

**Ministry of Energy, Mines & Petroleum Resources**  
Mining & Minerals Division  
BC Geological Survey

**Assessment Report**  
**Title Page and Summary**

**TYPE OF REPORT [type of survey(s)]:**  
Geophysical : Resisitivity

**TOTAL COST:** \$15,036

**AUTHOR(S):** Scott Allan

**SIGNATURE(S):** 

**NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):** \_\_\_\_\_

**YEAR OF WORK:** 2017

**STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S):** 5678747 October 7th, 2017 - October 16th 2017

**PROPERTY NAME:** Fireside Barite

**CLAIM NAME(S) (on which the work was done):** Lynx 1.386812

**COMMODITIES SOUGHT:** Barite

**MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:** 0094M003

**MINING DIVISION:** Liard

**NTS/BCGS:** 094M14E,094M14/0094M074

**LATITUDE:** 59 ° 45 ' 50 " **LONGITUDE:** 127 ° 14 ' 40 " (at centre of work)

**OWNER(S):**

1) Fireside Minerals Ltd

2) \_\_\_\_\_

**MAILING ADDRESS:**

Box 32069 West Kelowna, V4T-3G2

**OPERATOR(S) [who paid for the work]:**

1) Fireside Minerals Ltd

2) \_\_\_\_\_

**MAILING ADDRESS:**

**PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):**

Barite, Hydrothermal, Devonian, Kechika Group

**REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:** 0767,2880,9052,34620

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
Ground, mapping	_____	_____	_____
Photo interpretation	_____	_____	_____
<b>GEOPHYSICAL (line-kilometres)</b>			
<b>Ground</b>			
Magnetic	_____	_____	_____
Electromagnetic	_____	_____	_____
Induced Polarization	resistivity 1200 meters	386812	\$9,036
Radiometric	_____	_____	_____
Seismic	_____	_____	_____
Other	_____	_____	_____
<b>Airborne</b>			
_____	_____	_____	_____
<b>GEOCHEMICAL (number of samples analysed for...)</b>			
Soil	_____	_____	_____
Silt	_____	_____	_____
Rock	_____	_____	_____
Other	_____	_____	_____
<b>DRILLING (total metres; number of holes, size)</b>			
Core	_____	_____	_____
Non-core	_____	_____	_____
<b>RELATED TECHNICAL</b>			
Sampling/assaying	_____	_____	_____
Petrographic	_____	_____	_____
Mineralographic	_____	_____	_____
Metallurgic	_____	_____	_____
<b>PROSPECTING (scale, area)</b>			
_____	_____	_____	_____
<b>PREPARATORY / PHYSICAL</b>			
Line/grid (kilometres)	1200 meters	386812	\$ 6,000
Topographic/Photogrammetric (scale, area)	_____	_____	_____
Legal surveys (scale, area)	_____	_____	_____
Road, local access (kilometres)/trail	_____	_____	_____
Trench (metres)	_____	_____	_____
Underground dev. (metres)	_____	_____	_____
Other	_____	_____	_____
<b>TOTAL COST:</b>			15,036

Geophysical Report  
Direct Current Electrical Resistivity

Lynx 1 Claim  
Claim 386812  
Fireside Minerals

Liard Mining Division

N.T.S. 94M/14

Latitude 59° 45' 30" N Longitude 127° 14' 40" W

Report by:

Scott Allan

(G.I.T)

Dec. 15<sup>th</sup>, 2017

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## **Summary and Conclusions:**

Resistivity profiling of the subsurface has proven to be an effective exploration tool for vertical structures. Barite has been inferred to extend off lease into the lynx zone for 120 meters as a northerly extension to the moose ore body. Diamond drilling should commence to infill resource data between the pit limits and the extensions strike. It is inferred that 88,000 tonnes of barite exist beyond the final pit limits.

## **Introduction:**

An ore body of barite exists on mineral lease 361111 referred to as the moose deposit. This deposit of barite is fault hosted and has been defined for 700 meters extending onto lynx 1 mineral claim. Currently barite is actively being extracted and milled on site by Fireside Minerals during summer campaign mining seasons. Exploration by direct current resistivity was tested on lease for definition of barite, after testing resistivity was taken off lease onto the lynx 1 mineral claim. This report will detail results from resistivity profiling and recommendations for moving forward.

## **Location and Access:**

The Moose barite deposit can be accessed by a 5.5 kilometer gravel road located at kilometer 850 on the Alaska Highway. The Lynx claim vein extension can be accessed by following workings of the Moose deposit north to the bottom of the hillside. The location is shown on the Location Map in Appendix 1. The deposit is located at Lat. 59° 45' 30"N and Long. 127° 14' 40"W.

