

GM 72357

Induced polarization survey configuration OreVision IP, Gaudet-Fénelon project

Documents complémentaires

Additional Files



Licence



License

Cette première page a été ajoutée
au document et ne fait pas partie du
rapport tel que soumis par les auteurs.

Énergie et Ressources
naturelles

Québec 

INDUCED POLARIZATION SURVEY - CONFIGURATION



LOGISTICS AND INTERPRETATION REPORT

PREPARED FOR



GAUDET-FÉNELON PROJECT

FÉNELON TOWNSHIP, QUÉBEC, CANADA

SEPTEMBER 2021



Abitibi Geophysics, Head Office
1740, Sullivan road, suite 1400
Val-d'Or, QC, Canada, J9P 7H1

Phone: 1.819.874.8800
Fax: 1.819.874.8801
info@ageophysics.com

21QC014-P2



TABLE OF CONTENTS

1. Research Objective.....	1
2. Implemented Solution	4
3. Geophysical Interpretation	8
4. Recommendations and Conclusion.....	16
Appendix A: Project Overview	25
Appendix B: Data Acquisition	28
Appendix C: Data Processing and Deliverables	31

LIST OF TABLES

Table 1. OreVision® Drilling Targets on the Gaudet-Fénelon Project.....	17
Table 2. Quality Statistics – OreVision®	30
Table 3. Maps Produced	33

LIST OF FIGURES

Figure 1. Simplified structures, mineralized zones and property outlines of the Detour-Fénelon Gold Trend region. ...	2
Figure 2. Current OreVision®, previous 2020 AG OreVision® and 2019 TMC IP survey grids along with the main shear and mineralized zones.	3
Figure 3. To the left, conventional IP pseudosections. To the right, OreVision® IP pseudosections demonstrating the increased depth of investigation.....	5
Figure 4. A conventional IP survey allows the detection of the roof of this body buried at 50 m depth (top vertical section). OreVision® also allows to define the vertical extension (bottom section).....	5
Figure 5. OreVision® can detect a very deep source even below another.....	6
Figure 6. Demonstration of the efficiency of increasing the factor "n" versus the spacing "a" to see deeper.	6
Figure 7. Receiver ElrecPRO and SwitchPRO 240 from IRIS Instruments, automatically performing a series of several thousand compliance tests.....	7
Figure 8. Resistivity at an elevation of 100 m showing the interpreted features along with the structural interpretation of the region.	10
Figure 9. Geophysical interpretation including inferred faults and proposed DDH collars, underlain by resistivity grid at an elevation of 100 m.....	14
Figure 10. Geophysical interpretation including inferred faults and proposed DDH collars, underlain by TMI grid.	15
Figure 11. General location of the Gaudet-Fénelon Project.	25
Figure 12. Mining titles, TMC Geophysics 2019 IP and OreVision® survey coverages over the Gaudet-Fénelon Project.....	27
Figure 13. Transmitted signal across C ₁ – C ₂	29
Figure 14. Linear windows (1 s pulse).....	29



1. RESEARCH OBJECTIVE

The Gaudet-Fénelon Project is found in the northernmost portion of the famous Archean Abitibi greenstone belt. More precisely, this joint venture property, between Probe Metals and Midland Exploration, is located just south of the Sunday Lake Deformation Zone ("SLDZ") and covers over 20 kilometres of the Lower Detour Deformation Zone ("LDDZ"), two major east-west structures who respectively host the Detour Lake mine and the recent high-grade gold discoveries in Zone 58N (Kirkland Lake Gold). This project is also adjacent to Walbridge Mining's property which hosts the Fénelon, Tabasco and Reaper gold zones and many more mineralized zones (Figure 1).

Within this prolific Detour-Fenelon Gold trend, the mineralization occurs along or nearby those extensive multikilometer-long shear corridors and is primarily associated with quartz/carbonate veins and metallic sulphides in variable concentrations (mainly pyrite), but this region also has a potential for volcanogenic massive sulfide (VMS) deposits.

The application of the Induced Polarization method has proven to be efficient in this exploration context with many surveys conducted all over this prospective mining region. In 2020, an OreVision® IP survey was conducted for Midland Exploration on the adjacent property (Project 20QC048-P2). TMC Geophysics also successfully carried out an IP survey over the property in 2019 (Reference: 19C-341). Abitibi geophysics was therefore mandated to carry out an OreVision® IP survey over a larger portion of the Gaudet-Fénelon property, surrounding TMC's survey grid. (Figure 2).

As the mineralisation on this property is likely to be found within a network of quartz veins with a substantial amount of disseminated sulphides, the predicted response will likely be a series of weak to moderate chargeability increases associated with resistivity highs (Gold Index) or found within near by narrow zones of lower resistivities (shear zones). The intersections of late faults and shear zones should be considered for targeting in this exploration context.

Considering the significant overburden layer covering almost the entire survey area, even very low intensity anomalies could be of interest here. Anomalies that are conductive and chargeable, although not of primary importance, may also prove worthy of further investigation since this area has potential for VMS type anomalies as well. But caution should be taken in the exploration of such types of anomalies, as their signature could also be graphitic formations.

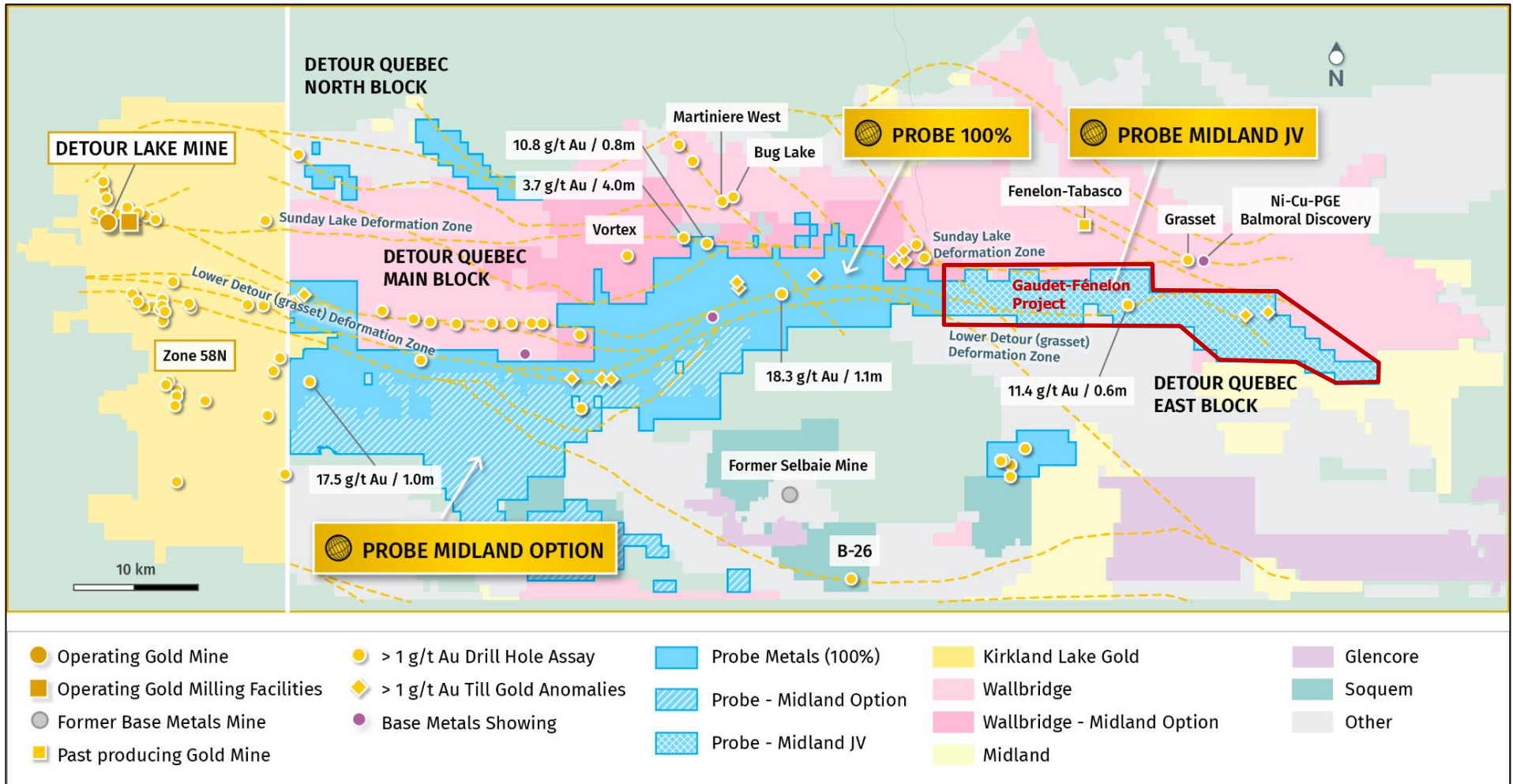


Figure 1. Simplified structures, mineralized zones and property outlines of the Detour-Fenelon Gold Trend region.

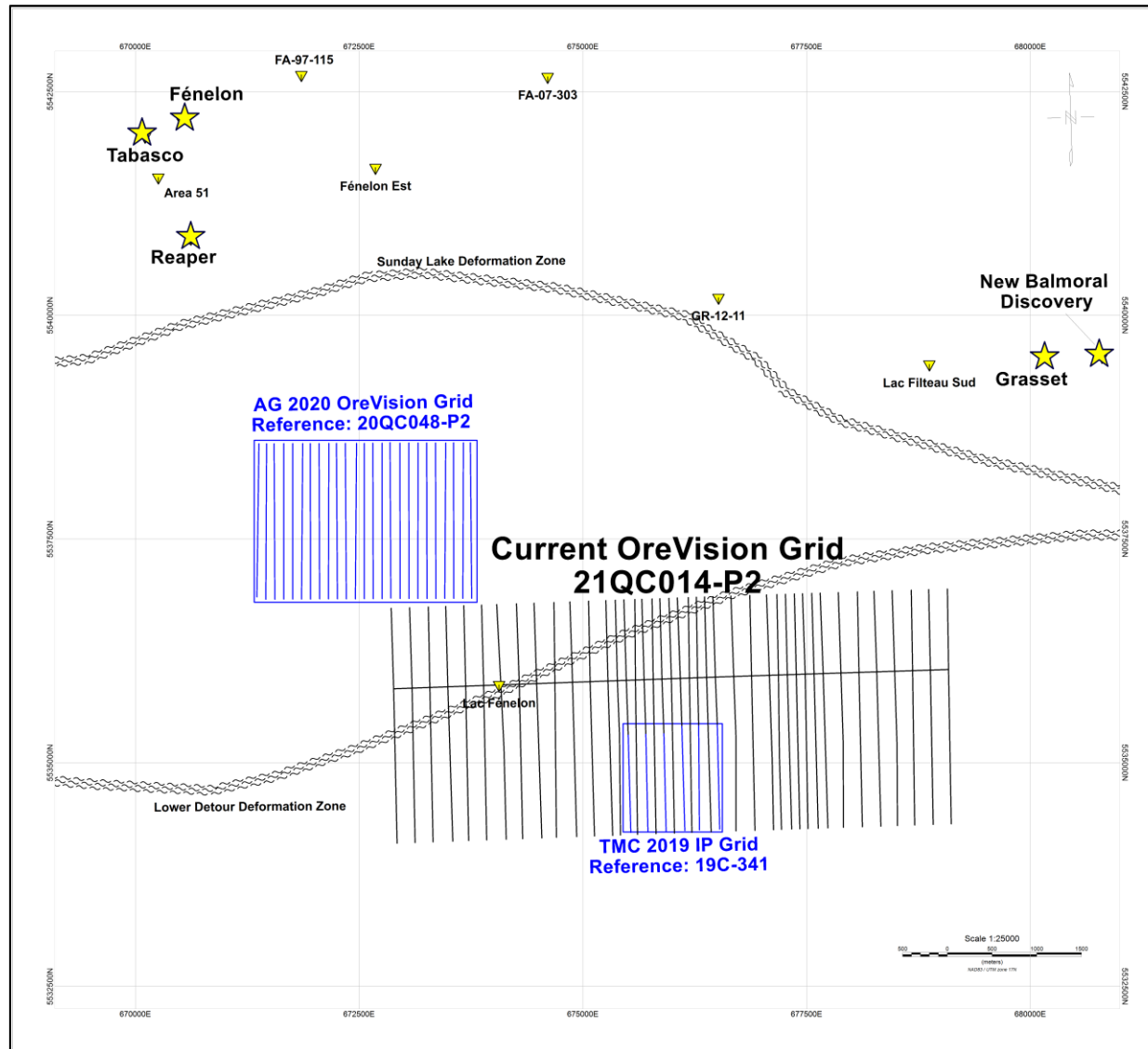


Figure 2. Current OreVision®, previous 2020 AG OreVision® and 2019 TMC IP survey grids along with the main shear and mineralized zones.



2. IMPLEMENTED SOLUTION

The basic field implementation of IP is simple. An electrical current (**I**) is sent through the ground, via a pair of current electrodes (C_1 - C_2). The primary voltage difference ΔV_p between two potential electrodes (P_1 - P_2) allows for the determination of the **apparent resistivity** (ρ_a) of the subsurface. The apparent resistivity is expressed in ohm-m (**Ωm**) and is proportional to the difficulty of the electric current to circulate in the ground. In the absence of a solid metallic conductor, the resistivity will be largely dependant on the porosity of the rocks. The following geological phenomena will act on the resistivity of the rock formations:

<u>Decrease</u>	<u>Increase</u>
Clay weathering	Carbonatation
Fracturing	Silicification
Shearing	Sericitization
Metamorphism	Albitization
Dissolution	Compaction
Saltwater	Metamorphism

The electrical current (**I**) will also charge the surface of the metallic minerals with the ions present in the groundwater, like little batteries in the ground. Once the current (**I**) is switched off, those batteries will discharge. The receiver records that weak secondary voltage difference ΔV_s decaying with time between the two potential electrodes (P_1 - P_2). The **chargeability** is the measure of this IP effect and is proportional to the total surface of metallic minerals in the subsurface rocks in contact with groundwater, just like lead plates in acid in a car battery. The secondary voltage ΔV_s is normalized by the primary voltage difference ΔV_p and by the acquisition time interval; the chargeability is therefore expressed in mV/V. In order to produce an anomaly, the grains do not need to be connected together, unlike electromagnetic (EM) methods.

Resistivity / induced polarization surveys are therefore very useful in mineral exploration to detect:

- Occurrences of disseminated sulphides (as low as 0.5%) to which gold, silver, copper, molybdenum, etc. could be associated. When disseminated in a silicified, carbonated sericitized or albitized rock, the apparent resistivity will rise above the level of the other host rocks, facilitating the interpretation of these occurrences.
- Semi-massive to massive, non-conductive clusters (rich in sphalerite, silicified or electrically discontinuous).
- Massive clusters that do not offer good coupling with EM fields (vertical cylinder or small lenses).



The main disadvantage of IP surveys is that other chargeable minerals exist, such as graphite, clay minerals and some oxides. From a geological point of view, IP responses are almost never uniquely interpretable. The power of the IP technique can also be greatly diminished by the presence of a conductive overburden layer covering the basement rock. The OreVision® approach fills this gap while offering many advantages over conventional methods:

- Improved penetration through conductive overburden.
- Greater depth of investigation (2 to 4 times higher than conventional techniques, Figure 3).
- Better near surface resolution.
- Increased definition of the vertical extent of sources (Figure 4).

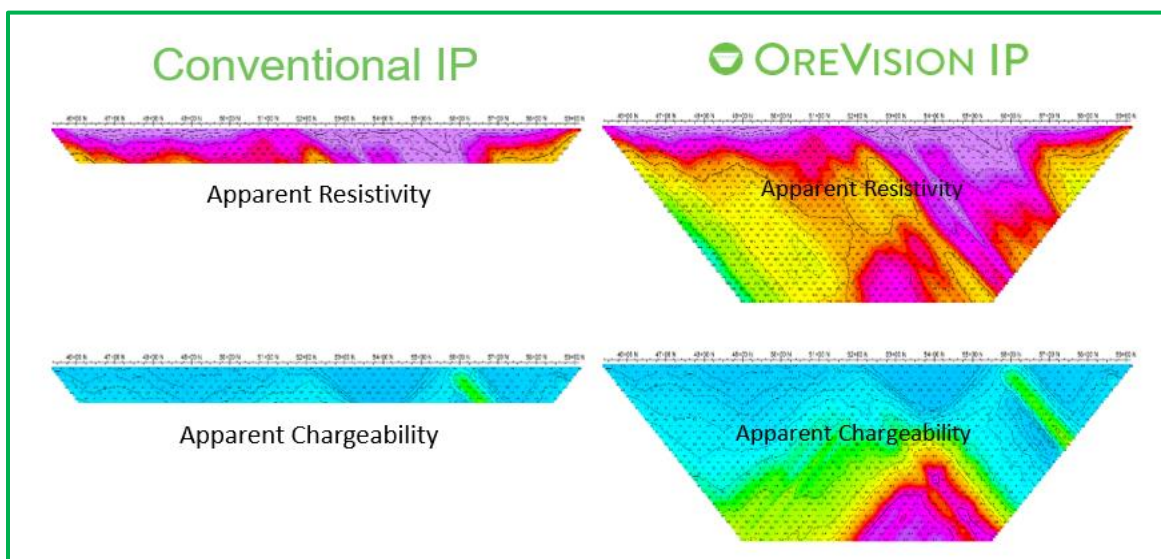


Figure 3. To the left, conventional IP pseudosections. To the right, OreVision® IP pseudosections demonstrating the increased depth of investigation.

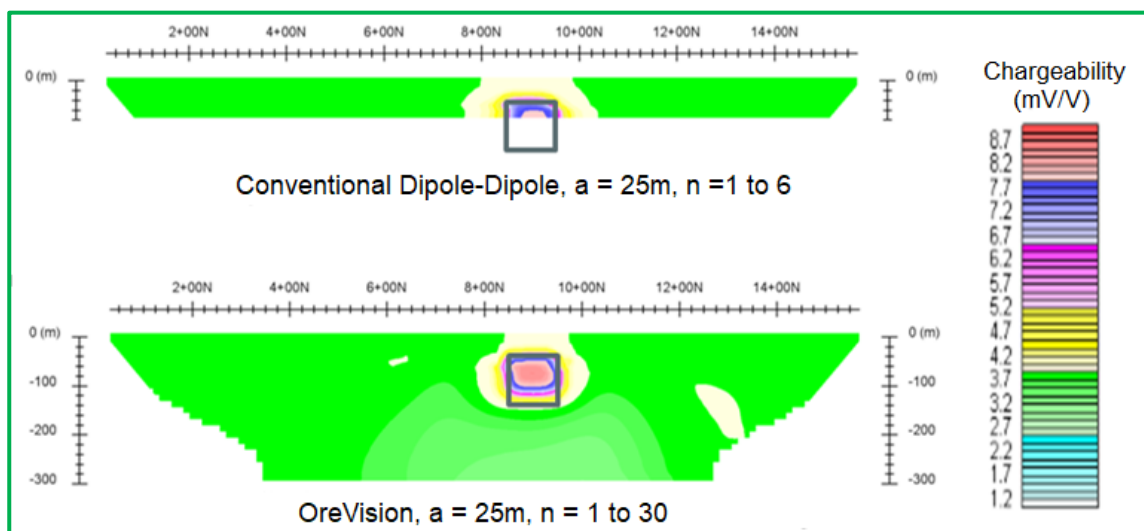


Figure 4. A conventional IP survey allows the detection of the roof of this body buried at 50 m depth (top vertical section). OreVision® also allows to define the vertical extension (bottom section).



- Enhanced discrimination of one source overlying another (Figure 5).

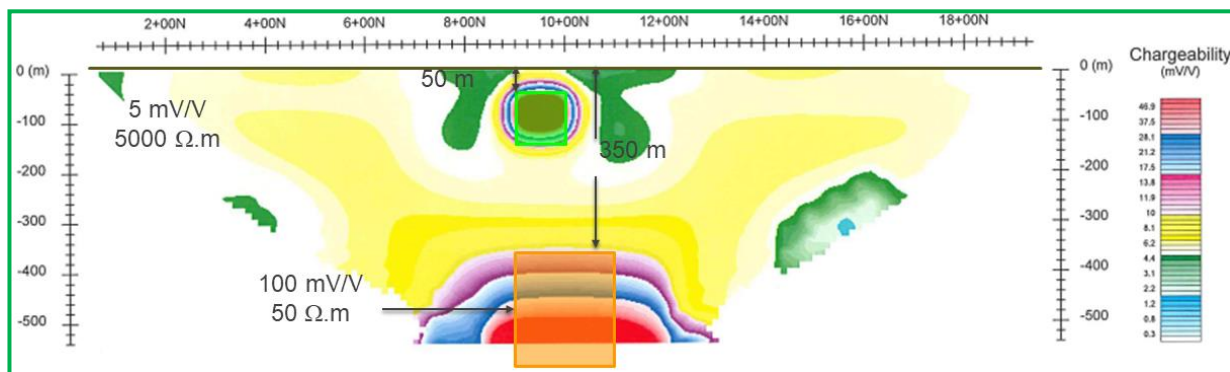


Figure 5. OreVision® can detect a very deep source even below another.

- Higher data density, providing comprehensive coverage.
- More reliable 3D data inversions, allowing accurate drill targets to be delivered.

The OreVision® system was designed with the following consideration in mind. Figure 6 compares the difference in resolution between increasing the "n" factor versus using larger "a" spacings. For a body buried at 200 m depth, the top section shows the inefficiency of 200 m "a" spacings with "n" factors 1-6. The middle section shows a very weak response, below the normal noise level, with an "a" spacing of 100 m. The bottom section shows that this same body is easily detected with "a" spacings of 25 m and "n" factors from 1 to 30.

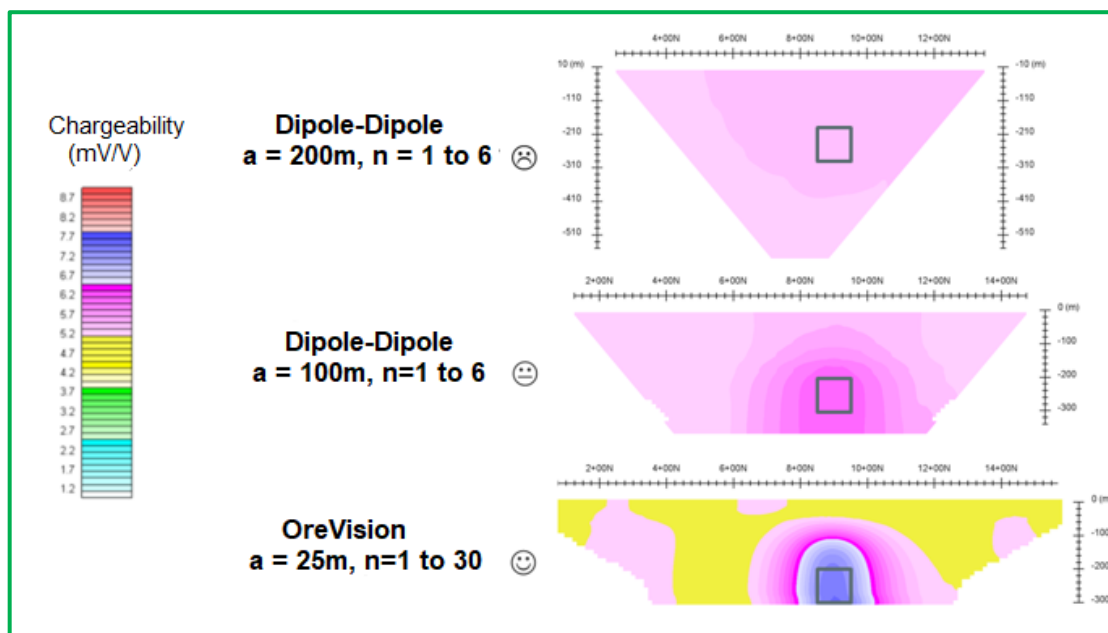


Figure 6. Demonstration of the efficiency of increasing the factor "n" versus the spacing "a" to see deeper.

To achieve this degree of resolution, the following technological advances have been made:

- The development of a special 24-conductors cable with triple electrical insulation that ensures faultless measurements.
- The design and construction of an electronic switch (up to 240 channels) for automatic addressing of measuring electrodes, without numbering or connection errors (Figure 7).

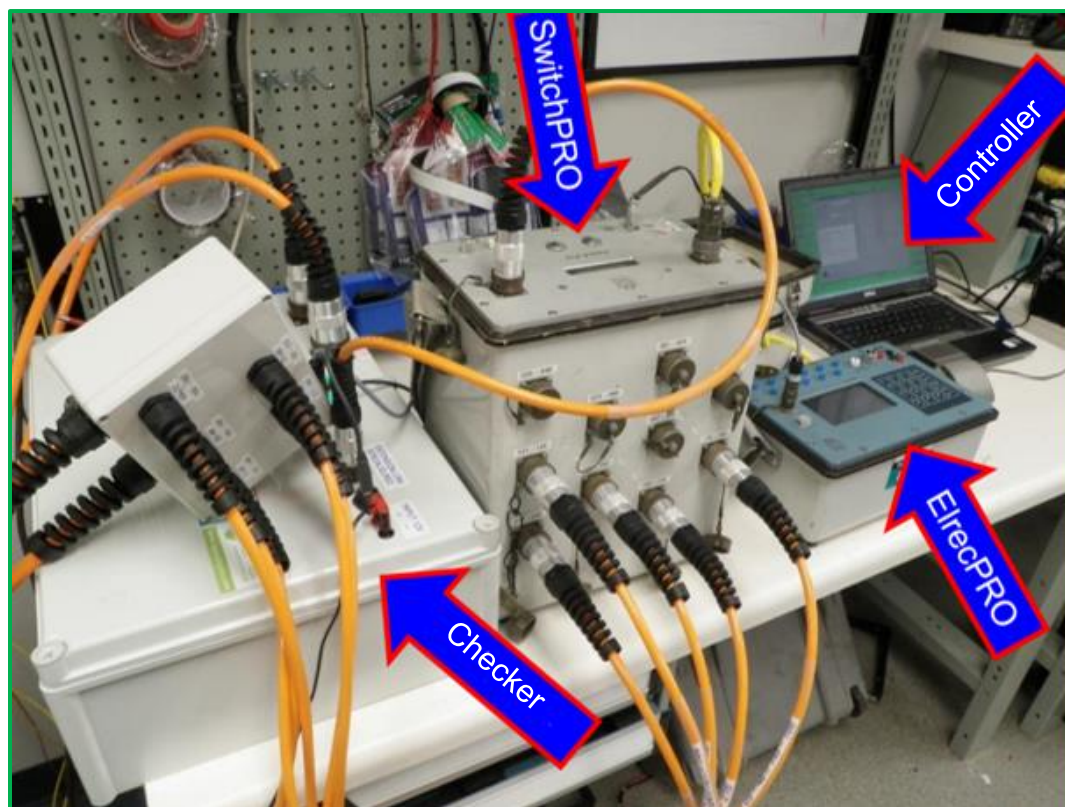


Figure 7. Receiver ElrecPRO and SwitchPRO 240 from IRIS Instruments, automatically performing a series of several thousand compliance tests.

