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.

VLF EM-16 Survey / Interpretation Report

On the

Klotz Lake West (Hardrock) Property

Target 1 (Grid 1) and Target 2 (Grid 2)

Laponen Lake Area, Pagwachuan Lake Area, Castlebar Lake Area

Longlac, Ontario

Prepared For

Prodigy Gold Inc.–an affiliated company of Argonaut Gold Inc.

Prepared by Shaun Parent

Superior Exploration, Adventure & Climbing Co. Ltd.

June 27, 2019

Table Of Contents

List of Tables, Maps & Appendices

Table List

Map List

Appendix List: Grid 1/Target 1

Appendix A-1 NAA Figures

Appendix A-2 NML Figures

Appendix List: Grid 2/Target 2

Appendix B-1 NAA Figures

Appendix B-2 NML Figures

Preamble

Superior Exploration, Adventure & Climbing Co. Ltd. is an Incorporated Company specializing in Mining Exploration and Geophysics as well as Professional Climbing.

Our VLF surveys (YVLF) are a non-invasive way to complete first pass ground geophysics. No cut lines are needed and an exploration permit is not generally required.

We have worked in many countries and have experience working in a wide variety of environments such as VMS, Breccia Pipes, Epithermal Veins and Shear Hosted Gold Deposits.

Shaun Parent, BSc. P. Geo is a member of the Association of Professional Geoscientists of Ontario as well as the Prospectors & Developers Association of Canada. He has over 30 years' experience working in the Geological and Geophysical Field. Although he specializes in Ground VLF, he is also experienced working with I.P., Max Min, Surface & Borehole Pulse EM, Airborne Magnetics and Ground Magnetometer.

Sandra Slater is a member of the Prospectors & Developers Association of Canada. She has been working in the Geological/Geophysical field for over 10 years and specializes in data analysis and VLF2DMF software, as well as assisting in the field.

Shaun began working with the developer of the VLF2DMF software since its inception in 2008 and he and Sandra continue to do so. Superior Exploration has completed many successful "blind" case history test VLF surveys over various ore bodies and mineralized zones.

Important Note:

Any reference to Grid 1 or Grid 2 is to be considered the same as Target 1 or Target 2

Executive Summary:

Ground VLF surveys were completed over 2 separate grids in the Klotz Lake area;
Grid 1 (Target 1) and Grid 2 (Target 2)
The property is located approximately 20 kilometers east of Longlac, Ontario.
The survey was carried out in May & June 2019 using a VLF EM-16 unit and a handheld Garmin GPS-60CSX.
The two transmitter stations used for this VLF survey were:

TX NAA: Cutler, Maine, USA
24.0 KHz
24 T 636267 4944945

TX NML: La Moure, North Dakota, USA
25.2 KHz
14 T 551103 5134927

A combined total of 12.5 km of VLF was carried out over the 2 separate grid areas

Grid 1 (Target 1): 11 VLF Lines (5.5 km)
Grid 2 (Target 2): 14 VLF Lines (7 km)

The main objective of the survey was to determine if the VLF Survey could delineate zones carrying mineralization and/or structures. No geological information was known at the time of the VLF survey.

Property Access

Access is by the following:

Grid 1 -
- On Highway 11, drive East of Longlac to the Caramat Highway
- Go along Caramat Highway for 7 kilometers to a logging road on left side
- Follow this logging road for 4.3 kilometers
- Line 4W is located approximately 250 meters to the east

Grid 2 -
- On Highway 11, drive east of Longlac to the Castlebar Side Road
- Turn right on Castlebar Side Road until you reach East Road
- Turn left on East Road and drive to the first bush road on the right
- Follow this bushroad for 1.4 kilometers to parking area before beaver dam
- Using an off road vehicle follow this road for approximately 1.5 kilometers where Line 3E will cross it.

Introduction

A VLF-EM16 survey is a relatively simple and economic geophysical survey that is used to better understand shallow, vertical and sub vertical bedrock conductors.

A VLF EM-16 unit is a handheld geophysics tool that uses very low frequency (VLF) submarine signals from various stations around the world. Transmitter stations are selected according to the strike of the rock units within the survey and should be aligned with the strike.

Electromagnetic (EM) surveys use a transmitter to generate a time-varying electromagnetic field in the earth, known as the primary field. This field gives rise to small, timevarying voltages in the earth. Where the earth is conductive, the voltages drive small timevarying flows of current, which give rise to electromagnetic fields of their own called secondary fields. The primary and secondary fields add together.

EM surveys measure the earth's willingness to conduct electricity, or conductivity. The higher the conductivity, the more current will flow in the earth for a given electrical field strength. If the earth is not conductive, the unwillingness of the earth to conduct electricity is expressed in resistivity. The higher the resistivity, the less current will flow for a given electrical field strength. At low frequencies, conductivity and resistivity are inversely related.

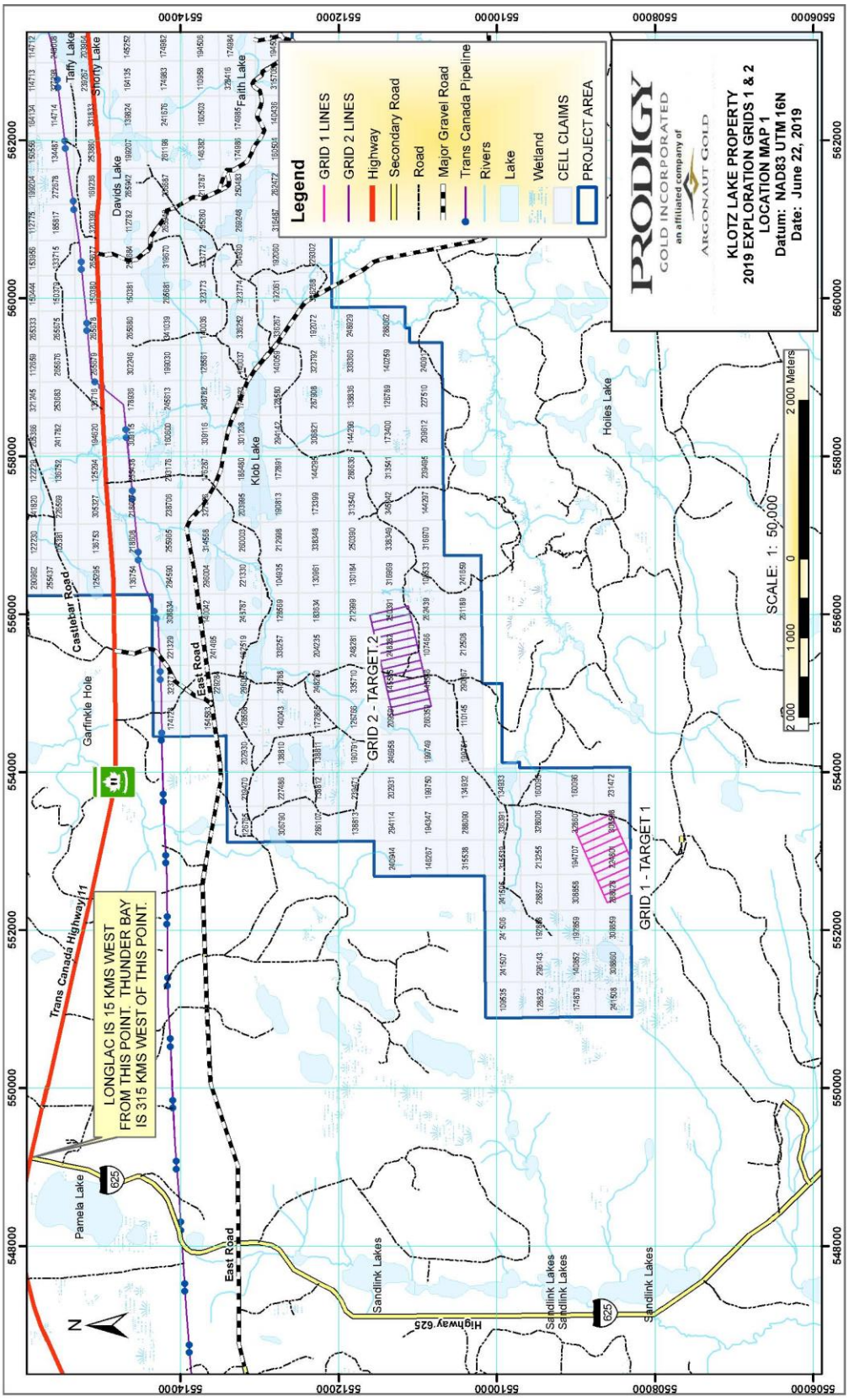
This report describes the findings and results of the VLF EM-16 survey utilizing the VLF2DMF processing software of which the author of this report has assisted in its development since 2007. It enables the processing and inversion of electromagnetic (EM) induction data acquired along a survey area using a Very Low Frequency (VLF) (Santos 2013). The software generates profiles of Raw Data, Fraser Filtered Data, Fraser Filter Pseudo Sections, KH Filtered Data, Resistivity, JY Inversions, and (2-D) Modelled Inversions.

VLF data collected in the surveyed area was also compiled onto separate plan maps of contoured Fraser Filter In Phase, Fraser Filter Quadrature as well as Resistivity data.

Personnel

The VLF EM-16 operator and GPS field navigator responsible for the collection of all raw data was Shaun Parent.
Processing, Profiling, Modelling and Interpretation of the VLF data using the VLF2DMF Software was completed by Sandra Slater and Shaun Parent.

Map 1 General Location Map of Grids 1 and 2



Work Performed

Fieldwork

The VLF EM-16 survey consisted of running a total of 25 VLF reconnaissance lines over 2 separate Grids. VLF lines were 100 meters apart.

- Grid 1 (Target 1) : 11 lines
- Grid 2 (Target 2) : 14 lines

The following parameters were used throughout the survey

Equipment Used: VLF EM-16 unit and a handheld Garmin 60-CSX PS

VLF Transmitters Used:

Target 1: NAA - 24.0 KHz. Cutler, Maine (East)
Azimuth 118 degrees 1541 Km
NML - 25.2 KHz. La Moure, North Dakota (West)
Azimuth 243 degrees 974 Km

Target 2: NAA - 24.0 KHz. Cutler, Maine (East)
Azimuth 118 degrees 1539 Km
NML - 25.2 KHz. La Moure, North Dakota (West)
Azimuth 243 degrees 977 Km

VLF survey direction: The VLF Em-16 receiver faced a direction of 00 degrees true azimuth for each reading taken.

VLF survey stations: VLF readings began at the south end of each VLF line and were taken approximately 25 meters apart along each survey line. Every 25 meter station was flagged with station marking.

Parameters of Measurement: In-phase and Quad-phase components of a vertical magnetic field is measured as a percentage of horizontal primary fields. (Tangent of tilt angle and ellipticity). VLF transmitter NAA was to the east while transmitter NML was to the west. The transmitters are chosen so that the direction to the transmitting station is as close to the orientation of the bedrock strike.

VLF Data Collection Process

Field data was collected as follows on each surveyed line.

- Each station was saved onto the Handheld Garmin 60CSX GPS Unit (including any local features such as power lines, fences and geological structures)
- VLF readings for each station were recorded on the GPS as In-Phase and Quadrature corresponding to the line number and station number. (See example in Table 1)
- Garmin and VLF data were compiled and processed. All UTM Values are NAD 83.

Table 1 Example of VLF Data Collection

Line 2E	NAA In phase	NAA Quadrature	NML In phase	NML Quadrature	Notes
3+00N	10	6	4	5	swamp
3+20N	8	4	2	4	oc

Interpretation & Modelling

VLF2DMF Data Processing

All VLF data collected was processed and interpreted separately for TX NAA and TX NML. The following filters, inversions, profiling and modelling were completed and used in the interpretation process, however, only the Raw Data and 2D Modelled Inversions are included in the appendices at the end of this report.

Raw Data Profiles

The raw data for each frequency was plotted for each line surveyed. No filtering or smoothing of the raw data was done. Raw Data Profiles for all lines can be found in the Appendices at the end of this report.

- Grid 1 (Target 1): Appendix A-1, A2
- Grid 2 (Target 2): Appendix B-1, B2

Fraser Filter Profile with Fraser Peaks

Raw data was run through the Fraser filter. This filter transforms In-Phase cross overs and inflections into positive peak anomalies. (Fraser 1969) In-Phase inflections and cross overs are usually plus to minus, while Quadrature responses are negative to positive giving a negative peak anomaly when the Fraser Filter is applied. Fraser filter data was compiled separately for each grid to produce Plan Maps.

- Grid 1 (Target 1): NAA Maps 3, 4 NML Maps 8, 9
- Grid 2 (Target 2): NAA Maps 13, 14 NML Maps 18, 19

Fraser Pseudo Section

Fraser Filter pseudo section is built by applying the Fraser Filter of various lengths along the survey line.

K-H Profiles

Raw Data was run through the Karous-Hjelt (K-H) filter. The filter is applied to obtain a section of current density. The higher values are generally associated with conductive structures. (Karous, Hjelt 1983)

Resistivity Profiles: 2000 & 4000 Ohm's

The apparent resistivity was calculated. The resistivity can be calculated if the mean environmental resistivity is known at the beginning of the VLF profile. A mean resistivity of 2000 ohm's and 4000 ohm's was used for all lines. Resistivity data from each profile was combined to produce plans maps. This report contains Plan Maps for Resistivity results at 4000 Ohm's.???

- Grid 1 (Target 1): NAA Map 5 NML Map 10
- Grid 2 (Target 2): NAA Map 15 NML Map 20

JY Section Model:

A 2D inversion that looks for the best distribution of the density of current (JY). The output is the apparent current density with positive values associated with conductors and negative values associated to resistors.

2D Inversion Resistivity Models 2000 Ohm's & 4000 Ohm's

A resistivity of 2000 Ohm's and 4000 Ohm's was used to build initial models used in the inversion to obtain a realistic cross section of the line surveyed. Conductive zones are red/yellow while resistive zones are blue. A depth scale is found on the left side of model profiles. Surface conductive zones show little depth extent, have a horizontal display and are limited in depth.

The maximum depth slice with a bedrock resistivity of 2000 Ohms is 144.3 meters for transmitter NAA (24.0 KHz.) and 140.9 meters for TX NML (25.2 KHz.).

The maximum depth slice with a bedrock resistivity of 4000 Ohms is 204.1 meters for transmitter NAA (24.0 KHz.) and 192.2 meters for TX NML (25.2 KHz.).

All Inversion models have the same color scaling using a minimum resistivity of 10 and a maximum of 10000. The vertical exaggeration of all models is 1.0. Fraser Filter anomaly picks are found across the top of all models. Models with a resistivity of 4000 Ohm's were selected for Grid 1 and 2000 Ohm's for Grid 2 due to a more detailed response and are included in this report. Models for all lines can be found in the Appendices at the end of this report.

- Grid 1 (Target 1): Appendix A-1, A-2
- Grid 2 (Target 2): Appendix B-1, B-2

Discussion of Results – Grid 1 (Target 1)

Lines 4W, 3W, 2W, 1W, 00, 1E, 2E, 3E, 4E, 5E, 6E

VLF Anomalies

VLF Trends were identified for TX NAA (2 trends) and TX NML (2 trends). Trends are signified as the following example: 4W-B, 3W-A, 2E-A (Line 4 West-VLF Pick B to Line 3W-VLF Pick A to Line 2 East-VLF Pick A)

TX NAA Grid 1 (2 Trends)

Map- 2 Elevation Contours with NAA Picks and Trends

- Trend 1 & 2 follows the edge of a topographic high which may signify the edge of a shear and a cliff and possible outcropping

Maps 3 & 4 Fraser Filter Contours of In Phase & Quadrature Values with NAA Picks and Trends.

- Trend 1 is weaker in the west and gets stronger to the east, merging with Trend 2 at Pick 5E-B
- Trend 2 is stronger and merges with Trend 1 at Pick 5E-B

Map 5 Resistivity 4000 Ohm Contours with NAA Picks and Trends

- Trend 1 follows the edge of resistivity high then enters the resistivity low at Pick 2E-A
- Trend 2 follows the edge of narrow resistivity low in the west but then follows the middle of a strong resistivity low at Pick 2E-B

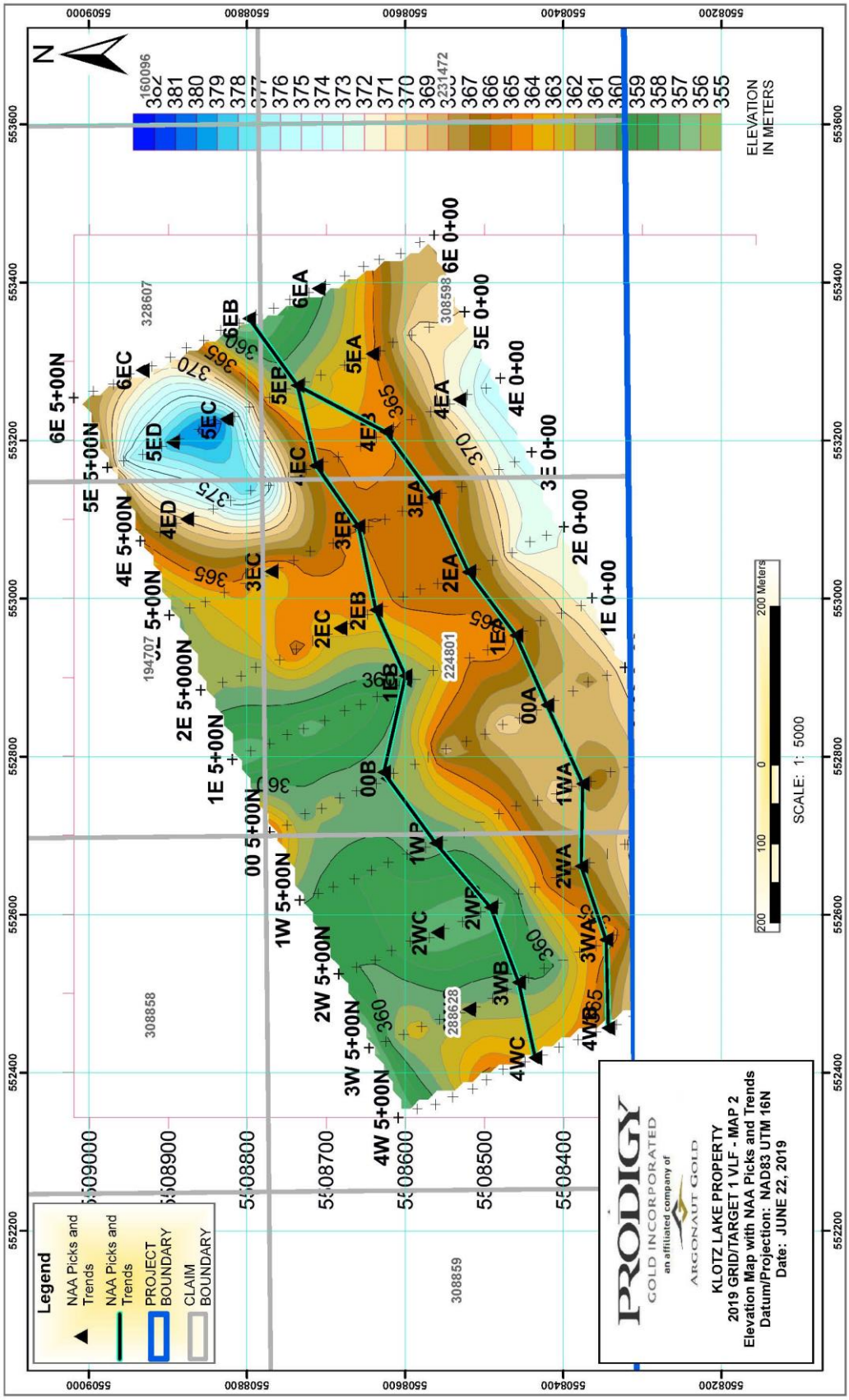
Map 6 NAA Picks and Trends on a Google Image

TX NAA Trends with those VLF Picks suggested for ground follow up in **Red**

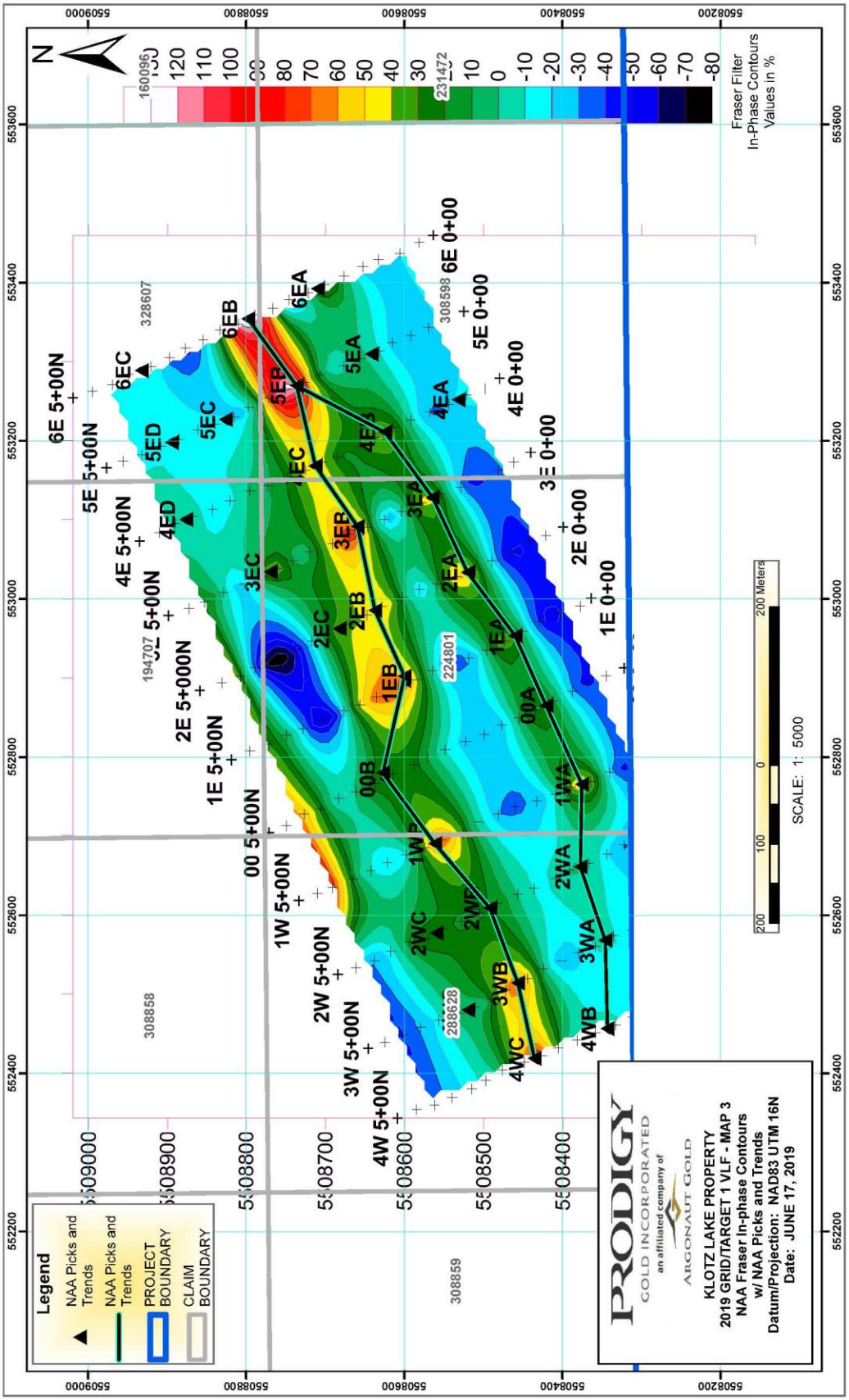
1 4WB, 3WA, 2WA, **1WA,** 00A, 1EA, **2EA, 3EA,** 4EB, **5EB, 6EB**

2 **4WC, 3WB,** 2WB, **1WB,** 00B, **1EB,** 2EB, **3EB,** 4EC, **5EB, 6EB**

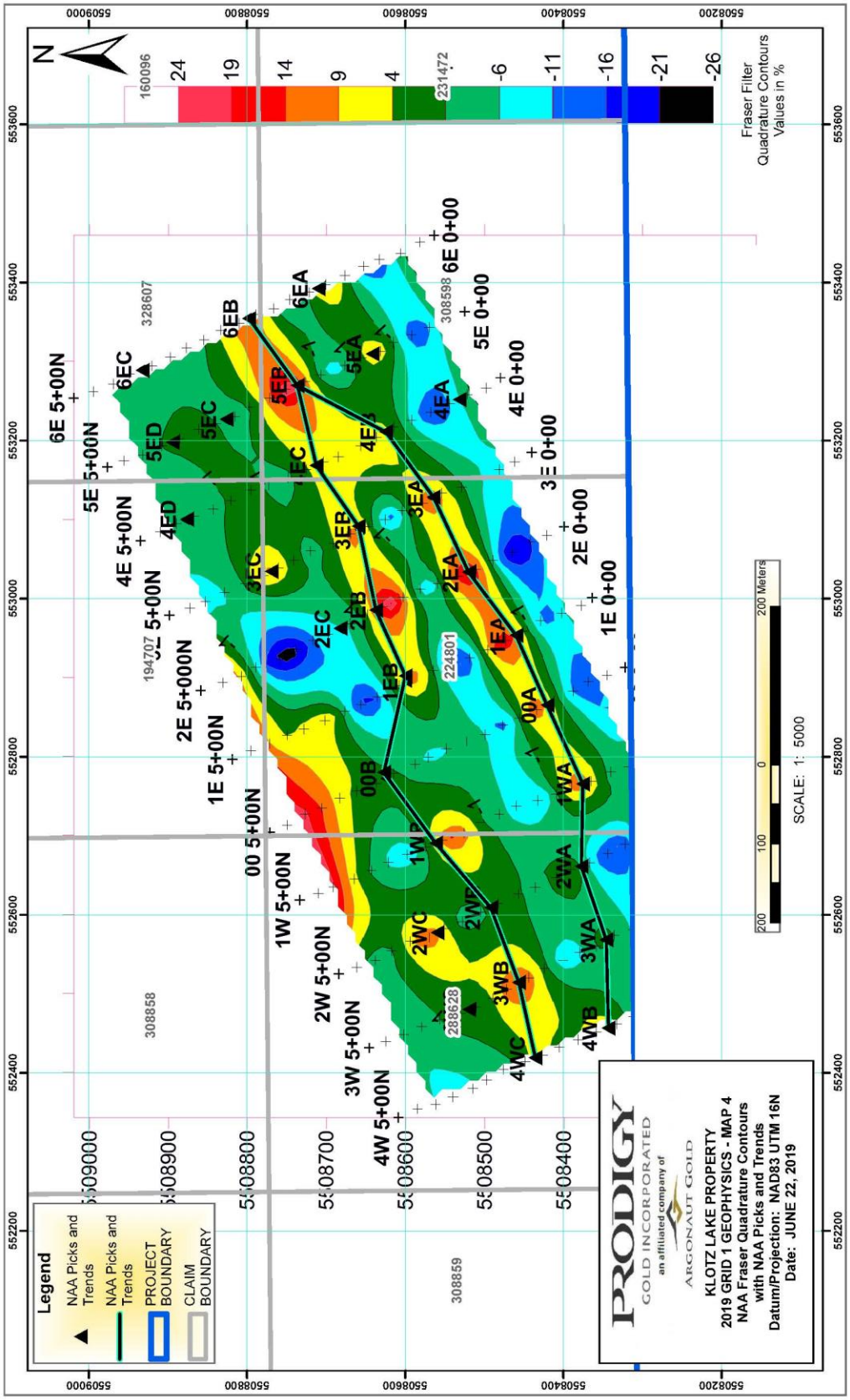
Map 2 Elevation Contours with NAA Picks & Trends



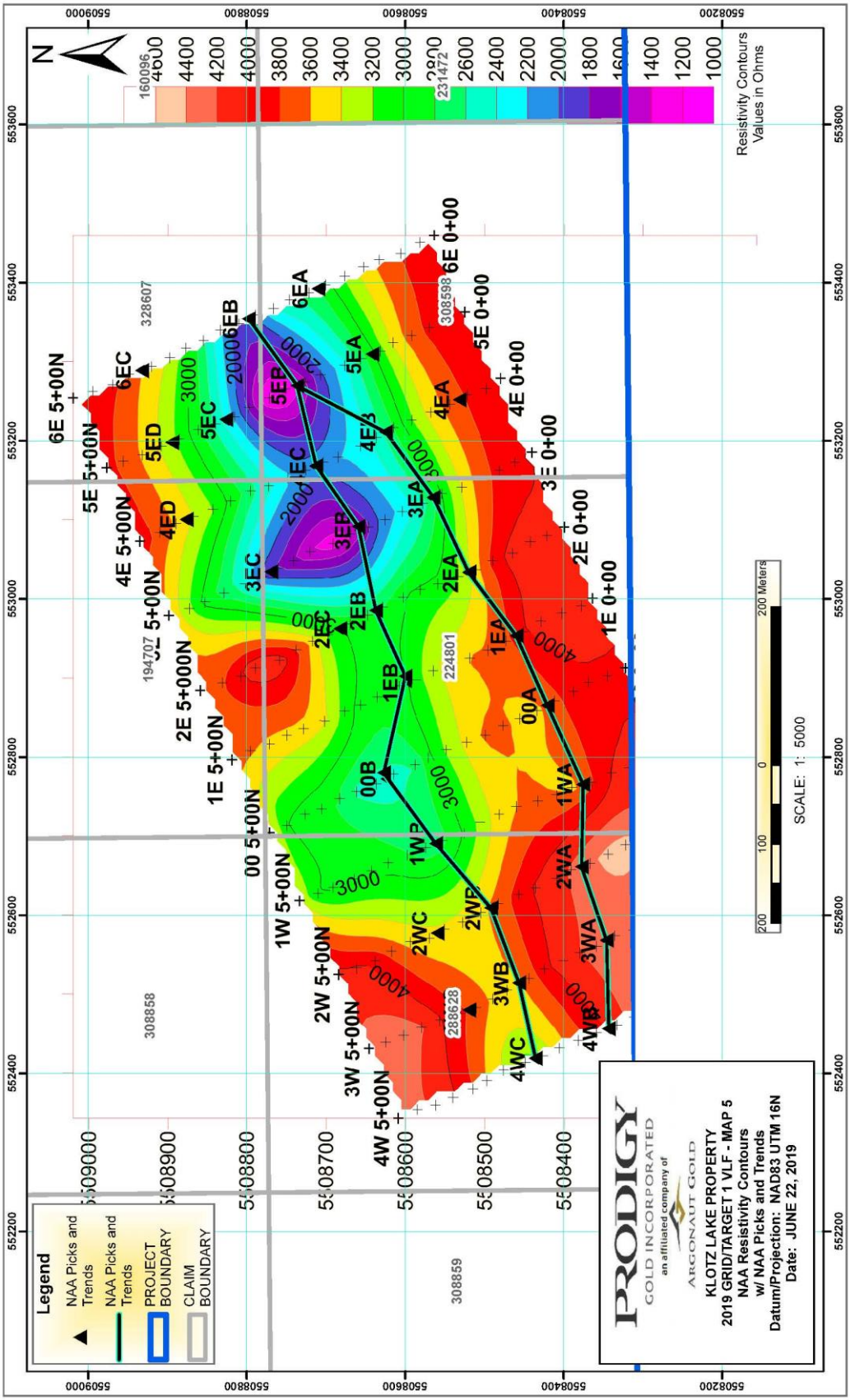
Map 3 Fraser Filter Contours of In Phase Values with NAA Picks & Trends



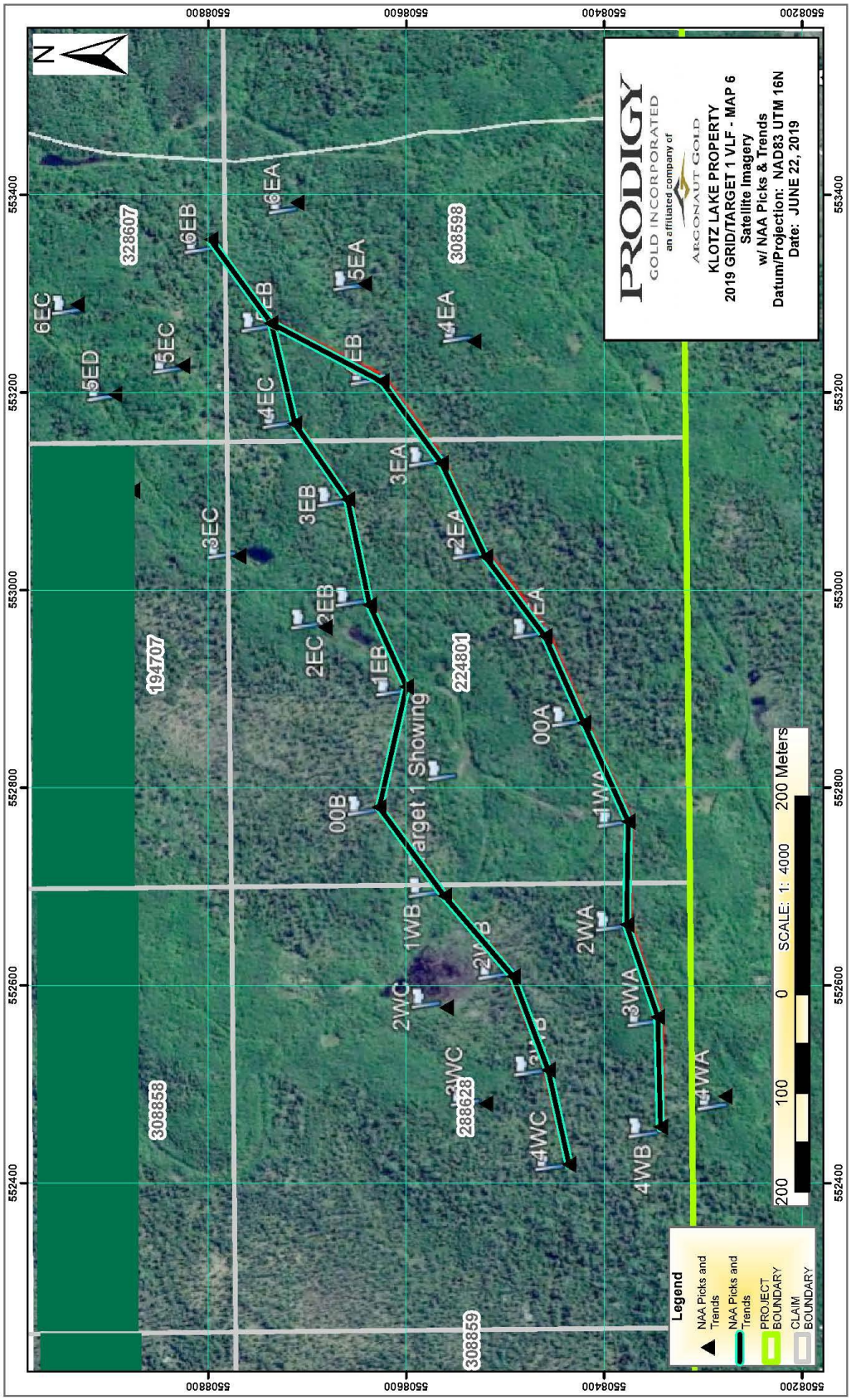
Map 4 Fraser Filter Contours of Quadrature Values with NAA Picks & Trends



Map 5 Resistivity 4000 Ohm Contours with NAA Picks & Trends



Map 6 Google Image of NAA Picks & Trends



TX NML Grid 1 (2 Trends)

Map- 7 Elevation Contours with NML Picks and Trends

- Trend 1 & 2 follow the edge of a topographic high which may signify the edge of a shear and a cliff and possible outcropping

Maps 8 & 9 Fraser Filter Contours of In Phase & Quadrature Values with NML Picks and Trends

- Trend 1 is weaker in the West and gets stronger to the east, merging with Trend 2 at Pick 5E-B
- Trend 2 is stronger and merges with Trend 2 at Pick 5E-B

Map 10 Resistivity 4000 Ohm Contours with NML Picks and Trends

- Trend 1 follows the edge of a Resistivity high then enters a resistivity low at Pick 2E-B
- Trend 2 follows a weak resistivity low then enters a strong resistivity low at Pick 2E-B

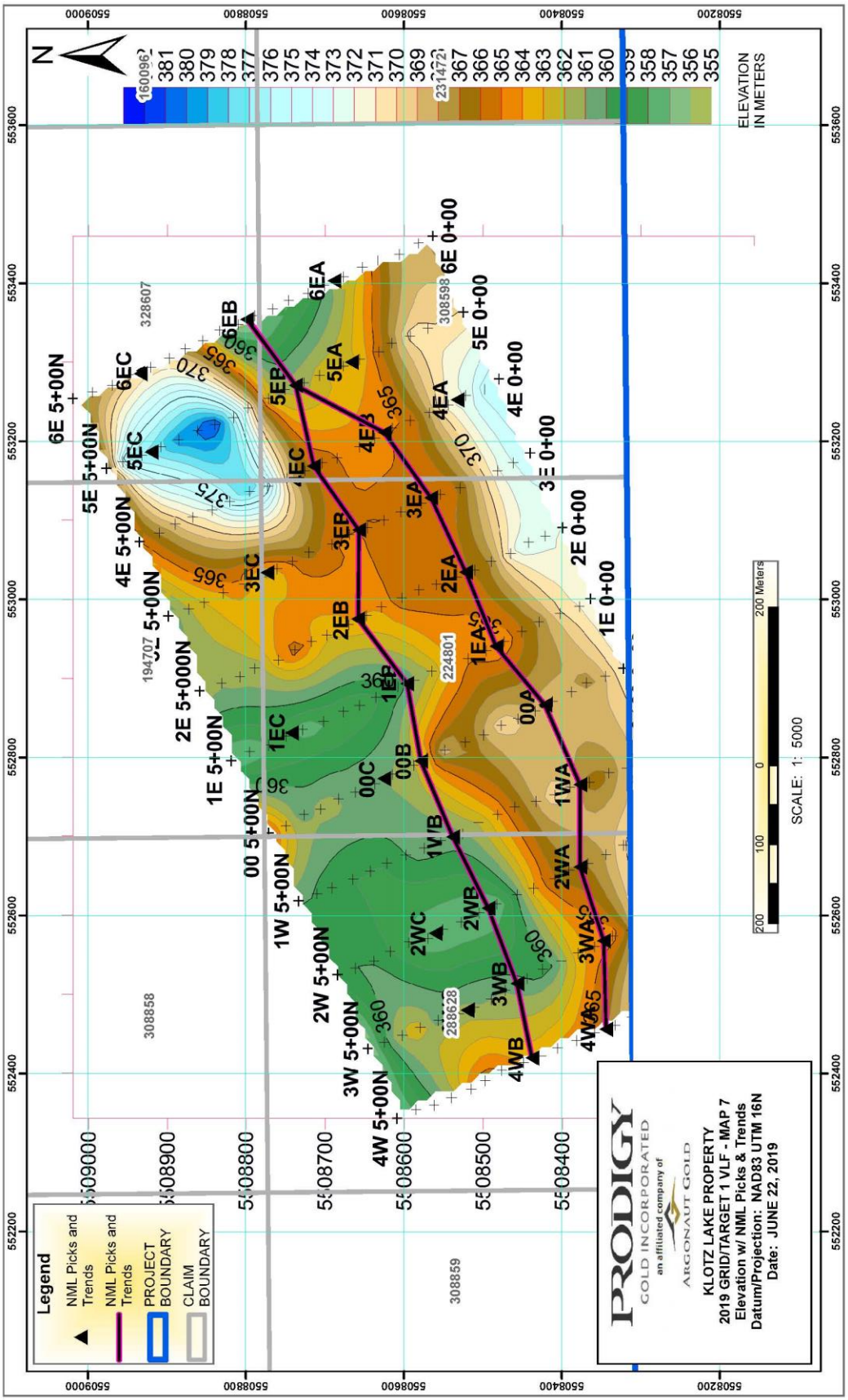
Map 11 NML Picks and Trends on a Google Image.

