,  $n=1$  to 30) to test the nature of the MEGATEM **A**, **U** and **V** conductors and to detect any possible disseminated sulphides, since disseminated pyrite-pyrrhotite zones were intersected in holes LF-238-5 and LF-238-4.



The author is confident that the Barraute Project offers potential for discovering new mineralized zones, and an investigation of the magnetic signatures identified by the present survey will be positive.

However, our knowledge of the property's geology is not as thorough as the geologist of Val-d'Or Mining Corporation. Our interpretation is mainly based on the observed geophysical responses.

To maximize the outcome of the present results, Val-d'Or Mining should ensure all available geoscience information are compiled, assessed and, if necessary, redefine the nature of the interpretation proposed in this report.

Respectfully submitted,  
Abitibi Geophysics Inc.



*A. Madjid Chemam*

Madjid Chemam, P. Geo.  
OGQ #1259  
Senior Geophysicist

MC/sl

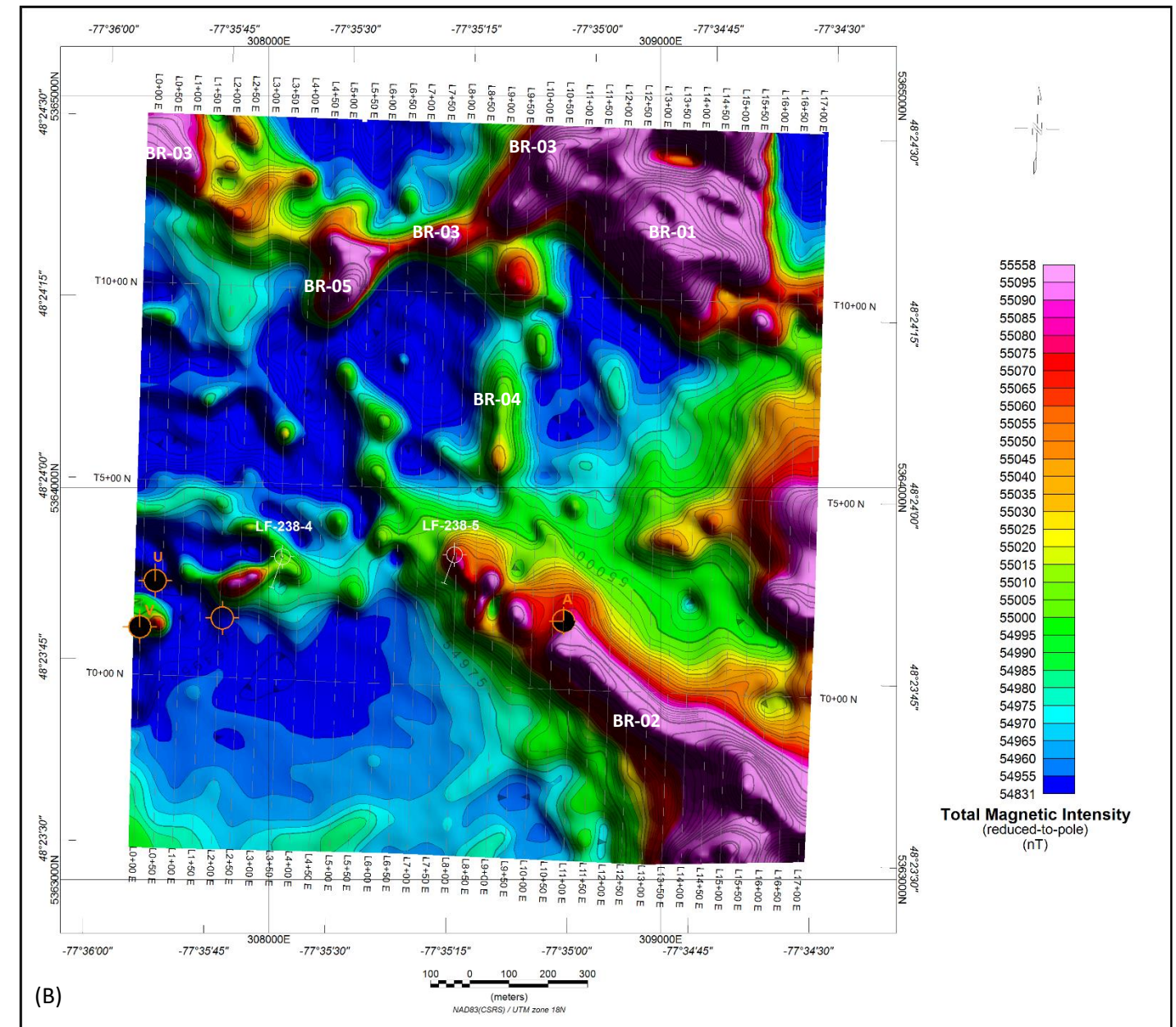
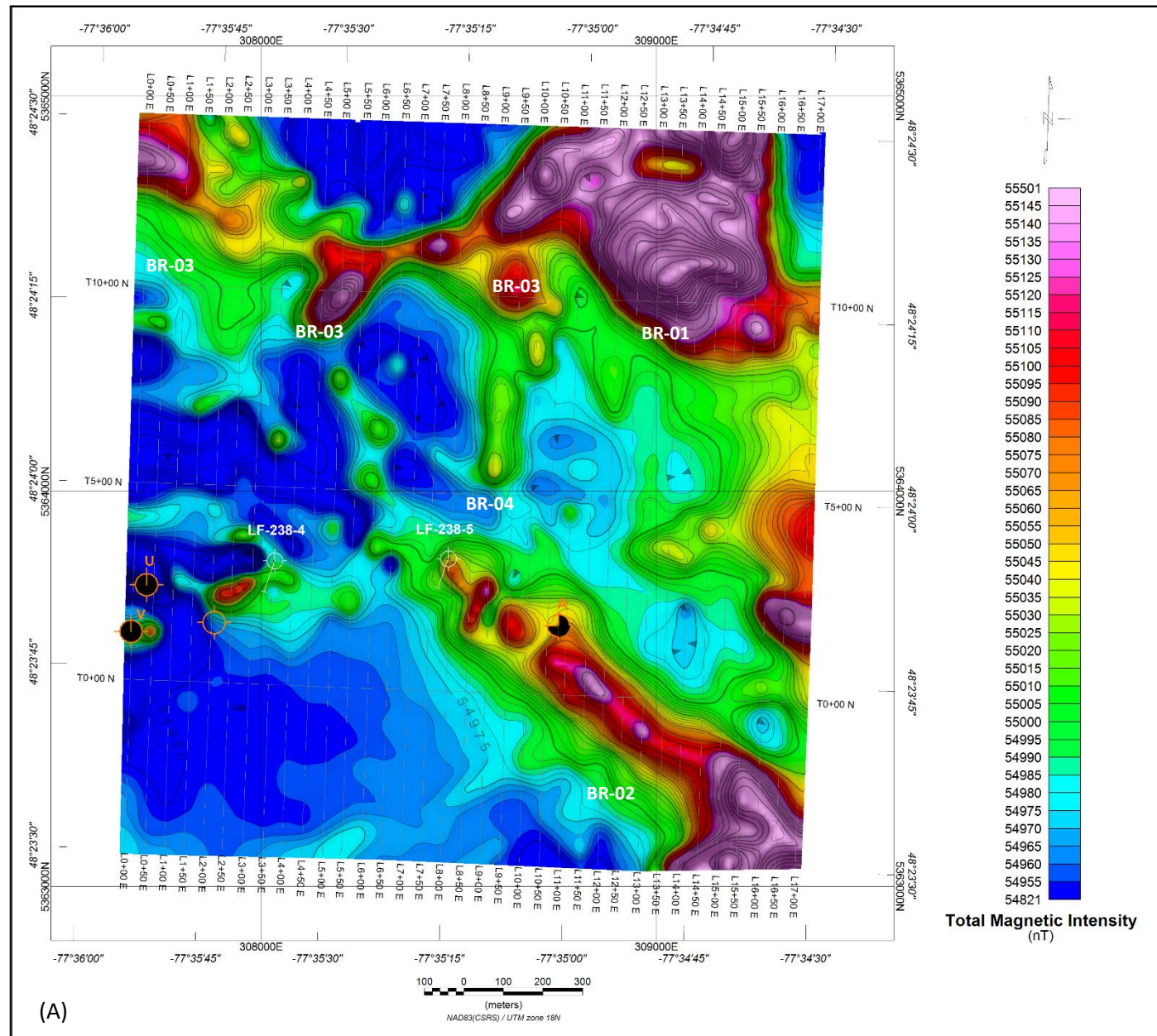


