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.

October 5, 2015
NTS: 031M13 ¼ NW, 032D04 ¼ SW

Total Magnetic Field and VLF Surveys on the Catharine Property

Claims 4273176 and 4270335

McElroy and Catharine Townships

Larder Lake Mining Division

588800 E 5318500 N
NAD83 Z17N

Report Prepared for:

John Rapski
P.O. Box 122
Swastika Ontario
T0K 1T0

Report Completed by:

Lucas Currah
Kencana Technical Services Inc.
3048 Seneca Dr.
Oakville Ontario
L6L 1A9

Contents

List of Maps

1.0 Introduction

The Catharine Property is 100 % owned by prospector John Rapski. It is comprised of two contiguous blocks of 15 unpatented mining claims located in northeast Catharine and west-central Skead townships, Larder Lake Mining Division. Table 1 shows a summary of John Rapski's land holdings. Map 1 shows provincial scale location map and Map 2 shows an overview of land holdings with respect to regional features and other administrative boundaries.

Table 1. Summary of claims comprising the Catharine property.

Claim	Units	Township
4270336	8	CATHARINE (G-3615)
4270337	16	CATHARINE (G-3615)
4270338	8	CATHARINE (G-3615)
4270339	4	CATHARINE (G-3615)
4273176	4	CATHARINE (G-3615)
4273177	16	CATHARINE (G-3615)
4273178	12	CATHARINE (G-3615)
4270335	4	MCELROY (G-3214)
4273237	4	SKEAD (M-0387)
4274113	3	SKEAD (M-0387)
4274114	1	SKEAD (M-0387)
4274115	7	SKEAD (M-0387)
4274209	1	SKEAD (M-0387)
4270336	8	CATHARINE (G-3615)
4270337	16	CATHARINE (G-3615)
Total:	88	

1.1 Location and Access

The property is located approximately 20 km southeast of Kirkland Lake, Ontario and 10 km southwest of Larder Lake, Ontario. Access to the property is granted by highway 624 south of Larder Lake and north of Englehart, which passes through the central portion of the claim group near the Catharine and Skead township boundary.

The northwest of the property is accessed via a lumber road in Catharine township to the north of highway 624, locally named Road 18, a well maintained lumber road. Approximately 3 km north of the highway, this road turns into an ATV trail/snow mobile trail to the West which grants access to the survey area.

2.0 Past Work

The current survey area does not have any past work reported on it on the digital assessment files. Until recently, it was a patent and not available for staking which may be the cause for this lack of assessment work.

Past work has consisted mostly of magnetic, VLF-EM, and horizontal loop EM surveys on the claims in Catharine township. Limited geological work has occurred on the property, as well as reverse circulation, and diamond drilling. Work has focused on delineating shear structures with gold and copper sulphide mineralization. Generally, limited outcrops were observed, and deep overburden up to 30 -40 meters was reported. Deep, conductive surficial clays were reported as a problem in measuring EM signals from bedrock sources. Magnetic surveys showed northwest trending structures in agreement with the regional bedrock geological unit trends. Generally, magnetic highs were attributed to ultramafic intrusive (peridotites and gabbros) with lower magnetic fields attributed to intermediate volcanic units. Appendix B of the report below summarizes the past work completed on the claim group for assessment work purposes.

Regional work has consisted of geological mapping (Map P2698, Jackson, 1995) and airborne magnetics survey (Map 82 040). Airborne magnetic surveys show northwest trending magnetic highs striking parallel to geological units. Generally, higher magnetic trends are associated with mafic to ultramafic volcanic and intrusive units. Geophysical units also support the presence of offsets along northeast trending faults, which are abundant in McElroy, Skead, and Catharine townships by offset magnetic trends.

Generally, most of the claim group is overlain by thick Quaternary sediments composed of eskers, clays, and glaciofluvial sediments making investigation/prospecting of bedrock difficult.

3.0 Regional Geology

The regional geology map by Jackson (1995) indicates that the central portion of the claim group is overlain by a thick succession of recent sediments, making mapping and prospecting of the surface difficult. However, the property is underlain by northwest trending intermediate volcanics to the south, transitioning into mafic volcanics to the north, with narrow interbeds of komatiitic to gabroic units. Peridotite units may underlay the very north claims underneath the cover of recent sedimentary rocks. Regional scale northeast faults are inferred to underlay the sediments in the central portion of the claim. The property claims, as well as the grid line locations are shown in Map 3.

4.0 Current Work Program

The current work program consisted of 11.5 line kilometers of total magnetic field and VLF-EM surveys to determine magnetic structures and VLF-EM conductors associated with potential gold mineralization. VLF-EM measurements were taken to determine if conductive anomalies would be associated with these potential anomalies, as conductive contrasts are suggested by sulphide mineralization accompanying auriferous shear zones from occurrences in Catharine (Montcrief) and Skead townships. North/South oriented lines were used to intersect the regional trend of rock units in the claim group area. Lines in the west of the grid were spaced at 50 meter intervals, and lines on the East of the grid were spaced at 100 meter intervals.

Lines were not cut, and the instrument operator, who was also the author used a compass to traverse with the instrument UTM readings as a guide. Map 3 shows the layout of the grid lines. Some of the bush consisted of thick moose maple and poplar making straight lines in some areas of the claim difficult.

4.1 Magnetic Survey

A GSM-19 Overhauser Magnetometer with a synchronized GPS system was used to collect magnetic field readings. Readings were collected at 2 second intervals, and were corrected for diurnal variations using a stationary proton procession magnetometer and applied using Gem-Link 5.2 software. Base station readings were collected at 15 second intervals using a reference field of 56,000 nT. A summary of the magnetometer specifications is shown in Table 3.