## **History:**

- 1963 the four original Fireside claims were staked in October by G.B. Smith of Edmonton, Alberta.
- 1964 Magnet Cove Barium Corp. acquired the property through an option agreement and proceeded to carry out a seismic refraction survey on the Bear, Moose and Wolf claims
- 1965-1985 Dresser Industries, affiliated with Magnet Cove Barium Corp. carried out multiple exploration drilling programs including reverse circulation and diamond drill.
- 1971-1972 Dresser Minerals Ltd. collected 2000 soil samples with accompanied ground gravity and magnetics surveys on all claims while completing geologic mapping of the Beaver Claims [Carter, 1973]
- 1981 a mine plan for the Moose Deposit was prepared for Dresser Minerals Ltd. by Canadian Mine Services with production plans to yield 343,011 tonnes of barite [McLeish and Baran, 1981]
- 1984 Dresser Minerals Ltd. developed the Moose deposit for mining
- In 1985 Magcobar Minerals, a subsidiary of Dresser Industries, carried out a seventeen hole diamond drill program on the Fireside Property with ten holes drilled on the Moose Zone and seven holes drilled on the West Bear
- 1988 The moose pit halts production at 70,000 tonnes of barite. Citing low commodity pricing
- 1997 Al Matovic acquires the Fireside barite claim group, prepare and mine 15,000 tonnes of barite from the moose deposit
- 1998 Owner ship transfers to Doug Allan, with Fireside Minerals becoming the operator of the mine site, production halts in the moose pit and begins in the bear pit.
- 2006 ten diamond drill holes were drilled in the West Bear area.
- 2011 a fifteen hole diamond drill program for the south moose and west bear had varying success on the bear

- 2012 a reverse circulation a 23 hole drilling program was carried out in the Moose, Beaver and Bear zones
- 2013 a 72 hole diamond drill program was completed on the moose and bear pit
- 2014 a 38 hole diamond drill program was completed on the moose and bear pit
- 2015, the bear pit was exhausted to original mine plan limits, a mine plan was prepared and accepted by the ministry of mines for the moose and an expansion of the bear.
- 2016 production of barite restarts in the moose pit

#### Claims:

Name	Tenure #	Sub-type	Size Ha.	Issue date	Good to date	Status	Owner	Ownership
	361111	Lease	41.8	1998/Jun/02	2019/Jun/02	Good	Fireside Minerals Ltd.	100.00%
Lynx 1	386812	Claim	400	2001/may/22	2019/Jun/05	Good	Fireside Minerals Ltd.	100.00%

#### General Setting:

The Moose barite deposit is located in the rolling hills of the Liard Plains roughly 745 meters above sea level (ASL), with local topographic highs reaching 880 meters. The area is covered with spotted lakes interconnected by small creeks and muskeg. A young dense forest of spruce, lodge pole pine and birch dominates the area as re-growth after a forest fire decades ago. Underlain by glacial till blanketing the region varying from 1-15 meters providing very little in the way of outcropping. Bedrock is comprised of sedimentary rocks of the Kechika group. Exploration trails in the region have thick regrowth of willow and alder. The Liard River is located 7.3 kilometers south west and is the most striking geographic feature of this region.

#### Local Geology;

The moose ore body consists of a steeply dipping vein system braided fault zone. The veins commonly pinch and swell over 700 meters rarely exceeding 3.5 meters in width. The vein system is offset by a multitude of post emplacement faults creating zones of brecciation and resulting in slight displacement. The barite is white to cream-white and is commonly iron stained with a massive crystalline structure. The vein clearly crosscuts local lithology and commonly includes altered wall rock, as lenses or zones of brecciation. The Moose vein is closed to the south as the vein appears to horse tail into several narrow veins. In the northern area structural control becomes much more consistent and outlines a vein ranging from 2.5 - 6.0 meters wide.

#### Mineralization:

Barite sufficiently marketable to the oilfield occurs in four known zones, the bear (past producer), the moose (active producer), beaver (developed prospect), and Denis (prospect). The barite on all localities is white massively crystalline with trace amount of sulphides occurring as galena, and sphalerite. It is suspected the sulphide mineralization is limited to buffering reactions during the emplacement of barite, where fluids may change alkalinity from acidic to basic.

**Theory of direct current resistivity;**

The theory of direct current resistivity, depends on ohms law. Ohms law is relationship that states voltage equals current multiplied by resistance.  $V=IR$ . Voltage is injected in the ground across two electrodes and current is measured across two differing electrodes, the measured current is resultant of bulk resistive property of the subsurface. By setting out an array of electrodes and varying there distance's a resulting resistivity map can be made of the subsurface allowing for interpretation of geologic units and structure. Resistive properties of the subsurface are dominantly based on pore space occupied with water. As such rocks such as a porous sandstone will have a much lower resistance than a massive non porous limestone. Other features such as a fault zone will host water due to the broken hosting rock thus lowering resistivity. This is in sharp contrast to barite which is almost infinitely resistive, although one must considered that a fractured barite vein may host water thus lowering its resistance.

Multiple arrays of electrodes can be utilized depending on the surface features of the conductor, horizontally lain units such as till, and shallow dipping beds are best imaged using vertical electrical sounding technique utilizing a Wenner, Schlumberger or a combination of both arrays. Were as vertically deposited units such as barite bound in steeply dipping fault zone, or steeply dipping rock units are best imaged using resistivity profiling or a dipole-dipole array. A variety of other arrays exists but are outside the scope of this report. Dipole-Dipole was the only electrode array used in this report.