Figure 6. High-resolution AeroVision® total magnetic intensity (A) versus its reduction-to-pole (B), including previously identified MEGATEM anomalies and old drillholes, Barraute property.

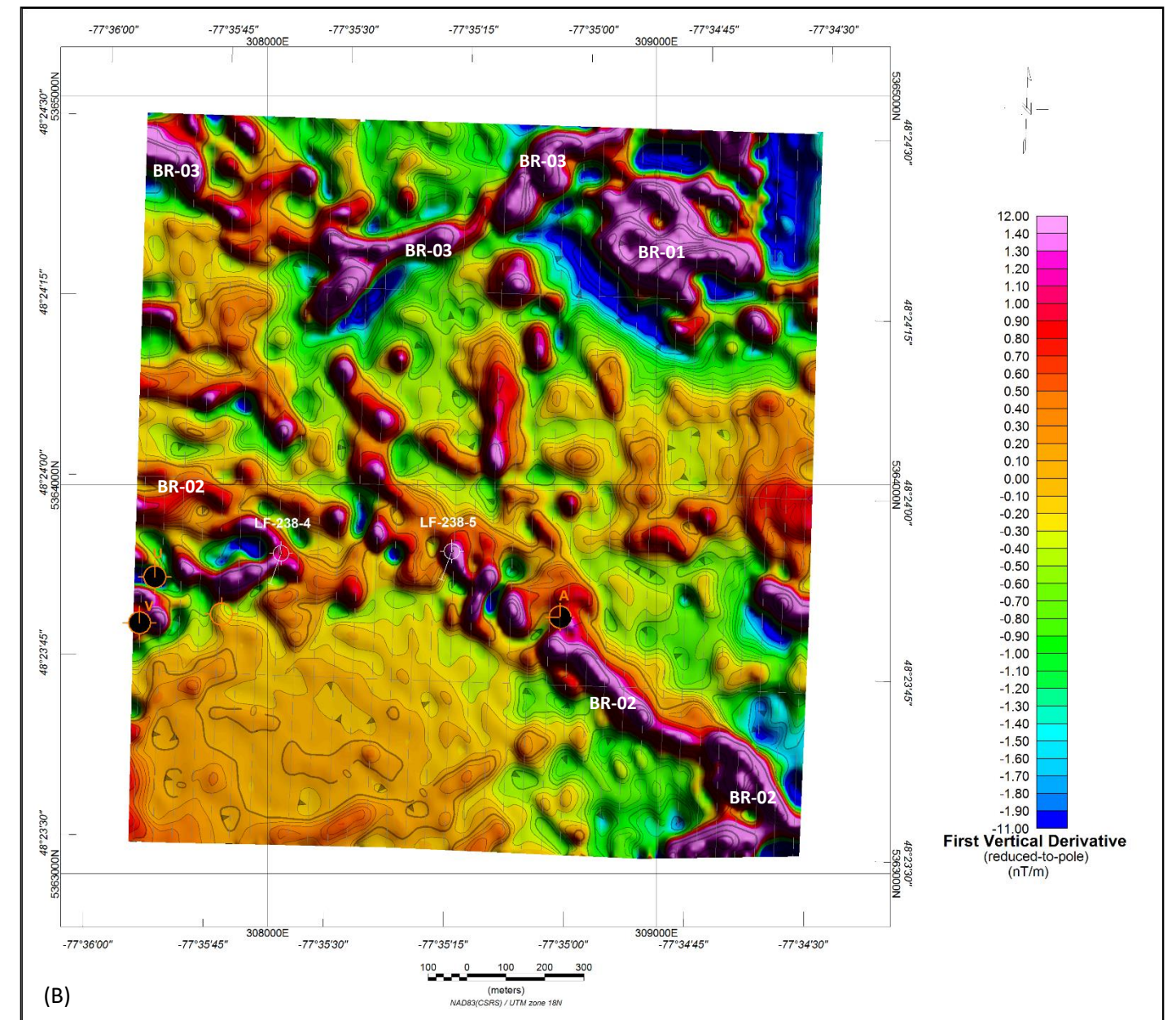
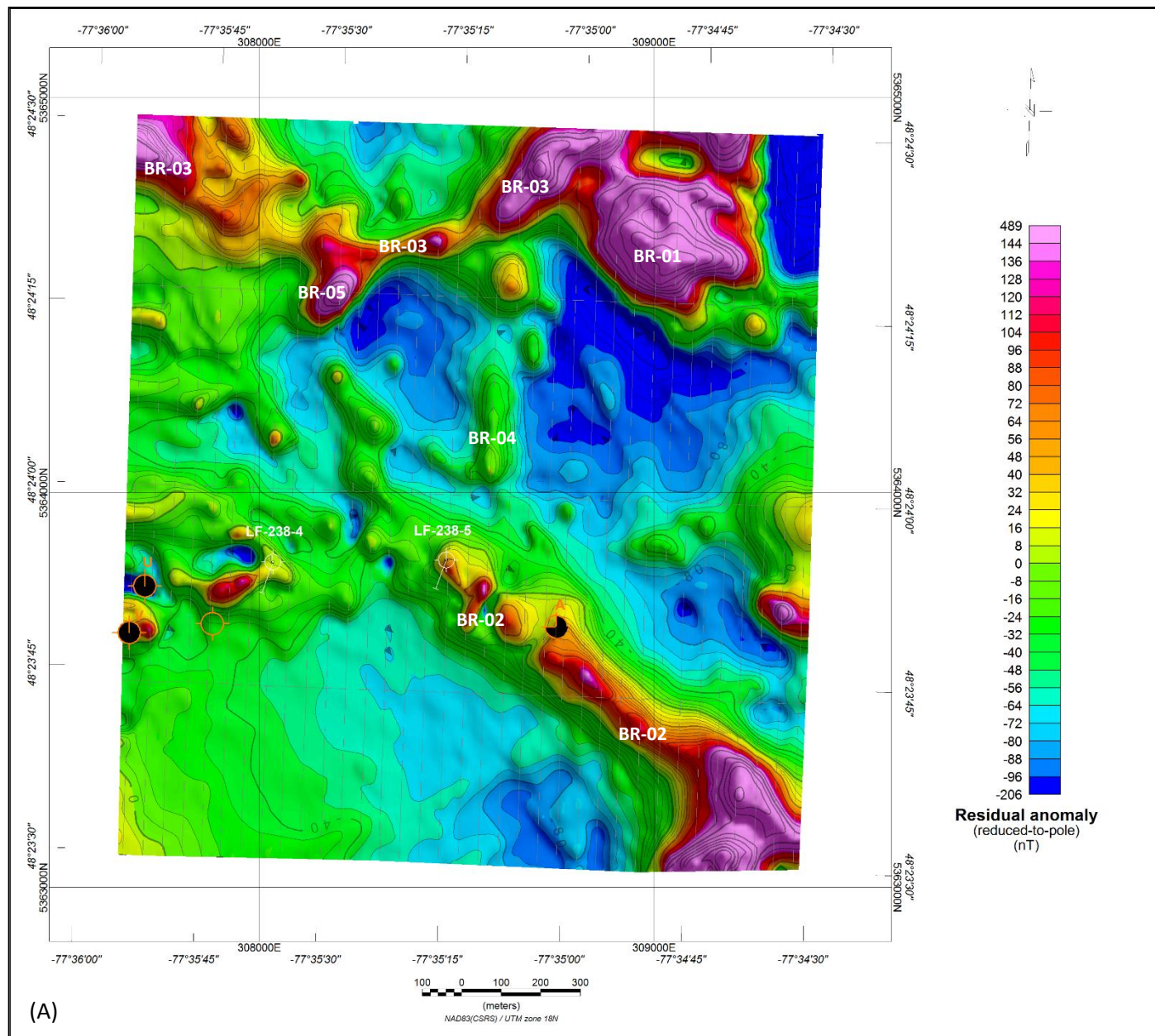


