Ontario

We are committed to providing accessible customer service.
If you need accessible formats or communications supports, please contact us.

Nous tenons à améliorer l’accessibilité des services à la clientèle.
Si vous avez besoin de formats accessibles ou d’aide à la communication, veuillez nous contacter.

REPORT ON AIRBORNE UAV MAG GEOPHYSICAL SURVEY ON THE BUTT TOWNSHIP PROPERTY

BUTT TOWNSHIP

DISTRICT OF NIPISSING

ONTARIO

FOR

GRIFTCO CORPORATION

Kelly Malcolm, P.Geo.

June 6th, 2021

Generic Geo Inc.

Contents

SUMMARY 3
INTRODUCTION 3
RELIANCE ON OTHER EXPERTS 4
PROPERTY DESCRIPTION AND LOCATION 4
ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY 8
HISTORY 11
Historical Exploration and Development Activities 11
Recent Exploration Activities 15
GEOLOGICAL SETTING AND MINERALIZATION 17
REGIONAL GEOLOGY 17
PROPERTY GEOLOGY AND MINERALIZATION 18
DEPOSIT TYPES 19
ADJACENT PROPERTIES 21
EXPLORATION WORK COMPLETED FOR THIS REPORT 21
Survey Specifications and Procedures 21
Instrumentation and Software 22
Data Processing and Presentation 22
Coordinate System 22
Magnetic Maps 23
Database Channel Descriptions 23
Interpretations 23
OTHER RELEVANT DATA AND INFORMATION 24
RECOMMENDATIONS and future plans 24
CONCLUSIONS 25
REFERENCES 25
SIGNATURE PAGE 27
APPENDIX A – LOGISTICS REPORT 28

LIST OF FIGURES

Figure 1: Location of Mag Survey Grid and Butt Township Property with respect to Hunstville, ON. 8
Figure 2: Butt Township Property Outline, Physiography, and Infrastructure. Also shown is the location of the Kearney Graphite Mine and related infrastructure. 10
Figure 3: Butt Township Property claims underlain by translucent TMI from the drone magnetic survey. 11
Figure 4: MDI Mineral Occurrences Overlaying Analytical Signal (AS) Magnetics on Butt Township Property 24

SUMMARY

This assessment report discusses a high-resolution airborne drone/UAV magnetometer survey flow over the entirety of the Butt Township property from April 17th to May 2nd, 2021. A total of 850.596 line kilometers of magnetic data was collected at an elevation of approximately 45 metres above ground level and line spacing of 25 to 50 metres. The work was completed by Pioneer Exploration Consultants Ltd. of Saskatchewan for Gritfto Corporation of Toronto. The survey was successful in identifying inferred structures trending approximately 070 degrees that correlate well with historical mineral occurrences, as well as an indication at highly magnetic units also correlate well with known mineral occurrences of uranium, thorium, and rare earth elements.

INTRODUCTION

The writer was hired by Griftco Corporation to complete an assessment report detailing the logistics, data acquisition, and results of a high-resolution airborne drone/UAV magnetometer survey on the Property.

Griftco Corporation wholly owns the mineral exploration rights for 88 mineral exploration claims comprising the Property and covering approximately 1,961 ha in Butt township, District of Nipissing, Ontario at 79º-5.8'W longitude, 45º-42.5'N latitude (Figure 1). The Property was acquired for its potential to host graphite and uranium, REE, niobium (columbium) and tantalum mineralization hosted in pegmatite dykes. The Property lies south of and adjacent to the graphite property of Ontario Graphite Limited.

The writer is the principal of Generic Geo Inc. (Generic Geo Inc.) This report is based on information provided by the Company, publicly available information as well as a visit to the Property by the writer with the most recent being in June of 2019.

Metric units and Canadian dollars are used throughout this report unless otherwise stipulated. Uranium analytical results are reported as percent uranium oxide, U_3O_8. The percentage of graphite/carbon determined by chemical analyses is reported as % C (g) throughout the report.

The Property is of interest for its potential to host graphite, uranium, REE, niobium (columbium) and tantalum-bearing minerals of economic interest as indicated by historical works including trenching and minor bulk sampling.

The report discusses historical exploration work as well as the data collected during the aeromagnetic drone/UAV survey.

RELIANCE ON OTHER EXPERTS

This report was prepared by the writer for Griftco Corporation and the information, conclusions, opinions and estimates contained herein are based on;

- much of the background information for this assessment report, including historical exploration, regional geology, local geology, neighbouring properties, and accessibility & infrastructure has been derived (often verbatim) from a draft 43-101 report written on the Butt Township Property in 2013 by L.D.S. Winter, P.Geo.,
- information available to the writer at the time of preparation of this report provided by the Company or that is in the public domain,
- assumptions, conditions and qualifications as set forth in this report,
- data and reports supplied by the client and available from the public domain and,
- property information available from the public website of the Ontario Ministry of Northern Development Mines and Forestry.

PROPERTY DESCRIPTION AND LOCATION

The Property is comprised of 88 unpatented contiguous mineral exploration claims covering 1,961 ha as listed in Table 1 and as illustrated in Figures 1, 2, and 3. The Property is located within the Butt township claim map area (M-0064). The claims are held in the name of Griftco Corporation.

The Property is located approximately 50 km north-northeast of Huntsville, Ontario at 79º-5.8'W longitude, 45º-42.5'N latitude and centred at UTM, NAD 83, Zone 17 co-ordinates 650000mE; 5062500mN (Figures 1 & 2).

Table 1: Schedule of Claims for the Butt Township Property

Claim#	Issue Date	Anniversary Date	Owner Client#	Due Date
100314	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
100315	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
100654	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
115793	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
115886	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
115943	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
116953	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
126261	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
127692	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
140555	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
142728	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
142773	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
143381	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
144815	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
155547	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
156915	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
171467	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
172135	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
172136	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
212711	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
222854	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
230212	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
240889	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
258856	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
268143	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
275401	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
275402	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
286930	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
287568	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
296038	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
296237	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
308549	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
311398	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
323480	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
325533	2018-04-10	2021-06-12	(10001207) Griftco Corporation	2021-06-12
533886	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26

533887	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533888	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533889	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533890	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533891	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533892	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533893	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533894	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533895	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533896	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533897	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533898	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533899	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533900	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533901	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533902	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533903	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533904	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533905	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533906	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533907	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533908	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533909	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533910	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533911	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533912	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
533913	2018-10-26	2021-10-26	(10001207) Griftco Corporation	2021-10-26
587540	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587541	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587542	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587543	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587544	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587545	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587546	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587547	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587548	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587549	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587550	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587551	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587552	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587553	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587554	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587555	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07

587556	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587557	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587558	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587559	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587560	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587561	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587564	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07
587615	2020-05-07	2022-05-07	(10001207) Griftco Corporation	2022-05-07

Under an agreement dated January 8, 2010, between Griftco Corporation and Dan Patrie Exploration Ltd., Griftco Corporation purchased the Property for consideration of $40,000, 100,000 common shares in the capital of Griftco Corporation and a 3% net smelter return royalty (the “NSR”) over the Property.

To the best of the Author’s knowledge, there are no mine workings, tailing ponds or waste rock piles on the Property. There are no recognized important natural features or improvements within the Property boundaries.

There is a total NSR on the Property of 3% payable to Dan Patrie Exploration Ltd. Apart from this NSR, there are no known additional royalties, back-in rights, payments or other agreements to which the Property is subject.

There are no recognized environmental liabilities to which the Property is subject.

None of the work carried out for this assessment report required permits.

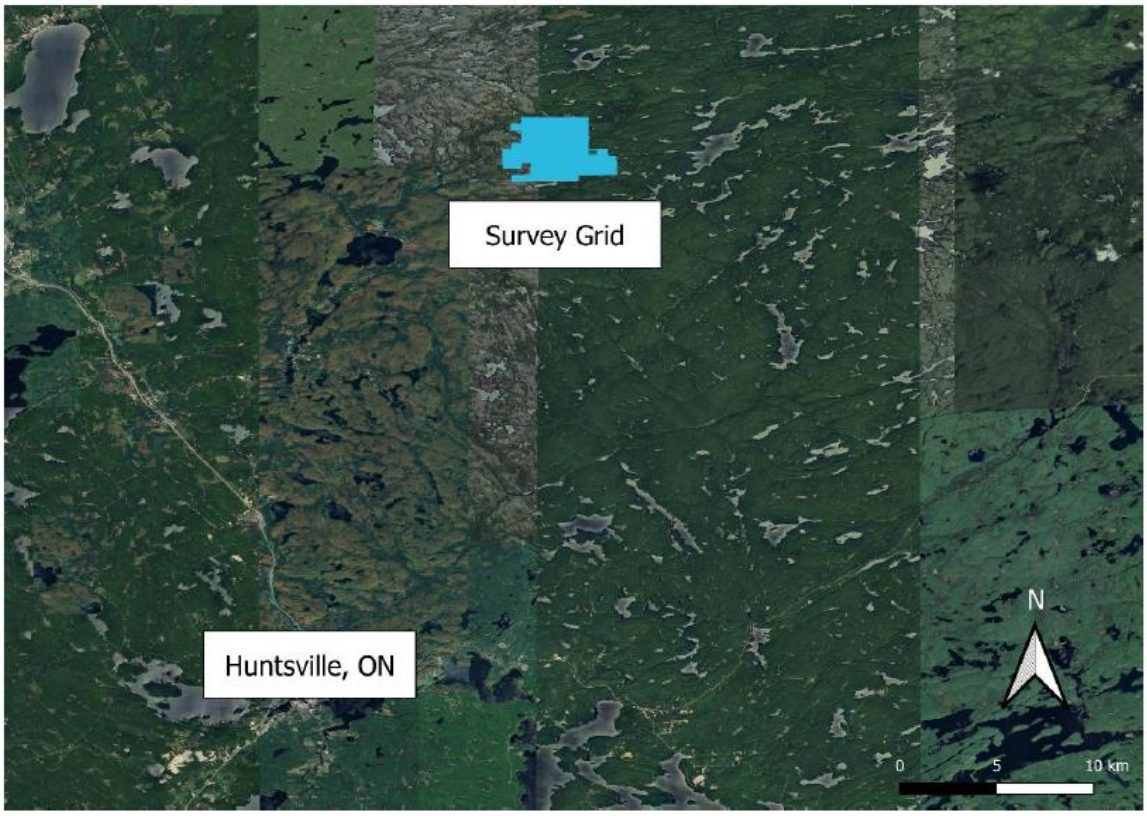


Figure 1: Location of Mag Survey Grid and Butt Township Property with respect to Hunstville, ON.

ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Access to the Property is by road from Provincial Highway #11 at Elmsdale, Ontario about 25 km north of Huntsville. Huntsville is approximately 200 km by road north of Toronto. From Elmsdale, Provincial Highway 518 leads east to Kearney (10 km) then the road continues north from here an additional 10 km to Sand Lake. From Sand Lake to the Property is about 12 km on the Forestry Tower Road. A number of logging roads provide good access to all sections of the Property (Figure 2).

Algonquin Park is immediately east of the Property and the Ontario Graphite Limited property is immediately to the north (Figure 2).

The local community of Kearney is approximately 22 km to the southwest of the Property and Huntsville is 35 km by road to the south. Huntsville can provide meals, accommodation and general services for any exploration work in the area.

The Property area has a cool continental climate with an average annual precipitation in the order of 1200 mm per year of which 25% falls as snow and with the annual temperatures being in the range from -16^{o}C to +25^{o}C. Snow accumulations are generally present for a 5 to 6 month period between November and April. In general, the climatic conditions permit exploration work to be carried out at all times of the year. In some cases, the winter season is more preferable for carrying out geophysical and drilling work in that it provides access to normally swampy areas.