- The development by our partner IRIS Instruments of a powerful transmitter (13 A) that is transportable by a single operator.
- The optimization of our current injection method to maximize the signal-to-noise ratio.
- The streamlining of field operations allowing productivity like that of conventional approaches, therefore at a comparable price.
- The implementation, on a cloud platform, of a powerful algorithm that allows us to perform 3D inversions with less approximation than conventional solutions.



3. GEOPHYSICAL INTERPRETATION

The OreVision® survey, performed along 41 profiles (L 11+00W to L 51+00E) was successful in mapping the resistivity and chargeability properties of the geological formations lying within the Gaudet-Fénelon Project.

Quality control (QC) performed on the collected OreVision® data validated 99% of the recorded readings.

The validated data were subjected to a 3D inversion using the Res3D inversion platform. The Res3D software solves two inverse problems. The resistivity data are first inverted to recover the spatial distribution of electrical resistivities, and, secondly, the chargeability data are inverted to recover the spatial distribution of polarizable particles in the rocks. This inversion is intended to better characterize the position, geometry and physical parameters of the highlighted conductive, resistive and polarizable sources. The inversion process also included the data collected by TMC geophysics in 2019 (the southern portion of lines L 15+00E, L 17+00E, L 19+00E, L 21+00E, L 23+00E and L 25+00E).

From the recovered Resistivity and Chargeability Earth Models, plan contour maps of Resistivity (8.2) and Chargeability (8.3) as well as vertical sections were produced. The Metal Factor and Gold Index were calculated and shown on plan contour maps (8.4 & 8.6). The Gold Index is also shown on the vertical sections.

The interpretation was conducted by first highlighting the chargeable anomalies with the help of the pseudosections, the recovered 3D models, the vertical sections and plan contour maps. These observed anomalies were indicated on the vertical sections and those that seemed to be produced by the same anomalous source were correlated from line-to-line and grouped together in what is called a polarizable axis or trend. They were graded according to their priority (importance), strength, chargeability/resistivity associations (Gold Index strength) and their association with the observed structures, and then transposed onto a plan map.

The reader is requested to consult Appendix C for the meaning of the Gold Index parameter and to follow the description of the results using the *Geophysical Interpretation Map* (10.0).

The structural interpretation provided by Probe Metals is in good agreement with this newly acquired OreVision® dataset. We only extended one NW fault zone through this survey grid, as it fits our interpreted chargeable trends and conductive corridors. This fault extension, labelled as F1, is plotted along the other structures on the *Geophysical Interpretation Map* (10.0).

❑ RESISTIVITY

On this survey grid, the dynamic range of resistivity values is low, ranging from approximately 25 to over 7 000 Ohm-m. High resistivity and low resistivity zones have been outlined in blue and pink on the *Geophysical Interpretation Map* (10.0). The high resistivity zones are marked by values greater than 2 500 Ohm-m, while the low resistivity zones by values less than 500 Ohm-m.

The contour plan maps (depth slices), extracted from Resistivity inversion models, are plotted at elevations of 200 m, 100 m and 0 m. These maps, alongside the apparent resistivity pseudosections and true-depth sections, have been used to interpret several resistive and conductive features. The most predominant features are listed below and illustrated in Figure 8.



- A well-defined strongly conductive zone (≤ 150 Ohm-m) spans this survey grid in a NE-SW direction. With close attention and observation, this zone can be interpreted as 2 distinct trends, labeled **C2** and **C3**. The northern **C3** trend appears broken in segments, probably due to faulting. This highly conductive trend could reflect the signature of the Lower Detour Deformation Zone (LDDZ).
- Another, short, ENE corridor of low resistivity labelled **C4** is found north of **C3**.
- One more conductive trend, labelled **C1**, is highlighted in the southern portion of the survey grid. The first section of this trend (**C1A**) is not fully resolved as it lies at the end of survey lines. East of L 3+00E, this trend appears to have undergone a significant northward offset. This narrow, well-defined offset segment (**C1B**) can be traced to L 41+00E. Another abrupt change in direction, east of L 41+00E, may suggest more faulting. It is unclear whether this zone is related to the **C1C** segment or whether it offsets southward with the half resolved **C5** conductive zone.
- The plan map 8.2_200 as well as all the vertical sections of the inverted resistivity data outline the presence of an extensive overburden layer, averaging 50 m in thickness, covering the entire survey grid. The resistivity of this layer varies from approximately 7 to 300 Ohm-m.
- A narrow, well-defined resistive corridor (**R2**) extends across nearly the entire survey grid. It is interpreted as two broken segments (**R2A** and **R2B**), trending parallel and south of the dominant shear zone representing the LDDZ, in the western part of the grid. Further east, this zone bifurcates (segments **R2C** and **R2D**) and disappears on the eastern survey lines.
- A large, elongated resistive zone (**R3A**) is mapped in the center of the survey grid. This resistive zone extends northward to form a large circular zone **R4**, which probably defines an overburden-covered terrain of the study area. East of line 41+00E, this resistive trend appears to be affected by numerous fault zones, resulting in its segmenting (**R3B**, **R3C** and/or possibly **R3D**).
- An elongated resistive zone, labelled as **R1**, extends from survey line L 14+00E to L 31+00E south of **C1B**.
- Two short NE-SW trending resistive corridors were identified in the northwest corner of the study grid. **R5** appears wedged between **C3** and **C4**, while **R6** is found north of **C4**.

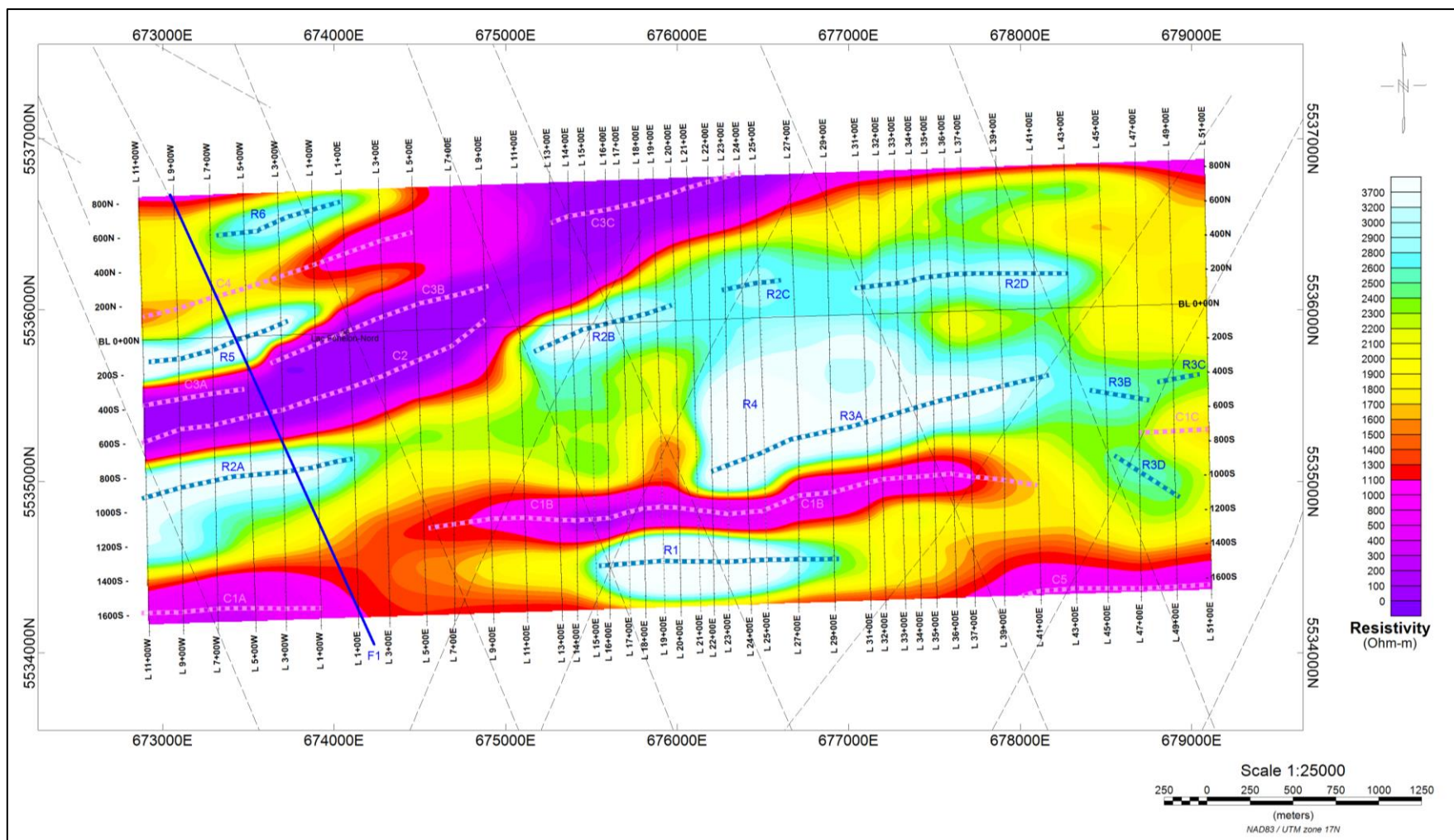


Figure 8. Resistivity at an elevation of 100 m showing the interpreted features along with the structural interpretation of the region.



❑ CHARGEABILITY

The overall chargeability response is moderate with an average chargeability background of about 1 to 4 mV/V and anomalous zones of moderate to high chargeability values ranging from 6 mV/V up to over 50 mV/V.

Following a detailed interpretation of the pseudosections and with the help of the recovered vertical sections, a total of **nine (9)** distinctive polarizable trends have been delineated on the Gaudet-Fénelon property. The surface projections of those interpreted anomalies are illustrated on the *Geophysical Interpretation Map (10.0)*.

A description of the interpreted anomalous trends is written below and further explanation on the selected targets can be found in Table 1 “OreVision® Drilling Targets on the Gaudet-Fénelon Project”. As discussed in the first section of this report, the most interesting targets might not be the strongest, due to the overburden layer.

➤ First Priority

The highest priority targets on the Gaudet-Fénelon Project are associated with weak to moderate chargeability trends straddling the western part of the survey grid near the well-defined highly conductive corridor composed **C2**, **C3A** and **C3B**. Chargeability trends **GF-03**, **GF-04** and **GF-08** are the highest priority based on their association with slightly higher resistivity values proximal to the main shear zone, in a sector that seems highly deformed by a series of NW faults, previously interpreted from high resolution magnetic data.

This setting is also coincident with the known Lac Fénelon-Nord mineralized zone. Please note that the overburden in this area appears to be very extensive and thick, which may contribute to the attenuation of the IP anomaly amplitudes.

GF-03 is a well-defined, weakly to moderately chargeable trend that extends for 2km in the western part of this survey grid. On the westernmost couple lines, this source's core centre is relatively shallow with a certain vertical extension and conductive in nature (**C2**). To the east, this source emerges rapidly from the conductive zone, gradually deepens, and is confined within a high MAG trend sitting between resistive and conductive trends (**R2** and **C2**). Two targets, both along fault zones and MAG breaks, are recommended for DDH testing.

GF-04 is the only first priority trend that extends further east, almost crossing the entire survey grid. On the westernmost first lines, this source is associated with conductive trend **C4** and is found in the deepest part of this survey. From L 3+00W to 13+00E, the central portion of GF-04, runs across the conductive zone; its causative source appears shallower, well-defined and compact. This area seems favorable for test drilling, and we propose one DDH on L 3+00E, about 250m NE of the Lac Fénelon-Nord mineralized zone. To the east, this trend is weaker and deeper, and seems to have been affected by several faults. This section is also comprised within resistive zones **R2B**, **R2C** and **R2D**. One drillhole is recommended (L 24+00E) to test the more resistive zone.

GF-08 extends over the westernmost 1.4 km of this grid. It is a weak, relatively shallow chargeable source. On its western end, it is found within a resistive corridor (**R5**), across conductive trend **C3** (right within it's break, between **C3A** and **C3B**) and ends by trending between **C2** and **C3B** in a slightly more resistive zone of this highly conductive corridor. On L 1+00E, where we recommend a DDH, this source seems associated with the Lac Fénelon-Nord mineralized zone. Another hole is also proposed within a resistive environment on L 7+00W.



➤ Second Priority

The second priority trends include the strongest, largest and best-defined chargeable sources on the survey grid. It seems contradictory, but they were either too conductive in nature or simply not located in the most attractive environments to qualify as first priority.

GF-01 is the largest and strongest anomaly found on this survey grid. It is weaker and deeper on either ends, while the centre part shows a strong chargeable response (especially between L13+00E and L 35+00E), and it is very closely associated with the **C1B** conductive trend. This section of the trend is also associated with a strongly magnetic lineament while the two ends are found offset, to the north and to the south of conductive trends **C1A** and **C1B**, respectively. Although the central portion of this chargeable axis is well-defined and strongly chargeable, it remains an open question as to whether it is a viable target for gold mineralization. We therefore recommend that two holes be drilled where it is weaker and more resistive in nature.

GF-02 is a relatively deep source (it may extend beyond this survey's DOI) that runs parallel, just north of **GF-01**. This trend is mostly weak, except between L 18+00E and L 21+00E and on lines 27+00E and 29+00E, where the response is moderate to high and near the intersection of two interpreted faults. This section is also found within a lower MAG canyon surrounded by highly magnetic features. Another prominent zone is found between L 29+00E and L 33+00E. The causative source in this zone is moderately chargeable, found within a low MAG and **R3A** resistive zone. We recommend testing those two zones.

GF-05 is located in the northern part of the survey lines, between **GF-04** and **GF-06**, and covers the entire survey grid. For the most part, it is a weak source, except in the western part of the grid, between lines 3+00W and 5+00E, where this anomaly is interestingly sitting on the northern edge of conductive trend **C4** and near the fault along which the Lac Fénelon-Nord mineralized zone sits. This anomaly is also interesting between L 13+00E and L 19+00E, a shallower stretch associated with slightly higher resistive values, compressed between conductive trends **C3B** and **C3C**. The eastern half is on the other hand very weak, ill-defined, and discontinuous. Two drillholes are recommended to test this chargeable trend.

GF-06, like **GF-01**, has a strong chargeable response. This source also appears to extend beyond this survey's DOI. It is located at the northern end of the survey area. Because of the electrode configuration, depth information on the ends of survey lines is less reliable, and inversion artifacts from edge effects could be contribute to the increased response and depths. Nevertheless, this anomalous trend is well-defined in the pseudosections and deserves to be tested between L 11+00W and L 1+00W, before disappearing to the north. This section is also found within a well-defined resistive corridor (**R6**) and low MAG region. We picked line 7+00W for testing because of its proximity to interpreted **F1** fault and because this region is associated within the lowest MAG response (probable altered zone).



➤ Third Priority

Short chargeable trends **GF-07** and **GF-09** are not as strong and/or well-defined, so they are classified here as third priority.

GF-07 is a weakly to moderately chargeable trend that spans just over one-kilometre of the southeastern region of the survey grid. It is associated with a corridor of slightly higher resistivity values just south of conductive **C1B** trend. This trend is not very well-defined in the recovered chargeability model due to its proximity to the strongly chargeable source **GF-01**. However, this anomaly looks more promising in the pseudosections, especially between L 33+00E and L 37+00E and is targeted accordingly on L 33+00E. This trend could also be targeted on L 36+00E or L 37+00E, where it occurs in a lower MAG region, near the intersection of two interpreted faults.

GF-09 is a very short 200 m long trend/zone of slightly higher chargeability values. It is a relatively shallow zone that does not appear to have significant depth extend. This source is still of value as it is favorably located on the northern edge of main **C3B** conductive trend, such as the Lac Fénelon-Nord mineralized zone, and associated with a low MAG. We have not recommended any drillholes as Probe Metals seems to have already planned one on L 11+00E.

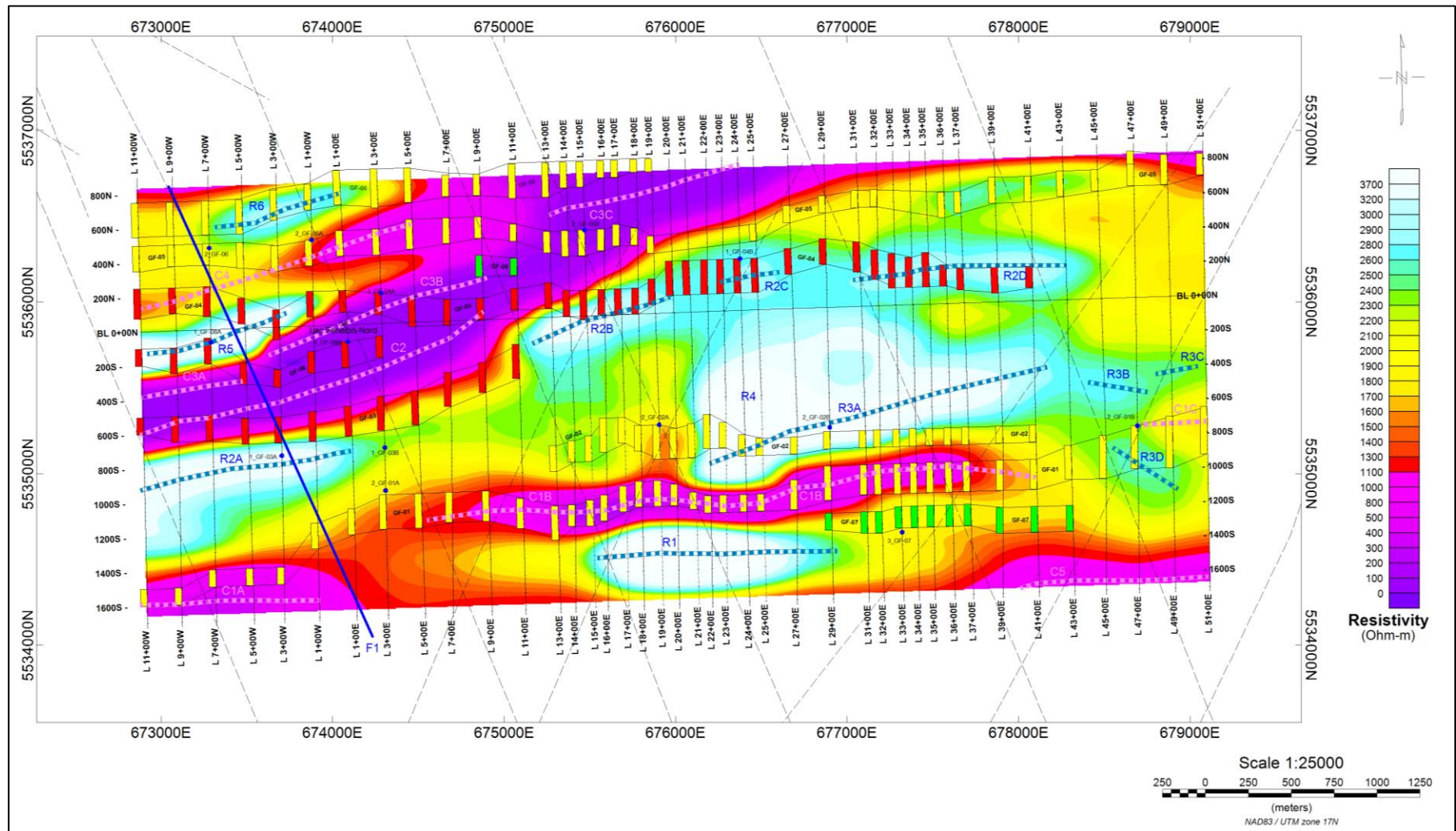


Figure 9. Geophysical interpretation including inferred faults and proposed DDH collars, underlain by resistivity grid at an elevation of 100 m.

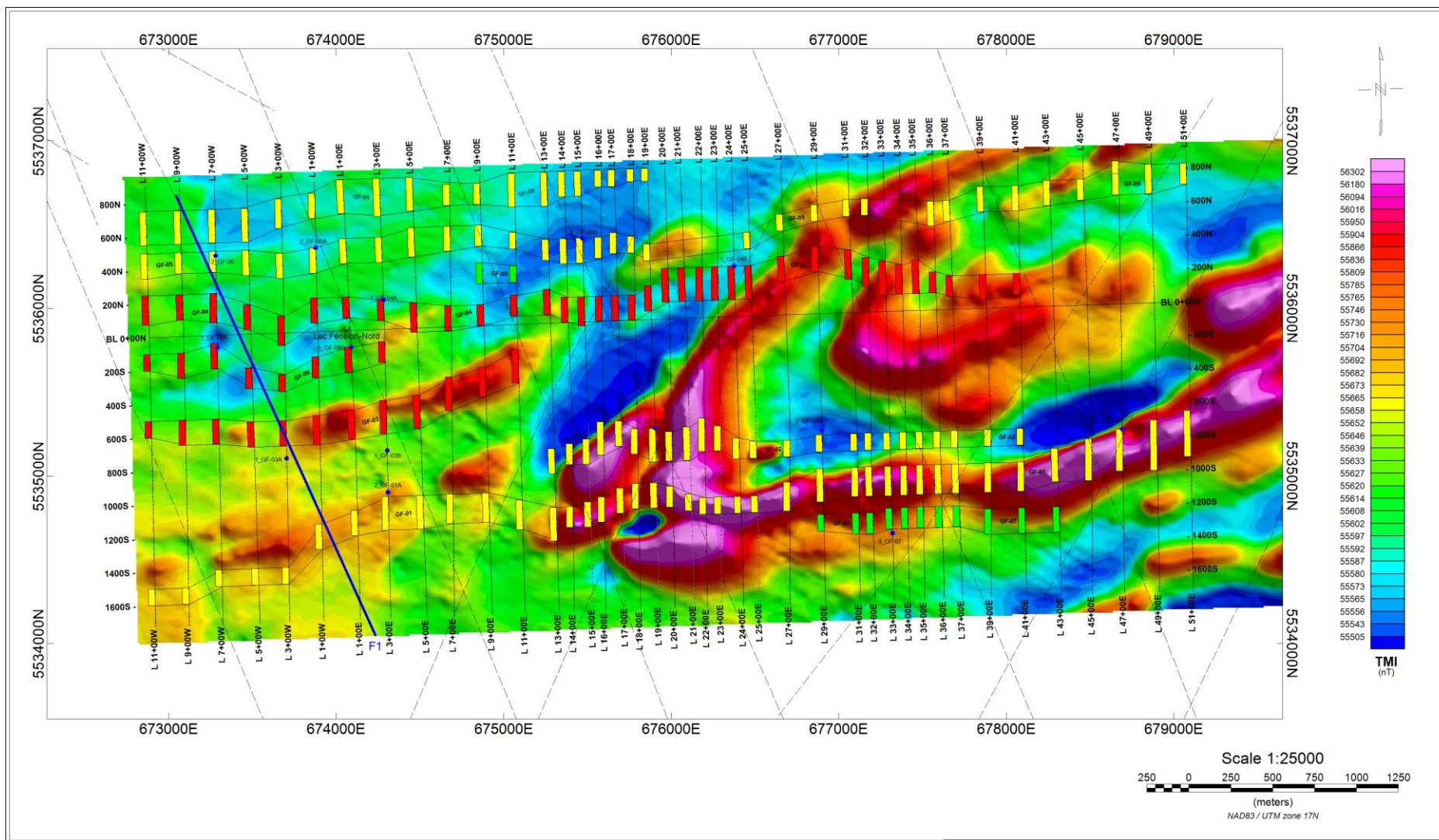


Figure 10. Geophysical interpretation including inferred faults and proposed DDH collars, underlain by TMI grid.



4. RECOMMENDATIONS AND CONCLUSION

The OreVision® survey allowed the identification of several distinctive resistive and conductive axes within the Gaudet-Fénelon Project. Using the available information, we reviewed the priority and importance attached to these targets.

☐ **PROSPECTING**

No chargeable sources appear to be close enough to surface (out-cropping or subcropping) for prospecting or trenching.

☐ **DRILLING**

A drilling program has been recommended to test some of the axes (targets) outlined in this report.

Table 1 lists the proposed drill holes and their characteristics as well as the location and description of the associated targets. These initial holes should be planned to intersect the centres of the targets as outlined on the interpreted depth sections.

The table includes images of the selected drill targets plotted on the chargeability section if not indicated otherwise.

☐ **OREVISION® SURVEY EXTENSION**

Survey extension will depend on the results of the recommended drill holes.



Table 1. OreVision® Drilling Targets on the Gaudet-Fénelon Project

Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
1_GF-03A	Well-defined and moderately chargeable target located on the boundary between a resistive trend (R2A) and conductive corridor C2 (LDDZ). This source also appears vertically elongated and south dipping. On a geological boundary and near a NW interpreted fault, just on the edge of a high MAG trend.	3+00W	6+00S	7+50S	0	55	
1_GF-03B	Very similar to the above-described target but slightly deeper and wider. On a geological boundary, along the same NW fault as the Lac Fénelon-Nord mineralized zone (in a high MAG trend break). Winter drilling campaign would be required since the proposed DDH's collar is located within Lac Fénelon.	3+00E	5+50S	7+25S	0	55	



Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
1_GF-04A	Well-defined, relatively shallow, and strongly chargeable target. About 250m northeast, and along the north edge of the same conductive trend (C3B) as the Lac Fénelon-Nord mineralized zone. Associated with a relatively low MAG. According to the geology, this target appears to be associated with a small lens of diorite.	3+00E	1+00N	1+75N	180	60	GF-04 0+00N 2+00N 150 1_GF-04A
1_GF-04B	Deep and weakly chargeable target. The weak nature of this target may be caused by the thick till cover. Target associated with a low MAG and resistive environment, along a NE interpreted fault zone.	24+00E	2+00N	3+25N	180	60	GF-04 +00N 2+00N 4+00N 25 1_GF-04B



Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
1_GF-08A	Very weakly chargeable zone recovered by the inversion. However, this anomaly is well-defined in the apparent chargeability data (pseudo-section). Relatively shallow target found within a resistive environment (R5). Associated with a relatively low MAG. Geological boundary (contact).	7+00W	2+75S	2+00S	180	60	
1_GF-08B	Relatively shallow and moderately chargeable target. Associated to slightly higher resistivity values, between two highly conductive zones (C2 et C3B). Associated with a relatively low MAG. Depicted just south of the Lac Fénelon-Nord zone.	1+00E	1+75S	1+00S	180	55	



Target (Priority Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
2_GF-01A	Broad and deep zone of weakly chargeable materials within a relatively resistive environment, just north of conductive trend C1B. Seems to extend deeper than this survey's DOI. The weak nature of this target may be caused by the thick overburden layer covering this zone. Located within a moderate MAG, between two moderately high MAG trends.	3+00E	11+00S	9+75S	180	60	GF-01
							GF-01
2_GF-01B	Very similar to the above-described target. Within small resistive body R4, just south of conductive trend C1C. Along a high MAG trend, near the intersection of two faults.	47+00E	8+75S	7+50S	180	60	GF-01



Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
2_GF-02A	Deep and large zone of strongly chargeable materials found within a relatively resistive environment. It appears to extend deeper than this survey's DOI. On the intersection of two faults. Within a lower MAG zone comprised within a highly magnetic region (what seems to be a fold axis).	19+00E	7+50S	6+50S	180	60	GF-02
2_GF-02B	Weakly to moderately chargeable target located in a large highly resistive zone (R3A). At depth, this zone seems to be merging with neighbouring chargeable anomaly GF-01, but this source is clearly delineated in the apparent chargeability pseudosection. Associated with a low MAG.	29+00E	7+75S	7+00S	180	60	GF-02



Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
2_GF-05A	Moderately to strongly chargeable target. In the inverted chargeability model, this zone appears to merge with the nearby chargeable anomaly GF-06 . However, this zone is very well-defined in the apparent chargeability section (pseudo-section).	1+00W	4+25N	5+00N	180	60	
	It is associated with a weaker conductive zone, north of the main conductive feature associated with the Lac Fénelon-Nord mineralized zone. Associated with a low MAG, near a NW interpreted fault zone.						
2_GF-05B	Well-defined, relatively shallow, and moderately chargeable target. This source is located in a slightly more resistive zone comprised within the same conductive trend (shear zone) as the Lac Fénelon-Nord mineralized zone.	15+00E	4+25N	4+75N	180	60	
	Target is also identified along a NW fault zone, on a geological contact and within a low MAG.						



