REPORT ON COMBINED HELICOPTER-BORNE MAGNETIC AND VLF-EM SURVEY NOSEWORTHY TOWNSHIP, ONTARIO

for

LOYDEX RESOURCES INCORPORATED

by

AERODAT LIMITED

December, 1984

TABLE OF CONTENTS

LIST OF MAPS

(Scale: 1:10,000)

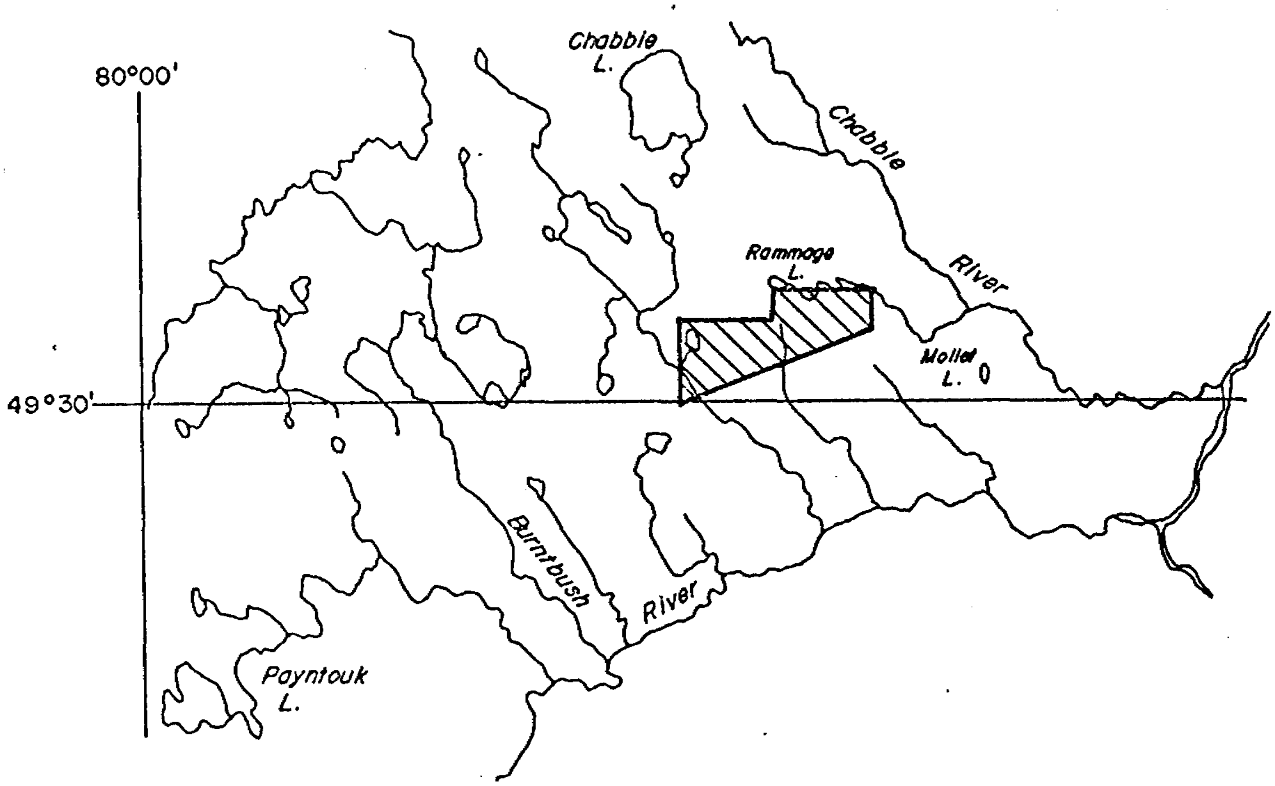
1. INTRODUCTION

This report describes an airborne geophysical survey carried out on behalf of Loydex Resources Incorporated by Aerodat Limited. Equipment operated included a magnetometer, a VLF-EM system, and a radar positioning system.

The survey was located in the Noseworthy Township in north-eastern Ontario. Flown on November 22, 1984, a total of 83.7 line kilometers (52 line miles) of data were collected.

2. SURVEY AREA

The survey area is indicated on the map below. The flight line direction was north/south with a nominal line spacing of 100 meters.



3. AIRCRAFT AND EQUIPMENT

3.1 Aircraft

The helicopter used for the survey was an Aerospatiale A-Star 350D owned and operated by Maple Leaf Helicopters. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a nominal terrain clearance of 60 meters.