The Property area is typical of Southern Ontario's Precambrian Shield terrain with the general topography being controlled by underlying bedrock ridges which in part are soil covered. Smaller areas may be cultivated while the remaining area is generally forest covered. Throughout the area, the soil is of a poor quality and only in small areas supports minor agriculture which is largely devoted to grazing of livestock.

For the most part, the Property is covered with second growth hard wood with some conifers and some open areas of lakes and swamps.

In general, the relief in the area is quite rugged and may be up to 50 metres. The overburden which is largely glacial till and glacial outwash deposits is relatively thin and would appear to average in the order of 1 metre to 5 metres deep. Swampy areas and lakes generally occupy the low-lying areas between the forested rocky ridges.

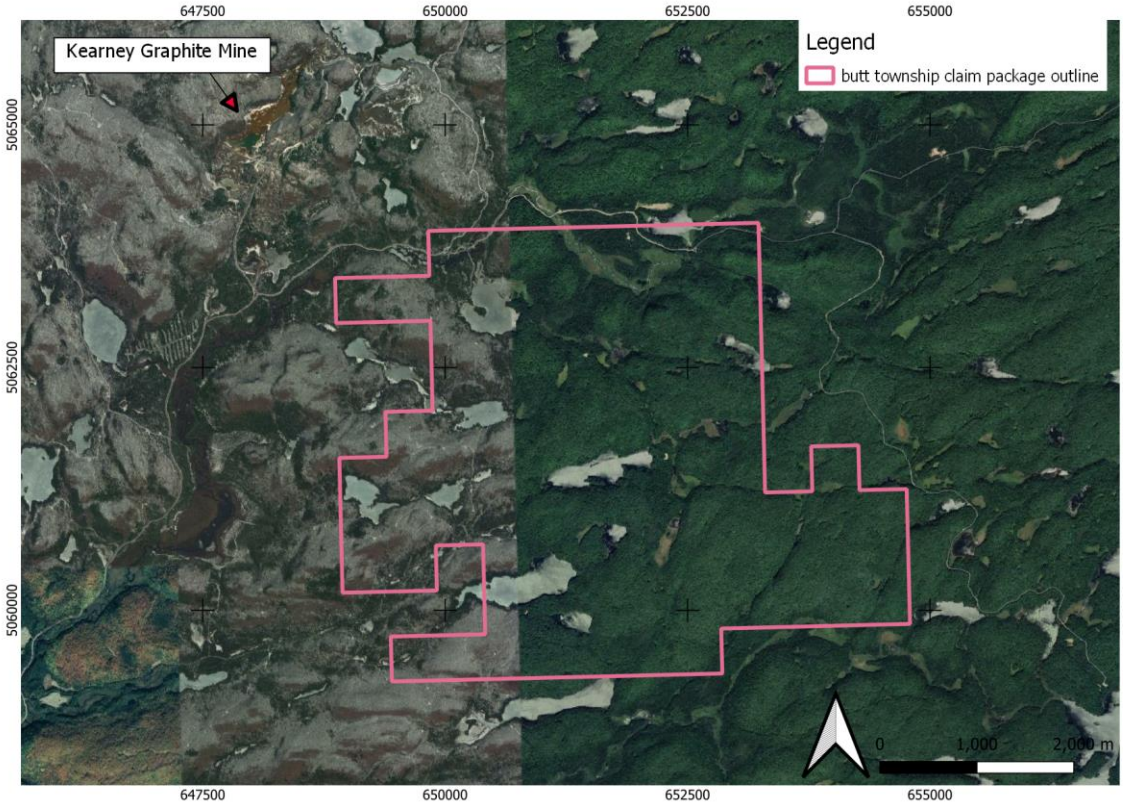


Figure 2: Butt Township Property Outline, Physiography, and Infrastructure. Also shown is the location of the Kearney Graphite Mine and related infrastructure.

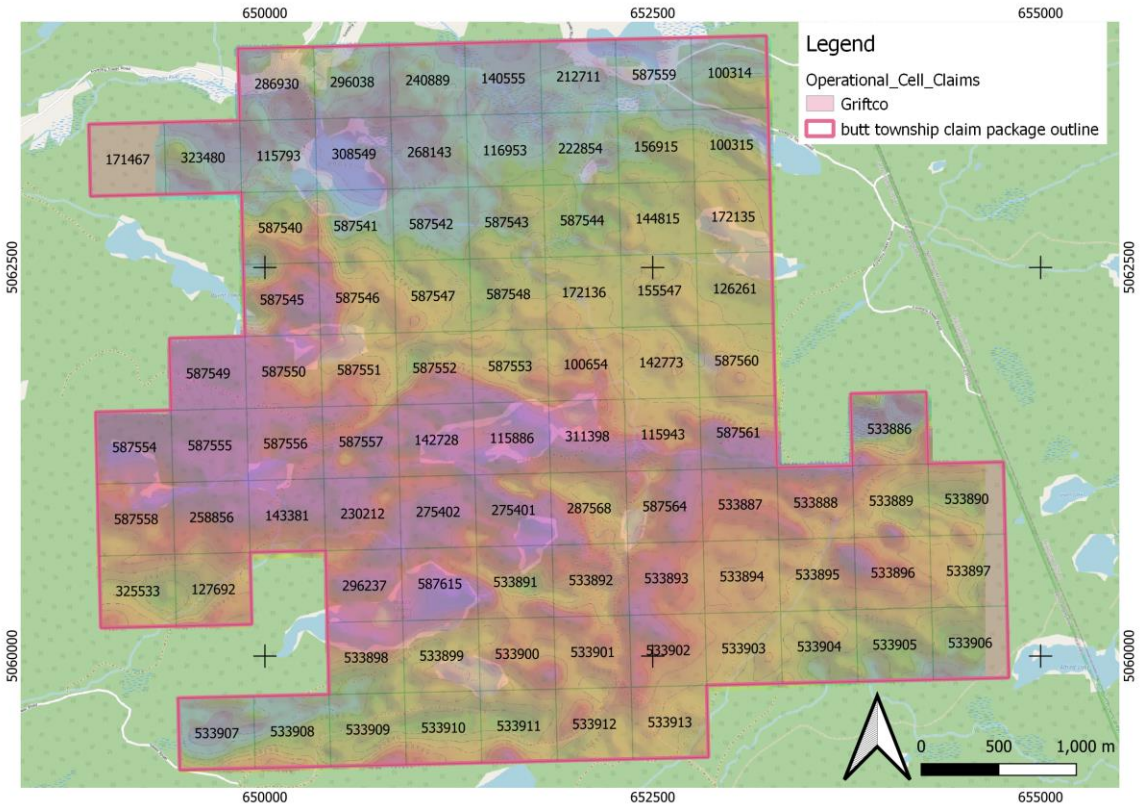


Figure 3: Butt Township Property claims underlain by translucent TMI from the drone magnetic survey.

HISTORY

Historical Exploration and Development Activities

The Property was acquired for its potential to host graphite and uranium and rare earth element (REE), niobium (columbium) and tantalum mineralization associated with pegmatite dykes as initially reported by Ellsworth (1921) and Knight (1919).

The original discovery of radioactive minerals in Butt Township (Elliott occurrence) was made in 1918 during surface mining for sheet mica. The occurrence is exposed on the shore of a small lake, Mica Lake, in the south half of Lot 13, Con. VII and is described in some detail by both Ellsworth (1921) and Knight (1919).

Knight (1919) reports the following determinations of uranium oxide for radioactive specimen material taken from the Elliott occurrence – Specimen #1 –

radioactive mineral (uraninite or pitchblende) – 74.98% uranium oxide. Specimen #2 – feldspar host-rock – 0.42% uranium oxide.

Ellsworth (1921) examined freshly exposed strippings and pits in 1920 and noted that the dyke material consisted of 75% red spar with quartz, the former containing "nuggets of radioactive minerals up to 1 inch (2.5 cm) diameter and probably of complex type". Needle-like crystals of allanite, commonly ½" (1.25 cm) to 1" (2.5 cm) in length, were readily discernible and Ellsworth mentions the occurrence of abundant lath-shaped allanite crystals up to 10" (25 cm) in length in one pit on lot 2.

Ellsworth also reported that analysis of the coarsely crystalline allanite gave up to 3% uranium oxide. He also reported "grab samples of deep red spar from the dyke on lots 2 and 3", #1, 0.26%; #2, 0.37%; #3, 0.45% U_3O_8 (the latter across a 3' (0.9 m) width in a pit on lot 3.

No determination for niobium (columbium)-tantalum content was made pending collection of freshly blasted, unweathered material.

Two showings of mineralized pegmatitic dyke were reported in lots 6 and 7. Although the exposures are some 1500 feet (457 m) apart, their respective positions are approximately on a common line of strike at about N80^{o}E and thus may indicate a single dyke or two closely parallel occurrences. The showings lie about 1200 m due east of the most easterly outcropping of a dyke to the west, but no direct structural relationship can be inferred.

The eastern showing lies in the creek valley adjacent to a trail and just below a narrow rock-walled defile extending westerly from Pine Lake (Figure 4). A northerly trending diabase dyke, 30' (9 m) to 40' (12.2 m) in width, is exposed on either side of the gorge.

The westerly occurrence, locally termed the "Blue Devil" showing and consisting of a sizable pit sunk on the dip of the dyke (30^{o}N) indicates a highly quartose vein-dyke, carrying apparent local narrow bands of nearly massive sulphides comprising pyrite, pyrrhotite and a trace of chalcopyrite. No nickel was detected. The footwall side of the occurrence is highly radioactive and it was reported that a bulk sample from this portion of the pit yielded about 3% uranium oxide by analysis.

In the north half of lot 10, Con. VI, in the eastern part of the Property, there are a number of narrow pegmatite dykes from 1" (2.5 cm) to 2" (5 cm) in width containing allanite crystals which are designated by Ellsworth (1921) as the Watson location.

In the north half of lot 10, Con. VII, narrow dykes of pegmatite from 1½" (3.8 cm) to 2" (5 cm) in width are reported exposed over short distances, along which scattered radioactive minerals up to ¼" (0.6 cm) diameter are observable. In the south half of lot 11, Con. VII, Ellsworth (1921) describes a pegmatite dyke 8" (20 cm) to 10" (25 cm) in width, exposed for a length of 709' (216 m) trending nearly due north. He noted radioactivity and small brownish crystals believed to be allanite. These showings are reported by Ellsworth under the heading "A.E. Trafford Claim".

On the north half of lot 13, Con. VII, a pegmatite dyke is said to be exposed for a length of 350' (106.7 m) having an average width of 8" (20 cm). Indications of radioactivity and typical red-alteration colours are mentioned by Ellsworth, but apparently no radioactive minerals were identified. This occurrence appears to strike in a northerly direction.

In a letter dated 19 October 1953, a Mr. Fockler (Fockler, 1953) reports on the discovery of radioactive niobium (columbium) – tantalum – uranium-bearing minerals in Lot 5, Concession IX, Butt Township. The showing was within a group of 27 claims referred to as the Yankee Dam group. The showing is exposed in a waterfall in the Magnetawan River in the northern part of the Property. Fockler describes the showing and samples as follows.

"The immediate locality surrounding the showing is underlain by granitic and mica gneisses of the Pre-Huronian complex. The rocks have a Grenville-like appearance and presumably are, in part, paragneissic in origin. Northeasterly-trending pegmatite dykes frequently occur with regular vein-like attitude in this locality.

The occurrence reported was discovered by E.J. Rivers through Geiger reconnaissance work conducted in late July 1953. A non-magnetic dark vitreous radioactive mineral was detected in freshly-blasted pegmatitic dyke-rock outcropping as a shelf in the river-bed during a period of low water. Similar material was obtained in a pegmatite exposure along the south bank of the stream, well above water level.