Target (Priority_ Anomaly)	Type / Target Interest	Location of the Drill Target		Proposed Drillhole			Target Visual
		Line	Station	Station	Azimuth	Dip	
2_GF-06	Deep and large zone of strongly chargeable material, occurring in a resistive environment, resulting in a very high Gold Index anomaly. This zone is well-defined in the apparent chargeability section (pseudo-section) but definitely not as strong as the recovered model. The discrepancy in intensity between the observed data and recovered model may be caused by the anomaly's proximity to the end of the line. Associated with a low MAG, near a NW interpreted fault zone.	7+00W	6+50N	4+75N	0	60	GF-05 1+00N 75 GF-06 6+00N 50 8+00N
3_GF-07	Weakly to moderately chargeable target. In the recovered chargeability model, this zone appears to merge with the nearby chargeable anomaly GF-01. However, this zone is very well-defined in the apparent chargeability section (pseudo-section). It is a mid-depth target that may be extending below this survey's DOI. Located in a resistive environment, on the south edge of a conductive trend.	33+00E	12+50S	13+25S	0	60	GF-07 14+00S 75 12+00S 75 GF-08 10+00S 75



The author is confident that the Gaudet-Fénelon property offers potential for discovering new mineralized zones and that the drillholes recommended for the investigation of the anomalous sources identified by the present survey will be positive.

However, our knowledge of the property's geology is not as thorough as the geologist of Probe Metals. Our interpretation and recommendations are mainly based on the observed geophysical responses.

In order to maximize the outcome of the present results, Probe Metals should, ensure all available geoscience information are compiled, assess and, if necessary, redefine the priority and nature of the recommendations proposed in this report.

Respectfully submitted,
Abitibi Geophysics Inc.



Catherine Phaneuf, P. Geo.
Project Geophysicist
OGQ #1860

CP/si



APPENDIX A: PROJECT OVERVIEW

❑ PROJECT ID	Gaudet-Fénelon Project (Our reference: 21QC014-P2)
❑ CUSTOMER	Probe Metals Inc. 56 Temperance Street, Suite 1000 Toronto, Ontario, M5H 3V5 www.probemetals.com
❑ REPRESENTATIVE	Daniel Lafontaine, P.Geo. dlafontaine@probemetals.com
❑ LOCATION	Fénelon Township, Québec, Canada NAD83 / UTM zone 17N: 676 000 mE, 5 535 500 mN NTS sheets: 32E/15
❑ NEAREST SETTLEMENTS	Matagami: Approximately 60 km ESE of the survey area. Amos: Approximately 150 km S of the survey area.
❑ ACCESS	From the base of operations (Technominex camp) the property is accessible by taking an easterly direction for approximately 25 km: then about 5 km to the NW, and 8 km to the NE.



Figure 11. General location of the Gaudet-Fénelon Project.



- | | |
|---|---|
| ☐ <i>CULTURAL FEATURES</i> | No cultural features were observed on the survey grid. |
| ☐ <i>GEOMORPHOLOGY</i> | The topography of the survey area is relatively flat, with elevations ranging from approximately 250 m to 280 m, above sea level. Hydrographically, a few creeks are found in the survey area as well as a small lake (Lac Fénelon) crossed by lines 1+00E to 11+00W. The lake is also surrounded by a large, flooded area. |
| ☐ <i>SURVEY GRID</i> | The OreVision® survey covered 41 lines (L 11+00W to L 51+00E) ranging in length from 1425 m to 2625 m and spaced every 200 m, and 100 m in the centre of the grid. The survey grid also includes TMC geophysics survey lines (southern portion of L 15+00E, L 17+00E, L 19+00E, L 21+00E, L 23+00E and L 25+00E). Those lines are shown in green below (Figure 12). |
| ☐ <i>LAND TENURE</i> | The mining titles covered by this OreVision® survey are jointly held by Probe Metals (50%) and Exploration Midland (50%) and are illustrated in Figure 12 below. |
| ☐ <i>COORDINATE SYSTEM</i> | Local datum: NAD 83
Projection type: Universal Transverse Mercator (UTM)
Zone: 17N |

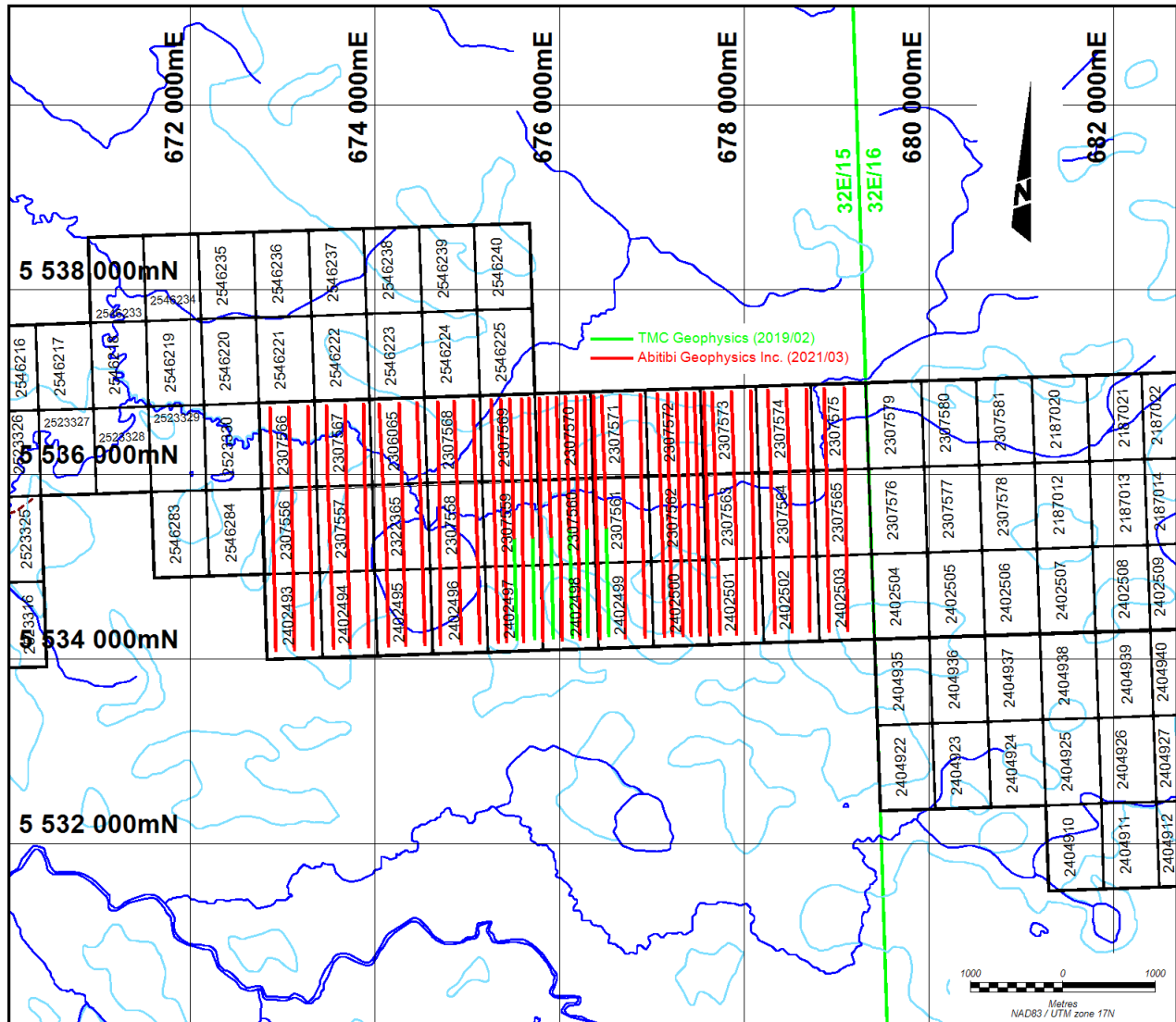


Figure 12. Mining titles, TMC Geophysics 2019 IP and OreVision® survey coverages over the Gaudet-Fénelon Project.



APPENDIX B: DATA ACQUISITION

- ☐ **TYPE OF SURVEY** Time Domain Resistivity / Induced Polarization
- ☐ **CONFIGURATION** OreVision® "a" = 37.5 m / "n" = 1 à 20
- ☐ **COVERAGE** 100.65 km (Abitibi Geophysics only)
- ☐ **ACQUISITION** March 9th to 23rd, 2021 and May 7th to June 2nd, 2021
- ☐ **PERSONNEL**
- | | |
|----------------------------|--|
| Guillaume Nantel, | Crew chief and Rx operator |
| Marc-Antoine Blais, | Crew chief and Rx operator |
| Pierre. O. St-Onge, | Field assistant |
| Aldo Racine, | Field assistant |
| Mathieu Campeau, | Field assistant |
| Henry-Philippe Bauer, | Field assistant |
| Sylvester Henry, | Field assistant |
| David Pelletier, | Field assistant |
| Guillaume-Olivier Poirier, | Field assistant |
| Carole Picard, Tech., | Plotting |
| Catherine Phaneuf, P.Geo., | QC, interpretation and report |
| Philip Fortin, P.Geo., | Final validation of product conformity |
- ☐ **ECOLOGO** Abitibi Geophysics adheres to the Ecologo Certification for the mining exploration industry. This certification promotes the widespread application of environmental, social, and economic practices of the highest standards. Abitibi Geophysics conforms with the standardized requirements of this certification and those of the government ministries related to these practices. The conditions for the execution of exploration work set by the governing bodies and any agreement between the claim owners and concerned Aboriginal communities are followed rigorously.
- ☐ **SECURITY AND ENVIRONMENT** As part of the Abitibi Geophysics Inc. EHS program, crew members received first aid training and were provided with the safety equipment and specialized training for the induced polarization technique.
- No incidents were reported during this project.
- ☐ **IP TRANSMITTERS (Tx)** **IRIS Instruments TIPIX, s/n: 5, 6, 7, 9 and 19**
- | | |
|-----------------|---|
| Maximum output: | up to 2.2 kW or 13 A or 1800 V |
| Power supply: | Honda 2000 VA |
| Electrodes: | shape memory alloy |
| Resolution: | 1 mA on output current display |
| Waveform: | bipolar square wave with 50% duty cycle |
| Pulse duration: | 1 second |

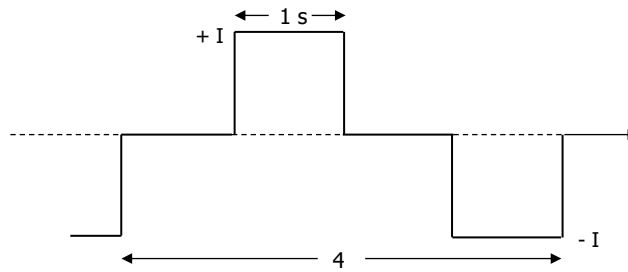


Figure 13. Transmitted signal across C₁ – C₂.

❑ IP RECEIVERS (RX)

IRIS Elrec-PRO with integrated SwitchPRO: s/n 478, 479, 480, 481, 488 and 489

Electrodes: shape memory alloy

V_P Primary voltage measurement:

- ✧ Input impedance: 100 MΩ
- ✧ Resolution: 1 μV
- ✧ Typical accuracy: 0.2%

M_a Apparent chargeability measurement:

- ✧ Resolution: 0.01 mV/V
- ✧ Typical accuracy: 0.4%
- ✧ Linear sampling mode: 20-time slices (M₁ to M₂₀)
- ✧ All gates are normalized with respect to a standard decay curve for QC in the field.

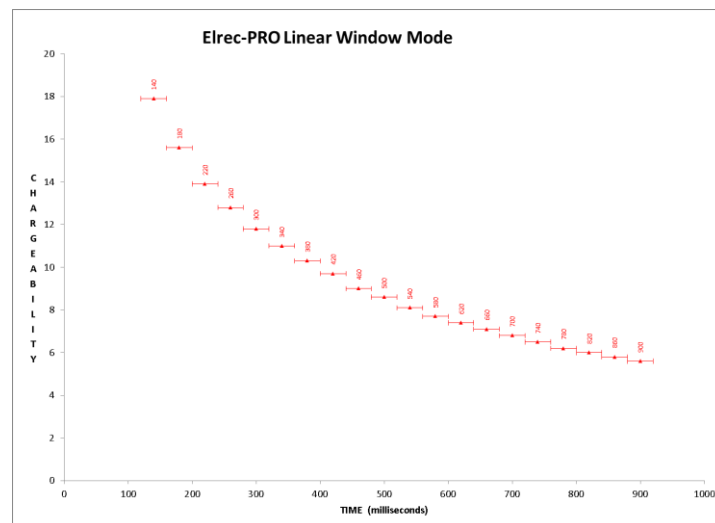


Figure 14. Linear windows (1 s pulse).

❑ APPARENT RESISTIVITY CALCULATION

$$\rho_a = 2 \cdot \pi \cdot \frac{V_P}{I} \cdot n \cdot (n + 1) \cdot a \text{ } (\Omega \cdot m)$$

Cumulative error: 5% max, mainly due to chaining accuracy.



❑ **QUALITY CONTROL**
(RECORDS AVAILABLE UPON
REQUEST)

Before the survey:

- ✓ Transmitter and motor generator were checked for maximum output using calibrated loads.
- ✓ Receivers were checked using the Abitibi Geophysics SIMP™ certified and calibrated V_P and M_a signal simulator.

During data acquisition:

- ✓ Rx and Tx cable insulation were verified every morning.
- ✓ Data was reviewed using Prosys II® allowing a daily, thorough monitoring of data quality and survey efficiency.
- ✓ Sufficient pulses were stacked: a minimum of 8 pulses for every reading.
- ✓ A minimum of 6 current electrodes and saltwater were used at each station.

At the Base of Operations:

- ✓ Field QCs were inspected and validated.
- ✓ Each IP decay curve was analyzed with our proprietary Geosoft GX, *InteractiveAnomaly*®. The gates that were rejected were not included in the calculation of the plotted M_a .

The first step in processing OreVision® data is quality control. To ensure consistent and efficient quality control Abitibi Geophysics has developed *InteractiveAnomaly*®. This Geosoft GX analyses the normalized decay curve for each reading within the data set. Only readings that successfully pass quality control will be used to calculate the final chargeability. Following this automated procedure, the apparent resistivity and apparent chargeability pseudosections are reviewed and further manual QC is conducted.

❑ **QUALITY STATISTICS**

Table 2. Quality Statistics – OreVision®

Gaudet-Fénelon Project	
Average contact resistance across R_x dipole (P_1 - P_2)	1.65 k Ω
Average injected current to T_x dipole (C_1 - C_2)	2093 mA
Average V_p measured across R_x dipole (P_1 - P_2)	87 mV
Observed windows found to fit a pure electrode polarization relaxation curve	90.2 %
Average deviation of the validated, normalized windows with respect to the mean chargeabilities.	0.27 mV/V



APPENDIX C: DATA PROCESSING AND DELIVERABLES

❑ *RES3D INVERSION*

Quality control (QC) performed on the collected OreVison® data validated 99% of the recorded readings. As stated earlier in this report, the inversion included the 2019 dataset collected by TMC geophysics. The validated data were inverted using Res3D software to recover the apparent resistivity and chargeability values. This software is capable of inverting 3D apparent resistivity and chargeability volumes using a regular grid of surface electrodes.

The software generates a model consisting of rectangular prisms (blocks) and applies a number of features for optimising the least-squares routine for faster completion on large datasets.

For this project, the modelled mesh block was divided by 129 x 296 x 23 rectangular cells (active cells) of 50 m in easting (X), 10 m in northing (Y), and 5 m in depth (Z downward). This modeling area was overlain by topographical data and 10 padding cells were added on either side of the x and y axes. The 868 480 cells below the surface defined the model, and the inverse problem was therefore formalized by inverting the 50 290 data points (including TMC Geophysics' data) to recover the resistivity and chargeability values in those cells.

The resistivity and IP models both converged after 7 iterations, with a final RMS of 4.54 and 0.58, respectively.

❑ *LIMITATIONS OF THE 3D INVERSION TECHNIQUE*

Inversions cannot create information that is not already in the raw data set (pseudosections), i.e., the limitations of the technique and array that was used will still prevail. However, noise is efficiently rejected, near-surface effects are easily identified and complex responses, such as two adjoining sources, a wide body or a dipping geological contact, are well resolved.

In the absence of hard constraining data about the subsurface geometry of the mineralization and considering the non-uniqueness of the geophysical inversion methods, any recovered electrical distribution is only one of an infinite number of possible distributions that could explain the observed data.

❑ *RESISTIVE SOURCES*

For chargeable and resistive sources, the depth extension may seem limited (the inversion seems to close at depth). This is a limitation of the electrical method and not of the inversion. Above a resistive body, the current lines are diverted to follow the easier (more conductive) path. Therefore, the investigation at depth is deficient in the contribution of the deeper part of the chargeable body. In fact, it can be assumed that these bodies extend at depth.



METAL FACTOR

From the recovered resistivity and chargeability models from the 3D inversion, the Metal Factor has been calculated as follows:

$$\text{Metal Factor (MF)} = (\text{chargeability} / \sqrt{\text{resistivity}}) \times 1000$$

This parameter particularly highlights regions of low resistivity and high chargeability usually associated with semi-massive to massive sulphides as well as gold associated with disseminated sulphides in sheared or faulted environments.

Note that a conductive zone with little or no chargeable association will still result in a high Metal Factor. This signature would be typical of a shear zone (ionic conductor) where sulphides were destroyed, thus producing no chargeable anomaly. This type of Metal Factor anomaly should still be considered in precious metals exploration, even in the absence of chargeable anomaly.

The resistivity and chargeability data should always be consulted prior to drawing any conclusions from the Metal Factor. The Metal Factor does not highlight resistive and chargeable zones as well as the Gold Index.

The Metal Factor Maps (8.4) display the results of this calculation.



GOLD INDEX

From the recovered resistivity and chargeability models from the 3D inversion, the Gold Index has been calculated as follows:

$$\text{Gold Index (GI)} = (\text{Chargeability}^2 \times \text{Resistivity} / 1000)$$

This parameter particularly highlights regions of high resistivity and chargeability which are amenable to hosting disseminated sulphides in quartz veins or associated with silicified / carbonatized / Albitization alteration zones. Note that a resistive zone with little or no chargeable association will still result in a high Gold Index. This signature would be typical of an indurated (very resistive) zone in which electrolyte could not circulate to charge the metallic grains due to a lack of porosity. This Gold Index anomaly should still be considered in precious metals exploration, even in the absence of chargeable anomaly.

The resistivity and chargeability data should always be consulted prior to drawing any conclusions from the Gold Index. The Gold Index does not highlight conductive and chargeable zones as well as the Metal Factor.

The Gold Index Maps (8.6) display the results of this calculation. The Gold Index is included with the vertical sections for each line.



❑ **DIGITAL DATA**

The maps, pseudosections and true depth sections are delivered in the Oasis Montaj map file and PDF formats. The maps are also delivered in the PNG, MapInfo, GeoTIFF, DXF and ArcView file formats.

A copy of all survey acquisition data (ASCII text format), processed data (Geosoft Montaj databases) and the inversion voxels are also delivered digitally.

Table 3. Maps Produced

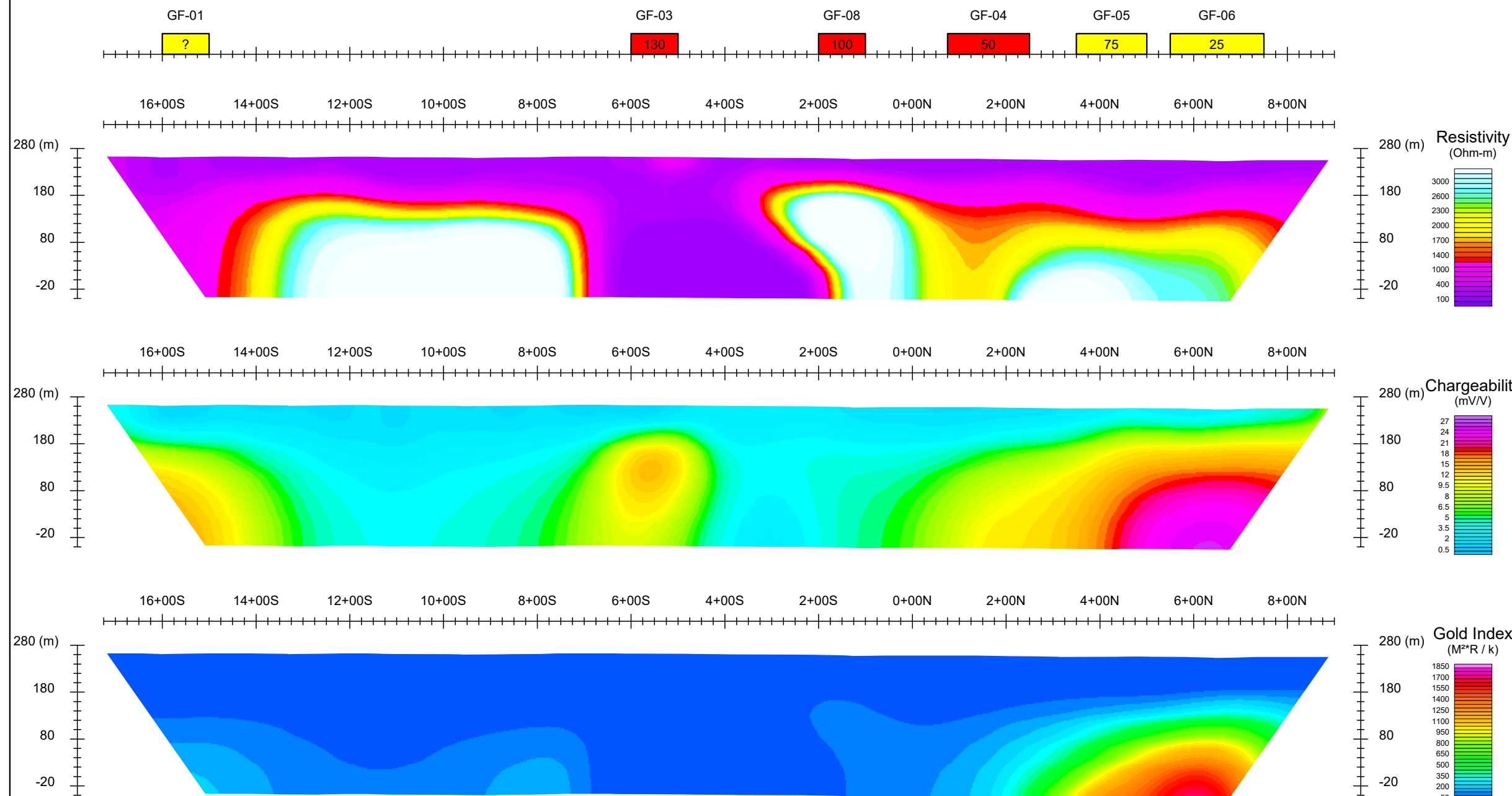
Map Number	Description	Scale
OreVision® Survey		
41 Plates L 11+00W to L 51+00E	Apparent Resistivity and Chargeability Pseudosections	1:5000
	Vertical Sections with calculated <i>Gold Index</i>	1:10 000
8.2_200	Inverted Resistivity at an Elevation of 200 m (Ohm-m)	1:5000
8.2_100	Inverted Resistivity at an Elevation of 100 m (Ohm-m)	1:5000
8.2_0	Inverted Resistivity at an Elevation of 0 m (Ohm-m)	1:5000
8.3_200	Inverted Chargeability at an Elevation of 200 m (mV/V)	1:5000
8.3_100	Inverted Chargeability at an Elevation of 100 m (mV/V)	1:5000
8.3_0	Inverted Chargeability at an Elevation of 0 m (mV/V)	1:5000
8.4_200	Calculated Metal Factor at an Elevation of 200 m	1:5000
8.4_100	Calculated Metal Factor at an Elevation of 100 m	1:5000
8.4_0	Calculated Metal Factor at an Elevation of 0 m	1:5000
8.6_200	Calculated Gold Index at an Elevation of 200 m	1:5000
8.6_100	Calculated Gold Index at an Elevation of 100 m	1:5000
8.6_0	Calculated Gold Index at an Elevation of 0 m	1:5000
10.0	Geophysical Interpretation	1:5000

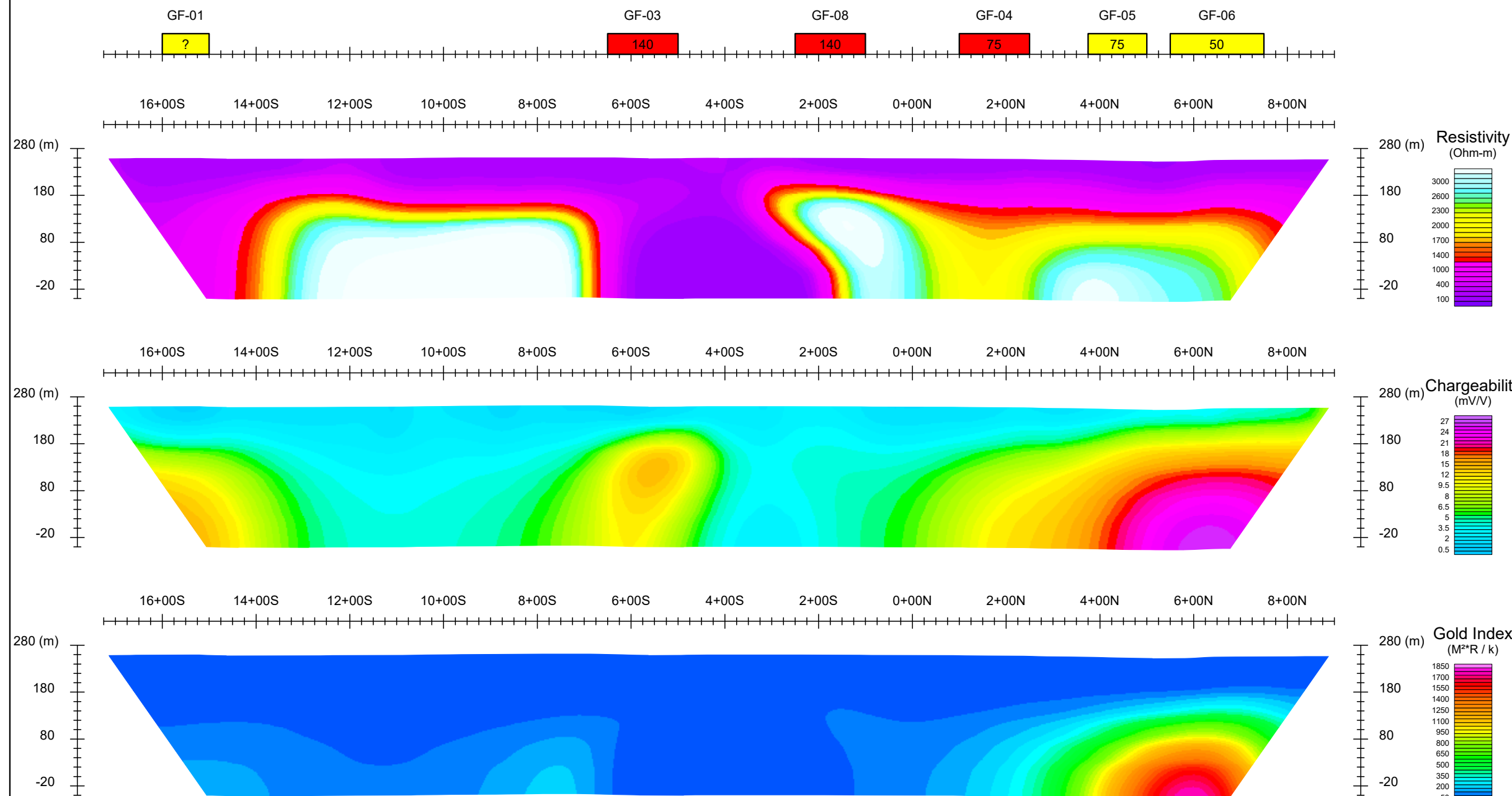
Our Quality Control System requires every final map to be inspected by at least two qualified persons before being approved and delivered with a final report.

