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# **Elk Lake Mining Company Limited**

## **VLF EM Survey Over the**

## **Elk Lake Property**

# **James Township, Ontario**

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## 1. SURVEY DETAILS

### 1.1 PROJECT NAME

This project is known as the **Elk Lake Property**.

### 1.2 CLIENT

Elk Lake Mining Company Ltd.  
P.O. Box 219  
14579 Government Road  
Larder Lake, Ontario  
P0K 1K0

### 1.3 LOCATION

The Elk Lake Property is located in James Township approximately 2 km southwest of Elk Lake, Ontario. The survey area covers parts of claims numbered 4240784 and 4273173 located in James Township, within the Larder Lake Mining Division.



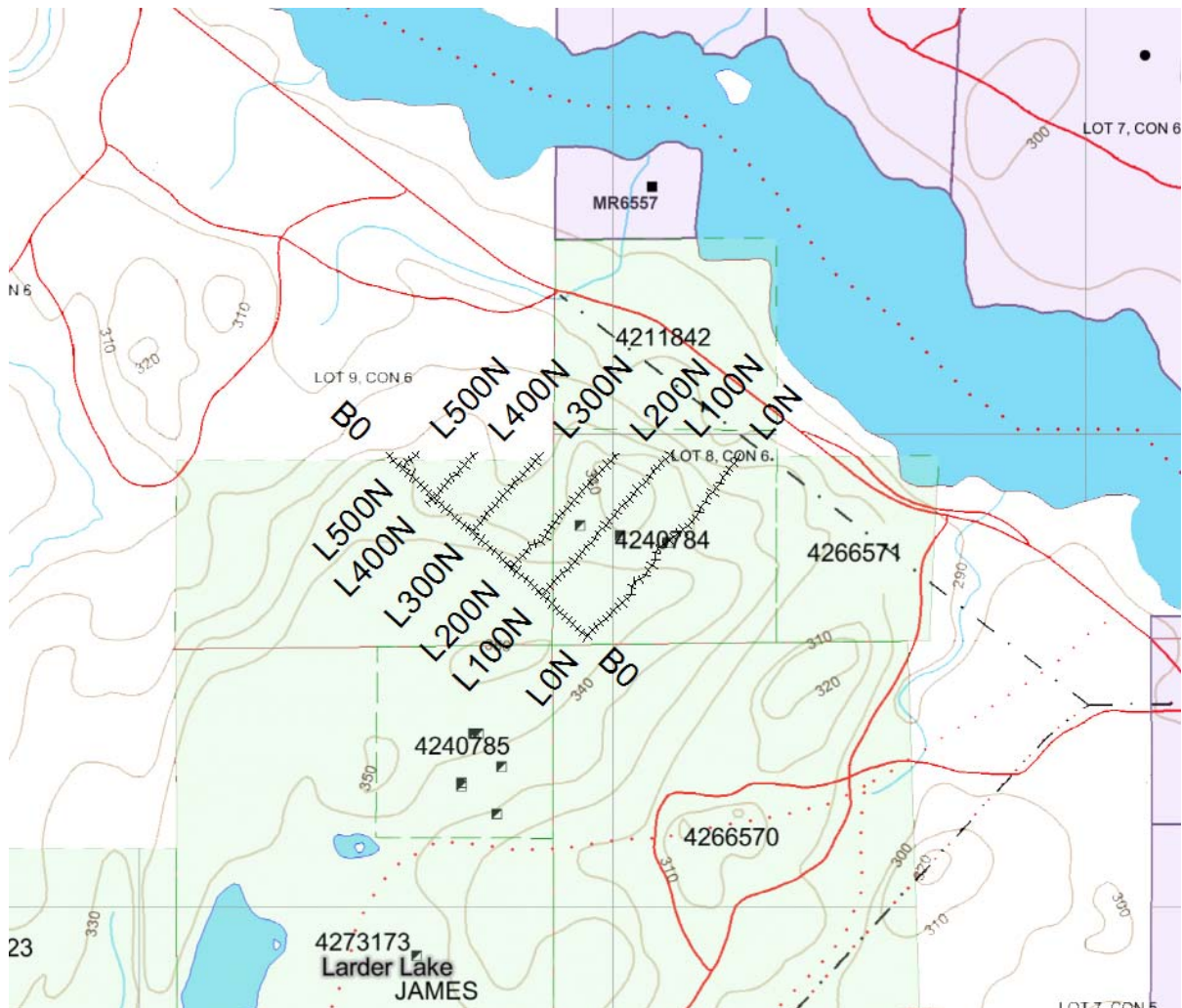
**Figure 1: Location of the Elk Lake Property**