Overall dimensions of the showings are approximately 140 feet (42.7 m) along the stream-bed by 40 feet (12.2 m) from bank to bank. Exposed vertical thickness of the pegmatite host rock is approximately 30 feet (9.2 m). The attitude of the dyke was not determined, however, it was considered to trend approximately east-west with a low dip to the north. The mineral-bearing portion of the dyke appeared to be flat-lying and to represent a sill-like mass resting on granite gneiss and overlain by mica gneiss. The feeder dyke may have a much steeper dip as evidenced by an associated vertical-

dipping narrow dyke which appears to branch northeasterly from the river bed exposure. The dyke exposure lies approximately 500 feet (152 m) westerly down-stream from the so-called Yankee Dam.

A small specimen of the mineral was submitted to Dr. D.H. Gorman, Department of Mineralogy, University of Toronto, for analysis. In his report, dated August 5, 1953 Dr. Gorman recommended that the specimen material be assayed chemically. A chemical assay made by Heys & Sons, Toronto, August 13, 1953 of the specimen material (approximately ¾" square) yielded the following results:

Uranium oxide	9.75%
Tantalum pentoxide	0.09%
Columbium pentoxide	30.79%

Subsequently, Fockler examined the occurrence with Rivers and obtained approximately 60 pounds of sample and specimen material for further investigation. A portion of this material, comprising 2 samples totalling approximately 30 pounds in weight, was submitted to Heys & Sons for analysis. Neither sample showed any uranium values and only trace amounts of niobium (columbium) and tantalum".

Dr. D.J. Gorman, mineralogist, identified the black, glossy, radioactive mineral as pyrochlore-microlite, a complex niobium (columbium) – tantalum oxide that may contain uranium and rare earth elements (REE).

Fockler (1955) describes the Property as being underlain by granite gneiss and paragneiss which are cut by numerous east-west trending north-dipping pegmatite and basic dykes ranging up to thirty or more feet (9 m) in thickness and possessing remarkable uniformity, both in attitude and composition.

Associated with the pegmatitic dyke-rocks are the various known occurrences of radioactive minerals, comprising uraninite, niobium (columbium)-tantalum bearing pyrochlore-microlite, allanite, ellsworthite and associated hematite, magnetite, limonite and sphene. The pegmatites are characteristically intergrowths of coarsely-crystalline pink or red feldspar, white to dark smoky quartz and aggregations of biotite mica. Highly radioactive dyke material invariably exhibits bright red alternation through which the radioactive minerals are interspersed as granules or as clusters of black crystals, some of which attain considerable size.

A radioactive pegmatite dyke of considerable regularity in both strike and thickness traverses the southwestern portion of the Property for a known length of 2200 feet (722 m). The showings lie in lots 2 and 3, Con. VI, Butt Twp. (Figure 4). Where

observed, the dyke cuts bands of mica gneiss and ranges from 5 feet (1.5 m) to 15 feet (4.6 m) in thickness, with an average width of approximately 10 feet (3 m). Low ground covers probable extensions of this occurrence both easterly and westerly beyond the distance traced by outcroppings of the dyke. Of the traceable length, approximately 450 feet (137.2 m) is irregularly exposed by strippings and shallow pits put down by early investigators about 1920.

Fockler (1955) summarized his research and observations as follows. "The stakings above described appear to hold good possibilities for the occurrence of deposits of uranium-bearing ore of commercial importance. Within their group, ten separate showings of radioactive mineralization are presently known. Three of these showings have yielded highly significant values in uranium oxide, as stated in an official report of the Ontario Department of Mines. In as much as no diamond drilling has been undertaken on the showings described, the potentialities of the uranium-bearing dykes, while unknown, are considered to be promising".

To the best of the writer's knowledge, no significant work has been carried out on the showings reported by Fockler (1955) to the present time and it is considered that Fockler's conclusions are still appropriate and valid.

No exploration work directed to the evaluation of the uranium, REE, niobium (columbium) and tantalum-bearing pegmatite dykes has been carried out in recent years.

Recent Exploration Activities

Dan Patrie Exploration Ltd. carried out an initial magnetometer survey using compass and GPS lines in January 2009 (Winter, 2009).

Three follow-up geophysical surveys were also carried out by Dan Patrie Exploration Ltd. on the Property as follows;

- April 2010 (Winter 2010, a); 27 line-km of line cutting, 27 line-km of total field magnetometer survey and 17 line-km of pole-dipole induced polarization (IP) survey with an "a-spacing" of 25 m and n = 1 to 6. The lines surveyed were 17+00E to 25+00E (Figure 5). The A Grid.
- July 2010 (Winter, 2010, b); 6.3 line-km of pole-dipole IP survey with an "a-spacing" of 25 m and n = 1 to 6. The lines surveyed were parts of lines 15+00E to 18+00E and line 21+00E (Figure 5). The A Grid.

- December 2011 (Winter, 2012); 9.6 line-km of total field magnetometer survey and 12.5 line-km of pole-dipole IP survey with an “a-spacing” of 25 m and n = 1 to 6. The lines surveyed were lines 3+00E to 14+00E north of the baseline 30+00N (Figure 5). The B Grid.

The initial (2009) total field magnetic survey completed on the Grid (Lines 17+00E to 25+00E and 17+00N to 34+00N, Figure 5) showed that the west-central part of the Property is underlain by rock units that appear to form two magnetic domains, one to the northeast and one to the southwest. The domain to the northeast has lower magnetic values generally below 55500 nT while the domain to southwest shows magnetic values generally above 55500 nT to maximum values of about 56200 nT. The boundary between these 2 domains trends 330^{o} and divides this part of the Property (the grid) approximately in half.

The December 2011 (Winter, 2012) magnetometer survey returned similar results to the earlier survey (Winter, 2009) and within the area surveyed confirmed the presence of two magnetic domains, an area of low magnetic susceptibility to the north and an area of higher magnetic susceptibility to the south. Three general trends or patterns are indicated by the magnetic survey, northwesterly (330^{o}), northeasterly and east-west.

The three IP surveys showed two main areas of anomalous chargeability values, associated with variable resistivities as shown in Figure 5. Anomalous chargeabilities range from in the order of 2 x background to several times background.

The main underlying bedrock units on the Property are generally medium-grained quartz-feldspar-mica-amphibole gneisses, similar to those on the Ontario Graphite Limited property to the north. When the IP chargeability anomalies were originally mapped out, it was thought that they could be due to sulphides and/or graphite in the gneisses, however, on close inspection no sulphides were observed in the gneisses. By elimination, this suggested that graphite could be the mineral producing the IP chargeability response, however, no graphite was obvious in the gneisses because of the considerable mica present.

Between 15 October and 10 November 2012, prospectors employed by DPEL carried out a rock sampling program on the Property with the work being concentrated in the survey grids where the IP surveys had identified zones of anomalous chargeabilities, usually with associated moderate to high resistivities (Figure 5). The main rock type through these areas are medium grained, mainly quartz-biotite-garnet (amphibole)

gneisses. Due to the proximity of the Ontario Graphite Limited property to the north, it was considered that the chargeability anomalies could be due to disseminated graphite in the gneisses. However, due to the biotite in the gneisses it is difficult to determine visually if flake graphite is present. To evaluate this potential it was decided to carry out a prospecting and rock sampling program in the grids where the IP anomalies had been identified. Only low graphite, C (g) results were obtained with the highest values being 0.10% C (g) and the average of all samples being 0.04 C (g).

GEOLOGICAL SETTING AND MINERALIZATION

REGIONAL GEOLOGY

The Property is located within the Kiosk Domain of the Algonquin Terrain of the Central Gneiss Belt of the Western Grenville Province, Ontario (Figure 3). The central Gneiss Belt and the Central Metasedimentary Belt are the 2 major subdivisions of the Grenville Province in Ontario.

The Central Gneiss Belt consists mainly of upper amphibolite and local granulite-facies, quartzo-feldspathic gneisses chiefly of igneous origin with subordinate paragneiss. The dominant structural trend is northeasterly, however, northwesterly trends occur along Georgian Bay. The Central Gneiss Belt consists of a variety of Archean to Mesoproterozoic crustal segments, all of which have been affected by the "Grenville Orogeny". Rocks of 3 main ages are present. North of the French River, reworked Archean and Paleoproterozoic gneisses of the Nipissing Terrane are intruded by Mesoproterozoic (1700 to 1350 Ma) plutonic rocks, with granitic and monzonitic rocks predominant. The bulk of the Central Gneiss Belt (Algonquin and Tomiko terranes) consists of Mesoproterozoic gneisses (1800 to 1600 Ma) intruded by 1500 to 1400 million-year-old granitic and monzonitic plutons that may represent an extension of the Eastern Granite-Rhyolite Province across the Grenville Front. The Parry Sound Terrane consists of mafic to intermediate rocks extracted from the mantle at about 1450 to 1350 Ma.

Distinctive lithotectonic terranes, some further sub-divided into domains, have been identified within the Central Gneiss Belt. The terranes and domains are distinguished by differences in rock types, internal structure, metamorphic grade,

geologic history and locally by geophysical signature. They are bounded by zones of intensely deformed layered rocks traceable for tens of kilometres.

The Algonquin Terrane consists of quartzo-feldspathic gneisses of plutonic and supracrustal origin characterized by a complex pattern of structural domains. Thus, the Algonquin Terrane is an area of Mesoproterozoic, polycyclic rocks, consisting of a number of domains (domains and subdomains). The southern and western parts of the Algonquin Terrane have been subdivided into the Britt, Ahmic, Kiosk, Rosseau, Go Home, Huntsville, Novar, McClintock domains interpreted to represent the lowest portion of a stacked succession of thrust sheets in this region. Large folded sheets of gneissic granites with primary isotopic ages in the 1500 to 1400 million year range occur in all these domains. Rocks of this age are common in the Eastern Granite-Rhyolite Province and the Algonquin Terrane and probably represent a section of Mesoproterozoic crust (1800 to 1600 Ma) extensively injected by granitic magmas of the Eastern Granite-Rhyolite Province. (Central Gneiss Belt, Grenville Province, Part 2, Section 19, Geology of Ontario, Easton, 1992).

PROPERTY GEOLOGY AND MINERALIZATION

The Property which lies within the Kiosk domain, is underlain by mafic, quartzo-feldspathic and metapelitic units at the amphibolite to granulite grade of metamorphism, some of which are graphite-bearing as on the Ontario Graphite Limited's Property. In turn these units host radioactive pegmatite dykes which host allanite, uraninite, pyrochlore, columbite and other uranium-bearing minerals (Ferguson, 1971; Hewitt, 1967). The radioactive pegmatites occur in an east-northeast-trending structural corridor within the subject Property. The locations of the reported known radioactive/pegmatite showings (21) are summarized in Table 2.

TABLE 2
BUTT PROPERTY, RADIOACTIVE SHOWINGS
LOCATIONS; UTM CO-ORDINATES, ZONE 17, NAD 83

Showing/Site	Northing	Easting	Lot & Con.
1	5063240	648440	Lot 3, Con 9, S½
2	5063460	648720	Lot 4, Con 9, S½
3	5063720	649460	Lot 6, Con 9, S½
4	5063820	649640	Lot 6, Con 9, S½
5	5063760	650000	Lot 7, Con 9, S½
6	5064040	650380	Lot 8, Con 9, S½
7	5061040	648880	Lot 2, Con 7, S½
8	5060280	649000	Lot 1, Con 6, S½
9	5060520	649600	Lot 3, Con 6, S½
10	5060940	649800	Lot 4, Con 6, N½
11	5061740	650000	Lot 5, Con 7, S½
12	5060880	650400	Lot 5, Con 6, S½
13	5061480	651080	Lot 8, Con 6, N½
14	5062560	650740	Lot 8, Con 7, N½
15	5063000	651560	Lot 10, Con 7, N½
16	5062400	651760	Lot 10, Con 7, S½
17	5061940	651880	Lot 10, Con 6, N½
18	5062080	652300	Lot 11, Con 6, N½
19	5062520	652160	Lot 11, Con 7, S½
20	5062580	653060	Lot 13, Con 7, N½
21	5063360	652700	Lot 13, Con 7, S½

DEPOSIT TYPES

The uranium, REE, niobium (columbium) and tantalum mineralization on the Property is hosted by a set of structurally controlled pegmatite dykes trending east-northeast and dipping in the order of 30^{o} north. This type of mineralization is similar to that in the Bancroft area of Ontario approximately 115 km to the east-southeast. In Geology and Economic Minerals of Canada, (Douglas, 1970, p. 168) the Bancroft area deposits are described.