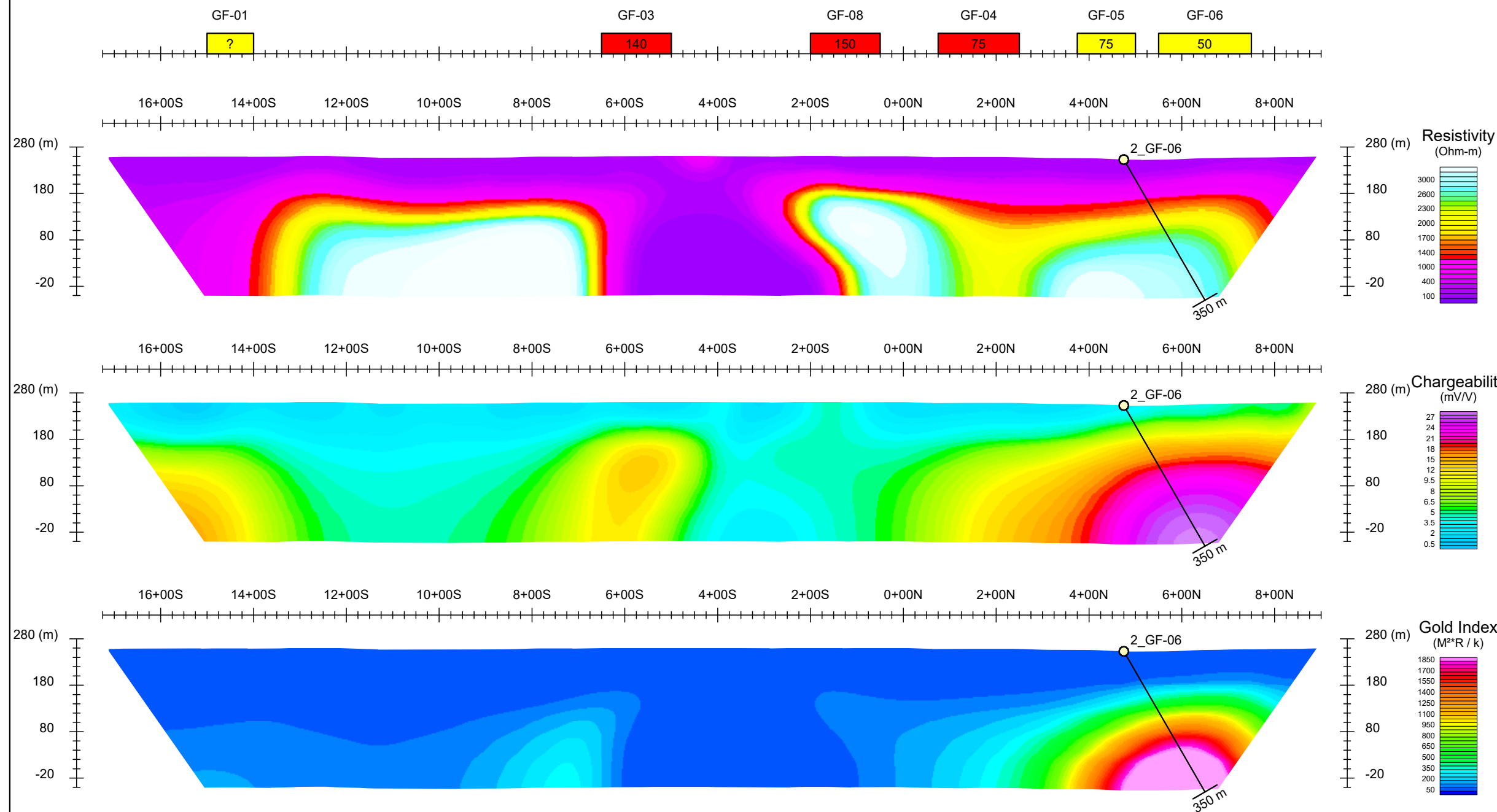


OREVISION® SURVEY

**VERTICAL SECTIONS FROM 3D INVERSION
WITH PROPOSED DDH**







Project no: 21QC014-P2

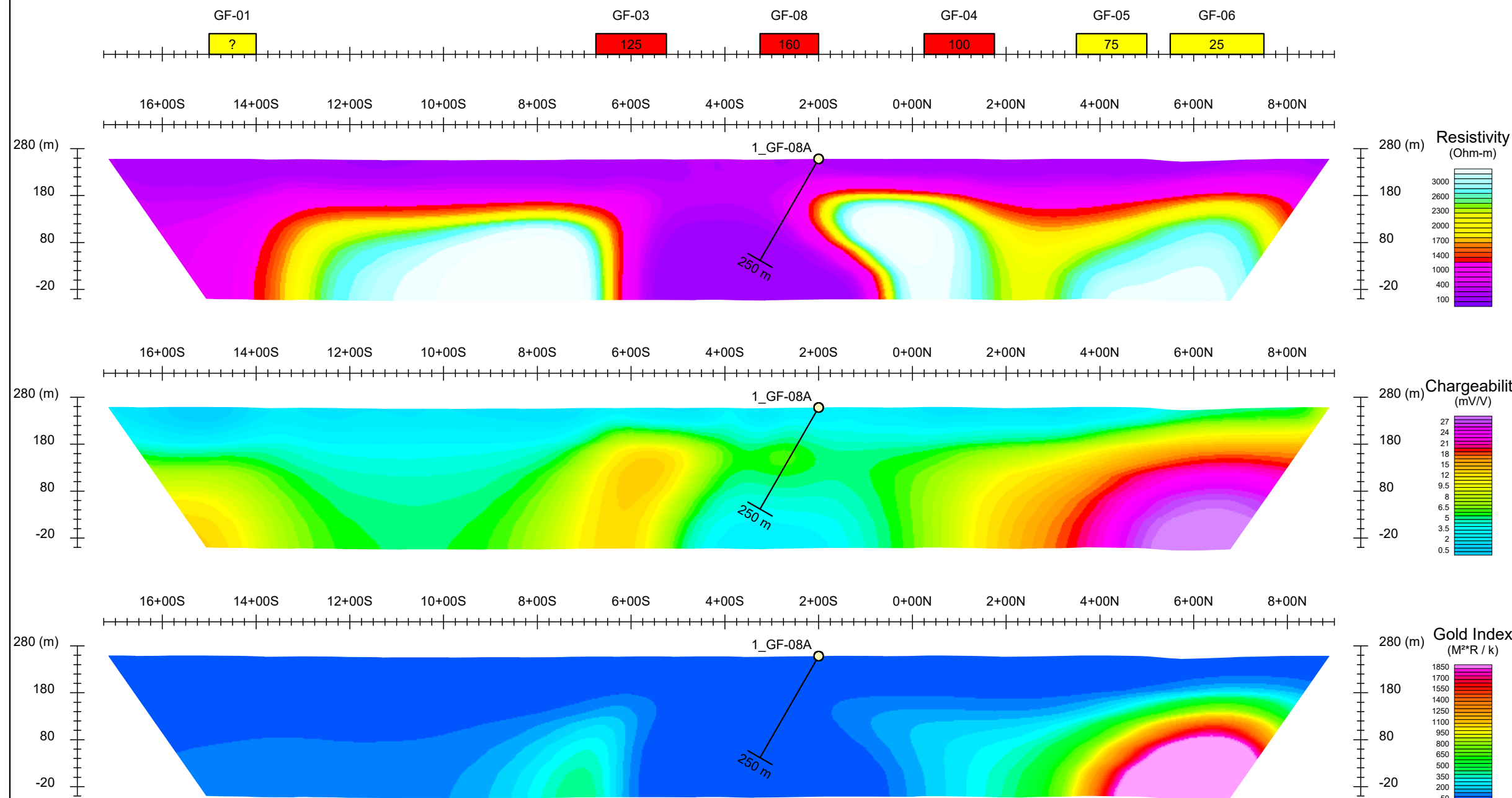
Scale 1 : 10 000

Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 7+00W



Project no: 21QC014-P2

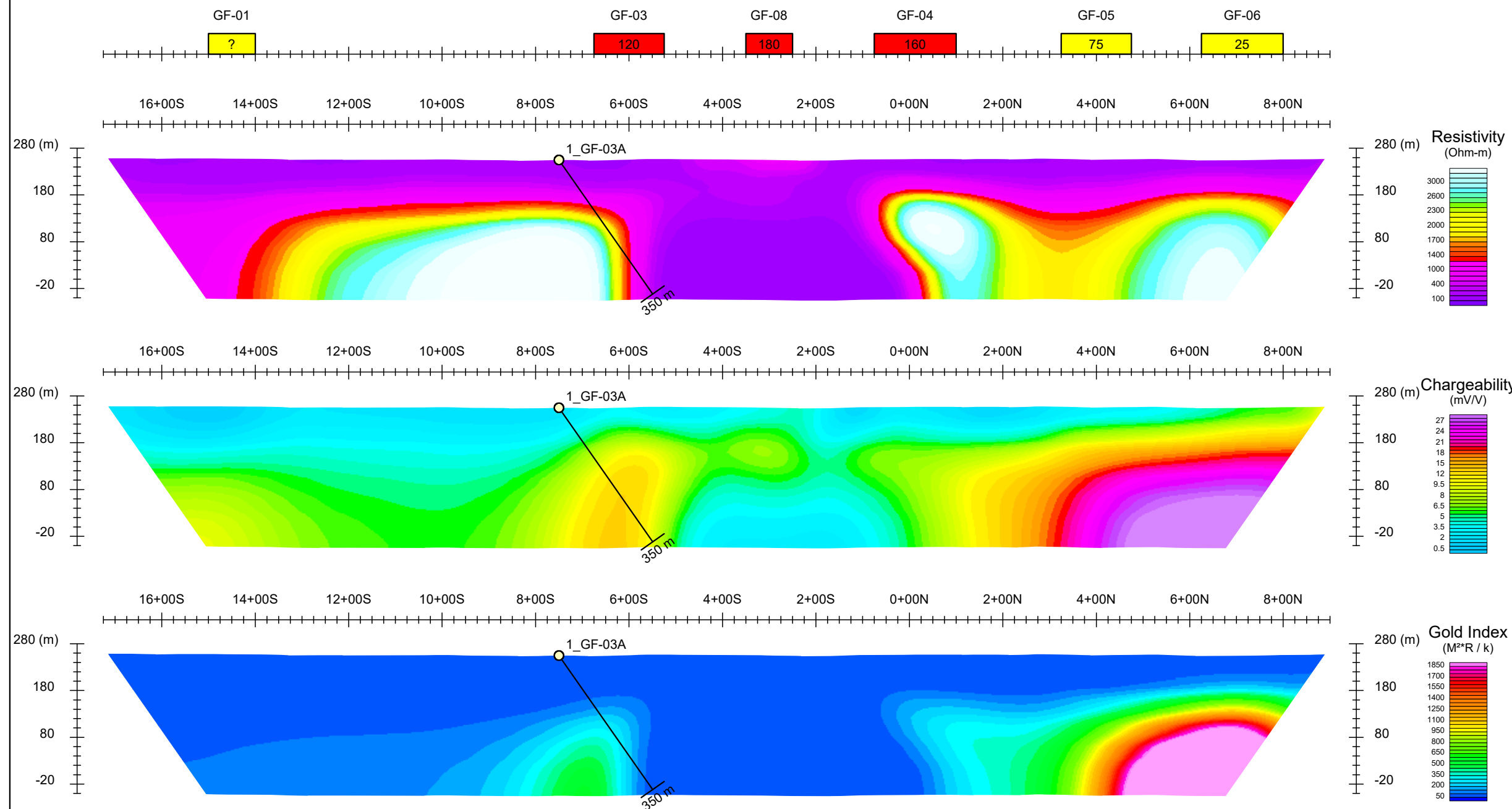
Scale 1 : 10 000

Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 5+00W



Project no: 21QC014-P2

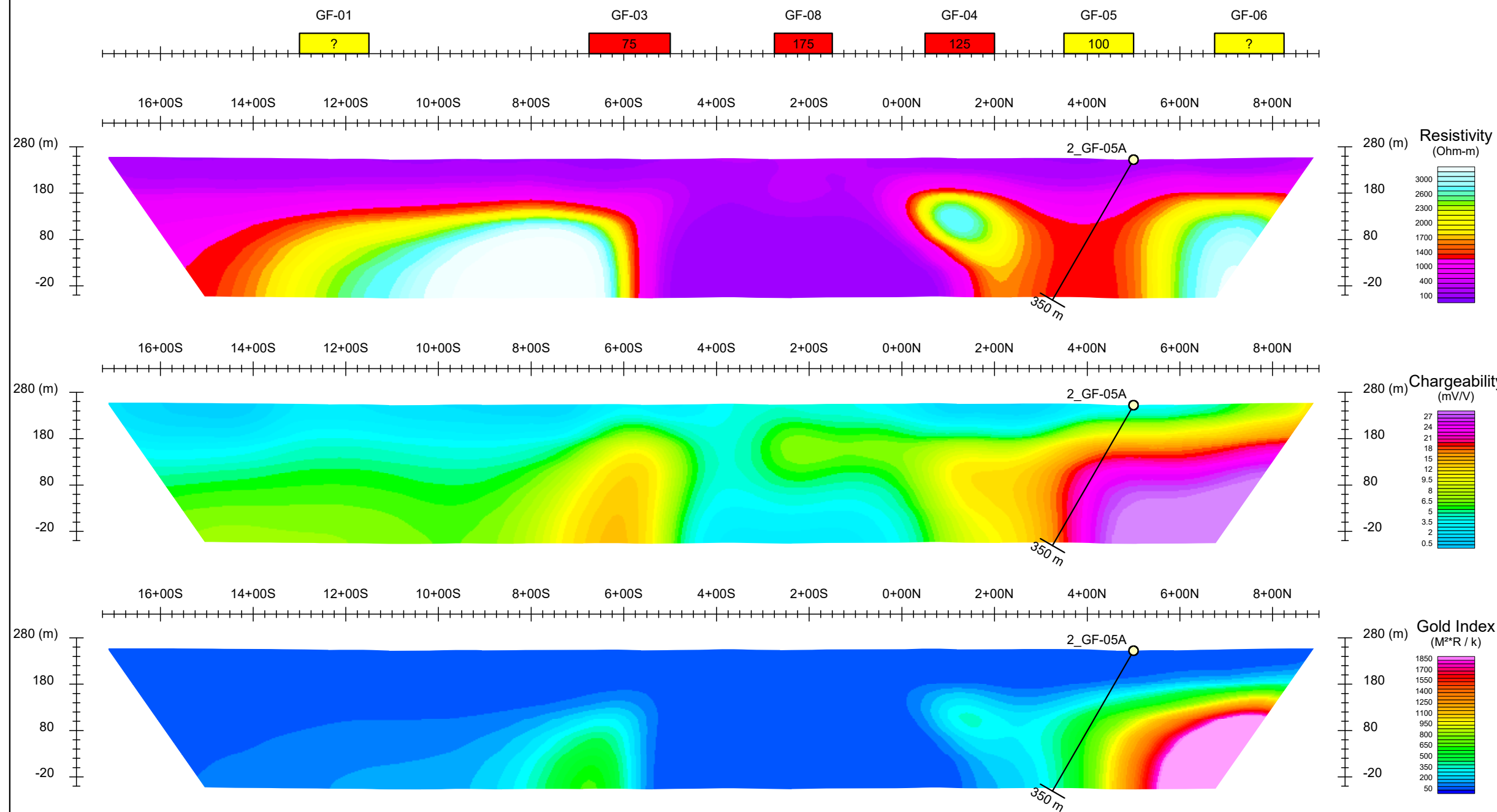
Scale 1 : 10 000

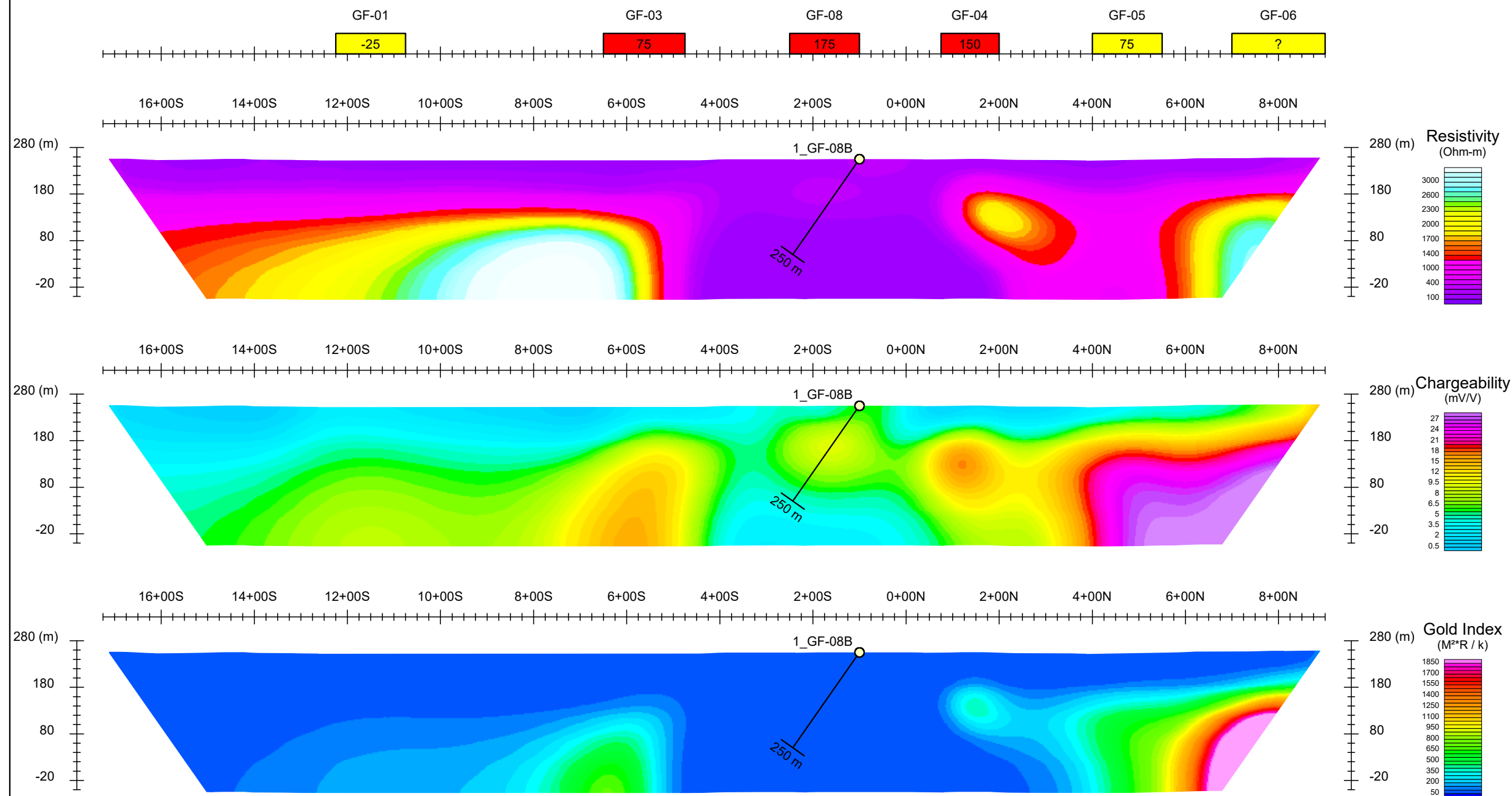
Probe Metals Inc.

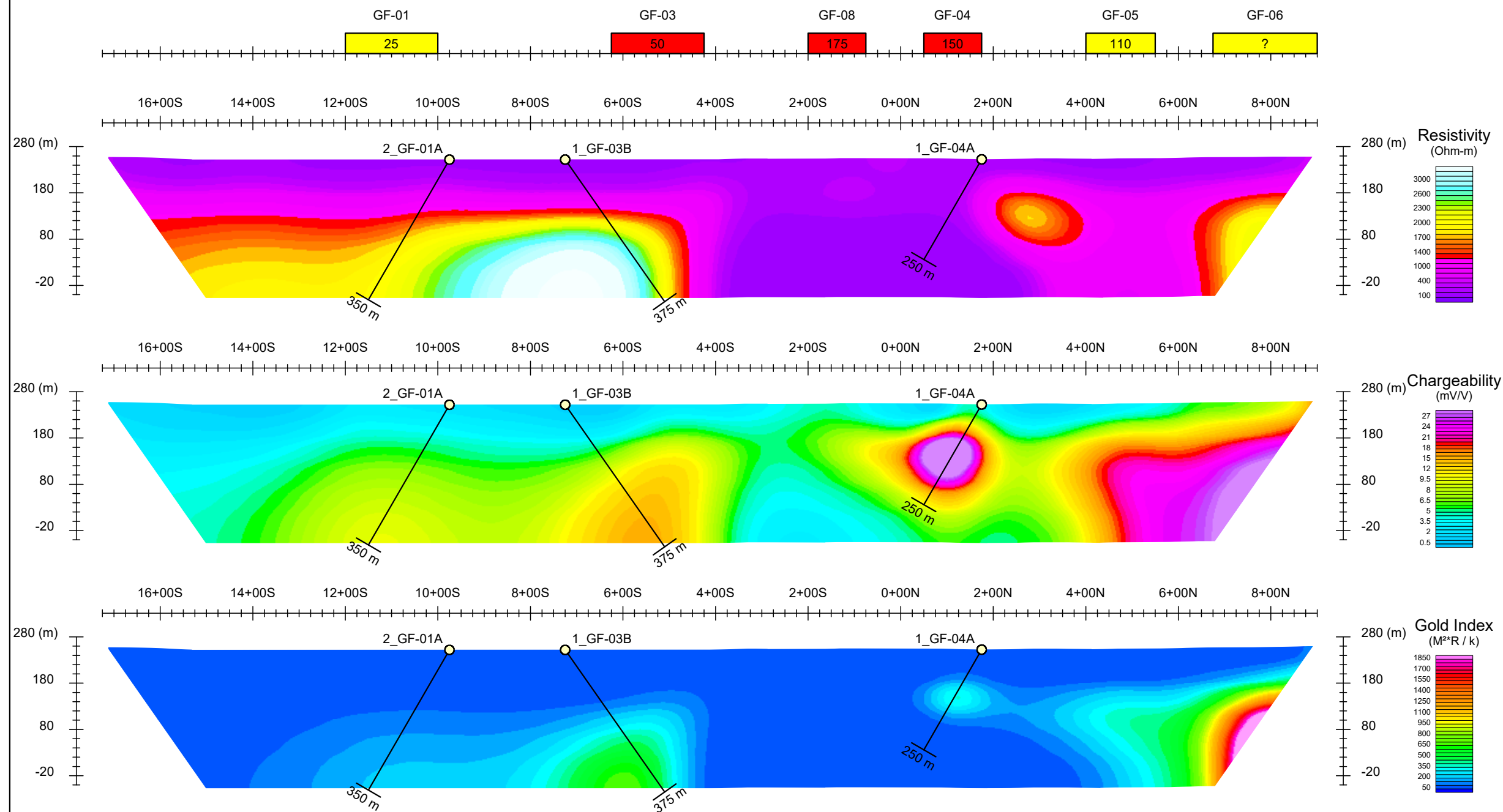
OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 3+00W