## 1.4 ACCESS

Access to the property was attained with a 4x4 truck along highway 65. From Elk Lake highway 65 was travelled west for 1.7km where the truck was parked at a location 100m from the traverse area.

## 1.5 SURVEY GRID

The traversed lines were established using a GPS in conjunction with the execution of the survey. The GPS operator would establish sample locations while remaining approximately 12.5m in front of the VLF EM operator. GPS waypoints and VLF EM samples were taken every 12.5m along these controlled traverses. The GPS used was a Garmin GPSMAP 62s with an external antenna for added accuracy.



**Figure 2: Claim Map with Elk Lake Property Traverses**

## 2. SURVEY WORK UNDERTAKEN

### 2.1 SURVEY LOG

Date	Description	Line	Min Extent	Max Extent	Total Survey (m)
February 1, 2016	Locate survey area and start data acquisition.	0N	0E	500E	500
		100N	0E	412.5E	412.5
		200N	0E	337.5E	337.5
		300N	0E	225E	225
		400N	12.5W	137.5E	150
		500N	0	50	50
		0E	0N	575N	575
					2250

**Table 1: Survey Log**

### 2.2 PERSONNEL

Jason Ploeger of Larder Lake, Ontario, conducted all the VLF EM data collection with Bill Bonney of Kirkland Lake, Ontario being responsible for the GPS control and GPS waypoint collection.

### 2.3 SURVEY SPECIFICATIONS

The survey was conducted with a GSM-19 v7 VLF.

A total of 2.25 line kilometers of VLF EM was read over the Elk Lake Property on February 1, 2016. This consisted of 180 VLF EM samples taken at a 12.5m sample interval.



### 3. OVERVIEW OF SURVEY RESULTS

#### 3.1 SUMMARY INTERPRETATION



**Figure 3: Google Image with VLF EM Overlay**

One anomalous area is outlined from the VLF survey. This can be seen at the traverse coordinate of 0N and 137.5E or UTM coordinate 548042E and 5287675N. The anomaly represents a weak crossover which appears to be associated with a bed-rock response. I would recommend prospecting this area to determine the source of this anomaly.

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## APPENDIX A

### STATEMENT OF QUALIFICATIONS

I, C. Jason Ploeger, hereby declare that:

1. I am a professional geophysicist with residence in Larder Lake, Ontario and am presently employed as a Geophysicist and Geophysical Manager of Canadian Exploration Services Ltd. of Larder Lake, Ontario.
2. I am a Practising Member of the Association of Professional Geoscientists, with membership number 2172.
3. I graduated with a Bachelor of Science degree in geophysics from the University of Western Ontario, in London Ontario, in 1999.
4. I have practiced my profession continuously since graduation in Africa, Bulgaria, Canada, Mexico and Mongolia.
5. I am a member of the Ontario Prospectors Association, a Director of the Northern Prospectors Association and a member of the Society of Exploration Geophysicists.
6. I do not have nor expect an interest in the properties and securities of **Elk Lake Mining Company Ltd.**
7. I am responsible for the final processing and validation of the survey results and the compilation of the presentation of this report. The statements made in this report represent my professional opinion based on my consideration of the information available to me at the time of writing this report.