Table 2. Specifications for GSM-19 Overhausser Magnetometer

Sensitivity:	0.022 nT @ 1Hz
Resolution:	0.01 nT
Accuracy:	0.1 nT
Range:	20,000 - 120,000 nT
Sampling Interval:	2 s

4.2 VLF Survey

VLF readings were taken at paced distances of approximately 10 - 20 meters depending on the terrain. The Cutler, Maine (24.0 kHz) station was used and percentage in-phase and out-of-phase (quadrature) components measured relative to the horizontal field. Only station readings with signal strengths greater than seven picoTesla (7 pT) were utilized in interpretation. The instrument has self-leveling features, and a sensitivity of 0.1 % for phase component measurements.

4.3 Data Processing and Interpretation

Magnetic field measurements were selected for signal quality values greater than 49 to ensure quality readings. Magnetic field measurements were interpreted using Surfer 11 software employing the Kriging interpolation method. An anisotropic search radius oriented 285/95 degrees was selected for interpolation. The resulting grid was smoothed using a 9x9 Gaussian filter to better delineate trends, and the resulting contour map is shown in Map 4. Additionally, the first derivative of the magnetic field was estimated using the square of the frequency strength during frequency domain filtering following a fast Fourier transform (FFT) of the raw magnetic grid. This was used to better delineate the nature of the magnetic anomalies by increasing the high frequency features of the data. Results are shown in Map 5.

The VLF profiles were interpolated linearly with respect to line direction from the raw VLF in-phase and out-of-phase components. These were overlain on a map with projection of the IP/OP readings projected perpendicular to the line direction, at a scale of 1 cm to 100 %. Map 5 shows the results for the north grid, and Map 8 for the south grid.

The interpolated VLF profiles were sampled at 15 meter intervals, and used in a 4-point Fraser filter calculation. The resulting Fraser filter values were plotted at the midpoint of the four points, and contoured to aid in the interpretation of the VLF survey. Results are shown in Map 7.

5.0 Results

Two linear magnetic highs trending northwest occur on the property (M_A and M_B). These mangetic anomalies are parallel to the regional strike of geologic units, and are most likely caused by more magnetic mafic volcanic rocks (or narrow bands of komatiitic basalts). The first derivative of the magnetic field suggests that they are variably magnetized along strike. The magnetic field to the south is much lower than the rest of the survey area, and this agrees with the contact of the intermediate volcanics to the south, and mafic volcanic sequences to the north. This contact appears to be marked by an asymmetrical VLF profile, which is marked as V_c , which may be caused by conductive contrasts in the mafic and intermediate volcanics near this contact.

Interpretation of the VLF results is difficult, as it appears that relatively discontinuous conductors trending NW exist on the grid. This would be supported by the trend of the geological units in the area. The VLF profiles and Fraser filter also indicate a weak to moderate conductor trending NW between the two magnetic anomalies, and is labeled V_B on Maps 6 and 7. This occurs on the northern flank fo teh southern magnetic anomaly.

Contouring of Fraser filter values shows a possible northeast trend in the conductors. This anomaly (V_A) is indicated on Map 6 and Map 7. The current survey may not discount the possibility of other northeast trending structures on the property due the oblique orientation of survey lines to these potential anomalies, and the larger line spacing over the northeast trending structure on the east of the grid. The possible locations of the northeast trending structures are indicated on the First Derivative of Magnetic Field Map (Map 5) with question marks. The first derivative magnetic field plot also shows lows associated with Fraser Filter high on anomaly V_A indicated on Map 5. This hypothesis may also offer another explanation of the variable magnetism is the presence of these two northeast trending regional fault structures.

It should be noted that the analysis of VLF data is further complicated by the surficial geology. The author noticed several clay filled valleys which appeared to correlate with the VLF responses in most cases. These valleys may represent deep sediments interfering with bedrock EM signals, leading to these discontinuous conductors caused by variable surficial cover, and not originating with a bedrock source of the observed anomalies. Past work also indicated that the presence of deep conductive over burden affected the results of Max Min horizontal loop and VLF-EM surveys.

6.0 Conclusions and Recommendations

The magnetic survey was successful in determining the approximate contact of the intermediate volcanics to the south and mafic volcanics to the north. An asymmetric peak in the VLF profile appears to mark this contact as well. The calculated derivative of the magnetic field and the total magnetic field

of the two northwest trending more magnetic highs show it to be variable magnetic along its strike. This may be due to heterogeneous composition along strike, or northeast trending structures crosscutting the more magnetic rock types.

The VLF survey showed several discontinuous conductors trending northwest. However, the line orientation may have confused the interpretation, as Fraser filter values show a stronger northeast trending anomaly, which would agree with the orientation of regional fault structures. An additional few lines oriented northwest are recommended to determine if there are northeast trending conductors that exist, or if the VLF conductors are caused by interference with surficial conductive clay units.

Some outcrop was noted by the author in the central area of claim 4273176, and some prospecting is recommended in this area. Outcrop occurred near a VLF crossover on the line at 588950 East (UTM, NAD83 Z17N), just to the north of the southern northwest trending magnetic high. Investigation of bedrock along this ridge may help to determine the cause of the VLF conductors, as well as the variable magnetic highs along the northwest trending magnetic anomalies.

7.0 Works Cited

Ontario Geological Survey, 2000. Airborne magnetic and electromagnetic surveys, Kirkland Lake Area; Ontario Geological Survey, Map 82 040, scale 1:20,000.

Jackson, S.L. 1995. Precambrian Geology, Larder Lake Area; Ontario Geological Survey, Map 2628, scale 1:50,000.

Note that assessment work files are summarized below in Appendix B.

Appendix A: Statement of Author Qualifications

1. I have graduated from Queen's University with a Bachelor of Science Degree in Engineering, majoring in geological engineering
2. I hold a current Ontario prospector's license (License Number: 1007743)
3. I have conducted and interpreted previous radiometric, magnetic, and VLF surveys over the past 3 years.