Project no: 21QC014-P2

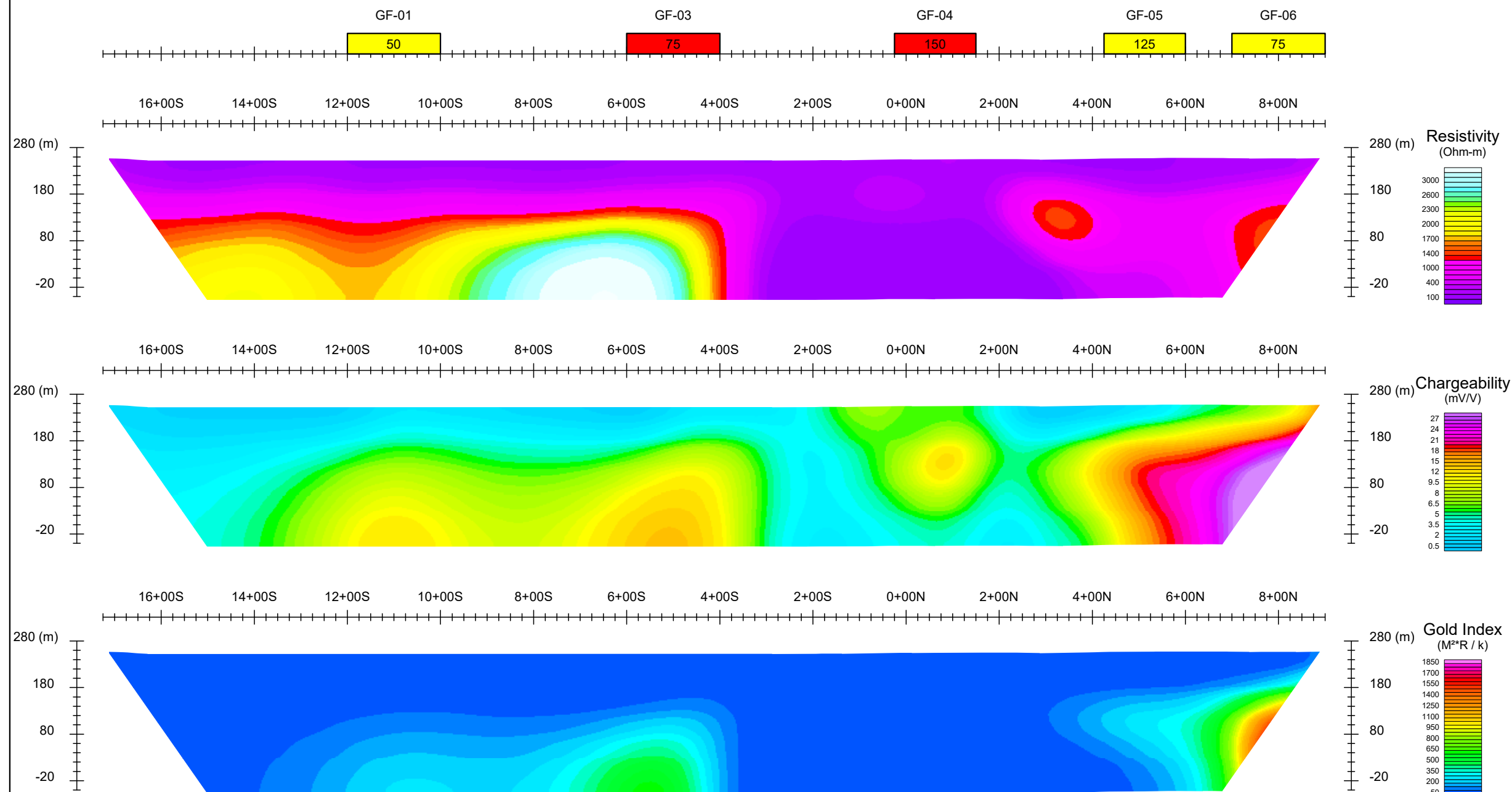
Scale 1 : 10 000

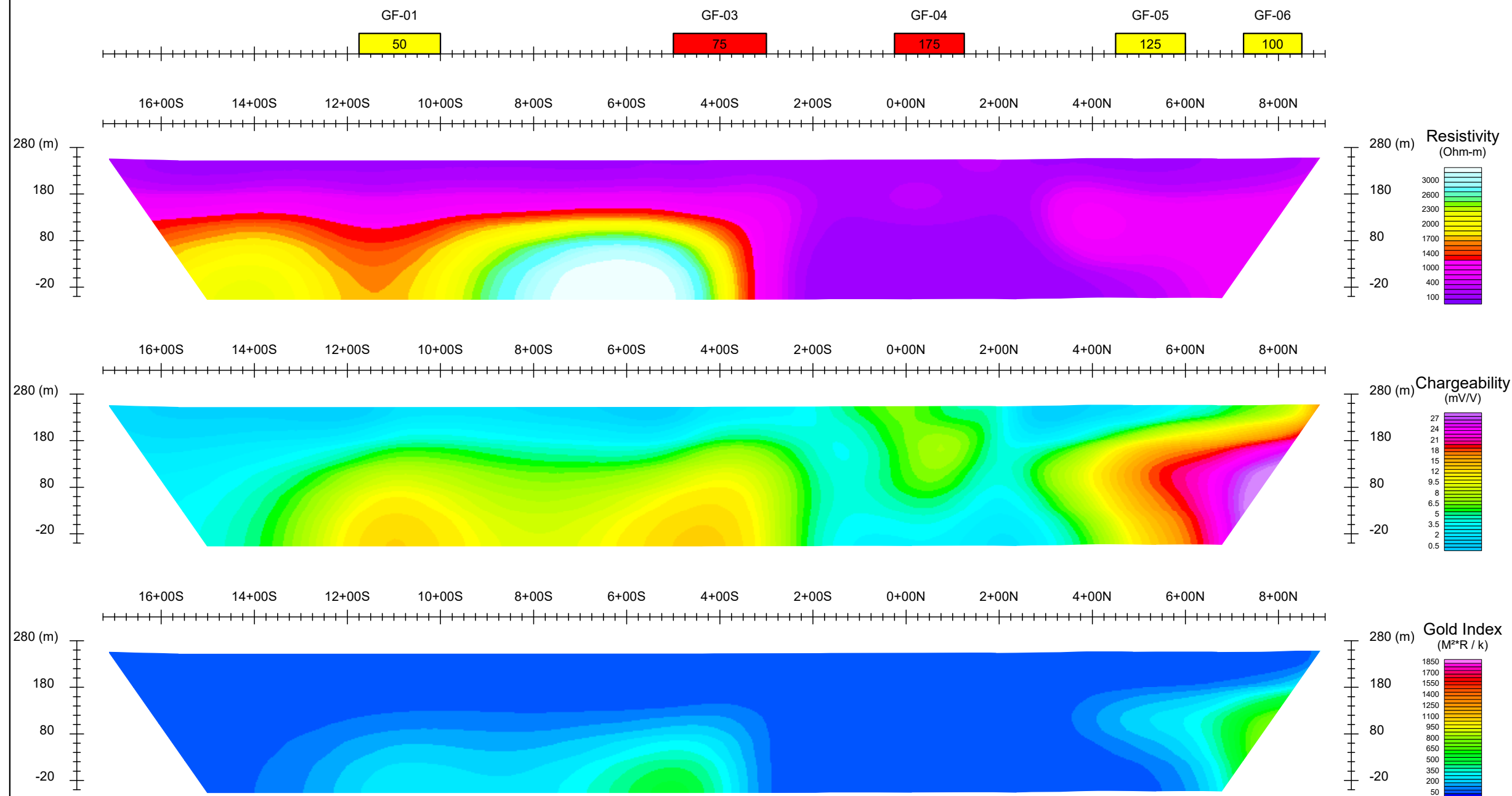
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 3+00E





Project no: 21QC014-P2

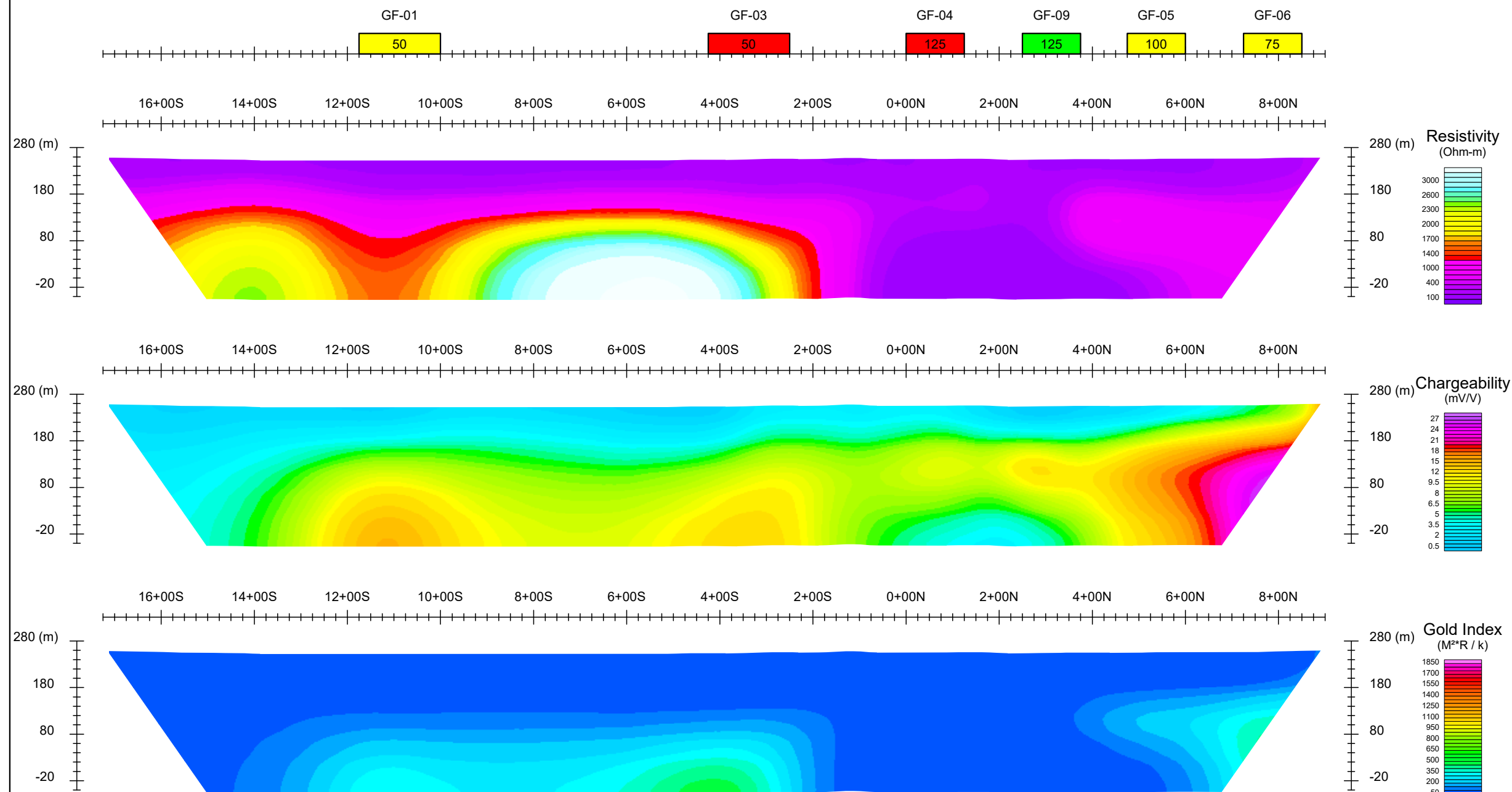
Scale 1 : 10 000

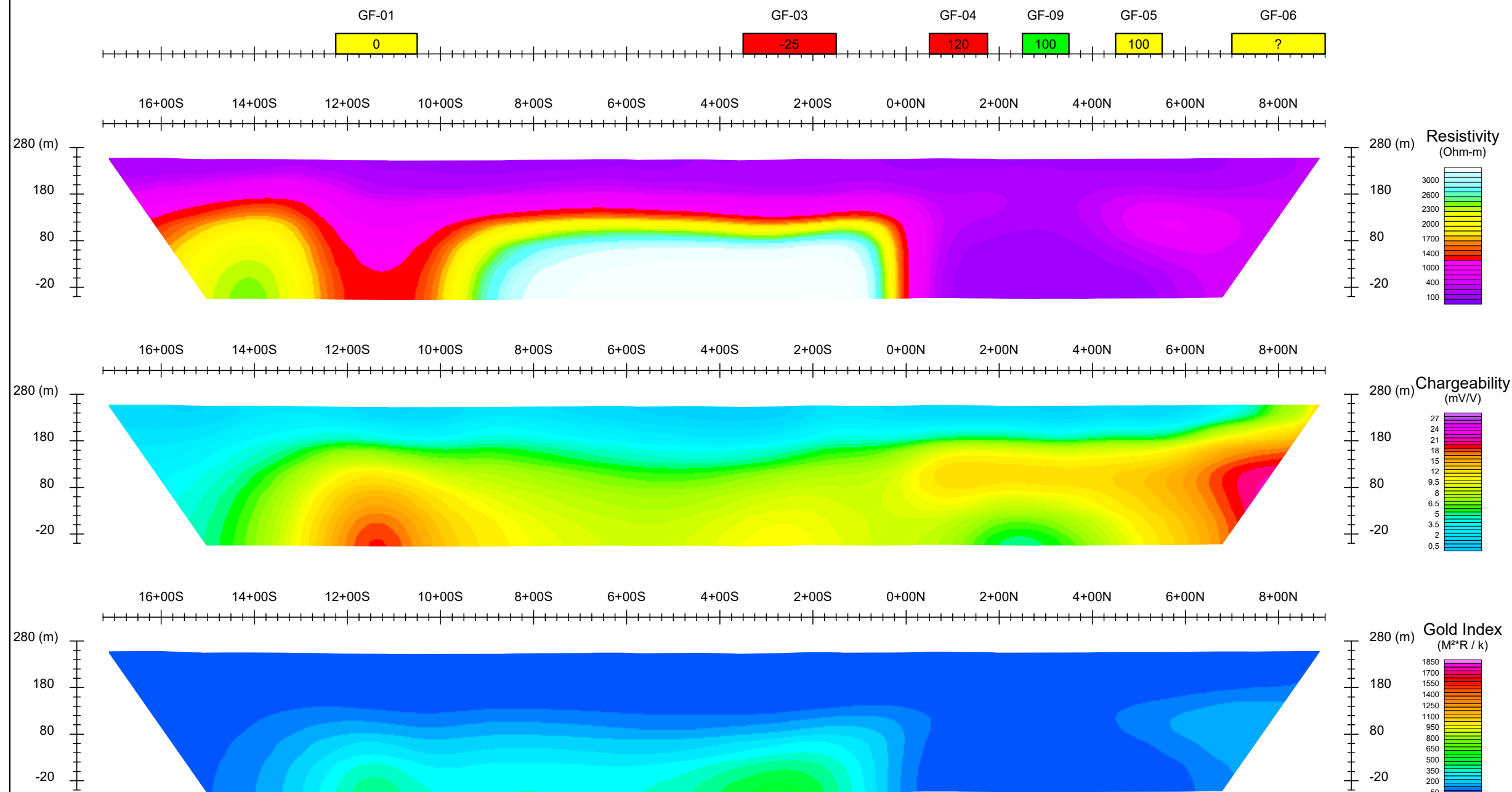
Probe Metals Inc.

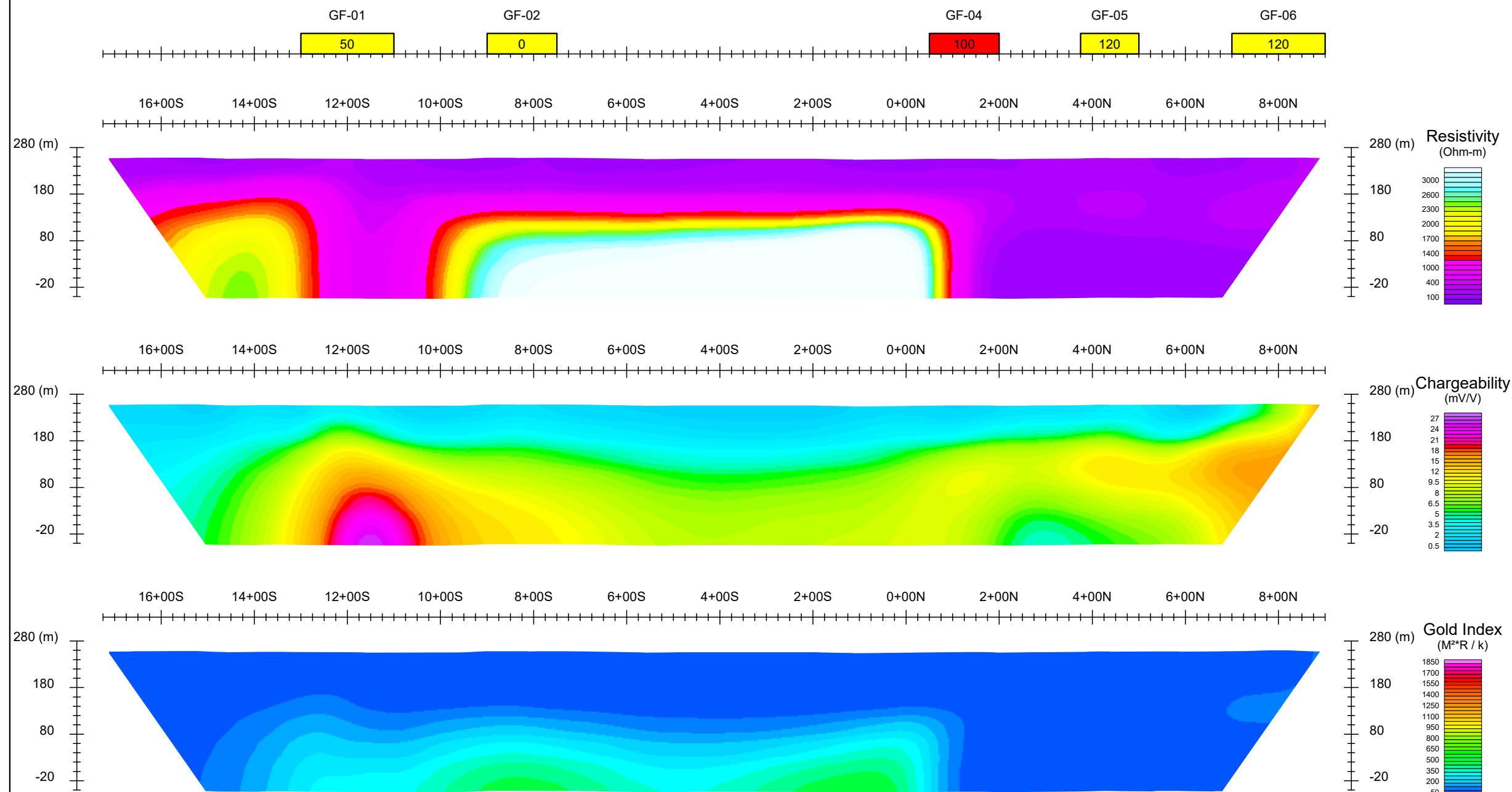
OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 7+00E







Project no: 21QC014-P2

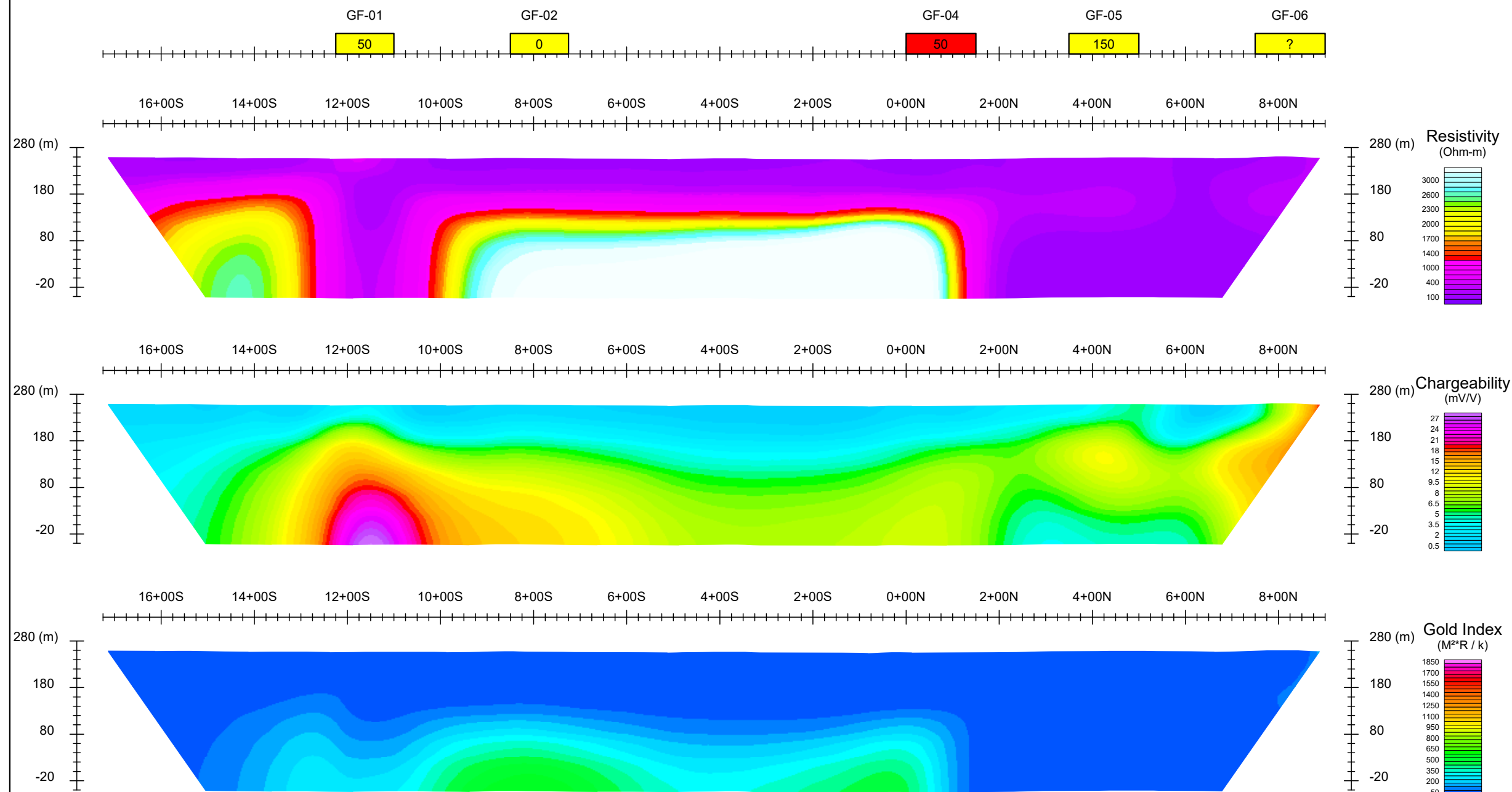
Scale 1 : 10 000

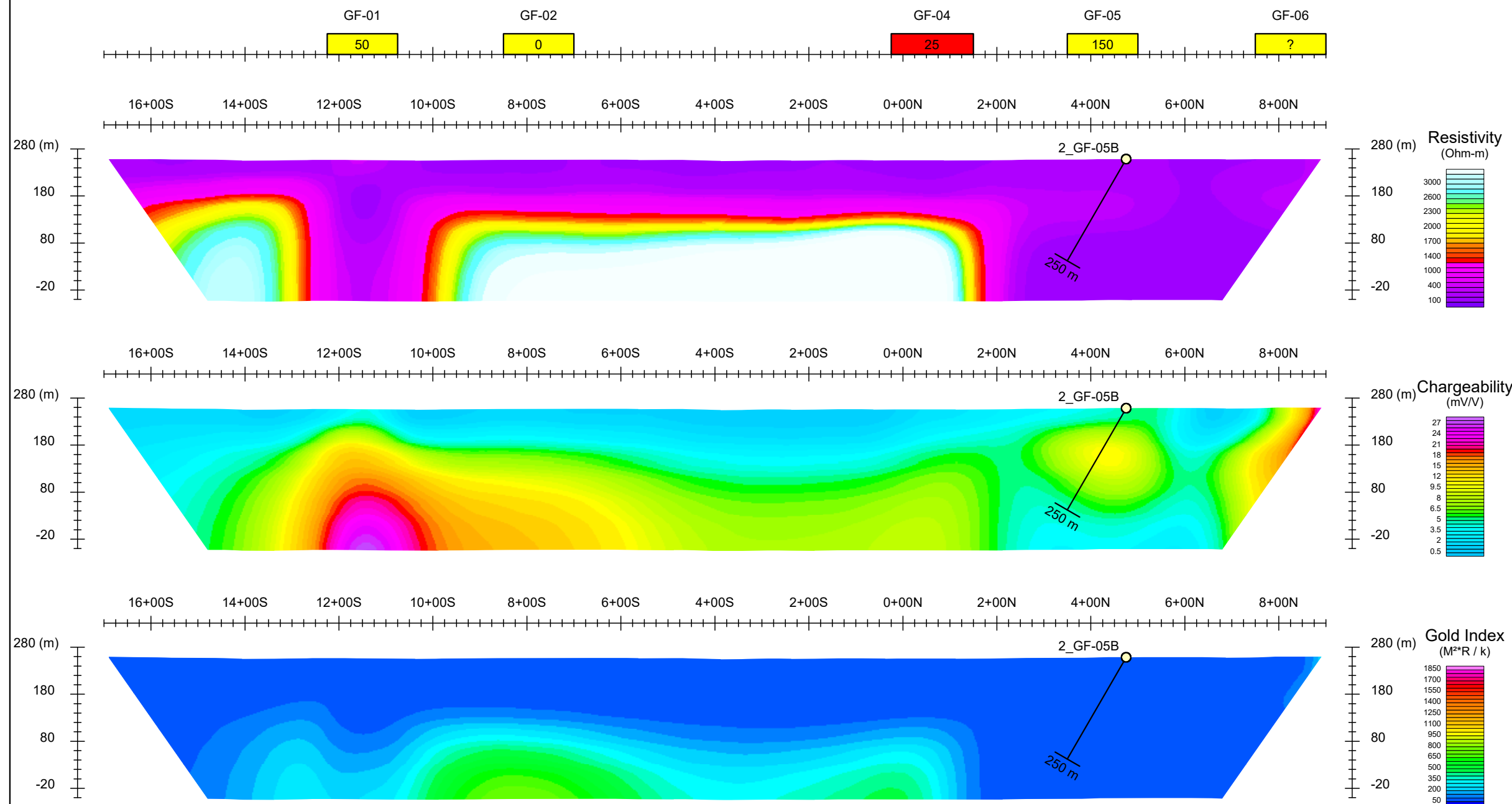
Probe Metals Inc.