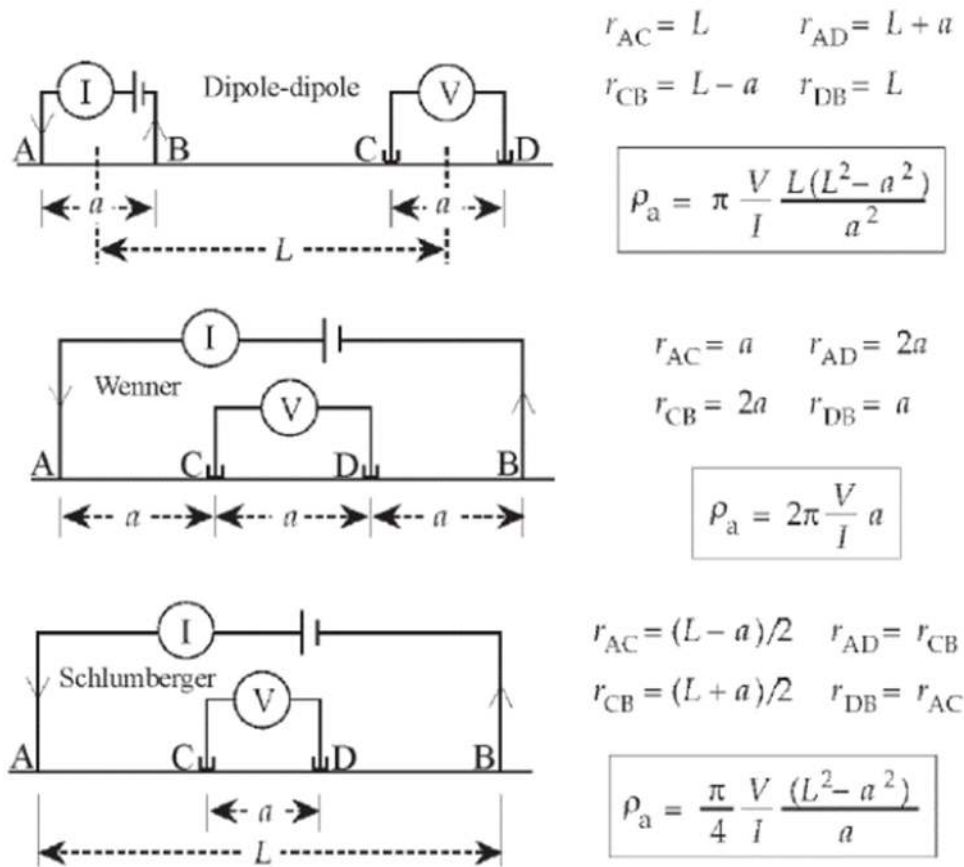


Figure 1. Exhibiting the electrode positions of the differing array set ups, AB (Current, injection electrodes) CD (Potential measured electrodes),

**Line 1 :**

Length: 200 meters

Array Type: Dipole – Dipole

Electrode Spacing: 2 meters

Interpretation: bad ground connection quality resulted in a pseudo section unable to pass QA/QC. No results offered for line 1, due to poor data quality.