"The four production mines of the Bancroft district are in the southwestern part of Grenville Province. The Bancroft area is underlain by three fairly circular masses, called the Cheddar granite, Cardiff complex and Faraday granite; each is about 6 miles (10 km) in diameter and is composed of granite, syenite, gneisses and related rocks. They are separated by metamorphic rocks of various kinds that exhibit a concentric structure. These are mainly marble, paragneiss, para-amphibolite and meta-gabbro. The principal uranium deposits are in bodies of granite and syenite with pegmatitic and metasomatic phases that either cut the wallrocks or replace them. The most favourable rocks were pegmatitic pyroxene granite or syenite, leucogranite and cataclastic quartz-rich granite-pegmatite. All are commonly high in sodium. Many ore shoots were associated with concentrations of mafic minerals and magnetite.

The Bicroft mine is in paragneiss and amphibolite on the east flank of the Cardiff complex. Its ores were in an en echelon swarm of lenticular dykes in a zone half a mile wide (800 m) and 3½ miles (5.8 km) long. The ore minerals were uranothorite and uraninite, the ore averaging about 0.1% U_3O_8. The Faraday mine is in a belt of metagabbro and amphibolite on the south flank of the Faraday granite. The ores were parts of a zone of irregular pegmatitic granite dykes, with metasomatic phases, extending at intervals over about 6000 feet (1800 m). The ore minerals were uraninite and uranothorite, with minor uranophane; ore averaged about 0.1% U_3O_8. The Canadian Dyno mine is in a belt of paragneiss and other rocks on the east flank of the Cheddar granite. The property contains a series of pegmatitic granite dykes only some of which were of ore grade. The ore minerals were uraninite and uranothorite. The Greyhawk mine is in meta-gabbro on the south flank of the Faraday granite. Its ores were in dykes of pegmatitic granite containing uraninite and uranothorite".

In addition to the pegmatite-hosted mineralization, the Property is considered to host deep metamorphic type graphite mineralization formed as the result of the metamorphism of organic-bearing units at high temperatures and pressures typical of those in the upper amphibolite to granulite grades of metamorphism. As a result of the high temperatures and pressures during metamorphism the sediments are recrystallized and the contained organic matter is converted to crystalline flake graphite.

The units from which low values in C (g)-graphite have been obtained are recrystallized and deformed metasedimentary units. Due to the high temperatures and pressures during metamorphism, folding has resulted and may have caused thickening and thinning of the sedimentary horizons in fold hinge zones and fold limbs respectively.

As a result, fold hinge zones may represent areas in which prospecting for concentrations of graphite could be focused.

ADJACENT PROPERTIES

The Kearney Mine, privately owned by Ontario Graphite Limited, is contiguous to the north of the Property. The mine was originally constructed in 1989 and operated for a 5 year period during which time it achieved a maximum production rate of 10000 tonnes per year of flake graphite. The plant was on care and maintenance until 2007 when it was taken over by Ontario Graphite Limited. The plant and site were re-commissioned and re-opened in late 2012. The objective of Ontario Graphite is to produce approximately one million tonnes of ore per year to provide 20000 tonnes of natural, large flake, high-carbon graphite concentrate per year.

A NI 43-101 compliant report dated January 2010 reports a Measured and Indicated Resource of 43.5 million tonnes of ore grading 2.34% C (g) with an Inferred Resource of 12.3 million tonnes averaging 2.42% C (g) (ontariographite.com).

The writer has not been able to verify this information and it is not necessarily indicative of the mineralization on the Butt township property.

EXPLORATION WORK COMPLETED FOR THIS REPORT

In April and May of 2021, Pioneer Exploration Services Inc. was contracted to conduct an airborne drone/UAV magnetometer survey over the entirety of the Butt Township property in an attempt to identify a magnetic contrast between the mineralized pegmatites identified historically and the gneissic basement rocks, and to identify controls on mineralization. **A detailed logistics report is provided as appendix A of this report**.

Survey Specifications and Procedures

The aeromagnetic survey at Butt Township was flown at a nominal altitude above ground level (AGL) of 45 m, although the elevation may vary depending on the treeline. Line spacing is resolution with a spacing of 25 to 50 metres. Elevation data used to determine ground level for this survey was sourced from Google Earth. A total of 850.596 line kilometres of airborne data were collected during this survey.

Instrumentation and Software

Airborne Magnetometer

GEM System's UAV GSMP-35UC is a potassium magnetometer providing unmatched sensitivity in addition to a low heading error effect. The GSMP-35UC operates on principles similar to other alkali vapor magnetometers however benefits from the unique nuclear properties of potassium. Each GSMP-35UC system has 0.0002 nT sensitivity combined with +/- 0.1 nT absolute accuracy over its full operating range.

Sensitivity: 0.0002 nT @ 1 Hz

Resolution: 0.0001 nT

Absolute Accuracy: +/- 0.1 nT

Heading Error: + / – 0.05 nT

Dynamic Range: 15,000 to 120,000 nT

Gradient Tolerance: 50,000 nT/m

Sampling Intervals: 1, 2, 5, 10, 20 Hz

Operating Temperature: -40°C to +55°C

UAV Platform

The Matrice 600 (M600) is DJI's platform designed for professional aerial photography and industrial applications. It is built to closely integrate several innovative DJI technologies, including the A3 flight controller, Lightbridge 2 transmission system, Intelligent Batteries and Battery Management system, for maximum performance and quick setup. This flight system allows the drone to automatically adjust its positioning during flight along predetermined survey lines.

Data Processing and Presentation

Post-field data processing and presentation was carried out using GemLink, Microsoft Excel, ioGAS, and QGIS.

The magnetic sensor was quality checked in the field prior to commencement of any measurements. Magnetic data was then quality checked in the field and any non-geoferenced points or points with poor-quality data were discarded. The final raw aeromagnetic dataset is a combination of daily flight data.

Coordinate System

The geophysical results accompanying this report are positioned using the WGS 1984 datum. The survey geodetic GPS positions have been map projected using the Universal Transverse Mercator (UTM) projection. A summary of the map datum and projection specifications are as follows"

Datum – WGS 1984 UTM Zone 17T
Scale Factor – 1:18,000
Linear Unit: Meter (1)

Magnetic Maps

Final map products provided include levelled and micro-levelled 1st Vertical Derivative (1VD), 3D Analytical Signal (AS), and Total Magnetic Intensity, Reduced to Pole (TMI-RTP).

Database Channel Descriptions

All aeromagnetic data is included in comma separated value (CSV) format and provided in Appendix 1. Descriptions of each database channel can be found in Table 4 below.

Table 4: Descriptions of abbreviations found in the raw magnetic data in Appendix 1

```
hhmmss.s nT L H FR uA ampl RF-VDC V-heater V-supply sensor-temp box-temp lat lon utmE utmN alt sat zone yaw pitch roll altitude
194913.4 051460.4128 0 1 0 3.4 096 07.9 14.3 25.6 48 42  043.8559518 -079.3540940  0632278.64  4857190.49 00189 06 17T -113.468 +004.853 -006.822 00 .00
```

hhmmss.s	194913.4	UTC Time
nT	051460.4128	Total field magnetic reading in nT
L	0	Lock status. 0 – unlocked, 1 – locked
H	1	Heater status. 0 – heater off, 1 – heater on
FR	0	Field reversal control. 0 - standard, 1 - opposite
uA	3.4	Light current displayed as 3.4uA
ampl	096	Signal strength displayed typically over 100 when locked
RF-VDC	07.9	RF dc voltage for lamp
V-Heater	14.3	Heater dc voltage
V-Supply	25.6	Battery dc voltage
Sensor-temp	48	Sensor Temperature
Box-temp	42	Electronics box temperature
Lat	043.8559518	GPS Latitude
Lon	-079.3540940	GPS Longitude
utmE	0632278.64	GPS UTM Easting
utmN	4857190.49	GPS UTM Northing
alt	00189	GPS Altitude above sea level
sat	06	Number of GPS Satellites
zone	17T	UTM zone
yaw	-113.468	IMU Yaw
pitch	+004.853	IMU Pitch
roll	-006.822	IMU Roll
altitude	00.00	Laser Altimeter (m)

Interpretations

The drone magnetic survey is of excellent quality and shows minimal error and noise. Structural features and annular intrusions are readily visible in the post-processing map images. Of particular interest are structural features that occur as breaks in the magnetic grain trending 070 from North, which appear to be correlated with known mineral occurrences.

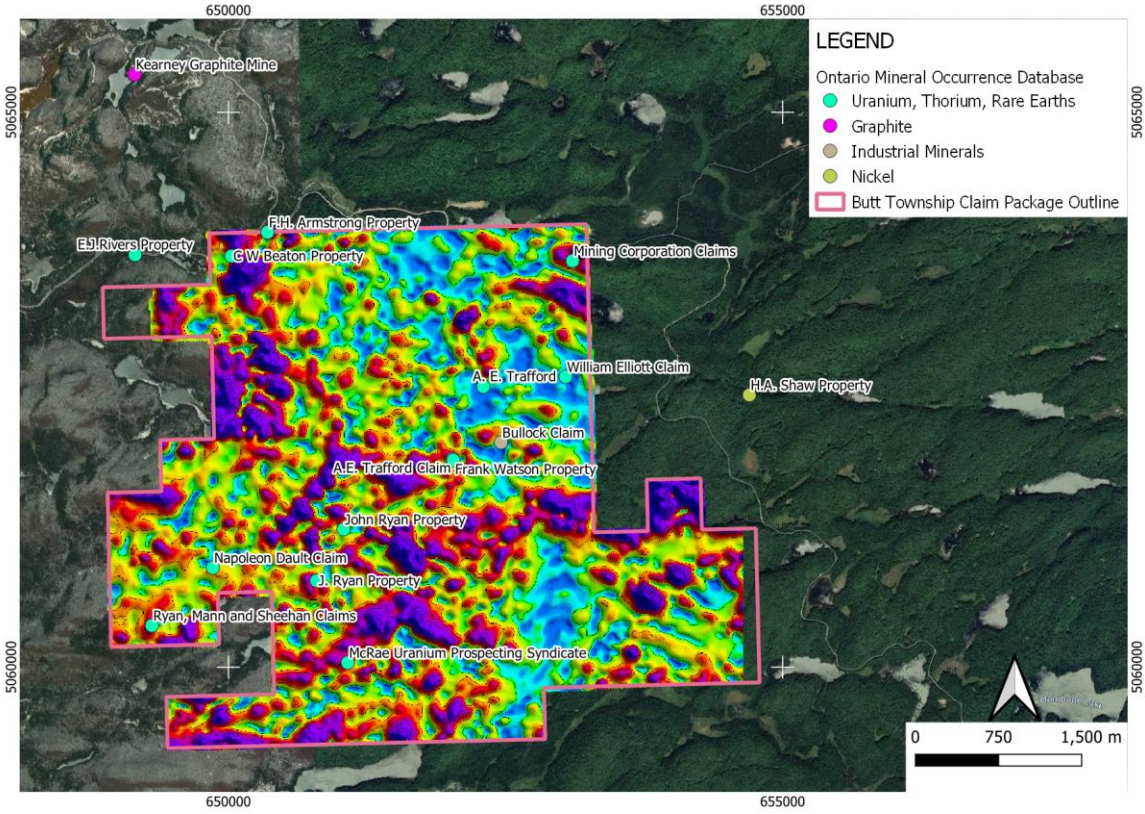


Figure 4: MDI Mineral Occurrences Overlaying Analytical Signal (AS) Magnetics on Butt Township Property

OTHER RELEVANT DATA AND INFORMATION

There is no other relevant data nor information that would make the information contained in this report misleading.