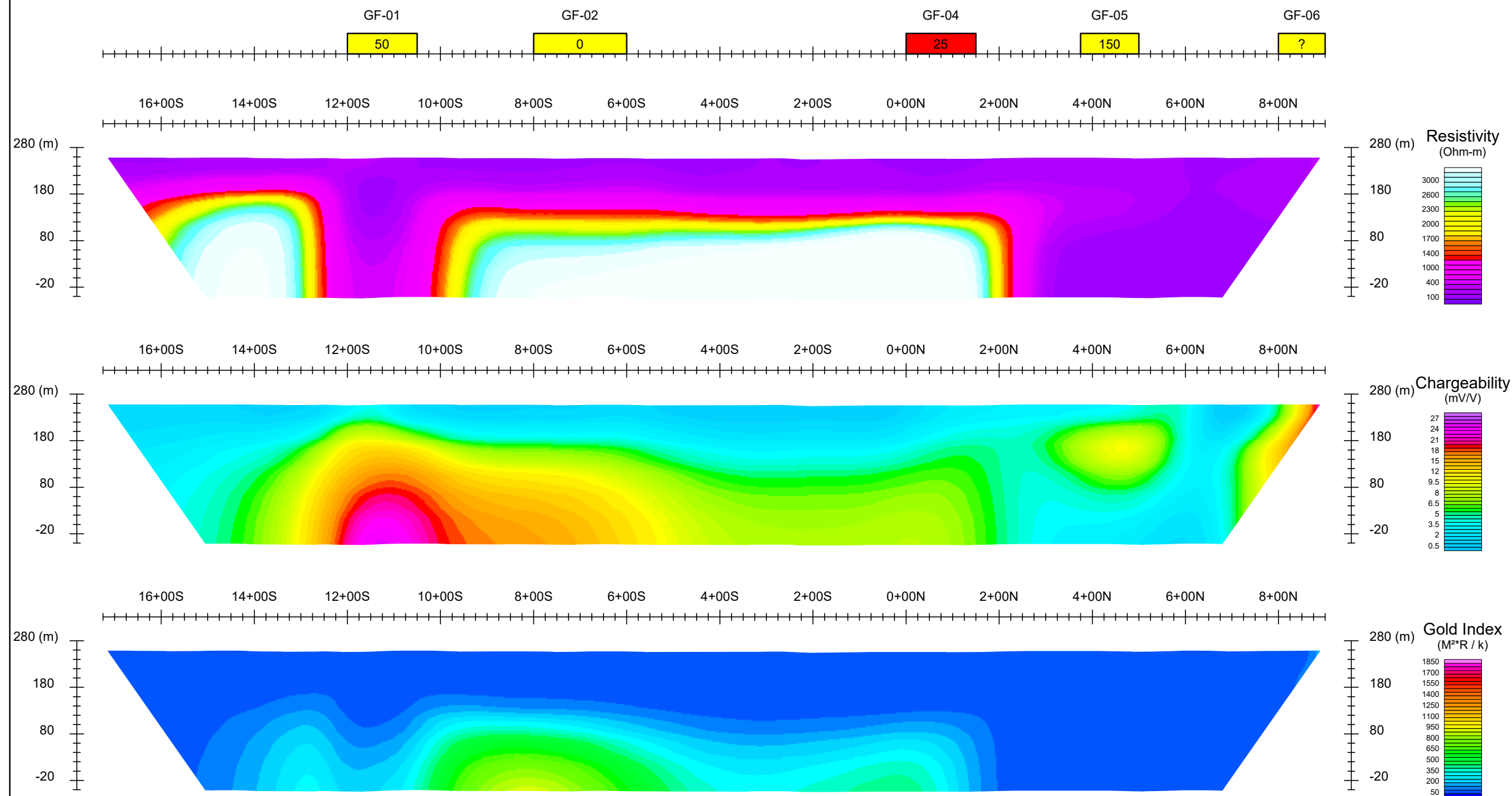
OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 13+00E







Project no: 21QC014-P2

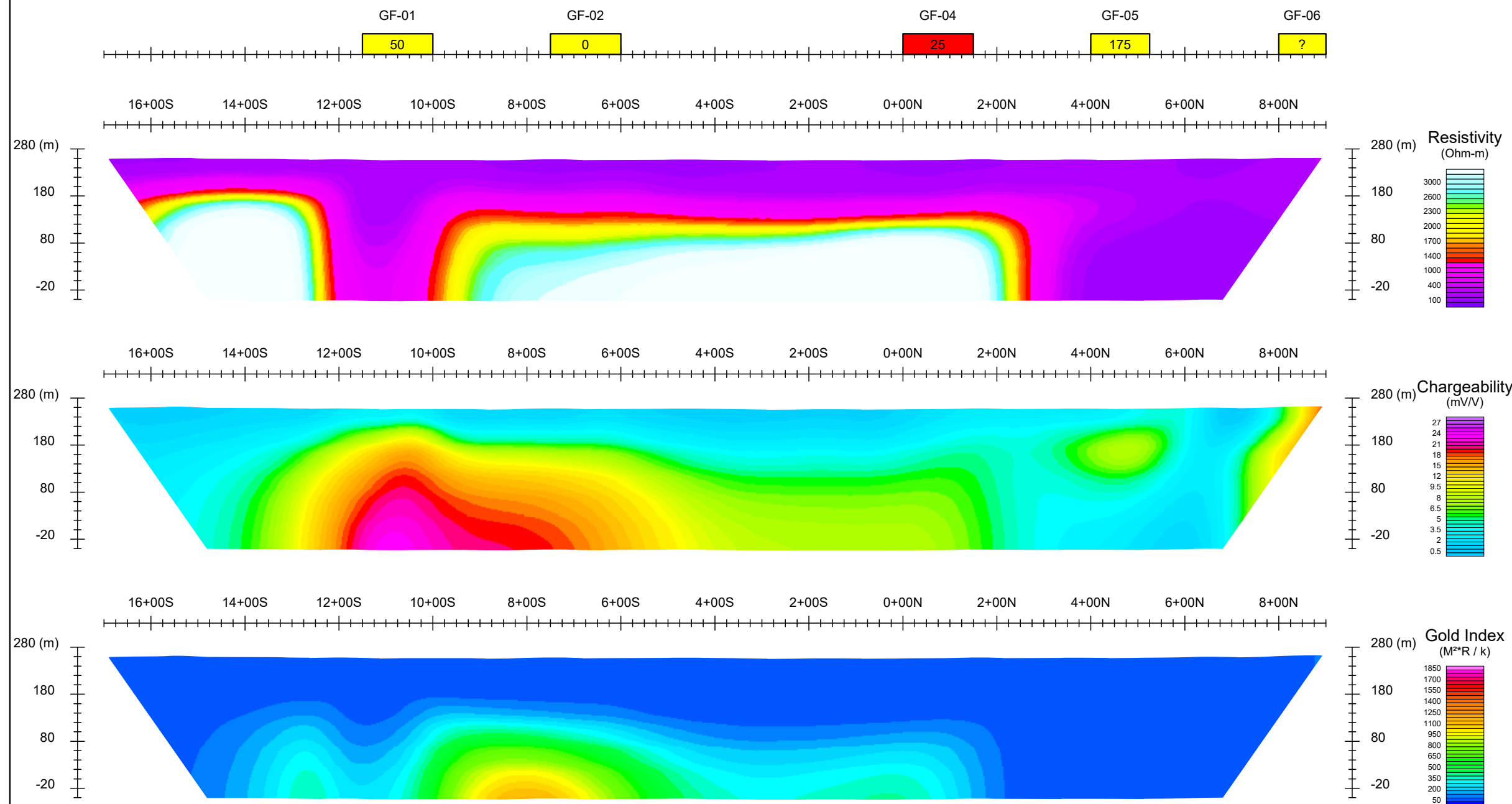
Scale 1 : 10 000

Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 16+00E



Project no: 21QC014-P2

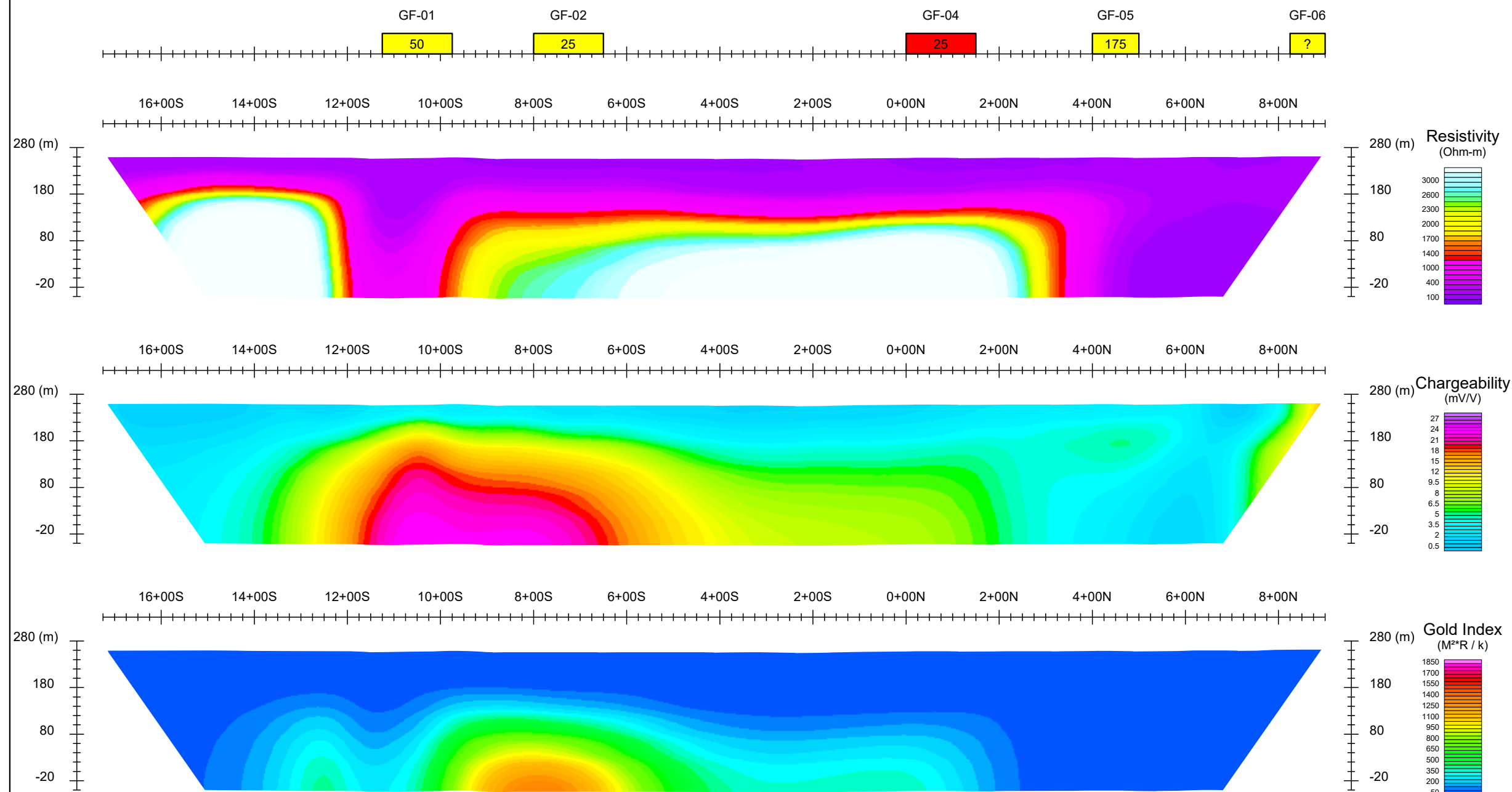
Scale 1 : 10 000

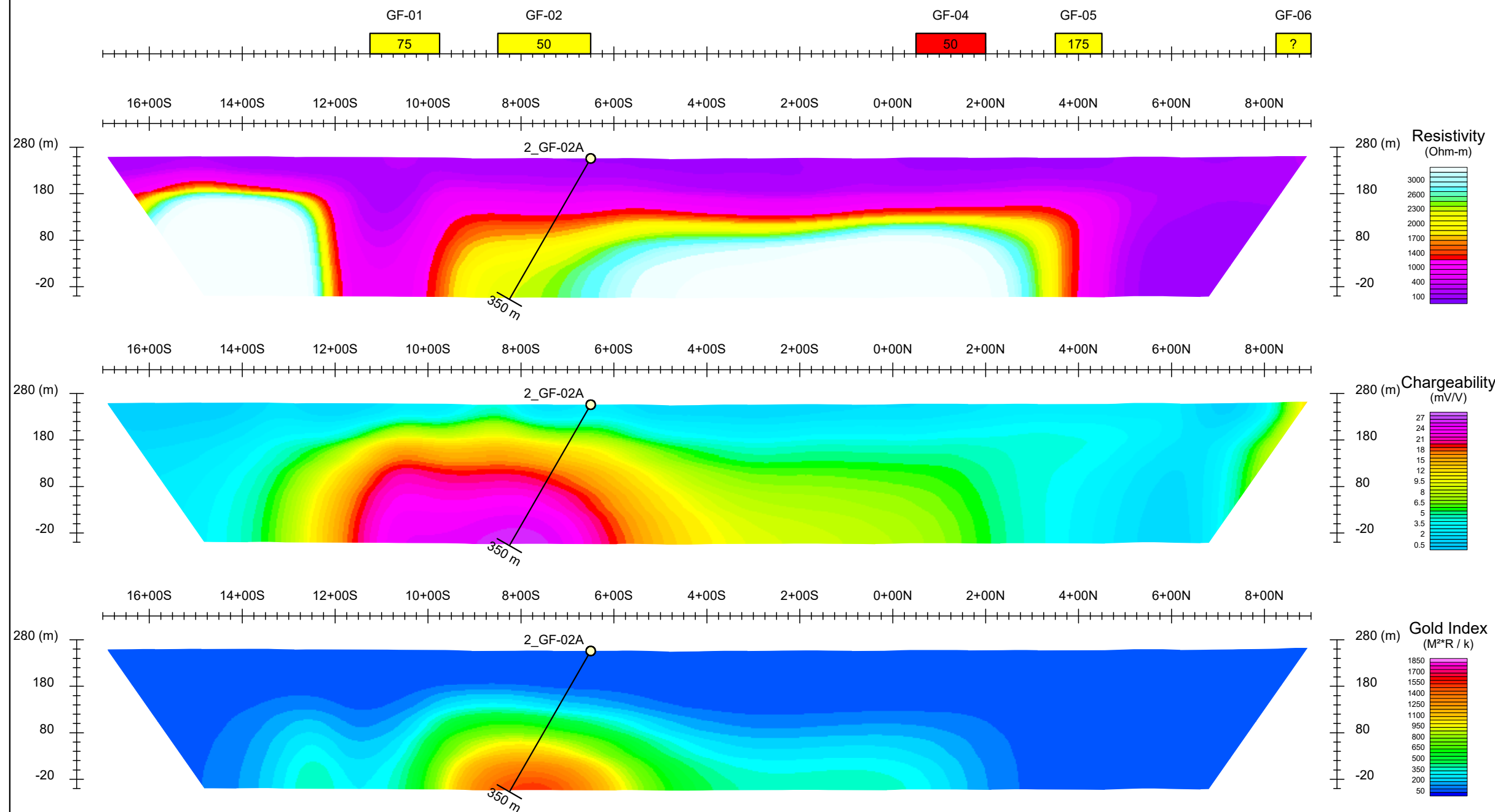
Probe Metals Inc.

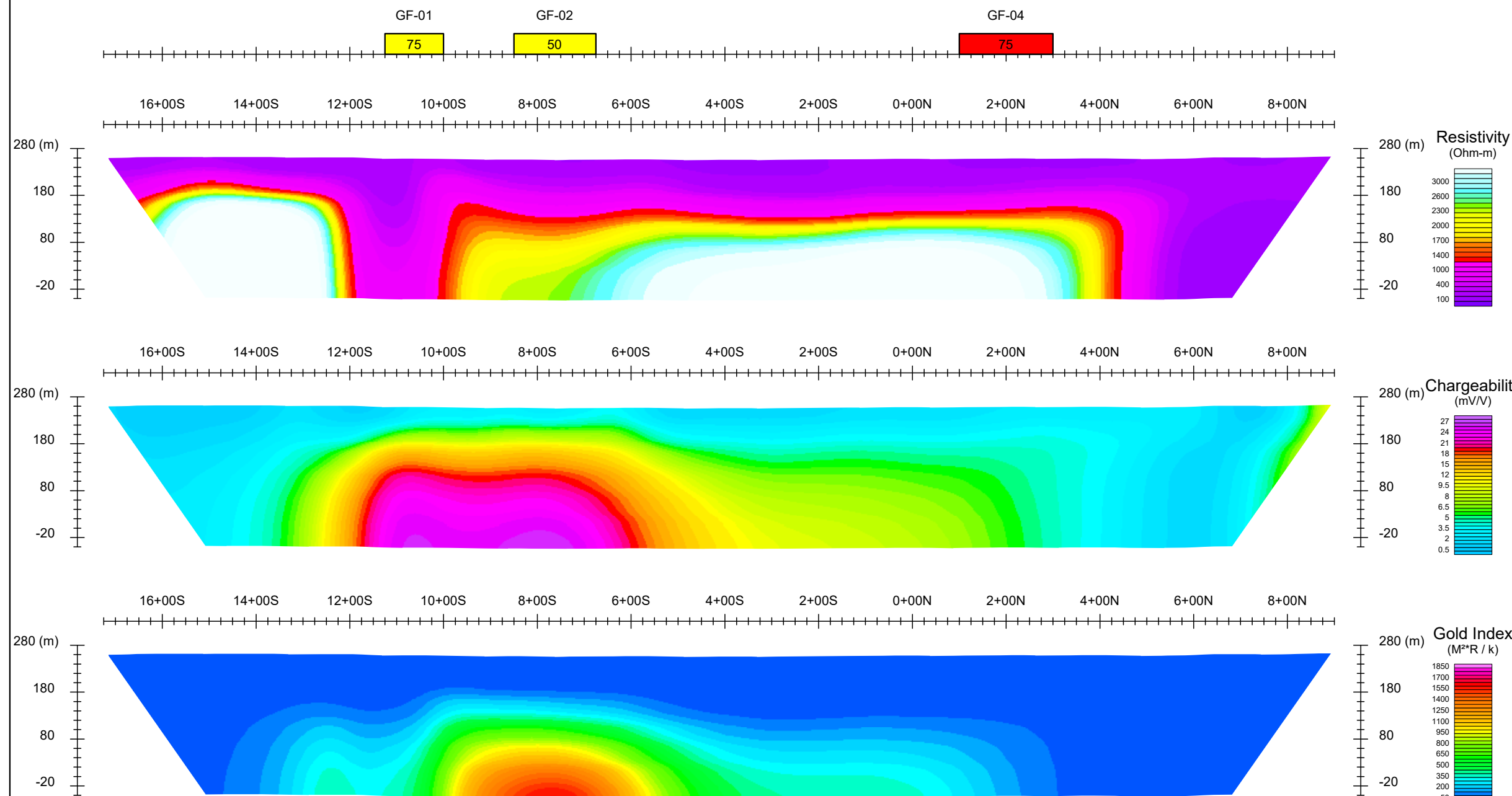
OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 17+00E







Project no: 21QC014-P2

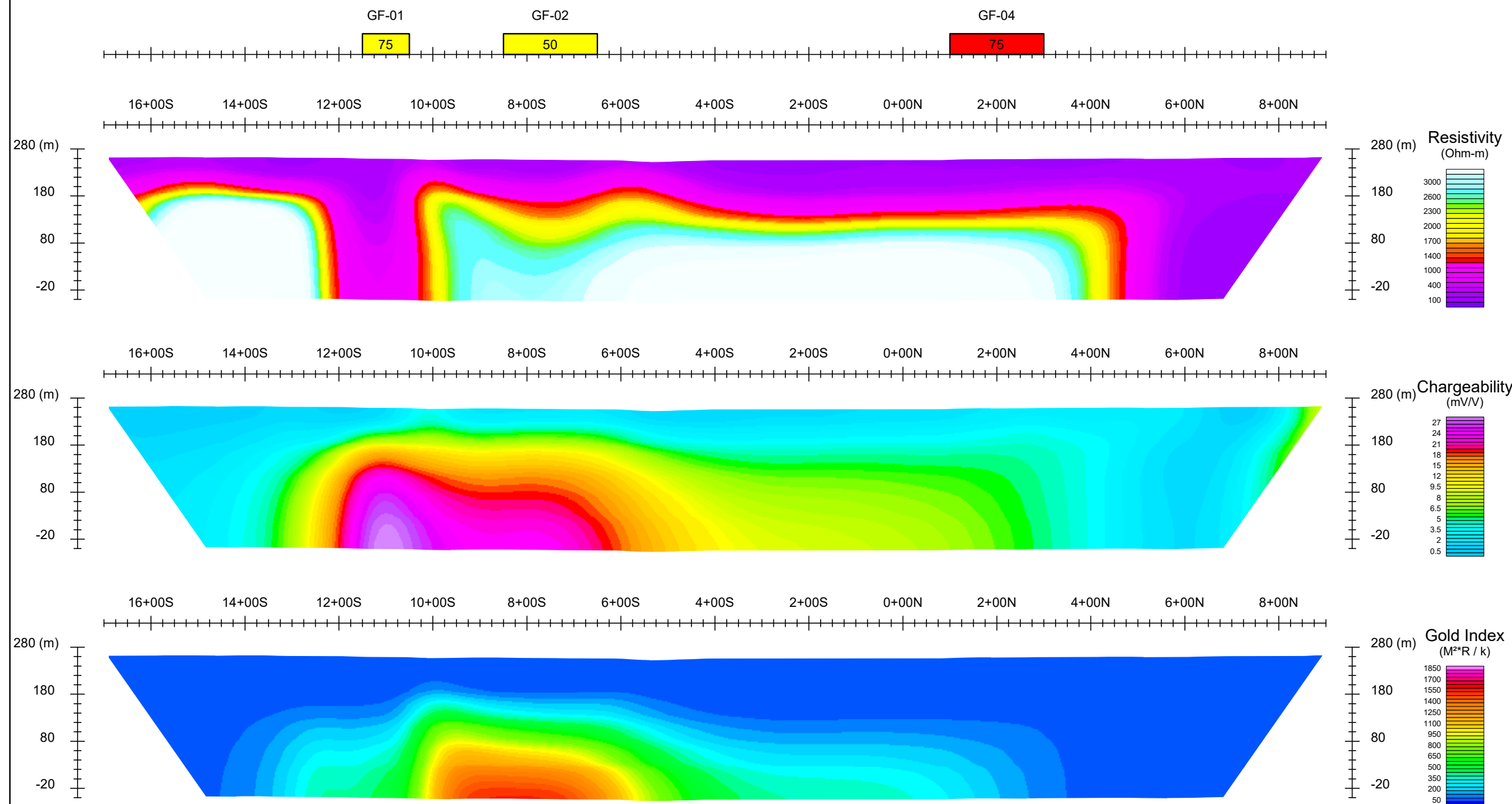
Scale 1 : 10 000

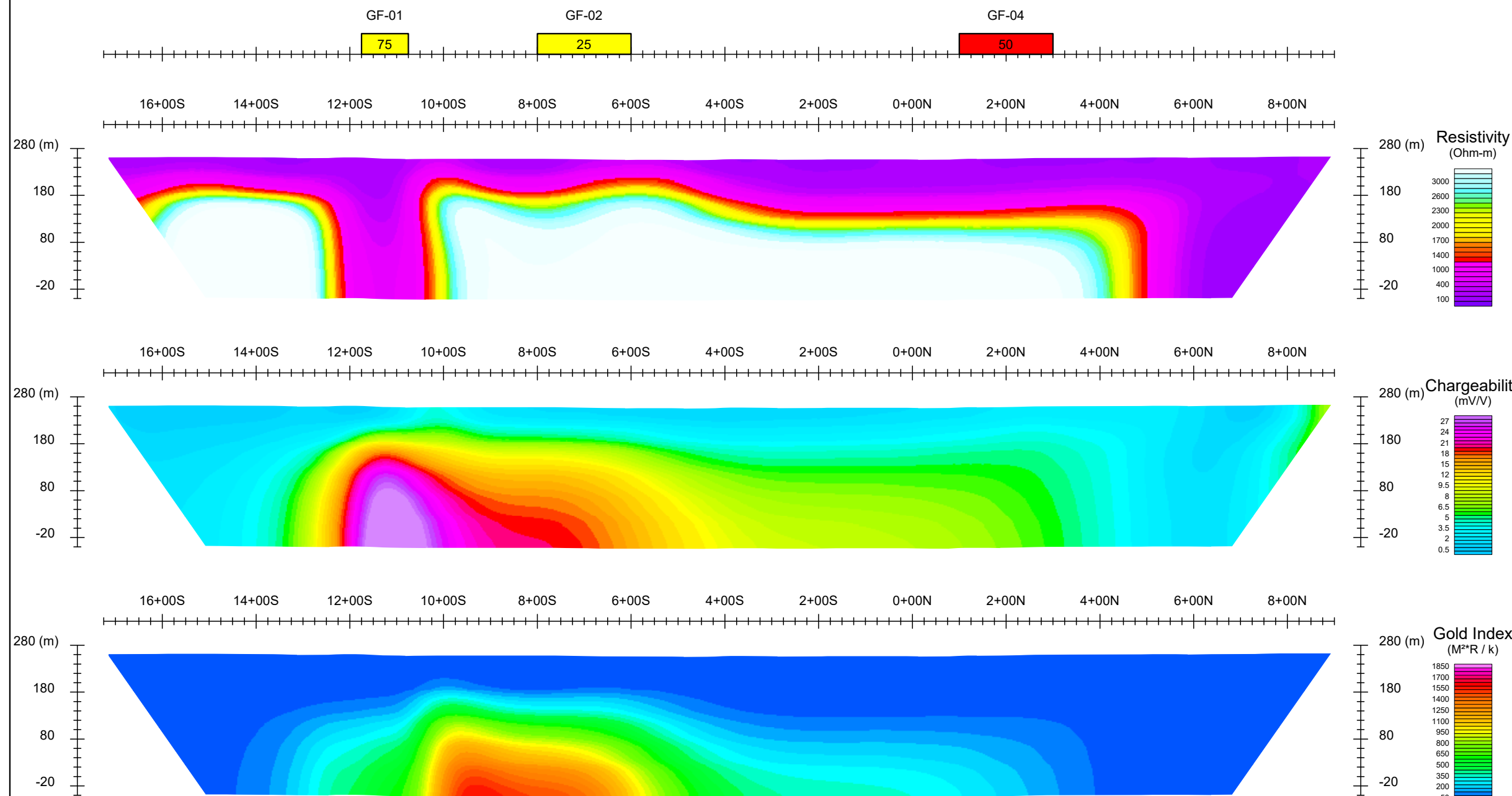
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 20+00E