TX NML Trends with those suggested for ground follow up highlighted in **Blue**

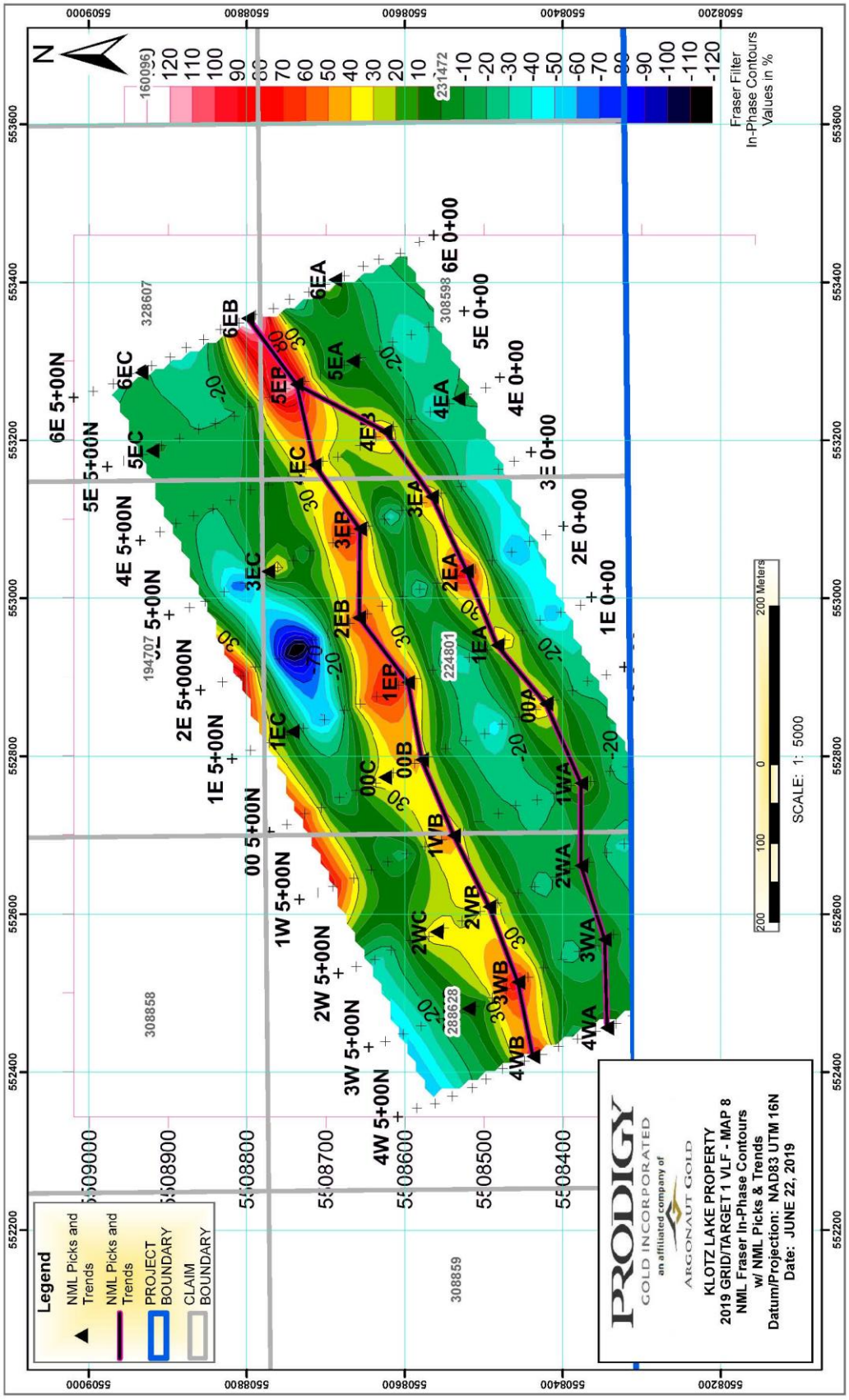
1 4WA, 3WA, 2WA, 1WA, **00A,** 1EA, **2EA, 3EA,** 4EB, **5EB, 6EB**

2 4WB, **3WB,** 2WB, **1WB, 00B, 1EB,** 2EB, 3EB, **4EC, 5EB, 6EB**

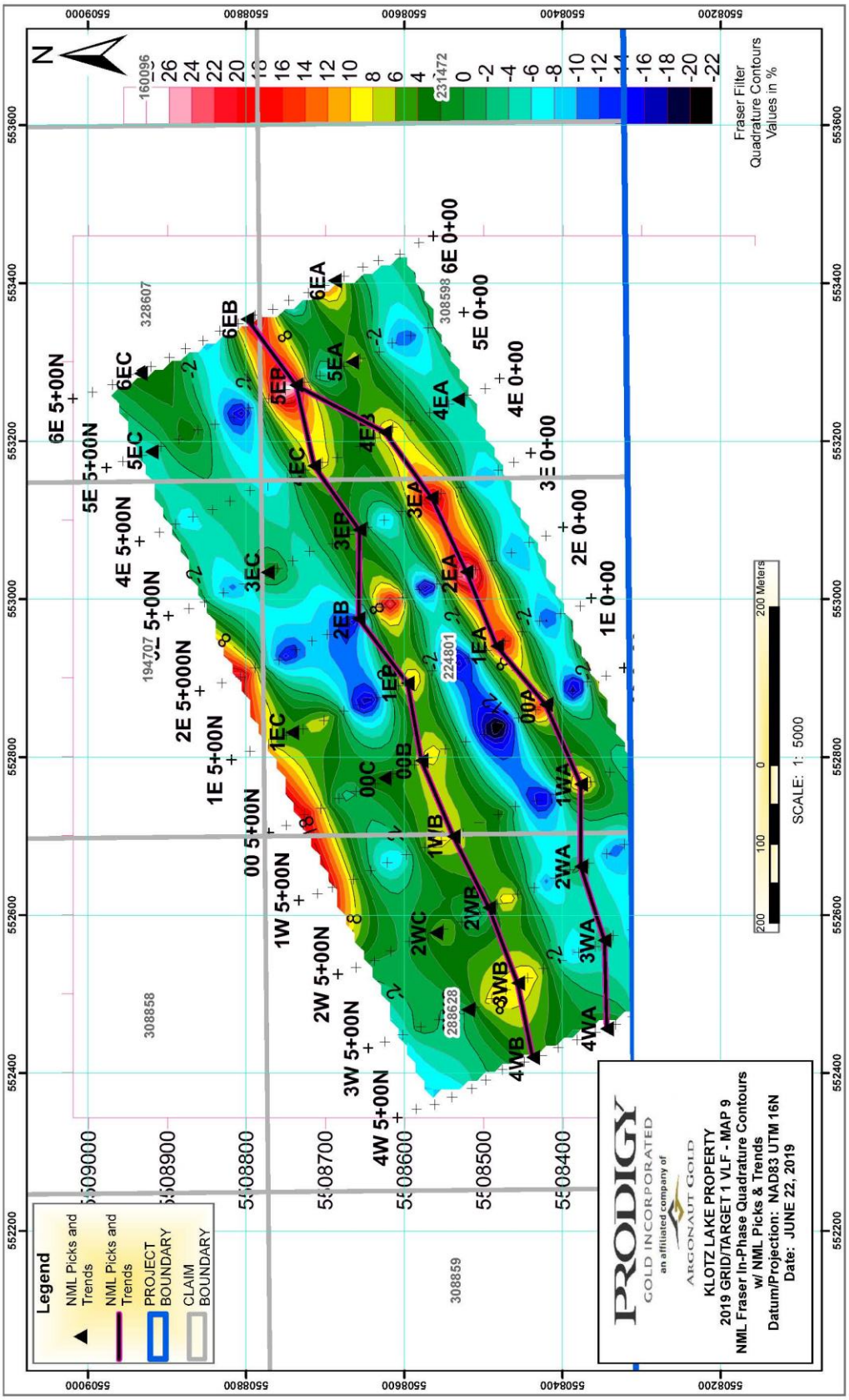
Map 7 Elevation Contours with NML Picks & Trends



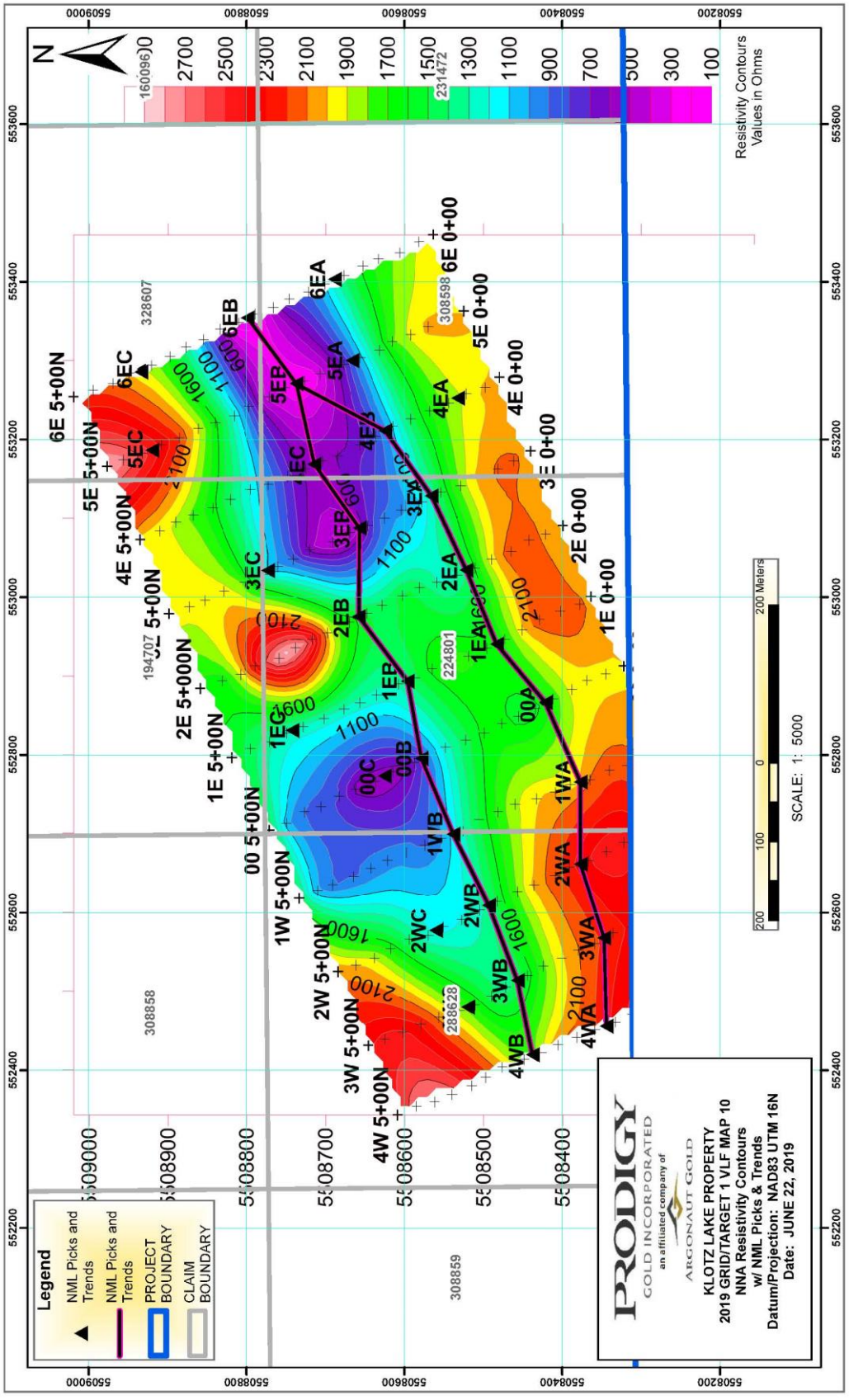
Map 8 Fraser Filter Contours of In Phase Values with NML Picks & Trends



Map 9 Fraser Filter Contours of Quadrature Values with NML Picks & Trends



Map 10 Resistivity 4000 Ohm Contours with NML Picks & Trends



Map 11 Google Image of NML Picks & Trends

Conclusions – Grid 1 (Target 1)

This Ground VLF EM-16 survey over the West Grid area was successful in:

- Defining several VLF bedrock conductors that form 2 main trends across Grid 1
- Using a bedrock background resistivity of 4000 ohms gave us modelled sections to 204 meters in depth and outlined several highly resistive and minimally resistive rock units
- Trend 2 appears to be the strongest trend while Trend 1 becomes stronger to the east and merges with trend 2 on line 5E @ Pick 5EB

Recommendations – Grid 1 (Target 1)

- Run additional 50 meter fill in lines at 3.5E, 4.5E & 5.5E in order to identify additional VLF information. This would enable a more detailed interpretation of the VLF response where Trend 1 and Trend 2 merge.
- Overlay the TX NAA and TX NML Picks and Trends on geology maps and airborne magnetic maps in order to identify surface lineaments and geological contacts.
- Run depth slice plan maps of both the KH data and the Inversion models at increasing depths. This will eliminate shallow conductors and isolate deeper bedrock conductors to a depth of 204 meters. This will also determine if the bedrock conductor has a dip or plunge.
- Ground follow-up of the VLF Picks and Trends outlined in this report in order to ground proof the targets with the geology, as outcrops exist on this grid.

NAA Strongest VLF Anomaly Picks:	Trend 1:	**1WA**, **2EA, 3EA, 5EB, 6EB**
	Trend 2:	**4WC, 3WB**, **1WB**, **1EB**, **3EB**, **5EB, 6EB**
NML Strongest VLF Anomaly Picks:	Trend 1:	**00A**, **2EA**, **3EA**, **5EB, 6EB**
	Trend 2:	**3WB**, **1WB**, **00B**, **1EB, 4EC, 5EB, 6EB**

- Proposed drill holes should be projected on both the inversion models and the JY models using a vertical exaggeration of 1.0 to determine if the proposed hole will intersect the VLF Bedrock conductor.

Discussion of Results – Grid 2 (Target 2)

8W, 7W, 6W, 5W, 4W, 3W, 2W, 1W, 00, 1E, 2E, 3E, 4E, 5E

VLF Anomalies

VLF Trends were identified for TX NAA (9 trends) and TX NML (5 trends). Trends are signified as in the following example: 4WB, 3WA, 2EA (Line 4 West-VLF Pick B to Line 3W-VLF Pick A to Line 2 East VLF Pick A

TX NAA Grid 2 (9 Trends)

Map 12 Elevation Contours with NAA Picks and Trends

- None of the defined trends follow any significant elevation features

Maps 13 & 14 Fraser Filter Contours of In Phase & Quadrature Values with NAA Picks and Trends

- Trend 1 Occurs in the southern portion of the grid and appears to get stronger to the southwest, exiting the grid at line 1W.
  Picks 2EA & 3EA are strongest
- Trend 2 Is a short striking conductor
  Picks 3EC & 2EC are strongest
- Trend 3 Has a long strike length with variable strength
  Picks 4EC, 1WC, 2WB & 3WB are strongest
- Trend 4 Has a short strike length
  Picks 4WB & 5WB are strongest
- Trend 5 Has a short strike length
  Pick 3WC is strongest
- Trend 6 Has a short strike length
  Pick 4WC is strongest
- Trend 7 Has a short strike length
  Pick 4WD is strongest
- Trend 8 Has a short strike length
  Picks 5WC, 7WB & 8WB are strongest
- Trend 9 Has a short strike length
  Picks 6WA & 8WA are strongest

Map 15 Resistivity 4000 Ohm Contours with NAA Picks and Trends

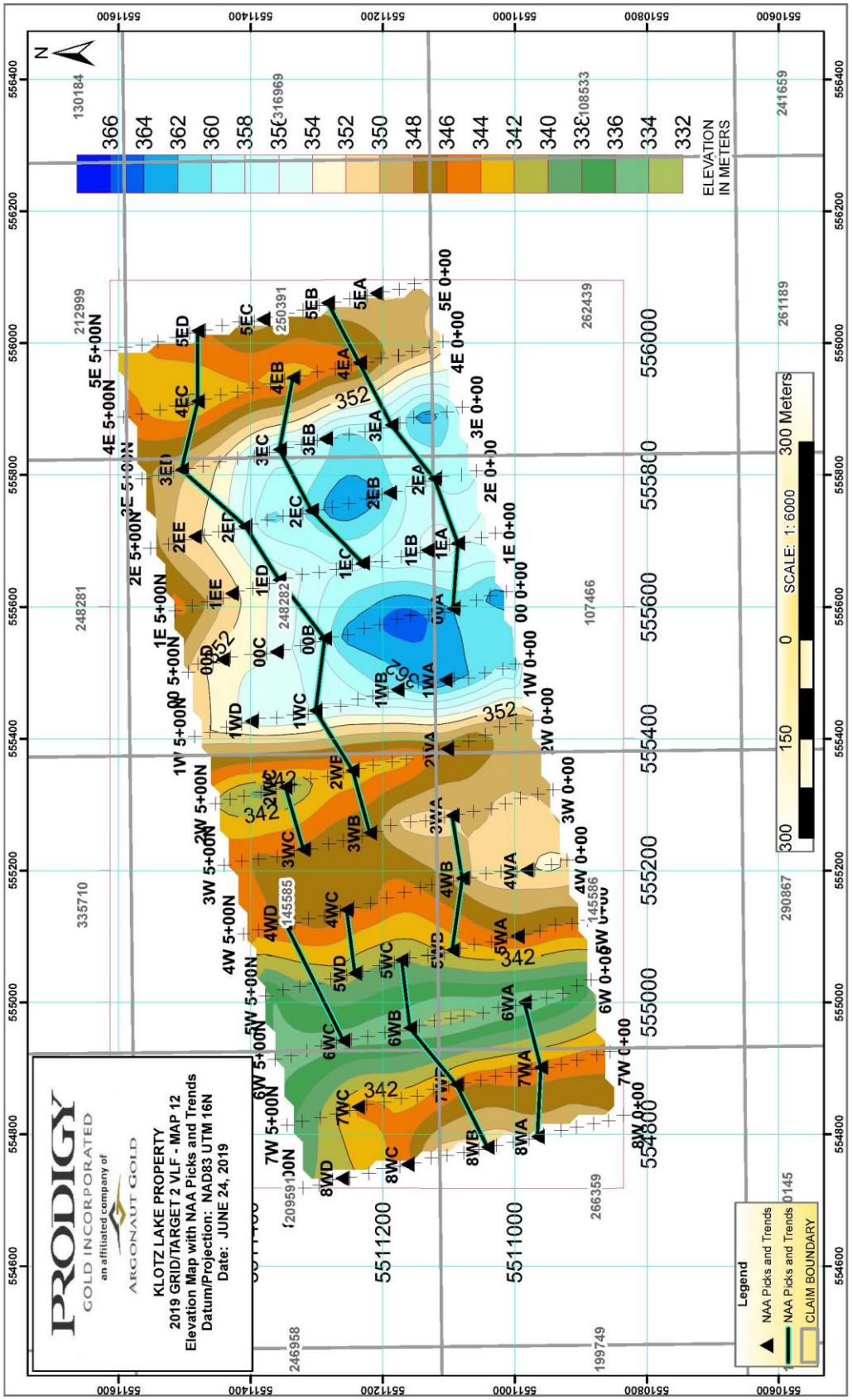
- Trend 1 Follows the edge of resistivity high
- Trend 2 Is found in the central portion of a resistivity high
- Trend 3 Crosses the resistivity high, but is stronger on the east and west flanks
- Trend 4 Has no resistivity association although Pick 5WB is at the edge of Resistivity low
- Trend 5 Pick 3WC occurs in resistivity low
- Trend 6 Pick 5WD occurs in resistivity low
- Trend 7 Follows the edge of resistivity low
- Trend 8 Follows a resistivity low
- Trend 9 Follows a resistivity low

Map 16 NAA Picks and Trends on a Google Image

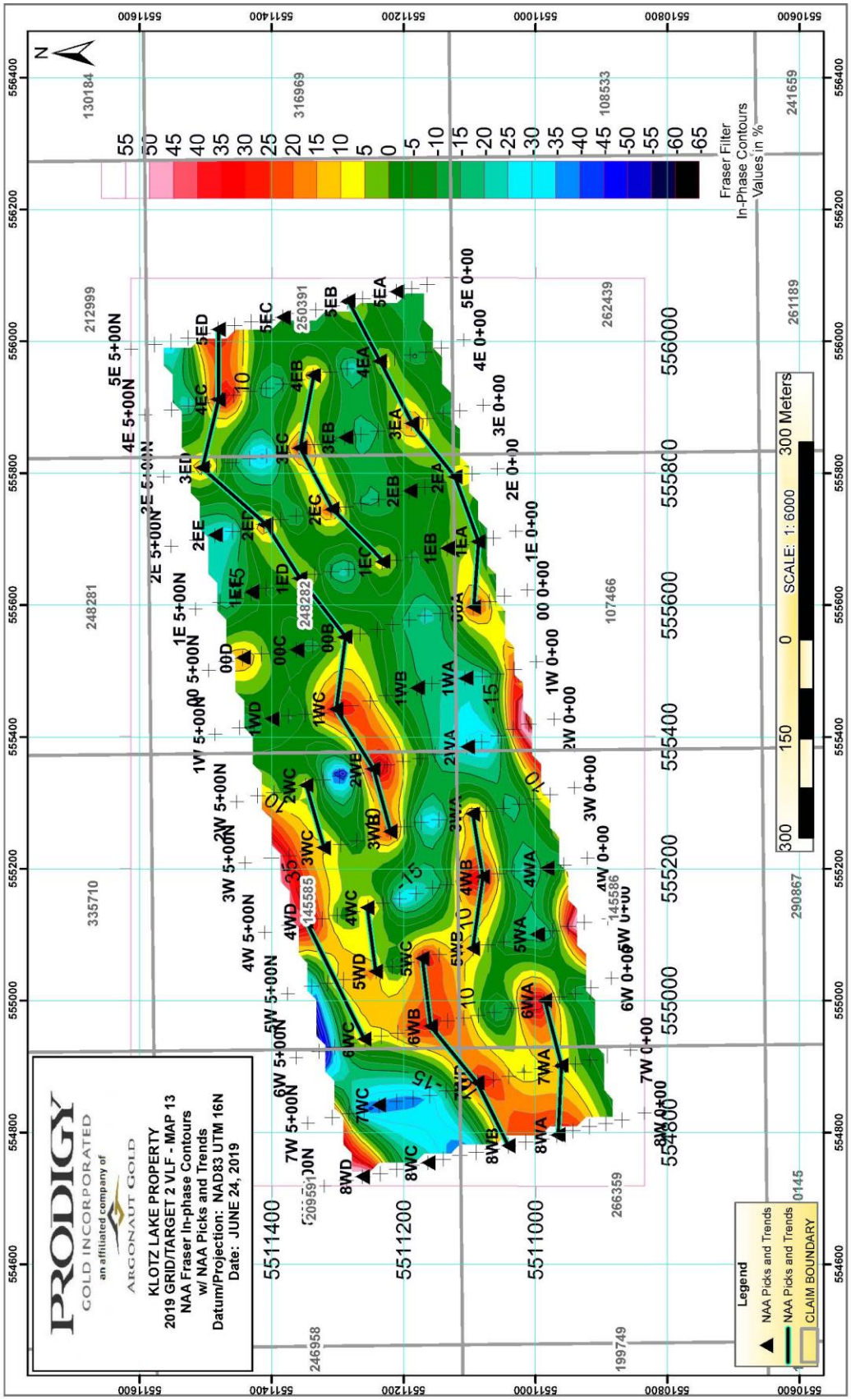
TX NAA Trends with those VLF Picks suggested for ground follow up in **Red**

1 5EB, 4EA, 3EA, **2EA,** 1EA, 00A
2 4EB, **3EC,** 2EC, 1EC
3 5ED, **4EC,** 3ED, 2ED, 1ED, 00B, **1WC, 2WB, 3WB**
4 3WA, **4WB, 5WB**
5 2WC-**3WC**
6 **4WC, 5WD**
7 **4WD,** 6WC
8 **5WC,** 6WB, **7WB, 8WB**
9 **6WA,** 7WA, **8WA**

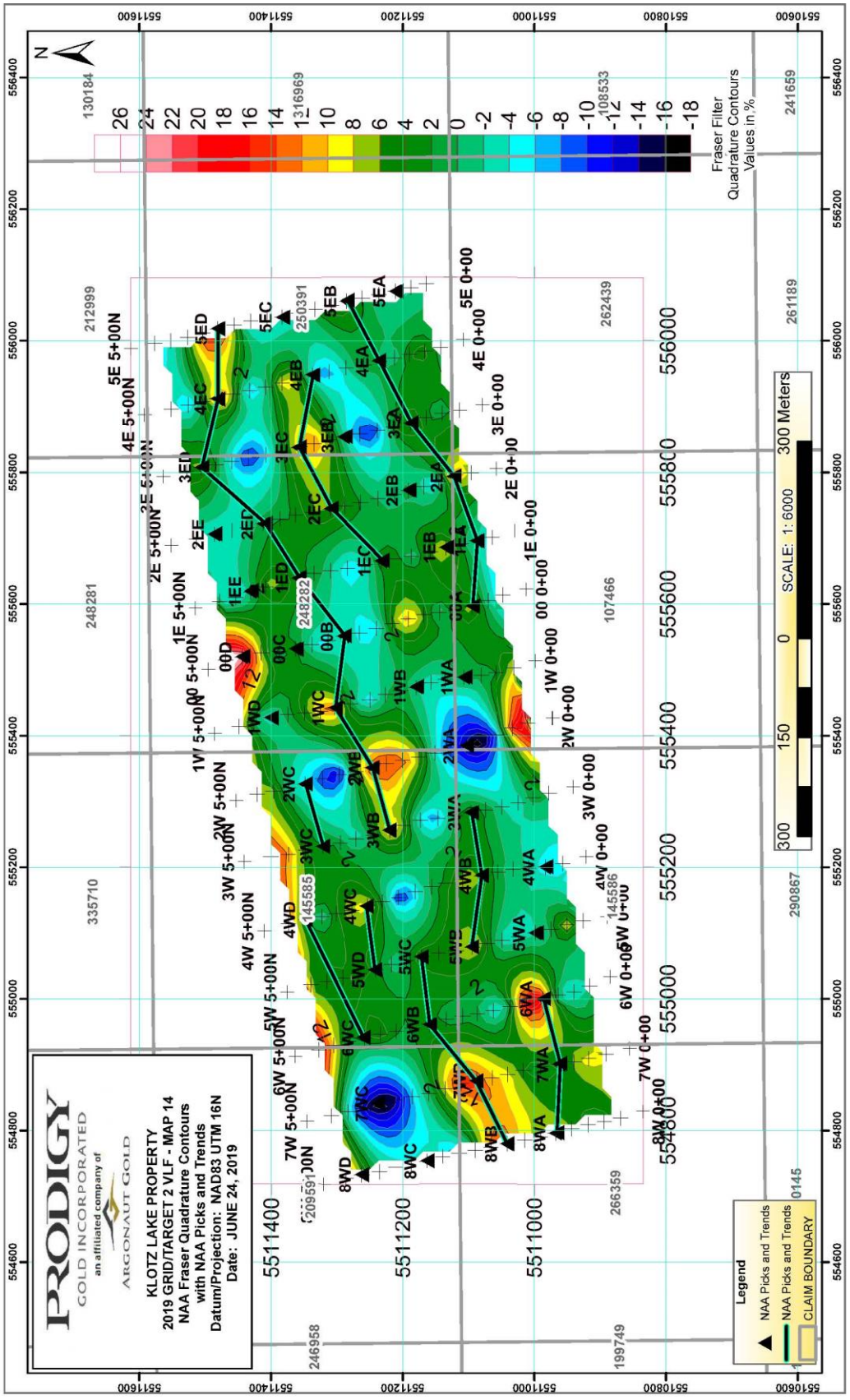
Map 12 Elevation Contours with NAA Picks & Trends



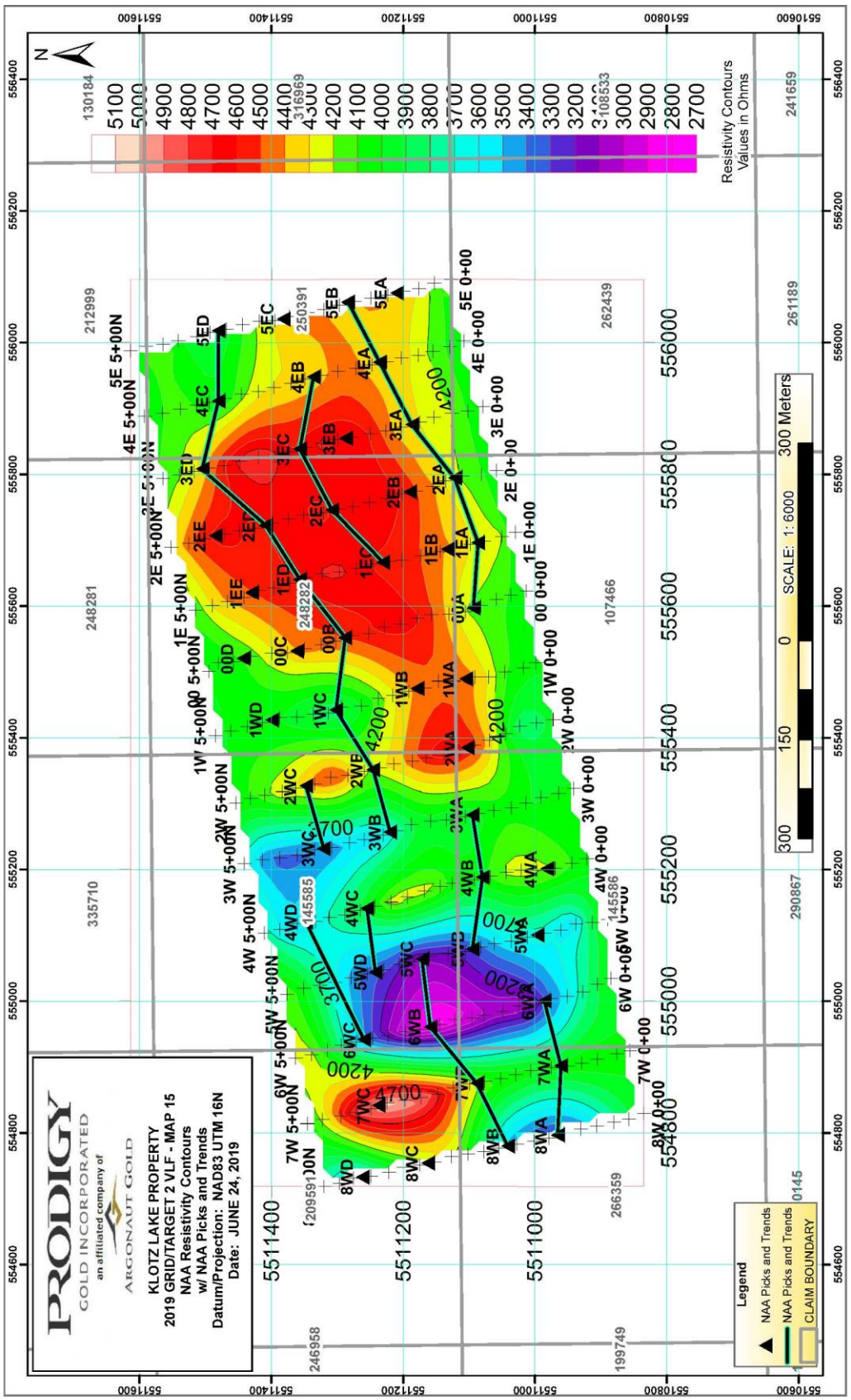
Map 13 Fraser Filter Contours of In Phase Values with NAA Picks & Trends



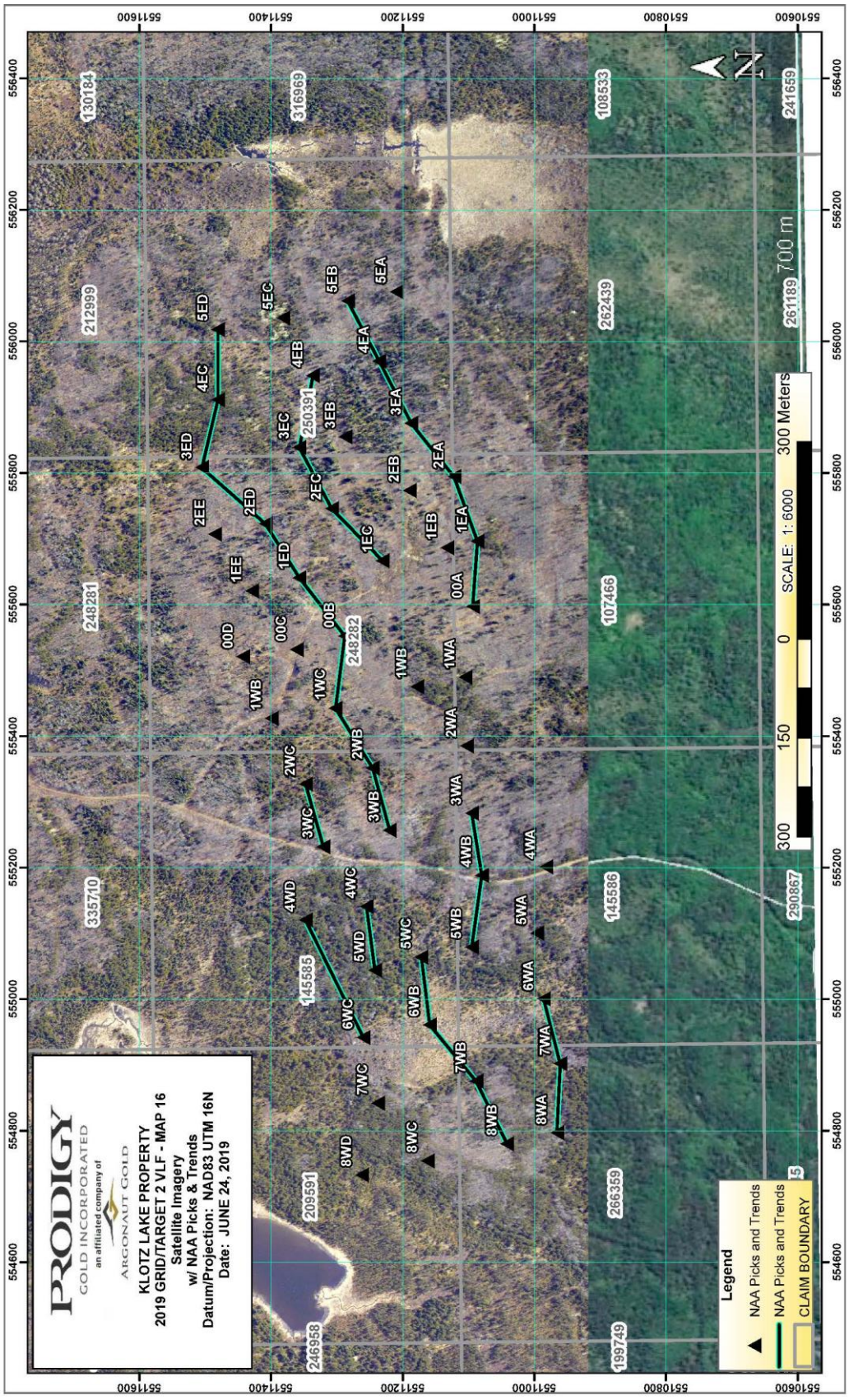
Map 14 Fraser Filter Contours of Quadrature Values with NAA Picks & Trends



Map 15 Resistivity 4000 Ohm Contours with NAA Picks & Trends



Map 16 Google Image of NAA Picks & Trends



TX NML Grid 2 (5 Trends)

Map-17 Elevation Contours with NML Picks and Trends

- No trends follow any significant topographic ridge or depression

Maps 18 & 19 Fraser Filter Contours of In Phase & Quadrature Values with NML Picks and Trends

- Trend 1 Strikes along southern portion of grid then exits at 1W.
  Picks 3EA & 00A are strongest
- Trend 2 Has a short strike length
  Picks 3EB & 2ED are strongest
- Trend 3 Has a long strike length
  Picks 5ED, 4EC, 1WC, 2WA & 3WB are strongest
- Trend 4 Strong Trend with all Picks being strong
  4WE, 5WC, 6WC, 7WB & 8WB
- Trend 5 Has a short strike length
  Picks 4WB, 5WB & 6WB are strongest

Map 20 Resistivity 4000 Ohm Contours with NML Picks and Trends

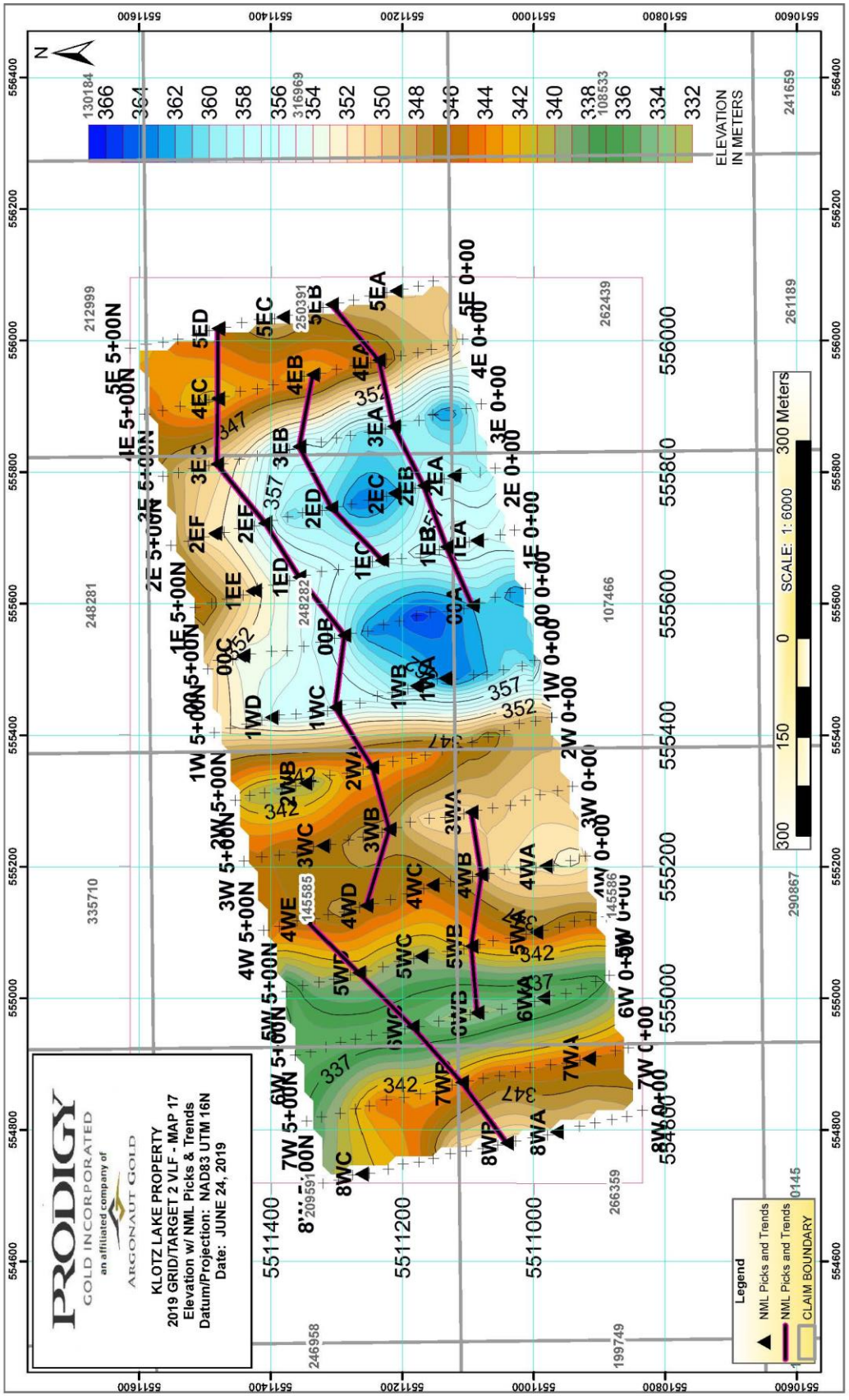
- Trend 1 Follows edge of resistivity high
- Trend 2 Follows the resistivity high
- Trend 3 Significant strike length, appears strongest outside of resistivity high
- Trend 4 Crosses the entire grid within a strong resistivity low
- Trend 5 Has a short strike length.
  Picks 5WB & 6WB occur in a resistivity low

Map 21 NML Picks and Trends on a Google Image

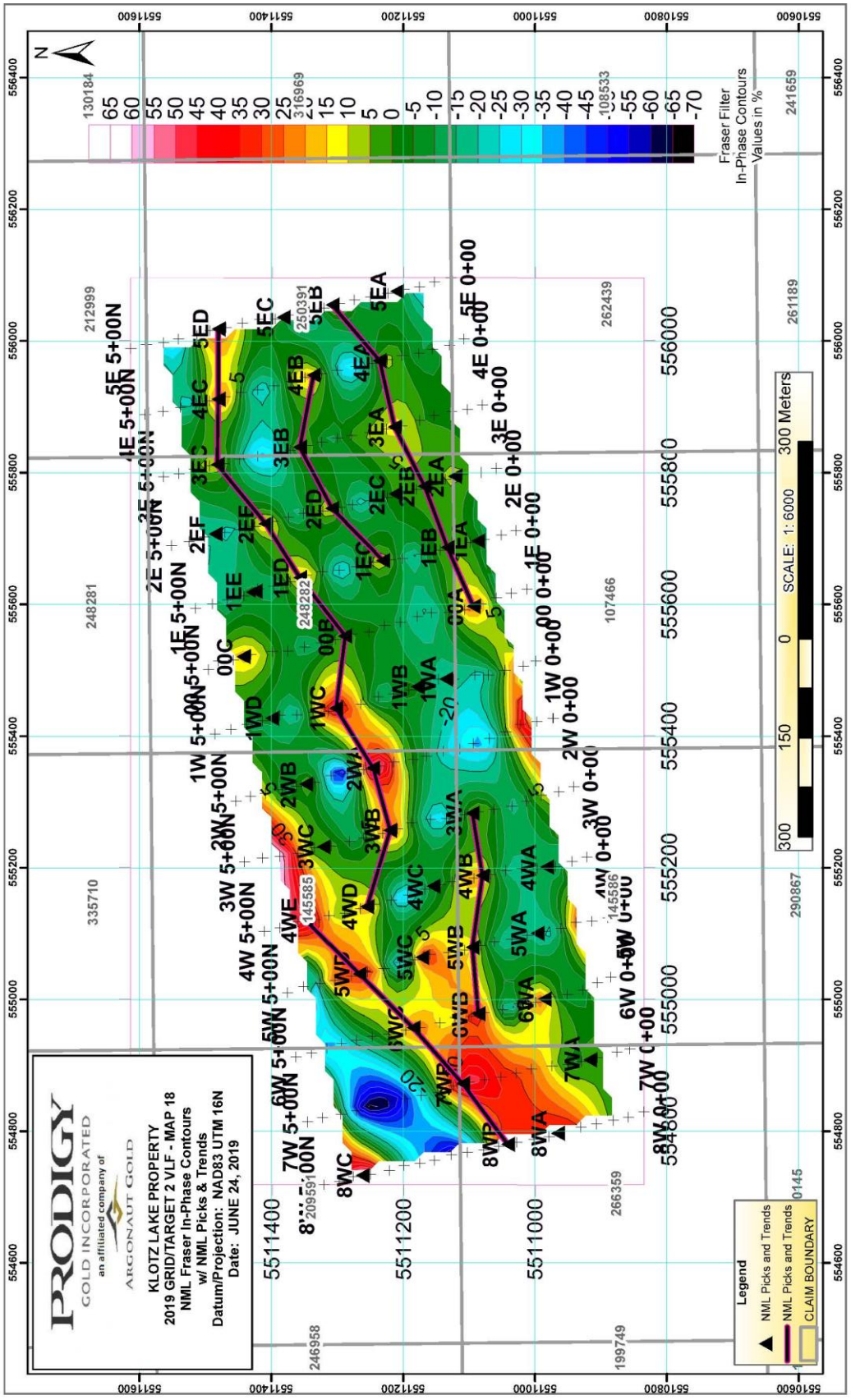
TX NML Trends with those Picks suggested for ground follow up highlighted in **Blue**

1 5EB, 4EA, **3EA,** 2EB, 1EB, 00A
2 4EB, **3EB, 2ED,** 1EC
3 **5ED, 4EC,** 3EC, 2EE, 1ED, 00B, **1WC, 2WA, 3WB,** 4WB
4 4WE, 5WD, 6WC, 7WB, 8WB
5 3WA, 4WB, **5WB, 6WB**

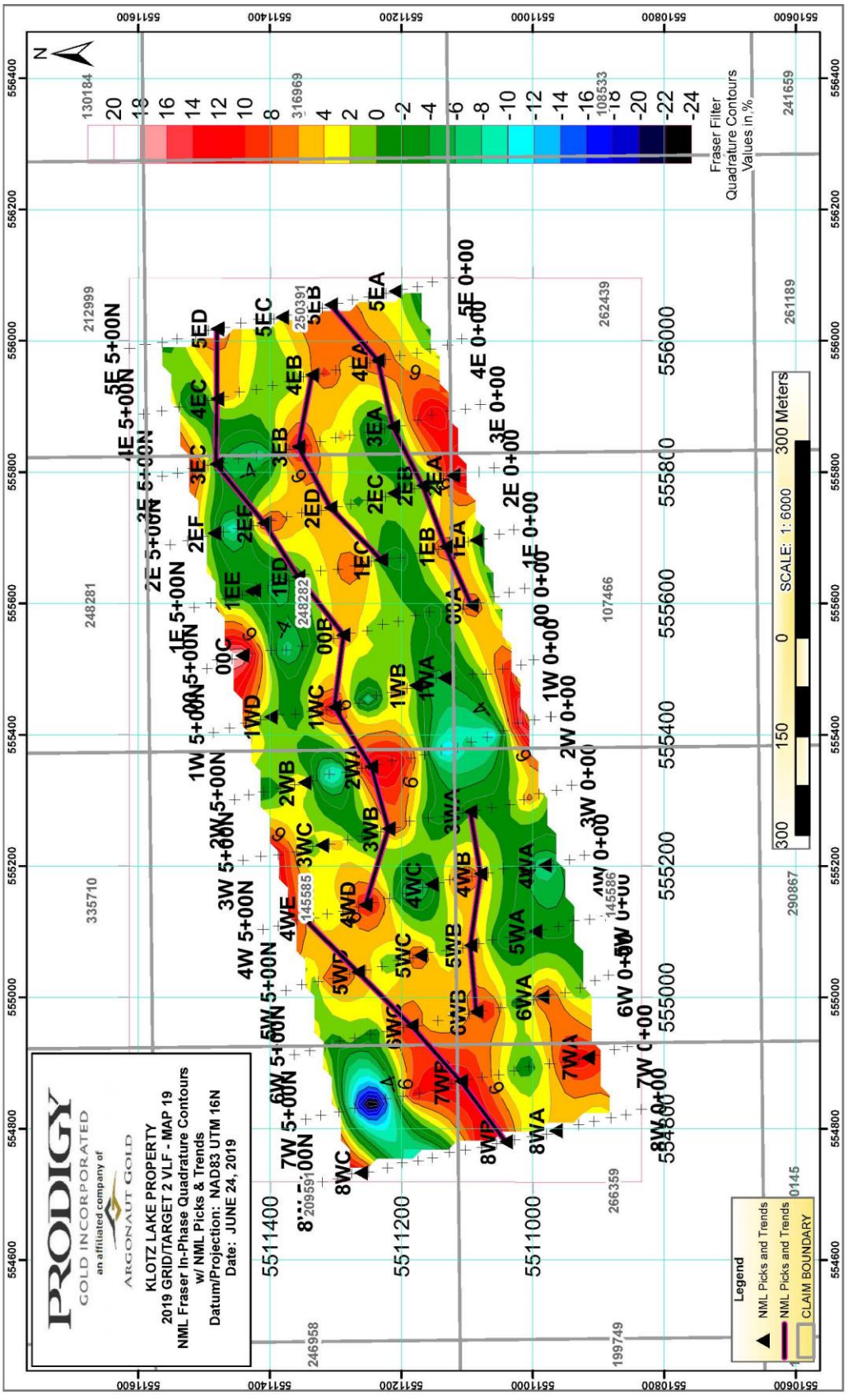
Map 17 Elevation Contours with NML Picks & Trends