C. Jason Ploeger, P.Geo., B.Sc.  
Geophysical Manager  
Canadian Exploration Services Ltd.

Larder Lake, ON  
February 4, 2016



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## APPENDIX B

### THEORETICAL BASIS AND SURVEY PROCEDURES

#### VLF EM SURVEY

The frequency domain VLF electromagnetic survey is designed to measure both the vertical and horizontal in-phase (IP) and Quadrature (OP) components of the anomalous field from electrically conductive zones. The sources for VLF EM surveys are several powerful radio transmitters located around the world which generate EM radiation in the low frequency band of 15-25kHz. The signals created by these long-range communications and navigational systems may be used for surveying up to several thousand kilometres away from the transmitter. The quality of the incoming VLF signal can be monitored using the field strength. A field strength above 5pT will produce excellent quality results. Anything lower indicates a weak signal strength, and possibly lower data quality. A very low signal strength (<1pT) may indicate the radio station is down.

The EM field is planar and horizontal at large distances from the EM source. The two components, electric (E) and magnetic (H), created by the source field are orthogonal to each other. E lies in a vertical plane while H lies at right angles to the direction of propagation in a horizontal plane. In order to ensure good coupling, the strike of possible conductors should lie in the direction of the transmitter to allow the H vector to pass through the anomaly, in turn, creating a secondary EM field.

The VLF EM receiver has two orthogonal aeriels which are tuned to the frequency of the transmitting station. The direction of the source station is located by rotating the sensor around a vertical axis until a null position is found. The VLF EM survey procedure consists of taking measurements at stations along each line on the grid. The receiver is rotated about a horizontal axis, right angles to the traverse and the tilt recorded at the null position.

## APPENDIX C

### GSM 19



### Specifications

#### Overhauser Performance

- Resolution: 0.01 nT
- Relative Sensitivity: 0.02 nT
- Absolute Accuracy: 0.2nT
- Range: 20,000 to 120,000 nT
- Gradient Tolerance: Over 10,000nT/m
- Operating Temperature: -40°C to +60°C

#### Operation Modes

- Manual: Coordinates, time, date and reading stored automatically at min. 3 second interval.
- Base Station: Time, date and reading stored at 3 to 60 second intervals.
- Walking Mag: Time, date and reading stored at coordinates of fiducial.
- Remote Control: Optional remote control using RS-232 interface.
- Input/Output: RS-232 or analog (optional) output using 6-pin weatherproof connector.

#### Operating Parameters

- Power Consumption: Only 2Ws per reading. Operates continuously for 45 hours on standby.
- Power Source: 12V 2.6Ah sealed lead acid battery standard, other batteries available
- Operating Temperature: -50°C to +60°C

#### Storage Capacity

- Manual Operation: 29,000 readings standard, with up to 116,000 optional. With 3 VLF stations: 12,000 standard and up to 48,000 optional.
- Base Station: 105,000 readings standard, with up to 419,000 optional (88 hours or 14 days uninterrupted operation with 3 sec. intervals)
- Gradiometer: 25,000 readings standard, with up to 100,000 optional. With 3 VLF stations: 12,000, with up to 45,000 optional.

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## Omnidirectional VLF

Performance Parameters: Resolution 0.5% and range to  $\pm 200\%$  of total field.  
Frequency 15 to 30 kHz.

Measured Parameters: Vertical in-phase & out-of-phase, 2 horizontal components, total field coordinates, date, and time.

Features: Up to 3 stations measured automatically, in-field data review, displays station field strength continuously, and tilt correction for up to  $\pm 10^\circ$  tilts.

Dimensions and Weights: 93 x 143 x 150mm and weighs only 1.0kg.

## Dimensions and Weights

Dimensions:

Console: 223 x 69 x 240mm

Sensor: 170 x 71mm diameter cylinder

Weight:

Console: 2.1kg

Sensor and Staff Assembly: 2.0kg

## Standard Components

GSM-19 magnetometer console, harness, battery charger, shipping case, sensor with cable, staff, instruction manual, data transfer cable and software.