Project no: 21QC014-P2

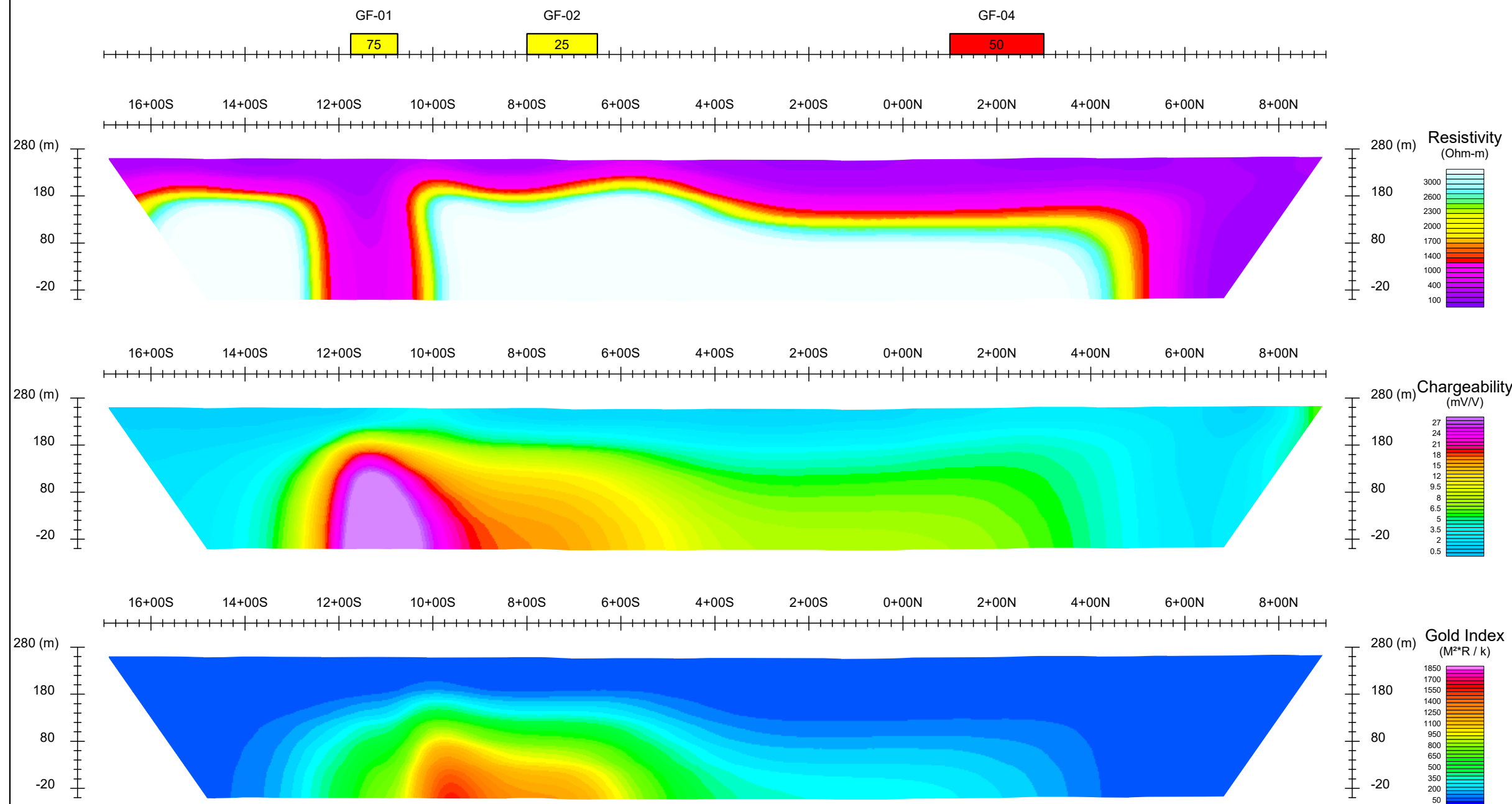
Scale 1 : 10 000

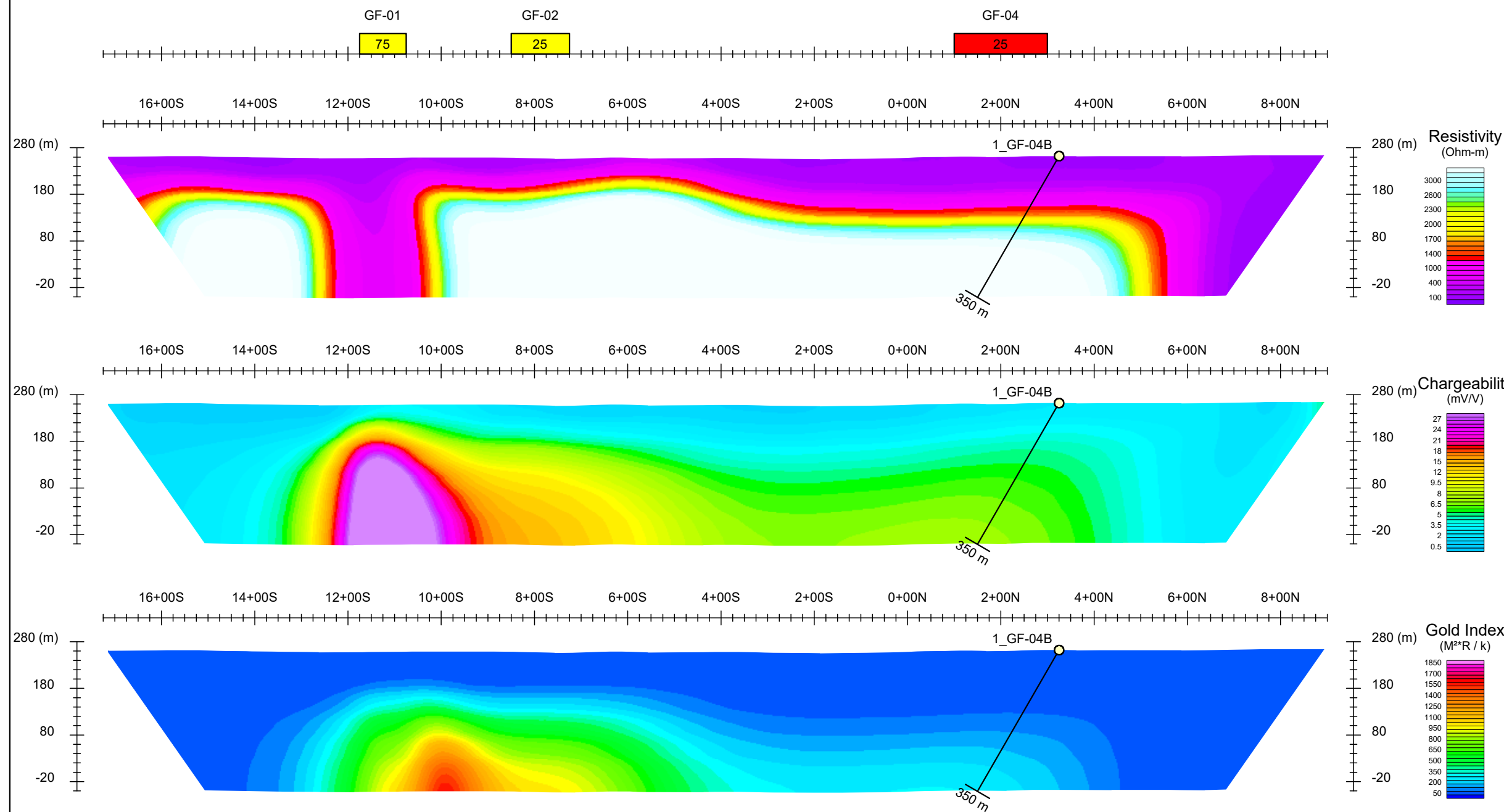
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 22+00E





Project no: 21QC014-P2

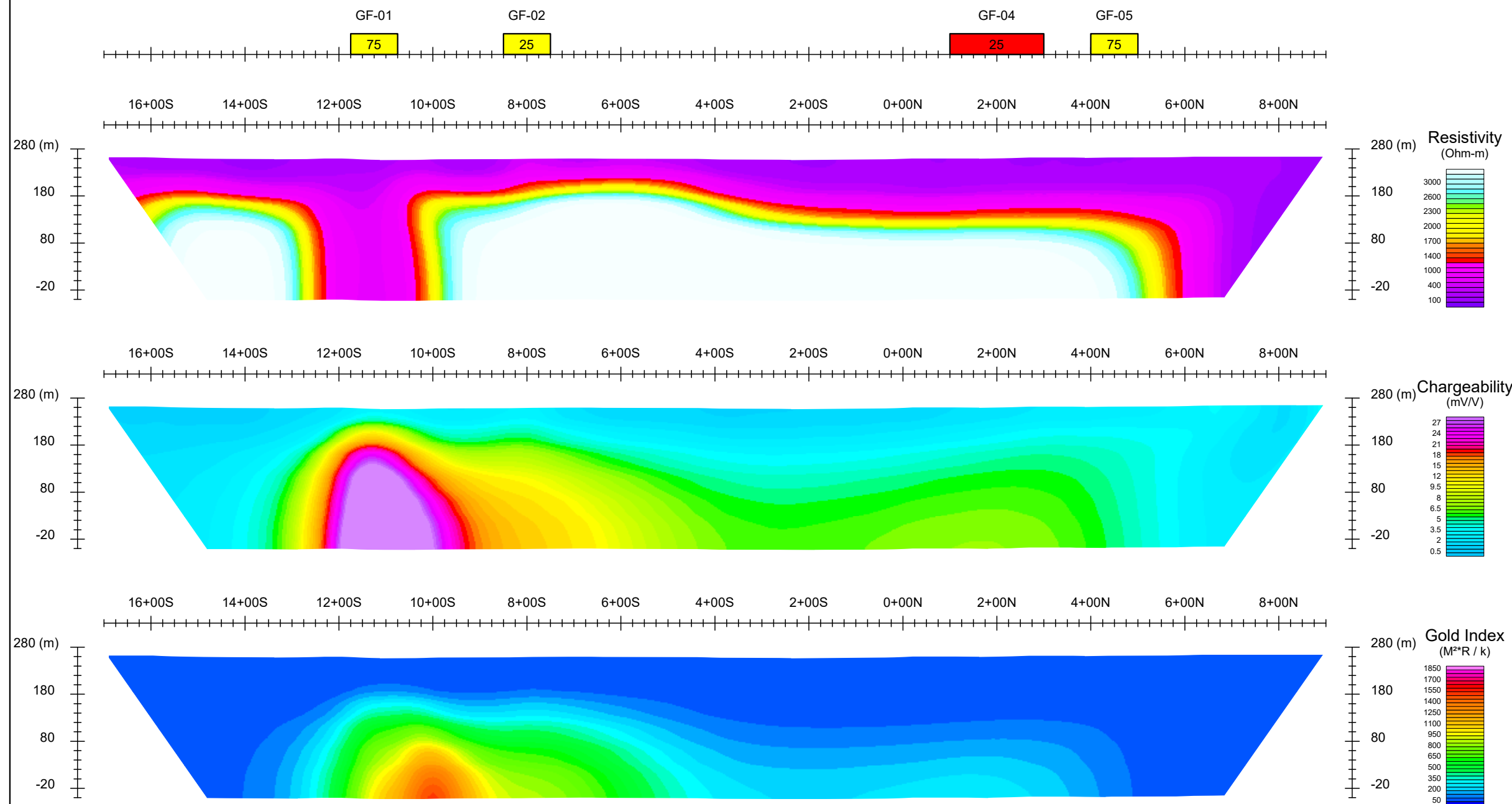
Scale 1 : 10 000

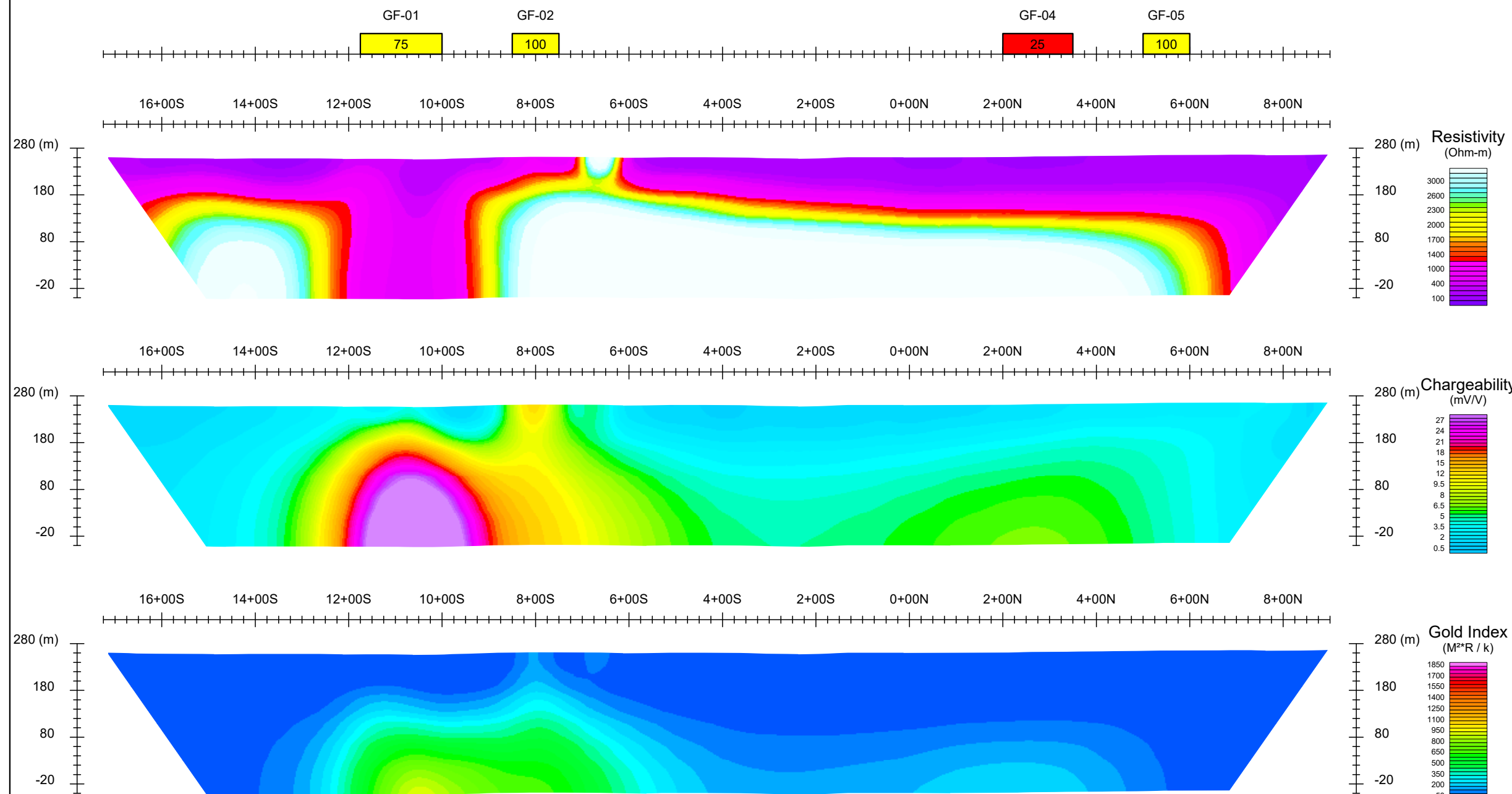
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 24+00E





Project no: 21QC014-P2

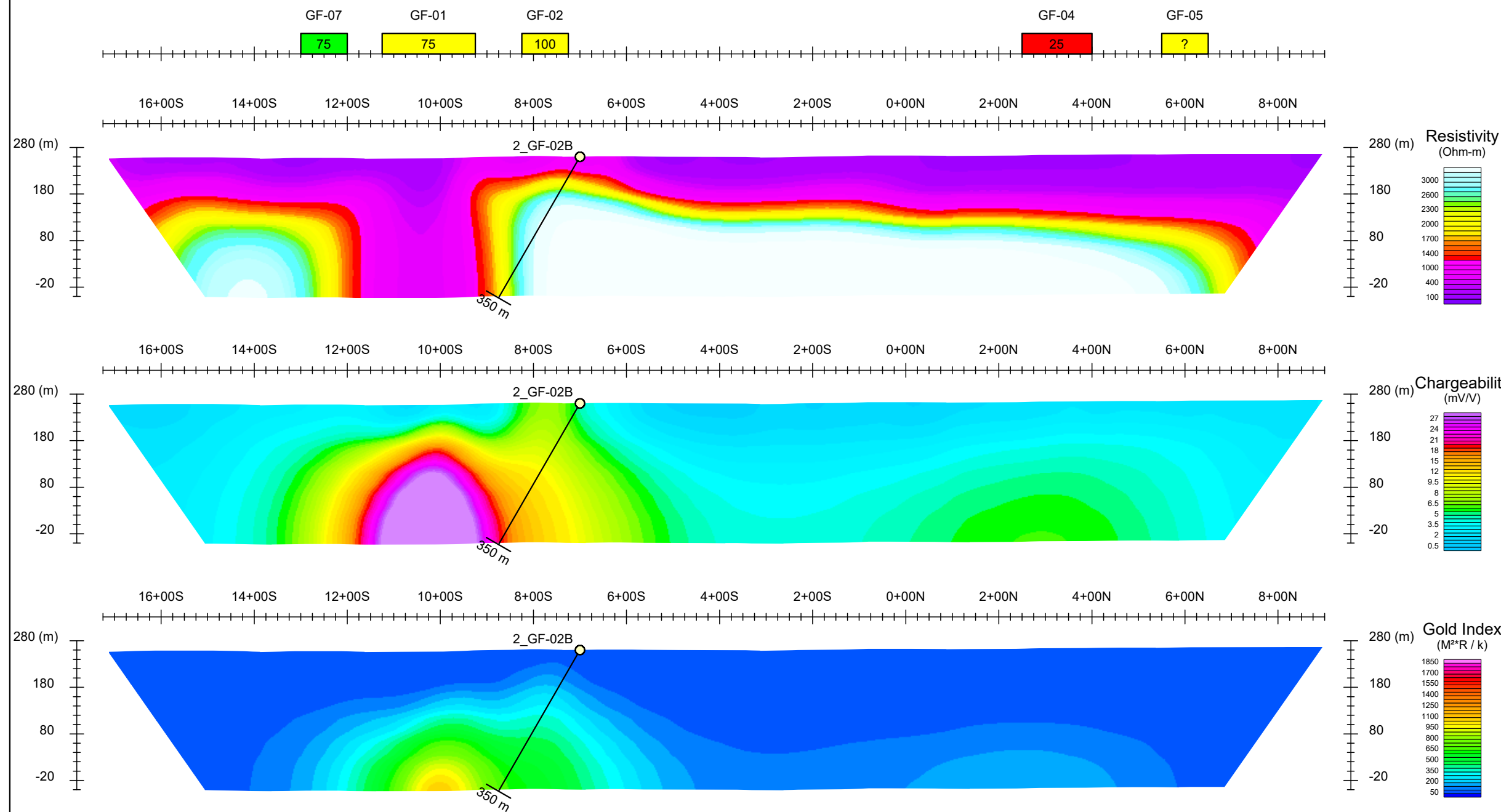
Scale 1 : 10 000

Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 27+00E



Project no: 21QC014-P2

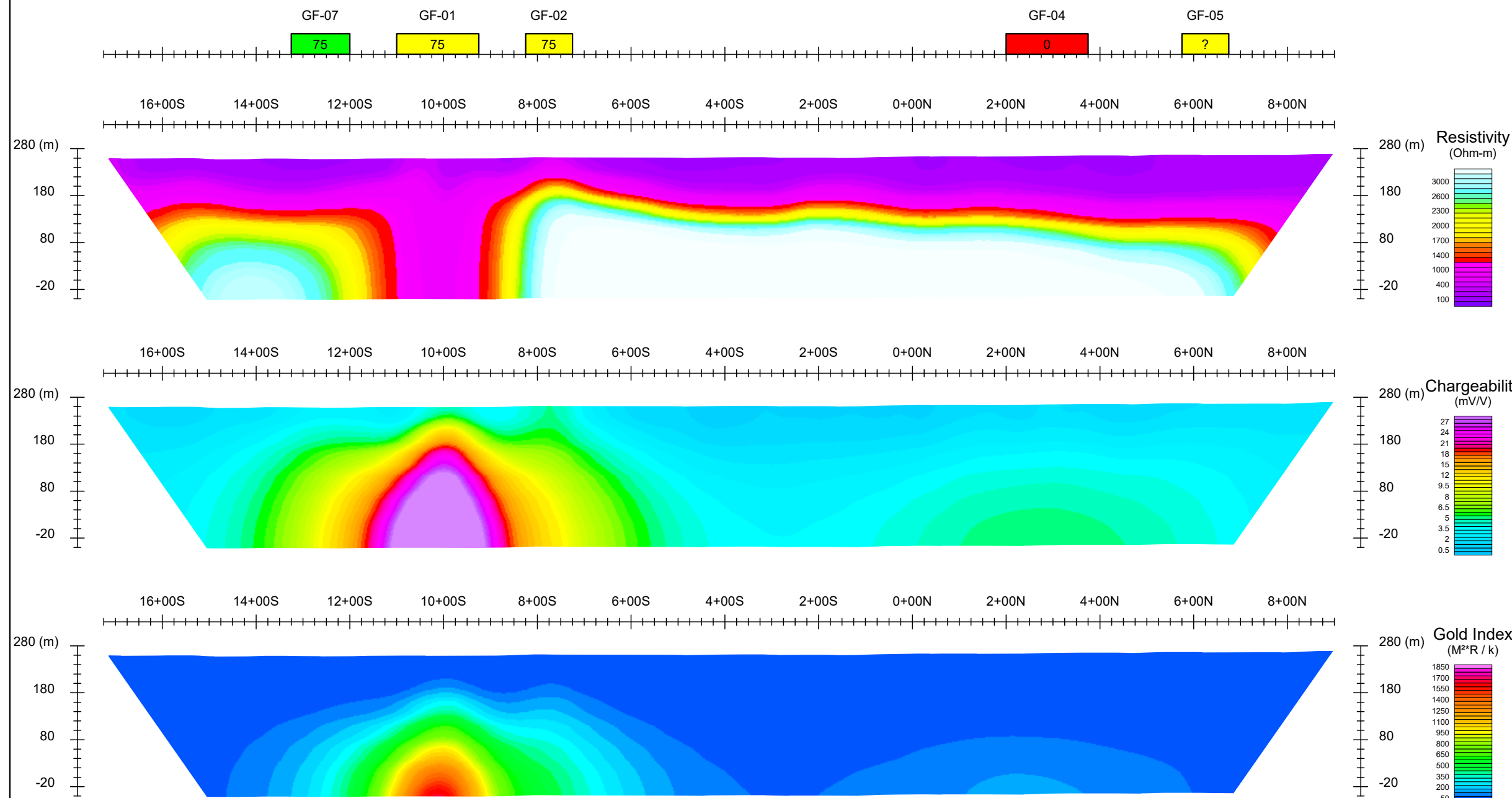
Scale 1 : 10 000

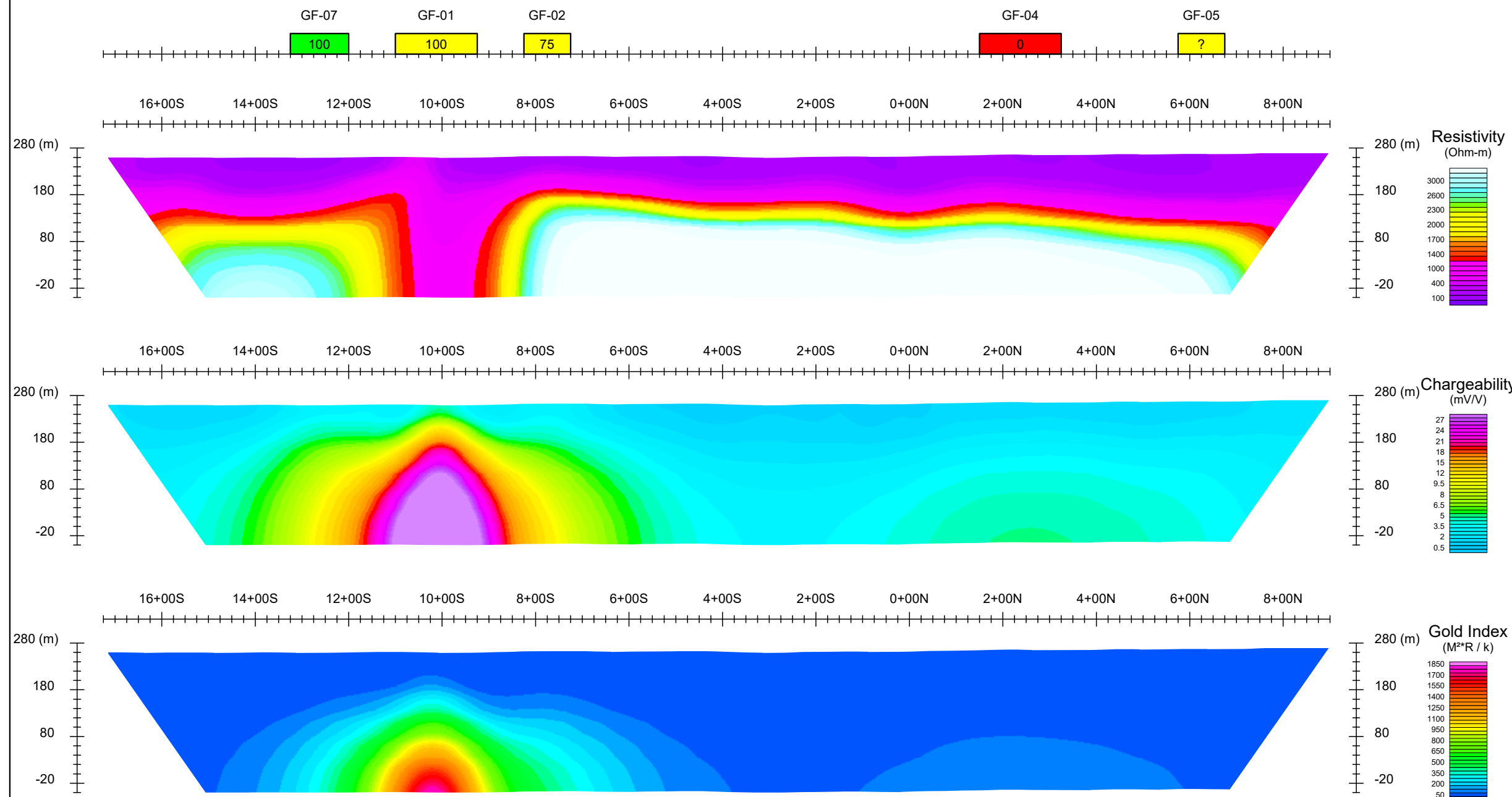
Probe Metals Inc.