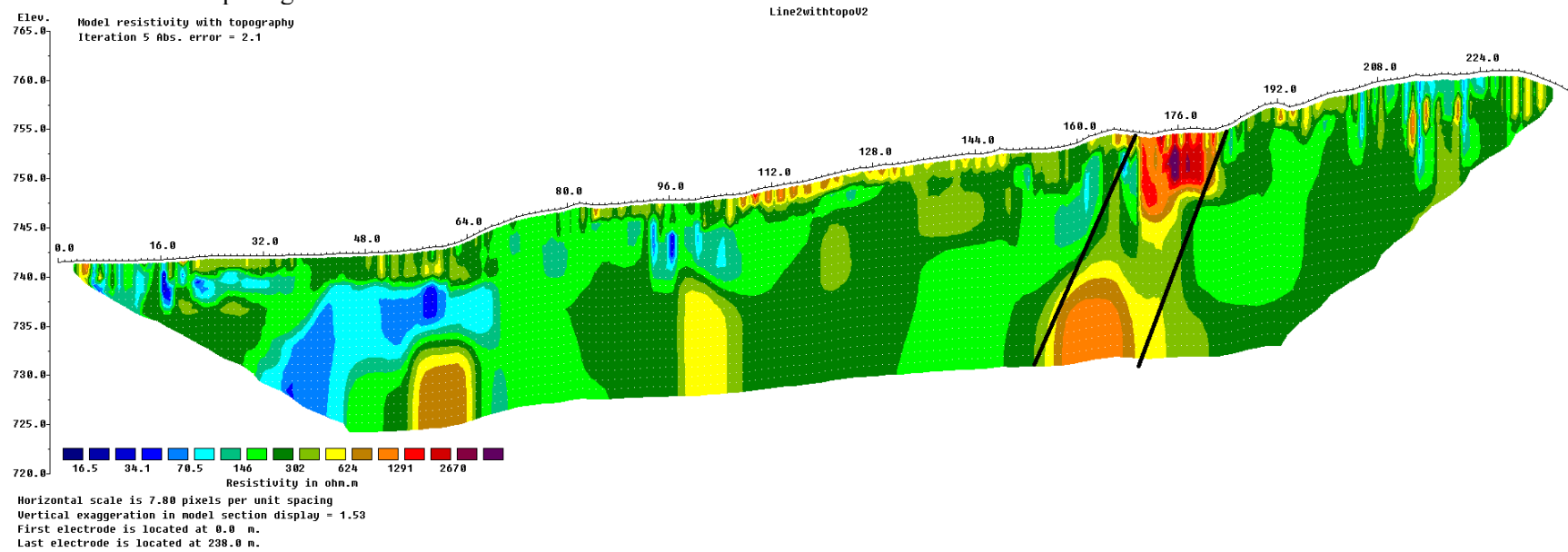


## Line 2:

Length: 250 meters

Array Type: Dipole – Dipole

Electrode Spacing: 2 meters



## Interpretation:

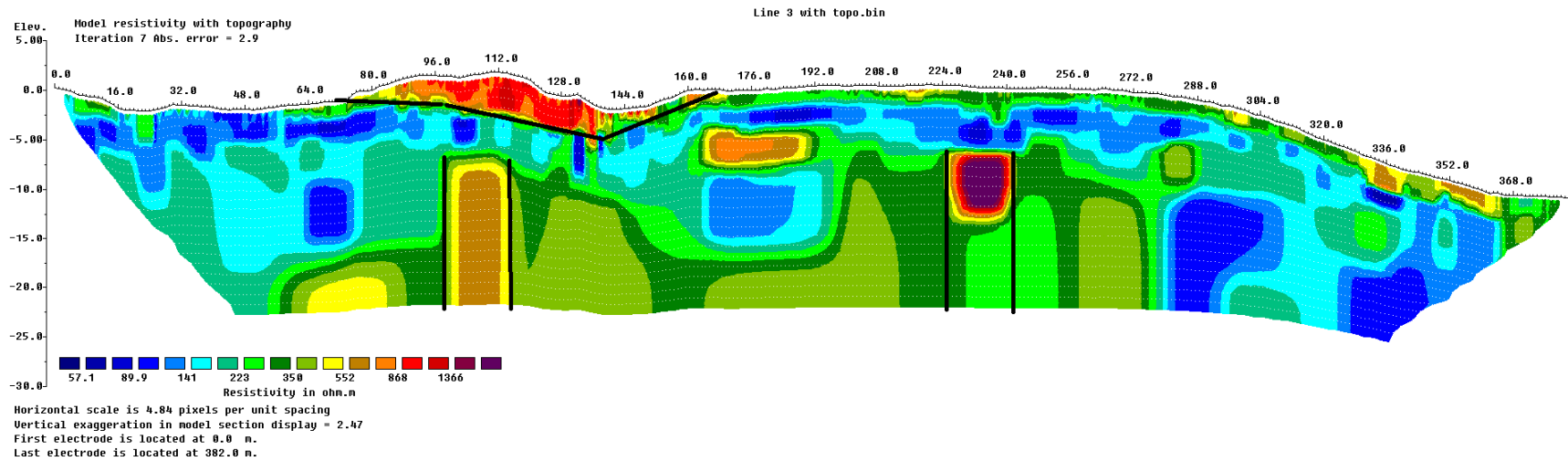
Two moderate reflectors show up  $>600$  ohm/m at 56 m and 104 m. A resistive low of  $>70$  ohm/m is seen at the left hand side the pseudo section this is representative of the prior excavation in the south moose. An east dipping reflector can be seen at 176 meters, this is a low grade zone of jig feed on surface and can be traced down 20 meters.

### Line 3:

Length: 380 meters

Array Type: Dipole – Dipole

Electrode Spacing: 2 meters



### Interpretation:

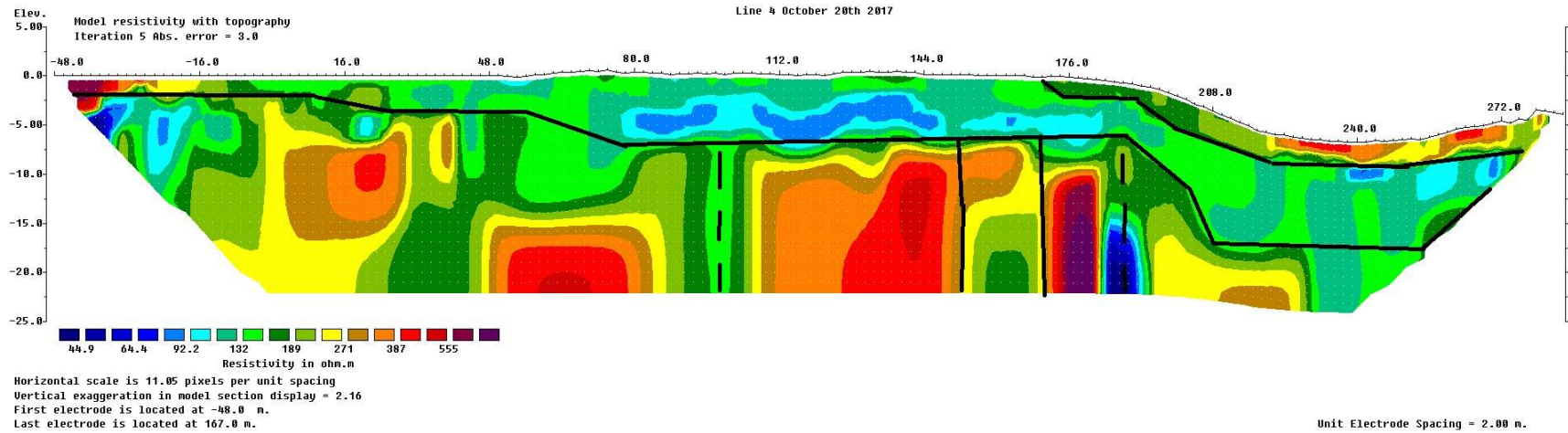
After topographic correction the pseudo section of line 3 changed drastically, a moderate reflector sticks out with 550 Ohm/m on the left hand side of the section at 104 meters with a second strong reflector >1400 Ohm/m at 232 m, this reflector is very different than all other reflectors it has limited depth and that is almost a block of resistivity. It is not suspected that barite has been located on this section. Given strike of the vein it would have been expected to be at 310 meters.