## Taking Advantage of a “Quirk” of Physics

Overhauser effect magnetometers are essentially proton precession devices except that they produce an order-of magnitude greater sensitivity. These "supercharged" quantum magnetometers also deliver high absolute accuracy, rapid cycling (up to 5 readings / second), and exceptionally low power consumption.

The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field. The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal-- that is ideal for very high-sensitivity total field measurement. In comparison with proton precession methods, RF signal generation also keeps power consumption to an absolute minimum and reduces noise (i.e. generating RF frequencies are well out of the bandwidth of the precession signal).

In addition, polarization and signal measurement can occur simultaneously - which enables faster, sequential measurements. This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

## APPENDIX C

### GARMIN GPS MAP 62S



Physical & Performance:	
Unit dimensions, WxHxD:	2.4" x 6.3" x 1.4" (6.1 x 16.0 x 3.6 cm)
Display size, WxH:	1.43" x 2.15" (3.6 x 5.5 cm); 2.6" diag (6.6 cm)
Display resolution, WxH:	160 x 240 pixels
Display type:	transflective, 65-K color TFT
Weight:	9.2 oz (260.1 g) with batteries
Battery:	2 AA batteries (not included); NiMH or Lithium recommended
Battery life:	20 hours
Waterproof:	yes (IPX7)
Floats:	no
High-sensitivity receiver:	yes
Interface:	high-speed USB and NMEA 0183 compatible
Maps & Memory:	
Basemap:	yes
Preloaded maps:	no
Ability to add maps:	yes
Built-in memory:	1.7 GB
Accepts data cards:	microSD™ card (not included)
Waypoints/favorites/locations:	2000

Routes:	200
Track log:	10,000 points, 200 saved tracks
<b>Features &amp; Benefits:</b>	
Automatic routing (turn by turn routing on roads):	yes (with optional mapping for detailed roads)
Electronic compass:	yes (tilt-compensated, 3-axis)
Touchscreen:	no
Barometric altimeter:	yes
Camera:	no
<u>Geocaching-friendly:</u>	yes (paperless)
<u>Custom maps compatible:</u>	yes
Photo navigation (navigate to geotagged photos):	yes
Outdoor GPS games:	no
Hunt/fish calendar:	yes
Sun and moon information:	yes
Tide tables:	yes
Area calculation:	yes
Custom POIs (ability to add additional points of interest):	yes
Unit-to-unit transfer (shares data wirelessly with similar units):	yes
Picture viewer:	yes
Garmin Connect™ compatible (online community where you analyze, categorize and share data):	yes

- *Specifications obtained from [www.garmin.com](http://www.garmin.com)*

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## **APPENDIX D**

### **LIST OF MAPS (IN MAP POCKET)**

Posted Profiled VLF EM Plan Map (1:2500)