To the best of my knowledge and abilities, the statements, information and conclusions made in this report and accompanying maps and figures are correct.

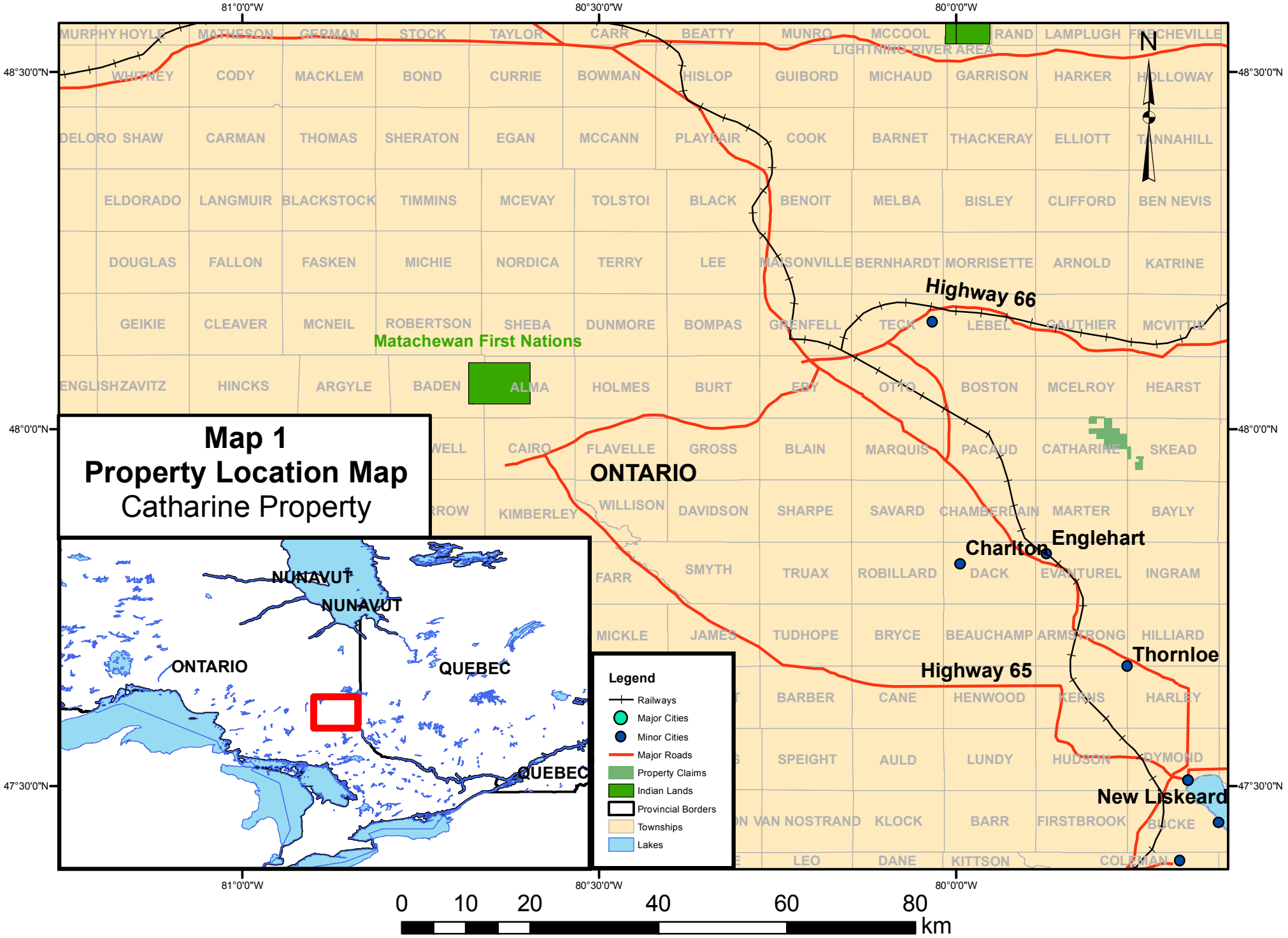
Signed:

