TD OILFIELDS LTD.

GROUND PENETRATING RADAR SURVEY AT MATSON CR.

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PLACER CLAIMS

DON 6 – DON 53	P39519 – P39566
JOE 1 – JOE 53	P39615 - P39665
LEW 1 – LEW 46	P39567 - P39612

Location: 63^{o} 43' N, 140^{o} 13' W
NTS: 115 O/9
Mining District: Dawson
Dates Work Was Performed: October 14, 2009 – October 22, 2009
Date: December 1, 2009

SUMMARY

A ground penetrating radar (GPR) survey of a grid on the DON claims on Matson Cr. was conducted to determine the depth to bedrock. 3.3 line kilometres of line cutting and GPR was performed from Oct 14, 2009 to Oct 22, 2009 to determine the depth to bedrock. The survey was performed in the Dawson Mining District with the camp coordinates at 538640E 7066240N NAD 83 UTM Zone 7N with the survey grid accessed by foot.

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

Aurora Geosciences Ltd. was retained by TD Oilfields Ltd. to conduct a ground penetrating radar (GPR) survey at Matson Cr. located at 63^o 43' N, 140^o 13' W on the Don 6 – 10 claims, no. P39519 – P39523. The purpose of the surveys was to determine the depth to bedrock, and other possible features of interest. This report describes the survey program and its results.

2.0 PROPERTY DESCRIPTION

The surveying sites are at Matson Cr. located at 63^o 43' N, 140^o 13' W. Site locations are shown in the claims location map in Figure 1 and the grid map in Figure 2. The claim grouping is GD00421 which has 147 claims listed in the table bellow.

Name	Grant #	Name of Owner
DON 6 – DON 53	P39519 - P39566	TD Oilfields Ltd.
LEW 1 – LEW 46	P39567 - P39612	TD Oilfields Ltd.
JOE 1 – JOE 53	P39613 - P39665	TD Oilfields Ltd.

The table bellow is the list claims for the application for renewal.

Name	Grant #	Name of Owner
DON 16 – DON 53	P39529 - P39566	TD Oilfields Ltd.
LEW 1 – LEW 46	P39567 - P39612	TD Oilfields Ltd.
JOE 1 – JOE 40	P39613 - P39652	TD Oilfields Ltd.
JOE 52	P39664	TD Oilfields Ltd.
JOE 53	P39665	TD Oilfields Ltd.

3.0 GROUND PENETRATING RADAR THEORY

The GPR method involves directing a transient electromagnetic wave into the ground and recording waves reflected and refracted by subsurface interfaces. The transit time together with the velocity of the ground can be inverted to yield a cross section showing the depths to the reflecting surfaces in the ground. The theory behind the GPR method is summarized in Annan and Cosway (1991), Davis and Annan (1987) and Power (1994).

3.1 Radar wave propagation and attenuation

Ground penetrating radar waves propagate according to Maxwell's Equations:

$$\nabla x H = J + \frac{\partial D}{\partial t} \quad (1)$$

$$\nabla x E = -\frac{\partial B}{\partial t} \quad (2)$$

$$\nabla \bullet D = \rho \quad (3)$$

$$\nabla \bullet B = 0 \quad (4)$$

Where **E** is the electric field, **B** is the magnetic induction, **D** is the displacement current, **J** is the current density, **t** is time and ρ is the electrical charge. These are the vector forms of Ampere's, Faraday's and Gauss' Laws and the statement that there are no magnetic monopoles. Taking the curl of (2) and applying an elementary identity yields the Helmholtz equation for EM propagation in a source free medium:

$$\nabla^2 E - \mu\sigma \frac{\partial E}{\partial t} - \mu\varepsilon \frac{\partial^2 E}{\partial t^2} = 0 \quad (5)$$

The solution to this equation in the most general form as a plane wave is in the form:

$$E(r, t) = E\, e^{-i(\omega t - \kappa \bullet r)} \quad (6)$$

Which, after substitution yields:

$$\kappa = \omega \frac{\sqrt{K^*}}{c} \quad (7)$$

Where ω is the angular frequency (2πf) and $\mathbf{K}^*$ is the complex dielectric permittivity and **c** is the speed of light *in vacuum*. The complex dielectric permittivity governs both the attenuation and phase velocity of the radar wave.

Dielectric permittivity is the ease with which a material may be polarized in an electric field. A material with abundant polar charges will have a higher dielectric permittivity than a material with comparatively fewer polar charges because per unit mass, the former will undergo more polarization than the latter. When the electric field changes, the polar material will resist the change in the field to a greater extent than the nonpolar substance. Consequently, materials with a high dielectric permittivity have a higher electrical impedance (greater attenuation) than materials with a lower dielectric permittivity. The phenomenon is log linear at low frequencies but increases rapidly when the applied frequency exceeds the frequency of the polar molecules. For water, the most important substance with respect to GPR system performance, this relaxation frequency is in the order of 1 GHz.

Velocity is also affected by dielectric permittivity. The second term in the exponent of equation (6) must be dimensionless which indicates that κ must have dimensions of 1/**r.** Consequently, the phase velocity must be:

$$v = \frac{c}{\sqrt{K^*}} \qquad (8)$$

Radar waves thus slow down and shorten up in materials with high dielectric permittivity, and speed up and lengthen in materials with low dielectric permittivity.

Attenuation at radar frequencies is a function of dielectric permittivity and electrical conductivity. Davis and Annan (1987) derive an expression for attenuation in decibels per meter at radar frequencies using complex conductivity and dielectric permittivity:

$$\alpha_m = \frac{1.69\text{x}10^3\ \sigma^*}{\sqrt{K^*}} \qquad (9)$$

In this relation, dielectric losses are incorporated into the complex conductivity σ*.

3.2 Radar wave reflection

EM waves reflect at the boundaries between materials with different velocities. In the earth, these boundaries occur at the interface between materials with different dielectric permittivities. At normal incidence on a planar reflector, the strength of the reflection (Reflection coefficient - R) reduces to:

$$R = \frac{\sqrt{K_1} - \sqrt{K_2}}{\sqrt{K_1} + \sqrt{K_2}} \qquad (10)$$

Thus the strength of the reflection is primarily a function of the contrast in dielectric permittivity.