#### Line 4:

Length: 216 meters

Array Type: Dipole – Dipole

Electrode Spacing: 2 meters

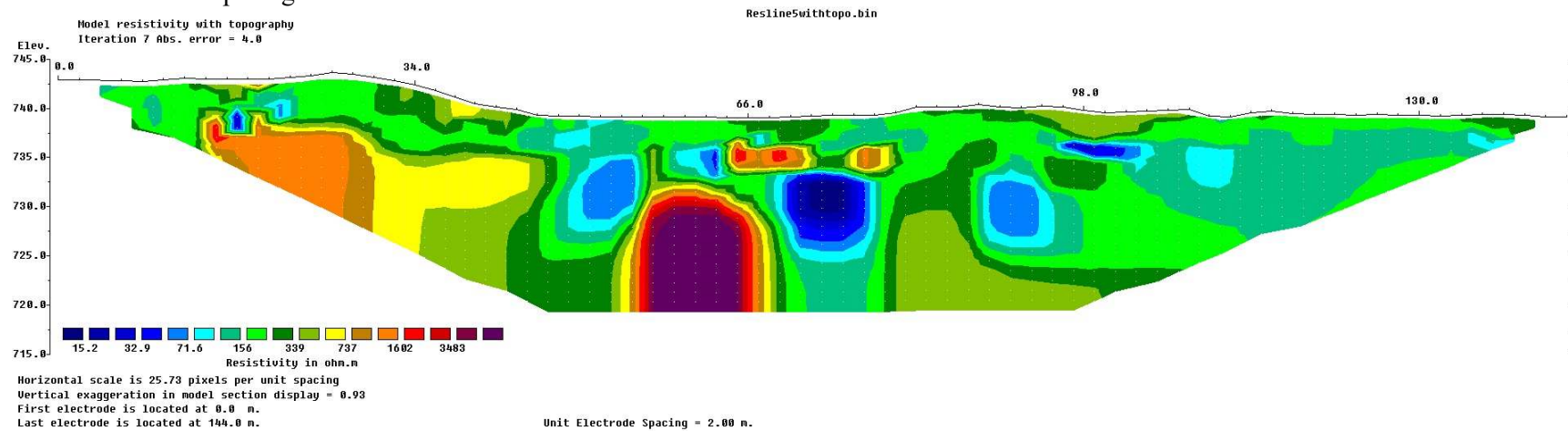


#### Interpretation:

At 176 meters a resistive reflector of  $> 550$  ohm/m is flanked by a resistivity low  $< 60$  ohm the width of the resistive reflector is approximately 10 meters. Due to the contrast of the units and there shape, when compared to line 5; it is interpreted that this is a probable barite vein. This vien is likely to be 3 meters wide and covered by 10 meter of glacial till. It is hypothesized that the glacial till has dampened the resistive signal from the barite vein. Several other moderate resistivity zones are noted in this pseudo section, they are possibly gabbroitic intrusions that are often found in close proximity to the barite veins.

**Line 5:** on lease, work applied to serve as an orientation survey for the lines 3 and 4 north of the pit.

Length: 150 meters  
Array Type: Dipole – Dipole  
Electrode Spacing: 2 meters



**Interpretation:** A strong reflector was found to be 3400 ohm/m near the center of the survey flanked by a unit of much lower resistivity 71 ohm/m, which is interpreted as a water occupied fault. Due to the resistive reflectors location and its proximity to a known ore vein, this resistive reflector is interpreted to be a clear indicator of barite. The reflector appears to be 9 meters wide, where in-reality the vein is this location is much closer to 3.5 meters, so it would appear the width of the reflector has been tripled.

**Discussion:**

Line 5 clearly hits barite with a resistive unit of 5500 Ohm/m next to a water bearing fault of 70 ohm/m this exact same reflector set is seen on line 3 on strike with the moose pit. Although absolute resistivity values seem to have been dampened by glacial till the overall reflector set seems to be congruent with barite. It is then inferred that barite extends from line 5 to line 4 a distance of 140 meters. Line 3 fails to show any indication of barite on strike, it is possible that the barite has begun to plunge and is at a deeper depth. Re-doing this line with 5 meter spacing would allow for confirmation of this idea as the wider spacing will allow for a deeper pseudo section. Line 2 and Line 1 could also benefit from wider spacing to see if the southern extension of moose pit can be traced at depth if not at surface.