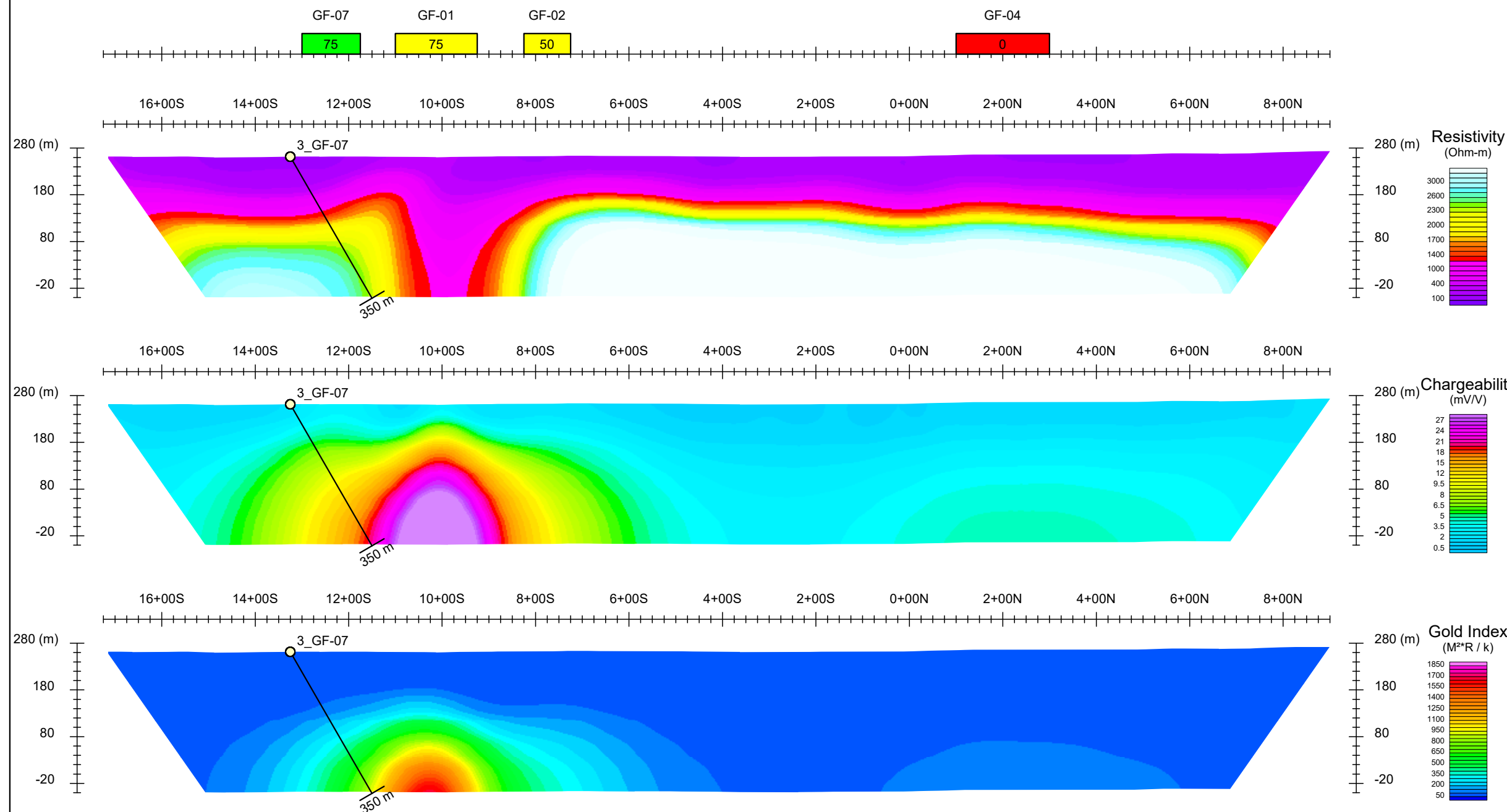
OreVision® Survey - Vertical Section

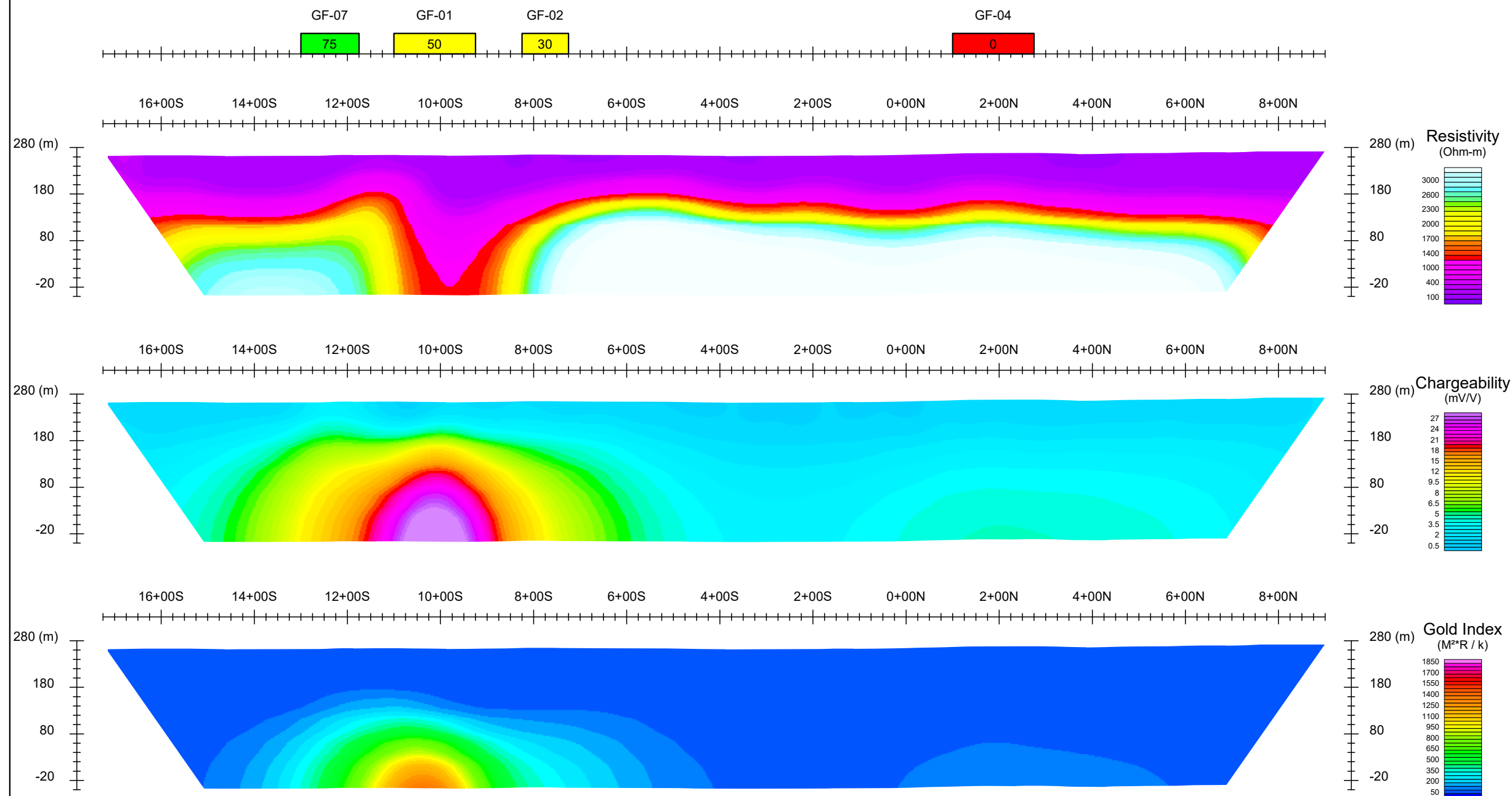
Gaudet-Fénelon Project

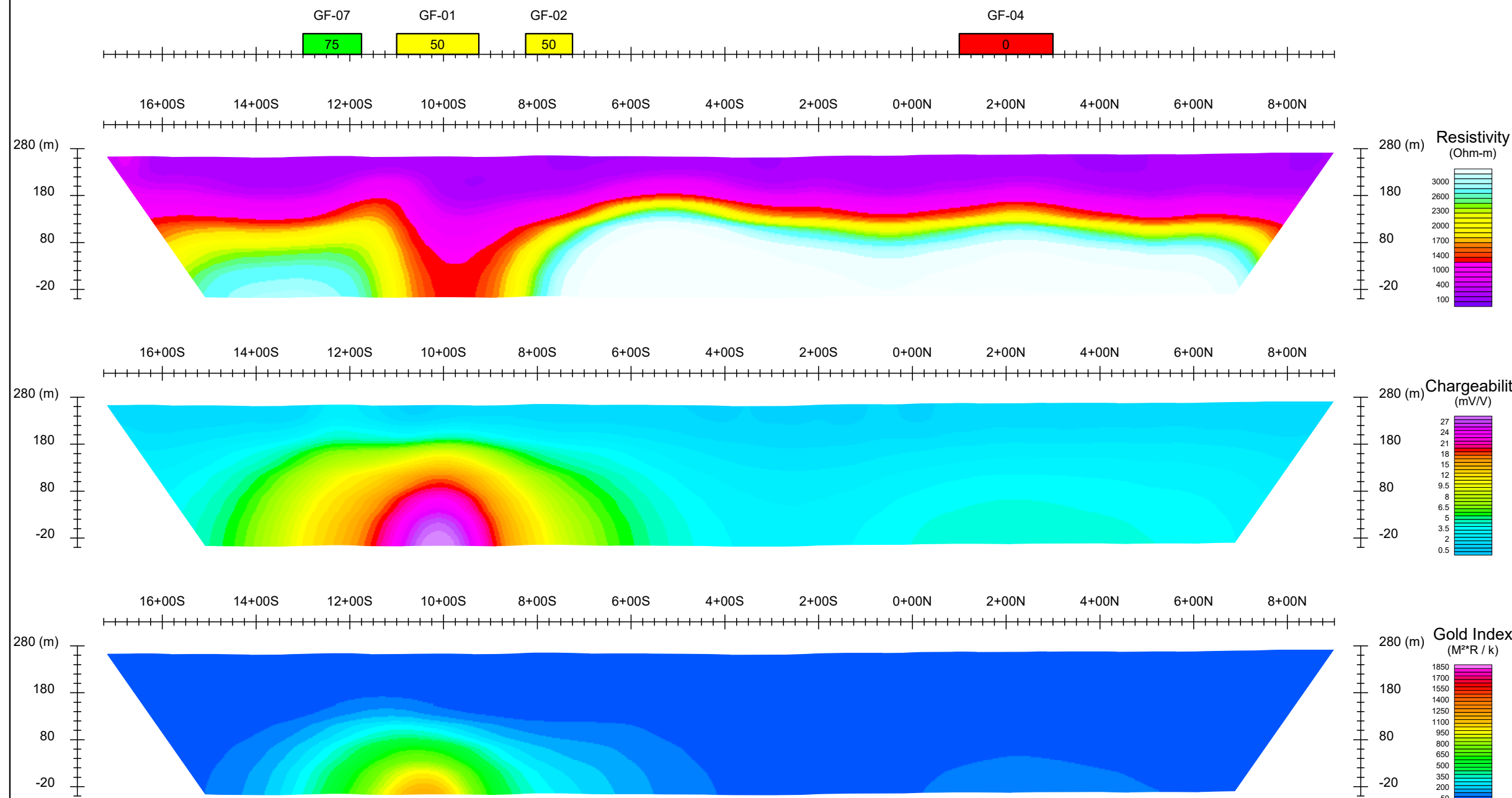
Line 29+00E

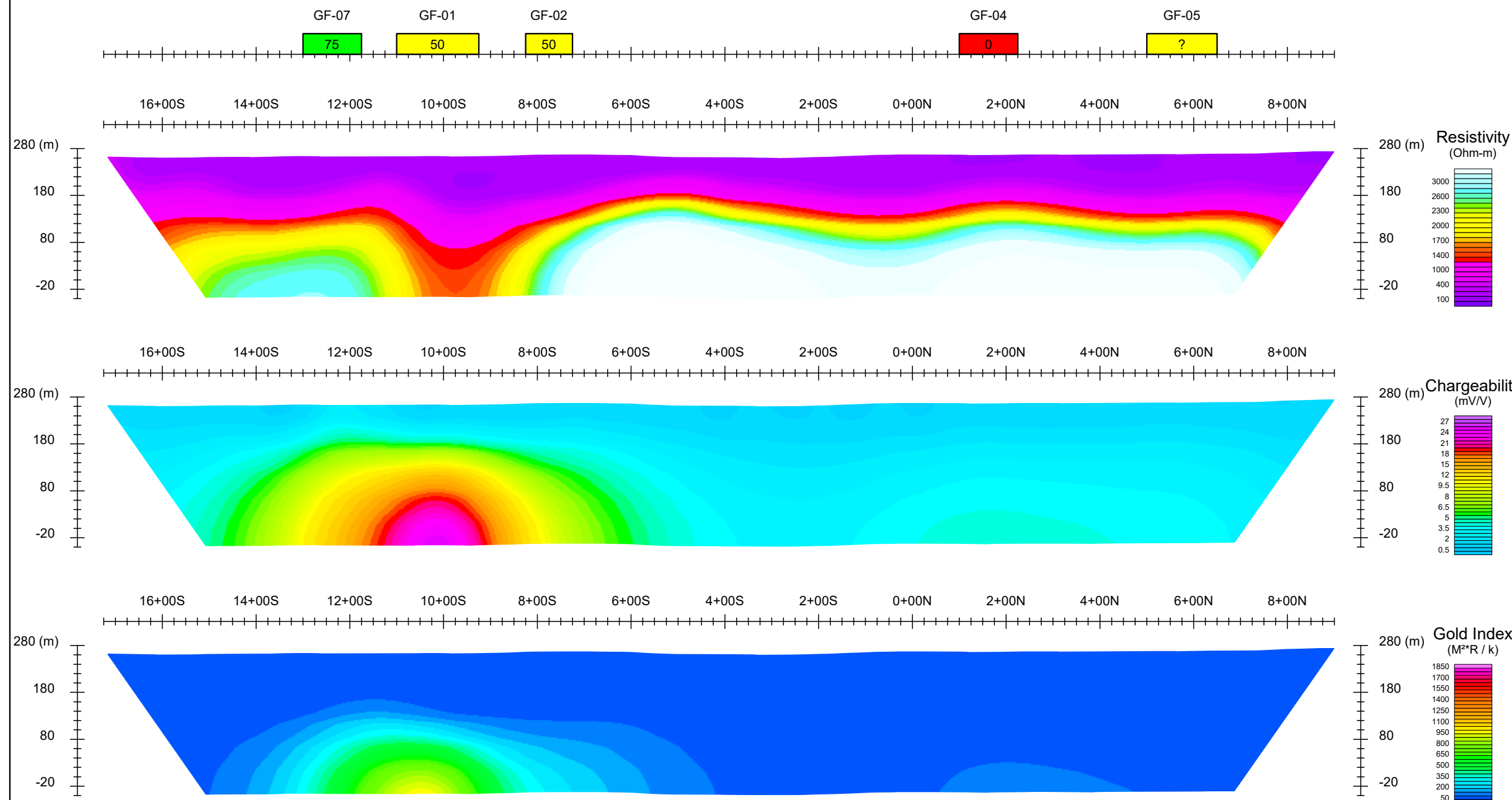












Project no: 21QC014-P2

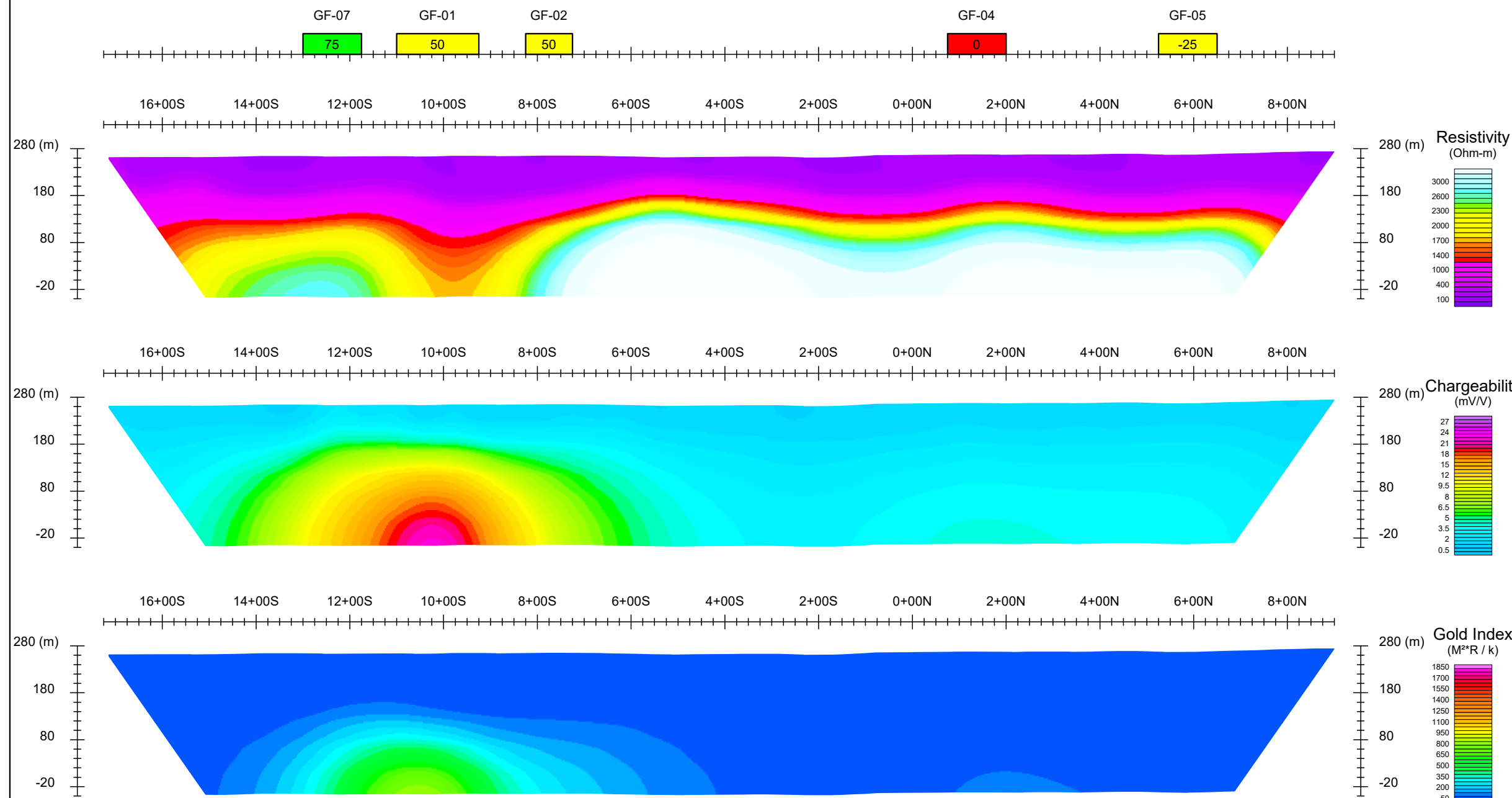
Scale 1 : 10 000

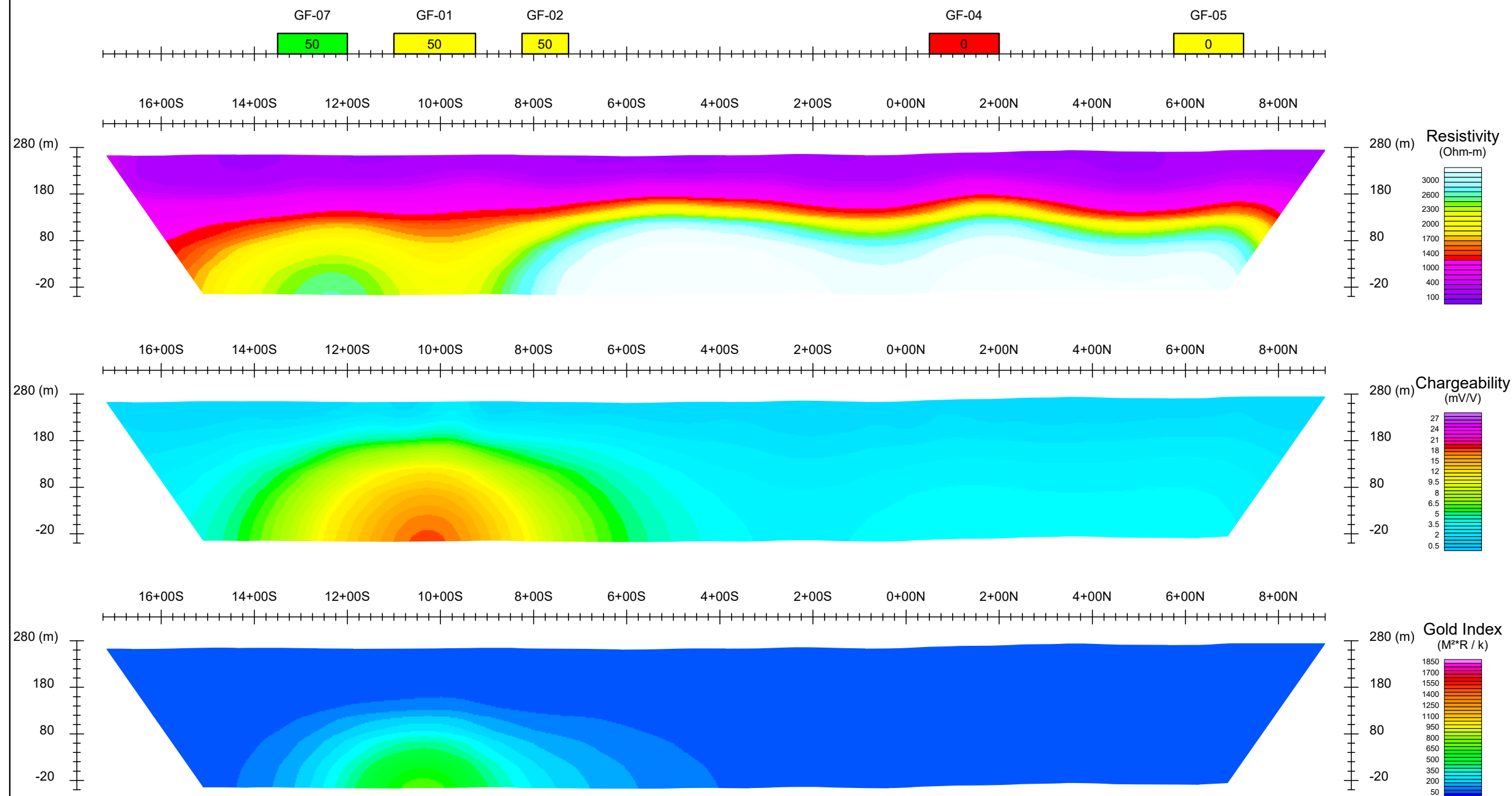
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 36+00E





Project no: 21QC014-P2

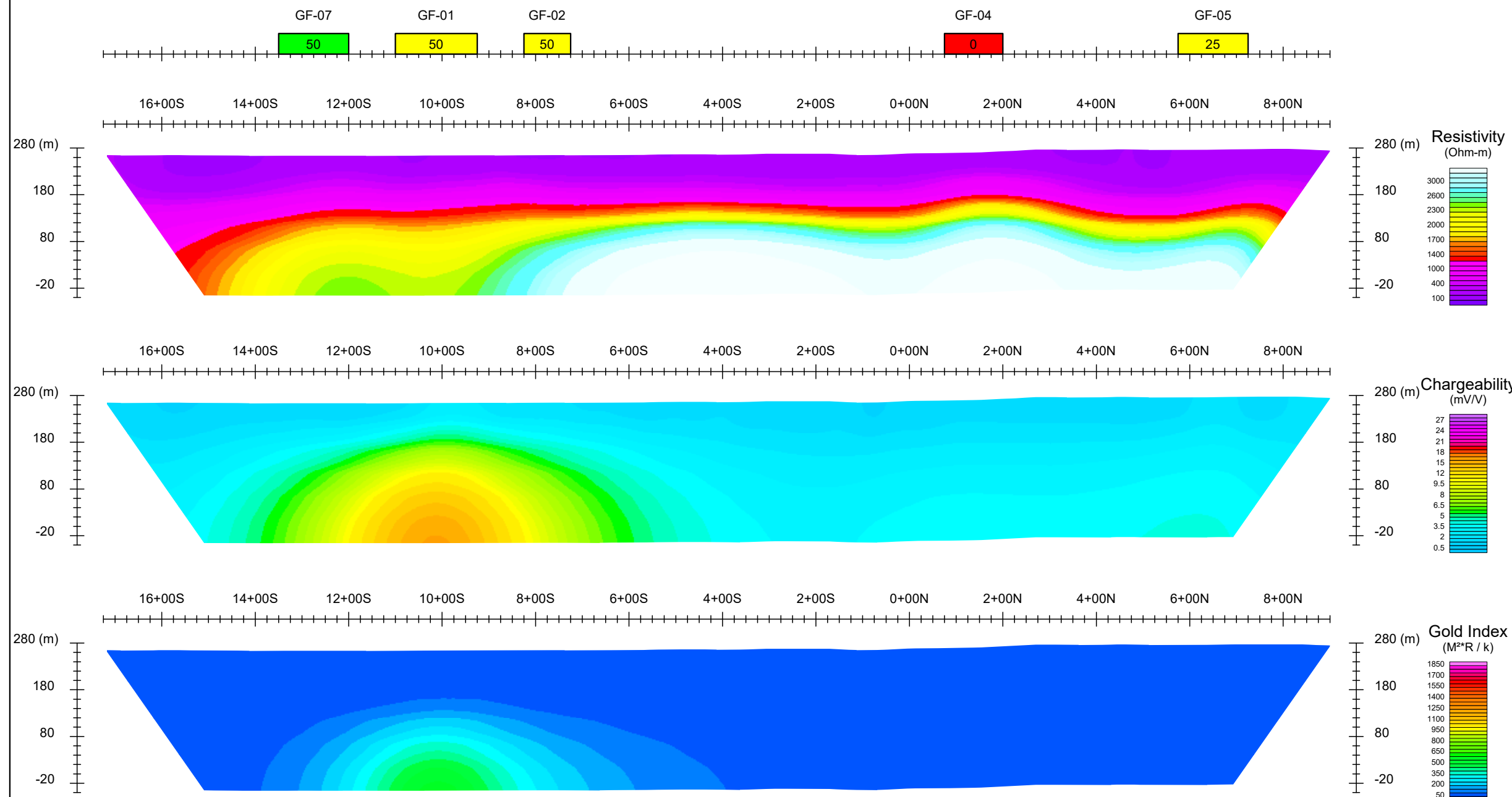
Scale 1 : 10 000

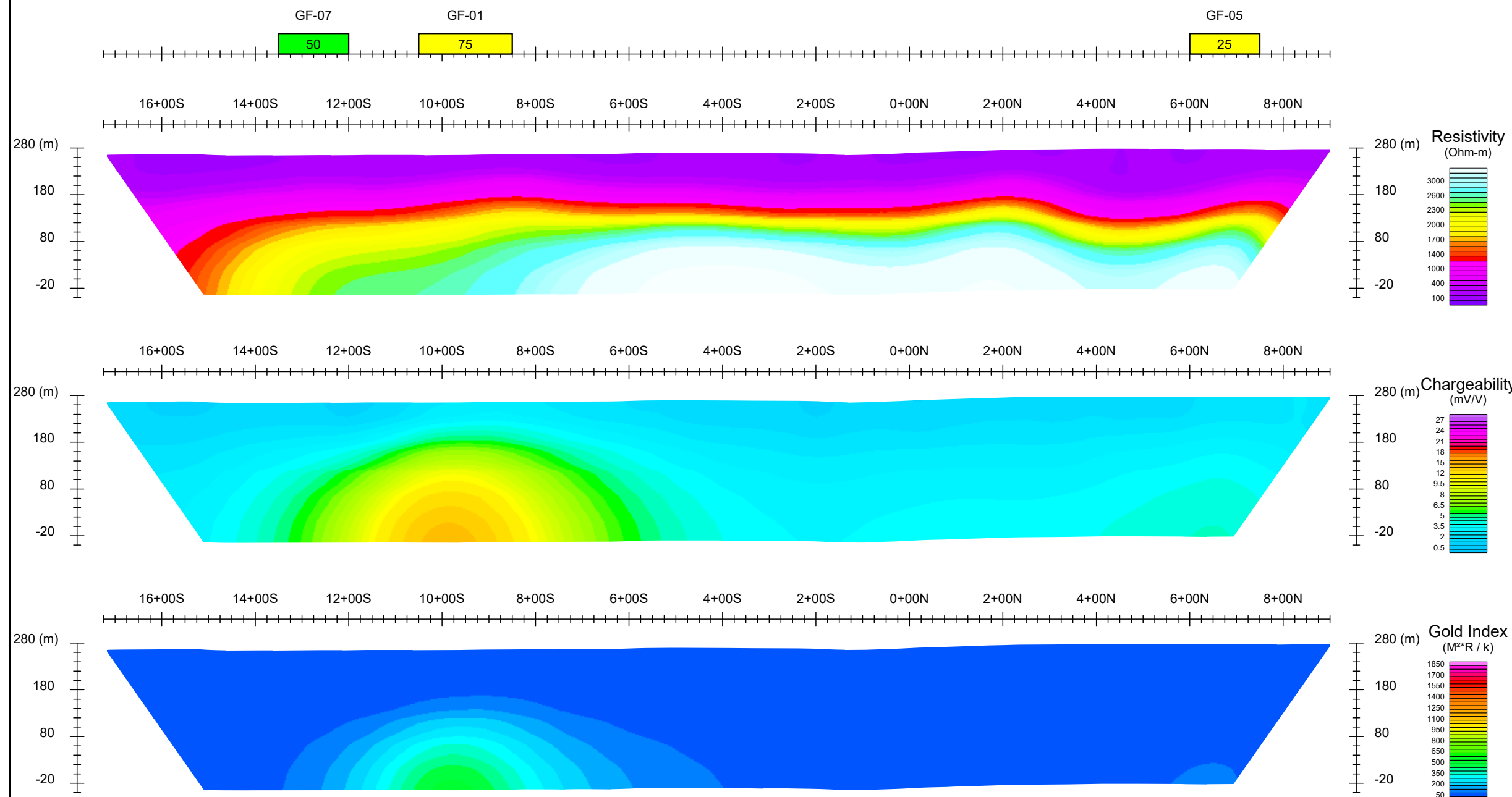
Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 39+00E





Project no: 21QC014-P2

Scale 1 : 10 000

Probe Metals Inc.

OreVision® Survey - Vertical Section

Gaudet-Fénelon Project

Line 43+00E