The size and texture of the target affect the strength of the reflection. If the target is small, the strength of the reflection will be reduced and similarly, if the surface is rough, the incident energy will be absorbed or scattered. Smooth and small are terms defined relative to the wavelength of the radar wave. The power reflected back to the surface governed solely by the geometry of the target is the product of the backscatter gain and the target cross sectional area (gϕ) (Annan and Davis 1977). For a planar reflector with reflection coefficient R at distance L, the backscatter gain is:

$$g\phi = \pi L^2 R \qquad (11)$$

If the target is rough, with irregularities in the order of λ/4 (quarter wavelength), the gain is reduced to:

$$g\phi = \frac{\pi\lambda LR}{2} \qquad (12)$$

Finally if the target is very small with radius a<<λ, the gain is reduced to:

$$g\phi = 65\pi^5 a^6 \lambda^4 \qquad (13)$$

In summary, the strength of a reflected wave depends strongly upon the size and roughness of the target.

3.3 System design and description

Ground radar systems consist of a transmitter and receiver, linked together by a controller. Both the transmitter and receiver consist of a electronic control unit and an antenna. The controller simultaneously triggers the transmitter and the receiver. Upon receipt of a signal from the controller, the transmitter sends a signal to the transmitting antenna which in turn generates a wave in the earth. The receiver is also triggered by a simultaneous pulse from the controller and it detects radiation at the same frequency as the transmitter. The receiver begins recording radar wave radiation as soon as it is triggered and ceases recording a short interval in the order of 1 or 2 μs after initiation. The system is sketched schematically in Figure GPR1. GPR systems are made to operate at discrete frequencies spanning a spectrum from around 5 MHz to 1 GHz. The transmitted signal consists of a discrete pulse with a centre frequency (dominant frequency) approximately equal to its bandwidth. Thus 25 MHz radar may generate a signal with a centre frequency of 125 MHz and bandwidth from 25 to 100 MHz. For this reason, the pulse period is inversely proportional to the centre frequency (Annan and Cosway 1991).

The table below shows the pulse wavelength in air and water for various GPR operating frequencies. Antenna design considerations require that the antennas be at least 1/3 of the system wavelength to ensure adequate propagation. Consequently, the lower the operating frequency, the larger the antennas required for the system. The practical lower limit is for exploration GPR systems is 12.5 MHz. The wavelength also has implications for the target resolution as described in the previous section. For planar horizontal targets, the resolution is in the order of 0.5λ.

Centre frequency (MHz)	λ in air (m) (v=300 m/ms)	λ in shale (m) (v=90 m/μs)	λ in water (m) (v=30 m/μs)
500	0.6	0.18	0.06
200	1.5	0.45	0.15

Centre frequency (MHz)	λ in air (m) (v=300 m/ms)	λ in shale (m) (v=90 m/μs)	λ in water (m) (v=30 m/μs)
100	3	0.9	0.3
50	6	1.8	0.6
25	12	3.6	1.2
12.5	24	7.2	2.4

The antenna radiation pattern imposes limitations on the system design. Figure GPR-2, adapted from Annan and Cosway (1991), illustrates the influence of the dielectric permittivity on the antenna radiation pattern. Earth materials display relative dielectric permittivities in the range of 5 to 40. At the lower end of this range, the radiation pattern focuses the energy into two lobes oriented at an inclination of approximately 45^0 to the vertical. Annan and Cosway (*ibid*) cite a design relation for the optimum antenna separation S:

$$S = \frac{2 \cdot D}{\sqrt{K - 1}} \qquad (14)$$

Where D is the estimated depth to the target. In practice, antennas are commonly separated at a distance equal to their length.

For optimal performance, the antennas should be oriented so that their electric field is parallel to the strike direction of the target. This normally implies that the antenna be oriented perpendicular to the direction of travel along a survey line. The RTA antenna is often oriented parallel to the direction of travel with one antenna in front of the other in a parallel endfire confiquration to facilitate the survey over rough terrain at the sacrifice of optimal coupling. If the target is equidimensional, there is no preferred direction for the antennas.

The GPR system is normally either worn and operated by a single operator for high frequency surveys, or is carried and guided by several operators with the controller being either worn or towed. The transmitter and receiver electronics are carried in a backpack the antennas are combined into one measurement array and linked via fiber optic cables to the controller unit which is either worn on a backpack. The radar is controlled by a console specifically designed store and collect data, the block diagram of the system shown in Figure GPR - 1.

3.4 Survey methods

GPR surveys are commonly run in two modes. Profile surveys are the most common survey and are conducted to map subsurface layers and to locate discrete or compact targets within the earth. Velocity surveys are conducted to determine the radar velocity of the earth in the survey area by observing the change in arrival times with antenna separation. Velocity surveys are impossible to conduct with 25 MHz RTA, and consequently were not preformed at Matson Cr.

Profile surveys are run with the antennas spaced a fixed distance apart and conducted by moving the antenna pair along the survey lines. The data is plotted in radargrams which show the centre of the antennas (x) on the horizontal axis and the signal on the y-axis as a function of time (t), with arrival time increasing vertically downward. The various reflections appear at various distances below the time zero line at the top of the radargram. These distances below the time zero line are proportional to the arrival times which in turn are roughly proportional to the depth to target. Thus, the reflections display a pattern which generally correlates with their subsurface location. During data processing, the arrival times may be converted to depths and the reflections are then displayed at the apparent depths of the sources. Reflections may be displayed as wiggle traces (no fill), variable area traces (as shown) or as variable density color or grey shade plots.

3.5 Electrical properties of earth materials at GPR frequencies

The GPR method detects reflections from materials in the earth with contrasting electrical properties. While both electrical conductivity (σ) and dielectric permittivity (ε) affect radar velocity and attenuation, to a first approximation velocity is determined primarily by dielectric permittivity and attenuation is determined primarily by conductivity with a not inconsequential contribution from dielectric permittivity. The table below, modified after Annan and Davis (1987), summarizes the electrical properties of materials commonly encountered during GPR surveys:

Material	**K**	**σ (mS/m)**	**v (m/μs)**	**α (dB/m)**
Air	1	0	300	0
Fresh water	80	0.5	33	0.1
Saline water	80	30,000	10	1000
Dry sand	3-5	0.01	150	0.01
Saturated sand	20-30	0.1-1	60	0.03 - 0.3
Limestone	4-8	0.5-2	120	0.4 - 1
Shale	5-15	1-100	90	1-100
Silt	5-30	1-100	70	1-100

Clay	5-40	2 - 1000	60	1-300
Granite	4-6	0.01 - 1	130	0.01
Ice	3-4	0.01	160	0.01

The dielectric permittivity and GPR velocity of earth materials is largely controlled by the water content since water is both a strongly polar substance and is very common in the subsurface. Consequently, most GPR interpretation is concerned with the distribution of liquid water in the subsurface as this will exert the strongest influence on both velocity and the source of reflections.