3.2 Equipment

3.2.1 Magnetometer

The magnetometer was a Geometrics G-803 proton precession type. The sensitivity of the instrument was 1 gamma at a 0.5 second sample rate. The sensor was towed in a bird 30 meters below the helicopter.

3.2.2 VLF-EM System

The VLF-EM system was a Herz Totem 1A. This instrument measures the total field and vertical quadrature component of the signal from the selected transmitting station. The station used was NAA (Cutler, Maine, transmitting frequency of 24.0 kHz). The sensor was towed in a bird 30 meters below the helicopter.

3.2.2 Magnetic Base Station

An IFG proton precession type magnetometer was operated at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation.

3.2.3 Radar Altimeter

A Hoffman HRA-100 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude for maximum accuracy.

3.2.4 Tracking Camera

A Geocam tracking camera was used to record flight path on 35 mm film. The camera was operated in strip mode and the fiducial numbers for cross-reference to the analog and digital data were imprinted on the margin of the film.

3.2.5 Analog Recorder

An RMS dot-matrix recorder was used to display the data during the survey. In addition to manual and time fiducials, the following data was recorded:

Channel	Input	Scale
06	VLF Quadrature	2.5 %/mm
07	VLF Total Field	2.5 %/mm
13	Altimeter	10 ft./mm
14	Magnetometer	5 gamma/mm
15	Magnetometer	50 gamma/mm

3.2.7 Digital Recorder

A Perle DAC/NAV data system recorded the survey data on magnetic tape. Information recorded was as follows:

Equipment	Interval
VLF-EM	0.5 second
Magnetometer	0.5 second

4. DATA PRESENTATION

4.1 Base Map and Flight Path

The base is a screened topographic map at a scale of 1:10,000.

The flight path was derived from the Mini-Ranger radar positioning system. The distance from the helicopter to two established reference locations was measured several times per second, and the position of the helicopter mathematically calculated by triangulation. It is estimated that the flight path is generally accurate to about 10 meters with respect to the topographic detail of the base map. The flight path is presented with fiducials for cross-reference to both the analog and digital data.

4.2 Total Field Magnetic Contours

The aeromagnetic data was corrected for diurnal variations by subtraction of the digitally recorded base station magnetic profile. No correction for regional variation was applied.

The corrected profile data was interpolated onto a regular grid at a 25 m true scale interval using a cubic spline technique. The grid provided the basis for threading the presented contours at a 10 gamma interval.

The aeromagnetic data was presented with flight path on a topographic map base.

4.3 VLF-EM Total Field Contours

The VLF-EM signal from NAA (Cutler, Maine) was compiled in map form. The mean response level of the total field signal was removed and the data was gridded and contoured at an interval of 2%. The VLF-EM data has been presented with flight path on the topographic map base.

Respectfully submitted,

AERODAT LIMITED

Glenn A. Boustead

December, 1984

Glenn A. Boustead, B.A.Sc.

APPENDIX I - General Interpretive Considerations

Magnetics

The total field magnetic map shows contours of the total magnetic field, uncorrected for regional variation. This data can be quite useful for geological mapping, as it reflects the varying magnetic properties of the underlying rocks. In general, the magnetic response increases in intensity as the rock type goes from felsic to intermediate to mafic. The amplitude, shape and size of the anomaly can be used to determine the geometry, position and depth of the causative body.

When correlated with electromagnetic data, the magnetics are a useful tool for outlining potential exploration targets. An apparent coincidence between a VLF-EM and a magnetic anomaly may be caused by a conductor which is also magnetic (such as sulphides containing pyrrhotite and/or magnetite), or by a conductor which lies in close association with a magnetic body (such as graphites and magnetites). It is often very difficult to distinguish between these cases.

More indirectly, varying intensities and pattern shifts on the magnetic contours can be interpreted as certain rock types, stratigraphic horizons, faults or folds which might be geologically favourable to a specific type of mineralization.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is elliptically polarized in the vicinity of electrical conductors. The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component of the polarization ellipse.

The relatively high frequency of VLF 15-25 kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field response is an indicator of the existence and position of a conductivity anomaly. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

The vertical quadrature component over steeply dipping sheet like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The amplitude of the quadrature response, as opposed to shape is function of target conductance and depth as well as the conductivity of the overburden and host rock. As the primary field travels down to the conductor through conductive material it is both attenuated and phase shifted in a negative sense. The secondary field produced by this altered field at the target also has an associated phase shift. This phase shift is positive and is larger for relatively poor conductors. This secondary field is attenuated and phase shifted in a negative sense during return travel to the surface. The net effect of these 3 phase shifts determine the phase of the secondary field sensed at the receiver.