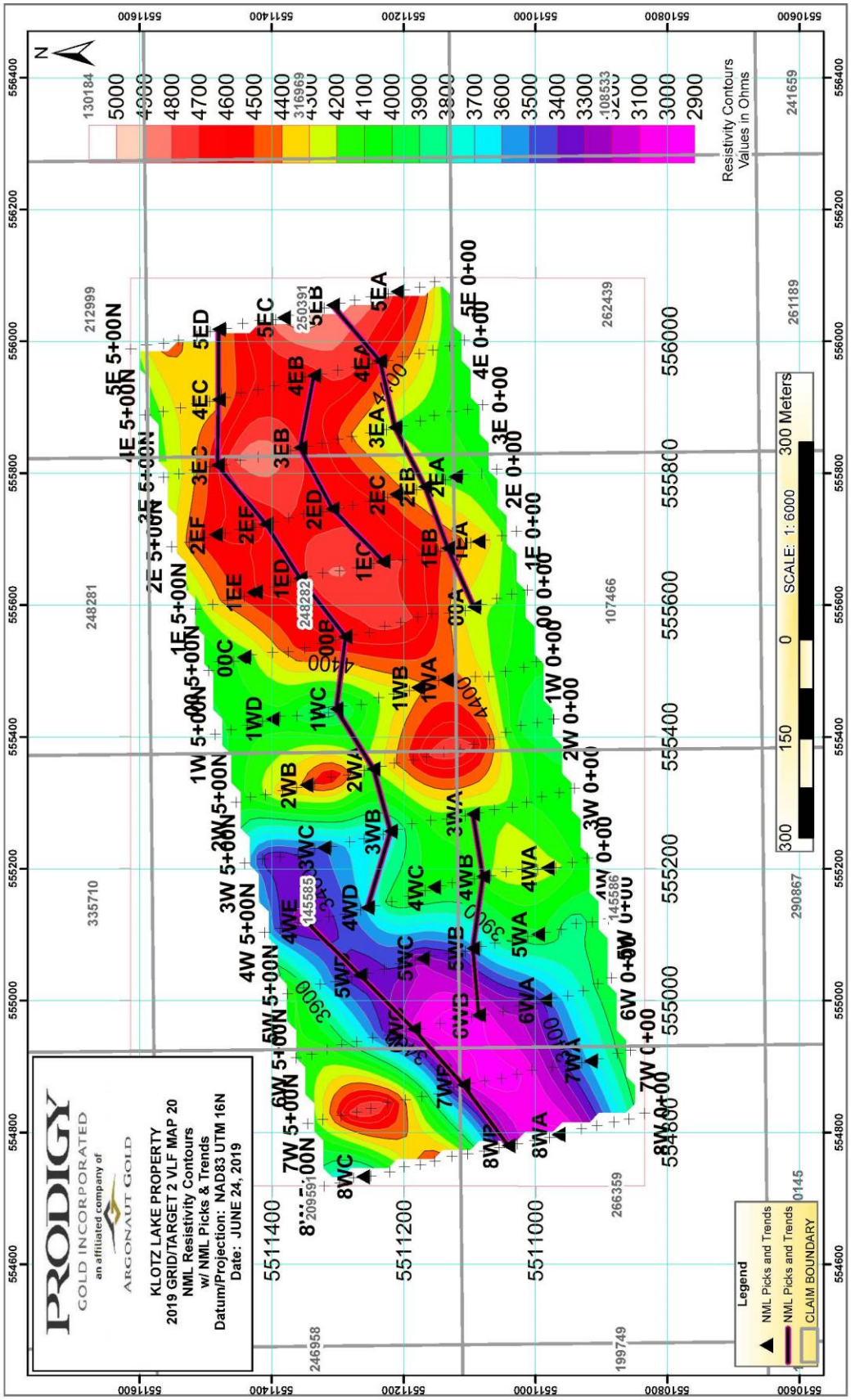
Map 18 Fraser Filter Contours of In Phase Values with NML Picks & Trends



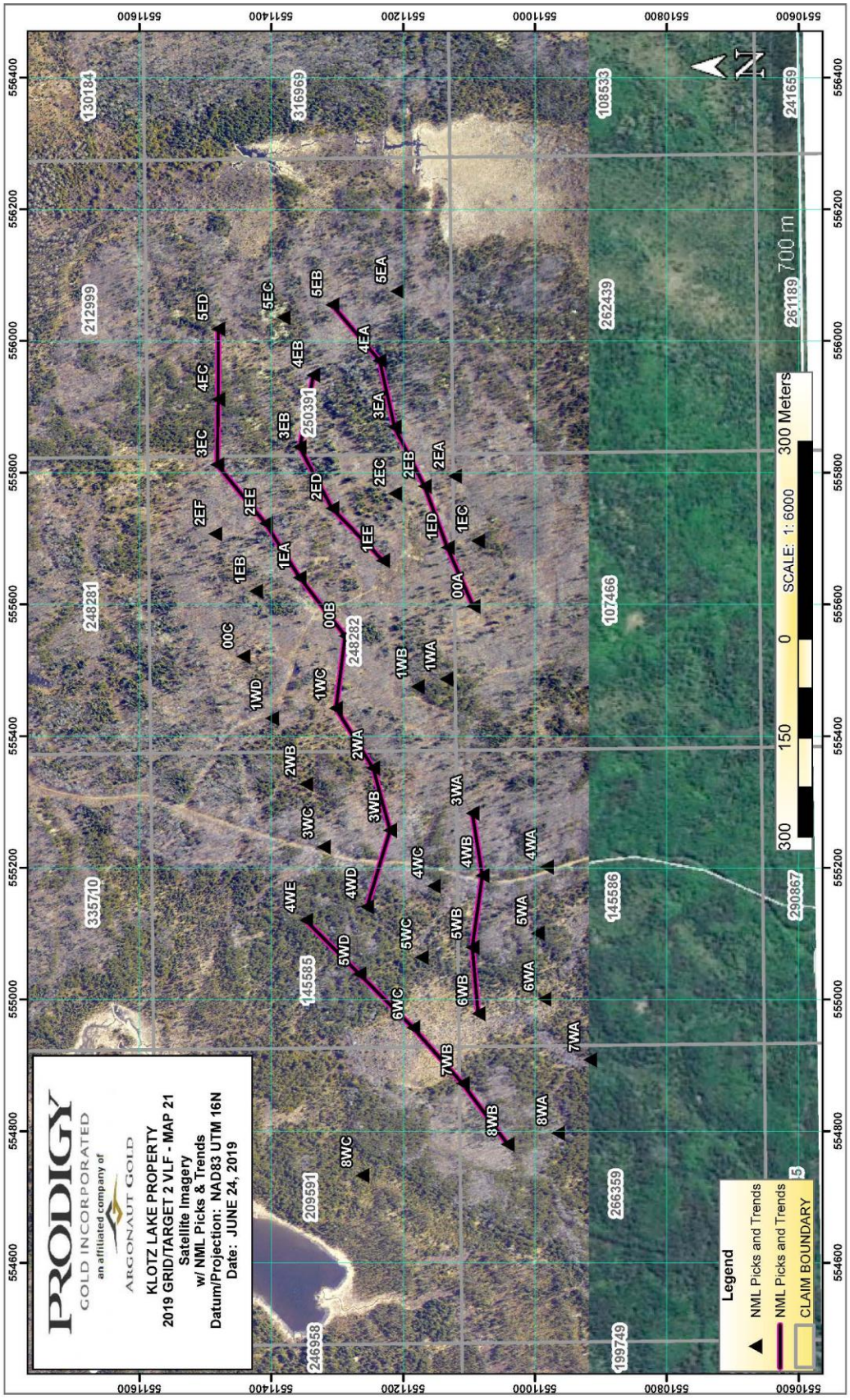
Map 19 Fraser Filter Contours of Quadrature Values with NML Picks & Trends



Map 20 Resistivity 4000 Ohm Contours with NML Picks & Trends



Map 21 Google Image of NML Picks & Trends



Conclusions – Grid 2 (Target 2)

This Ground VLF EM-16 survey over the West Grid area was successful in:

- Defining several VLF bedrock conductors that form trends across the grid
- Using a bedrock background resistivity of 2000 ohms gave us modelled sections to 144 meters in depth and outlined several highly resistive and minimally resistive rock units.
- Trend 4 appears to be the strongest trend trends 2, 3 and 4 have interesting responses

Recommendations – Grid 2 (Target 2)

- Run additional 50 meter fill in lines at 3.5W, 4.5W, 5.5W, 6.5W & 7.5W, in order to identify additional VLF information along Trend 4 and to see if trend 5 is a splice from Trend 4.
- Overlay the TX NAA and NML Picks and Trends on geology maps and airborne magnetic maps in order to identify surface lineaments and geological contacts.
- Run depth slice plan maps of both the KH data and the Inversion models at increasing depths. This will eliminate shallow conductors and isolate deeper bedrock conductors to a depth of 204 meters. This will also determine if the bedrock conductor has a dip or plunge.
- Ground follow-up of the VLF Picks and Trends outlined in this report in order to ground proof the targets with the geology, as outcrops exist on this grid.

NAA Strongest VLF Anomaly Picks: Trend 1 2EA
Trend 2 3EC
Trend 3 4EC, 1WC, 2WB, 3WB
Trend 4 4WB, 5WB
Trend 5 3WC
Trend 6 4WC, 5WD
Trend 7 4WD
Trend 8 5WC, 7WB, 8WB
Trend 9 6WA & 8WA

NML Strongest VLF Anomaly Picks: Trend 1 3EA
Trend 2 3EB, 2ED
Trend 3 5ED, 4EC, 1WC, 2WA, 3WB
Trend 4 4WE, 5WD, 6WC, 7WB, 8WB
Trend-5 5WB, 6WB

- Proposed drill holes should be projected on both the inversion models and the JY models using a vertical exaggeration of 1.0 to determine if the proposed hole will intersect the VLF Bedrock conductor.

List of References

Baker, H.A,. and J.O. Myers, 1979, VLF-EM model studies and some simple quantitative applications to field results: Geoexploration 17, 55-63

Fraser, D.C., 1969. Contouring of VLF-EM data. Geophysics, 34 958-967

Geonics Ltd., 1997: Operating Manual for VLF Em-16

Karous, M and Hjelt, S.E., 1983: Linear filtering of VLF dip-angle measurements, Geophysical Prospecting 31, 782-794

McNeil, J.D. and Labson; 1991: Geological Mapping using VLF radio fields. In Nabghian, M.N Ed, Electrical Methods in Applied Geophysics 11. Soc. Expl. Geoph, 521-640

Sayden, A.S, Boniwell, J.B; 1989: VLF Electromagnetic Method, Canadian Institute of Mining and Metalurgy, Special Volume 41, 111-125 of VLF-EM Data

Monteiro Santos, F.A; 2013: VLF 2D V1.3 A program for 2D inversion

Certificate of Qualifications

I, Shaun Parent, P. Geo . Residing at 282 B Whispering Pines Road, Batchawana Bay, Ontario do certify that:

1. I am a consulting Geoscientist with Superior Exploration, Adventure & Climbing Co. Ltd.

2. I graduated with a Geological Technician Diploma from Sir Sandford Fleming College in 1986.

3. I graduated with a BSc. from the University of Toronto in 1986

4. I am a member in good standing with the Association of Professional Geoscientists of Ontario #1955 and a member of the Prospectors and Developers Association of Canada.

5. I have been employed continuously as a Geoscientist for the past 32 years since my graduation from University.

6. The nature of my involvement with this project was to carry out the interpretation of the VLF data using the EMTOMO VLF2D Software of which I have been developing with Dr. Fernando Santos of Lisbon, Portugal.

Dated this 27th day of June 2019

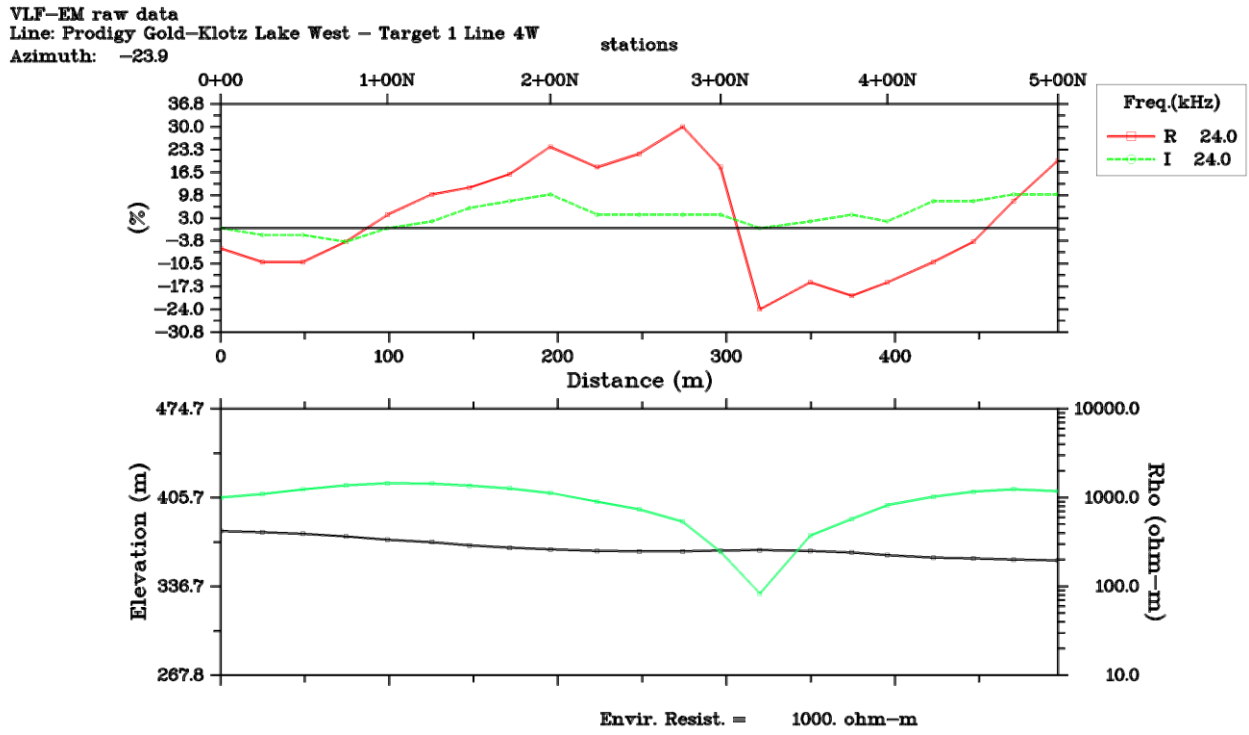
Shaun Parent, Diploma-Geo, BSc. P. Geo

APPENDIX A-1

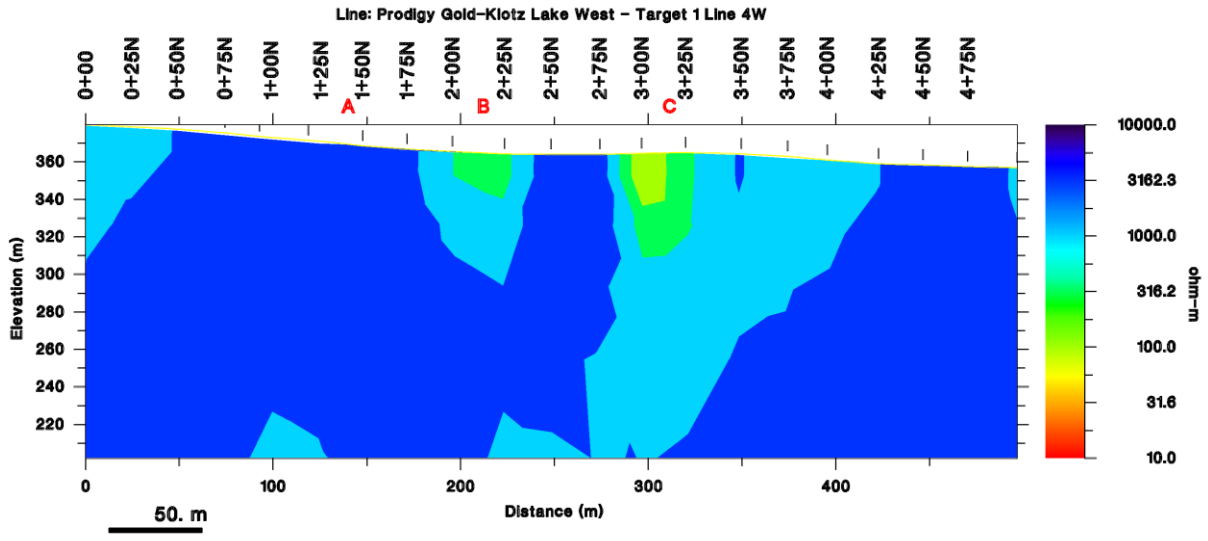
Grid 1/Target 1

NAA Figures

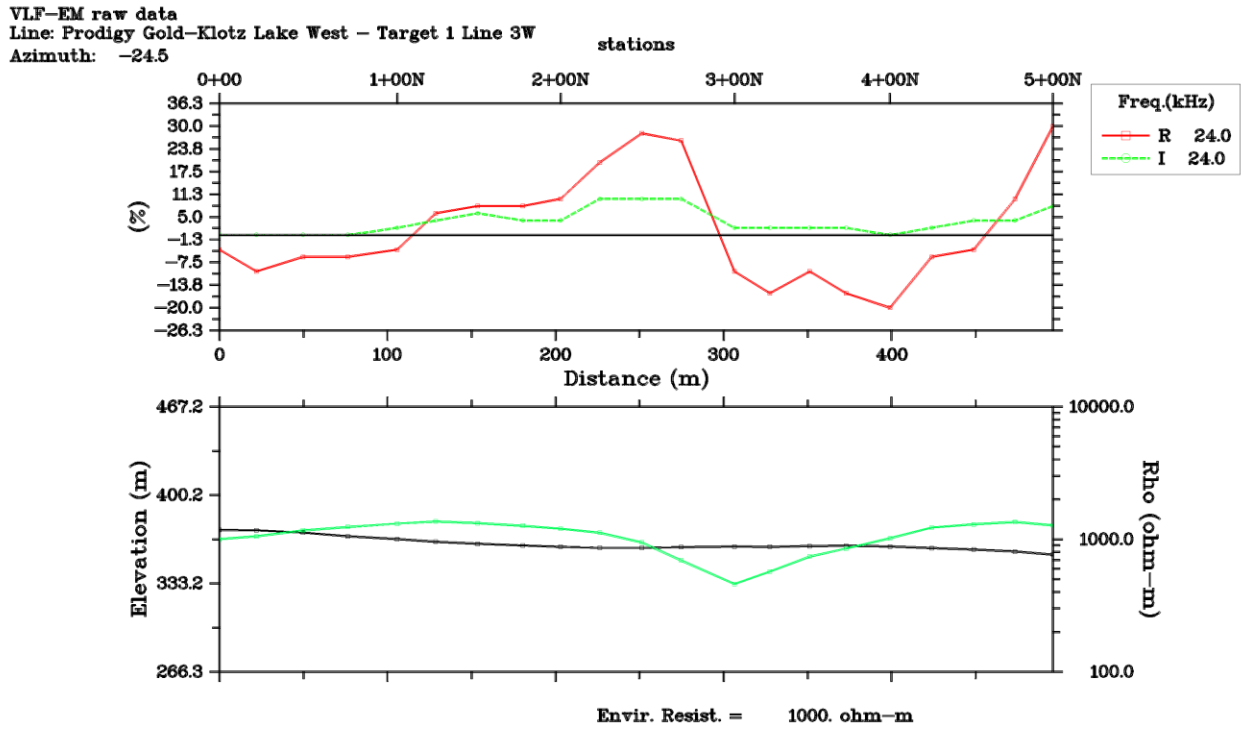
Grid 1 NAA Figure 1 Line 4W Raw Data Profile



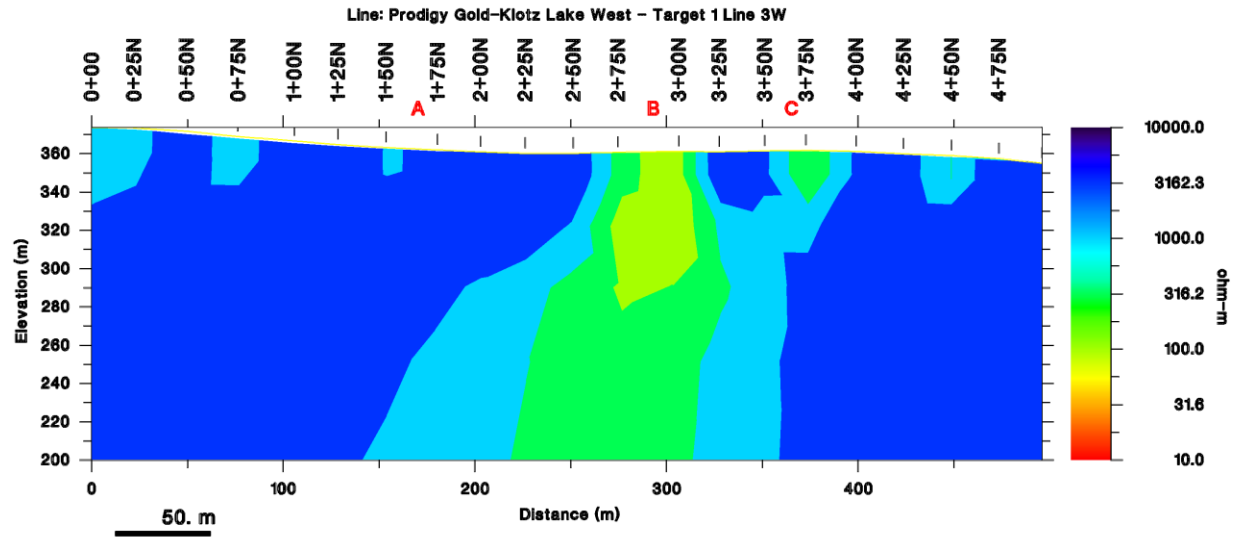
Grid 1 NAA Figure 2 Line 4W Model 4000 Ohm with Fraser Picks



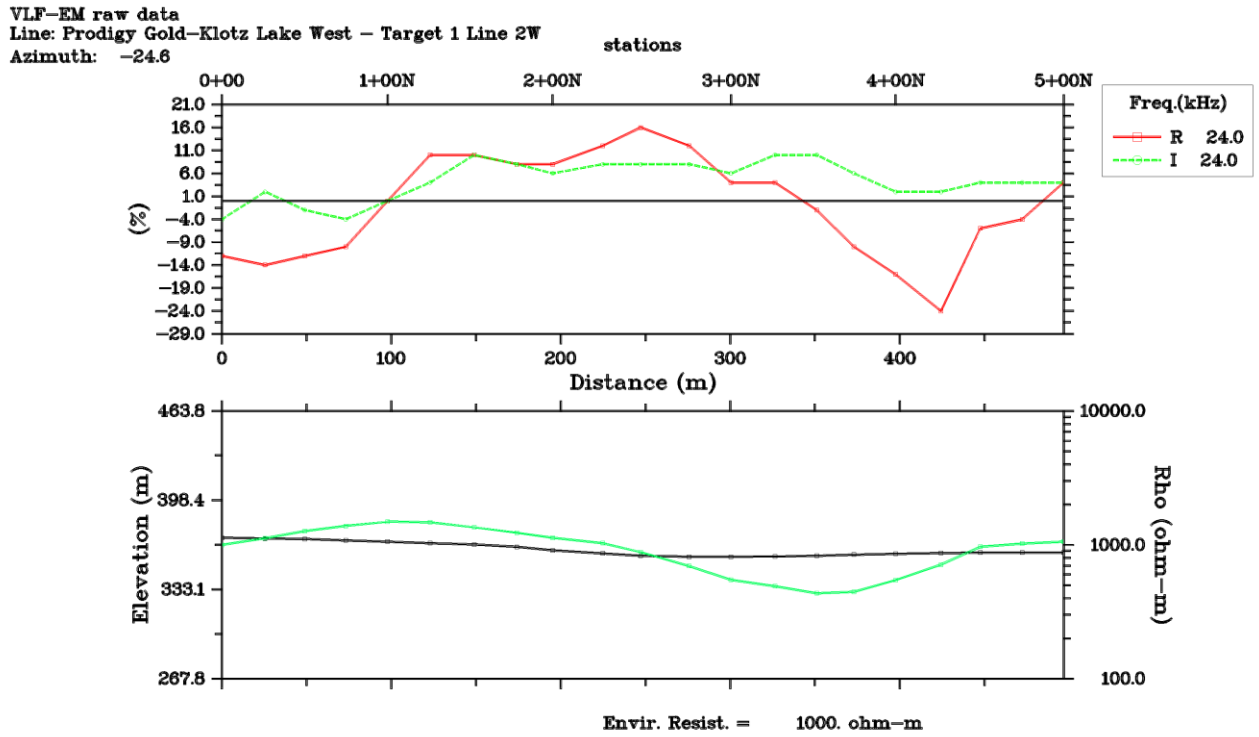
Grid 1 NAA Figure 3 Line 3W Raw Data Profile



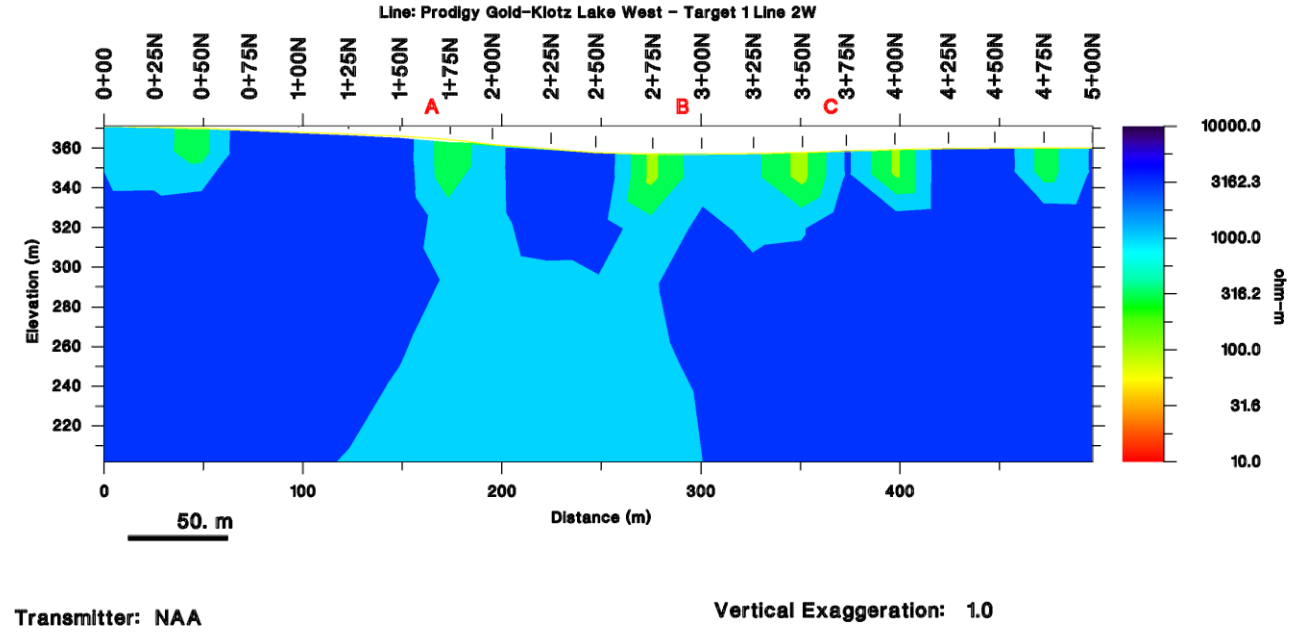
Grid 1 NAA Figure 4 Line 3W Model 4000 Ohm with Fraser Picks



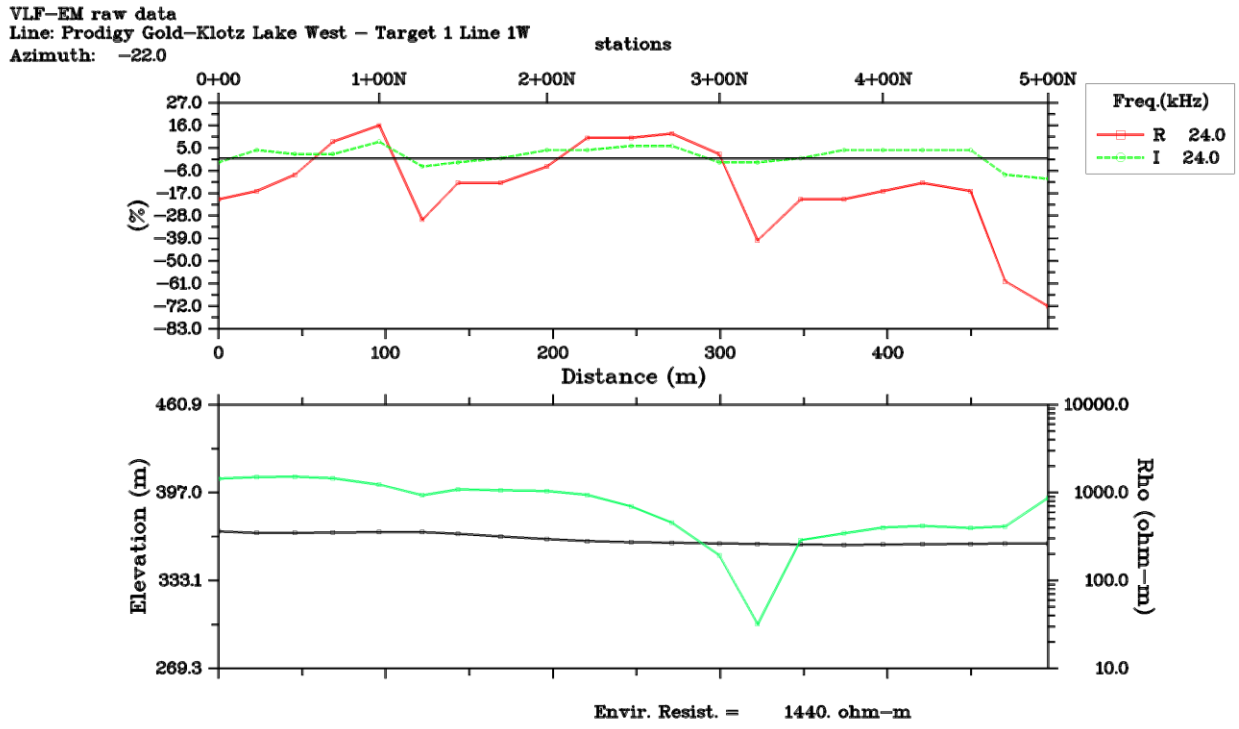
Grid 1 NAA Figure 5 Line 2W Raw Data Profile



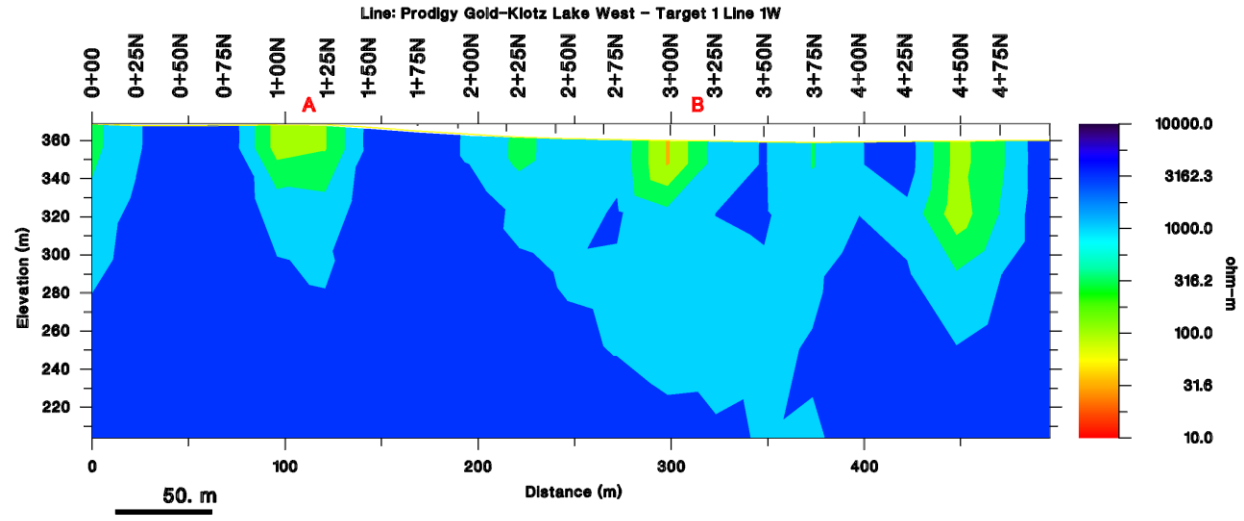
Grid 1 NAA Figure 6 Line 2W Model 4000 Ohm with Fraser Picks



Grid 1 NAA Figure 7 Line 1W Raw Data Profile



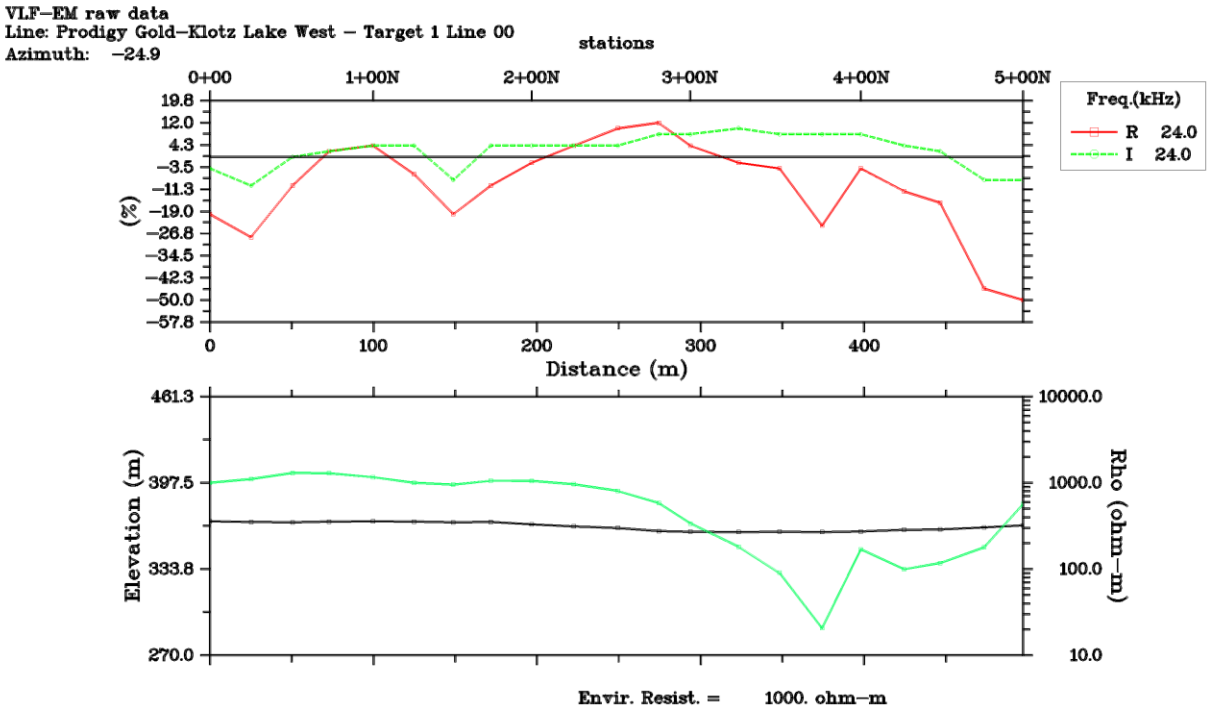
Grid 1 NAA Figure 8 Line 1W Model 4000 Ohm with Fraser Picks



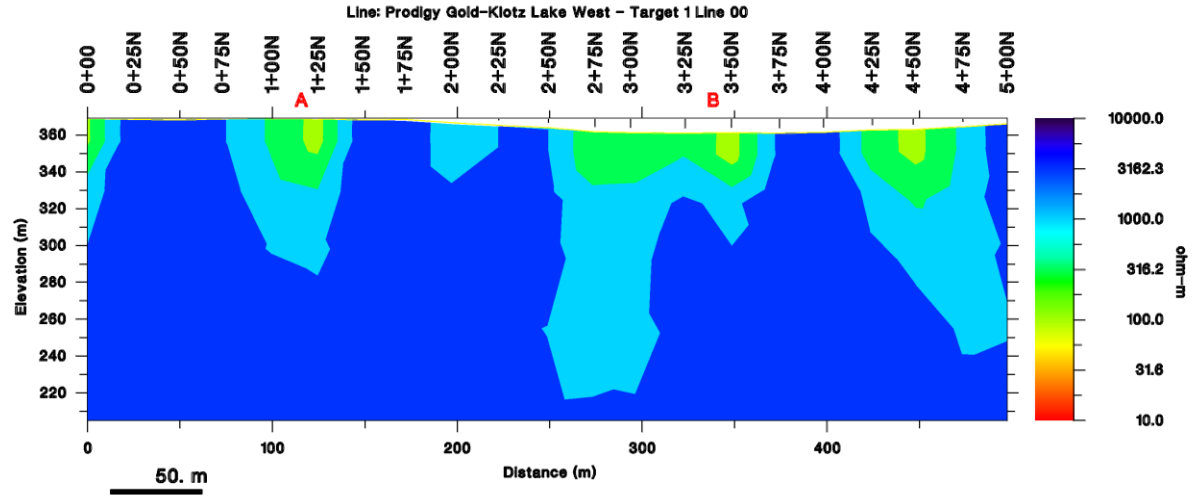
Transmitter: NAA

Vertical Exaggeration: 1.0

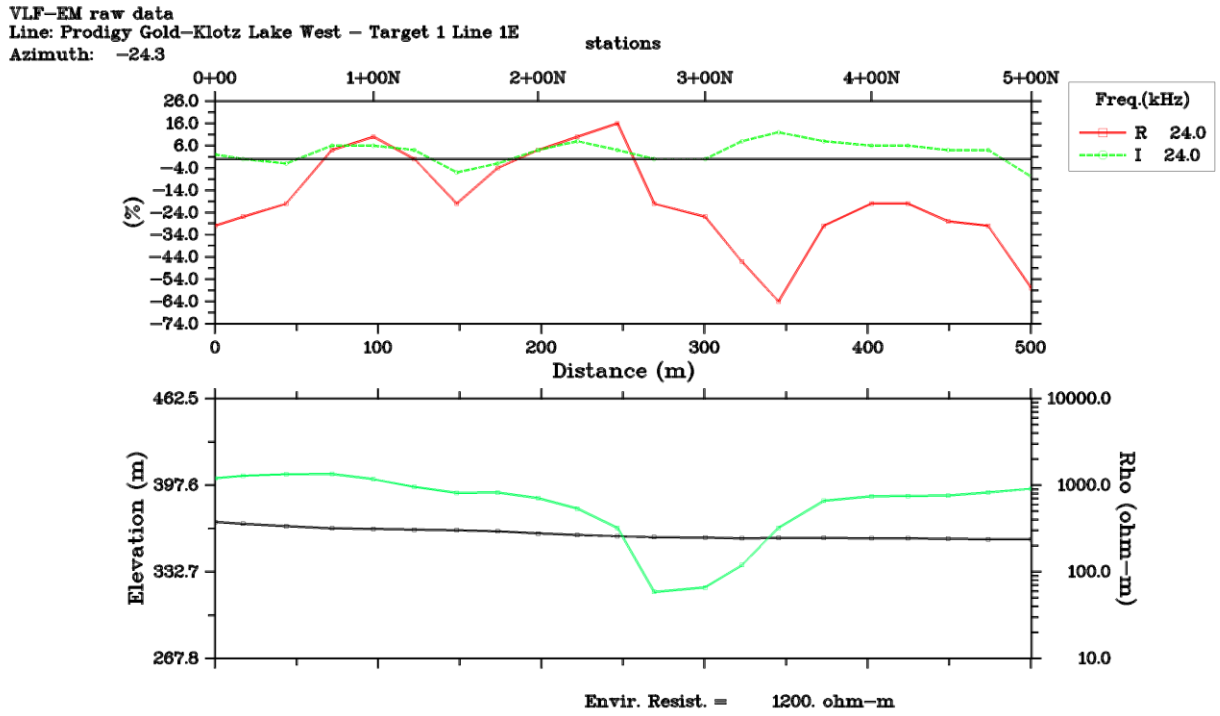
Grid 1 NAA Figure 9 Line 00 Raw Data Profile



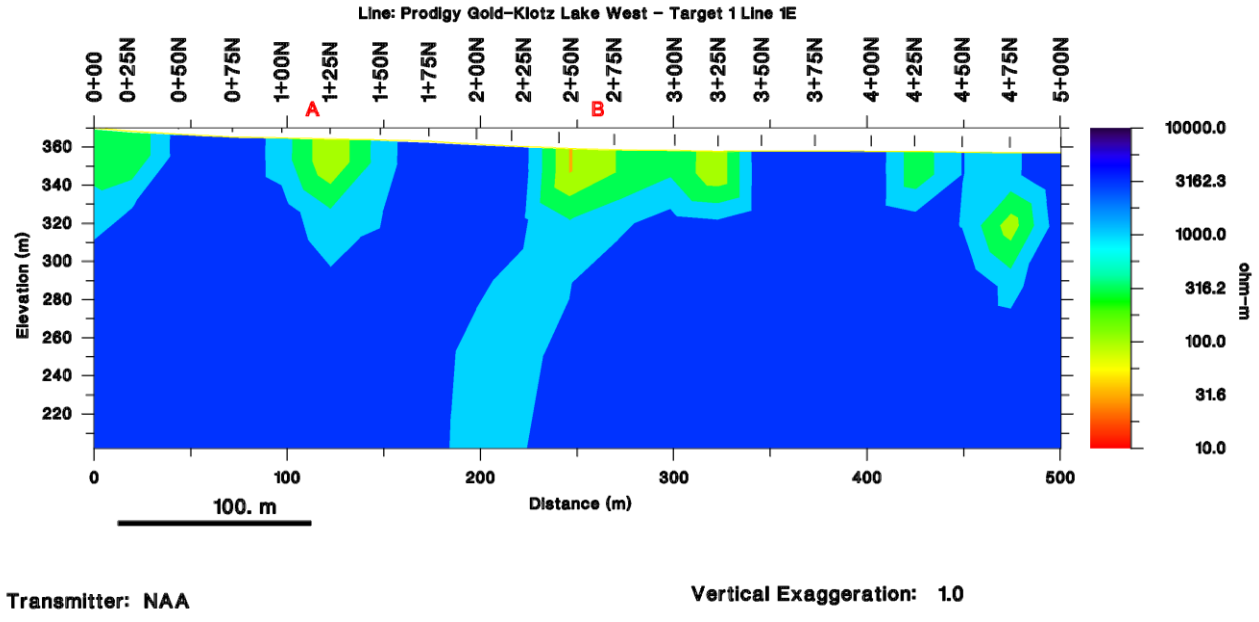
Grid 1 NAA Figure 10 Line 00 Model 4000 Ohm with Fraser Picks



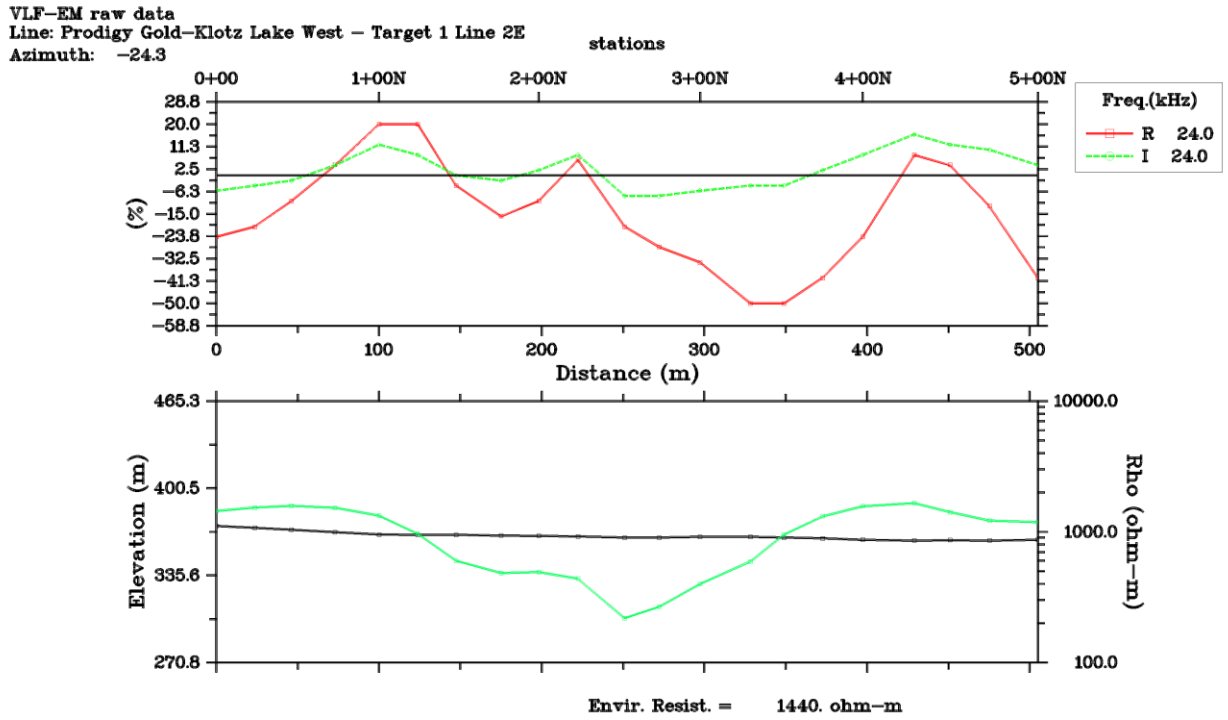
Grid 1 NAA Figure 11 Line 1E Raw Data Profile