Most earth materials are electrical insulators and electrical conduction occurs primarily within electrolyte solutions and, more rarely, within the few conducting minerals (eg. sulphides or graphite). The presence of water and the concentration of current carrying ions within it thus governs the conductivity of earth materials. McNeill (1980) summarizes the factors controlling electrical conductivity in earth materials:

a. Porosity - if water filled

b. Permeability - facilitates current flow in electrolytes

c. Ion concentration - fresh water is a virtual insulator whereas saline water is a conductor.

d. Saturation - water saturation determines the ability of a substance to carry electrical current.

e. Temperature and phase of the electrolyte

Permafrost generally improves radar performance by suppressing attenuation due to liquid water. Bound water within clays however can persist well below 0^0 C and both attenuation due to conduction and surprising reflections can be found in overburden at temperatures down to -30^0 C. Examples of this are clay rich saprolites in the Klondike district of the Yukon which are good reflectors within thoroughly frozen permafrost sections.

3.6 Response of Bedrock

The bedrock should produce a linearly consistent reflector where the energy is reflected back. On a trace by trace basis the GPR signal takes the quickest path to the bedrock and is reflected back to the receiving antenna. It should be a good reflector because the water saturated gravels or sediments provide a good contrast to the relatively dry bedrock. Sometimes, if it is an inconsistent boundary it may look like a series of hyperbolas that are linearly consistent.

4.0 PERSONNEL AND EQUIPMENT

The GPR survey was performed by the following personnel.

Andre Lebel	Crew Chief	Oct 15 – Oct 22, 2009
Steve Francis	Line Cutter/ Helper	Oct 15 – Oct 22, 2009

The crew was equipped with the following instruments and equipment.

GPR system:	RAMAC XV 11 Monitor RAMAC II Control Unit 25 MHz rough terrain antenna (RTA) Spare batteries, ancillary equipment
GPS system:	Garmin 76 handheld GPS
Data processing:	laptop computer Reflex processing software Geosoft processing software
Other:	3/4 ton 4x4 truck 2 man summer camp

5.0 LOGISTICS

The camp was located at 538640E 7066240N NAD 83 UTM Zone 7N, and consisted of a 14' x 16' wall tent, and a woodstove for heat. All the equipment and crew mobed to and from the site using BELL 206 helicopter staging from Dawson. The survey grid was accessed by foot. A full survey log of the project is attached in appendix A.

5.0 SURVEY SPECIFICATIONS

The survey was performed according to the following specification

Grids and Lines:	The lines were cut to a maximum width of 1.5 m and chained unequally with a laser range finder. The grid was registered with a handheld GPS unit to NAD 83 UTM Zone 7N.

Antenna: 25 MHz RTA

Sampling interval: 0.25 m/reading, Hip chain based trigger

Sampling frequency: 300MHz

Time window: >600ns

Datum: NAD 83, UTM Zone 7N

6.0 DATA PROCESSING

The GPR data was processed with the REFLEXW software package developed by Sandmeier Scientific Software Ltd. This section describes the data processing applied to the GPR data.

The profile survey data was processed using the following procedures in the order they are described:

1. *Set time zero:* The time zero line on the radargrams was reset to the first arrival of the ground wave.

2. *Dewow:* Low frequency antenna-to-antenna reverberations were removed by examining the frequency spectra from a representative traces and applying a low cut filter to remove frequencies below the first trough in the average frequency spectrum. The first trough commonly represents the upper cutoff frequency of low frequency wow.

3. *Gain:* A filter that acted on each trace that consisted of a linear and exponential function, where the amplitude is increased according to $g(t) = (1+a*t)*\exp(b*t)$ where a and b are variables that are entered in.

4. *Geometric corrections:* Radargrams were registered to grid coordinates using the indicated station at the tie and base line intersections. The coordinates shown on the top of each radargram are in grid coordinates. The raw data is always collected from trace 1 (left) to trace n (right), which were then flipped so that the radargrams are shown in a south to north direction. The traces were then interpolated to the markers which are shown as white squares on the radargrams using a trace interval of 0.25 m. GPS coordinates were collected by handled Garmin GPS 76 and were assigned to each trace are indicated on the bottom of the radargrams.

5. Vertical adjustment: Static correction preformed to the radargrams to make a visual effect of topography.

6. *Interpretation:* At this stage, reflections which may be caused by bedrock were identified and annotated on the radargrams.

7. *Printing and annotation:* Radargrams were converted to adobe .PDF files and annotated where necessary.

7.0 RESULTS

All figures and products described in this report are contained in the back pockets of this report. The location of the grid relative to the claims is shown in Figure 1 and Figure 2. Figures 3 through 8 are the radargrams for L0 W to L600 W and BL200 N respectively. These maps show the processed data with interpreted bedrock picks included and any comments. The Station markers are shown as white squares on the radargrams and triangles on the grid map. The scale on all the radargrams 1:750 with a vertical exaggeration of 1 to 3. The velocity was determined to be 0.13 m/ns from diffraction hyperbola analysis from diffraction hyperbolas shown in the table bellow. Interpreted bedrock picks are marked in red with question marks where the reflection is unclear. Radargrams in .pdf format and a digital copy of this report in .pdf format are appended on a CD-ROM. Descriptions of the results follow.