Figure 7. Residual magnetic anomaly (A) versus the first vertical derivative (B), all reduced-to-pole, including previously identified MEGATEM anomalies and old drillholes, Barraute property.

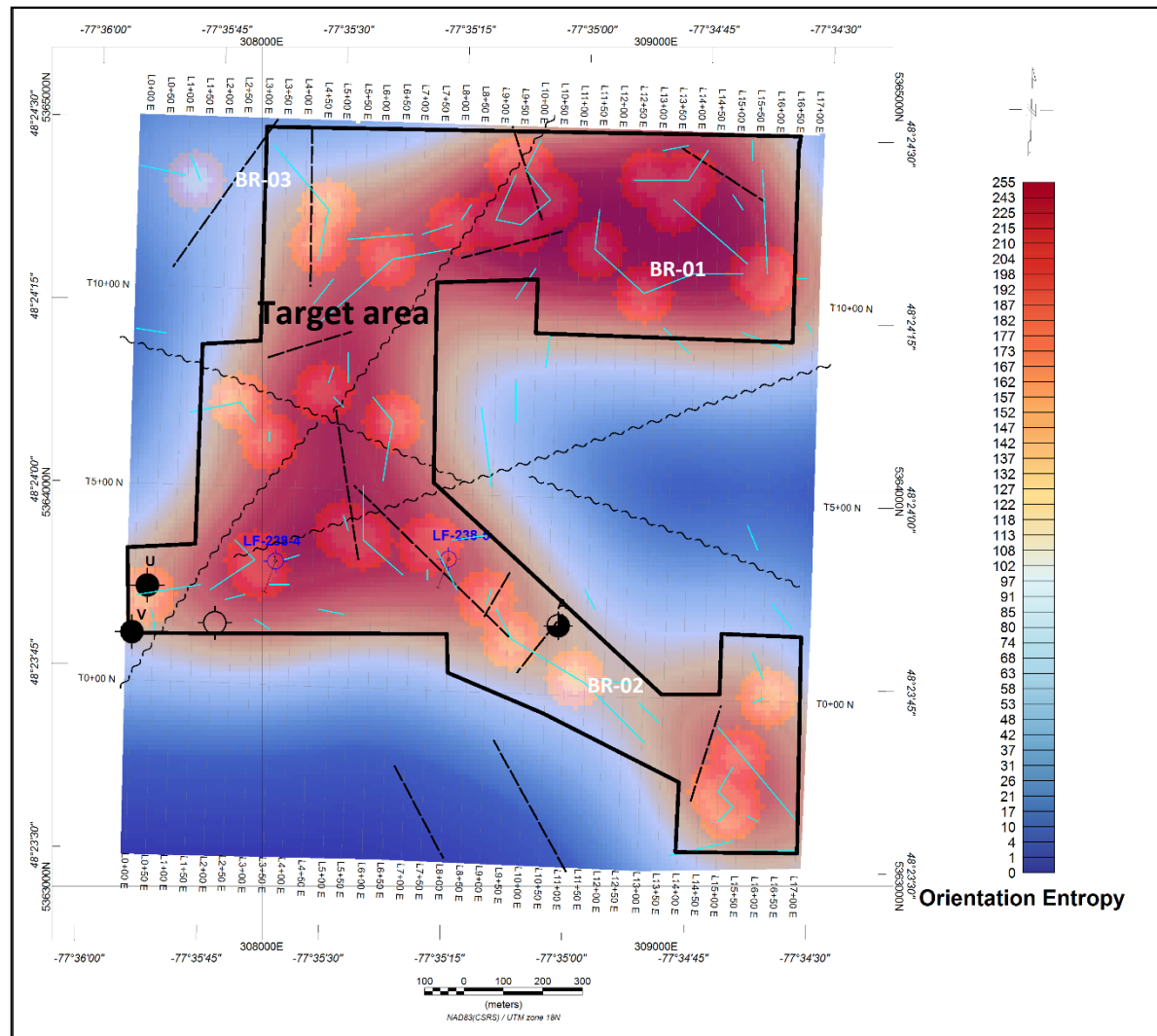


Figure 8. Predictive targeting map showing zone of high structural complexity including the inferred faults and MEGATEM A, U and V anomalies, Barraute property.