A relatively poor conductor in resistive ground will yield a net positive phase shift. A relatively good conductor in more conductive ground will yield a net negative phase shift. A combination is possible whereby the net phase shift is zero and the response is purely in-phase with no quadrature component.

A net positive phase shift combined with the geometrical cross-over shape will lead to a positive quadrature response on the side of approach and a negative on the side of departure. A net negative phase shift would produce the reverse. A further sign reversal occurs with a 180 degree change in instrument orientation as occurs on reciprocal line headings. During digital processing of the quadrature data for map presentation this is corrected for by normalizing the sign to one of the flight line headings.

32E12SE0086 2.7783 NOSEWORTHY

900

Mining Lands Section

Control Sheet

File No 2.7783

TYPE OF SURVEY ✓ GEOPHYSICAL

____ GEOLOGICAL

____ GEOCHEMICAL

____ EXPENDITURE

MINING LANDS COMMENTS:

Doug

Signature of Assessor

7/2/85

Date

LD gd

Ontario Natural Resources

(Geophysical, Geological, Geochemical and Expenditures)

2.7783

Mining Act

Note: – If number of mining claims traversed exceeds space on this form, attach a list. Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

#30

Type of Survey(s): HELICOPTER-BORNE MAGNETIC & VLF-EM Survey

Township or Area: NOSEWORTHY TWP

Claim Holder(s): LOYDEX RESOURCES INC

Prospector's Licence No.: T 1293

Address: 24 KENTON CRT., WHITBY, ONTARIO L1N 5X7

Survey Company: AERODAT LIMITED

Date of Survey (from & to): 22 11 84 22 11 84 (Day Mo. Yr. Day Mo. Yr.)

Total Miles of line ~~Cut~~ FLOWN: 52

Name and Address of Author (of Geo-Technical report): G. A. BOOSTEAD, AERODAT LIMITED, 3883 NASHUA DRIVE, MISSISSAUGA, ONT

Credits Requested per Each Claim in Columns at right

Special Provisions	Geophysical	Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	- Electromagnetic	
	- Magnetometer	
For each additional survey using the same grid: Enter 20 days (for each)	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

LARDER LAKE MINING DIV. RECEIVED JAN 23 1985 AM PM 7 8 9 10 11 12 1 2 3 4 5 6

LARDER LAKE MINING DIV. RECEIVED JAN -9 1985 AM PM 7 8 9 10 11 12 1 2 3 4 5 6

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	789509		L	789532	
	789510			789533	
	789511			789534	
	789512			789535	
	789513			789536	
	789514			789537	
	789515			789538	
	789516			789539	
	789517			789540	
	789518			789541	
	789519			789542	
	789520			789543	
	789521			789544	
	789522			789545	
	789523			789546	
	789524			789547	
	789525			789548	
	789526			789549	
	789527			789550	
	789528			789551	
	789529			789552	
	789530			789553	
	789531			789554	

(see attached list)

Total number of mining claims covered by this report of work: 52

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
2080	JAN 23 1985	[signature]
	Date Approved as Recorded: 85.2.18	Branch Director: [signature]

Date: Jan 21/85 — Recorded Holder or Agent (Signature): L J Nelson

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: L J NELSON, 24 KENTON CRT, WHITBY, ONT

Date Certified: Jan 7/85 — Certified by (Signature): L J Nelson

Mining Claims traversed (continued)

L 789555
789556
789557
789558
789559
789560

TOTAL NUMBER
OF CLAIMS COVERED
BY THIS SURVEY ——— (52)

C J Nelson
Jan 7/85

File________

Ontario

Ministry of Natural Resources

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) HELICOPTER-BORNE MAGNETIC AND VLF-EM SURVEY
Township or Area NOSEWORTHY
Claim Holder(s) LOYDEX RESOURCES INC

Survey Company AERODAT LIMITED
Author of Report GLENN A. BOUSTEAD
Address of Author AERODAT LIMITED 3883 NASHUA DRIVE MISSISSAUGA, ONT
Covering Dates of Survey NOVEMBER 22, 1984
(linecutting to office)
Total Miles of Line ~~cut~~ FLOWN 52 Line miles

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	~~40~~
–Magnetometer	~~20~~
–Radiometric	
–Other	
Geological	
Geochemical	

RECEIVED
FEB 07 1985
MINING LANDS SECTION

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer 40 Electromagnetic 40 Radiometric ____
(enter days per claim)

DATE: January 7/85 SIGNATURE: L J Nelson
Author of Report or Agent

Res. Geol.________ Qualifications 26114

Previous Surveys

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
L	789509
	789510
	789511
	789512
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	789529
	789530