Line	Center Station	Diffraction hyperbola velocity (m/ns)
0	130	0.1
0	222	0.15
150	77	0.15
150	105	0.15
150	368	0.15
300	108	0.13
300	122	0.14
300	142	0.14
300	350	0.175
450	280	0.16
450	298	0.13
450	343	0.1

600	289	0.09
600	400	0.17
600	540	0.07
BL 200	15	0.07
BL 200	78	0.1
BL 200	124	0.1
BL 200	185	0.15
BL 200	238	0.13
BL 200	330	0.13
BL 200	350	0.13

L0 W – The bedrock reflector was not distinct for L0 W, and it was difficult to pick. The interpreted bedrock reflection was from 4 to 15 m deep. The first set of reflections is thought to be a clay layer or frost layer since it is near to the surface. The bedrock pick was a little more difficult, because it was a weaker reflector that looked like a change of character in some places. The line finished on outcrop at north end of the line which was as starting point for the interpreted bedrock pick. Diffraction hyperbola analysis from diffraction hyperbolas at stations 130, and 222 were interpreted to have velocity of 0.1 and 0.15 m/ns respectively. BL200 N crossed at the first marker.

L150 W - The bedrock reflector was not distinct. The top of a set of hyperbolas was the reflection that was picked and not the uppermost reflection which (the same as L0 W) is thought to be the reflection off of a clay layer or frost layer. The interpreted bedrock picks were of a depth of 5 – 15 m. Diffraction hyperbolas at stations 77, 105, and 368 were all analyzed to have a velocity of 0.15 m/ns.

L300 W - The bedrock reflector was not distinct. The reflection that was picked is a weaker reflection which where is coincident with a set of diffraction hyperbolas originating from this surface. As in L0 W there is a more distinct reflection nearer to the surface which causes reverberation from station 460 to station 520 that masks the reflector. From the interpreted bedrock depth there seems to be an accumulation of fill on the bench centered at station 200. Diffraction hyperbolas at stations 108, 122, 142, and 350 were analysed to have a velocity of 0.13, 0.14, 0.14, and 0.175 m/ns respectively.

L450 W – The bedrock reflector was not distinct. The reflection interpreted as the bedrock is weaker reflector that the depth ranges from 5 to 15m and not the stronger upper reflector. There is an interpreted channel which is centered at station 420. Diffraction hyperbolas at stations 280,298, and 343 were analysed to have velocities of 0.1, 0.13, and 0.16 m/ns respectively.

L600 W – There is lots of reverberation in this section that made picking the bedrock reflections very dificult. The interpreted bedrock depth, although with a low degree of confidence is from 5 m to 15 m. There is an interpreted depression centered at station 560 that could be of interest. Diffraction hyperbolas at stations 289, 400 and 540 were analysed to have a velocities of 0.09, 0.17, 0.07 and 0.11 m/ns respectively.

BL200 N– The bedrock reflector was not distinct and it is interpreted as a set continuous set of hyperbolas. There are reverberations starting at station 560 that masks the reflection which makes it harder to follow though to L600 W. Diffraction hyperbolas at stations 15, 78, 124, 185, 238, 330, and 350 were analysed to have velocities of 0.07, 0.1, 0.1, 0.15, 0.13, 0.13, 0.13 and 0.13 m/ns respectively.

8.0 CONCLUSIONS

The results of the GPR survey on the TD Oilfields Ltd. Claims on Matson Cr. support the following conclusions:

a. It was difficult to pick the bedrock in many places, but in the places where the bedrock was picked the depth was in-between 4 – 15 m using velocities determined by diffraction hyperbola analysis.

b. There are several channels that cannot be followed from line to line because of the separation between lines that could be areas of interest. At L0 W station 100, L0 W station 225, L150 W station 580, and L450 W station 440N there are channels or depressions in the bedrock which may be of interest.

c. On the high side of the embankment, the south sides of L600 W (station 0 – 60), L450 W (station 0 – 200), and L300 W (Station 0 – 300) are up on an embankment, it was hard to see any reflectors; however there may be benches of thick fill, as on L300 W centered at station 200 has an interpreted bedrock depth which shows a considerable thickness of fill.

9.0 RECOMMENDATIONS

The results of this survey support the following recommendations:

a. Bedrock depth controls by auger drilling to confirm the bedrock picks.

b. Interpreted channels should be auger drilled to confirm their existence and to assess grades.

c. If the grades in features of interest warrant, further infill GPR lines with further auger drilling to determine the extent of the pay.

Respectfully submitted,
AURORA GEOSCIENCES LTD.

Andre Lebel, BSc.
Geophysicist

Dave Hildes, PHD. PGeoph.
Geophysicist

REFERENCES CITED

Annan, A.P. and J. L. Davis (1977) Radar range analysis for geologicalmaterials.Geological Survey of Canada Paper 77-1B, pp. 117-122.

Annan, A.P. and S.W. Cosway (1991). Ground penetrating radar survey design. Paper presented at the 53rd Annual Meeting of the European Association of Exploration Geophysicists.

Davis, J. L. and A. P. Annan (1987) Ground penetrating radar for high resolution mapping of soil and rock stratigraphy. Paper presented at Exploration '87.

McNeill, J. D. (1980) Electrical Conductivity of Soils and Rocks. Geonics Ltd: Technical Note TN-5.

Power, M.A. (1994) An evaluation of ground penetrating radar as a tool in placer exploration. Indian and Northern Affairs Canada: Yukon Region. Open File 1994-1(T)

Sheriff, R.E. and L.P. Geldart (1995) <u>Exploration Seismology - Second Edition</u>. New York: Cambridge University Press.

Zeng, X. and G.A. McMechan (1997) GPR characterization of buried tanks and pipes. Geophysics Vol. 62, No. 3, pp. 797-806.

APPENDIX A.

STATEMENT OF QUALIFICATIONS

I, Dave Hildes, P. Geo., certify that:

1) I reside at 125 War Eagle Way, Whitehorse, Yukon Territory, Y1A 5W5

2) I am a geophysicist employed by Aurora Geosciences Ltd. of Whitehorse, Yukon Territory.

3) I graduated from the University of British Columbia with a Ph. D. in geophysics in 2001 and have worked as a geophysicist since that time.

4) I am a member of the Association of Professional Engineers and Geoscientists of British Columbia, Registration No 29887.

5) I have no interest, direct or indirect, nor do I hope to receive any interest, direct or indirect, in TD Oilfields Ltd. or any of its properties

Dated this____th day of________________, 2009, at Whitehorse, Yukon Territory.

Dave Hildes, Ph. D., P.Geo.

APPENDIX B.