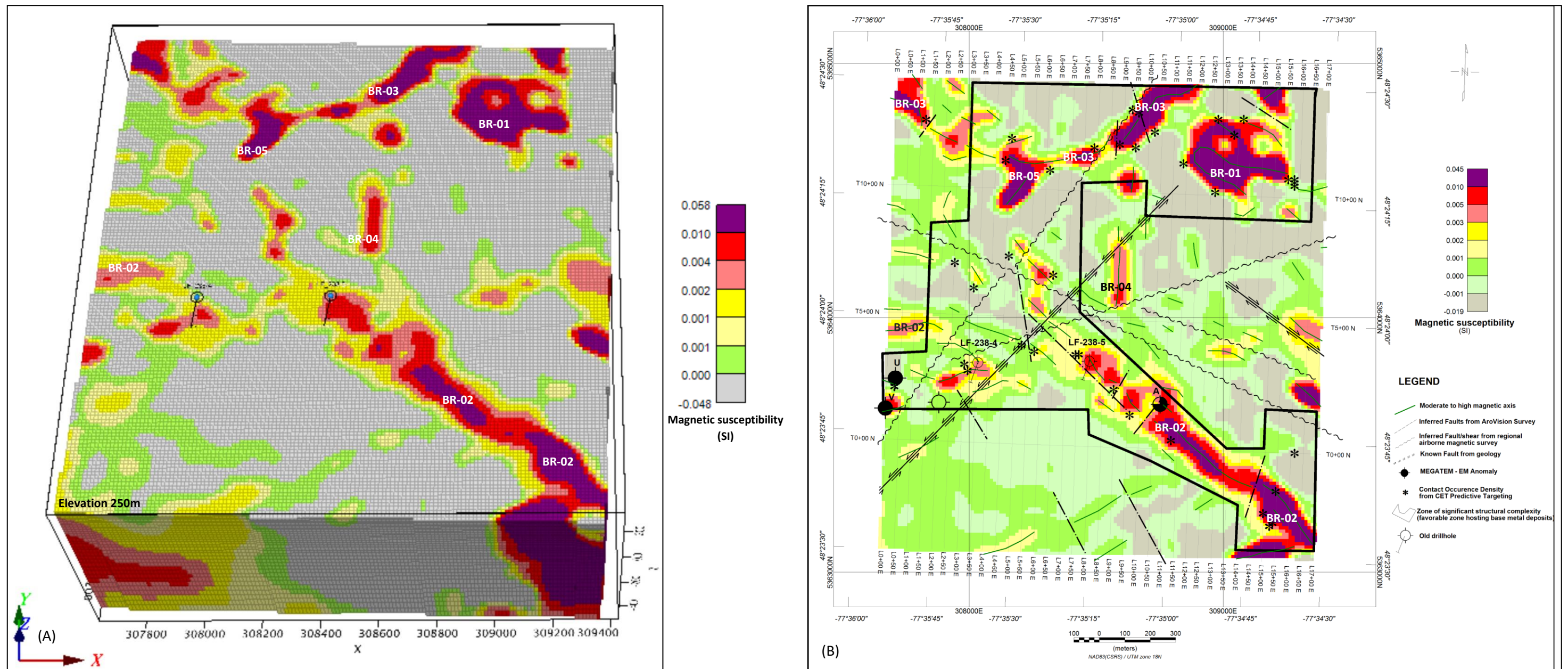


Figure 9. Subsurface magnetic susceptibility distribution plotted as 3D voxel (A) versus the geophysical interpretation map (B), Barraute property.



## APPENDIX A – PROJECT OVERVIEW

- ❑ **PROJECT ID** **Barraute Project**  
(Our reference: **23QC036B-MU**)
  
- ❑ **GENERAL LOCATION** North-east of Val-d'Or, Abitibi, Québec, Canada
  
- ❑ **CUSTOMER** **Val-d'Or Mining Corporation**  
2864 chemin Sullivan  
Val-d'Or, Québec J9P 0B9  
<https://www.valdormining.com>
  
- ❑ **REPRESENTATIVE** **Mr. Michael Rosatelli, P. Eng.**  
GM/VP Exploration  
[Michael.rosatelli@valdormining.com](mailto:Michael.rosatelli@valdormining.com)  
**Telephone:** (819) 824-2808
  
- ❑ **SURVEY TYPE** **AeroVision® (UAV-MAG) Survey**
  
- ❑ **GEOPHYSICAL OBJECTIVES** To improve the geological understanding of the property.  
To help identify new VMS type base metal deposits.