If space insufficient, attach list

TOTAL CLAIMS________

837 (5/79)

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations ____________________ Number of Readings ____________________

Station interval ____________________ Line spacing ____________________

Profile scale ____________________

Contour interval ____________________

MAGNETIC

Instrument ____________________

Accuracy – Scale constant ____________________

Diurnal correction method ____________________

Base Station check-in interval (hours) ____________________

Base Station location and value ____________________

ELECTROMAGNETIC

Instrument ____________________

Coil configuration ____________________

Coil separation ____________________

Accuracy ____________________

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency ____________________ (specify V.L.F. station)

Parameters measured ____________________

GRAVITY

Instrument ____________________

Scale constant ____________________

Corrections made ____________________

Base station value and location ____________________

Elevation accuracy ____________________

INDUCED POLARIZATION RESISTIVITY

Instrument ____________________

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time ____________________ Frequency ____________________

– Off time ____________________ Range ____________________

– Delay time ____________________

– Integration time ____________________

Power ____________________

Electrode array ____________________

Electrode spacing ____________________

Type of electrode ____________________

SELF POTENTIAL

Instrument ______ Range ______

Survey Method ______

Corrections made ______

RADIOMETRIC

Instrument ______

Values measured ______

Energy windows (levels) ______

Height of instrument ______ Background Count ______

Size of detector ______

Overburden ______
(type, depth – include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey ______

Instrument ______

Accuracy ______

Parameters measured ______

Additional information (for understanding results) ______

AIRBORNE SURVEYS

Type of survey(s) ______

Instrument(s) ① Geometrics G-803 proton precession ② Herz Totem 1A
(specify for each type of survey)

Accuracy ① 1 gamma at a 0.5 second sample rate ② Measures total field and vertical quadrature from station NAA.
(specify for each type of survey)

Aircraft used Aerospatiale A-Star 350 D Helicopter.

Sensor altitude 30 m.

Navigation and flight path recovery method Geocam tracking camera was used to record flight path on 35 mm film.

Aircraft altitude 60 m Line Spacing 100 m.

Miles flown over total area 52 line miles. Over claims only 52 claims · 52 miles.

GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken ______________________

____

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Total Number of Samples ______________________

Type of Sample ______________________
(Nature of Material)

Average Sample Weight ______________________

Method of Collection ______________________

____

Soil Horizon Sampled ______________________

Horizon Development ______________________

Sample Depth ______________________

Terrain ______________________

____

Drainage Development ______________________

Estimated Range of Overburden Thickness ______________________

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SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis ______________________

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General ______________________

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ANALYTICAL METHODS

Values expressed in: per cent ☐ p. p. m. ☐ p. p. b. ☐

Cu, Pb, Zn, Ni, Co, Ag, Mo, As,-(circle)

Others ______________________

Field Analysis (______________________ tests)

Extraction Method ______________________

Analytical Method ______________________

Reagents Used ______________________

Field Laboratory Analysis

No. (______________________ tests)

Extraction Method ______________________

Analytical Method ______________________

Reagents Used ______________________

Commercial Laboratory (______________________ tests)

Name of Laboratory ______________________

Extraction Method ______________________

Analytical Method ______________________

Reagents Used ______________________

General ______________________

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C S Nelson

(see page 3)

6 Page 3 of claim list (continued)

L 789558
789559
789560

Total number of claims 52.

CJ Nelson
Jan 7, 1985

Natural Resources Ontario

(Geophysical, Geological, Geochemical and Expenditures)

2.7783

Mining Act

Note: – exceeds space on this form, attach a list. Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
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Type of Survey: HELICOPTER-BORNE MAGNETIC + VLF-EM Survey

Township or Area: NOSEWORTHY TWP

Claim Holder(s): LOYDEX RESOURCES INC

Prospector's Licence No.: T 1293

Address: 24 KENTON CRT., WHITBY, ONTARIO L1N 5X7

Survey Company: AERODAT LIMITED

Date of Survey (from & to): 22 11 84 – 22 11 84

Total Miles of line Flown: 52

Name and Address of Author (of Geo-Technical report): G. A. BOOSTEAD, AERODAT LIMITED, 3883 NASHUA DRIVE, MISSISSAUGA, ONT

Credits Requested per Each Claim in Columns at right

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	- Other	
	Geological	
	Geochemical	

Man Days	Geophysical	Days per Claim
Complete reverse side and enter total(s) here	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

LARDER LAKE MINING DIV. RECEIVED JAN 23 1985 AM PM 7 8 9 10 11 12 1 2 3 4 5 6

LARDER LAKE MINING DIV. RECEIVED JAN -9 1985 AM PM 7 8 9 10 11 12 1 2 3 4 5 6

Expenditures (excludes power stripping)