PROJECT LOG

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 14, 2009

PREPARED BY: Andre Lebel

OPERATIONS		
Item	*Unit / description*	*Qty*
Linecutting	line-km	
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS		
Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL		
Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Helper	Steve Francis	0
Driver		
Other		
Total persons in camp		**1**

Samples shipped (Lot #)	

OTHER

Weather & seas

Sunny 0C

Notes (incidents, other)

Andre drove from Whitehorse to Dawson and lodged at Steve's place for the night.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 15, 2009

PREPARED BY: Andre Lebel

OPERATIONS

Item	*Unit / description*	*Qty*
Linecutting	line-km	
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS

Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206	Transnorth	1.6 hrs
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL

Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Sunny 0C

Notes (incidents, other)

Flew out from Dawson at 11:00 am using a Jet Ranger. It took 2 trips, 1 sling and 1 internal load. We finished setting up the camp by 4pm. The truck wasn't working in the morning a wheel broke off the fan belt and with no belt the truck wouldn't work. We arranged to get it repaired while were in camp.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 16, 2009

PREPARED BY:

Andre Lebel

OPERATIONS

Item	*Unit / description*	*Qty*
Linecutting	line-km	0.7
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS

Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL

Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Sunny -10C

Notes (incidents, other)

Cut the base line and started cutting L0 W. There was a cliff in the middle of the of base line, so we had to walk around and finish cutting it.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 17, 2009

PREPARED BY: Andre Lebel

OPERATIONS

Item	*Unit / description*	*Qty*
Linecutting	line-km	0.6
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS

Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL

Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy 5C

Notes (incidents, other)

Finished cutting L0 W it hit a cliff out at north end of the line, and then cut the south side of L150 W.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 18, 2009

PREPARED BY:
Andre Lebel

OPERATIONS

Item	*Unit / description*	*Qty*
Linecutting	line-km	0.95
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS

Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL

Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy 0C

Notes (incidents, other)

Cut L150 W on the north side of the creek, and L300 W on both sides of the creek. There was a cliff on the south side of the creek, so we had to walk around. Started to cut L450 W from the north end of the line.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 19, 2009

PREPARED BY:

Andre Lebel

OPERATIONS		
Item	*Unit / description*	*Qty*
Linecutting	line-km	
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	2
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS		
Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL		
Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Helper	Steve Francis	1
Driver		
Other		
Total persons in camp		2

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy 0C

Notes (incidents, other)

Did GPR on lines L0 W, L150 W, L300 W and the Base line from 0W to 440W.

Matson Cr. GPR
DAILY REPORT FORM

AURORA GEOSCIENCES

DATE:	October 20, 2009

PREPARED BY:
Andre Lebel

OPERATIONS		
Item	*Unit / description*	*Qty*
Linecutting	line-km	0.9
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS		
Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL		
Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy -5C

Notes (incidents, other)

Finished cutting L450 W, there was clift in the middle of the line, so we walked around and up and finished it off. Started L600 W from the BL to the north end, and then cut from the BL south until it hit a cliff at stn 100N.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 21, 2009

PREPARED BY:
Andre Lebel

OPERATIONS

Item	*Unit / description*	*Qty*
Linecutting	line-km	0.1
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	1.2
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS

Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206		
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL

Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy -5C

Notes (incidents, other)

Finished cutting L600 From 0 to 100 N and surveyed L450 W, L600 W and the BL from 600 W - 465 W with the GPR.

AURORA GEOSCIENCES

Matson Cr. GPR
DAILY REPORT FORM

DATE:	October 22, 2009

PREPARED BY:
Andre Lebel

OPERATIONS		
Item	*Unit / description*	*Qty*
Linecutting	line-km	
Total magnetic field	line-km	
Gravity	line-km	
IP	line-km	
HLEM	line-km	
PROTEM	line-km	
GPR	line-km	
Gravity		
Winkie - standby	hours	
Winkie - other		

LOGISTICS		
Type	*Contractor*	*Hrs or units*
Camp helicopter		
Bell 206	Transnorth	1.6 hrs
C185		
Beaver		
Barge - Remote supplier		
Barge - Spirit		
Other barge or tug		
Hotel rooms in town		
Persons in town		

PERSONNEL		
Company / position	*Person*	*In camp?*
Aurora - Crew chief	Andre Lebel	1
Line cutter	Steve Francis	1
Driver		
Other		
Total persons in camp		**2**

Samples shipped (Lot #)	

OTHER

Weather & seas

Cloudy 0C

Notes (incidents, other)

Packed up and demobed the camp back to Dawson. The helicopter came at 11:00 am, and everything was back in Dawson by 1:00 pm. Andre drove back to Whitehorse later that afternoon.

APPENDIX C.

INSTRUMENT SPECIFICATIONS

Brief Description & Technical Specification

Typical system set-up comprises a MALÅ ProEx control unit mounted in a backpack, MALÅ XV Monitor, RTA, rechargeable batteries and a triggering mechanism (survey wheel, hip chain, or time).

The whole design is rated to IP65 and complies with the European ETSI EN 302 066-1 standard.

25 MHz

The MALÅ RTA 25 MHz is suitable for investigations requiring the deepest possible depth penetration.

Length : 13.06 m (distance Tx-Rx: 6 m)
Weight: 7.8 kg

50 MHz

The MALÅ RTA 50 MHz is suitable for investigations that require medium to deep depth penetration. This was MALÅ Geoscience's first antenna in the MALÅ RTA series and has found wide appeal since it was released in 2004 with a proven track record.

Length : 9.25 m (distance Tx-Rx: 4 m)
Weight: 7.0 kg

100 MHz

The MALÅ RTA 100 MHz is suitable for investigations that require medium depth penetration with reasonable resolution.

Length : 6.56 m (distance Tx-Rx: 2 m)
Weight: 6.0 kg

Technical Specification

Power supply:	Li-Ion 12V battery or other external source (9-18 V)
Operating time:	5 h nominal (12V battery)
Operating temp:	-20° to +50°C
Environmental:	IP65
Dimensions:	32.6 x 21.5 x 5.2 cm (with protruding details 8.6 cm)
Weight:	2.6 kg
Antennas:	All MALÅ Antennas, except when operating the MALÅ Borehole Antennas in tomographic mode
Communication:	Ethernet 100Mb/s
Display:	Color backlit TFT LCD (640 x 480 pixels), hi-brite (XV10), or trans-reflective (XV11)

APPENDIX D.