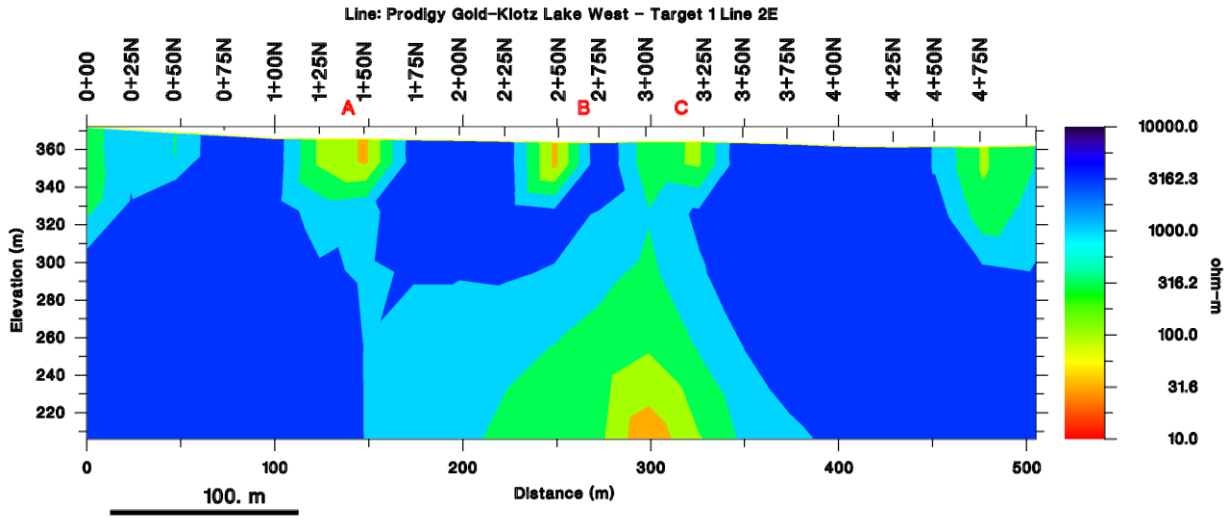
Grid 1 NAA Figure 12 Line 1E Model 4000 Ohm with Fraser Picks



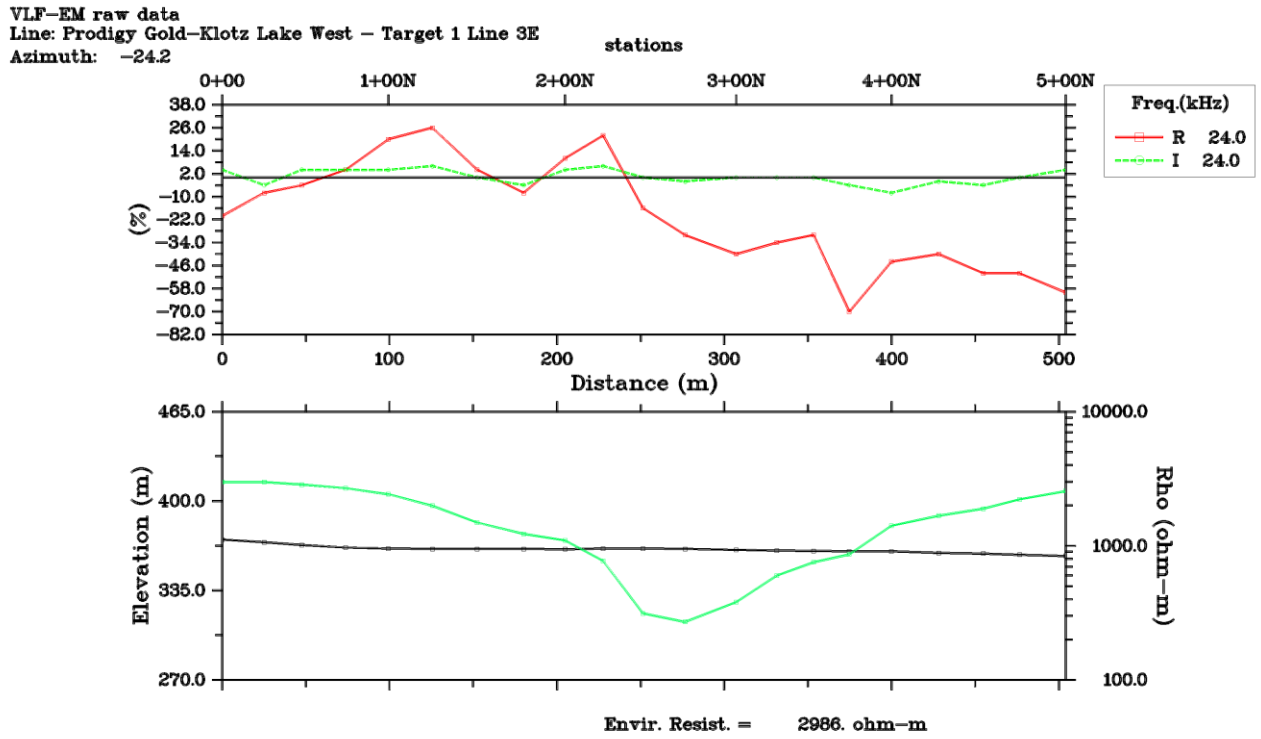
Grid 1 NAA Figure 13 Line 2E Raw Data Profile



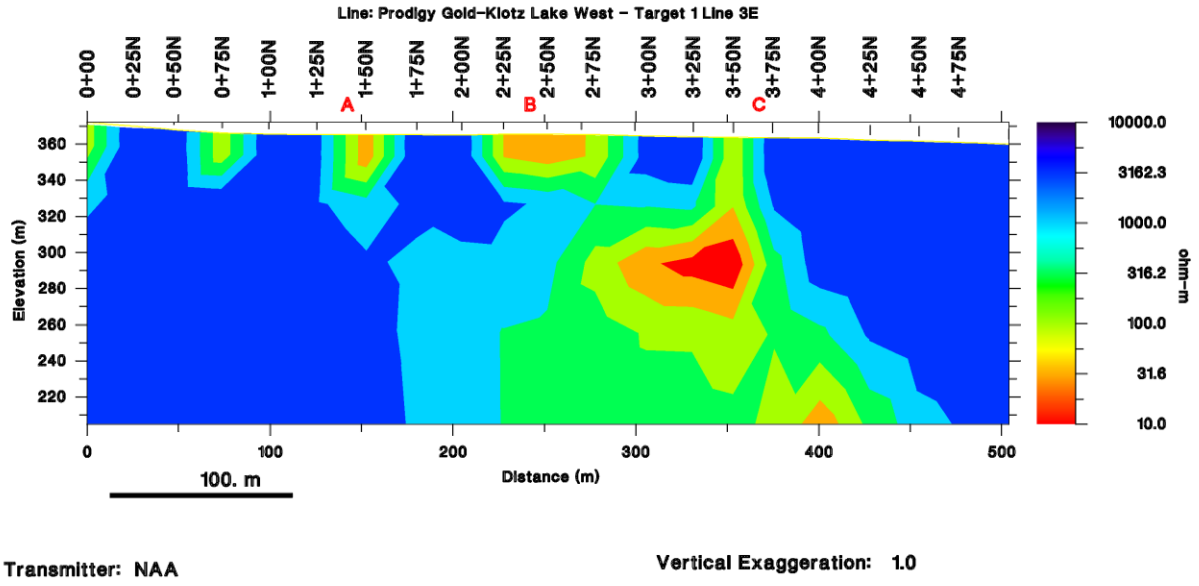
Grid 1 NAA Figure 14 Line 2E Model 4000 Ohm with Fraser Picks



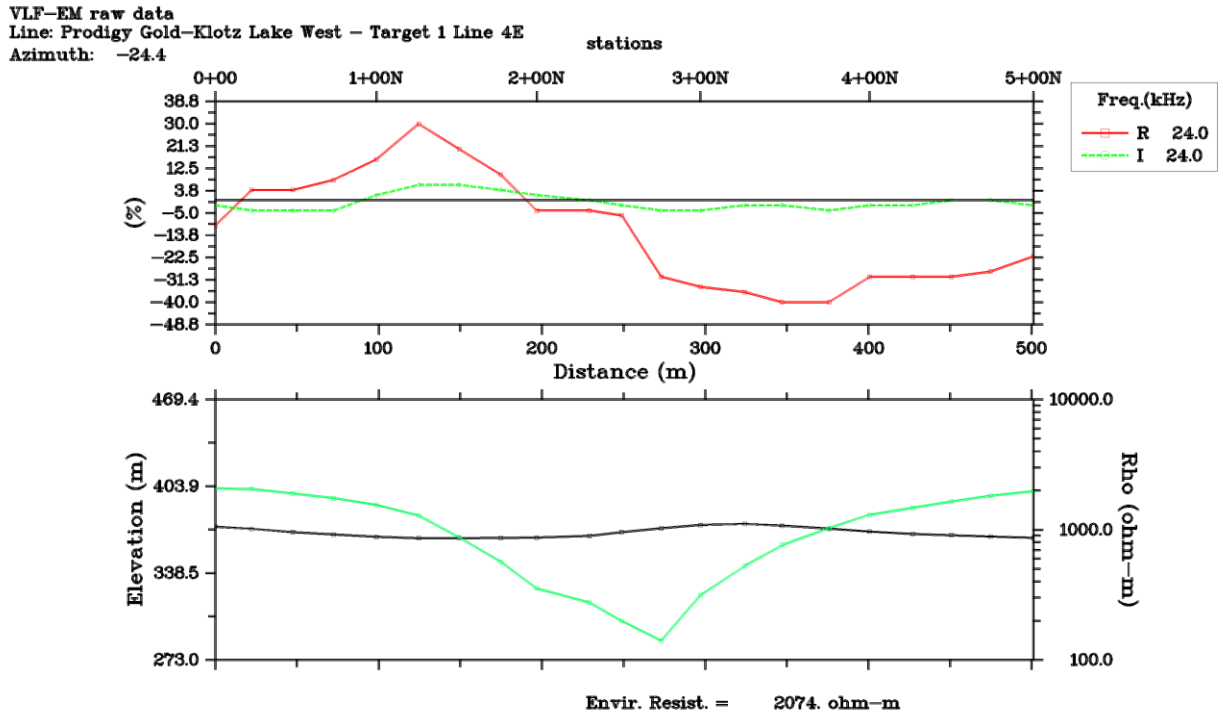
Grid 1 NAA Figure 15 Line 3E Raw Data Profile



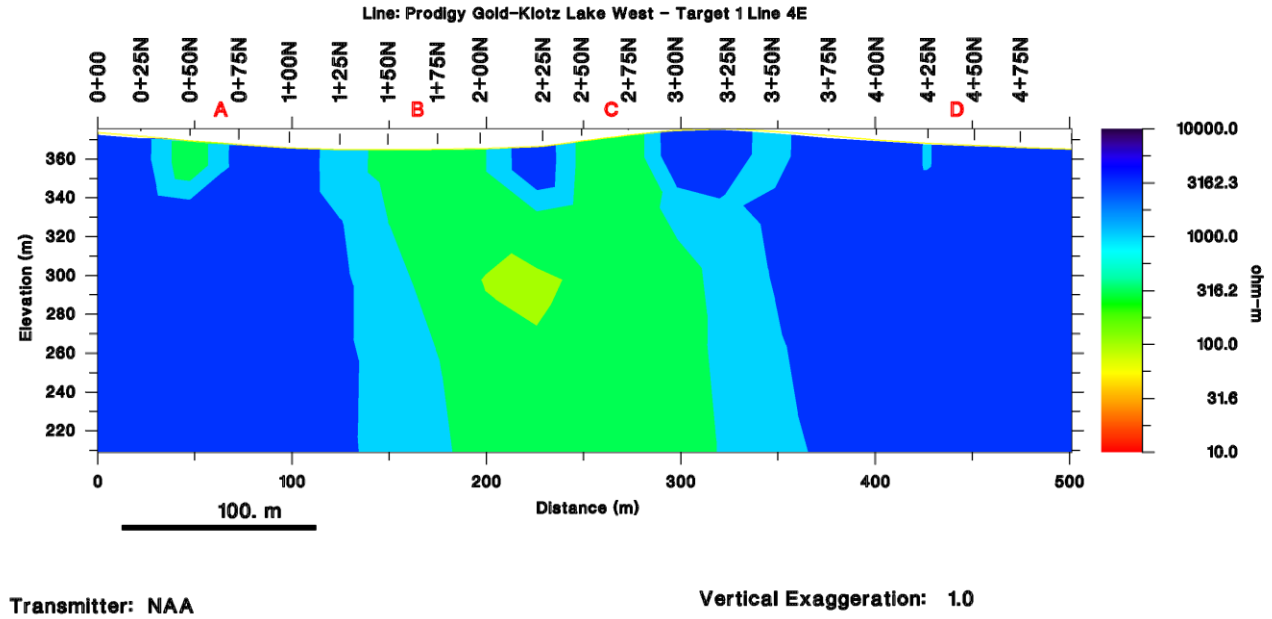
Grid 1 NAA Figure 16 Line 3E Model 4000 Ohm with Fraser Picks



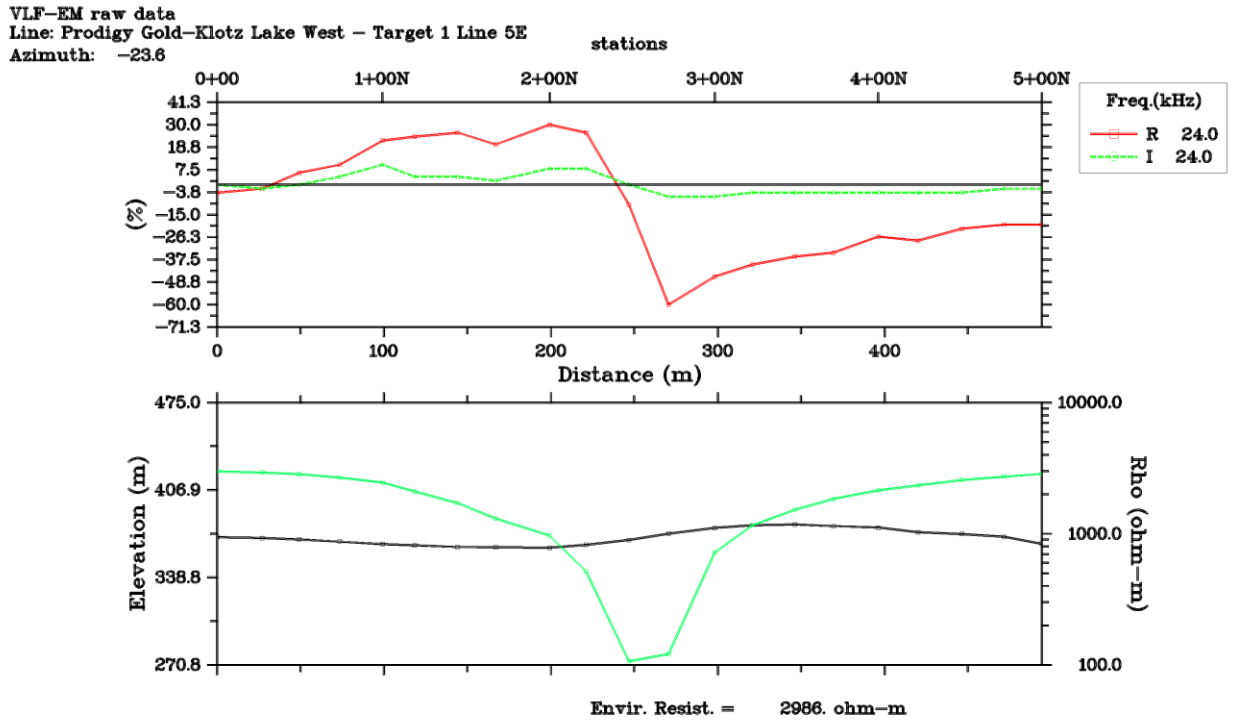
Grid 1 NAA Figure 17 Line 4E Raw Data Profile



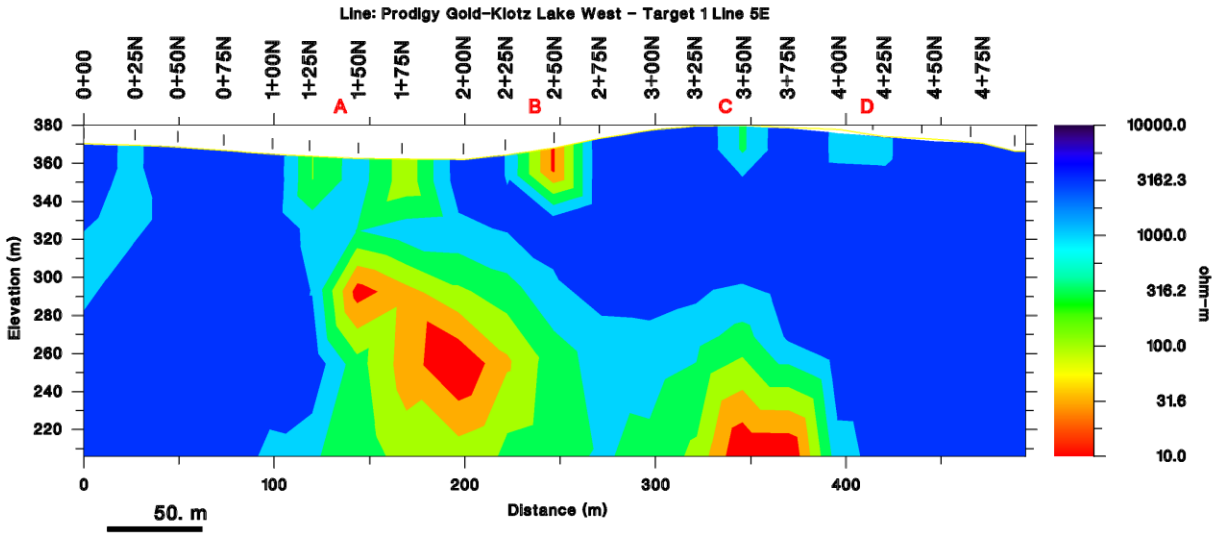
Grid 1 NAA Figure 18 Line 4E Model 4000 Ohm with Fraser Picks



Grid 1 NAA Figure 19 Line 5E Raw Data Profile



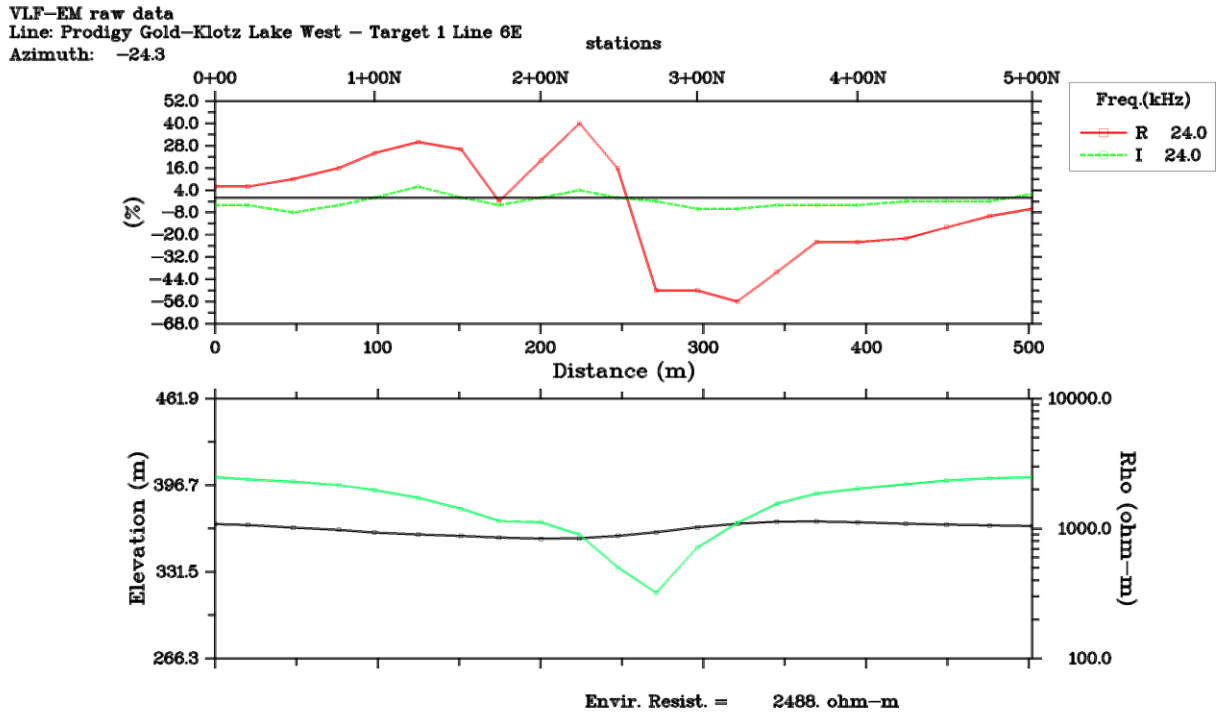
Grid 1 NAA Figure 20 Line 5E Model 4000 Ohm with Fraser Picks



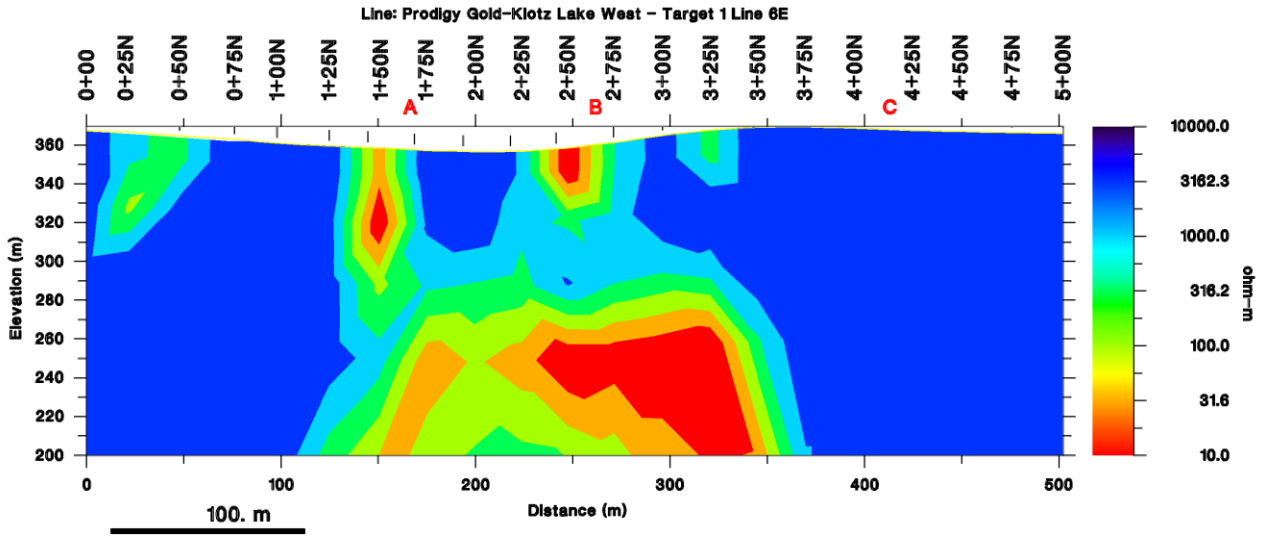
Transmitter: NAA

Vertical Exaggeration: 1.0

Grid 1 NAA Figure 21 Line 6E Raw Data Profile



Grid 1 NAA Figure 22 Line 6E Model 4000 Ohm with Fraser Picks



Transmitter: NAA

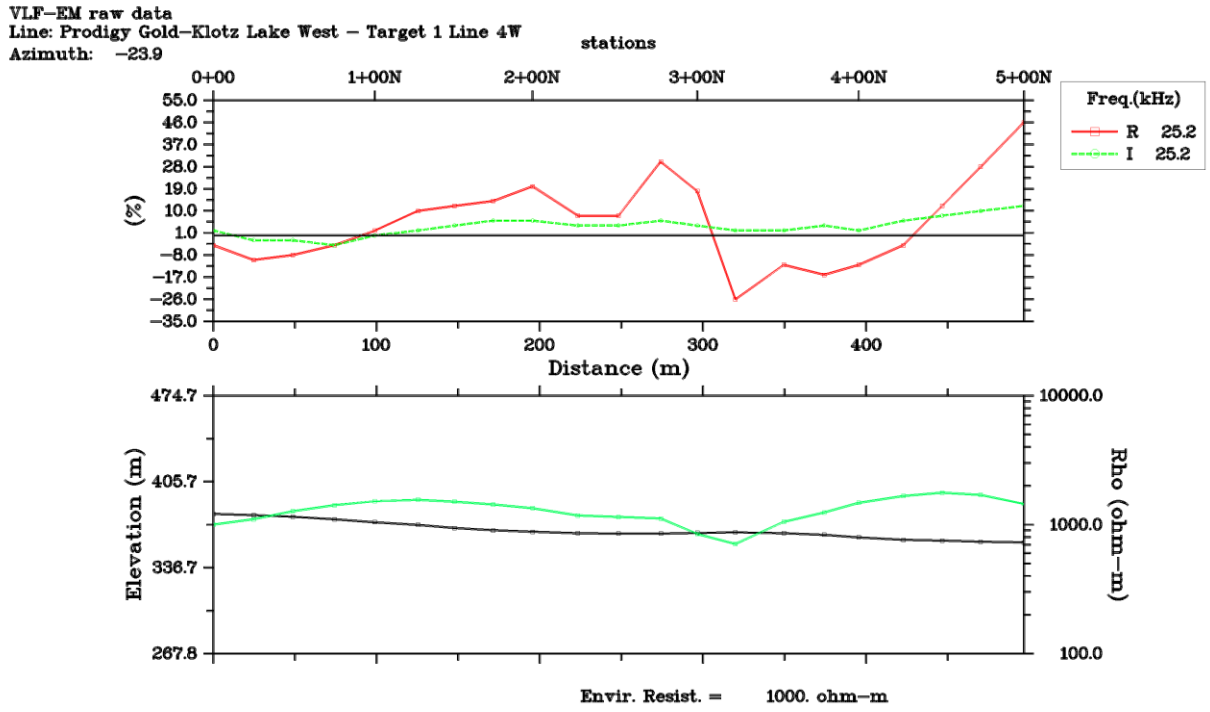
Vertical Exaggeration: 1.0

APPENDIX A-2

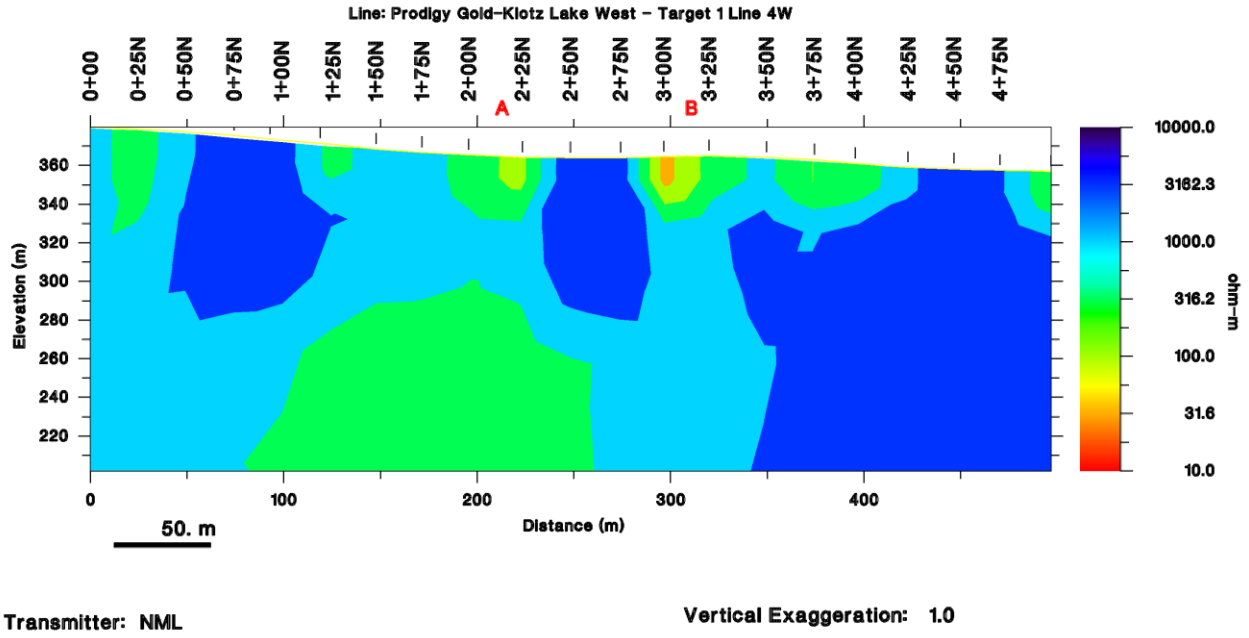
Grid 1/Target 1

NML Figures

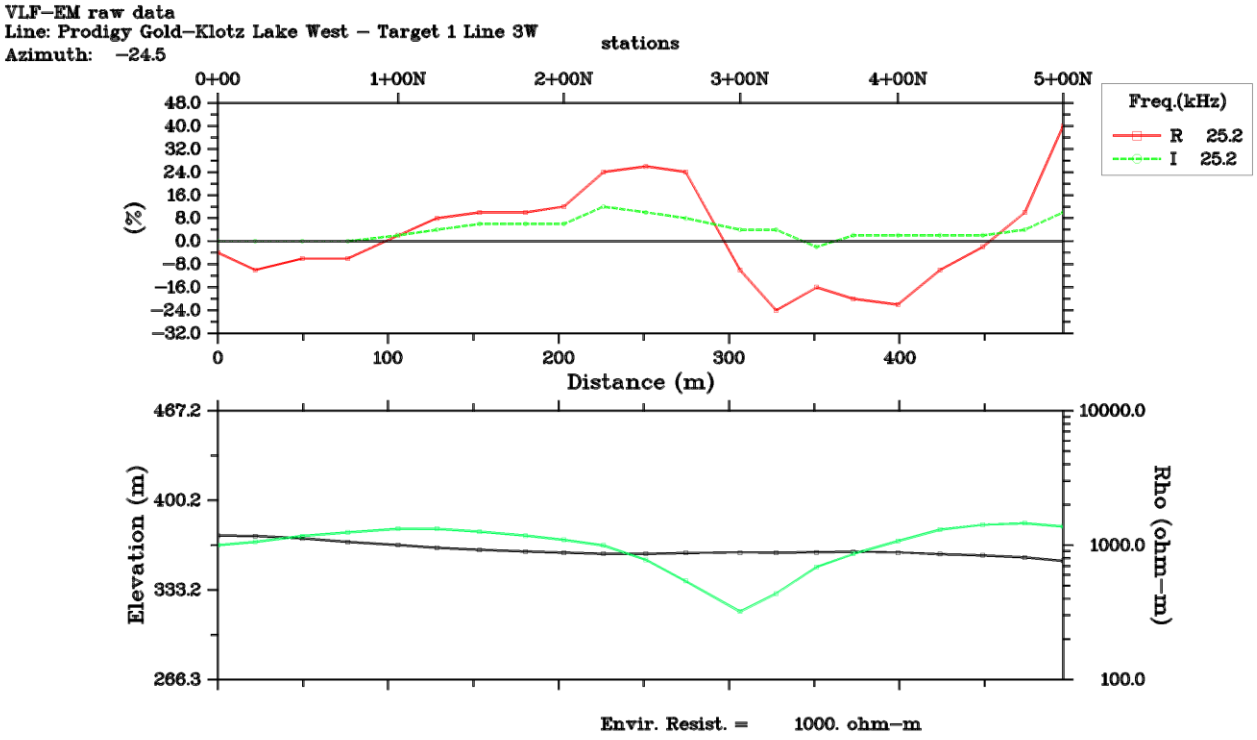
Grid 1 NML Figure 1 Line 4W Raw Data Profile



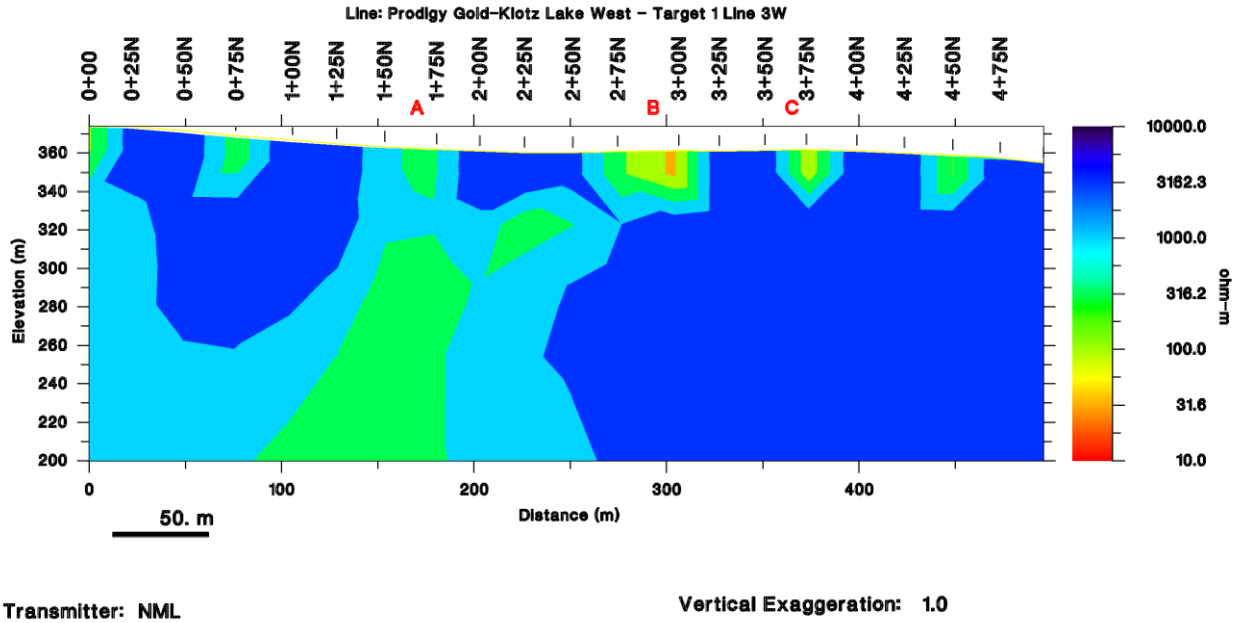
Grid 1 NML Figure 2 Line 4W Model 4000 Ohm with Fraser Picks



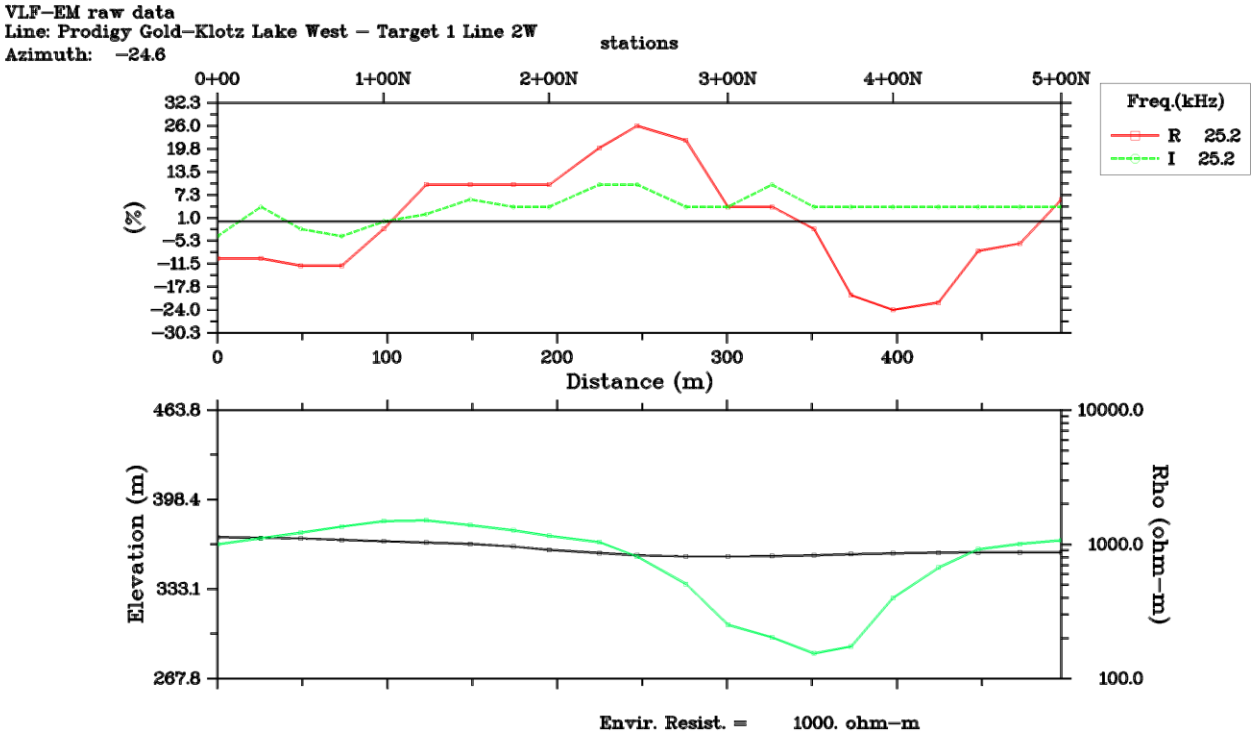
Grid 1 NML Figure 3 Line 3W Raw Data Profile



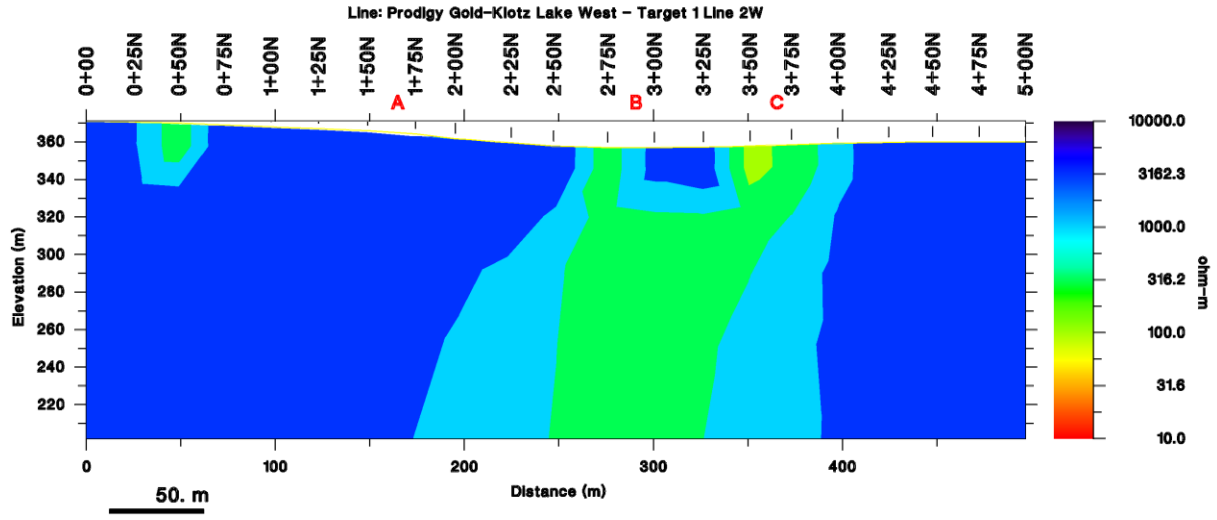
Grid 1 NML Figure 4 Line 3W Model 4000 Ohm with Fraser Picks



Grid 1 NML Figure 5 Line 2W Raw Data Profile



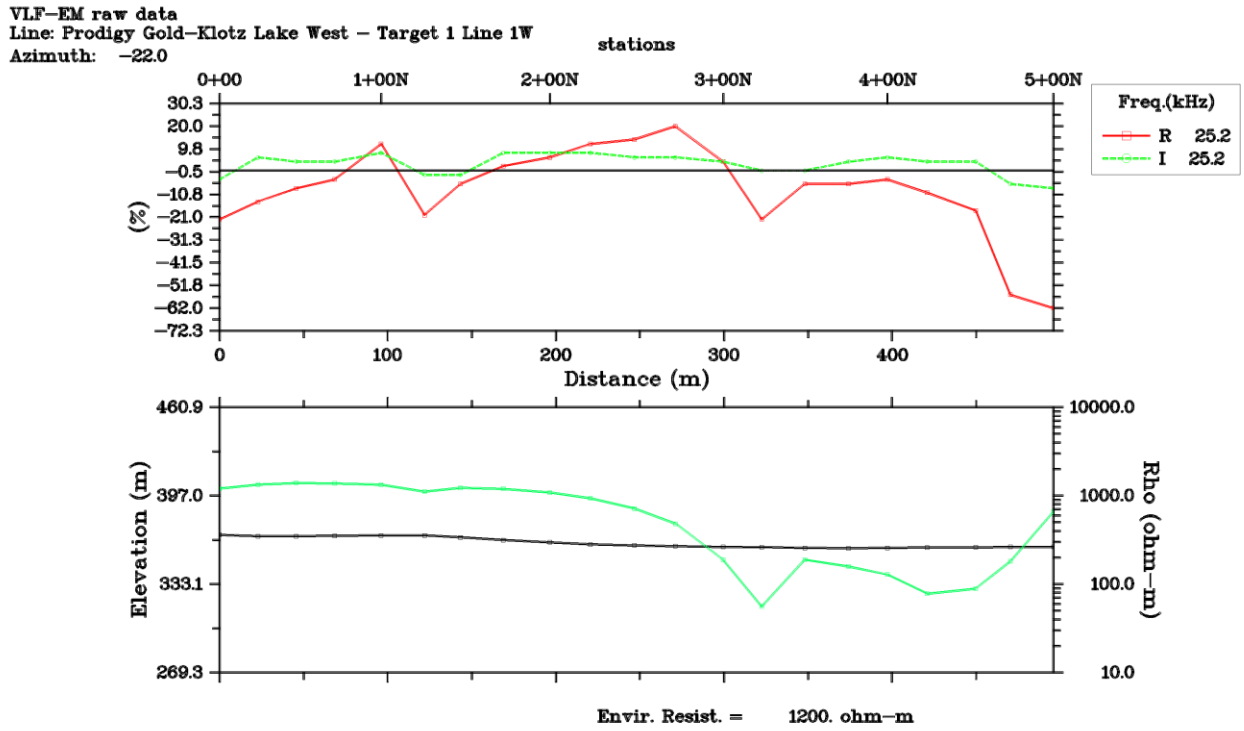
Grid 1 NML Figure 6 Line 2W Model 4000 Ohm with Fraser Picks