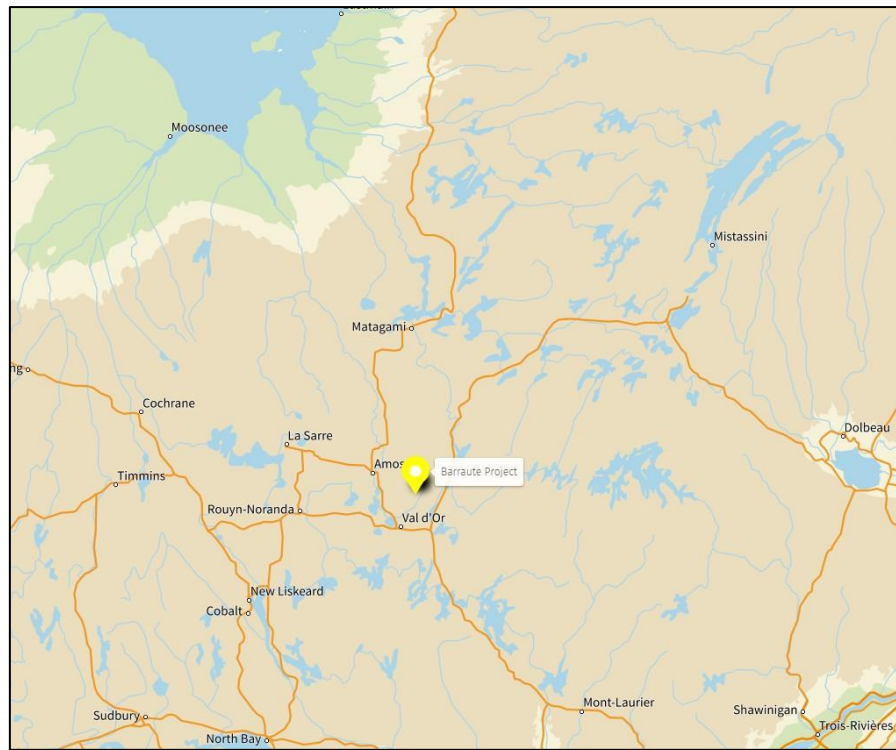


Figure 10. General location of the Barraute Project.



- LOCATION* **Fiedmont Township, Québec, Canada**  
Centred on 48°23'59" N, and 77°35'10" W  
NAD83 / UTM zone 18N, 308 584 mE, 5 364 000 mN  
NTS sheet: **32C/05**
- NEAREST SETTLEMENTS* **Barraute:** 6.5 km NW.  
**Senneterre:** approximately 28 km east.
- ACCESS* From the town of Barraute, the property is accessible via County Road 387 by driving south for about 3 km, then turning east and continuing on road 386 towards Senneterre for about 3.2 km. The survey grid can be reached by following an ATV trail for 1 km to reach its NE part.
- PHYSIOGRAPHY* The Barraute property consists of generally flat, low-lying ground with elevations ranging from 318 to 335 m. The highest areas ( $\geq 328$  m) are in the SW part of the grid, between L 0+00E and L 3+00E and TL 0+00N and TL 5+00N.  
The grid area is generally clay covered and varies from flat spruce lowland swamp to gently rolling outcrop areas, with some spruce and jack pine in the sand covered areas.>.
- CULTURAL FEATURES* No cultural features are present on the survey site.
- MINING LAND TENURE* The covered claims in the present project are wholly (100%) owned by Val-d'Or Mining Corporation. These claims are illustrated in Figure 11.
- SURVEY GRID* The AeroVision® survey consists of 35 lines (L 0+00E to L 17+00E) regularly spaced at 50 m and oriented N002°. The survey lines are 1850 m in length.  
Three tie lines (TL 0+00N to TL 10+00N) spaced every 500 m complete the survey grid.  
Refer to Figure 11 for a plan view of the zone covered by the present survey.
- COORDINATE SYSTEM* Local datum: NAD83  
Projection type: Universal Transverse Mercator (UTM)  
Zone: 18N