STATEMENT OF EXPENDITURES

Description	Time	Unit	Rate	Amount
Survey Days, 2 Man Crew	6	Days	$1,841.00	$11,046.00
Mobe days, 2 Man Crew	2	Days	$1,641.00	$3,282.00
Mobe days, 1 Man Crew	1	Days	$1,266.00	$1,266.00
Helicopter Charter	2 mobe days, billed hourly			$4,200.00
Field expenses				$1,689.26
Report				$2,500.00
Rental gear shipping				$1,038.70
En-route rental				$2,700.00
Prep Fee				$525.00
			Total	$28,246.96

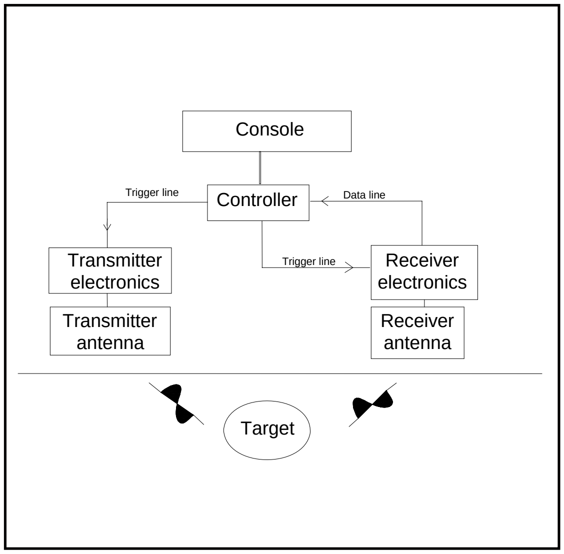


Figure GPR-1 GPR system block diagram.

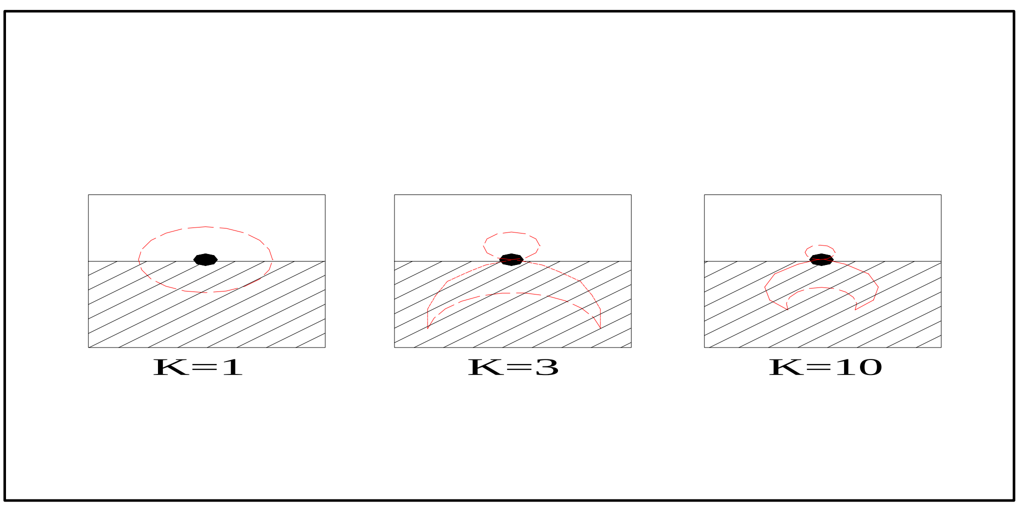
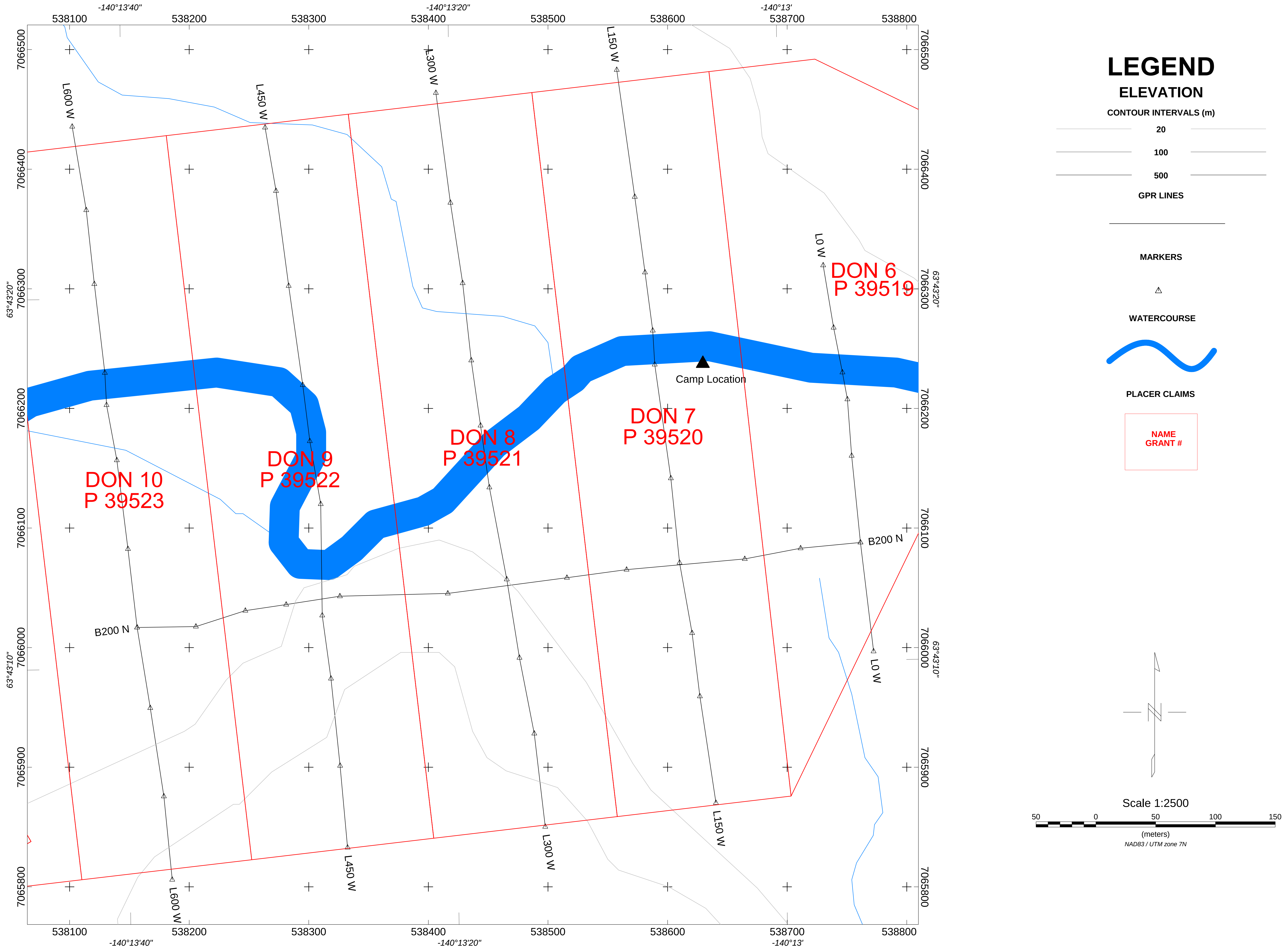