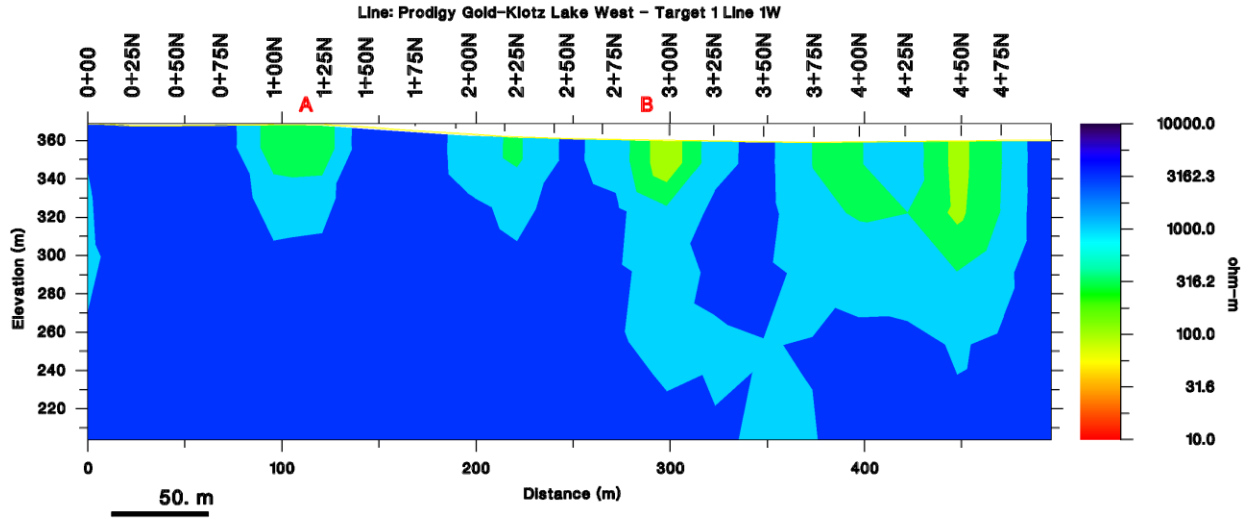
Transmitter: NML

Vertical Exaggeration: 1.0

Grid 1 NML Figure 7 Line 1W Raw Data Profile



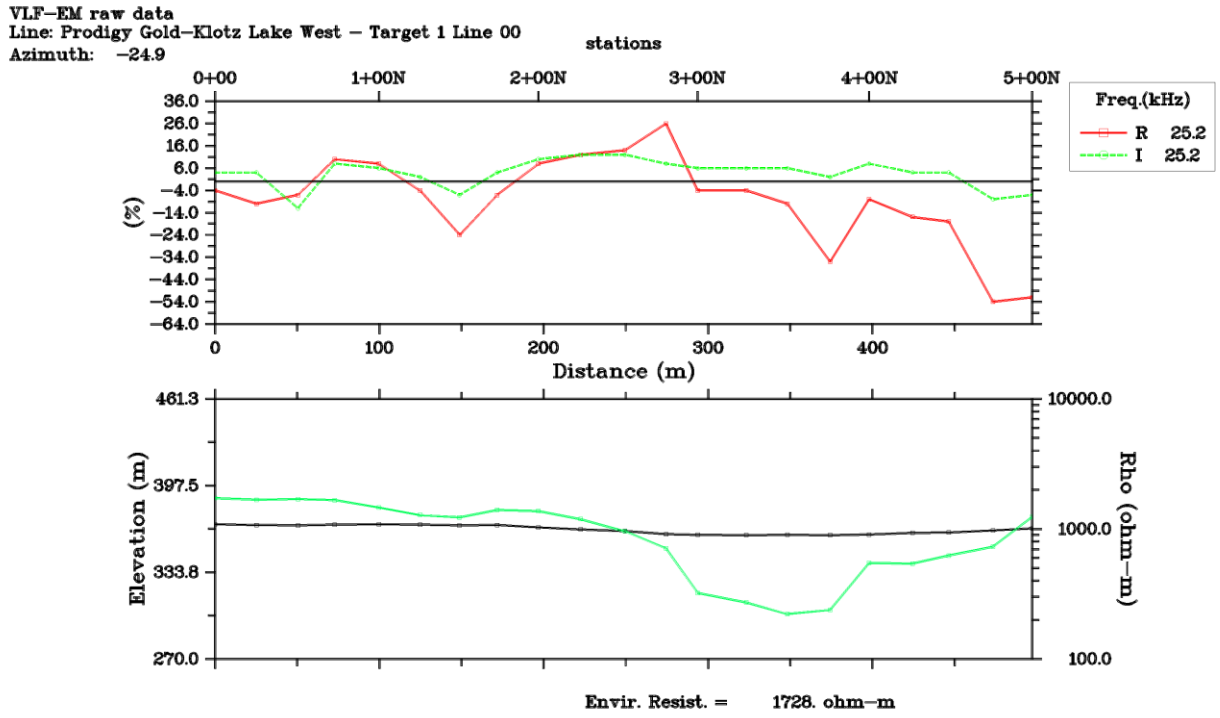
Grid 1 NML Figure 8 Line 1W Model 4000 Ohm with Fraser Picks



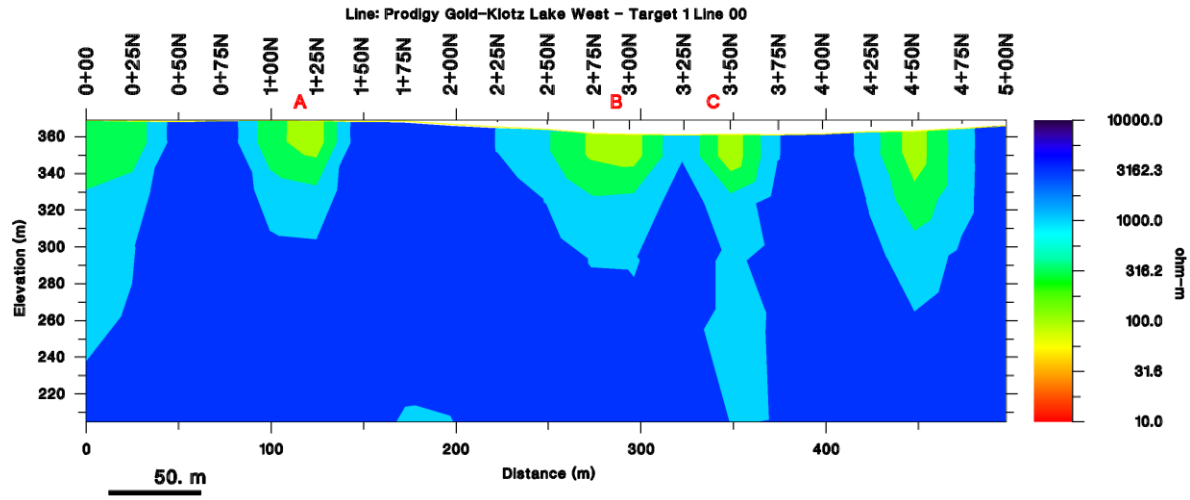
Transmitter: NML

Vertical Exaggeration: 1.0

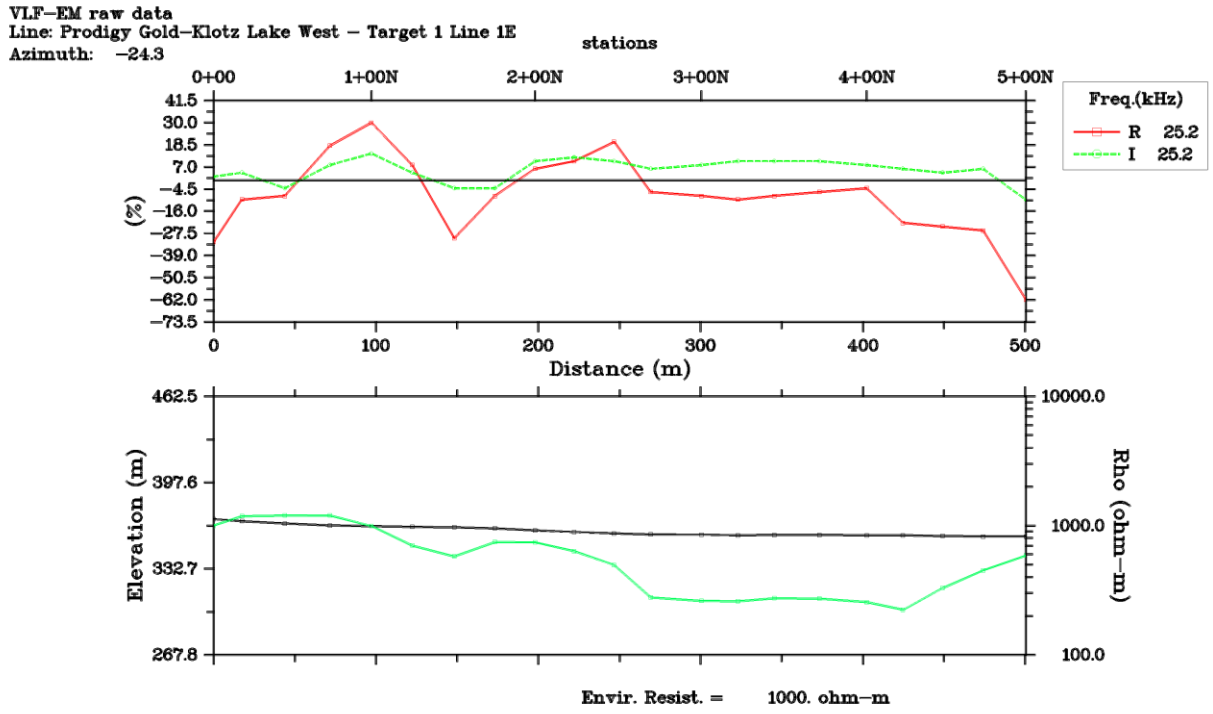
Grid 1 NML Figure 9 Line 00 Raw Data Profile



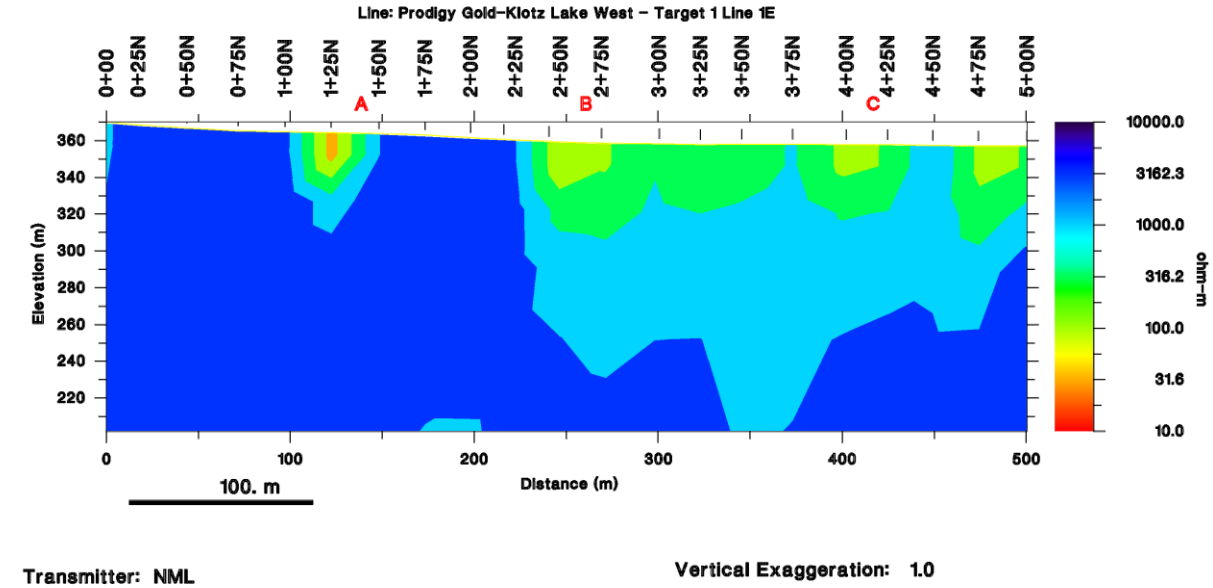
Grid 1 NML Figure 10 Line 00 Model 4000 Ohm with Fraser Picks



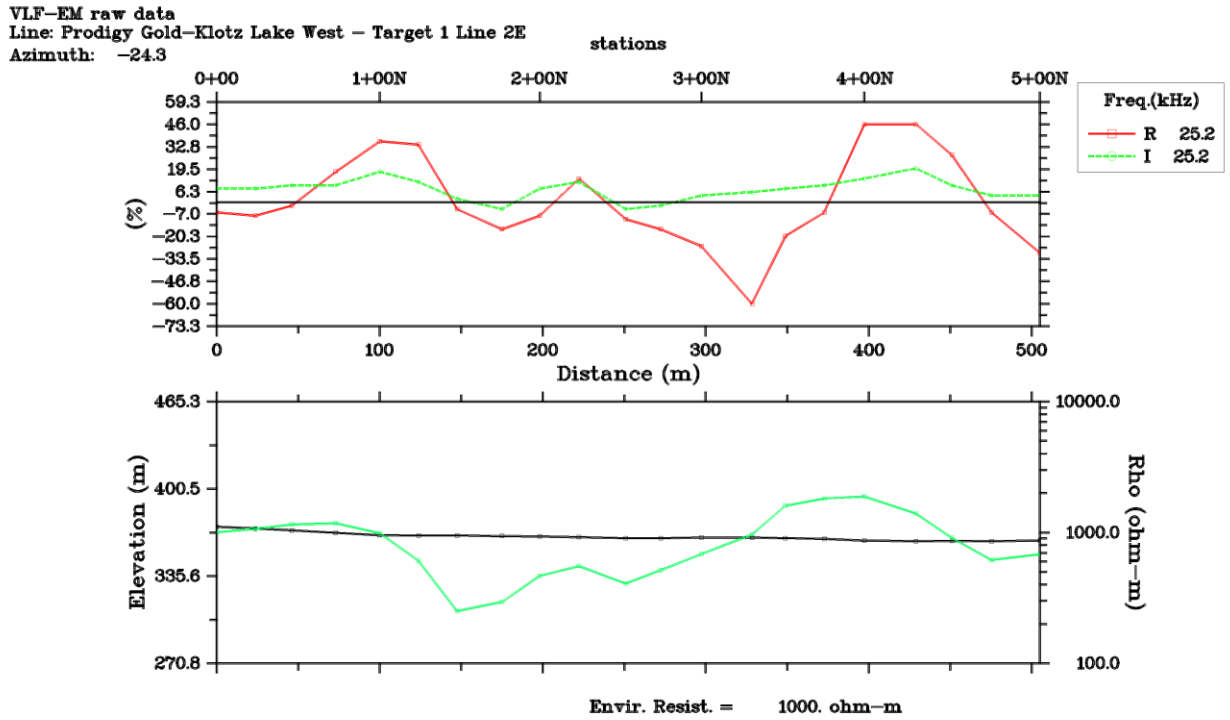
Grid 1 NML Figure 11 Line 1E Raw Data Profile



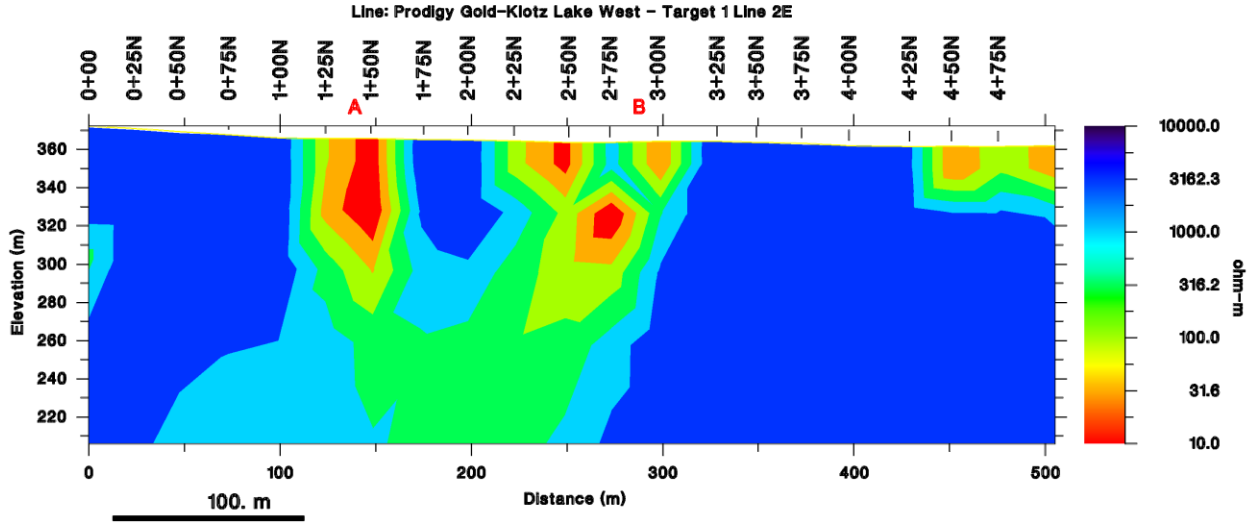
Grid 1 NML Figure 12 Line 1E Model 4000 Ohm with Fraser Picks



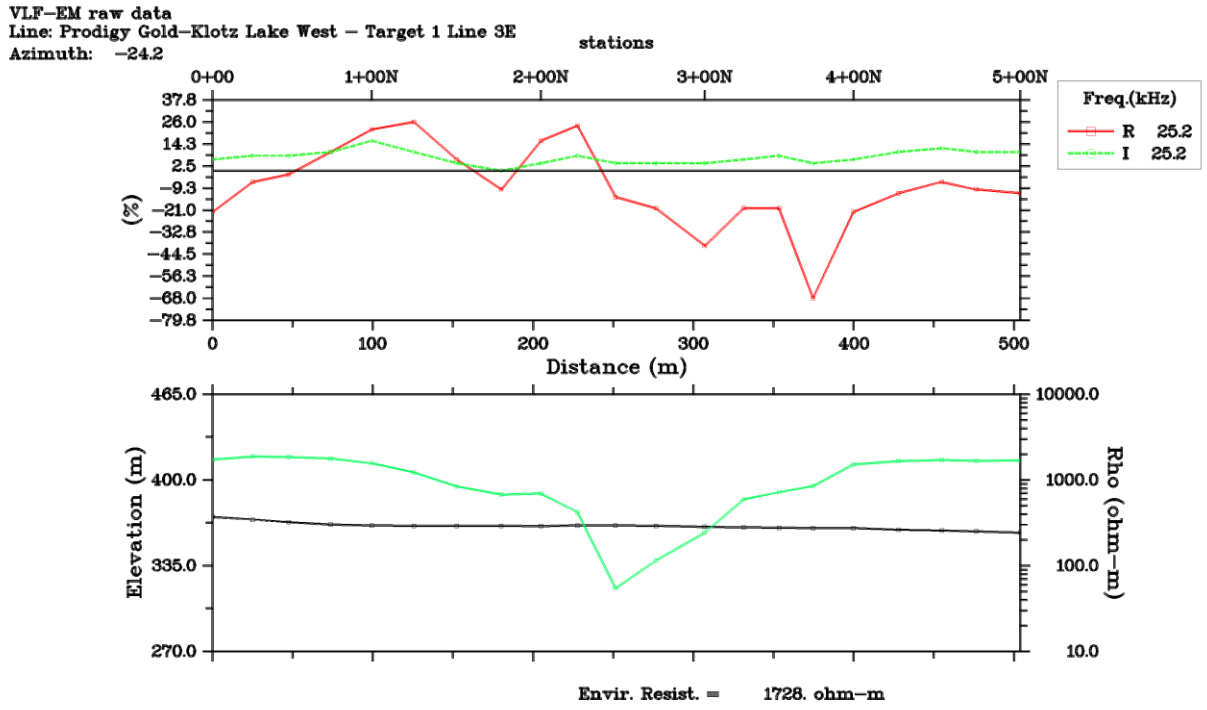
Grid 1 NML Figure 13 Line 2E Raw Data Profile



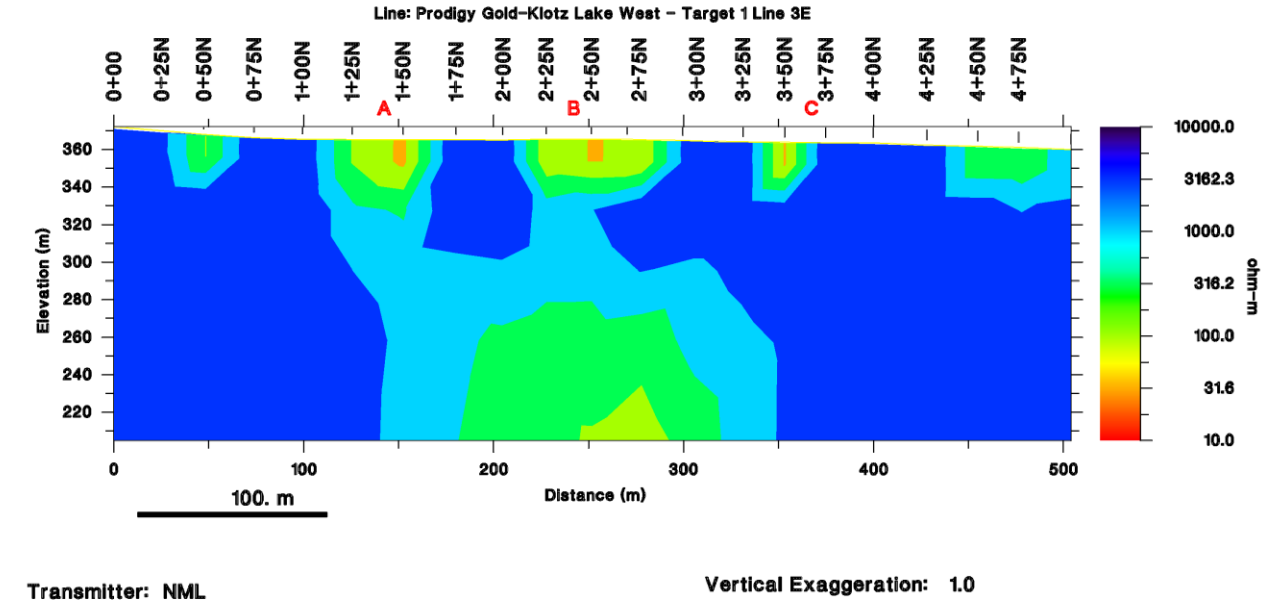
Grid 1 NML Figure 14 Line 2E Model 4000 Ohm with Fraser Picks



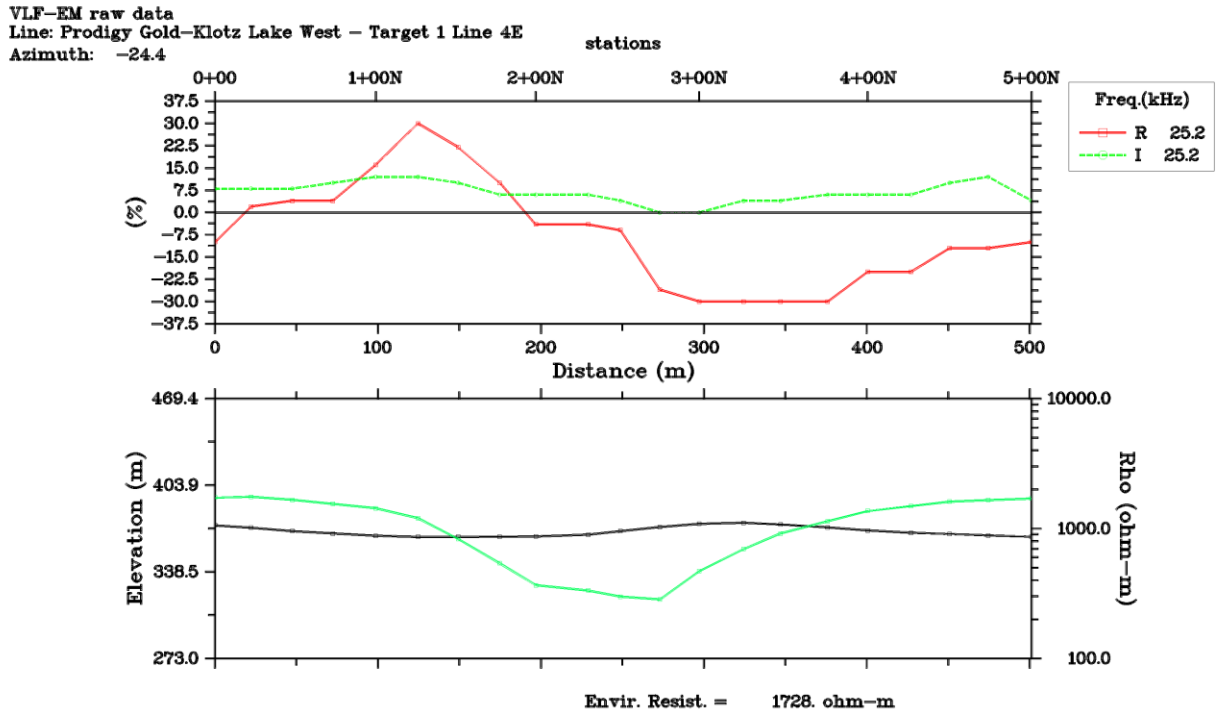
Grid 1 NML Figure 15 Line 3E Raw Data Profile



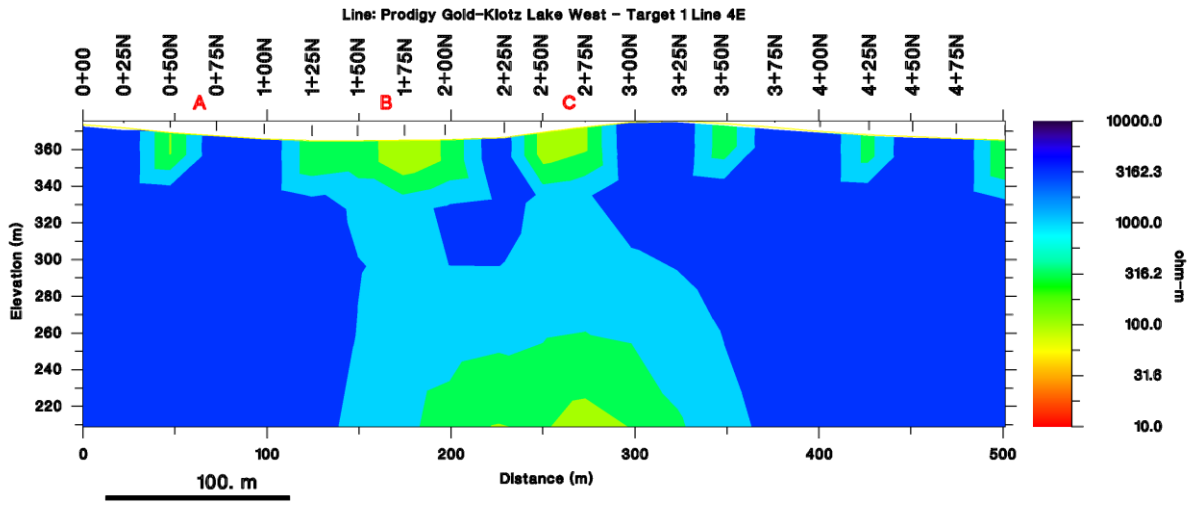
Grid 1 NML Figure 16 Line 3E Model 4000 Ohm with Fraser Picks



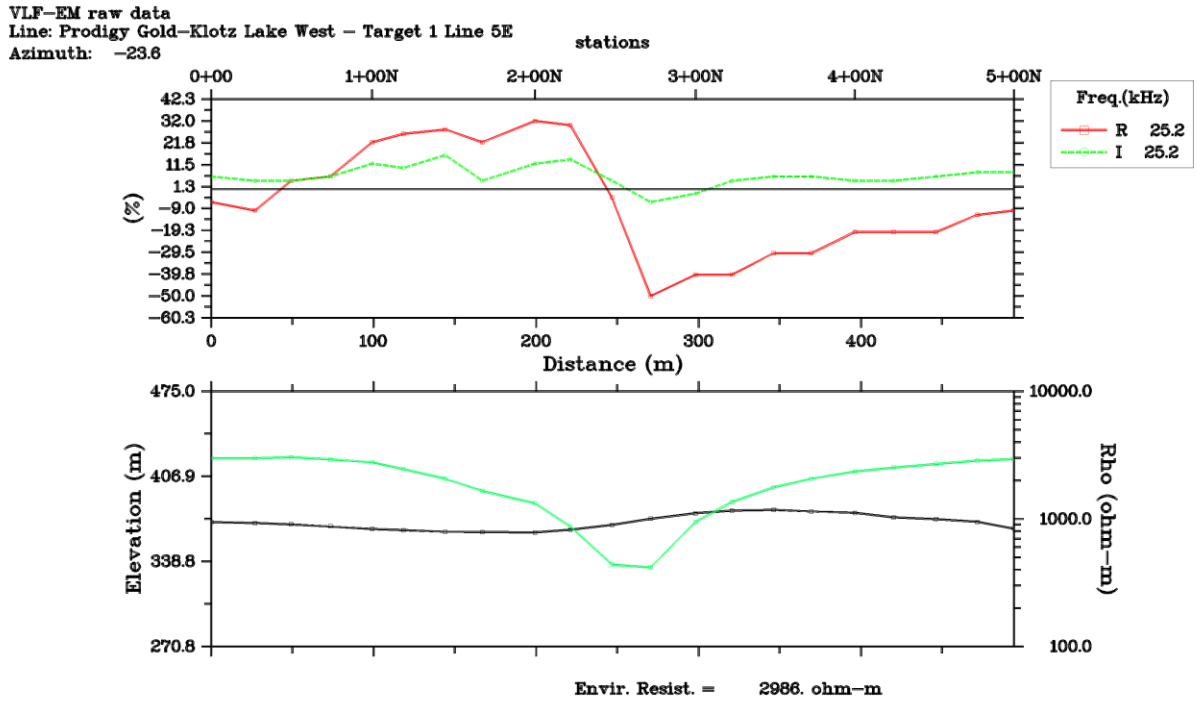
Grid 1 NML Figure 17 Line 4E Raw Data Profile



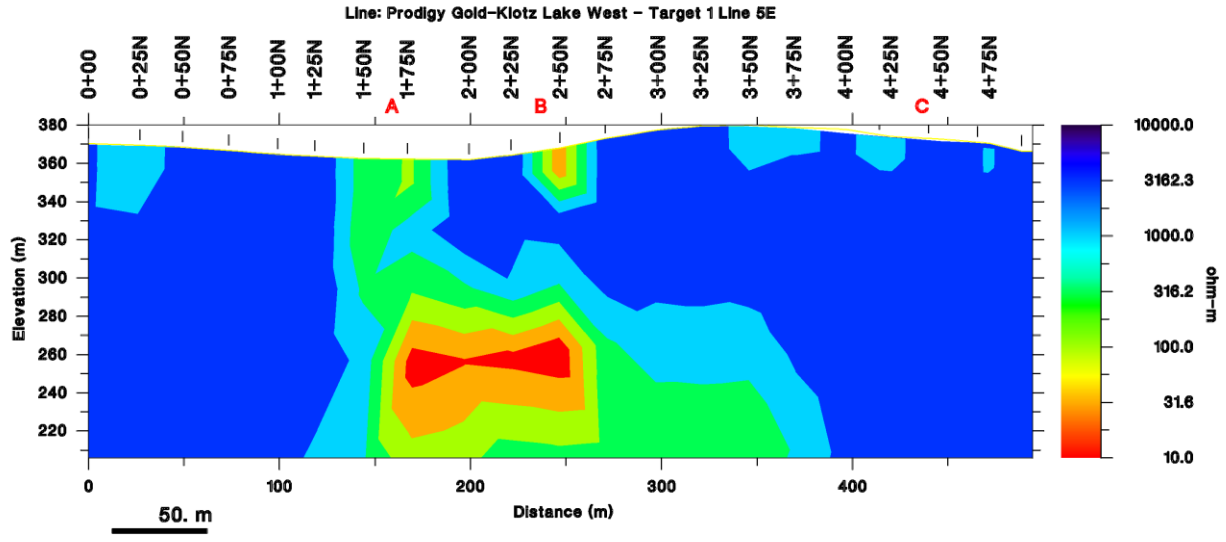
Grid 1 NML Figure 18 Line 4E Model 4000 Ohm with Fraser Picks



Grid 1 NML Figure 19 Line 5E Raw Data Profile



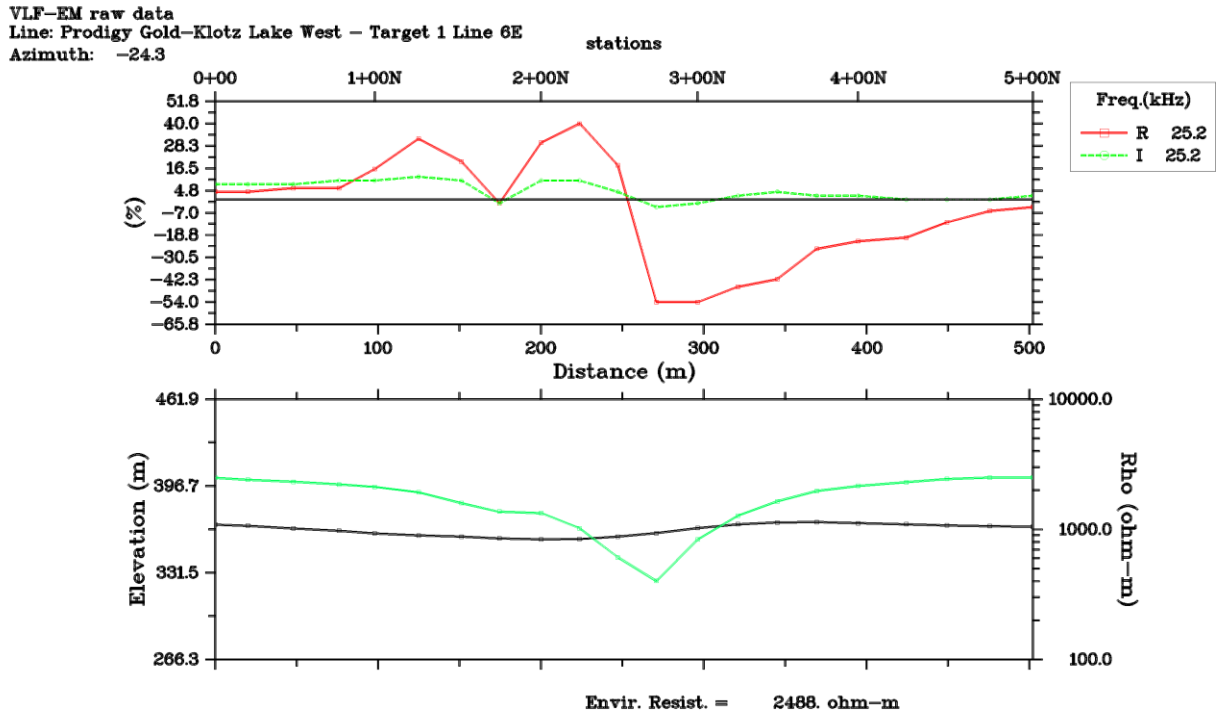
Grid 1 NML Figure 20 Line 5E Model 4000 Ohm with Fraser Picks



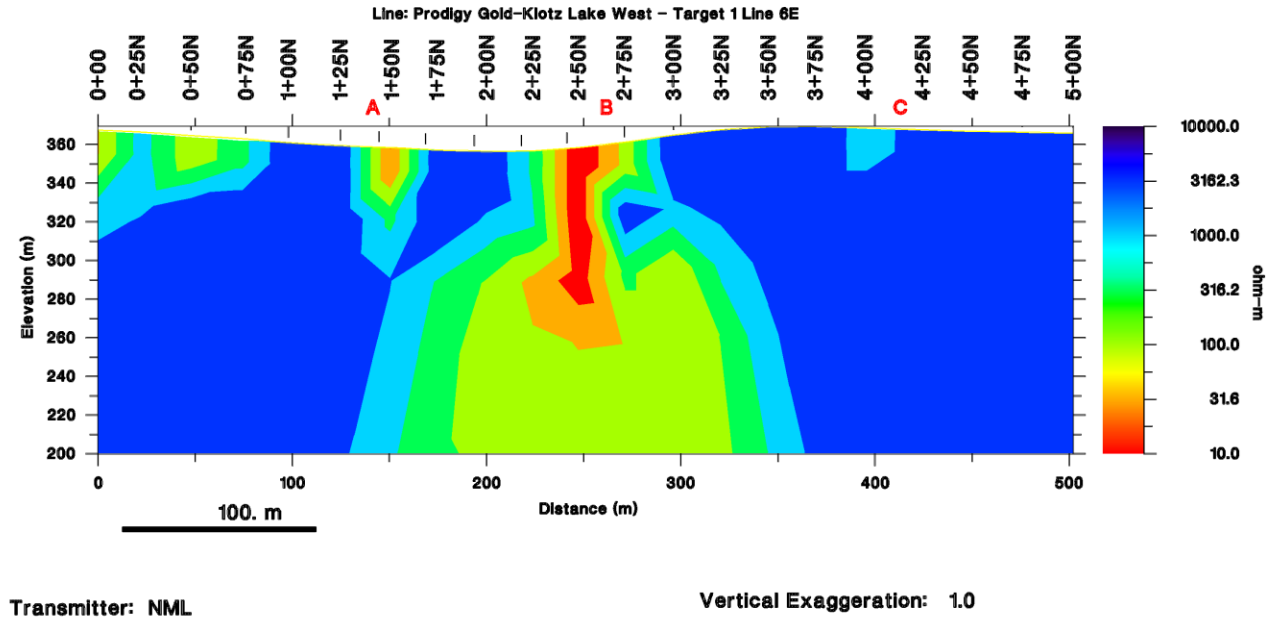
Transmitter: NML

Vertical Exaggeration: 1.0

Grid 1 NML Figure 21 Line 6E Raw Data Profile



Grid 1 NML Figure 22 Line 6E Model 4000 Ohm with Fraser Picks

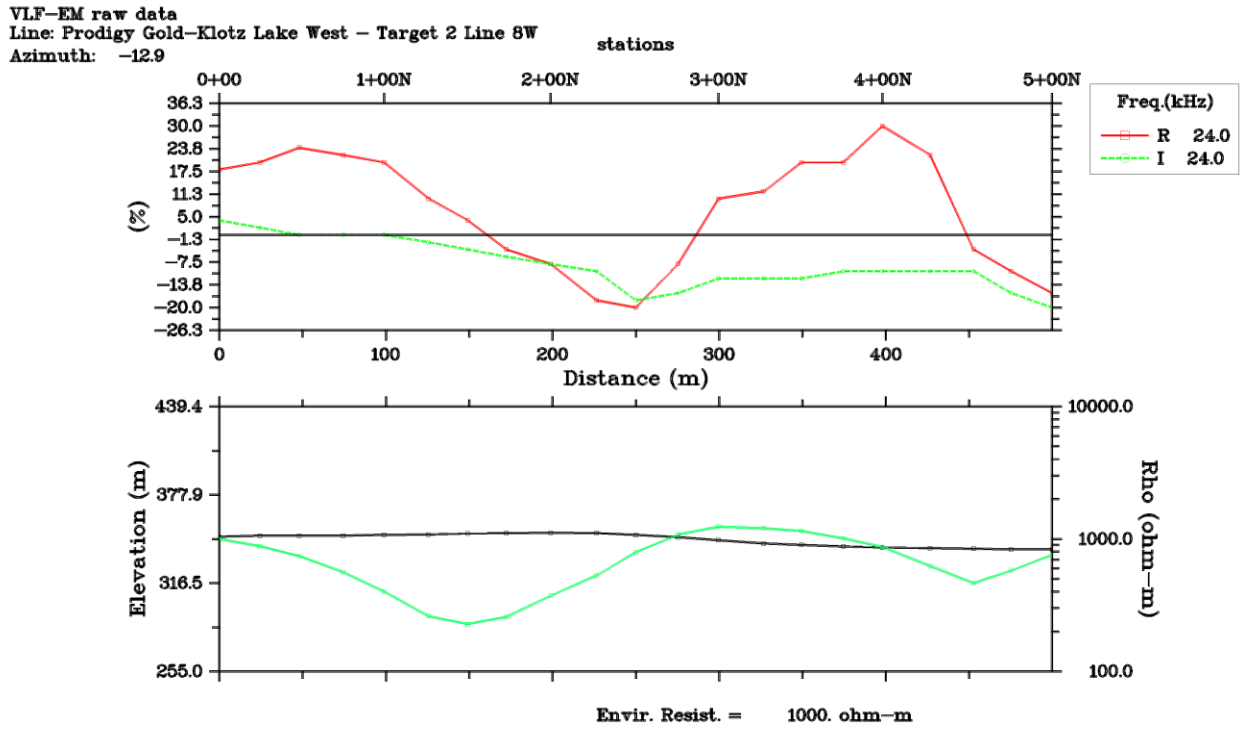


APPENDIX B-1

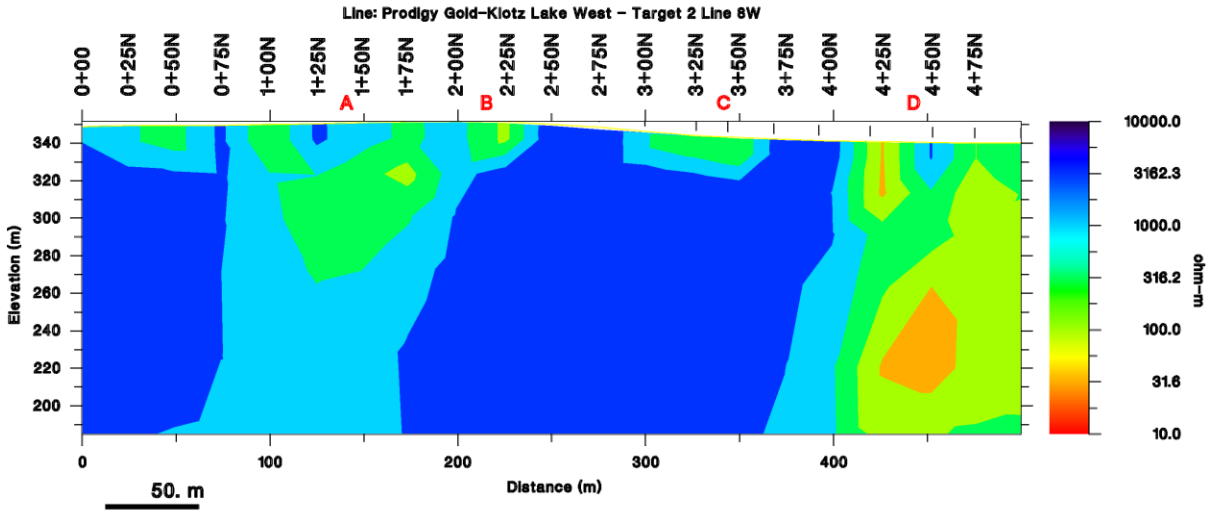
Grid 2/Target 2

NAA Figures

Grid 2 NAA Figure 1 Line 8W Raw Data Profile



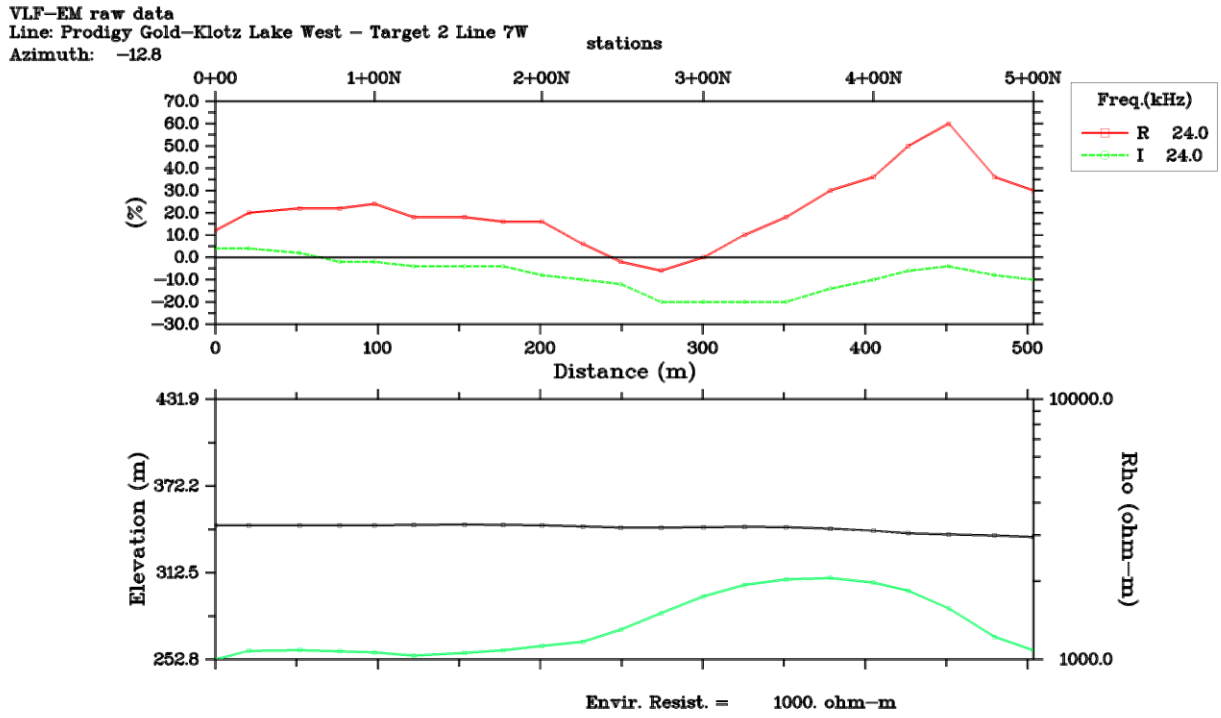
Grid 2 NAA Figure 2 Line 8W Model 2000 Ohm with Fraser Picks