Type of Work Performed:

Performed on Claim(s):

Calculation of Expenditure Days Credits

Total Expenditures $ ÷ 15 = Total Days Credits

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date: Jan 21/85 — Recorded Holder or Agent (Signature): [signature]

Mining Claims Traversed (List in numerical sequence)

Prefix	Number	Expend. Days Cr.	Prefix	Number	Expend. Days Cr.
L	789509	✓	L	789532	✓
	789510	✓		789533	✓
	789511	✓		789534	✓
	789512	✓		789535	✓
	789513	✓		789536	✓
	789514	✓		789537	✓
	789515	✓		789538	✓
	789516	✓		789539	✓
	789517	✓		789540	✓
	789518	✓		789541	✓
	789519	✓		789542	✓
	789520	✓		789543	✓
	789521	✓		789544	✓
	789522	✓		789545	✓
	789523	✓		789546	✓
	789524	✓		789547	✓
	789525	✓		789548	✓
	789526	✓		789549	✓
	789527	✓		789550	✓
	789528	✓		789551	✓
	789529	✓		789552	✓
	789530	✓		789553	✓
	789531	✓		789554	✓

(see attached list)

Total number of mining claims covered by this report of work: 52

For Office Use Only

Total Days Cr. Recorded	Date Recorded	Mining Recorder
2080	JAN 23 1985	[signature]
	Date Approved as Recorded	Branch Director

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying: L J NELSON, 24 KENTON CRT, WHITBY, ONT

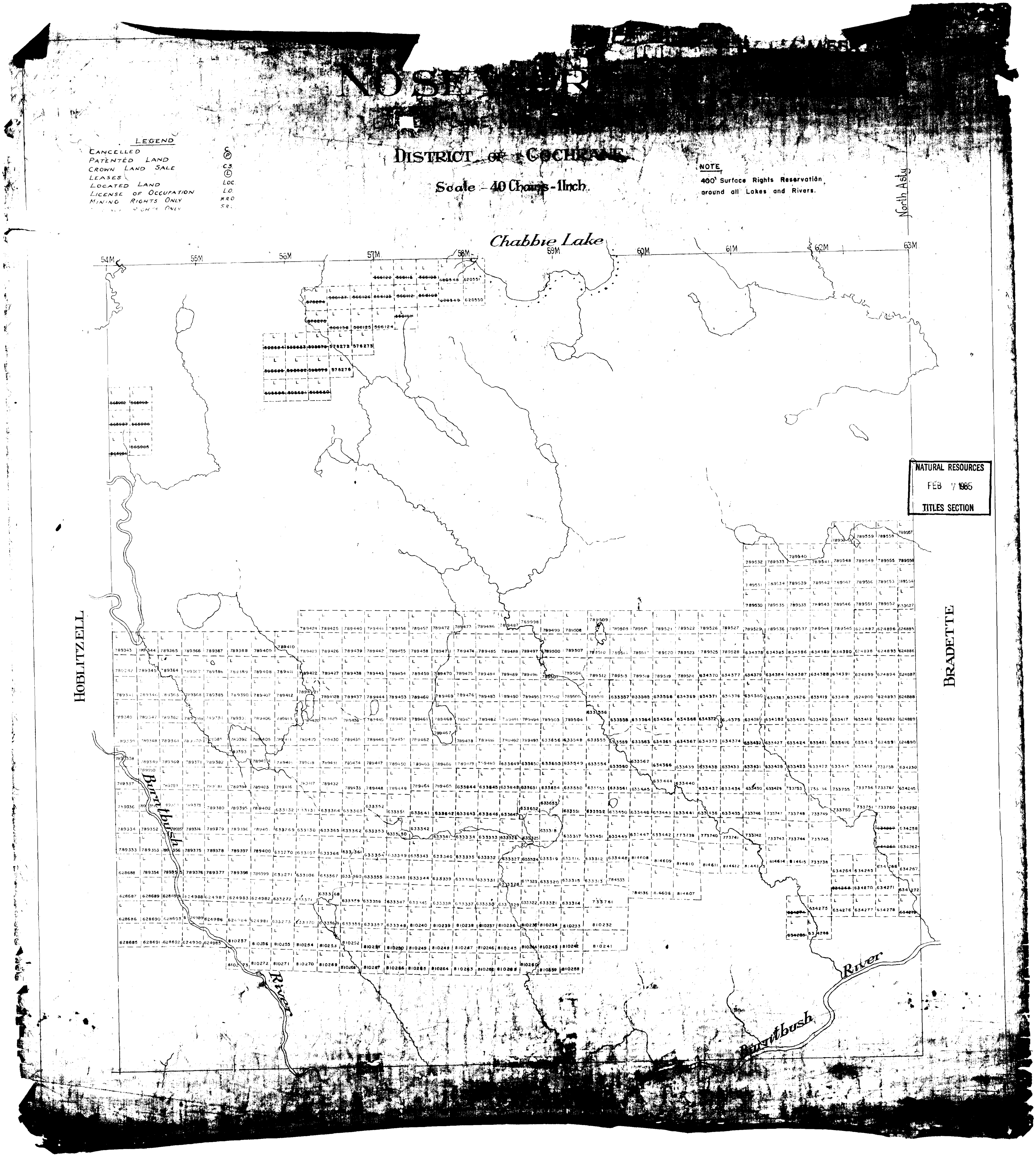
Date Certified: Jan 7/85 — Certified by (Signature): [signature]