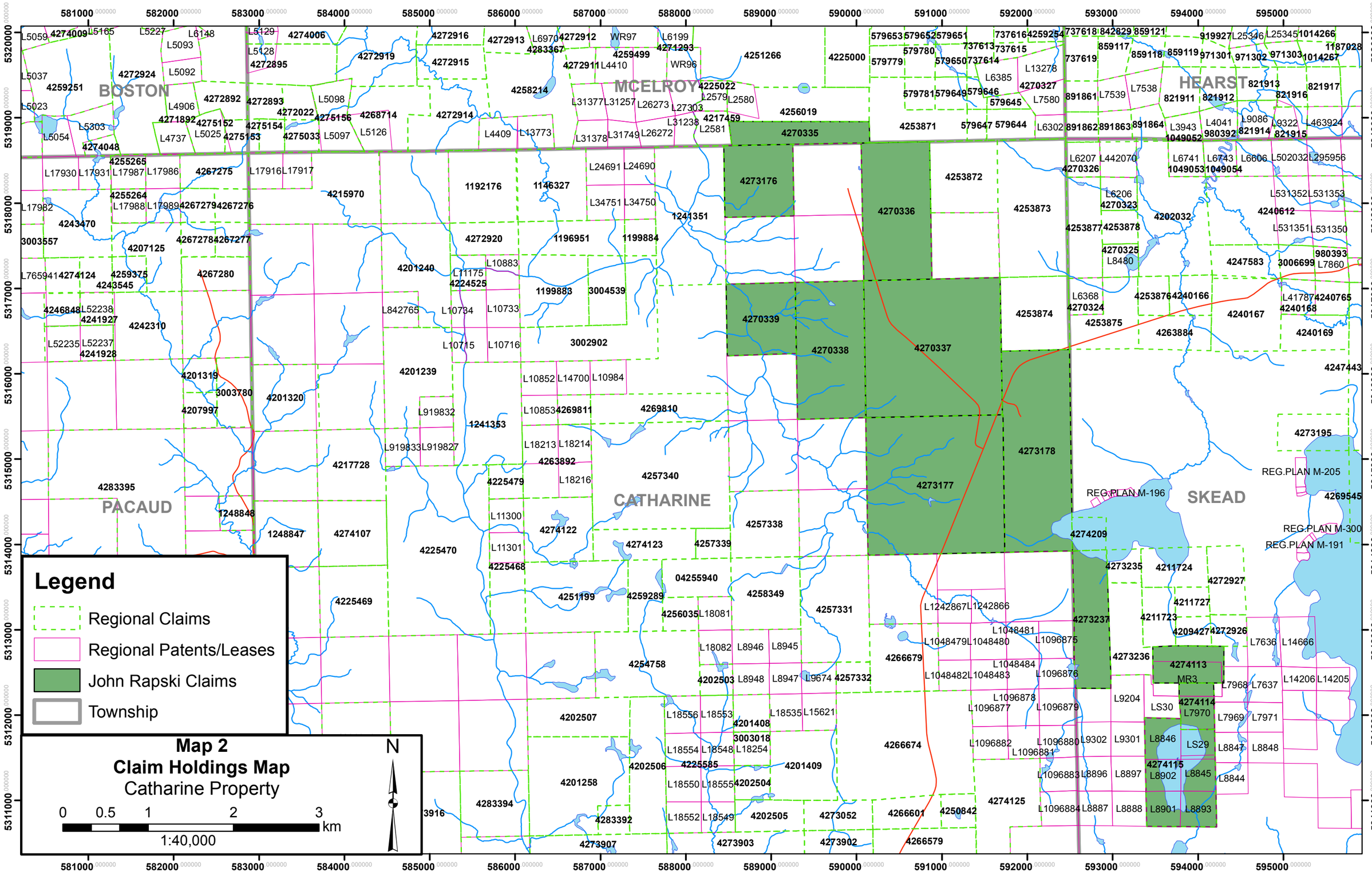
Lucas Currah

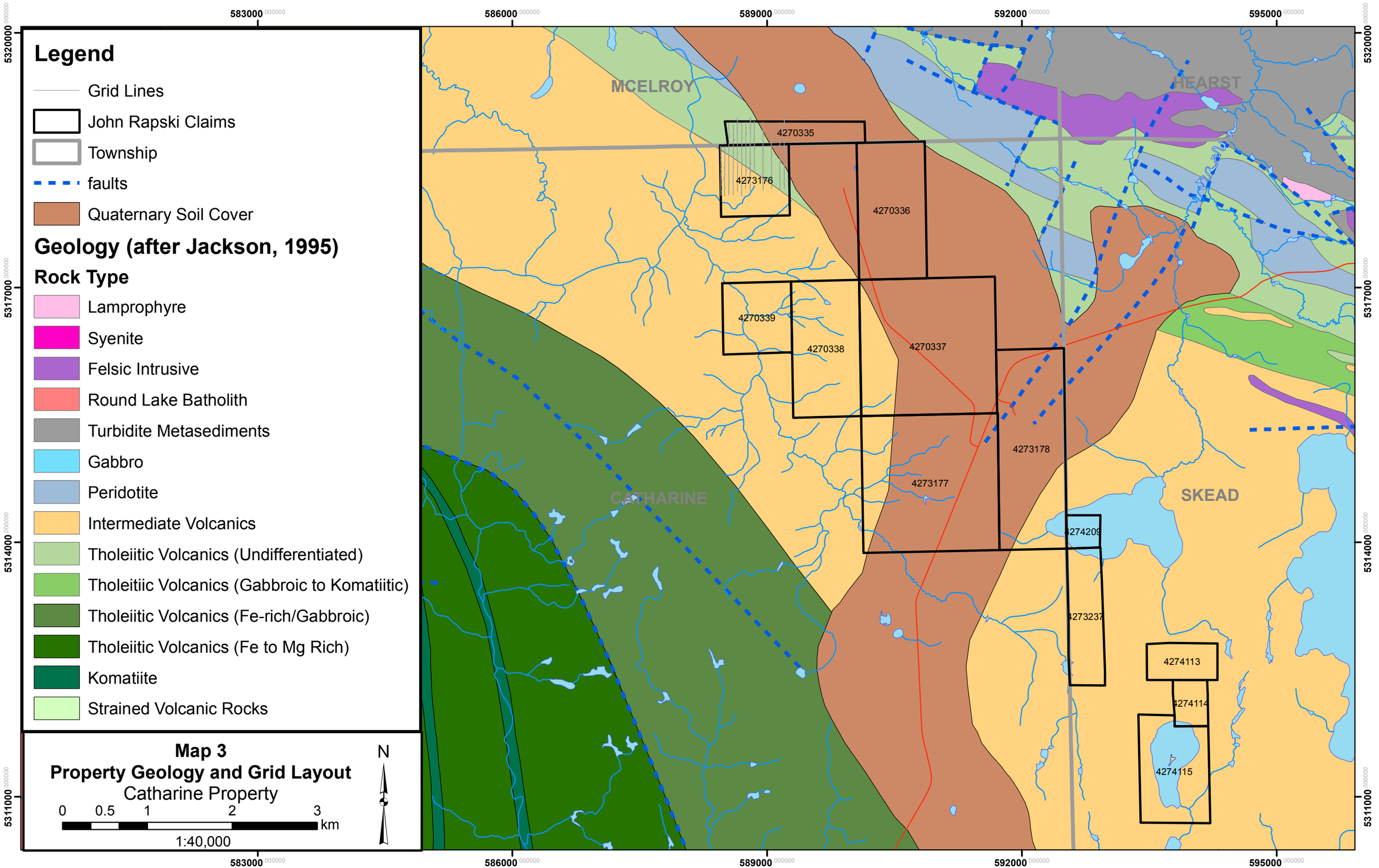
October 5th, 2015

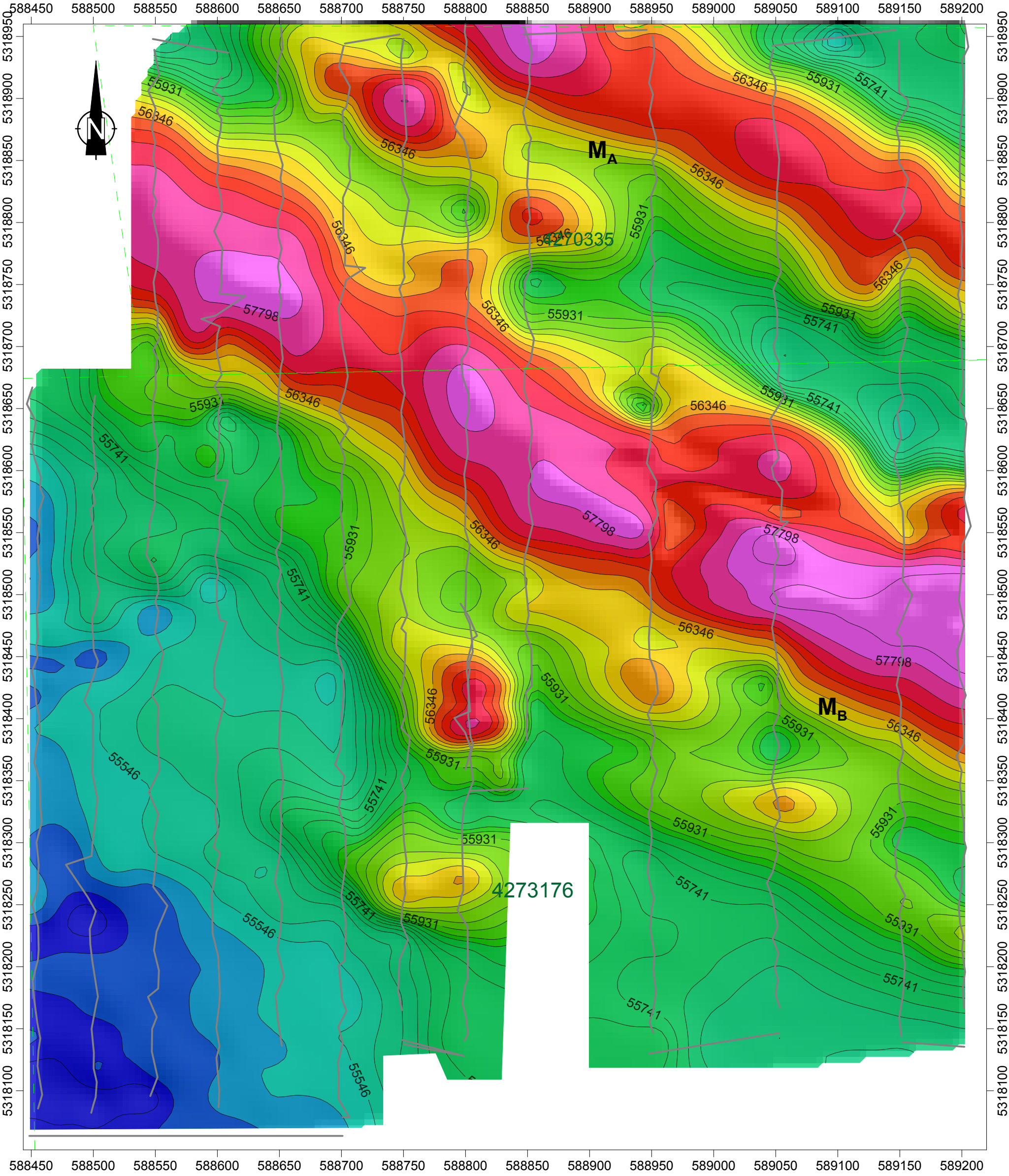
Appendix B: Summary of Assessment Work

Report Name	Author	Year	Location	Summary
Diamond Drilling for T&H Resources Ltd. (31M13NW0011)	Logged by D. Hawke	1993	Lots 2-4, Concession V and VI.	Diamond drill logs without assays are available, and report generally intermediate volcanic with lesser amounts of mafic volcanic and felsic volcanic sequences. Think overburden in the 2 holes (KK-93-1, KK-93-2) was quite deep at 20 and 36 meters, respectively.
Geological Survey on the Catharine Property (32D04SW0104)	Mary Greer	1984	Lots 1-6, Concession V and IV Catharine Township, Lots 10-12, Concession V and VI Skead Township	Geological survey for the Perron claims. The survey found very limited outcrop, except near the township boundary at concession V and VI, where peridotite outcrops were noted. Eskers, glaciofluvial sands, clays and tills were noted to overlay majority of the property. Agglomerates and porphyritic volcanics flows of intermediate composition were noted.
Vertical Loop EM and Magnetic Survey (32D04SE0129)	P. Eldrigde	1992	Lots 2-4, Concession V and VI.	Survey focused on a flat lying area near a peridotite outcrop near the township boundary. Conflicting EM responses were observed in clay overburden near a creek, and no further investigation was warranted by the author's interpretation.
Reverse Circulation Program for International Kengate Ventures	F. Kernicke	1994	Lots 1-6, Concession V and IV Catharine Township	Two reverse circulation drill holes, KV-1 and KV-2. Drilled to test Max-Min EM and Magnetic anomaly (circular), respectively. Intersected 30-40 meters of overburden, with barren basalt at bedrock. No follow-up work was recommended.
Horizontal Loop EM and Total Field Magnetometer Survey	R. Meikle	1994	Lots 2-4, Concession V and VI.	Limited weak to moderate conductors were identified on the survey grid, oriented NW associated with moderate magnetic anomalies.