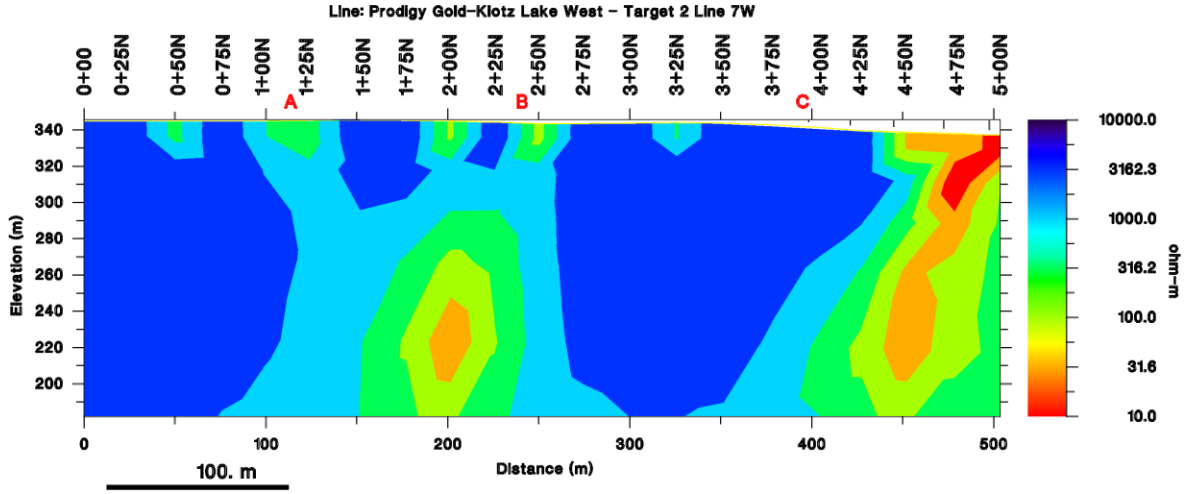
Transmitter: NAA

Vertical Exaggeration: 1.0

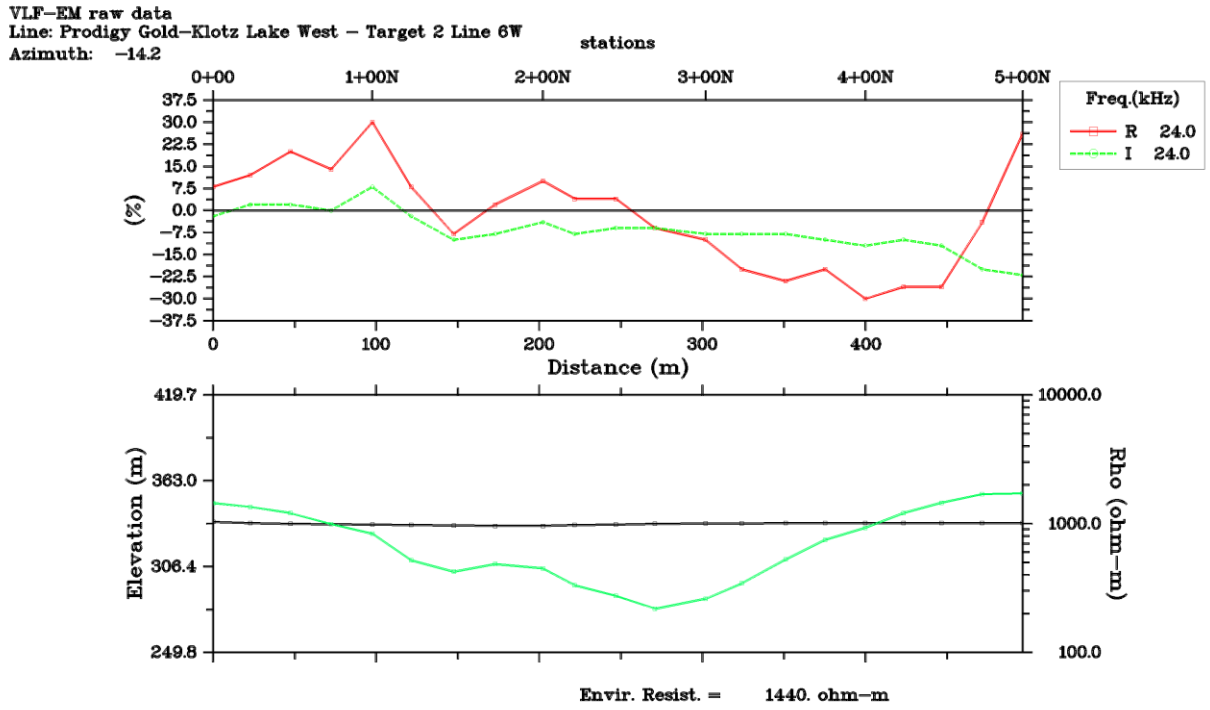
Grid 2 NAA Figure 3 Line 7W Raw Data Profile



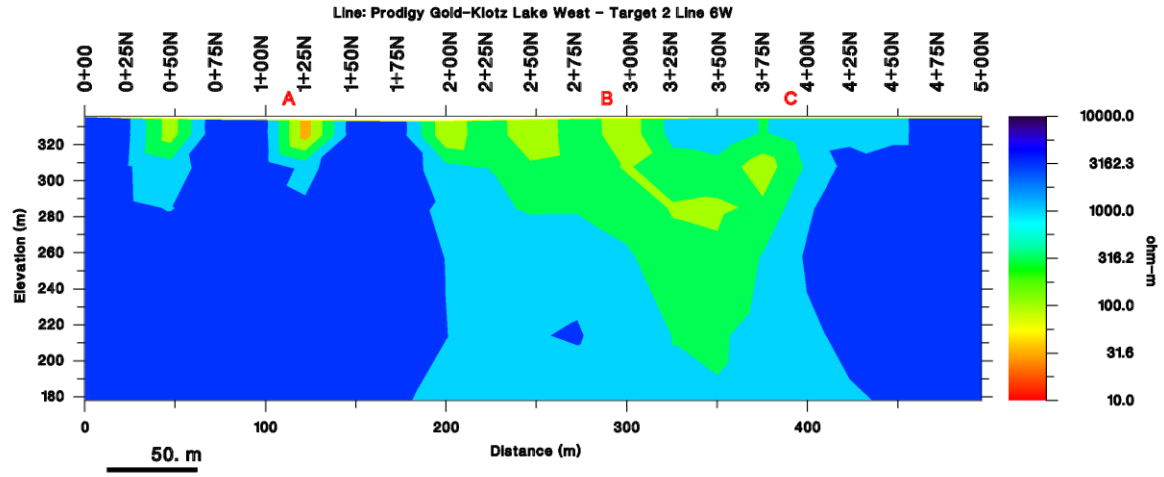
Grid 2 NAA Figure 4 Line 7W Model 2000 Ohm with Fraser Picks



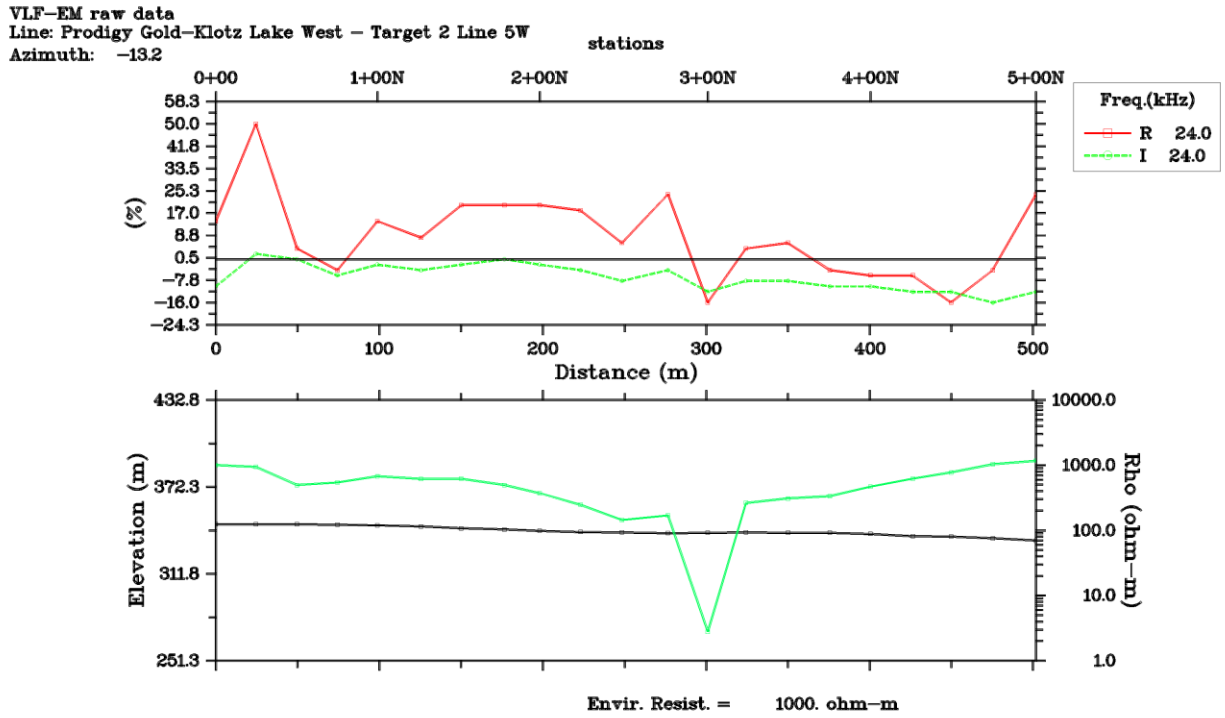
Grid 2 NAA Figure 5 Line 6W Raw Data Profile



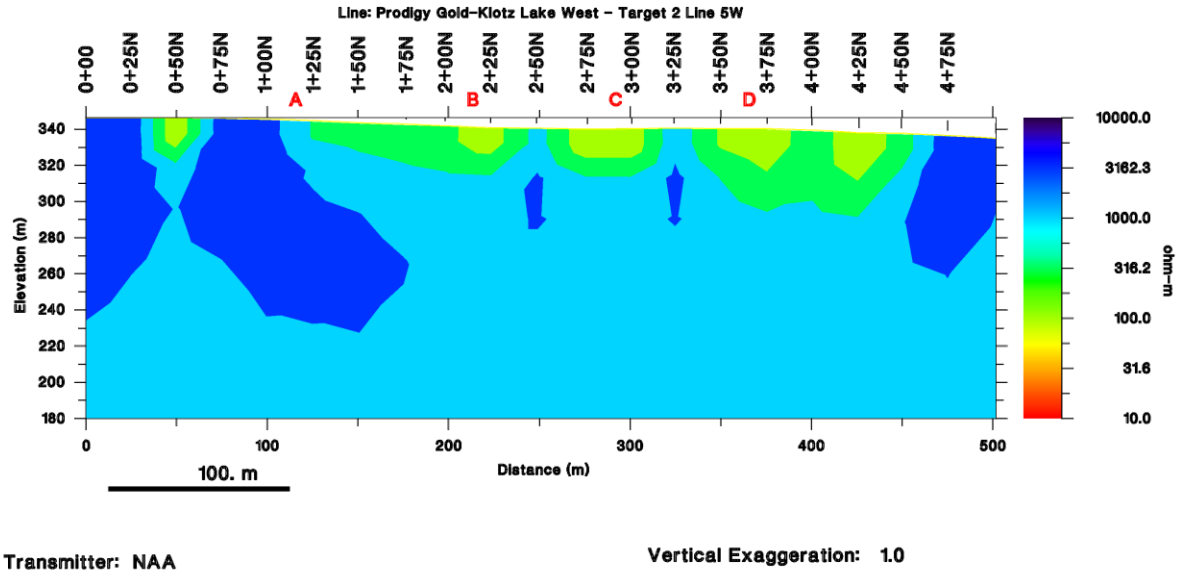
Grid 2 NAA Figure 6 Line 6W Model 2000 Ohm with Fraser Picks



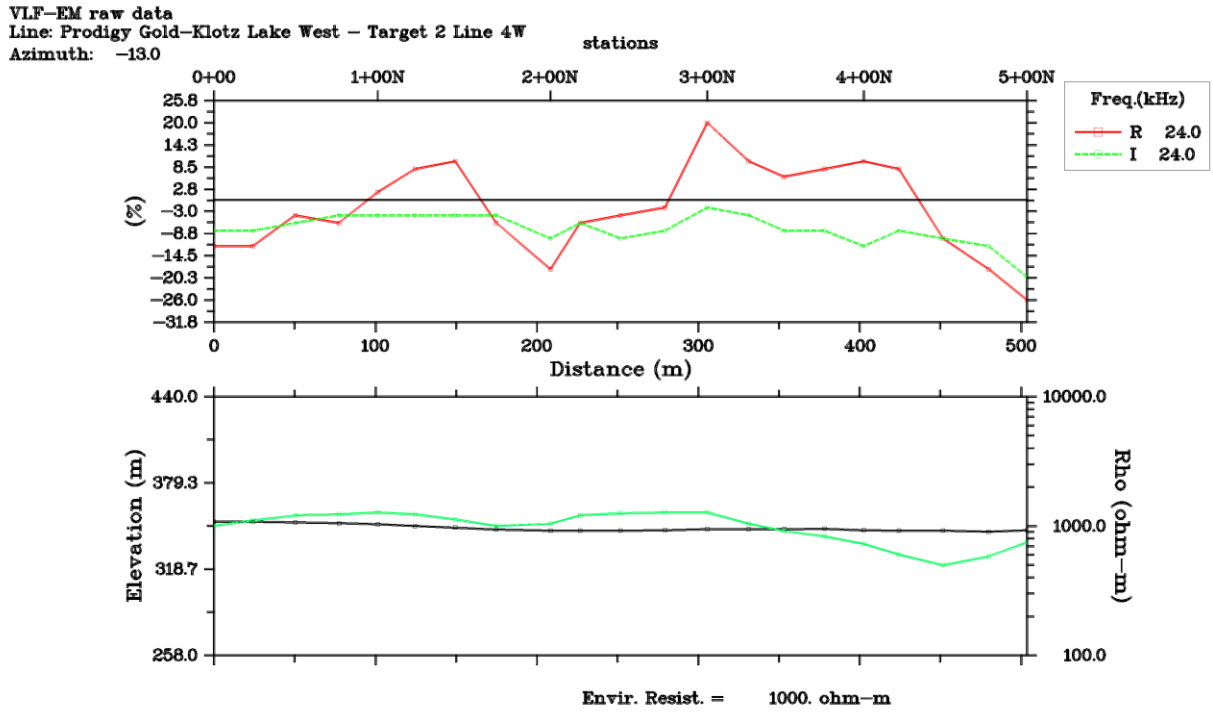
Grid 2 NAA Figure 7 Line 5W Raw Data Profile



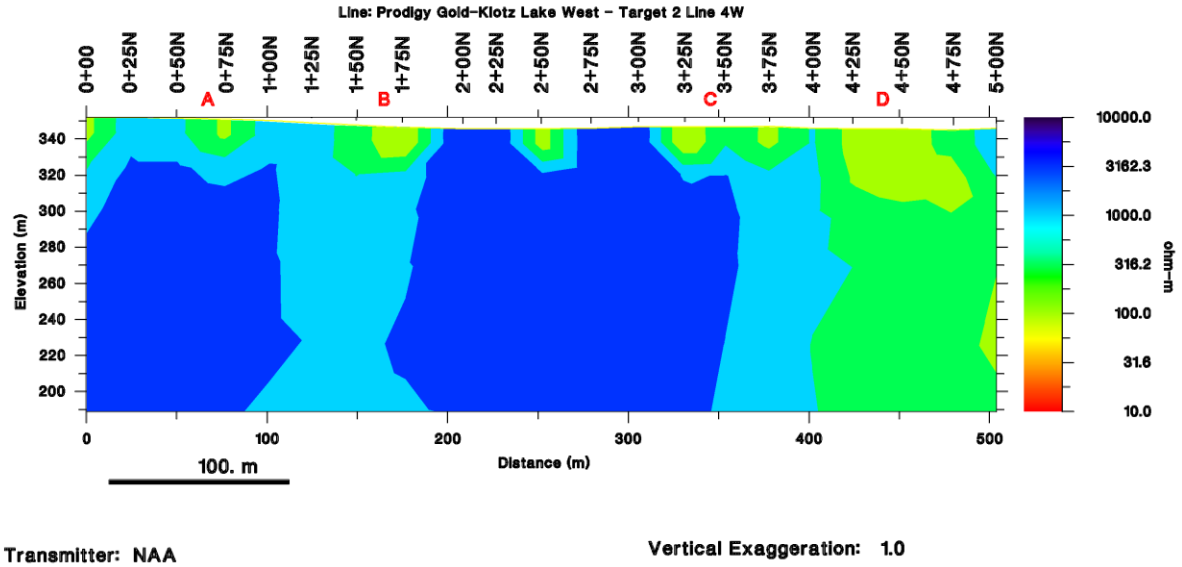
Grid 2 NAA Figure 8 Line 5W Model 2000 Ohm with Fraser Picks



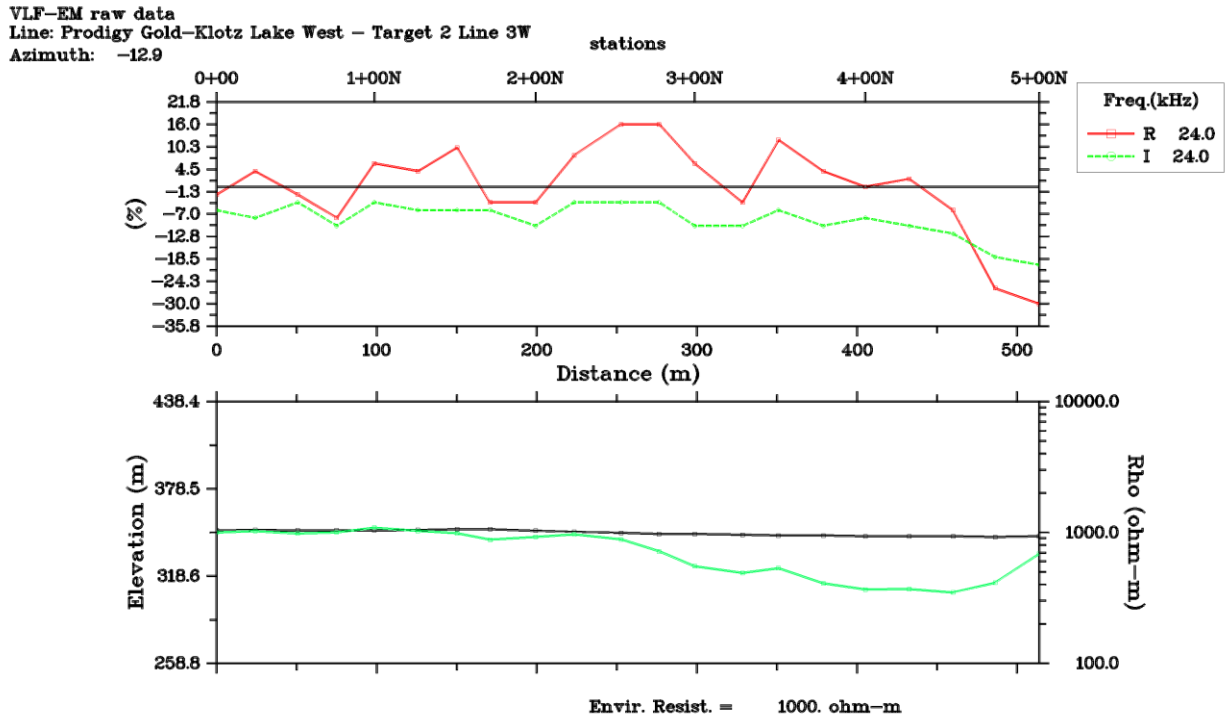
Grid 2 NAA Figure 9 Line 4W Raw Data Profile



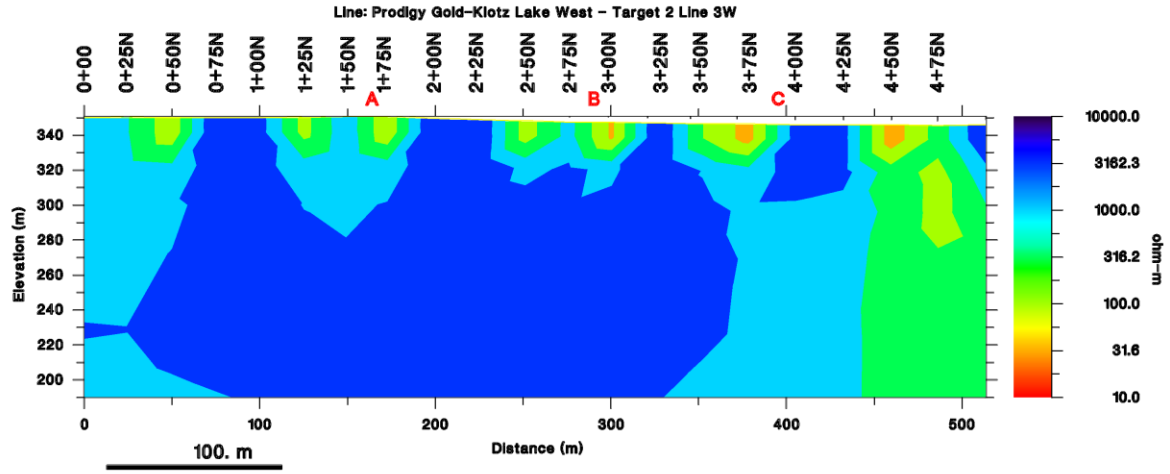
Grid 2 NAA Figure 10 Line 4W Model 2000 Ohm with Fraser Picks



Grid 2 NAA Figure 11 Line 3W Raw Data Profile



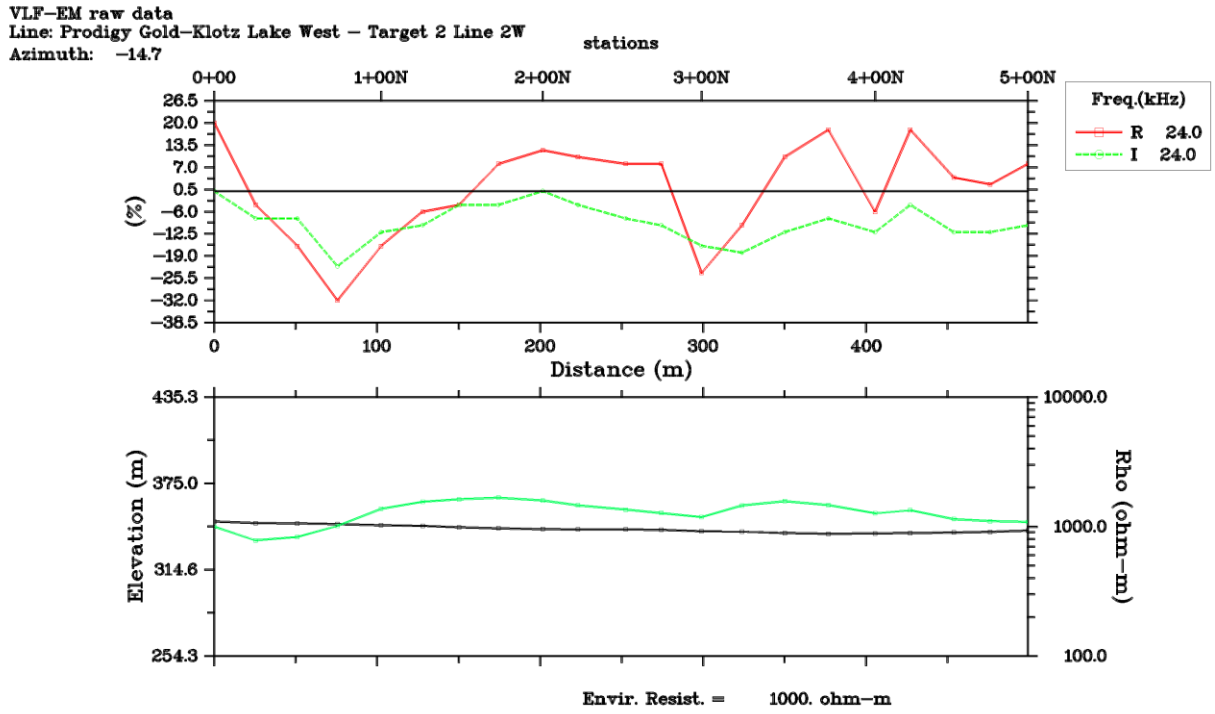
Grid 2 NAA Figure 12 Line 3W Model 2000 Ohm with Fraser Picks



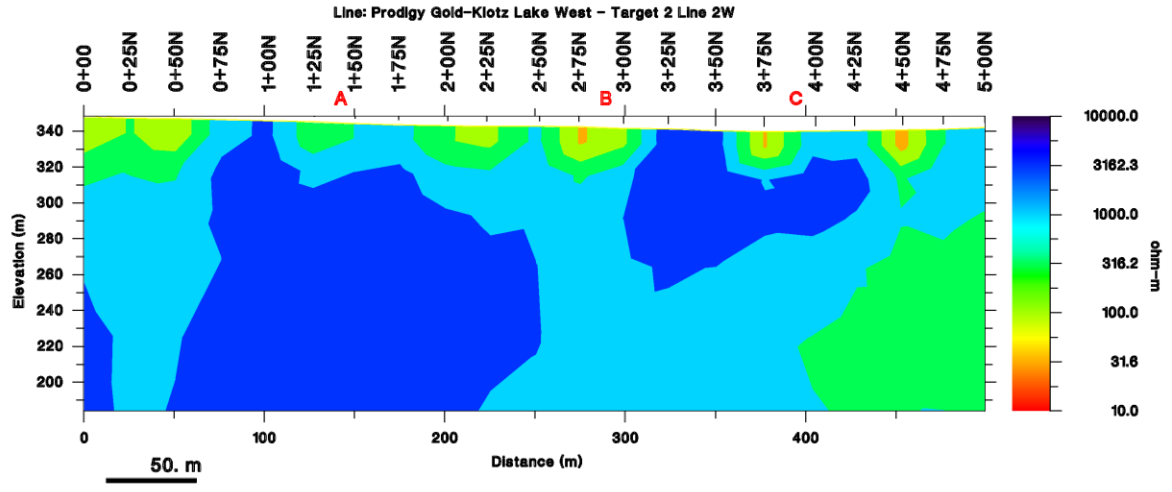
Transmitter: NAA

Vertical Exaggeration: 1.0

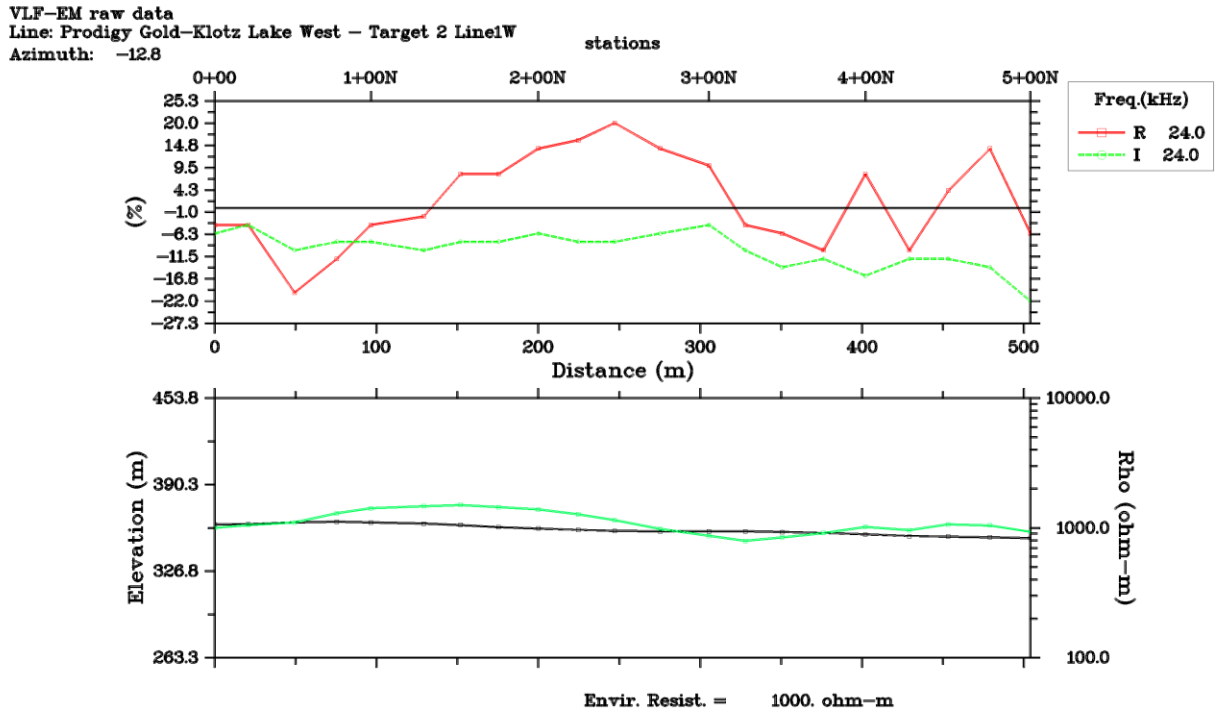
Grid 2 NAA Figure 13 Line 2W Raw Data Profile



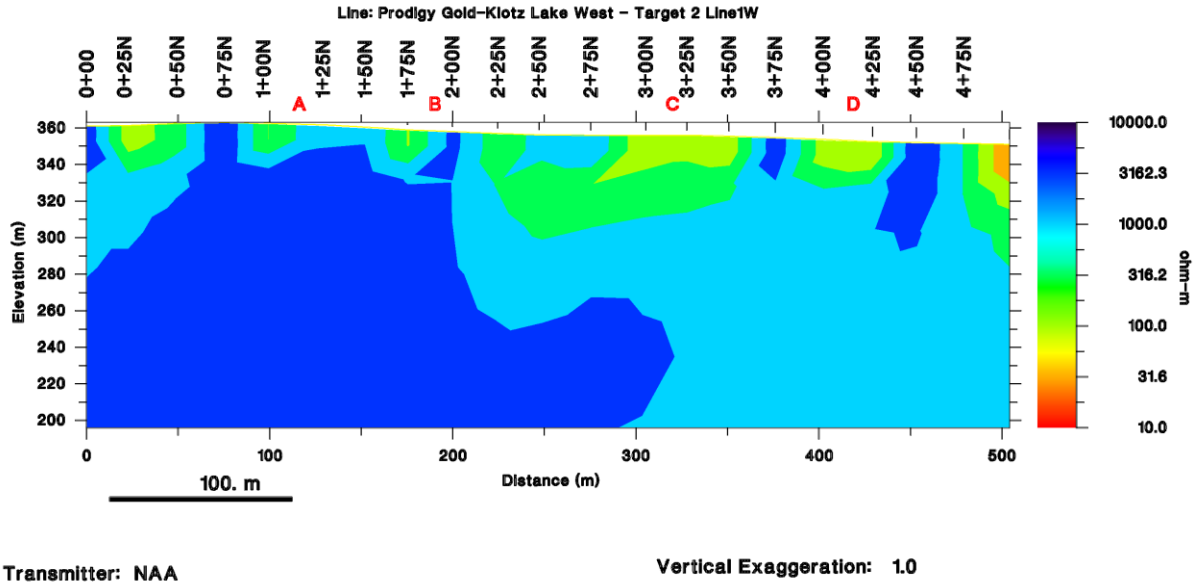
Grid 2 NAA Figure 14 Line 2W Model 2000 Ohm with Fraser Picks



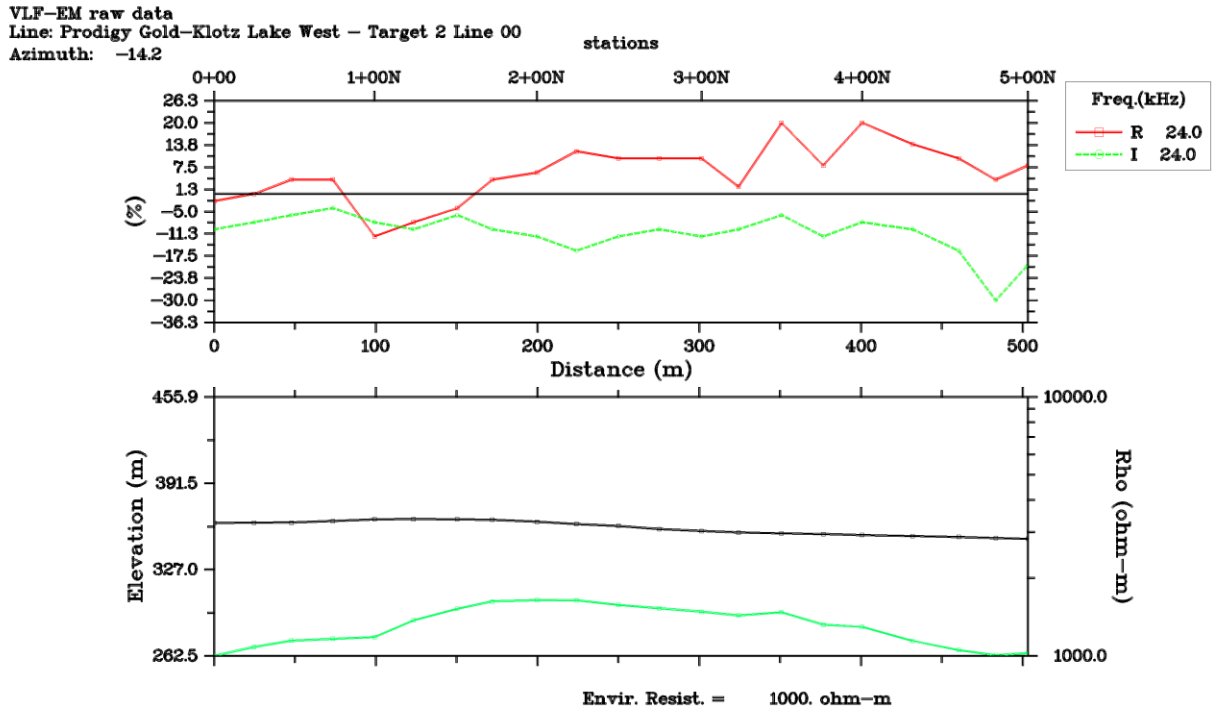
Grid 2 NAA Figure 15 Line 1W Raw Data Profile



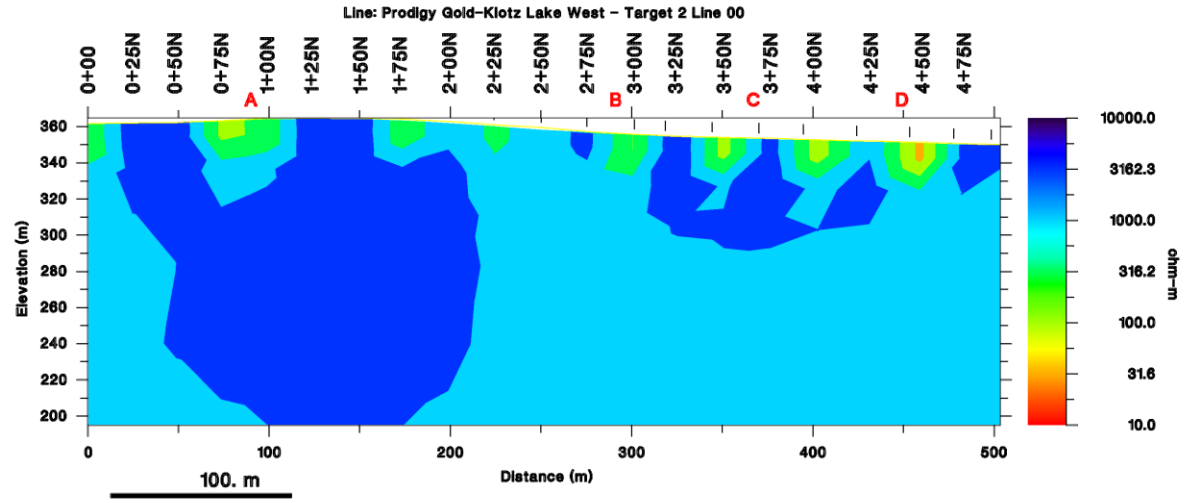
Grid 2 NAA Figure 16 Line 1W Model 2000 Ohm with Fraser Picks



Grid 2 NAA Figure 17 Line 00 Raw Data Profile



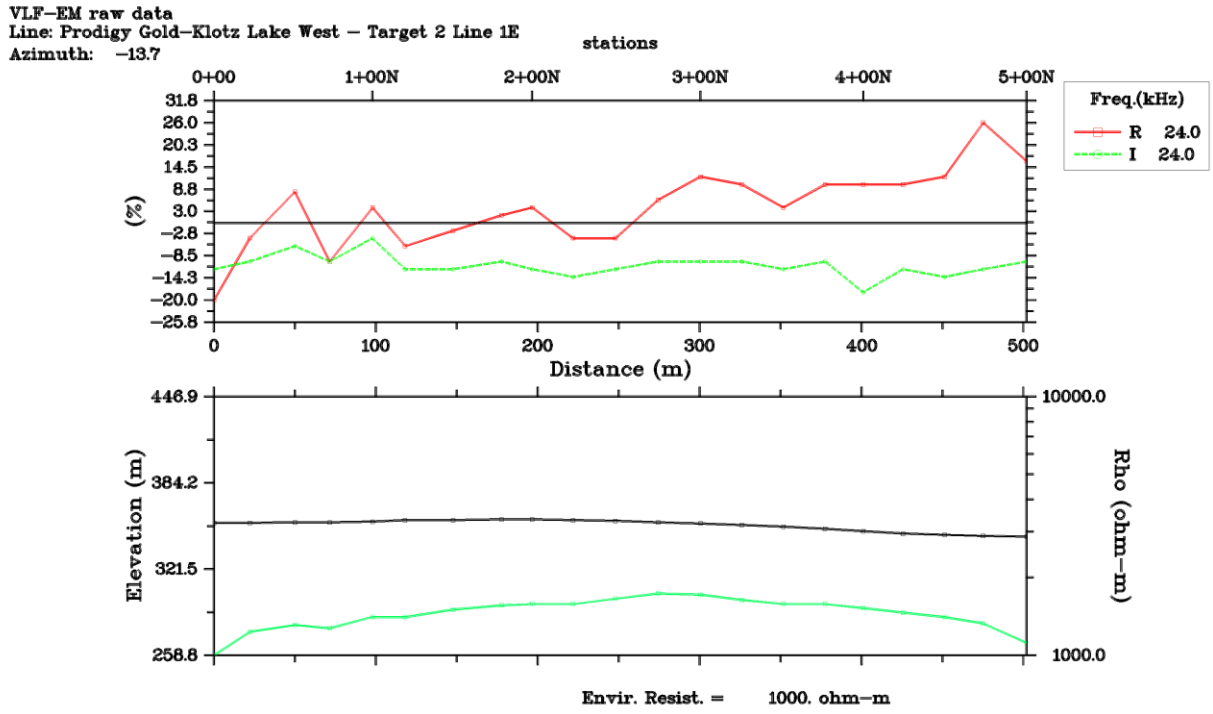
Grid 2 NAA Figure 18 Line 00 Model 2000 Ohm with Fraser Picks



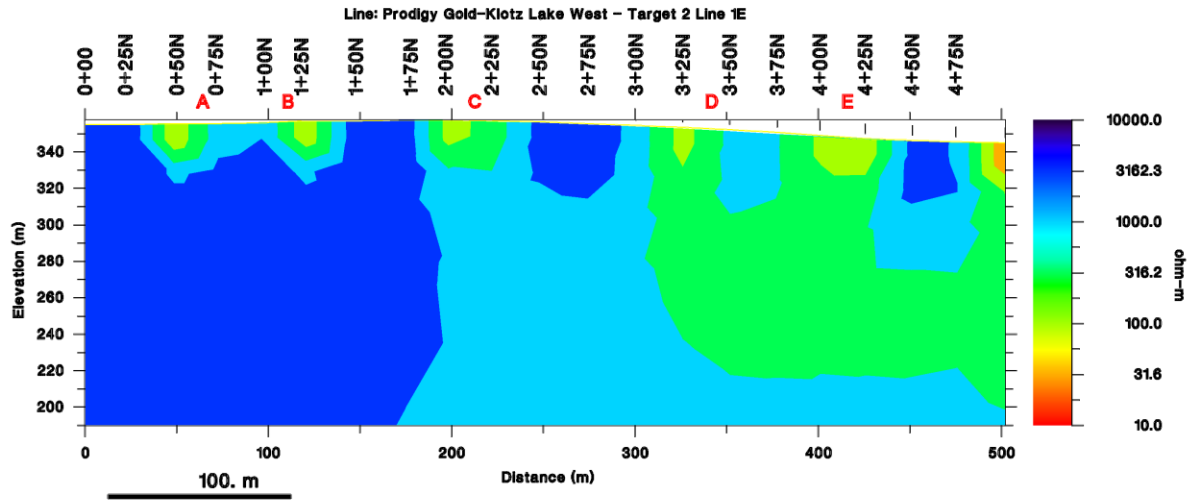
Transmitter: NAA

Vertical Exaggeration: 1.0

Grid 2 NAA Figure 19 Line 1E Raw Data Profile



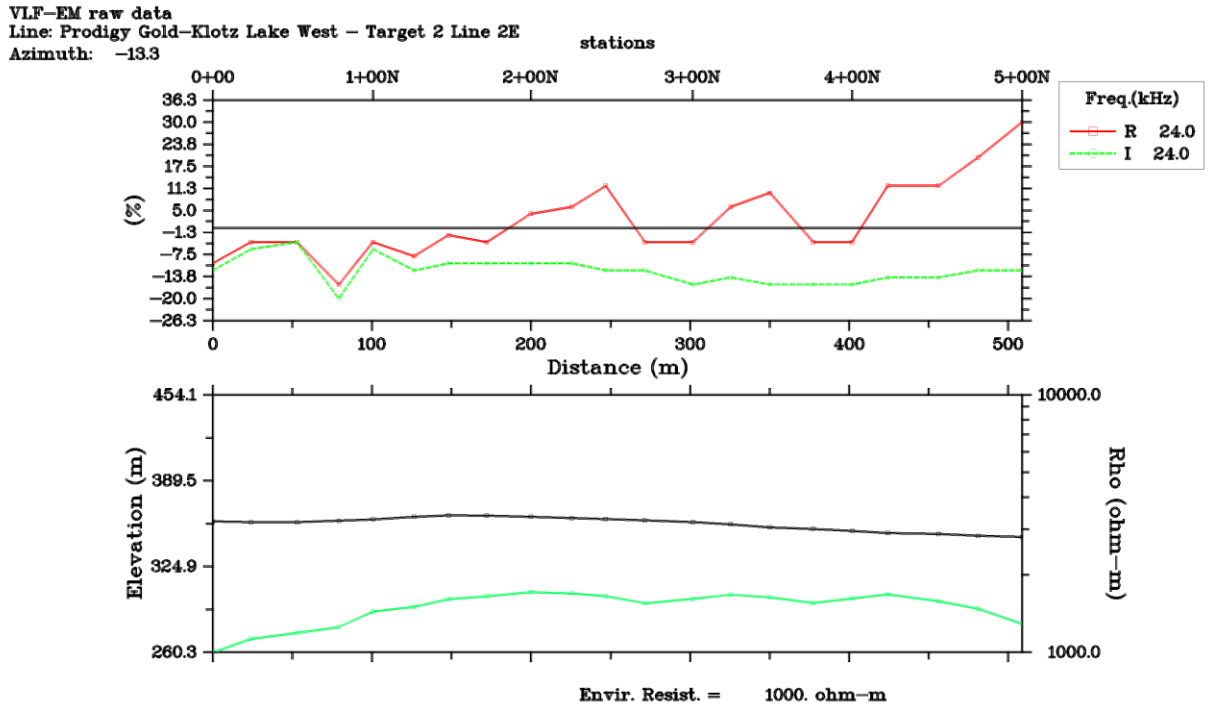
Grid 2 NAA Figure 20 Line 1E Model 2000 Ohm with Fraser Picks