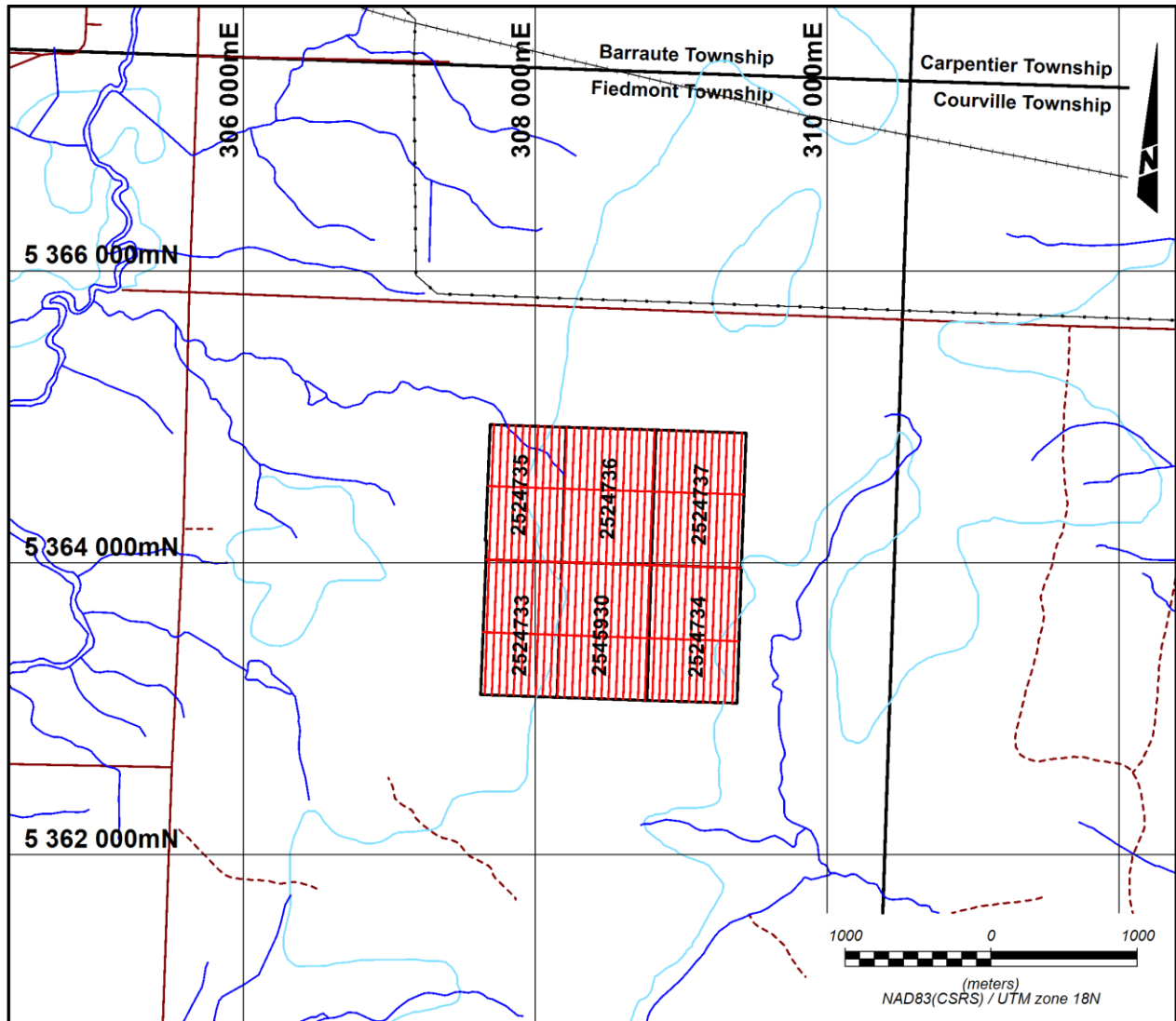


Figure 11. Index of claims and AeroVision® flight coverage within the Barraute Project.



## APPENDIX B – TECHNICAL SPECIFICATIONS

- ❑ *TYPE OF SURVEY* Measurement of the total magnetic intensity (TMI) with RTK-GPS readings recorded every 0.1 second (10 Hz sample rate) using an unmanned aerial vehicle (UAV). The plotted total magnetic values were corrected for diurnal variations using readings taken every 3 seconds by a synchronized local base station.
  
- ❑ *DATA ACQUISITION* August 25<sup>th</sup>, 2023.
  
- ❑ *SURVEY COVERAGE* **70.1 km**



Figure 12. Devbriio UAV-Multicopter with CS-VL magnetometer.



□ TECHNICAL SPECIFICATIONS

**Multicopter DJI M 600 UAV platform equipped with collision avoidance system.**

- Diagonal Wheelbase 1133 mm
- Dimensions 1668 x 1518 x 727 mm
- Weight 9.1 kg
- Max Takeoff Weight 15.5 kg
- Hovering Accuracy (P-GPS) Vertical  $\pm 0.5$  m, Horiz.  $\pm 1.5$  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 65 km/h / (40 mph), no wind
- Max Service Ceiling ASL 2500 m
- Hovering Time No payload: 38 mn, 5.5 kg payload: 18 mn
- Flight Control System A3 Pro
- Nacelles DJI compatibles Ronin-MX, ZENMUSE™ Z30, Zenmuse X5/X5R, Zenmuse X3,
- Operating Temperature -10 à 40 °C (14 à 104 °F)

**- Remote Controller:**

- Operating Frequency 920,6 MHz to 928 MHz (Japon); 5,725 GHz to 5,825 GHz; 2,400 GHz to 2,483 GHz
- Max Transmission Distance FCC Compliant: 5 km (3,1 miles); CE compliant: 3,5 km (2,2 miles) (Unobstructed, free of interference)
- Transmitter Power (EIRP) 10 dBm @ 900 M, 13 dBm @ 5,8 G, 20 dBm @ 2,4 G
- Video Output Port HDMI, SDI, USB
- Operating Temperature 10 à 40 °C (14 à 104 °F)
- Battery 6000 mAh LiPo 2S

**- Standard Battery (Model TB48S):**

- Capacity 5700 mAh
- Voltage 22.8 V
- Battery Type LiPo 6S
- Energy 129.96 Wh
- Net Weight 680 g
- Max Charging Power 180 W



ROVER MAGNETOMETER

**CS-VL from Scintrex,**

Sensor: Self-oscillation split-beam Cesium Vapor  
(non-radioactive Cs-133)

Resolution:	0,001 nT
Sensitivity:	0.0006 nT @ 1Hz
Operating zones:	15° à 75° & 105° à 165°
Noise envelope:	Typically 0.002 nT P-P
Absolute accuracy:	< 2.5 nT
Sampling rate:	0.1 sec (10 Hz)
Gradient tolerance:	> 40 000 nT/m
Operating range:	15 000 – 100 000 nT
Heading error:	± 0,2 nT
Weight:	890 g (3 m cable)



Figure 13. CS-VL magnetometer.