Mining Claims traversed (continued)

L 789555 ✓
789556 ✓
789557 ✓
789558 ✓
789559 ✓
789560 ✓

TOTAL NUMBER
OF CLAIMS COVERED
BY THIS SURVEY —— (52)

C J Nelson
Jan 7/85



32F12SE0086 2.7783 NOSEWORTHY

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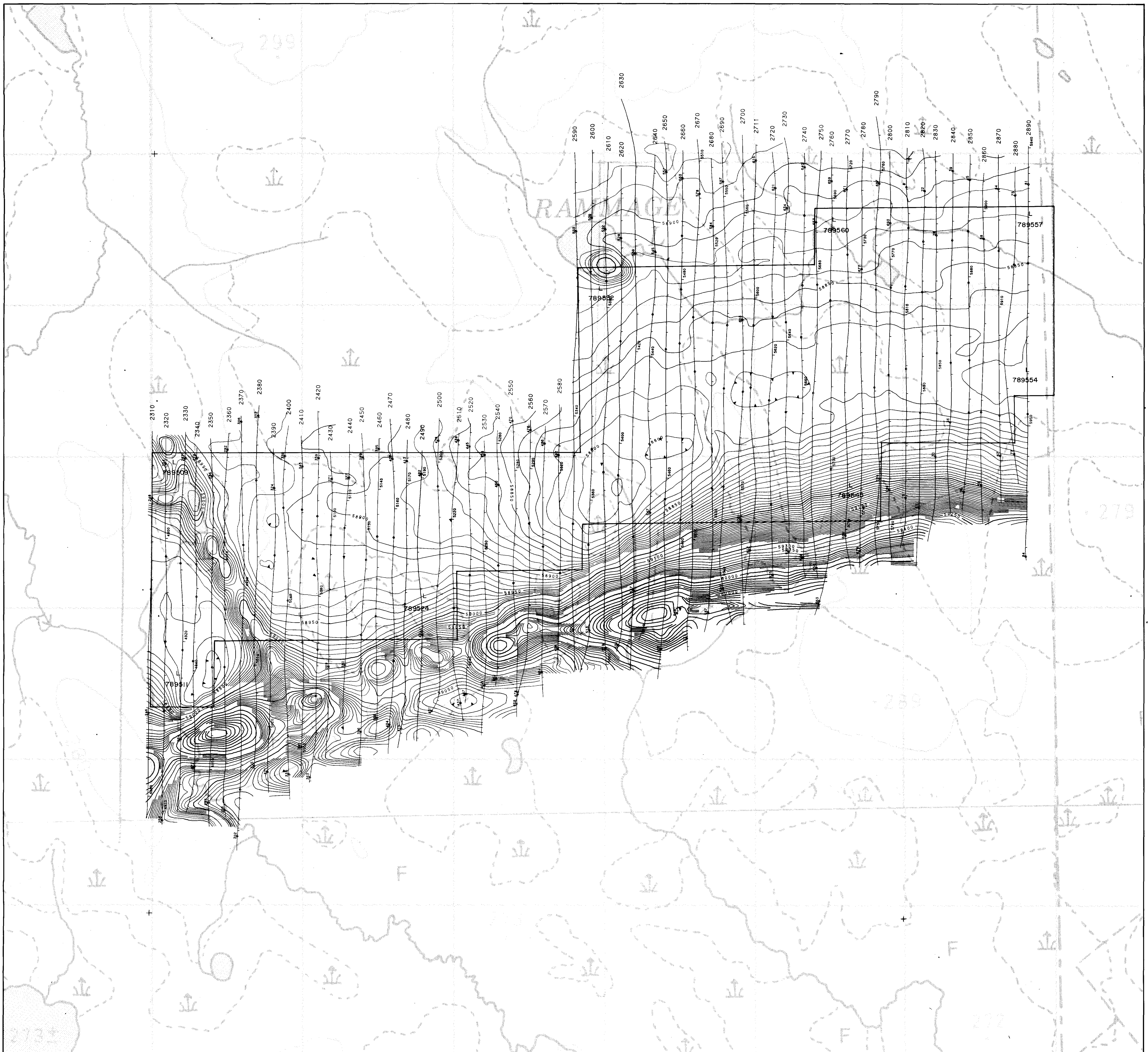
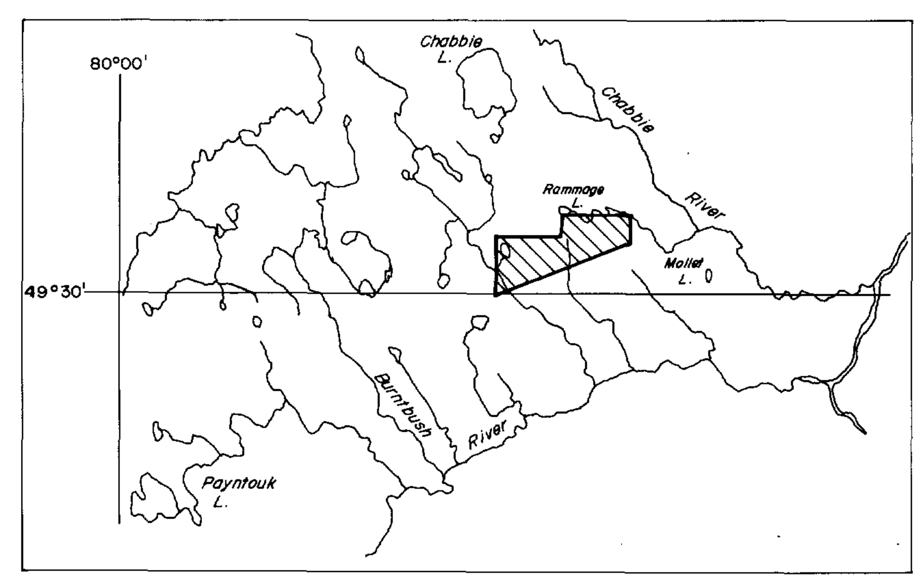