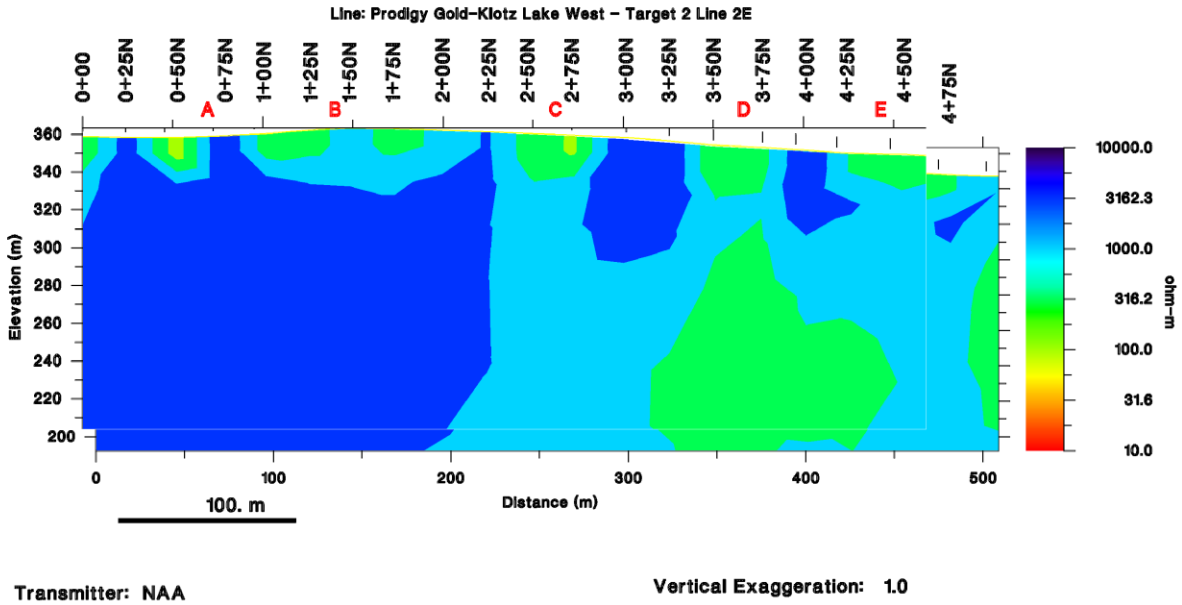
Transmitter: NAA

Vertical Exaggeration: 1.0

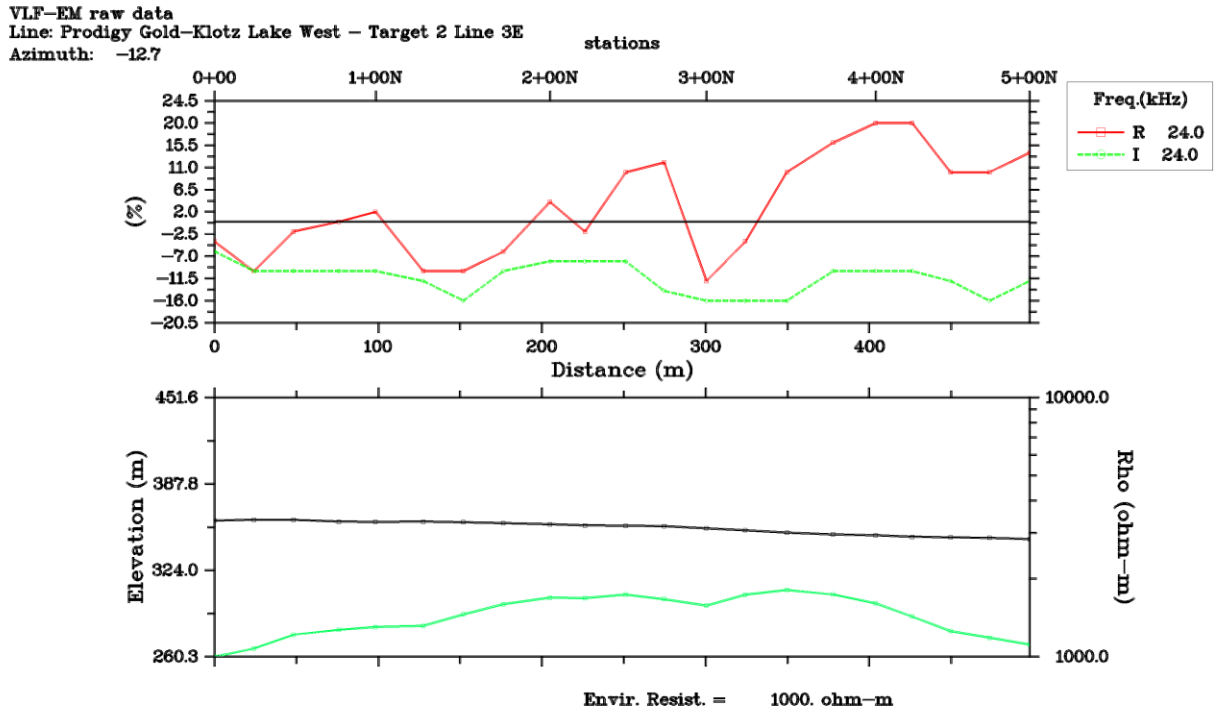
Grid 2 NAA Figure 21 Line 2E Raw Data Profile



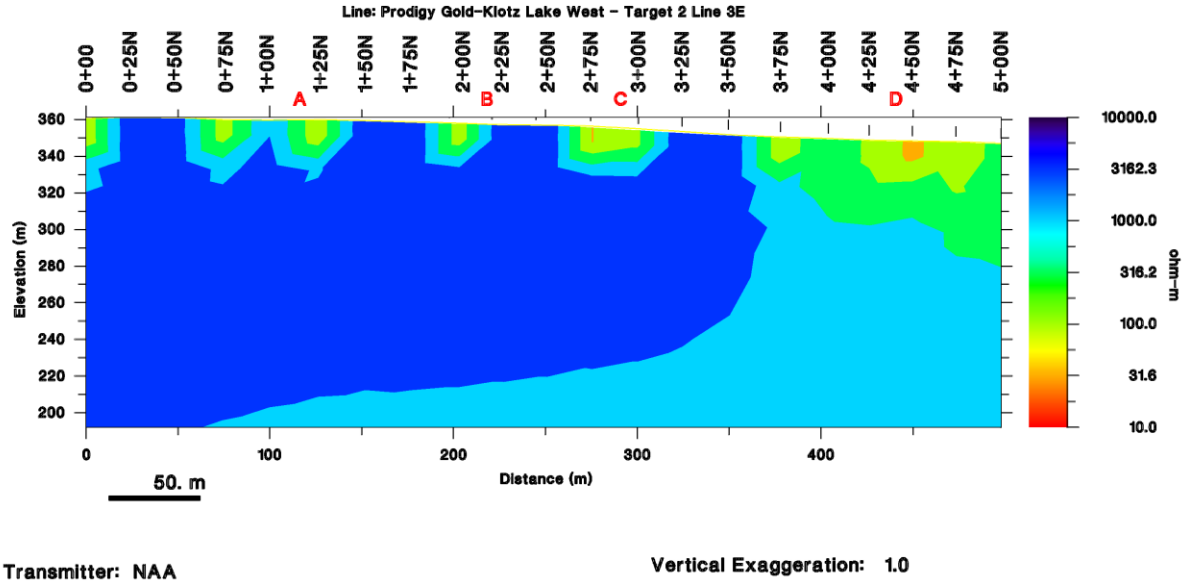
Grid 2 NAA Figure 22 Line 2E Model 2000 Ohm with Fraser Picks



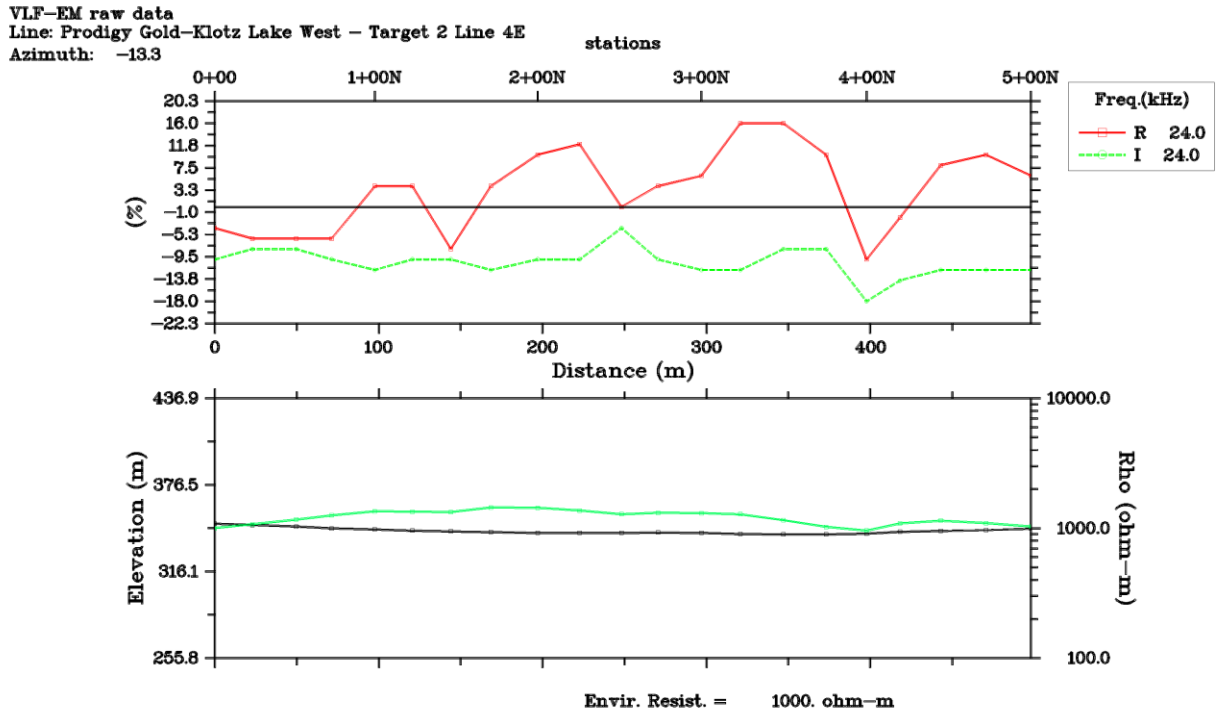
Grid 2 NAA Figure 23 Line 3E Raw Data Profile



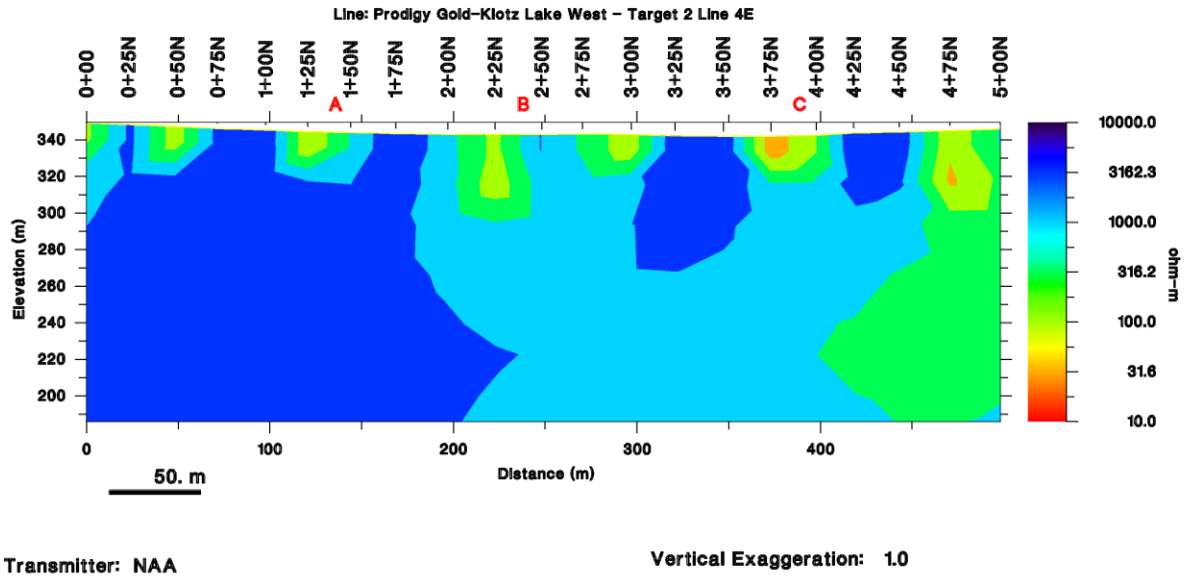
Grid 2 NAA Figure 24 Line 3E Model 2000 Ohm with Fraser Picks



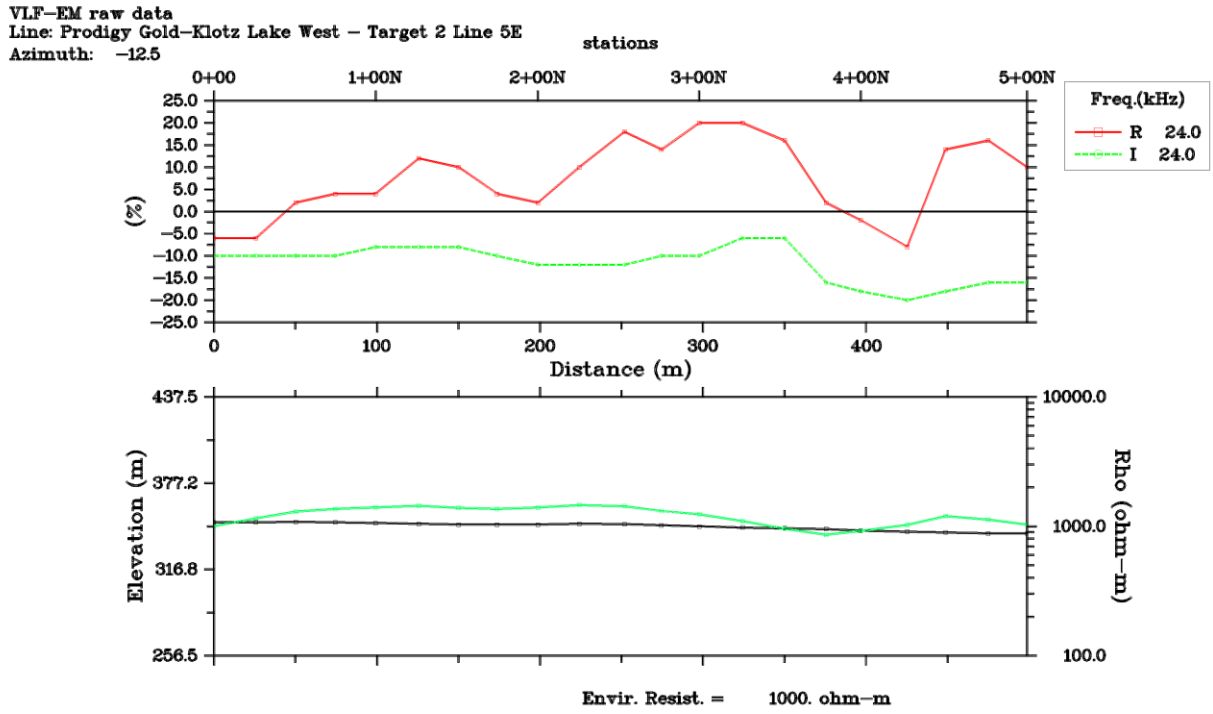
Grid 2 NAA Figure 25 Line 4E Raw Data Profile



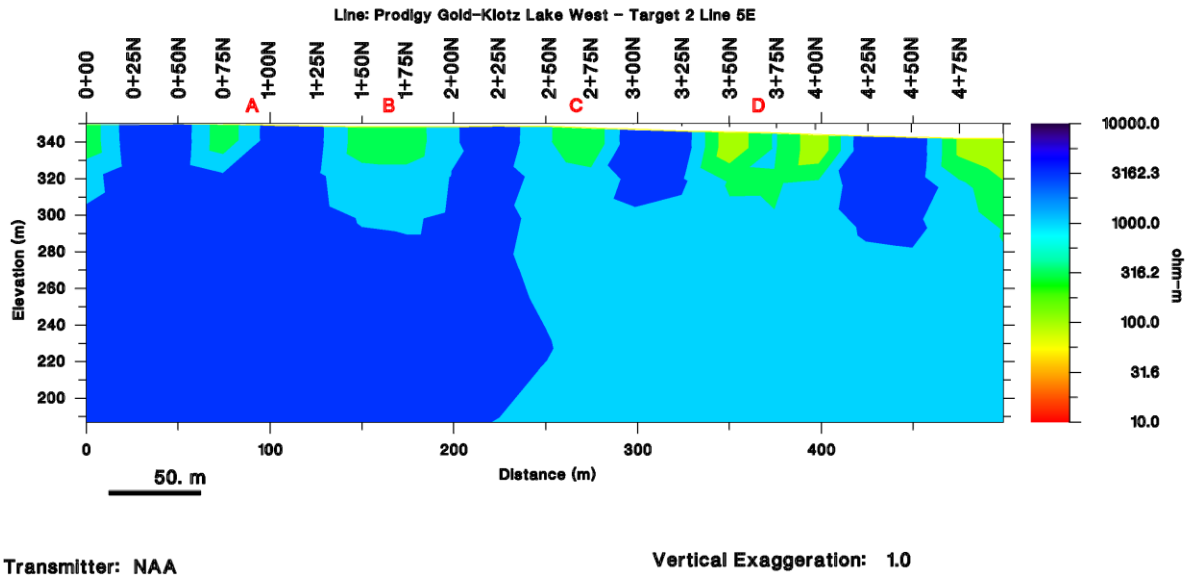
Grid 2 NAA Figure 26 Line 4E Model 2000 Ohm with Fraser Picks



Grid 2 NAA Figure 27 Line 5E Raw Data Profile



Grid 2 NAA Figure 28 Line 5E Model 2000 Ohm with Fraser Picks

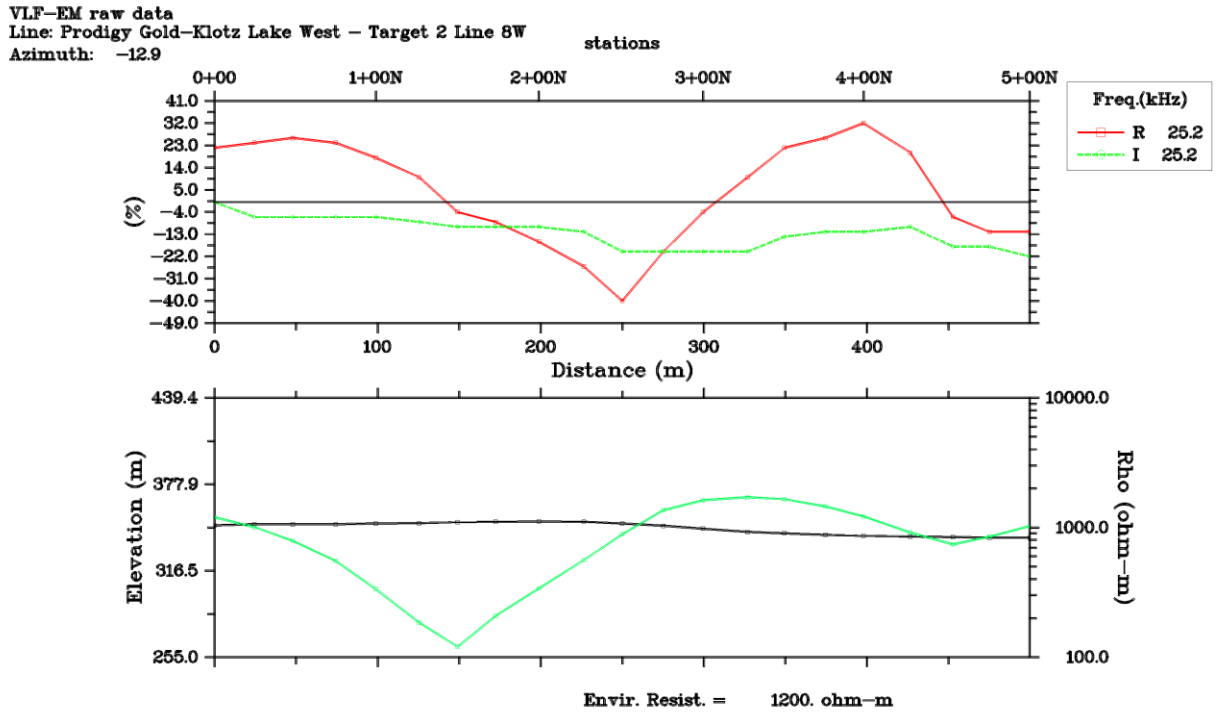


APPENDIX B-2

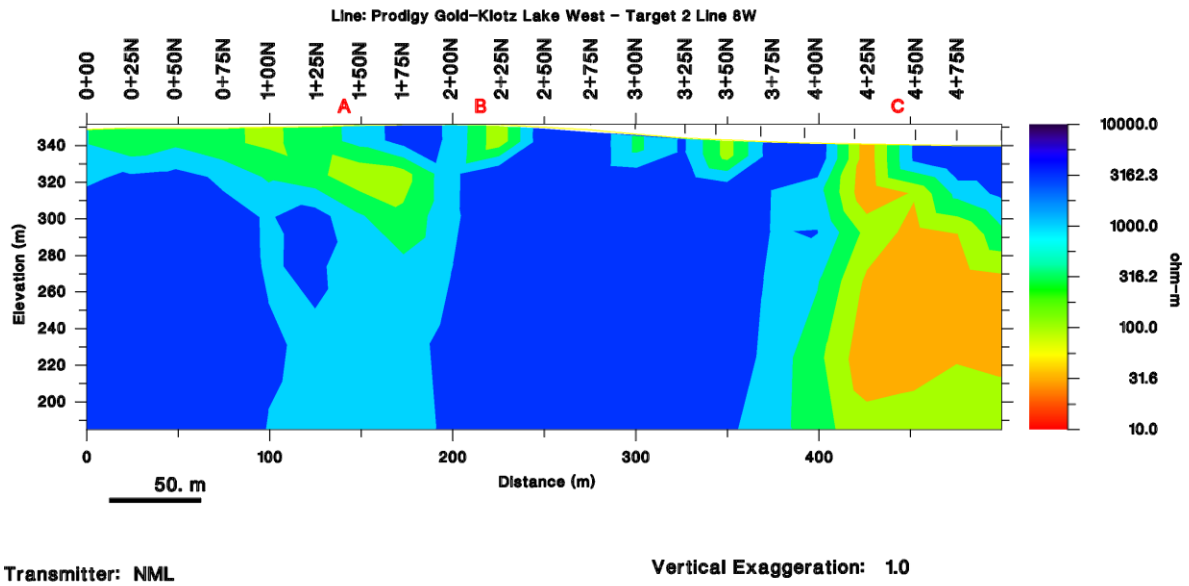
Grid 2/Target 2

NML Figures

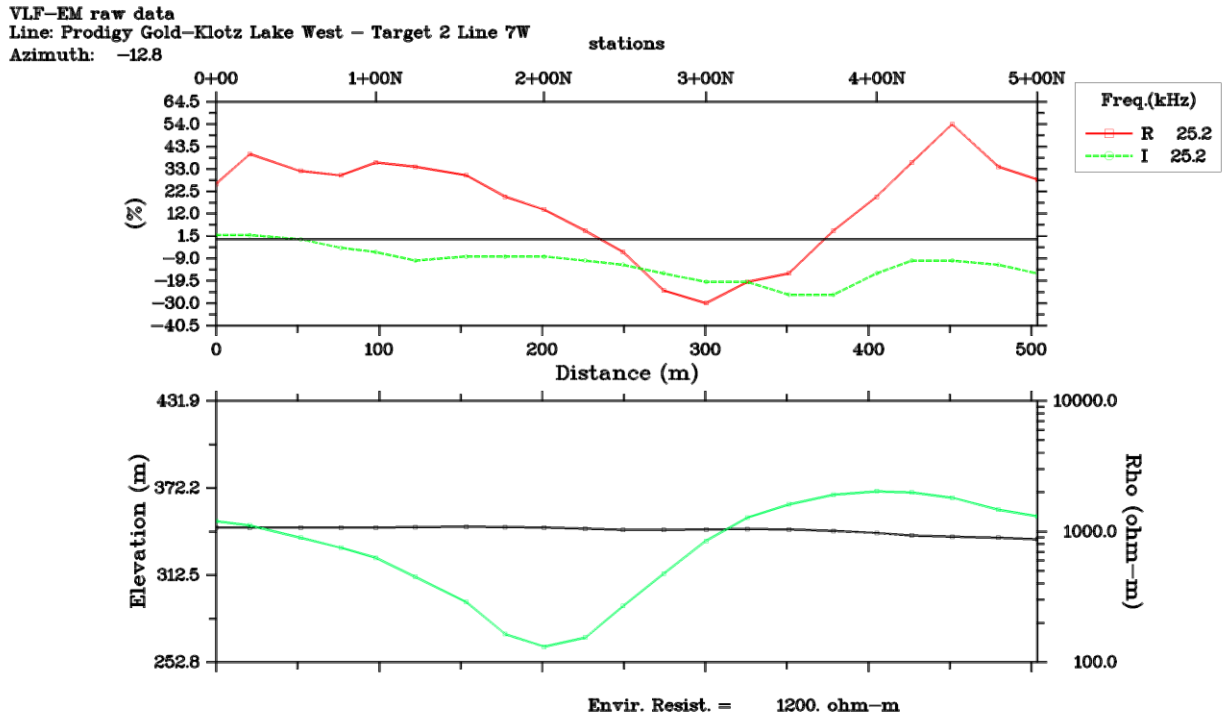
Grid 2 NML Figure 1 Line 8W Raw Data Profile



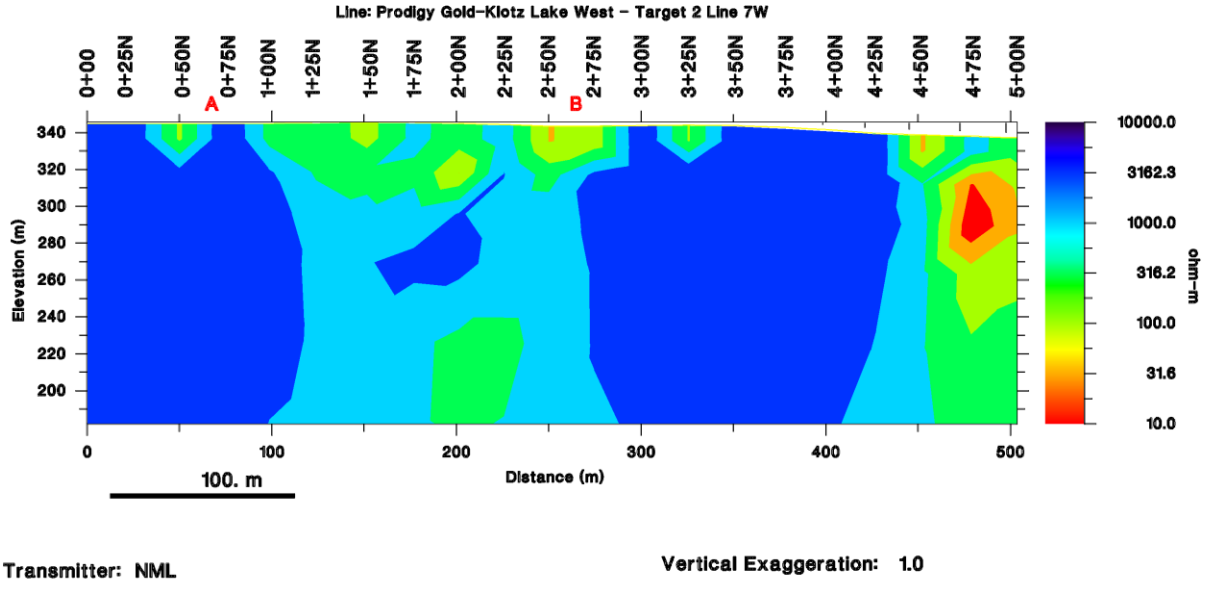
Grid 2 NML Figure 2 Line 8W Model 2000 Ohm with NML Fraser Picks



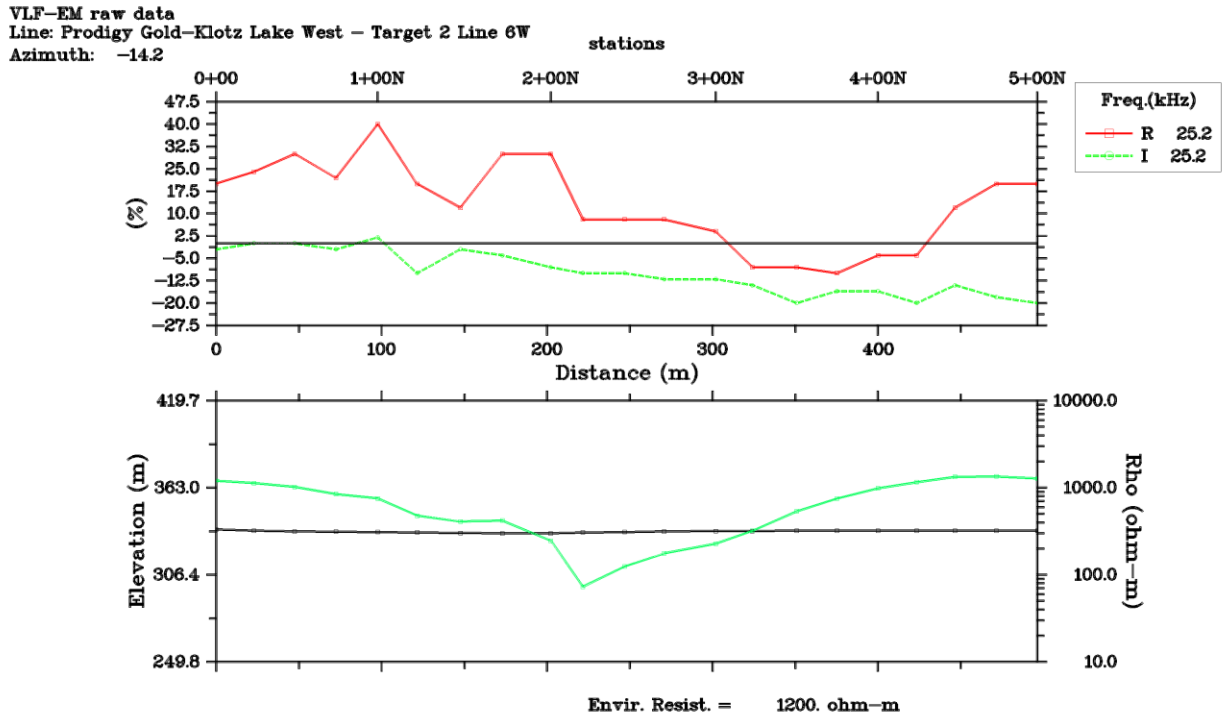
Grid 2 NML Figure 3 Line 7W Raw Data Profile



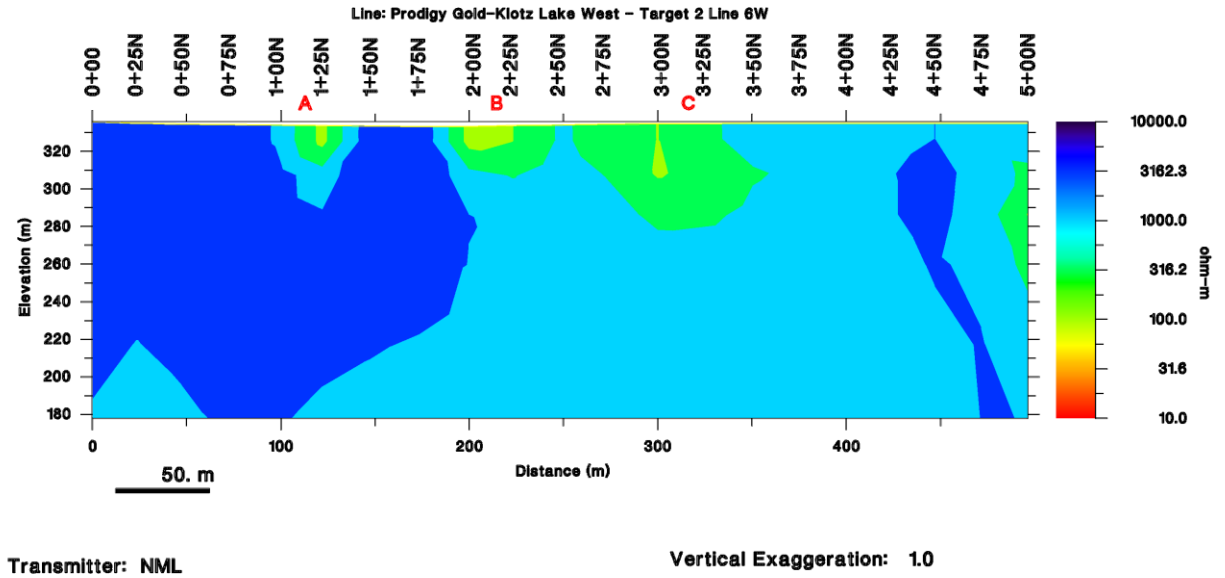
Grid 2 NML Figure 4 Line 7W Model 2000 Ohm with Fraser Picks



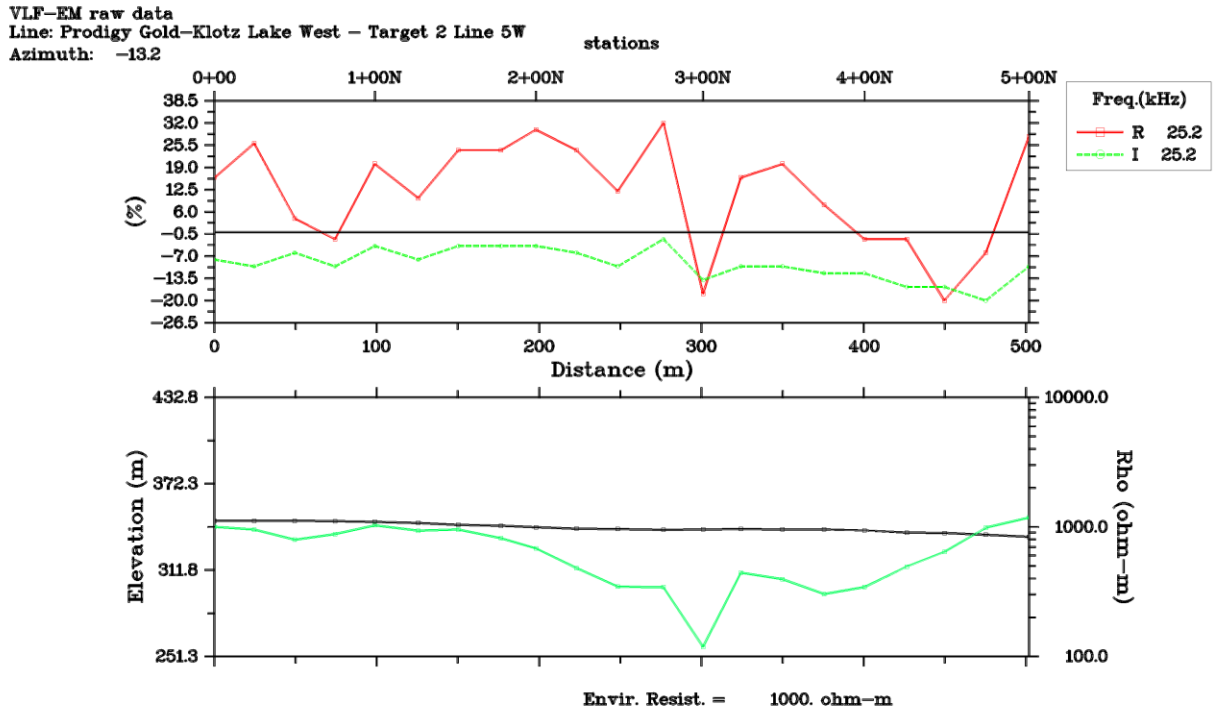
Grid 2 NML Figure 5 Line 6W Raw Data Profile



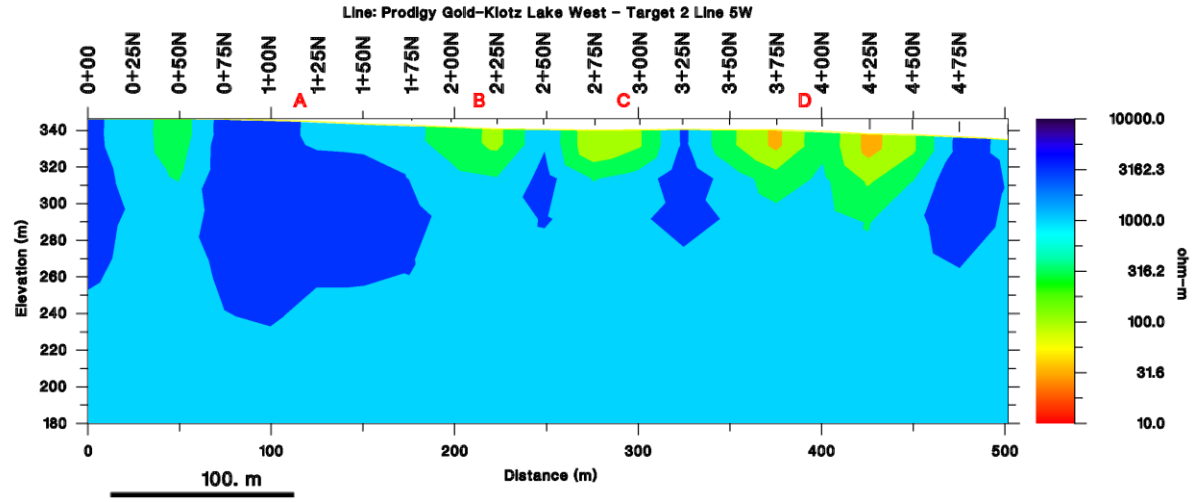
Grid 2 NML Figure 6 Line 6W Model 2000 Ohm with Fraser Picks



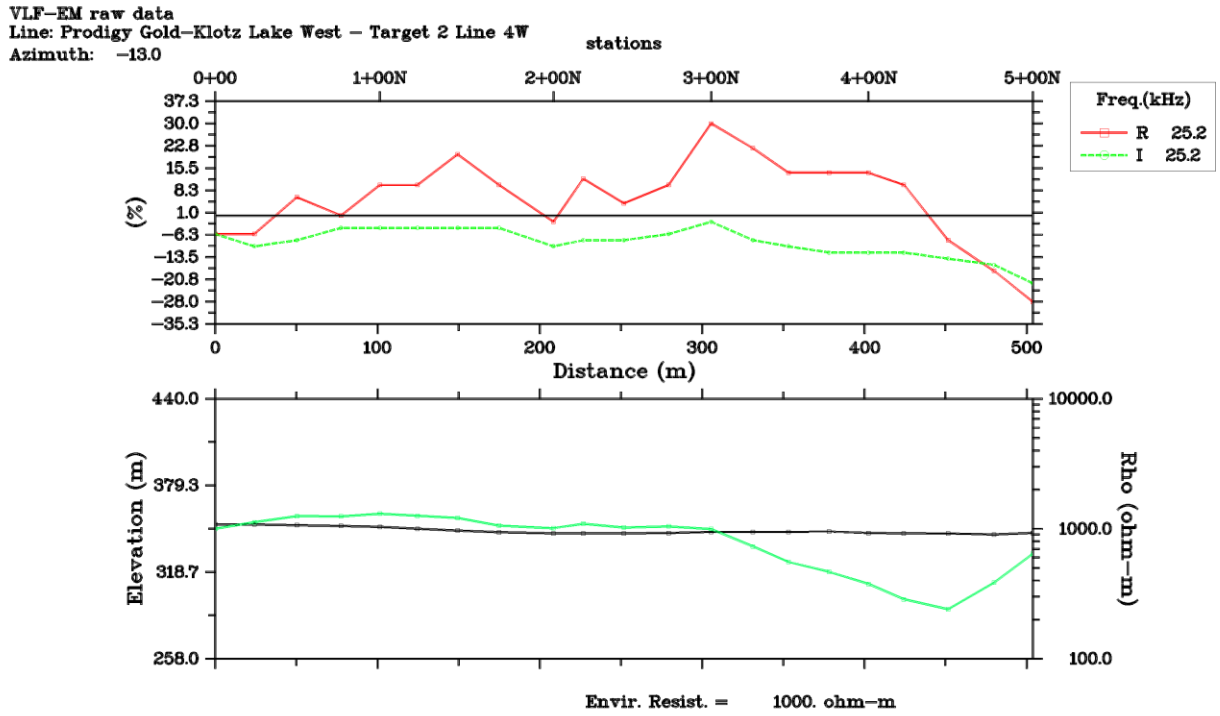
Grid 2 NML Figure 7 Line 5W Raw Data Profile



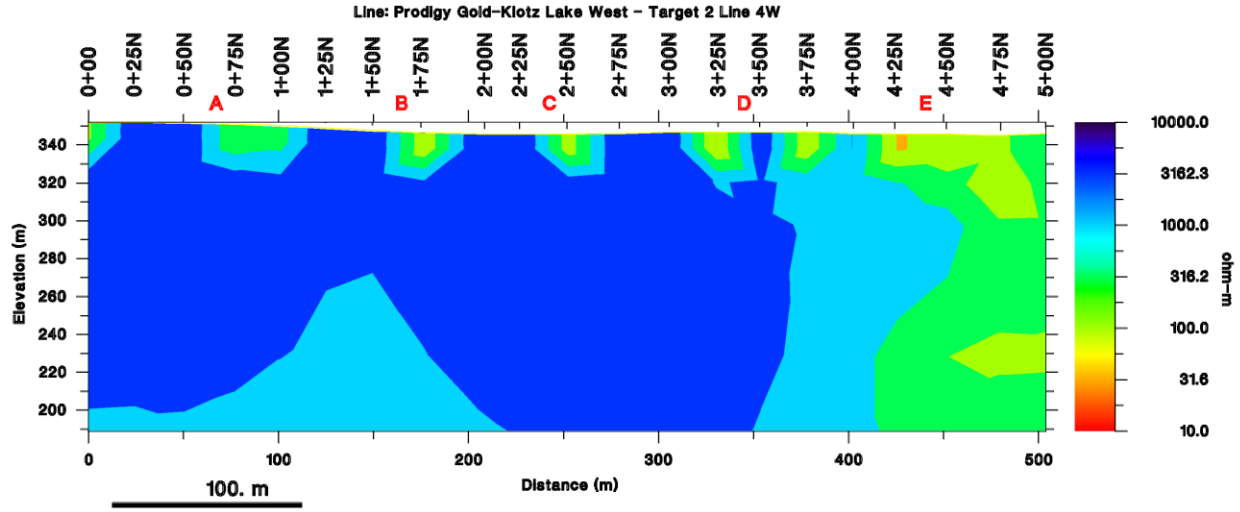
Grid 2 NML Figure 8 Line 5W Model 2000 Ohm with Fraser Picks