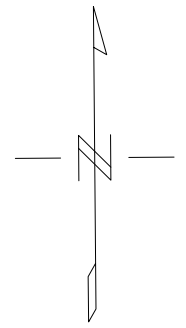
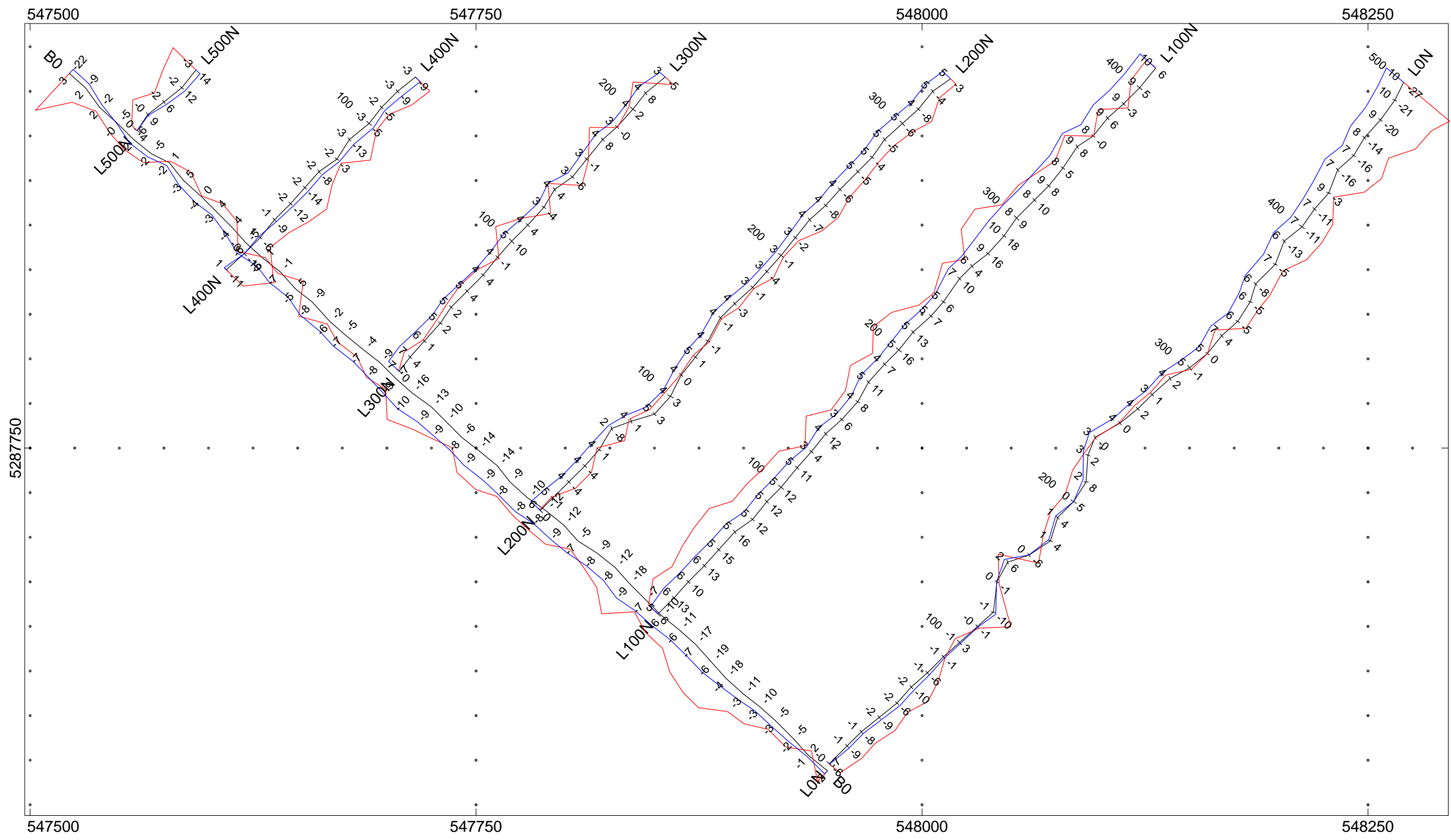
- 1) ELK LAKE-ELK LAKE-VLF-NML

Claim Map with VLF EM Traverses (1:20000)

- 2) ELK LAKE-ELK LAKE-GRID

**TOTAL MAPS = 2**





**ELK LAKE MINING COMPANY LIMITED**

**ELK LAKE PROPERTY  
James Township, Ontario**

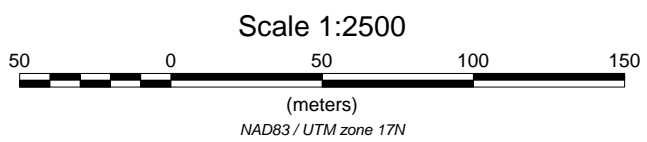
VLF IN PHASE/OUT PHASE PROFILE  
25.2kHz NML - LAMOUR USA

In Phase: Posted Right/Bottom (Red)  
Out Phase: Posted Left/Top (Blue)