RECOMMENDATIONS AND FUTURE PLANS

Recommendations of future work include ground-based electromagnetic surveys at the northern portion of the property adjacent to the Kearney Graphite Mine project. In addition, prospecting work should be completed on the 070 from North structures to identify potential U-Th-REE-bearing pegmatites. A structural analysis of this dataset is also warranted and should aid in the prospecting program.

CONCLUSIONS

The aeromagnetic survey undertaken on the Butt Township property resulted in the acquisition of 850.596 line kilometres of high-resolution magnetic data with profile lines spaced between 25 and 50 metres apart and an above ground level altitude of ~45 metres. Using an auto-controlled drone for much of this survey resulted in minimal deviation from the planned survey lines. The documents and data submitted with this report should complement previous exploration works that were completed on the property. This magnetic dataset, combined with the upcoming remaining data, should aid in mapping and constraining potentially mineralized geological horizons of interest.

REFERENCES

1. Canadian Mines Handbook, 2011-2012
   Ontario Graphite Limited, p. 470.

2. Clark, R.G., 2008
   The In's and Out's of Nuclear Fuel, www.uranium.info, 63 p.

3. Easton, R.M., 1992
   The Grenville Province and the Proterozoic History of Southern and Central Ontario; p. 715-754, The Central Gneiss Belt, in Geology of Ontario, Part 2, MNDM.

4. Ellsworth, H.V., 1921

   Radium-bearing pegmatites of Ontario, Geol. Sur. Cda., Summary Report, Part D, p. 62-66.

5. Ferguson, S.A., 1971
   Columbium (Niobium) Deposits of Ontario, ODM, Mineral Resources Circular 14, p. 49.

6. Fockler, E.K., 1955

Report on Group of 46 Claims in Concession VI and VII, Butt Twp., District of Nipissing, Ontario, 4 p. unpublished report.

7. Hewitt, D.F., 1967
Uranium and Thorium Deposits of Southern Ontario, ODM, Mineral Resources Circular No. 4, p. 47.

8. Knight, C.W., 1919

A New Discovery of Pitchblende, Ont. Dept. Mines, Ann. Rept. Vol. 28, Pt. 1, p. 94-95.

9. Lang, A.H., Griffith, J.W. and Steacy, H. R., 1962

Canadian Deposits of Uranium and Thorium, GSC, Ec. Geol. Series. No. 16 Bancroft Area, p. 175-186 (no Butt).

10. Ontario Graphite Limited
www.ontariographite.com

11. Winter, L.D.S., 2009
Magnetometer Survey Report on the Butt Township Property, Butt Twp., Dist. of Nipissing, Ontario for Dan Patrie Exploration Ltd., 11 pages, 4 Figures, 2 Maps.

12. Winter, L.D.S., 2010 (a)
Geophysical Surveys Report on the Butt Uranium Rare Earth Property, Butt Township, Dist. of Nipissing, Ontario for Griftco Corporation, 17 pages, 5 Figures, 1 Map and 8 Pseudosections.

13. Winter, L.D.S., 2010 (b)
Geophysical Survey Report on the Butt Uranium Rare Earth Property, Butt Township, District of Nipissing, Ontario for Griftco Corporation, Addendum, 9 pages, 1 Figure, 5 Pseudosections.

14. Winter, L.D.S., 2012
Geophysical Survey Report on the Butt Township Property, Butt Township, District of Nipissing, Ontario for Dan Patrie Exploration Ltd., 17 pages, 5 Figure, 13 Pseudosections, 1 Map.

15. Winter, L.D.S., 2013
Draft Technical Report (NI 43-101) on the Butt Township Property, Butt Township, District of Nipissing, Ontario for Griftco Exploration.

SIGNATURE PAGE

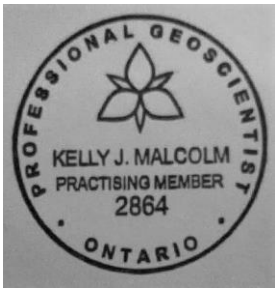
This report titled: “REPORT ON AIRBORNE UAV MAG GEOPHYSICAL SURVEY ON THE BUTT TOWNSHIP PROPERTY, BUTT TOWNSHIP, DISTRICT OF NIPISSING, ONTARIO, FOR GRIFTCO CORPORATION” and dated 6 June 2021 was prepared by and signed by the following author:

Dated at Toronto, Ontario
6 June 2021

”Kelly Malcolm, P.Geo.” (signed)
Kelly Malcolm, P.Geo.
Consulting Geologist

Generic Geo Inc.

410-1005 King St West, Toronto, ON, M6K 3M8
(647) 299-1153
email: kmalcolm@genericgeo.ca



CERTIFICATE OF AUTHOR

I, Kelly Malcolm, P. Geo. do hereby certify that:

1. I am President of a geological consulting firm headquartered in Toronto called Generic Geo Inc.;

2. I hold the following academic qualifications: h.B.Sc. (Geology) and B.A. Economics from Laurentian University, 2014.

3. I am a registered Professional Geoscientist with the Association of Professional Geoscientists of Ontario (No. 2864) and a member in good standing.

3. I have worked in the mining and exploration industry for approximately 10 years.

4. I have visited the Butt Township Property several times, most recently in June of 2020.

5. I am not aware of any material fact, or change in reported information, in connection with the subject property, not reported or considered by me, the omission of which makes this report misleading.

6. I am the author responsible for the preparation of the Assessment Report titled " REPORT ON AIRBORNE UAV MAG GEOPHYSICAL SURVEY ON THE BUTT TOWNSHIP PROPERTY, BUTT TOWNSHIP, DISTRICT OF NIPISSING, ONTARIO, FOR, GRIFTCO CORPORATION " and dated 6 June 2021.

APPENDIX A – LOGISTICS REPORT

Generic Geo Inc.

UAV Aeromagnetic Survey
Logistics Report

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Table of Contents

Introduction 1

Location 1

Survey Specifications and Procedures 2

Instrumentation and Software 3

Magnetic Base Station 3

Unmanned Aerial Vehicle – Matrice 600 3

UAV Aeromagnetic Configuration 4

Data Deliverables and Channel Descriptions 5

Magnetic Maps and Derived Data Products 5

Total Magnetic Field 5

First Vertical Derivative 6

3D Analytic Signal 6

Data Processing 7

Data Comments 9

List of Figures

Figure 1: The completed UAV aeromagnetic survey lines are illustrated in blue over the project area in relation to nearby town. 2

List of Tables

Table 1: Personnel involved with the project. 1

Table 2: Survey details. 3

Table 3: Database channel descriptions. 5

List of Appendices

Appendix 1: Instrument Specification 10

Appendix 2: Final Maps 16

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Introduction

From April 17th to May 2nd , 2021 Pioneer Exploration Consultants Ltd. (Pioneer) completed an airborne magnetic survey using an Unmanned Aerial Vehicle (UAV) over an area approximately 40 km north of Huntsville, Ontario. The survey was flown at the request of Generic Geo Inc.

This report covers data acquisition, instrument descriptions, data processing and presentations. The digital data delivery is described later in this report. This report does not include any geological interpretations of the geophysical dataset. Key survey personnel are listed in Table 1.

Table 1: Personnel involved with the project.

Pilot in Command	Vladyslav Shutyi
Ground Crew	Andrew Branson
Data Processing and QA/QC	Kiyavash Parvar, Andrew Gagnon-Nandram

Location

The survey area is located approximately 40 km north of Huntsville. The staging locations were accessed by truck. The completed survey lines are illustrated in Figure 1.

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

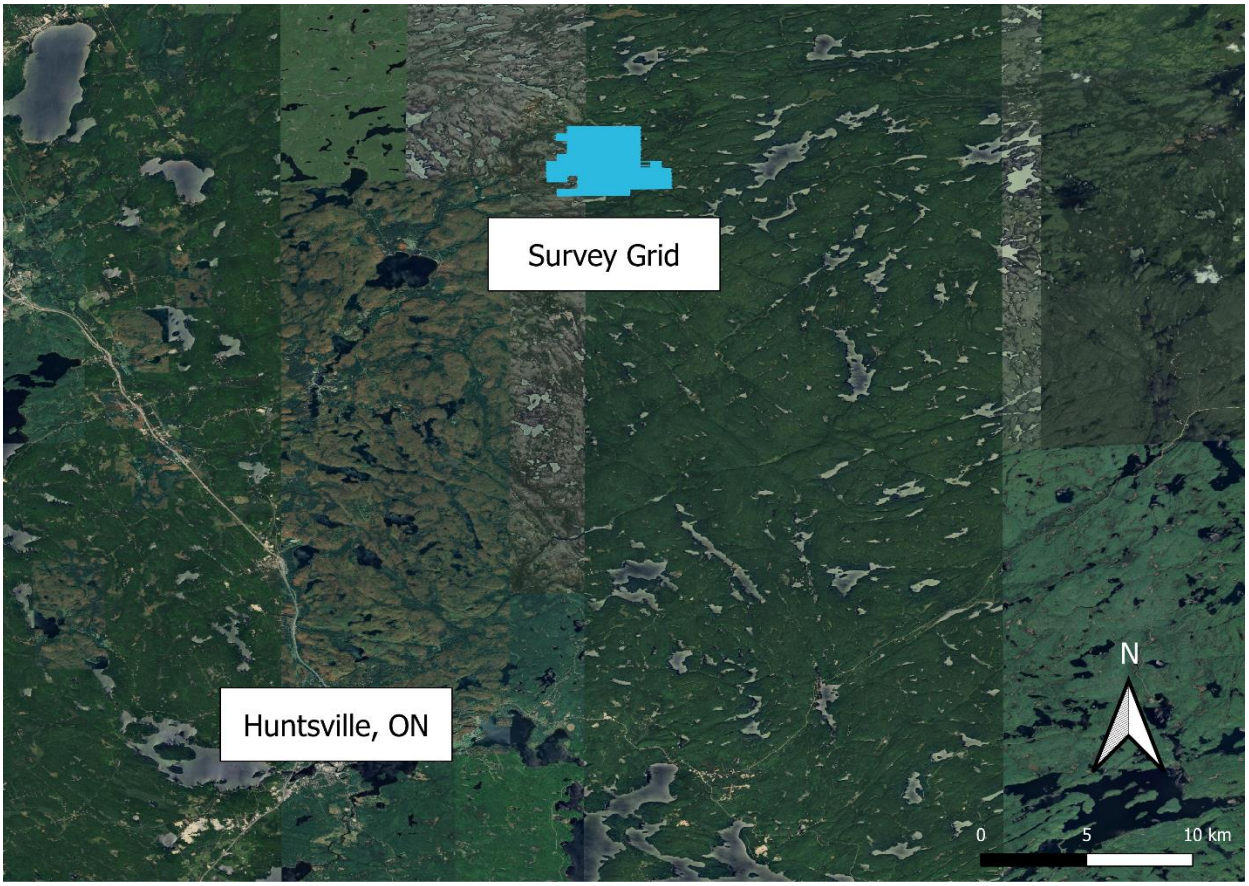


Figure 1: The completed UAV aeromagnetic survey lines are illustrated in blue over the project area in relation to nearby town.

Survey Specifications and Procedures

Data collection for this survey area was conducted at 50 m line spacing, with a smaller high resolution area flown at 25 m spacing. The nominal magnetic sensor altitude above ground level (AGL) was set to 45 m for the survey area. Elevation from the terrain may vary depending on the treeline and obstacles on the flight route. The nominal production groundspeed is 9 m/s for flat topography with no wind. The survey speed may vary depending on the terrain and environmental conditions.