Line 2 has shown that a low grade zone seen at surface west and of the moose pit is east dipping, and has some down dip extensions.

**Conclusions:**

It is inferred that barite extends off lease for 120 meters, or 140 meters beyond the pit limit. Using the following assumptions, width of 3 meters, mining depth of 50 meters, and density of  $4.2 \text{ g/cm}^3$  it is inferred that 88,000 tonnes barite exists in a northerly extensions of the moose ore body..

**Recommendations:**

Proposed and permitted diamond drill holes should be drilled to confirm presence of the inferred barite off lease. Line 1 and 3 should be re-done to ensure accuracy of data, with 5 meter spacing to allow for deeper penetration of resistivity measurements. An application to extend the lease northward should be put forward with a review and discussion about re-routing a natural drainage at the north end of the moose pit.

**Statement of qualifications:**

*I, Scott Allan, geologist, with business address of box 32069 Kelowna BC, V4T 3G2 and residential address of 331 Silver Valley Rise, NW, Calgary, Alberta, T3B 4B1 certify that,*

Obtained a Bachelor of Science degree from the University of Calgary in 2013

A registered geologist in training with Alberta Professional Engineers and Geoscientist Association (APEGA, member # 116181)


From 2010 to present I have been involved in production and exploration for Fireside Minerals Ltd. I have personally participated in field acquisition of data and data interpretation.

<b>Fireside Lynx Claim</b>		<b>Amount</b>	<b>Total</b>	<b>\$15,036.00</b>
Scott Allan -Geo	Oct 7th - 16th ( 9 days)	500 / day x 1	\$4,500.00	
Andrew Allan- President		700 / day x 1	\$0.00	
Jemma Allan - CFO		700 / day x 1	\$0.00	
Helper	Oct 7th - 16th ( 9 days)	300/ day x 1	\$2,700.00	
Diesel Fuel - minesite (L)		1.10 / L	\$0.00	
Gasoline - Minesite (L)		1.10 / L	\$0.00	
Diesel Fuel- Gas Station		1.10/ L	\$0.00	
Quad			\$0.00	
Truck			\$0.00	
Excavator trial building	Oct 7th - 9th, 15th (24 hrs)	\$250/ hr	\$6,000.00	
<i>Loring Labs</i>			\$0.00	
<b>Assaying Rock</b>			\$0.00	
	Log in Fee	\$0.50	\$0.00	
	Rehomoginize Samples	\$1.25	\$0.00	
	Whole Rock ICP - Total Digestion	\$60.00	\$0.00	
	30 Element ICP Analyses - Total Digestion	\$108.25	\$0.00	
	Specific Gravity Determinations	\$32.00	\$0.00	
	Sample Disposal Fee	\$1.00	\$0.00	
<b>Samples Soil</b>			\$0.00	
	Log in Fee	\$0.50	\$0.00	
	Sample Perparation	\$4.70	\$0.00	
	Barium	\$11.00	\$0.00	
	Lead & Zinc Geochem	\$7.45	\$0.00	
<i>Fireside Labs</i>			\$0.00	
	Thin Section Analysis	\$200.00	\$0.00	
	Specific Gravity Determinations	\$25.00	\$0.00	
	Water Solubule Alkaline earthmetals as calcium	\$100.00	\$0.00	
	Sample Prepartion	\$7.00	\$0.00	
<i>Calgary Rock</i>			\$0.00	
	Thin Section preperation	\$50.00	\$0.00	
	Detailed thin sections analysis	\$350.00	\$0.00	
	Brief thin sections analysis	\$250.00	\$0.00	
Resisitvity Equipment		\$ 204 / day	\$1,836.00	
Lodging		\$ 150 person	\$0.00	
Food Camp (\$25 / person)		\$ 25 / person	\$0.00	
Food Sub (\$50 / person)		\$ 50 / person	\$0.00	
Report Costs		\$1,350		
			\$15,036.00	