Figure GPR-2. Antenna radiation pattern (cross sectional view) for ground with different relative dielectric permittivity. Distance of curve from centre of antenna denotes strength of radiation in that direction. (after Annan and Cosway (1991))



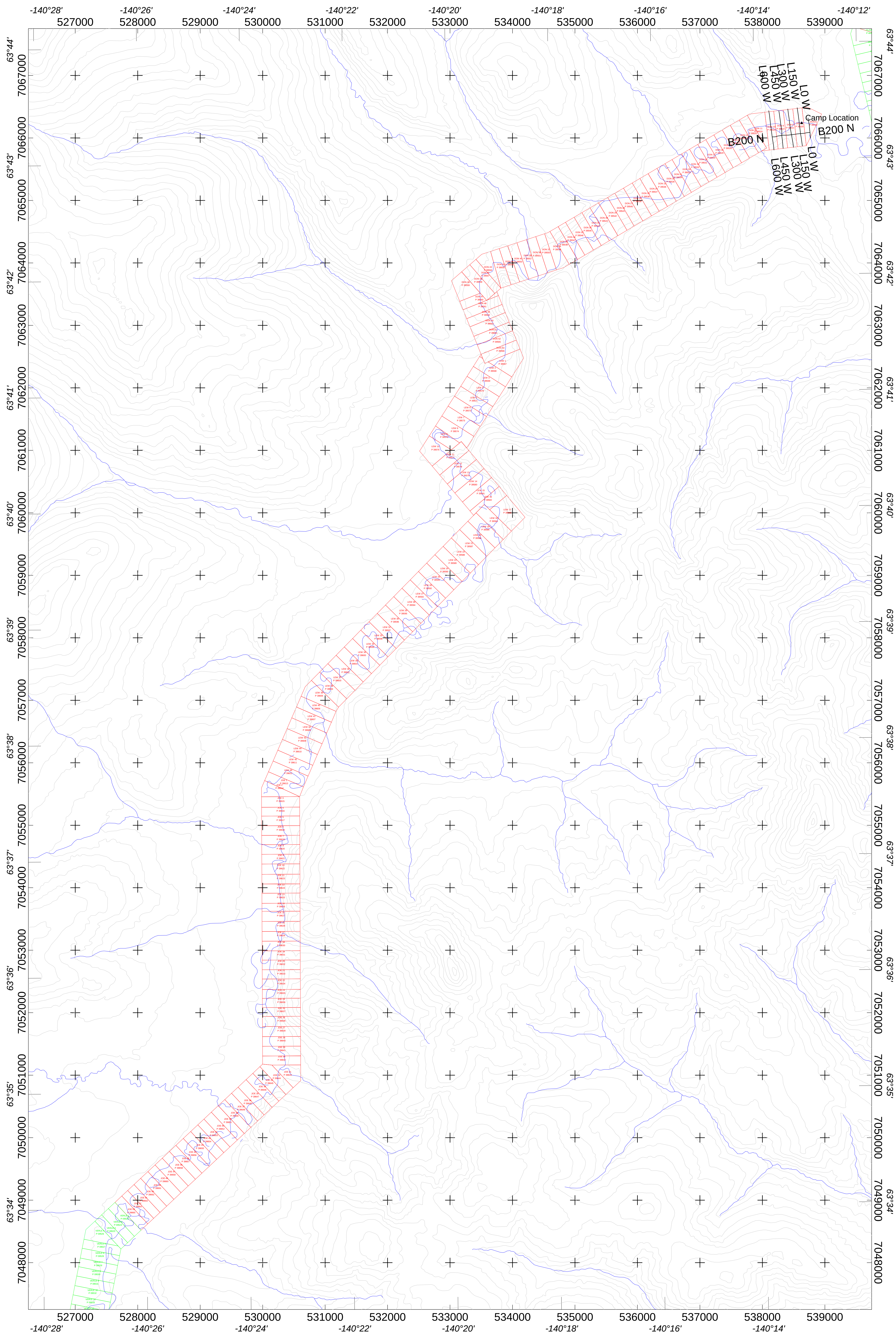
TD OILFIELDS LTD.

FIGURE 1: GRID MAP
Matson Cr. GPR

Mining District: Dawson
Datum: NAD 83
NTS Map Sheet: 115 N/09
DATE: Nov 15, 2009

GRID: Local
Proj: UTM Zone 7N
Job: TDO-9546-YT
Drawn By: AL

AURORA GEOSCIENCES LTD.



LEGEND

ELEVATION

CONTOUR INTERVALS (m)

20

100

500

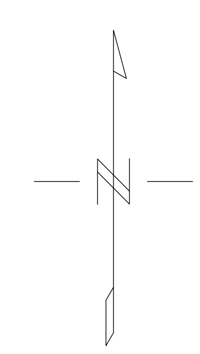
GPR LINES

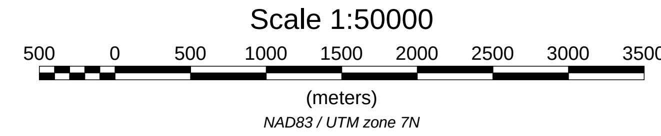
MARKERS

WATERCOURSE

PLACER CLAIMS

NAME
GRANT #





TD OILFIELDS LTD.