The ground crews performed daily safety meetings and pre-flight checks prior to the start of drone flight operations. The Pilot in Command (PIC) is responsible for the safety of the crew and equipment during the survey operations. Each survey flight is pre-planned using ground control software, then the flight plans are uploaded to the UAV prior to takeoff. The UAV system flies the pre-defined waypoint-based flight plans while the ground crew maintains visual line of sight with the craft and the flight telemetry information. Flights are terminated and the UAV returns for landing when the battery voltage reaches a

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

certain limit, or when the flight plan is complete. The survey flights can be manually terminated and taken over with full manual pilot control at anytime. Upon landing, the flight batteries are exchanged and the sensor is downloaded for data QAQC. The average distance covered by each flight is approximately 6-10-line kms of data acquisition.

Addition details on the completed survey can be found in Table 2.

Table 2: Survey details.

Area Name	Line Spacing (m)	Line Direction (deg)	Tie Line Spacing (m)	Flight Lines (km)	Tie Lines (km)	Total Line Kilometres (km)
Butt Township	25	000	250	768.572	82.023	850.596

Instrumentation and Software

The principal airborne sensor used was a Gem Systems Canada GSMP-35U potassium vapor sensor mounted on a UAV platform. Ancillary equipment included a laser altimeter with a 130m range, Global Positioning Satellite (GPS) system antenna and Inertial Measurement Unit (IMU). A stationary GSM-19 Overhauser magnetometer was used as a base station. Raw aerial magnetometer data was collected at a rate of 10 Hz while base station data was collected at a rate of 0.16 Hz. Total field and GPS UTC time were recorded with each data point, enabling diurnal correction to be applied during final data processing.

Magnetic Base Station

A GSM-19 Overhauser Magnetometer base station was placed in a location of low magnetic gradient, away from electrical transmission lines and moving metallic objects, such as motor vehicles and aircrafts. The data collected from this base station was used to diurnally correct the aeromagnetic data. The GSM-19 Overhauser Magnetometer is supplied by GEM systems of Markham, Ontario. General specifications of the magnetometer are included in Appendix 1: Instrument Specification.

Unmanned Aerial Vehicle – Matrice 600

Pioneer used the Matrice M600 Pro UAV to complete this survey. The Matrice 600 (M600) is DJI's platform designed for professional aerial photography and industrial applications. It is built to closely integrate with a host of powerful DJI technologies, including the A3 flight controller, Lightbridge 2 transmission system, Intelligent Batteries and Battery Management system, for maximum performance and quick setup. As stated by the manufacturer, some of the advantages to using this type of multirotor systems are:

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

Total Integration: The modular design makes the M600 easy to set up and ready to use in just minutes. Its dust proof propulsion systems simplify maintenance while actively cooled motors make for reliable operation during extended use.

Smart Flight Safety: The M600 uses sine-wave driven, intelligent ESCs to ensure it performs accurately, safely and efficiently while A3's self-adaptive flight systems adjust flight parameters automatically based on different payloads. The A3 can be upgraded with two additional GNSS and IMU units to A3 Pro or with D-RTK GNSS for enhanced accuracy.

Extended Flight Time and Transmission Range: The M600 features an extended flight time and a 5 km long-range, ultra-low latency HD image transmission for accurate image composition and capture. The system uses 6 small DJI Intelligent Batteries, allowing it to be shipped easily to wherever it is needed. A customized battery management system and power distribution board allows all six batteries to be turned on with the press of a single button and keeps the system in flight in the event of a battery failure. It also allows users to check the battery status in real-time during flight.

Powerful App Control: The M600 supports a live HD view, battery status, redundancy status, transmission strength and much more, straight from the tablet application.

UAV Aeromagnetic Configuration

GEM System's UAV GSMP-35U is a potassium magnetometer providing unmatched sensitivity in addition to a low heading error effect. The GSMP-35U operates similarly to other alkali vapor magnetometers while benefiting from the unique spectral properties of potassium. Each GSMP-35U system has 0.0002 nT sensitivity combined with +/- 0.1 nT absolute accuracy over its full operating range. More details on the instrument can be found in Appendix 1: Instrument Specification. The UAV aeromagnetic setup consists of a towed bird configuration with a sensor-aircraft separation distance of either 3 or 5m. The sensor is flown along the survey lines with a fixed heading to maximize the signal amplitude and provide the best sensor orientation for the local conditions. This action minimizes heading errors. The data is both stored on board during acquisition and transmitted in real-time back to the ground control station to monitor the collection during flight and ground clearance of the sensor from the laser altimeter data.

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

Data Deliverables and Channel Descriptions

All data is typically delivered in either Geosoft Database (GDB) or simple formats such as .txt or csv. The data deliverables are client specific to best suit their needs and software requirements. Regardless of software, a database is supplied to the client with channel descriptions as described in Table 3.

Table 3: Database channel descriptions.

Parameter	Explanation	Units/Format
Date	Flight Date	Yyyy/mm/dd
Time	GNSS time stamp	hhmmss.ss
lat	Latitude (WGS84)	Decimal degrees
lon	Longitude (WGS84)	Decimal degrees
alt	GPS altitude above the average sea level	metres
utmE	UTM easting (WGS84)	metres
utmN	UTM northing (WGS84)	metres
sat	Number of locked satellites	metres
zone	UTM zone	-
yaw	IMU yaw reading	Degrees
pitch	IMU pitch reading	Degrees
roll	IMU roll reading	Degrees
nT	Magnetic field readings (Raw)	Nanotesla
nT2	Diurnal correction has been applied on the nT channel (Diurnal datum: 54500 nT)	Nanotesla
Final	Final Total Magnetic Intensity	Nanotesla
VD1	1st Vertical derivative	nT/m
AS	Analytic Signal	nT/m
Dist	Distance to the first point of the line	metres

Magnetic Maps and Derived Data Products

The final magnetic data has been presented in the form of several different magnetic maps (Appendix 2: Final Maps). Each of these different data presentations is a useful tool for identifying geological structures and other features.

Total Magnetic Field

Based on the flight lines covered by the drone, the total magnetic field map grid was created by interpolating the filtered magnetic data. The purpose of this data presentation is to highlight geological

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

structures that may be visible in the survey area by their magnetic signature or their magnetic contrast to their surroundings.

First Vertical Derivative

The first order vertical derivative quantifies the rate of change of the magnetic field as a function of elevation. It is an approximation of the vertical magnetic gradient, which could be directly measured with separate magnetometers vertically spaced apart. The purpose of this type of filter is to eliminate the long wavelength signatures and make sharp features more detectable, such as the edges of magnetic bodies. This filter also increases the noise level, which limits the use of higher order derivatives (n=2 for example). The vertical derivative is used to delineate the contacts between large-scale magnetic domains because its value is zero over vertical contacts.

3D Analytic Signal

The analytic signal is the square root of the sum of the squares of the derivatives in the x, y, and z directions:

$$Analytical\ Signal = \sqrt{dx * dx + dy * dy + dz * dz}$$

The analytic signal is useful in locating the edges of magnetic source bodies, particularly where remnant magnetic signals and/or low magnetic latitude complicates interpretation.

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

Data Processing

All general magnetic QA/QC and data processing techniques have been applied to the data. All post-field data processing was carried out using Geosoft Oasis Montaj, Python and Microsoft Excel software/ programming languages. Presentation of final maps used ESRI ArcMap and/or Geosoft Oasis Montaj. Results were gridded using minimum curvature method and a grid cell size of approximately 1/3 of flight line spacing.

The geophysical images accompanying this report are positioned using the WGS 1984 datum. The survey geodetic GPS positions have been map-projected using the Universal Transverse Mercator (UTM) projection. A summary of the map datum and projection specifications are as follows:

- Datum: WGS 1984 UTM Zone 17North
- Scale Factor: 1:18000
- Linear Unit: Metre (1)

The magnetic data was first quality checked in the field and any points lacking sufficient georeferenced data or which were excessively noisy were removed. The resulting data was processed as mosaics throughout the survey area as data was collected daily. The final result is a combination of all collected data, including lines that were re-flown due to weak or insufficient magnetic signal.

The base station readings were initially processed and filtered to remove high frequency noise. The filtered base station dataset was then used to perform a diurnal correction on the magnetic survey data. The diurnally corrected profile data were interpolated into a grid using the minimum curvature technique with a grid size of approximately 1/3 of flight line spacing. All final maps have a normalized color interval.

After finishing interpolation, initial processing subjected the data to a non-linear filter with a wavelength limit of 3-4 fiducials and tolerance of 0.001. This filter removes high frequency noise which mostly occur because the sensor is in the dead zone due to sudden changes in sensor orientation, effect of ferro-metallic objects, or the influence of weather conditions on the sensor. This filter smooths out noise and high frequency features.

After leveling the data using the tie lines, the data was micro-levelled. This step is performed to mitigate the corrugation effect associated with gaps between the data lines and is completed by applying a high-pass butterworth filter with the threshold of 100 metres (line spacing x 4) followed by a directional cosine filter perpendicular to the line direction. The resulted noise channel was then subtracted from the leveled values to microlevel the data. The final result of the leveling and micro-leveling processes was then put in “Final” Channel of the database.

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

The following corrections were applied to the airborne magnetic data:

- Correction for diurnal variation using the digitally recorded ground base station magnetic values as described above
- Lag was measured by a lag test prior to the operation. Only a minor lag correction is applied to final data
- Heading biases were applied based on clover leaf data collected
- Micro-leveling
- Analytic Signal calculation
- First Vertical Derivative calculation

The final maps are included in Appendix 2: Final Maps.

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Data Comments

Pioneer's UAV aeromagnetic surveys result in a high quality, high resolution data product. The increased flight line density and lower flight elevation possible with the use of a UAV platform results in superior resolution data products when compared to conventional airborne magnetic data. Using an auto-controlled UAV platform also allows for minimal deviation from pre-planned flight lines, and greatly reduces the impact of human errors during data acquisition.

Logistics remains a major challenge of UAV surveying. In order to operate legally within the guidelines set by Transport Canada, line of sight must be maintained to the UAV and surrounding airspace at all times. This often results in the necessity of several staging locations for covering the survey area, and sometimes requires the employment of additional equipment such as an aerial platform or scissor lift to achieve unobstructed line of sight beyond surrounding buildings or vegetation. The smaller flight sorties are typical in UAV-based surveys and require greater attention in post processing.

Pioneer makes every effort to identify potential sources of noise in order to mitigate their impact on our collected survey data. The magnetic noise envelope of our UAVs has been mapped in 3D prior to use. Our flight lines are planned with a minimum of 50 m overlap past the survey boundaries so that the magnetic sensor has time to stabilize itself after the UAV has completed its turns. Additionally, weather is carefully monitored and when excessive data inconsistency is noted due to weather conditions, flights are suspended until conditions improve.

Pioneer is very pleased with the results from this survey and confirms that the level of error and noise in the dataset falls below our threshold, which is set based on the Geological Survey of Canada guidelines for airborne magnetometer survey data.

Respectfully submitted,

Kiyavash Parvar, M.A.Sc. UAV Geophysics
Manager of Geophysics
Pioneer Exploration Consultants Ltd.
Ottawa, Ontario

PIONEER EXPLORATION

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Appendix 1: Instrument Specification

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

GSM-19 Overhauser Magnetometer

Performance

Sensitivity: Standard
GSM-19 0.022 nT @ 1 Hz
GSM-19PRO 0.015 nT @ 1 Hz
Resolution: 0.01 nT
Absolute Accuracy: 0.1 nT
Dynamic Range: 20,000 to 120,000 nT
Gradient Tolerance: up to 10,000 nT/m
Samples at: 60+, 5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperature: -40°C to +50°C

Operating Modes

Manual: Coordinates, time, date and reading stored automatically at up to 0.2 sec.
Base Station: Time, date and reading stored at 1 to 60 second intervals.
Remote Control: Optional remote control using RS-232 interface.
Input / Output: Input/Output: RS-232 using 6-pin weatherproof connector with USB adapter.