LEGEND

250 gammas	
50 gammas	
10 gammas	

Average bird height .... 30 m

Line spacing .... 100 m



LOYDEX RESOURCES INCORPORATED

TOTAL FIELD MAGNETIC MAP

27783

NOSEWORTHY TOWNSHIP

ONTARIO

SCALE 1/10,000

0 330 660 1320 1/2 mile

0 100 200 500 1 Kilometre

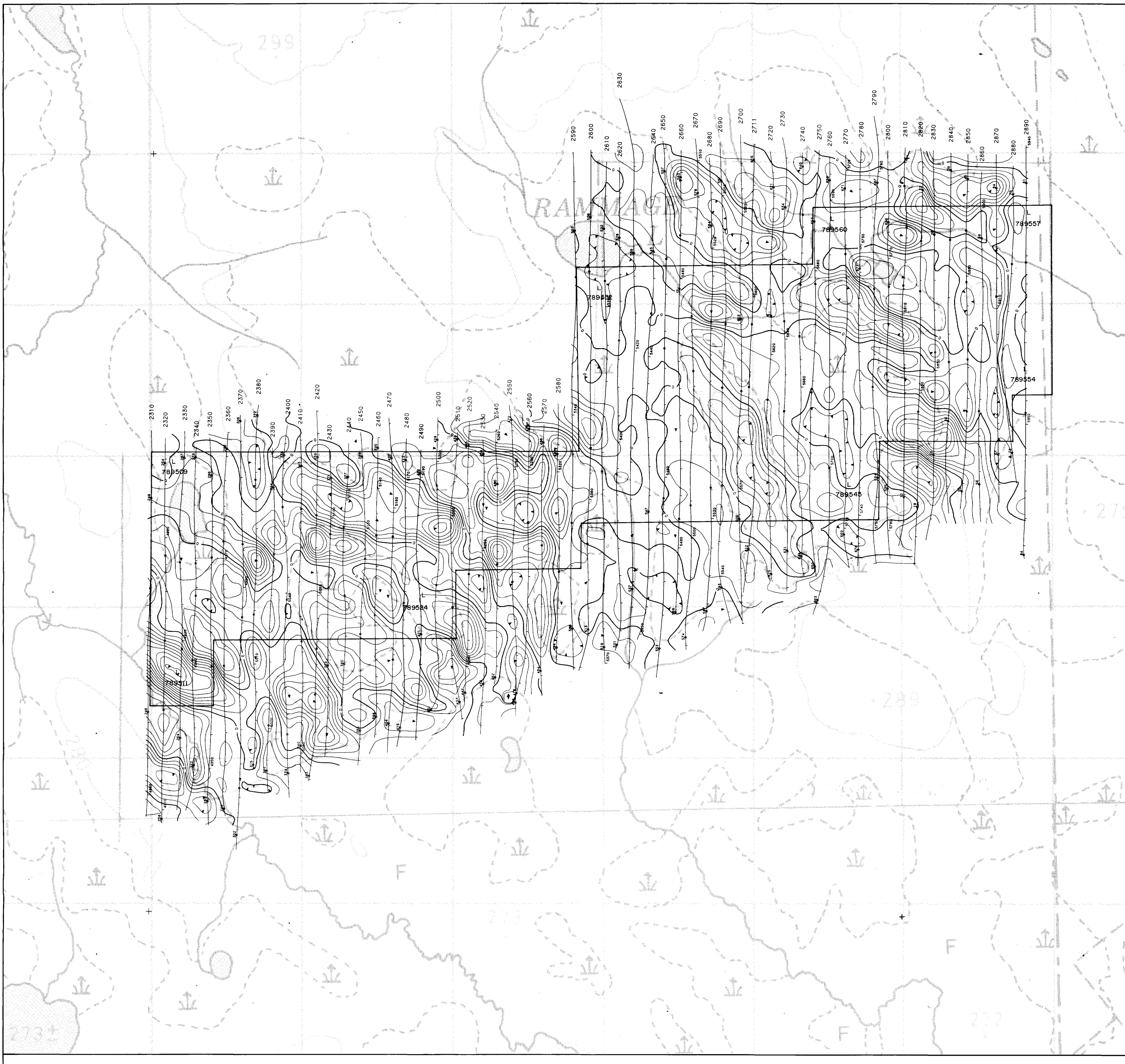
AERODAT LIMITED

DATE:	November 1984
N.T.S. No:	32E
MAP No:	1

J8447

210

32E12SE0006 2.7783 NOSEWORTHY



LEGEND