# APPENDIX 1




# Lynx Claim Location Map

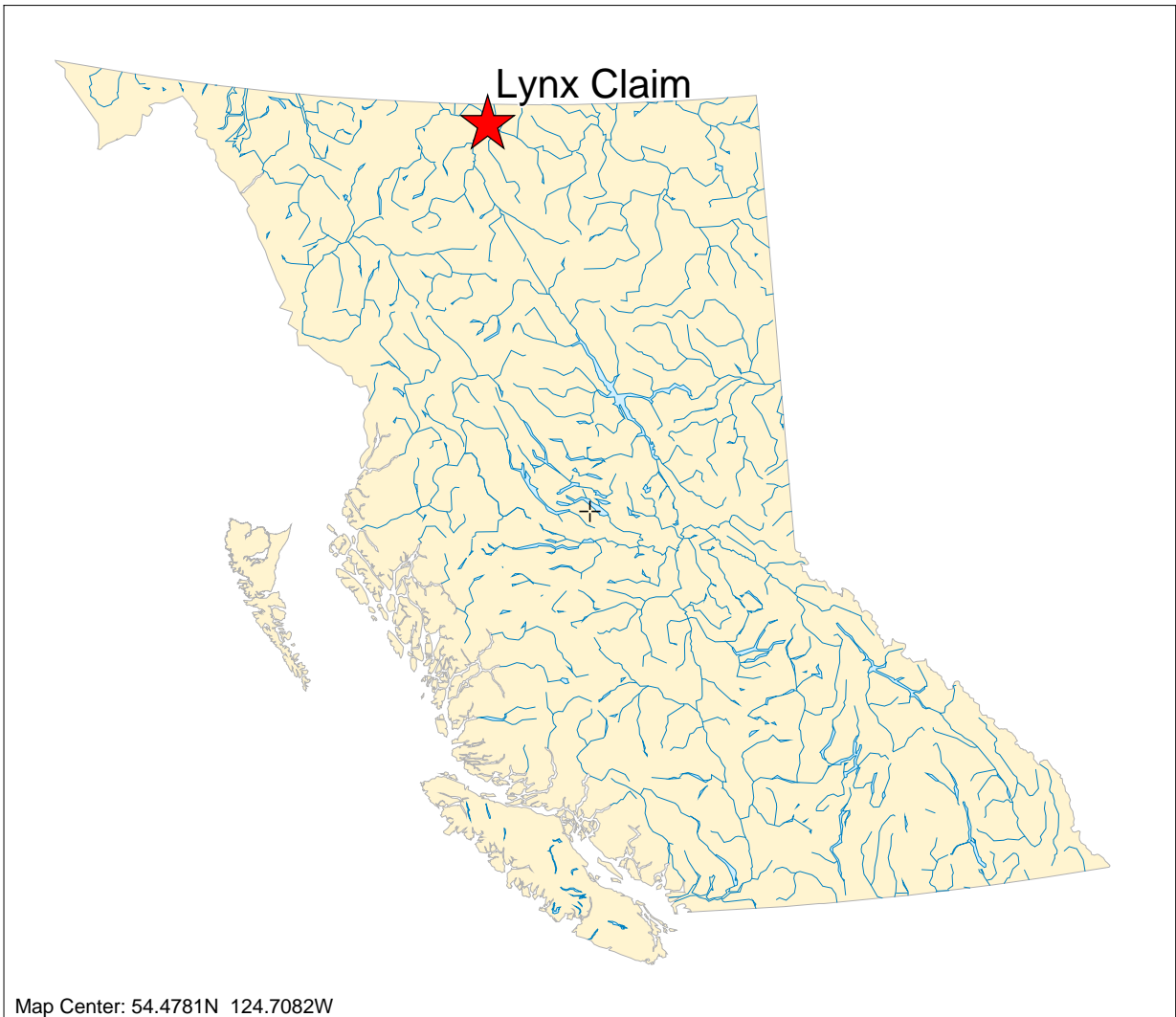
 **Lynx Claim Location**

**Topographic Layers**

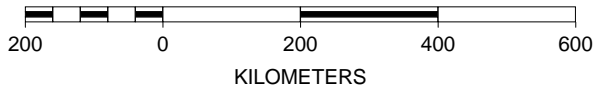
-  Lakes 1:6M
-  Rivers 1:6M

**BC Border Layers**

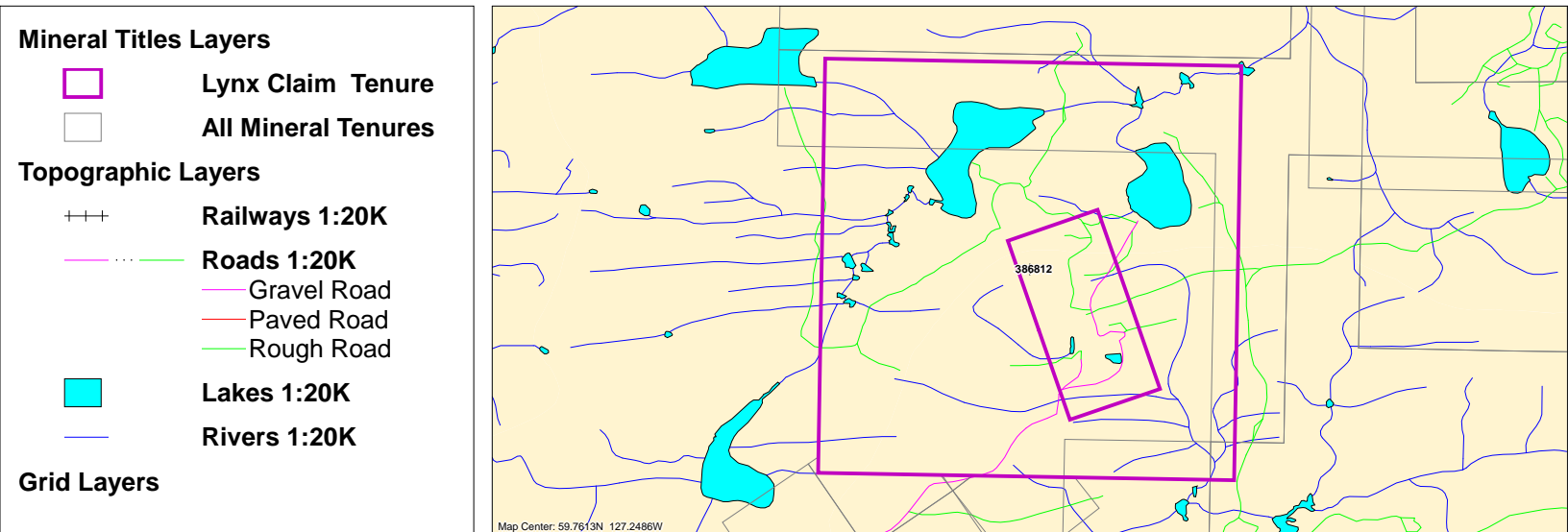
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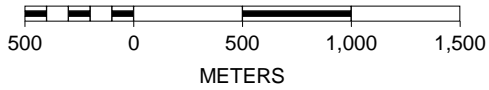
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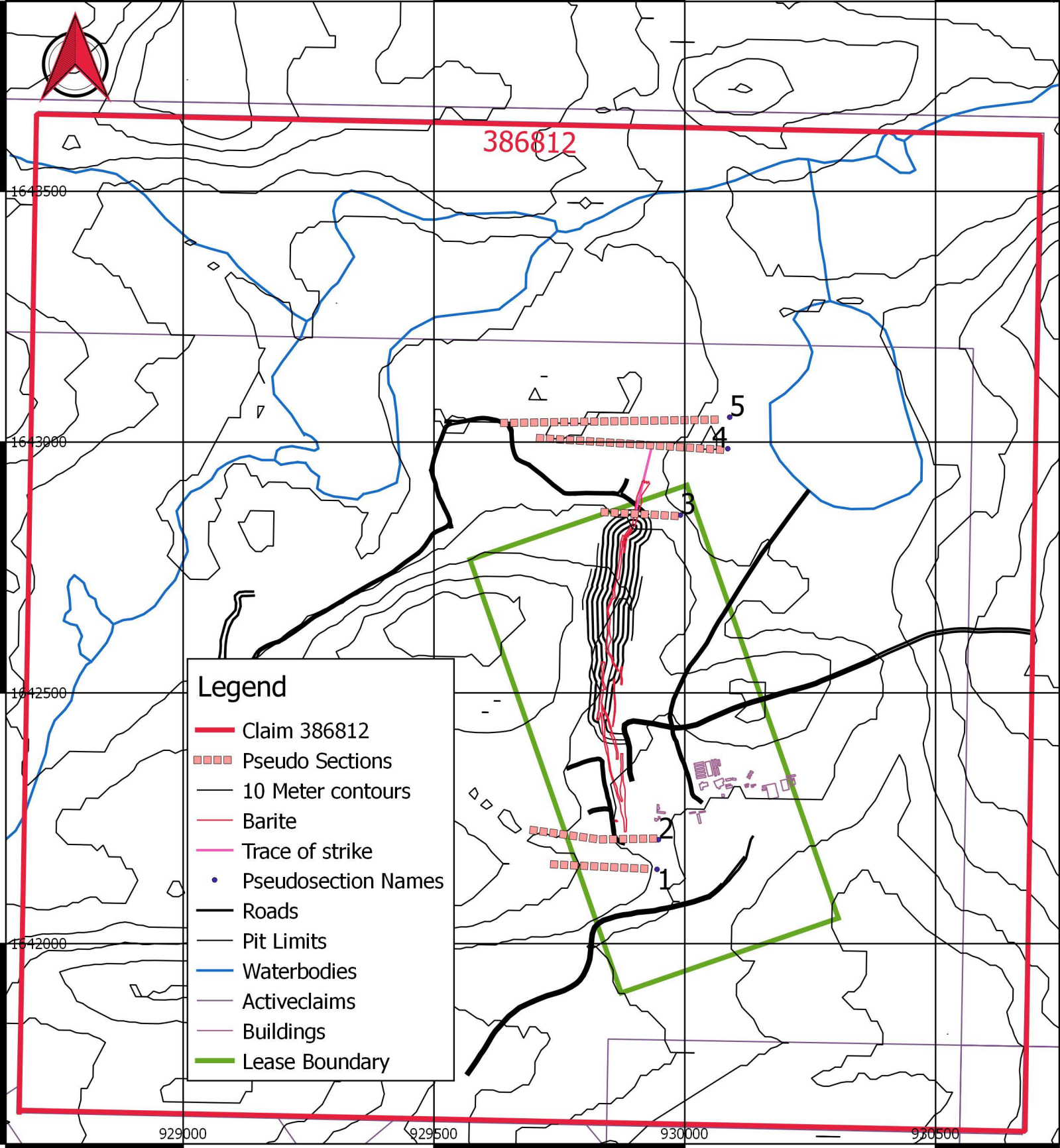


# Lynx Claim Map



SCALE 1 : 34,985

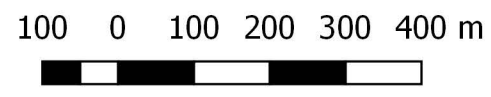




- Legend**
- Claim 386812
  - - - Pseudo Sections
  - 10 Meter contours
  - Barite
  - Trace of strike
  - Pseudosection Names
  - Roads
  - Pit Limits
  - Waterbodies
  - Activeclaims
  - Buildings
  - Lease Boundary

**Lynx Claim Map 386812**

Fireside Minerals Ltd.  
 Mapping Dec. 2017  
 By: Scott Allan



Scale 1:10,000