Grid 2 NML Figure 9 Line 4W Raw Data Profile



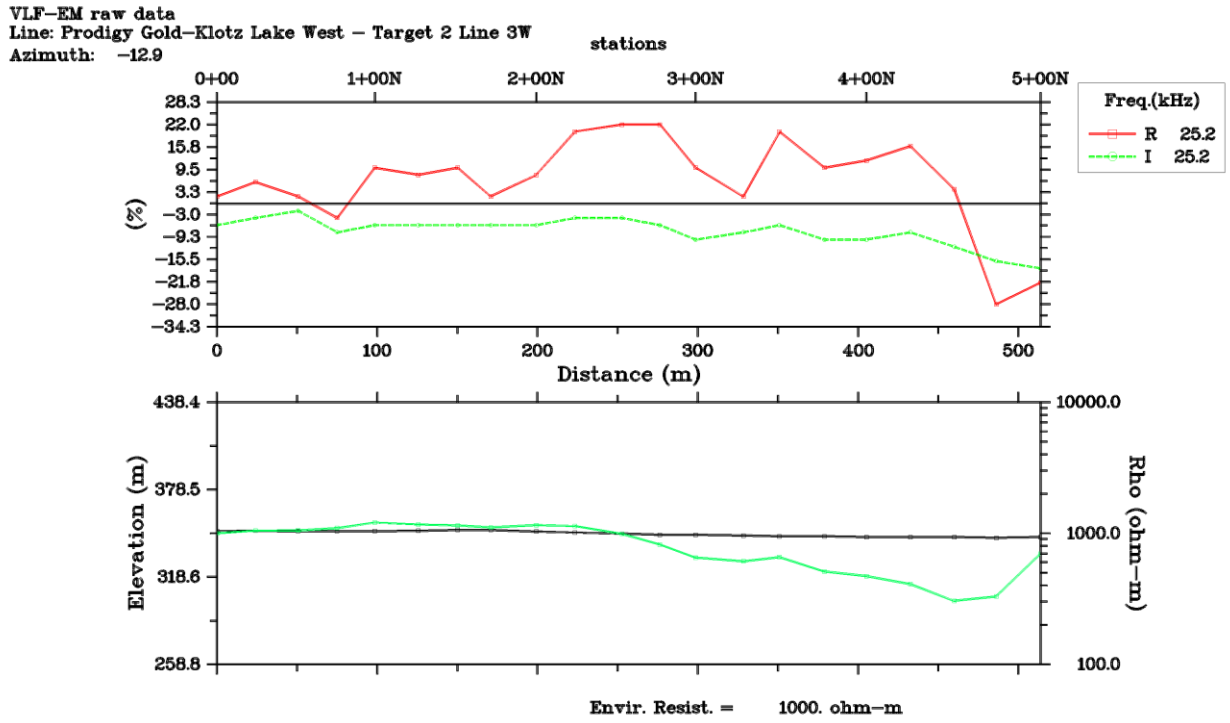
Grid 2 NML Figure 10 Line 4W Model 2000 Ohm with Fraser Picks



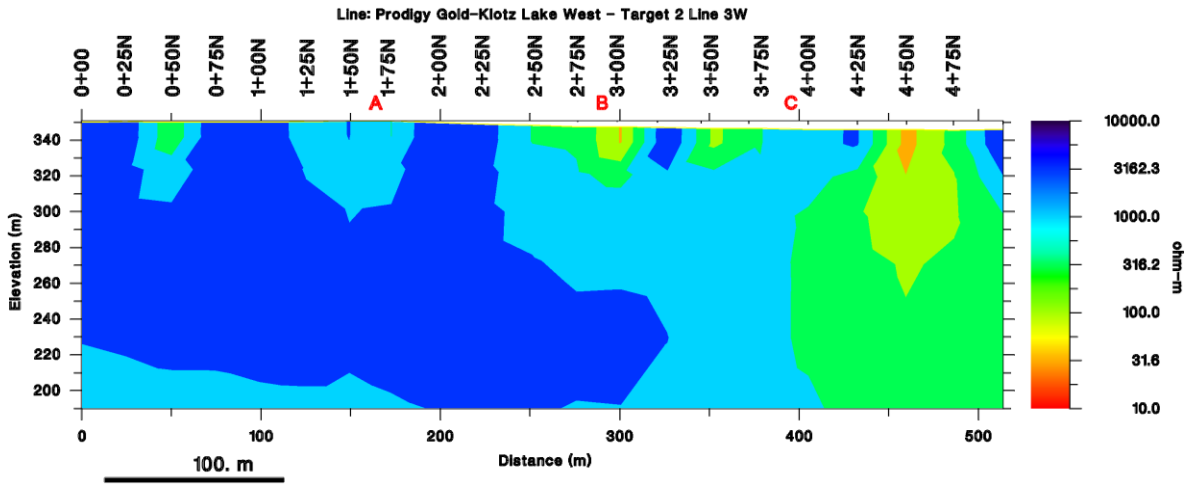
Transmitter: NML

Vertical Exaggeration: 1.0

Grid 2 NML Figure 11 Line 3W Raw Data Profile



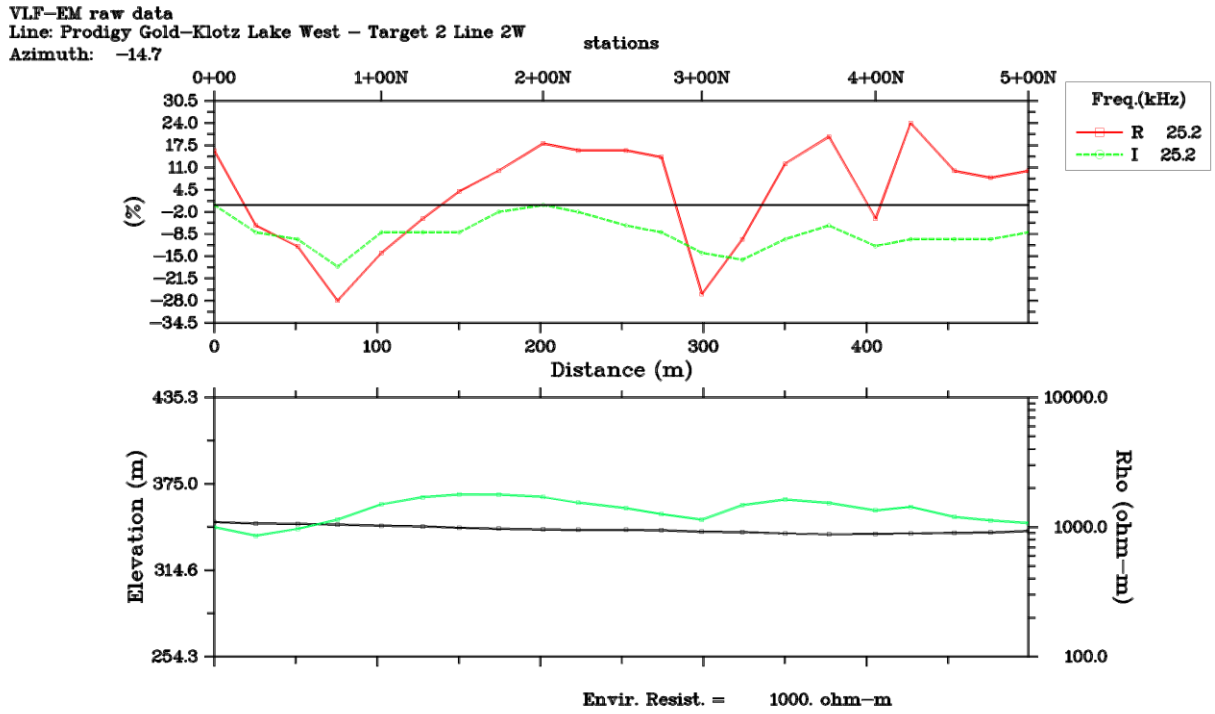
Grid 2 NML Figure 12 Line 3W Model 2000 Ohm with Fraser Picks



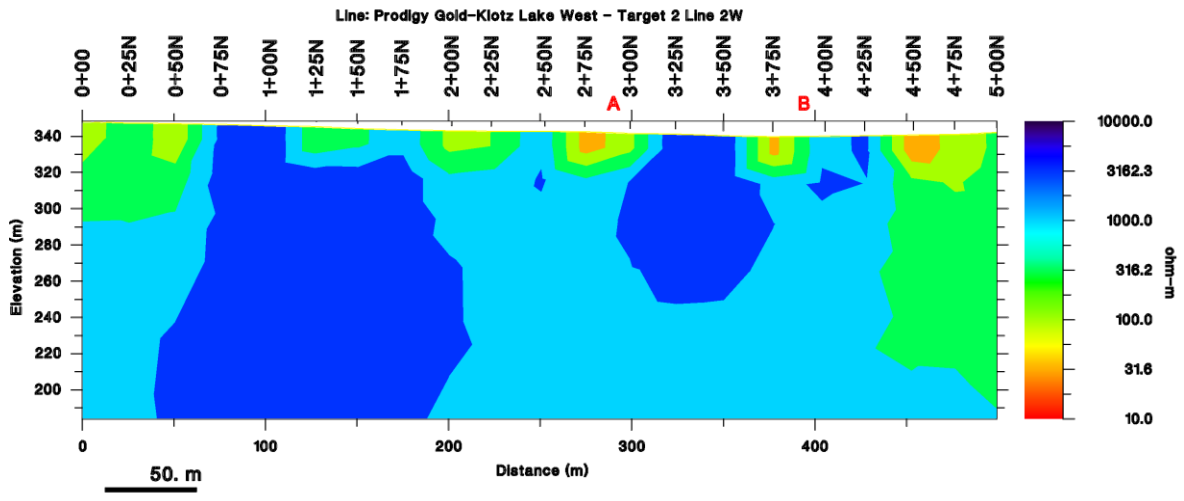
Transmitter: NML

Vertical Exaggeration: 1.0

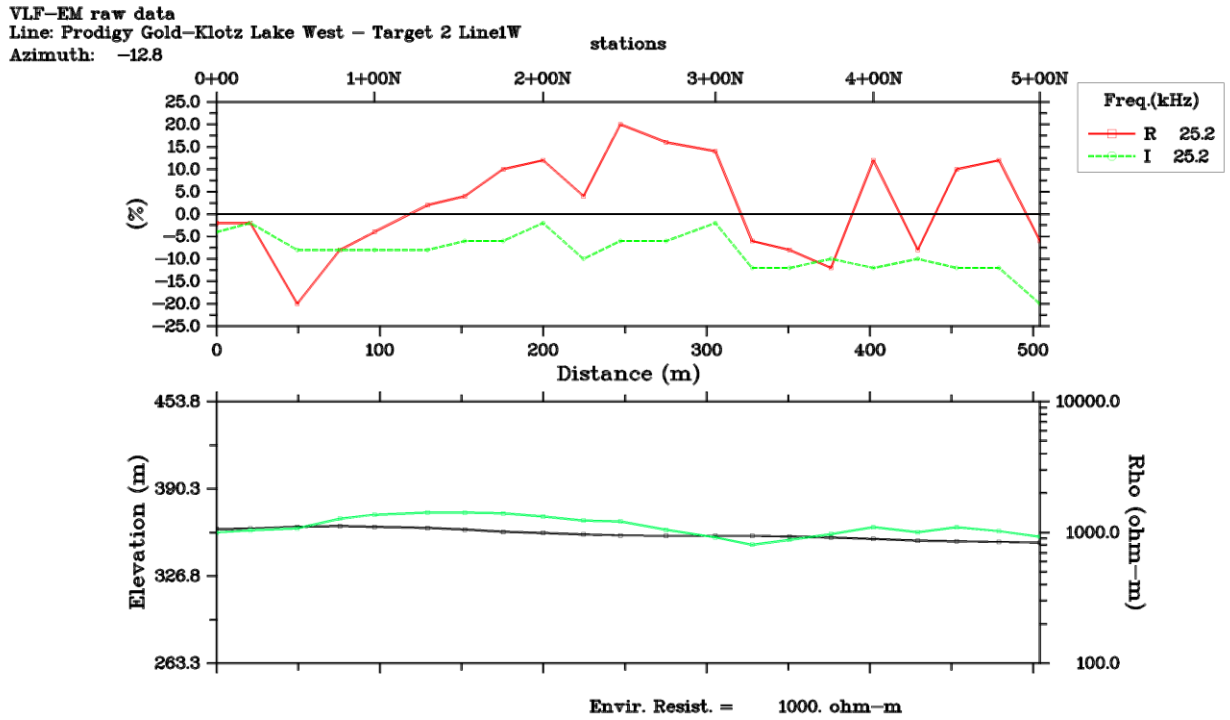
Grid 2 NML Figure 13 Line 2W Raw Data Profile



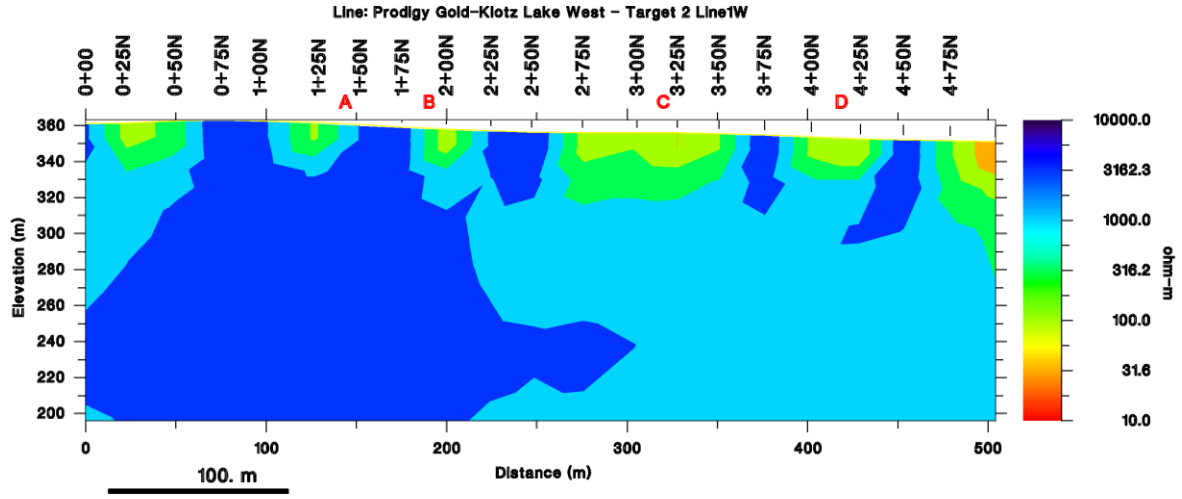
Grid 2 NML Figure 14 Line 2W Model 2000 Ohm with Fraser Picks



Grid 2 NML Figure 15 Line 1W Raw Data Profile



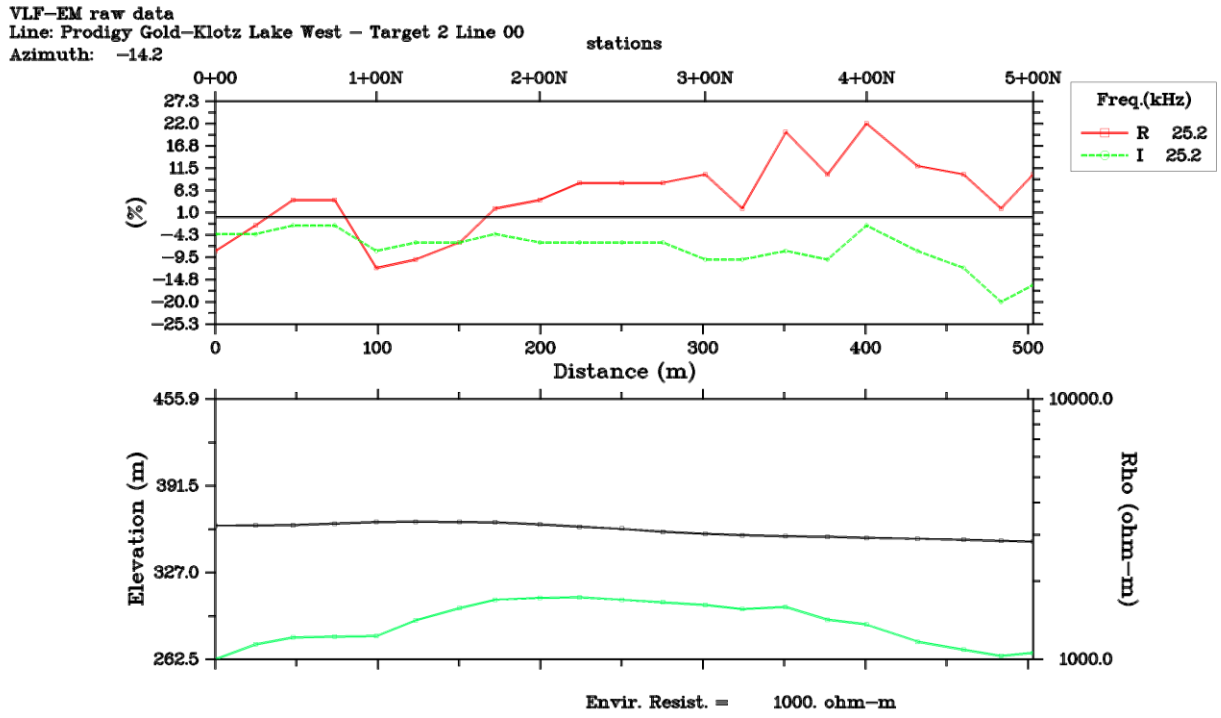
Grid 2 NML Figure 16 Line 1W Model 2000 Ohm with Fraser Picks



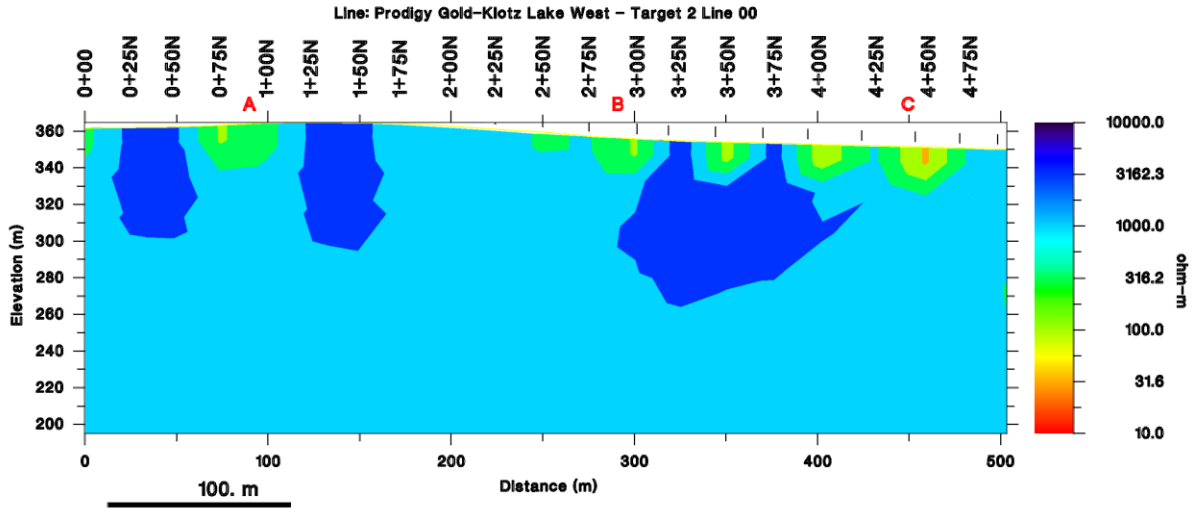
Transmitter: NML

Vertical Exaggeration: 1.0

Grid 2 NML Figure 17 Line 00 Raw Data Profile



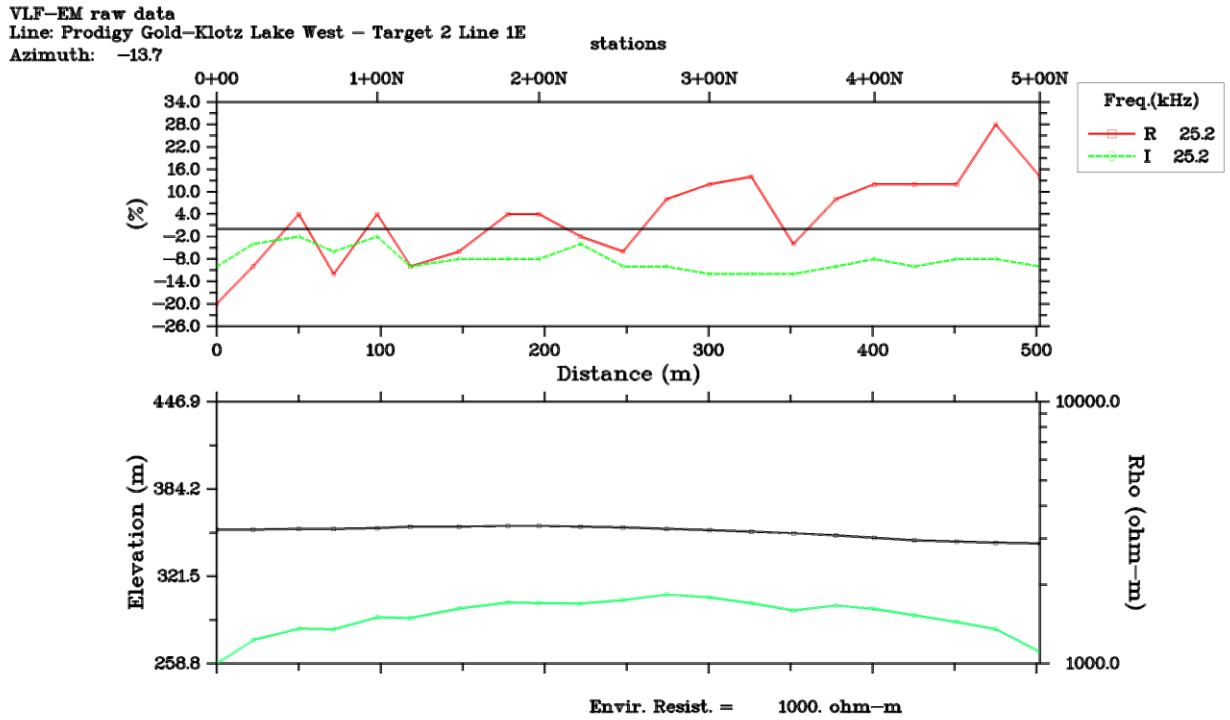
Grid 2 NML Figure 18 Line 00 Model 2000 Ohm with Fraser Picks



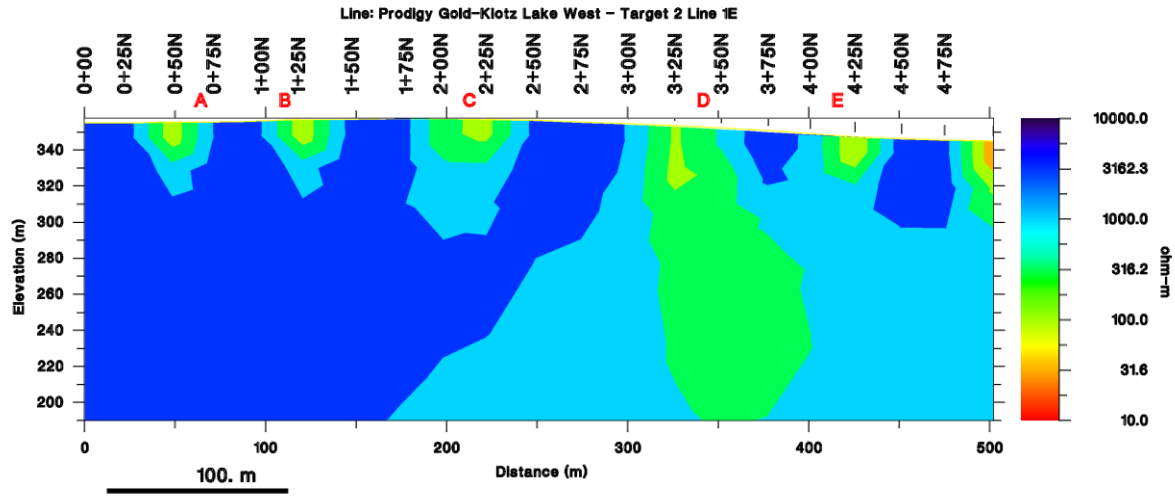
Transmitter: NML

Vertical Exaggeration: 1.0

Grid 2 NML Figure 19 Line 1E Raw Data Profile



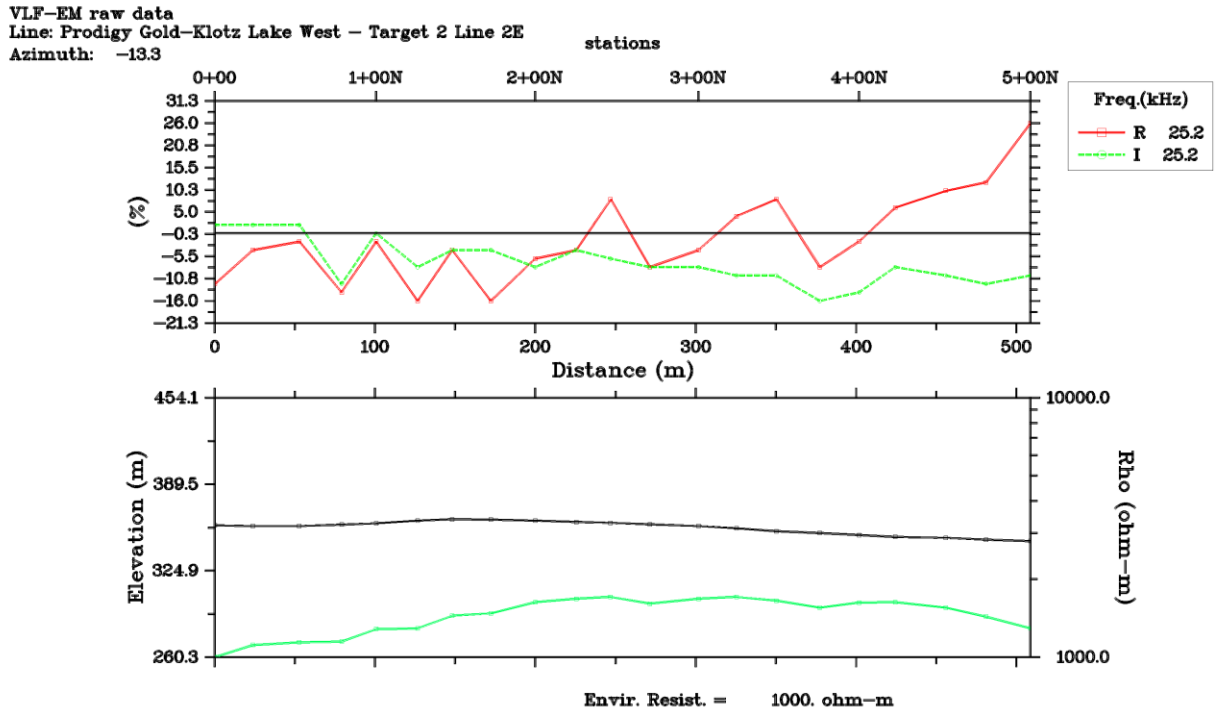
Grid 2 NML Figure 20 Line 1E Model 2000 Ohm with Fraser Picks



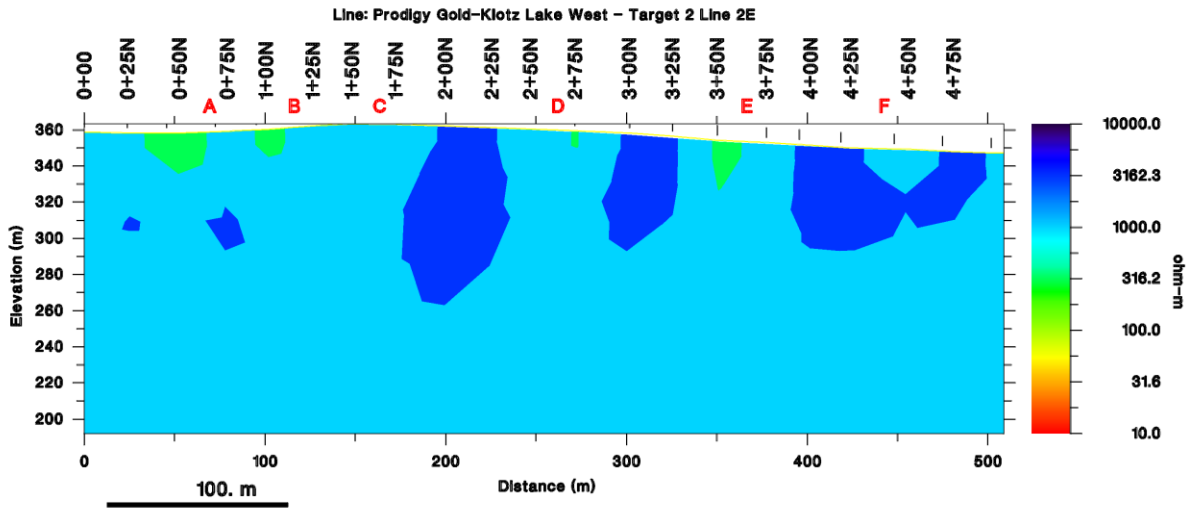
Transmitter: NML

Vertical Exaggeration: 1.0

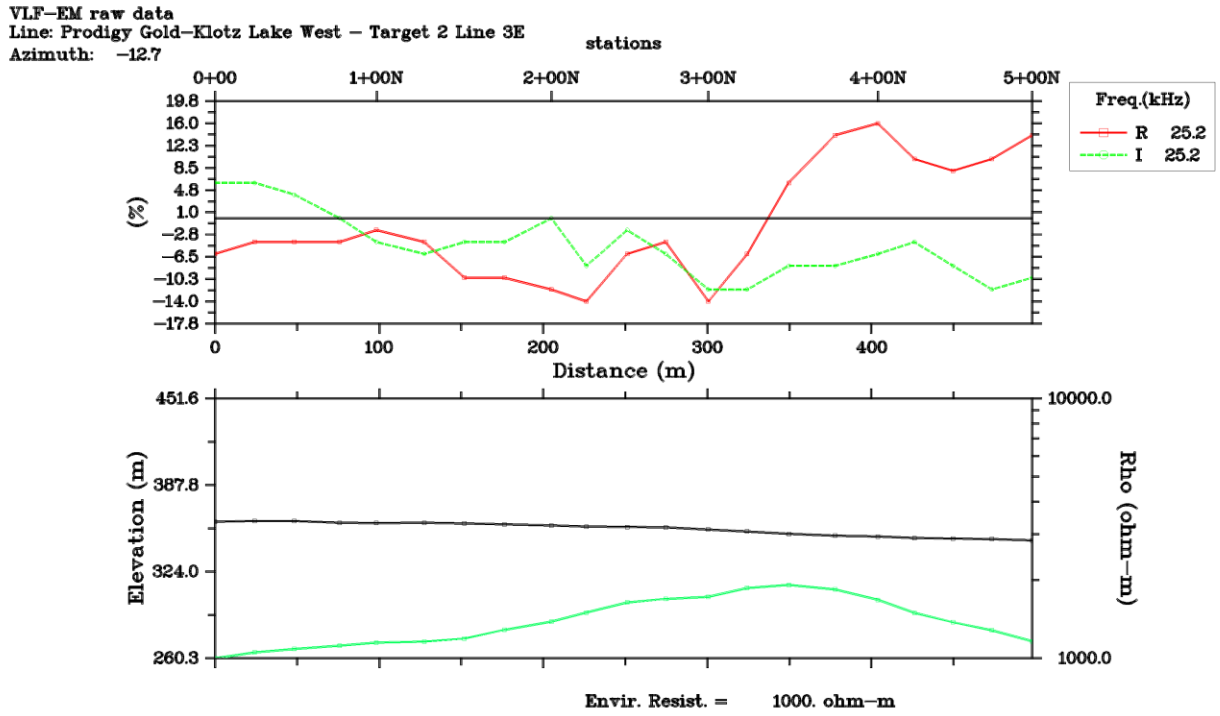
Grid 2 NML Figure 21 Line 2E Raw Data Profile



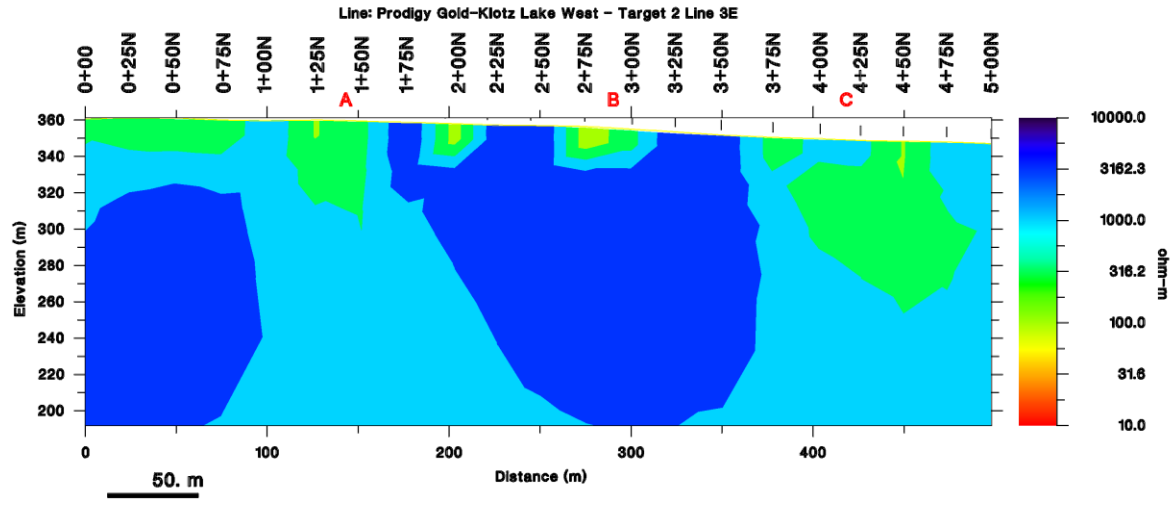
Grid 2 NML Figure 22 Line 2E Model 2000 Ohm with Fraser Picks



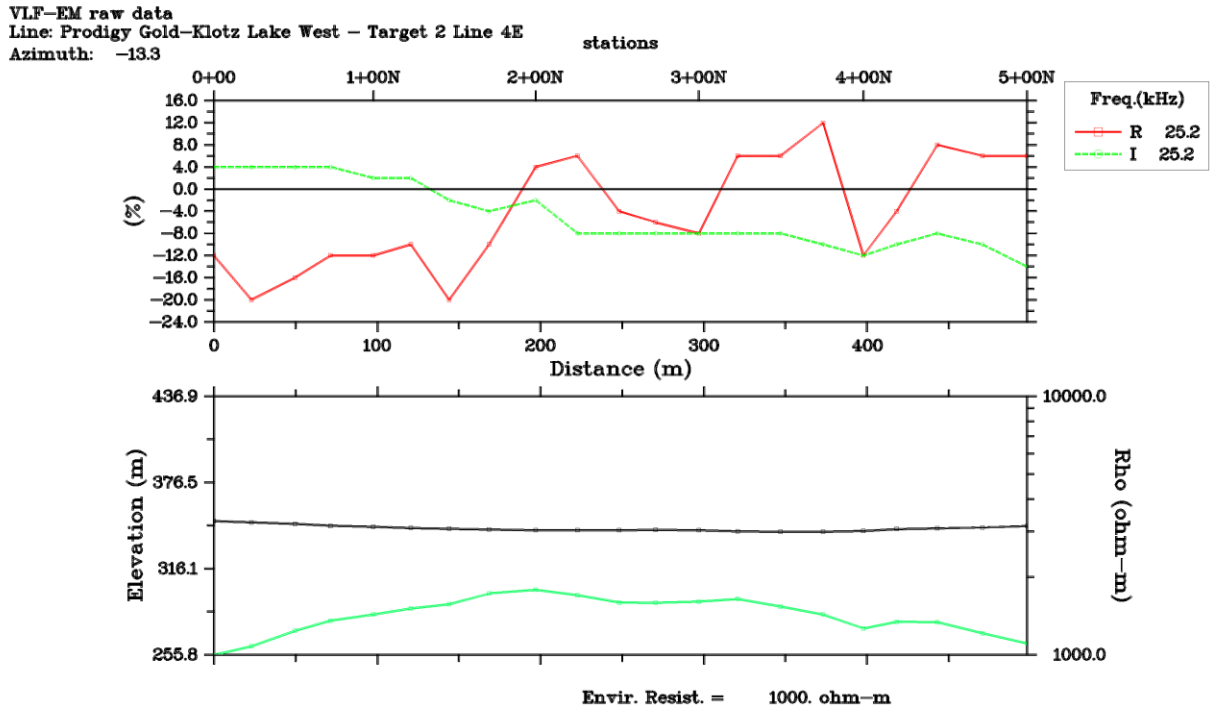
Grid 2 NML Figure 23 Line 3E Raw Data Profile



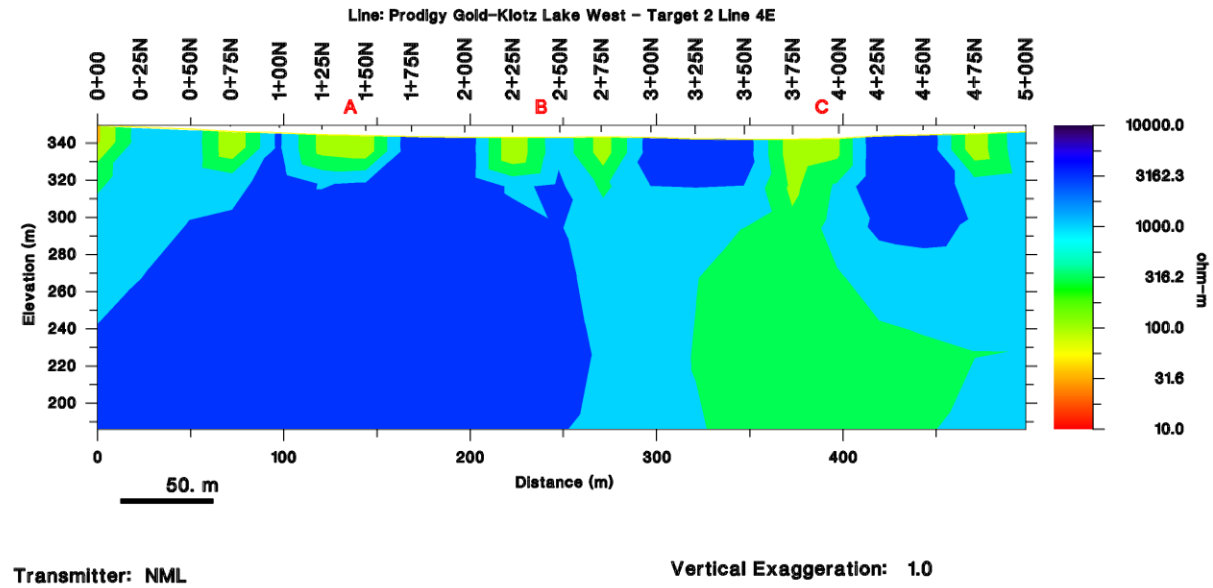
Grid 2 NML Figure 24 Line 3E Model 2000 Ohm with Fraser Picks



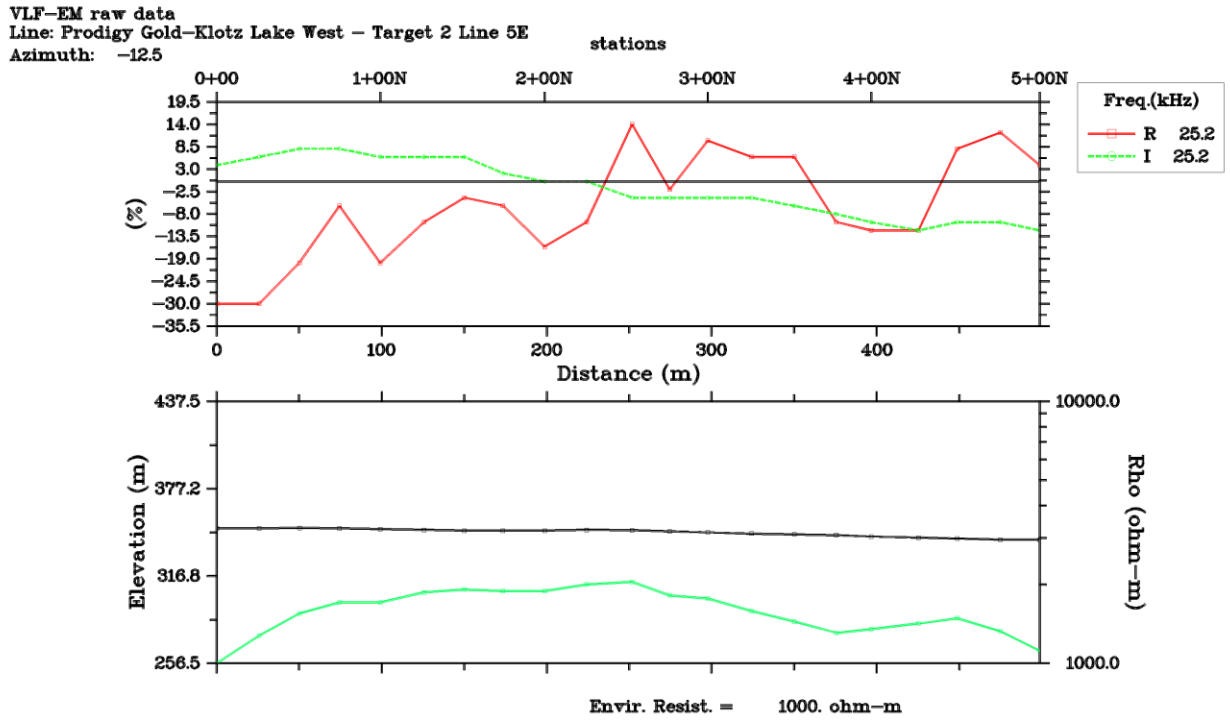
Grid 2 NML Figure 25 Line 4E Raw Data Profile



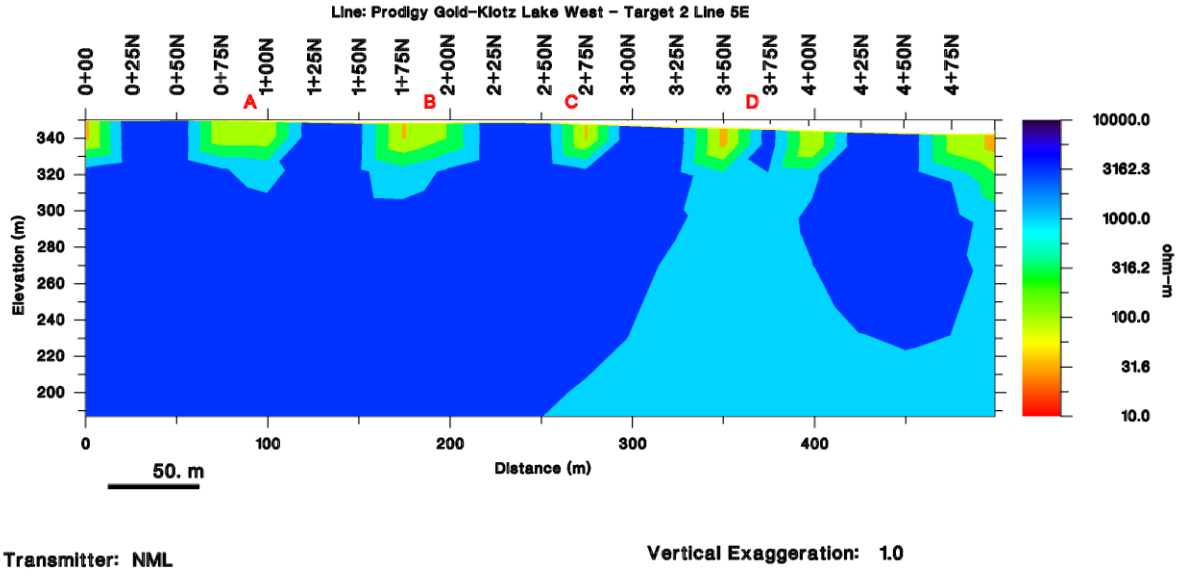
Grid 2 NML Figure 26 Line 4E Model 2000 Ohm with Fraser Picks



Grid 2 NML Figure 27 Line 5E Raw Data Profile



Grid 2 NML Figure 28 Line 5E Model 2000 Ohm with Fraser Picks



Contractor	Work Performed	Amount	HST	Total
Exploration Services	Ground VLF-EM Survey 2 GPS Grids	$27,765.00	$3,609.45	$31,374.45
Sunset Apartments	Accommodation for Geophysicist - May	$1,800.00		$1,800.00
	Accommodation for Geophysicist - June	$450.00		$450.00
Tanya Coutour	GIS Support: Making Figures for Report	$1,200.00	$156.00	$1,356.00
			TOTAL	**$34,980.45**