Memory - (# of Readings in millions)

Mobile: 1.4M,
Base Station: 5.3M,
Gradiometer: 1.2M,
Walking Mag: 2.6M

Dimensions

Console: 223mm x 69mm x 240 mm(8.7x2.7x9.5in)
Sensor: 175mm x 75mm diameter cylinder (6.8in long by 3 in diameter)

Weights

Console with Belt: 2.1 kg
Sensor and Staff Assembly: 1.0 kg

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

Matrice 600

Structure

Diagonal Wheelbase: 1133 mm
Aircraft Dimensions: 1668 mm x 1518 mm x 759 mm (Propellers, frame arms and GPS mount unfolded)
640 mm x 582 mm x 623 mm (Frame arms and GPS mount folded)
Package Dimensions : 620 mm x 320 mm x 505 mm
Intelligent Flight Battery Quantity: 6
Weight (with six TB47S batteries): 9.1 kg
Weight (with six TB48S batteries): 9.6 kg
Max Takeoff Weight: 15.1 kg

Performance

Hovering Accuracy (P-Mode, with GPS) Vertical: ±0.5 m, Horizontal: ±1.5 m
Max Angular Velocity: Pitch: 300°/s, Yaw: 150°/s
Max Pitch Angle: 25°
Max Speed of Ascent: 5 m/s
Max Speed of Descent: 3 m/s
Max Wind Resistance: 8 m/s
Max Flight Altitude above Sea Level: 2500 m
Max Speed: 18 m/s (No wind)
Hovering Time (with six TB47S batteries)* No payload: 35 min, 6 kg payload: 16 min
Hovering Time (with six TB48S batteries)* No payload: 40 min, 5.5 kg payload: 18 min

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

Remote Controller

Operating Frequency:

- 920.6 MHz to 928 MHz (Japan)
- 5.725 GHz to 5.825 GHz
- 2.400 GHz to 2.483 GHz

Max Transmission Distance (unobstructed, free of interference) :

- FCC Compliant: 3.1 miles (5 km)
- CE Compliant: 2.1 miles (3.5 km)

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

EIRP:

- 10 dBm @ 900 M/li>
- 13 dBm @ 5.8 G
- 20 dBm @ 2.4 G

Video Output Port: HDMI, SDI, USB
Dual Users Capability: Master-and-Slave control
Mobile Device Holder: Supports smartphones and tablets
Output Power: 9 W
Operating Temperature: 14° to 104° F (-10° to 40° C)
Storage Temperature:
Less than 3 months: -4° to 113° F (-20° to 45° C)
More than 3 months: 72° to 82° F (22° to 28° C)

Charge Temperature: 32° to 104° F (0° to 40° C)
Built-in Battery: 6000 mAh, 2S LiP
Max Tablet Width: 170 m

Propulsion System

Motor Model: DJI 6010
Propeller Model: DJI 2170

Battery

Model: TB48S
Capacity: 5700 mAh
Voltage: 22.8 V
Type: LiPo 6S
Energy: 129.96 Wh
Net Weight: 680 g
Operating Temperature: 14° to 104° F (-10° to 40° C)
Storage Temperature: Less than 3 months: -4° to 113° F (-20° to 45° C)
More than 3 months: 72° to 82° F (22° to 28° C)
Charge Temperature: 41° to 104° F (5° to 40° C)
Max Charging Power: 180 W

Charger

Model: A14-100P1A
Voltage: Output26.3 V
Power Rating: 100 W

Pioneer Exploration Consultants Ltd.
info@pioneerexploration.ca
t. 1-306-715-6802

GEM GSMP-35UA: Ultra Light-Weight Potassium Magnetometer

Magnetometer Specifications

Sensitivity: 0.0002 nT @ 1 Hz
Resolution: 0.0001 nT
Absolute Accuracy: +/- 0.1 nT
Heading Error: + / – 0.05 nT
Dynamic Range: 15,000 to 120,000 nT
Gradient Tolerance: 50,000 nT/m
Sampling Intervals: 1, 2, 5, 10, 20 Hz
Operating Temperature: -40°C to +55°C

Orientation

Sensor Angle: optimum angle 35° between sensor head axis & field vector.
Proper Orientation: 10° to 80° & 100° to 170
Heading Error: +/- 0.05 nT between 10° to 80°and 360° full rotation about axis.

Environmental

Operating Temperature: -40°C to +55°C
Storage Temperature: -70°C to +55°C
Humidity:0 to 100%, splashproof

Dimensions & Weight

Sensor: 161mm x 64mm (external dia) with 2m cabling ; 0.43 kg
Electronics Box: 236mm x 56mm x 39mm; 0.46 kg
Option 1 cabling; .125kg
Option 3 light weight battery; .250kg

Power

Power Supply:18 to 32 V DC
Power Requirements: approx. 50 W at start up, dropping to 12 W after warm-up
Power Consumption:12 W typical at 20°C
Warm-up Time: <15 minutes at -40°C

Outputs

20 Hz RS-232 output with comprehensive Windows Personal Computer (PC) software for data acquisition and display.

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Outputs UTC time, magnetic field, lock indication, heater, field reversal, GPS position (latitude, longitude altitude, number of satellites)

Components

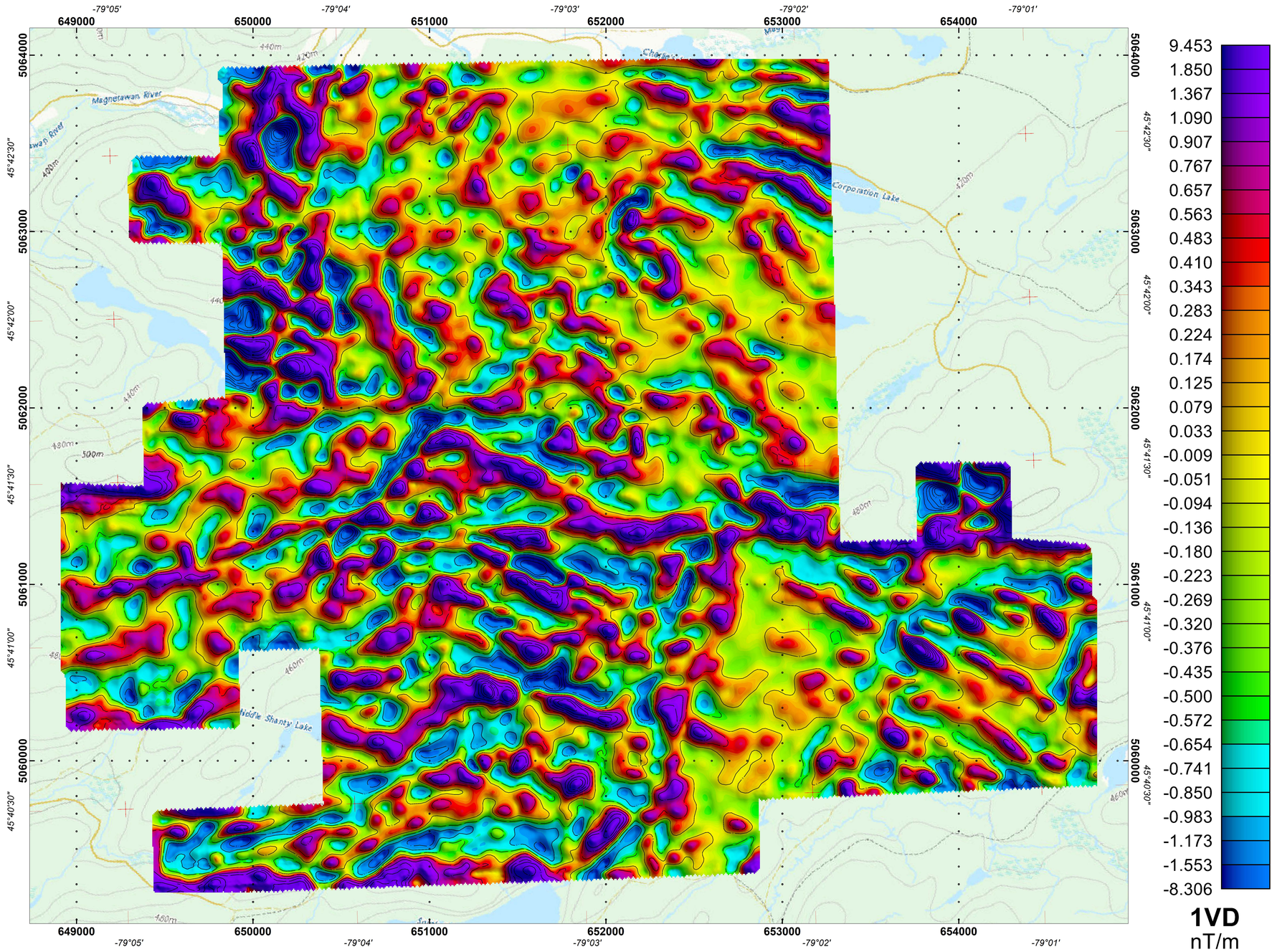
Sensor, pre-amplifier box, 2m sensor /pre-amplifier cable (optional cable 3-5m), manual & shipping case

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Appendix 2: Final Maps

PIONEER EXPLORATION



Scale 1:18000

250 0 250 500

metres

WGS 84 / UTM zone 17N

Generic Geo Inc.

Flight Parameters:

Flight line spacing: 25 m
Flight line azimuth: 000°N
Tie-line spacing: 250 m
Tie-line direction: 090°N
Nominal sensor elevation above ground: 30m

Instrumentation:

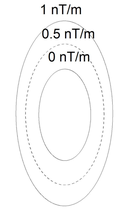
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

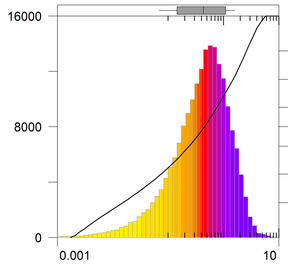
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17U)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

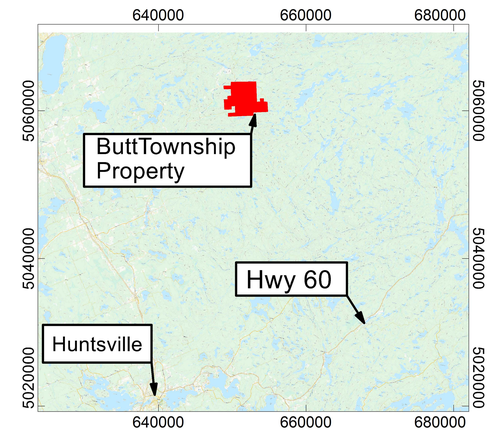
Contour Legend:





Data Distribution

Samples:	402996
Minimum:	-8.306
Maximum:	9.453
Mean:	0.008074
Geo.Mean:	0.3712
Median:	-0.03042
Mode:	-0.06054
Std.Dev.:	0.8967
Std.Err.:	0.001413
Skew:	0.1845
Kurtosis:	7.254
Log:	
Mean:	-0.4258
Median:	-0.3419
Skew:	-0.9588