81°0'0"W
80°30'0"W
80°0'0"W
48°30'0"N
48°0'0"N
47°30'0"N
N
Map 1
Property Location Map
Catharine Property
Matachewan First Nations
Highway 66
Highway 65
ONTARIO
Charlton
Englehart
Thornloe
New Liskeard
NUNAVUT
NUNAVUT
ONTARIO
QUEBEC
QUEBEC
Legend
Railways
Major Cities
Minor Cities
Major Roads
Property Claims
Indian Lands
Provincial Borders
Townships
Lakes
0 10 20 40 60 80
km


BOSTON
MCELROY
HEARST
PACAUD
CATHARINE
SKEAD
REG.PLAN M-205
REG.PLAN M-196
REG.PLAN M-300
REG.PLAN M-191
Legend
Regional Claims
Regional Patents/Leases
John Rapski Claims
Township
Map 2
Claim Holdings Map
Catharine Property
0 0.5 1 2 3 km
1:40,000
N


Legend
Grid Lines
John Rapski Claims
Township
faults
Quaternary Soil Cover
Geology (after Jackson, 1995)
Rock Type
Lamprophyre
Syenite
Felsic Intrusive
Round Lake Batholith
Turbidite Metasediments
Gabbro
Peridotite
Intermediate Volcanics
Tholeiitic Volcanics (Undifferentiated)
Tholeiitic Volcanics (Gabbroic to Komatiitic)
Tholeiitic Volcanics (Fe-rich/Gabbroic)
Tholeiitic Volcanics (Fe to Mg Rich)
Komatiite
Strained Volcanic Rocks
Map 3
Property Geology and Grid Layout
Catharine Property
0 0.5 1 2 3
km
1:40,000
N
583000
586000
589000
592000
595000
5320000
5317000
5314000
5311000
MCELROY
HEARST
CATHARINE
SKEAD
4270335
4273176
4270336
4270339
4270338
4270337
4273178
4273177
4274209
4273237
4274113
4274114
4274115



John Rapski
Catharine Property Survey

Map 4:
Total Magnetic Field

Figures Created by: Lucas Currah
Map Datum: UTM NAD83 Zone 17 (CSRS98)
Scale: 1:3,500
Claim Numbers: 4273176, 4270335
Township: McElroy, Catharine
Division: Larder Lake

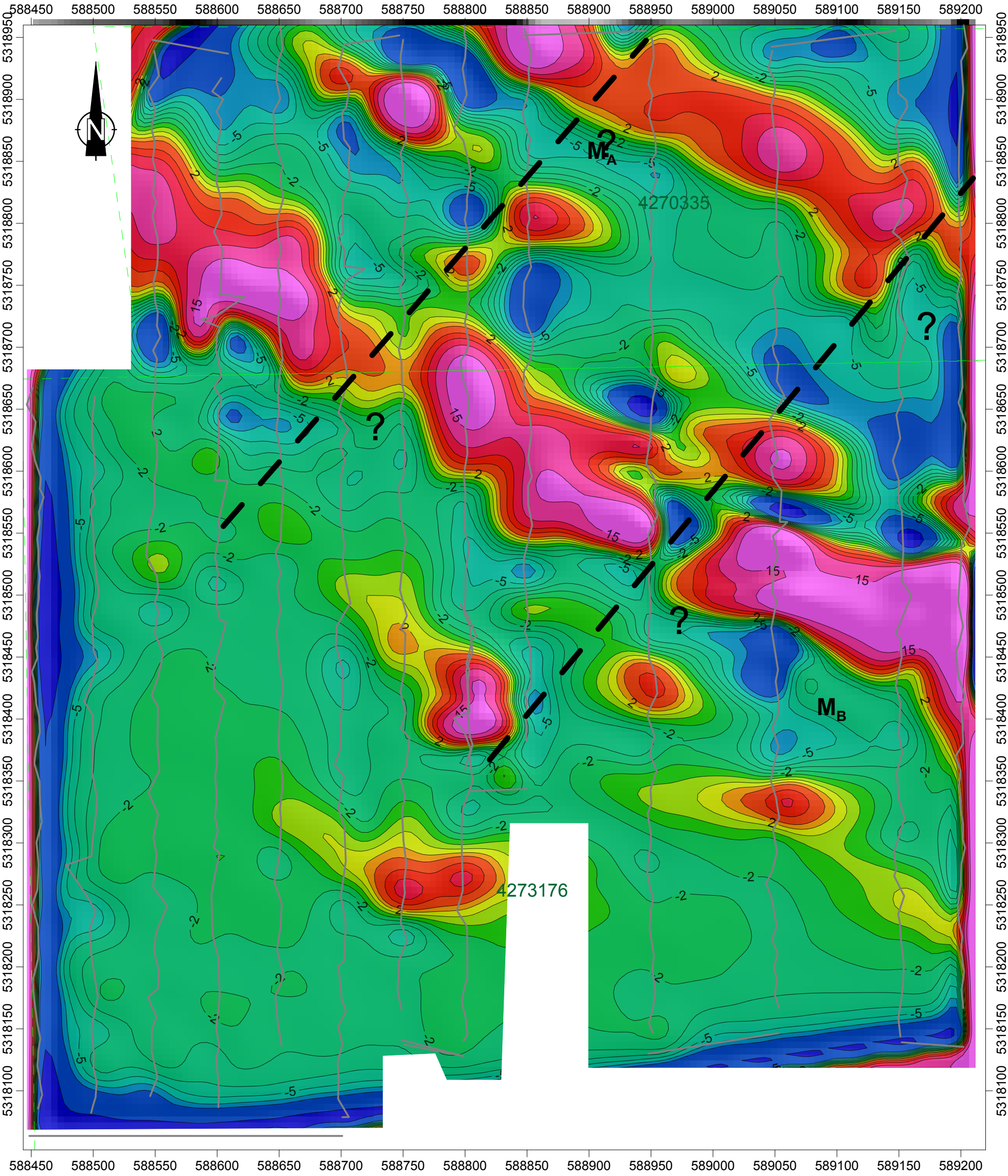
Instrument: GSM-19 Overhauser Magnometer
Base Field: 56,000 nT
VLF Station: Cutler, Maine (24.0 kHz)
Sign Convention: Increasing secondary field strength to the north is postive
Surveyor: Lucas Currah
Date: September, 2015 **Kilometers:** 11.5