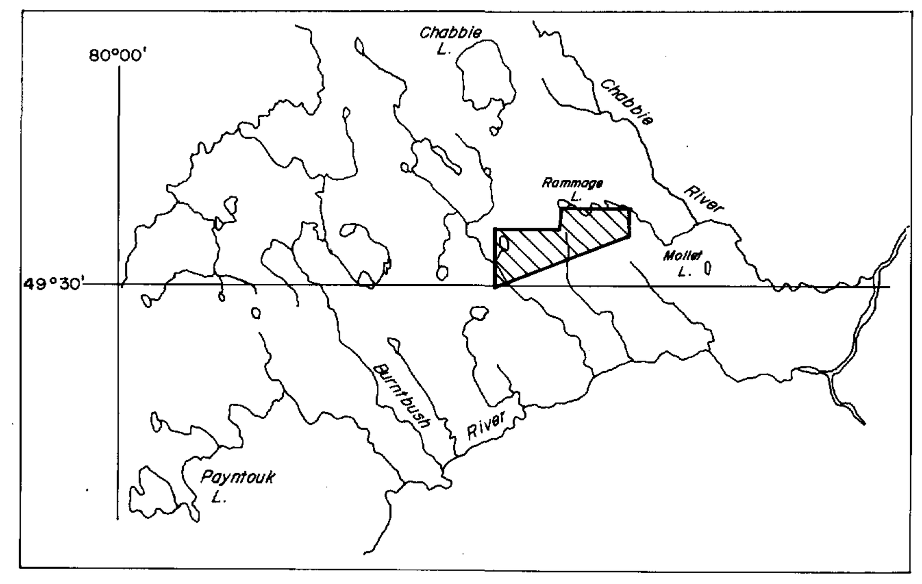
50% ....

10% ....

1% ....

Average bird height .... 30 m

Line spacing .... 100 m



LOYDEX RESOURCES INCORPORATED

VLF-EM TOTAL FIELD CONTOURS

NAA (MAINE) 24.0 kHz.

27783

NOSEWORTHY TOWNSHIP

ONTARIO

SCALE 1/10,000

0 330 660 1320 1/2 mile

0 100 200 500 1 Kilometre

AEROBAT LIMITED

DATE:	November 1984
N.T.S. No:	32E
MAP No:	2

J8447

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