BASE STATION  
MAGNETOMETER

**GSM-19W from GEM Systems**

Sampling rate:	3 seconds
Reference Field:	54 900 nT
Location (Long., Lat./ WGS 84):	77.5948 W, 48.3983 N

COLLISION AVOIDANCE  
SYSTEM

**Devbriio ANCAS**

Collision avoidance rate:	50 Hz
Obstacle detection:	Up to 70 m



☐ *GPS NAVIGATION SYSTEM*

**ZED-F9P module**

**u-blox F9 high precision GNSS module / Dual Frequency**

- Concurrent reception of GPS, GLONASS, Galileo and BeiDou
- Multi-band RTK with fast convergence times and reliable performance
- High update rate for highly dynamic applications
- Centimeter accuracy in a small and energy efficient module
- Easy integration of RTK for fast time-to-market

☐ *SURVEY SPECIFICATIONS*

- Nominal survey speed: 12 m/s
- Average terrain clearance: 24 m (AGL)
- Flight direction: N 002° / N 182°
- Traverse line interval: 50 m
- Tie lines: N 092° / N 272°
- Tie line interval: 500 m

☐ *PERSONNEL*

Simon Boivin	Field Crew Manager
Stéphane Gauthier	UAV System Operator
Carole Picard, Tech.	Plotting
Madjid Chemam, P.Geo.	Processing and Report
Catherine Phaneuf P.Geo.	Final validation of product Conformity

☐ *DATA QUALITY CONTROLS*

**Before the survey:**

- ✓ All magnetometers were successfully field-tested and automatically synchronized with GPS time.
- ✓ The pilot uploaded the flight plan to the AutoCopter via a laptop computer and ensured no errors in the GPS waypoints.
- ✓ The pilot estimated the number of lines to survey before switching to the manual mode to return the AutoCopter to the field base operation to change the batteries.

**During data acquisition:**

- ✓ The QA/QC geophysicist had to successfully test for any magnetic contamination before each take-off.
- ✓ Clover leaf tests maintained a standard deviation within 1 nT across eight intersections.
- ✓ The QA/QC geophysicist reviewed the quality of the recorded data every time the AutoCopter returned to the base of operations.
- ✓ The QA/QC geophysicist ensured no active geomagnetic activity would be encountered during the survey by visiting the Space Weather Canada website:  
([www.spaceweather.gc.ca/forecast-previousion](http://www.spaceweather.gc.ca/forecast-previousion)).



□ *DATA QUALITY CONTROLS  
(CONTINUED)*

**At the Base of Operations:**

- ✓ Field QCs were inspected & validated.
- ✓ The data set was viewed on a line-by-line basis to check for errors (spikes) using a profile editor.
- ✓ The short-missed sections in the raw data were filled in by interpolation.
- ✓ A diurnal correction was applied.
- ✓ The magnetic data was conventionally levelled using:
  - Statistical levelling: this operation levels the tie lines to the flight lines of tie lines.
  - Full levelling: this operation levels the flight lines to the ties.



## APPENDIX C – DELIVERABLES

- ❑ *TOTAL FIELD CONTOURS*

The total magnetic field (TMF) was gridded using the Multi Trend Gridding (MTG) algorithm with grid cell size starting from 6 m to 12.5 m. One pass of a 3 x 3 Hanning filter was applied to the resulting grid to improve the overall appearance of the final map (1.2).

The Oasis Montaj colour table (clra64.tbl) was used with linear intervals of 10 nT from 54 900 nT to 55 450 nT.
  
- ❑ *CALCULATED FIRST VERTICAL DERIVATIVE CONTOURS*

Using a convolution filter method, the first vertical derivative (vertical gradient) of the total magnetic field was calculated to enhance the high frequency component of the magnetic data and eliminate long wavelength regional effects. This high frequency enhancement resolves the contacts of magnetic features more accurately than the total field response (map 1.4)

The Oasis Montaj colour table (clra64.tbl) was used with linear intervals of 0.2 nT/m from -3.8 nT/m to +3.8 nT/m.
  
- ❑ *RESIDUAL ANOMALY CONTOURS*

The regional magnetic component was obtained from the 1<sup>st</sup> order polynomial trend. The residual anomaly was then generated straightforwardly by subtracting the regional field from the total magnetic values (map 1.5).

The Oasis Montaj color table (Clra64.tbl) was used with linear intervals of 10 nT from -100 nT to +300 nT.
  
- ❑ *MAPS PRODUCED*

A plot of 4 geophysical maps were produced (as described in Table 1) at a scale of 1:5000.

All plan maps are registered to the NAD83 / UTM zone 18N grid coordinate system, as collected in the field.

Our Quality System requires that at least two qualified persons inspect every final map before being approved and included in a final report.
  
- ❑ *DIGITAL DATA*

The above-described maps are delivered in the Oasis Montaj map file format and many others.

The digital delivery package also includes a copy of all survey acquisition data (ASCII text format) and processed data (Geosoft Montaj databases).



**Table 1. Maps Produced**

<b>Map number</b>	<b>AeroVision® (Drone-MAG) Survey</b>	<b>Scale</b>
<b>Barraute Project</b>		
1.2	Total Field Contours (nT)	1:5000
1.4	Calculated First Vertical Derivative Contours (nT/m)	1:5000
1.5	Residual Anomaly Contours (nT) (Removed 1 <sup>st</sup> order Polynomial)	1:5000
10.0	Geophysical Interpretation	1:5000