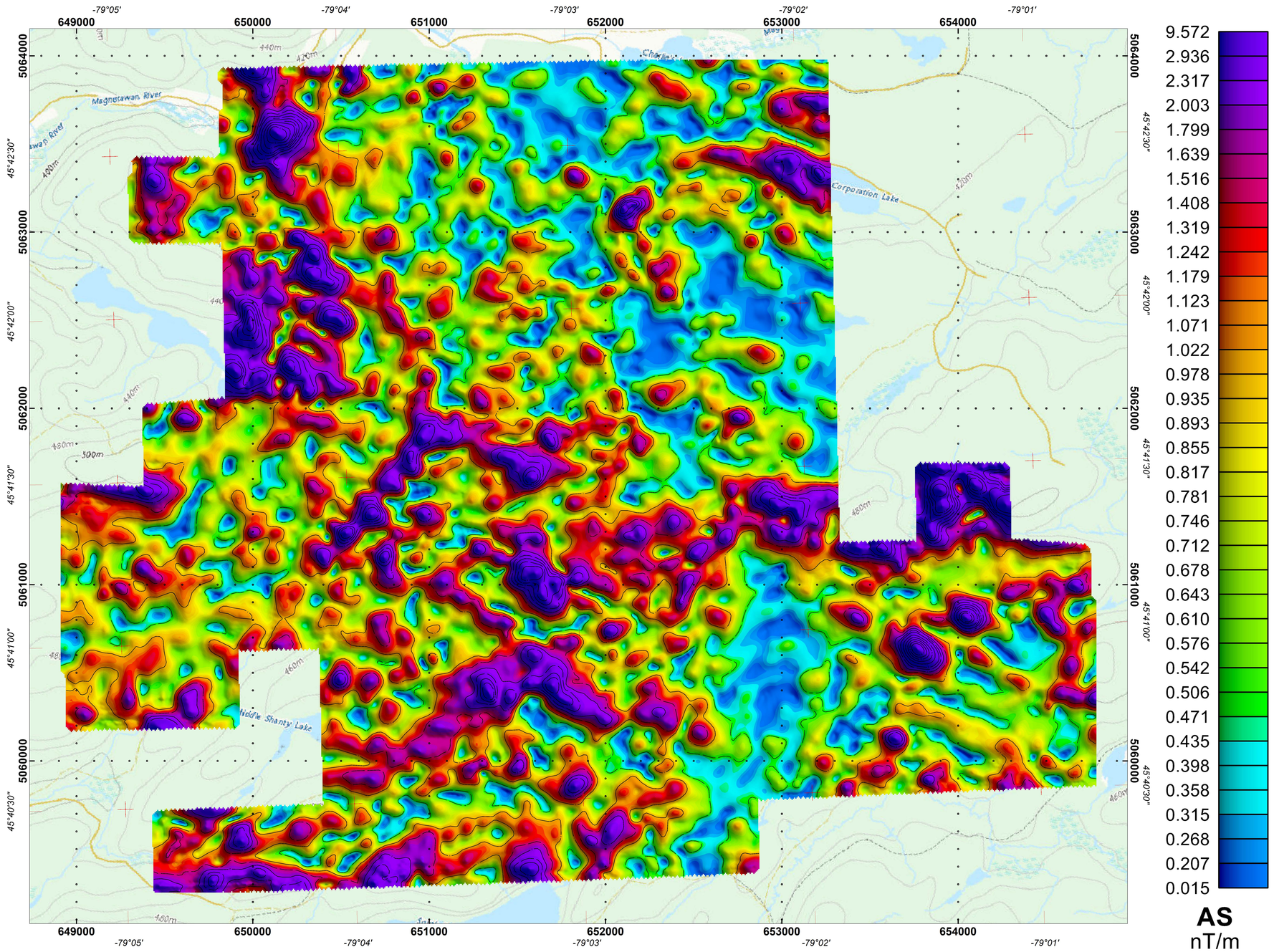
Pioneer Exploration Consultants Ltd.

Levelled and Micro-levelled Drone Aeromagnetic Survey
1st Vertical Derivative (1VD)
Units: nT/m

Survey Date: April-May 2021
Property: Butt Township

Map Author: Kiyavash Parvar MASc. Geophysics

PIONEER EXPLORATION



Scale 1:18000

250 0 250 500

metres

WGS 84 / UTM zone 17N

Generic Geo Inc.

Flight Parameters:

Flight line spacing: 25 m
Flight line azimuth: 000°N
Tie-line spacing: 250 m
Tie-line direction: 090°N
Nominal sensor elevation above ground: 30m

Instrumentation:

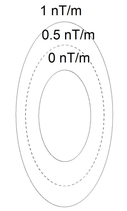
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

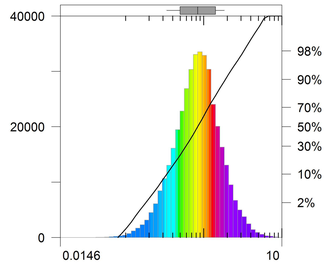
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17U)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

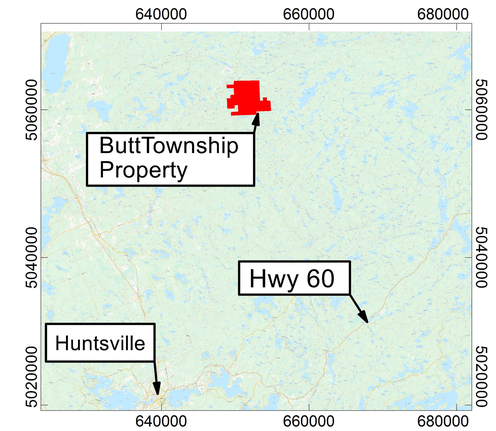
Contour Legend:





Data Distribution

Samples:	402996
Minimum:	0.014459
Maximum:	9.572
Mean:	1.021
Geo.Mean:	0.8145
Median:	0.8357
Mode:	0.3335
Std.Dev.:	0.7626
Std.Err.:	0.001201
Skew:	2.578
Kurtosis:	11.75
Log:	
Mean:	-0.08913
Median:	-0.07794
Skew:	-0.1841



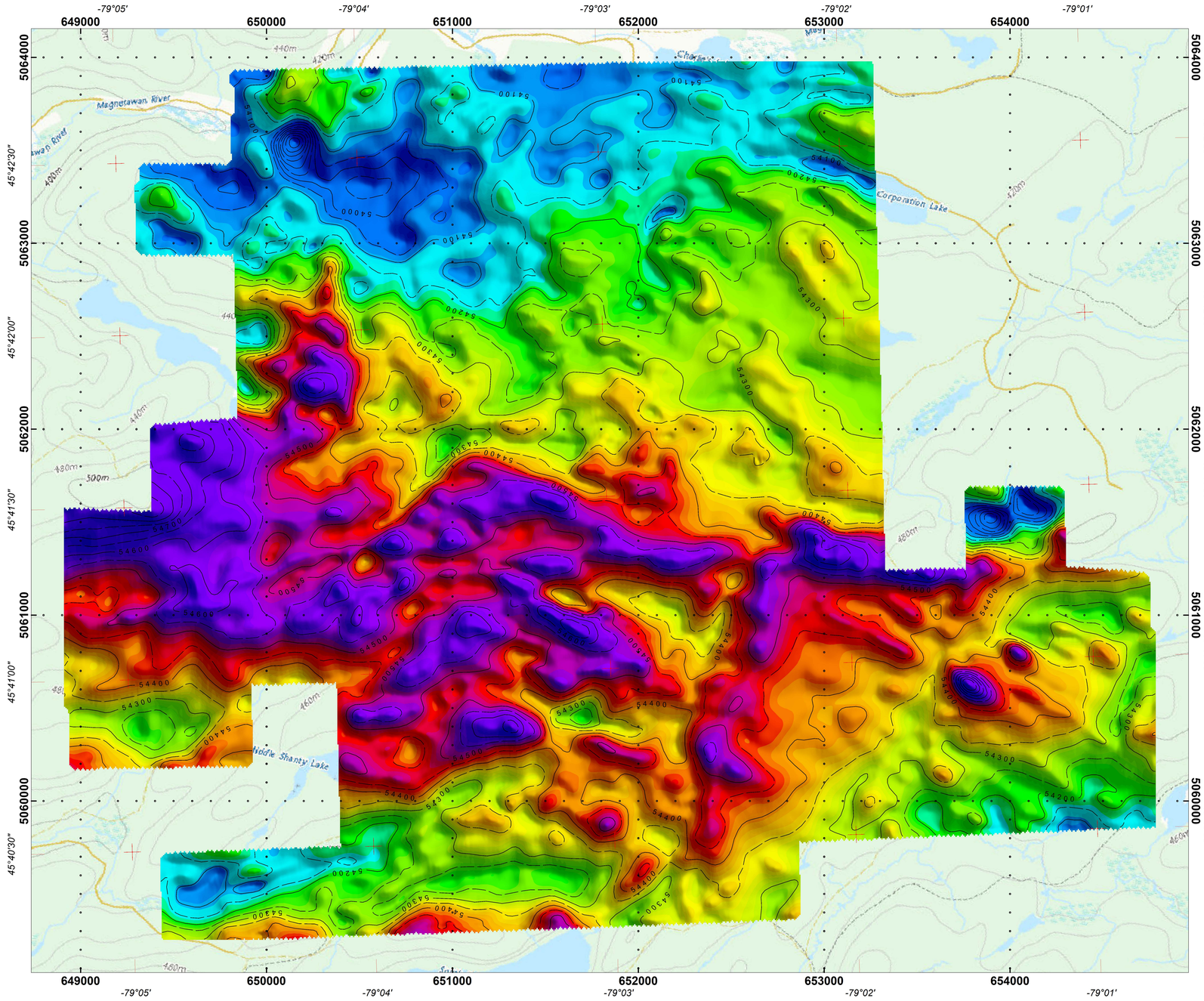
Pioneer Exploration Consultants Ltd.

Levelled and Micro-levelled Drone Aeromagnetic Survey
Analytic Signal (AS)
Units: nT/m

Survey Date: April-May 2021
Property: Butt Township

Map Author: Kiyavash Parvar MASc. Geophysics

PIONEER EXPLORATION



Scale 1:18000

250 0 250 500

metres

WGS 84 / UTM zone 17N

Generic Geo Inc.

Flight Parameters:

Flight line spacing: 25 m
Flight line azimuth: 000°N
Tie-line spacing: 250 m
Tie-line direction: 090°N
Nominal sensor elevation above ground: 30m

Instrumentation:

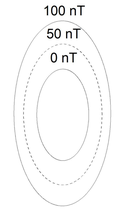
Unmanned aerial vehicle: Matrice 600 UAV
In-flight magnetometer: GEM Systems GSMP-35UA (Potassium vapor)
In-flight sampling lime: 10 Hz (0.1 s)
Ground magnetometers (base station): GEM GSM-19 (Overhauser proton)
Base station sampling rate: 0.16 Hz (6.0 s)

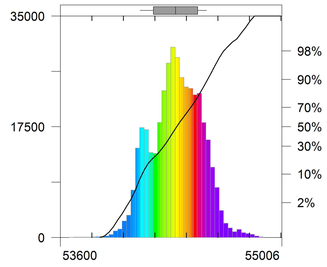
Coordinate system:

Datum: WGS84
Projection: Universal Transverse Mercator Central meridian: (Zone 17U)

Hill shade inclination:045°N
Hill shade declination:045°N (NE-SW)

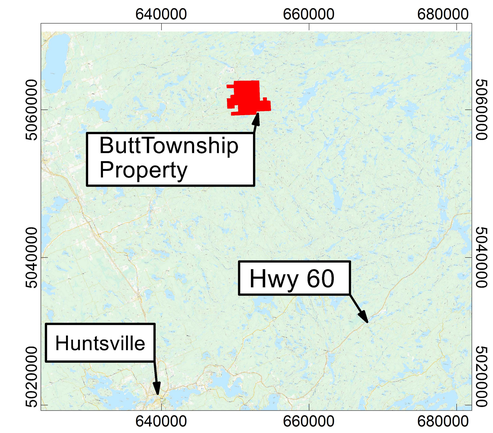
Contour Legend:





Data Distribution

Samples:	402996
Minimum:	53660
Maximum:	54880
Mean:	54340
Geo.Mean:	54340
Median:	54340
Mode:	54340
Std.Dev.:	157.8
Std.Err.:	0.2486
Skew:	-0.03516
Kurtosis:	-0.2039



Pioneer Exploration Consultants Ltd.

Levelled and Micro-levelled Drone Aeromagnetic Survey
Total Magnetic Intensity, Reduced to Pole (TMI-RTP)
Units: nT

Survey Date: April-May 2021
Property: Butt Township

Map Author: Kiyavash Parvar MASc. Geophysics