Line Location

0m 100m 200m 300m

Magnetic Field (nT)

58507
57798
57251
56867
56649
56470
56346
56233
56131
56069
55986
55931
55882
55855
55815
55776
55741
55701
55664
55617
55573
55546
55507
55468
55410
55352
54644



John Rapski
Catharine Property Survey

Map 5:
1st Vertical Derivative of Magnetic Field

Figures Created by: Lucas Currah
Map Datum: UTM NAD83 Zone 17 (CSRS98)
Scale: 1:3,500
Claim Numbers: 4273176, 4270335
Township: McElroy, Catharine
Division: Larder Lake

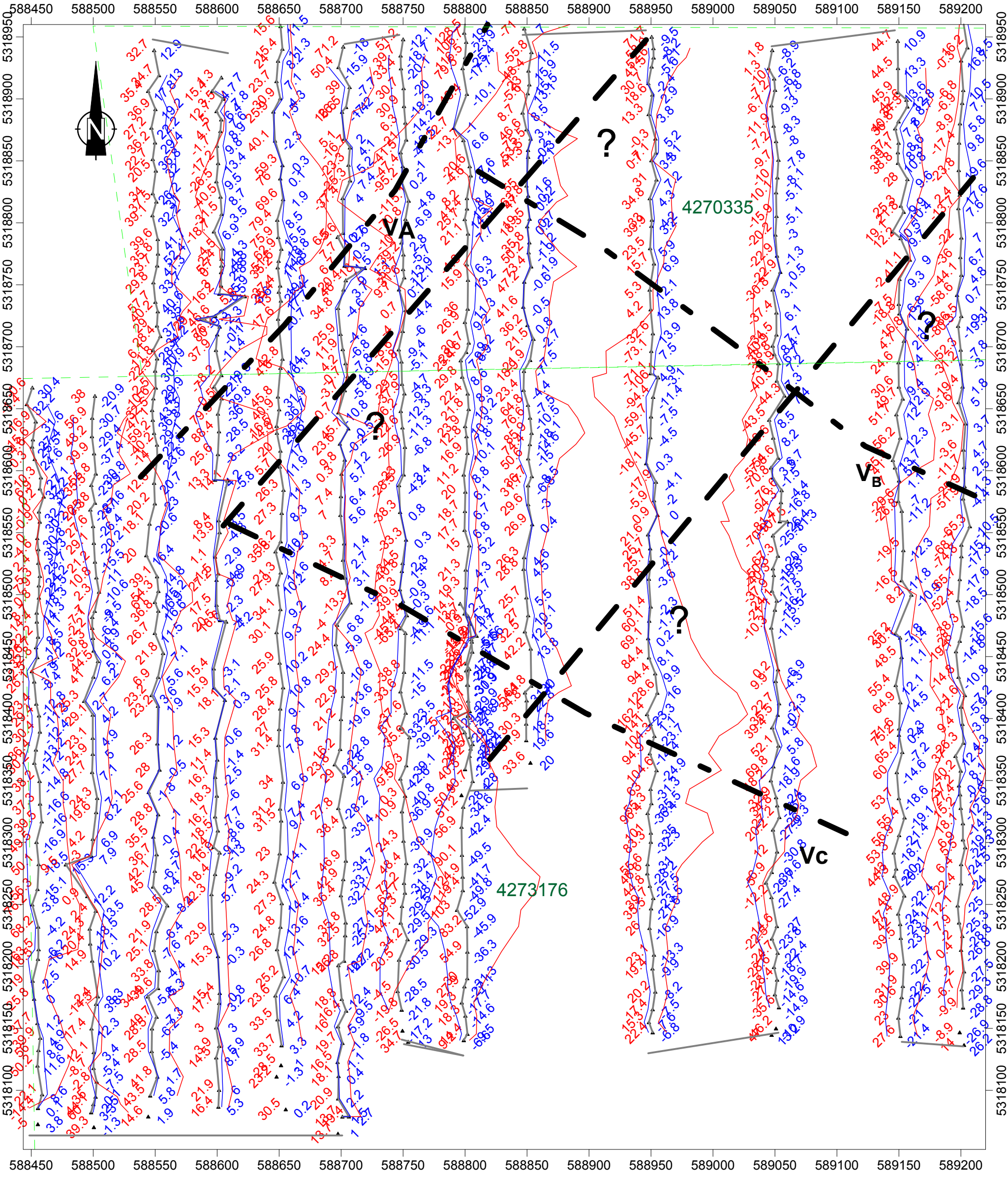
Instrument: GSM-19 Overhauser Magnometer
Base Field: 56,000 nT
VLF Station: Cutler, Maine (24.0 kHz)
Sign Convention: Increasing secondary field strength to the north is postive
Surveyor: Lucas Currah
Date: September, 2015 **Kilometers:** 11.5

Line Location

0m 100m 200m 300m

Calculated 1st Vertical Derivative of Magnetic Field (nT)