FIGURE 2: CLAIMS LOCATION MAP
Matson Cr. GPR

Mining District: Dawson	GRID: Local
Datum: NAD 83	Proj: UTM Zone 7N
NTS Map Sheet: 115 N/09	Job: TDO-9546-YT
DATE: Nov 15, 2009	Drawn By: AL

AURORA GEOSCIENCES LTD.

Figure 3 L 0 W Radargram

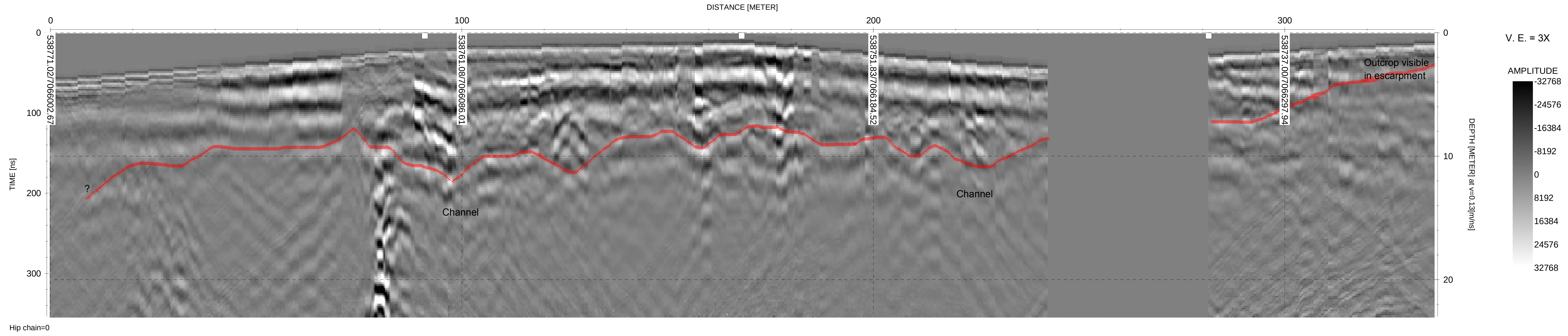


Figure 4 L 150 W Radargram

Figure 5 L 300 W Radargram

Figure 6 L 450 W Radargram

Figure 7 L 600 W Radargram

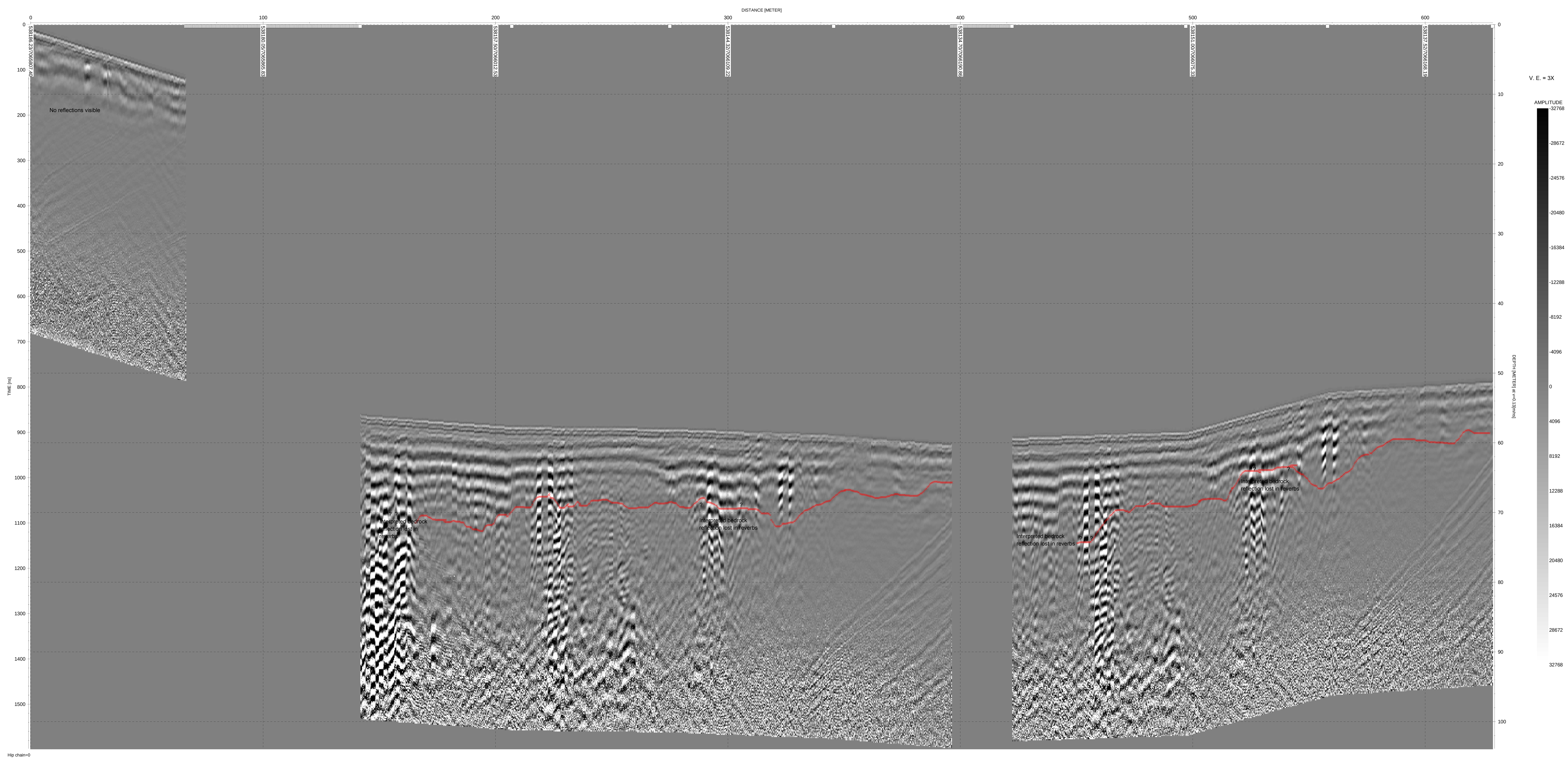


Figure 8

BL 200 N Radargram