Vertical Profile Scales: 2 %/mm

Station Separation: 12.5 meters  
Posting Level: 0

GSM-19 VLF v7



Receiver Operated By: C Jason Ploeger  
GPS Operated By: Bill Bonney  
Processed by: C Jason Ploeger  
Map Drawn By: C Jason Ploeger, P.Geo  
February 2016





Date / Time of Issue: Mon Jan 13 08 29 35 EST 2014

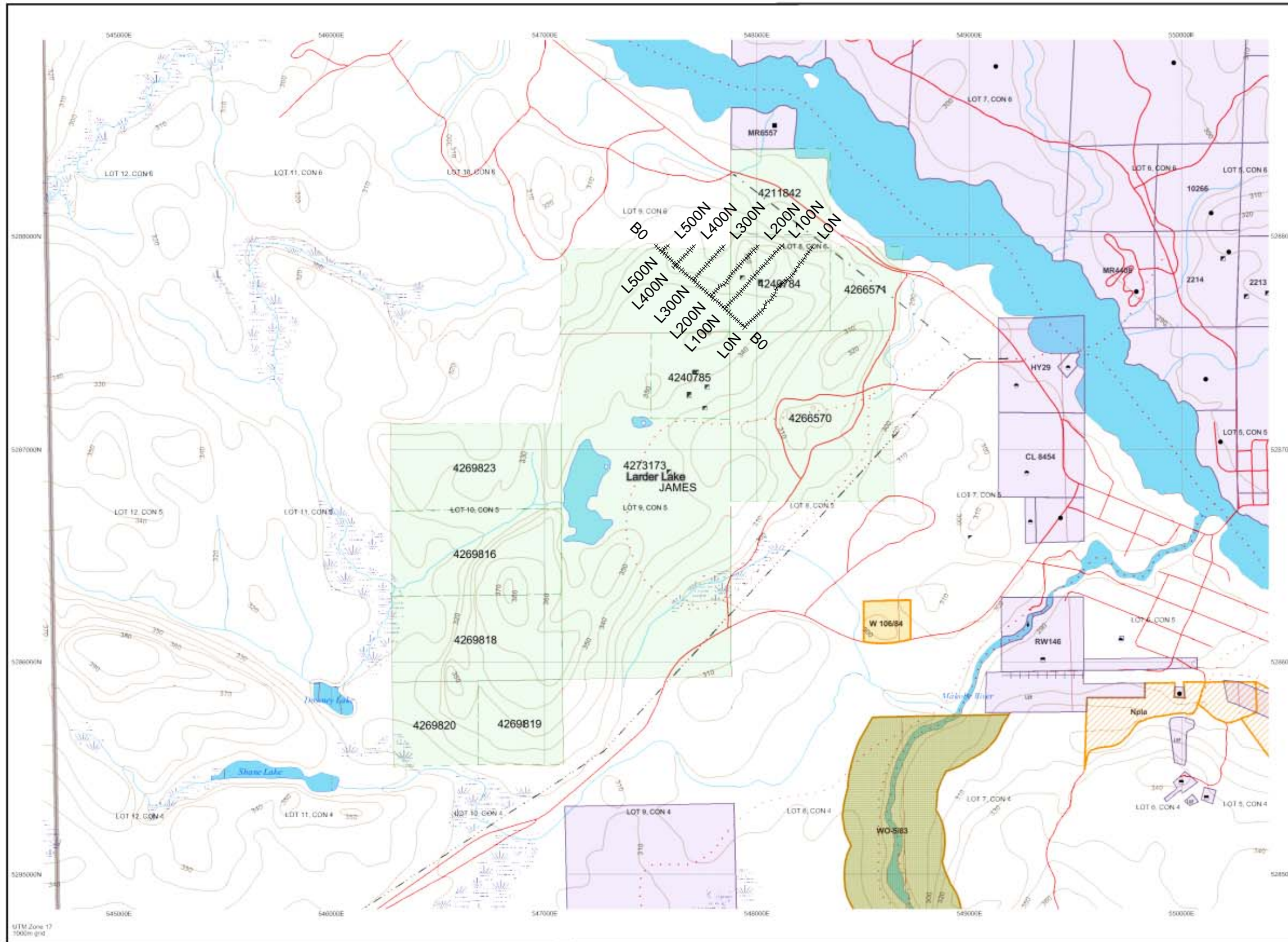
TOWNSHIP / AREA  
JAMES

PLAN  
M-0225

ADMINISTRATIVE DISTRICTS / DIVISIONS

Mining Division  
Land Titles/Registry Division  
Ministry of Natural Resources District