69
15
10
7
5
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-12
-63
-149

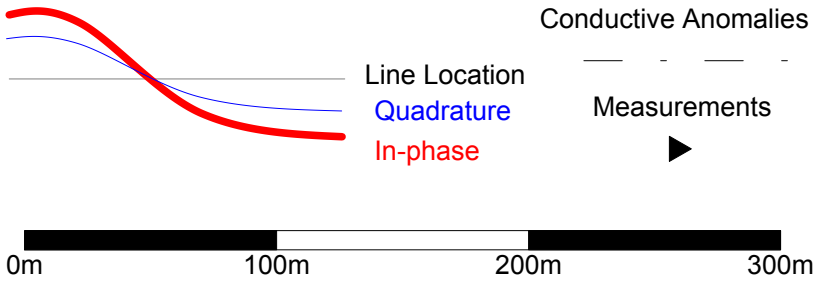


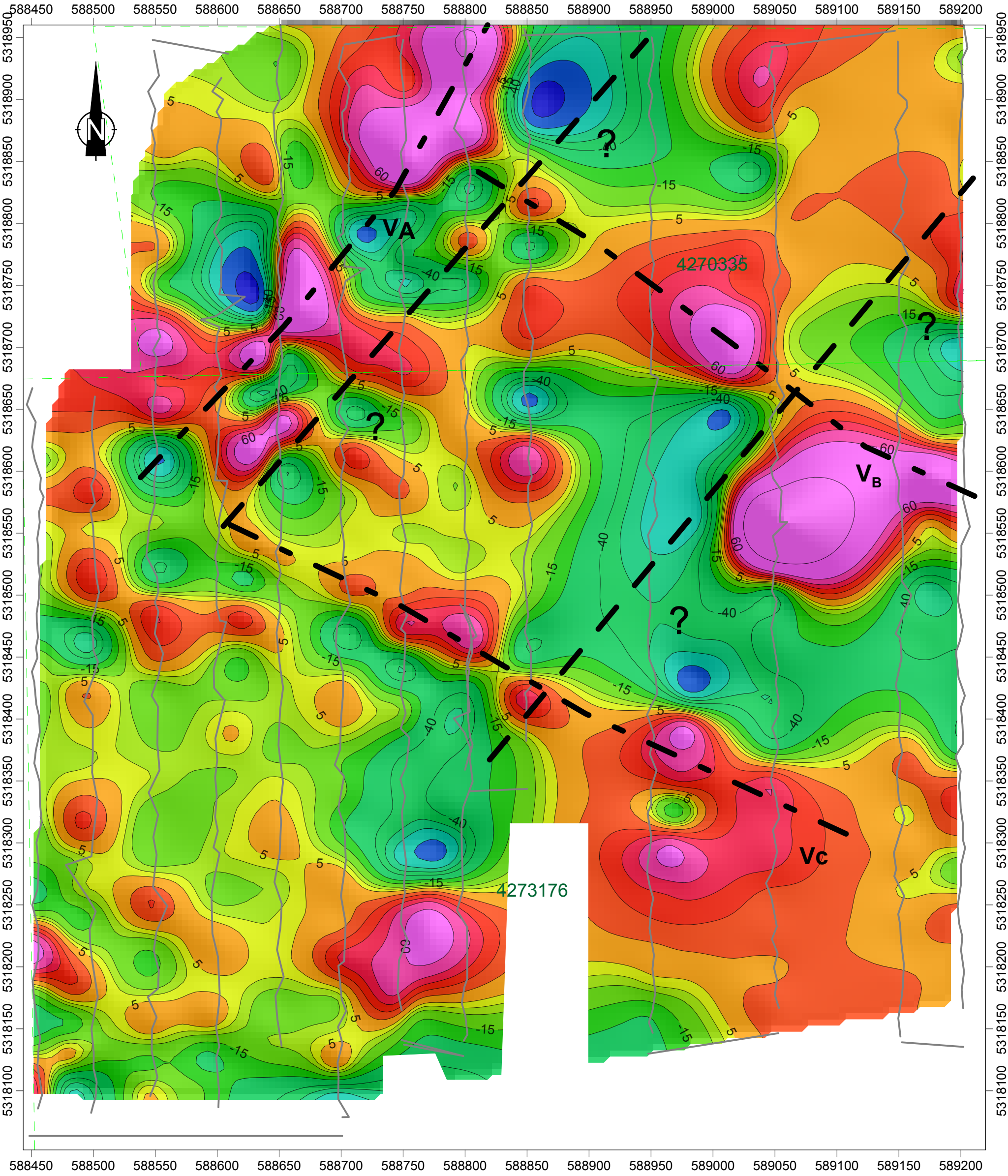
John Rapski
Catharine Property Survey

Map 6:
VLF Profiles

Figures Created by: Lucas Currah
Map Datum: UTM NAD83 Zone 17 (CSRS98)
Scale: 1:3,500
Claim Numbers: 4273176, 4270335
Township: McElroy, Catharine
Division: Larder Lake

Instrument: GSM-19 Overhauser Magnometer
Base Field: 56,000 nT
VLF Station: Cutler, Maine (24.0 kHz)
Sign Convention: Increasing secondary field strength to the north is postive
Surveyor: Lucas Currah
Date: September, 2015 **Kilometers:** 11.5





John Rapski
Catharine Property Survey

Map 7:
Fraser Filter

Figures Created by: Lucas Currah
Map Datum: UTM NAD83 Zone 17 (CSRS98)
Scale: 1:3,500
Claim Numbers: 4273176, 4270335
Township: McElroy, Catharine
Division: Larder Lake

Instrument: GSM-19 Overhauser Magnometer
Base Field: 56,000 nT
VLF Station: Cutler, Maine (24.0 kHz)
Sign Convention: Increasing secondary field strength to the north is postive
Surveyor: Lucas Currah
Date: September, 2015 **Kilometers:** 11.5

Line Location
Quadrature
In-phase
Conductive Anomalies

0m 100m 200m 300m

4 Point Fraser Filter Value

120
60
45
35
25
15
5
0
-5
-15
-25
-40
-50
-60
-75
-95
-110