Larder Lake  
TIMISKAMING  
KIRKLAND LAKE



TOPOGRAPHIC

- Administrative Boundaries
- Township
- Concession Lot
- Provincial Park
- Indian Reserve
- Crt. Pt & Pile
- Contour
- Mine Shaft
- Mine Headframe
- Railway
- Road
- Trail
- Natural Gas Pipeline
- Utilities
- Tower

Land Tenure

- Freehold Patent:**
  - Surface And Mining Rights
  - Surface Rights Only
  - Mining Rights Only
- Leasehold Patent:**
  - Surface And Mining Rights
  - Surface Rights Only
  - Mining Rights Only
- License of Occupation:**
  - Uses Not Specified
  - Surface And Mining Rights
  - Surface Rights Only
  - Mining Rights Only
- Land Use Permit:**
  - Land Use Permit
  - Order In Council (Not open for staking)
  - Water Power Lease Agreement



LAND TENURE WITHDRAWALS

- Areas Withdrawn from Disposition
- Mining Acts Withdrawal Types
  - Wsm: Surface And Mining Rights Withdrawn
  - Ws: Surface Rights Only Withdrawn
  - Wm: Mining Rights Only Withdrawn
- Order In Council Withdrawal Types
  - W'cm: Surface And Mining Rights Withdrawn
  - W's: Surface Rights Only Withdrawn
  - W'm: Mining Rights Only Withdrawn

No IMPORTANT NOTICES



LAND TENURE WITHDRAWAL DESCRIPTIONS (list may not be complete)

Identifier	Type	Date	Description
W 106/84	Ws	Jan 1, 2001	SURFACE RIGHTS WITHDRAWN FROM STAKING SECTION 36/8 ORDER NRW 100/84
WO-583	Wsm	Jan 1, 2001	SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING SECTION 36/8 ORDER NO. WO-583

IMPORTANT NOTICES

Areas under which special regulation, limitations or conditions exist that affect normal prospecting, staking and mineral development activities.

Those wishing to stake mining claims should consult with the Provincial Mining Records' Office of the Ministry of Northern Development and Mines for additional information on the status of the lands shown hereon. This map is not intended for navigational, survey, or land title determination purposes as the information shown on this map is compiled from various sources. Completeness and accuracy are not guaranteed. Additional information may also be obtained through the local Land Titles or Registry Office, or the Ministry of Natural Resources.

The information shown is derived from digital data available in the Provincial Mining Records' Office at the time of downloading from the Ministry of Northern Development and Mines web site.

General Information and Limitations

Contact Information:  
Provincial Mining Records' Office  
Walker Green Miller Centre 933 Ramsey Lake Road  
Sudbury ON P3E 6B5  
Home Page: [www.mdm.gov.on.ca/MNDM/MINES/LANDS/ntmsrmpge.htm](http://www.mdm.gov.on.ca/MNDM/MINES/LANDS/ntmsrmpge.htm)

Toll Free  
Tel: 1 (888) 415-9845 ext 574  
Fax: 1 (877) 670-1444

Map Datum: NAD 83  
Projection: UTM (6 degree)  
Topographic Data Source: Land Information Ontario  
Mining Land Tenure Source: Provincial Mining Records' Office

This map may not show unregistered land tenure and interests in land including certain patents, leases, easements, right of ways, flooding rights, licences, or other forms of disposition of rights and interest from the Crown. Also certain land tenure and land uses that restrict or prohibit free entry to stake mining claims may not be illustrated.